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#IZAR50yearsinternational



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CEO

IZAR Cutting Tools SAL

izar@izartool.com

Amorebieta 02.01.2022

Estimados clientes, colaboradores y amigos,

Cuando allá por 1998 poníamos en el mercado el primer catálogo industrial de la nueva época de IZAR, esta era nuestra única herramienta de promoción, formación y venta.

Hoy, nuestra oferta es mucho más amplia y está muy orientada a atender específicamente las necesidades de cada cliente. Contamos para ello, además de con este formato, con un catálogo de mecanizado industrial, un catálogo en pulgadas y, finalmente, nuestro exitoso catálogo profesional.

Sin embargo, este catálogo industrial que tienen en sus manos continúa siendo nuestra principal herramienta para satisfacer las necesidades de los usuarios más exigentes en la fabricación avanzada, y está en el corazón mismo de nuestra empresa.

De nuevo, hemos hecho un importante esfuerzo de innovación: no solamente ampliamos la gama de productos y estuchados, sino que innovamos en el propio diseño del catálogo, que es mucho más técnico que el anterior.

Esta nueva edición cuenta con más de 580 páginas e incluye más de 14.500 artículos. Destaca de forma natural el capítulo de METAL DURO, que continuamos ampliando y mejorando como continuidad a la verdadera revolución que planteamos en la anterior edición de este catálogo. En concreto, debemos mencionar el desarrollo de nuevos productos, tanto en brocas como en fresas, adentrándonos en las micro herramientas, en las brocas de series extra largas, fresas para composites, etc., obteniendo así una guía de soluciones para el mecanizado industrial. Continuamos apostando por aportar soluciones avanzadas a los problemas de mecanizado, incluyendo recomendaciones específicas de condiciones de corte para los diferentes materiales, y consolidamos la utilización y estandarización del código ISO, como referencia universal de aplicación de materiales.

Finalmente, a pesar de nuestro compromiso con la estabilidad de precios, la evolución de las materias primas, de la energía y de los fletes se han combinado de tal forma, que han generado la mayor espiral inflacionista imaginable. Esto nos obliga a actualizar nuestros precios, que se incrementan en el entorno de un 6% como media aproximada. No es un incremento lineal, sino que hemos querido ser cuidadosos, y hemos evaluado el impacto de la subida de forma individual, artículo por artículo.

Todo ello viene además combinado con un reajuste de la política de descuentos, que tiene un impacto cero en nuestros distribuidores, pero que acerca los precios publicados a los precios reales de venta al usuario final, lo que es esencial en esta nueva era de las nuevas tecnologías y de la transparencia en la que vivimos,

Estamos muy agradecidos de contar con su confianza pues, sin ustedes, nada de lo hacemos tendría sentido.

Dear customers, business partners and friends,

Back in 1998, when we launched the first industrial catalogue of the new IZAR era, this was our only tool for promotion, training and sales.

Today, our offer is much broader and is very much oriented towards meeting the specific needs of each customer. In addition to this format, we also have an industrial machining catalogue, an inch catalogue and, finally, our successful professional catalogue.

However, the industrial catalogue you hold in your hands continues to be our main tool for meeting the needs of the most demanding users in advanced manufacturing, and it's at the very heart of our company.

Once again, we have made a major effort to innovate: not only have we expanded the range of products and packaging, but we have also innovated in the design of the catalogue itself, which is much more technical than the previous one.

This new edition has more than 580 pages and includes more than 14,500 articles. The chapter on SOLID CARBIDE naturally stands out, and we are continuing to expand and improve on it as a continuation of the true revolution we proposed in the previous edition of this catalogue. Specifically, we must mention the development of new products, both in drill bits and end mills, going into micro tools, extra-long series drill bits, end mills for composites, etc., obtaining a guide to industrial machining solutions.

We continue our commitment to provide advanced solutions to machining problems, including specific recommendations on cutting conditions for the different materials, and we consolidate the use and standardisation of the ISO code as a universal reference for the application of materials.

Finally, despite our commitment to price stability, the evolution of raw materials, energy and freight rates have combined in such a way as to generate the largest inflationary spiral imaginable. This forces us to update our prices, which increase by approximately 6% on average. It is not a linear increase; instead, we wanted to be careful and we have assessed the impact of the increase on an item-by-item basis.

This is combined with a readjustment of the discount policy, which has zero impact on our distributors, but brings the published prices closer to the real sales prices to the end user. This is essential in this new era of new technologies and transparency in which we live.

We are very grateful for your trust, as, without you, none of what we do would make sense.

Chers clients, collaborateurs et amis,

Lorsque nous avons lancé le premier catalogue industriel de la nouvelle ère d'IZAR en 1998, c'était notre seul outil de promotion, de formation et de vente.

Aujourd'hui, notre offre est beaucoup plus large et très axée sur les besoins spécifiques de chaque client. En plus de ce format, nous disposons également d'un catalogue d'usinage industriel, d'un catalogue pouces et, enfin, de notre catalogue professionnel à succès.

Cependant, ce catalogue industriel que vous tenez entre vos mains reste notre principal outil pour répondre aux besoins des utilisateurs les plus exigeants en matière de fabrication avancée, et il est au cœur même de notre entreprise.

Une fois de plus, nous avons fait un gros effort d'innovation : non seulement nous avons élargi la gamme de produits et d'emballages, mais nous avons également innové dans la conception du catalogue lui-même, qui est beaucoup plus technique que le précédent.

Cette nouvelle édition compte plus de 580 pages et comprend plus de 14 500 articles. Le chapitre sur le CARBURE que nous continuons à étoffer et à améliorer est particulièrement mis en avant, dans le prolongement de la véritable révolution que nous avons proposée dans l'édition précédente de ce catalogue. En particulier, il faut mentionner la conception de nouveaux produits, tant dans les forets que dans les fraises, en passant par les micro-outils, les forets de série extra-longue, les fraises pour composites, etc., obtenant ainsi un guide de solutions pour l'usinage industriel.

Nous continuons à nous engager à fournir des solutions avancées aux problèmes d'usinage, notamment des recommandations spécifiques concernant les conditions de coupe pour différents matériaux, et nous consolidons l'utilisation et la normalisation du code ISO en tant que référence universelle pour l'application des matériaux.

Enfin, malgré notre engagement en faveur de la stabilité des prix, l'évolution des matières premières, de l'énergie et des frets se sont combinés de manière à générer la plus grande spirale inflationniste imaginable. Cela nous oblige à actualiser nos prix, qui augmentent d'environ 6% en moyenne. Il ne s'agit pas d'une augmentation linéaire, mais nous avons voulu être prudents et nous avons évalué l'impact de l'augmentation article par article.

Ceci est combiné à un réajustement de la politique de réductions, qui a un impact nul sur nos distributeurs, mais rapproche les prix publiés des prix de vente réels à l'utilisateur final, ce qui est essentiel dans cette nouvelle ère de nouvelles technologies et de transparence dans laquelle nous vivons.

Nous vous remercions vivement de votre confiance, car sans vous, rien de ce que nous faisons n'aurait de sens.

UNA EMPRESA CON VALORES

A Company With Values

Une entreprise avec des valeurs

Valores IZAR

- La honestidad
- El enfoque al cliente
- La adaptación al cambio
- El compromiso con la calidad y con el trabajo bien hecho
- El trabajo en equipo
- El interés por la tecnología y por la innovación

IZAR Values

- Honesty
- Customer focus
- Adaptation to change
- Commitment to quality and to the job well done
- Team-work
- Interest for technology and innovation

Valeurs IZAR

- L'honnêteté
- L'orientation client
- L'adaptation au changement
- L'engagement pour la qualité et pour le travail bien fait
- Le travail en équipe
- L'intérêt pour la technologie et l'innovation

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SME of the year 2021 in Bizkaia award

Prix PME de l'année 2021 en Biscaye



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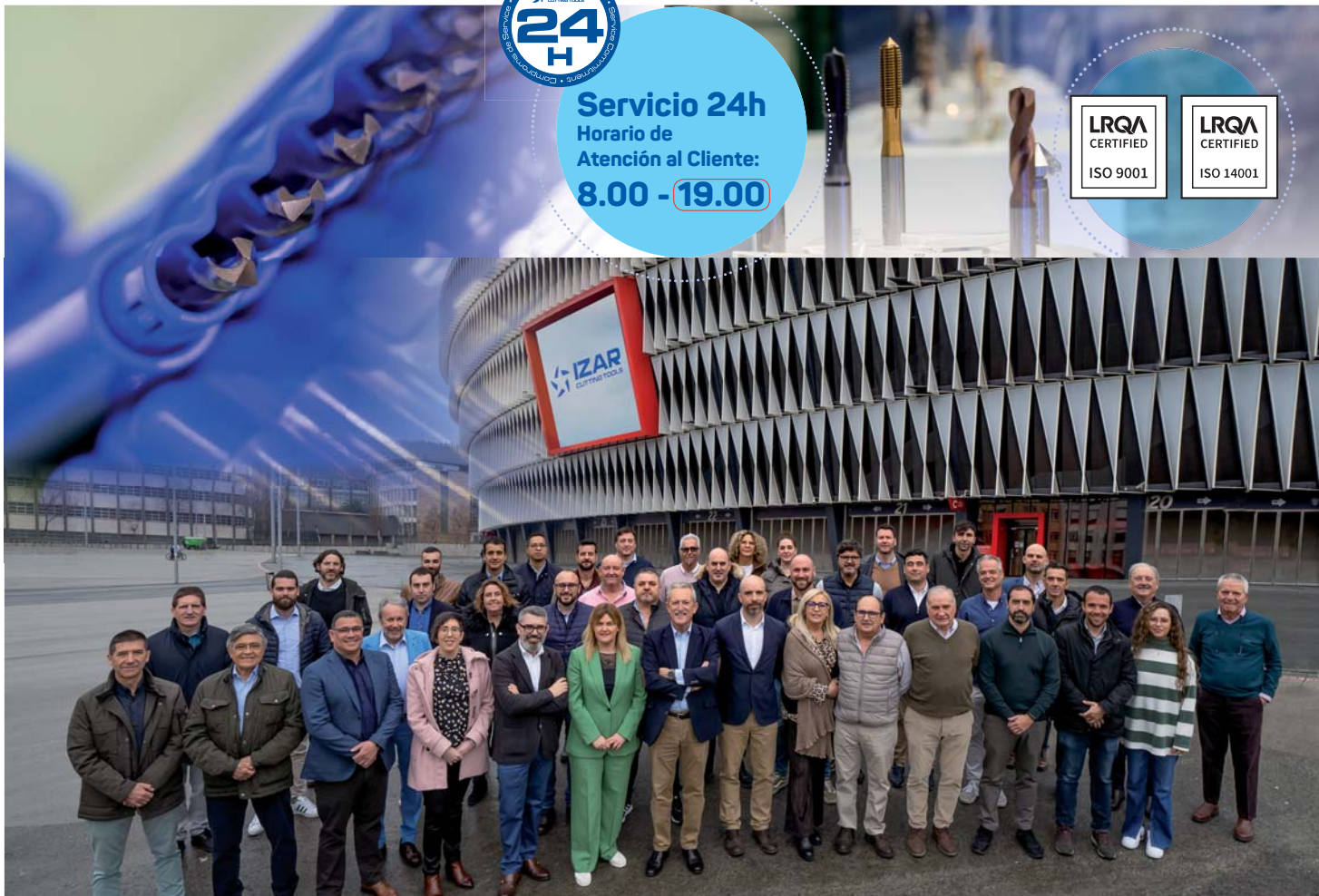
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New!

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| GRUPO GROUP GROUPE | SUBGRUPO SUBGROUP S. GROUPE | MATERIALES MATERIALS MATÉRIAUX | DUREZA Hardness Dureté (HRC) | DUREZA Hardness Dureté (HB) | TRACCIÓN Tensile Traction (N/mm ²) |
|--------------------------|-----------------------------------|---|---------------------------------------|--------------------------------------|---|
| P | P.1 | Aceros Construcción - Aceros Cementación Structural Steels - Case Hardening Steels Aciers de construction - Aciers supérieurs | <24,5 | <250 | <850 |
| | | Aceros al Carbono No Aleados - Aceros Bonificados Unalloyed Carbon Steels - Heat-Treatable Steels Aciers au carbone sans alliage - Aciers supérieurs | | | |
| | P.2 | Aceros Aleados Alloyed Steels Aciers alliés | <31,6 | <300 | <1000 |
| | P.3 | Aceros Aleados Tratados - Aceros Bonificados Heat-Treatable Alloyed Steels Aciers alliés supérieurs | 31,6-42,8 | 300-400 | 1000-1300 |
| | P.4 | Materiales resistentes al desgaste Wear-Resistant Materials Matériaux résistant a l'usure | 42,8-50,8 | 400-500 | 1300-1800 |
| | P.5 | INOX Ferríticos-Martensíticos Ferritic-Martensitic Stainless INOX ferritiques-martensitiques | <34 | <320 | <1100 |
| M | | INOX Austeníticos Austenitic Stainless INOX austénitiques | <24,5 | <250 | <850 |
| K | K.1 | Fundición Gris Grey Cast Iron Fonte grise | | <200 | <700 |
| | K.2 | Fundición Nodular Nodular Cast Iron Fonte nodulaire | <31,6 | >200<300 | >700<1000 |
| S | | Aleaciones Termorresistentes (Titanio, Inconel...) Heat-Resistant Alloys (Titanium, Inconel...) Alliages thermorésistants (Titane, Inconel...) | | | |
| N | N.1 | Cobre - Bronce - Latón Viruta Corta Copper - Bronze - Brass (Short Chip) Cuivre - Bronze - Laiton (Copeaux courts) | | <200 | <700 |
| | N.2 | Cobre - Bronce - Latón Viruta Larga Copper - Bronze - Brass (Long Chip) Cuivre - Bronze - Laiton (Copeaux longs) | | <200 | <700 |
| | N.3 | Al - Mg No Aleado Unalloyed Al - Mg Al - Mg Sans alliage | | <100 | <350 |
| | N.4 | Aleaciones Al Si < 10% Al Alloys Si < 10% Alliages Al Si < 10% | | <180 | <600 |
| | N.5 | Aleaciones Al Si > 10% Al Alloys Si > 10% Alliages Al Si > 10% | | <180 | <600 |
| | N.6 | Termoplásticos Thermoplastics Thermoplastiques | | | |
| | N.7 | Duroplásticos Hard Plastics Plastiques durs | | | |
| F | | Composites de Fibras (Fibra de Carbono, Fibra de Vidrio...) Fiber Composites (CFRP, GFRP, Honeycomb...) Composites en fibre (CFRP, GFRP, Structure en nid d'abeilles...) | | | |
| H | | Aceros Templados, Aceros Endurecidos Heat-Treated Alloys Aciers trempés, Aciers alliés supérieurs | 45<70 | | |

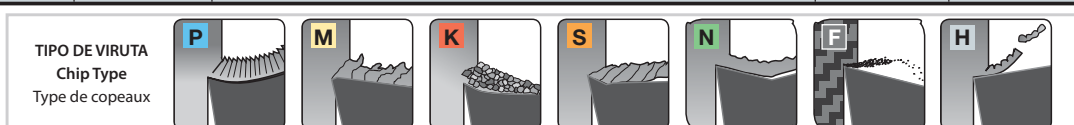


TABLA MATERIALES

Material Table - Tableau de matériaux

| | España Spain - Espagne | Alemania Germany - Allemagne | Francia France | Reino Unido UK - Royaume-Uni | Suecia Sweden - Suède | Italia Italy - Italie | EE.UU. USA - États-Unis |
|---|--|---------------------------------|--------------------|---------------------------------|--------------------------|--------------------------|----------------------------|
| | UNE | W.-nr. | DIN | AFNOR | B.S. | UNI | AISI |
| GRUPO GROUP GROUPE P ACEROS - STEELS - ACIERS | | | | | | | |
| P.1 | ACEROS DE CONSTRUCCIÓN / STRUCTURAL STEELS / ACIERS DE CONSTRUCTION (<850 N/mm² / <250 HB) | | | | | | |
| | AE235B,FE360 B | 1,0036 | FE360 (ST 37-2) | E 42-2 | FE 360 B | 1311 | FE 360 B FU A 570 GR.33,36 |
| | AE235B,FE360B | 1,0037 | FE 360 B(RST 37-2) | E 24-2 | FE 360 B | | FE 360 B,C,D A 283 CR.C |
| | AE275B,FE430BFN | 1,0044 | FE 430 B (ST 44-2) | E 28-2 | FE 430 B FN | | FE 430 B A 570 GR.40 |
| | A490-2,FE490-2FN | 1,0050 | FE 490-2 (ST 50-2) | A 50-2 | FE 490-2 FN | | FE 490 A 570 GR.50 |
| | A590-2,FE590-2FN | 1,0060 | FE 590-2 (ST 60-2) | A 60-2 | FE 590-2 FN | | FE 60-2 A 572 GR.65 |
| | A690-2,FE690-2FN | 1,0070 | FE 690-2 (ST 70-2) | A 70-2 | FE 690-2 FN | | FE 70-2,FE 690 |
| | AE 235 D,FE360D1FF | 1,0116 | FE 360D1 (ST 37-3) | A 24-3 | FE 360 D1 FF | 1312 | FE 360 C,D A 284 GR.D |
| | ACEROS DE CEMENTACIÓN / CASE HARDENING STEELS / ACIERS DE CIMENTERIE | | | | | | |
| | F.111 | 1,0401 | C 15 | AF 37 C 12 | 080 A 15 | 1350 | C 15 M 1015 |
| F.1510-C10K | 1,1121 | CK 10 | XC 10 | 040 A 10 | 1265 | C 10 1010 | |
| F.1110-C15K | 1,1141 | C15 | C18RR | 080M15 | 1390 | C15 GR.1016 | |
| | 1,7015 | 15 CR 3 | 12C8 | 523M15 | | 5015 | |
| F.1516-16MNCRS | 1,7131 | 16MNCRS | 16MCS | 527M17 | | 16MNCRS NO.5115 | |
| F.150 D | 1,7147 | 20MNCRS | 20MC5 | | | 20MNCRS 5120 | |
| ACEROS DE FÁCIL MECANIZACIÓN / FREE-CUTTING STEELS / ACIERS D'USINAGE MECANIQUE FACILE | | | | | | | |
| F.2111-11SMN28 | 1,0712 | 9SMN28 | S 250 | 230M07 | | CF 9 SMN 28 1213 | |
| F.2112-11SMN PB28 | 1,0718 | 9 SMN PB 28 | S 250 PB | | 1914 | CF 9SMN PB28 12 L 13 | |
| F.2121-10S20 | 1,0721 | 10S20 | 10F1 | 210M15 | | CF10S20 GR.1108 | |
| F.210-G | 1,0726 | 35S20 | 35 MF 6 | 212M36 | 1957 | CF 35 SMN 10 1140 | |
| | 1,0727 | 45 S 20 | 45 MF 4 | | 1973 | 1146 | |
| F.2113-12SMN35 | 1,0736 | 9 SMN 36 | S 300 | | | CF 9 SMN 36 1215 | |
| F.210-F | 1,0723 | 15 S 20 | | 210 A 15 | 1922 | | |
| ACEROS DE CONSTRUCCIÓN FUNDIDOS / CAST STEELS / ACIERS DE CONSTRUCTION FONTE | | | | | | | |
| | 1,0416 | GS-83,3 | A 42C-M | AM 1 | | FEG38VR GR. N1 | |
| | 1,0551 | GS-52 | E26-52-M | 161GR400A | | GC20 GR.N 2 | |
| | 1,0553 | GS-60 | 30M6M | A 3 | | GR.80-40 | |
| | 1,0554 | GS-62 | E26-52-M | AW3 | | GR.105-85 | |
| ACEROS AL CARBONO NO ALEADOS / UNALLOYED CARBON STEELS / ACIERS AU CARBONE SANS ALLIAGE | | | | | | | |
| ACEROS BONIFICADOS / HEAT-TREATABLE STEELS / ACIERS SUPÉRIEURS | | | | | | | |
| F. 112 | 1,0402 | C 22 | 1 C 22 | 070 M 20 | 1450 | C 25 M 1023 | |
| F. 113 | 1,5010 | C 35 | C 35 | 40 HS | | C 35 GR.1035 | |
| F.114 | 1,0503 | C 45 | C 45 | 50 HS | 1650 | C 45 GR.1043 | |
| F. 115 | 1,0535 | C 55 | C 54 | 50 | 1655 | C 55 GR.1055 | |
| | 1,0601 | CK 60 | C 60 | 60 HS,CS | | C 60 1060 | |
| F.1120-C25K | 1,1151 | CK 22 | 2 C 22 | 055 M 15 | | C 20, C 25 1020 | |
| | 1,1157 | 40 MN 4 | 35 M 5 | 150 M 36 | | 1035 | |
| F.1130-C35K | 1,1181 | CK 35 | 2 C 35 | 080 A 35 | 1572 | C 35 1038 | |
| F.1140-C45K | 1,1191 | CK 45 | 2 C 45 | 080 M 46 | 1660 | C45 1045 | |
| F.1150-C55K | 1,1203 | CK 55 | 2 C 55 | 060 A 57 | | C 55 1055 | |
| | 1,1221 | CK 60 | 2 C 60 | 060 A 62 | 1770 | C 60 1060 | |
| ACEROS ALEADOS - ALLOYED STEELS - ACIERS ALLIÉS (<1000 N/mm² / <300 HB) | | | | | | | |
| P.2 | ACEROS ALEADOS PARA HERRAMIENTAS / ALLOYED TOOL STEELS / ACIERS ALLIÉS POUR OUTILS | | | | | | |
| | F.5230-100 CR6 | 1,2067 | 100 CR 6 | Y 100 C 6 | BL 3 | | L 1 , L 3 |
| | F.5212-X210CR12 | 1,2080 | X210 CR 12 | Z 200 C 12 | B D 3 | 2710 | X 205CR12 KU D 3 |
| | F.5227-X100CRMO V5 | 1,2363 | X 100 CRMO V5 | Z 100 | CDV 5 | 2260 | X100CRMOV51KU A 2 |
| | | 1,2379 | X 155CRVMO 12 | Z 160CDV12 | BD2 | 2310 | X155CRVMO121KU D 2 |
| | F.5220-95MNCRW5 | 1,2510 | 100 MNCRW 4 | 90 MWCV 5 | BO 1 | 2140 | 95MNVCR5KU O 1 |
| | | 1,2550 | 60 WCRV 7 | 55 W C20 | BS 1 | | 55 WCR V8 KU S 1 |
| | | 1,2842 | 90MN CRV8 | 90 MNV8 | B 02 | | 90MNVCR8KU O 2 |
| | ACEROS RÁPIDOS / HIGH SPEED STEELS / ACIERS RAPIDES | | | | | | |
| | F.5563.12-1-5-5 | 1,3202 | HS 12-1-4-5 | HS 12-1-5-5 | BT 15 | | HS12-1-5-5 T 15 |
| F.5553.10-4-3-10 | 1,3207 | HS 10-4-3-10 | Z130WKC DV | BT 42 | | HS 10-4-3-10 T 42 | |
| F.5613-6-5-2-5 | 1,3243 | HS 6-5-2-5 | Z85WDCV06 | BM 35 | 2723 | HS 6-5-2-5 M 35 | |
| F.5617-2-10-1-8 | 1,3247 | S 2 10 1 8 | Z110DKCWV | BM 42 | | HS 5-5-2 M 42 | |
| F.5603-6-5-2 | 1,3343 | HS 6-5-2 | Z85WDCV06 | BM 2 | 2715 | HS 6-5-2 M 2 | |
| FUNDICIÓN ALEADA / ALLOYED CAST IRON / FONTE ALLIÉE | | | | | | | |
| F.8372-AM26CRMO4 | 1,7218 | GS-25 CRMO 4 | 25 CD 4 | 70 8A 25 | 2225 | 25 CRM04 4130 | |
| F.8331-AM34CRMO 4 | 1,7220 | 34 CRM 04 | 25 CD 4 | 708 A25 | 2234 | 30 CRM04 4130 | |
| ACEROS BONIFICADOS / ALLOYED HEAT-TREATABLE STEELS / ACIERS SUPÉRIEURS | | | | | | | |
| F. 114 | 1,0503 | C 45 | C 45 | 50 HS | 1650 | C 45 GR.1043 | |
| F.8331-AM34CRMO 4 | 1,7220 | 34 CRMO 4 | 25 CD4 | 708 A25 | | 30 CRMO 4 4130 | |
| F.8332-AM42CRMO 4 | 1,7225 | 41 CRMO 4 | 42 CD4 | 708M 40 | 2244 | 38CRMO 4KB GR.4140 | |
| | 1,7228 | 50 CRMO 4 | 50 CR MO 4 | 708 A 47 | | 4150 | |
| ACEROS NITRURACIÓN / NITRIDING STEELS / ACIERS AVEC NITRATE | | | | | | | |
| | 1,7779 | 20 CRMOV 1 3 5 | | | | | |
| | 1,8504 | 34 CR AL 6 | | | | | |
| F.1741-34CRAIMO 5 | 1,8507 | 34 CRAIMO 5 | 30 CAD 6,12 | | | 34 CR AI MO 7 A 355 Cl.D | |
| F.1740-41 CRAIMO 7 | 1,8509 | 41 CRAIMO 7 | 40 CAD 6,12 | 905 M 39 | | 41 CR AI MO 7 A 355 Cl.A | |
| F.1712-31 CRMO 12 | 1,8515 | 31 CRMO 12 | 30 CD 12 | 722 M 24 | 2240 | 30 CR MO 12 | |

TABLA MATERIALES

Material Table - Tableau de matériaux

| | España Spain - Espagne | Alemania Germany - Allemagne | Francia France | Reino Unido UK - Royaume-Uni | Suecia Sweden - Suède | Italia Italy - Italie | EE.UU. USA - États-Unis | |
|---|--|---------------------------------|-------------------|---------------------------------|--------------------------|--------------------------|----------------------------|--------------|
| | UNE | W.-nr. | DIN | AFNOR | B.S. | SS | UNI | AISI |
| ACEROS ALEADOS BONIFICADOS - HEAT-TREATABLE ALLOYED STEEL - ACIERS ALLIÉS SUPÉRIEURS (1000-1300 N/mm² / 300-400 HB) | | | | | | | | |
| P.3 | ACEROS ALEADOS HERRAMIENTAS / ALLOYED TOOL STEELS / ACIERS ALLIÉS OUTILS | | | | | | | |
| | | 1,2311 | 40 CRMNMO 7 | | | | | |
| | | 1,2312 | 40 CRMNMO 8 6 | | | | | |
| | F.5213-X210CRW 12 | 1,2436 | X 210 CRW 12 | Z 200 CW 12 | | 2312 | X 215 CRW 12 1 KU | |
| | | 1,2713 | 55 N1CRMOV 6 | 55 NCDV | BH 224/5 | | | L 6 |
| | | 1,2714 | 56 N1CRMOV 7 | 55 NCDV 7 | BH 224/5 | | 56 N1CRMOV7KU | L 6 |
| | ACEROS ALEADOS HTAS. TRABAJO CALIENTE / TOOL STEELS WARM WORKING / ACIERS ALLIÉS OUTILS TRAVAIL EN CHAUD | | | | | | | |
| | F.5317-X37CRMOV 5 | 1,2343 | X38CRMOV5.1 | Z 38CDV 5 | BH 11 | | X37CRMOV51KU | H 11 |
| | F.5318-X40CRMOV 5 | 1,2344 | X 40CRMOV 51 | X 40CRMOV 5 | BH 13 | 2242 | X 40CRMOV511KU | H 13 |
| | F.5318-X40CRMOV 5 | | | | | | | |
| | F.5313-30CRMOV 12 | 1,2365 | X 32CRMOV 3 3 | 32CDV12-28 | BH 10 | | 30CRMOV1227KU | H 10 |
| | F.5323-X30WCRV 9 3 | 1,2581 | X30WCRV 9,3 | Z30WCV 9 | BH 21 | | X 30WCRV 93KU | H 21 |
| | | 1,2550 | 60 WCRV 7 | 55 WC 20 | BS 1 | | 55 WCRV 8 KU | S 1 |
| | | 1,2567 | X 30 WCRV 5 3 | Z 32 WCV 5 | | | X 30 WCRV 53 KU | |
| | ACEROS BONIFICADOS / HEAT-TREATABLE STEELS / ACIERS SUPÉRIEURS | | | | | | | |
| | 1,5864 | 35 N1CR 18 | | | | | | |
| | 1,6580 | 30 N1CRMO 8 | | | | | | |
| F-124 A | 1,7361 | 32 CRMO 12 | 30 CD 12 | 722 M 24 | | 32 CRMO 12 | | |
| | 1,7707 | 30 CRMOV 9 | | | | 31 CRMOV 10 | | |
| ACEROS NITRURACIÓN / NITRIDING STEELS / ACIERS AVEC NITRATE | | | | | | | | |
| F.1712-31 CRMO 12 | 1,8515 | 31 CRMO 12 | 30 CD 12 | 722 M 24 | 2240 | 30 CRMO 12 | | |
| | 1,8523 | 39 CRMOV 13 9 | | 897 M 39 | | | | |
| P.4 | Materiales resistentes al desgaste - Wear-Resistant Materials - Matériaux résistant à l'usure | | | | | | | |
| | Por ejemplo / For instance / Par exemple HARDOX® 450 wear plate - XAR 450 - RAEX® - FORA - CREUSABRO | | | | | | | |
| P.5 | ACEROS INOX MARTENSÍTICOS / MARTENSITIC STAINLESS STEEL / ACIERS INOX MARTENSITIQUES (<1100 N/mm² / <320 HB) | | | | | | | |
| | F.3402-X20CR13 | 1,4021 | X 20 CR 13 | X 20 CR 13 | 420 S 37 | 2314 | X 20 CR 13 | 420 |
| | F.3427-X19CRNI 17-2 | 1,4057 | X 20 CRNI 17 2 | Z 15 CN16,02 | 431 S29 | 2321 | X 16 CRNI16 | 431 |
| | F.3220-X45CRSI09-03 | 1,4718 | X 45 CRSI 9,3 | Z 45 CS9 | 401 S45 | | X 45CR SI 8 | HNV 3 |
| | ACEROS INOX FERRÍTICOS / FERRITIC STAINLESS STEELS / ACIERS INOX FERRITIQUES (<1100 N/mm² / <320 HB) | | | | | | | |
| | F.3111-X6CRAI 13 | 1,4002 | X 6 CRAI 13 | Z 8CA 12 | 405 S17 | | X 6 CRAI 13 | 405 |
| | F.3401-X 10 CR 13 | 1,4006 | X 10 CR13 | Z 12 C 13 | 410 S2 | 2302 | X 12 CR 13 | 410 |
| | F.3113-X6 CR17 | 1,4016 | X 6 CR 17 | Z 8 C 17 | 430 S18 | 2320 | X 8 CR 17 | 430 |
| | F.3115-X5CRTI 17 | 1,4510 | X 6 CRTI 17 | Z 8C T 17 | | | X 6 CRTI 17 | 430 TI |
| | | 1,4512 | X 6 CRTI 12 | Z 6CT 12 | 409 S19 | | X 6 CRTI 12 | 409 |
| GRUPO GROUP GROUPE M ACEROS INOXIDABLES - STAINLESS STEELS - ACIERS INOX | | | | | | | | |
| ACEROS INOX AUSTENÍTICOS / AUSTENITIC STAINLESS STEELS / ACIERS INOX AUSTÉNITIQUES (< 850 N/mm² / <250 HB) | | | | | | | | |
| F.3507-X 10CRNI 18-8 | 1,4300 | X 12 CRNI 18 8 | | | | | | 302 |
| F.3504-X5CRNI 18-10 | 1,4301 | X5 CRNI 18-10 | X5 CRNI 18-10 | 304 S31 | 2333 | X5 CRNI 18-10 | | 304 |
| F.3541-X2CRNIN 18-10 | 1,4311 | X 2 CRNIN 18-10 | Z 3CN 18.07AZ | 304 S 61 | 2371 | X 2 CRNIN 18 11 | | 304 LN |
| F.3542-X2CRNIMON17-12-2 | 1,4406 | X 2 CRNIMON 17-12-2 | Z 3 CND17.11.02 | 316 S 61 | 2375 | X 2 CRNIMON 17 12 | | 316 LN |
| F.3533-X2CRNIMO17-13-2 | 1,4435 | X2CRNIMO 18-14-3 | Z3CND 17-12-03 | 316 S14 | 2353 | X2CRNIMO 1713 | | 316 L |
| F.3523-X6CRNITI 18-10 | 1,4541 | X 6 CRNITI 18-10 | Z 6CNT 18-10 | 321 S31 | 2337 | X 6 CRNITI 18 11 | | 321 |
| F.3535-X6CRNITI 17-12-2 | 1,4571 | X 6 CRNIMOTI 17 12 2 | Z 6CNDT 17,12 | 320 S18 | 2350 | X 6 CRNIMOTI 17 12 | | 316 TI |
| F.3535-X6CRNIMOTI17-12 | 1,4573 | X 10 CRNIMOTI 18 12 | | 320 S33 | | X 6 CRNIMOTI 17 13 | | 316 TI |
| F.3312-X15CRNISI20-12 | 1,4828 | X 15CRNISI 20 12 | Z 17CNS 20 12 | 309 S24 | | X 16CRNI 23 14 | | 309 |
| GRUPO GROUP GROUPE K FUNDICIÓN - CAST IRON - FONTE | | | | | | | | |
| FUNDICIÓN GRIS / GREY CAST IRON / FONTE GRISE (<700N/mm²/<200 HB) | | | | | | | | |
| K.1 | | 0.7033 | GGG 35-3 | FGS 370-71 | GR.350/22 | 0717-15 | GS 370-17 | |
| | | 0.7040 | GGG 40 | FGS 400-12 | GR.420-12 | 0717-02 | GS 400-12 | GR.60-40-18 |
| | | 0.7050 | GGG 50 | FGS 500-7 | 500/7 | 0727 | GS 500-7 | 65-45-12 |
| | | 0.7060 | GGG 60 | FGS 600-3 | GR.600/3 | 0732-03 | GS 600-3 | GR.80-55-06 |
| | | 0.8135 | GTS 35-10 | MN 35-10 | B 35-12 | 0815 | B 35-10 | GR.32510 |
| | | 0.8145 | GTS 45-06 | MN 450-6 | P 45-06 | 0852-00 | P 45-06 | GR.45006 |
| | | 0.8155 | GTS 55-04 | MN 550-4 | P 55-04 | 0854-00 | P 55-04 | 6004 |
| K.2 | FUNDICIÓN NODULAR / NODULAR CAST IRON / FONTE NODULAIRE (700-1000N/mm² / 200-300 HB) | | | | | | | |
| | | 0.7070 | GGG 70 | FGS 700-2 | GR.700/2 | 0737-01 | GS 700-2 | 100-70-03 |
| | | 0.8080 | GGG 80 | FGS 800-2 | GR.800/2 | | GS 800-2 | GR.120-90-02 |

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TABLA MATERIALES

Material Table - Tableau de matériaux

| | España Spain - Espagne | Alemania Germany - Allemagne | | Francia France | Reino Unido UK - Royaume-Uni | Suecia Sweden - Suède | Italia Italy - Italie | EE.UU. USA - États-Unis |
|--|---------------------------|---------------------------------|----------------------|-------------------|---------------------------------|--------------------------|--------------------------|----------------------------|
| | UNE | W.-nr. | DIN | AFNOR | B.S. | SS | UNI | AISI |
| GRUPO GROUP GROUPE S | | | | | | | | |
| ALEACIONES TERMORRESISTENTES - HEAT-RESISTANT ALLOYS - ALLIAGES THERMORÉSISTANTS | | | | | | | | |
| TITANIO PURO / UNALLOYED TITANIUM / TITANE PUR (<700 N/mm² / <200 HB) | | | | | | | | |
| | | 3,7024 | TI 99,5 GRADO 1 | T 35 | | | | |
| | | 3,7034 | TI 99,7 GRADO 2 | T 40 | | | | |
| | | 3,7055 | TI 99,4 GRADO 3 | T 50 | | | | |
| | | 3,7065 | TI 4 | T 60 | | | | |
| TITANIO ALEADO / ALLOYED TITANIUM / ALLIAGES TITANE (< 900 N/mm² / <270 HB) | | | | | | | | |
| | | 3,7114 | TIAL 5 SN 2 | | | | | |
| | | 3,7124 | TICU 2,5 | TU 2 | | | | |
| | | 3,7164 | TIAL 6 V 4 | T-AGV | 2 TA 10 | | | |
| ALEACIONES NICKEL / NICKEL ALLOYS / ALLIAGES NICKEL: Inconel, Nimonic, Hastelloy... (<1300 N/mm² / <380 HB) | | | | | | | | |
| GRUPO GROUP GROUPE N | | | | | | | | |
| COBRE - LATÓN - BRONCE - COPPER - BRASS - BRONZE - CUIVRE - LAITON - BRONZE (< 700 N/mm² / <200-300 HB) | | | | | | | | |
| BRONCES / BRONZE / BRONZES | | | | | | | | |
| | | 2,1020 | CU SN 6 | | | | | |
| | C 7150 | 2,1030 | CU SN 8 | | | | | |
| ALEACIONES COBRE VIRUTA CORTA / SHORT CHIPPING COPPER / ALLIAGE CUIVRE COPEAUX COURTS | | | | | | | | |
| N.1 | | 2,0360 | CU ZN 40 | CU ZN 40 | CZ 109 | | P-CU ZN 40 | C 28000 |
| | | 2,0402 | CU ZN 40 PB2 | CU ZN 39 PB2 | CZ 122 | | | C 38000 |
| LATONES / BRASS / LAITONS (< 700 N/mm² / < 200-300 HB) | | | | | | | | |
| | | 2,0250 | CU ZN 20 | CU ZN 20 | CZ 103 | | | C 24000 |
| | | 2,0265 | CU ZN 30 | CU ZN 30 | CZ 106 | | P-CU ZN 30 | C 26000 |
| | | 2,0321 | CU ZN 37 | CU ZN 37 | CZ 108 | | | C 27400 |
| ALEACIÓN Cu VIRUTA LARGA / LONG CHIPS ALLOYED Cu / ALLIAGE Cu COPEAUX LONGS (< 700 N/mm² / <200-300 HB) | | | | | | | | |
| N.2 | | 2,1245 | CUBE 1,7 | CU BE 1,7 | CB101 | | | C 17000 |
| | | 2,1247 | CUBE 2 | CU BE 1,9 | | | | C 17200 |
| GRUPO GROUP GROUPE N | | | | | | | | |
| ALUMINIO - MAGNESIO - ALUMINIUM - MAGNESIUM | | | | | | | | |
| Al - Mg SIN ALEAR / UNALLOYED ALUMINIUM - MAGNESIUM / ALUMINIUM - MAGNESIUM SANS ALLIAGE (<350 N/mm² / <100 HB) | | | | | | | | |
| N.3 | | 3,0250 | AI 99,5 H | | | | | |
| | | 3,0280 | AI 99,8 H | | | | | |
| ALEACIONES ALUMINIO / ALUMINIUM ALLOYS / ALLIAGES ALUMINIUM Si<10% (< 600 N/mm² / <180 HB) | | | | | | | | |
| N.4 | L-3811 | 3,0515 | AIMN 1 | 3103 | 3103 | | P-ALMN 1,2 CU | A 93003 |
| | L-3120-38-312 | 3,1325 | AICUMG 1 | 2017 A | | | P-AICU4MGMNSI | A 92017 |
| | L-3140-38-314 | 3,1355 | AICUMG 2 | 2024 | 2024 | | P-AICU4-4MGMN | 2024 |
| | L-3710-38.371 | 3,4365 | AIZNMGCU-1,5 | 7075 | 7075 | | P-AIZNMGCU-1,5 | A 9775 |
| FUNDICIÓN ALUMINIO / CAST ALUMINIUM / FONTE ALUMINIUM | | | | | | | | |
| | | 3,3292 | GD-AIMG 9 | A-G10SY 4 | LM 10 | | | A 05200 |
| ALEACIONES ALUMINIO / ALUMINIUM ALLOYS / ALLIAGES ALUMINIUM Si>10% (<600 N/mm² / <180 HB) | | | | | | | | |
| N.5 | L-2560-61 | 3,2381 | G-AISI 10 MG | A-S10G | | | G-AISI9MG | A-0359.0 |
| | L-2530 | 3,2583 | G-AISI 11 | A-S12U | LM 20 | | G-AISI13CUMN | A-04130 |
| GRUPO GROUP GROUPE N | | | | | | | | |
| MATERIALES SINTÉTICOS - SYNTHETIC MATERIALS - MATERIELS SYNTHETIQUES | | | | | | | | |
| TERMOPLÁSTICOS / THERMOPLASTICS / THERMOPLASTIQUES | | | | | | | | |
| N.6 | | | POLIPROPILENO | | PP | | | |
| | | | POLISTIROL | | PS | | | |
| | | | POLIVILNICLORITO | | | PVC | | |
| | | | POLICARBONATO | | MACRALON | PC | | |
| | ULTRAMID | | POLIAMIDA | | PA | | | |
| | | | POLIMETILMETACRILATO | | PLEXIGLAS | PMMA | | |
| DUROPLÁSTICOS / HARD PLASTICS / PLASTIQUES DURS | | | | | | | | |
| N.7 | | | BAQUELITA | | | | | |
| | | | PERTINAX | | | | | |
| | | | MOLTOPREN | | | | | |
| | | | RESOPAL | GRAFITO | | | | |
| GRUPO GROUP GROUPE F | | | | | | | | |
| COMPOSITES DE FIBRAS (FIBRA DE CARBONO, FIBRA DE VIDRIO, ESTRUCTURAS TIPO PANAL DE ABEJA...) FIBER COMPOSITES (CFRP, GFRP, HONEYCOMB...) COMPOSITES EN FIBRE (CFRP, GFRP, STRUCTURE EN NID D'ABEILLES...) | | | | | | | | |
| GRUPO GROUP GROUPE H | | | | | | | | |
| ACEROS TEMPLADOS, ACEROS ENDURECIDOS HEAT-TREATED ALLOYS - ACIERS TREMPÉS, ACIERS ALLIÉS SUPÉRIEURS | | | | | | | | |

BROCAS METAL DURO

Carbide Drill Bits

Forets carbure

● **Uso Recomendado / Recommended Use / Utilisation conseillée**

○ **Uso Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | |
|------------------------|--------------------------|-----------------------------|--------------------------------|--------------------------|--|-------------------------|--|---|---|--|---------------------------------------|----------|----------|---|--|--|-----------|
| <850 N/mm ² | < 1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant | MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm ² | 700-1000 N/mm ² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Allages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC |
| | | | | | FUNDICIÓN Cast Iron Fonte | | Cu - BRONCE LATÓN Copper Bronze Cuivre Bronze Laiton | | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | |
| | | | | | P | | M | K | S | N | | | | | | | F |
| P.1 | | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | | | | | | | | | | |

| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | | | | | | | |
|------|------|-----------|-----------|---------------|------------------------|-----|-----|-----|-----|-----|---|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | | | | | |
| 8400 | 38 | 6537 K | 3XD | Micro-grano | ALTIN | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8405 | 40 | 6537 L | 5XD | Micro-grano | ALTIN | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8410 | 42 | 6537 K | 3XD | Grano UF | ALTIN | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8415 | 44 | 6537 L | 5XD | Grano UF | ALTIN | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8411 | 46 | IZAR Std. | 8XD | Grano UF | X-AlCr | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8413 | 50 | IZAR Std. | 10XD | Grano UF | X-AlCr | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8414 | 51 | IZAR Std. | 15XD | Grano UF | X-AlCr | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8416 | 52 | IZAR Std. | 20XD | Grano UF | X-AlCr | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8401 | 53 | IZAR Std. | 3XD | Grano UF | TIALCN | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8403 | 54 | IZAR Std. | 3XD | Grano UF | SUA | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9016 | 56 | IZAR Std. | | Grano UF | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9010 | 58 | 338 | N | Micro-grano | | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9056 | 59 | 6539 | N | Micro-grano | | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9075 | 61 | IZAR Std. | ... | Grano UF | X-AlCr | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9076 | 62 | 6539 | N | Micro-grano | | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9301 | 63 | IZAR Std. | | Micro-grano | | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9303 | 64 | IZAR Std. | | Micro-grano | | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9310 | 65 | 333 | A | Micro-grano | | ● | ● | ● | ○ | ○ | ○ | ● | ● | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9100 | 66 | 338 | N | MD/HM Carbure | | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9036 | 67 | 340 | N | MD/HM Carbure | | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

TABLA USO TALADRADO PMX - HSSE - HSS

PMX - HSSE - HSS Drilling Use Table - Tableau usage Perçage PMX - HSSE - HSS

BROCAS PMX - HSSE - HSS PMX - HSSE - HSS Drill Bits Forets PMX - HSSE - HSS

- **Usado Recomendado** / Recommended Use / Utilisation conseillée
- **Usado Alternativo** / Alternative Use / Option d'emploi



| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | | S | N | | | | | | | F | H |
|------|------|-----------|-----------|------------|------------------------|--|-----|-----|-----|-----|---|-----|------------------------------|-----|--|-----|---|-----|-----|--|---|---|---|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | |
| | | | | | | <850 N/mm² < 1000 N/mm² 1000-1300 N/mm² ANTIDESGASTE Wear-Resistant Anti-Usure MARTENSÍTICO Martensitique | | | | | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitique | | FUNDICIÓN Cast Iron Fonte | | ALEACIONES TERMORESISTENTES Heat-Resistant Alloys - Alliages thermostésistant | | VIRUTA CORTA Short Chip - copeaux courts VIRUTA LARGA Long Chip - copeaux longs NO ALEADO Unalloyed - Sans alliage < 10% Si > 10% Si | | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | |
| 6016 | 70 | 338 | N | PMX | X-AlCr | ● | ● | ● | | ● | ● | ● | ● | ○ | ● | | | | ● | ● | | | |
| 6000 | 72 | IZAR Std. | | PMX | NITREX | | | | | | | | | | ● | | | | | | | | |
| 1029 | 75 | 338 | N | HSSE 5% Co | BORDEAUX | ○ | ○ | ● | ○ | | ● | ● | ● | ○ | | | | | | | | | |
| 1016 | 76 | 338 | N | HSSE 5% Co | TIALSIN | | ○ | ● | | ● | ○ | ○ | ○ | ● | | | | | | | | | |
| 1000 | 78 | 338 | TS | HSSE 5% Co | TIALSIN | | ● | ○ | | | | ● | ● | | | | | | | ● | ● | | |
| 1021 | 79 | 338 | W | HSSE 5% Co | | ● | | | | | ● | ● | | | ● | ● | ● | ● | ● | ● | | | |
| 1020 | 80 | 338 | W | HSSE 5% Co | | | | | | | ● | | | | | | ● | ● | ● | | | | |
| 1027 | 81 | 338 | N | HSSE 5% Co | | | ○ | ● | | ● | | | | ● | | | | | | | | | |
| 1015 | 82 | 338 | N | HSS | ZIRKONIO | ● | | | | | | ● | ● | | | | ● | ● | ● | | | | |
| 1010 | 84 | 338 | N | HSS | TIN | ● | | | | | | | | ○ | ○ | | | ○ | ○ | ○ | | | |
| 1013 | 87 | 338 | N | HSS | TIALSIN | ● | | | | | | | | ○ | ○ | | | ○ | ○ | ○ | | | |
| 1012 | 89 | 338 | H | HSS | | | | | | | | | | | ● | ● | | | | | | | |
| 1007 | 90 | 338 | N | HSS | | ● | | | | | | | | ○ | ○ | | | ○ | ○ | ○ | | | |
| 1025 | 91 | 338 | N | HSS | | ● | | | | | | | | ○ | ○ | | | ○ | ○ | ○ | | | |
| 1054 | 92 | 1897 | N | Cobalt "S" | X-AlCr | | | | | ● | | | | | | | | | | | | | |
| 1055 | 93 | 1897 | TS | HSSE 5% Co | TIALSIN | | ● | ○ | | | ○ | ● | ● | ○ | | | | | ● | ● | | | |
| 1056 | 94 | 1897 | N | HSSE 5% Co | TIALSIN | | | ● | | ● | ● | ○ | ○ | ● | | | | | | | | | |
| 1666 | 96 | IZAR Std. | | HSSE 5% Co | | | | ● | | ● | | | | ● | | | | | | | | | |
| 1050 | 97 | 1897 | N | HSS | | ● | | | | | | | | ○ | ○ | | | ○ | ○ | ○ | | | |
| 1660 | 98 | IZAR Std. | | HSS | | ● | | | | | | | | ○ | ○ | | | ○ | ○ | ○ | | | |



TABLA USO TALADRADO PMX - HSSE - HSS

PMX - HSSE - HSS Drilling Use Table - Tableau usage Perçage PMX - HSSE - HSS

BROCAS PMX - HSSE - HSS

PMX - HSSE - HSS Drill Bits

Forets PMX - HSSE - HSS

● **Usado Recomendado / Recommended Use / Utilisation conseillée**

○ **Usado Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | | |
|----------------------|------------------------|------------------------|---------------------------------------|-----------------------------------|-------------|---|---|-----------------------|--|-----------------------------------|---|-------------------------------|--------------------|--------------------|---|---------------------------------------|--|-----------------------|
| <850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant | ANTI-UsURE MARTENSITICO | Martensitic | INOX AUSTENITICO Austenitic Stainless Steel | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys | VIRUTA CORTA Short Chip | VIRUTA LARGA Long Chip | NO ALEADO Unalloyed | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics | DUROPLÁSTICOS Hard Plastics | F Composites de Fibras Fiber Composites | H 45-70 HRC |
| | | | | | | FUNDICIÓN Cast Iron | ALERACIONES TERMORRESISTENTES Heat-Resistant Alloys | | | Cu - BRONCE Copper | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | |

| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | | S | N | | | | | | | F | H | | | | |
|------|------|-----------|-----------|---------------|------------------------|----------|-----|-----|-----|-----|----------|----------|-----|----------|----------|-----|-----|-----|-----|---|---|----------|----------|---|--|--|--|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | | | | |
| 1036 | 99 | 340 | N | HSSE 5% Co | | | ○ | ● | | ● | ● | ○ | ○ | ● | | | | | | | | | | | | | |
| 1300 | 100 | 340 | TS | HSSE 5% Co | TIALSIN | | ● | ○ | | | | ● | ● | | | | | | ● | ● | | | | | | | |
| 1030 | 101 | 338 | N | HSS | TIN | ● | | | | | | ○ | ○ | | | | | ○ | ○ | ○ | | | | | | | |
| 9040 | 103 | 1869 | | HSSE 5% Co | | | ● | | | ● | ● | ● | ● | | | | | | ● | ● | | | | | | | |
| 1040 | 104 | 1869 | N | HSS | | ● | | | | | | ● | ● | | | | | ○ | ○ | ○ | | | | | | | |
| 9196 | 114 | 345 | N | MD/HM Carbure | | | ● | ● | | ● | ● | ○ | ○ | ● | ● | ● | | | | | | | | ● | | | |
| 9116 | 115 | 345 | N | HSSE 5% Co | | | ● | | | ● | ● | ● | ● | | | | | | | | | | | | | | |
| 1110 | 116 | 345 | N | HSS | TIN | ● | ○ | | | | | ● | ● | | | | ○ | ○ | | | | | | | | | |
| 1154 | 119 | IZAR Std. | | Cobalt "S" | X-AICr | | | | ● | | | | | | | | | | | | | | | | | | |
| 1130 | 120 | 341 | N | HSS | | ● | ○ | | | | | ● | ● | | | | ○ | ○ | | | | | | | | | |
| 1140 | 121 | 1870 | N | HSS | | ● | ○ | | | | | ● | ● | | | | ○ | ○ | | | | | | | | | |
| 1301 | 123 | IZAR Std. | | HSSE 5% Co | | ● | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● | | | | | |
| 1303 | 123 | IZAR Std. | | HSSE 5% Co | | ● | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● | | | | | |
| 1310 | 124 | 333 | A | HSS | TIN | ● | ● | | | | | ○ | ○ | | | | ● | | | | ● | | | | | | |
| 1320 | 125 | 333 | R | HSS | | ● | ● | | | | | ○ | ○ | | | | ● | | | | ● | | | | | | |
| 1330 | 126 | 333 | B | HSS | | ● | ● | | | | | ○ | ○ | | | | ● | | | | ● | | | | | | |
| 9315 | 127 | 333 | A | HSSE 5% Co | | ● | ● | | | | | ○ | ○ | | | | ● | | | | ● | | | | | | |

FRESAS HUECAS M. ELECTROMAGNÉTICAS

Core Drills

Fraises à carotter UP électromagnétiques

Pag. 141

MÁQUINAS AFILADORAS BROCAS

Drill Bit Sharpening Machines

Machines affûteuse forets

Pag. 158



TABLA USO ESCARIADO - AVELLANADO

Reaming-Countersinking Use Table - Tableau usage Alésage-Fraisage

ESCARIADORES-AVELLANADORES
Reamers-Countersinks-Counterbores
Alésoirs-Outils

- **Usó Recomendado** / Recommended Use / Utilisation conseillée
- **Usó Alternativo** / Alternative Use / Option d'emploi

| | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---------------------------------|--|-----------------|--|--|--|-------------|----------------|--|---|---|---------------------------------------|----------|----------|---|--|----------|--|-----------|---|---|
| | <850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant - Anti-Usure | MARTENSITICO Martensitique | INOX AUSTENITICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC | | |
| | FUNDICIÓN Cast Iron Fonte | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | | Cu - BRONCE LATON Copper Bronze Cuivre Bronze Laiton | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | | | | | | | | | | |
| Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | | | |
| Ref. | Pag. | DIN | Tipo Type | ISO | Material | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H |

ESCARIADO - AVELLANADO METAL DURO

Carbide Reaming-Countersinking - Alésage-Fraisage carbure

| | | | | | | | | | | | | | | | | | | | | | | |
|------|--|-----|------|---|--|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9060 | | 162 | 8093 | B | | Micro-grano | ● | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9575 | | 163 | 335 | C | | Micro-grano | ● | ● | ○ | ● | ● | ● | ○ | ● | ○ | ● | ● | ● | ○ | | | ○ |



ESCARIADO - AVELLANADO PMX-HSSE-HSS

PMX-HSSE-HSS Reaming-Countersinking - Alésage-Fraisage PMX-HSSE-HSS

| | | | | | | | | | | | | | | | | | | | | | | | |
|------|--|-----|------|-----|------|------------|---------|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|
| 2060 | | 166 | 212 | B/D | 521 | HSSE 5% Co | TIALSIN | ● | ● | ○ | ● | | | | | | | | | | | | |
| 2064 | | 168 | 212 | E | 521 | HSSE 5% Co | | ● | ● | | | ● | ○ | ○ | ○ | ○ | ○ | | | | | | |
| 2160 | | 169 | 208 | B | 521 | HSSE 5% Co | | ● | ● | ○ | ● | | | | | | | | | | | | |
| 2164 | | 170 | 208 | C | 521 | HSSE 5% Co | | ● | ● | | | ● | ○ | ○ | ○ | ○ | ○ | | | | | | |
| 2310 | | 171 | 219 | B | 2402 | HSSE 5% Co | | ● | ● | ○ | ● | | | | | | | | | | | | |
| 2314 | | 172 | 219 | C | 2402 | HSSE 5% Co | | ● | ● | | | ● | ○ | ○ | ○ | ○ | ○ | | | | | | |
| 2020 | | 173 | 2179 | E | 3466 | HSS | | ● | | | | | | | | | | | | | | | |
| 2130 | | 174 | 311 | | 2238 | HSS | | ● | | | | | | | | | | | | | | | |
| 2010 | | 175 | 206 | B | 236 | HSS | | ● | | | | | | | | | | | | | | | |
| 2026 | | 176 | 9 | B | 3465 | HSS | | ● | | | | | | | | | | | | | | | |
| 2015 | | 177 | | | | HSS | | ● | | | | | | | | | | | | | | | |
| 2016 | | 177 | | | | HSS | | ● | | | | | | | | | | | | | | | |
| 2017 | | 177 | | | | HSS | | ● | | | | | | | | | | | | | | | |

ESCARIADORES-AVELLANADORES Reamers-Countersinks-Counterbores Alésoirs-Outils

● **Usado Recomendado / Recommended Use / Utilisation conseillée**
○ **Usado Alternativo / Alternative Use / Option d'emploi**

| | | | | | | | | | | | | | | | | |
|--|--------------------------|---|-----------------------------|--|---------------------------------|---|---|--|---------------------------------------|--|----------|---|---|---|---|--|
| <850 N/mm ² | < 1000 N/mm ² | 1000-1300 N/mm ² ANTIDESGASTE Wear-Resistant ANTI-USURE | MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm ² | 700-1000 N/mm ² ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermorésistants | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibra Fiber Composites | 45-70 HRC | |
|  | | | | | FUNDICIÓN Cast Iron Fonte | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermorésistants | | Cu - BRONCE LATÓN Copper Bronze Bronze Cuivre Bronze Laiton | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | |  | | Composites de Fibra Fiber Composites | |
| | | | | | P | | M | K | S | N | | | | | | |
| P.1 | | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | |

| Ref. | Pag. | DIN | Tipo Type | ISO | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | | | |
|------|--------------------|-----------|-----------|------|------------|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---|---|--|--|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | | | |
| 6575 | 179 | 335 | C | | PMX | | | ● | ● | ● | ● | | | | | | | | | | | | | | | | |
| 2574 | New! 180 | 335 | C | | HSSE 5% Co | ZIRKONIO | ● | | | | ○ | ○ | | | | | | | | | | | | | | | |
| 2575 | 181 | 335 | C | | HSSE 5% Co | | ● | | | | ○ | ○ | | | | | | | | | | | | | | | |
| 2572 | 182 | IZAR Std. | | | HSSE 5% Co | | ● | | | | ○ | | | | | | | | | | | | | | | | |
| 2573 | 183 | 335 | C | | HSS | | ● | | | | ○ | ○ | | | | | | | | | | | | | | | |
| 2550 | 184 | 334 | A | 3294 | HSS | | ● | ○ | | | | | | | | | | | | | | | | | | | |
| 2580 | 184 | 347 | A | 3294 | HSS | | ● | ○ | | | | | | | | | | | | | | | | | | | |
| 2530 | 185 | 373 | | 4206 | HSS | | ● | ○ | | | ● | | ○ | ○ | ○ | | | | | | | | | | | | |
| 2685 | 186 | 335 | D | | HSS | | ● | | | | ○ | ○ | | | | | | | | | | | | | | | |
| 2660 | 187 | 334 | B | 3293 | HSS | | ● | ○ | | | | | | | | | | | | | | | | | | | |
| 2690 | 187 | 347 | B | 3293 | HSS | | ● | ○ | | | | | | | | | | | | | | | | | | | |
| 2630 | 188 | 375 | | | HSS | | ● | ○ | | | ● | | ○ | ○ | ○ | | | | | | | | | | | | |

TABLA USO ROSCADO

Threading Use Table - Tableau usage Taraudage

MACHOS
Taps /Tarauds*

*Punta / Point / Pointe M3-M6: Macho / Male

*Punta / Point / Pointe >M6: Hembra / Female

- Uso Recomendado / Recommended Use / Utilisation conseillée**
- Uso Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | |
|--|----------------------|------------------------|------------------------|--|--|-----------------------|-----------------------|---|---|---|--|--------------------|--------------------|--|---|---|------------------|
| | <850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant MARTENSITICO Martensitic | INOX AUSTENITICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | VIRUTA CORTA Short Chip - Copaux courts | VIRUTA LARGA Long Chip - Copaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites | 45-70 HRC |
| | | | | | | | | | | | | | | | | | |

| Ref. | Pag. | Rosca Thread Filet | Uso Use Usage | DIN | Material | Recubr. Coating Revêt. | P | | | | | M | | K | | S | | | | | | | N | | | | | | | F | | H | | | | | | | | | | | | |
|------|------|--------------------|--------------------|-----|---------------|------------------------|------------------------|-----|-----|-----|-----|----------|-----|----------|-----|----------|-----|-----|-----|-----|---|---|----------|---|---|---|---|---|---|----------|---|----------|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H | | | | | | | | | | | | | | | | | | | | | | |
| 3130 | 194 | M | Máquina Machine | 371 | PMX | HARD | | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3230 | | | | | | | Form: B 3,5-5h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3170 | 195 | M | Máquina Machine | 371 | PMX | HARD | | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3270 | | | | | | | Form: C 2-3h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3143 | 196 | M | Máquina Machine | 371 | HSSE-V | | | | ● | | | ○ | ○ | ● | ● | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| 3243 | | | | | | Form: B 3,5-5h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3153 | 197 | M | Máquina Machine | 371 | HSSE-V | | | | ● | | | ○ | ○ | ● | ● | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | | |
| 3253 | | | | | | Form: C 2-3h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3125 | 198 | M | Máquina Machine | 371 | PMX | HARD | | | | ● | | | | | ● | ● | ● | ● | | | | | | | ● | ● | | | | | | | | | | | | | | | | | | |
| 3225 | | | | | | | Form: B 3,5-5h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3165 | 199 | M | Máquina Machine | 371 | PMX | HARD | | | | ● | | | | | ● | ● | ● | ● | | | | | | | ● | ● | | | | | | | | | | | | | | | | | | |
| 3265 | | | | | | | Form: C 2-3h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3149 | 200 | M | Máquina Machine | 371 | HSSE 5% Co | TIN | | | | | | | | | ● | ● | | | | | | | | | ● | ● | | | | | | | | | | | | | | | | | | |
| 3249 | | | | | | | Form: B 3,5-5h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3159 | 201 | M | Máquina Machine | 371 | HSSE 5% Co | TIN | | | | | | | | | ● | ● | | | | | | | | | ● | ● | | | | | | | | | | | | | | | | | | |
| 3259 | | | | | | | Form: C 2-3h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3176 | 202 | M | Máquina Machine | 371 | HSSE 5% Co | | | | | | | | | | ● | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3276 | | | | | | Form: C 2-3h Tol: 6HX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3172 | 203 | M | Máquina Machine | 371 | HSSE 5% Co | | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | |
| 3272 | | | | | | Form: B 3,5-5h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175 | 204 | M | Máquina Machine | 371 | HSSE 5% Co | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3275 | | | | | | Form: C 2-3h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3174 | 205 | M | Máquina Machine | 371 | HSSE 5% Co | | | | ● | ○ | | | | | | | | | | | | | | | | ○ | ○ | ● | ● | ● | ○ | | | | | | | | | | | | | |
| 3274 | | | | | | Form: B 3,5-5h Tol: 6H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

TABLA USO ROSCADO

Threading Use Table - Tableau usage Taraudage


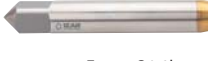



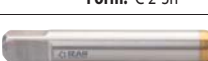
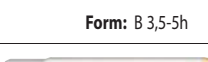




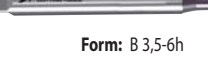

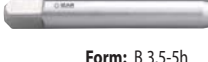










| Ref. | Pag. | Rosca Thread | Usa Use | DIN | Material | Recubr. Coating Revêt. | P | | | | | M | | K | | S | | N | | | | | | | F | H | | |
|------|---|--------------|---------|-----------------|-----------|------------------------|-----------|-----------|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|--|---|---|---|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | S | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | | | |
| 3171 |  | 207 | M | Máquina Machine | 371 / 376 | PMX | TIALN-TIN | ● | ● | ● | | ● | ● | | | | | ● | ● | ● | ● | ● | | | | | | |
| 3162 |  | 207 | M | Máquina Machine | 2174 | PMX | TIN | ● | ● | ● | | ● | ● | | | | | ● | ● | ● | ● | ● | | | | | | |
| 3173 |  | 208 | M | Máquina Machine | 371 / 376 | PMX | TICN | ● | ● | ● | | ● | ● | | | | | ● | ● | ● | ● | ● | | | | | | |
| 3163 |  | 208 | M | Máquina Machine | 2174 | HSSE 5% Co | TICN | ● | | | | | | | | | | ● | ● | ● | ● | | | | | | | |
| 3164 |  | 209 | M | Máquina Machine | 2174 | HSSE 8% Co | TICN | ● | ● | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | | | |
| 3120 |  | 210 | M | Máquina Machine | 371 | HSSE-V | TIN | ● | ● | | | ● | ● | ● | ● | | | ● | ● | | ● | ● | | | | | | |
| 3220 |  | | | | 376 | | | ● | ● | | | ● | ● | ● | ● | | | ● | ● | ● | ● | | | ● | ● | | | |
| 3160 |  | 211 | M | Máquina Machine | 371 | HSSE-V | TIN | ● | ● | | | ● | ● | ● | ● | | | ● | ● | | ● | ● | | | | | | |
| 3260 |  | | | | 376 | | | ● | ● | | | ● | ● | ● | ● | | | ● | ● | ● | ● | | | ● | ● | | | |
| 3151 |  | 212 | M | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | | | | | | | | | ● | | | | | | |
| 3251 |  | | | | 376 | | | ● | | | | | | | | | | | | | | | | | | | | |
| 3129 |  | 213 | M | Máquina Machine | 371 / 376 | PMX | HARD | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | | | | | | |
| 3169 |  | 213 | M | Máquina Machine | 371 / 376 | PMX | HARD | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | | | | | | |
| 3100 |  | 214 | M/MF | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | ○ | | ● | ● | | | |
| 3200 |  | | | | 215 | | | 376 / 374 | ○ | | ● | ● | | | | | | | | | | | | | | | | |
| 3110 |  | 217 | M/MF | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | ● | | ● | | | | |
| 3210 |  | | | | 218 | | | 376 / 374 | ○ | | ● | ● | | | | | | | | | | | | | | | | |
| 3140 |  | 220 | M | Máquina Machine | 371 | HSSE 5% Co | | | | | | | | | | | | | | | | ● | | | | | | |
| 3240 |  | | | | 376 | | | | | | | | | | | | | | | | | | | | | | | |
| 3600 |  | 221 | M | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | | | | | | | | | | | | | | | |
| 3150 |  | 222 | M/MF | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | ○ | | ● | ● | | | |
| 3250 |  | | | | 223 | | | 376 | ○ | | ● | ● | | | | | | | | | | | | | | | | |
| 3166 |  | 224 | M/MF | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | | | | | | | | | ○ | | ● | ● | | | |
| 3167 |  | 224 | M/MF | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | | | | | | | | | ○ | | ● | ● | | | |

TABLA USO ROSCADO

Threading Use Table - Tableau usage Taraudage

MACHOS
Taps /Tarauds*

*Punta / Point / Pointe M3-M6: Macho / Male
*Punta / Point / Pointe >M6: Hembra / Female

● Uso Recomendado / Recommended Use / Utilisation conseillé
○ Uso Alternativo / Alternative Use / Option d'emploi



| | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|------------------------|------------------------|--|---|--|-----------------------|---|--|---|--|--|--------------------|--------------------|--|---|---|------------------|-----|-----|-----|-----|--|--|
| < 850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant - Anti-Usure | MARTENSITICO Martensitic Marténitique | INOX AUSTENITICO Austenitic Stainless Steel - Aciers inox austénitique | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermorésistants | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC | | | | | | |
| | | | | | FUNDICIÓN Cast Iron Fonte | | Cu - BRONCE LATON Copper Bronze Cuivre Bronze Laiton | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | | | | | | | | |
| | | | | | P | M | K | S | N | | | | | | | F | H | | | | | | |
| | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | |

| Ref. | Pag. | Rosca Thread Filet | Uso Use Usage | DIN | Material | Recubr. Coating Revêt. | P.1 | P.2 | P.3 | P.4 | P.5 | M | K.1 | K.2 | S | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H |
|----------|--------------------|--------------------|---------------------|------------|---------------|------------------------|------------------------|-----------|-----|-----|-----|---|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|---|
| 3101 | 225 | M | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | | | | |
| 3201 | | | | | | | Form: B 3,5-5h Tol: 6H | 376 / 374 | ○ | ● | | | | | | | | | | | | | | |
| 3161 | 226 | M | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | | | | |
| 3261 | | | | | | | Form: C 2-3h Tol: 6H | 376 / 374 | ○ | ● | | | | | | | | | | | | | | |
| 3105 | 227 | M | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | | | | |
| 3205 | | | | | | | Form: B 3,5-5h Tol: 6G | 376 | ○ | ● | | | | | | | | | | | | | | |
| 3155 | 228 | M | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | | | ● | | | | | | | | | | | |
| 3255 | | | | | | | Form: C 2-3h Tol: 6G | 376 | ○ | ● | | | | | | | | | | | | | | |
| 3185 | 229 | M | Máquina Machine | 357 | HSS | | ● | | | | | | | | | | | | ● | ● | ● | | | |
| 3119 | 239 | M | Máquina Machine | ISO 529 | HSSE 5% Co | | ● | | | | | | ● | ● | | | | | | ● | ● | | | |
| 3113 | New! 239 | M | Máquina Machine | ISO 529 | HSSE 5% Co | | ● | | | | | | ● | ● | | | | | | ● | ● | | | |
| 3109 | 240 | M (ISO) | Máquina Machine | ISO 529 | HSS | TIN | ● | | | | | | ● | | | | | | | ● | ● | | | |
| 3157 | 241 | M (ISO) | Máquina Machine | ISO 529 | HSS | TIN | ● | | | | | | ● | | | | | | | ● | ● | | | |
| 3036 | 242 | M | Mano Hand Main | 352 / 2181 | HSSE 5% Co | | | | | | | | ● | ● | ○ | ○ | | | | | | | | |
| 3037 | | | | | | | Form: C 2-3h Tol: 6H | ● | ● | ○ | ○ | | | | | | | | | | | | | |

TABLA USO ROSCADO

Threading Use Table - Tableau usage Taraudage

MACHOS Taps /Tarauds*

*Punta / Point / Pointe M3-M6: Macho / Male

*Punta / Point / Pointe >M6: Hembra / Female

● **Uso Recomendado / Recommended Use / Utilisation conseillée**

○ **Uso Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | |
|-------------|--------------|-----------------|--------------------------------|-----------------------------|--|-------------|---|---|--|---------------------------|--|----------|----------|----------------------------------|--------------------------------|--|-----------|
| < 850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant | MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys | VIRUTA CORTA Short Chip | VIRUTA LARGA Long Chip | NO ALEADO Unalloyed | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics | DUROPLÁSTICOS Hard Plastics | Composites de fibras Fiber Composites | 45-70 HRC |
| | | | | | FUNDICIÓN Cast Iron | | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys | | Cu - BRONCE LATÓN Copper Bronze | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | |
| | | | | | P | | M | K | S | N | | | | | F | H | |
| P.1 | | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | |

| Ref. | Image | Pag. | Rosca Thread Filet | Uso Use Usage | DIN | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | |
|------|-------|------|--------------------------|---------------------|------------|---------------|------------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|--|--|
| | | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | |
| 3030 | | 243 | M | Mano Hand Main | 352 | HSS | | ● | | | | | | | | | | | | | | | | | | |
| 3031 | | | | | | | | 352 | ● | ● | ● | ● | ○ | | | | | | | | | | | | | |
| 3040 | | 244 | M | Mano Hand Main | ISO 529 | HSS | | ● | | | | ● | ● | | | ○ | ○ | ● | ● | ● | | | | | | |
| 3020 | | 245 | MF | Mano Hand Main | 2181 | HSS | | ● | | | | | | | | | | | | | | | | | | |
| 3021 | | | | | | | | 2181 | ● | ● | ● | ● | ○ | | | | | | | | | | | | | |
| 3010 | | 247 | M/MF | Mano Hand Main | 352 / 2181 | HSS | | ● | | | | ● | ● | | | | | ● | ● | ● | ○ | | | | | |
| 3023 | | 249 | M | Mano Hand Main | 352 | HSS | | ● | | | | ● | ● | | | | | ● | ● | ● | ● | ● | | | | |
| 3144 | | 250 | UNC | Máquina Machine | 371 | PMX | HARD | | ● | | | ● | ● | ○ | ○ | | | ● | ● | ● | ● | ○ | | | | |
| 3104 | | 250 | UNC | Máquina Machine | 371 | PMX | HARD | | ● | | | ● | ● | ○ | ○ | | | ● | ● | ● | ● | ○ | | | | |
| 3134 | | 251 | UNC | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | ● | | | | | | ● | ● | ● | ● | ○ | | | | |
| 3234 | | | | | 376 | ● | | | | | | | | | | | | | | | | | | | | |
| 3114 | | 252 | UNC | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | ● | | | | | | ● | ● | ● | ● | ○ | | | | |
| 3214 | | | | | 376 | ● | | | | | | | | | | | | | | | | | | | | |
| 3154 | | 253 | UNC | Máquina Machine | 371 | HSSE 5% Co | | ● | | | | ● | | | | | | ● | ● | ● | ● | ○ | | | | |
| 3254 | | | | | 376 | ● | | | | | | | | | | | | | | | | | | | | |

MACHOS Taps /Tarauds*

*Punta / Point / Pointe M3-M6: Macho / Male

*Punta / Point / Pointe >M6: Hembra / Female

- Uso Recomendado / Recommended Use / Utilisation conseillée
- Uso Alternativo / Alternative Use / Option d'emploi



| | | | | | | | | | | | | | | | | |
|----------------------|------------------------|--|------------------------------------|---|-----------------------|-----------------------|--|--|--|--|--------------------|--------------------|--|---|--|------------------|
| <850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² ANTIDESGASTE Wear-Resistant Anti-Usure | MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORESISTENTES Heat-Resistant Alloys - Alliages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC |
|----------------------|------------------------|--|------------------------------------|---|-----------------------|-----------------------|--|--|--|--|--------------------|--------------------|--|---|--|------------------|

| Ref. | Pag. | Rosca Thread Filet | Uso Use Usage | DIN | Material | Recubr. Coating Revêt. | P | | | | | M | | K | | S | | N | | | | | | | F H | | | | | | | | | | | | | | |
|------|------|--------------------------|---------------------|------|---------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | S.1 | S.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H | | | | | | | | | | | | | | | |
| 3034 | 254 | UNC | Mano Hand Main | 352 | HSS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3127 | 255 | UNF | Máquina Machine | 374 | PMX | HARD | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3124 | 255 | UNF | Máquina Machine | 374 | PMX | HARD | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3204 | 256 | UNF | Máquina Machine | 374 | HSSE 5% Co | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3224 | 256 | UNF | Máquina Machine | 374 | HSSE 5% Co | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3244 | 257 | UNF | Máquina Machine | 374 | HSSE 5% Co | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3024 | 258 | UNF | Mano Hand Main | 2181 | HSS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3025 | 259 | UNEF | Mano Hand Main | 2181 | HSS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3209 | 260 | UN | Máquina Machine | 374 | HSSE 5% Co | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3107 | 261 | NPT | Máquina Machine | 374 | HSSE 5% Co | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3017 | 261 | NPT | Mano Hand Main | 2181 | HSS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



TABLA USO ROSCADO

Threading Use Table - Tableau usage Taraudage

MACHOS Taps /Tarauds*

*Punta / Point / Pointe M3-M6: Macho / Male
*Punta / Point / Pointe >M6: Hembra / Female

- **Usado Recomendado / Recommended Use / Utilisation conseillée**
- **Usado Alternativo / Alternative Use / Option d'emploi**

| | | | | | | | | | | | | | | | | |
|--|--------------|-----------------|--|--|---------------------------------|----------------|---|---|--|---------------------------------------|----------|---|---|--|--|-----------|
| <850 N/mm² | < 1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant MARTENSITICO Martensitic | INOX AUSTENITICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm² | 700-1000 N/mm² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Allages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC |
|  | | | | | FUNDICIÓN Cast Iron Fonte | | Cu - BRONCE LATÓN Copper Bronze Cuivre Bronze Laiton | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | |  | | | | |













| Ref. | Pag. | Rosca Thread Filet | Usos Use Usage | DIN | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | | | | |
|------|------|--------------------------|---|----------------------|---------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|--|--|--|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | | | | |
| 3102 | 262 | BSW (Whitworth) | Máquina Machine  | 371 | HSSE 5% Co | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3202 | | | | Form: B 3,5-5h | | | 376 | | | | | | | | | | | | | | | | | | | | | |
| 3112 | 263 | BSW (Whitworth) | Máquina Machine  | 371 | HSSE 5% Co | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3212 | | | | Form: C 2-3h | | | 376 | | | | | | | | | | | | | | | | | | | | | |
| 3152 | 264 | BSW (Whitworth) | Máquina Machine  | 371 | HSSE 5% Co | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3252 | | | | Form: C 2-3h | | | 376 | | | | | | | | | | | | | | | | | | | | | |
| 3032 | 265 | BSW (Whitworth) | Mano Hand Main  | 352 | HSS | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3012 | | | | Form: C 2-3h Tol: 6H | | | 266 | | | | | | | | | | | | | | | | | | | | | |
| 3126 | 267 | BSPP (Gas) | Máquina Machine  | 5156 | HSSE 5% Co | TIN | | | | | | ● | ● | | | | | | | | | | | | | | | |
| 3136 | 267 | BSPP (Gas) | Máquina Machine  | 5156 | HSSE 5% Co | TIN | | | | | | ● | ● | | | | | | | | | | | | | | | |
| 3106 | 268 | BSPP (Gas) | Máquina Machine  | 5156 | HSSE 5% Co | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3116 | 268 | BSPP (Gas) | Máquina Machine  | 5156 | HSSE 5% Co | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3156 | 269 | BSPP (Gas) | Máquina Machine  | 5156 | HSSE 5% Co | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3026 | 270 | BSPP (Gas) | Mano Hand Main  | 5157 | HSS | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3016 | | | | Form: C 2-3h | | | | | | | | | | | | | | | | | | | | | | | | |
| 3019 | 272 | BSPT (RC) | Mano Hand Main  | 5157 | HSS | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |
| 3011 | 272 | PG | Mano Hand Main  | 40432 | HSS | | ● | | | | | ● | ● | | | | ● | ● | ● | ● | ○ | | | | | | | |

TABLA USO ROSCADO

Threading Use Table - Tableau usage Taraudage



| Ref. | Pag. | Rosca Thread Filet | Uso Use Usage | DIN | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | | | |
|------|------|--------------------------|---------------------|------------|---------------|------------------------------|-----|-----|-----|-----|-----|---|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|--|--|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | |
| 3540 | 273 | M | Máquina Machine | 223 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3536 | 274 | M/MF | Mano Hand Main | 22568 | HSSE 5% Co | | | ● | ○ | | ● | ● | | | | | | ● | ● | ● | | | | | | | |
| 3500 | 275 | M/MF | Mano Hand Main | 223 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3501 | 276 | M | Mano Hand Main | 223 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3510 | 277 | M | Mano Hand Main | ISO 529 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3534 | 277 | UNC | Mano Hand Main | 223 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3504 | 278 | UNF | Mano Hand Main | 223 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3505 | 278 | UNEF | Mano Hand Main | 22568 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3507 | 279 | NPT | Mano Hand Main | 223 B | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3502 | 279 | BSW (Whitworth) | Mano Hand Main | 223 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3546 | 280 | BSPP (Gas) | Mano Hand Main | 24231 | HSSE 5% Co | | | ● | ○ | | ● | ● | | | | | | ● | ● | ● | | | | | | | |
| 3506 | 280 | BSPP (Gas) | Mano Hand Main | 24231 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3519 | 281 | BSPT (RC) | Mano Hand Main | 24231 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |
| 3509 | 281 | PG | Mano Hand Main | 40434 | HSS | | | ● | ○ | | | | | | | | | ● | ● | ● | | | | | | | |

ACCESORIOS ROSCADO - Threading Accesories - Accessoires de taraudage

GIRA-MACHOS

Tap Wrench
Porte-taraud



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PORTA-COJINETES

Die Holder
Porte filières



Pag. 286

GIRA-MACHOS CRIQUÉ

Tap Wrench
Porte-taraud



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PORTA-COJINETES ISO 529

ISO 529 Die Holder
Porte filières ISO 529



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GALGA

Pitch Gauge
Jauge



Pag. 283

EXTRACTOR TORNILLOS

Screw Extractor
Extracteur vis



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ALARGADOR MACHOS MÁQUINA

Machine Tap Extension
Rallonge tarauds machine



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INSERTO REPARACIÓN ROSCAS

Thread Repair Insert
Filet rapportés



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ALARGADOR MACHOS MANO

Hand Tap Extension
Rallonge tarauds à main



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MACHO PARA INSERTO REPARACIÓN ROSCAS

Thread Repair Insert Tap
Taraud filet rapportés



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PORTA-MACHOS COMPENSACIÓN RADIAL/AXIAL

Radial/Axial Compensation Tap Holder
Porte-tarauds compensation rayon / axe



Pag. 285

INSERTADOR

Fitting Tool
Appareil de pose



Pag. 291

ADAPTADOR PORTA-MACHOS DE CAMBIO RÁPIDO CON EMBRAGUE

Quick Change Tap Collet with Safety Clutch
Adaptateur porte-tarauds changement rapide avec embrayage



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ROMPE ARRASTRES

Pin-Breaker
Rupteur



Pag. 291

TABLA USO FRESADO METAL DURO

Carbide Milling Use Table - Tableau usage Fraisage carbure

FRESAS METAL DURO Carbide End Mills Fraises carbure

- **Usado Recomendado / Recommended Use / Utilisation conseillée**
- **Usado Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | | | | | |
|------------------------|--------------------------|-----------------------------|--|--|---------------------------------|----------------------------|---|---|--|---------------------------------------|----------|----------|---|--|--|-----------|-----|-----|-----|---|---|
| <850 N/mm ² | < 1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm ² | 700-1000 N/mm ² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC | | | | | |
| | | | | | FUNDICIÓN Cast Iron Fonte | | Cu - BRONCE LATON Copper Bronze Brass Cuivre Bronze Laiton | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | | | | | | |
| | | | | | P | | M | K | S | N | | | | | | | F | H | | | |
| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H |

| | | | | | | | | | | | | | | | | | | | | | | | |
|------|-------|-----|-----------|----|---------------|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9644 | 4-5 Z | 296 | IZAR Std. | NR | Micro-grano | CROMAX | ● | ● | ● | | ● | ● | ● | | | | | | | | | | |
| 9647 | 3 Z | 297 | IZAR Std. | WR | Micro-grano | CROMAX | | | | ● | ● | | ● | | | | ● | | | | | | |
| 9405 | 6-8 Z | 299 | 6528 | N | Grano UF | IKRA | | ● | ● | ○ | | | | | | | | | | | | ● | |
| 9415 | 6-8 Z | 299 | 6528 | N | Grano UF | IKRA | | ● | ● | ○ | | | | | | | | | | | | ● | |
| 9406 | 4-5 Z | 300 | 6528 | N | Grano UF | IKRA | | ● | ● | | ● | ● | | ○ | ○ | | | | | | | ● | |
| 9446 | 4-5 Z | 301 | 6528 | N | Grano UF | IKRA | | ● | ● | | ● | ● | | ○ | ○ | | | | | | | ○ | |
| 9447 | 4-5 Z | 301 | 6528 | N | Grano UF | IKRA | | ● | ● | | ● | ● | | ○ | ○ | | | | | | | ○ | |
| 9461 | 4 Z | 302 | 6528 | N | Grano UF | IKRA | | ● | ● | ● | | | | | | | | | | | | ● | |
| 9401 | 4 Z | 303 | 6528 | N | Micro-grano | CROMAX | ● | ● | ○ | | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | |
| 9410 | 4 Z | 303 | IZAR Std. | N | Micro-grano | CROMAX | ● | ● | ○ | | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | |
| 9412 | 4 Z | 304 | 6528 | N | Micro-grano | CROMAX | ● | ● | ○ | | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ |
| 9407 | 4 Z | 304 | IZAR Std. | N | Micro-grano | CROMAX | ● | ● | ○ | | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ |
| 9431 | 3 Z | 305 | 6528 | N | Micro-grano | CROMAX | ● | ● | ● | | | ● | ● | ○ | | | | | | | | | |
| 9436 | 3 Z | 306 | 6528 | W | Micro-grano | CROMAX | ● | ● | | ● | | | | ● | ● | ● | ● | ○ | ○ | | | | |
| 9437 | 3 Z | 307 | IZAR Std. | W | Micro-grano | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | | ○ | |
| 9439 | 3 Z | 308 | 6528 | W | Micro-grano + | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | | | |
| 9460 | 2 Z | 309 | 6528 | N | Grano UF | IKRA | | ● | ● | ● | | | | | | | | | | | | ● | |
| 9421 | 2 Z | 310 | 6528 | N | Micro-grano | CROMAX | ● | ● | ○ | | ● | ● | ● | ● | ● | ● | ○ | ○ | | | | | |
| 9424 | 2 Z | 310 | IZAR Std. | N | Micro-grano | CROMAX | ● | ● | ○ | | ● | ● | ● | ● | ● | ○ | ○ | | | | | | |
| 9427 | 2 Z | 311 | IZAR Std. | W | Micro-grano + | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | | | |

TABLA USO FRESADO METAL DURO

Carbide Milling Use Table - Tableau usage Fraissage carbure

| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | | S | N | | | | | | | F | H | | | | | |
|------|------|-----|--------------|----------|------------------------------|--------|-----|-----|-----|-----|---|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | | | | |
| 9429 | | 311 | IZAR Std. | W | Micro-grano + | | | | | | | | | | | | | | | ● | ● | ● | ● | ● | | | | |
| 9465 | | 312 | IZAR Std. | | Grano UF | SUA | | | ● | ● | ● | ○ | | ○ | | | | | | | | | | | | | | ● |
| 9425 | | 313 | 6528 | N | Micro-grano | CROMAX | ● | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | | | | | | ○ | |
| 9426 | | 313 | IZAR Std. | N | Micro-grano | CROMAX | ● | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | | | | | | ○ | |
| 9470 | | 315 | IZAR Std. | | Grano UF | SUA | ○ | ○ | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | ○ | |
| 9475 | | 316 | IZAR Std. | | Grano UF | SUA | ○ | ○ | ● | ● | ● | ● | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | |
| 9441 | | 318 | IZAR Std. | | Micro-grano + | | | | | | | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | | |
| 9416 | | 319 | IZAR Std. | | Micro-grano + | | | | | | | | | | | | | | | | ● | ● | ● | ● | ○ | | | |
| 9417 | | 320 | IZAR Std. | | Micro-grano + | | | | | | | | | | | | | | | | ● | ● | ● | ● | ○ | | | |
| 9456 | | 321 | IZAR Std. | | Micro-grano + | | | | | | | | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | |
| 9419 | | 322 | IZAR Std. | | Micro-grano + | ALTIN | | | | | | | | | | | | | | ● | ● | ● | | | | ○ | | |
| 9413 | | 323 | | | | CARBEX | | | | | | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | | |
| 9411 | | 324 | IZAR Std. | | Micro-grano + | ALTIN | | | | | | | | | | | | | | ● | ● | ● | ● | ○ | ○ | | | |
| 9414 | | 324 | IZAR Std. | | Micro-grano + | | | | | | | | | | | | | | | ● | ● | ● | | | | ○ | | |
| 1689 | | 325 | IZAR Std. | | Micro-grano | | | | | | | | | | | | | | | | ○ | ○ | ○ | ○ | ○ | ● | ○ | |
| 9453 | | 327 | IZAR Std. | | Grano UF | SUA | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | |
| 9455 | | 328 | IZAR Std. | | Grano UF | SUA | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | |
| 9457 | | 329 | IZAR Std. | | Grano UF | SUA | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | |
| 9450 | | 330 | IZAR Std. | | Grano UF | SUA | ● | ● | ● | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| 9451 | | 332 | IZAR Std. | | Micro-grano | TIALCN | ○ | ● | ● | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | ● | |
| 9454 | | 333 | IZAR Std. | | Grano UF | TIALCN | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | ○ | |
| 9452 | | 333 | IZAR Std. | | Grano UF | TIALCN | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ | ○ | | | ○ | |
| 9459 | | 334 | IZAR Std. | | Micro-grano | | ● | ○ | | | | | | | | | | | | ● | ● | ● | ○ | ○ | ○ | | ○ | |
| 9280 | | 336 | | | Micro-grano | | | | | | | | | | | | | | | | | | ● | ● | ● | | | |
| 9281 | | 337 | IZAR Std. | | Micro-grano + | DIAMAX | | | | | | | | | | | | | | | | | ● | ● | ● | | | |
| 9282 | | 338 | IZAR Std. | | Micro-grano + | DIAMAX | | | | | | | | | | | | | | | | | | ● | ● | ● | | |
| 9283 | | 339 | IZAR Std. | | Micro-grano + | DIAMAX | | | | | | | | | | | | | | | | | | ● | ● | ● | | |

TABLA USO FRESADO METAL DURO

Carbide Milling Use Table - Tableau usage Fraisage carbure

FRESAS ROTATIVAS Rotary Burrs Fraises limes rotatives

● **Usos Recomendado / Recommended Use / Utilisation conseillée**

○ **Usos Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | | | |
|--|---------------------------------|--------------------------|-----------------------------|--------------------------------|--------------------------|-----------------------------|--|-------------------------|----------------------------|--|---|---|---------------------------------------|----------|----------|---|--|---|-----------|
| | <850 N/mm ² | < 1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant | ANTI-USURA Anti-Usure | MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm ² | 700-1000 N/mm ² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibra Fiber Composites | 45-70 HRC |
| | FUNDICIÓN Cast Iron Fonte | | | | | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | | | | | | |

| Ref. | Pag. | Tipo Type | Norma Norm | Material | Rec. Coat. Revêt. | Dent. | P | | | | | M | | K | | S | | N | | | | | | | H | |
|------|------|--------------|---------------|---------------|-------------------------|-------|-----|-----|-----|-----|-----|-----|-----|---|---|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | S | S | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | |
| 9260 | 342 | B | ZYA-S | MD/HM/Carbure | ALTIN | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | | | | | | | | | | ● | ● | ● | ● | ● | | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | ● | ● | |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9240 | 342 | B | ZYA-S | MD/HM/Carbure | | 3 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9250 | 343 | A | ZYA | MD/HM/Carbure | ALTIN | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | | | | | | | | | | ● | ● | ● | ● | ● | | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | | ● | ● |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9230 | 343 | A | ZYA | MD/HM/Carbure | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9251 | 344 | C | WRC | MD/HM/Carbure | ALTIN | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | | | | | | | | | | | ● | ● | ● | ● | ● | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | | ● | ● |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| | | | | | | S | | | | | | | | | | | | | | | | | | | | |
| | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| 9231 | 344 | C | WRC | MD/HM/Carbure | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9252 | 345 | N | WKN | MD/HM/Carbure | | 3 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | | ● | ● |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9254 | 346 | G | SPG | MD/HM/Carbure | ALTIN | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | | | | | | | | | | | ● | ● | ● | ● | ● | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | | ● | ● |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| 9255 | 347 | M | SKM | MD/HM/Carbure | | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | | | | | | | | | | | ● | ● | ● | ● | ● | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | | ● | ● |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| 9256 | 347 | K | KSK | MD/HM/Carbure | | 3 | ● | ● | ● | | | | | | | | | | | | | | | | | |
| | | | | | | 4 | ○ | ○ | | | | | | | | | | | | | | | | | ● | ● |
| | | | | | | 6 | ● | ● | ● | | | | | | | | | | | | | | | | | |

FRESAS ROTATIVAS

Rotary Burrs

Fraises limes rotativas

● **Usado Recomendado / Recommended Use / Utilisation conseillée**

○ **Usado Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | |
|------------------------|--------------------------|-----------------------------|---|-----------------------------|--|-------------------------|---|--|---|--|---------------------------------------|----------|----------|---|--|--|-----------|
| <850 N/mm ² | < 1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant Anti-Usure | MARTENSITICO Martensitic | INOX AUSTENITICO Austenitic Stainless Steel - Aciers inox austénitiques | < 700 N/mm ² | 700-1000 N/mm ² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Allages thermorésistants | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites Composites en fibre | 45-70 HRC |
| | | | | | FUNDICIÓN Cast Iron Fonte | | Cu - BRONCE LÁTÓN Copper Bronze Brass Cuivre Bronze Laiton | | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | |
| | | | | | P | | M | K | S | N | | | | | | | F |
| P.1 | | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | | | | | | | | | | |

| Ref. | Pag. | Tipo | Norma | Material | Rec. Coat. Revêt. | Dent. | P | | | | | M | K | S | N | | | | | | | F | H | | | | | | | | | |
|------|------|------|-------|---------------|-------------------|-------|-----|-----|-----|-----|-----|---|-----|-----|---|---|---|---|---|---|--|---|---|---|---|---|---|---|---|---|--|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | | | | | | | | | | | | | | | | | |
| 9257 | 348 | E | TRE | MD/HM/Carbure | | New! | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 3 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | |
| | | | | | | | 4 | ○ | ○ | | | ● | ○ | ○ | ○ | ● | ○ | ○ | | | | | | | | | | | ● | ● | | |
| | | | | | | | 6 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | |
| | | | | | | | M | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| 9237 | 348 | E | TRE | MD/HM/Carbure | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | |
| | | | | | | 6 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | |
| 9258 | 349 | D | KUD | MD/HM/Carbure | ALTIN | New! | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 3 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | |
| | | | | | | | 4 | ○ | ○ | | | ● | ○ | ○ | ○ | ● | ○ | ○ | | | | | | | | | | | ● | ● | | |
| | | | | | | | 6 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | |
| | | | | | | | M | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| 9238 | 349 | D | KUD | MD/HM/Carbure | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | |
| | | | | | | 6 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | |
| 9266 | 350 | H | B | MD/HM/Carbure | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | | |
| | | | | | | 4 | ○ | ○ | | | ● | ○ | ○ | ○ | ● | ○ | ○ | | | | | | | | | | | ● | ● | | | |
| | | | | | | 6 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | |
| 9267 | 351 | L | KEL | MD/HM/Carbure | ALTIN | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 3 | ● | ● | ● | | ● | ● | ○ | ○ | ● | ○ | ○ | | | | | ● | ● | ● | ● | ● | | | | | | |
| | | | | | | 4 | ○ | ○ | | | ● | ○ | ○ | ○ | ● | ○ | ○ | | | | | | | | | | | ● | ● | | | |
| | | | | | | 6 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | |
| 9247 | 351 | L | KEL | MD/HM/Carbure | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 6 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | |
| 9268 | 352 | F | RBF | MD/HM/Carbure | ALTIN | New! | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 3 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | | | | | ● | ● | ● | ● | ● | | | | |
| | | | | | | | 4 | ○ | ○ | | | ● | ○ | ○ | ○ | ● | ○ | ○ | | | | | | | | | | | ● | ● | | |
| | | | | | | | 6 | ● | ● | ● | | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | |
| | | | | | | | M | | | | | | | | | ● | | | | | | | | | | | | | | | | |
| 9248 | 352 | F | RBF | MD/HM/Carbure | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | 6 | ● | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | | | | | | | | |

TABLA USO FRESADO PMX - HSSE - HSS

PMX - HSSE - HSS Milling Use Table - Tableau usage Fraisage PMX - HSSE - HSS

FRESAS PMX - HSSE - HSS PMX - HSSE - HSS End Mills Fraises PMX - HSSE - HSS

- **Uso Recomendado / Recommended Use / Utilisation conseillée**
- **Uso Alternativo / Alternative Use / Option d'emploi**



| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | | | |
|------|-------|-----|-----------|----------|------------------------|-----------|-----|-----|-----|-----|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|----------|----------|-----|-----|--|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | | | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | | | N.6 | N.7 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6644 | 4-6 Z | 360 | 844 | NR-F | PMX | TIALN-TOP | ● | ○ | ○ | ○ | ● | | | | | | | | | | | | | | |
| 6696 | 4-6 Z | 360 | 844 | NR-F | PMX | TIALN-TOP | ● | ○ | ○ | ○ | ● | | | | | | | | | | | | | | |
| 6647 | 4-5 Z | 361 | 844 | NR-F | PMX | TIALN-TOP | | | | | ● | | | | | | | | | | | | | | |
| 6640 | 4-6 Z | 362 | 844 | NR | PMX | TIALN-TOP | ● | | | | | | | ○ | ○ | ● | ● | ● | | | | | | | |
| 6690 | 4-6 Z | 362 | 844 | NR | PMX | TIALN-TOP | ● | | | | | | | ○ | ○ | ● | ● | ● | | | | | | | |
| 6642 | 4-5 Z | 363 | 844 | NF | PMX | TIALN-TOP | ● | | | | | | ● | ○ | ○ | | | | | | | | | | |
| 6692 | 4 Z | 363 | 844 | NF | PMX | TIALN-TOP | ● | | | | | | ● | ○ | ○ | | | | | | | | | | |
| 6444 | 3 Z | 364 | 844 | NR-F | PMX | TIALN-TOP | ● | ○ | | ● | | | | | | | | | | | | | | | |
| 4644 | 3-5 Z | 365 | 844 | NR-F | HSSE 8% Co | TIALSIN | ● | | | | | ● | ● | ● | ● | ● | | | | | | | | | |
| 4696 | 4-5 Z | 365 | 844 | NR-F | HSSE 8% Co | TIALSIN | ● | | | | | ● | ● | ● | ● | ● | | | | | | | | | |
| 4640 | 4-6 Z | 366 | 844 | NR | HSSE 8% Co | TIALSIN | ● | | | | | ○ | ○ | | ○ | ○ | | | | | | | | | |
| 4690 | 4-6 Z | 366 | 844 | NR | HSSE 8% Co | TIALSIN | ● | | | | | ○ | ○ | | ○ | ○ | | | | | | | | | |
| 4680 | 4-6 Z | 367 | 844 | NF | HSSE 8% Co | TIALSIN | ● | | | | | ○ | ○ | | ○ | ○ | | | | | | | | | |
| 4692 | 4-6 Z | 367 | 844 | NF | HSSE 8% Co | TIALSIN | ● | | | | | ○ | ○ | | ○ | ○ | | | | | | | | | |
| 4447 | 3 Z | 368 | 844 | WR | HSSE 8% Co | TIALSIN | ● | | | | | | | ● | ● | ● | ● | ● | | | | | | | |
| 4497 | 3 Z | 368 | 844 | WR | HSSE 8% Co | TIALSIN | ● | | | | | | | ● | ● | ● | ● | ● | | | | | | | |

| | | | | | |
|--|----------------------------|--|--|------------|--------------------------------|
| <850 N/mm ² | <1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant | Anti-Usure | MARTENSITICO Martensitic |
| INOX AUSTÉNITICO Austenitic Stainless Steel | FUNDICIÓN Cast Iron | ALUMINIO Aluminum | TERMOPLÁSTICOS Thermoplastics | | DUROPLÁSTICOS Hard Plastics |
| <700 N/mm ² | 700-1000 N/mm ² | ALAEACIONES TERMORRESISTENTES Heat-Resistant Alloys | VIRUTA CORTA Short Chip | | VIRUTA LARGA Long Chip |
| INOX AUSTÉNITICO Austenitic Stainless Steel | FUNDICIÓN Cast Iron | ALUMINIO Aluminum | Cu-BRONCE LATÓN Copper Bronze Brass | | NO ALEADO Unalloyed |
| | | | < 10% SI | | > 10% SI |
| | | | TERMOPLÁSTICOS Thermoplastics | | DUROPLÁSTICOS Hard Plastics |
| | | | Composites de Fibras Fiber Composites | | 45-70 HRC |

TABLA USO FRESADO PMX - HSSE - HSS

PMX - HSSE - HSS Milling Use Table - Tableau usage Fraisage PMX - HSSE - HSS

FRESAS PMX - HSSE - HSS
PMX - HSSE - HSS End Mills
Fraises PMX - HSSE - HSS

● **Usado Recomendado / Recommended Use / Utilisation conseillée**

○ **Usado Alternativo / Alternative Use / Option d'emploi**



| | | | | | | | | | | | | | | | | | |
|------------------------|-------------------------|-----------------------------|--------------------------------|-----------------------------|--|---|--|---|----------------------------|---------------------------|------------------------|---------|---------|----------------------------------|--------------------------------|--|-----------|
| <850 N/mm ² | <1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant | MARTENSITICO Martensitic | INOX AUSTENITICO Austenitic Stainless Steel | <700 N/mm ² | 700-1000 N/mm ² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys | VIRUTA CORTA Short Chip | VIRUTA LARGA Long Chip | NO ALEADO Unalloyed | <10% Si | >10% Si | TERMOPLÁSTICOS Thermoplastics | DUROPLÁSTICOS Hard Plastics | Composites de Fibras Fiber Composites | 45-70 HRC |
| | | | | | FUNDICIÓN Cast Iron | Cu - BRONCE LATÓN Copper Bronze Culivre Bronze Laiton | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | | F | H | |
| | | | | | | | | P | | M | K | S | N | | | | |
| P.1 | | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 N.2 N.3 N.4 N.5 N.6 N.7 | | | | | | | | | |

| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | |
|------|-------|-----|--------------|----------|------------------------------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|---|---|--|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | | | |
| 6666 | 4-6 Z | 370 | 844 | N | PMX | TIALN-TOP | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| 6600 | 4-6 Z | 371 | 844 | N | PMX | TIALN-TOP | | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| 6606 | 4-6 Z | 371 | 844 | N | PMX | TIALN-TOP | | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| 6604 | 4 Z | 372 | 844 | N | PMX | TIALN-TOP | ● | ○ | | | | | ● | ● | ● | | | | | | | | |
| 6430 | 3 Z | 373 | 844 | W | PMX | TIALN-TOP | | | | | ● | | ● | ● | ● | | | | | | | | |
| 6439 | 3 Z | 374 | 844 | N | PMX | TIALN-TOP | | ● | ○ | | ● | | | | | | | | | | | | |
| 6420 | 2 Z | 375 | 327 | N | PMX | TIALN-TOP | ● | ● | ○ | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| 4600 | 4-6 Z | 376 | 844 | N | HSSE 8% Co | TIALSIN | ● | | | | ● | ● | | ● | ● | | | | | | | | |
| 4606 | 4-6 Z | 376 | 844 | N | HSSE 8% Co | TIALSIN | ● | | | | ● | ● | | ● | ● | | | | | | | | |
| 4400 | 4-6 Z | 377 | 844 | N | HSSE 8% Co | TIALSIN | ● | | | | ● | ● | | ● | ● | | | | | | | | |
| 4430 | 3 Z | 378 | 844 | W | HSSE 8% Co | TIALSIN | | ● | | | | | | | | | | ● | ● | ● | | | |
| 4432 | 3 Z | 378 | 844 | W | HSSE 8% Co | TIALSIN | | ● | | | | | | | | | | ● | ● | ● | | | |
| 4439 | 3 Z | 379 | 844 | N | HSSE 8% Co | TIALSIN | | ● | | | ○ | ○ | ● | ● | ● | | | | | | | | |
| 4420 | 2 Z | 380 | 327 | N | HSSE 8% Co | TIALSIN | ● | | | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | | |
| 4426 | 2 Z | 380 | IZAR Std. | N | HSSE 8% Co | TIALSIN | ● | | | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | | | |
| 4422 | 2 Z | 381 | 327 | N | HSSE 8% Co | TIALSIN | ● | | | | ○ | ○ | ● | ● | | | | | | | | | |
| 4470 | 2 Z | 381 | IZAR Std. | N | HSSE 8% Co | TIALSIN | ● | | | | ○ | ○ | ● | ● | | | | | | | | | |

TABLA USO FRESADO PMX - HSSE - HSS

PMX - HSSE - HSS Milling Use Table - Tableau usage Fraisage PMX - HSSE - HSS

FRESAS PMX - HSSE - HSS PMX - HSSE - HSS End Mills Fraises PMX - HSSE - HSS

● **Usado Recomendado** / Recommended Use / Utilisation conseillée

○ **Usado Alternativo** / Alternative Use / Option d'emploi



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|-------------|-----------------|--------------------------------|--------------------------|-----------------------------|--|---------------------------|------------|----------------|------------------------|-------|---|------------------------|----------------------------|---|---------------------------|---------------|------------------------|--------------|----------|----------|--|------------------|--------------------------------|-----------------|--|---------------------|-----------|--|--|--|--|
| <850 N/mm² | <1000 N/mm² | 1000-1300 N/mm² | ANTIDESGASTE Wear-Resistant | ANTI-USURE Anti-Usure | MARTENSITICO Martensitic | INOX AUSTENITICO Austenitic Stainless Steel | Aciers inox austénitiques | <700 N/mm² | 700-1000 N/mm² | FUNDICIÓN Cast Iron | Fonte | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys | Alliages thermostables | VIRUTA CORTA Short Chip | Copeaux courts | VIRUTA LARGA Long Chip | Copeaux longs | NO ALEADO Unalloyed | Sans alliage | < 10% Si | > 10% Si | TERMOPLÁSTICOS Thermoplastics | Thermoplastiques | DUROPLÁSTICOS Hard Plastics | Plastiques durs | Composites de Fibras Fiber Composites | Composites en fibre | 45-70 HRC | | | | |
| | | | | | | | | | | | | | | | Cu - BRONCE LATON Copper Bronze Brass Cuivre Bronze Laiton | | | | | | | ALUMINIO - MAGNESIO Aluminium - Magnesium | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | M | K.1 | K.2 | S | | | N | | | | | | | F | H | | | | | | | | | | | | | | | | | |
| P.1 | P.2 | P.3 | P.4 | P.5 | M | K.1 | K.2 | S | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H | | | | | | | | | | | | | | | |



| Ref. | Image | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | | S | | | N | | | | | | | F | H | |
|------|-------|-------|-----|-----------|----------|------------------------|-----|-----|-----|-----|-----|---|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|---|---|---|--|
| | | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | M | K.1 | K.2 | S | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H | | | |
| 4410 | | 1Z | 382 | IZAR Std. | W | HSSE 5% Co | | | | | | | | | | | | | | ● | ● | ● | ● | | | | |
| 4411 | | 1Z | 382 | IZAR Std. | W | HSSE 5% Co | | | | | | | | | | | | | | ● | ● | ● | ● | | | | |
| 4401 | | 4-8 Z | 383 | 844 | N | HSS | ● | | | | | | | | | | | | | | | | | | | | |
| 4421 | | 2Z | 384 | 327 | N | HSS | ● | | | | | | | | | | | | | | | | | | | | |
| 4412 | | 1Z | 385 | IZAR Std. | W | HSS | | | | | | | | | | | | | | | ● | ● | ● | ● | | | |
| 4413 | | 1Z | 385 | IZAR Std. | W | HSS | | | | | | | | | | | | | | | ● | ● | ● | ● | | | |
| 4414 | | 1Z | 386 | IZAR Std. | W | HSS | | | | | | | | | | | | | | | ● | ● | ● | ● | | | |
| 4415 | | 1Z | 386 | IZAR Std. | W | HSS | | | | | | | | | | | | | | | ● | ● | ● | ● | | | |
| 4416 | | 1Z | 387 | IZAR Std. | W | HSS | | | | | | | | | | | | | | | ● | ● | ● | ● | | | |
| 4417 | | 1Z | 387 | IZAR Std. | W | HSS | | | | | | | | | | | | | | | ● | ● | ● | ● | | | |

FRESAS ESPECIALES

Shank Tools Fraises specials

● **Usado Recomendado** / Recommended Use / Utilisation conseillée

○ **Usado Alternativo** / Alternative Use / Option d'emploi

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-----------------------|--|--|------------|--|------------------------|--|--|------------|--|------------------------|--|--|------------|--|---|--|--|------------|--|---------------------------------|--|--|------------|--|---|--|--|------------|--|-----------------------|--|--|------------|--|-----------------------|--|--|------------|--|---|--|--|------------|--|--|--|--|------------|--|--|--|--|------------|--|--|--|--|------------|--|--------------------|--|--|------------|--|--------------------|--|--|--|--|--|--|--|--|--|---|--|--|--|--|---|--|--|--|--|------------------|--|--|--|--|
|  |  | < 850 N/mm² | | | | | < 1000 N/mm² | | | | | 1000-1300 N/mm² | | | | | ANTIDESGASTE Wear-Resistant Anti-Ussure | | | | | MARTENSITICO Martensitic | | | | | INOX AUSTENITICO Austenitic Stainless Steel - Aciers inox austénitiques | | | | | < 700 N/mm² | | | | | 700-1000 N/mm² | | | | | ALEACIONES TERMOPRESISTENTES Heat-Resistant Alloys - Allages thermorésistants | | | | | VIRUTA CORTA Short Chip - copeaux courts | | | | | VIRUTA LARGA Long Chip - copeaux longs | | | | | NO ALEADO Unalloyed - Sans alliage | | | | | < 10% Si | | | | | > 10% Si | | | | | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | | | | | DUROPLÁSTICOS Hard Plastics - Plastiques durs | | | | | Composites de Fibras Fiber Composites Composites en fibre | | | | | 45-70 HRC | | | | |
| | | P | | | | | M | | | | | K | | | | | S | | | | | N | | | | | F | | | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P.1 | | | | | P.2 | | | | | P.3 | | | | | P.4 | | | | | P.5 | | | | | K.1 | | | | | K.2 | | | | | N.1 | | | | | N.2 | | | | | N.3 | | | | | N.4 | | | | | N.5 | | | | | N.6 | | | | | N.7 | | | | | | | | | | | | | | | | | | | | | | | | | | |



| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | | K | | S | N | | | | | | | F | | H | | | | | | | | | | | | | | | |
|------|------|--------|--------------|------------|------------------------------|----------|-----|-----|-----|-----|----------|-----|----------|-----|----------|----------|-----|-----|-----|-----|---|---|----------|--|----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | K.1 | K.2 | S | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | F | H | | | | | | | | | | | | | | | | | | |
| 4800 | 395 | 851 AA | N | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4802 | 395 | 851 AB | NR | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4834 | 396 | 850 D | N | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5080 | 397 | 6518 B | N | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4330 | 398 | 1833 A | N | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4340 | 398 | 1883 B | N | HSSE 8% Co | | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4810 | 399 | 851 B | N | HSSE 8% Co | | ● | ○ | | | | | | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | |

TABLA USO FRESADO PMX - HSSE - HSS

PMX - HSSE - HSS Milling Use Table - Tableau usage Fraisage PMX - HSSE - HSS

FRESAS CÓNICAS Taper Shank End Mills Fraises coniques

- **Usado Recomendado / Recommended Use / Utilisation conseillée**
- **Usado Alternativo / Alternative Use / Option d'emploi**

| | | | | | | | | | | | | | | | | | | | | | |
|---|-------------------------|-----------------------------|--------------------------------|--------------------------|-----------------------------|--|--|--|--|---|---|---------------------------------------|---------|---------|---|--|--|-----------|-----|--|--|
| <850 N/mm ² | <1000 N/mm ² | 1000-1300 N/mm ² | ANTIDESGASTE Wear-Resistant | ANTI-USURE Anti-Usure | MARTENSÍTICO Martensitic | INOX AUSTENÍTICO Austenitic Stainless Steel - Aciers inox austénitiques | <700 N/mm ² | 700-1000 N/mm ² | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | VIRUTA CORTA Short Chip - copeaux courts | VIRUTA LARGA Long Chip - copeaux longs | NO ALEADO Unalloyed - sans alliage | <10% Si | >10% Si | TERMOPLÁSTICOS Thermoplastics - Thermoplastiques | DUROPLÁSTICOS Hard Plastics - Plastiques durs | Composites de Fibras Fiber Composites | 45-70 HRC | | | |
|  | | | | | | FUNDICIÓN Cast Iron Fonte | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys - Alliages thermostables | Cu - BRONCE LATÓN Copper Bronze Cuivre Bronze Laiton | ALUMINIO - MAGNESIO Aluminium - Magnesium |  | Composites de Fibras Fiber Composites | 45-70 HRC | | | | | | | | | |
| | | | | | | | | | | | | | P | M | K | S | N | | | | |
| | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | |

| Ref. | Pag. | DIN | Tipo Type | Material | Recubr. Coating Revêt. | P | | | | | M | K | S | N | | | | | | | F | H | |
|------|------|-----------|--------------|---------------|------------------------------|-----|-----|-----|-----|-----|---|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|--|
| | | | | | | P.1 | P.2 | P.3 | P.4 | P.5 | | K.1 | K.2 | | N.1 | N.2 | N.3 | N.4 | N.5 | N.6 | N.7 | | |
| 4675 | 400 | 845 B | NR-F | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | | | | | | | | | | | |
| 4570 | 401 | 845 B | NR | HSSE 8% Co | | ● | ○ | | | | | | | | | | | | | | | | |
| 4580 | 401 | 845 B | NR | HSSE 8% Co | | ● | ○ | | | | | | | | | | | | | | | | |
| 4610 | 402 | 845 B | N | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | | | | | | | | | | | |
| 4516 | 402 | 845 B | N | HSSE 8% Co | TIALSIN | ● | ○ | | | | | | | | | | | | | | | | |
| 4550 | 403 | 326 D | N | HSSE 8% Co | | ● | ○ | | | | | | | | | | | | | | | | |
| 9674 | 404 | IZAR Std. | | | | | | | | | | | ○ | ○ | ● | ● | ● | ● | | | | | |

Dentado / Teeth / Denture: 2

FRESAS AGUJERO Milling Cutters Fraises à trou

Pag. 407



TALADRADO - Drilling - Perçage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|-----------------------|------------------------------------|-------------------|
| 8450 |  | 453 | | WCMX |
| 8425 |  | 453 | | ISO 9766 (3XD) |
| 8465 |  | New! 455 | | SOGX |
| 8470 |  | New! 455 | | SOMX |
| 8475 |  | New! 456 | | TOMX |
| 8460 |  | New! 456 | | DOEX |
| 8431 |  | New! 457 | | SPS.. 90° |
| 8432 |  | New! 457 | | SPS.. 90° |
| 8430 |  | New! 458 | | SPS.. 60° |

| | | | |
|-------------|--|--|-----|
| Set 8431 |  | SET PORTA-PLAQUITAS PUNTEADO SPS.. 90° SPS.. 90° Spotting Tool-Holder Set Jeu de porte-plaquettes de repérage SPS.. 90° | 457 |
| | |  | |

| | | | |
|-------------|--|--|-----|
| Set 8432 |  | SET PORTA-PLAQUITAS PUNTEADO SPS.. 90° SPS.. 90° Spotting Tool-Holder Set Jeu de porte-plaquettes de repérage SPS.. 90° | 457 |
| | |  | |

TORNEADO - Turning - Tournage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|--------------|
| 8500 |  | 468 | + | CCMT |
| 8501 |  | 469 | + | CCGT |
| 8510 |  | 470 | - | CNMG |
| 8512 |  | 471 | - | CNMM |
| 8515 |  | 471 | + | DCGT |
| 8520 |  | 472 | + | DCMT |
| 8530 |  | 473 | - | DNMG |
| 8535 |  | 474 | - | KNUX |
| 8540 |  | 474 | + | SCMT |
| 8550 |  | 475 | - | SNMG |
| 8554 |  | 475 | + | SPUN |


| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|--------------|
| 8558 |  | 476 | + | TCGT |
| 8560 |  | 476 | + | TCMT |
| 8570 |  | 477 | - | TNMG |
| 8571 |  | 478 | + | TPMR |
| 8572 |  | 478 | + | TPUN |
| 8575 |  | 479 | + | VBMT |
| 8576 |  | 479 | + | VCGT |
| 8577 |  | 480 | + | VCMT |
| 8578 |  | 480 | - | VNMG |
| 8580 |  | 481 | - | WNMG |

TABLA USO PLAQUITAS MD

HM Inserts Use Table - Tableau usage Plaquettes carbure

TORNEADO - Turning - Tournage

Exterior - External - Extérieur

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|---------------|
| 8726 | | 485 | — | CKJN -93° |
| 8706 | | 485 | + | CSBP. -75° |
| 8707 | | 486 | + | CTGP. -90° |
| 8790 | | 486 | — | DWLN. -95° |
| 8710 | | 487 | — | MCLN. -95° |
| 8700 | | 487 | — | MTJN. -93° |
| 8724 | | 488 | — | MVJN. -93° |
| 8770 | | 488 | — | MWLN. -95° |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|---------------|
| 8709 | | 489 | — | PCLN. -95° |
| 8725 | | 489 | — | PDJN. -93° |
| 8791 | | 490 | — | PSSN -45° |
| 8704 | | 490 | + | SCLC. -95° |
| 8729 | | 491 | + | SDJC. -93° |
| 8703 | | 491 | + | STJC. -93° |
| 8727 | | 492 | + | SVJB -93° |
| 8728 | | 492 | + | SVJC -93° |

Interior - Internal - Intérieur

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|-----------------|
| 8715 | | 493 | + | S-CTFP. -90° |
| 8731 | | 493 | — | S-MCLN. -95° |
| 8732 | | 494 | — | S-MTUN. -93° |
| 8769 | | 494 | — | S-MVUN -93° |
| 8780 | | 495 | — | S-MWLN. -95° |
| 8800 | | 495 | — | S-MWLN. -95° |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|-----------------|
| 8733 | | 496 | — | S-PCLN. -95° |
| 8765 | | 496 | — | S-PDUN. -93° |
| 8751 | | 497 | + | S-SCLC. -95° |
| 8761 | | 497 | + | S-SDUC. -93° |
| 8718 | | 498 | + | S-STFC. -90° |
| 8768 | | 498 | + | S-SVUC. -93° |

| | | |
|----------|-----|---|
| Set 8799 | 516 | SET DE TORNEADO - Turning Inserts Set - Jeu de tournage |
| | | |

TRONZADO Y RANURADO - Parting & Grooving - Tronçonnage et rainurage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|-------------------|------|------------------------------------|--------------|
| 8600 | | 500 | | LFMX |
| 8601 | New! | 501 | | MGMN |
| 8603 | | 502 | EXT. | TN..ER.A |
| 8606 | | 503 | INT. | TN..IR.A |
| 8850 | | 504 | | XLCF |







| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|-------------------|------|------------------------------------|--------------|
| 8860 | | 504 | | MS-EN |
| 8870 | | 505 | | XLCFN |
| 8875 | | 505 | | XLCFN |
| 8865 | New! | 506 | | XMCG |
| 8866 | New! | 506 | | S-GMGG |



| | | |
|----------|-----|---|
| Set 8605 | 503 | SET RANURADO SEEGER® Grooving Set Seeger® Jeu rainurage Seeger® |
| | | |

TABLA USO PLAQUITAS MD

HM Inserts Use Table - Tableau usage Plaquettes carbure

ROSCADO - Threading - Taraudage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|------------------|
| 8610 |  | 511 | EXT. PERFIL TOTAL | MÉTRICA 60° |
| 8615 |  | 511 | EXT. PERFIL PARCIAL | TN..ER.M 60° |
| 8620 |  | 512 | INT. PERFIL TOTAL | MÉTRICA 60° |
| 8625 |  | 512 | INT. PERFIL PARCIAL | TN..IR.M 60° |
| 8612 |  | 513 | EXT. PERFIL TOTAL | WHITWORTH 55° |
| 8622 |  | 513 | INT. PERFIL TOTAL | WHITWORTH 55° |



| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|--------------|
| 8820 |  | 515 | EXT. | SER |
| 8830 |  | 515 | INT. | SIR |

| | | | | | |
|-------------|--|---|---|--|-----|
| Set 8610 |  | SET ROSCADO EXTERIOR ROSCA MÉTRICA ISO ISO Metric External Threading Set Jeu taraudage extérieur filetage métrique ISO | | | 511 |
| | |  |  | | |

FRESADO - Milling - Fraisage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|-----------------------|------------------------------------|---------------------|
| 8232 |  | 523 | | A50060 |
| 8230 |  | 524 | | S45SE12F -45° |
| 8235 |  | 525 | | W45SE123F -45° |
| 8240 |  | 526 | | S45OD06 -45° |
| 8241 |  | New! 527 | | S90XN08 |
| 8245 |  | New! 528 | | S90AP10D -90° |
| 8247 |  | 529 | | S90AP10D-RF -90° |
| 8250 |  | 530 | | S90AP16D -90° |
| 8255 |  | 531 | | W90TP16D -90° |
| 8260 |  | 532 | | W90TP22D -90° |
| 8264 |  | 533 | | SAP-06 |
| 8265 |  | 534 | | SAP-10D |
| 8270 |  | 535 | | SAP-16D |
| 8275 |  | 536 | | S90SN12 |
| 8280 |  | 537 | | SCMORD |
| 8285 |  | 538 | | SRD |
| 8290 |  | 539 | | SRC |
| 8295 |  | 540 | | SLC |
| 8633 |  | 543 | + | APHT-16-FA |
| 8636 |  | 543 | + | APET-10-FA |
| 8639 |  | 543 | + | APKT-10-M |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|-----------------------|------------------------------------|--------------|
| 8642 |  | 544 | + | APKT-16 |
| 8645 |  | 544 | + | LC |
| 8648 |  | 544 | + | ODMT |
| 8651 |  | 545 | + | RC |
| 8654 |  | 545 | + | RDHT |
| 8657 |  | 545 | + | RDHW |
| 8660 |  | 546 | + | SEKN-12 |
| 8663 |  | 546 | + | SEKR-12 |
| 8666 |  | 546 | + | SEHT-12 |
| 8667 |  | 547 | + | SEET-12 |
| 8669 |  | 547 | + | SEHT-12 |
| 8672 |  | 547 | + | SNHQ |
| 8675 |  | 548 | + | TPKN |
| 8678 |  | 548 | + | TPKR |
| 8679 |  | New! 548 | - | XNMX |
| 8680 |  | 549 | + | XOET |
| 8690 |  | 549 | + | WNMW |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|----------------|
| 8200 |  | 554 | | DIN 69871-A-AD |
| 8201 |  | 554 | | JIS B 6339-BT |



TALADRADO METAL DURO

Carbide Drilling
Perçage carbure

BROCAS METAL DURO INTEGRAL

Solid Carbide Drill Bits
Forets carbure

38

BROCAS CENTRAR

Center Drills
Forets à centrer

63

BROCAS PUNTA METAL DURO

Carbide Tipped Drill Bits
Forets pointe carbure

66

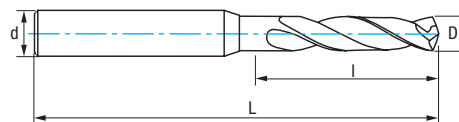
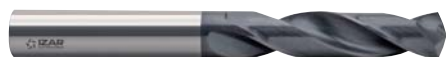


Ref. **8400**

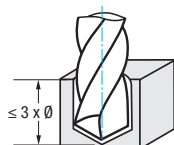
BROCA METAL DURO GRAN RENDIMIENTO CNC 3XD

3XD CNC High Performance Carbide Drill Bit

Foret carbure haut rendement CNC 3XD



| | | | | | | | | | | |
|---------------------------------------|--------------|---------------|--|--|--|--|----------------|--------------|------------|------------|
| MD/HM Carbure Micrograno | ALTIN | DIN 6537 K | | | | | DIN 6535 HA | HRC 45-55 | Tol. m7 | 3XD |
|---------------------------------------|--------------|---------------|--|--|--|--|----------------|--------------|------------|------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 |
| P | P.1 | 90-110 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,300 | 0,340 |
| | P.2 | 50-80 | 0,060 | 0,090 | 0,120 | 0,140 | 0,160 | 0,200 | 0,220 |
| | P.3 | 40-70 | 0,040 | 0,050 | 0,070 | 0,090 | 0,100 | 0,140 | 0,160 |
| | P.4 | 15-30 | 0,035 | 0,050 | 0,060 | 0,062 | 0,070 | 0,075 | 0,080 |
| | P.5 | 40-70 | 0,030 | 0,050 | 0,060 | 0,062 | 0,070 | 0,075 | 0,080 |
| M | | 35-45 | 0,045 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |
| K | K.1 | 40-100 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,320 |
| | K.2 | 40-60 | 0,080 | 0,120 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| S | | 30-40 | 0,040 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |
| N | N.1 | 50-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.2 | 50-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.3 | 80-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.4 | 80-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.5 | 60-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



Video

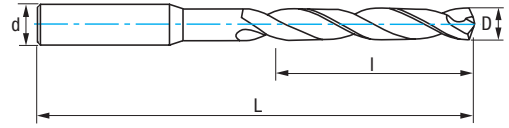


Ref. **8405**

BROCA METAL DURO GRAN RENDIMIENTO CNC 5XD

5XD CNC High Performance Carbide Drill Bit

Foret carbure haut rendement CNC 5XD



MD/HM
Carbure
Micrograno

ALTIN

DIN
6537 L

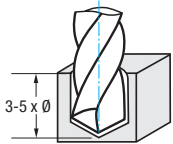


DIN
6535 HA

HRC
45-55

Tol.
m7

5XD



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | ALTIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 |
| P | P.1 | 90-110 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,300 | 0,340 |
| | P.2 | 50-80 | 0,060 | 0,090 | 0,120 | 0,140 | 0,160 | 0,200 | 0,220 |
| | P.3 | 40-70 | 0,040 | 0,050 | 0,070 | 0,090 | 0,100 | 0,140 | 0,160 |
| | P.4 | 15-30 | 0,030 | 0,050 | 0,060 | 0,062 | 0,070 | 0,075 | 0,080 |
| | P.5 | 40-70 | 0,045 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |
| M | | 35-45 | 0,035 | 0,050 | 0,060 | 0,062 | 0,070 | 0,075 | 0,080 |
| K | K.1 | 40-100 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,320 |
| | K.2 | 40-60 | 0,080 | 0,120 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| S | | 30-40 | 0,040 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |
| N | N.1 | 50-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.2 | 50-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.3 | 80-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.4 | 80-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.5 | 60-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$


$$Vf (\text{mm/min.}) = \text{r.p.m.} \times f$$




Ref. **8405****BROCA METAL DURO GRAN RENDIMIENTO CNC 5XD**

5XD CNC High Performance Carbide Drill Bit

Foret carbure haut rendement CNC 5XD

| | D mm | d mm | L mm | I mm |  | N° Art. ALTIN | € |
|------|---------|---------|---------|---------|---|------------------|-------|
| | 3,00 | 6,00 | 66 | 28 | 1 | 16156 | 41,99 |
| | 3,10 | 6,00 | 66 | 28 | 1 | 68746 | 41,99 |
| | 3,20 | 6,00 | 66 | 28 | 1 | 68747 | 41,99 |
| | 3,30 | 6,00 | 66 | 28 | 1 | 16178 | 41,99 |
| | 3,50 | 6,00 | 66 | 28 | 1 | 16202 | 41,99 |
| | 3,70 | 6,00 | 66 | 28 | 1 | 68748 | 41,99 |
| | 3,80 | 6,00 | 74 | 36 | 1 | 68749 | 41,99 |
| | 4,00 | 6,00 | 74 | 36 | 1 | 16219 | 41,99 |
| | 4,10 | 6,00 | 74 | 36 | 1 | 68750 | 41,99 |
| | 4,20 | 6,00 | 74 | 36 | 1 | 16221 | 41,99 |
| New! | 4,25 | 6,00 | 74 | 36 | 1 | 78715 | 41,99 |
| | 4,30 | 6,00 | 74 | 36 | 1 | 68751 | 41,99 |
| New! | 4,40 | 6,00 | 74 | 36 | 1 | 78719 | 41,99 |
| | 4,50 | 6,00 | 74 | 36 | 1 | 16225 | 41,99 |
| | 4,60 | 6,00 | 74 | 36 | 1 | 68752 | 41,99 |
| New! | 4,70 | 6,00 | 74 | 36 | 1 | 78722 | 41,99 |
| | 4,80 | 6,00 | 82 | 44 | 1 | 68753 | 41,99 |
| | 4,90 | 6,00 | 82 | 44 | 1 | 68754 | 41,99 |
| | 5,00 | 6,00 | 82 | 44 | 1 | 16226 | 41,99 |
| | 5,10 | 6,00 | 82 | 44 | 1 | 68756 | 41,99 |
| | 5,20 | 6,00 | 82 | 44 | 1 | 68758 | 41,99 |
| | 5,30 | 6,00 | 82 | 44 | 1 | 68759 | 41,99 |
| | 5,50 | 6,00 | 82 | 44 | 1 | 16227 | 41,99 |
| New! | 5,60 | 6,00 | 82 | 44 | 1 | 68760 | 41,99 |
| | 5,70 | 6,00 | 82 | 44 | 1 | 68760 | 41,99 |
| | 5,80 | 6,00 | 82 | 44 | 1 | 68761 | 41,99 |
| | 5,90 | 6,00 | 82 | 44 | 1 | 68762 | 41,99 |
| | 6,00 | 6,00 | 82 | 44 | 1 | 16228 | 41,99 |
| | 6,10 | 8,00 | 91 | 53 | 1 | 68763 | 49,68 |
| | 6,20 | 8,00 | 91 | 53 | 1 | 68764 | 49,68 |
| New! | 6,30 | 8,00 | 91 | 53 | 1 | 79094 | 49,68 |
| New! | 6,40 | 8,00 | 91 | 53 | 1 | 79095 | 49,68 |
| | 6,50 | 8,00 | 91 | 53 | 1 | 16229 | 49,68 |
| | 6,60 | 8,00 | 91 | 53 | 1 | 68765 | 49,68 |
| New! | 6,70 | 8,00 | 91 | 53 | 1 | 79859 | 49,68 |
| | 6,75 | 8,00 | 91 | 53 | 1 | 68766 | 49,68 |
| | 6,80 | 8,00 | 91 | 53 | 1 | 16231 | 49,68 |
| | 6,90 | 8,00 | 91 | 53 | 1 | 68767 | 49,68 |
| | 7,00 | 8,00 | 91 | 53 | 1 | 16242 | 49,68 |
| | 7,20 | 8,00 | 91 | 53 | 1 | 68769 | 49,68 |
| | 7,40 | 8,00 | 91 | 53 | 1 | 68771 | 49,68 |
| | 7,50 | 8,00 | 91 | 53 | 1 | 16252 | 49,68 |
| | 7,80 | 8,00 | 91 | 53 | 1 | 68772 | 49,68 |
| New! | 7,90 | 8,00 | 91 | 53 | 1 | 79868 | 49,68 |
| | 8,00 | 8,00 | 91 | 53 | 1 | 16254 | 49,68 |
| | 8,10 | 10,00 | 103 | 61 | 1 | 68773 | 60,91 |
| | 8,20 | 10,00 | 103 | 61 | 1 | 68774 | 60,91 |
| New! | 8,30 | 10,00 | 103 | 61 | 1 | 79893 | 60,91 |
| New! | 8,40 | 10,00 | 103 | 61 | 1 | 79894 | 60,91 |
| | 8,50 | 10,00 | 103 | 61 | 1 | 16260 | 60,91 |
| | 8,60 | 10,00 | 103 | 61 | 1 | 68775 | 60,91 |
| New! | 8,70 | 10,00 | 103 | 61 | 1 | 79897 | 60,91 |
| | 8,80 | 10,00 | 103 | 61 | 1 | 68776 | 60,91 |
| New! | 8,90 | 10,00 | 103 | 61 | 1 | 79900 | 60,91 |

| | D mm | d mm | L mm | I mm |  | N° Art. ALTIN | € |
|------|---------|---------|---------|---------|---|------------------|--------|
| | 9,00 | 10,00 | 103 | 61 | 1 | 16276 | 60,91 |
| New! | 9,10 | 10,00 | 103 | 61 | 1 | 79903 | 60,91 |
| | 9,20 | 10,00 | 103 | 61 | 1 | 68786 | 60,91 |
| | 9,30 | 10,00 | 103 | 61 | 1 | 68787 | 60,91 |
| New! | 9,40 | 10,00 | 103 | 61 | 1 | 79906 | 60,91 |
| | 9,50 | 10,00 | 103 | 61 | 1 | 16277 | 60,91 |
| New! | 9,60 | 10,00 | 103 | 61 | 1 | 79911 | 60,91 |
| New! | 9,70 | 10,00 | 103 | 61 | 1 | 79916 | 60,91 |
| | 9,80 | 10,00 | 103 | 61 | 1 | 68788 | 60,91 |
| New! | 9,90 | 10,00 | 103 | 61 | 1 | 79970 | 60,91 |
| | 10,00 | 10,00 | 103 | 61 | 1 | 16278 | 60,91 |
| | 10,10 | 12,00 | 118 | 71 | 1 | 68792 | 88,65 |
| | 10,20 | 12,00 | 118 | 71 | 1 | 16279 | 88,65 |
| | 10,30 | 12,00 | 118 | 71 | 1 | 68796 | 88,65 |
| | 10,40 | 12,00 | 118 | 71 | 1 | 68797 | 88,65 |
| | 10,50 | 12,00 | 118 | 71 | 1 | 16280 | 88,65 |
| | 10,60 | 12,00 | 118 | 71 | 1 | 68798 | 88,65 |
| New! | 10,70 | 12,00 | 118 | 71 | 1 | 79990 | 88,65 |
| | 10,80 | 12,00 | 118 | 71 | 1 | 68799 | 88,65 |
| | 11,00 | 12,00 | 118 | 71 | 1 | 16281 | 88,65 |
| New! | 11,10 | 12,00 | 118 | 71 | 1 | 79998 | 88,65 |
| | 11,20 | 12,00 | 118 | 71 | 1 | 68801 | 88,65 |
| | 11,30 | 12,00 | 118 | 71 | 1 | 68802 | 88,65 |
| | 11,50 | 12,00 | 118 | 71 | 1 | 16282 | 88,65 |
| New! | 11,70 | 12,00 | 118 | 71 | 1 | 80010 | 88,65 |
| | 11,80 | 12,00 | 118 | 71 | 1 | 68803 | 88,65 |
| | 12,00 | 12,00 | 118 | 71 | 1 | 16300 | 88,65 |
| New! | 12,10 | 14,00 | 124 | 77 | 1 | 80025 | 117,01 |
| | 12,20 | 14,00 | 124 | 77 | 1 | 68804 | 117,01 |
| | 12,30 | 14,00 | 124 | 77 | 1 | 68805 | 117,01 |
| New! | 12,40 | 14,00 | 124 | 77 | 1 | 80030 | 117,01 |
| | 12,50 | 14,00 | 124 | 77 | 1 | 68806 | 117,01 |
| New! | 12,70 | 14,00 | 124 | 77 | 1 | 80031 | 117,01 |
| | 12,80 | 14,00 | 124 | 77 | 1 | 68808 | 117,01 |
| | 13,00 | 14,00 | 124 | 77 | 1 | 16303 | 117,01 |
| | 13,30 | 14,00 | 124 | 77 | 1 | 68809 | 117,01 |
| | 13,50 | 14,00 | 124 | 77 | 1 | 68810 | 117,01 |
| New! | 13,70 | 14,00 | 124 | 77 | 1 | 80057 | 117,01 |
| | 13,80 | 14,00 | 124 | 77 | 1 | 68812 | 117,01 |
| | 14,00 | 14,00 | 124 | 77 | 1 | 16305 | 117,01 |
| | 14,20 | 16,00 | 133 | 83 | 1 | 68813 | 147,87 |
| | 14,50 | 16,00 | 133 | 83 | 1 | 68814 | 147,87 |
| New! | 14,70 | 16,00 | 133 | 83 | 1 | 80088 | 147,87 |
| | 15,00 | 16,00 | 133 | 83 | 1 | 16308 | 147,87 |
| | 15,50 | 16,00 | 133 | 83 | 1 | 68815 | 147,87 |
| | 15,70 | 16,00 | 133 | 83 | 1 | 68816 | 147,87 |
| | 16,00 | 16,00 | 133 | 83 | 1 | 16310 | 147,87 |
| | 16,50 | 18,00 | 143 | 93 | 1 | 68834 | 220,34 |
| | 17,00 | 18,00 | 143 | 93 | 1 | 10838 | 220,34 |
| | 17,50 | 18,00 | 143 | 93 | 1 | 68836 | 220,34 |
| | 18,00 | 18,00 | 143 | 93 | 1 | 68837 | 220,34 |
| | 18,50 | 20,00 | 153 | 101 | 1 | 68839 | 240,27 |
| | 19,00 | 20,00 | 153 | 101 | 1 | 68840 | 240,27 |
| | 19,50 | 20,00 | 153 | 101 | 1 | 68842 | 240,27 |
| | 20,00 | 20,00 | 153 | 101 | 1 | 68843 | 240,27 |

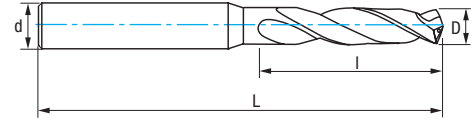


Ref. **8410**

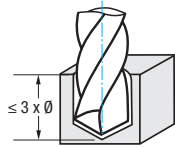
BROCA METAL DURO REFRIGERACIÓN INTERIOR 3XD

3XD Internal Cooling Carbide Drill Bit

Foret carbure lubrification interne 3XD



| | | | | | | | | | | |
|-------------------------------------|-------|---------------|--|--|--|--|----------------|--------------|------------|------------|
| MD/HM Carbure Grano UF | ALTIN | DIN 6537 K | | | | | DIN 6535 HA | HRC 45-55 | Tol. m7 | 3XD |
|-------------------------------------|-------|---------------|--|--|--|--|----------------|--------------|------------|------------|



| Material | | Vc (m/min) * | Avances** f/rev. (mm/rev) - Feed** - Pas** | | | | | | |
|----------|------|--------------|--|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | ALTIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 |
| P | P.1 | 100-120 | 0,180 | 0,200 | 0,280 | 0,300 | 0,350 | 0,400 | 0,450 |
| | P.2 | 90-110 | 0,160 | 0,180 | 0,200 | 0,220 | 0,280 | 0,300 | 0,350 |
| | P.3 | 75-95 | 0,080 | 0,100 | 0,110 | 0,120 | 0,140 | 0,180 | 0,220 |
| | P.4 | 35-40 | 0,050 | 0,070 | 0,090 | 0,100 | 0,110 | 0,140 | 0,160 |
| | P.5 | 50-65 | 0,090 | 0,120 | 0,150 | 0,180 | 0,200 | 0,240 | 0,260 |
| M | | 30-40 | 0,060 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 |
| K | K.1 | 125-150 | 0,200 | 0,220 | 0,300 | 0,350 | 0,400 | 0,450 | 0,550 |
| | K.2 | 90-110 | 0,180 | 0,200 | 0,260 | 0,280 | 0,300 | 0,350 | 0,450 |
| S | | 35-50 | 0,060 | 0,090 | 0,090 | 0,100 | 0,140 | 0,160 | 0,180 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf = r.p.m. \times f \times K \quad Vf \text{ (Avance mm/min Feed/Pas)}$$

K = Coeficiente corrección según profundidad taladrado
Correction coefficient depending on drilling depth
Coéfficient correction suivant la profondeur du perçage

***K para/for/pour Vc: **K para/for/pour Vf:**

< 3 x Ø → K = 1

< 3 x Ø → K = 1

< 4 x Ø → K = 0,9

> 3 x Ø → K = 0,9

< 5 x Ø → K = 0,8



Ref. **8410**

BROCA METAL DURO REFRIGERACIÓN INTERIOR 3XD

3XD Internal Cooling Carbide Drill Bit

Foret carbure lubrification interne 3XD



| | D mm | d mm | L mm | l mm | | N° Art. ALTIN | € |
|-------------|---------|---------|---------|---------|---|------------------|-------|
| | 3,00 | 6,00 | 62 | 20 | 1 | 12950 | 53,81 |
| New! | 3,10 | 6,00 | 62 | 20 | 1 | 78712 | 53,81 |
| | 3,20 | 6,00 | 62 | 20 | 1 | 12951 | 53,81 |
| | 3,30 | 6,00 | 62 | 20 | 1 | 12952 | 53,81 |
| | 3,40 | 6,00 | 62 | 20 | 1 | 12953 | 53,81 |
| | 3,50 | 6,00 | 62 | 20 | 1 | 12954 | 53,81 |
| | 3,70 | 6,00 | 62 | 20 | 1 | 12955 | 53,81 |
| | 4,00 | 6,00 | 66 | 24 | 1 | 16315 | 53,81 |
| | 4,10 | 6,00 | 66 | 24 | 1 | 16317 | 53,81 |
| | 4,20 | 6,00 | 66 | 24 | 1 | 16319 | 53,81 |
| New! | 4,25 | 6,00 | 66 | 24 | 1 | 78716 | 53,81 |
| | 4,30 | 6,00 | 66 | 24 | 1 | 16448 | 53,81 |
| | 4,50 | 6,00 | 66 | 24 | 1 | 16559 | 53,81 |
| | 4,60 | 6,00 | 66 | 24 | 1 | 16568 | 53,81 |
| | 4,70 | 6,00 | 66 | 24 | 1 | 16588 | 53,81 |
| | 4,80 | 6,00 | 66 | 28 | 1 | 16589 | 53,81 |
| New! | 4,90 | 6,00 | 66 | 28 | 1 | 78743 | 53,81 |
| | 5,00 | 6,00 | 66 | 28 | 1 | 16601 | 53,81 |
| | 5,10 | 6,00 | 66 | 28 | 1 | 16603 | 53,81 |
| | 5,20 | 6,00 | 66 | 28 | 1 | 16604 | 53,81 |
| | 5,30 | 6,00 | 66 | 28 | 1 | 16605 | 53,81 |
| | 5,50 | 6,00 | 66 | 28 | 1 | 16607 | 53,81 |
| | 5,60 | 6,00 | 66 | 28 | 1 | 16609 | 53,81 |
| | 5,70 | 6,00 | 66 | 28 | 1 | 16616 | 53,81 |
| | 5,80 | 6,00 | 66 | 28 | 1 | 16645 | 53,81 |
| | 6,00 | 6,00 | 66 | 28 | 1 | 16671 | 53,81 |
| | 6,10 | 8,00 | 79 | 34 | 1 | 16684 | 63,79 |
| | 6,20 | 8,00 | 79 | 34 | 1 | 16698 | 63,79 |
| | 6,30 | 8,00 | 79 | 34 | 1 | 16705 | 63,79 |
| | 6,50 | 8,00 | 79 | 34 | 1 | 16732 | 63,79 |
| New! | 6,70 | 8,00 | 79 | 34 | 1 | 80094 | 63,79 |
| | 6,75 | 8,00 | 79 | 34 | 1 | 68282 | 63,79 |
| | 6,80 | 8,00 | 79 | 34 | 1 | 16742 | 63,79 |
| | 6,90 | 8,00 | 79 | 34 | 1 | 16744 | 63,79 |
| | 7,00 | 8,00 | 79 | 34 | 1 | 16745 | 63,79 |
| | 7,20 | 8,00 | 79 | 41 | 1 | 16747 | 63,79 |
| | 7,40 | 8,00 | 79 | 41 | 1 | 16750 | 63,79 |
| | 7,50 | 8,00 | 79 | 41 | 1 | 16751 | 63,79 |
| | 7,80 | 8,00 | 79 | 41 | 1 | 16756 | 63,79 |
| | 7,90 | 8,00 | 79 | 41 | 1 | 16757 | 63,79 |
| | 8,00 | 8,00 | 79 | 41 | 1 | 16759 | 63,79 |
| | 8,10 | 10,00 | 89 | 47 | 1 | 16760 | 71,56 |
| | 8,20 | 10,00 | 89 | 47 | 1 | 16762 | 71,56 |
| | 8,50 | 10,00 | 89 | 47 | 1 | 16766 | 71,56 |
| | 8,60 | 10,00 | 89 | 47 | 1 | 16767 | 71,56 |
| | 8,70 | 10,00 | 89 | 47 | 1 | 16768 | 71,56 |
| | 8,80 | 10,00 | 89 | 47 | 1 | 16769 | 71,56 |
| New! | 8,90 | 10,00 | 89 | 47 | 1 | 80124 | 71,56 |

| | D mm | d mm | L mm | l mm | | N° Art. ALTIN | € |
|-------------|---------|---------|---------|---------|---|------------------|--------|
| | 9,00 | 10,00 | 89 | 47 | 1 | 16772 | 71,56 |
| | 9,30 | 10,00 | 89 | 47 | 1 | 16775 | 71,56 |
| | 9,50 | 10,00 | 89 | 47 | 1 | 16778 | 71,56 |
| | 9,80 | 10,00 | 89 | 47 | 1 | 16781 | 71,56 |
| | 10,00 | 10,00 | 89 | 47 | 1 | 16807 | 71,56 |
| | 10,10 | 12,00 | 102 | 55 | 1 | 68283 | 106,54 |
| | 10,20 | 12,00 | 102 | 55 | 1 | 16822 | 106,54 |
| | 10,30 | 12,00 | 102 | 55 | 1 | 68284 | 106,54 |
| | 10,40 | 12,00 | 102 | 55 | 1 | 13022 | 106,54 |
| | 10,50 | 12,00 | 102 | 55 | 1 | 16834 | 106,54 |
| | 10,70 | 12,00 | 102 | 55 | 1 | 68285 | 106,54 |
| | 10,80 | 12,00 | 102 | 55 | 1 | 16835 | 106,54 |
| | 11,00 | 12,00 | 102 | 55 | 1 | 16836 | 106,54 |
| | 11,10 | 12,00 | 102 | 55 | 1 | 13023 | 106,54 |
| | 11,20 | 12,00 | 102 | 55 | 1 | 13028 | 106,54 |
| New! | 11,30 | 12,00 | 102 | 55 | 1 | 80322 | 106,54 |
| | 11,50 | 12,00 | 102 | 55 | 1 | 16837 | 106,54 |
| | 11,70 | 12,00 | 102 | 55 | 1 | 68286 | 106,54 |
| | 11,80 | 12,00 | 102 | 55 | 1 | 13029 | 106,54 |
| | 12,00 | 12,00 | 102 | 55 | 1 | 16838 | 106,54 |
| | 12,10 | 14,00 | 107 | 60 | 1 | 68287 | 143,09 |
| | 12,20 | 14,00 | 107 | 60 | 1 | 68288 | 143,09 |
| New! | 12,30 | 14,00 | 107 | 60 | 1 | 26405 | 143,09 |
| New! | 12,40 | 14,00 | 107 | 60 | 1 | 80327 | 143,09 |
| | 12,50 | 14,00 | 107 | 60 | 1 | 16840 | 143,09 |
| | 12,70 | 14,00 | 107 | 60 | 1 | 13031 | 143,09 |
| | 13,00 | 14,00 | 107 | 60 | 1 | 16841 | 143,09 |
| New! | 13,10 | 14,00 | 107 | 60 | 1 | 80328 | 143,09 |
| New! | 13,30 | 14,00 | 107 | 60 | 1 | 80363 | 143,09 |
| | 13,50 | 14,00 | 107 | 60 | 1 | 16842 | 143,09 |
| | 13,70 | 14,00 | 107 | 60 | 1 | 68289 | 143,09 |
| New! | 13,80 | 14,00 | 107 | 60 | 1 | 80392 | 143,09 |
| | 14,00 | 14,00 | 107 | 60 | 1 | 16844 | 143,09 |
| | 14,20 | 16,00 | 115 | 65 | 1 | 46689 | 184,26 |
| | 14,50 | 16,00 | 115 | 65 | 1 | 16848 | 184,26 |
| | 14,70 | 16,00 | 115 | 65 | 1 | 68290 | 184,26 |
| | 15,00 | 16,00 | 115 | 65 | 1 | 16849 | 184,26 |
| | 15,50 | 16,00 | 115 | 65 | 1 | 16855 | 184,26 |
| | 15,70 | 16,00 | 115 | 65 | 1 | 68291 | 184,26 |
| | 16,00 | 16,00 | 115 | 65 | 1 | 16867 | 184,26 |
| | 16,50 | 18,00 | 123 | 73 | 1 | 12960 | 295,10 |
| | 17,00 | 18,00 | 123 | 73 | 1 | 12962 | 295,10 |
| | 17,50 | 18,00 | 123 | 73 | 1 | 12963 | 295,10 |
| | 18,00 | 18,00 | 123 | 73 | 1 | 12965 | 295,10 |
| | 18,50 | 20,00 | 131 | 79 | 1 | 12968 | 321,79 |
| | 19,00 | 20,00 | 131 | 79 | 1 | 12969 | 321,79 |
| | 19,50 | 20,00 | 131 | 79 | 1 | 12970 | 321,79 |
| | 20,00 | 20,00 | 131 | 79 | 1 | 12972 | 321,79 |

DIN 6535 HE
 Disponible en stock / Available in stock / Disponible en stock



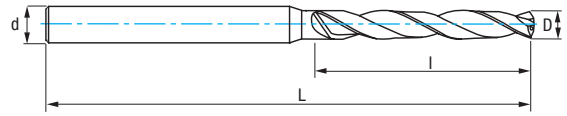
Ref. 8412

Ref. **8415**

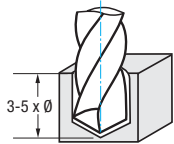
BROCA METAL DURO REFRIGERACIÓN INTERIOR 5XD

5XD Internal Cooling Carbide Drill Bit

Foret carbure lubrification interne 5XD



| | | | | | | | | | | |
|-------------------------------------|-------|---------------|--|--|--|--|----------------|--------------|------------|------------|
| MD/HM Carbure Grano UF | ALTIN | DIN 6537 L | | | | | DIN 6535 HA | HRC 45-55 | Tol. m7 | 5XD |
|-------------------------------------|-------|---------------|--|--|--|--|----------------|--------------|------------|------------|



| Material | | Vc (m/min) * | Avances** f/rev. (mm/rev) - Feed** - Pas** | | | | | | |
|----------|------|--------------|--|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | ALTIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 |
| P | P.1 | 100-120 | 0,180 | 0,200 | 0,280 | 0,300 | 0,350 | 0,400 | 0,450 |
| | P.2 | 90-110 | 0,160 | 0,180 | 0,200 | 0,220 | 0,280 | 0,300 | 0,350 |
| | P.3 | 75-95 | 0,080 | 0,100 | 0,110 | 0,120 | 0,140 | 0,180 | 0,220 |
| | P.4 | 35-40 | 0,050 | 0,070 | 0,090 | 0,100 | 0,110 | 0,140 | 0,160 |
| | P.5 | 50-65 | 0,090 | 0,120 | 0,150 | 0,180 | 0,200 | 0,240 | 0,260 |
| M | | 30-40 | 0,060 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 |
| K | K.1 | 125-150 | 0,200 | 0,220 | 0,300 | 0,350 | 0,400 | 0,450 | 0,550 |
| | K.2 | 90-110 | 0,180 | 0,200 | 0,260 | 0,280 | 0,300 | 0,350 | 0,450 |
| S | | 35-50 | 0,060 | 0,090 | 0,090 | 0,100 | 0,140 | 0,160 | 0,180 |

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf = \text{r.p.m.} \times f \times K \quad Vf \text{ (Avance mm/min Feed/Pas)}$$

K = Coeficiente corrección segun profundidad taladrado
Correction coefficient depending on drilling depth
Coéficent correction suivant la profondeur du perçage

***K para/for/pour Vc: **K para/for/pour Vf:**


- | | |
|-------------------|-------------------|
| < 3 x Ø → K = 1 | < 3 x Ø → K = 1 |
| < 4 x Ø → K = 0,9 | > 3 x Ø → K = 0,9 |
| < 5 x Ø → K = 0,8 | |




Ref. **8415****BROCA METAL DURO REFRIGERACIÓN INTERIOR 5XD**

5XD Internal Cooling Carbide Drill Bit

Foret carbure lubrification interne 5XD

| | D mm | d mm | L mm | l mm |  | N° Art. ALTIN | € |
|-------------|---------|---------|---------|---------|---|------------------|-------|
| | 3,00 | 6,00 | 66 | 28 | 1 | 12973 | 57,94 |
| New! | 3,10 | 6,00 | 66 | 28 | 1 | 78713 | 57,94 |
| | 3,20 | 6,00 | 66 | 28 | 1 | 12975 | 57,94 |
| | 3,30 | 6,00 | 66 | 28 | 1 | 12978 | 57,94 |
| | 3,40 | 6,00 | 66 | 28 | 1 | 12980 | 57,94 |
| | 3,50 | 6,00 | 66 | 28 | 1 | 12981 | 57,94 |
| | 3,70 | 6,00 | 66 | 28 | 1 | 12982 | 57,94 |
| | 4,00 | 6,00 | 74 | 36 | 1 | 16876 | 62,28 |
| | 4,10 | 6,00 | 74 | 36 | 1 | 16882 | 62,28 |
| | 4,20 | 6,00 | 74 | 36 | 1 | 16891 | 62,28 |
| New! | 4,25 | 6,00 | 74 | 36 | 1 | 78717 | 62,28 |
| | 4,30 | 6,00 | 74 | 36 | 1 | 16900 | 62,28 |
| New! | 4,40 | 6,00 | 74 | 36 | 1 | 78720 | 62,28 |
| | 4,50 | 6,00 | 74 | 36 | 1 | 16915 | 62,28 |
| | 4,60 | 6,00 | 74 | 36 | 1 | 16924 | 62,28 |
| | 4,70 | 6,00 | 74 | 36 | 1 | 16933 | 62,28 |
| | 4,80 | 6,00 | 82 | 44 | 1 | 16939 | 62,28 |
| New! | 4,90 | 6,00 | 82 | 44 | 1 | 78756 | 62,28 |
| | 5,00 | 6,00 | 82 | 44 | 1 | 16945 | 62,28 |
| | 5,10 | 6,00 | 82 | 44 | 1 | 16948 | 62,28 |
| | 5,20 | 6,00 | 82 | 44 | 1 | 16951 | 62,28 |
| | 5,30 | 6,00 | 82 | 44 | 1 | 16952 | 62,28 |
| | 5,50 | 6,00 | 82 | 44 | 1 | 16957 | 62,28 |
| | 5,60 | 6,00 | 82 | 44 | 1 | 16960 | 62,28 |
| | 5,70 | 6,00 | 82 | 44 | 1 | 16961 | 62,28 |
| | 5,80 | 6,00 | 82 | 44 | 1 | 16962 | 62,28 |
| | 6,00 | 6,00 | 82 | 44 | 1 | 16968 | 62,28 |
| | 6,10 | 8,00 | 91 | 53 | 1 | 17006 | 76,53 |
| | 6,20 | 8,00 | 91 | 53 | 1 | 17021 | 76,53 |
| | 6,30 | 8,00 | 91 | 53 | 1 | 17030 | 76,53 |
| New! | 6,40 | 8,00 | 91 | 53 | 1 | 80126 | 76,53 |
| | 6,50 | 8,00 | 91 | 53 | 1 | 17039 | 76,53 |
| New! | 6,70 | 8,00 | 91 | 53 | 1 | 80129 | 76,53 |
| | 6,75 | 8,00 | 91 | 53 | 1 | 68292 | 76,53 |
| | 6,80 | 8,00 | 91 | 53 | 1 | 17091 | 76,53 |
| | 6,90 | 8,00 | 91 | 53 | 1 | 17094 | 76,53 |
| | 7,00 | 8,00 | 91 | 53 | 1 | 17104 | 76,53 |
| | 7,20 | 8,00 | 91 | 53 | 1 | 17110 | 76,53 |
| | 7,40 | 8,00 | 91 | 53 | 1 | 17111 | 76,53 |
| | 7,50 | 8,00 | 91 | 53 | 1 | 17119 | 76,53 |
| | 7,80 | 8,00 | 91 | 53 | 1 | 17143 | 76,53 |
| | 7,90 | 8,00 | 91 | 53 | 1 | 17148 | 76,53 |
| | 8,00 | 8,00 | 91 | 53 | 1 | 17149 | 76,53 |
| | 8,10 | 10,00 | 103 | 61 | 1 | 17172 | 87,59 |
| | 8,20 | 10,00 | 103 | 61 | 1 | 17227 | 87,59 |
| | 8,50 | 10,00 | 103 | 61 | 1 | 17241 | 87,59 |
| | 8,60 | 10,00 | 103 | 61 | 1 | 17254 | 87,59 |
| | 8,70 | 10,00 | 103 | 61 | 1 | 17269 | 87,59 |

| | D mm | d mm | L mm | l mm |  | N° Art. ALTIN | € |
|-------------|---------|---------|---------|---------|---|------------------|--------|
| | 8,80 | 10,00 | 103 | 61 | 1 | 17275 | 87,59 |
| | 9,00 | 10,00 | 103 | 61 | 1 | 17278 | 87,59 |
| | 9,30 | 10,00 | 103 | 61 | 1 | 17295 | 87,59 |
| | 9,50 | 10,00 | 103 | 61 | 1 | 17302 | 87,59 |
| | 9,80 | 10,00 | 103 | 61 | 1 | 17308 | 87,59 |
| New! | 9,90 | 10,00 | 103 | 61 | 1 | 80130 | 87,59 |
| | 10,00 | 10,00 | 103 | 61 | 1 | 17320 | 87,59 |
| | 10,10 | 12,00 | 118 | 71 | 1 | 68293 | 127,88 |
| | 10,20 | 12,00 | 118 | 71 | 1 | 17321 | 127,88 |
| | 10,30 | 12,00 | 118 | 71 | 1 | 68294 | 127,88 |
| | 10,40 | 12,00 | 118 | 71 | 1 | 13034 | 127,88 |
| | 10,50 | 12,00 | 118 | 71 | 1 | 17323 | 127,88 |
| | 10,70 | 12,00 | 118 | 71 | 1 | 68295 | 127,88 |
| | 10,80 | 12,00 | 118 | 71 | 1 | 17324 | 127,88 |
| | 11,00 | 12,00 | 118 | 71 | 1 | 17326 | 127,88 |
| | 11,20 | 12,00 | 118 | 71 | 1 | 13037 | 127,88 |
| New! | 11,30 | 12,00 | 118 | 71 | 1 | 80133 | 127,88 |
| | 11,50 | 12,00 | 118 | 71 | 1 | 17330 | 127,88 |
| | 11,70 | 12,00 | 118 | 71 | 1 | 68296 | 127,88 |
| | 11,80 | 12,00 | 118 | 71 | 1 | 13038 | 127,88 |
| | 12,00 | 12,00 | 118 | 71 | 1 | 17336 | 127,88 |
| | 12,10 | 14,00 | 124 | 77 | 1 | 68297 | 171,77 |
| | 12,20 | 14,00 | 124 | 77 | 1 | 68298 | 171,77 |
| New! | 12,30 | 14,00 | 124 | 77 | 1 | 80136 | 171,77 |
| New! | 12,40 | 14,00 | 124 | 77 | 1 | 80137 | 171,77 |
| | 12,50 | 14,00 | 124 | 77 | 1 | 17343 | 171,77 |
| | 12,70 | 14,00 | 124 | 77 | 1 | 13040 | 171,77 |
| | 13,00 | 14,00 | 124 | 77 | 1 | 17344 | 171,77 |
| New! | 13,10 | 14,00 | 124 | 77 | 1 | 80141 | 171,77 |
| New! | 13,30 | 14,00 | 124 | 77 | 1 | 80252 | 171,77 |
| | 13,50 | 14,00 | 124 | 77 | 1 | 17346 | 171,77 |
| | 13,70 | 14,00 | 124 | 77 | 1 | 68299 | 171,77 |
| New! | 13,80 | 14,00 | 124 | 77 | 1 | 80305 | 171,77 |
| | 14,00 | 14,00 | 124 | 77 | 1 | 17357 | 171,77 |
| | 14,20 | 16,00 | 133 | 83 | 1 | 68300 | 211,97 |
| | 14,50 | 16,00 | 133 | 83 | 1 | 17365 | 211,97 |
| | 14,70 | 16,00 | 133 | 83 | 1 | 68301 | 211,97 |
| | 15,00 | 16,00 | 133 | 83 | 1 | 17371 | 211,97 |
| | 15,50 | 16,00 | 133 | 83 | 1 | 17379 | 211,97 |
| | 15,70 | 16,00 | 133 | 83 | 1 | 68302 | 211,97 |
| | 16,00 | 16,00 | 133 | 83 | 1 | 17384 | 211,97 |
| | 16,50 | 18,00 | 143 | 93 | 1 | 12984 | 339,62 |
| | 17,00 | 18,00 | 143 | 93 | 1 | 12985 | 339,62 |
| | 17,50 | 18,00 | 143 | 93 | 1 | 12986 | 339,62 |
| | 18,00 | 18,00 | 143 | 93 | 1 | 12987 | 339,62 |
| | 18,50 | 20,00 | 153 | 101 | 1 | 12988 | 369,41 |
| | 19,00 | 20,00 | 153 | 101 | 1 | 12989 | 369,41 |
| | 19,50 | 20,00 | 153 | 101 | 1 | 12990 | 369,41 |
| | 20,00 | 20,00 | 153 | 101 | 1 | 12991 | 369,41 |



 **DIN 6535 HE**
Disponible en stock / Available in stock / Disponible en stock

Ref. 8417 

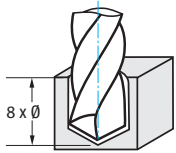
Ref. **8411**

BROCA METAL DURO CON REFRIGERACIÓN INTERIOR 8XD

8XD Internal Coolant Carbide Drill Bit
Foret carbure lubrification interne 8XD



| | | | | | | | | | | |
|-------------------------------------|--------|--------------|--|--|--|--|--------------|------------|---|------------|
| MD/HM Carbure Grano UF | X-AICr | IZAR Std. | | | | | HRC 45-55 | Tol. m7 | Pulido Espejo Mirror Polished Polyglass | 8XD |
|-------------------------------------|--------|--------------|--|--|--|--|--------------|------------|---|------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf = r.p.m. \times f \times K \quad Vf \text{ (Avance mm/min Feed/Pas)}$$

K = Coeficiente corrección segun profundidad taladrado
Correction coefficient depending on drilling depth
Cœficient correction suivant la profondeur du perçage

***K para/for/pour Vc: **K para/for/pour Vf:**
< 3 x Ø → K = 1 < 3 x Ø → K = 1
< 4 x Ø → K = 0,9 > 3 x Ø → K = 0,9
< 5 x Ø → K = 0,8

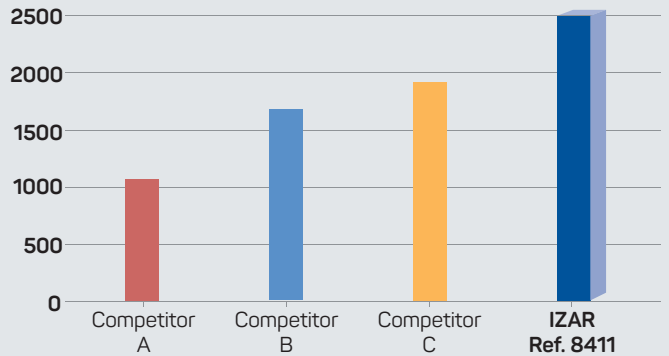
| Material | | Vc (m/min) * | Avances** f/rev. (mm/rev) - Feed** - Pas** | | | | | | |
|----------|------|--------------|--|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | X-AICr | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 |
| P | P.1 | 100-120 | 0,160 | 0,190 | 0,230 | 0,280 | 0,300 | 0,340 | 0,400 |
| | P.2 | 90-110 | 0,140 | 0,160 | 0,190 | 0,210 | 0,265 | 0,290 | 0,330 |
| | P.3 | 75-95 | 0,090 | 0,090 | 0,100 | 0,110 | 0,130 | 0,160 | 0,200 |
| | P.4 | 35-40 | 0,040 | 0,050 | 0,060 | 0,070 | 0,075 | 0,095 | 0,105 |
| | P.5 | 50-65 | 0,060 | 0,080 | 0,100 | 0,120 | 0,135 | 0,160 | 0,175 |
| M | | 60-70 | 0,060 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 |
| K | K.1 | 125-150 | 0,135 | 0,145 | 0,200 | 0,235 | 0,265 | 0,300 | 0,365 |
| | K.2 | 90-110 | 0,120 | 0,135 | 0,175 | 0,185 | 0,200 | 0,235 | 0,300 |
| S | | 35-50 | 0,040 | 0,060 | 0,060 | 0,065 | 0,095 | 0,105 | 0,120 |



Ref. **8411**

Nº AGUJEROS / Holes / Trous

Mat. 16MnCr5



Competidores de primer nivel
Top level competitors
Concurrents de premier rang


- Geometría multi-material de alto rendimiento.
- Tratamiento superficial previo y posterior al recubrimiento para una mejor evacuación de viruta.
- High Performance Multi-Material Geometry.
- Surface Treatment -before & after coating- for a better Chipping-Off.
- Géométrie multi-matériaux haut rendement.
- Traitement de surface - avant et après revêtement - pour une meilleure évacuation des copeaux.




Ref. **8411****BROCA METAL DURO CON REFRIGERACIÓN INTERIOR 8XD**

8XD Internal Coolant Carbide Drill Bit

Foret carbure lubrification interne 8XD

| D mm | d mm | L mm | l mm |  | N° Art. X-AICr | € |
|---------|---------|---------|---------|---|-------------------|--------|
| 3,00 | 6,00 | 80 | 40 | 1 | 80494 | 79,65 |
| 3,50 | 6,00 | 80 | 40 | 1 | 80496 | 79,65 |
| 4,00 | 6,00 | 80 | 40 | 1 | 79184 | 71,85 |
| 4,10 | 6,00 | 80 | 40 | 1 | 79185 | 71,85 |
| 4,20 | 6,00 | 80 | 40 | 1 | 79186 | 71,85 |
| 4,30 | 6,00 | 85 | 45 | 1 | 79187 | 71,85 |
| 4,40 | 6,00 | 85 | 45 | 1 | 79188 | 71,85 |
| 4,50 | 6,00 | 85 | 45 | 1 | 79189 | 71,85 |
| 4,60 | 6,00 | 85 | 45 | 1 | 79190 | 71,85 |
| 4,70 | 6,00 | 85 | 45 | 1 | 79191 | 71,85 |
| 4,80 | 6,00 | 90 | 50 | 1 | 79192 | 71,85 |
| 4,90 | 6,00 | 90 | 50 | 1 | 79193 | 71,85 |
| 5,00 | 6,00 | 90 | 50 | 1 | 79194 | 71,85 |
| 5,10 | 6,00 | 90 | 50 | 1 | 79195 | 71,85 |
| 5,20 | 6,00 | 90 | 50 | 1 | 79196 | 71,85 |
| 5,30 | 6,00 | 90 | 50 | 1 | 79197 | 71,85 |
| 5,40 | 6,00 | 110 | 57 | 1 | 79198 | 71,85 |
| 5,50 | 6,00 | 110 | 57 | 1 | 79199 | 71,85 |
| 5,60 | 6,00 | 110 | 57 | 1 | 79200 | 71,85 |
| 5,70 | 6,00 | 110 | 57 | 1 | 79201 | 71,85 |
| 5,80 | 6,00 | 110 | 57 | 1 | 79202 | 71,85 |
| 5,90 | 6,00 | 110 | 57 | 1 | 79203 | 71,85 |
| 6,00 | 6,00 | 110 | 57 | 1 | 79204 | 71,85 |
| 6,10 | 8,00 | 116 | 66 | 1 | 79205 | 113,60 |
| 6,20 | 8,00 | 116 | 66 | 1 | 79206 | 113,60 |
| 6,30 | 8,00 | 116 | 66 | 1 | 79207 | 113,60 |
| 6,40 | 8,00 | 116 | 66 | 1 | 79209 | 113,60 |
| 6,50 | 8,00 | 116 | 66 | 1 | 79211 | 113,60 |
| 6,60 | 8,00 | 116 | 66 | 1 | 79212 | 113,60 |
| 6,70 | 8,00 | 116 | 66 | 1 | 79213 | 113,60 |
| 6,80 | 8,00 | 116 | 66 | 1 | 79214 | 113,60 |
| 6,90 | 8,00 | 126 | 76 | 1 | 79215 | 116,88 |
| 7,00 | 8,00 | 126 | 76 | 1 | 79217 | 116,88 |
| 7,10 | 8,00 | 126 | 76 | 1 | 79218 | 116,88 |
| 7,20 | 8,00 | 126 | 76 | 1 | 79219 | 116,88 |
| 7,30 | 8,00 | 126 | 76 | 1 | 79221 | 116,88 |
| 7,40 | 8,00 | 126 | 76 | 1 | 79222 | 116,88 |
| 7,50 | 8,00 | 126 | 76 | 1 | 79223 | 116,88 |
| 7,60 | 8,00 | 126 | 76 | 1 | 79225 | 116,88 |
| 7,70 | 8,00 | 126 | 76 | 1 | 79226 | 116,88 |
| 7,80 | 8,00 | 126 | 76 | 1 | 79227 | 116,88 |
| 7,90 | 8,00 | 126 | 76 | 1 | 79228 | 116,88 |
| 8,00 | 8,00 | 126 | 76 | 1 | 79229 | 116,88 |
| 8,10 | 10,00 | 140 | 87 | 1 | 79230 | 158,08 |

| D mm | d mm | L mm | l mm |  | N° Art. X-AICr | € |
|---------|---------|---------|---------|---|-------------------|--------|
| 8,20 | 10,00 | 140 | 87 | 1 | 79231 | 158,08 |
| 8,30 | 10,00 | 140 | 87 | 1 | 79232 | 158,08 |
| 8,40 | 10,00 | 140 | 87 | 1 | 79233 | 158,08 |
| 8,50 | 10,00 | 140 | 87 | 1 | 79234 | 158,08 |
| 8,60 | 10,00 | 140 | 87 | 1 | 79235 | 158,08 |
| 8,70 | 10,00 | 140 | 87 | 1 | 79236 | 158,08 |
| 8,80 | 10,00 | 140 | 87 | 1 | 79237 | 158,08 |
| 8,90 | 10,00 | 140 | 87 | 1 | 79238 | 158,08 |
| 9,00 | 10,00 | 145 | 95 | 1 | 79239 | 158,08 |
| 9,10 | 10,00 | 145 | 95 | 1 | 79240 | 158,08 |
| 9,20 | 10,00 | 145 | 95 | 1 | 79241 | 158,08 |
| 9,30 | 10,00 | 145 | 95 | 1 | 79242 | 158,08 |
| 9,40 | 10,00 | 145 | 95 | 1 | 79244 | 158,08 |
| 9,50 | 10,00 | 145 | 95 | 1 | 79246 | 158,08 |
| 9,60 | 10,00 | 145 | 95 | 1 | 79248 | 158,08 |
| 9,70 | 10,00 | 145 | 95 | 1 | 79249 | 158,08 |
| 9,80 | 10,00 | 145 | 95 | 1 | 79250 | 158,08 |
| 9,90 | 10,00 | 145 | 95 | 1 | 79251 | 158,08 |
| 10,00 | 10,00 | 145 | 95 | 1 | 79252 | 158,08 |
| 10,20 | 12,00 | 160 | 106 | 1 | 79253 | 202,21 |
| 10,30 | 12,00 | 160 | 106 | 1 | 79254 | 202,21 |
| 10,50 | 12,00 | 160 | 106 | 1 | 79255 | 202,21 |
| 10,80 | 12,00 | 160 | 106 | 1 | 79260 | 202,21 |
| 11,00 | 12,00 | 160 | 106 | 1 | 79261 | 202,21 |
| 11,20 | 12,00 | 165 | 114 | 1 | 79262 | 202,21 |
| 11,50 | 12,00 | 165 | 114 | 1 | 79263 | 202,21 |
| 11,80 | 12,00 | 165 | 114 | 1 | 79264 | 202,21 |
| 12,00 | 12,00 | 165 | 114 | 1 | 79265 | 202,21 |
| *12,10 | 14,00 | 185 | 135 | 1 | 79269 | |
| *12,20 | 14,00 | 185 | 133 | 1 | 79270 | |
| *12,30 | 14,00 | 185 | 133 | 1 | 79272 | |
| *12,50 | 14,00 | 185 | 133 | 1 | 79273 | |
| *12,70 | 14,00 | 185 | 133 | 1 | 79274 | |
| 13,00 | 14,00 | 185 | 133 | 1 | 79275 | 281,25 |
| *13,50 | 14,00 | 185 | 133 | 1 | 79276 | |
| *14,00 | 14,00 | 185 | 133 | 1 | 79277 | |
| *14,10 | 16,00 | 205 | 152 | 1 | 79278 | |
| *14,20 | 16,00 | 205 | 152 | 1 | 79279 | |
| *14,50 | 16,00 | 205 | 152 | 1 | 79280 | |
| *15,00 | 16,00 | 205 | 152 | 1 | 79281 | |
| *15,50 | 16,00 | 205 | 152 | 1 | 79282 | |
| *16,00 | 16,00 | 205 | 152 | 1 | 79283 | |

* Diam. bajo demanda / upon request / sur demande



**BROCAS EXTRA-LARGAS
METAL DURO
REFRIGERACIÓN INTERIOR**

Internal Coolant
Extra-Long
Carbide Drill Bits

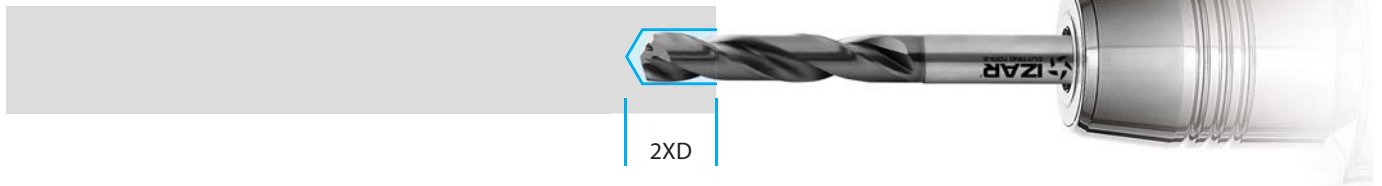
Forets extra-longs
carbure
lubrification interne



INSTRUCCIONES DE TALADRADO PARA AGUJEROS PROFUNDOS A PARTIR DE BROCAS 10XD

Deep Hole Drilling Instructions for 10XD drill bits and above

Instructions de perçage pour des trous profonds à partir de forets 10XD



1) Taladrado con broca guía

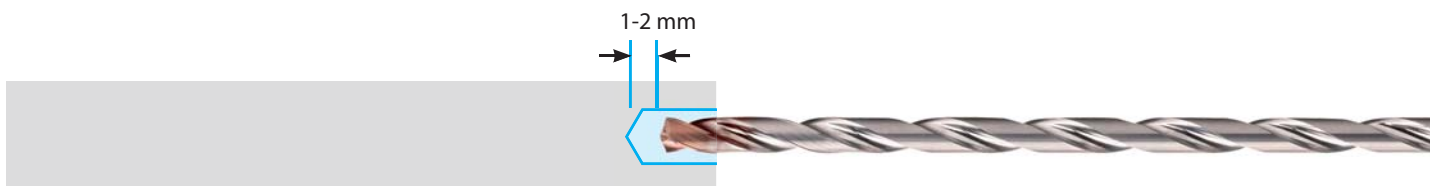
Utilizamos una broca corta, por ejemplo de longitud 3XD, con refrigeración (refrigeración interior o exterior, dependiendo del tipo de broca guía que usemos). Esta broca debe tener el mismo ángulo de punta que la broca larga que usaremos después.

1) Pilot drilling

Pilot drilling with a short drill bit (3XD) with coolant (internal or external). The point angle should be the same as in the long drill bit on the step 2.

1) Perçage avec foret de guidage

Nous utilisons un foret court, par exemple de longueur 3XD, avec refroidissement (refroidissement interne ou externe, selon le type de foret de guidage que nous utilisons). Ce foret doit avoir le même angle de pointe que le foret long que nous utiliserons après.



2) Introducir la broca larga en el agujero guía

Introducir cuidadosamente la broca sin refrigeración a 300 rpm y con vf: 1000 mm/min.

Justo antes de llegar al fondo del agujero guía (1-2 mm), parar el avance y activar la refrigeración.

2) Insert the long drill into the pilot drill hole

Insert the long drill carefully and without any coolant at 300 rpm and vf: 1000 mm/min. Just before reaching the bottom of the hole (1-2 mm), stop the feed and start adding the coolant.

2) Insérer le foret long dans le trou de guidage

Insérer avec précaution le foret non refroidi à 300 rpm avec vf: 1000 mm/min.

Juste avant d'atteindre le fond du trou de guidage (1-2 mm), arrêter l'avance et activer le refroidissement.



3) Punteado

Ajustar las Vc y Vf a 50% hasta llegar a una profundidad aproximada de 3XD.

3) Spot drilling

Reduce Vc and Vf to 50% of the final value. Hole depth: 3XD aprox.

3) Pointillage

Ajuster la Vc et la Vf à 50% jusqu'à atteindre une profondeur d'environ 3XD.



4) Taladrado profundo

Ajustar las Vc y Vf a los valores finales (100%) y sin ralentizar en ningún momento.

4) Deep hole drilling

Adjust Vc and Vf at 100%. Don't reduce the speed in the whole process.

4) Perçage profond

Ajuster les Vc et Vf aux valeurs finales (100%) et sans ralentir à aucun moment.



5) Extracción de la broca

Antes de extraer la broca, volvemos a reducir a Vc: 300 rpm y a vf: 500 mm/min. Sin refrigeración.

5) Removing the long drill

After reaching the hole depth, reduce the Vc to 300 rpm and vf: 500 mm/min. Don't use any coolant during this process.

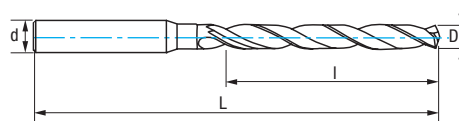
5) Retrait du foret

Avant de retirer le foret, nous le réduisons à Vc: 300 rpm et vf: 500 mm/min. Pas de refroidissement.

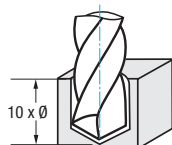
Ref. **8413**

BROCA METAL DURO CON REFRIGERACIÓN INTERIOR 10XD

10XD Internal Coolant Carbide Drill Bit
Foret carbure lubrification interne 10XD



| | | | | | | | | | | |
|-------------------------------------|--------|--------------|--|--|--|--|--------------|------------|---|-------------|
| MD/HM Carbure Grano UF | X-AlCr | IZAR Std. | | | | | HRC 45-55 | Tol. m7 | Pulido Espejo Mirror Polished Polyglass | 10XD |
|-------------------------------------|--------|--------------|--|--|--|--|--------------|------------|---|-------------|



Faceta doble
Double Margin
≤ Ø 3 Listel double

| Material | Vc (m/min) * | Avances** f/rev. (mm/rev) - Feed** - Pas** | | | | | |
|------------|--------------|--|-------|-------|-------|-------|-------|
| Grupo Sub. | X-AlCr | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | |
| P | P.1 | 90-100 | 0,130 | 0,170 | 0,240 | 0,260 | 0,280 |
| | P.2 | 70-80 | 0,100 | 0,125 | 0,170 | 0,190 | 0,240 |
| | P.3 | 60-70 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| M | | 45-60 | 0,040 | 0,040 | 0,040 | 0,055 | 0,065 |
| K | K.1 | 60-70 | 0,110 | 0,180 | 0,240 | 0,280 | 0,300 |

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf = \text{r.p.m.} \times f \times K \quad Vf \text{ (Avance mm/min Feed/Pas)}$$

K = Coeficiente corrección segun profundidad taladrado
Correction coefficient depending on drilling depth
Coéfficient correction suivant la profondeur du perçage

***K para/for/pour Vc: **K para/for/pour Vf:**
< 3 x Ø → K = 1 < 3 x Ø → K = 1
< 4 x Ø → K = 0,9 > 3 x Ø → K = 0,9
< 5 x Ø → K = 0,8

| D mm | d mm | L mm | l mm | | Nº Art. X-AlCr | € |
|-------|-------|------|------|---|----------------|--------|
| 3,00 | 4,00 | 100 | 48 | 1 | 79284 | 92,93 |
| 3,50 | 4,00 | 100 | 48 | 1 | 79288 | 92,93 |
| 4,00 | 4,00 | 100 | 48 | 1 | 79289 | 92,93 |
| 4,50 | 6,00 | 125 | 72 | 1 | 79291 | 148,70 |
| 5,00 | 6,00 | 125 | 72 | 1 | 79292 | 148,70 |
| 5,50 | 6,00 | 125 | 72 | 1 | 79293 | 148,70 |
| 6,00 | 6,00 | 125 | 72 | 1 | 79294 | 148,70 |
| 6,50 | 8,00 | 150 | 96 | 1 | 79295 | 241,63 |
| 7,00 | 8,00 | 150 | 96 | 1 | 79296 | 241,63 |
| 7,50 | 8,00 | 150 | 96 | 1 | 79297 | 241,63 |
| 8,00 | 8,00 | 150 | 96 | 1 | 79298 | 241,63 |
| 8,50 | 10,00 | 175 | 120 | 1 | 79299 | 360,58 |
| 9,00 | 10,00 | 175 | 120 | 1 | 79300 | 360,58 |
| 9,50 | 10,00 | 175 | 120 | 1 | 79302 | 360,58 |
| 10,00 | 10,00 | 175 | 120 | 1 | 79304 | 360,58 |
| 11,00 | 12,00 | 200 | 132 | 1 | 79305 | 528,78 |
| 12,00 | 12,00 | 200 | 144 | 1 | 79308 | 528,78 |



- Geometrías especiales y otras medidas bajo demanda
- Special geometries and other sizes upon request
- Géométries spéciales et autres tailles sur demande

P Aceros
Steels
Aciers

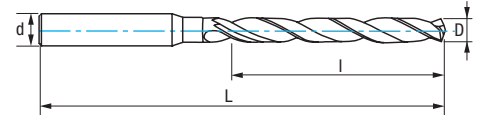
M INOX Austeníticos
Austenitic Stainless
INOX Austénitiques

Ref. **8414**

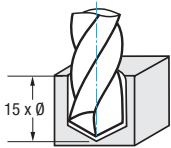
BROCA METAL DURO CON REFRIGERACIÓN INTERIOR 15XD

15XD Internal Coolant Carbide Drill Bit

Foret carbure lubrification interne 15XD



| | | | | | | | | | | |
|-------------------------------------|---------------|--------------|--|--|--|--|--------------|------------|---|-------------|
| MD/HM Carbure Grano UF | X-AICr | IZAR Std. | | | | | HRC 45-55 | Tol. m7 | Pulido Espejo Mirror Polished Polyglass | 15XD |
|-------------------------------------|---------------|--------------|--|--|--|--|--------------|------------|---|-------------|



Faceta doble
Double Margin
≤ Ø 3 Listel double

| Material | | Vc (m/min) * | Avances** f/rev. (mm/rev) - Feed** - Pas** | | | | |
|----------|------|--------------|--|-------|-------|-------|-------|
| Grupo | Sub. | X-AICr | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 90-100 | 0,130 | 0,170 | 0,240 | 0,260 | 0,280 |
| | P.2 | 70-80 | 0,100 | 0,125 | 0,170 | 0,190 | 0,240 |
| | P.3 | 60-70 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| M | | 45-60 | 0,040 | 0,040 | 0,040 | 0,055 | 0,065 |
| K | K.1 | 60-70 | 0,110 | 0,180 | 0,240 | 0,280 | 0,300 |

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \varnothing}$$

$$Vf = \text{r.p.m.} \times f \times K \quad Vf \text{ (Avance mm/min Feed/Pas)}$$

K = Coeficiente corrección segun profundidad taladrado
Correction coefficient depending on drilling depth
Coéfficient correction suivant la profondeur du perçage

***K para/for/pour Vc: **K para/for/pour Vf:**

- < 3 x Ø → K = 1 < 3 x Ø → K = 1
- < 4 x Ø → K = 0,9 > 3 x Ø → K = 0,9
- < 5 x Ø → K = 0,8

| D mm | d mm | L mm | l mm | | Nº Art. X-AICr | € |
|-------|-------|------|------|---|----------------|--------|
| 3,00 | 3,00 | 95 | 55 | 1 | 79310 | 116,17 |
| 3,50 | 4,00 | 115 | 76 | 1 | 79311 | 120,82 |
| 4,00 | 4,00 | 115 | 76 | 1 | 79312 | 120,82 |
| 4,50 | 6,00 | 133 | 93 | 1 | 79313 | 177,50 |
| 5,00 | 6,00 | 133 | 93 | 1 | 79314 | 177,50 |
| 5,50 | 6,00 | 150 | 110 | 1 | 79315 | 204,45 |
| 6,00 | 6,00 | 150 | 110 | 1 | 79316 | 204,45 |
| 6,50 | 8,00 | 167 | 127 | 1 | 79317 | 302,96 |
| 7,00 | 8,00 | 167 | 127 | 1 | 79319 | 302,96 |
| 7,50 | 8,00 | 183 | 143 | 1 | 79320 | 320,62 |
| 8,00 | 8,00 | 183 | 143 | 1 | 79322 | 320,62 |
| 8,50 | 10,00 | 204 | 160 | 1 | 79323 | 415,88 |
| 9,00 | 10,00 | 204 | 160 | 1 | 79325 | 415,88 |
| 9,50 | 10,00 | 221 | 177 | 1 | 79326 | 443,76 |
| 10,00 | 10,00 | 221 | 177 | 1 | 79327 | 443,76 |
| 11,00 | 12,00 | 247 | 198 | 1 | 79328 | 736,02 |
| 12,00 | 12,00 | 263 | 214 | 1 | 79329 | 752,75 |



- Geometrías especiales y otras medidas bajo demanda
- Special geometries and other sizes upon request
- Géométries spéciales et autres tailles sur demande

S Aleaciones Termorresistentes
(Titanio, Inconel...)
Heat-Resistant Alloys
(Titanium, Inconel...)
Alliages Thermorésistants
(Titane, Inconel...)

N Aluminio
Aluminium

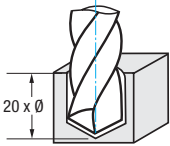
Ref. **8416**

BROCA METAL DURO CON REFRIGERACIÓN INTERIOR 20XD

20XD Internal Coolant Carbide Drill Bit
Foret carbure lubrification interne 20XD



| | | | | | | | | | | |
|-------------------------------------|--------|--------------|--|--|--|--|--------------|------------|---|-------------|
| MD/HM Carbure Grano UF | X-AlCr | IZAR Std. | | | | | HRC 45-55 | Tol. m7 | Pulido Espejo Mirror Polished Polyglass | 20XD |
|-------------------------------------|--------|--------------|--|--|--|--|--------------|------------|---|-------------|



Faceta doble
Double Margin
≤ Ø 3 Listel double

| Material | | Vc (m/min)* | Avances** f/rev. (mm/rev) - Feed** - Pas** | | | |
|----------|------|-------------|--|-------|-------|-------|
| Grupo | Sub. | X-AlCr | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| P | P.1 | 90-100 | 0,130 | 0,170 | 0,240 | 0,260 |
| | P.2 | 70-80 | 0,100 | 0,125 | 0,170 | 0,190 |
| | P.3 | 60-70 | 0,070 | 0,080 | 0,090 | 0,100 |
| M | | 45-60 | 0,040 | 0,040 | 0,040 | 0,055 |
| K | K.1 | 60-70 | 0,110 | 0,180 | 0,240 | 0,280 |

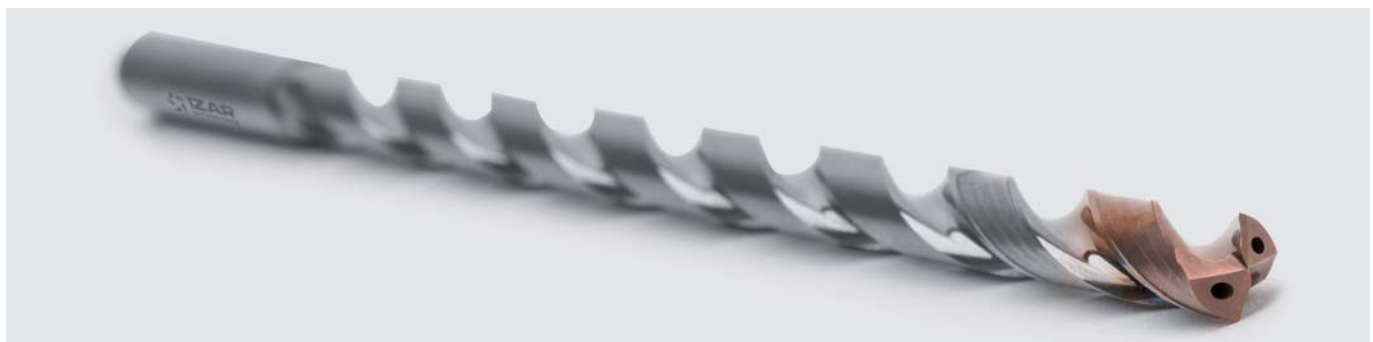
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf = r.p.m. \times f \times K \quad Vf \text{ (Avance mm/min Feed/Pas)}$$

K = Coeficiente corrección segun profundidad taladrado
Correction coefficient depending on drilling depth
Coéfficient correction suivant la profondeur du perçage

***K para/for/pour Vc: **K para/for/pour Vf:**
 < 3 x Ø → K = 1 < 3 x Ø → K = 1
 < 4 x Ø → K = 0,9 > 3 x Ø → K = 0,9
 < 5 x Ø → K = 0,8

| D mm | d mm | L mm | l mm | | N° Art. X-AlCr | € |
|-------|-------|------|------|---|----------------|--------|
| 3,00 | 3,00 | 110 | 70 | 1 | 79330 | 139,39 |
| 3,50 | 4,00 | 123 | 83 | 1 | 79331 | 151,03 |
| 4,00 | 4,00 | 136 | 96 | 1 | 79332 | 151,03 |
| 4,50 | 6,00 | 158 | 118 | 1 | 79333 | 213,00 |
| 5,00 | 6,00 | 158 | 118 | 1 | 79334 | 213,00 |
| 5,10 | 6,00 | 158 | 118 | 1 | 83096 | 245,34 |
| 5,50 | 6,00 | 180 | 140 | 1 | 79335 | 245,34 |
| 6,00 | 6,00 | 180 | 140 | 1 | 79336 | 245,34 |
| 6,50 | 8,00 | 202 | 162 | 1 | 79337 | 363,52 |
| 7,00 | 8,00 | 202 | 162 | 1 | 79338 | 363,52 |
| 7,50 | 8,00 | 223 | 183 | 1 | 79339 | 384,74 |
| 8,00 | 8,00 | 223 | 183 | 1 | 79340 | 384,74 |
| 8,50 | 10,00 | 249 | 205 | 1 | 79341 | 499,05 |
| 9,00 | 10,00 | 249 | 205 | 1 | 79342 | 499,05 |
| 9,50 | 10,00 | 271 | 227 | 1 | 79343 | 763,74 |
| 10,00 | 10,00 | 271 | 227 | 1 | 79344 | 763,74 |

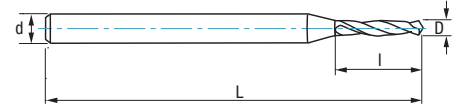


Ref. **8401**

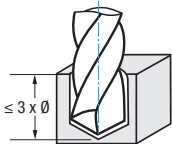
MICRO BROCA METAL DURO GRAN RENDIMIENTO CNC 3XD

3XD CNC High Performance Carbide Micro Drill Bit

Micro foret carbure haut rendement CNC 3XD



| | | | | | | | | | |
|-------------------------------------|---------------|--------------|--|--|--|--------------|------------|---|------------|
| MD/HM Carbure Grano UF | TIALCN | IZAR Std. | | | | HRC 45-55 | Tol. h8 | Pulido Espejo Mirror Polished Polyglass | 3XD |
|-------------------------------------|---------------|--------------|--|--|--|--------------|------------|---|------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas |
|----------|------|------------|--------------------------------------|
| Grupo | Sub. | TIALCN | Diam. 0,2-2,9 |
| P | P.1 | 28-48 | 0,080-0,160 |
| | P.2 | 24-45 | 0,070-0,160 |
| | P.3 | 20-40 | 0,065-0,145 |
| | P.5 | 24-40 | 0,070-0,145 |
| M | | 16-32 | 0,048-0,120 |
| K | K.1 | 32-48 | 0,080-0,160 |
| | K.2 | 28-44 | 0,080-0,160 |

| D mm | d mm | L mm | I mm | | N° Art. TIALCN | € |
|------------------|------|------|------|---|----------------|-------|
| 0,20 | 3,00 | 38 | 3 | 1 | 77262 | 17,94 |
| 0,30 | 3,00 | 38 | 3 | 1 | 77264 | 17,94 |
| 0,40 | 3,00 | 38 | 3 | 1 | 77265 | 17,94 |
| 0,50 | 3,00 | 38 | 3 | 1 | 77266 | 17,94 |
| 0,60 | 3,00 | 38 | 3 | 1 | 77267 | 17,27 |
| 0,70 | 3,00 | 38 | 3 | 1 | 77268 | 17,27 |
| 0,80 | 3,00 | 38 | 4 | 1 | 77270 | 17,27 |
| 0,90 | 3,00 | 38 | 4 | 1 | 77273 | 17,27 |
| 1,00 | 3,00 | 38 | 4 | 1 | 77275 | 16,60 |
| 1,10 | 3,00 | 38 | 6 | 1 | 77277 | 16,60 |
| 1,20 | 3,00 | 38 | 6 | 1 | 77279 | 16,60 |
| 1,30 | 3,00 | 38 | 6 | 1 | 77280 | 16,60 |
| New! 1,35 | 3,00 | 38 | 6 | 1 | 20038 | 18,76 |
| 1,40 | 3,00 | 38 | 6 | 1 | 77281 | 16,60 |
| 1,50 | 3,00 | 38 | 6 | 1 | 77286 | 16,60 |

| D mm | d mm | L mm | I mm | | N° Art. TIALCN | € |
|------|------|------|------|---|----------------|-------|
| 1,60 | 3,00 | 38 | 8 | 1 | 77287 | 16,60 |
| 1,70 | 3,00 | 38 | 8 | 1 | 77288 | 16,60 |
| 1,80 | 3,00 | 38 | 8 | 1 | 77289 | 16,60 |
| 1,90 | 3,00 | 38 | 8 | 1 | 77292 | 16,60 |
| 2,00 | 3,00 | 38 | 8 | 1 | 77293 | 16,60 |
| 2,10 | 3,00 | 38 | 8 | 1 | 77301 | 18,76 |
| 2,20 | 3,00 | 38 | 8 | 1 | 77324 | 18,76 |
| 2,30 | 3,00 | 38 | 8 | 1 | 77325 | 18,76 |
| 2,40 | 3,00 | 38 | 8 | 1 | 77326 | 18,76 |
| 2,50 | 3,00 | 38 | 8 | 1 | 77327 | 18,76 |
| 2,60 | 3,00 | 38 | 8 | 1 | 77328 | 18,76 |
| 2,70 | 3,00 | 38 | 8 | 1 | 77329 | 18,76 |
| 2,80 | 3,00 | 38 | 8 | 1 | 77330 | 18,76 |
| 2,90 | 3,00 | 38 | 8 | 1 | 77331 | 18,76 |



- **Aguzado de gran precisión.**
- **Geometría especial para alto rendimiento en aceros aleados y fundición.**
- **Gran acabado superficial del canal para una excelente evacuación de viruta.**
- **High precision Split Point.**
- **Special geometry for higher performance in Alloyed Steels and die Cast Iron.**
- **Polished coating surface for an excellent chip removal.**
- **Affûtage précision.**
- **Géométrie spéciale pour haute performance dans aciers alliés et fonte.**
- **Grand finition superficielle de goujure pour une excellente évacuation des copeaux.**



Video

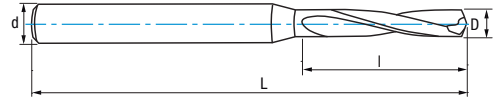
Ref. **8403**

BROCA METAL DURO MATERIALES TEMPLADOS 60 HRC

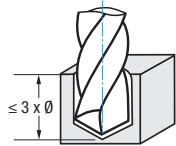
60 HRC Hardened Materials Solid Carbide Drill Bit

Foret carbure matériaux trempés 60 HRC

New!



| | | | | | | | | | |
|-------------------------------------|-----|--------------|--|--|--|--------------|------------|------------|---|
| MD/HM Carbure Grano UF | SUA | IZAR Std. | | | | HRC 45-60 | Tol. h8 | 3XD | Faceta doble Double Margin Listel double |
|-------------------------------------|-----|--------------|--|--|--|--------------|------------|------------|---|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------------------|------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | SUA | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.4 | 15-30 | 0,015 | 0,035 | 0,050 | 0,060 | 0,062 | 0,070 |
| S | 38-45 HRC | 15-30 | 0,003 | 0,060 | 0,080 | 0,100 | 0,150 | 0,180 |
| H | 40-45 HRC | 30-50 | 0,003 | 0,060 | 0,080 | 0,100 | 0,150 | 0,180 |
| | 45-50 HRC | 20-30 | 0,003 | 0,060 | 0,080 | 0,100 | 0,150 | 0,180 |
| | 50-60 HRC | 20-30 | 0,002 | 0,040 | 0,060 | 0,080 | 0,100 | 0,140 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

- Brocas especialmente diseñadas para taladrar aleaciones termoresistentes y aceros endurecidos.
- Geometría de punta con filo protegido.
- Mango reforzado.
- Specially designed for heat-resistant alloys and hardened steels.
- Optimized drill point geometry which provides an excellent wear protection of the edges.
- Reinforced shank.
- Forets spécialement conçus pour percer des alliages thermorésistants et des aciers supérieurs.
- Géométrie de la pointe avec arête protégée.
- Queue renforcée.




Ref. **8403****BROCA METAL DURO MATERIALES TEMPLADOS 60 HRC**


60 HRC Hardened Materials Solid Carbide Drill Bit

Foret carbure matériaux trempés 60 HRC

New!

| D mm | d mm | L mm | l mm |  | N° Art. SUA | € |
|---------|---------|---------|---------|---|----------------|-------|
| 0,90 | 3,00 | 50 | 8 | 1 | 53801 | 25,41 |
| 0,95 | 3,00 | 50 | 8 | 1 | 53802 | 25,41 |
| 1,00 | 3,00 | 50 | 8 | 1 | 53804 | 25,41 |
| 1,10 | 3,00 | 50 | 8 | 1 | 53805 | 25,41 |
| 1,20 | 3,00 | 50 | 8 | 1 | 53810 | 25,41 |
| 1,25 | 3,00 | 50 | 8 | 1 | 53811 | 25,41 |
| 1,30 | 3,00 | 50 | 10 | 1 | 53814 | 25,41 |
| 1,40 | 3,00 | 50 | 10 | 1 | 53816 | 25,41 |
| 1,45 | 3,00 | 50 | 10 | 1 | 53829 | 25,41 |
| 1,50 | 3,00 | 50 | 10 | 1 | 53831 | 25,41 |
| 1,60 | 3,00 | 50 | 10 | 1 | 53836 | 25,41 |
| 1,65 | 3,00 | 50 | 10 | 1 | 53840 | 25,41 |
| 1,70 | 3,00 | 50 | 10 | 1 | 53843 | 25,41 |
| 1,75 | 3,00 | 50 | 10 | 1 | 53847 | 25,41 |
| 1,85 | 3,00 | 50 | 10 | 1 | 53856 | 25,41 |
| 1,90 | 3,00 | 50 | 10 | 1 | 53866 | 25,41 |
| 2,00 | 3,00 | 50 | 12 | 1 | 53868 | 25,41 |
| 2,05 | 3,00 | 50 | 12 | 1 | 53870 | 28,73 |
| 2,10 | 3,00 | 50 | 12 | 1 | 53872 | 28,73 |
| 2,20 | 3,00 | 50 | 12 | 1 | 53873 | 28,73 |
| 2,30 | 3,00 | 50 | 12 | 1 | 53874 | 28,73 |
| 2,40 | 3,00 | 50 | 12 | 1 | 53875 | 28,73 |
| 2,50 | 3,00 | 50 | 12 | 1 | 53876 | 28,73 |
| 3,00 | 6,00 | 60 | 24 | 1 | 53793 | 49,95 |
| 3,10 | 6,00 | 60 | 24 | 1 | 53771 | 49,95 |
| 3,20 | 6,00 | 60 | 24 | 1 | 53772 | 49,95 |
| 3,30 | 6,00 | 60 | 24 | 1 | 53795 | 49,95 |
| 3,50 | 6,00 | 60 | 24 | 1 | 53796 | 49,95 |
| 3,70 | 6,00 | 60 | 24 | 1 | 53773 | 49,95 |
| 3,80 | 6,00 | 60 | 24 | 1 | 53775 | 49,95 |
| 4,00 | 6,00 | 66 | 24 | 1 | 81608 | 49,95 |
| 4,10 | 6,00 | 66 | 24 | 1 | 53777 | 49,95 |

New!

| D mm | d mm | L mm | l mm |  | N° Art. SUA | € |
|---------|---------|---------|---------|---|----------------|--------|
| 4,20 | 6,00 | 66 | 24 | 1 | 81609 | 49,95 |
| 4,50 | 6,00 | 66 | 24 | 1 | 81610 | 49,95 |
| 4,60 | 6,00 | 66 | 24 | 1 | 81611 | 49,95 |
| 4,80 | 6,00 | 66 | 28 | 1 | 81613 | 49,95 |
| 5,00 | 6,00 | 66 | 28 | 1 | 81614 | 49,95 |
| 5,50 | 6,00 | 66 | 28 | 1 | 81615 | 49,95 |
| 5,70 | 6,00 | 66 | 28 | 1 | 81617 | 49,95 |
| 5,80 | 6,00 | 66 | 28 | 1 | 81618 | 49,95 |
| 6,00 | 6,00 | 66 | 28 | 1 | 81619 | 49,95 |
| 6,50 | 8,00 | 79 | 34 | 1 | 81621 | 80,60 |
| 6,80 | 8,00 | 79 | 34 | 1 | 81622 | 80,60 |
| 7,00 | 8,00 | 79 | 34 | 1 | 81623 | 80,60 |
| 7,40 | 8,00 | 79 | 41 | 1 | 81624 | 80,60 |
| 7,50 | 8,00 | 79 | 41 | 1 | 81625 | 80,60 |
| 7,80 | 8,00 | 79 | 41 | 1 | 81626 | 80,60 |
| 7,90 | 8,00 | 79 | 41 | 1 | 22706 | 80,60 |
| 8,00 | 8,00 | 79 | 41 | 1 | 81627 | 80,60 |
| 8,50 | 10,00 | 89 | 47 | 1 | 81628 | 104,27 |
| 8,80 | 10,00 | 89 | 47 | 1 | 81629 | 104,27 |
| 9,00 | 10,00 | 89 | 47 | 1 | 81630 | 104,27 |
| 9,30 | 10,00 | 89 | 47 | 1 | 81632 | 104,27 |
| 9,50 | 10,00 | 89 | 47 | 1 | 81633 | 104,27 |
| 9,80 | 10,00 | 89 | 47 | 1 | 81634 | 104,27 |
| 10,00 | 10,00 | 89 | 47 | 1 | 81635 | 104,27 |
| 10,20 | 12,00 | 102 | 55 | 1 | 81636 | 123,13 |
| 10,50 | 12,00 | 102 | 55 | 1 | 81637 | 123,13 |
| 10,70 | 12,00 | 102 | 55 | 1 | 81638 | 123,13 |
| 11,00 | 12,00 | 102 | 55 | 1 | 81639 | 123,13 |
| 11,20 | 12,00 | 102 | 55 | 1 | 81640 | 123,13 |
| 11,50 | 12,00 | 102 | 55 | 1 | 81641 | 123,13 |
| 11,70 | 12,00 | 102 | 55 | 1 | 81642 | 123,13 |
| 12,00 | 12,00 | 102 | 55 | 1 | 81643 | 123,13 |

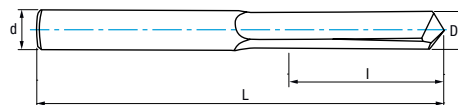


Ref. **9016**

BROCA METAL DURO DESTRUCTORA MACHOS

Tap Destroyer Solid Carbide Drill Bit
Foret carbure destructeur de tarauds

New!



| | | | | | |
|-------------------------------------|--------------|----------|--|--------------|------------|
| MD/HM Carbure Grano UF | IZAR Std. | 120° | | HRC 50-65 | Tol. h6 |
|-------------------------------------|--------------|----------|--|--------------|------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|-----------|-------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| H | 50-55 HRC | 25-30 | 0,040 | 0,060 | 0,080 | 0,100 | 0,150 |
| | 55-60 HRC | 15-25 | 0,040 | 0,060 | 0,080 | 0,100 | 0,150 |
| | 60-65 HRC | 10-15 | 0,020 | 0,040 | 0,060 | 0,080 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | d mm | L mm | l mm | Macho * Tap - Taraud | | Nº Art. MD/HM | € |
|-------|-------|------|------|-------------------------|---|------------------|--------|
| 2,00 | 3,00 | 38 | 10 | M3 | 1 | 58951 | 36,87 |
| 3,00 | 3,00 | 38 | 15 | M4 - M5 | 1 | 58954 | 36,87 |
| 4,00 | 4,00 | 50 | 20 | M6 | 1 | 59987 | 50,71 |
| 5,00 | 5,00 | 50 | 25 | M8 - M10 | 1 | 59989 | 57,08 |
| 6,00 | 6,00 | 60 | 30 | M12 | 1 | 66145 | 63,38 |
| 7,00 | 8,00 | 79 | 35 | M14 | 1 | 66399 | 84,63 |
| 8,00 | 8,00 | 79 | 40 | M16 | 1 | 66407 | 84,63 |
| 9,00 | 10,00 | 100 | 45 | M18 | 1 | 66408 | 109,49 |
| 10,00 | 10,00 | 100 | 50 | M20 | 1 | 66409 | 109,49 |



* El ø de la broca deberá ser superior al ø nucleo del macho.

The ø of the drill bit must be greater than the ø of the tap core.

Le ø du foret doit être supérieur au ø du noyau du taraud.



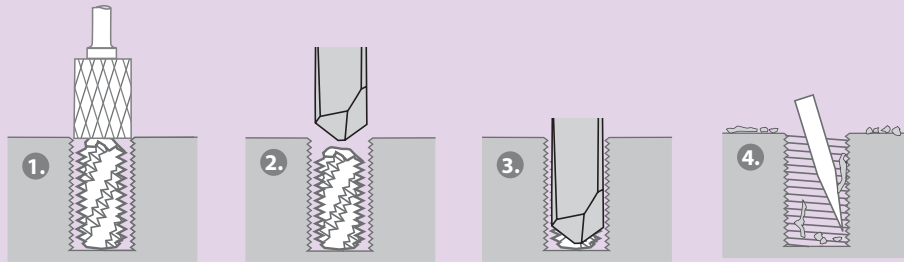
Set 5 Pcs

| Cont. | Nº Art. MD/HM | € |
|--------------|------------------|--------|
| 2-3-4-5-6 mm | 83426 | 232,67 |

Set Price!

- Diseño especial para retirar machos rotos.
- Requiere una buena sujeción de pieza y cabezal rígido.
- No válido para extraer machos de laminación.
- Specifically designed for removing broken taps.
- It is recommended to use a proper fixing with an stable chuck.
- Not suitable for forming taps.
- Conception spéciale pour enlever les tarauds cassés.
- Nécessite un bon serrage de la pièce et une tête rigide.
- Non valide pour retirer les tarauds réfoyeurs.



Ref. **9016****BROCA METAL DURO DESTRUCTORA MACHOS**Tap Destroyer Solid Carbide Drill Bit
Foret carbure destructeur de tarauds**New!****PROCEDIMIENTO
PARA QUITAR MACHOS ROTOS:****1. Macho roto**

Si sobresale alguna parte del macho roto, alisarla para poder taladrarlo más fácilmente.

2. Centrado de la broca

Colocar la broca sobre el centro del macho, fijando bien tanto la pieza de trabajo como la misma broca.

Sin lubricante, hacer un taladrado inicial de aproximación y retraer la broca rápidamente.

3. Proceso de taladrado

Taladrar a velocidad y avance fijos, y con paños para evacuar la viruta. Utilizar lubricación.

4. Sustraer el macho roto

Sustraer los restos del macho roto con un buril o instrumento similar.

**PROCEDURE
FOR REMOVING BROKEN TAPS:****1. Broken Tap**

If any part of the broken tap is protruding, grind the surface in order to make it flat.

2. Centering of the Drill

Position the drill bit on the center of the broken tap. Please make sure that both the workpiece and the tap are firmly secured. Make an initial drill approach and retract the drill bit quickly. Don't use any lubrication.

3. Drilling

Drill the hole at a fixed speed and feed, stopping the process occasionally to remove the broken chips. Use lubrication in this step.

4. Chip Removal

The parts of the broken tap can be removed using a scribe or a similar tool.

**PROCÉDURE POUR ENLEVER
LES TARAUDS CASSÉS :****1. Taraud cassé**

Si une partie du taraud dépasse, lissez la surface endommagée du taraud au ras de la pièce pour la percer plus facilement.

2. Centrage du foret

Placez le foret au centre du taraud. Assurez-vous que la pièce et le foret sont correctement centrés. Faites un premier perçage d'approximation, puis rétractez rapidement le foret. Pour cette étape, n'utilisez pas de lubrifiant.

3. Processus de perçage

Percez le trou à vitesse et avance fixes, en arrêtant de temps en temps pour évacuer les copeaux. Utilisez du lubrifiant.

4. Retirer les restes

Les restes peuvent être retirés en utilisant un burin ou similaire

Ref. **8401**Ref. **9470**Ref. **9475****GAMA MICROHERRAMIENTAS**

Micro Tools

Range micro outils

Ref. **8401**Gama - Range - Gamme: **0,20 - 2,90 mm**Pag. **53**Ref. **9470**Gama - Range - Gamme: **0,20 - 4,00 mm**Pag. **315**Ref. **9475**Gama - Range - Gamme: **0,30 - 4,00 mm**Pag. **316****Soluciones en Mecanizado**

Complete micro machining solutions

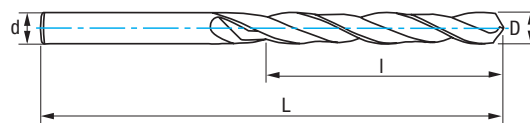
Solutions d'usinage

Ref. **9010**

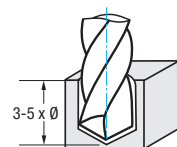
BROCA METAL DURO SERIE CORTA

Carbide Drill Bit. Jobber Series

Foret carbure série courte



| | | | | | | |
|--------------------------------|--------------|--|--|--|--|--------------|
| MD/HM Carbure Micrograno | DIN 338 N | | | | | Tol. D h8 |
|--------------------------------|--------------|--|--|--|--|--------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 |
| P | P.1 | 60-75 | | 0,026 | 0,045 | 0,066 | 0,088 | 0,110 | 0,130 | 0,160 | 0,180 |
| | P.2 | 55-65 | | 0,022 | 0,043 | 0,057 | 0,072 | 0,090 | 0,110 | 0,140 | 0,160 |
| | P.5 | 40-50 | | 0,022 | 0,043 | 0,057 | 0,072 | 0,090 | 0,110 | 0,140 | 0,160 |
| M | | 35-45 | | 0,022 | 0,036 | 0,050 | 0,062 | 0,065 | 0,072 | 0,076 | 0,080 |
| K | K.1 | 40-70 | | 0,044 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | K.2 | 40-60 | | 0,030 | 0,060 | 0,090 | 0,120 | 0,140 | 0,170 | 0,200 | 0,230 |
| S | | 30-40 | | 0,026 | 0,045 | 0,066 | 0,088 | 0,110 | 0,130 | 0,160 | 0,180 |
| N | N.1 | 40-100 | | 0,040 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.2 | 70-150 | | 0,040 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.3 | 100-150 | | 0,040 | 0,080 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.4 | 100-150 | | 0,040 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.5 | 60-120 | | 0,040 | 0,080 | 0,130 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| | N.6 | 80-170 | | 0,020 | 0,040 | 0,055 | 0,070 | 0,090 | 0,120 | 0,140 | 0,160 |
| | N.7 | 60-120 | | 0,020 | 0,035 | 0,050 | 0,060 | 0,065 | 0,072 | 0,075 | 0,080 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



New!

New!

New!

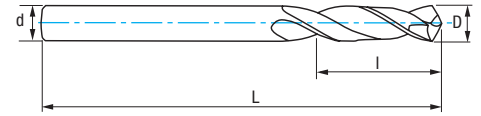
| D mm | L mm | I mm | | Nº Art. MD/HM | € | D mm | L mm | I mm | | Nº Art. MD/HM | € | D mm | L mm | I mm | | Nº Art. MD/HM | € |
|------|------|------|---|---------------|-------|------|------|------|---|---------------|-------|-------|------|------|---|---------------|--------|
| 1,00 | 34 | 12 | 1 | 44961 | 8,41 | 4,10 | 75 | 43 | 1 | 68311 | 26,32 | 7,80 | 117 | 75 | 1 | 68326 | 65,00 |
| 1,50 | 40 | 18 | 1 | 44964 | 9,25 | 4,20 | 75 | 43 | 1 | 44985 | 26,32 | 8,00 | 117 | 75 | 1 | 45009 | 47,84 |
| 1,80 | 46 | 22 | 1 | 71933 | 14,22 | 4,30 | 80 | 47 | 1 | 68312 | 26,32 | 8,50 | 117 | 75 | 1 | 45010 | 53,67 |
| 2,00 | 49 | 24 | 1 | 44967 | 11,51 | 4,40 | 80 | 47 | 1 | 72393 | 26,32 | 8,60 | 125 | 81 | 1 | 68329 | 53,67 |
| 2,50 | 57 | 30 | 1 | 44970 | 13,92 | 4,50 | 80 | 47 | 1 | 44988 | 26,14 | 9,00 | 125 | 81 | 1 | 45011 | 58,15 |
| 2,60 | 57 | 30 | 1 | 72385 | 17,40 | 4,60 | 80 | 47 | 1 | 56854 | 31,90 | 9,40 | 125 | 81 | 1 | 72409 | 83,00 |
| 2,70 | 61 | 33 | 1 | 72387 | 17,40 | 4,70 | 80 | 47 | 1 | 72394 | 31,90 | 9,50 | 125 | 81 | 1 | 45012 | 58,15 |
| 2,80 | 61 | 33 | 1 | 72388 | 17,40 | 4,80 | 86 | 52 | 1 | 68313 | 31,90 | 9,60 | 133 | 87 | 1 | 72410 | 95,00 |
| 2,90 | 61 | 33 | 1 | 72389 | 17,40 | 4,90 | 86 | 52 | 1 | 68314 | 31,90 | 9,70 | 133 | 87 | 1 | 72411 | 95,00 |
| 3,00 | 61 | 33 | 1 | 44973 | 14,27 | 5,00 | 86 | 52 | 1 | 44991 | 31,90 | 9,90 | 133 | 87 | 1 | 72412 | 95,00 |
| 3,10 | 65 | 36 | 1 | 68308 | 19,29 | 5,10 | 86 | 52 | 1 | 68315 | 31,90 | 10,00 | 133 | 87 | 1 | 45013 | 58,15 |
| 3,20 | 65 | 36 | 1 | 65908 | 19,29 | 5,50 | 93 | 57 | 1 | 44997 | 35,71 | 10,20 | 133 | 87 | 1 | 45014 | 86,56 |
| 3,30 | 65 | 36 | 1 | 44976 | 19,29 | 6,00 | 93 | 57 | 1 | 45000 | 37,96 | 10,30 | 133 | 87 | 1 | 68334 | 86,56 |
| 3,40 | 70 | 39 | 1 | 72390 | 19,29 | 6,20 | 101 | 63 | 1 | 56857 | 44,50 | 10,50 | 133 | 87 | 1 | 45015 | 86,56 |
| 3,50 | 70 | 39 | 1 | 44979 | 19,01 | 6,30 | 101 | 63 | 1 | 56858 | 44,50 | 11,00 | 142 | 94 | 1 | 45016 | 86,56 |
| 3,60 | 70 | 39 | 1 | 72391 | 21,39 | 6,50 | 101 | 63 | 1 | 45003 | 40,67 | 11,50 | 142 | 94 | 1 | 45017 | 86,56 |
| 3,70 | 70 | 39 | 1 | 68309 | 21,39 | 6,80 | 109 | 69 | 1 | 45004 | 40,67 | 12,00 | 151 | 101 | 1 | 45018 | 86,56 |
| 3,80 | 75 | 43 | 1 | 68310 | 21,39 | 6,90 | 109 | 69 | 1 | 68323 | 40,67 | 13,00 | 151 | 101 | 1 | 45019 | 116,26 |
| 3,90 | 75 | 43 | 1 | 72392 | 21,39 | 7,00 | 109 | 69 | 1 | 45007 | 40,67 | 14,00 | 160 | 108 | 1 | 45020 | 185,00 |
| 4,00 | 75 | 43 | 1 | 44982 | 21,39 | 7,50 | 109 | 69 | 1 | 45008 | 40,67 | 15,00 | 169 | 114 | 1 | 45021 | 201,82 |



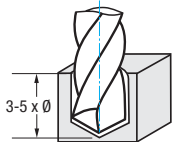
Ref. **9056**

BROCA METAL DURO SERIE EXTRA CORTA

Carbide Drill Bit. Stub Series
Foret carbure série extra-courte



| | | | | | | |
|--------------------------------|---------------|--|--|--|--|--------------|
| MD/HM Carbure Micrograno | DIN 6539 N | | | | | Tol. D h8 |
|--------------------------------|---------------|--|--|--|--|--------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 |
| P | P.1 | 60-75 | 0,026 | 0,045 | 0,066 | 0,088 | 0,110 | 0,130 | 0,160 | 0,180 |
| | P.2 | 55-65 | 0,022 | 0,043 | 0,057 | 0,072 | 0,090 | 0,110 | 0,140 | 0,160 |
| | P.5 | 40-50 | 0,022 | 0,043 | 0,057 | 0,072 | 0,090 | 0,110 | 0,140 | 0,160 |
| M | | 35-45 | 0,022 | 0,036 | 0,050 | 0,062 | 0,065 | 0,072 | 0,076 | 0,080 |
| K | K.1 | 40-70 | 0,044 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | K.2 | 40-60 | 0,030 | 0,060 | 0,090 | 0,120 | 0,140 | 0,170 | 0,200 | 0,230 |
| S | | 30-40 | 0,026 | 0,045 | 0,066 | 0,088 | 0,110 | 0,130 | 0,160 | 0,180 |
| N | N.1 | 40-100 | 0,040 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.2 | 70-150 | 0,040 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.3 | 100-150 | 0,040 | 0,080 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.4 | 100-150 | 0,040 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.5 | 60-120 | 0,040 | 0,080 | 0,130 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| | N.6 | 80-170 | 0,020 | 0,040 | 0,055 | 0,070 | 0,090 | 0,120 | 0,140 | 0,160 |
| | N.7 | 60-120 | 0,020 | 0,035 | 0,050 | 0,060 | 0,065 | 0,072 | 0,075 | 0,080 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | | Nº Art. MD/HM | € | D mm | L mm | I mm | | Nº Art. MD/HM | € | D mm | L mm | I mm | | Nº Art. MD/HM | € |
|------|------|------|---|---------------|-------|------|------|------|---|---------------|-------|-------|------|------|---|---------------|--------|
| 1,00 | 26 | 6 | 1 | 72203 | 5,37 | 5,00 | 62 | 26 | 1 | 72311 | 17,83 | 10,00 | 89 | 43 | 1 | 72425 | 62,31 |
| 1,50 | 32 | 9 | 1 | 74087 | 6,50 | 5,20 | 62 | 26 | 1 | 72317 | 23,47 | 10,20 | 89 | 43 | 1 | 14287 | 65,62 |
| 2,00 | 38 | 12 | 1 | 72230 | 7,07 | 5,50 | 66 | 28 | 1 | 72326 | 21,53 | 10,50 | 89 | 43 | 1 | 72428 | 69,19 |
| 2,50 | 43 | 14 | 1 | 72245 | 7,94 | 6,00 | 66 | 28 | 1 | 72341 | 25,61 | 11,00 | 95 | 47 | 1 | 72431 | 78,37 |
| 3,00 | 46 | 16 | 1 | 72260 | 10,19 | 6,50 | 70 | 31 | 1 | 72356 | 31,02 | 11,50 | 95 | 47 | 1 | 72434 | 85,45 |
| 3,20 | 49 | 18 | 1 | 74878 | 12,52 | 6,80 | 74 | 34 | 1 | 72365 | 38,16 | 12,00 | 102 | 51 | 1 | 72437 | 92,82 |
| 3,30 | 49 | 18 | 1 | 72266 | 12,52 | 7,00 | 74 | 34 | 1 | 72371 | 34,57 | 13,00 | 102 | 51 | 1 | 72440 | 109,02 |
| 3,50 | 52 | 20 | 1 | 74090 | 12,19 | 7,50 | 74 | 34 | 1 | 72386 | 38,16 | 14,00 | 107 | 54 | 1 | 72443 | 128,36 |
| 4,00 | 55 | 22 | 1 | 72281 | 14,18 | 8,00 | 79 | 36 | 1 | 72401 | 46,24 | 15,00 | 111 | 56 | 1 | 72446 | 154,07 |
| 4,10 | 55 | 22 | 1 | 69421 | 17,27 | 8,50 | 79 | 36 | 1 | 72416 | 50,81 | 16,00 | 115 | 58 | 1 | 72449 | 173,19 |
| 4,20 | 55 | 22 | 1 | 72287 | 17,27 | 9,00 | 84 | 40 | 1 | 72419 | 53,76 | | | | | | |
| 4,50 | 58 | 24 | 1 | 72296 | 16,12 | 9,50 | 84 | 40 | 1 | 72422 | 56,46 | | | | | | |



New!

BROCA MD 3Z ALTO AVANCE

High Feed 3Z Carbide Drill Bit
Foret carbure 3Z haute avance

Ref. 9075



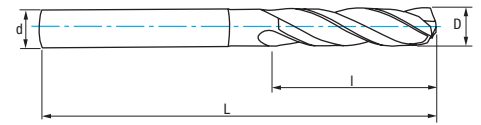
▶ Video

- Mejora drástica de los tiempos de producción gracias a avances superiores.
 - Mejora la precisión de los agujeros.
 - Testado en diferentes materiales obteniendo excelentes resultados. Destaca en aceros, fundición e inoxidables.
-
- Faster production time thanks to the higher feeds.
 - Remarkably accurate holes.
 - Extensively tested in a wide range of materials, obtaining outstanding results in steels, stainless steels and cast iron.
-
- Amélioration drastique des temps de production grâce à des avancées supérieures.
 - Trous beaucoup plus précis.
 - Testé sur différents matériaux obtenant d'excellents résultats. Se distingue en acier, fonte et acier inoxydable.

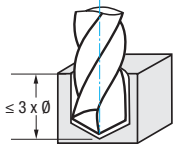
Ref. **9075**

BROCA MD 3Z ALTO AVANCE
High Feed 3Z Carbide Drill Bit
Foret carbure 3Z haute avance

New!



| | | | | | | | | |
|-------------------------------------|---------------|--------------|--|--|--|------------|---|------------|
| MD/HM Carbure Grano UF | X-AICr | IZAR Std. | | | | 3 Z | Pulido Espejo Mirror Polished Polyglass | 3XD |
|-------------------------------------|---------------|--------------|--|--|--|------------|---|------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | X-AICr | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 100-120 | 0,135 | 0,210 | 0,300 | 0,360 | 0,420 |
| | P.2 | 90-110 | 0,135 | 0,210 | 0,300 | 0,360 | 0,420 |
| | P.5 | 50-65 | 0,060 | 0,098 | 0,128 | 0,180 | 0,210 |
| M | | 60-70 | 0,060 | 0,098 | 0,128 | 0,180 | 0,210 |
| K | K.1 | 125-150 | 0,203 | 0,218 | 0,300 | 0,353 | 0,398 |
| | K.2 | 90-110 | 0,180 | 0,203 | 0,263 | 0,278 | 0,300 |
| N | N.3 | 90-300 | 0,120 | 0,190 | 0,266 | 0,320 | 0,370 |
| | N.4 | 90-300 | 0,120 | 0,190 | 0,266 | 0,320 | 0,370 |
| | N.5 | 70-150 | 0,120 | 0,190 | 0,266 | 0,320 | 0,370 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



| D mm | d mm | L mm | l mm | | N° Art. X-AICr | € |
|------|------|------|------|---|----------------|-------|
| 3,00 | 4,00 | 46 | 16 | 1 | 20210 | 40,85 |
| 3,30 | 4,00 | 49 | 18 | 1 | 20211 | 40,85 |
| 3,50 | 4,00 | 52 | 20 | 1 | 20213 | 40,85 |
| 4,00 | 4,00 | 55 | 22 | 1 | 20215 | 40,85 |
| 4,20 | 6,00 | 55 | 22 | 1 | 20216 | 49,12 |
| 4,50 | 6,00 | 58 | 24 | 1 | 20221 | 49,12 |
| 5,00 | 6,00 | 62 | 26 | 1 | 20226 | 49,12 |
| 5,50 | 6,00 | 66 | 28 | 1 | 20228 | 49,12 |
| 6,00 | 6,00 | 66 | 28 | 1 | 20236 | 49,12 |
| 6,50 | 8,00 | 70 | 31 | 1 | 20242 | 73,45 |
| 6,80 | 8,00 | 74 | 34 | 1 | 20247 | 73,45 |
| 7,00 | 8,00 | 74 | 34 | 1 | 20253 | 73,45 |

| D mm | d mm | L mm | l mm | | N° Art. X-AICr | € |
|-------|-------|------|------|---|----------------|--------|
| 7,50 | 8,00 | 74 | 34 | 1 | 20262 | 73,45 |
| 8,00 | 8,00 | 79 | 36 | 1 | 20270 | 73,45 |
| 8,50 | 10,00 | 79 | 36 | 1 | 20273 | 98,23 |
| 9,00 | 10,00 | 84 | 40 | 1 | 20275 | 111,54 |
| 9,50 | 10,00 | 84 | 40 | 1 | 20280 | 111,54 |
| 10,00 | 10,00 | 89 | 43 | 1 | 20282 | 111,54 |
| 10,20 | 12,00 | 89 | 43 | 1 | 20284 | 142,29 |
| 10,50 | 12,00 | 89 | 43 | 1 | 20288 | 142,29 |
| 11,00 | 12,00 | 95 | 47 | 1 | 20290 | 142,29 |
| 11,50 | 12,00 | 95 | 47 | 1 | 20291 | 142,29 |
| 12,00 | 12,00 | 102 | 51 | 1 | 20294 | 142,29 |
| 13,00 | 14,00 | 102 | 51 | 1 | 20295 | 181,31 |

- Avance x1,5 comparando con broca 2Z convencional.
- Recubrimiento Alto Rendimiento X-AICr.
- Agujeros más precisos con mejor acabado superficial.
- Punta Autocentrante.
- x1.5 Feed vs standard 2Z drill bits.
- High performance X-AICr coating with polished surface.
- Remarkably accurate holes and outstanding surface finishing.
- Self-centering function geometry.
- Avance x 1,5 par rapport au foret 2Z conventionnel.
- Revêtement haute performance X-AICr avec surface polie.
- Trous plus précis avec une meilleure finition de surface.
- Pointe d'auto-centrage.

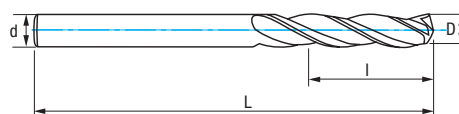


Video

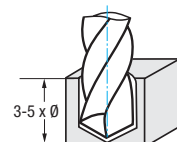
Ref. **9076**

BROCA METAL DURO 3Z. SERIE EXTRA-CORTA

3Z Carbide Drill Bit. Stub Series
Foret carbure 3Z. Série extra-courte



| | | | | | | |
|---------------------------------------|---------------|--|--|--|----|--------------|
| MD/HM Carbure Micrograno | DIN 6539 N | | | | 3Z | Tol. D h8 |
|---------------------------------------|---------------|--|--|--|----|--------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | MD/HM/Carb. | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 |
| P | P.1 | 80-100 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | P.2 | 80-100 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | P.5 | 40-70 | 0,040 | 0,065 | 0,085 | 0,120 | 0,140 | 0,160 | 0,180 |
| K | K.1 | 40-80 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | K.2 | 40-60 | 0,080 | 0,120 | 0,150 | 0,200 | 0,230 | 0,250 | 0,270 |
| S | | 30-50 | 0,060 | 0,090 | 0,120 | 0,140 | 0,160 | 0,200 | 0,220 |
| N | N.1 | 50-150 | 0,080 | 0,130 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| | N.2 | 50-150 | 0,080 | 0,130 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| | N.3 | 100-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.4 | 100-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |
| | N.5 | 100-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,320 | 0,350 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | l mm | | N° Art. MD/HM | € |
|------|------|------|---|---------------|-------|
| 3,00 | 46 | 16 | 1 | 74114 | 17,27 |
| 3,30 | 49 | 18 | 1 | 72713 | 22,08 |
| 3,50 | 52 | 20 | 1 | 72716 | 20,09 |
| 4,00 | 55 | 22 | 1 | 72719 | 21,53 |
| 4,50 | 58 | 24 | 1 | 72725 | 24,91 |
| 5,50 | 66 | 28 | 1 | 72731 | 31,98 |
| 6,50 | 70 | 31 | 1 | 72737 | 42,74 |
| 6,80 | 74 | 34 | 1 | 14282 | 51,48 |
| 7,00 | 74 | 34 | 1 | 72740 | 48,69 |
| 7,50 | 74 | 34 | 1 | 72743 | 52,92 |
| 8,00 | 79 | 36 | 1 | 72746 | 57,17 |

| D mm | L mm | l mm | | N° Art. MD/HM | € |
|-------|------|------|---|---------------|--------|
| 8,50 | 79 | 36 | 1 | 72749 | 60,56 |
| 9,00 | 84 | 40 | 1 | 72752 | 64,24 |
| 9,50 | 84 | 40 | 1 | 14283 | 71,31 |
| 10,00 | 89 | 43 | 1 | 72755 | 78,37 |
| 10,20 | 89 | 43 | 1 | 14284 | 85,45 |
| 10,50 | 89 | 43 | 1 | 14285 | 92,82 |
| 11,00 | 95 | 47 | 1 | 72758 | 106,98 |
| 11,50 | 95 | 47 | 1 | 14286 | 110,65 |
| 12,00 | 102 | 51 | 1 | 72761 | 114,03 |
| 15,00 | 111 | 56 | 1 | 72770 | 202,60 |



Ref. 9076 hasta fin de existencias. Se sustituirá por ref. 9075

While stocks last. In the future it will be replaced by ref. 9075

Dans la limite des stocks disponibles. Il sera remplacé par la réf. 9075

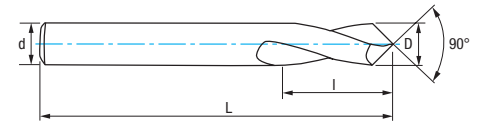


Ref. **9301**

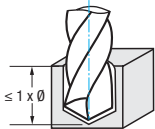
BROCA CENTRAR METAL DURO CNC 90°

90° Carbide CNC Center Drill

Foret carbure à centrer CNC 90°



| | | |
|---------------------------------------|--------------|--|
| MD/HM Carbure Micrograno | IZAR Std. | |
|---------------------------------------|--------------|--|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 3 | Ø 6 | Ø 10 | Ø 16 |
| P | P.1 | 60-75 | 0,070 | 0,090 | 0,150 | 0,200 | 0,250 |
| | P.2 | 40-55 | 0,070 | 0,090 | 0,150 | 0,200 | 0,250 |
| | P.3 | 25-30 | 0,060 | 0,080 | 0,140 | 0,170 | 0,200 |
| | P.5 | 20-30 | 0,060 | 0,080 | 0,140 | 0,200 | 0,220 |
| M | | 20-30 | 0,060 | 0,080 | 0,140 | 0,200 | 0,220 |
| K | K.1 | 45-50 | 0,100 | 0,120 | 0,170 | 0,220 | 0,250 |
| | K.2 | 45-50 | 0,100 | 0,120 | 0,170 | 0,220 | 0,250 |
| S | | 20-30 | 0,050 | 0,060 | 0,080 | 0,120 | 0,150 |
| N | N.1 | 55-60 | 0,100 | 0,120 | 0,150 | 0,220 | 0,250 |
| | N.2 | 55-60 | 0,100 | 0,120 | 0,150 | 0,220 | 0,250 |
| | N.3 | 100-110 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.4 | 100-110 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.5 | 70-90 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.6 | 150-200 | 0,150 | 0,160 | 0,220 | 0,280 | 0,300 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | Nº Art. MD/HM | € |
|-------|------|------|---------------|--------|
| 2,00 | 40 | 8 | 68397 | 23,74 |
| 3,00 | 45 | 10 | 68398 | 24,00 |
| 4,00 | 50 | 12 | 68399 | 28,59 |
| 5,00 | 50 | 15 | 68400 | 37,07 |
| 6,00 | 50 | 18 | 44862 | 52,21 |
| 8,00 | 60 | 23 | 44865 | 73,99 |
| 10,00 | 70 | 24 | 44868 | 95,54 |
| 12,00 | 70 | 24 | 44871 | 143,88 |
| 16,00 | 80 | 26 | 44874 | 175,81 |
| 20,00 | 100 | 35 | 44877 | 311,75 |

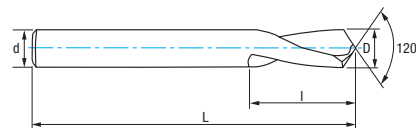


Ref. **9303**

BROCA CENTRAR METAL DURO CNC 120°

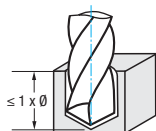
120° CNC Carbide Center Drill

Foret carbure à centrar CNC 120°



MD/HM
Carbure
Micrograno

IZAR
Std.

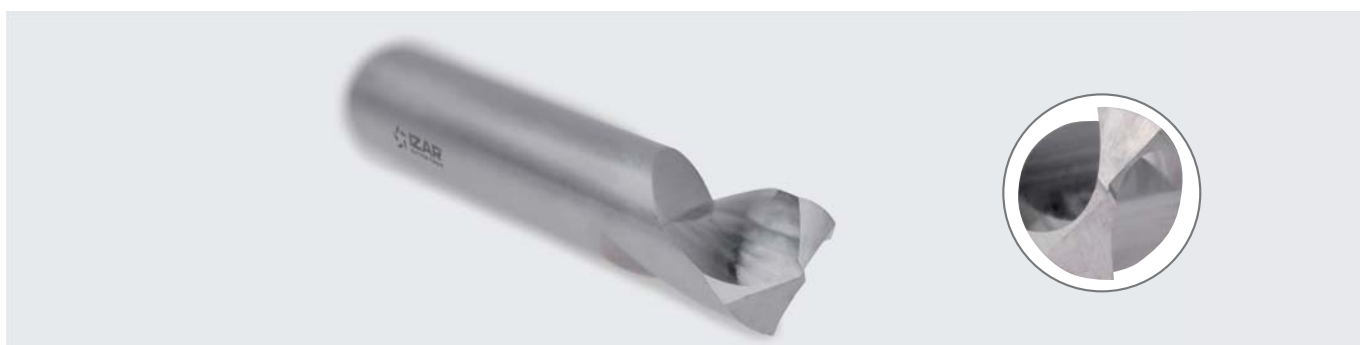


| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 3 | Ø 6 | Ø 10 | Ø 16 |
| P | P.1 | 60-75 | 0,070 | 0,090 | 0,150 | 0,200 | 0,250 |
| | P.2 | 40-55 | 0,070 | 0,090 | 0,150 | 0,200 | 0,250 |
| | P.3 | 25-30 | 0,060 | 0,080 | 0,140 | 0,170 | 0,200 |
| | P.5 | 20-30 | 0,060 | 0,080 | 0,140 | 0,200 | 0,220 |
| M | | 20-30 | 0,060 | 0,080 | 0,140 | 0,200 | 0,220 |
| K | K.1 | 45-50 | 0,100 | 0,120 | 0,170 | 0,220 | 0,250 |
| | K.2 | 45-50 | 0,100 | 0,120 | 0,170 | 0,220 | 0,250 |
| S | | 20-30 | 0,050 | 0,060 | 0,080 | 0,120 | 0,150 |
| N | N.1 | 55-60 | 0,100 | 0,120 | 0,150 | 0,220 | 0,250 |
| | N.2 | 55-60 | 0,100 | 0,120 | 0,150 | 0,220 | 0,250 |
| | N.3 | 100-110 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.4 | 100-110 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.5 | 70-90 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.6 | 150-200 | 0,150 | 0,160 | 0,220 | 0,280 | 0,300 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

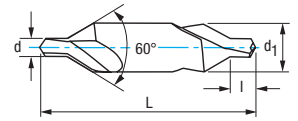
| D mm | L mm | I mm | N° Art. MD/HM | € |
|---------|---------|---------|------------------|--------|
| 2,00 | 40 | 8 | 68401 | 23,74 |
| 3,00 | 45 | 10 | 68402 | 24,00 |
| 4,00 | 50 | 12 | 68403 | 28,59 |
| 5,00 | 50 | 15 | 68404 | 37,07 |
| 6,00 | 50 | 18 | 44878 | 52,21 |
| 8,00 | 60 | 23 | 44880 | 73,99 |
| 10,00 | 70 | 24 | 44883 | 95,54 |
| 12,00 | 70 | 24 | 44889 | 143,88 |
| 16,00 | 80 | 26 | 44892 | 175,81 |
| 20,00 | 100 | 35 | 44895 | 311,75 |



Ref. **9310**

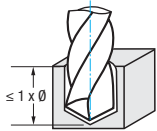
BROCA CENTRAR DOBLE METAL DURO

Double Center Carbide Drill
Foret carbure à centrar double



MD/HM
Carbure
Micrograno

DIN
333 A



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 3 | Ø 6 | Ø 10 | Ø 16 |
| P | P.1 | 60-75 | 0,070 | 0,090 | 0,150 | 0,200 | 0,250 |
| | P.2 | 50-60 | 0,070 | 0,090 | 0,150 | 0,200 | 0,250 |
| | P.3 | 25-40 | 0,060 | 0,080 | 0,140 | 0,170 | 0,200 |
| | P.5 | 20-30 | 0,060 | 0,080 | 0,140 | 0,200 | 0,220 |
| M | | 20-30 | 0,060 | 0,080 | 0,140 | 0,200 | 0,220 |
| K | K.1 | 50-60 | 0,100 | 0,120 | 0,170 | 0,220 | 0,250 |
| | K.2 | 35-50 | 0,100 | 0,120 | 0,170 | 0,220 | 0,250 |
| S | | 20-30 | 0,050 | 0,060 | 0,080 | 0,120 | 0,150 |
| N | N.1 | 70-100 | 0,100 | 0,120 | 0,150 | 0,220 | 0,250 |
| | N.2 | 70-100 | 0,100 | 0,120 | 0,150 | 0,220 | 0,250 |
| | N.3 | 100-150 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.4 | 100-150 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.5 | 70-90 | 0,120 | 0,140 | 0,160 | 0,220 | 0,250 |
| | N.6 | 150-200 | 0,150 | 0,160 | 0,220 | 0,280 | 0,300 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| d mm | | d1 mm | L mm | l mm | N° Art. MD/HM | € |
|---------|---|----------|---------|---------|------------------|--------|
| 1,00 | x | 3,15 | 31 | 1,3-1,7 | 68405 | 37,45 |
| 1,25 | x | 3,15 | 31 | 1,6-2,0 | 68406 | 37,45 |
| 1,60 | x | 4,00 | 35 | 2,0-2,6 | 68407 | 38,53 |
| 2,00 | x | 5,00 | 40 | 2,5-3,1 | 68408 | 48,15 |
| 2,50 | x | 6,30 | 45 | 3,1-3,8 | 68409 | 57,24 |
| 3,15 | x | 8,00 | 50 | 3,9-4,6 | 68410 | 69,56 |
| 4,00 | x | 10,00 | 55 | 5,0-5,9 | 68411 | 92,55 |
| 5,00 | x | 12,50 | 63 | 6,3-7,2 | 68412 | 156,23 |
| 6,30 | x | 16,00 | 71 | 8,0-8,9 | 68413 | 247,18 |

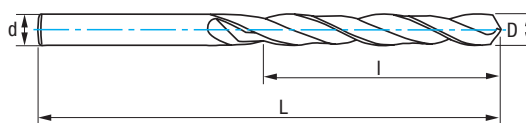


Ref. **9100**

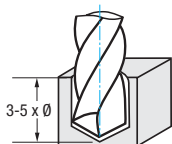
BROCA PUNTA METAL DURO. SERIE CORTA

Carbide Tipped Drill Bit. Jobber Series

Foret pointe carbure



| | | | | | | |
|----------------------------|--------------|--|--|--|--|--------------|
| MD HM Carbure | DIN 338 N | | | | Rectificado Ground Taillé meulé | Tol. D h7 |
|----------------------------|--------------|--|--|--|--|--------------|



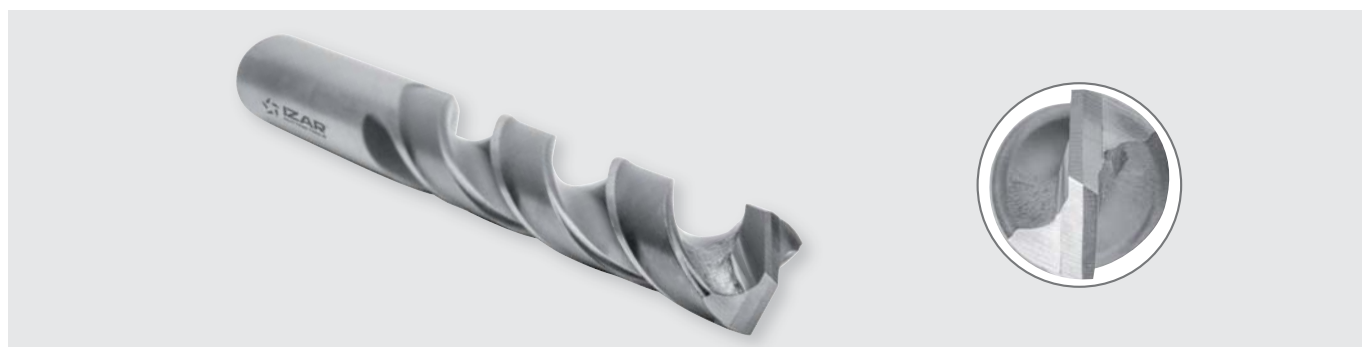
| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 30-50 | 0,015 | 0,025 | 0,035 | 0,045 | 0,050 | 0,055 | 0,070 | 0,080 | |
| | P.3 | 10-15 | 0,010 | 0,020 | 0,030 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 | |
| | P.5 | 12-25 | 0,010 | 0,020 | 0,030 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 | |
| M | | 10-25 | 0,010 | 0,020 | 0,030 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 | |
| K | K.1 | 50-90 | 0,020 | 0,040 | 0,060 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | |
| | K.2 | 40-60 | 0,010 | 0,020 | 0,030 | 0,040 | 0,050 | 0,050 | 0,060 | 0,060 | |
| S | | 20-35 | 0,015 | 0,030 | 0,030 | 0,035 | 0,050 | 0,060 | 0,080 | 0,090 | |
| N | N.1 | 40-100 | 0,030 | 0,060 | 0,100 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | |
| | N.2 | 40-100 | 0,030 | 0,060 | 0,100 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | |
| | N.7 | 20-100 | 0,022 | 0,040 | 0,050 | 0,060 | 0,065 | 0,070 | 0,080 | 0,120 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | l mm | | Nº Art. MD/HM | € |
|------|------|------|---|---------------|-------|
| 2,00 | 49 | 24 | 1 | 71429 | 15,96 |
| 2,50 | 57 | 30 | 1 | 71444 | 15,96 |
| 2,70 | 57 | 30 | 1 | 46916 | 15,96 |
| 3,00 | 61 | 33 | 1 | 71459 | 15,96 |
| 3,10 | 61 | 33 | 1 | 46917 | 16,44 |
| 3,20 | 65 | 36 | 1 | 23058 | 16,44 |
| 3,30 | 65 | 36 | 1 | 26716 | 16,44 |
| 3,40 | 70 | 39 | 1 | 29479 | 16,44 |
| 3,50 | 70 | 39 | 1 | 71474 | 16,44 |
| 3,60 | 70 | 39 | 1 | 52285 | 16,44 |
| 4,00 | 75 | 43 | 1 | 71489 | 16,44 |
| 4,10 | 75 | 43 | 1 | 46918 | 16,44 |
| 4,20 | 75 | 43 | 1 | 22016 | 16,44 |
| 4,50 | 80 | 47 | 1 | 71504 | 16,86 |
| 4,60 | 80 | 47 | 1 | 26963 | 16,86 |
| 4,70 | 80 | 47 | 1 | 17101 | 16,86 |
| 4,80 | 86 | 52 | 1 | 26964 | 16,86 |
| 5,00 | 86 | 52 | 1 | 71516 | 16,86 |
| 5,10 | 86 | 52 | 1 | 23059 | 17,79 |
| 5,20 | 86 | 52 | 1 | 67682 | 17,79 |
| 5,50 | 93 | 57 | 1 | 71531 | 17,79 |
| 5,60 | 93 | 57 | 1 | 32603 | 18,66 |
| 5,70 | 93 | 57 | 1 | 23889 | 18,66 |
| 5,80 | 93 | 57 | 1 | 54039 | 18,66 |
| 6,00 | 93 | 57 | 1 | 71543 | 18,66 |
| 6,10 | 101 | 63 | 1 | 23891 | 22,23 |
| 6,20 | 101 | 63 | 1 | 32691 | 22,23 |

| D mm | L mm | l mm | | Nº Art. MD/HM | € |
|-------|------|------|---|---------------|--------|
| 6,30 | 101 | 63 | 1 | 32692 | 22,23 |
| 6,50 | 101 | 63 | 1 | 71558 | 22,23 |
| 6,60 | 101 | 63 | 1 | 30614 | 22,24 |
| 6,80 | 109 | 69 | 1 | 23893 | 22,24 |
| 7,00 | 109 | 69 | 1 | 71573 | 22,24 |
| 7,50 | 109 | 69 | 1 | 71585 | 23,12 |
| 7,80 | 117 | 75 | 1 | 23914 | 23,12 |
| 8,00 | 117 | 75 | 1 | 71600 | 23,12 |
| 8,50 | 117 | 75 | 1 | 71615 | 25,22 |
| 8,60 | 125 | 81 | 1 | 27007 | 39,23 |
| 9,00 | 125 | 81 | 1 | 71630 | 25,22 |
| 9,50 | 125 | 81 | 1 | 71645 | 27,55 |
| 10,00 | 133 | 87 | 1 | 71660 | 27,55 |
| 10,20 | 133 | 87 | 1 | 27008 | 35,50 |
| 10,50 | 133 | 87 | 1 | 71663 | 35,50 |
| 11,00 | 142 | 94 | 1 | 71666 | 35,50 |
| 11,50 | 142 | 94 | 1 | 71672 | 40,83 |
| 12,00 | 151 | 101 | 1 | 71675 | 40,83 |
| 12,50 | 151 | 101 | 1 | 71681 | 48,86 |
| 13,00 | 151 | 101 | 1 | 71684 | 48,86 |
| 14,00 | 160 | 108 | 1 | 71690 | 56,85 |
| 15,00 | 169 | 114 | 1 | 71696 | 64,83 |
| 16,00 | 178 | 120 | 1 | 71702 | 74,63 |
| 17,00 | 184 | 125 | 1 | 71705 | 81,72 |
| 18,00 | 191 | 130 | 1 | 71711 | 87,95 |
| 19,00 | 198 | 135 | 1 | 71717 | 109,26 |
| 20,00 | 205 | 140 | 1 | 71723 | 124,36 |

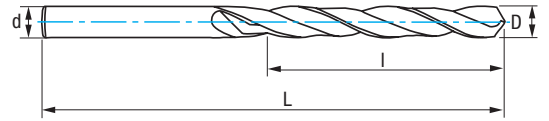


Ref. **9036**

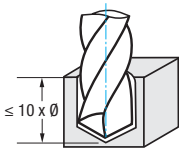
BROCA PUNTA METAL DURO. SERIE LARGA

Carbide Tipped Drill Bit. Long Series

Foret pointe carbure serie longue



| | | | | | | |
|---------------|-----------|------|--|-----------------------------|------------------------------------|-----------|
| MD/HM Carbure | DIN 340 N | 118° | | Bright Finish (Black Flute) | Rectificado Ground Taillé Meulé | Tol. D h7 |
|---------------|-----------|------|--|-----------------------------|------------------------------------|-----------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 30-50 | 0,015 | 0,025 | 0,035 | 0,045 | 0,050 | 0,055 | 0,070 | 0,080 |
| | P.3 | 10-15 | 0,010 | 0,020 | 0,030 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 |
| | P.5 | 12-25 | 0,010 | 0,020 | 0,030 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 |
| M | | 10-25 | 0,010 | 0,020 | 0,030 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 |
| K | K.1 | 50-90 | 0,020 | 0,040 | 0,060 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 |
| | K.2 | 40-60 | 0,010 | 0,020 | 0,030 | 0,040 | 0,050 | 0,050 | 0,060 | 0,060 |
| S | | 20-35 | 0,015 | 0,030 | 0,030 | 0,035 | 0,050 | 0,060 | 0,080 | 0,090 |
| N | N.1 | 40-100 | 0,030 | 0,060 | 0,100 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 |
| | N.2 | 40-100 | 0,030 | 0,060 | 0,100 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 |
| | N.7 | 20-100 | 0,022 | 0,040 | 0,050 | 0,060 | 0,065 | 0,070 | 0,080 | 0,120 |

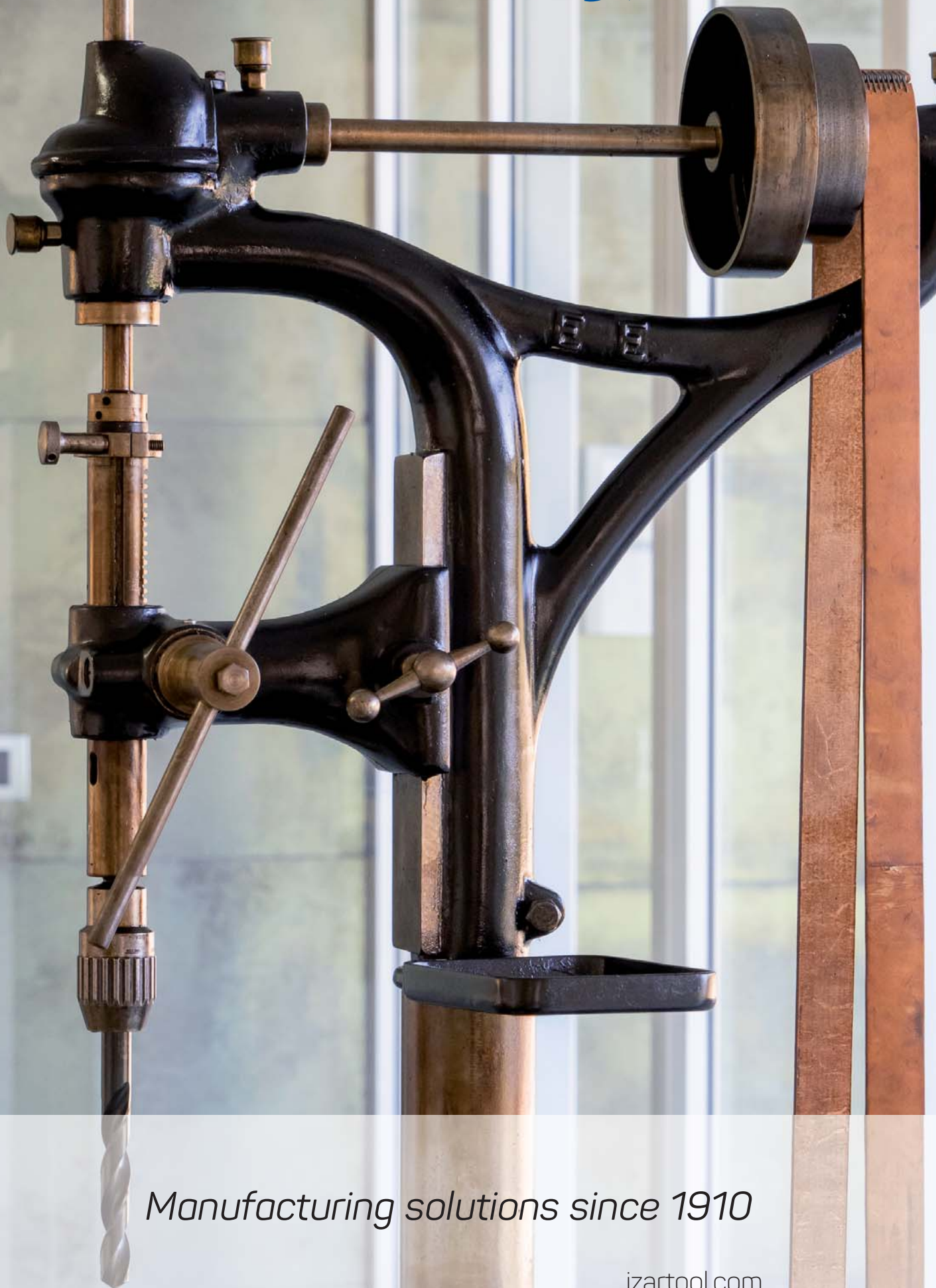
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

- * Se recomienda reducir el avance entre 2/3 y 1/2
- * It is recommended to reduce Feed between 2/3 & 1/2
- * On conseille réduire l'avance entre 2/3 et 1/2

| D mm | L mm | I mm | | N° Art. MD/HM | € | D mm | L mm | I mm | | N° Art. MD/HM | € |
|------|------|------|---|---------------|-------|-------|------|------|---|---------------|--------|
| 2,00 | 85 | 56 | 1 | 71786 | 29,20 | 7,50 | 156 | 102 | 1 | 71939 | 35,29 |
| 2,50 | 95 | 62 | 1 | 73901 | 28,90 | 8,00 | 165 | 109 | 1 | 71954 | 35,29 |
| 3,00 | 100 | 66 | 1 | 71813 | 25,91 | 8,50 | 165 | 109 | 1 | 71969 | 44,87 |
| 3,10 | 106 | 69 | 1 | 71816 | 30,07 | 9,00 | 175 | 109 | 1 | 71972 | 39,03 |
| 3,20 | 106 | 69 | 1 | 67853 | 30,07 | 9,50 | 175 | 115 | 1 | 71975 | 41,54 |
| 3,30 | 106 | 69 | 1 | 70588 | 30,07 | 10,00 | 184 | 115 | 1 | 71978 | 41,54 |
| 3,50 | 112 | 73 | 1 | 71825 | 24,81 | 10,50 | 184 | 121 | 1 | 71981 | 55,97 |
| 4,00 | 119 | 78 | 1 | 71840 | 25,69 | 11,00 | 195 | 121 | 1 | 71984 | 55,97 |
| 4,10 | 119 | 78 | 1 | 69337 | 31,82 | 11,50 | 195 | 128 | 1 | 71987 | 64,98 |
| 4,50 | 126 | 82 | 1 | 71855 | 26,26 | 12,00 | 205 | 128 | 1 | 71990 | 64,98 |
| 5,00 | 132 | 87 | 1 | 71867 | 26,50 | 12,50 | 205 | 134 | 1 | 71993 | 70,12 |
| 5,20 | 132 | 87 | 1 | 69339 | 34,87 | 13,00 | 205 | 134 | 1 | 71996 | 70,12 |
| 5,50 | 139 | 91 | 1 | 71882 | 28,79 | 14,00 | 214 | 140 | 1 | 72002 | 75,62 |
| 6,00 | 139 | 91 | 1 | 71894 | 28,79 | 15,00 | 220 | 144 | 1 | 72008 | 88,25 |
| 6,20 | 148 | 97 | 1 | 71900 | 37,46 | 16,00 | 227 | 149 | 1 | 72014 | 96,78 |
| 6,50 | 148 | 97 | 1 | 71909 | 30,92 | 17,00 | 235 | 154 | 1 | 72017 | 116,32 |
| 6,70 | 148 | 97 | 1 | 71915 | 37,46 | 18,00 | 241 | 158 | 1 | 72020 | 116,32 |
| 6,80 | 156 | 102 | 1 | 67683 | 37,46 | 19,00 | 247 | 162 | 1 | 72023 | 129,89 |
| 7,00 | 156 | 102 | 1 | 71924 | 30,92 | 20,00 | 254 | 166 | 1 | 72026 | 175,80 |





Manufacturing solutions since 1910

izartool.com



TALADRADO PMX - HSSE - HSS

PMX - HSSE - HSS Drilling

Perçage PMX - HSSE - HSS

BROCAS MANGO CILÍNDRICO

Straight Shank Drill Bits
Forets queue cylindrique

JUEGOS BROCAS

Drill Bit Sets
Jeux forets

BROCAS MANGO CÓNICO

Morse Taper Shank Drill Bits
Forets queue cône morse

BROCAS CENTRAR

Center Drills
Forets à centrer

BROCAS ESCARIADORES 3 CORTES

3 Cut Core Drills
Forets aléseurs 3 lèvres

BROCAS BIDIAMETRALES

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Forets etagés

70

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Forets spéciaux

106

FRESAS HUECAS M. ELECTROMAGNÉTICAS

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Fraises à carotter UP électromagnétiques

114

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Mandrins précision

123

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Drilling Accessories
Accessoires Perçage

129

MÁQUINAS AFILADORAS

Sharpening Machines
Machines affûteuses

131

134

140

153

155

158

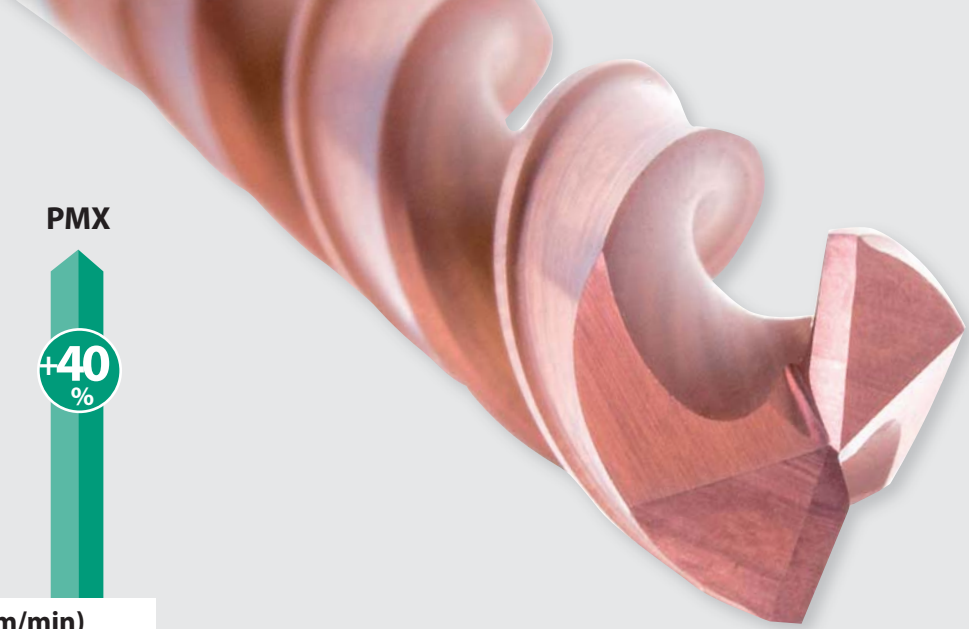


HSS

PMX

+40%
%

Vc (m/min)

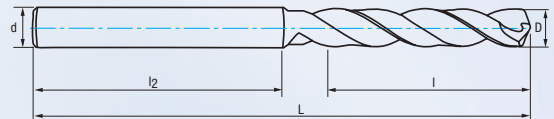


Ref. **6016**

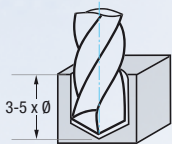
BROCA PMX ALTO RENDIMIENTO INOX / MATERIALES DUROS

Stainless / Hard Materials High Performance PMX Drill Bit

Foret PMX haut rendement Inox / Matériaux durs



| | | | | | | | | | |
|-----|--------|-------------|------|--|--|--|------------------------------------|--|--------------|
| PMX | X-AlCr | IZAR Std. N | 138° | | | | Rectificado Ground Taillé meulé | Especial / Special / Spéciale Inox AISI 304 Stainless Steel | Tol. D h8 |
|-----|--------|-------------|------|--|--|--|------------------------------------|--|--------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | X-AlCr | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 30-50 | 0,060 | 0,100 | 0,120 | 0,120 | 0,160 | 0,200 | 0,250 | 0,250 |
| | P.2 | 30-45 | 0,050 | 0,060 | 0,100 | 0,100 | 0,120 | 0,160 | 0,200 | 0,200 |
| | P.3 | 25-35 | 0,030 | 0,050 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,120 |
| | P.5 | 15-20 | 0,030 | 0,050 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,120 |
| M | | 10-18 | 0,030 | 0,050 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,120 |
| K | K.1 | 35-45 | 0,080 | 0,100 | 0,160 | 0,160 | 0,200 | 0,250 | 0,300 | 0,300 |
| | K.2 | 30-40 | 0,080 | 0,100 | 0,160 | 0,160 | 0,200 | 0,250 | 0,300 | 0,300 |
| N | N.1 | 80-100 | 0,050 | 0,080 | 0,100 | 0,100 | 0,120 | 0,160 | 0,200 | 0,200 |
| | N.2 | 50-60 | 0,050 | 0,080 | 0,100 | 0,100 | 0,120 | 0,160 | 0,200 | 0,200 |
| | N.7 | 20-35 | 0,040 | 0,060 | 0,080 | 0,080 | 0,100 | 0,120 | 0,160 | 0,160 |





Ref. **6016**

BROCA PMX ALTO RENDIMIENTO INOX / MATERIALES DUROS

Stainless / Hard Materials High Performance PMX Drill Bit

Foret PMX haut rendement Inox / Matériaux durs

| D mm | d mm | L mm | l mm | l2 mm |  | N° Art. X-AlCr | € |
|---------|---------|---------|---------|----------|---|-------------------|-------|
| 2,00 | 3,00 | 46 | 15 | 28 | 1 | 59563 | 16,21 |
| 2,10 | 3,00 | 46 | 15 | 28 | 1 | 59564 | 16,21 |
| 2,20 | 3,00 | 46 | 15 | 28 | 1 | 59565 | 16,21 |
| 2,30 | 3,00 | 46 | 15 | 28 | 1 | 59566 | 16,21 |
| 2,50 | 3,00 | 46 | 15 | 28 | 1 | 59567 | 16,21 |
| 2,60 | 3,00 | 50 | 19 | 28 | 1 | 59569 | 16,21 |
| 2,80 | 3,00 | 50 | 19 | 28 | 1 | 59570 | 16,21 |
| 2,90 | 3,00 | 50 | 19 | 28 | 1 | 59571 | 16,21 |
| 3,00 | 3,00 | 50 | 19 | 28 | 1 | 59573 | 16,21 |
| 3,20 | 4,00 | 55 | 23 | 28 | 1 | 59574 | 17,70 |
| 3,30 | 4,00 | 55 | 23 | 28 | 1 | 59575 | 17,70 |
| 3,40 | 4,00 | 55 | 23 | 28 | 1 | 59578 | 17,70 |
| 3,50 | 4,00 | 55 | 23 | 28 | 1 | 59579 | 17,70 |
| 3,70 | 4,00 | 61 | 29 | 28 | 1 | 59582 | 17,70 |
| 3,80 | 4,00 | 61 | 29 | 28 | 1 | 59583 | 17,70 |
| 3,90 | 4,00 | 61 | 29 | 28 | 1 | 59584 | 17,70 |
| 4,00 | 4,00 | 61 | 29 | 28 | 1 | 59585 | 18,34 |
| 4,20 | 6,00 | 72 | 30 | 36 | 1 | 59586 | 22,91 |
| 4,30 | 6,00 | 72 | 30 | 36 | 1 | 59587 | 22,91 |
| 4,50 | 6,00 | 72 | 30 | 36 | 1 | 59593 | 22,91 |
| 4,60 | 6,00 | 75 | 33 | 36 | 1 | 59596 | 22,91 |
| 4,80 | 6,00 | 75 | 33 | 36 | 1 | 59597 | 22,91 |
| 4,90 | 6,00 | 75 | 33 | 36 | 1 | 59598 | 22,91 |
| 5,00 | 6,00 | 75 | 33 | 36 | 1 | 59599 | 30,56 |
| 5,10 | 6,00 | 75 | 33 | 36 | 1 | 59600 | 30,56 |
| 5,30 | 6,00 | 75 | 33 | 36 | 1 | 59601 | 30,56 |
| 5,50 | 6,00 | 75 | 33 | 36 | 1 | 59602 | 30,56 |
| 5,80 | 6,00 | 79 | 37 | 36 | 1 | 59603 | 30,56 |
| 5,90 | 6,00 | 79 | 37 | 36 | 1 | 59604 | 30,56 |
| 6,00 | 6,00 | 79 | 37 | 36 | 1 | 59605 | 30,56 |
| 6,30 | 8,00 | 83 | 39 | 36 | 1 | 59606 | 39,68 |
| 6,40 | 8,00 | 83 | 39 | 36 | 1 | 59607 | 39,68 |
| 6,50 | 8,00 | 83 | 39 | 36 | 1 | 59608 | 39,68 |
| 6,80 | 8,00 | 88 | 44 | 36 | 1 | 59609 | 39,68 |

| D mm | d mm | L mm | l mm | l2 mm |  | N° Art. X-AlCr | € |
|---------|---------|---------|---------|----------|---|-------------------|-------|
| 6,90 | 8,00 | 88 | 44 | 36 | 1 | 59738 | 39,68 |
| 7,00 | 8,00 | 88 | 44 | 36 | 1 | 59610 | 39,68 |
| 7,40 | 8,00 | 88 | 44 | 36 | 1 | 59611 | 39,68 |
| 7,50 | 8,00 | 88 | 44 | 36 | 1 | 59612 | 39,68 |
| 7,80 | 8,00 | 92 | 48 | 36 | 1 | 59613 | 39,68 |
| 7,90 | 8,00 | 92 | 48 | 36 | 1 | 59702 | 39,68 |
| 8,00 | 8,00 | 92 | 48 | 36 | 1 | 59520 | 39,68 |
| 8,50 | 10,00 | 98 | 48 | 40 | 1 | 59703 | 51,88 |
| 8,60 | 10,00 | 101 | 51 | 40 | 1 | 59704 | 51,88 |
| 8,80 | 10,00 | 101 | 51 | 40 | 1 | 59705 | 51,88 |
| 8,90 | 10,00 | 101 | 51 | 40 | 1 | 59706 | 51,88 |
| 9,00 | 10,00 | 101 | 51 | 40 | 1 | 59707 | 51,88 |
| 9,30 | 10,00 | 101 | 51 | 40 | 1 | 59708 | 51,88 |
| 9,40 | 10,00 | 101 | 51 | 40 | 1 | 59709 | 51,88 |
| 9,50 | 10,00 | 101 | 51 | 40 | 1 | 59710 | 51,88 |
| 9,80 | 10,00 | 105 | 55 | 40 | 1 | 59711 | 51,88 |
| 9,90 | 10,00 | 105 | 55 | 40 | 1 | 59712 | 51,88 |
| 10,00 | 10,00 | 105 | 55 | 40 | 1 | 59713 | 51,88 |
| 10,20 | 12,00 | 112 | 55 | 45 | 1 | 59714 | 64,11 |
| 10,30 | 12,00 | 112 | 55 | 45 | 1 | 59716 | 64,11 |
| 10,50 | 12,00 | 112 | 55 | 45 | 1 | 59718 | 64,11 |
| 10,80 | 12,00 | 116 | 59 | 45 | 1 | 59719 | 64,11 |
| 10,90 | 12,00 | 116 | 59 | 45 | 1 | 59720 | 64,11 |
| 11,00 | 12,00 | 116 | 59 | 45 | 1 | 59721 | 73,27 |
| 11,10 | 12,00 | 116 | 59 | 45 | 1 | 59722 | 73,27 |
| 11,50 | 12,00 | 116 | 59 | 45 | 1 | 59723 | 79,39 |
| 11,80 | 12,00 | 121 | 64 | 45 | 1 | 59724 | 79,39 |
| 11,90 | 12,00 | 121 | 64 | 45 | 1 | 59725 | 79,39 |
| 12,00 | 12,00 | 121 | 64 | 45 | 1 | 59726 | 79,39 |
| 12,20 | 14,00 | 129 | 70 | 45 | 1 | 59727 | 85,48 |
| 12,50 | 14,00 | 129 | 70 | 45 | 1 | 59728 | 85,48 |
| 12,70 | 14,00 | 129 | 70 | 45 | 1 | 59729 | 85,48 |
| 12,80 | 14,00 | 129 | 70 | 45 | 1 | 59730 | 85,48 |
| 12,90 | 14,00 | 129 | 70 | 45 | 1 | 59731 | 85,48 |
| 13,00 | 14,00 | 129 | 70 | 45 | 1 | 59732 | 85,48 |



Set 8 Pcs

| Cont. Ø | N° Art. X-AlCr | € |
|--------------------------------------|-------------------|--------|
| 3 - 3,3 - 4 - 4,2 5 - 6 - 6,8 - 8 | 74871 | 215,63 |



HSS

PMX

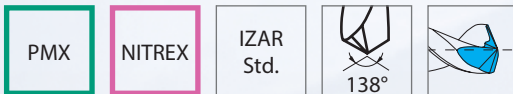
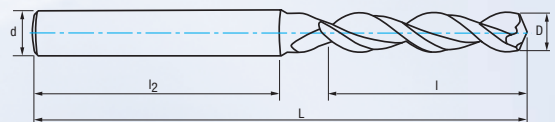
+40%
%

Vc (m/min)

Ref. **6000****BROCA PMX ALTO RENDIMIENTO TITANIO / ALEACIONES ESPECIALES**

Titanium / Special Alloys High Performance PMX Drill Bit

Foret PMX haut rendement Titane / Alliages spéciaux

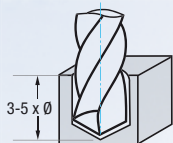

Especial / Special / Spéciale
Titanio/Titanium/Titane Ti6Al4V
Nimonic, Hastelloy, Inconel
Tol. D
h8
Filo Corregido
Convex Edge
 Filets Corrigés

Perfil
 Profile
 Profil
"S"
Rectificado
 Ground
 Taillé meulé

| Material | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| | | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| S | 6-14 | 0,020 | 0,030 | 0,040 | 0,050 | 0,070 | 0,100 | 0,100 | 0,120 |
| | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 |
| N | 100-120 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 |
| | | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

**Hélice forma "S":**

- Taladrado más rápido y estable.
- Agujeros con buen acabado y gran precisión.

"S" Form Helix:

- Faster and more stable Drilling.
- High precision and good finishing holes.

Helix form "S":

- Plus rapide et stable perçage.
- Trous de précision et de bonne finition.

Filo corregido tipo "Convex":

- Afilado especial de gran precisión.
- Mejora el acabado superficial del mecanizado.
- Diseño especial para mecanizar materiales con pobre conductividad térmica como el titanio tratado Ti6Al4V.

"Convex" type Split Point:

- High Precision Special Split Point.
- Better Machining Surface Quality.
- Specially designed for machining Materials with poor Thermal Conductivity such as Ti6Al4V treated Titanium.

"Convex" type affûtage en croix:


- Spécial affûtage en croix d'haute précision.
- S'améliore la finition de la surface.
- Conception spécial pour les matériaux avec une mauvaise conductivité thermique comme le titane traité Ti6Al4V.


Ref. **6000**

BROCA PMX ALTO RENDIMIENTO TITANIO / ALEACIONES ESPECIALES

Titanium / Special Alloys High Performance PMX Drill Bit

Foret PMX haut rendement Titane / Alliages spéciaux

| D mm | d mm | L mm | I mm | I2 mm |  | N° Art. NITREX | € |
|---------|---------|---------|---------|----------|---|-------------------|-------|
| 2,00 | 3,00 | 46 | 15 | 28 | 1 | 57450 | 16,21 |
| 2,10 | 3,00 | 46 | 15 | 28 | 1 | 58986 | 16,21 |
| 2,20 | 3,00 | 46 | 15 | 28 | 1 | 58987 | 16,21 |
| 2,30 | 3,00 | 46 | 15 | 28 | 1 | 58989 | 16,21 |
| 2,50 | 3,00 | 46 | 15 | 28 | 1 | 57451 | 16,21 |
| 2,60 | 3,00 | 50 | 19 | 28 | 1 | 58990 | 16,21 |
| 2,80 | 3,00 | 50 | 19 | 28 | 1 | 58992 | 16,21 |
| 2,90 | 3,00 | 50 | 19 | 28 | 1 | 58993 | 16,21 |
| 3,00 | 3,00 | 50 | 19 | 28 | 1 | 55623 | 16,21 |
| 3,20 | 4,00 | 55 | 23 | 28 | 1 | 57452 | 17,70 |
| 3,30 | 4,00 | 55 | 23 | 28 | 1 | 57461 | 17,70 |
| 3,40 | 4,00 | 55 | 23 | 28 | 1 | 58995 | 17,70 |
| 3,50 | 4,00 | 55 | 23 | 28 | 1 | 57462 | 17,70 |
| 3,70 | 4,00 | 61 | 29 | 28 | 1 | 58996 | 17,70 |
| 3,80 | 4,00 | 61 | 29 | 28 | 1 | 58998 | 17,70 |
| 3,90 | 4,00 | 61 | 29 | 28 | 1 | 58999 | 17,70 |
| 4,00 | 4,00 | 61 | 29 | 28 | 1 | 55626 | 18,34 |
| 4,20 | 6,00 | 72 | 30 | 36 | 1 | 57463 | 22,91 |
| 4,30 | 6,00 | 72 | 30 | 36 | 1 | 59001 | 22,91 |
| 4,50 | 6,00 | 72 | 30 | 36 | 1 | 57464 | 22,91 |
| 4,60 | 6,00 | 75 | 33 | 36 | 1 | 59002 | 22,91 |
| 4,80 | 6,00 | 75 | 33 | 36 | 1 | 59004 | 22,91 |
| 4,90 | 6,00 | 75 | 33 | 36 | 1 | 59005 | 22,91 |
| 5,00 | 6,00 | 75 | 33 | 36 | 1 | 55627 | 30,56 |
| 5,10 | 6,00 | 75 | 33 | 36 | 1 | 59007 | 30,56 |
| 5,30 | 6,00 | 75 | 33 | 36 | 1 | 59008 | 30,56 |
| 5,50 | 6,00 | 75 | 33 | 36 | 1 | 57465 | 30,56 |
| 5,80 | 6,00 | 79 | 37 | 36 | 1 | 59010 | 30,56 |
| 5,90 | 6,00 | 79 | 37 | 36 | 1 | 59011 | 30,56 |
| 6,00 | 6,00 | 79 | 37 | 36 | 1 | 55646 | 30,56 |
| 6,30 | 8,00 | 83 | 39 | 36 | 1 | 59014 | 39,68 |
| 6,40 | 8,00 | 83 | 39 | 36 | 1 | 59013 | 39,68 |
| 6,50 | 8,00 | 83 | 39 | 36 | 1 | 57466 | 39,68 |
| 6,80 | 8,00 | 88 | 44 | 36 | 1 | 57467 | 39,68 |
| 6,90 | 8,00 | 88 | 44 | 36 | 1 | 59016 | 39,68 |

| D mm | d mm | L mm | I mm | I2 mm |  | N° Art. NITREX | € |
|---------|---------|---------|---------|----------|---|-------------------|-------|
| 7,00 | 8,00 | 88 | 44 | 36 | 1 | 55650 | 39,68 |
| 7,40 | 8,00 | 88 | 44 | 36 | 1 | 59019 | 39,68 |
| 7,50 | 8,00 | 88 | 44 | 36 | 1 | 57469 | 39,68 |
| 7,80 | 8,00 | 92 | 48 | 36 | 1 | 59022 | 39,68 |
| 7,90 | 8,00 | 92 | 48 | 36 | 1 | 59025 | 39,68 |
| 8,00 | 8,00 | 92 | 48 | 36 | 1 | 55654 | 39,68 |
| 8,50 | 10,00 | 98 | 48 | 40 | 1 | 57470 | 51,88 |
| 8,60 | 10,00 | 101 | 51 | 40 | 1 | 59026 | 51,88 |
| 8,80 | 10,00 | 101 | 51 | 40 | 1 | 59028 | 51,88 |
| 8,90 | 10,00 | 101 | 51 | 40 | 1 | 59031 | 51,88 |
| 9,00 | 10,00 | 101 | 51 | 40 | 1 | 55656 | 51,88 |
| 9,30 | 10,00 | 101 | 51 | 40 | 1 | 59034 | 51,88 |
| 9,40 | 10,00 | 101 | 51 | 40 | 1 | 59035 | 51,88 |
| 9,50 | 10,00 | 101 | 51 | 40 | 1 | 57471 | 51,88 |
| 9,80 | 10,00 | 105 | 55 | 40 | 1 | 59037 | 51,88 |
| 9,90 | 10,00 | 105 | 55 | 40 | 1 | 59038 | 51,88 |
| 10,00 | 10,00 | 105 | 55 | 40 | 1 | 55659 | 51,88 |
| 10,20 | 12,00 | 112 | 55 | 45 | 1 | 57472 | 64,11 |
| 10,30 | 12,00 | 112 | 55 | 45 | 1 | 59040 | 64,11 |
| 10,50 | 12,00 | 112 | 55 | 45 | 1 | 57473 | 64,11 |
| 10,80 | 12,00 | 116 | 59 | 45 | 1 | 59043 | 64,11 |
| 10,90 | 12,00 | 116 | 59 | 45 | 1 | 59046 | 64,11 |
| 11,00 | 12,00 | 116 | 59 | 45 | 1 | 55660 | 73,27 |
| 11,10 | 12,00 | 116 | 59 | 45 | 1 | 59047 | 73,27 |
| 11,50 | 12,00 | 116 | 59 | 45 | 1 | 57474 | 79,39 |
| 11,80 | 12,00 | 121 | 64 | 45 | 1 | 59049 | 79,39 |
| 11,90 | 12,00 | 121 | 64 | 45 | 1 | 59050 | 79,39 |
| 12,00 | 12,00 | 121 | 64 | 45 | 1 | 55662 | 79,39 |
| 12,20 | 14,00 | 129 | 70 | 45 | 1 | 59052 | 85,48 |
| 12,50 | 14,00 | 129 | 70 | 45 | 1 | 57475 | 85,48 |
| 12,70 | 14,00 | 129 | 70 | 45 | 1 | 59055 | 85,48 |
| 12,80 | 14,00 | 129 | 70 | 45 | 1 | 59058 | 85,48 |
| 12,90 | 14,00 | 129 | 70 | 45 | 1 | 59061 | 85,48 |
| 13,00 | 14,00 | 129 | 70 | 45 | 1 | 55663 | 85,48 |





Ref. 1029

La mejor broca de HSS Co del mercado*

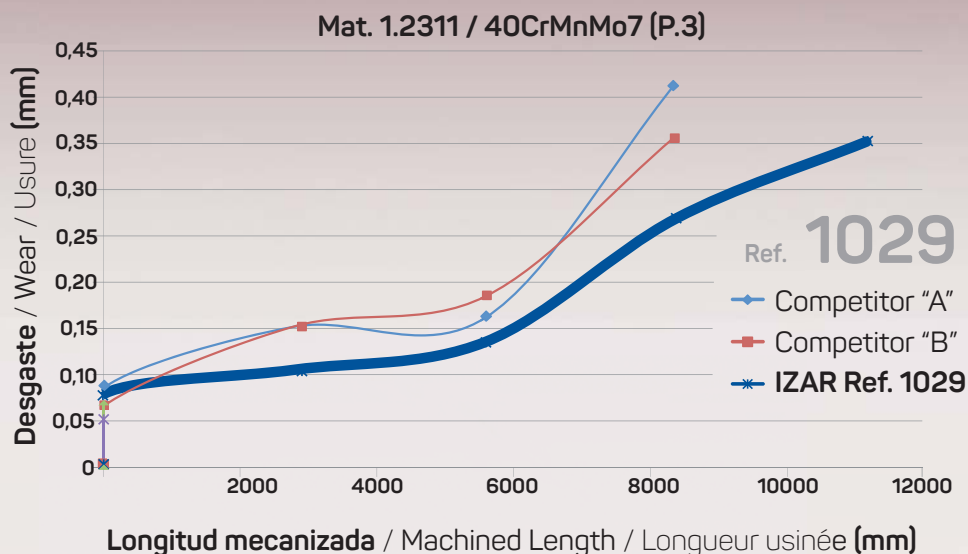
Broca de Cobalto especial para Materiales Duros, Inoxidables y Fundición

The best HSS Co drill bit on the market*

Cobalt drill bit suitable for Hard materials, Stainless Steel and Cast Iron

Le meilleur foret HSS Co du marché*

Foret cobalt spécial pour matériaux durs, inox et fonté



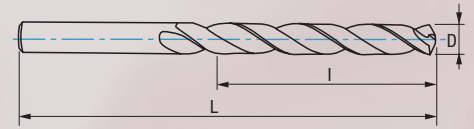
* Testado contra las marcas más conocidas del mercado
 * Comparative test against well-known brands in the market
 * Testé contre les marques les plus connues du marché

Ref. **1029**

BROCA MANGO CILÍNDRICO MULTI ACERO

Multi-Steel Straight Shank Drill Bit

Foret multi-acier queue cylindrique



HSSE
5%Co

BORDEAUX

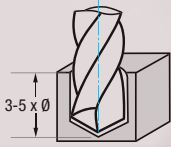
DIN
338 N



Rectificado
Ground
Taillé meulé

A.R.I.* * Alto Rendimiento Intensivo
I.H.P.* * Intensive High Performance
H.P.I.* * Haute Performance Intensif

Tol. D
h8



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | BORDEAUX | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.3 | 10-18 | 0,030 | 0,050 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,120 |
| | P.5 | 12-17 | 0,030 | 0,050 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,120 |
| M | | 10-18 | 0,030 | 0,050 | 0,060 | 0,060 | 0,080 | 0,100 | 0,120 | 0,120 |
| K | K.1 | 35-40 | 0,080 | 0,100 | 0,160 | 0,160 | 0,200 | 0,250 | 0,300 | 0,300 |
| | K.2 | 25-30 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 |

| D | L | I | Icon | Nº Art. | € |
|------|----|----|------|----------|------|
| mm | mm | mm | | BORDEAUX | |
| 1,00 | 34 | 12 | 10 | 81658 | 2,24 |
| 1,50 | 40 | 18 | 10 | 81657 | 2,18 |
| 2,00 | 49 | 24 | 10 | 79827 | 2,28 |
| 2,10 | 49 | 24 | 10 | 80672 | 2,31 |
| 2,30 | 53 | 27 | 10 | 80674 | 2,33 |
| 2,50 | 57 | 30 | 10 | 80513 | 2,07 |
| 2,70 | 61 | 33 | 10 | 80724 | 2,29 |
| 2,75 | 61 | 33 | 10 | 80726 | 2,28 |
| 3,00 | 61 | 33 | 10 | 80711 | 2,04 |
| 3,10 | 65 | 36 | 10 | 80712 | 2,57 |
| 3,20 | 65 | 36 | 10 | 80715 | 2,57 |
| 3,25 | 65 | 36 | 10 | 80716 | 2,57 |
| 3,30 | 65 | 36 | 10 | 80717 | 2,57 |
| 3,50 | 70 | 39 | 10 | 80718 | 2,55 |
| 3,60 | 70 | 39 | 10 | 80719 | 2,85 |
| 3,70 | 70 | 39 | 10 | 80720 | 2,85 |
| 3,75 | 70 | 39 | 10 | 80721 | 2,76 |
| 3,90 | 75 | 43 | 10 | 80722 | 2,84 |
| 4,00 | 75 | 43 | 10 | 80723 | 2,63 |
| 4,10 | 75 | 43 | 10 | 80727 | 2,77 |

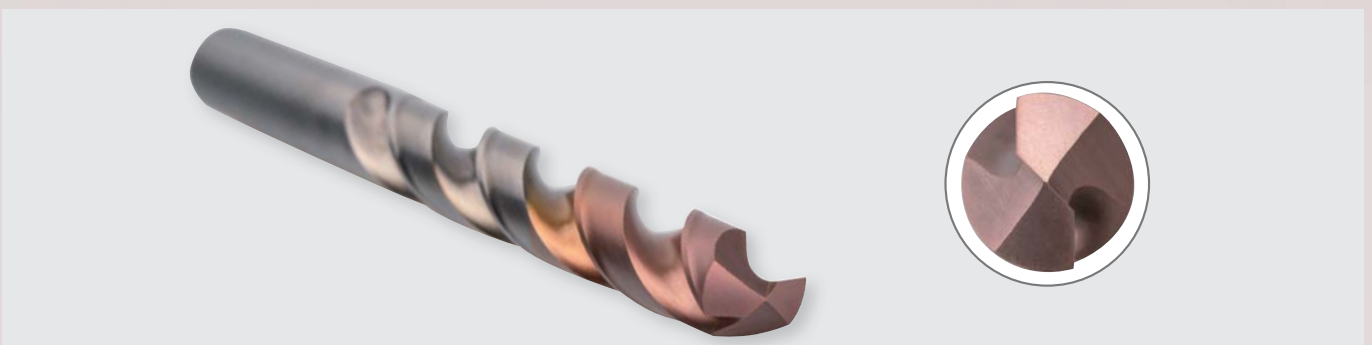
| D | L | I | Icon | Nº Art. | € |
|------|-----|----|------|----------|------|
| mm | mm | mm | | BORDEAUX | |
| 4,20 | 75 | 43 | 10 | 80728 | 2,77 |
| 4,25 | 75 | 43 | 10 | 80729 | 2,77 |
| 4,30 | 80 | 47 | 10 | 80731 | 2,78 |
| 4,40 | 80 | 47 | 10 | 80732 | 2,78 |
| 4,50 | 80 | 47 | 10 | 80733 | 2,80 |
| 4,70 | 80 | 47 | 10 | 80734 | 3,01 |
| 4,75 | 80 | 47 | 10 | 80735 | 2,92 |
| 4,80 | 86 | 52 | 10 | 80736 | 3,00 |
| 5,00 | 86 | 52 | 10 | 80737 | 2,86 |
| 5,10 | 86 | 52 | 10 | 80738 | 3,06 |
| 5,20 | 86 | 52 | 10 | 80739 | 3,13 |
| 5,25 | 86 | 52 | 10 | 80740 | 3,10 |
| 5,30 | 86 | 52 | 10 | 80741 | 3,13 |
| 5,50 | 93 | 57 | 10 | 80742 | 3,24 |
| 5,60 | 93 | 57 | 10 | 80744 | 3,59 |
| 5,75 | 93 | 57 | 10 | 80745 | 3,47 |
| 5,80 | 93 | 57 | 10 | 80746 | 3,59 |
| 5,90 | 93 | 57 | 10 | 80748 | 3,59 |
| 6,00 | 93 | 57 | 10 | 80749 | 3,34 |
| 6,20 | 101 | 63 | 10 | 80750 | 6,40 |

| D | L | I | Icon | Nº Art. | € |
|------------------|-----|-----|------|----------|-------|
| mm | mm | mm | | BORDEAUX | |
| 6,50 | 101 | 63 | 10 | 80751 | 6,18 |
| 6,80 | 109 | 69 | 10 | 80752 | 6,55 |
| 7,00 | 109 | 69 | 10 | 80753 | 6,54 |
| 7,20 | 109 | 69 | 10 | 80754 | 7,69 |
| New! 7,30 | 109 | 69 | 10 | 25277 | 7,69 |
| 7,50 | 109 | 69 | 10 | 80755 | 6,71 |
| 8,00 | 117 | 75 | 10 | 80756 | 7,14 |
| 8,20 | 117 | 75 | 10 | 80757 | 8,23 |
| 8,50 | 117 | 75 | 10 | 80758 | 7,96 |
| 8,80 | 125 | 81 | 10 | 80759 | 10,01 |
| 9,00 | 125 | 81 | 10 | 80760 | 8,83 |
| 9,50 | 125 | 81 | 10 | 80761 | 8,98 |
| 9,80 | 133 | 87 | 10 | 80762 | 11,67 |
| 10,00 | 133 | 87 | 10 | 80763 | 9,41 |
| 10,20 | 133 | 87 | 5 | 80764 | 16,23 |
| 10,50 | 133 | 87 | 5 | 80765 | 16,23 |
| 11,00 | 142 | 94 | 5 | 80766 | 16,91 |
| 11,50 | 142 | 94 | 5 | 80767 | 17,94 |
| 12,00 | 151 | 101 | 5 | 80768 | 18,55 |
| 12,50 | 151 | 101 | 5 | 81656 | 22,93 |
| 13,00 | 151 | 101 | 5 | 80769 | 23,31 |

- Recubrimiento de alto rendimiento con la última tecnología
- Geometría multi-material con una alta durabilidad en todo tipo de Aceros, Inox, Fundición...

- State-of-the-art technology coating for a higher performance
- Multi-material geometry, obtaining long durability in all types of Steel, Inox, Cast Iron...

- Revêtement de dernière technologie pour une performance supérieure
- Géométrie multi-matériaux, obtenant une longue durée de vie dans tous les types d'Acier, Inox, Fonte...



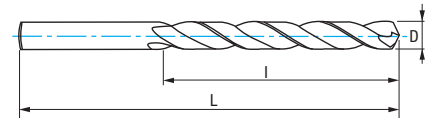
Ref. 1016

PROFESSIONAL

BROCA MANGO CILÍNDRICO MATERIALES Duros. SERIE CORTA

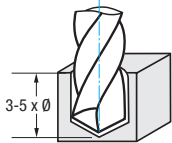
Hard Materials Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique matériaux durs. Série courte



| | | | | | | | | | |
|---------------------|----------------------------------|--------------|----------|-------------------------|--|--|--|---|--------------|
| HSSE 5%Co | HSSE 5%Co + TIALSIN | DIN 338 N | 135° | DIN 1412 C ≥ 2 mm | | Ambar Gold Finish Finition Or | Rectificado Ground Taillé meulé | A.R.I.* Alto Rendimiento Intensivo I.H.P.* Intensive High Performance H.P.I.* Haute Performance Intensif | Tol. D h8 |
|---------------------|----------------------------------|--------------|----------|-------------------------|--|--|--|---|--------------|

| | | | |
|--|--|-------------|--|
| | | x3,5 | Resistencia al desgaste Wear Resistance Résistant à l'usure |
|--|--|-------------|--|



$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

$$V_f \text{ (mm/min.)} = r.p.m. \times f$$

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | | |
|----------|------|------------|---------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 5% Co | TIALSIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | |
| P | P.3 | 8-15 | 12-20 | 0,020 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,160 | |
| | P.5 | 8-12 | 12-17 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,150 | 0,170 | |
| S | | 10-15 | 14-20 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | |



| D mm | L mm | I mm | | Nº Art. 5% Co | € | Nº Art. TIALSIN | € |
|------|------|------|----|---------------|------|-----------------|------|
| 0,50 | 22 | 6 | 10 | 37442 | 1,92 | | |
| 0,60 | 27 | 7 | 10 | 37443 | 2,45 | | |
| 0,70 | 28 | 9 | 10 | 37444 | 2,45 | | |
| 0,75 | 28 | 9 | 10 | 37445 | 1,75 | | |
| 0,80 | 30 | 10 | 10 | 37446 | 1,83 | | |
| 0,90 | 32 | 11 | 10 | 37447 | 1,83 | | |
| 1,00 | 34 | 12 | 10 | 27309 | 1,41 | 12897 | 2,97 |
| 1,10 | 36 | 14 | 10 | 20107 | 1,74 | 17722 | 3,35 |
| 1,20 | 38 | 16 | 10 | 28861 | 1,73 | 17723 | 3,31 |
| 1,25 | 38 | 16 | 10 | 20112 | 1,67 | 17724 | 3,22 |
| 1,30 | 38 | 16 | 10 | 20116 | 1,73 | 17725 | 3,31 |
| 1,40 | 40 | 18 | 10 | 20125 | 1,73 | 17726 | 3,31 |
| 1,50 | 40 | 18 | 10 | 27170 | 1,36 | 12898 | 2,90 |
| 1,60 | 43 | 20 | 10 | 20133 | 1,73 | 17727 | 3,34 |
| 1,70 | 43 | 20 | 10 | 20142 | 1,73 | 17728 | 3,31 |
| 1,75 | 46 | 22 | 10 | 20146 | 1,67 | 17729 | 3,22 |
| 1,80 | 46 | 22 | 10 | 20151 | 1,73 | 17730 | 3,31 |
| 1,90 | 46 | 22 | 10 | 20155 | 1,73 | 17731 | 3,34 |
| 2,00 | 49 | 24 | 10 | 19247 | 1,40 | 12899 | 3,03 |
| 2,10 | 49 | 24 | 10 | 20161 | 1,65 | 17732 | 3,08 |
| 2,20 | 53 | 27 | 10 | 20166 | 1,65 | 17734 | 3,08 |
| 2,25 | 53 | 27 | 10 | 20170 | 1,58 | 17735 | 3,04 |
| 2,30 | 53 | 27 | 10 | 20175 | 1,65 | 17736 | 3,11 |
| 2,40 | 57 | 30 | 10 | 20184 | 1,65 | 17737 | 3,11 |
| 2,50 | 57 | 30 | 10 | 19251 | 1,28 | 12900 | 2,75 |
| 2,60 | 57 | 30 | 10 | 20199 | 1,60 | 17738 | 3,05 |
| 2,65 | 57 | 30 | 10 | 80109 | 1,60 | | |
| 2,70 | 61 | 33 | 10 | 20203 | 1,60 | 17739 | 3,05 |
| 2,75 | 61 | 33 | 10 | 19262 | 1,58 | 17740 | 3,04 |
| 2,80 | 61 | 33 | 10 | 20209 | 1,60 | 17741 | 3,06 |
| 2,90 | 61 | 33 | 10 | 20214 | 1,60 | 17742 | 3,06 |
| 3,00 | 61 | 33 | 10 | 19256 | 1,26 | 12901 | 2,70 |
| 3,05 | 65 | 36 | 10 | 79847 | 1,71 | | |
| 3,10 | 65 | 36 | 10 | 20220 | 1,53 | 12882 | 3,41 |
| 3,15 | 65 | 36 | 10 | 79848 | 1,71 | | |
| 3,20 | 65 | 36 | 10 | 20224 | 1,53 | 17226 | 3,41 |
| 3,25 | 65 | 36 | 10 | 19259 | 1,53 | 12883 | 3,41 |
| 3,30 | 65 | 36 | 10 | 20230 | 1,53 | 12884 | 3,41 |
| 3,40 | 70 | 39 | 10 | 20235 | 1,60 | 12885 | 3,54 |
| 3,50 | 70 | 39 | 10 | 19268 | 1,52 | 12902 | 3,40 |
| 3,60 | 70 | 39 | 10 | 20241 | 1,92 | 17743 | 3,79 |
| 3,70 | 70 | 39 | 10 | 20245 | 1,92 | 17744 | 3,79 |

| D mm | L mm | I mm | | Nº Art. 5% Co | € | Nº Art. TIALSIN | € |
|------|------|------|----|---------------|------|-----------------|------|
| 3,75 | 70 | 39 | 10 | 19269 | 1,79 | | |
| 3,80 | 75 | 43 | 10 | 20251 | 1,92 | 17746 | 3,79 |
| 3,90 | 75 | 43 | 10 | 20256 | 1,92 | 17748 | 3,79 |
| 4,00 | 75 | 43 | 10 | 19286 | 1,61 | 12903 | 3,51 |
| 4,05 | 75 | 43 | 10 | 18949 | 2,01 | | |
| 4,10 | 75 | 43 | 10 | 20265 | 1,79 | 12886 | 3,68 |
| 4,15 | 75 | 43 | 10 | 65326 | 2,01 | | |
| 4,20 | 75 | 43 | 10 | 20269 | 1,79 | 12887 | 3,68 |
| 4,25 | 75 | 43 | 10 | 19271 | 1,79 | 12888 | 3,68 |
| 4,30 | 80 | 47 | 10 | 20278 | 1,92 | 12931 | 3,71 |
| 4,40 | 80 | 47 | 10 | 20283 | 1,92 | 17749 | 3,71 |
| 4,50 | 80 | 47 | 10 | 19274 | 1,86 | 12904 | 3,72 |
| 4,60 | 80 | 47 | 10 | 20289 | 2,13 | 17750 | 4,00 |
| 4,70 | 80 | 47 | 10 | 20293 | 2,13 | 17752 | 4,01 |
| 4,75 | 80 | 47 | 10 | 20298 | 2,01 | 17753 | 3,89 |
| 4,80 | 86 | 52 | 10 | 20302 | 2,13 | 17754 | 4,00 |
| 4,90 | 86 | 52 | 10 | 20311 | 2,13 | 17755 | 4,00 |
| 5,00 | 86 | 52 | 10 | 19277 | 1,94 | 12905 | 3,82 |
| 5,05 | 86 | 52 | 10 | 76128 | 2,59 | | |
| 5,10 | 86 | 52 | 10 | 20320 | 2,31 | 12891 | 4,08 |
| 5,15 | 86 | 52 | 10 | 79849 | 2,59 | | |
| 5,20 | 86 | 52 | 10 | 20328 | 2,31 | 17757 | 4,18 |
| 5,25 | 86 | 52 | 10 | 19280 | 2,29 | 12893 | 4,12 |
| 5,30 | 86 | 52 | 10 | 20340 | 2,31 | 17756 | 4,18 |
| 5,40 | 93 | 57 | 10 | 20349 | 2,31 | 17758 | 4,18 |
| 5,50 | 93 | 57 | 10 | 19290 | 2,45 | 12906 | 4,31 |
| 5,60 | 93 | 57 | 10 | 20361 | 2,92 | 17759 | 4,79 |
| 5,70 | 93 | 57 | 10 | 20370 | 2,92 | 17760 | 4,79 |
| 5,75 | 93 | 57 | 10 | 20379 | 2,76 | | |
| 5,80 | 93 | 57 | 10 | 20388 | 2,92 | 17762 | 4,79 |
| 5,90 | 93 | 57 | 10 | 20397 | 2,92 | 17763 | 4,79 |
| 6,00 | 93 | 57 | 10 | 19301 | 2,63 | 12907 | 4,45 |
| 6,05 | 101 | 63 | 10 | 79855 | 3,64 | | |
| 6,10 | 101 | 63 | 10 | 20415 | 3,24 | 17764 | 8,54 |
| 6,15 | 101 | 63 | 10 | 79856 | 3,64 | | |
| 6,20 | 101 | 63 | 10 | 20424 | 3,24 | 17765 | 8,54 |
| 6,25 | 101 | 63 | 10 | 20433 | 3,06 | | |
| 6,30 | 101 | 63 | 10 | 20442 | 3,24 | 17767 | 8,54 |
| 6,35 | 101 | 63 | 10 | 79858 | 3,24 | | |
| 6,40 | 101 | 63 | 10 | 20451 | 3,24 | 17768 | 8,54 |
| 6,45 | 101 | 63 | 10 | 64140 | 3,24 | | |
| 6,50 | 101 | 63 | 10 | 27290 | 3,13 | 12908 | 8,25 |

Ref. **1016**
PROFESSIONAL**BROCA MANGO CILÍNDRICO MATERIALES DUROS. SERIE CORTA**

Hard Materials Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique matériaux durs. Série courte

| D mm | L mm | I mm |  | N° Art. 5% Co | € | N° Art. TIALSIN | € | D mm | L mm | I mm |  | N° Art. 5% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---|------------------|-------|--------------------|-------|-------------------|---------|---------|---|------------------|-------|--------------------|-------|
| 6,60 | 101 | 63 | 10 | 20466 | 3,89 | 17769 | 8,97 | 10,70 | 142 | 94 | 5 | 27693 | 12,65 | | |
| 6,70 | 101 | 63 | 10 | 20475 | 3,89 | 17770 | 8,97 | 10,75 | 142 | 94 | 5 | 27696 | 13,12 | | |
| 6,75 | 109 | 69 | 10 | 20481 | 3,66 | 12894 | 8,72 | 10,80 | 142 | 94 | 5 | 27699 | 12,65 | 17812 | 24,94 |
| 6,80 | 109 | 69 | 10 | 20488 | 3,66 | 12895 | 8,72 | 10,90 | 142 | 94 | 5 | 27702 | 12,65 | | |
| 6,90 | 109 | 69 | 10 | 20493 | 3,89 | 17771 | 9,19 | 11,00 | 142 | 94 | 5 | 27705 | 10,13 | 12919 | 22,54 |
| 7,00 | 109 | 69 | 10 | 19305 | 3,42 | 12909 | 8,71 | 11,10 | 142 | 94 | 5 | 27708 | 14,39 | | |
| 7,10 | 109 | 69 | 10 | 20499 | 4,95 | 17773 | 10,24 | 11,20 | 142 | 94 | 5 | 27711 | 14,39 | | |
| 7,20 | 109 | 69 | 10 | 20503 | 4,95 | 17774 | 10,24 | 11,25 | 142 | 94 | 5 | 27714 | 14,94 | 17816 | 26,77 |
| 7,25 | 109 | 69 | 10 | 20508 | 4,65 | | | 11,30 | 142 | 94 | 5 | 27717 | 14,39 | | |
| 7,30 | 109 | 69 | 10 | 20512 | 4,95 | 17776 | 10,24 | 11,40 | 142 | 94 | 5 | 27720 | 14,39 | | |
| 7,40 | 109 | 69 | 10 | 20517 | 4,95 | 17777 | 10,24 | 11,50 | 142 | 94 | 5 | 19307 | 12,11 | 12932 | 23,92 |
| 7,50 | 109 | 69 | 10 | 19292 | 3,66 | 12910 | 8,94 | 11,60 | 142 | 94 | 5 | 27724 | 14,88 | | |
| 7,60 | 117 | 75 | 10 | 20523 | 5,98 | 17778 | 11,25 | 11,70 | 142 | 94 | 5 | 27727 | 14,88 | | |
| 7,70 | 117 | 75 | 10 | 20527 | 5,98 | 17779 | 11,25 | 11,75 | 142 | 94 | 5 | 27730 | 15,45 | | |
| 7,75 | 117 | 75 | 10 | 20532 | 5,64 | | | 11,80 | 142 | 94 | 5 | 27733 | 14,88 | | |
| 7,80 | 117 | 75 | 10 | 20536 | 5,98 | 17781 | 11,25 | 11,90 | 151 | 101 | 5 | 27736 | 14,88 | | |
| 7,90 | 117 | 75 | 10 | 20541 | 5,98 | 17782 | 11,25 | 12,00 | 151 | 101 | 5 | 19311 | 12,94 | 12920 | 24,74 |
| 8,00 | 117 | 75 | 10 | 20208 | 4,28 | 12911 | 9,53 | 12,10 | 151 | 101 | 5 | 27742 | 17,26 | | |
| 8,10 | 117 | 75 | 10 | 22734 | 5,70 | 17783 | 10,96 | 12,20 | 151 | 101 | 5 | 27745 | 17,26 | | |
| 8,20 | 117 | 75 | 10 | 22737 | 5,70 | 17784 | 10,96 | 12,25 | 151 | 101 | 5 | 19313 | 17,91 | | |
| 8,25 | 117 | 75 | 10 | 22740 | 5,38 | | | 12,30 | 151 | 101 | 5 | 27749 | 17,26 | | |
| 8,30 | 117 | 75 | 10 | 22743 | 5,70 | 17786 | 11,87 | 12,40 | 151 | 101 | 5 | 27752 | 17,26 | | |
| 8,40 | 117 | 75 | 10 | 22746 | 5,70 | 17787 | 10,96 | 12,50 | 151 | 101 | 5 | 27755 | 15,77 | 12921 | 30,57 |
| 8,50 | 117 | 75 | 10 | 19298 | 4,44 | 12912 | 10,62 | 12,60 | 151 | 101 | 5 | 27758 | 18,01 | | |
| 8,60 | 125 | 81 | 10 | 22752 | 7,26 | 17788 | 13,33 | 12,70 | 151 | 101 | 5 | 27761 | 18,01 | | |
| 8,70 | 125 | 81 | 10 | 22755 | 7,26 | 17789 | 13,33 | 12,75 | 151 | 101 | 5 | 19316 | 18,72 | | |
| 8,75 | 125 | 81 | 10 | 22758 | 6,86 | | | 12,80 | 151 | 101 | 5 | 27765 | 18,01 | | |
| 8,80 | 125 | 81 | 10 | 22761 | 7,26 | 17791 | 13,33 | 12,90 | 151 | 101 | 5 | 27768 | 18,01 | | |
| 8,90 | 125 | 81 | 10 | 22764 | 7,26 | 17792 | 13,33 | 13,00 | 151 | 101 | 5 | 27771 | 16,15 | 12923 | 31,07 |
| 9,00 | 125 | 81 | 10 | 20358 | 5,67 | 12914 | 11,77 | 13,25 | 160 | 108 | 1 | 27777 | 22,31 | | |
| 9,10 | 125 | 81 | 10 | 22768 | 8,05 | 17794 | 14,14 | 13,50 | 160 | 108 | 1 | 27774 | 17,78 | 12924 | 32,63 |
| 9,20 | 125 | 81 | 10 | 22771 | 8,05 | 17795 | 14,14 | 13,75 | 160 | 108 | 1 | 27780 | 22,31 | | |
| 9,25 | 125 | 81 | 10 | 22774 | 7,57 | | | 14,00 | 160 | 108 | 1 | 27783 | 17,59 | 12927 | 32,44 |
| 9,30 | 125 | 81 | 10 | 22777 | 8,05 | 17797 | 14,14 | 14,25 | 169 | 114 | 1 | 27786 | 29,34 | | |
| 9,40 | 125 | 81 | 10 | 22780 | 8,05 | 17798 | 14,14 | 14,50 | 169 | 114 | 1 | 27789 | 24,93 | 12929 | 39,32 |
| 9,50 | 125 | 81 | 10 | 20545 | 5,89 | 12915 | 11,96 | 14,75 | 169 | 114 | 1 | 27792 | 29,34 | | |
| 9,60 | 133 | 87 | 10 | 22784 | 9,47 | 17799 | 15,55 | 15,00 | 169 | 114 | 1 | 27795 | 25,32 | 12930 | 39,80 |
| 9,70 | 133 | 87 | 10 | 23567 | 9,47 | 17800 | 15,55 | 15,25 | 178 | 120 | 1 | 27798 | 40,49 | | |
| 9,75 | 133 | 87 | 10 | 26697 | 8,93 | | | 15,50 | 178 | 120 | 1 | 27801 | 29,31 | 82202 | 41,04 |
| 9,80 | 133 | 87 | 10 | 26809 | 9,47 | 17802 | 15,55 | 15,75 | 178 | 120 | 1 | 27804 | 40,49 | | |
| 9,90 | 133 | 87 | 10 | 27121 | 9,47 | 17803 | 15,55 | 16,00 | 178 | 120 | 1 | 27807 | 30,37 | 15084 | 42,09 |
| 10,00 | 133 | 87 | 10 | 27291 | 6,48 | 12917 | 12,55 | New! 16,50 | 184 | 125 | 1 | 27811 | 34,70 | 26752 | 48,10 |
| 10,10 | 133 | 87 | 5 | 27318 | 10,87 | | | 17,00 | 184 | 125 | 1 | 27814 | 34,70 | 35437 | 48,09 |
| 10,20 | 133 | 87 | 5 | 27541 | 9,17 | 12896 | 21,62 | 17,50 | 191 | 130 | 1 | 27817 | 38,47 | 35438 | 51,86 |
| 10,25 | 133 | 87 | 5 | 27544 | 11,28 | 17805 | 23,73 | 18,00 | 191 | 130 | 1 | 27820 | 41,88 | 15252 | 55,28 |
| 10,30 | 133 | 87 | 5 | 27585 | 10,87 | 17806 | 23,28 | New! 18,50 | 198 | 135 | 1 | 27823 | 46,27 | 26755 | 59,67 |
| 10,40 | 133 | 87 | 5 | 27682 | 10,87 | 17807 | 23,28 | New! 19,00 | 198 | 135 | 1 | 27826 | 46,27 | 67417 | 59,67 |
| 10,50 | 133 | 87 | 5 | 27685 | 9,17 | 12918 | 21,62 | New! 19,50 | 205 | 140 | 1 | 27829 | 51,29 | 26757 | 64,69 |
| 10,60 | 133 | 87 | 5 | 27690 | 12,65 | | | New! 20,00 | 205 | 140 | 1 | 27832 | 54,95 | 26742 | 68,35 |

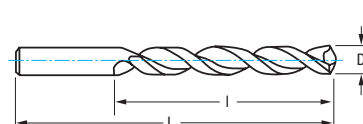
Ref. **1056**Extra-Corta / Stub / Extra-courte **Pag 94**Ref. **1036**Larga / Long / Longue **Pag 99**

Ref. **1000**

BROCA MANGO CILÍNDRICO AGUJEROS TOL. IT8-9. SERIE CORTA

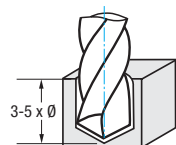
IT8-9 Tolerance Hole Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique trous tolérance IT8-9. Série courte



| | | | | | | | | | |
|------------------|----------------------------|------------------|------|--|--|-------------------------------------|---|------------------|--|
| HSSE 5%Co | HSSE 5%Co + TIALSIN | DIN 338TS | 135° | | Filo Corregido Convex Edge "U" Filets Corrigés | Perfil Profile "S" Profil | Rectificado Ground Taillé meulé | Tol. D h8 | |
|------------------|----------------------------|------------------|------|--|--|-------------------------------------|---|------------------|--|

5% Co **TIALSIN** **x3,5** **Resistencia al desgaste**
Wear Resistance Résistant à l'usure



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|---------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 5% Co | TIALSIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| P | P.1 | 20-25 | 28-35 | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 |
| | P.2 | 20-25 | 28-35 | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 |
| | P.3 | 8-15 | 12-20 | 0,020 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 |
| K | K.1 | 30-35 | 36-42 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |
| | K.2 | 25-30 | 30-36 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 |
| N | N.5 | 40-50 | 56-70 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |
| | N.6 | 35-45 | 40-58 | 0,080 | 0,130 | 0,150 | 0,170 | 0,190 | 0,250 | 0,290 | 0,310 | 0,360 |

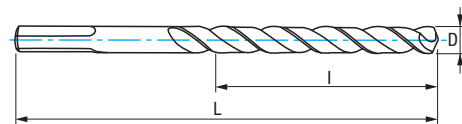
| D mm | L mm | I mm | 10 | Nº Art. 5% Co | € | 10 | Nº Art. TIALSIN | € |
|------|------|------|----|---------------|------|----|-----------------|------|
| 2,00 | 49 | 24 | 10 | 22232 | 3,38 | 1 | 13524 | 4,99 |
| 2,10 | 49 | 24 | 10 | 14496 | 3,61 | 1 | 21550 | 5,08 |
| 2,30 | 53 | 27 | 10 | 14497 | 3,61 | 1 | 21552 | 5,08 |
| 2,50 | 57 | 30 | 10 | 22233 | 3,07 | 1 | 13527 | 4,55 |
| 2,70 | 61 | 33 | 10 | 14500 | 3,57 | 1 | 24854 | 5,02 |
| 2,75 | 61 | 33 | 10 | 14455 | 3,78 | 1 | 24855 | 5,25 |
| 3,00 | 61 | 33 | 10 | 22234 | 3,00 | 1 | 13530 | 4,45 |
| 3,10 | 65 | 36 | 10 | 14502 | 3,66 | 1 | 14599 | 5,54 |
| 3,20 | 65 | 36 | 10 | 22235 | 3,66 | 1 | 13533 | 5,54 |
| 3,25 | 65 | 36 | 10 | 14457 | 3,66 | 1 | 14479 | 5,54 |
| 3,30 | 65 | 36 | 10 | 14503 | 3,66 | 1 | 14601 | 5,54 |
| 3,50 | 70 | 39 | 10 | 22236 | 3,63 | 1 | 13536 | 5,50 |
| 3,60 | 70 | 39 | 10 | 14925 | 4,21 | 1 | 24856 | 6,10 |
| 3,70 | 70 | 39 | 10 | 14508 | 4,21 | 1 | 24857 | 6,10 |
| 3,75 | 70 | 39 | 10 | 14458 | 4,31 | 1 | 24858 | 6,19 |
| 3,90 | 75 | 43 | 10 | 14634 | 4,60 | 1 | 24859 | 6,47 |
| 4,00 | 75 | 43 | 10 | 22237 | 3,89 | 1 | 13539 | 5,78 |
| 4,10 | 75 | 43 | 10 | 14511 | 4,31 | 1 | 14605 | 6,19 |
| 4,20 | 75 | 43 | 10 | 22238 | 4,31 | 1 | 13542 | 6,19 |
| 4,25 | 75 | 43 | 10 | 14461 | 4,31 | 1 | 14482 | 6,19 |
| 4,30 | 80 | 47 | 10 | 14514 | 4,60 | 1 | 14607 | 6,66 |
| 4,40 | 80 | 47 | 10 | 14635 | 4,60 | 1 | 24860 | 6,50 |
| 4,50 | 80 | 47 | 10 | 22239 | 4,43 | 1 | 13545 | 6,32 |
| 4,70 | 80 | 47 | 10 | 14637 | 5,12 | 1 | 24861 | 7,01 |
| 4,75 | 80 | 47 | 10 | 14464 | 4,83 | 1 | 24862 | 6,72 |
| 4,80 | 86 | 52 | 10 | 14641 | 5,12 | 1 | 24863 | 7,01 |
| 5,00 | 86 | 52 | 10 | 22240 | 4,64 | 1 | 13548 | 6,53 |
| 5,10 | 86 | 52 | 10 | 22241 | 5,54 | 1 | 13551 | 7,35 |
| 5,20 | 86 | 52 | 10 | 14517 | 5,54 | 1 | 24864 | 7,43 |

| D mm | L mm | I mm | 10 | Nº Art. 5% Co | € | 10 | Nº Art. TIALSIN | € |
|-------|------|------|----|---------------|-------|----|-----------------|-------|
| 5,25 | 86 | 52 | 10 | 14466 | 5,50 | 1 | 14485 | 7,37 |
| 5,30 | 86 | 52 | 10 | 14643 | 5,54 | 1 | 24865 | 7,43 |
| 5,50 | 93 | 57 | 10 | 22242 | 5,89 | 1 | 13554 | 7,76 |
| 5,60 | 93 | 57 | 10 | 14646 | 7,01 | 1 | 24866 | 8,90 |
| 5,75 | 93 | 57 | 10 | 14467 | 6,61 | 1 | 24867 | 8,51 |
| 5,80 | 93 | 57 | 10 | 14523 | 7,01 | 1 | 24868 | 8,90 |
| 5,90 | 93 | 57 | 10 | 14647 | 7,01 | 1 | 24869 | 8,90 |
| 6,00 | 93 | 57 | 10 | 22243 | 6,29 | 1 | 13557 | 8,16 |
| 6,20 | 101 | 63 | 5 | 14526 | 7,76 | 1 | 24870 | 12,83 |
| 6,50 | 101 | 63 | 5 | 22244 | 7,54 | 1 | 13560 | 12,58 |
| 6,80 | 109 | 69 | 5 | 14527 | 8,78 | 1 | 14610 | 13,83 |
| 7,00 | 109 | 69 | 5 | 22245 | 8,23 | 1 | 13563 | 13,47 |
| 7,20 | 109 | 69 | 5 | 14649 | 11,59 | 1 | 24871 | 16,84 |
| 7,50 | 109 | 69 | 5 | 14529 | 8,78 | 1 | 14611 | 14,02 |
| 8,00 | 117 | 75 | 5 | 22246 | 10,26 | 1 | 13566 | 15,50 |
| 8,20 | 117 | 75 | 5 | 14533 | 13,86 | 1 | 24872 | 19,98 |
| 8,50 | 117 | 75 | 5 | 22247 | 10,68 | 1 | 13569 | 16,80 |
| 8,80 | 125 | 81 | 5 | 14653 | 17,09 | 1 | 24873 | 23,20 |
| 9,00 | 125 | 81 | 5 | 22248 | 13,63 | 1 | 13572 | 19,78 |
| 9,50 | 125 | 81 | 5 | 14535 | 14,13 | 1 | 14613 | 20,26 |
| 9,80 | 133 | 87 | 5 | 14655 | 21,42 | 1 | 24874 | 27,54 |
| 10,00 | 133 | 87 | 5 | 22249 | 15,52 | 1 | 14363 | 21,62 |
| 10,20 | 133 | 87 | 1 | 39627 | 21,96 | 1 | 62785 | 34,35 |
| 10,50 | 133 | 87 | 1 | 14659 | 21,96 | 1 | 14676 | 34,35 |
| 11,00 | 142 | 94 | 1 | 22250 | 24,30 | 1 | 14364 | 36,68 |
| 11,50 | 142 | 94 | 1 | 14664 | 29,04 | 1 | 14677 | 40,94 |
| 12,00 | 151 | 101 | 1 | 22251 | 31,06 | 1 | 14365 | 42,97 |
| 12,50 | 151 | 101 | 1 | 39600 | 37,84 | 1 | 62810 | 52,92 |
| 13,00 | 151 | 101 | 1 | 22252 | 38,75 | 1 | 14366 | 53,83 |

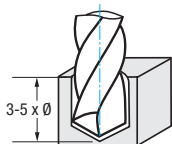
| | | | |
|------------------|--|--|----------------|
| Ref. 1055 | | Extra-Corta / Stub / Extra-courte | Pag 93 |
| Ref. 1300 | | Larga / Long / Longue | Pag 100 |
| Ref. 9040 | | Extra Larga / Extra Long / Extra-longue | Pag 103 |

Ref. **1021**
BOROA

BROCA MANGO CILÍNDRICO MULTI INOX. SERIE CORTA
Multi-STAINLESS Steel Straight Shank Drill Bit. Jobber Series
Foret queue cylindrique Multi INOX. Série courte



| | | | | | | | | | |
|--------------|--------------|------|-----|-------------------------|--|------|-----------------------------------|--------------------------------|--------------|
| HSSE 5%Co | DIN 338 W | 135° | 40° | DIN 1412 C ≥ 2 mm | | ≥0.4 | Chapa Sheets Tôle < 5 mm | Blue+ Gold Finish ≥ 3 mm | Tol. D h8 |
|--------------|--------------|------|-----|-------------------------|--|------|-----------------------------------|--------------------------------|--------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | 5% Co | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 30-35 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | |
| | P.5 | 8-12 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | |
| M | | 6-12 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | |
| N | N.1 | 30-40 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | |
| | N.2 | | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | |
| | N.3 | 60-80 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | |
| | N.4 | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | |
| | N.5 | | 40-50 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 |

| D mm | L mm | I mm | | Nº Art. 5% Co | € |
|------|------|------|----|---------------|------|
| 1,00 | 34 | 12 | 10 | 25641 | 2,58 |
| 1,25 | 38 | 16 | 10 | 25642 | 3,07 |
| 1,50 | 40 | 18 | 10 | 25644 | 2,46 |
| 1,75 | 46 | 22 | 10 | 69953 | 3,07 |
| 2,00 | 49 | 24 | 10 | 25645 | 2,46 |
| 2,25 | 53 | 27 | 10 | 25646 | 2,71 |
| 2,50 | 57 | 30 | 10 | 25647 | 2,24 |
| 2,75 | 61 | 33 | 10 | 25648 | 2,71 |
| 3,00 | 61 | 33 | 10 | 25650 | 2,18 |
| 3,20 | 65 | 36 | 10 | 25710 | 2,69 |
| 3,25 | 65 | 36 | 10 | 25728 | 2,69 |
| 3,30 | 65 | 36 | 10 | 25730 | 2,69 |
| 3,50 | 70 | 39 | 10 | 25733 | 2,64 |
| 3,75 | 70 | 39 | 10 | 25738 | 3,19 |
| 4,00 | 75 | 43 | 10 | 25744 | 2,87 |
| 4,20 | 75 | 43 | 10 | 25751 | 3,19 |
| 4,25 | 75 | 43 | 10 | 25756 | 3,19 |
| 4,50 | 80 | 47 | 10 | 25762 | 3,19 |
| 4,75 | 80 | 47 | 10 | 25764 | 3,55 |
| 5,00 | 86 | 52 | 10 | 25769 | 3,42 |
| 5,20 | 86 | 52 | 10 | 25774 | 4,24 |

| D mm | L mm | I mm | | Nº Art. 5% Co | € |
|------------------|------|------|----|---------------|-------|
| 5,25 | 86 | 52 | 10 | 25777 | 4,00 |
| 5,50 | 93 | 57 | 10 | 25780 | 4,32 |
| 5,75 | 93 | 57 | 10 | 25786 | 4,83 |
| 6,00 | 93 | 57 | 10 | 25788 | 4,61 |
| 6,25 | 101 | 63 | 10 | 25790 | 5,29 |
| 6,50 | 101 | 63 | 10 | 25793 | 5,38 |
| 6,75 | 109 | 69 | 10 | 25795 | 6,32 |
| 6,80 | 109 | 69 | 10 | 25798 | 6,30 |
| 7,00 | 109 | 69 | 10 | 25801 | 5,86 |
| 7,25 | 109 | 69 | 10 | 25803 | 8,05 |
| 7,50 | 109 | 69 | 10 | 25805 | 6,24 |
| 7,75 | 117 | 75 | 10 | 69952 | 9,66 |
| 8,00 | 117 | 75 | 10 | 25807 | 7,30 |
| 8,25 | 117 | 75 | 5 | 25809 | 9,29 |
| 8,50 | 117 | 75 | 5 | 25811 | 7,63 |
| 8,75 | 125 | 81 | 5 | 69950 | 11,71 |
| 9,00 | 125 | 81 | 5 | 25813 | 9,71 |
| New! 9,10 | 125 | 81 | 5 | 48842 | 13,77 |
| New! 9,20 | 125 | 81 | 5 | 48845 | 13,77 |
| 9,25 | 125 | 81 | 5 | 69949 | 12,95 |
| New! 9,30 | 125 | 81 | 5 | 48848 | 13,77 |

| D mm | L mm | I mm | | Nº Art. 5% Co | € |
|-------------------|------|------|---|---------------|-------|
| 9,50 | 125 | 81 | 5 | 25815 | 10,05 |
| 9,75 | 133 | 87 | 5 | 69947 | 15,27 |
| 10,00 | 133 | 87 | 5 | 25817 | 11,10 |
| 10,20 | 133 | 87 | 1 | 32666 | 14,96 |
| 10,25 | 133 | 87 | 1 | 25819 | 19,50 |
| 10,50 | 133 | 87 | 1 | 25821 | 14,96 |
| 10,75 | 142 | 94 | 1 | 69946 | 21,50 |
| 11,00 | 142 | 94 | 1 | 25823 | 16,51 |
| New! 11,10 | 142 | 94 | 1 | 48851 | 22,68 |
| New! 11,20 | 142 | 94 | 1 | 48854 | 22,68 |
| 11,25 | 142 | 94 | 1 | 69945 | 23,55 |
| New! 11,30 | 142 | 94 | 1 | 48857 | 22,68 |
| 11,50 | 142 | 94 | 1 | 25825 | 19,00 |
| 11,75 | 142 | 94 | 1 | 69944 | 24,39 |
| 12,00 | 151 | 101 | 1 | 25827 | 20,37 |
| 12,25 | 151 | 101 | 1 | 69943 | 25,87 |
| 12,50 | 151 | 101 | 1 | 25829 | 22,67 |
| 12,75 | 151 | 101 | 1 | 69941 | 27,02 |
| 13,00 | 151 | 101 | 1 | 25831 | 23,00 |
| 14,00 | 160 | 108 | 1 | 81564 | 24,61 |

Ángulo de Punta 135°:

- Especial taladro mano.
- Aguzado de gran precisión.
- Menor fuerza de corte.
- Buen centrado superficies curvas.

135° Point Angle:

- Special portable drilling machine.
- High precision Split Point.
- Lower cutting-forces.
- Good centering on concave surfaces.

Angle de pointe 135°:

- Perceuses à main
- Affûtage précision
- Force de coupe inférieure
- Autocentrage surfaces courbes



Hélice 40°:

- Excelente evacuación de viruta.
- Taladrado más rápido y estable.
- Agujeros precisos hasta el final.

40° Helix:

- Excellent chip removal.
- Faster & stable drilling.
- Accurate holes right to the end.

Helix 40°:

- Excellente évacuation copeaux
- Perçage plus rapide et stable
- Trous précis jusqu'au bout

Mango de 3 Planos:

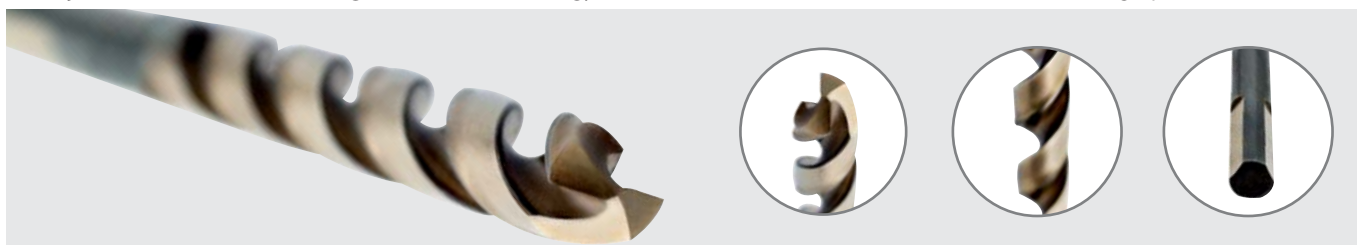
- Óptimo agarre y sujeción.
- Menor esfuerzo.
- Evita que se resbale la broca.
- Inmejorable transmisión de la energía.

3-Flat Shank:

- Optimum fixing.
- Low effort.
- No spinning in the drill-chuck.
- Ideal energy-transmission.

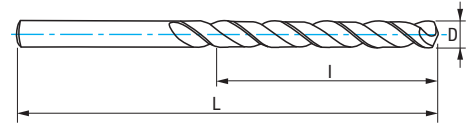
Queue 3 plans:

- Fixation optimale
- Effort inférieur
- Pas de glissement du foret
- Transmission d'énergie parfait

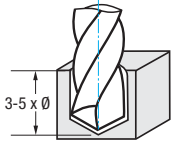


Ref. **1020**
SPEED MAX

BROCA MANGO CILÍNDRICO INOX. SERIE CORTA
Stainless Steel Straight Shank Drill Bit. Jobber Series
Foret queue cylindrique Inoxydable. Série courte



| | | | | | | | | |
|----------------------|----------------------|--|--|----------------------------------|--|--|--|----------------------|
| HSSE 5%Co | DIN 338 W | | | DIN 1412 C ≥ 2 mm | | | Chapa Sheets Tôle < 5 mm | Tol. D h8 |
|----------------------|----------------------|--|--|----------------------------------|--|--|--|----------------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| M | | 6-12 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,150 |
| N | N.3 | 60-80 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 |
| | N.4 | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 |
| | N.5 | 40-50 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |

| D mm | L mm | I mm | 10 | Nº Art. 5% Co | € |
|------|------|------|----|---------------|------|
| 1,00 | 34 | 12 | 10 | 14115 | 2,08 |
| 1,25 | 38 | 16 | 10 | 14116 | 2,46 |
| 1,50 | 40 | 18 | 10 | 14117 | 1,97 |
| 2,00 | 49 | 24 | 10 | 21615 | 1,97 |
| 2,10 | 49 | 24 | 10 | 13961 | 2,29 |
| 2,20 | 53 | 27 | 10 | 13962 | 2,29 |
| 2,25 | 53 | 27 | 10 | 21616 | 2,17 |
| 2,30 | 53 | 27 | 10 | 13963 | 2,29 |
| 2,40 | 57 | 30 | 10 | 13965 | 2,29 |
| 2,50 | 57 | 30 | 10 | 21618 | 1,79 |
| 2,60 | 57 | 30 | 10 | 13966 | 2,29 |
| 2,70 | 61 | 33 | 10 | 13968 | 2,29 |
| 2,75 | 61 | 33 | 10 | 21625 | 2,17 |
| 2,80 | 61 | 33 | 10 | 12964 | 2,35 |
| 2,90 | 61 | 33 | 10 | 13969 | 2,35 |
| 3,00 | 61 | 33 | 10 | 16283 | 1,76 |
| 3,10 | 65 | 36 | 10 | 17970 | 2,16 |
| 3,20 | 65 | 36 | 10 | 16284 | 2,16 |
| 3,25 | 65 | 36 | 10 | 16285 | 2,16 |
| 3,30 | 65 | 36 | 10 | 16286 | 2,16 |
| 3,40 | 70 | 39 | 10 | 13971 | 2,35 |
| 3,50 | 70 | 39 | 10 | 16287 | 2,14 |
| 3,60 | 70 | 39 | 10 | 13972 | 2,82 |
| 3,70 | 70 | 39 | 10 | 14120 | 2,82 |
| 3,75 | 70 | 39 | 10 | 16288 | 2,55 |
| 3,80 | 75 | 43 | 10 | 12507 | 2,82 |
| 3,90 | 75 | 43 | 10 | 13974 | 2,82 |
| 4,00 | 75 | 43 | 10 | 16289 | 2,29 |
| 4,10 | 75 | 43 | 10 | 16290 | 2,55 |
| 4,20 | 75 | 43 | 10 | 16291 | 2,55 |
| 4,25 | 75 | 43 | 10 | 16292 | 2,55 |
| 4,30 | 80 | 47 | 10 | 14122 | 2,82 |
| 4,40 | 80 | 47 | 10 | 13975 | 2,82 |
| 4,50 | 80 | 47 | 10 | 16293 | 2,55 |
| 4,60 | 80 | 47 | 10 | 13979 | 2,99 |
| 4,70 | 80 | 47 | 10 | 13981 | 2,99 |
| 4,75 | 80 | 47 | 10 | 16294 | 2,84 |
| 4,80 | 86 | 52 | 10 | 14123 | 3,14 |
| 4,90 | 86 | 52 | 10 | 13983 | 3,14 |
| 5,00 | 86 | 52 | 10 | 16295 | 2,75 |
| 5,10 | 86 | 52 | 10 | 16296 | 3,24 |
| 5,20 | 86 | 52 | 10 | 28626 | 3,39 |
| 5,25 | 86 | 52 | 10 | 16297 | 3,20 |
| 5,30 | 86 | 52 | 10 | 13984 | 3,25 |
| 5,40 | 93 | 57 | 10 | 13986 | 3,25 |
| 5,50 | 93 | 57 | 10 | 16298 | 3,47 |

| D mm | L mm | I mm | 10 | Nº Art. 5% Co | € |
|------|------|------|----|---------------|-------|
| 5,60 | 93 | 57 | 10 | 13987 | 4,27 |
| 5,70 | 93 | 57 | 10 | 25134 | 4,27 |
| 5,75 | 93 | 57 | 10 | 16299 | 3,86 |
| 5,80 | 93 | 57 | 10 | 13989 | 4,27 |
| 5,90 | 93 | 57 | 10 | 13991 | 4,27 |
| 6,00 | 93 | 57 | 10 | 16302 | 3,68 |
| 6,10 | 101 | 63 | 10 | 13993 | 4,51 |
| 6,20 | 101 | 63 | 10 | 13994 | 4,51 |
| 6,25 | 101 | 63 | 10 | 21627 | 4,23 |
| 6,30 | 101 | 63 | 10 | 14002 | 4,51 |
| 6,40 | 101 | 63 | 10 | 14003 | 4,51 |
| 6,50 | 101 | 63 | 10 | 16304 | 4,29 |
| 6,60 | 101 | 63 | 10 | 14004 | 5,36 |
| 6,70 | 101 | 63 | 10 | 14005 | 5,36 |
| 6,75 | 109 | 69 | 10 | 21628 | 5,05 |
| 6,80 | 109 | 69 | 10 | 16306 | 5,05 |
| 6,90 | 109 | 69 | 10 | 14006 | 5,36 |
| 7,00 | 109 | 69 | 10 | 16307 | 4,69 |
| 7,10 | 109 | 69 | 10 | 14007 | 6,75 |
| 7,20 | 109 | 69 | 10 | 14008 | 6,75 |
| 7,25 | 109 | 69 | 10 | 21631 | 6,43 |
| 7,30 | 109 | 69 | 10 | 14009 | 6,75 |
| 7,40 | 109 | 69 | 10 | 14010 | 6,75 |
| 7,50 | 109 | 69 | 10 | 16309 | 5,01 |
| 7,60 | 117 | 75 | 10 | 14011 | 8,17 |
| 7,70 | 117 | 75 | 10 | 14012 | 8,17 |
| 7,75 | 117 | 75 | 10 | 69940 | 7,72 |
| 7,80 | 117 | 75 | 10 | 14013 | 8,17 |
| 7,90 | 117 | 75 | 10 | 14014 | 8,17 |
| 8,00 | 117 | 75 | 10 | 16311 | 5,85 |
| 8,10 | 117 | 75 | 5 | 14015 | 7,79 |
| 8,20 | 117 | 75 | 5 | 14016 | 7,79 |
| 8,25 | 117 | 75 | 5 | 21633 | 7,43 |
| 8,30 | 117 | 75 | 5 | 14017 | 7,79 |
| 8,40 | 117 | 75 | 5 | 14018 | 7,79 |
| 8,50 | 117 | 75 | 5 | 16313 | 6,12 |
| 8,60 | 125 | 81 | 5 | 14019 | 10,01 |
| 8,70 | 125 | 81 | 5 | 14020 | 10,01 |
| 8,75 | 125 | 81 | 5 | 69938 | 9,37 |
| 8,80 | 125 | 81 | 5 | 14021 | 10,01 |
| 8,90 | 125 | 81 | 5 | 14022 | 10,01 |
| 9,00 | 125 | 81 | 5 | 16314 | 7,77 |
| 9,10 | 125 | 81 | 5 | 14023 | 10,87 |
| 9,20 | 125 | 81 | 5 | 14024 | 10,87 |
| 9,25 | 125 | 81 | 5 | 69937 | 10,37 |
| 9,30 | 125 | 81 | 5 | 14025 | 10,87 |

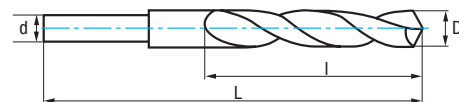
| D mm | L mm | I mm | 5 | Nº Art. 5% Co | € |
|-------|------|------|---|---------------|-------|
| 9,40 | 125 | 81 | 5 | 14026 | 10,87 |
| 9,50 | 125 | 81 | 5 | 16316 | 8,06 |
| 9,60 | 133 | 87 | 5 | 14027 | 12,95 |
| 9,70 | 133 | 87 | 5 | 14028 | 12,95 |
| 9,75 | 133 | 87 | 5 | 69935 | 12,21 |
| 9,80 | 133 | 87 | 5 | 14029 | 12,95 |
| 9,90 | 133 | 87 | 5 | 14060 | 12,95 |
| 10,00 | 133 | 87 | 5 | 16318 | 8,89 |
| 10,10 | 133 | 87 | 5 | 14064 | 14,78 |
| 10,20 | 133 | 87 | 5 | 14248 | 11,98 |
| 10,25 | 133 | 87 | 5 | 21634 | 15,60 |
| 10,30 | 133 | 87 | 5 | 74568 | 14,78 |
| 10,40 | 133 | 87 | 5 | 74567 | 14,78 |
| 10,50 | 133 | 87 | 5 | 16320 | 11,98 |
| 10,60 | 133 | 87 | 5 | 74566 | 17,43 |
| 10,70 | 142 | 94 | 5 | 74565 | 17,43 |
| 10,75 | 142 | 94 | 5 | 69934 | 17,19 |
| 10,80 | 142 | 94 | 5 | 14249 | 17,43 |
| 10,90 | 142 | 94 | 5 | 74564 | 17,43 |
| 11,00 | 142 | 94 | 5 | 16321 | 13,23 |
| 11,10 | 142 | 94 | 5 | 30587 | 19,28 |
| 11,20 | 142 | 94 | 5 | 14250 | 19,28 |
| 11,25 | 142 | 94 | 5 | 69932 | 18,85 |
| 11,30 | 142 | 94 | 5 | 74563 | 19,28 |
| 11,40 | 142 | 94 | 5 | 74562 | 19,37 |
| 11,50 | 142 | 94 | 5 | 16322 | 15,22 |
| 11,60 | 142 | 94 | 5 | 74561 | 19,95 |
| 11,70 | 142 | 94 | 5 | 74560 | 19,95 |
| 11,75 | 142 | 94 | 5 | 69931 | 19,50 |
| 11,80 | 142 | 94 | 5 | 14252 | 19,95 |
| 11,90 | 151 | 101 | 5 | 74559 | 19,95 |
| 12,00 | 151 | 101 | 5 | 16323 | 16,33 |
| 12,10 | 151 | 101 | 5 | 74558 | 20,95 |
| 12,20 | 151 | 101 | 5 | 14276 | 20,95 |
| 12,25 | 151 | 101 | 5 | 69929 | 20,69 |
| 12,30 | 151 | 101 | 5 | 74557 | 20,95 |
| 12,40 | 151 | 101 | 5 | 74556 | 20,95 |
| 12,50 | 151 | 101 | 5 | 16324 | 18,17 |
| 12,60 | 151 | 101 | 5 | 74554 | 21,86 |
| 12,70 | 151 | 101 | 5 | 74553 | 21,86 |
| 12,75 | 151 | 101 | 5 | 69928 | 21,62 |
| 12,80 | 151 | 101 | 5 | 14288 | 21,86 |
| 12,90 | 151 | 101 | 5 | 74552 | 21,86 |
| 13,00 | 151 | 101 | 5 | 16325 | 18,44 |

Ref. **1027**

BROCA MANGO REBAJADO MATERIALES DUROS. SERIE CORTA

Hard Materials Reduced Shank Drill Bit. Jobber Series

Foret queue reduite matériaux durs. Série courte



HSSE
5%Co

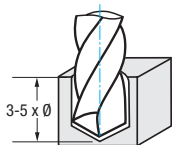
DIN
338 N



DIN
1412 C
≥ 2 mm

Rectificado
Ground
Taillé meulé

Tol. D
h8



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | |
|----------|------|------------|--------------------------------------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 12 | Ø 16 | Ø 20 |
| P | P.3 | 8-15 | 0,100 | 0,120 | 0,160 |
| | P.5 | 8-12 | 0,120 | 0,150 | 0,170 |
| S | | 10-15 | 0,100 | 0,120 | 0,140 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

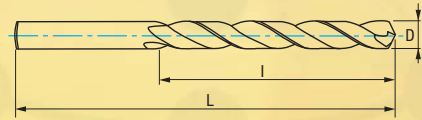
| D | d | L | l | | N° Art. | € |
|-------|-------|-----|-----|---|---------|--------|
| mm | mm | mm | mm | | 5% Co | |
| 10,50 | 10,00 | 133 | 87 | 1 | 54954 | 11,90 |
| 11,00 | 10,00 | 142 | 94 | 1 | 54955 | 13,15 |
| 11,50 | 10,00 | 142 | 94 | 1 | 54956 | 15,75 |
| 12,00 | 10,00 | 151 | 101 | 1 | 22346 | 16,84 |
| 12,50 | 10,00 | 151 | 101 | 1 | 54957 | 20,49 |
| 13,00 | 10,00 | 151 | 101 | 1 | 22347 | 21,61 |
| 13,50 | 12,70 | 160 | 108 | 1 | 49200 | 23,13 |
| 14,00 | 12,70 | 160 | 108 | 1 | 22344 | 23,55 |
| 14,50 | 12,70 | 169 | 114 | 1 | 49201 | 32,43 |
| 15,00 | 12,70 | 169 | 114 | 1 | 22348 | 33,88 |
| 15,50 | 12,70 | 178 | 120 | 1 | 49223 | 38,10 |
| 16,00 | 12,70 | 178 | 120 | 1 | 22349 | 39,08 |
| 16,50 | 12,70 | 184 | 125 | 1 | 54979 | 45,09 |
| 17,00 | 12,70 | 184 | 125 | 1 | 22350 | 44,66 |
| 17,50 | 12,70 | 191 | 130 | 1 | 54958 | 50,01 |
| 18,00 | 12,70 | 191 | 130 | 1 | 22351 | 53,93 |
| 18,50 | 12,70 | 198 | 135 | 1 | 54959 | 60,17 |
| 19,00 | 12,70 | 198 | 135 | 1 | 22353 | 59,55 |
| 19,50 | 12,70 | 205 | 140 | 1 | 54960 | 66,71 |
| 20,00 | 12,70 | 205 | 140 | 1 | 22354 | 70,71 |
| 20,50 | 12,70 | 205 | 145 | 1 | 66946 | 74,45 |
| 21,00 | 12,70 | 205 | 145 | 1 | 66941 | 74,45 |
| 21,50 | 12,70 | 210 | 150 | 1 | 66945 | 82,13 |
| 22,00 | 12,70 | 210 | 150 | 1 | 66940 | 82,13 |
| 22,50 | 12,70 | 210 | 150 | 1 | 66944 | 89,85 |
| 23,00 | 12,70 | 210 | 150 | 1 | 66939 | 89,85 |
| 23,50 | 12,70 | 220 | 160 | 1 | 66943 | 99,15 |
| 24,00 | 12,70 | 220 | 160 | 1 | 66938 | 99,15 |
| 24,50 | 12,70 | 220 | 160 | 1 | 66942 | 108,11 |
| 25,00 | 12,70 | 220 | 160 | 1 | 66937 | 108,11 |





Ref. **1015**
ZIRKON

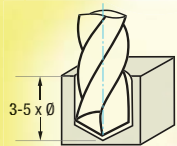
BROCA MANGO CILÍNDRICO ZIRKONIO
Zirkonio Straight Shank Drill Bit
Foret queue cylindrique Zirkonio



| | | | | | | |
|-----|----------|-----------|------|--|--|-----------|
| HSS | Zirkonio | DIN 338 N | 130° | | | Tol. D h8 |
|-----|----------|-----------|------|--|--|-----------|



Video



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | Zirkonio | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| P | P.1 | 33-40 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | |
| | K | K.1 | 40-45 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |
| N | K.2 | 33-40 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | |
| | N.3 | 80-105 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | |
| | N.4 | 50-65 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | |
| | N.5 | | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | |

Angulo punta 130°

- Autocentradora
- Ideal taladro portátil
- Geometría especial diseñada para reducir el esfuerzo de corte

130° Point Angle

- Autocentering
- Ideal Portable Drilling Machine
- Special Geometry designed for reducing cutting effort

Angle Pointe 130°

- Autocentreur
- Perceuse à main
- Géométrie pour réduire l'effort de coupe

Nuevo recubrimiento Zirkonio de última generación por PVD

- Basado en ZRN
- Bajo coeficiente de fricción
- Muy resistente a la corrosión
- Adecuado para materiales no férricos
- Evita la adherencia de material en el filo de corte

Latest generation Zirkonio coating by PVD

- Based on ZRN
- Low Friction Coefficient
- High Corrosion Resistant
- Appropriate for Non-Ferrous Materials
- Built-Up Edge avoided

Nouveau revêtement Zirkonio dernière génération par PVD




- Base ZRN
- Faible coefficient friction
- Résistant à l'usage
- Recommandé pour aciers non ferreux
- Évite l'adhérence sur les filets de coupe

Ref. **1015**
ZIRKON

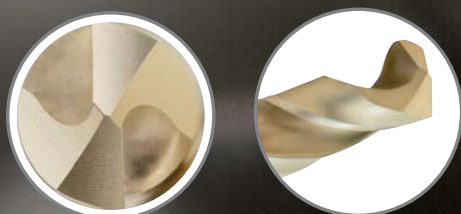
BROCA MANGO CILÍNDRICO ZIRKONIO
Zirkonio Straight Shank Drill Bit
Foret queue cylindrique Zirkonio



New!

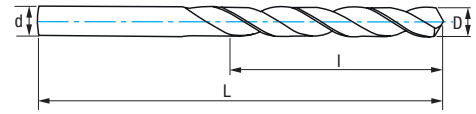
| D mm | L mm | I mm |  | Nº Art. Zirkonio | € | D mm | L mm | I mm |  | Nº Art. Zirkonio | € | D mm | L mm | I mm |  | Nº Art. Zirkonio | € |
|------|------|------|---|------------------|------|------|------|------|---|------------------|------|-------|------|------|---|------------------|-------|
| 1,00 | 34 | 12 | 10 | 59101 | 1,61 | 5,00 | 86 | 52 | 10 | 58831 | 1,97 | 9,00 | 125 | 81 | 5 | 59161 | 5,80 |
| 1,10 | 36 | 14 | 10 | 62815 | 1,88 | 5,10 | 86 | 52 | 10 | 62849 | 2,35 | 9,10 | 125 | 81 | 5 | 62879 | 8,20 |
| 1,20 | 38 | 16 | 10 | 62819 | 1,88 | 5,20 | 86 | 52 | 10 | 59139 | 2,35 | 9,20 | 125 | 81 | 5 | 62880 | 8,20 |
| 1,25 | 38 | 16 | 10 | 68271 | 1,88 | 5,25 | 86 | 52 | 10 | 68366 | 2,26 | 9,25 | 125 | 81 | 5 | 68374 | 6,32 |
| 1,30 | 38 | 16 | 10 | 62820 | 1,88 | 5,30 | 86 | 52 | 10 | 62850 | 2,35 | 9,30 | 125 | 81 | 5 | 62881 | 8,20 |
| 1,40 | 40 | 18 | 10 | 62821 | 1,88 | 5,40 | 93 | 57 | 10 | 62851 | 2,35 | 9,40 | 125 | 81 | 5 | 62882 | 8,20 |
| 1,50 | 40 | 18 | 10 | 59103 | 1,46 | 5,50 | 93 | 57 | 10 | 59140 | 2,50 | 9,50 | 125 | 81 | 5 | 59163 | 6,00 |
| 1,60 | 43 | 20 | 10 | 62822 | 1,88 | 5,60 | 93 | 57 | 10 | 62852 | 2,99 | 9,60 | 133 | 87 | 5 | 62883 | 9,65 |
| 1,70 | 43 | 20 | 10 | 62823 | 1,88 | 5,70 | 93 | 57 | 10 | 62853 | 2,99 | 9,70 | 133 | 87 | 5 | 62884 | 9,65 |
| 1,75 | 46 | 22 | 10 | 68274 | 1,69 | 5,75 | 93 | 57 | 10 | 68367 | 2,90 | 9,75 | 133 | 87 | 5 | 68375 | 7,05 |
| 1,80 | 46 | 22 | 10 | 62824 | 1,88 | 5,80 | 93 | 57 | 10 | 62854 | 2,99 | 9,80 | 133 | 87 | 5 | 62886 | 9,65 |
| 1,90 | 46 | 22 | 10 | 62826 | 1,88 | 5,90 | 93 | 57 | 10 | 62855 | 2,99 | 9,90 | 133 | 87 | 5 | 62887 | 9,65 |
| 2,00 | 49 | 24 | 10 | 59100 | 1,52 | 6,00 | 93 | 57 | 10 | 59145 | 2,66 | 10,00 | 133 | 87 | 5 | 59164 | 6,59 |
| 2,10 | 49 | 24 | 10 | 62827 | 1,77 | 6,10 | 101 | 63 | 10 | 62856 | 3,31 | 10,10 | 133 | 87 | 5 | 62888 | 11,09 |
| 2,20 | 53 | 27 | 10 | 62828 | 1,77 | 6,20 | 101 | 63 | 10 | 62857 | 3,31 | 10,20 | 133 | 87 | 5 | 59166 | 9,35 |
| 2,25 | 53 | 27 | 10 | 68363 | 1,62 | 6,25 | 101 | 63 | 10 | 68368 | 3,08 | 10,30 | 133 | 87 | 5 | 62889 | 11,09 |
| 2,30 | 53 | 27 | 10 | 62829 | 1,77 | 6,30 | 101 | 63 | 10 | 62858 | 3,31 | 10,40 | 133 | 87 | 5 | 62890 | 11,09 |
| 2,40 | 57 | 30 | 10 | 62830 | 1,77 | 6,40 | 101 | 63 | 10 | 62859 | 3,31 | 10,50 | 133 | 87 | 5 | 59167 | 9,35 |
| 2,50 | 57 | 30 | 10 | 59104 | 1,37 | 6,50 | 101 | 63 | 10 | 59148 | 3,20 | 10,60 | 133 | 87 | 5 | 62892 | 12,89 |
| 2,60 | 57 | 30 | 10 | 62831 | 1,72 | 6,60 | 101 | 63 | 10 | 62860 | 3,96 | 10,70 | 142 | 94 | 5 | 62893 | 12,89 |
| 2,70 | 61 | 33 | 10 | 62832 | 1,72 | 6,70 | 101 | 63 | 10 | 62861 | 3,96 | 10,80 | 142 | 94 | 5 | 62895 | 12,89 |
| 2,75 | 61 | 33 | 10 | 68364 | 1,46 | 6,75 | 109 | 69 | 10 | 68369 | 2,99 | 10,90 | 172 | 94 | 5 | 62896 | 12,89 |
| 2,80 | 61 | 33 | 10 | 62833 | 1,72 | 6,80 | 109 | 69 | 10 | 59149 | 3,72 | 11,00 | 142 | 94 | 5 | 59170 | 10,34 |
| 2,90 | 61 | 33 | 10 | 62834 | 1,72 | 6,90 | 109 | 69 | 10 | 62862 | 3,96 | 11,10 | 142 | 94 | 5 | 62898 | 14,66 |
| 3,00 | 61 | 33 | 10 | 59115 | 1,34 | 7,00 | 109 | 69 | 10 | 59151 | 3,49 | 11,20 | 142 | 94 | 5 | 62900 | 14,66 |
| 3,10 | 65 | 36 | 10 | 62835 | 1,65 | 7,10 | 109 | 69 | 10 | 62863 | 5,05 | 11,30 | 142 | 94 | 5 | 62902 | 14,66 |
| 3,20 | 65 | 36 | 10 | 59118 | 1,65 | 7,20 | 109 | 69 | 10 | 62864 | 5,05 | 11,40 | 142 | 94 | 5 | 62904 | 14,66 |
| 3,25 | 65 | 36 | 10 | 59121 | 1,65 | 7,25 | 109 | 69 | 10 | 68370 | 4,13 | 11,50 | 142 | 94 | 5 | 59172 | 12,35 |
| 3,30 | 65 | 36 | 10 | 59124 | 1,65 | 7,30 | 109 | 69 | 10 | 62865 | 5,05 | 11,60 | 172 | 94 | 5 | 62905 | 15,19 |
| 3,40 | 70 | 39 | 10 | 62836 | 1,72 | 7,40 | 109 | 69 | 10 | 62866 | 5,05 | 11,70 | 142 | 94 | 5 | 62907 | 15,19 |
| 3,50 | 70 | 39 | 10 | 59127 | 1,62 | 7,50 | 109 | 69 | 10 | 59155 | 3,72 | 11,80 | 142 | 94 | 5 | 62908 | 15,19 |
| 3,60 | 70 | 39 | 10 | 62837 | 2,07 | 7,60 | 117 | 75 | 10 | 62867 | 6,10 | 11,90 | 151 | 101 | 5 | 62909 | 15,19 |
| 3,70 | 70 | 39 | 10 | 62838 | 2,07 | 7,70 | 117 | 75 | 10 | 62868 | 6,10 | 12,00 | 151 | 101 | 5 | 59173 | 13,22 |
| 3,75 | 70 | 39 | 10 | 68365 | 1,80 | 7,75 | 117 | 75 | 10 | 68371 | 4,71 | 12,10 | 151 | 101 | 5 | 62910 | 17,60 |
| 3,80 | 75 | 43 | 10 | 62839 | 2,07 | 7,80 | 117 | 75 | 10 | 62869 | 6,10 | 12,20 | 151 | 101 | 5 | 62918 | 17,60 |
| 3,90 | 75 | 43 | 10 | 62841 | 2,07 | 7,90 | 117 | 75 | 10 | 62870 | 6,10 | 12,30 | 151 | 101 | 5 | 62921 | 17,60 |
| 4,00 | 75 | 43 | 10 | 59131 | 1,74 | 8,00 | 117 | 75 | 10 | 59157 | 4,36 | 12,40 | 151 | 101 | 5 | 62923 | 17,60 |
| 4,10 | 75 | 43 | 10 | 62842 | 1,83 | 8,10 | 117 | 75 | 5 | 62871 | 5,82 | 12,50 | 151 | 101 | 5 | 59176 | 16,08 |
| 4,20 | 75 | 43 | 10 | 59133 | 1,83 | 8,20 | 117 | 75 | 5 | 62872 | 5,82 | 12,60 | 151 | 101 | 5 | 62927 | 18,37 |
| 4,25 | 75 | 43 | 10 | 59134 | 1,83 | 8,25 | 117 | 75 | 5 | 68372 | 4,38 | 12,70 | 151 | 101 | 5 | 62930 | 18,37 |
| 4,30 | 80 | 47 | 10 | 62843 | 1,95 | 8,30 | 117 | 75 | 5 | 62873 | 5,82 | 12,80 | 151 | 101 | 5 | 62932 | 18,37 |
| 4,40 | 80 | 47 | 10 | 62844 | 1,95 | 8,40 | 117 | 75 | 5 | 62874 | 5,82 | 12,90 | 151 | 101 | 5 | 62934 | 18,37 |
| 4,50 | 80 | 47 | 10 | 59137 | 1,89 | 8,50 | 117 | 75 | 5 | 59158 | 4,55 | 13,00 | 151 | 101 | 5 | 59179 | 16,46 |
| 4,60 | 80 | 47 | 10 | 62845 | 2,17 | 8,60 | 125 | 81 | 5 | 62875 | 7,39 | 13,50 | 160 | 108 | 1 | 25147 | 22,50 |
| 4,70 | 80 | 47 | 10 | 62846 | 2,17 | 8,70 | 125 | 81 | 5 | 62876 | 7,39 | 14,00 | 160 | 108 | 1 | 25154 | 24,13 |
| 4,75 | 80 | 47 | 10 | 68350 | 1,94 | 8,75 | 125 | 81 | 5 | 68373 | 5,65 | 14,50 | 169 | 114 | 1 | 25155 | 25,94 |
| 4,80 | 86 | 52 | 10 | 62847 | 2,17 | 8,80 | 125 | 81 | 5 | 62877 | 7,39 | 15,00 | 169 | 114 | 1 | 25156 | 26,26 |
| 4,90 | 86 | 52 | 10 | 62848 | 2,17 | 8,90 | 125 | 81 | 5 | 62878 | 7,39 | 16,00 | 178 | 120 | 1 | 25157 | 32,00 |

New!
New!
New!
New!
New!



Ref. **1010**
CLASSIQUE

BROCA MANGO CILÍNDRICO USO GENERAL HSS. SERIE CORTA
HSS General Purpose Straight Shank Drill Bit. Jobber Series
Foret queue cylindrique utilisation générale HSS. Série courte

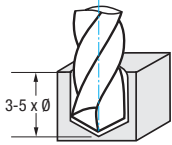


| | | | | | | |
|-----|-----------|-----------|------|-------------|------------------------------------|-----------|
| HSS | HSS + TIN | DIN 338 N | 118° | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|-----------|------|-------------|------------------------------------|-----------|



HSS **TIN** **x2,5** Resistencia al desgaste
Wear Resistance
Résistant à l'usure

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | | |
|----------|------|------------|-------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | HSS | TIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | |
| P | P.1 | 25-30 | 30-35 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 | |
| K | K.1 | 30-35 | 36-42 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | |
| | K.2 | 25-30 | 30-36 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | |
| N | N.3 | 60-80 | 72-96 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | 0,450 | |
| | N.4 | | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | 0,450 | |
| | N.5 | 40-50 | 48-60 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



| D mm | L mm | I mm | Icon | Nº Art. HSS | € | Nº Art. TIN | € |
|------------------|------|------|------|-------------|------|-------------|------|
| 0,30 | 19 | 3 | 10 | 17996 | 1,96 | | |
| 0,35 | 19 | 4 | 10 | 17999 | 2,02 | | |
| 0,40 | 20 | 5 | 10 | 18002 | 1,96 | | |
| 0,45 | 20 | 5 | 10 | 18005 | 1,96 | | |
| 0,50 | 22 | 6 | 10 | 18008 | 1,38 | | |
| 0,55 | 24 | 7 | 10 | 18011 | 1,74 | | |
| 0,60 | 24 | 7 | 10 | 18014 | 1,74 | | |
| 0,65 | 26 | 8 | 10 | 18017 | 1,74 | | |
| 0,70 | 28 | 9 | 10 | 18020 | 1,74 | | |
| 0,75 | 28 | 9 | 10 | 18023 | 1,27 | | |
| 0,80 | 30 | 10 | 10 | 18026 | 1,30 | | |
| 0,85 | 30 | 10 | 10 | 18029 | 1,30 | | |
| 0,90 | 32 | 11 | 10 | 18032 | 1,30 | | |
| 0,95 | 32 | 11 | 10 | 18035 | 1,30 | | |
| 1,00 | 34 | 12 | 10 | 10001 | 1,01 | 18305 | 2,08 |
| New! 1,05 | 34 | 12 | 10 | 18038 | 1,12 | 53352 | 2,10 |
| 1,10 | 36 | 14 | 10 | 10004 | 1,12 | 15056 | 2,10 |
| 1,15 | 36 | 14 | 10 | 18041 | 1,12 | | |
| 1,20 | 38 | 16 | 10 | 10007 | 1,12 | 18308 | 2,10 |
| 1,25 | 38 | 16 | 10 | 10010 | 0,89 | 27087 | 1,95 |
| 1,30 | 38 | 16 | 10 | 10013 | 0,99 | 18311 | 2,02 |
| 1,35 | 40 | 18 | 10 | 18050 | 0,99 | | |
| 1,40 | 40 | 18 | 10 | 10016 | 0,99 | 27337 | 2,02 |
| 1,45 | 40 | 18 | 10 | 18053 | 0,99 | | |
| 1,50 | 40 | 18 | 10 | 10019 | 0,77 | 18314 | 1,78 |
| 1,55 | 43 | 20 | 10 | 18059 | 0,95 | | |
| 1,60 | 43 | 20 | 10 | 10022 | 0,95 | 18317 | 1,99 |
| 1,65 | 43 | 20 | 10 | 18062 | 0,95 | | |
| 1,70 | 43 | 20 | 10 | 10025 | 0,95 | 18320 | 1,99 |
| 1,75 | 46 | 22 | 10 | 10028 | 0,85 | 18323 | 1,94 |
| 1,80 | 46 | 22 | 10 | 10031 | 0,85 | 18326 | 1,90 |
| New! 1,85 | 46 | 22 | 10 | 18068 | 0,85 | 77801 | 1,90 |
| 1,90 | 46 | 22 | 10 | 10034 | 0,85 | 18329 | 1,90 |
| 1,95 | 49 | 24 | 10 | 18071 | 0,85 | | |
| 2,00 | 49 | 24 | 10 | 10037 | 0,73 | 18332 | 1,78 |
| 2,05 | 49 | 24 | 10 | 18074 | 0,75 | | |
| 2,10 | 49 | 24 | 10 | 10040 | 0,75 | 18335 | 1,71 |
| 2,15 | 53 | 27 | 10 | 18077 | 0,75 | | |

| D mm | L mm | I mm | Icon | Nº Art. HSS | € | Nº Art. TIN | € |
|------|------|------|------|-------------|------|-------------|------|
| 2,20 | 53 | 27 | 10 | 10043 | 0,75 | 18338 | 1,71 |
| 2,25 | 53 | 27 | 10 | 10046 | 0,70 | 18341 | 1,66 |
| 2,30 | 53 | 27 | 10 | 10049 | 0,88 | 18344 | 1,83 |
| 2,35 | 53 | 27 | 10 | 18080 | 0,88 | | |
| 2,40 | 57 | 30 | 10 | 10052 | 0,88 | 18347 | 1,83 |
| 2,45 | 57 | 30 | 10 | 18083 | 0,88 | | |
| 2,50 | 57 | 30 | 10 | 10055 | 0,73 | 18350 | 1,72 |
| 2,55 | 57 | 30 | 10 | 18086 | 0,90 | | |
| 2,60 | 57 | 30 | 10 | 10058 | 0,90 | 18353 | 1,84 |
| 2,65 | 57 | 30 | 10 | 18089 | 0,90 | | |
| 2,70 | 61 | 33 | 10 | 10061 | 0,90 | 27166 | 1,84 |
| 2,75 | 61 | 33 | 10 | 10064 | 0,77 | 18356 | 1,78 |
| 2,80 | 61 | 33 | 10 | 10067 | 0,90 | 18359 | 1,84 |
| 2,85 | 61 | 33 | 10 | 18092 | 0,90 | | |
| 2,90 | 61 | 33 | 10 | 10070 | 0,90 | 27088 | 1,84 |
| 2,95 | 61 | 33 | 10 | 18095 | 0,90 | | |
| 3,00 | 61 | 33 | 10 | 10073 | 0,66 | 18362 | 1,61 |
| 3,05 | 65 | 36 | 10 | 18098 | 0,87 | 17358 | 2,09 |
| 3,10 | 65 | 36 | 10 | 10076 | 0,77 | 18365 | 2,05 |
| 3,15 | 65 | 36 | 10 | 27343 | 0,87 | 29078 | 2,09 |
| 3,20 | 65 | 36 | 10 | 10079 | 0,77 | 18368 | 2,05 |
| 3,25 | 65 | 36 | 10 | 10082 | 0,77 | 18371 | 2,05 |
| 3,30 | 65 | 36 | 10 | 10085 | 0,77 | 18374 | 2,05 |
| 3,35 | 65 | 36 | 10 | 27345 | 0,99 | | |
| 3,40 | 70 | 39 | 10 | 10088 | 1,00 | 27322 | 2,19 |
| 3,45 | 70 | 39 | 10 | 27346 | 1,00 | 21777 | 2,19 |
| 3,50 | 70 | 39 | 10 | 10091 | 0,75 | 18377 | 2,01 |
| 3,55 | 70 | 39 | 10 | 18101 | 1,03 | | |
| 3,60 | 70 | 39 | 10 | 10094 | 1,03 | 27323 | 2,22 |
| 3,65 | 70 | 39 | 10 | 18104 | 1,03 | | |
| 3,70 | 70 | 39 | 10 | 10097 | 1,03 | 18380 | 2,22 |
| 3,75 | 70 | 39 | 10 | 10100 | 0,88 | 18383 | 2,14 |
| 3,80 | 75 | 43 | 10 | 10103 | 1,06 | 18386 | 2,25 |
| 3,85 | 75 | 43 | 10 | 18107 | 1,06 | 79546 | 2,25 |
| 3,90 | 75 | 43 | 10 | 10106 | 1,06 | 27165 | 2,25 |
| 3,95 | 75 | 43 | 10 | 18110 | 1,06 | | |
| 4,00 | 75 | 43 | 10 | 10109 | 0,86 | 18389 | 2,11 |
| 4,05 | 75 | 43 | 10 | 27349 | 1,06 | | |

Ref. **1010**
CLASSIQUE**BROCA MANGO CILÍNDRICO USO GENERAL HSS. SERIE CORTA**

HSS General Purpose Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique utilisation générale HSS. Série courte

| D mm | L mm | I mm |  | Nº Art. HSS | € | Nº Art. TIN | € | D mm | L mm | I mm |  | Nº Art. HSS | € | Nº Art. TIN | € |
|-------|------|------|---|-------------|-------|-------------|-------|-------|------|------|---|-------------|-------|-------------|-------|
| 10,20 | 133 | 87 | 5 | 10331 | 4,73 | 18560 | 12,92 | 13,80 | 160 | 108 | 1 | 18176 | 15,20 | 24664 | 25,66 |
| 10,25 | 133 | 87 | 5 | 10334 | 5,28 | 27274 | 13,48 | 13,90 | 160 | 108 | 1 | 10451 | 15,20 | 68188 | 25,66 |
| 10,30 | 133 | 87 | 5 | 10337 | 5,91 | 29151 | 13,78 | 14,00 | 160 | 108 | 1 | 10454 | 11,31 | 29007 | 21,79 |
| 10,40 | 133 | 87 | 5 | 10340 | 5,91 | | | 14,10 | 169 | 114 | 1 | 18179 | 16,20 | | |
| 10,50 | 133 | 87 | 5 | 10343 | 4,73 | 18563 | 12,62 | 14,20 | 169 | 114 | 1 | 18185 | 16,20 | | |
| 10,60 | 133 | 87 | 5 | 10346 | 6,52 | 29154 | 14,00 | 14,25 | 169 | 114 | 1 | 10457 | 13,27 | 29194 | 23,64 |
| 10,70 | 142 | 94 | 5 | 10349 | 6,52 | | | 14,30 | 169 | 114 | 1 | 18188 | 16,50 | | |
| 10,75 | 142 | 94 | 5 | 10352 | 6,12 | 27277 | 13,94 | 14,40 | 169 | 114 | 1 | 18191 | 16,50 | | |
| 10,80 | 142 | 94 | 5 | 10355 | 7,23 | 29157 | 14,69 | 14,50 | 169 | 114 | 1 | 10460 | 12,20 | 29198 | 22,59 |
| 10,90 | 142 | 94 | 5 | 10358 | 7,23 | | | 14,60 | 169 | 114 | 1 | 18194 | 16,80 | | |
| 11,00 | 142 | 94 | 5 | 10361 | 5,51 | 18566 | 13,36 | 14,70 | 169 | 114 | 1 | 18197 | 16,80 | | |
| 11,10 | 142 | 94 | 5 | 10364 | 7,35 | | | 14,75 | 169 | 114 | 1 | 10463 | 13,27 | 29202 | 23,64 |
| 11,20 | 142 | 94 | 5 | 10367 | 7,35 | | | 14,80 | 169 | 114 | 1 | 18200 | 16,20 | | |
| 11,25 | 142 | 94 | 5 | 10370 | 6,24 | 26801 | 14,05 | 14,90 | 169 | 114 | 1 | 18203 | 16,20 | | |
| 11,30 | 142 | 94 | 5 | 10373 | 7,23 | | | 15,00 | 169 | 114 | 1 | 10466 | 12,33 | 29205 | 22,76 |
| 11,40 | 142 | 94 | 5 | 10376 | 7,23 | 27450 | 15,06 | 15,20 | 178 | 120 | 1 | 18209 | 21,26 | | |
| 11,50 | 142 | 94 | 5 | 10379 | 5,89 | 18569 | 13,72 | 15,25 | 178 | 120 | 1 | 10469 | 18,10 | 29209 | 28,26 |
| 11,60 | 142 | 94 | 5 | 10382 | 7,23 | | | 15,50 | 178 | 120 | 1 | 10472 | 14,43 | 29213 | 24,77 |
| 11,70 | 142 | 94 | 5 | 10385 | 7,23 | | | 15,60 | 178 | 120 | 1 | 18218 | 24,88 | | |
| 11,75 | 142 | 94 | 5 | 10388 | 6,24 | 27275 | 14,05 | 15,70 | 178 | 120 | 1 | 18221 | 24,88 | | |
| 11,80 | 142 | 94 | 5 | 10391 | 7,90 | 29166 | 15,69 | 15,75 | 178 | 120 | 1 | 10475 | 18,34 | | |
| 11,90 | 151 | 101 | 5 | 10394 | 7,90 | 29167 | 15,69 | 15,80 | 178 | 120 | 1 | 18224 | 23,22 | | |
| 12,00 | 151 | 101 | 5 | 10397 | 6,55 | 18572 | 14,36 | 15,90 | 178 | 120 | 1 | 18227 | 23,22 | | |
| 12,10 | 151 | 101 | 5 | 10400 | 9,22 | 29169 | 18,57 | 16,00 | 178 | 120 | 1 | 10478 | 15,02 | 29220 | 25,32 |
| 12,20 | 151 | 101 | 5 | 10403 | 9,22 | | | 16,20 | 184 | 125 | 1 | 27289 | 31,79 | | |
| 12,25 | 151 | 101 | 5 | 10406 | 8,13 | 18578 | 17,92 | 16,25 | 184 | 125 | 1 | 10481 | 27,03 | | |
| 12,30 | 151 | 101 | 5 | 10409 | 8,68 | | | 16,50 | 184 | 125 | 1 | 10484 | 17,48 | 12861 | 27,01 |
| 12,40 | 151 | 101 | 5 | 10412 | 8,68 | | | 16,75 | 184 | 125 | 1 | 10487 | 28,25 | 19368 | 37,77 |
| 12,50 | 151 | 101 | 5 | 10415 | 7,21 | 18581 | 17,01 | 16,80 | 184 | 125 | 1 | 27676 | 42,70 | 19369 | 52,24 |
| 12,60 | 151 | 101 | 5 | 10418 | 9,00 | | | 17,00 | 184 | 125 | 1 | 10490 | 17,48 | 12866 | 27,02 |
| 12,70 | 151 | 101 | 5 | 10421 | 9,00 | | | 17,25 | 191 | 130 | 1 | 10493 | 29,33 | | |
| 12,75 | 151 | 101 | 5 | 10424 | 8,01 | 27276 | 17,80 | 17,50 | 191 | 130 | 1 | 10496 | 20,09 | 12862 | 29,62 |
| 12,80 | 151 | 101 | 5 | 10427 | 10,04 | | | 17,75 | 191 | 130 | 1 | 10499 | 32,48 | | |
| 12,90 | 151 | 101 | 5 | 10430 | 10,04 | | | 18,00 | 191 | 130 | 1 | 10502 | 21,24 | 29236 | 29,89 |
| 13,00 | 151 | 101 | 5 | 10433 | 7,46 | 18584 | 17,28 | 18,25 | 198 | 135 | 1 | 10505 | 31,85 | | |
| 13,10 | 151 | 101 | 1 | 10436 | 10,26 | | | 18,50 | 198 | 135 | 1 | 10508 | 23,59 | | |
| 13,20 | 151 | 101 | 1 | 18164 | 10,26 | | | 18,75 | 198 | 135 | 1 | 10511 | 32,76 | | |
| 13,25 | 160 | 108 | 1 | 10439 | 11,71 | 29180 | 22,16 | 19,00 | 198 | 135 | 1 | 10514 | 23,59 | 14065 | 33,66 |
| 13,30 | 160 | 108 | 1 | 18167 | 15,89 | | | 19,25 | 205 | 140 | 1 | 10517 | 42,87 | | |
| 13,40 | 160 | 108 | 1 | 18170 | 15,89 | | | 19,50 | 205 | 140 | 1 | 10520 | 25,29 | | |
| 13,50 | 160 | 108 | 1 | 10442 | 10,56 | 29184 | 21,05 | 19,75 | 205 | 140 | 1 | 10523 | 41,58 | | |
| 13,60 | 160 | 108 | 1 | 18173 | 15,89 | | | 20,00 | 205 | 140 | 1 | 10526 | 28,82 | 14076 | 37,48 |
| 13,70 | 160 | 108 | 1 | 10445 | 15,89 | | | | | | | | | | |
| 13,75 | 160 | 108 | 1 | 10448 | 11,87 | 16497 | 22,34 | | | | | | | | |

Ref. **1050**

Extra-Corta / Stub / extra-Courte

Pag 97

Ref. **1030**

Larga / Long / Longue

Pag 101

Ref. **1040**

Extra Larga / Extra Long / Extra-Longue

Pag 104

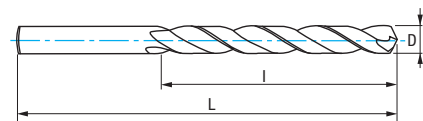
Ref. **1013**

SPEED POINT

BROCA MANGO CILÍNDRICO AGUZADA. SERIE CORTA

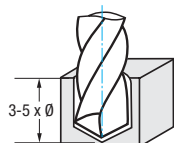
Split Point Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique affûtage en croix. Série courte



| | | | | | | | | |
|-----|---------------|-----------|------|-------------------|--|---------------------------------------|-----------------------------------|-----------|
| HSS | HSS + TIALSIN | DIN 338 N | 130° | DIN 1412 C ≥ 2 mm | | Rectificado Ground Taillé meulé | Chapa Sheets Tôle < 5 mm | Tol. D h8 |
|-----|---------------|-----------|------|-------------------|--|---------------------------------------|-----------------------------------|-----------|

HSS **TIALSIN** **x3,5** Resistencia al desgaste
Wear Resistance
Résistant à l'usure



| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|---------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | HSS | TIALSIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | |
| P | P.1 | 25-30 | 33-40 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | |
| K | K.1 | 30-35 | 40-45 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | |
| | K.2 | 25-30 | 33-40 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | |
| N | N.3 | 60-80 | 80-105 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | |
| | N.4 | | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | |
| | N.5 | 40-50 | 50-65 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f


| D mm | L mm | I mm | | Nº Art. HSS | € | Nº Art. TIALSIN | € | D mm | L mm | I mm | | Nº Art. HSS | € | Nº Art. TIALSIN | € |
|------|------|------|----|-------------|------|-----------------|------|------|------|------|----|-------------|------|-----------------|------|
| 1,00 | 34 | 12 | 10 | 17673 | 1,14 | 37620 | 2,70 | 4,25 | 75 | 43 | 10 | 10777 | 1,06 | | |
| 1,10 | 36 | 14 | 10 | 10650 | 1,26 | | | 4,30 | 80 | 47 | 10 | 10779 | 1,42 | | |
| 1,20 | 38 | 16 | 10 | 10656 | 1,26 | | | 4,40 | 80 | 47 | 10 | 10780 | 1,42 | | |
| 1,30 | 38 | 16 | 10 | 10662 | 1,11 | | | 4,50 | 80 | 47 | 10 | 10782 | 1,09 | 37627 | 2,99 |
| 1,40 | 40 | 18 | 10 | 10663 | 1,11 | | | 4,60 | 80 | 47 | 10 | 10783 | 1,45 | | |
| 1,50 | 40 | 18 | 10 | 10666 | 0,85 | 37621 | 2,43 | 4,70 | 80 | 47 | 10 | 10786 | 1,45 | 69082 | 3,34 |
| 1,60 | 43 | 20 | 10 | 10669 | 1,05 | | | 4,75 | 80 | 47 | 10 | 10787 | 1,28 | | |
| 1,70 | 43 | 20 | 10 | 10670 | 1,05 | | | 4,80 | 86 | 52 | 10 | 10789 | 1,58 | 39240 | 3,47 |
| 1,75 | 46 | 22 | 10 | 10671 | 0,95 | | | 4,90 | 86 | 52 | 10 | 10792 | 1,55 | | |
| 1,80 | 46 | 22 | 10 | 10672 | 0,94 | | | 5,00 | 86 | 52 | 10 | 10793 | 1,19 | 17442 | 3,07 |
| 1,90 | 46 | 22 | 10 | 10674 | 0,94 | | | 5,10 | 86 | 52 | 10 | 10795 | 1,59 | | |
| 2,00 | 49 | 24 | 10 | 10675 | 0,80 | 37497 | 2,35 | 5,20 | 86 | 52 | 10 | 10797 | 1,59 | 39242 | 3,50 |
| 2,10 | 49 | 24 | 10 | 10677 | 0,85 | | | 5,25 | 86 | 52 | 10 | 10798 | 1,53 | | |
| 2,20 | 53 | 27 | 10 | 13596 | 0,85 | | | 5,30 | 86 | 52 | 10 | 10799 | 1,99 | 45421 | 3,90 |
| 2,25 | 53 | 27 | 10 | 10679 | 0,77 | | | 5,40 | 93 | 57 | 10 | 10800 | 1,99 | | |
| 2,30 | 53 | 27 | 10 | 13608 | 1,00 | | | 5,50 | 93 | 57 | 10 | 10801 | 1,57 | 37628 | 3,46 |
| 2,40 | 57 | 30 | 10 | 10683 | 1,00 | | | 5,60 | 93 | 57 | 10 | 10802 | 2,09 | | |
| 2,50 | 57 | 30 | 10 | 10684 | 0,82 | 37622 | 2,25 | 5,70 | 93 | 57 | 10 | 10804 | 2,09 | 39244 | 4,00 |
| 2,60 | 57 | 30 | 10 | 10685 | 1,01 | | | 5,75 | 93 | 57 | 10 | 10807 | 2,05 | | |
| 2,70 | 61 | 33 | 10 | 10686 | 1,01 | | | 5,80 | 93 | 57 | 10 | 10808 | 1,99 | | |
| 2,75 | 61 | 33 | 10 | 10687 | 0,86 | | | 5,90 | 93 | 57 | 10 | 10810 | 1,99 | | |
| 2,80 | 61 | 33 | 10 | 10690 | 1,01 | | | 6,00 | 93 | 57 | 10 | 10811 | 1,60 | 32677 | 3,52 |
| 2,90 | 61 | 33 | 10 | 10692 | 1,01 | | | 6,10 | 93 | 57 | 10 | 10813 | 2,30 | | |
| 3,00 | 61 | 33 | 10 | 10693 | 0,73 | 37623 | 2,14 | 6,20 | 101 | 63 | 10 | 10814 | 2,30 | 39246 | 7,55 |
| 3,10 | 65 | 36 | 10 | 10695 | 0,86 | | | 6,25 | 101 | 63 | 10 | 10815 | 2,15 | | |
| 3,20 | 65 | 36 | 10 | 10696 | 0,86 | 32571 | 2,75 | 6,30 | 101 | 63 | 10 | 10816 | 2,43 | | |
| 3,25 | 65 | 36 | 10 | 10698 | 0,86 | | | 6,40 | 101 | 63 | 10 | 10819 | 2,46 | | |
| 3,30 | 65 | 36 | 10 | 10699 | 0,86 | 37624 | 2,75 | 6,50 | 101 | 63 | 10 | 10822 | 1,89 | 36558 | 7,14 |
| 3,40 | 70 | 39 | 10 | 10701 | 1,10 | | | 6,60 | 101 | 63 | 10 | 11145 | 3,03 | | |
| 3,50 | 70 | 39 | 10 | 10702 | 0,85 | 37625 | 2,73 | 6,70 | 101 | 63 | 10 | 11154 | 3,03 | 45424 | 8,28 |
| 3,60 | 70 | 39 | 10 | 10704 | 1,14 | | | 6,75 | 109 | 69 | 10 | 11157 | 2,29 | 66924 | 7,54 |
| 3,70 | 70 | 39 | 10 | 10705 | 1,14 | | | 6,80 | 109 | 69 | 10 | 11163 | 2,29 | 37629 | 7,54 |
| 3,75 | 70 | 39 | 10 | 10708 | 1,00 | | | 6,90 | 109 | 69 | 10 | 11166 | 3,32 | 45725 | 8,56 |
| 3,80 | 75 | 43 | 10 | 10710 | 1,21 | 39236 | 3,10 | 7,00 | 109 | 69 | 10 | 11172 | 2,29 | 36559 | 7,54 |
| 3,90 | 75 | 43 | 10 | 10719 | 1,21 | | | 7,10 | 109 | 69 | 10 | 11175 | 3,53 | | |
| 4,00 | 75 | 43 | 10 | 10770 | 0,95 | 32572 | 2,85 | 7,20 | 109 | 69 | 10 | 13066 | 3,53 | | |
| 4,10 | 75 | 43 | 10 | 10774 | 1,06 | | | 7,25 | 109 | 69 | 10 | 11184 | 2,89 | | |
| 4,20 | 75 | 43 | 10 | 10776 | 1,06 | 36557 | 2,94 | 7,30 | 109 | 69 | 10 | 11190 | 3,53 | | |

Ref. **1013**

BROCA MANGO CILÍNDRICO AGUZADA. SERIE CORTA

Split Point Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique affutage en croix. Série courte

| D mm | L mm | I mm |  | N° Art. HSS | € | N° Art. TIALSIN | € | | D mm | L mm | I mm |  | N° Art. HSS | € | N° Art. TIALSIN | € |
|-------------------|------|------|---|-------------|------|-----------------|-------|-------------|-------|------|------|---|-------------|-------|-----------------|-------|
| 7,40 | 109 | 69 | 10 | 11202 | 3,53 | | | New! | 10,75 | 142 | 94 | 5 | 53633 | 6,72 | | |
| 7,50 | 109 | 69 | 10 | 11217 | 2,40 | 37630 | 7,65 | | 10,80 | 142 | 94 | 5 | 17972 | 8,09 | | |
| 7,60 | 117 | 75 | 10 | 14362 | 4,18 | | | | 10,90 | 142 | 94 | 5 | 17975 | 8,09 | | |
| 7,70 | 117 | 75 | 10 | 11226 | 4,18 | | | | 11,00 | 142 | 94 | 5 | 13783 | 6,18 | 37635 | 17,99 |
| 7,75 | 117 | 75 | 10 | 11229 | 3,22 | | | | 11,10 | 142 | 94 | 5 | 17978 | 8,25 | | |
| 7,80 | 117 | 75 | 10 | 11230 | 4,21 | | | New! | 11,20 | 142 | 94 | 5 | 66583 | 8,25 | | |
| 7,90 | 117 | 75 | 10 | 11251 | 4,21 | | | | 11,25 | 142 | 94 | 5 | 53636 | 6,87 | | |
| 8,00 | 117 | 75 | 10 | 11268 | 2,75 | 36560 | 8,00 | | 11,30 | 142 | 94 | 5 | 17980 | 8,25 | | |
| 8,10 | 117 | 75 | 5 | 11269 | 4,29 | | | | 11,40 | 142 | 94 | 5 | 17981 | 8,25 | | |
| 8,20 | 117 | 75 | 5 | 11287 | 4,29 | 64063 | 10,38 | | 11,50 | 142 | 94 | 5 | 17609 | 6,60 | 37636 | 18,43 |
| 8,25 | 117 | 75 | 5 | 11290 | 3,22 | | | | 11,60 | 142 | 94 | 5 | 17982 | 8,10 | | |
| 8,30 | 117 | 75 | 5 | 11297 | 4,49 | | | | 11,70 | 142 | 94 | 5 | 19657 | 8,10 | | |
| 8,40 | 117 | 75 | 5 | 11302 | 4,49 | | | | 11,80 | 142 | 94 | 5 | 17984 | 8,85 | | |
| 8,50 | 117 | 75 | 5 | 11303 | 2,97 | 37498 | 9,04 | | 11,90 | 151 | 101 | 5 | 17987 | 8,85 | | |
| 8,60 | 125 | 81 | 5 | 11304 | 5,64 | | | | 12,00 | 151 | 101 | 5 | 17611 | 7,35 | 37637 | 19,20 |
| 8,70 | 125 | 81 | 5 | 11305 | 5,64 | | | | 12,10 | 151 | 101 | 5 | 63357 | 10,34 | | |
| 8,75 | 125 | 81 | 5 | 11306 | 4,32 | | | New! | 12,20 | 151 | 101 | 5 | 63358 | 10,34 | | |
| 8,80 | 125 | 81 | 5 | 11307 | 5,66 | | | | 12,25 | 151 | 101 | 5 | 53639 | 8,94 | | |
| 8,90 | 125 | 81 | 5 | 11308 | 5,66 | | | | 12,30 | 151 | 101 | 5 | 22343 | 9,72 | | |
| 9,00 | 125 | 81 | 5 | 11310 | 3,63 | 37631 | 9,70 | | 12,40 | 151 | 101 | 5 | 63360 | 9,72 | | |
| 9,10 | 125 | 81 | 5 | 14378 | 5,69 | 39252 | 11,79 | | 12,50 | 151 | 101 | 5 | 17615 | 8,06 | 37638 | 22,97 |
| 9,20 | 125 | 81 | 5 | 14304 | 5,69 | 64064 | 11,78 | | 12,60 | 151 | 101 | 5 | 63361 | 10,12 | | |
| 9,25 | 125 | 81 | 5 | 11313 | 4,38 | | | | 12,70 | 151 | 101 | 5 | 17081 | 10,12 | | |
| 9,30 | 125 | 81 | 5 | 14305 | 5,29 | | | New! | 12,75 | 151 | 101 | 5 | 53645 | 8,81 | | |
| 9,40 | 125 | 81 | 5 | 13007 | 5,29 | | | | 12,80 | 151 | 101 | 5 | 63363 | 11,25 | | |
| 9,50 | 125 | 81 | 5 | 11317 | 3,93 | 37632 | 10,02 | | 12,90 | 151 | 101 | 5 | 63364 | 11,25 | | |
| 9,60 | 133 | 87 | 5 | 11318 | 6,79 | | | | 13,00 | 151 | 101 | 5 | 16556 | 8,35 | 36556 | 23,28 |
| 9,70 | 133 | 87 | 5 | 13440 | 6,79 | | | | 13,50 | 160 | 108 | 1 | 22833 | 11,84 | 83459 | 26,70 |
| 9,75 | 133 | 87 | 5 | 11321 | 4,95 | | | | 14,00 | 160 | 108 | 1 | 19224 | 12,70 | 64065 | 27,56 |
| 9,80 | 133 | 87 | 5 | 11322 | 6,69 | | | | 14,50 | 169 | 114 | 1 | 24941 | 13,65 | | |
| 9,90 | 133 | 87 | 5 | 11323 | 6,69 | | | New! | 15,00 | 169 | 114 | 1 | 19227 | 13,82 | 12770 | 28,29 |
| 10,00 | 133 | 87 | 5 | 11324 | 4,23 | 36147 | 10,32 | | 15,50 | 178 | 120 | 1 | 51929 | 15,87 | | |
| 10,10 | 133 | 87 | 5 | 22341 | 5,69 | | | New! | 16,00 | 178 | 120 | 1 | 22306 | 16,84 | 12771 | 28,58 |
| 10,20 | 133 | 87 | 5 | 17648 | 5,28 | 37633 | 17,12 | | 16,50 | 184 | 125 | 1 | 51640 | 18,63 | | |
| New! 10,25 | 133 | 87 | 5 | 53630 | 5,81 | | | New! | 17,00 | 184 | 125 | 1 | 48580 | 18,63 | 12784 | 32,01 |
| 10,30 | 133 | 87 | 5 | 17506 | 6,64 | 37634 | 18,49 | | 17,50 | 191 | 130 | 1 | 48582 | 21,42 | | |
| 10,40 | 133 | 87 | 5 | 17966 | 6,64 | | | New! | 18,00 | 191 | 130 | 1 | 48583 | 22,67 | 12792 | 36,06 |
| 10,50 | 133 | 87 | 5 | 17613 | 5,28 | 38088 | 17,12 | | 18,50 | 198 | 135 | 1 | 48585 | 25,18 | | |
| 10,60 | 133 | 87 | 5 | 17969 | 7,28 | | | New! | 19,00 | 198 | 135 | 1 | 48586 | 25,18 | 12793 | 38,56 |
| 10,70 | 142 | 94 | 5 | 22342 | 7,28 | | | New! | 19,50 | 205 | 140 | 1 | 48588 | 26,98 | | |
| | | | | | | | | New! | 20,00 | 205 | 140 | 1 | 48589 | 30,75 | 12794 | 44,14 |

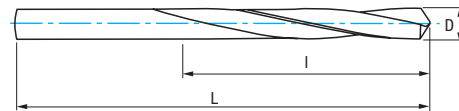


Ref. **1012**

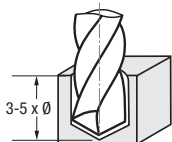
BROCA MANGO CILÍNDRICO COBRE/LATÓN. SERIE CORTA

Copper/Brass Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique cuivre/laiton. Série courte



| | | | | | | | |
|-----|-----------|--|--|--|--|---------------------------------------|--------------|
| HSS | DIN 338 H | | | | | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|--|--|--|--|---------------------------------------|--------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| N | N.1 | 30-40 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 |
| | N.2 | | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ $Vf (mm/min.) = r.p.m. \times f$

| D mm | L mm | I mm | | Nº Art. HSS | € | D mm | L mm | I mm | | Nº Art. HSS | € |
|-------|------|------|----|-------------|-------|-------|------|------|----|-------------|-------|
| 1,00 | 34 | 12 | 10 | 10586 | 2,64 | 7,50 | 109 | 69 | 10 | 10625 | 6,74 |
| 1,25 | 38 | 16 | 10 | 27590 | 2,97 | 7,75 | 117 | 75 | 10 | 19022 | 14,44 |
| 1,50 | 40 | 18 | 10 | 10589 | 2,63 | 8,00 | 117 | 75 | 10 | 10628 | 7,18 |
| 2,00 | 49 | 24 | 10 | 10592 | 2,35 | 8,25 | 117 | 75 | 10 | 19031 | 13,47 |
| 2,25 | 53 | 27 | 10 | 18908 | 2,50 | 8,50 | 117 | 75 | 10 | 10631 | 8,32 |
| 2,50 | 57 | 30 | 10 | 10595 | 2,16 | 9,00 | 125 | 81 | 10 | 10634 | 8,76 |
| 2,75 | 61 | 33 | 10 | 18917 | 2,94 | 9,50 | 125 | 81 | 10 | 10637 | 10,26 |
| 3,00 | 61 | 33 | 10 | 10598 | 2,40 | 9,75 | 133 | 87 | 10 | 19040 | 22,98 |
| 3,25 | 65 | 36 | 10 | 18932 | 2,94 | 10,00 | 133 | 87 | 10 | 10640 | 10,70 |
| 3,50 | 70 | 39 | 10 | 10601 | 2,57 | 10,50 | 133 | 87 | 5 | 10643 | 12,84 |
| *3,75 | 70 | 39 | 10 | 18941 | 3,82 | 11,00 | 142 | 94 | 5 | 10646 | 14,31 |
| 4,00 | 75 | 43 | 10 | 10604 | 2,80 | 11,50 | 142 | 94 | 5 | 10649 | 17,31 |
| 4,25 | 75 | 43 | 10 | 18953 | 4,17 | 12,00 | 151 | 101 | 5 | 10652 | 18,66 |
| 4,50 | 80 | 47 | 10 | 10607 | 3,42 | 12,50 | 151 | 101 | 5 | 10655 | 21,16 |
| 4,75 | 80 | 47 | 10 | 18968 | 5,43 | 13,00 | 151 | 101 | 5 | 10658 | 22,68 |
| 5,00 | 86 | 52 | 10 | 10610 | 3,71 | 14,00 | 160 | 108 | 1 | 18863 | 34,61 |
| 5,20 | 86 | 52 | 10 | 18974 | 5,69 | 14,50 | 169 | 114 | 1 | 46846 | 49,69 |
| 5,25 | 86 | 52 | 10 | 18977 | 5,60 | 15,00 | 169 | 114 | 1 | 54158 | 51,18 |
| 5,50 | 93 | 57 | 10 | 10613 | 4,52 | 16,00 | 178 | 120 | 1 | 46847 | 54,39 |
| *5,75 | 93 | 57 | 10 | 18980 | 6,86 | 16,50 | 184 | 125 | 1 | 46848 | 55,93 |
| 6,00 | 93 | 57 | 10 | 10616 | 4,88 | 17,00 | 184 | 125 | 1 | 46849 | 57,64 |
| 6,25 | 101 | 63 | 10 | 18986 | 6,86 | 18,00 | 191 | 130 | 1 | 54159 | 61,20 |
| 6,50 | 101 | 63 | 10 | 10619 | 5,43 | 18,50 | 198 | 135 | 1 | 46851 | 62,81 |
| 6,75 | 109 | 69 | 10 | 18998 | 8,26 | 19,00 | 198 | 135 | 1 | 46852 | 64,78 |
| 7,00 | 109 | 69 | 10 | 10622 | 5,73 | 20,00 | 205 | 140 | 1 | 46850 | 68,39 |
| 7,25 | 109 | 69 | 10 | 19013 | 10,92 | | | | | | |



* Diam. hasta fin de existencias / while stock lasts / jusqu'à la fin de stock

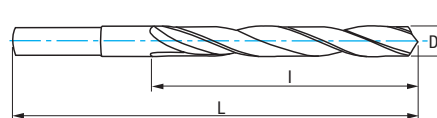


Ref. **1007**

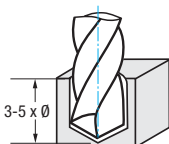
BROCA MANGO REBAJADO HSS. SERIE CORTA

HSS Reduced Shank Drill Bit. Jobber Series

Foret queue reduite HSS. Série courte



| | | | | | | | | | |
|-----|-----------|------|--------|--|--|--|-------------|------------------------------------|-----------|
| HSS | DIN 338 N | 118° | L30 mm | | | | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|------|--------|--|--|--|-------------|------------------------------------|-----------|

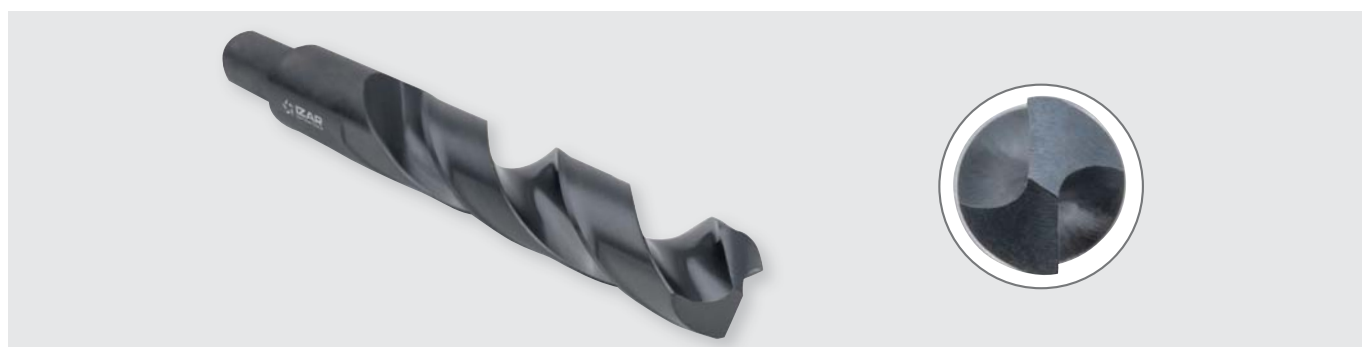


| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|
| Grupo | Sub. | | HSS | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 25-30 | 0,160 | 0,180 | 0,250 | 0,430 |
| K | K.1 | 30-35 | 0,250 | 0,300 | 0,360 | 0,360 |
| | K.2 | 25-30 | 0,200 | 0,240 | 0,280 | 0,340 |
| N | N.3 | 60-80 | 0,320 | 0,380 | 0,450 | 0,540 |
| | N.4 | | 0,320 | 0,380 | 0,450 | 0,540 |
| | N.5 | 40-50 | 0,250 | 0,300 | 0,360 | 0,430 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad | \quad Vf (mm/min.) = r.p.m. \times f$$

| D mm | d mm | L mm | l mm | | N° Art. HSS | € |
|-------|-------|------|------|---|-------------|-------|
| 10,50 | 10,00 | 133 | 87 | 1 | 15976 | 7,02 |
| 11,00 | 10,00 | 142 | 94 | 1 | 15977 | 7,94 |
| 11,50 | 10,00 | 142 | 94 | 1 | 15978 | 8,40 |
| 12,00 | 10,00 | 151 | 101 | 1 | 15979 | 9,17 |
| 12,50 | 10,00 | 151 | 101 | 1 | 15980 | 9,94 |
| 13,00 | 10,00 | 151 | 101 | 1 | 15981 | 10,22 |
| 13,50 | 12,70 | 160 | 108 | 1 | 15982 | 13,81 |
| 14,00 | 12,70 | 160 | 108 | 1 | 15984 | 14,66 |
| 14,50 | 12,70 | 169 | 114 | 1 | 15985 | 15,66 |
| 15,00 | 12,70 | 169 | 114 | 1 | 15987 | 15,82 |
| 15,50 | 12,70 | 178 | 120 | 1 | 15988 | 18,24 |
| 16,00 | 12,70 | 178 | 120 | 1 | 15989 | 18,91 |
| 16,50 | 12,70 | 184 | 125 | 1 | 15990 | 21,21 |
| 17,00 | 12,70 | 184 | 125 | 1 | 15991 | 21,21 |
| 17,50 | 12,70 | 191 | 130 | 1 | 15992 | 24,14 |

| D mm | d mm | L mm | l mm | | N° Art. HSS | € |
|-------|-------|------|------|---|-------------|-------|
| 18,00 | 12,70 | 191 | 130 | 1 | 15993 | 25,42 |
| 18,50 | 12,70 | 198 | 135 | 1 | 15994 | 28,05 |
| 19,00 | 12,70 | 198 | 135 | 1 | 15995 | 28,05 |
| 19,50 | 12,70 | 205 | 140 | 1 | 15996 | 30,56 |
| 20,00 | 12,70 | 205 | 140 | 1 | 15997 | 35,20 |
| 20,50 | 12,70 | 205 | 145 | 1 | 66932 | 37,24 |
| 21,00 | 12,70 | 205 | 145 | 1 | 17071 | 37,24 |
| 21,50 | 12,70 | 210 | 150 | 1 | 66933 | 41,06 |
| 22,00 | 12,70 | 210 | 150 | 1 | 17072 | 41,06 |
| 22,50 | 12,70 | 210 | 150 | 1 | 66934 | 44,92 |
| 23,00 | 12,70 | 210 | 150 | 1 | 36364 | 44,92 |
| 23,50 | 12,70 | 220 | 160 | 1 | 66935 | 49,58 |
| 24,00 | 12,70 | 220 | 160 | 1 | 36365 | 49,58 |
| 24,50 | 12,70 | 220 | 160 | 1 | 66936 | 54,04 |
| 25,00 | 12,70 | 220 | 160 | 1 | 36366 | 54,04 |

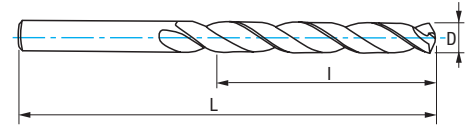


Ref. **1025**

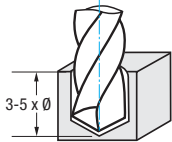
BROCA MANGO CILÍNDRICO CORTE IZQUIERDA. SERIE CORTA

Left Hand Straight Shank Drill Bit. Jobber Series

Foret queue cylindrique coupe à gauche



| | | | | | | | | |
|-----|-----------|--|--|--|--|-------------|------------------------------------|-----------|
| HSS | DIN 338 N | | | | | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|--|--|--|--|-------------|------------------------------------|-----------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | HSS | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 |
| P | P.1 | 25-30 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | |
| K | K.1 | 30-35 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | |
| | K.2 | 25-30 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | |
| N | N.3 | 60-80 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | |
| | N.4 | | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | |
| | N.5 | 40-50 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ $Vf (mm/min.) = r.p.m. \times f$

| D mm | L mm | I mm | | Nº Art. HSS | € |
|-------|------|------|----|-------------|-------|
| 1,00 | 34 | 12 | 10 | 10554 | 3,52 |
| 1,50 | 40 | 18 | 10 | 10560 | 3,52 |
| 2,00 | 49 | 24 | 10 | 10562 | 3,20 |
| 2,50 | 57 | 30 | 10 | 10564 | 3,20 |
| 3,00 | 61 | 33 | 10 | 10569 | 2,43 |
| 3,50 | 70 | 39 | 10 | 11121 | 2,84 |
| 4,00 | 75 | 43 | 10 | 11566 | 3,20 |
| 4,50 | 80 | 47 | 10 | 11811 | 3,64 |
| 5,00 | 86 | 52 | 10 | 11817 | 3,93 |
| 5,50 | 93 | 57 | 10 | 11820 | 5,23 |
| 6,00 | 93 | 57 | 10 | 12001 | 5,38 |
| 6,50 | 101 | 63 | 10 | 12330 | 6,28 |
| 7,00 | 109 | 69 | 10 | 12336 | 7,62 |
| 7,50 | 109 | 69 | 10 | 12339 | 8,01 |
| 8,00 | 117 | 75 | 10 | 12345 | 9,17 |
| 8,50 | 117 | 75 | 10 | 12348 | 9,88 |
| 9,00 | 125 | 81 | 10 | 12399 | 12,03 |
| 9,50 | 125 | 81 | 10 | 12408 | 13,13 |
| 10,00 | 133 | 87 | 10 | 12417 | 14,13 |
| 11,00 | 142 | 94 | 5 | 70015 | 22,76 |
| 12,00 | 151 | 101 | 5 | 70016 | 27,05 |
| 13,00 | 151 | 101 | 5 | 70017 | 34,12 |

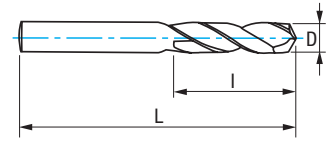


Ref. **1054**

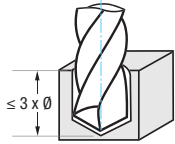
BROCA MANGO CILÍNDRICO MAT.S ALTA RESISTENCIA. SERIE EXTRA CORTA

High Resistance Materials Straight Shank Drill Bit. Stub Series

Foret queue cylindrique matériaux haute résistance. Série extra-courte



| | | | | | | | | |
|------------|--------|------------|--|--|--|---|-----------|--|
| Cobalt "S" | X-AlCr | DIN 1897 N | | | | Rectificado Ground Taillé meulé | Tol. D h8 | Por ejemplo For instance Par exemple HARDOX® wear plate |
|------------|--------|------------|--|--|--|---|-----------|--|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | Cobalt "S" | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 18 |
| P | P.4 | 6-8 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |

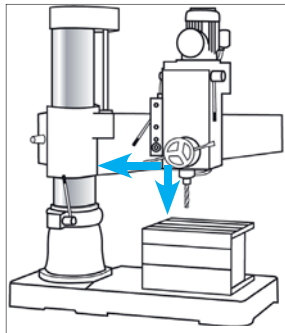
r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f



| D mm | L mm | I mm | | Nº Art. X-AlCr | € |
|------|------|------|---|----------------|-------|
| 2,00 | 38 | 12 | 1 | 32693 | 6,49 |
| 2,50 | 43 | 14 | 1 | 32694 | 5,62 |
| 3,00 | 46 | 16 | 1 | 32695 | 5,62 |
| 3,30 | 49 | 18 | 1 | 32696 | 7,93 |
| 3,50 | 52 | 20 | 1 | 32697 | 7,93 |
| 4,00 | 55 | 22 | 1 | 32698 | 8,22 |
| 4,20 | 55 | 22 | 1 | 32699 | 8,71 |
| 4,50 | 58 | 24 | 1 | 32700 | 8,71 |
| 5,00 | 62 | 26 | 1 | 32701 | 9,21 |
| 5,10 | 62 | 26 | 1 | 82696 | 10,58 |
| 5,50 | 66 | 28 | 1 | 32702 | 10,28 |

| D mm | L mm | I mm | | Nº Art. X-AlCr | € |
|-------|------|------|---|----------------|-------|
| 6,00 | 66 | 28 | 1 | 32703 | 10,87 |
| 6,50 | 70 | 31 | 1 | 32704 | 13,57 |
| 6,80 | 74 | 34 | 1 | 32705 | 15,78 |
| 7,00 | 74 | 34 | 1 | 32706 | 14,39 |
| 7,50 | 74 | 34 | 1 | 32707 | 16,23 |
| 8,00 | 79 | 37 | 1 | 32708 | 16,01 |
| 8,50 | 79 | 37 | 1 | 32709 | 21,94 |
| 9,00 | 84 | 40 | 1 | 32710 | 22,82 |
| 9,50 | 84 | 40 | 1 | 32711 | 24,10 |
| 10,00 | 89 | 43 | 1 | 32712 | 25,43 |
| 10,20 | 89 | 43 | 1 | 32713 | 27,57 |

| D mm | L mm | I mm | | Nº Art. X-AlCr | € |
|-------|------|------|---|----------------|--------|
| 10,50 | 89 | 43 | 1 | 32714 | 27,57 |
| 11,00 | 95 | 47 | 1 | 32715 | 29,63 |
| 11,50 | 95 | 47 | 1 | 32716 | 31,43 |
| 12,00 | 102 | 51 | 1 | 32717 | 31,22 |
| 12,50 | 102 | 51 | 1 | 32718 | 41,59 |
| 13,00 | 102 | 51 | 1 | 32719 | 43,01 |
| 14,00 | 107 | 54 | 1 | 32720 | 52,15 |
| 15,00 | 111 | 56 | 1 | 32721 | 65,21 |
| 16,00 | 115 | 58 | 1 | 32722 | 74,15 |
| 18,00 | 123 | 62 | 1 | 32723 | 102,32 |



Es vital minimizar las vibraciones a la hora de taladrar:

- Minimizar el voladizo de la columna al taladro
- Anclar la pieza con bridas de fijación
- Utilizar brocas cortas para minimizar la flexión
- Aplicar abundante refrigeración

It is vital to minimize vibrations when drilling:

- Minimize the distance between drill and column
- Clamp the workpiece securely
- Use short drill bits in order to minimize flexure
- Provide abundant supply of coolant

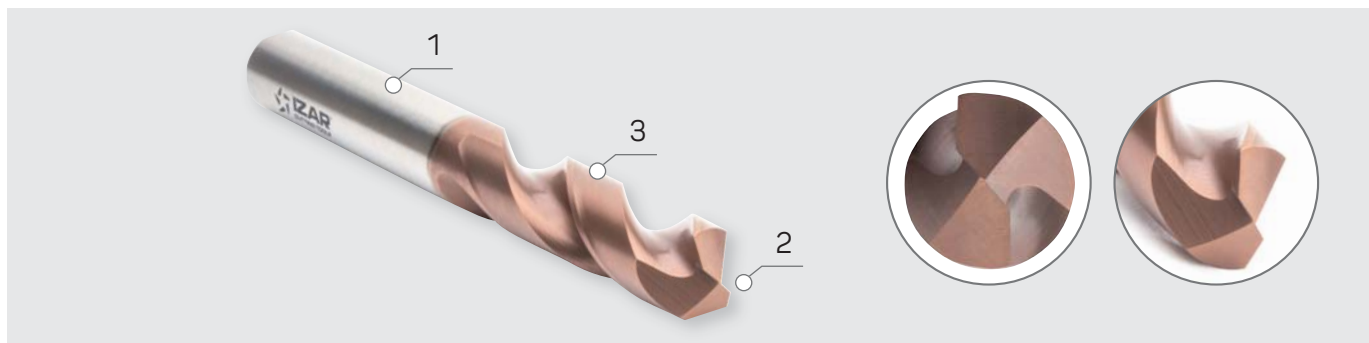
C'est vital minimiser les vibrations au moment du perçage:

- Approcher la perceuse à colonne
- Fixer bien la pièce à usiner
- Employer des forets courts pour minimiser la flexibilité
- Refroidissez au maximum.

- 1- Broca de Alto Rendimiento en Taladros Columna / CNC
- 2- Nueva Geometría especial con Nucleo Reforzado que resiste mejor las Fuerzas de Corte
- 3- Nuevo Recubrimiento con base AlCr que reduce el Desgaste en el Filo de Corte

- 1- High Performance Drill Bit in Stationary Drilling Machines / CNC
- 2- New special Reinforced Web that resists Cutting Forces better
- 3- New AlCr based Coating that reduces Cutting Edge Wear

- 1- Foret haute performance pour perceuses à colonne / CNC
- 2- Nouvelle géométrie spéciale avec ame renforcée qui résiste mieux les forces de coupe
- 3- Nouveau revêtement AlCr qui réduit l'usure dans le fil de coupe



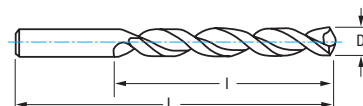
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Ref. **1055**

BROCA M. CILÍNDRICO AGUJEROS TOL. IT8-9. SERIE EXTRA CORTA

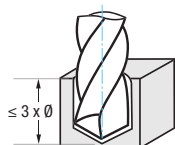
IT8-9 Tolerance Hole Straight Shank Drill Bit. Stub Series

Foret queue cylindrique trous tolérance IT8-9. Série extra-courte



| | | | | | | | | |
|--------------|---------------------------|----------------|------|--|--|--|--|--------------|
| HSSE 5%Co | HSSE 5%Co + TIALSIN | DIN 1897 TS | 135° | | Filo Corregido Convex Edge "U" Filets Corrigés | Perfil Profile Profil "S" | Rectificado Ground Taillé meulé | Tol. D h8 |
|--------------|---------------------------|----------------|------|--|--|--|--|--------------|

5% Co **TIALSIN** **x3,5** **Resistencia al desgaste**
Wear Resistance
Résistant à l'usure



| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|---------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 5% Co | TIALSIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | |
| P | P.2 | 20-25 | 28-35 | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 | |
| | P.3 | 8-15 | 12-20 | 0,020 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | |
| K | K.1 | 30-35 | 36-42 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | |
| | K.2 | 25-30 | 30-36 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | |
| N | N.5 | 40-50 | 56-70 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | |
| | N.6 | 35-45 | 40-58 | 0,080 | 0,130 | 0,150 | 0,170 | 0,190 | 0,250 | 0,290 | 0,310 | 0,360 | |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f



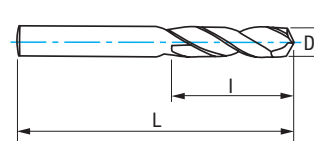
| D mm | L mm | l mm | | Nº Art. 5% Co | € | | Nº Art. TIALSIN | € | D mm | L mm | l mm | | Nº Art. 5% Co | € | | Nº Art. TIALSIN | € |
|------|------|------|----|---------------|------|---|-----------------|------|-------|------|------|----|---------------|-------|---|-----------------|-------|
| 1,00 | 26 | 6 | 10 | 80498 | 3,93 | 1 | 80518 | 5,41 | 5,50 | 66 | 28 | 10 | 14151 | 5,89 | 1 | 14208 | 7,62 |
| 1,50 | 32 | 9 | 10 | 80499 | 3,79 | 1 | 80519 | 5,27 | 5,60 | 66 | 28 | 10 | 14152 | 7,01 | 1 | 14209 | 8,71 |
| 2,00 | 38 | 12 | 10 | 12486 | 3,79 | 1 | 14135 | 5,26 | 5,75 | 66 | 28 | 10 | 14153 | 6,61 | 1 | 14211 | 8,31 |
| 2,10 | 38 | 12 | 10 | 14108 | 4,51 | 1 | 14164 | 5,85 | 5,80 | 66 | 28 | 10 | 14154 | 7,01 | 1 | 16035 | 8,71 |
| 2,30 | 40 | 13 | 10 | 14110 | 4,51 | 1 | 14166 | 5,85 | 5,90 | 66 | 28 | 10 | 14155 | 7,01 | 1 | 16059 | 8,71 |
| 2,50 | 43 | 14 | 10 | 14111 | 3,10 | 1 | 14168 | 4,44 | 6,00 | 66 | 28 | 10 | 14156 | 6,29 | 1 | 14118 | 8,00 |
| 2,70 | 46 | 16 | 10 | 14112 | 3,61 | 1 | 14169 | 4,97 | 6,10 | 70 | 31 | 5 | 80280 | 7,91 | 1 | 80295 | 12,47 |
| 2,75 | 46 | 16 | 10 | 14113 | 3,78 | 1 | 14170 | 5,14 | 6,20 | 70 | 31 | 5 | 14157 | 7,91 | 1 | 16101 | 12,47 |
| 3,00 | 46 | 16 | 10 | 14114 | 3,00 | 1 | 14172 | 4,35 | 6,30 | 70 | 31 | 5 | 80514 | 7,91 | 1 | 80530 | 12,47 |
| 3,10 | 49 | 18 | 10 | 14124 | 3,66 | 1 | 14174 | 5,36 | 6,50 | 70 | 31 | 5 | 14158 | 7,54 | 1 | 16131 | 12,06 |
| 3,20 | 49 | 18 | 10 | 14125 | 3,66 | 1 | 14176 | 5,36 | 6,80 | 74 | 34 | 5 | 14159 | 10,28 | 1 | 16140 | 14,82 |
| 3,25 | 49 | 18 | 10 | 14126 | 3,66 | 1 | 14177 | 5,36 | 7,00 | 74 | 34 | 5 | 14160 | 8,48 | 1 | 16149 | 12,97 |
| 3,30 | 49 | 18 | 10 | 14127 | 3,66 | 1 | 14180 | 5,36 | 7,20 | 74 | 34 | 5 | 14161 | 11,59 | 1 | 16380 | 16,12 |
| 3,50 | 52 | 20 | 10 | 14128 | 3,63 | 1 | 14183 | 5,33 | 7,50 | 74 | 34 | 5 | 14162 | 10,91 | 1 | 17697 | 15,45 |
| 3,60 | 52 | 20 | 10 | 14130 | 4,21 | 1 | 14184 | 5,91 | 8,00 | 79 | 37 | 5 | 14163 | 10,62 | 1 | 18352 | 15,16 |
| 3,70 | 52 | 20 | 10 | 14131 | 4,21 | 1 | 14186 | 5,91 | 8,20 | 79 | 37 | 5 | 14165 | 13,86 | 1 | 18358 | 19,19 |
| 3,75 | 52 | 20 | 10 | 14132 | 4,31 | 1 | 14188 | 6,00 | 8,50 | 79 | 37 | 5 | 14167 | 12,60 | 1 | 18373 | 17,94 |
| 3,90 | 55 | 22 | 10 | 14133 | 4,60 | 1 | 14190 | 6,31 | 8,80 | 84 | 40 | 5 | 14171 | 18,42 | 1 | 18587 | 24,93 |
| 4,00 | 55 | 22 | 10 | 14134 | 3,89 | 1 | 14191 | 5,60 | 9,00 | 84 | 40 | 5 | 14173 | 13,75 | 1 | 18590 | 19,08 |
| 4,10 | 55 | 22 | 10 | 14136 | 4,35 | 1 | 14192 | 6,04 | 9,30 | 84 | 40 | 5 | 80281 | 18,09 | 1 | 80296 | 23,42 |
| 4,20 | 55 | 22 | 10 | 14137 | 4,35 | 1 | 14193 | 6,04 | 9,50 | 84 | 40 | 5 | 14175 | 15,49 | 1 | 19431 | 20,81 |
| 4,25 | 55 | 22 | 10 | 14139 | 4,35 | 1 | 14194 | 6,04 | 9,80 | 89 | 43 | 5 | 14178 | 21,59 | 1 | 19437 | 26,91 |
| 4,30 | 58 | 24 | 10 | 14140 | 5,02 | 1 | 14195 | 6,73 | 9,90 | 89 | 43 | 5 | 80282 | 20,02 | 1 | 80298 | 25,32 |
| 4,40 | 58 | 24 | 10 | 14141 | 5,02 | 1 | 14196 | 6,73 | 10,00 | 89 | 43 | 5 | 14179 | 17,21 | 1 | 19643 | 22,53 |
| 4,50 | 58 | 24 | 10 | 14142 | 4,43 | 1 | 14197 | 6,16 | 10,20 | 89 | 43 | 1 | 80283 | 21,96 | 1 | 80300 | 33,14 |
| 4,60 | 58 | 24 | 10 | 80279 | 5,24 | 1 | 80293 | 6,93 | 10,50 | 89 | 43 | 1 | 14181 | 21,96 | 1 | 20591 | 33,14 |
| 4,70 | 58 | 24 | 10 | 14143 | 5,24 | 1 | 14198 | 6,93 | 11,00 | 95 | 47 | 1 | 14182 | 24,30 | 1 | 20658 | 35,45 |
| 4,75 | 58 | 24 | 10 | 14144 | 4,85 | 1 | 14199 | 6,58 | 11,20 | 95 | 47 | 1 | 80284 | 35,84 | 1 | 80301 | 47,01 |
| 4,80 | 62 | 26 | 10 | 14145 | 5,24 | 1 | 14200 | 6,93 | 11,50 | 95 | 47 | 1 | 14185 | 29,04 | 1 | 21547 | 40,21 |
| 5,00 | 62 | 26 | 10 | 14146 | 4,85 | 1 | 14201 | 6,58 | 12,00 | 102 | 51 | 1 | 14187 | 31,06 | 1 | 24876 | 42,23 |
| 5,10 | 62 | 26 | 10 | 14147 | 5,95 | 1 | 14202 | 7,64 | 12,50 | 102 | 51 | 1 | 80285 | 37,82 | 1 | 80302 | 51,82 |
| 5,20 | 62 | 26 | 10 | 14148 | 5,95 | 1 | 14203 | 7,64 | 13,00 | 102 | 51 | 1 | 14189 | 38,75 | 1 | 25131 | 52,76 |
| 5,25 | 62 | 26 | 10 | 14149 | 5,50 | 1 | 14206 | 7,21 | | | | | | | | | |
| 5,30 | 62 | 26 | 10 | 14150 | 5,95 | 1 | 14207 | 7,64 | | | | | | | | | |

Ref. **1056**

BROCA MANGO CILÍNDRICO MATERIALES DUROS. SERIE EXTRA CORTA

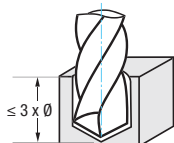
Hard Materials Straight Shank Drill Bit. Stub Series

Foret queue cylindrique matériaux durs. Série extra-courte



| | | | | | | | | | |
|---------------------|---|---------------|------|-------------------------|--|--|--|---|--------------|
| HSSE 5%Co | HSSE 5%Co + TIALSIN | DIN 1897 N | 135° | DIN 1412 C ≥ 2 mm | | Ambar Gold Finish Finition or | Rectificado Ground Taillé meulé | A.R.I.* Alto Rendimiento Intensivo I.H.P.* Intensive High Performance H.P.I.* Haute Performance Intensif | Tol. D h8 |
|---------------------|---|---------------|------|-------------------------|--|--|--|---|--------------|

5% Co **TIALSIN** **x3,5** Resistencia al desgaste
Wear Resistance
Résistant à l'usure



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------------|------------|---------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 5% Co | TIALSIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.3 | 8-15 | 12-20 | 0,020 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,160 |
| | P.5 | 8-12 | 12-17 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,150 | 0,170 |
| S | | 10-15 | 14-20 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 |


| | D | L | l | | Nº Art. | € | Nº Art. | € |
|-------------|------|----|----|----|---------|------|---------|------|
| | mm | mm | mm | | 5% Co | | TIALSIN | |
| | 1,00 | 26 | 6 | 10 | 27835 | 1,98 | 24570 | 3,22 |
| New! | 1,10 | 28 | 7 | 10 | 82449 | 2,43 | 82455 | 3,64 |
| New! | 1,20 | 30 | 8 | 10 | 82450 | 2,43 | 82432 | 3,64 |
| | 1,25 | 30 | 8 | 10 | 11532 | 2,35 | | |
| New! | 1,30 | 30 | 8 | 10 | 82451 | 2,43 | 82456 | 3,64 |
| New! | 1,40 | 32 | 9 | 10 | 82452 | 2,43 | 82457 | 3,64 |
| | 1,50 | 32 | 9 | 10 | 27986 | 1,90 | 24573 | 3,12 |
| | 1,60 | 34 | 10 | 10 | 27838 | 2,43 | 24574 | 3,64 |
| New! | 1,70 | 34 | 10 | 10 | 82453 | 2,43 | 82458 | 3,64 |
| | 1,75 | 36 | 11 | 10 | 11536 | 2,35 | | |
| | 1,80 | 36 | 11 | 10 | 11537 | 2,43 | 24576 | 3,64 |
| New! | 1,90 | 36 | 11 | 10 | 82454 | 2,43 | 82459 | 3,64 |
| | 2,00 | 38 | 12 | 10 | 27841 | 1,91 | 22340 | 3,11 |
| | 2,10 | 38 | 12 | 10 | 11539 | 2,27 | 24577 | 3,39 |
| | 2,20 | 40 | 13 | 10 | 11540 | 2,27 | 24578 | 3,39 |
| | 2,25 | 40 | 13 | 10 | 11541 | 2,22 | | |
| | 2,30 | 40 | 13 | 10 | 11543 | 2,27 | 24580 | 3,39 |
| | 2,40 | 43 | 14 | 10 | 27844 | 2,27 | 24581 | 3,39 |
| | 2,50 | 43 | 14 | 10 | 27846 | 1,55 | 28097 | 2,68 |
| | 2,60 | 43 | 14 | 10 | 28016 | 1,81 | 24582 | 3,28 |
| | 2,70 | 46 | 16 | 10 | 27850 | 1,81 | 24583 | 2,95 |
| | 2,75 | 46 | 16 | 10 | 11544 | 1,89 | | |
| | 2,80 | 46 | 16 | 10 | 11545 | 1,81 | 24585 | 2,95 |
| | 2,90 | 46 | 16 | 10 | 11547 | 1,81 | 24586 | 2,95 |
| | 3,00 | 46 | 16 | 10 | 27853 | 1,55 | 23344 | 2,68 |
| | 3,10 | 49 | 18 | 10 | 27856 | 1,66 | 24587 | 3,08 |
| | 3,20 | 49 | 18 | 10 | 27864 | 1,66 | 24588 | 3,08 |
| | 3,25 | 49 | 18 | 10 | 27866 | 1,66 | 24631 | 3,08 |
| | 3,30 | 49 | 18 | 10 | 27870 | 1,66 | 24635 | 3,08 |
| | 3,40 | 52 | 20 | 10 | 11548 | 2,02 | 24637 | 3,46 |
| | 3,50 | 52 | 20 | 10 | 27872 | 1,66 | 23345 | 3,08 |
| | 3,60 | 52 | 20 | 10 | 11549 | 2,02 | 24645 | 3,45 |
| | 3,70 | 52 | 20 | 10 | 11550 | 2,02 | 24654 | 3,45 |
| | 3,75 | 52 | 20 | 10 | 27875 | 2,09 | | |
| | 3,80 | 55 | 22 | 10 | 27878 | 2,02 | 28095 | 3,45 |
| | 3,90 | 55 | 22 | 10 | 11551 | 2,02 | 24656 | 3,45 |
| | 4,00 | 55 | 22 | 10 | 27880 | 1,84 | 28096 | 3,25 |
| | 4,10 | 55 | 22 | 10 | 27884 | 2,19 | 24657 | 3,61 |


| | D | L | l | | Nº Art. | € | Nº Art. | € |
|--|------|----|----|----|---------|------|---------|------|
| | mm | mm | mm | | 5% Co | | TIALSIN | |
| | 4,20 | 55 | 22 | 10 | 27888 | 2,19 | 24658 | 3,61 |
| | 4,25 | 55 | 22 | 10 | 27891 | 2,19 | 24659 | 3,61 |
| | 4,30 | 58 | 24 | 10 | 11552 | 2,52 | 24660 | 3,93 |
| | 4,40 | 58 | 24 | 10 | 11553 | 2,52 | 24661 | 3,93 |
| | 4,50 | 58 | 24 | 10 | 27894 | 2,19 | 24737 | 3,61 |
| | 4,60 | 58 | 24 | 10 | 28058 | 2,63 | 24844 | 4,05 |
| | 4,70 | 58 | 24 | 10 | 28061 | 2,63 | 24904 | 4,05 |
| | 4,75 | 58 | 24 | 10 | 27898 | 2,44 | | |
| | 4,80 | 62 | 26 | 10 | 27901 | 2,63 | 24908 | 4,05 |
| | 4,90 | 62 | 26 | 10 | 27903 | 2,63 | 24910 | 4,05 |
| | 5,00 | 62 | 26 | 10 | 27905 | 2,44 | 28098 | 3,88 |
| | 5,10 | 62 | 26 | 10 | 27908 | 2,97 | 23346 | 4,40 |
| | 5,20 | 62 | 26 | 10 | 27910 | 2,97 | 24911 | 4,40 |
| | 5,25 | 62 | 26 | 10 | 27912 | 2,70 | 24912 | 4,16 |
| | 5,30 | 62 | 26 | 10 | 11554 | 2,97 | 24923 | 4,40 |
| | 5,40 | 66 | 28 | 10 | 11555 | 2,97 | 24926 | 4,40 |
| | 5,50 | 66 | 28 | 10 | 27916 | 2,70 | 24928 | 4,16 |
| | 5,60 | 66 | 28 | 10 | 11556 | 3,13 | 24932 | 4,47 |
| | 5,70 | 66 | 28 | 10 | 11557 | 3,13 | 24934 | 4,47 |
| | 5,75 | 66 | 28 | 10 | 27919 | 3,26 | | |
| | 5,80 | 66 | 28 | 10 | 11558 | 3,13 | 21907 | 4,47 |
| | 5,90 | 66 | 28 | 10 | 11559 | 3,13 | 25040 | 4,47 |
| | 6,00 | 66 | 28 | 10 | 27926 | 3,08 | 23054 | 4,52 |
| | 6,10 | 70 | 31 | 10 | 11561 | 3,96 | 25043 | 7,79 |
| | 6,20 | 70 | 31 | 10 | 11562 | 3,96 | 24206 | 7,79 |
| | 6,25 | 70 | 31 | 10 | 11563 | 4,12 | 25046 | 9,22 |
| | 6,30 | 70 | 31 | 10 | 27929 | 3,96 | 25049 | 7,79 |
| | 6,40 | 70 | 31 | 10 | 28094 | 3,96 | 25051 | 7,79 |
| | 6,50 | 70 | 31 | 10 | 27931 | 3,69 | 25052 | 7,52 |
| | 6,60 | 70 | 31 | 10 | 11565 | 4,97 | 25054 | 8,80 |
| | 6,70 | 70 | 31 | 10 | 11567 | 4,97 | 25055 | 8,80 |
| | 6,75 | 74 | 34 | 10 | 11568 | 5,12 | 25058 | 8,94 |
| | 6,80 | 74 | 34 | 10 | 27934 | 5,12 | 25060 | 8,94 |
| | 6,90 | 74 | 34 | 10 | 59715 | 5,64 | 78398 | 9,47 |
| | 7,00 | 74 | 34 | 10 | 27936 | 4,23 | 22803 | 8,06 |
| | 7,20 | 74 | 34 | 10 | 48746 | 5,91 | | |
| | 7,25 | 74 | 34 | 10 | 11572 | 5,47 | | |
| | 7,30 | 74 | 34 | 10 | 23013 | 5,91 | 23018 | 9,74 |

Ref. **1056****BROCA MANGO CILÍNDRICO MATERIALES DUROS. SERIE EXTRA CORTA**

Hard Materials Straight Shank Drill Bit. Stub Series

Foret queue cylindrique matériaux durs. Série extra-courte

| D mm | L mm | I mm |  | N° Art. 5% Co | € | N° Art. TIALSIN | € |
|------------------|---------|---------|---|------------------|-------|--------------------|-------|
| 7,40 | 74 | 34 | 10 | 78943 | 5,91 | 82305 | 9,74 |
| 7,50 | 74 | 34 | 10 | 27939 | 5,12 | 25063 | 8,93 |
| New! 7,60 | 79 | 37 | 10 | 77834 | 6,28 | 77835 | 10,12 |
| 7,70 | 79 | 37 | 10 | 78942 | 6,28 | 82306 | 10,12 |
| 7,75 | 79 | 37 | 10 | 11577 | 5,91 | | |
| 7,80 | 79 | 37 | 10 | 11586 | 6,28 | 25067 | 10,12 |
| 7,90 | 79 | 37 | 10 | 83502 | 6,28 | 83501 | 10,12 |
| 8,00 | 79 | 37 | 10 | 27941 | 5,30 | 20035 | 9,14 |
| 8,10 | 79 | 37 | 10 | 78941 | 7,36 | 82307 | 11,83 |
| 8,20 | 79 | 37 | 10 | 78920 | 7,36 | 82308 | 11,83 |
| 8,25 | 79 | 37 | 10 | 11595 | 6,94 | | |
| 8,30 | 79 | 37 | 10 | 78925 | 7,36 | 82309 | 11,83 |
| 8,40 | 79 | 37 | 10 | 78926 | 7,36 | 82310 | 11,83 |
| 8,50 | 79 | 37 | 10 | 27944 | 6,24 | 28099 | 10,72 |
| 8,60 | 84 | 40 | 10 | 78927 | 8,02 | 82311 | 12,52 |
| 8,70 | 84 | 40 | 10 | 78944 | 8,02 | 82312 | 12,52 |
| 8,75 | 84 | 40 | 10 | 11616 | 7,56 | | |
| 8,80 | 84 | 40 | 10 | 78928 | 8,02 | 82313 | 12,52 |
| 8,90 | 84 | 40 | 10 | 78945 | 8,02 | 82314 | 12,52 |
| 9,00 | 84 | 40 | 10 | 27947 | 6,88 | 25073 | 11,37 |
| New! 9,20 | 84 | 40 | 10 | 28835 | 9,04 | | |
| 9,25 | 84 | 40 | 10 | 28122 | 8,52 | | |
| 9,30 | 84 | 40 | 10 | 78929 | 9,04 | 82315 | 13,52 |
| 9,40 | 84 | 40 | 10 | 78930 | 9,04 | 82316 | 13,52 |
| 9,50 | 84 | 40 | 10 | 27950 | 7,74 | 25076 | 12,21 |
| 9,75 | 89 | 43 | 10 | 11712 | 9,47 | | |
| 9,80 | 89 | 43 | 10 | 78931 | 10,02 | 82317 | 14,50 |
| 10,00 | 89 | 43 | 10 | 27953 | 8,63 | 28100 | 13,10 |

| D mm | L mm | I mm |  | N° Art. 5% Co | € | N° Art. TIALSIN | € |
|-------------------|---------|---------|---|------------------|-------|--------------------|-------|
| 10,20 | 89 | 43 | 1 | 11730 | 9,61 | 25079 | 18,98 |
| 10,25 | 89 | 43 | 1 | 11736 | 11,84 | | |
| 10,30 | 89 | 43 | 1 | 78946 | 10,73 | 83266 | 20,09 |
| New! 10,40 | 89 | 43 | 1 | 48749 | 10,73 | | |
| 10,50 | 89 | 43 | 1 | 28136 | 9,61 | 25082 | 18,98 |
| 10,80 | 95 | 47 | 1 | 78933 | 12,22 | | |
| 11,00 | 95 | 47 | 1 | 27956 | 10,75 | 25084 | 20,12 |
| 11,25 | 95 | 47 | 1 | 11793 | 15,68 | | |
| 11,50 | 95 | 47 | 1 | 27959 | 12,70 | 18543 | 22,08 |
| 12,00 | 102 | 51 | 1 | 27962 | 13,59 | 23055 | 22,95 |
| 12,25 | 102 | 51 | 1 | 11808 | 18,82 | | |
| 12,50 | 102 | 51 | 1 | 27965 | 16,56 | 25088 | 28,31 |
| 12,70 | 102 | 51 | 1 | 27968 | 18,91 | | |
| 13,00 | 102 | 51 | 1 | 27971 | 16,96 | 25094 | 28,74 |
| 13,50 | 107 | 54 | 1 | 27974 | 19,83 | 19880 | 34,67 |
| 14,00 | 107 | 54 | 1 | 27978 | 21,35 | 25096 | 36,19 |
| 14,50 | 111 | 56 | 1 | 11835 | 29,62 | 25097 | 41,38 |
| 15,00 | 111 | 56 | 1 | 11838 | 30,05 | 25100 | 44,55 |
| 15,50 | 115 | 58 | 1 | 11853 | 34,77 | | |
| New! 16,00 | 115 | 58 | 1 | 11865 | 36,06 | 30501 | 47,78 |
| 16,50 | 119 | 60 | 1 | 11871 | 41,26 | | |
| 17,00 | 119 | 60 | 1 | 11874 | 41,26 | | |
| 17,50 | 123 | 62 | 1 | 11880 | 45,68 | | |
| 18,00 | 123 | 62 | 1 | 11883 | 49,79 | | |
| 18,50 | 127 | 64 | 1 | 11889 | 54,96 | | |
| 19,00 | 127 | 64 | 1 | 11898 | 54,96 | | |
| 19,50 | 131 | 66 | 1 | 11901 | 60,94 | | |
| 20,00 | 131 | 66 | 1 | 11907 | 65,26 | 25140 | 79,66 |



Ref. **1666**

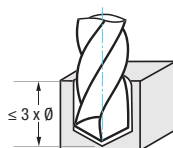
BROCA MANGO CILÍNDRICO DOBLE CHAPA. SERIE EXTRA CORTA

Double Sheet Straight Shank Drill Bit. Stub Series

Foret queue cylindrique double tole. Série extra-courte



| | | | | | | | | |
|--------------|--------------|------|-------------------------|-------------------------|--|-------------------------------------|---------------------------------------|--|
| HSSE 5%Co | IZAR Std. | 135° | DIN 1412 C ≥ 2 mm | Chapa Sheets Tôle | | Ambar Gold Finish Finition or | Rectificado Ground Taillé meulé | A.R.I.* Alto Rendimiento Intensivo I.H.P.* Intensive High Performance H.P.I.* Haute Performance Intensif |
|--------------|--------------|------|-------------------------|-------------------------|--|-------------------------------------|---------------------------------------|--|



| D mm | L mm | l mm | | N° Art. 5% Co | € |
|---------|---------|---------|----|------------------|------|
| 3,25 | 52 | 14 | 10 | 28988 | 2,28 |
| 4,10 | 58 | 16 | 10 | 14373 | 2,49 |
| 4,90 | 62 | 18 | 10 | 18385 | 3,16 |
| 5,10 | 62 | 19 | 10 | 18654 | 4,49 |



Tol. D
h8



Ref. **1660**

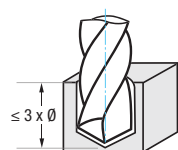
BROCA MANGO CILÍNDRICO DOBLE CHAPA HSS. SERIE EXTRA CORTA

HSS Double Sheet Straight Shank Drill Bit. Stub Series

Foret queue cylindrique double tole HSS. Série extra-courte



| | | | | | | | |
|-----|-----------|------|--|-------------------|-------------|------------------------------------|-----------|
| HSS | IZAR Std. | 135° | | Chapa Sheets Tôle | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|------|--|-------------------|-------------|------------------------------------|-----------|



| | D mm | L mm | I mm | | N° Art. HSS | € |
|-------------|------|------|------|----|-------------|------|
| | 2,00 | 38 | 9 | 10 | 16028 | 1,86 |
| | 2,20 | 40 | 9 | 10 | 27607 | 1,71 |
| New! | 2,25 | 43 | 10 | 10 | 16031 | 1,95 |
| | 2,30 | 43 | 10 | 10 | 25604 | 2,20 |
| New! | 2,40 | 43 | 10 | 10 | 25607 | 2,20 |
| | 2,50 | 43 | 10 | 10 | 16034 | 1,84 |
| New! | 2,75 | 46 | 13 | 10 | 16037 | 1,73 |
| | 2,80 | 46 | 13 | 10 | 16040 | 1,73 |
| | 2,90 | 46 | 13 | 10 | 16043 | 1,73 |
| | 3,00 | 46 | 13 | 10 | 16046 | 1,60 |
| | 3,10 | 52 | 14 | 10 | 16049 | 1,60 |
| | 3,20 | 52 | 14 | 10 | 16052 | 1,60 |
| | 3,25 | 52 | 14 | 10 | 16055 | 1,60 |
| | 3,30 | 52 | 14 | 10 | 16058 | 1,60 |
| | 3,40 | 52 | 14 | 10 | 16061 | 1,79 |
| | 3,50 | 52 | 14 | 10 | 16064 | 1,79 |
| | 3,70 | 55 | 15 | 10 | 16067 | 1,99 |
| | 3,75 | 55 | 15 | 10 | 16070 | 2,05 |
| | 3,80 | 55 | 15 | 10 | 16073 | 1,99 |
| | 4,00 | 55 | 15 | 10 | 16076 | 1,84 |
| | 4,10 | 58 | 16 | 10 | 16079 | 1,99 |
| | 4,20 | 58 | 16 | 10 | 16082 | 1,99 |

| | D mm | L mm | I mm | | N° Art. HSS | € |
|-------------|-------|------|------|----|-------------|------|
| | 4,25 | 58 | 16 | 10 | 16085 | 1,99 |
| | 4,50 | 58 | 16 | 10 | 16088 | 2,05 |
| | 4,75 | 62 | 18 | 10 | 16094 | 3,32 |
| | 4,80 | 62 | 18 | 10 | 16097 | 2,27 |
| | 4,90 | 62 | 18 | 10 | 16100 | 2,27 |
| | 5,00 | 62 | 18 | 10 | 16103 | 2,34 |
| | 5,10 | 66 | 19 | 10 | 16106 | 3,20 |
| | 5,20 | 66 | 19 | 10 | 16109 | 3,20 |
| | 5,25 | 66 | 19 | 10 | 16112 | 3,32 |
| | 5,50 | 66 | 19 | 10 | 16115 | 2,84 |
| | 5,70 | 66 | 19 | 10 | 25634 | 3,76 |
| | 5,75 | 66 | 19 | 10 | 16121 | 3,92 |
| | 6,00 | 66 | 19 | 10 | 16127 | 3,18 |
| New! | 6,10 | 70 | 21 | 10 | 25640 | 4,29 |
| New! | 6,20 | 70 | 21 | 10 | 25643 | 4,29 |
| | 6,50 | 70 | 21 | 10 | 16133 | 3,51 |
| | 7,00 | 74 | 24 | 10 | 16136 | 4,19 |
| | 7,40 | 74 | 24 | 10 | 25664 | 5,76 |
| | 7,50 | 74 | 24 | 10 | 16139 | 4,28 |
| | 8,00 | 79 | 25 | 10 | 16142 | 5,12 |
| | 9,00 | 84 | 25 | 10 | 16148 | 6,85 |
| | 10,00 | 89 | 27 | 10 | 16154 | 7,37 |

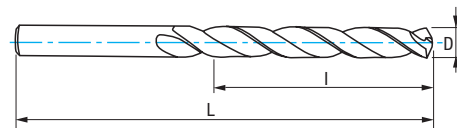


Ref. **1036**

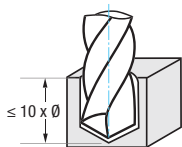
BROCA MANGO CILÍNDRICO MATERIALES DUROS. SERIE LARGA

Hard Materials Straight Shank Drill Bit. Long Series

Foret queue cylindrique matériaux durs. Série longue



| | | | | | | | | |
|--------------|--------------|------|--|--|---|---|---|--------------|
| HSSE 5%Co | DIN 340 N | 135° | | | Ambar Gold Finish Finition or | Rectificado Ground Taillé meulé | A.R.I.* Alto Rendimiento Intensivo I.H.P.* Intensive High Performance H.P.I.* Haute Performance Intensif | Tol. D h8 |
|--------------|--------------|------|--|--|---|---|---|--------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 5% Co | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | |
| P | P.3 | 8-15 | 0,020 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | |
| | P.5 | 8-12 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,150 | |
| S | | 10-15 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

* Se recomienda reducir el avance entre 2/3 y 1/2
 * It is recommended to reduce feed between 2/3 & 1/2
 * On conseille réduire l'avance entre 2/3 et 1/2

| D mm | L mm | I mm | | N° Art. 5% Co | € | D mm | L mm | I mm | | N° Art. 5% Co | € |
|------|------|------|----|---------------|------|-------|------|------|----|---------------|-------|
| 2,00 | 85 | 56 | 10 | 21375 | 4,70 | 6,00 | 139 | 91 | 10 | 21388 | 8,78 |
| 2,50 | 95 | 62 | 10 | 21377 | 4,27 | 6,50 | 148 | 97 | 5 | 21389 | 10,06 |
| 3,00 | 100 | 66 | 10 | 21378 | 4,27 | 6,75 | 156 | 102 | 5 | 21905 | 11,69 |
| 3,10 | 106 | 69 | 10 | 21694 | 4,87 | 6,80 | 156 | 102 | 5 | 27031 | 11,69 |
| 3,20 | 106 | 69 | 10 | 15102 | 4,87 | 7,00 | 156 | 102 | 5 | 21393 | 11,76 |
| 3,25 | 106 | 69 | 10 | 21379 | 4,87 | 7,50 | 156 | 102 | 5 | 21394 | 12,49 |
| 3,30 | 106 | 69 | 10 | 27030 | 4,87 | 8,00 | 165 | 109 | 5 | 21395 | 13,93 |
| 3,50 | 112 | 73 | 10 | 21380 | 5,02 | 8,50 | 165 | 109 | 5 | 21396 | 15,48 |
| 3,70 | 112 | 73 | 10 | 15118 | 6,13 | 8,60 | 175 | 115 | 5 | 27032 | 22,10 |
| 3,75 | 112 | 73 | 10 | 21381 | 5,75 | 9,00 | 175 | 115 | 5 | 21397 | 16,83 |
| 4,00 | 119 | 78 | 10 | 21382 | 5,19 | 9,50 | 175 | 115 | 5 | 21398 | 17,02 |
| 4,10 | 119 | 78 | 10 | 33246 | 5,75 | 10,00 | 184 | 121 | 5 | 21399 | 18,36 |
| 4,20 | 119 | 78 | 10 | 15186 | 5,75 | 10,20 | 184 | 121 | 1 | 27033 | 24,84 |
| 4,25 | 119 | 78 | 10 | 21383 | 5,75 | 10,25 | 184 | 121 | 1 | 21906 | 27,05 |
| 4,50 | 126 | 82 | 10 | 21384 | 6,41 | 10,50 | 184 | 121 | 1 | 21400 | 24,84 |
| 4,75 | 126 | 82 | 10 | 21385 | 6,43 | 11,00 | 195 | 128 | 1 | 21401 | 27,61 |
| 5,00 | 132 | 87 | 10 | 21386 | 6,41 | 11,50 | 195 | 128 | 1 | 21402 | 29,04 |
| 5,25 | 132 | 87 | 10 | 21904 | 7,62 | 12,00 | 205 | 134 | 1 | 21403 | 31,46 |
| 5,50 | 139 | 91 | 10 | 21387 | 8,78 | 12,50 | 205 | 134 | 1 | 21404 | 37,83 |
| 5,75 | 139 | 91 | 10 | 21776 | 8,82 | 13,00 | 205 | 134 | 1 | 21406 | 38,75 |

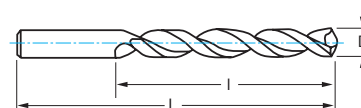


Ref. **1300**

BROCA MANGO CILÍNDRICO AGUJEROS TOLERANCIA IT8-9. SERIE LARGA

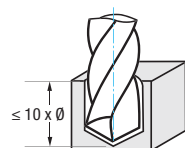
IT8-9 Tolerance Hole Straight Shank Drill Bit. Long Series

Foret queue cylindrique trous tolérance IT8-9. Série longue



| | | | | | | | | |
|--------------|---------------------------|---------------|------|--|--|---|--|--------------|
| HSSE 5%Co | HSSE 5%Co + TIALSIN | DIN 340 TS | 135° | | Filo Corregido Convex Edge Filets Corrigés "U" | Perfil Profile Profil "S" | Rectificado Ground Taillé meulé | Tol. D h8 |
|--------------|---------------------------|---------------|------|--|--|---|--|--------------|

| | | |
|--|--|--|
| | | x3,5 Resistencia al desgaste Wear Resistance Résistant à l'usure |
|--|--|--|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

- * Se recomienda reducir el avance entre 2/3 y 1/2
- * It is recommended to reduce feed between 2/3 & 1/2
- * On conseille réduire l'avance entre 2/3 et 1/2

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|---------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 5% Co | TIALSIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| P | P.2 | 20-25 | 28-35 | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 |
| | P.3 | 8-15 | 12-20 | 0,020 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 |
| K | K.1 | 30-35 | 36-42 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |
| | K.2 | 25-30 | 30-36 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 |
| N | N.5 | 40-50 | 56-70 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 |
| | N.6 | 35-45 | 40-58 | 0,080 | 0,130 | 0,150 | 0,170 | 0,190 | 0,250 | 0,290 | 0,310 | 0,360 |

| D mm | L mm | I mm | | N° Art. 5% Co | € | N° Art. TIALSIN | € |
|------|------|------|---|---------------|-------|-----------------|-------|
| 2,00 | 85 | 56 | 1 | 22254 | 7,49 | 14389 | 9,41 |
| 2,10 | 85 | 56 | 1 | 14539 | 7,00 | 24875 | 8,73 |
| 2,30 | 90 | 59 | 1 | 14541 | 7,26 | 24897 | 9,00 |
| 2,50 | 95 | 62 | 1 | 22255 | 6,82 | 14391 | 8,56 |
| 2,70 | 100 | 66 | 1 | 14551 | 7,65 | 24877 | 9,41 |
| 2,75 | 100 | 66 | 1 | 14470 | 7,79 | 24878 | 9,56 |
| 3,00 | 100 | 66 | 1 | 22256 | 6,82 | 14392 | 8,58 |
| 3,10 | 106 | 69 | 1 | 14553 | 7,79 | 14616 | 10,04 |
| 3,20 | 106 | 69 | 1 | 22257 | 7,79 | 14393 | 10,04 |
| 3,25 | 106 | 69 | 1 | 14472 | 7,79 | 14488 | 10,04 |
| 3,30 | 106 | 69 | 1 | 14556 | 7,79 | 14617 | 10,04 |
| 3,50 | 112 | 73 | 1 | 22258 | 8,06 | 14395 | 10,32 |
| 3,60 | 112 | 73 | 1 | 14928 | 9,47 | 23335 | 11,72 |
| 3,70 | 112 | 73 | 1 | 14563 | 9,81 | 24879 | 12,06 |
| 3,75 | 112 | 73 | 1 | 14473 | 9,19 | 24880 | 11,45 |
| 3,90 | 119 | 78 | 1 | 14665 | 10,38 | 24881 | 12,66 |
| 4,00 | 119 | 78 | 1 | 22260 | 8,30 | 14396 | 10,56 |
| 4,10 | 119 | 78 | 1 | 14569 | 9,19 | 14619 | 11,45 |
| 4,20 | 119 | 78 | 1 | 22261 | 9,19 | 14397 | 11,45 |
| 4,25 | 119 | 78 | 1 | 14476 | 9,19 | 14490 | 11,45 |
| 4,30 | 126 | 82 | 1 | 14571 | 10,27 | 14623 | 12,46 |
| 4,40 | 126 | 82 | 1 | 14670 | 10,62 | 24882 | 12,89 |
| 4,50 | 126 | 82 | 1 | 22262 | 10,28 | 14398 | 12,54 |
| 4,70 | 126 | 82 | 1 | 14671 | 10,15 | 24883 | 12,43 |
| 4,75 | 126 | 82 | 1 | 14481 | 10,29 | 24884 | 12,56 |
| 4,80 | 132 | 87 | 1 | 14673 | 10,62 | 24885 | 12,89 |
| 5,00 | 132 | 87 | 1 | 22263 | 10,28 | 14409 | 12,54 |
| 5,10 | 132 | 87 | 1 | 22264 | 11,99 | 14415 | 14,18 |

| D mm | L mm | I mm | | N° Art. 5% Co | € | N° Art. TIALSIN | € |
|-------|------|------|---|---------------|-------|-----------------|-------|
| 5,20 | 132 | 87 | 1 | 14575 | 11,99 | 24886 | 14,24 |
| 5,25 | 132 | 87 | 1 | 14484 | 12,41 | 14493 | 14,67 |
| 5,30 | 132 | 87 | 1 | 14679 | 12,41 | 24887 | 14,66 |
| 5,50 | 139 | 91 | 1 | 22265 | 14,05 | 14416 | 16,30 |
| 5,60 | 139 | 91 | 1 | 14685 | 14,34 | 24888 | 16,62 |
| 5,75 | 139 | 91 | 1 | 14487 | 14,12 | 24889 | 16,39 |
| 5,80 | 139 | 91 | 1 | 14580 | 14,69 | 24890 | 16,97 |
| 5,90 | 139 | 91 | 1 | 14689 | 14,88 | 24891 | 17,16 |
| 6,00 | 139 | 91 | 1 | 22266 | 14,05 | 14419 | 16,30 |
| 6,20 | 148 | 97 | 1 | 14581 | 18,18 | 24892 | 24,22 |
| 6,50 | 148 | 97 | 1 | 22267 | 16,11 | 14427 | 22,15 |
| 6,80 | 156 | 102 | 1 | 14586 | 18,72 | 14625 | 24,77 |
| 7,00 | 156 | 102 | 1 | 22268 | 18,80 | 14428 | 25,10 |
| 7,20 | 156 | 102 | 1 | 14691 | 22,80 | 24893 | 29,10 |
| 7,50 | 156 | 102 | 1 | 14587 | 19,97 | 14628 | 26,26 |
| 8,00 | 165 | 109 | 1 | 22269 | 22,28 | 14431 | 28,57 |
| 8,20 | 165 | 109 | 1 | 14593 | 25,08 | 24894 | 32,41 |
| 8,50 | 165 | 109 | 1 | 22270 | 24,75 | 14434 | 32,09 |
| 8,80 | 175 | 115 | 1 | 14695 | 26,75 | 24895 | 34,11 |
| 9,00 | 175 | 115 | 1 | 22271 | 26,91 | 14437 | 34,27 |
| 9,50 | 175 | 115 | 1 | 14598 | 27,24 | 14629 | 34,58 |
| 9,80 | 184 | 121 | 1 | 14697 | 46,17 | 24896 | 53,52 |
| 10,00 | 184 | 121 | 1 | 22272 | 29,37 | 14439 | 36,73 |
| 10,50 | 184 | 121 | 1 | 14701 | 39,75 | 14713 | 54,61 |
| 11,00 | 195 | 128 | 1 | 22273 | 44,18 | 14440 | 59,03 |
| 11,50 | 195 | 128 | 1 | 14707 | 46,46 | 14719 | 60,77 |
| 12,00 | 205 | 134 | 1 | 22274 | 50,35 | 14443 | 64,63 |
| 13,00 | 205 | 134 | 1 | 22275 | 62,01 | 14445 | 80,11 |

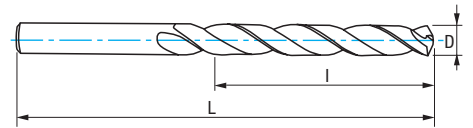


Ref. **1030**

BROCA MANGO CILÍNDRICO HSS. SERIE LARGA

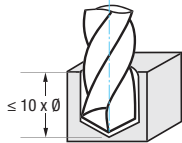
HSS Straight Shank Drill Bit. Long Series

Foret queue cylindrique HSS. Série longue



| | | | | | | | | |
|-----|-----------|-----------|------|--|--|-------------|------------------------------------|-----------|
| HSS | HSS + TIN | DIN 340 N | 118° | | | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|-----------|------|--|--|-------------|------------------------------------|-----------|

HSS **TIN** **x2,5** Resistencia al desgaste
Wear Resistance
Résistant à l'usure



| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|-------|------------|-------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | TIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 25-30 | 30-35 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 |
| | K | 30-35 | 36-42 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 |
| N | K.2 | 25-30 | 30-36 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 |
| | N.3 | 60-80 | 72-96 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | 0,450 |
| | N.4 | | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | 0,450 |
| N.5 | 40-50 | 48-60 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

* Se recomienda reducir el avance entre 2/3 y 1/2
* It is recommended to reduce feed between 2/3 & 1/2
* On conseille réduire l'avance entre 2/3 et 1/2

| D mm | L mm | I mm | | N° Art. HSS | € | N° Art. TIN | € |
|------------------|------|------|----|-------------|------|-------------|------|
| 0,50 | 32 | 12 | 10 | 26656 | 5,60 | | |
| 0,60 | 35 | 15 | 10 | 26658 | 4,55 | | |
| 0,70 | 42 | 21 | 10 | 19467 | 4,55 | | |
| 0,80 | 46 | 25 | 10 | 24592 | 4,55 | | |
| 0,90 | 51 | 29 | 10 | 26659 | 4,55 | | |
| 1,00 | 56 | 33 | 10 | 11573 | 4,60 | 27465 | 5,73 |
| 1,10 | 60 | 37 | 10 | 11576 | 4,47 | 27466 | 5,60 |
| 1,20 | 65 | 41 | 10 | 11579 | 4,47 | 27467 | 5,60 |
| 1,25 | 65 | 41 | 10 | 11582 | 4,61 | 27468 | 5,76 |
| 1,30 | 65 | 41 | 10 | 11585 | 4,47 | 27111 | 5,60 |
| 1,40 | 70 | 45 | 10 | 11588 | 4,47 | 27469 | 5,60 |
| New! 1,45 | 70 | 45 | 10 | 31704 | 4,47 | 31706 | 5,60 |
| 1,50 | 70 | 45 | 10 | 11591 | 3,32 | 27470 | 4,43 |
| 1,60 | 76 | 50 | 10 | 11594 | 4,47 | 27471 | 5,60 |
| 1,70 | 76 | 50 | 10 | 11597 | 4,47 | 27472 | 5,60 |
| 1,75 | 80 | 53 | 10 | 11600 | 3,70 | 27473 | 4,81 |
| 1,80 | 80 | 53 | 10 | 11603 | 3,55 | 27141 | 4,71 |
| 1,90 | 80 | 53 | 10 | 11606 | 3,55 | 27474 | 4,71 |
| 2,00 | 85 | 56 | 10 | 11609 | 2,35 | 27145 | 3,52 |
| 2,10 | 85 | 56 | 10 | 11612 | 3,24 | 27146 | 4,28 |
| 2,20 | 90 | 59 | 10 | 11615 | 3,24 | 27475 | 4,28 |
| 2,25 | 90 | 59 | 10 | 11618 | 2,59 | 27476 | 3,63 |
| 2,30 | 90 | 59 | 10 | 11621 | 3,12 | 27142 | 4,17 |
| 2,40 | 95 | 62 | 10 | 11624 | 3,12 | 27477 | 4,17 |
| 2,50 | 95 | 62 | 10 | 11627 | 2,35 | 27478 | 3,39 |
| 2,60 | 95 | 62 | 10 | 11630 | 3,12 | 27479 | 4,17 |
| 2,70 | 100 | 66 | 10 | 11633 | 3,12 | 27144 | 4,17 |
| 2,75 | 100 | 66 | 10 | 11636 | 3,24 | 27480 | 4,29 |
| 2,80 | 100 | 66 | 10 | 11639 | 3,12 | 27143 | 4,17 |
| 2,90 | 100 | 66 | 10 | 11642 | 3,12 | 27147 | 4,17 |
| 3,00 | 100 | 66 | 10 | 11645 | 2,19 | 20132 | 3,22 |
| 3,10 | 106 | 69 | 10 | 11648 | 2,43 | 27220 | 3,74 |
| 3,20 | 106 | 69 | 10 | 11651 | 2,43 | 27217 | 3,74 |
| 3,25 | 106 | 69 | 10 | 11654 | 2,43 | 27213 | 3,74 |


| D mm | L mm | I mm | | N° Art. HSS | € | N° Art. TIN | € |
|------|------|------|----|-------------|------|-------------|------|
| 3,30 | 106 | 69 | 10 | 11657 | 2,43 | 27210 | 3,74 |
| 3,40 | 112 | 73 | 10 | 11660 | 3,12 | 27167 | 4,42 |
| 3,50 | 112 | 73 | 10 | 11663 | 2,30 | 27211 | 3,61 |
| 3,60 | 112 | 73 | 10 | 11666 | 3,12 | 27515 | 4,42 |
| 3,70 | 112 | 73 | 10 | 11669 | 3,12 | 28267 | 4,42 |
| 3,75 | 112 | 73 | 10 | 11672 | 3,24 | 27218 | 4,58 |
| 3,80 | 119 | 78 | 10 | 11675 | 3,89 | 27221 | 5,20 |
| 3,90 | 119 | 78 | 10 | 11678 | 3,89 | 27222 | 5,20 |
| 4,00 | 119 | 78 | 10 | 11681 | 2,49 | 27216 | 3,82 |
| 4,10 | 119 | 78 | 10 | 11684 | 3,26 | 27219 | 4,59 |
| 4,20 | 119 | 78 | 10 | 11687 | 3,26 | 27224 | 4,59 |
| 4,25 | 119 | 78 | 10 | 11690 | 3,26 | 27214 | 4,59 |
| 4,30 | 126 | 82 | 10 | 11693 | 4,21 | 27215 | 5,53 |
| 4,40 | 126 | 82 | 10 | 11696 | 4,21 | 27481 | 5,53 |
| 4,50 | 126 | 82 | 10 | 11699 | 2,97 | 27089 | 4,30 |
| 4,60 | 126 | 82 | 10 | 11702 | 4,21 | 27212 | 5,53 |
| 4,70 | 126 | 82 | 10 | 19955 | 4,21 | 27482 | 5,53 |
| 4,75 | 126 | 82 | 10 | 11705 | 4,39 | 76657 | 5,70 |
| 4,80 | 132 | 87 | 10 | 11708 | 4,87 | 27483 | 6,19 |
| 4,90 | 132 | 87 | 10 | 11711 | 4,87 | 27484 | 6,19 |
| 5,00 | 132 | 87 | 10 | 11714 | 3,19 | 27103 | 4,51 |
| 5,10 | 132 | 87 | 10 | 11717 | 4,87 | 27155 | 6,19 |
| 5,20 | 132 | 87 | 10 | 11720 | 4,87 | 27101 | 6,19 |
| 5,25 | 132 | 87 | 10 | 11723 | 5,05 | 27104 | 6,38 |
| 5,30 | 132 | 87 | 10 | 11726 | 5,29 | 76658 | 6,63 |
| 5,40 | 139 | 91 | 10 | 11729 | 5,29 | 27153 | 6,63 |
| 5,50 | 139 | 91 | 10 | 11732 | 4,20 | 27152 | 5,51 |
| 5,60 | 139 | 91 | 10 | 11735 | 5,29 | 27109 | 6,63 |
| 5,70 | 139 | 91 | 10 | 11738 | 5,29 | 27107 | 6,63 |
| 5,75 | 139 | 91 | 10 | 11741 | 5,50 | 27114 | 6,82 |
| 5,80 | 139 | 91 | 10 | 11744 | 5,83 | 27100 | 7,14 |
| 5,90 | 139 | 91 | 10 | 11747 | 5,83 | 27282 | 7,14 |
| 6,00 | 139 | 91 | 10 | 11750 | 3,90 | 27168 | 5,22 |
| 6,10 | 148 | 97 | 10 | 11753 | 5,83 | 27105 | 9,36 |


Ref. **1030**

BROCA MANGO CILÍNDRICO HSS. SERIE LARGA

HSS Straight Shank Drill Bit. Long Series

Foret queue cylindrique HSS. Série longue

| D mm | L mm | I mm |  | N° Art. HSS | € | N° Art. TIN | € |
|-------|------|------|---|-------------|-------|-------------|-------|
| 6,20 | 148 | 97 | 10 | 11756 | 5,83 | 27281 | 9,36 |
| 6,25 | 148 | 97 | 10 | 11759 | 6,04 | 27485 | 9,58 |
| 6,30 | 148 | 97 | 10 | 11762 | 5,89 | 27486 | 9,39 |
| 6,40 | 148 | 97 | 10 | 11765 | 5,89 | 27108 | 9,39 |
| 6,50 | 148 | 97 | 10 | 11768 | 4,99 | 20135 | 8,51 |
| 6,60 | 148 | 97 | 10 | 11771 | 5,89 | 27169 | 9,39 |
| 6,70 | 148 | 97 | 10 | 11774 | 5,89 | 27283 | 9,39 |
| 6,75 | 156 | 102 | 10 | 11777 | 6,11 | 27487 | 9,62 |
| 6,80 | 156 | 102 | 10 | 11780 | 6,11 | 27160 | 9,62 |
| 6,90 | 156 | 102 | 10 | 11783 | 6,25 | 27106 | 9,79 |
| 7,00 | 156 | 102 | 10 | 11786 | 5,82 | 20138 | 9,35 |
| 7,10 | 156 | 102 | 10 | 11789 | 6,25 | 27158 | 9,79 |
| 7,20 | 156 | 102 | 10 | 11792 | 6,25 | 27488 | 9,79 |
| 7,25 | 156 | 102 | 10 | 11795 | 6,50 | 27159 | 10,02 |
| 7,30 | 156 | 102 | 10 | 11798 | 6,38 | 76659 | 9,90 |
| 7,40 | 156 | 102 | 10 | 11801 | 6,38 | 27489 | 9,90 |
| 7,50 | 156 | 102 | 10 | 11804 | 6,19 | 27490 | 9,71 |
| 7,60 | 165 | 109 | 10 | 11807 | 6,38 | 20141 | 9,90 |
| 7,70 | 165 | 109 | 10 | 11810 | 6,38 | 27157 | 9,90 |
| 7,75 | 165 | 109 | 10 | 11813 | 6,63 | 27491 | 10,15 |
| 7,80 | 165 | 109 | 10 | 11816 | 7,14 | 27154 | 10,65 |
| 7,90 | 165 | 109 | 10 | 11819 | 7,14 | 27232 | 10,65 |
| 8,00 | 165 | 109 | 10 | 11822 | 6,90 | 27492 | 10,42 |
| 8,10 | 165 | 109 | 5 | 11825 | 7,14 | 27493 | 11,29 |
| 8,20 | 165 | 109 | 5 | 11828 | 7,14 | 27494 | 11,29 |
| 8,25 | 165 | 109 | 5 | 11831 | 7,41 | 28850 | 11,54 |
| 8,30 | 165 | 109 | 5 | 11834 | 10,97 | 27495 | 15,12 |
| 8,40 | 165 | 109 | 5 | 11837 | 10,97 | 20144 | 15,12 |
| 8,50 | 165 | 109 | 5 | 11840 | 7,67 | 27496 | 11,82 |
| 8,60 | 175 | 115 | 5 | 11843 | 10,97 | 27284 | 15,12 |
| 8,70 | 175 | 115 | 5 | 11846 | 10,97 | 27516 | 15,12 |
| 8,75 | 175 | 115 | 5 | 11849 | 11,42 | 27285 | 15,54 |
| 8,80 | 175 | 115 | 5 | 11852 | 11,21 | 27497 | 15,36 |
| 8,90 | 175 | 115 | 5 | 11855 | 11,21 | 27517 | 15,36 |
| 9,00 | 175 | 115 | 5 | 11858 | 8,34 | 27113 | 12,50 |
| 9,10 | 175 | 115 | 5 | 11861 | 11,21 | 27110 | 15,36 |
| 9,20 | 175 | 115 | 5 | 11864 | 11,21 | 27231 | 15,36 |
| 9,25 | 175 | 115 | 5 | 11867 | 11,66 | 27498 | 15,79 |
| 9,30 | 175 | 115 | 5 | 11870 | 12,08 | 27112 | 16,22 |
| 9,40 | 175 | 115 | 5 | 11873 | 12,08 | 27499 | 16,22 |
| 9,50 | 175 | 115 | 5 | 11876 | 8,45 | 27500 | 12,58 |
| 9,60 | 184 | 121 | 5 | 11879 | 12,08 | 27501 | 16,22 |
| 9,70 | 184 | 121 | 5 | 11882 | 12,08 | 27502 | 16,22 |
| 9,75 | 184 | 121 | 5 | 11885 | 12,53 | 27503 | 16,65 |
| 9,80 | 184 | 121 | 5 | 11888 | 12,08 | 27504 | 16,22 |
| 9,90 | 184 | 121 | 5 | 11891 | 12,08 | 26994 | 16,22 |
| 10,00 | 184 | 121 | 5 | 11894 | 9,13 | 20147 | 13,27 |

| D mm | L mm | I mm |  | N° Art. HSS | € | N° Art. TIN | € |
|-------|------|------|---|-------------|--------|-------------|-------|
| 10,20 | 184 | 121 | 1 | 11900 | 12,33 | 20150 | 20,98 |
| 10,25 | 184 | 121 | 1 | 11903 | 11,42 | 27230 | 20,06 |
| 10,50 | 184 | 121 | 1 | 11912 | 12,33 | 27229 | 20,98 |
| 10,75 | 195 | 128 | 1 | 11921 | 12,53 | 27505 | 21,18 |
| 10,80 | 195 | 128 | 1 | 11924 | 15,68 | 26996 | 24,34 |
| 11,00 | 195 | 128 | 1 | 11930 | 13,71 | 27228 | 22,34 |
| 11,10 | 195 | 128 | 1 | 30588 | 18,33 | 30589 | 26,96 |
| 11,25 | 195 | 128 | 1 | 11939 | 16,29 | 27506 | 24,94 |
| 11,50 | 195 | 128 | 1 | 11948 | 13,97 | 27227 | 22,59 |
| 11,75 | 195 | 128 | 1 | 11957 | 18,33 | 27225 | 26,97 |
| 11,80 | 195 | 128 | 1 | 11960 | 18,33 | 27507 | 26,97 |
| 11,90 | 205 | 134 | 1 | 11963 | 18,33 | 27508 | 26,97 |
| 12,00 | 205 | 134 | 1 | 11966 | 15,61 | 27509 | 24,28 |
| 12,20 | 205 | 134 | 1 | 11972 | 17,66 | 26993 | 28,50 |
| 12,25 | 205 | 134 | 1 | 11975 | 17,71 | 27510 | 28,54 |
| 12,30 | 205 | 134 | 1 | 11978 | 20,87 | 27511 | 31,74 |
| 12,50 | 205 | 134 | 1 | 11984 | 16,44 | 27512 | 27,31 |
| 12,75 | 205 | 134 | 1 | 11993 | 21,69 | 27513 | 32,55 |
| 13,00 | 205 | 134 | 1 | 12002 | 18,66 | 27226 | 29,51 |
| 13,25 | 214 | 140 | 1 | 12005 | 21,69 | | |
| 13,50 | 214 | 140 | 1 | 12008 | 20,83 | 12933 | 31,67 |
| 13,75 | 214 | 140 | 1 | 12011 | 21,75 | 17836 | 32,63 |
| 14,00 | 214 | 140 | 1 | 12014 | 22,48 | 12935 | 33,34 |
| 14,25 | 220 | 144 | 1 | 12017 | 40,49 | 17837 | 51,36 |
| 14,50 | 220 | 144 | 1 | 12020 | 26,33 | 12936 | 37,16 |
| 14,75 | 220 | 144 | 1 | 12023 | 40,49 | | |
| 15,00 | 220 | 144 | 1 | 12026 | 25,46 | 12939 | 36,33 |
| 15,25 | 227 | 149 | 1 | 12029 | 45,73 | | |
| 15,50 | 227 | 149 | 1 | 12032 | 37,80 | | |
| 15,75 | 227 | 149 | 1 | 12035 | 45,73 | | |
| 16,00 | 227 | 149 | 1 | 12038 | 29,64 | 21320 | 38,29 |
| 16,25 | 235 | 154 | 1 | 12041 | 50,47 | | |
| 16,50 | 235 | 154 | 1 | 12044 | 35,06 | | |
| 16,75 | 235 | 154 | 1 | 12047 | 50,47 | 21324 | 59,12 |
| 17,00 | 235 | 154 | 1 | 12050 | 35,22 | 21326 | 43,86 |
| 17,25 | 241 | 158 | 1 | 12053 | 58,02 | | |
| 17,50 | 241 | 158 | 1 | 12056 | 52,07 | | |
| 17,75 | 241 | 158 | 1 | 12059 | 67,66 | | |
| 18,00 | 241 | 158 | 1 | 12062 | 36,73 | | |
| 18,25 | 247 | 162 | 1 | 12065 | 79,70 | | |
| 18,50 | 247 | 162 | 1 | 12068 | 56,88 | | |
| 18,75 | 247 | 162 | 1 | 12071 | 79,02 | | |
| 19,00 | 247 | 162 | 1 | 12074 | 46,03 | | |
| 19,25 | 254 | 166 | 1 | 12077 | 88,55 | | |
| 19,50 | 254 | 166 | 1 | 12080 | 88,55 | | |
| 19,75 | 254 | 166 | 1 | 12083 | 100,00 | | |
| 20,00 | 254 | 166 | 1 | 12086 | 51,66 | | |

New!

New!

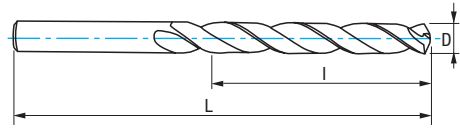


Ref. **1040**

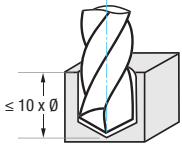
BROCA MANGO CILÍNDRICO HSS. SERIE EXTRA LARGA

HSS Straight Shank Drill Bit. Extra Long Series

Foret queue cylindrique HSS. Série extra-longue



| | | | | | | | |
|-----|------------|------|--|--|-------------|------------------------------------|-----------|
| HSS | DIN 1869 N | 118° | | | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|------------|------|--|--|-------------|------------------------------------|-----------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 25-30 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 |
| K | K.1 | 30-35 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 |
| | K.2 | 25-30 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 |
| N | N.3 | 60-80 | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | 0,450 |
| | N.4 | | 0,080 | 0,110 | 0,130 | 0,150 | 0,190 | 0,220 | 0,260 | 0,320 | 0,380 | 0,450 |
| | N.5 | 40-50 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

* Se recomienda reducir el avance entre 2/3 y 1/2

* It is recommended to reduce feed between 2/3 & 1/2

* On conseille réduire l'avance entre 2/3 et 1/2

| D mm | L mm | I mm | | N° Art. HSS | € | D mm | L mm | I mm | | N° Art. HSS | € |
|------|------|------|---|-------------|-------|-------|------|------|---|-------------|-------|
| 2,00 | 125 | 85 | 1 | 12158 | 10,77 | 6,50 | 350 | 235 | 1 | 12230 | 34,87 |
| 2,50 | 140 | 95 | 1 | 12161 | 11,25 | 7,00 | 225 | 155 | 1 | 12233 | 22,96 |
| 3,00 | 150 | 100 | 1 | 12164 | 11,66 | 7,00 | 290 | 200 | 1 | 12236 | 31,98 |
| 3,00 | 190 | 136 | 1 | 12167 | 13,47 | 7,00 | 370 | 250 | 1 | 12239 | 43,23 |
| 3,50 | 165 | 115 | 1 | 12170 | 13,15 | 7,50 | 225 | 155 | 1 | 12242 | 25,86 |
| 3,50 | 210 | 145 | 1 | 12173 | 15,16 | 7,50 | 290 | 200 | 1 | 12245 | 34,45 |
| 3,50 | 265 | 180 | 1 | 12176 | 21,69 | 7,50 | 370 | 250 | 1 | 12248 | 50,19 |
| 4,00 | 175 | 120 | 1 | 12179 | 13,15 | 8,00 | 240 | 165 | 1 | 12251 | 28,57 |
| 4,00 | 220 | 150 | 1 | 12182 | 15,49 | 8,00 | 305 | 210 | 1 | 12254 | 39,58 |
| 4,00 | 280 | 190 | 1 | 12185 | 22,10 | 8,00 | 390 | 265 | 1 | 12257 | 51,57 |
| 4,50 | 185 | 125 | 1 | 12188 | 14,58 | 8,50 | 240 | 165 | 1 | 12260 | 38,89 |
| 4,50 | 235 | 160 | 1 | 12191 | 18,19 | 8,50 | 305 | 210 | 1 | 12263 | 52,99 |
| 4,50 | 295 | 200 | 1 | 12194 | 26,04 | 8,50 | 390 | 265 | 1 | 12266 | 72,88 |
| 5,00 | 195 | 135 | 1 | 12197 | 15,39 | 9,00 | 250 | 175 | 1 | 12269 | 37,07 |
| 5,00 | 245 | 170 | 1 | 12200 | 19,57 | 9,00 | 320 | 220 | 1 | 12272 | 48,96 |
| 5,00 | 315 | 210 | 1 | 12203 | 24,05 | 9,00 | 410 | 280 | 1 | 12275 | 71,89 |
| 5,50 | 205 | 140 | 1 | 12206 | 18,22 | 9,50 | 250 | 175 | 1 | 12278 | 43,68 |
| 5,50 | 260 | 180 | 1 | 12209 | 26,04 | 9,50 | 320 | 220 | 1 | 12281 | 60,03 |
| 5,50 | 330 | 225 | 1 | 12212 | 30,05 | 9,50 | 410 | 280 | 1 | 12284 | 80,87 |
| 6,00 | 205 | 140 | 1 | 12215 | 18,22 | 10,00 | 265 | 185 | 1 | 12287 | 43,10 |
| 6,00 | 260 | 180 | 1 | 12218 | 26,04 | 10,00 | 340 | 235 | 1 | 12290 | 56,39 |
| 6,00 | 330 | 225 | 1 | 12221 | 30,05 | 10,00 | 430 | 295 | 1 | 12293 | 78,34 |
| 6,50 | 215 | 150 | 1 | 12224 | 21,69 | 11,00 | 280 | 195 | 1 | 28866 | 54,57 |
| 6,50 | 275 | 190 | 1 | 12227 | 27,99 | 12,00 | 295 | 205 | 1 | 28867 | 72,05 |



NEW
PACKAGING!

OLATU

Marcamos la diferencia

- Diseño exclusivo
- 13% más ligero
- 64% menos de impacto ambiental
- Ergonómico
- Apto para colgar
- Apilable

Making the difference

- Exclusive design
- 13% lighter
- 64% less environmental impact
- Ergonomic
- Possible to hang
- Stackable

Marquant la différence

- Design esclusif
- 13% plus léger
- 64% moins d'impact environnementale
- Ergonomique
- Brochable
- Empilable



▶ Video



Sets 1466

JUEGO BROCAS. 19 PCS. (1-10 X 0,50 mm)

Drill Bit Set. 19 pcs. (1-10 x 0,50 mm)

Jeu de forets. 19 pcs. (1-10 x 0,50 mm)



Ref. 1021

| | |
|---------|-------|
| N° Art. | € |
| 5% Co | |
| 34201 | 98,64 |



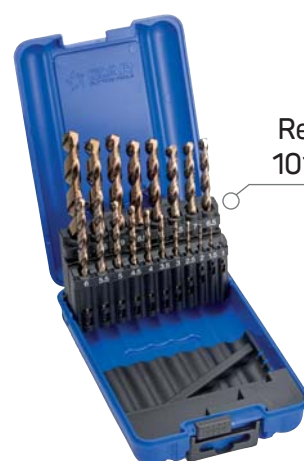
Ref. 1020

| | |
|---------|-------|
| N° Art. | € |
| 5% Co | |
| 24636 | 79,51 |



Ref. 1029

| | |
|----------|-------|
| N° Art. | € |
| BORDEAUX | |
| 81649 | 92,38 |



Ref. 1016

| | |
|---------|-------|
| N° Art. | € |
| 5% Co | |
| 25274 | 58,08 |



Ref. 1016
TIALSIN

| | |
|---------|--------|
| N° Art. | € |
| TIALSIN | |
| 14748 | 122,28 |



Ref. 1015

| | |
|----------|-------|
| N° Art. | € |
| Zirkonio | |
| 59234 | 59,76 |



Ref. 1013

| | |
|---------|-------|
| N° Art. | € |
| HSS | |
| 18808 | 38,05 |



Ref. 1013
TIALSIN

| | |
|---------|--------|
| N° Art. | € |
| TIALSIN | |
| 38833 | 102,29 |



Ref. 1010

| | |
|---------|-------|
| N° Art. | € |
| HSS | |
| 25271 | 34,27 |



Ref. 1010
TIN

| | |
|---------|-------|
| N° Art. | € |
| TIN | |
| 27132 | 75,43 |



Ref. 1025

| | |
|---------|--------|
| N° Art. | € |
| HSS | |
| 66659 | 122,74 |

Sets **1456**

JUEGO BROCAS. 25 PCS. (1-13 X 0,50 mm)

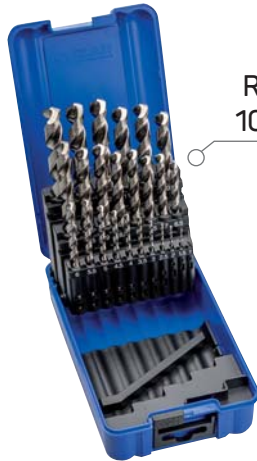
Drill Bit Set. 25 pcs. (1-13 x 0,50 mm)

Jeu de forets. 25 pcs. (1-13 x 0,50 mm)



Ref. 1021

| | |
|---------|--------|
| N° Art. | € |
| 5% Co | |
| 34199 | 215,94 |



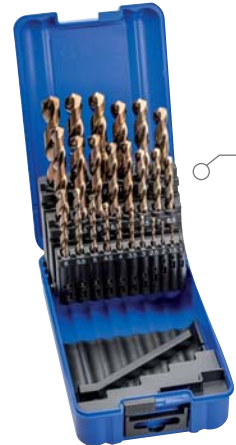
Ref. 1020

| | |
|---------|--------|
| N° Art. | € |
| 5% Co | |
| 24638 | 173,66 |



Ref. 1029

| | |
|----------|--------|
| N° Art. | € |
| BORDEAUX | |
| 81687 | 209,00 |



Ref. 1016

| | |
|---------|--------|
| N° Art. | € |
| 5% Co | |
| 18370 | 135,12 |



Ref. 1016
TIALSIN

| | |
|---------|--------|
| N° Art. | € |
| TIALSIN | |
| 15378 | 277,52 |



Ref. 1015

| | |
|----------|--------|
| N° Art. | € |
| Zirkonio | |
| 59235 | 138,33 |



Ref. 1013

| | |
|---------|-------|
| N° Art. | € |
| HSS | |
| 18807 | 80,64 |



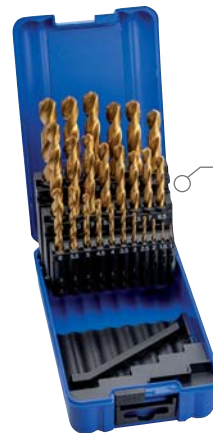
Ref. 1013
TIALSIN

| | |
|---------|--------|
| N° Art. | € |
| TIALSIN | |
| 38832 | 222,05 |



Ref. 1010

| | |
|---------|-------|
| N° Art. | € |
| HSS | |
| 25235 | 72,39 |



Ref. 1010
TIN

| | |
|---------|--------|
| N° Art. | € |
| TIN | |
| 27133 | 164,55 |

Sets 1459

JUEGO BROCAS. 29 PCS (1-13 x 0.50 mm + Previos roscado*)
 Drill Bit Set. 29 pcs (1-13 x 0.50 mm + Before Threading sizes*)
 Jeu de forets. 29 pcs (1-13 x 0.50 mm + Pré Taraudage*)

New!



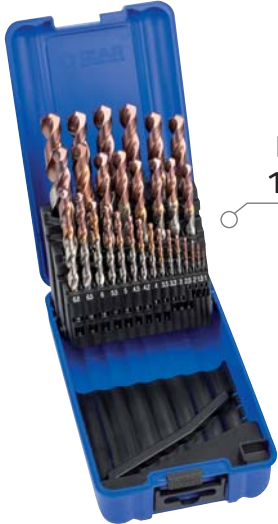
Ref. 1021

| N° Art. 5% Co | € |
|---------------|--------|
| 15114 | 242,42 |



Ref. 1020

| N° Art. 5% Co | € |
|---------------|--------|
| 15113 | 195,11 |



Ref. 1029

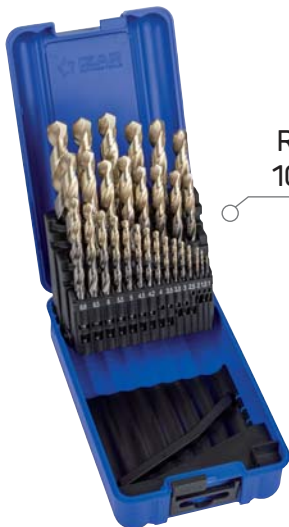
| N° Art. BORDEAUX | € |
|------------------|--------|
| 15111 | 236,81 |



Ref. 1016

| N° Art. 5% Co | € |
|---------------|--------|
| 15073 | 150,98 |

| N° Art. TIALSIN | € |
|-----------------|--------|
| 15090 | 314,68 |



Ref. 1015

| N° Art. Zirkonio | € |
|------------------|--------|
| 15115 | 154,59 |



Ref. 1010

| N° Art. HSS | € |
|-------------|-------|
| 15070 | 80,58 |

| N° Art. TIN | € |
|-------------|--------|
| 15089 | 186,79 |



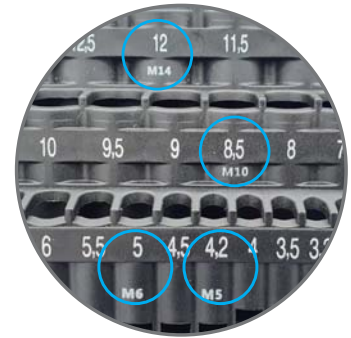
Ref. 1013

| N° Art. HSS | € |
|-------------|-------|
| 15088 | 89,84 |

| N° Art. TIALSIN | € |
|-----------------|--------|
| 15120 | 252,10 |

*
Previos Roscado
+ Before Threading
 Pré-Taraudage
(3,3 - 4,2 - 6,8 - 10,2 mm)

| | |
|-----|----------|
| M3 | 2,50 mm |
| M4 | 3,30 mm |
| M5 | 4,20 mm |
| M6 | 5,00 mm |
| M8 | 6,80 mm |
| M10 | 8,50 mm |
| M12 | 10,20 mm |
| M14 | 12,00 mm |



Estuche indicando los previos al roscado
Information about threading sizes on the set
 Informations concernant les mesures de pré-taraudage dans le coffret

Sets **1407**

JUEGO BROCAS. 37 PCS. (1-10 X 0,25 mm)

Drill Bit Set. 37 pcs. (1-10 x 0,25 mm)

Jeu de forets. 37 pcs. (1-10 x 0,25 mm)



Ref. 1016

| | |
|---------|--------|
| N° Art. | € |
| 5% Co | |
| 18367 | 148,61 |



Ref. 1010

| | |
|---------|-------|
| N° Art. | € |
| HSS | |
| 26768 | 94,91 |



Ref. 1010
TIN

| | |
|---------|--------|
| N° Art. | € |
| TIN | |
| 27134 | 176,60 |

Sets **1409**

JUEGO BROCAS. 49 PCS. (1-13 X 0,25 mm)

Drill Bit Set. 49 pcs. (1-13 x 0,25 mm)

Jeu de forets. 49 pcs. (1-13 x 0,25 mm)



Ref. 1016

| | |
|---------|--------|
| N° Art. | € |
| 5% Co | |
| 18369 | 318,46 |



Ref. 1010

| | |
|---------|--------|
| N° Art. | € |
| HSS | |
| 26802 | 174,41 |



Ref. 1010
TIN

| | |
|---------|--------|
| N° Art. | € |
| TIN | |
| 27135 | 358,31 |

Sets **1405**

JUEGO BROCAS. 50 PCS. (1-5,9 X 0,10 mm)

Drill Bit Set. 50 pcs. (1-5,9 x 0,10 mm)

Jeu de Forets. 50 pcs. (1-5,9 x 0,10 mm)



Ref. 1016

| | |
|---------|--------|
| N° Art. | € |
| 5% Co | |
| 10788 | 103,80 |



Ref. 1010

| | |
|---------|-------|
| N° Art. | € |
| HSS | |
| 26765 | 64,87 |



Ref. 1010
TIN

| | |
|---------|--------|
| N° Art. | € |
| TIN | |
| 13154 | 120,41 |

Sets 1406

JUEGO BROCAS. 91 PCS. (1-10 X 0,10 mm)

Drill Bit Set. 91 pcs. (1-10 x 0,10 mm)

Jeu de forets. 91 pcs. (1-10 x 0,10 mm)



Ref.
1016

| N° Art. | € |
|---------|--------|
| 56686 | 354,78 |



Ref.
1015

| N° Art. | € |
|---------|--------|
| 66483 | 364,10 |



Ref.
1013

| N° Art. | € |
|---------|--------|
| 60624 | 255,64 |



Ref.
1010

| N° Art. | € |
|---------|--------|
| 56685 | 230,98 |

* Base roja / Red base / Base rouge

Sets 1408

JUEGO BROCAS. 41 PCS. (6-10 X 0,10 mm)

Drill Bit Set. 41 pcs. (6-10 x 0,10 mm)

Jeu de forets. 41 pcs. (6-10 x 0,10 mm)



Ref.
1016

| N° Art. | € |
|---------|--------|
| 18366 | 252,13 |



Ref.
1010
TIN

| N° Art. | € |
|---------|--------|
| 13152 | 307,37 |



Ref.
1010

| N° Art. | € |
|---------|--------|
| 26771 | 167,27 |

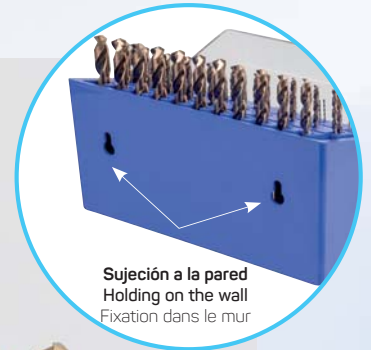
New!

NOVABOX

Sets **1410**



Medir y ubicar las brocas en un solo movimiento
Gauge and place the drills in one single movement
Mesurer et classer les forets en une seule course



- Almacena y trabaja con este juego de 55 brocas para metal
- Manejo fácil para colocar las brocas en los huecos correspondientes
- Posibilidad de colgar en la pared gracias al colgador trasero
- Storage and management in a 55 metalworking drill set
- Easy use to put drills in suitable socket
- Possibility to hang on the wall
- Stockez et travaillez avec ce jeu de 55 forets
- Utilisation facile pour ranger les forets dans le trou correspondant
- Possibilité d'accrocher au mur grâce au crochet arrière

Contenido:
Content:
Contenu:

55
pcs

- Ø1,0 – 4,0 mm: 3 piezas pieces pièces
- Ø4,2 – 8,0 mm: 2 piezas pieces pièces
- Ø8,50 – 13,0 mm: 1 pieza pieces pièces

Agujeros para:

- Brocas desde 1 a 13 mm x 0,5 mm
- Incluye los siguientes diámetros previos al roscado: Ø2,5 / 3,3 / 4,2 / 5,0 / 6,8 / 8,5 / 10,2 / 12,0 mm para las métricas de roscado M3 / M4 / M5 / M6 / M8 / M10 / M12 / M14

Holes for:

- Drill diameters from 1 to 13 mm x 0,5 mm
- Includes core hole sizes: Ø2,5 / 3,3 / 4,2 / 5,0 / 6,8 / 8,5 / 10,2 / 12,0 mm for threading dimensions M3 / M4 / M5 / M6 / M8 / M10 / M12 / M14

Trous pour:

- Forets de 1 à 13 mm x 0,5 mm
- Inclut les diamètres suivantes pré-taraudage: Ø2,5 / 3,3 / 4,2 / 5,0 / 6,8 / 8,5 / 10,2 / 12,0 mm pour les métriques de taraudage M3 / M4 / M5 / M6 / M8 / M10 / M12 / M14

Sets 1410

MEDIDOR DE DIÁMETROS

Diameter gauge
Jauge de diamètres

55 Pcs:

1-13 x 0,5 mm

- Ø1,0 – 4,0 mm: 3 pcs
- Ø4,2 – 8,0 mm: 2 pcs
- Ø8,50 – 13,0 mm: 1 pcs

Ref.
1016



| Cont. Ø | Nº Art. 5% Co | € |
|-----------------|------------------|--------|
| 1 - 13 x 0,5 mm | 19537 | 235,30 |

Ref.
1015



| Cont. Ø | Nº Art. Zirkonio | € |
|-----------------|---------------------|--------|
| 1 - 13 x 0,5 mm | 28360 | 241,82 |

Ref.
1010



| Cont. Ø | Nº Art. HSS | € |
|-----------------|----------------|--------|
| 1 - 13 x 0,5 mm | 19535 | 136,45 |

Ref.
1013



| Cont. Ø | Nº Art. HSS | € |
|-----------------|----------------|--------|
| 1 - 13 x 0,5 mm | 19536 | 148,37 |

Sets **1470**

JUEGO BROCAS
Drill Bit Set
Jeu de forets

170 Pcs: 1-10 x 0,5 mm
ø 1-8: 10 pcs/ø
ø 8,5-10: 5 pcs/ø



Ref. 1016

| | |
|---------------|--------|
| N° Art. 5% Co | € |
| 10676 | 456,33 |



Ref. 1013

| | |
|-------------|--------|
| N° Art. HSS | € |
| 56677 | 294,68 |



Ref. 1010

| | |
|-------------|--------|
| N° Art. HSS | € |
| 19590 | 264,67 |

220 Pcs: 1-13 x 0,5 + 3,3 + 4,2 mm
ø 1-8: 10 pcs/ø
ø 8,5-13: 5 pcs/ø



Ref. 1016

| | |
|---------------|--------|
| N° Art. 5% Co | € |
| 25391 | 906,06 |



Ref. 1013

| | |
|-------------|--------|
| N° Art. HSS | € |
| 56679 | 558,17 |



Ref. 1010

| | |
|-------------|--------|
| N° Art. HSS | € |
| 56676 | 503,89 |

Sets **1476**

JUEGO BROCAS. 19 PCS. (1-10 X 0,50 mm)
Drill Bit Set. 19 pcs. (1-10 x 0,50 mm)
Jeu de forets. 19 pcs. (1-10 x 0,50 mm)



Ref. 1056

| | |
|---------------|-------|
| N° Art. 5% Co | € |
| 11943 | 90,75 |



Ref. 1056
TIALSIN

| | |
|-----------------|--------|
| N° Art. TIALSIN | € |
| 27014 | 138,47 |



Ref. 1050

| | |
|-------------|-------|
| N° Art. HSS | € |
| 11935 | 59,49 |

1021

Sets
BROCA MULTI INOX
Multi-STAINLESS Drill Bit
Foret Multi INOX



| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 5,50 | 10 | 10,00 | 5 |
| 1,50 | 10 | 6,00 | 10 | 10,50 | 1 |
| 2,00 | 10 | 6,50 | 10 | 11,00 | 1 |
| 2,50 | 10 | 7,00 | 10 | 11,50 | 1 |
| 3,00 | 10 | 7,50 | 10 | 12,00 | 1 |
| 3,50 | 10 | 8,00 | 10 | 12,50 | 1 |
| 4,00 | 10 | 8,50 | 5 | 13,00 | 1 |
| 4,50 | 10 | 9,00 | 5 | | |
| 5,00 | 10 | 9,50 | 5 | | |

176 Pcs

N° Art.
HSSE

€
55448 886,70



Cuartos / Quarters / Quarts

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,25 | 10 | 8,00 | 10 |
| 1,50 | 10 | 4,50 | 10 | 8,50 | 10 |
| 2,00 | 10 | 5,00 | 10 | 9,00 | 10 |
| 2,50 | 10 | 5,50 | 10 | 9,50 | 5 |
| 3,00 | 10 | 6,00 | 10 | 10,00 | 5 |
| 3,25 | 10 | 6,50 | 10 | 11,00 | 2 |
| 3,50 | 10 | 7,00 | 10 | 12,00 | 2 |
| 4,00 | 10 | 7,50 | 10 | 13,00 | 2 |

206 Pcs

N° Art. HSSE

€
57527 1.035,50

Previos Roscado / Before Threading / Pré-Taraudage

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,50 | 10 | 8,50 | 10 |
| 1,50 | 10 | 5,00 | 10 | 9,00 | 10 |
| 2,00 | 10 | 5,50 | 10 | 9,50 | 5 |
| 2,50 | 10 | 6,00 | 10 | 10,00 | 5 |
| 3,00 | 10 | 6,50 | 10 | 10,20 | 2 |
| 3,30 | 10 | 6,80 | 10 | 11,00 | 2 |
| 3,50 | 10 | 7,00 | 10 | 12,00 | 2 |
| 4,00 | 10 | 7,50 | 10 | 13,00 | 2 |
| 4,20 | 10 | 8,00 | 10 | | |

218 Pcs

N° Art. HSSE

€
57981 1.128,37

1020

Sets
BROCA INOX
Stainless Steel Drill Bit
Foret Inoxydable



| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 5,50 | 10 | 10,00 | 5 |
| 1,50 | 10 | 6,00 | 10 | 10,50 | 5 |
| 2,00 | 10 | 6,50 | 10 | 11,00 | 5 |
| 2,50 | 10 | 7,00 | 10 | 11,50 | 5 |
| 3,00 | 10 | 7,50 | 10 | 12,00 | 5 |
| 3,50 | 10 | 8,00 | 10 | 12,50 | 5 |
| 4,00 | 10 | 8,50 | 5 | 13,00 | 5 |
| 4,50 | 10 | 9,00 | 5 | | |
| 5,00 | 10 | 9,50 | 5 | | |

200 Pcs

N° Art.
HSSE

€
55446 1.084,01



Cuartos / Quarters / Quarts

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,25 | 10 | 8,00 | 10 |
| 1,50 | 10 | 4,50 | 10 | 8,50 | 5 |
| 2,00 | 20 | 5,00 | 20 | 9,00 | 10 |
| 2,50 | 10 | 5,50 | 10 | 9,50 | 5 |
| 3,00 | 20 | 6,00 | 20 | 10,00 | 5 |
| 3,25 | 10 | 6,50 | 10 | 11,00 | 5 |
| 3,50 | 20 | 7,00 | 10 | 12,00 | 5 |
| 4,00 | 20 | 7,50 | 10 | 13,00 | 5 |

270 Pcs

N° Art. HSSE

€
57526 1.089,11

Previos Roscado / Before Threading / Pré-Taraudage

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,50 | 10 | 8,50 | 5 |
| 1,50 | 10 | 5,00 | 20 | 9,00 | 10 |
| 2,00 | 20 | 5,50 | 10 | 9,50 | 5 |
| 2,50 | 10 | 6,00 | 20 | 10,00 | 5 |
| 3,00 | 20 | 6,50 | 10 | 10,20 | 5 |
| 3,30 | 10 | 6,80 | 10 | 11,00 | 5 |
| 3,50 | 20 | 7,00 | 10 | 12,00 | 5 |
| 4,00 | 20 | 7,50 | 10 | 13,00 | 5 |
| 4,20 | 10 | 8,00 | 10 | | |

285 Pcs

N° Art. HSSE

€
57979 1.199,45

1016

Sets
BROCA MATERIALES DUROS
Hard Materials Drill Bit
Foret matériaux durs



| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 5,50 | 10 | 10,00 | 10 |
| 1,50 | 10 | 6,00 | 10 | 10,50 | 5 |
| 2,00 | 10 | 6,50 | 10 | 11,00 | 5 |
| 2,50 | 10 | 7,00 | 10 | 11,50 | 5 |
| 3,00 | 10 | 7,50 | 10 | 12,00 | 5 |
| 3,50 | 10 | 8,00 | 10 | 12,50 | 5 |
| 4,00 | 10 | 8,50 | 10 | 13,00 | 5 |
| 4,50 | 10 | 9,00 | 10 | | |
| 5,00 | 10 | 9,50 | 10 | | |

220 Pcs

N° Art.
HSSE

€
55449 938,29



Cuartos / Quarters / Quarts

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,25 | 10 | 8,00 | 30 |
| 1,50 | 10 | 4,50 | 10 | 8,50 | 10 |
| 2,00 | 40 | 5,00 | 40 | 9,00 | 10 |
| 2,50 | 10 | 5,50 | 10 | 9,50 | 10 |
| 3,00 | 40 | 6,00 | 40 | 10,00 | 10 |
| 3,25 | 10 | 6,50 | 10 | 11,00 | 5 |
| 3,50 | 10 | 7,00 | 10 | 12,00 | 5 |
| 4,00 | 40 | 7,50 | 10 | 13,00 | 5 |

395 Pcs

N° Art. HSSE

€
57525 1.137,01

Previos Roscado / Before Threading / Pré-Taraudage

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,50 | 10 | 8,50 | 10 |
| 1,50 | 10 | 5,00 | 40 | 9,00 | 10 |
| 2,00 | 40 | 5,50 | 10 | 9,50 | 10 |
| 2,50 | 10 | 6,00 | 40 | 10,00 | 10 |
| 3,00 | 40 | 6,50 | 10 | 10,20 | 5 |
| 3,30 | 10 | 6,80 | 10 | 11,00 | 5 |
| 3,50 | 10 | 7,00 | 10 | 12,00 | 5 |
| 4,00 | 40 | 7,50 | 10 | 13,00 | 5 |
| 4,20 | 10 | 8,00 | 30 | | |

410 Pcs

N° Art. HSSE

€
57978 1.219,46

Sets 1015

BROCA ZIRKONIO

Zirkonio Drill Bit

Foret Zirkonio



| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 5,50 | 10 | 10,00 | 5 |
| 1,50 | 10 | 6,00 | 10 | 10,50 | 5 |
| 2,00 | 10 | 6,50 | 10 | 11,00 | 5 |
| 2,50 | 10 | 7,00 | 10 | 11,50 | 5 |
| 3,00 | 10 | 7,50 | 10 | 12,00 | 5 |
| 3,50 | 10 | 8,00 | 10 | 12,50 | 5 |
| 4,00 | 10 | 8,50 | 5 | 13,00 | 5 |
| 4,50 | 10 | 9,00 | 5 | | |
| 5,00 | 10 | 9,50 | 5 | | |

200 Pcs

N° Art. Zirkonio

€

14229

848,08



Cuartos / Quarters / Quarts

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,25 | 10 | 8,00 | 20 |
| 1,50 | 10 | 4,50 | 10 | 8,50 | 10 |
| 2,00 | 30 | 5,00 | 40 | 9,00 | 10 |
| 2,50 | 10 | 5,50 | 10 | 9,50 | 5 |
| 3,00 | 50 | 6,00 | 50 | 10,00 | 10 |
| 3,25 | 10 | 6,50 | 10 | 11,00 | 5 |
| 3,50 | 10 | 7,00 | 10 | 12,00 | 5 |
| 4,00 | 50 | 7,50 | 10 | 13,00 | 5 |

400 Pcs

N° Art. Zirkonio

€

15999

1.141,17

Previos Roscado / Before Threading / Pré-Taraudage

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 4,50 | 10 | 8,50 | 10 |
| 1,50 | 10 | 5,00 | 40 | 9,00 | 10 |
| 2,00 | 30 | 5,50 | 10 | 9,50 | 5 |
| 2,50 | 10 | 6,00 | 50 | 10,00 | 10 |
| 3,00 | 50 | 6,50 | 10 | 10,20 | 5 |
| 3,30 | 10 | 6,80 | 10 | 11,00 | 5 |
| 3,50 | 10 | 7,00 | 10 | 12,00 | 5 |
| 4,00 | 50 | 7,50 | 10 | 13,00 | 5 |
| 4,20 | 10 | 8,00 | 20 | | |

415 Pcs

N° Art. Zirkonio

€

16001

1.225,10

Sets 1013

BROCA AGUZADA

Split Point Drill Bit

Foret affutage en croix



| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 5,50 | 10 | 10,00 | 5 |
| 1,50 | 10 | 6,00 | 30 | 10,50 | 5 |
| 2,00 | 20 | 6,50 | 10 | 11,00 | 5 |
| 2,50 | 20 | 7,00 | 10 | 11,50 | 5 |
| 3,00 | 40 | 7,50 | 10 | 12,00 | 5 |
| 3,50 | 20 | 8,00 | 20 | 12,50 | 5 |
| 4,00 | 40 | 8,50 | 5 | 13,00 | 5 |
| 4,50 | 20 | 9,00 | 5 | | |
| 5,00 | 30 | 9,50 | 5 | | |

350 Pcs

N° Art. HSS

€

55443

661,34



Cuartos / Quarters / Quarts

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 30 | 4,25 | 30 | 8,00 | 40 |
| 1,50 | 20 | 4,50 | 30 | 8,50 | 20 |
| 2,00 | 40 | 5,00 | 50 | 9,00 | 20 |
| 2,50 | 30 | 5,50 | 40 | 9,50 | 5 |
| 3,00 | 50 | 6,00 | 50 | 10,00 | 20 |
| 3,25 | 30 | 6,50 | 20 | 11,00 | 5 |
| 3,50 | 30 | 7,00 | 20 | 12,00 | 10 |
| 4,00 | 50 | 7,50 | 20 | 13,00 | 5 |

665 Pcs

N° Art. HSS

€

57524

1.133,56

Previos Roscado / Before Threading / Pré-Taraudage

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 30 | 4,50 | 30 | 8,50 | 20 |
| 1,50 | 20 | 5,00 | 50 | 9,00 | 20 |
| 2,00 | 40 | 5,50 | 40 | 9,50 | 5 |
| 2,50 | 30 | 6,00 | 50 | 10,00 | 20 |
| 3,00 | 50 | 6,50 | 20 | 10,20 | 5 |
| 3,30 | 30 | 6,80 | 10 | 11,00 | 5 |
| 3,50 | 30 | 7,00 | 20 | 12,00 | 10 |
| 4,00 | 50 | 7,50 | 20 | 13,00 | 5 |
| 4,20 | 30 | 8,00 | 40 | | |

680 Pcs

N° Art. HSS

€

57976

1.182,79

Sets 1010

BROCA USO GENERAL

General Purpose Drill Bit

Foret utilisation générale



| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 10 | 5,50 | 10 | 10,00 | 10 |
| 1,50 | 10 | 6,00 | 30 | 10,50 | 5 |
| 2,00 | 20 | 6,50 | 10 | 11,00 | 5 |
| 2,50 | 20 | 7,00 | 10 | 11,50 | 5 |
| 3,00 | 50 | 7,50 | 10 | 12,00 | 5 |
| 3,50 | 30 | 8,00 | 20 | 12,50 | 5 |
| 4,00 | 40 | 8,50 | 10 | 13,00 | 5 |
| 4,50 | 20 | 9,00 | 10 | | |
| 5,00 | 40 | 9,50 | 10 | | |

400 Pcs

N° Art. HSS

€

55440

696,08



Cuartos / Quarters / Quarts

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 30 | 4,25 | 10 | 8,00 | 40 |
| 1,50 | 20 | 4,50 | 20 | 8,50 | 10 |
| 2,00 | 40 | 5,00 | 80 | 9,00 | 10 |
| 2,50 | 30 | 5,50 | 10 | 9,50 | 10 |
| 3,00 | 80 | 6,00 | 60 | 10,00 | 30 |
| 3,25 | 20 | 6,50 | 20 | 11,00 | 15 |
| 3,50 | 20 | 7,00 | 20 | 12,00 | 20 |
| 4,00 | 60 | 7,50 | 10 | 13,00 | 10 |

675 Pcs

N° Art. HSS

€

57523

1.134,98

Previos Roscado / Before Threading / Pré-Taraudage

| Ø mm | Uds | Ø mm | Uds | Ø mm | Uds |
|------|-----|------|-----|-------|-----|
| 1,00 | 30 | 4,50 | 20 | 8,50 | 10 |
| 1,50 | 20 | 5,00 | 80 | 9,00 | 10 |
| 2,00 | 40 | 5,50 | 10 | 9,50 | 10 |
| 2,50 | 30 | 6,00 | 60 | 10,00 | 30 |
| 3,00 | 80 | 6,50 | 20 | 10,20 | 10 |
| 3,30 | 20 | 6,80 | 10 | 11,00 | 15 |
| 3,50 | 20 | 7,00 | 20 | 12,00 | 20 |
| 4,00 | 60 | 7,50 | 10 | 13,00 | 10 |
| 4,20 | 10 | 8,00 | 40 | | |

695 Pcs

N° Art. HSS

€

57975

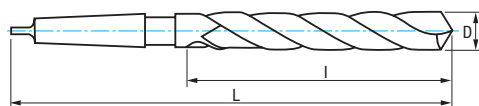
1.202,53

Ref. **9196**

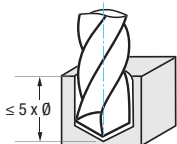
BROCA MANGO CÔNICO PUNTA METAL DURO. SERIE CORTA

Carbide Tipped Morse Taper Shank Drill Bit. Jobber Series

Foret queue cône morse pointe carbure. Série courte



| | | | | | | |
|----------------------------|--------------|------|--|------------------------------|---------------------------------------|--------------|
| MD HM Carbure | DIN 345 N | 118° | | White Flute (Black Helix) | Rectificado Ground Taillé meulé | Tol. D h7 |
|----------------------------|--------------|------|--|------------------------------|---------------------------------------|--------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 |
| P | P.2 | 30-50 | 0,045 | 0,050 | 0,055 | 0,070 | 0,080 | 0,080 | 0,090 |
| | P.3 | 10-15 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 | 0,070 | 0,080 |
| | P.5 | 12-25 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 | 0,070 | 0,080 |
| M | | 10-25 | 0,040 | 0,040 | 0,050 | 0,050 | 0,060 | 0,070 | 0,080 |
| K | K.1 | 50-90 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 |
| | K.2 | 40-60 | 0,040 | 0,050 | 0,050 | 0,060 | 0,060 | 0,070 | 0,080 |
| S | | 20-35 | 0,035 | 0,050 | 0,060 | 0,080 | 0,090 | 0,120 | 0,150 |
| N | N.1 | 40-100 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,180 | 0,200 |
| | N.2 | 40-100 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,180 | 0,200 |
| | N.7 | 20-100 | 0,060 | 0,065 | 0,070 | 0,080 | 0,120 | 0,150 | 0,200 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | CM | N° Art. MD/HM | € | D mm | L mm | I mm | CM | N° Art. MD/HM | € |
|-------|------|------|----|---------------|--------|-------|------|------|----|---------------|--------|
| 8,00 | 156 | 75 | 1 | 73049 | 60,26 | 19,50 | 238 | 140 | 2 | 73115 | 182,63 |
| 8,50 | 156 | 75 | 1 | 73052 | 65,18 | 20,00 | 238 | 140 | 2 | 73118 | 182,63 |
| 9,00 | 162 | 81 | 1 | 73055 | 65,18 | 20,50 | 243 | 145 | 2 | 73121 | 185,20 |
| 9,50 | 162 | 81 | 1 | 73058 | 65,18 | 21,00 | 243 | 145 | 2 | 73124 | 185,20 |
| 10,00 | 168 | 87 | 1 | 73061 | 71,70 | 21,50 | 248 | 150 | 2 | 73127 | 202,18 |
| 10,50 | 168 | 87 | 1 | 73064 | 71,70 | 22,00 | 248 | 150 | 2 | 74132 | 202,18 |
| 11,00 | 175 | 94 | 1 | 73067 | 77,50 | 22,50 | 248 | 150 | 2 | 73130 | 202,18 |
| 11,50 | 175 | 94 | 1 | 73070 | 77,50 | 23,00 | 253 | 155 | 2 | 73133 | 219,90 |
| 12,00 | 182 | 101 | 1 | 73073 | 81,28 | 23,50 | 276 | 155 | 3 | 73136 | 219,90 |
| 12,50 | 182 | 101 | 1 | 73076 | 81,28 | 24,00 | 281 | 160 | 3 | 73139 | 241,64 |
| 13,00 | 182 | 101 | 1 | 73079 | 92,42 | 24,50 | 281 | 160 | 3 | 73142 | 241,64 |
| 13,50 | 189 | 108 | 1 | 73082 | 92,42 | 25,00 | 281 | 160 | 3 | 73145 | 247,43 |
| 14,00 | 189 | 108 | 1 | 73085 | 100,50 | 26,00 | 286 | 165 | 3 | 73151 | 278,06 |
| 14,50 | 212 | 114 | 2 | 73088 | 100,50 | 27,00 | 291 | 170 | 3 | 73157 | 296,68 |
| 15,00 | 212 | 114 | 2 | 73091 | 113,53 | 28,00 | 291 | 170 | 3 | 73163 | 328,28 |
| 15,50 | 218 | 120 | 2 | 73094 | 121,32 | 29,00 | 296 | 175 | 3 | 73169 | 349,59 |
| 16,00 | 218 | 120 | 2 | 73097 | 121,32 | 30,00 | 296 | 175 | 3 | 73172 | 371,99 |
| 16,50 | 223 | 125 | 2 | 73100 | 121,32 | 31,00 | 301 | 180 | 3 | 73175 | 492,41 |
| 17,00 | 223 | 125 | 2 | 74129 | 128,64 | 32,00 | 334 | 185 | 4 | 73178 | 492,41 |
| 17,50 | 228 | 130 | 2 | 73103 | 128,64 | 33,00 | 334 | 185 | 4 | 73181 | 606,85 |
| 18,00 | 228 | 130 | 2 | 73106 | 138,90 | 34,00 | 339 | 190 | 4 | 73184 | 606,85 |
| 18,50 | 233 | 135 | 2 | 73109 | 162,51 | 35,00 | 339 | 190 | 4 | 73187 | 606,85 |
| 19,00 | 233 | 135 | 2 | 73112 | 162,51 | | | | | | |

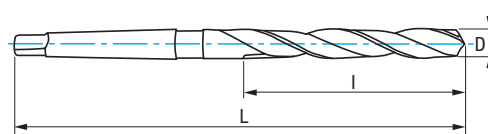


Ref. **9116**

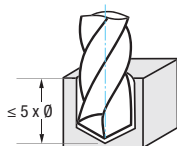
BROCA MANGO CÓNICO INOX. SERIE CORTA

Stainless Steel Morse Taper Shank Drill Bit. Jobber Series

Foret queue cône morse inoxydable. Série courte



| | | | | | | | |
|---------------|--------------|------|---|---------------------------------------|------------------------------------|----------------|--------------|
| HSSE 5% Co | DIN 345 N | 118° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé | Afilado Split Point Affûtage | "S" > 11,50 mm | Tol. D h8 |
|---------------|--------------|------|---|---------------------------------------|------------------------------------|----------------|--------------|



$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

$$V_f (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | Ø 40 |
| P | P.2 | 20-25 | 0,120 | 0,130 | 0,160 | 0,200 | 0,250 | 0,260 | 0,300 |
| | P.5 | 8-12 | 0,100 | 0,120 | 0,150 | 0,170 | 0,210 | 0,250 | 0,300 |
| M | | 6-12 | 0,100 | 0,120 | 0,150 | 0,170 | 0,210 | 0,250 | 0,300 |
| K | K.1 | 30-35 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |
| | K.2 | 40-60 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 |
| S | | 10-15 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |
| N | N.1 | 30-40 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 |
| | N.2 | 30-40 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |

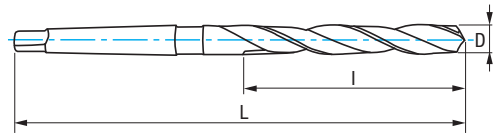
| D mm | L mm | I mm | CM | N° Art. 5% Co | € |
|--|------|------|----|---------------|--------|
| 10,00 | 168 | 84 | 1 | 74650 | 59,82 |
| 10,50 | 168 | 84 | 1 | 74651 | 62,37 |
| 11,00 | 175 | 94 | 1 | 74652 | 59,78 |
| 11,50 | 175 | 94 | 1 | 74675 | 62,37 |
| DIAM. > 11,50 mm Afilado "S" Point | | | | | |
| 12,00 | 182 | 101 | 1 | 74676 | 63,94 |
| 12,50 | 182 | 101 | 1 | 74677 | 67,68 |
| 13,00 | 182 | 101 | 1 | 74678 | 65,69 |
| 13,50 | 189 | 108 | 1 | 74679 | 85,83 |
| 14,00 | 189 | 108 | 1 | 74680 | 84,17 |
| 14,50 | 212 | 114 | 2 | 74681 | 93,44 |
| 15,00 | 212 | 114 | 2 | 74682 | 85,83 |
| 15,50 | 218 | 120 | 2 | 74683 | 95,10 |
| 16,00 | 218 | 120 | 2 | 74684 | 91,75 |
| 16,50 | 223 | 125 | 2 | 74685 | 95,94 |
| 17,00 | 223 | 125 | 2 | 74686 | 95,10 |
| 17,50 | 228 | 130 | 2 | 74687 | 101,03 |
| 18,00 | 228 | 130 | 2 | 74688 | 99,34 |
| 18,50 | 233 | 135 | 2 | 74689 | 108,57 |
| 19,00 | 233 | 135 | 2 | 74690 | 106,07 |
| 19,50 | 238 | 140 | 2 | 74691 | 122,09 |
| 20,00 | 238 | 140 | 2 | 74692 | 118,69 |
| 20,50 | 243 | 145 | 2 | 74693 | 136,35 |

| D mm | L mm | I mm | CM | N° Art. 5% Co | € |
|-------|------|------|----|---------------|--------|
| 21,00 | 243 | 145 | 2 | 74694 | 138,04 |
| 21,50 | 248 | 150 | 2 | 74695 | 155,78 |
| 22,00 | 248 | 150 | 2 | 74117 | 140,47 |
| 22,50 | 253 | 155 | 2 | 74696 | 173,41 |
| 23,00 | 253 | 155 | 2 | 74697 | 163,40 |
| 23,50 | 276 | 155 | 3 | 74698 | 173,41 |
| 24,00 | 281 | 160 | 3 | 74699 | 175,09 |
| 24,50 | 281 | 160 | 3 | 74700 | 186,92 |
| 25,00 | 281 | 160 | 3 | 74701 | 184,96 |
| 25,50 | 286 | 165 | 3 | 74702 | 229,06 |
| 26,00 | 286 | 165 | 3 | 74703 | 217,06 |
| 26,50 | 286 | 165 | 3 | 74704 | 240,75 |
| 27,00 | 291 | 170 | 3 | 74705 | 240,75 |
| 27,50 | 291 | 170 | 3 | 74706 | 287,90 |
| 28,00 | 291 | 170 | 3 | 74707 | 266,35 |
| 28,50 | 296 | 175 | 3 | 74708 | 294,64 |
| 29,00 | 296 | 175 | 3 | 74709 | 272,28 |
| 29,50 | 296 | 175 | 3 | 74710 | 301,40 |
| 30,00 | 296 | 175 | 3 | 74711 | 278,06 |
| 32,00 | 334 | 185 | 4 | 74714 | 294,61 |
| 33,00 | 334 | 185 | 4 | 74715 | 336,48 |
| 35,00 | 339 | 190 | 4 | 74717 | 399,83 |
| 36,00 | 344 | 195 | 4 | 74718 | 429,01 |
| 39,00 | 349 | 200 | 4 | 74721 | 507,26 |
| 40,00 | 349 | 200 | 4 | 74722 | 535,73 |



Ref. **1110**

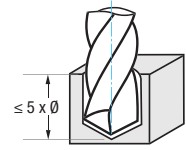
BROCA MANGO CÓNICO HSS. SERIE CORTA
 HSS Morse Taper Shank Drill Bit. Jobber Series
 Foret queue cône morse HSS. Série courte



| | | | | | | | |
|-----|-----------|-----------|------|-----------|-------------|------------------------------------|-----------|
| HSS | HSS + TIN | DIN 345 N | 118° | (Ø14÷Ø40) | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|-----------|------|-----------|-------------|------------------------------------|-----------|

HSS **TIN** **x2,5** Resistencia al desgaste
 Wear Resistance
 Résistant à l'usure

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | | |
|----------|------|------------|-------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | HSS | TIN | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | |
| P | P.1 | 25-30 | 30-35 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 | 0,300 | 0,310 | 0,400 | |
| | P.2 | 15-20 | 20-25 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 | 0,200 | 0,250 | 0,260 | 0,300 | |
| K | K.1 | 30-35 | 36-42 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 | |
| | K.2 | 25-30 | 30-36 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 | |
| N | N.1 | 30-40 | 36-48 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 | |
| | N.2 | 30-40 | 36-48 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 | |



$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \varnothing}$$

$$V_f (\text{mm/min.}) = \text{r.p.m.} \times f$$

| D mm | L mm | I mm | CM | Nº Art. HSS | € | Nº Art. TIN | € | D mm | L mm | I mm | CM | Nº Art. HSS | € | Nº Art. TIN | € |
|-------|------|------|----|-------------|-------|-------------|-------|-------|------|------|----|-------------|-------|-------------|-------|
| 5,00 | 133 | 52 | 1 | 14426 | 13,92 | | | 15,00 | 212 | 114 | 2 | 14546 | 25,96 | 22583 | 40,53 |
| 5,25 | 133 | 52 | 1 | 14429 | 16,01 | | | 15,25 | 218 | 120 | 2 | 14549 | 30,89 | | |
| 5,50 | 138 | 57 | 1 | 14432 | 13,92 | | | 15,50 | 218 | 120 | 2 | 14552 | 26,85 | 22586 | 41,45 |
| 5,75 | 138 | 57 | 1 | 14435 | 16,01 | | | 15,75 | 218 | 120 | 2 | 14555 | 30,89 | | |
| 6,00 | 138 | 57 | 1 | 14438 | 13,92 | | | 16,00 | 218 | 120 | 2 | 14558 | 26,85 | 22589 | 41,45 |
| 6,25 | 144 | 63 | 1 | 14441 | 18,24 | | | 16,25 | 223 | 125 | 2 | 14561 | 34,94 | | |
| 6,50 | 144 | 63 | 1 | 14444 | 14,81 | 27616 | 21,60 | 16,50 | 223 | 125 | 2 | 14564 | 30,37 | 22592 | 45,35 |
| 6,75 | 150 | 69 | 1 | 14447 | 17,03 | 27617 | 23,83 | 16,75 | 223 | 125 | 2 | 14567 | 34,94 | | |
| 7,00 | 150 | 69 | 1 | 14450 | 14,81 | | | 17,00 | 223 | 125 | 2 | 14570 | 30,37 | 22595 | 45,35 |
| 7,25 | 150 | 69 | 1 | 14453 | 19,59 | | | 17,25 | 228 | 130 | 2 | 14573 | 38,65 | | |
| 7,50 | 150 | 69 | 1 | 14456 | 15,93 | | | 17,50 | 228 | 130 | 2 | 14576 | 33,60 | 27573 | 48,58 |
| 7,75 | 156 | 75 | 1 | 14459 | 19,59 | | | 17,75 | 228 | 130 | 2 | 14579 | 38,65 | | |
| 8,00 | 156 | 75 | 1 | 14462 | 15,88 | 10590 | 22,67 | 18,00 | 228 | 130 | 2 | 14582 | 32,33 | 22598 | 47,30 |
| 8,25 | 156 | 75 | 1 | 14465 | 22,99 | | | 18,25 | 233 | 135 | 2 | 14585 | 42,53 | 27004 | 64,73 |
| 8,50 | 156 | 75 | 1 | 14468 | 17,27 | 18636 | 24,48 | 18,50 | 233 | 135 | 2 | 14588 | 36,99 | 27560 | 59,20 |
| 8,75 | 162 | 81 | 1 | 14471 | 20,66 | | | 18,75 | 233 | 135 | 2 | 14591 | 42,53 | | |
| 9,00 | 162 | 81 | 1 | 14474 | 17,27 | | | 19,00 | 233 | 135 | 2 | 14594 | 36,99 | 27561 | 59,20 |
| 9,25 | 162 | 81 | 1 | 14477 | 22,85 | | | 19,25 | 238 | 140 | 2 | 14597 | 46,29 | | |
| 9,50 | 162 | 81 | 1 | 14480 | 17,06 | | | 19,50 | 238 | 140 | 2 | 14600 | 40,25 | 22601 | 62,30 |
| 9,75 | 168 | 87 | 1 | 14483 | 22,85 | | | 19,75 | 238 | 140 | 2 | 14603 | 46,29 | | |
| 10,00 | 168 | 87 | 1 | 14486 | 16,75 | 27209 | 30,05 | 20,00 | 238 | 140 | 2 | 14606 | 40,25 | 22607 | 62,30 |
| 10,25 | 168 | 87 | 1 | 14489 | 21,39 | 19677 | 32,76 | 20,25 | 243 | 145 | 2 | 14609 | 47,99 | 67709 | 70,85 |
| 10,50 | 168 | 87 | 1 | 14492 | 18,58 | | | 20,50 | 243 | 145 | 2 | 14612 | 41,73 | 22610 | 64,59 |
| 10,75 | 175 | 94 | 1 | 14495 | 21,39 | | | 20,75 | 243 | 145 | 2 | 14615 | 47,99 | | |
| 11,00 | 175 | 94 | 1 | 14498 | 18,58 | 22562 | 29,96 | 21,00 | 243 | 145 | 2 | 14618 | 41,73 | 22613 | 68,37 |
| 11,25 | 175 | 94 | 1 | 14501 | 22,49 | 67708 | 34,98 | 21,25 | 248 | 150 | 2 | 14621 | 52,94 | 24531 | 79,57 |
| 11,50 | 175 | 94 | 1 | 14504 | 19,57 | | | 21,50 | 248 | 150 | 2 | 14624 | 46,01 | 27593 | 72,66 |
| 11,75 | 175 | 94 | 1 | 14507 | 22,49 | | | 21,75 | 248 | 150 | 2 | 14627 | 52,94 | 39985 | 79,57 |
| 12,00 | 182 | 101 | 1 | 14510 | 19,57 | 22568 | 30,95 | 22,00 | 248 | 150 | 2 | 14630 | 46,01 | 22616 | 72,66 |
| 12,25 | 182 | 101 | 1 | 14513 | 25,04 | | | 22,25 | 248 | 150 | 2 | 14633 | 57,92 | | |
| 12,50 | 182 | 101 | 1 | 14516 | 20,95 | 22571 | 34,43 | 22,50 | 253 | 155 | 2 | 14636 | 50,37 | 27582 | 77,26 |
| 12,75 | 182 | 101 | 1 | 14519 | 25,04 | | | 22,75 | 253 | 155 | 2 | 14639 | 57,92 | 18729 | 86,06 |
| 13,00 | 182 | 101 | 1 | 14522 | 21,79 | 22574 | 35,29 | 23,00 | 253 | 155 | 2 | 14642 | 50,37 | 27562 | 78,51 |
| 13,25 | 189 | 108 | 1 | 14525 | 27,55 | 49243 | 41,05 | 23,25 | 276 | 155 | 3 | 14645 | 63,91 | 67710 | 92,05 |
| 13,50 | 189 | 108 | 1 | 14528 | 23,01 | 19713 | 36,53 | 23,50 | 276 | 155 | 3 | 14648 | 55,57 | 15079 | 83,71 |
| 13,75 | 189 | 108 | 1 | 14531 | 27,55 | | | 23,75 | 281 | 160 | 3 | 14651 | 63,91 | 67711 | 92,05 |
| 14,00 | 189 | 108 | 1 | 14534 | 23,01 | 22577 | 36,53 | 24,00 | 281 | 160 | 3 | 14654 | 55,57 | 22622 | 83,71 |
| 14,25 | 212 | 114 | 2 | 14537 | 29,83 | 19723 | 44,40 | 24,25 | 281 | 160 | 3 | 14657 | 69,71 | | |
| 14,50 | 212 | 114 | 2 | 14540 | 25,96 | 22580 | 40,53 | 24,50 | 281 | 160 | 3 | 14660 | 60,59 | 22625 | 98,85 |
| 14,75 | 212 | 114 | 2 | 14543 | 29,83 | | | 24,75 | 281 | 160 | 3 | 14663 | 69,71 | | |

Ref. **1110**
BROCA MANGO CÓNICO HSS. SERIE CORTA
 HSS Morse Taper Shank Drill Bit. Jobber Series
 Foret queue cône morse HSS. Série courte

| D mm | L mm | I mm | CM | N° Art. HSS | € | N° Art. TIN | € | D mm | L mm | I mm | CM | N° Art. HSS | € | N° Art. TIN | € |
|---------|---------|---------|----|----------------|--------|----------------|--------|---------|---------|---------|----|----------------|----------|----------------|--------|
| 25,00 | 281 | 160 | 3 | 14666 | 60,59 | 22628 | 98,85 | 47,50 | 364 | 215 | 4 | 14843 | 276,97 | | |
| 25,25 | 286 | 165 | 3 | 14669 | 75,83 | | | 48,00 | 369 | 220 | 4 | 14846 | 276,97 | 13131 | 353,62 |
| 25,50 | 286 | 165 | 3 | 14672 | 65,92 | 79571 | 103,92 | 48,50 | 369 | 220 | 4 | 14849 | 287,60 | | |
| 25,75 | 286 | 165 | 3 | 14675 | 75,83 | | | 49,00 | 369 | 220 | 4 | 14852 | 287,60 | | |
| 26,00 | 286 | 165 | 3 | 14678 | 65,92 | 22634 | 103,92 | 49,50 | 369 | 220 | 4 | 14855 | 298,05 | 67720 | 374,68 |
| 26,25 | 286 | 165 | 3 | 14681 | 82,10 | | | 50,00 | 369 | 220 | 4 | 14858 | 298,05 | 26753 | 374,68 |
| 26,50 | 286 | 165 | 3 | 14684 | 71,40 | 19798 | 109,15 | 51,00 | 412 | 225 | 5 | 14864 | 351,85 | | |
| 26,75 | 291 | 170 | 3 | 14687 | 82,10 | 67712 | 119,84 | 52,00 | 412 | 225 | 5 | 14867 | 375,13 | | |
| 27,00 | 291 | 170 | 3 | 14690 | 71,40 | 26741 | 109,15 | 53,00 | 412 | 225 | 5 | 14870 | 400,28 | | |
| 27,25 | 291 | 170 | 3 | 14693 | 87,87 | | | 54,00 | 417 | 230 | 5 | 14873 | 442,62 | | |
| 27,50 | 291 | 170 | 3 | 14696 | 76,44 | 26744 | 113,94 | 55,00 | 417 | 230 | 5 | 14876 | 436,74 | 58497 | 509,70 |
| 27,75 | 291 | 170 | 3 | 14699 | 87,87 | | | 56,00 | 417 | 230 | 5 | 14879 | 492,98 | | |
| 28,00 | 291 | 170 | 3 | 14702 | 76,44 | 22637 | 113,94 | 57,00 | 422 | 235 | 5 | 14882 | 521,65 | | |
| 28,25 | 296 | 175 | 3 | 14705 | 94,27 | | | 58,00 | 422 | 235 | 5 | 14885 | 524,90 | | |
| 28,50 | 296 | 175 | 3 | 14708 | 81,96 | 22640 | 126,92 | 59,00 | 422 | 235 | 5 | 14888 | 541,81 | | |
| 28,75 | 296 | 175 | 3 | 14711 | 94,27 | 67713 | 139,23 | 60,00 | 422 | 235 | 5 | 14891 | 515,14 | | |
| 29,00 | 296 | 175 | 3 | 14714 | 81,96 | 26747 | 126,92 | 61,00 | 427 | 240 | 5 | 14894 | 602,95 | | |
| 29,25 | 296 | 175 | 3 | 14717 | 103,65 | 67714 | 148,60 | 62,00 | 427 | 240 | 5 | 14897 | 627,99 | | |
| 29,50 | 296 | 175 | 3 | 14720 | 90,12 | 22643 | 135,08 | 63,00 | 427 | 240 | 5 | 14900 | 664,11 | | |
| 29,75 | 296 | 175 | 3 | 14723 | 103,65 | | | 64,00 | 432 | 245 | 5 | 14903 | 700,69 | | |
| 30,00 | 296 | 175 | 3 | 14726 | 90,12 | 22646 | 135,08 | 65,00 | 432 | 245 | 5 | 14906 | 672,91 | 68996 | 781,57 |
| 30,25 | 301 | 180 | 3 | 14729 | 115,34 | | | 66,00 | 432 | 245 | 5 | 14909 | 756,28 | | |
| 30,50 | 301 | 180 | 3 | 14732 | 100,29 | 19813 | 141,80 | 67,00 | 432 | 245 | 5 | 14912 | 780,70 | | |
| 30,75 | 301 | 180 | 3 | 14735 | 115,34 | | | 68,00 | 437 | 250 | 5 | 14915 | 800,96 | | |
| 31,00 | 301 | 180 | 3 | 14738 | 100,29 | 26750 | 141,80 | 69,00 | 437 | 250 | 5 | 14918 | 825,82 | | |
| 31,25 | 301 | 180 | 3 | 14741 | 122,14 | 67715 | 176,10 | 70,00 | 437 | 250 | 5 | 14921 | 783,01 | | |
| 31,50 | 301 | 180 | 3 | 14744 | 106,20 | | | | | | | | | | |
| 31,75 | 306 | 185 | 3 | 14747 | 122,14 | | | | | | | | | | |
| 32,00 | 334 | 185 | 4 | 14750 | 106,20 | 22649 | 160,13 | | | | | | | | |
| 32,50 | 334 | 185 | 4 | 14753 | 121,32 | | | | | | | | | | |
| 33,00 | 334 | 185 | 4 | 14756 | 121,32 | 22652 | 174,54 | 71,00 | 437 | 250 | 5 | 14924 | 904,01 | | |
| 33,50 | 334 | 185 | 4 | 14759 | 131,91 | 59215 | 184,09 | 72,00 | 442 | 255 | 5 | 14927 | 922,74 | | |
| 34,00 | 339 | 190 | 4 | 14762 | 131,91 | 22655 | 177,34 | 73,00 | 442 | 255 | 5 | 14930 | 946,91 | | |
| 34,50 | 339 | 190 | 4 | 14765 | 144,14 | | | 74,00 | 442 | 255 | 5 | 14933 | 974,60 | | |
| 35,00 | 339 | 190 | 4 | 14768 | 144,14 | 27574 | 196,32 | 75,00 | 442 | 255 | 5 | 14936 | 918,03 | | |
| 35,50 | 339 | 190 | 4 | 14771 | 154,66 | 19830 | 205,33 | 76,00 | 447 | 260 | 5 | 14939 | 1.081,02 | | |
| 36,00 | 344 | 195 | 4 | 14774 | 154,66 | 22658 | 205,33 | 77,00 | 514 | 260 | 6 | 14942 | 1.160,06 | | |
| 36,50 | 344 | 195 | 4 | 14777 | 163,03 | | | 78,00 | 514 | 260 | 6 | 14945 | 1.182,72 | | |
| 37,00 | 344 | 195 | 4 | 14780 | 163,03 | | | 79,00 | 514 | 260 | 6 | 14948 | 1.206,53 | | |
| 37,50 | 344 | 195 | 4 | 14783 | 171,48 | 27523 | 223,66 | 80,00 | 514 | 260 | 6 | 14951 | 1.272,88 | | |
| 38,00 | 349 | 200 | 4 | 14786 | 171,48 | 22667 | 223,66 | 81,00 | 519 | 265 | 6 | 14954 | 1.401,45 | | |
| 38,50 | 349 | 200 | 4 | 14789 | 182,88 | | | 82,00 | 519 | 265 | 6 | 14957 | 1.436,46 | | |
| 39,00 | 349 | 200 | 4 | 14792 | 182,88 | 28009 | 233,56 | 83,00 | 519 | 265 | 6 | 14960 | 1.464,03 | | |
| 39,50 | 349 | 200 | 4 | 14795 | 193,10 | 67716 | 243,78 | 84,00 | 519 | 265 | 6 | 14963 | 1.495,11 | | |
| 40,00 | 349 | 200 | 4 | 14798 | 193,10 | 22670 | 243,78 | 85,00 | 519 | 265 | 6 | 14966 | 1.532,05 | | |
| 40,50 | 354 | 205 | 4 | 14801 | 203,05 | | | 86,00 | 524 | 270 | 6 | 14969 | 1.565,49 | | |
| 41,00 | 354 | 205 | 4 | 14804 | 203,05 | 67717 | 265,83 | 87,00 | 524 | 270 | 6 | 14972 | 1.598,77 | | |
| 41,50 | 354 | 205 | 4 | 14807 | 215,46 | | | 88,00 | 524 | 270 | 6 | 14975 | 1.639,85 | | |
| 42,00 | 354 | 205 | 4 | 14810 | 215,46 | 27575 | 278,33 | 89,00 | 524 | 270 | 6 | 14978 | 1.671,56 | | |
| 42,50 | 354 | 205 | 4 | 14813 | 226,01 | | | 90,00 | 524 | 270 | 6 | 14981 | 1.719,44 | | |
| 43,00 | 359 | 210 | 4 | 14816 | 226,01 | | | 91,00 | 529 | 275 | 6 | 14984 | 1.813,50 | | |
| 43,50 | 359 | 210 | 4 | 14819 | 236,61 | 67718 | 299,48 | 92,00 | 529 | 275 | 6 | 14987 | 1.823,93 | | |
| 44,00 | 359 | 210 | 4 | 14822 | 236,61 | 27315 | 299,48 | 93,00 | 529 | 275 | 6 | 14990 | 1.888,99 | | |
| 44,50 | 359 | 210 | 4 | 14825 | 247,05 | | | 94,00 | 529 | 275 | 6 | 14993 | 1.927,39 | | |
| 45,00 | 359 | 210 | 4 | 14828 | 247,05 | | | 95,00 | 529 | 275 | 6 | 14996 | 1.966,99 | | |
| 45,50 | 364 | 215 | 4 | 14831 | 257,48 | 41292 | 334,10 | 96,00 | 534 | 280 | 6 | 14999 | 2.031,81 | | |
| 46,00 | 364 | 215 | 4 | 14834 | 257,48 | 27577 | 334,10 | 97,00 | 534 | 280 | 6 | 15002 | 2.048,83 | | |
| 46,50 | 364 | 215 | 4 | 14837 | 267,95 | 67719 | 344,58 | 98,00 | 534 | 280 | 6 | 15005 | 2.094,53 | | |
| 47,00 | 364 | 215 | 4 | 14840 | 267,95 | | | 99,00 | 534 | 280 | 6 | 15008 | 2.132,41 | | |
| | | | | | | | | 100,00 | 534 | 280 | 6 | 15011 | 2.173,07 | | |

>70 mm bajo demanda / upon request / sur demande

Ref. **1110**

BROCA MANGO CÓNICO HSS. SERIE CORTA
 HSS Morse Taper Shank Drill Bit. Jobber Series
 Foret queue cône morse HSS. Série courte



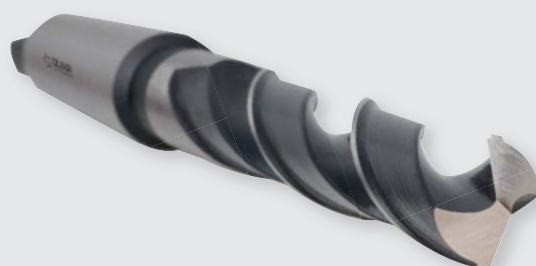
Set 25 Pcs

| Cont. Ø | Nº Art. HSS | € |
|---|-------------|----------|
| 14-14,5-15-15,5-16-16,5-17-17,5-18-18,5-19-19,5-20-20,5-21-21,5-22-22,5-23-24-25-26-27-28-30 mm | 14263 | 1.224,06 |



Set 10 Pcs

| Cont. Ø | Nº Art. HSS | € |
|-----------------------------------|-------------|--------|
| 14-15-16-17- 18-19-20-21-22-25 mm | 19346 | 410,21 |

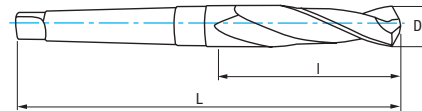


Ref. **1154**

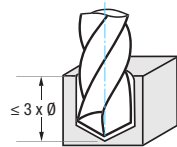
BROCA MANGO CÓNICO MAT.S ALTA RESISTENCIA. SERIE EXTRA CORTA

High Resistance Materials Morse Taper Shank Drill Bit. Stub Series

Foret queue cône morse matériaux haute résistance. Série extra-courte



| | | | | | | | | |
|------------|--------|-----------|--|--|--|---------------------------------------|--------------|--|
| Cobalt "S" | X-AlCr | IZAR Std. | | | | Rectificado Ground Taillé meulé | Tol. D h8 | Por ejemplo For instance Par exemple HARDOX® wear plate |
|------------|--------|-----------|--|--|--|---------------------------------------|--------------|--|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | Cobalt "S" | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 60 |
| P | P.4 | 6-8 | 0,180 | 0,200 | 0,220 | 0,310 | 0,450 |

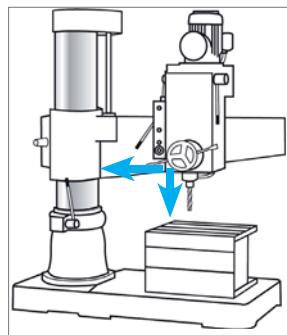
r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f

| D mm | L mm | I mm | CM | Nº Art. X-AlCr | € |
|-------|------|------|----|----------------|--------|
| 14,00 | 145 | 64 | 1 | 59788 | 93,83 |
| 16,00 | 169 | 71 | 2 | 59792 | 106,48 |
| 18,00 | 175 | 77 | 2 | 37409 | 129,62 |
| 19,00 | 182 | 80 | 2 | 39990 | 152,30 |
| 20,00 | 185 | 83 | 2 | 39991 | 167,78 |
| 21,00 | 189 | 87 | 2 | 39992 | 185,93 |
| 22,00 | 192 | 90 | 2 | 39993 | 197,18 |
| 23,00 | 196 | 94 | 2 | 39994 | 211,53 |

| D mm | L mm | I mm | CM | Nº Art. X-AlCr | € |
|--------|------|------|----|----------------|--------|
| 24,00 | 219 | 98 | 3 | 39995 | 221,31 |
| 25,00 | 219 | 98 | 3 | 39996 | 247,85 |
| 26,00 | 224 | 103 | 3 | 39997 | 265,10 |
| 27,00 | 231 | 107 | 3 | 39998 | 280,32 |
| 28,00 | 231 | 107 | 3 | 39999 | 297,39 |
| 30,00 | 236 | 112 | 3 | 40000 | 332,43 |
| *32,00 | 271 | 122 | 4 | 70809 | |
| *33,00 | 271 | 122 | 4 | 70812 | |

| D mm | L mm | I mm | CM | Nº Art. X-AlCr | € |
|--------|------|------|----|----------------|---|
| *35,00 | 274 | 125 | 4 | 70814 | |
| *36,00 | 277 | 128 | 4 | 70815 | |
| *37,00 | 277 | 128 | 4 | 70817 | |
| *40,00 | 300 | 151 | 4 | 70818 | |
| *50,00 | 304 | 154 | 4 | 63995 | |
| *55,00 | 345 | 158 | 5 | 70820 | |
| *56,00 | 345 | 158 | 5 | 70822 | |
| *60,00 | 352 | 165 | 5 | 60232 | |

* Diam. bajo demanda / upon request / sur demande



Es vital minimizar las vibraciones a la hora de taladrar:

- Minimizar el voladizo de la columna al taladro
- Anclar la pieza con bridas de fijación
- Utilizar brocas cortas para minimizar la flexión
- Aplicar abundante refrigeración

It is vital to minimize vibrations when drilling:

- Minimize the distance between drill and column
- Clamp the workpiece securely
- Use short drill bits in order to minimize flexure
- Provide abundant supply of coolant

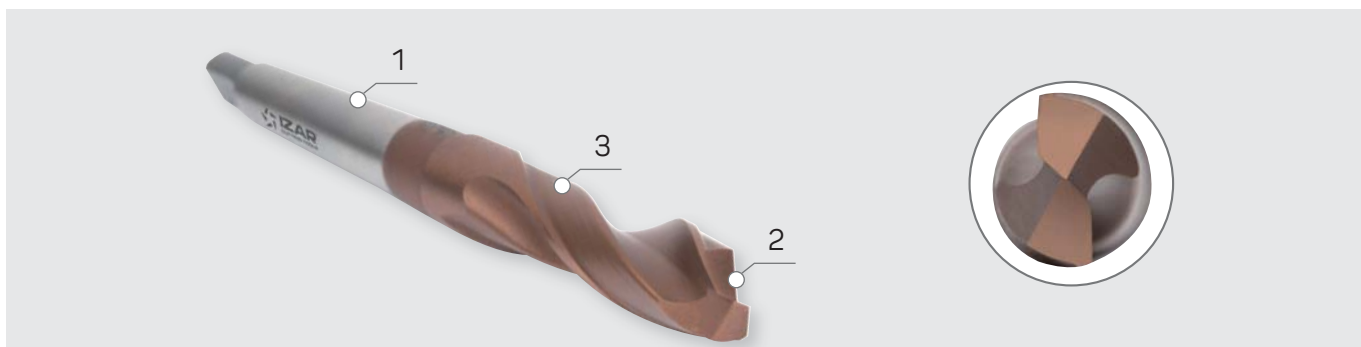
C'est vital minimiser les vibrations au moment du perçage:

- Approcher la perceuse à colonne
- Fixer bien la pièce à usiner
- Employer des forets courts pour minimiser la flexibilité
- Refroidissez au maximum.

- 1- Broca de Alto Rendimiento en Taladros Columna / CNC
- 2- Nueva Geometría especial con Nucleo Reforzado que resiste mejor las Fuerzas de Corte
- 3- Nuevo Recubrimiento con base AlCr que reduce el Desgaste en el Filo de Corte

- 1- High Performance Drill Bit in Stationary Drilling Machines / CNC
- 2- New special Reinforced Web that resists Cutting Forces better
- 3- New AlCr based Coating that reduces Cutting Edge Wear

- 1- Foret haute performance pour perceuses à colonne / CNC
- 2- Nouvelle géométrie spéciale avec ame renforcée qui resiste mieux les forces de coupe
- 3- Nouveau revêtement AlCr qui réduit l'usure dans le fil de coupe



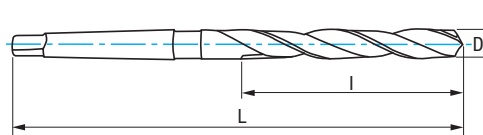
Hardox® and Raex® are trademarks owned by the SSAB group of companies.

Ref. **1130**

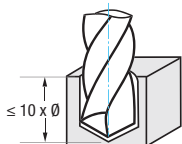
BROCA MANGO CÓNICO HSS. SERIE LARGA

HSS Morse Taper Shank Drill Bit. Long Series

Foret queue cône morse HSS. Série longue



| | | | | | | | |
|-----|-----------|------|--|--|-------------|------------------------------------|-----------|
| HSS | DIN 341 N | 118° | | | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|-----------|------|--|--|-------------|------------------------------------|-----------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 |
| P | P.1 | 25-30 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 | 0,300 | 0,310 | 0,400 |
| | P.2 | 15-20 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 | 0,200 | 0,250 | 0,260 | 0,300 |
| K | K.1 | 30-35 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |
| | K.2 | 25-30 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 |
| N | N.1 | 30-40 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 |
| | N.2 | 30-40 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi} \quad V_f (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | CM | Nº Art. HSS | € | D mm | L mm | I mm | CM | Nº Art. HSS | € |
|-------------------|------|------|----|-------------|-------|-------|------|------|----|-------------|--------|
| 5,00 | 155 | 74 | 1 | 15122 | 20,19 | 22,00 | 289 | 191 | 2 | 15242 | 87,57 |
| 5,50 | 161 | 80 | 1 | 15125 | 27,03 | 22,50 | 296 | 198 | 2 | 15245 | 96,17 |
| 6,00 | 161 | 80 | 1 | 15128 | 21,44 | 23,00 | 296 | 198 | 2 | 15248 | 87,57 |
| 6,50 | 167 | 86 | 1 | 15131 | 21,91 | 23,50 | 319 | 198 | 3 | 15251 | 111,54 |
| 7,00 | 174 | 93 | 1 | 15137 | 23,26 | 24,00 | 327 | 206 | 3 | 15254 | 112,40 |
| 7,50 | 174 | 93 | 1 | 15140 | 24,45 | 24,50 | 327 | 206 | 3 | 15257 | 119,33 |
| 8,00 | 181 | 100 | 1 | 15143 | 24,89 | 25,00 | 327 | 206 | 3 | 15260 | 112,40 |
| 8,20 | 181 | 100 | 1 | 23621 | 33,92 | 25,50 | 335 | 214 | 3 | 15263 | 135,60 |
| 8,50 | 181 | 100 | 1 | 15146 | 24,89 | 26,00 | 335 | 214 | 3 | 15266 | 118,46 |
| 9,00 | 188 | 107 | 1 | 15152 | 27,43 | 26,50 | 335 | 214 | 3 | 15269 | 139,90 |
| 9,50 | 188 | 107 | 1 | 15155 | 30,02 | 27,00 | 343 | 222 | 3 | 15272 | 127,88 |
| 10,00 | 197 | 116 | 1 | 15164 | 30,92 | 27,50 | 343 | 222 | 3 | 15275 | 164,78 |
| 10,50 | 197 | 116 | 1 | 15167 | 32,21 | 28,00 | 343 | 222 | 3 | 15278 | 145,91 |
| 11,00 | 206 | 125 | 1 | 15170 | 30,92 | 28,50 | 351 | 230 | 3 | 15281 | 195,73 |
| 11,20 | 206 | 125 | 1 | 27071 | 30,92 | 29,00 | 351 | 230 | 3 | 15284 | 159,60 |
| 11,50 | 206 | 125 | 1 | 15173 | 30,92 | 29,50 | 351 | 230 | 3 | 15287 | 195,73 |
| 12,00 | 215 | 134 | 1 | 15176 | 33,08 | 30,00 | 351 | 230 | 3 | 15290 | 163,88 |
| 12,50 | 215 | 134 | 1 | 15179 | 33,92 | 30,50 | 360 | 239 | 3 | 15293 | 224,76 |
| 13,00 | 215 | 134 | 1 | 15182 | 33,92 | 31,00 | 360 | 239 | 3 | 15296 | 207,73 |
| 13,50 | 223 | 142 | 1 | 15185 | 36,93 | 31,50 | 360 | 239 | 3 | 15299 | 240,28 |
| 14,00 | 223 | 142 | 1 | 15188 | 38,16 | 32,00 | 397 | 248 | 4 | 15302 | 207,73 |
| 14,50 | 245 | 147 | 2 | 15194 | 48,06 | 32,50 | 397 | 248 | 4 | 15305 | 264,26 |
| New! 14,75 | 245 | 147 | 2 | 23720 | 55,23 | 33,00 | 397 | 248 | 4 | 15308 | 221,43 |
| 15,00 | 245 | 147 | 2 | 15197 | 48,06 | 33,50 | 397 | 248 | 4 | 15311 | 260,89 |
| 15,50 | 251 | 153 | 2 | 15200 | 47,18 | 34,00 | 406 | 257 | 4 | 15314 | 269,39 |
| 16,00 | 251 | 153 | 2 | 15203 | 48,92 | 34,50 | 406 | 257 | 4 | 15317 | 286,67 |
| 16,50 | 257 | 159 | 2 | 15206 | 53,20 | 35,00 | 406 | 257 | 4 | 15320 | 271,22 |
| 17,00 | 257 | 159 | 2 | 15209 | 53,20 | 35,50 | 406 | 257 | 4 | 15323 | 286,67 |
| 17,50 | 263 | 165 | 2 | 15212 | 60,93 | 36,00 | 416 | 267 | 4 | 15326 | 312,50 |
| 18,00 | 263 | 165 | 2 | 15218 | 59,20 | 36,50 | 416 | 267 | 4 | 15329 | 396,61 |
| 18,50 | 269 | 171 | 2 | 15221 | 66,92 | 37,00 | 416 | 267 | 4 | 15332 | 338,06 |
| 19,00 | 269 | 171 | 2 | 15224 | 62,65 | 37,50 | 416 | 267 | 4 | 15335 | 393,01 |
| 19,50 | 275 | 177 | 2 | 15227 | 72,96 | 38,00 | 426 | 277 | 4 | 15338 | 351,98 |
| 20,00 | 275 | 177 | 2 | 15230 | 66,92 | 38,50 | 426 | 277 | 4 | 15341 | 448,00 |
| 20,50 | 282 | 184 | 2 | 15233 | 85,82 | 39,00 | 426 | 277 | 4 | 15344 | 367,22 |
| 21,00 | 282 | 184 | 2 | 15236 | 77,24 | 39,50 | 426 | 277 | 4 | 15347 | 448,00 |
| 21,50 | 289 | 191 | 2 | 15239 | 93,53 | 40,00 | 426 | 277 | 4 | 15350 | 398,18 |



Ref. **1140**

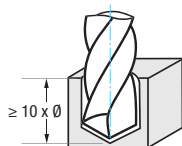
BROCA MANGO CÓNICO HSS. SERIE EXTRA LARGA

HSS Morse Taper Shank Drill Bit. Extra Long Series

Foret queue cône morse HSS. Série extra-longue



| | | | | | | | |
|-----|------------|------|--|--|-------------|------------------------------------|-----------|
| HSS | DIN 1870 N | 118° | | | Blue Finish | Rectificado Ground Taillé meulé | Tol. D h8 |
|-----|------------|------|--|--|-------------|------------------------------------|-----------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 |
| P | P.1 | 25-30 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 | 0,300 | 0,310 | 0,400 |
| | P.2 | 15-20 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 | 0,200 | 0,250 | 0,260 | 0,300 |
| K | K.1 | 30-35 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |
| | K.2 | 25-30 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 |
| N | N.1 | 30-40 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 | 0,410 | 0,490 |
| | N.2 | 30-40 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 | 0,510 | 0,620 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | CM | Nº Art. HSS | € | D mm | L mm | I mm | CM | Nº Art. HSS | € |
|-------|------|------|----|-------------|--------|-------|------|------|----|-------------|--------|
| 8,00 | 265 | 165 | 1 | 15440 | 69,40 | 17,50 | 370 | 245 | 2 | 15554 | 181,82 |
| 8,00 | 330 | 210 | 1 | 15443 | 86,52 | 17,50 | 465 | 310 | 2 | 15557 | 218,75 |
| 8,50 | 265 | 165 | 1 | 15446 | 76,22 | 18,00 | 370 | 245 | 2 | 15560 | 181,82 |
| 8,50 | 330 | 210 | 1 | 15449 | 88,45 | 18,00 | 465 | 310 | 2 | 15563 | 218,75 |
| 9,00 | 275 | 175 | 1 | 15452 | 78,43 | 18,50 | 370 | 245 | 2 | 15566 | 197,09 |
| 9,00 | 345 | 220 | 1 | 15455 | 99,74 | 18,50 | 465 | 310 | 2 | 15569 | 236,42 |
| 9,50 | 275 | 175 | 1 | 15458 | 83,97 | 19,00 | 370 | 245 | 2 | 15572 | 197,09 |
| 9,50 | 345 | 220 | 1 | 15461 | 100,78 | 19,00 | 465 | 310 | 2 | 15575 | 236,42 |
| 10,00 | 285 | 185 | 1 | 15464 | 86,26 | 19,50 | 385 | 260 | 2 | 15578 | 210,49 |
| 10,00 | 360 | 235 | 1 | 15467 | 106,36 | 19,50 | 490 | 325 | 2 | 15581 | 255,87 |
| 10,50 | 285 | 185 | 1 | 15470 | 91,59 | 20,00 | 385 | 260 | 2 | 15584 | 210,49 |
| 10,50 | 360 | 235 | 1 | 15473 | 109,66 | 20,00 | 490 | 325 | 2 | 15587 | 255,87 |
| 11,00 | 300 | 195 | 1 | 15476 | 95,62 | 20,50 | 385 | 260 | 2 | 15590 | 238,43 |
| 11,00 | 375 | 250 | 1 | 15479 | 113,73 | 20,50 | 490 | 325 | 2 | 15593 | 286,28 |
| 11,50 | 300 | 195 | 1 | 15482 | 104,72 | 21,00 | 385 | 260 | 2 | 15596 | 238,43 |
| 11,50 | 375 | 250 | 1 | 15485 | 130,76 | 21,00 | 490 | 325 | 2 | 15599 | 286,28 |
| 12,00 | 310 | 205 | 1 | 15488 | 107,17 | 21,50 | 405 | 270 | 2 | 15602 | 254,25 |
| 12,00 | 395 | 260 | 1 | 15491 | 133,52 | 21,50 | 515 | 345 | 2 | 15605 | 307,28 |
| 12,50 | 310 | 205 | 1 | 15494 | 114,05 | 22,00 | 405 | 270 | 2 | 15608 | 254,25 |
| 12,50 | 395 | 260 | 1 | 15497 | 149,06 | 22,00 | 515 | 345 | 2 | 15611 | 307,28 |
| 13,00 | 310 | 205 | 1 | 15500 | 114,05 | 22,50 | 405 | 270 | 2 | 15614 | 289,74 |
| 13,00 | 395 | 260 | 1 | 15503 | 149,06 | 22,50 | 515 | 345 | 2 | 15617 | 346,85 |
| 13,50 | 325 | 220 | 1 | 15506 | 124,89 | 23,00 | 405 | 270 | 2 | 15620 | 289,74 |
| 13,50 | 410 | 275 | 1 | 15509 | 153,05 | 23,00 | 515 | 345 | 2 | 15623 | 346,85 |
| 14,00 | 325 | 220 | 1 | 15512 | 124,89 | 23,50 | 425 | 270 | 3 | 15626 | 318,32 |
| 14,00 | 410 | 275 | 1 | 15515 | 153,05 | 23,50 | 535 | 345 | 3 | 15629 | 386,01 |
| 14,50 | 340 | 220 | 2 | 15518 | 136,76 | 24,00 | 440 | 290 | 3 | 15632 | 318,32 |
| 14,50 | 425 | 275 | 2 | 15521 | 166,69 | 24,00 | 555 | 365 | 3 | 15635 | 386,01 |
| 15,00 | 340 | 220 | 2 | 15524 | 136,76 | 24,50 | 440 | 290 | 3 | 15638 | 329,90 |
| 15,00 | 425 | 275 | 2 | 15527 | 166,69 | 24,50 | 555 | 365 | 3 | 15641 | 406,79 |
| 15,50 | 355 | 230 | 2 | 15530 | 153,33 | 25,00 | 440 | 290 | 3 | 15644 | 329,90 |
| 15,50 | 445 | 295 | 2 | 15533 | 183,87 | 25,00 | 555 | 365 | 3 | 15647 | 406,79 |
| 16,00 | 355 | 230 | 2 | 15536 | 153,33 | 25,50 | 440 | 290 | 3 | 15650 | 340,97 |
| 16,00 | 445 | 295 | 2 | 15539 | 183,87 | 25,50 | 555 | 365 | 3 | 15653 | 449,41 |
| 16,50 | 355 | 230 | 2 | 15542 | 165,22 | 26,00 | 440 | 290 | 3 | 15656 | 340,97 |
| 16,50 | 445 | 295 | 2 | 15545 | 198,69 | 26,00 | 555 | 365 | 3 | 15659 | 449,41 |
| 17,00 | 355 | 230 | 2 | 15548 | 165,22 | 26,50 | 440 | 290 | 3 | 15662 | 349,19 |
| 17,00 | 445 | 295 | 2 | 15551 | 198,69 | 26,50 | 555 | 365 | 3 | 15665 | 463,69 |

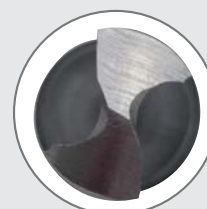
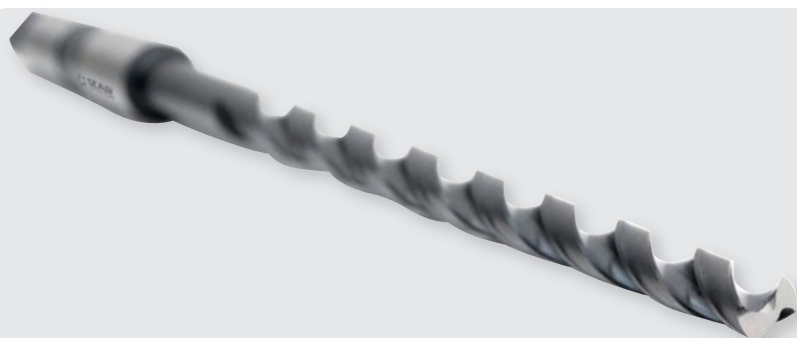


Ref. **1140****BROCA MANGO CÓNICO HSS. SERIE EXTRA LARGA**

HSS Morse Taper Shank Drill Bit. Extra Long Series

Foret queue cône morse HSS. Série extra-longue

| D mm | L mm | I mm | CM | Nº Art. HSS | € | D mm | L mm | I mm | CM | Nº Art. HSS | € |
|---------|---------|---------|----|----------------|--------|---------|---------|---------|----|----------------|----------|
| 27,00 | 460 | 305 | 3 | 15668 | 349,19 | 36,00 | 530 | 340 | 4 | 15740 | 614,95 |
| 27,00 | 580 | 385 | 3 | 15671 | 463,69 | 36,00 | 665 | 430 | 4 | 15743 | 818,21 |
| 27,50 | 460 | 305 | 3 | 15674 | 372,49 | 37,00 | 530 | 340 | 4 | 15746 | 630,49 |
| 27,50 | 580 | 385 | 3 | 15677 | 501,58 | 37,00 | 665 | 430 | 4 | 15749 | 909,10 |
| 28,00 | 460 | 305 | 3 | 15680 | 372,49 | 38,00 | 555 | 360 | 4 | 15752 | 687,77 |
| 28,00 | 580 | 385 | 3 | 15683 | 501,58 | 38,00 | 695 | 460 | 4 | 15755 | 962,70 |
| 28,50 | 460 | 305 | 3 | 15686 | 386,01 | 39,00 | 555 | 360 | 4 | 15758 | 716,80 |
| 28,50 | 580 | 385 | 3 | 15689 | 553,43 | 39,00 | 695 | 460 | 4 | 15761 | 1.008,63 |
| 29,00 | 460 | 305 | 3 | 15692 | 386,01 | 40,00 | 555 | 360 | 4 | 15764 | 755,66 |
| 29,00 | 580 | 385 | 3 | 15695 | 553,43 | 40,00 | 695 | 460 | 4 | 15767 | 962,10 |
| 29,50 | 460 | 305 | 3 | 15698 | 399,62 | 41,00 | 555 | 360 | 4 | 15770 | 850,65 |
| 29,50 | 580 | 385 | 3 | 15701 | 558,01 | 41,00 | 695 | 460 | 4 | 15773 | 1.093,54 |
| 30,00 | 460 | 305 | 3 | 15704 | 399,62 | 42,00 | 555 | 360 | 4 | 15776 | 878,68 |
| 30,00 | 580 | 385 | 3 | 15707 | 558,01 | 42,00 | 695 | 460 | 4 | 15779 | 1.167,60 |
| 31,00 | 480 | 320 | 3 | 15710 | 447,99 | 43,00 | 585 | 385 | 4 | 15782 | 916,31 |
| 31,00 | 610 | 410 | 3 | 15713 | 594,94 | 43,00 | 735 | 490 | 4 | 15785 | 1.191,36 |
| 32,00 | 505 | 320 | 4 | 15716 | 468,39 | 44,00 | 735 | 490 | 4 | 15791 | 1.233,17 |
| 32,00 | 635 | 410 | 4 | 15719 | 624,19 | 45,00 | 735 | 490 | 4 | 15797 | 1.290,65 |
| 33,00 | 505 | 320 | 4 | 15722 | 510,39 | 47,00 | 735 | 490 | 4 | 15809 | 1.414,51 |
| 33,00 | 635 | 410 | 4 | 15725 | 691,02 | 48,00 | 605 | 405 | 4 | 15812 | 1.103,98 |
| 34,00 | 530 | 340 | 4 | 15728 | 553,43 | 49,00 | 605 | 405 | 4 | 15818 | 1.137,60 |
| 34,00 | 665 | 430 | 4 | 15731 | 717,63 | 49,00 | 765 | 510 | 4 | 15821 | 1.553,78 |
| 35,00 | 530 | 340 | 4 | 15734 | 569,99 | 50,00 | 605 | 405 | 4 | 15824 | 1.171,09 |
| 35,00 | 665 | 430 | 4 | 15737 | 779,21 | | | | | | |

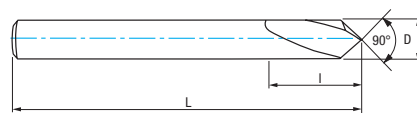


Ref. 1301

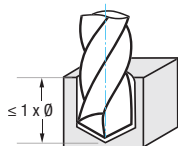
BROCA CENTRAR CNC 90°

90° CNC Center Drill

Foret à centrar CNC 90°



| | | | | |
|--------------|--------------|-----|--|--|
| HSSE 5%Co | IZAR Std. | 90° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé |
|--------------|--------------|-----|--|--|



| Material | | Vc (m/min) | Refs. 1301-1303 - Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------|------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
| P | P.1 | 20-25 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 | 0,300 |
| | P.2 | 8-12 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 | 0,200 | 0,250 |
| | P.3 | 6-10 | 0,035 | 0,045 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,160 | 0,180 |
| | P.5 | 6-10 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,150 | 0,170 | 0,210 |
| M | | 8-12 | 0,040 | 0,050 | 0,060 | 0,070 | 0,090 | 0,100 | 0,120 | 0,150 | 0,170 | 0,210 |
| K | K.1 | 20-24 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 |
| | K.2 | 15-20 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 |
| S | | 10-12 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 |
| N | N.1 | 25-30 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | 0,240 | 0,280 | 0,340 |
| | N.5 | 15-25 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | 0,300 | 0,360 | 0,430 |
| | N.6 | 25-30 | 0,130 | 0,150 | 0,170 | 0,190 | 0,250 | 0,290 | 0,310 | 0,360 | 0,400 | 0,440 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | N° Art. 5% Co | € |
|-------|------|------|---------------|--------|
| 3,00 | 50 | 10 | 69189 | 17,66 |
| 4,00 | 52 | 12 | 69190 | 17,66 |
| 5,00 | 60 | 15 | 69192 | 19,89 |
| 6,00 | 66 | 20 | 69193 | 19,89 |
| 8,00 | 79 | 25 | 69195 | 22,47 |
| 10,00 | 89 | 25 | 69196 | 22,47 |
| 12,00 | 102 | 30 | 69198 | 31,06 |
| 16,00 | 115 | 35 | 69199 | 42,82 |
| 20,00 | 131 | 40 | 69201 | 84,28 |
| 25,00 | 138 | 45 | 69202 | 109,19 |



Ref. 1303

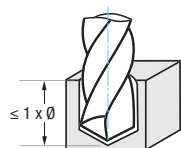
BROCA CENTRAR CNC 120°

120° CNC Center Drill

Foret à centrar CNC 120°



| | | | | |
|--------------|--------------|------|--|--|
| HSSE 5%Co | IZAR Std. | 120° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé |
|--------------|--------------|------|--|--|



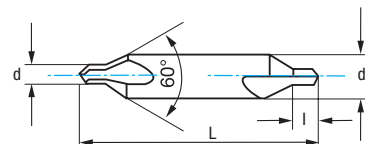
| D mm | L mm | I mm | N° Art. 5% Co | € |
|-------|------|------|---------------|--------|
| 3,00 | 50 | 10 | 69204 | 17,66 |
| 4,00 | 52 | 12 | 69205 | 17,66 |
| 5,00 | 60 | 15 | 69207 | 19,89 |
| 6,00 | 66 | 20 | 69208 | 19,89 |
| 8,00 | 79 | 25 | 69210 | 22,47 |
| 10,00 | 89 | 25 | 69211 | 22,47 |
| 12,00 | 102 | 30 | 69216 | 31,06 |
| 16,00 | 115 | 35 | 69217 | 42,82 |
| 20,00 | 131 | 40 | 69219 | 84,28 |
| 25,00 | 138 | 45 | 69220 | 109,19 |



Ref. **1310**

BROCA CENTRAR DOBLE

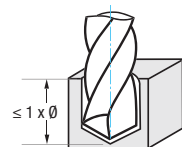
Double Center Drill
Foret à centrer double



| | | | | | | |
|-----|-----------|-----------|---------|------|---|---------------------------------------|
| HSS | HSS + TIN | DIN 333 A | Angular | 118° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé |
|-----|-----------|-----------|---------|------|---|---------------------------------------|

HSS **TIN** **x2,5** Resistencia al desgaste
Wear Resistance
Résistant à l'usure

| Material | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|----------|------------|------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Grupo | Sub. | HSS | TIN | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | P.1 | 20-25 | 24-30 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 |
| | | P.2 | 8-12 | 9-14 | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 |
| K | K.1 | K.1 | 20-24 | 24-28 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 |
| | | K.2 | 15-20 | 18-24 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 |
| N | N.1 | N.1 | 25-30 | 30-36 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 |
| | | N.5 | 15-25 | 18-29 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 |



$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ $Vf (mm/min.) = r.p.m. \times f$

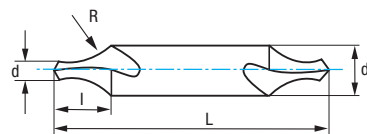
| d mm | d1 mm | L mm | I mm | N° Art. HSS | € | N° Art. TIN | € |
|---------------------------|--------|-------|-------|-------------|-------|-------------|---|
| 1,00 x 3,15 | 31,50 | 1,30 | 40001 | 4,82 | 74157 | 9,57 | |
| 1,25 x 3,15 | 31,50 | 1,60 | 40004 | 4,82 | 74160 | 9,57 | |
| 1,25 x 4,00 | 35,50 | 1,60 | 40007 | 5,12 | 74163 | 10,27 | |
| 1,60 x 4,00 | 35,50 | 2,00 | 40010 | 4,82 | 74885 | 10,01 | |
| 1,60 x 5,00 | 40,00 | 2,00 | 40013 | 5,12 | 74882 | 10,83 | |
| 2,00 x 5,00 | 40,00 | 2,50 | 40016 | 5,23 | 74166 | 10,96 | |
| 2,00 x 6,30 | 45,00 | 2,50 | 40019 | 5,61 | 74883 | 11,77 | |
| 2,50 x 6,30 | 45,00 | 3,10 | 40022 | 5,78 | 60380 | 11,93 | |
| 2,50 x 8,00 | 50,00 | 3,10 | 40025 | 6,37 | 74884 | 12,49 | |
| 3,15 x 8,00 | 50,00 | 3,90 | 40028 | 6,37 | 74169 | 12,49 | |
| 3,15 x 10,00 | 56,00 | 3,90 | 40031 | 7,49 | 73574 | 15,73 | |
| 4,00 x 10,00 | 56,00 | 5,00 | 40034 | 9,20 | 60383 | 17,37 | |
| 4,00 x 12,50 | 63,00 | 5,00 | 40037 | 10,24 | 74876 | 19,50 | |
| 5,00 x 12,50 | 63,00 | 6,30 | 40040 | 15,41 | 60386 | 22,23 | |
| 5,00 x 16,00 | 71,00 | 6,30 | 40043 | 24,54 | 74172 | 35,40 | |
| New! 6,30 x 16,00 | 71,00 | 8,00 | 40046 | 22,09 | 48671 | 28,63 | |
| 6,30 x 20,00 | 80,00 | 8,00 | 40049 | 37,47 | 14742 | 44,28 | |
| 8,00 x 20,00 | 80,00 | 10,10 | 40052 | 41,23 | 55428 | 48,58 | |
| 10,00 x 25,00 | 100,00 | 12,80 | 40055 | 63,82 | 14388 | 71,75 | |
| New! 12,50 x 31,50 | 125,00 | 16,50 | 74881 | 152,32 | 48674 | 175,10 | |



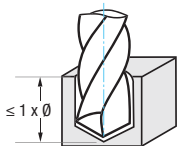
Ref. **1320**

BROCA CENTRAR DOBLE

Double Center Drill
Foret à centrer double



| | | | | | |
|-----|-----------|--------|------|--|--|
| HSS | DIN 333 R | Radial | 118° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé |
|-----|-----------|--------|------|--|--|



| Material | | VC (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | HSS | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 20-25 | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | |
| | P.2 | 8-12 | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | |
| K | K.1 | 20-24 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | |
| | K.2 | 15-20 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | |
| N | N.1 | 25-30 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | |
| | N.5 | 15-25 | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | |

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \varnothing}$ | Vf (mm/min.) = r.p.m. x f

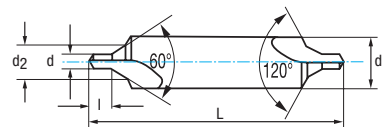
| d mm | d1 mm | L mm | l mm | N° Art. HSS | € |
|-------|---------|--------|-------|-------------|--------|
| 1,00 | x 3,15 | 31,50 | 3,00 | 40091 | 5,28 |
| 1,25 | x 3,15 | 31,50 | 3,35 | 40094 | 5,28 |
| 1,25 | x 4,00 | 35,50 | 3,75 | 40097 | 5,28 |
| 1,60 | x 4,00 | 35,50 | 4,25 | 40100 | 5,28 |
| 1,60 | x 5,00 | 40,00 | 4,75 | 40103 | 6,02 |
| 2,00 | x 5,00 | 40,00 | 5,30 | 40106 | 5,73 |
| 2,00 | x 6,30 | 45,00 | 6,00 | 40109 | 6,72 |
| 2,50 | x 6,30 | 45,00 | 6,70 | 40112 | 6,37 |
| 2,50 | x 8,00 | 50,00 | 7,50 | 40115 | 7,01 |
| 3,15 | x 8,00 | 50,00 | 8,50 | 40118 | 7,01 |
| 3,15 | x 10,00 | 56,00 | 9,50 | 40121 | 9,14 |
| 4,00 | x 10,00 | 56,00 | 10,60 | 40124 | 9,14 |
| 4,00 | x 12,50 | 63,00 | 11,80 | 40127 | 15,26 |
| 5,00 | x 12,50 | 63,00 | 13,20 | 40130 | 15,33 |
| 5,00 | x 16,00 | 71,00 | 15,00 | 40133 | 21,73 |
| 6,30 | x 16,00 | 71,00 | 17,00 | 40136 | 21,86 |
| 6,30 | x 20,00 | 80,00 | 19,00 | 40139 | 38,98 |
| 8,00 | x 20,00 | 80,00 | 21,20 | 40142 | 45,06 |
| 10,00 | x 25,00 | 100,00 | 31,50 | 40145 | 72,41 |
| 12,50 | x 31,50 | 125,00 | 33,50 | 40148 | 157,11 |



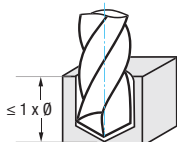
Ref. **1330**

BROCA CENTRAR DOBLE

Double Center Drill
Foret à centrer double



| | | | | | | |
|-----|-------------------|---------------------|---------|------|---|---------------------------------------|
| HSS | Old DIN 320 | New DIN 333 B | Angular | 118° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé |
|-----|-------------------|---------------------|---------|------|---|---------------------------------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 20-25 | | 0,045 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 |
| | P.2 | 8-12 | | 0,035 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 |
| K | K.1 | 20-24 | | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 |
| | K.2 | 15-20 | | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 |
| N | N.1 | 25-30 | | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 |
| | N.5 | 15-25 | | 0,060 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

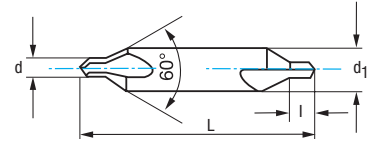
| d | d1 | d2 | L | l | | Nº Art. HSS | € |
|------|---------|-------|--------|------|---|-------------|-------|
| 1,00 | x 4,00 | 2,12 | 35,50 | 1,30 | 1 | 40166 | 8,93 |
| 1,25 | x 5,00 | 2,65 | 40,00 | 1,60 | 1 | 40172 | 8,93 |
| 1,25 | x 7,10 | 3,15 | 45,00 | 1,60 | 1 | 40175 | 10,01 |
| 1,60 | x 6,30 | 3,35 | 45,00 | 2,00 | 1 | 40178 | 8,93 |
| 1,60 | x 8,00 | 4,00 | 50,00 | 2,00 | 1 | 40181 | 10,01 |
| 2,00 | x 8,00 | 4,25 | 50,00 | 2,50 | 1 | 40184 | 9,43 |
| 2,00 | x 10,00 | 5,00 | 56,00 | 2,50 | 1 | 40187 | 12,20 |
| 2,50 | x 10,00 | 5,30 | 56,00 | 3,10 | 1 | 40190 | 11,06 |
| 2,50 | x 11,20 | 6,30 | 60,00 | 3,10 | 1 | 40193 | 13,62 |
| 3,15 | x 11,20 | 6,70 | 60,00 | 3,90 | 1 | 40196 | 13,63 |
| 3,15 | x 14,00 | 8,00 | 67,00 | 3,90 | 1 | 40199 | 20,45 |
| 4,00 | x 14,00 | 8,50 | 67,00 | 5,00 | 1 | 40202 | 19,11 |
| 4,00 | x 16,00 | 10,00 | 80,00 | 5,00 | 1 | 40205 | 30,04 |
| 5,00 | x 18,00 | 10,60 | 75,00 | 6,30 | 1 | 40208 | 27,94 |
| 5,00 | x 20,00 | 12,50 | 90,00 | 6,30 | 1 | 40211 | 44,18 |
| 6,30 | x 20,00 | 13,20 | 80,00 | 8,00 | 1 | 40214 | 41,53 |
| 6,30 | x 25,00 | 16,00 | 100,00 | 8,00 | 1 | 40217 | 66,86 |



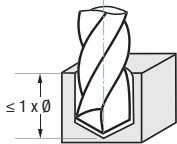
Ref. **9315**

BROCA CENTRAR DOBLE LARGA

Long Double Center Drill
Foret à centrer double longue



| | | | | | |
|--------------|--------------|---------|------|---|---------------------------------------|
| HSSE 5%Co | DIN 333 A | Angular | 118° | Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé |
|--------------|--------------|---------|------|---|---------------------------------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 2 | Ø 3 | Ø 4 | Ø 5 |
| P | P.1 | 20-25 | 0,045 | 0,055 | 0,070 | 0,080 |
| | P.2 | 8-12 | 0,035 | 0,045 | 0,050 | 0,060 |
| K | K.1 | 20-24 | 0,060 | 0,090 | 0,100 | 0,120 |
| | K.2 | 15-20 | 0,050 | 0,070 | 0,080 | 0,100 |
| N | N.1 | 25-30 | 0,050 | 0,070 | 0,080 | 0,100 |
| | N.5 | 15-25 | 0,060 | 0,090 | 0,100 | 0,120 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

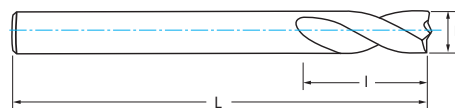
| d mm | x | d1 mm | L mm | l mm | N° Art. 5%Co | € |
|---------|---|----------|---------|---------|-----------------|-------|
| 1,00 | x | 4,00 | 60 | 1,30 | 74894 | 16,59 |
| 1,00 | x | 4,00 | 120 | 1,30 | 74902 | 41,44 |
| 1,50 | x | 5,00 | 60 | 2,00 | 74895 | 16,91 |
| 1,50 | x | 5,00 | 120 | 2,00 | 74903 | 39,35 |
| 2,00 | x | 6,00 | 80 | 2,50 | 74896 | 17,64 |
| 2,00 | x | 6,00 | 120 | 2,50 | 74904 | 39,35 |
| 2,50 | x | 8,00 | 80 | 3,10 | 74897 | 21,41 |
| 2,50 | x | 8,00 | 120 | 3,10 | 74905 | 45,58 |
| 3,00 | x | 8,00 | 80 | 3,90 | 74898 | 21,41 |
| 3,00 | x | 8,00 | 120 | 3,90 | 74906 | 45,58 |
| 3,00 | x | 10,00 | 100 | 3,90 | 74899 | 27,59 |
| 3,00 | x | 10,00 | 120 | 3,90 | 74907 | 51,76 |
| 4,00 | x | 10,00 | 100 | 5,00 | 74900 | 27,59 |
| 4,00 | x | 10,00 | 120 | 5,00 | 74908 | 51,76 |
| 4,00 | x | 12,00 | 100 | 5,00 | 74901 | 37,24 |
| 4,00 | x | 12,00 | 120 | 5,00 | 74909 | 61,79 |
| 5,00 | x | 14,00 | 120 | 6,30 | 74910 | 74,21 |



Ref. **1604****BROCA CORTA PUNTOS SOLDADURA**

Welding Point Jobber Drill Bit

Foret courte points soudure



| | | | | | | |
|---------------|--|--|---------------|--|--|--|
| HSSE 5% Co | Máquina Convencional Conventional Machine Machine à colonne | | DIN 1412 E | | Blanca Bright Finish Finition blanche | |
|---------------|--|--|---------------|--|--|--|



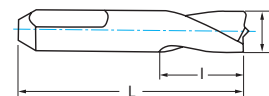
| D mm | L mm | I mm | N° Art. 5% Co | € |
|---------|---------|---------|------------------|-------|
| 6,00 | 66 | 28 | 16326 | 10,85 |
| 8,00 | 80 | 37 | 16327 | 13,83 |
| 10,00 | 89 | 43 | 66909 | 17,32 |

Ref. 1604 recubierta ZIRKONIO bajo demanda /
upon request / sur demande

Ref. **1605****BROCA EXTRA-CORTA PUNTOS SOLDADURA**

Welding Point Stub Drill Bit

Foret extra-courte points soudure



| | | | | | | |
|---------------|--|--|---------------|--|--|--|
| HSSE 8% Co | Máquina Neumática Pneumatic Machine Perceuse à main | | DIN 1412 E | | Blanca Bright Finish Finition blanche | |
|---------------|--|--|---------------|--|--|--|



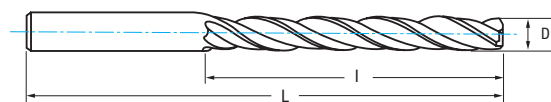
| D mm | L mm | I mm | N° Art. 5% Co | € |
|---------|---------|---------|------------------|-------|
| 8,00 | 38 | 15 | 16328 | 17,26 |
| 8,00 | 45 | 15 | 16329 | 19,24 |
| 10,00 | 45 | 15 | 70687 | 22,90 |

Ref. 1605 recubierta ZIRKONIO bajo demanda /
upon request / sur demande"

Ref. **2510****BROCA ESCARIADOR 3 CORTES COMPENSAR ORIFICIOS DESVIADOS. M. CILÍNDRICO**

3 Cut Core Drill to Compensate Diverted Holes. Straight Shank

Foret aléreur 3 lèvres pour compenser orifices déviés. Queue cylindrique



| | | | | | | |
|-----|---------|--|--|--|--|--------------|
| HSS | DIN 344 | | | | Blanca Bright Finish Finition blanche | Tol. D h8 |
|-----|---------|--|--|--|--|--------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| P | P.1 | 20-25 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 |
| | P.2 | 15-20 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf \text{ (mm/min.)} = r.p.m. \times f$$

| D mm | L mm | I mm | Pre-Escariado Pre-Reaming Pre-Alesage | Pre-Taladrado Pre-Drilling Pre-Perçage | Z | Nº Art. HSS | € |
|-------|------|------|---|--|---|----------------|--------------|
| 5,00 | 108 | 74 | 4,80 | 3,50 | 3 | 41972 | 28,12 |
| 6,00 | 116 | 80 | 5,80 | 4,20 | 3 | 41975 | 28,12 |
| 7,00 | 133 | 93 | 6,80 | 4,90 | 3 | 41978 | 28,12 |
| 8,00 | 142 | 100 | 7,80 | 5,60 | 3 | 41981 | 29,66 |
| 9,00 | 151 | 107 | 8,80 | 6,30 | 3 | 75024 | 36,11 |
| 10,00 | 162 | 116 | 9,80 | 7,00 | 3 | 41984 | 37,76 |
| 11,00 | 173 | 125 | 10,75 | 7,70 | 3 | 75025 | 41,62 |
| 12,00 | 184 | 134 | 11,75 | 8,40 | 3 | 41987 | 44,68 |
| 13,00 | 184 | 134 | 12,75 | 9,10 | 3 | 80090 | 56,99 |
| 14,00 | 194 | 142 | 13,75 | 9,80 | 3 | 41990 | 60,92 |
| 15,00 | 202 | 147 | 14,75 | 10,50 | 3 | 80227 | 66,47 |
| 16,00 | 211 | 153 | 15,75 | 11,20 | 3 | 41993 | 72,40 |

**PERFORADO CON BROCAS-ESCARIADORES:**

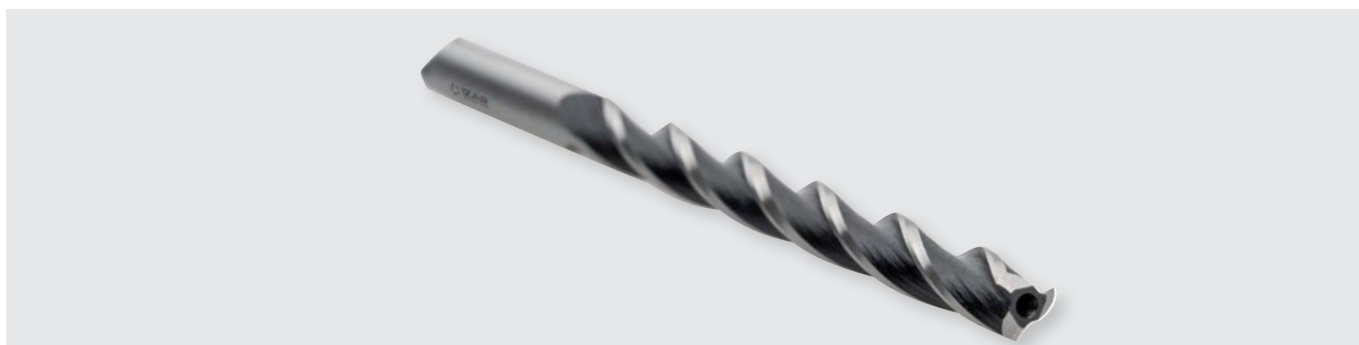
Pueden utilizarse las condiciones de trabajo señaladas en nuestro Catálogo de Brocas para el Empleo de Brocas Helicoidales. En general, deben utilizarse Valores de Velocidad próximos a los Valores Inferiores de dichas Tablas, mientras que en Avances deben ser utilizados los Valores Máximos e incluso superiores, tendiendo a lo que señalamos para el Escariado.

DRILLING WITH CORE DRILLS:

Could be used Working Conditions for Drill Bits Use, as shown in our Drill Catalogue. As a general Rule, must be used Cutting Figures close to the Inferior ones shown in those Tables, while about Feed must be used Maximum (even Superior) Figures, tending to those ones shown for Reaming.

PERÇAGE AVEC FORETS ALÉSEURS:

On peut travailler avec les conditions de coupe indiquées dans notre Catalogue pour l'utilisation de forets. En général, il faut prendre des valeurs de vitesse de coupe proches aux tableaux, tandis que les avances il faut tenir compte les valeurs maximales où mêmes supérieures, s'approchant aux données de l'alesage.

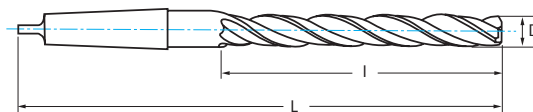


Ref. **2610**

BROCA ESCARIADOR 3 CORTES COMPENSAR ORIFICIOS DESVIADOS. M. CÓNICO

3 Cut Core Drill to Compensate Diverted Holes. Morse Taper Shank

Foret aléueur 3 lèvres pour compenser orifices déviés. Queue cône morse



| | | | | | | |
|-----|---------|--|--|--|---|--------------|
| HSS | DIN 343 | | | | Blanca Bright Finish Finition blanche | Tol. D h8 |
|-----|---------|--|--|--|---|--------------|

| $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ $Vf (mm/min.) = r.p.m. \times f$ | Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | | | |
|--|----------|------------|----------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Grupo | Sub. | HSS | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | Ø 40 |
| | P | P.1 P.2 | 20-25 15-20 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 | 0,180 | 0,250 | 0,300 | 0,310 | 0,400 |

| D mm | L mm | l mm | Pre-Escariado Pre-Reaming Pre-Alesage | Pre-Taladrado Pre-Drilling Pre-Perçage | CM | Nº Art. HSS | € |
|-------|------|------|---|--|----|----------------|--------|
| 10,00 | 168 | 87 | 9,80 | 7,00 | 1 | 42212 | 56,53 |
| 11,00 | 175 | 94 | 1075 | 7,70 | 1 | 42218 | 58,54 |
| 12,00 | 182 | 101 | 11,75 | 8,40 | 1 | 42224 | 60,58 |
| 13,00 | 182 | 101 | 12,75 | 9,10 | 1 | 42233 | 63,31 |
| 14,00 | 189 | 108 | 13,75 | 9,80 | 1 | 42236 | 67,01 |
| 15,00 | 212 | 114 | 14,75 | 10,50 | 2 | 42239 | 72,06 |
| 16,00 | 218 | 120 | 15,75 | 11,20 | 2 | 42242 | 76,72 |
| 17,00 | 223 | 125 | 16,75 | 11,90 | 2 | 42245 | 83,89 |
| 18,00 | 228 | 130 | 17,75 | 12,60 | 2 | 42248 | 90,91 |
| 19,00 | 233 | 135 | 18,70 | 13,30 | 2 | 42251 | 108,57 |
| 20,00 | 238 | 140 | 19,70 | 14,00 | 2 | 42254 | 109,68 |
| 21,00 | 243 | 145 | 20,70 | 14,60 | 2 | 42257 | 117,73 |
| 22,00 | 248 | 150 | 21,70 | 15,30 | 2 | 42260 | 128,83 |
| 23,00 | 253 | 155 | 22,70 | 16,00 | 2 | 42263 | 138,02 |
| 24,00 | 281 | 160 | 23,70 | 16,60 | 3 | 42266 | 148,54 |
| 25,00 | 281 | 160 | 24,70 | 17,30 | 3 | 42269 | 159,05 |
| 26,00 | 286 | 165 | 25,70 | 18,00 | 3 | 42272 | 175,62 |
| 27,00 | 291 | 170 | 26,70 | 19,30 | 3 | 42275 | 189,26 |
| 28,00 | 291 | 170 | 27,70 | 19,30 | 3 | 42278 | 205,16 |
| 30,00 | 296 | 175 | 29,70 | 20,50 | 3 | 42287 | 237,99 |
| 32,00 | 334 | 185 | 31,60 | 22,00 | 4 | 42293 | 268,31 |
| 34,00 | 339 | 190 | 33,60 | 24,00 | 4 | 42296 | 297,48 |
| 35,00 | 339 | 190 | 34,60 | 25,00 | 4 | 42299 | 322,69 |
| 36,00 | 344 | 195 | 35,60 | 25,50 | 4 | 42302 | 328,67 |
| 38,00 | 349 | 200 | 37,60 | 26,50 | 4 | 42308 | 375,31 |
| 40,00 | 349 | 200 | 39,60 | 28,00 | 4 | 42314 | 412,87 |
| 42,00 | 354 | 205 | 41,60 | 29,00 | 4 | 42317 | 484,27 |



PERFORADO CON BROCAS-ESCARIADORES:

Pueden utilizarse las condiciones de trabajo señaladas en nuestro Catálogo de Brocas para el Empleo de Brocas Helicoidales. En general, deben utilizarse Valores de Velocidad próximos a los Valores Inferiores de dichas Tablas, mientras que en Avances deben ser utilizados los Valores Máximos e incluso superiores, tendiendo a lo que señalamos para el Escariado.

DRILLING WITH CORE DRILLS:

Could be used Working Conditions for Drill Bits Use, as shown in our Drill Catalogue. As a general Rule, must be used Cutting Figures close to the Inferior ones shown in those Tables, while about Feed must be used Maximum (even Superior) Figures, tending to those ones shown for Reaming.

PERÇAGE AVEC FORETS ALÉUEURS:

On peut travailler avec les conditions de coupe indiquées dans notre Catalogue pour l'utilisation de forets. En général, il faut prendre des valeurs de vitesse de coupe proches aux tableaux, tandis que les avances il faut tenir compte les valeurs maximales où mêmes supérieures, s'approchant aux données de l'alesage.

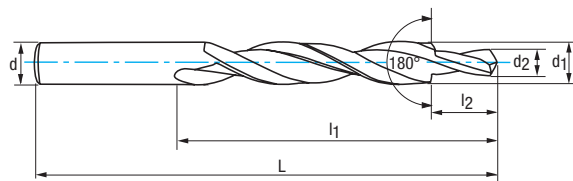


Ref. **2536**

BROCA BIDIAMETRAL MANGO CILÍNDRICO

Straight Shank Subland Drill Bit

Foret étagé queue cylindrique



HSS **180°** DIN 8376

Blanca Bright Finish Finition blanche
 Rectificado Ground Taillé meulé
 Tol. d2 h9 Tol. d1 h8



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | HSS | M-3 | M-4 | M-5 | M-6 | M-8 | M-10 |
| P | P.1 | 15-20 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,130 | |
| | P.2 | 8-10 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | |
| K | K.1 | 25-30 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | |
| | K.2 | 14-18 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | |
| N | N.1 | 30-35 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | |
| | N.2 | 30-35 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | |
| | N.5 | 20-25 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | |

Filo Independiente en cada ø para Cabezas de Tornillo Allen DIN-912

Independent Edge in each ø for Screw-Heads Allen DIN-912

Filet indépendant sur chaque ø pour tête de vis allen DIN 912

| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | N° Art. HSS | € |
|----|-------|-------|------|-------|-------|-------------|-------|
| M3 | 3,40 | 6,00 | 93 | 57 | 9 | 42056 | 49,35 |
| M4 | 4,50 | 8,00 | 117 | 75 | 11 | 42059 | 51,72 |
| M5 | 5,50 | 10,00 | 133 | 87 | 13 | 42062 | 61,49 |

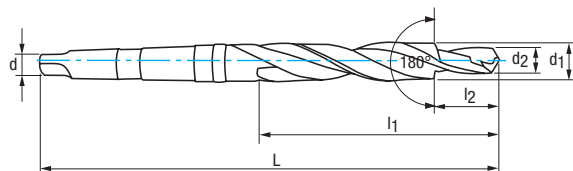
| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|-------------|--------|
| M6 | 6,60 | 11,00 | 142 | 94 | 15 | 42065 | 69,45 |
| M8 | 9,00 | 15,00 | 169 | 114 | 19 | 42068 | 85,32 |
| M10 | 11,00 | 18,00 | 191 | 130 | 23 | 42071 | 169,62 |

Ref. **2636**

BROCA BIDIAMETRAL MANGO CÓNICO

Morse Taper Shank Subland Drill Bit

Foret étagé queue cône morse



HSS **180°** DIN 8377

Blanca Bright Finish Finition blanche
 Rectificado Ground Taillé meulé
 Tol. d2 h9 Tol. d1 h8



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | HSS | M-8 | M-10 | M-12 | M-14 | M-16 | M-18 | M-20 |
| P | P.1 | 15-20 | 0,120 | 0,130 | 0,160 | 0,170 | 0,180 | 0,200 | 0,250 | |
| | P.2 | 8-10 | 0,100 | 0,120 | 0,130 | 0,140 | 0,160 | 0,180 | 0,200 | |
| K | K.1 | 25-30 | 0,180 | 0,210 | 0,250 | 0,280 | 0,300 | 0,330 | 0,360 | |
| | K.2 | 14-18 | 0,140 | 0,170 | 0,200 | 0,220 | 0,240 | 0,250 | 0,280 | |
| N | N.1 | 30-35 | 0,140 | 0,170 | 0,200 | 0,220 | 0,240 | 0,260 | 0,280 | |
| | N.2 | 30-35 | 0,180 | 0,210 | 0,250 | 0,280 | 0,300 | 0,330 | 0,360 | |
| | N.5 | 20-25 | 0,180 | 0,210 | 0,250 | 0,280 | 0,300 | 0,330 | 0,360 | |

Filo Independiente en cada ø para Cabezas de Tornillo Allen DIN-912

Independent Edge in each ø for Screw-Heads Allen DIN-912

Filet indépendant sur chaque ø pour tête de vis allen DIN 912

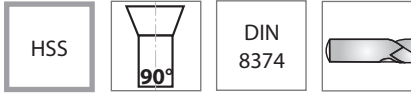
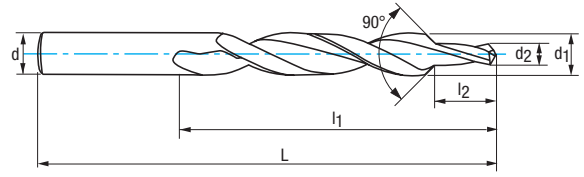
| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | CM | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|----|-------------|--------|
| M8 | 9,00 | 15,00 | 212 | 114 | 19 | 2 | 42470 | 121,59 |
| M10 | 11,00 | 18,00 | 228 | 130 | 23 | 2 | 42473 | 137,06 |
| M12 | 13,50 | 20,00 | 238 | 140 | 27 | 2 | 42476 | 153,31 |
| M14 | 15,50 | 24,00 | 281 | 160 | 31 | 3 | 42479 | 217,41 |

| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | CM | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|----|-------------|--------|
| M16 | 17,50 | 26,00 | 286 | 165 | 35 | 3 | 42482 | 310,00 |
| M18 | 20,00 | 30,00 | 296 | 175 | 39 | 3 | 42485 | 346,64 |
| M20 | 22,00 | 33,00 | 334 | 185 | 43 | 4 | 42488 | 391,97 |

Ref. **2546**

BROCA BIDIAMETRAL MANGO CILÍNDRICO

Straight Shank Subland Drill Bit
Foret étagé queue cylindrique



| | | | |
|--|--|---------------|---------------|
| Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé | Tol. d2 h9 | Tol. d1 h8 |
|--|--|---------------|---------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | M-3 | M-4 | M-5 | M-6 | M-8 |
| P | P.1 | 15-20 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,130 |
| | P.2 | 8-10 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 |
| K | K.1 | 25-30 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 |
| | K.2 | 14-18 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 |
| N | N.1 | 30-35 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 |
| | N.2 | 30-35 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 |
| | N.5 | 20-25 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

Broca-Avellanador con Filos Independientes para Asientos Cónicos a 90° DIN 74/A

Independent Edge Countersink-Drill for 90° Spot Holes DIN 74/A

Foret-Fraise à ébavurer avec filets indépendants coniques à 90° DIN 74/A

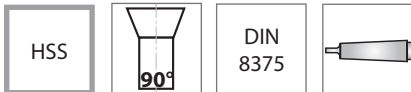
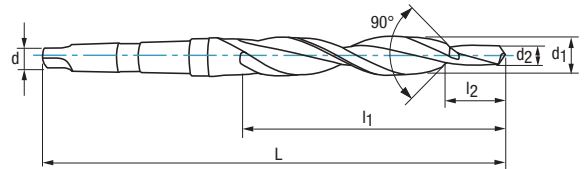
| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | N° Art. HSS | € |
|----|-------|-------|------|-------|-------|-------------|--------------|
| M3 | 3,20 | 6,00 | 93 | 57 | 9 | 42101 | 57,55 |
| M4 | 4,30 | 8,00 | 117 | 75 | 11 | 42104 | 60,35 |
| M5 | 5,30 | 10,00 | 133 | 87 | 13 | 42107 | 71,73 |

| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|-------------|---------------|
| M6 | 6,40 | 11,50 | 142 | 94 | 15 | 42110 | 81,94 |
| M8 | 8,40 | 15,00 | 169 | 114 | 19 | 42113 | 112,08 |
| M10 | 10,50 | 19,00 | 198 | 135 | 23 | 42116 | 173,05 |

Ref. **2646**

BROCA BIDIAMETRAL MANGO CÓNICO

Morse Taper Shank Subland Drill Bit
Foret étagé queue cône morse



| | | | |
|--|--|---------------|---------------|
| Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé | Tol. d2 h9 | Tol. d1 h8 |
|--|--|---------------|---------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|
| Grupo | Sub. | | HSS | M-5 | M-6 | M-8 |
| P | P.1 | 15-20 | 0,080 | 0,100 | 0,120 | 0,130 |
| | P.2 | 8-10 | 0,060 | 0,080 | 0,100 | 0,120 |
| K | K.1 | 25-30 | 0,120 | 0,150 | 0,180 | 0,210 |
| | K.2 | 14-18 | 0,100 | 0,120 | 0,140 | 0,170 |
| N | N.1 | 30-35 | 0,100 | 0,120 | 0,140 | 0,170 |
| | N.2 | 30-35 | 0,120 | 0,150 | 0,180 | 0,210 |
| | N.5 | 20-25 | 0,120 | 0,150 | 0,180 | 0,210 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

Broca-Avellanador con Filos Independientes para Asientos Cónicos a 90° DIN 74/A

Independent Edge Countersink-Drill for 90° Spot Holes DIN 74/A

Foret-Fraise à ébavurer avec filets indépendants coniques à 90° DIN 74/A

| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | CM | N° Art. HSS | € |
|----|-------|-------|------|-------|-------|----|-------------|---------------|
| M5 | 5,50 | 11,00 | 175 | 94 | 13 | 1 | 42530 | 117,56 |
| M6 | 6,60 | 13,00 | 182 | 101 | 15 | 1 | 42533 | 119,96 |

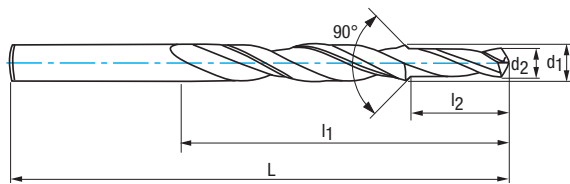
| M | d2 mm | d1 mm | L mm | l1 mm | l2 mm | CM | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|----|-------------|---------------|
| M8 | 9,00 | 17,20 | 228 | 130 | 19 | 2 | 42536 | 142,97 |
| M10 | 11,00 | 21,50 | 248 | 150 | 23 | 2 | 42539 | 169,28 |

Ref. **2544**

BROCA BIDIAMETRAL MANGO CILÍNDRICO

Straight Shank Subland Drill Bit

Foret étagé queue cylindrique



| | | | |
|-----|--|----------|--|
| HSS | | DIN 8378 | |
|-----|--|----------|--|

| | | | |
|--|--|---------------|---------------|
| Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé | Tol. d2 h9 | Tol. d1 h8 |
|--|--|---------------|---------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | HSS | M-3 | M-4 | M-5 | M-6 | M-8 | M-10 | M-12 |
| P | P.1 | 15-20 | 0,055 | 0,070 | 0,080 | 0,100 | 0,120 | 0,130 | 0,160 | |
| | P.2 | 8-10 | 0,045 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,130 | |
| K | K.1 | 25-30 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | |
| | K.2 | 14-18 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | |
| N | N.1 | 30-35 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,170 | 0,200 | |
| | N.2 | 30-35 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | |
| | N.5 | 20-25 | 0,090 | 0,100 | 0,120 | 0,150 | 0,180 | 0,210 | 0,250 | |

Broca-Avellanador con Filos Independientes para preparar Agujero Previo Roscado y Avellanado 90°

Independent Edge Countersink-Drill for 90° Drilling & Counterboring Previous Hole Preparation

Foret-Fraise à ébavurer avec filets indépendants coniques à 90° pour préparer des avant-trous

| M | d2 mm | d1 mm | L mm | I1 mm | I2 mm | N° Art. HSS | € |
|----|-------|-------|------|-------|-------|-------------|--------------|
| M3 | 2,50 | 3,40 | 70 | 39 | 8,80 | 42080 | 44,26 |
| M4 | 3,30 | 4,50 | 80 | 47 | 11,40 | 42083 | 47,59 |
| M5 | 4,20 | 5,50 | 93 | 57 | 13,60 | 42086 | 51,27 |
| M6 | 5,00 | 6,60 | 101 | 63 | 16,50 | 42089 | 58,33 |

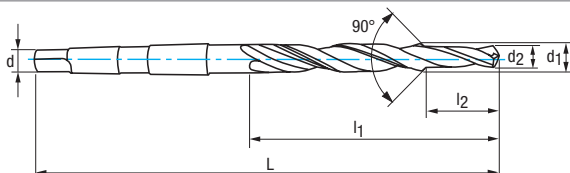
| M | d2 mm | d1 mm | L mm | I1 mm | I2 mm | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|-------------|---------------|
| M8 | 6,80 | 9,00 | 125 | 81 | 21,00 | 42092 | 69,49 |
| M10 | 8,50 | 11,00 | 142 | 94 | 25,50 | 42095 | 81,08 |
| M12 | 10,20 | 13,50 | 160 | 108 | 30,00 | 42098 | 100,94 |

Ref. **2644**

BROCA BIDIAMETRAL MANGO CÓNICO

Morse Taper Shank Subland Drill Bit

Foret étagé queue cône morse



| | | | |
|-----|--|----------|--|
| HSS | | DIN 8379 | |
|-----|--|----------|--|

| | | | |
|--|--|---------------|---------------|
| Blanca Bright Finish Finition blanche | Rectificado Ground Taillé meulé | Tol. d2 h9 | Tol. d1 h8 |
|--|--|---------------|---------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|------|
| Grupo | Sub. | | HSS | M-8 | M-10 | M-12 | M-14 | M-16 | M-18 | M-20 |
| P | P.1 | 15-20 | 0,120 | 0,130 | 0,160 | 0,170 | 0,180 | 0,200 | 0,250 | |
| | P.2 | 8-10 | 0,100 | 0,120 | 0,130 | 0,140 | 0,160 | 0,180 | 0,200 | |
| K | K.1 | 25-30 | 0,180 | 0,210 | 0,250 | 0,280 | 0,300 | 0,330 | 0,360 | |
| | K.2 | 14-18 | 0,140 | 0,170 | 0,200 | 0,220 | 0,240 | 0,250 | 0,280 | |
| N | N.1 | 30-35 | 0,140 | 0,170 | 0,200 | 0,220 | 0,240 | 0,260 | 0,280 | |
| | N.2 | 30-35 | 0,180 | 0,210 | 0,250 | 0,280 | 0,300 | 0,330 | 0,360 | |
| | N.5 | 20-25 | 0,180 | 0,210 | 0,250 | 0,280 | 0,300 | 0,330 | 0,360 | |

Broca-Avellanador con Filos Independientes para preparar Agujero Previo Roscado y Avellanado 90°

Independent Edge Countersink-Drill for 90° Drilling & Counterboring Previous Hole Preparation

Foret-Fraise à ébavurer avec filets indépendants coniques à 90° pour préparer des avant-trous

| M | d2 mm | d1 mm | L mm | I1 mm | I2 mm | CM | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|----|-------------|---------------|
| M8 | 6,80 | 9,00 | 162 | 81 | 21,00 | 1 | 42509 | 107,89 |
| M10 | 8,50 | 11,00 | 175 | 94 | 25,50 | 1 | 42512 | 117,54 |
| M12 | 10,20 | 13,50 | 189 | 108 | 30,00 | 1 | 42515 | 138,87 |
| M14 | 12,00 | 15,50 | 218 | 120 | 34,50 | 2 | 42518 | 148,17 |

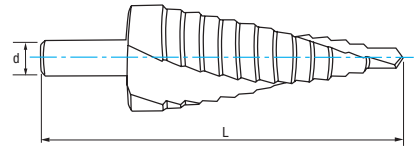
| M | d2 mm | d1 mm | L mm | I1 mm | I2 mm | CM | N° Art. HSS | € |
|-----|-------|-------|------|-------|-------|----|-------------|---------------|
| M16 | 14,00 | 17,50 | 228 | 130 | 38,50 | 2 | 42521 | 159,92 |
| M18 | 15,50 | 20,00 | 238 | 140 | 43,50 | 2 | 42524 | 178,83 |
| M20 | 17,50 | 22,00 | 248 | 150 | 47,50 | 2 | 42527 | 216,26 |

Ref. **1617**

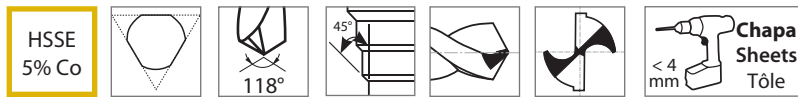
BROCA ESCALONADA ESPIRAL HSSE INOX

Stainless HSSE Spiral Step Drill Bit

Foret étagé spirale HSSE Inox



- Canal optimizado para virutas largas y complejas
- Avellanado especial 45°
- Filos de corte protegidos y muy afilados
- Sin rebabas
- Mayor vida útil en materiales muy duros
- Autocentrado en chapas finas
- Optimized channel for long and complex chips
- Special 45° Countersinking
- Very sharpened & protected cutting edges
- No burrs
- Longer tool life in very hard materials
- Autocentering in fine sheets
- Goujüre optimisée pour copeaux longs et complexes
- Ébavurage special à 45°
- Filets des arêtes de coupe protégés et plus affûtés
- Sans bavures
- Vie utile plus longue pour aciers plus durs
- Autocentrage sur toles minces



| | | | | | | |
|----------|-----|----------------------------|----------|-----------------|----------|--|
| P | P.1 | Aceros Steels Aciers | M | INOX | N | Cobre / Copper / Cuivre Aluminio / Aluminium Plásticos / Plastics / Plastiques |
| | P.5 | Acier INOX | | Stainless Steel | | |

| Cap. mm | Nº Pasos* Steps* / Étages* | d mm | L mm | Nº Art. 5%Co | € |
|------------|---|---------|---------|-----------------|--------|
| 4-12 | 9 (4-5-6-7-8-9-10-11-12) | 6 | 80 | 67314 | 50,73 |
| 4-20 | 9 (4-6-8-10-12-14-16-18-20) | 9 | 69 | 67316 | 71,98 |
| 6-30 | 13 (6-8-10-12-14-16-18-20-22-24-26-28-30) | 10 | 99 | 67318 | 104,64 |



Set 3 Pcs

| Cont. | Nº Art. 5%Co | € |
|---------------------|-----------------|--------|
| 4-12, 4-20, 6-30 mm | 67317 | 227,36 |

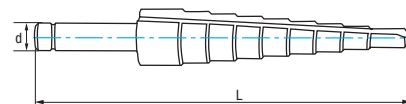


Ref. **1607**

BROCA ESCALONADA HSSE INOX

Stainless HSSE Step Drill Bit

Foret étagé HSSE Inox



- Nueva punta robusta autocentrante
- Avellanado especial 45°
- Menor desgaste y esfuerzo de corte
- Mayor rendimiento y vida útil de la herramienta
- Mejor evacuación de viruta
- Acabado sin rebabas

- New autocentering robust point
- Special 45° Countersinking
- Lower wear and cutting effort
- Better performance & longer tool life
- Better chipping-off
- No-burr finishing

- Nouvelle pointe plus robuste autocestrante
- Ébavurage special à 45°
- Réduction de l'usure et de l'effort de coupe
- Augmentation de la performance et vie utile de l'outil
- Meilleure évacuation des copeaux
- Finition sans bavures

| | | | | | | | |
|---------------|--------------|--|--|--|--|--|-------------------------|
| HSSE 5% Co | IZAR Std. | | | | | | Chapa Sheets Tôle |
|---------------|--------------|--|--|--|--|--|-------------------------|

| | | | | | | |
|----------|--------------------------|-----------------------------------|----------|--|----------|---|
| P | P.1 P.5 | Aceros Steels Aciers | M | INOX Stainless Steel Acier INOX | N | Cobre / Copper / Cuivre Aluminio / Aluminium Plásticos / Plastics / Plastiques |
|----------|--------------------------|-----------------------------------|----------|--|----------|---|

| Cap. mm | Nº Pasos Steps / Étages | d mm | L mm | Nº Art. 5%Co | € |
|---------|---|------|------|-----------------|--------|
| 4-12 | 9 (4-5-6-7-8-9-10-11-12) | 6 | 79 | 12072 | 48,72 |
| 4-20 | 9 (4-6-8-10-12-14-16-18-20) | 8 | 67 | 12078 | 61,97 |
| 6-30 | 13 (6-8-10-12-14-16-18-20-22-24-26-28-30) | 10 | 100 | 12084 | 91,06 |
| 9-36 | 10 (9-12-15-18-21-24-27-30-33-36) | 12 | 82 | 67299 | 163,82 |
| 12-20 | 9 (12-13-14-15-16-17-18-19-20) | 9 | 75 | 60835 | 67,58 |
| 20-30 | 11 (20-21-22-23-24-25-26-27-28-29-30) | 12 | 88 | 60837 | 98,50 |
| 30-40 | 11 (30-31-32-33-34-35-36-37-38-39-40) | 13 | 98 | 60838 | 154,03 |
| 40-50 | 11 (40-41-42-43-44-45-46-47-48-49-50) | 13 | 112 | 60839 | 229,19 |
| 50-60 | 11 (50-51-52-53-54-55-56-57-58-59-60) | 13 | 120 | 60840 | 342,92 |



Set 3 Pcs

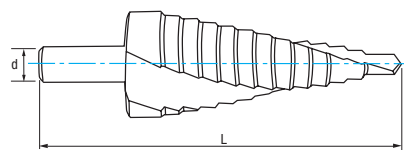
| Cont. | Nº Art. 5%Co | € |
|---------------------|-----------------|--------|
| 4-12, 4-20, 6-30 mm | 43519 | 201,74 |



Ref. **1612**

BROCA ESCALONADA ESPIRAL HSS

HSS **Spiral** Step Drill Bit
Foret étagé **spirale** HSS



- Canal optimizado para virutas largas y complejas
- Avellanado especial 45°
- Filos de corte protegidos y muy afilados
- Sin rebabas
- Mayor vida útil en materiales muy duros
- Autocentrado en chapas finas
- Optimized channel for long and complex chips
- Special 45° Countersinking
- Very sharpened & protected cutting edges
- No burrs
- Longer tool life in very hard materials
- Autocentering in fine sheets
- Goujure optimisée pour copeaux longs et complexes
- Ébavurage special à 45°
- Filets des arêtes de coupe protégés et plus affûtés
- Sans bavures
- Vie utile plus longue pour aciers plus durs
- Autocentrage sur toles minces

| | | | | | | | | |
|-----|--|--|--|--|--|--|--------------------------------|--|
| HSS | | | | | | | Chapa Sheets Tôle | Materiales ferrosos Ferrous Materials Matériaux ferreux |
|-----|--|--|--|--|--|--|--------------------------------|--|

| | | | | | |
|----------|------------|-----------------------------------|----------|--------------------------|--|
| P | P.1 | Aceros Steels Aciers | N | N.6 N.7 | Plásticos Plastics Plastiques |
|----------|------------|-----------------------------------|----------|--------------------------|--|

| Cap. mm | Nº Pasos Steps / Étages | d mm | L mm | Nº Art. HSS | € |
|---------|---|------|------|-------------|---------------|
| 4-12 | 9 (4-5-6-7-8-9-10-11-12) | 6 | 80 | 67360 | 42,26 |
| 4-20 | 9 (4-6-8-10-12-14-16-18-20) | 9 | 69 | 67366 | 59,97 |
| 6-30 | 13 (6-8-10-12-14-16-18-20-22-24-26-28-30) | 10 | 99 | 67368 | 87,22 |
| 6-38 | 12 (6-9-13-16-19-21-23-26-29-32-35-38) | 12 | 97 | 69557 | 171,53 |



Set 3 Pcs

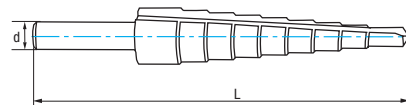
| Cont. | Nº Art. HSS | € |
|---------------------|-------------|---------------|
| 4-12, 4-20, 6-30 mm | 67357 | 189,45 |



Ref. **1602**

BROCA ESCALONADA HSS

HSS Step Drill
Foret étagé HSS



- Nueva punta robusta autocentrante
- Avellanado especial 45°
- Menor desgaste y esfuerzo de corte
- Mayor rendimiento y vida útil de la herramienta
- Mejor evacuación de viruta
- Acabado sin rebabas

- New autocentering robust point
- Special 45° Countersinking
- Lower wear and cutting effort
- Better performance & longer tool life
- Better chipping-off
- No-burr finishing

- Nouvelle pointe plus robuste autocentrante
- Ébavurage special à 45°
- Réduction de l'usure et de l'effort de coupe
- Augmentation de la performance et vie utile de l'outil
- Meilleure évacuation des copeaux
- Finition sans bavures



Chapa
Sheets
Tôle

Materiales ferrosos
Ferrous Materials
Matériaux ferreux

P P.1

Aceros
Steels
Aciers

N N.6
N.7

Plásticos
Plastics
Plastiques



Set 3 Pcs

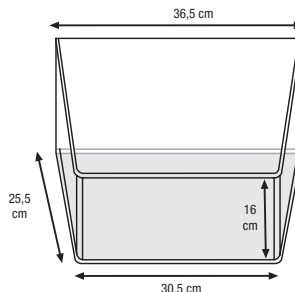
| Cap. mm | Nº Pasos Steps / Étages | d mm | L mm | Nº Art. HSS | € |
|---------|---|------|------|-------------|--------|
| 4-12 | 9 (4-5-6-7-8-9-10-11-12) | 6 | 79 | 12048 | 40,61 |
| 4-20 | 9 (4-6-8-10-12-14-16-18-20) | 9 | 67 | 12054 | 51,63 |
| 4-30 | 14 (4-6-8-10-12-14-16-18-20-22-24-26-28-30) | 10 | 100 | 66484 | 68,30 |
| 6-30 | 13 (6-8-10-12-14-16-18-20-22-24-26-28-30) | 10 | 100 | 12060 | 75,89 |
| 7-37 | 8 (7-12,5-15,2-18,6-20,4-22,5-28,3-37) | 12 | 90 | 67619 | 148,04 |
| 9-36 | 10 (9-12-15-18-21-24-27-30-33-36) | 12 | 82 | 12066 | 136,52 |
| 12-20 | 9 (12-13-14-15-16-17-18-19-20) | 9 | 75 | 56798 | 56,31 |
| 20-30 | 11 (20-21-22-23-24-25-26-27-28-29-30) | 12 | 88 | 56799 | 82,09 |
| 30-40 | 11 (30-31-32-33-34-35-36-37-38-39-40) | 13 | 98 | 60715 | 123,23 |
| 40-50 | 11 (40-41-42-43-44-45-46-47-48-49-50) | 13 | 112 | 60716 | 190,99 |
| 50-60 | 11 (50-51-52-53-54-55-56-57-58-59-60) | 13 | 120 | 60717 | 285,77 |

| Cont. | Nº Art. HSS | € |
|---------------------|-------------|--------|
| 4-12, 4-20, 6-30 mm | 43518 | 168,13 |

Expo **1602**

EXPOSITOR BROCAS ESCALONADAS

Step Drill Display
Présentoirs forets étagés



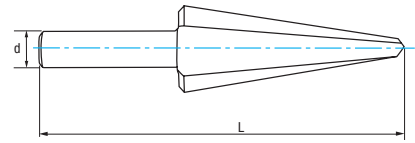
15 Pcs

| Nº Art. | € |
|---------|----------|
| 65184 | 1.486,06 |

| Cap. mm | Nº Art. HSS | Uds. |
|---------|-------------|------|
| 4-12 | 12048 | 2 |
| 4-20 | 12054 | 2 |
| 6-30 | 12060 | 2 |
| 9-36 | 12066 | 2 |
| 12-20 | 56798 | 2 |
| 20-30 | 56799 | 2 |
| 30-40 | 60715 | 1 |
| 40-50 | 60716 | 1 |
| 50-60 | 60717 | 1 |

Ref. **1609**

BROCA TUBO/CHAPA HSSE
HSSE Tube-Sheet Drill
Foret ampli-trou HSSE



- Nueva geometría
- Menor desgaste, mayor vida útil de la herramienta
- Mayor velocidad de corte
- Materia prima de última generación

- New geometry
- Lower wear and longer tool life
- Higher cutting speed
- Last generation raw material

- Nouvelle Géométrie
- Réduction de l'usure, vie plus longue de l'outil
- Augmentation de la vitesse de coupe
- Matière Première dernière génération

| | | | | | | | |
|---------------|--------------|--|--|--|--|-----------------------------------|----------------|
| HSSE 5% Co | IZAR Std. | | | | | Chapa Sheets Tôle < 4 mm | Blue Finish |
|---------------|--------------|--|--|--|--|-----------------------------------|----------------|

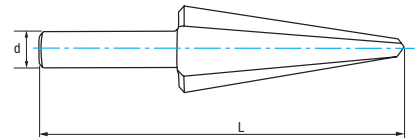
| | | | | | |
|---------------------|-----------------------------------|----------|--|---------------------|--|
| P P.1 P.5 | Aceros Steels Aciers | M | INOX Stainless Steel Acier INOX | N N.6 N.7 | Plásticos Plastics Plastiques |
|---------------------|-----------------------------------|----------|--|---------------------|--|

| Cap. mm | d mm | L mm | Nº Art. 5% Co | € |
|---------|------|------|---------------|--------|
| 3-14 | 6 | 60 | 12108 | 31,11 |
| 4-30,5 | 10 | 102 | 69926 | 104,62 |
| 8-20 | 8 | 62 | 69925 | 41,20 |
| 16-30,5 | 10 | 72 | 12111 | 68,00 |



Ref. **1603**

BROCA TUBO/CHAPA
Tube-Sheet Drill Bit
Foret ampli-trou



- Nueva geometría
- Menor desgaste, mayor vida útil de la herramienta
- Mayor velocidad de corte
- Materia prima de última generación

- New geometry
- Lower wear and longer tool life
- Higher cutting speed
- Last generation raw material

- Nouvelle Géométrie
- Réduction de l'usure, vie plus longue de l'outil
- Augmentation de la vitesse de coupe
- Matière Première dernière génération

| | | | | | | |
|-----|--|--|--|--|-----------------------------------|---|
| HSS | | | | | Chapa Sheets Tôle < 4 mm | Metal no ferroso Non-ferrous Metal Métal non ferreux |
|-----|--|--|--|--|-----------------------------------|---|

| | | | |
|--------------|-----------------------------------|---------------------|--|
| P P.1 | Aceros Steels Aciers | N N.6 N.7 | Plásticos Plastics Plastiques |
|--------------|-----------------------------------|---------------------|--|

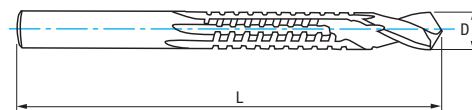
| Cap. mm | d mm | L mm | Nº Art. HSS | € | Cap. mm | d mm | L mm | Nº Art. HSS | € |
|---------|------|------|-------------|-------|---------|------|------|-------------|--------|
| 3-14 | 6 | 60 | 12090 | 16,01 | 26-40 | 12 | 85 | 69922 | 90,91 |
| 4-25,4 | 10 | 90 | 69921 | 42,98 | 36-50 | 12 | 97 | 12100 | 132,62 |
| 5-20 | 8 | 66 | 69920 | 26,60 | 40-61* | 13 | 103 | 12102 | 221,28 |
| 8-20 | 8 | 62 | 69924 | 23,00 | 46-60 | 13 | 96 | 69923 | 221,28 |
| 16-30,5 | 10 | 72 | 12096 | 43,93 | | | | | |



* Cap. hasta fin de existencias / while stock lasts / jusqu'à la fin de stock

Ref. **1606**

BROCA FRESA
Milling Drill
Foret à découper la tôle



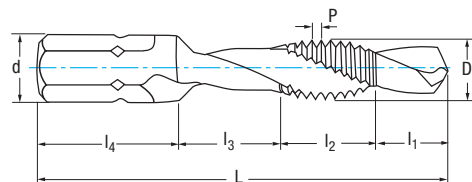
| | | | | |
|-----|-----------|------|-----|--|
| HSS | IZAR Std. | 135° | 30° | Blanca Bright Finish Finition blanche |
|-----|-----------|------|-----|--|

| D mm | L mm | N° Art. HSS | € |
|------|------|-------------|-------|
| 6,00 | 90 | 16330 | 13,70 |
| 8,00 | 95 | 16331 | 17,51 |



Ref. **1610**

BROCA-MACHO-AVELLANADOR
Combi Tap With Countersink
Outil multi-función



| | | | | |
|-----|----------|--|---------------|--|
| HSS | DIN 3126 | Mango HEX 1/4 Shank / Queue | Multi-Función | Blanca Bright Finish Finition blanche |
|-----|----------|--|---------------|--|

| D mm | L mm | l1 mm | l2 mm | l3 mm | l4 mm | d mm | p | Avellanado Countersinking Fraisage mm | | N° Art. HSS | € |
|------|------|-------|-------|-------|-------|------|------|--|---|-------------|-------|
| M3 | 36 | 5 | 8 | 7 | 12 | 6,35 | 0,50 | 7,00 | 1 | 12567 | 17,15 |
| M4 | 39 | 5 | 11 | 8 | 12 | 6,35 | 0,70 | 7,00 | 1 | 12571 | 17,15 |
| M5 | 41 | 7 | 11 | 9 | 12 | 6,35 | 0,80 | 7,00 | 1 | 12577 | 19,23 |
| M6 | 44 | 8 | 11 | 10 | 12 | 6,35 | 1,00 | 7,00 | 1 | 10971 | 19,84 |
| M8 | 50 | 11 | 15 | 10 | 12 | 6,35 | 1,25 | 9,00 | 1 | 12582 | 27,42 |
| M10 | 59 | 12 | 21 | 10 | 12 | 6,35 | 1,50 | 11,00 | 1 | 12583 | 33,08 |



Set 7 Pcs

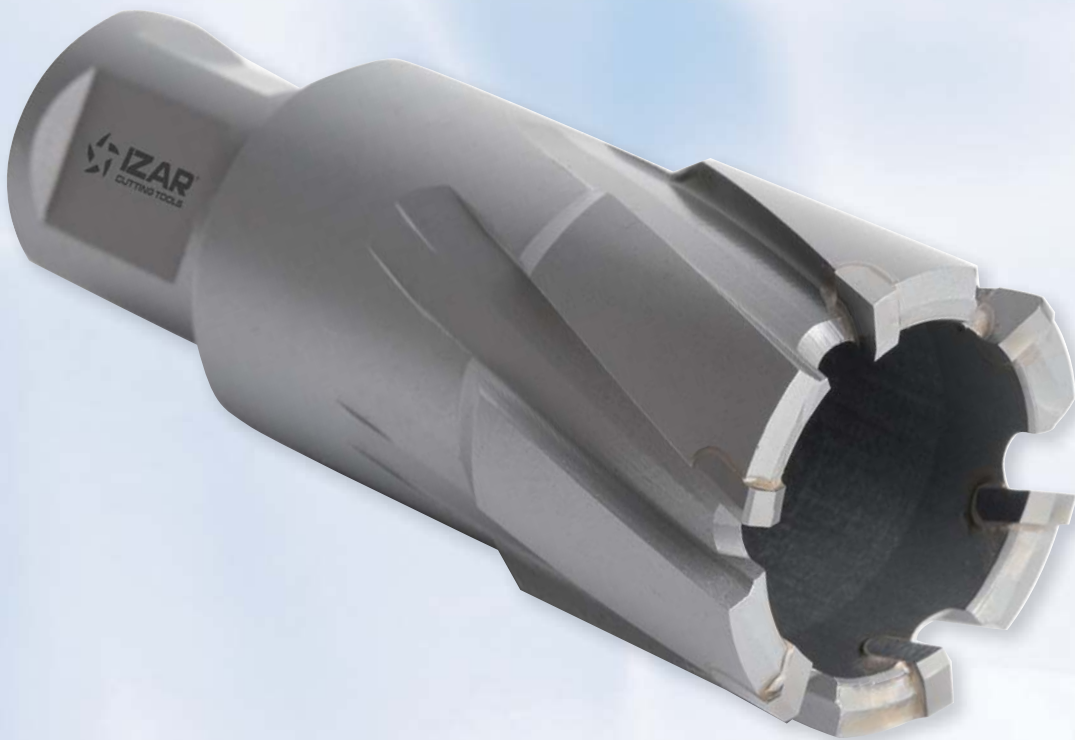
| Cont. Ø | N° Art. HSS | € |
|---------------------------|-------------|--------|
| M3-M4-M5-M6-M8-M10-Adapt. | 11025 | 133,87 |



FRESAS HUECAS M. ELECTROMAGNÉTICAS

Core Drills

Fraises à carotter UP électromagnétiques

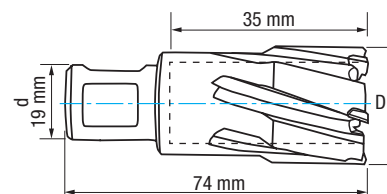


Ref. **4078**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS TCT CORTA

Short TCT Core Drill

Fraise à carotter pour unité de perçage électromagnétique TCT courte



| | | |
|--|--|---|
| MD/HM TCT | Serie Corta Short Length Série courte | Apto con Poca Lubricación Suitable with Minimal Cooling Apte avec lubrification minimale |
| Apto para Madera Suitable for Wood Adapté au bois | | DOBLE WELDON |



| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |
| | P.2 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | P.3 | 795 | 682 | 596 | 530 | 477 | 381 | 318 | 238 | 190 | 159 |
| | P.4 | 477 | 409 | 358 | 318 | 286 | 229 | 191 | 143 | 114 | 95 |
| M | | 530 | 454 | 397 | 353 | 318 | 254 | 212 | 159 | 127 | 106 |
| K | K.1 | 1591 | 1364 | 1193 | 1061 | 954 | 763 | 636 | 477 | 381 | 318 |
| N | N.1 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | N.2 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | N.3 | 2387 | 2046 | 1790 | 1591 | 1432 | 1145 | 954 | 716 | 572 | 477 |

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi} \quad V_f \text{ (mm/min.)} = r.p.m. \times f$$

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|-------|
| 14 | 19 | 74 | 35 | 61963 | 42,26 |
| 15 | 19 | 74 | 35 | 61964 | 42,26 |
| 16 | 19 | 74 | 35 | 61965 | 42,26 |
| 17 | 19 | 74 | 35 | 61966 | 42,26 |
| 18 | 19 | 74 | 35 | 61967 | 42,26 |
| 19 | 19 | 74 | 35 | 61968 | 42,26 |
| 20 | 19 | 74 | 35 | 61969 | 42,26 |
| 21 | 19 | 74 | 35 | 61970 | 42,33 |
| 22 | 19 | 74 | 35 | 61971 | 42,33 |
| 23 | 19 | 74 | 35 | 61973 | 42,60 |
| 24 | 19 | 74 | 35 | 61974 | 43,05 |
| 25 | 19 | 74 | 35 | 61975 | 43,22 |
| 26 | 19 | 74 | 35 | 61976 | 50,06 |
| 27 | 19 | 74 | 35 | 61977 | 50,06 |
| 28 | 19 | 74 | 35 | 61978 | 50,06 |
| 29 | 19 | 74 | 35 | 61979 | 50,06 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|-------|
| 30 | 19 | 74 | 35 | 61980 | 50,06 |
| 31 | 19 | 74 | 35 | 61981 | 62,23 |
| 32 | 19 | 74 | 35 | 61982 | 63,87 |
| 33 | 19 | 74 | 35 | 61983 | 64,27 |
| 34 | 19 | 74 | 35 | 61984 | 72,40 |
| 35 | 19 | 74 | 35 | 61985 | 79,43 |
| 36 | 19 | 74 | 35 | 61986 | 79,43 |
| 37 | 19 | 74 | 35 | 61987 | 79,43 |
| 38 | 19 | 74 | 35 | 61988 | 79,43 |
| 39 | 19 | 74 | 35 | 61989 | 79,43 |
| 40 | 19 | 74 | 35 | 61990 | 79,43 |
| 41 | 19 | 74 | 35 | 61991 | 92,10 |
| 42 | 19 | 74 | 35 | 61992 | 96,95 |
| 43 | 19 | 74 | 35 | 61993 | 98,85 |
| 44 | 19 | 74 | 35 | 61994 | 98,88 |
| 45 | 19 | 74 | 35 | 61995 | 98,88 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|--------|
| 46 | 19 | 74 | 35 | 61996 | 113,94 |
| 47 | 19 | 74 | 35 | 61997 | 113,94 |
| 48 | 19 | 74 | 35 | 61998 | 113,94 |
| 49 | 19 | 74 | 35 | 61999 | 114,14 |
| 50 | 19 | 74 | 35 | 62000 | 118,31 |
| 51 | 19 | 74 | 35 | 62001 | 123,94 |
| 52 | 19 | 74 | 35 | 62002 | 123,94 |
| 53 | 19 | 74 | 35 | 62003 | 123,94 |
| 54 | 19 | 74 | 35 | 62004 | 123,94 |
| 55 | 19 | 74 | 35 | 62005 | 124,45 |
| 56 | 19 | 74 | 35 | 62006 | 135,12 |
| 57 | 19 | 74 | 35 | 62007 | 135,12 |
| 58 | 19 | 74 | 35 | 62008 | 135,12 |
| 59 | 19 | 74 | 35 | 62009 | 143,22 |
| 60 | 19 | 74 | 35 | 62010 | 150,42 |

Ref. **4075**

EXPULSORES

Pilot Pins

Ejecteurs



| | |
|-----|--|
| HSS | |
|-----|--|

| D mm | L mm | Cap. mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|--------|------|---------|--------------------|-------------|-------|
| 6,34 | 90 | 12-17 | 4078 (35 mm) | 65905 | 17,39 |
| * 6,34 | 116 | 12-17 | 4078 (35 mm) | 71750 | 23,73 |
| 7,98 | 90 | 18-60 | 4078 (35 mm) | 65907 | 22,60 |
| * 7,98 | 118 | 18-60 | 4078 (35 mm) | 71880 | 28,48 |

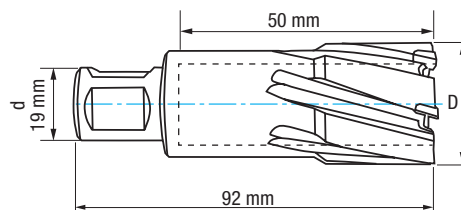
* Para uso con adaptador
When using with adapter / Pour usage avec adaptateur

Ref. **4077**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS TCT LARGA

Long TCT Core Drill

Fraise à carotter pour unité de perçage électromagnétique TCT longue



| | | |
|--------------|---|---|
| MD/HM TCT | Serie Larga Long Length Série longue | Apto con Poca Lubricación Suitable with Minimal Cooling Apte avec lubrification minimale |
|--------------|---|---|

| | |
|--|---------------------|
| Apto para Madera Suitable for Wood Adapté au bois | DOBLE WELDON |
|--|---------------------|

| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |
| | P.2 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | P.3 | 795 | 682 | 596 | 530 | 477 | 381 | 318 | 238 | 190 | 159 |
| | P.4 | 477 | 409 | 358 | 318 | 286 | 229 | 191 | 143 | 114 | 95 |
| M | | 530 | 454 | 397 | 353 | 318 | 254 | 212 | 159 | 127 | 106 |
| K | K.1 | 1591 | 1364 | 1193 | 1061 | 954 | 763 | 636 | 477 | 381 | 318 |
| N | N.1 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | N.2 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | N.3 | 2387 | 2046 | 1790 | 1591 | 1432 | 1145 | 954 | 716 | 572 | 477 |



$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

$$V_f (mm/min.) = r.p.m. \times f$$

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|-------|
| 14 | 19 | 92 | 50 | 56746 | 60,24 |
| 15 | 19 | 92 | 50 | 56747 | 60,24 |
| 16 | 19 | 92 | 50 | 56749 | 60,24 |
| 17 | 19 | 92 | 50 | 56750 | 60,24 |
| 18 | 19 | 92 | 50 | 56752 | 60,24 |
| 19 | 19 | 92 | 50 | 56753 | 60,24 |
| 20 | 19 | 92 | 50 | 56754 | 60,24 |
| 21 | 19 | 92 | 50 | 56755 | 63,19 |
| 22 | 19 | 92 | 50 | 56756 | 63,19 |
| 23 | 19 | 92 | 50 | 56757 | 63,19 |
| 24 | 19 | 92 | 50 | 56758 | 63,27 |
| 25 | 19 | 92 | 50 | 56759 | 63,27 |
| 26 | 19 | 92 | 50 | 56760 | 75,76 |
| 27 | 19 | 92 | 50 | 56761 | 75,76 |
| 28 | 19 | 92 | 50 | 56762 | 75,89 |
| 29 | 19 | 92 | 50 | 56763 | 75,89 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|--------|
| 30 | 19 | 92 | 50 | 56764 | 75,89 |
| 31 | 19 | 92 | 50 | 56765 | 91,37 |
| 32 | 19 | 92 | 50 | 56766 | 91,37 |
| 33 | 19 | 92 | 50 | 56767 | 91,37 |
| 34 | 19 | 92 | 50 | 56768 | 91,37 |
| 35 | 19 | 92 | 50 | 56769 | 91,37 |
| 36 | 19 | 92 | 50 | 56770 | 104,31 |
| 37 | 19 | 92 | 50 | 56771 | 104,70 |
| 38 | 19 | 92 | 50 | 56772 | 104,70 |
| 39 | 19 | 92 | 50 | 56773 | 104,70 |
| 40 | 19 | 92 | 50 | 56774 | 104,70 |
| 41 | 19 | 92 | 50 | 56775 | 126,30 |
| 42 | 19 | 92 | 50 | 56776 | 126,30 |
| 43 | 19 | 92 | 50 | 56777 | 126,30 |
| 44 | 19 | 92 | 50 | 56778 | 126,30 |
| 45 | 19 | 92 | 50 | 56779 | 126,30 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|--------|
| 46 | 19 | 92 | 50 | 56780 | 147,03 |
| 47 | 19 | 92 | 50 | 56781 | 147,12 |
| 48 | 19 | 92 | 50 | 56782 | 147,12 |
| 49 | 19 | 92 | 50 | 56783 | 147,12 |
| 50 | 19 | 92 | 50 | 56784 | 147,12 |
| 51 | 19 | 92 | 50 | 56785 | 166,26 |
| 52 | 19 | 92 | 50 | 56786 | 166,89 |
| 53 | 19 | 92 | 50 | 56787 | 166,89 |
| 54 | 19 | 92 | 50 | 56788 | 166,89 |
| 55 | 19 | 92 | 50 | 56789 | 166,89 |
| 56 | 19 | 92 | 50 | 56790 | 183,06 |
| 57 | 19 | 92 | 50 | 56791 | 183,06 |
| 58 | 19 | 92 | 50 | 56792 | 183,06 |
| 59 | 19 | 92 | 50 | 56793 | 194,04 |
| 60 | 19 | 92 | 50 | 56794 | 199,56 |

Ref. **4075**

EXPULSORES

Pilot Pins

Ejecteurs



| | |
|-----|--|
| HSS | |
|-----|--|

| D mm | L mm | Cap. mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|--------|------|---------|--------------------|-------------|-------|
| 6,34 | 106 | 12-17 | 4077 (50 mm) | 61501 | 22,05 |
| * 6,34 | 127 | 12-17 | 4077 (50 mm) | 71878 | 18,18 |
| 7,98 | 105 | 18-60 | 4077 (50 mm) | 61503 | 26,46 |
| * 7,98 | 130 | 18-60 | 4077 (50 mm) | 71883 | 33,18 |

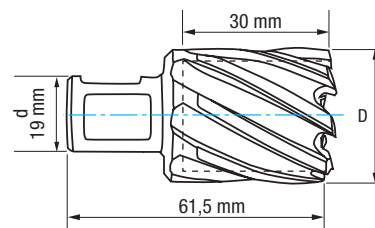
* Para uso con adaptador
When using with adapter / Pour usage avec adaptateur

Ref. **4070**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS HSS CORTA

Short HSS Core Drill

Fraise à carotter pour unité de perçage électromagnétique HSS courte



HSS

Serie Corta
Short Length
Série courte

Rectificado
Ground
Taillé meulé

Aceros Construcción
Structural Steels
Aciers de construction

Apto con Poca Lubricación
Suitable with Minimal Cooling
Apte avec lubrification minimale

DOBLE
WELDON



| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 344 | 295 | 258 | 229 | 206 | 165 | 137 | 103 | 82 | 68 |
| | P.2 | 265 | 227 | 198 | 176 | 159 | 127 | 106 | 79 | 63 | 53 |
| K | K.1 | 477 | 409 | 358 | 318 | 286 | 229 | 190 | 143 | 114 | 95 |
| N | N.3 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|-------|
| 12 | 19 | 61,5 | 30 | 21106 | 25,86 |
| 13 | 19 | 61,5 | 30 | 21107 | 25,86 |
| 14 | 19 | 61,5 | 30 | 21108 | 26,81 |
| 15 | 19 | 61,5 | 30 | 21109 | 27,93 |
| 16 | 19 | 61,5 | 30 | 21110 | 29,05 |
| 17 | 19 | 61,5 | 30 | 21111 | 29,98 |
| 18 | 19 | 61,5 | 30 | 21112 | 31,10 |
| 19 | 19 | 61,5 | 30 | 21113 | 31,86 |
| 20 | 19 | 61,5 | 30 | 21114 | 33,35 |
| 21 | 19 | 61,5 | 30 | 21115 | 35,61 |
| 22 | 19 | 61,5 | 30 | 21116 | 36,92 |
| 23 | 19 | 61,5 | 30 | 21117 | 38,43 |
| 24 | 19 | 61,5 | 30 | 21118 | 39,93 |
| 25 | 19 | 61,5 | 30 | 21119 | 41,23 |
| 26 | 19 | 61,5 | 30 | 21120 | 42,73 |
| 27 | 19 | 61,5 | 30 | 21121 | 43,10 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|-------|
| 28 | 19 | 61,5 | 30 | 21122 | 45,74 |
| 29 | 19 | 61,5 | 30 | 21123 | 47,24 |
| 30 | 19 | 61,5 | 30 | 21124 | 48,54 |
| 31 | 19 | 61,5 | 30 | 21125 | 52,85 |
| 32 | 19 | 61,5 | 30 | 21126 | 56,60 |
| 33 | 19 | 61,5 | 30 | 21127 | 59,60 |
| 34 | 19 | 61,5 | 30 | 21128 | 68,00 |
| 35 | 19 | 61,5 | 30 | 21129 | 75,26 |
| 36 | 19 | 61,5 | 30 | 21130 | 75,50 |
| 37 | 19 | 61,5 | 30 | 21131 | 76,86 |
| 38 | 19 | 61,5 | 30 | 21132 | 77,62 |
| 39 | 19 | 61,5 | 30 | 21133 | 78,34 |
| 40 | 19 | 61,5 | 30 | 21134 | 78,64 |
| 41 | 19 | 61,5 | 30 | 21135 | 80,50 |
| 42 | 19 | 61,5 | 30 | 21136 | 85,83 |
| 43 | 19 | 61,5 | 30 | 21137 | 89,74 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|--------|
| 44 | 19 | 61,5 | 30 | 21138 | 92,60 |
| 45 | 19 | 61,5 | 30 | 21139 | 93,67 |
| 46 | 19 | 61,5 | 30 | 21140 | 95,77 |
| 47 | 19 | 61,5 | 30 | 21141 | 97,56 |
| 48 | 19 | 61,5 | 30 | 21142 | 101,50 |
| 49 | 19 | 61,5 | 30 | 21143 | 102,21 |
| 50 | 19 | 61,5 | 30 | 21144 | 108,25 |
| 51 | 19 | 61,5 | 30 | 21145 | 110,39 |
| 52 | 19 | 61,5 | 30 | 21146 | 113,95 |
| 53 | 19 | 61,5 | 30 | 21147 | 116,57 |
| 54 | 19 | 61,5 | 30 | 21148 | 122,43 |
| 55 | 19 | 61,5 | 30 | 21149 | 124,16 |
| 56 | 19 | 61,5 | 30 | 21150 | 128,28 |
| 57 | 19 | 61,5 | 30 | 21151 | 132,43 |
| 58 | 19 | 61,5 | 30 | 21152 | 134,50 |
| 59 | 19 | 61,5 | 30 | 21153 | 142,08 |
| 60 | 19 | 61,5 | 30 | 21154 | 150,41 |



Set 6 Pcs

| Cont. Ø | Nº Art. HSS | € |
|-------------------|-------------|--------|
| 12-14-16-18-20-22 | 66858 | 183,08 |



Set 5 Pcs

| Cont. Ø | Nº Art. HSS | € |
|----------------|-------------|--------|
| 24-26-28-30-32 | 66859 | 233,52 |

Ref. **4075**

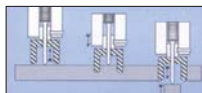
EXPULSORES

Pilot Pins

Ejecteurs



HSS



| D mm | L mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|--------|------|--------------------|-------------|-------|
| 6,34 | 77 | 4070 (30 mm) | 61502 | 9,39 |
| * 6,34 | 102 | 4070 (30 mm) | 61500 | 12,96 |

* Para uso con adaptador

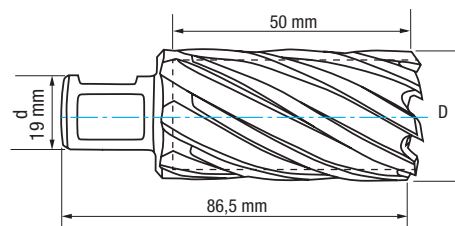
When using with adapter / Pour usage avec adaptateur

Ref. **4071**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS HSS LARGA

Long HSS Core Drill

Fraise à carotter pour unité de perçage électromagnétique HSS longue



| | | | |
|-----|---|--|---|
| HSS | Serie Larga Long Length Série longue | Rectificado Ground Taillé meulé | Aceros Construcción Structural Steels Aciers de construction |
|-----|---|--|---|

| | |
|---|---------------------|
| Apto con Poca Lubricación Suitable with Minimal Cooling Apte avec lubrification minimale | DOBLE WELDON |
|---|---------------------|

| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 344 | 295 | 258 | 229 | 206 | 165 | 137 | 103 | 82 | 68 |
| | P.2 | 265 | 227 | 198 | 176 | 159 | 127 | 106 | 79 | 63 | 53 |
| K | K.1 | 477 | 409 | 358 | 318 | 286 | 229 | 190 | 143 | 114 | 95 |
| N | N.3 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|-------|
| 12 | 19 | 86,5 | 50 | 73338 | 35,82 |
| 13 | 19 | 86,5 | 50 | 73339 | 35,82 |
| 14 | 19 | 86,5 | 50 | 21157 | 37,13 |
| 15 | 19 | 86,5 | 50 | 21158 | 38,62 |
| 16 | 19 | 86,5 | 50 | 21159 | 41,23 |
| 17 | 19 | 86,5 | 50 | 21160 | 42,73 |
| 18 | 19 | 86,5 | 50 | 21161 | 45,93 |
| 19 | 19 | 86,5 | 50 | 21162 | 46,85 |
| 20 | 19 | 86,5 | 50 | 21163 | 48,18 |
| 21 | 19 | 86,5 | 50 | 21164 | 53,60 |
| 22 | 19 | 86,5 | 50 | 21165 | 55,11 |
| 23 | 19 | 86,5 | 50 | 21166 | 56,98 |
| 24 | 19 | 86,5 | 50 | 21167 | 58,67 |
| 25 | 19 | 86,5 | 50 | 21168 | 60,35 |
| 26 | 19 | 86,5 | 50 | 21169 | 62,23 |
| 27 | 19 | 86,5 | 50 | 21170 | 65,22 |
| 28 | 19 | 86,5 | 50 | 21171 | 68,22 |
| 29 | 19 | 86,5 | 50 | 21172 | 70,83 |
| 30 | 19 | 86,5 | 50 | 21173 | 71,65 |
| 31 | 19 | 86,5 | 50 | 21174 | 75,26 |
| 32 | 19 | 86,5 | 50 | 21175 | 78,55 |
| 33 | 19 | 86,5 | 50 | 21177 | 82,19 |
| 34 | 19 | 86,5 | 50 | 21178 | 85,82 |
| 35 | 19 | 86,5 | 50 | 21179 | 89,45 |
| 36 | 19 | 86,5 | 50 | 21180 | 92,00 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|--------|
| 37 | 19 | 86,5 | 50 | 21181 | 95,45 |
| 38 | 19 | 86,5 | 50 | 21182 | 98,18 |
| 39 | 19 | 86,5 | 50 | 21183 | 101,09 |
| 40 | 19 | 86,5 | 50 | 21184 | 106,33 |
| 41 | 19 | 86,5 | 50 | 21185 | 108,07 |
| 42 | 19 | 86,5 | 50 | 21186 | 109,47 |
| 43 | 19 | 86,5 | 50 | 21187 | 112,26 |
| 44 | 19 | 86,5 | 50 | 21188 | 113,65 |
| 45 | 19 | 86,5 | 50 | 21189 | 117,13 |
| 46 | 19 | 86,5 | 50 | 21190 | 118,53 |
| 47 | 19 | 86,5 | 50 | 21191 | 125,15 |
| 48 | 19 | 86,5 | 50 | 21192 | 128,28 |
| 49 | 19 | 86,5 | 50 | 21193 | 128,98 |
| 50 | 19 | 86,5 | 50 | 21194 | 131,77 |
| 51 | 19 | 86,5 | 50 | 21195 | 139,44 |
| 52 | 19 | 86,5 | 50 | 21196 | 145,02 |
| 53 | 19 | 86,5 | 50 | 21197 | 162,43 |
| 54 | 19 | 86,5 | 50 | 21198 | 164,84 |
| 55 | 19 | 86,5 | 50 | 21199 | 166,42 |
| 56 | 19 | 86,5 | 50 | 21200 | 171,40 |
| 57 | 19 | 86,5 | 50 | 21201 | 182,11 |
| 58 | 19 | 86,5 | 50 | 21202 | 182,15 |
| 59 | 19 | 86,5 | 50 | 21203 | 192,50 |
| 60 | 19 | 86,5 | 50 | 21204 | 199,53 |

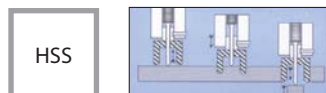


Ref. **4075**

EXPULSORES

Pilot Pins

Ejecteurs



HSS

| D mm | L mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|--------|------|--------------------|-------------|-------|
| 6,34 | 102 | 4071 (50 mm) | 61500 | 12,96 |
| * 6,34 | 127 | 4071 (50 mm) | 71878 | 18,18 |

* Para uso con adaptador

When using with adapter / Pour usage avec adaptateur

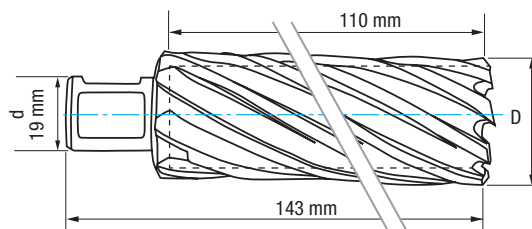


Ref. **4072**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS HSS EXTRA LARGA

Extra Long HSS Core Drill

Fraise à carotter pour unité de perçage électromagnétique HSS extra-longue



HSS

Serie Extra-Larga
Extra-Long Series
Série extra-longue

Aceros Construcción
Structural Steels
Aciers de construction

Apto con Poca Lubricación
Suitable with Minimal Cooling
Apte avec lubrification minimale

DOBLE WELDON

| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 344 | 295 | 258 | 229 | 206 | 165 | 137 | 103 | 82 | 68 |
| | P.2 | 265 | 227 | 198 | 176 | 159 | 127 | 106 | 79 | 63 | 53 |
| K | K.1 | 477 | 409 | 358 | 318 | 286 | 229 | 190 | 143 | 114 | 95 |
| N | N.3 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|---------------|
| 20 | 19 | 143 | 110 | 56694 | 96,17 |
| 21 | 19 | 143 | 110 | 56695 | 97,99 |
| 22 | 19 | 143 | 110 | 56696 | 99,84 |
| 23 | 19 | 143 | 110 | 56697 | 101,82 |
| 24 | 19 | 143 | 110 | 56698 | 107,88 |
| 25 | 19 | 143 | 110 | 56699 | 109,86 |
| 26 | 19 | 143 | 110 | 56700 | 121,30 |
| 27 | 19 | 143 | 110 | 56701 | 123,50 |
| 28 | 19 | 143 | 110 | 56702 | 125,93 |
| 29 | 19 | 143 | 110 | 56703 | 128,29 |
| 30 | 19 | 143 | 110 | 56704 | 130,74 |
| 31 | 19 | 143 | 110 | 56706 | 136,40 |
| 32 | 19 | 143 | 110 | 56707 | 138,81 |
| 33 | 19 | 143 | 110 | 56708 | 148,63 |
| 34 | 19 | 143 | 110 | 56709 | 151,32 |
| 35 | 19 | 143 | 110 | 56710 | 154,09 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|---------------|
| 36 | 19 | 143 | 110 | 56711 | 156,94 |
| 37 | 19 | 143 | 110 | 56712 | 160,20 |
| 38 | 19 | 143 | 110 | 56714 | 163,21 |
| 39 | 19 | 143 | 110 | 56715 | 166,29 |
| 40 | 19 | 143 | 110 | 56716 | 169,46 |
| 41 | 19 | 143 | 110 | 56717 | 198,37 |
| 42 | 19 | 143 | 110 | 56718 | 201,69 |
| 43 | 19 | 143 | 110 | 56719 | 205,09 |
| 44 | 19 | 143 | 110 | 56721 | 208,57 |
| 45 | 19 | 143 | 110 | 56722 | 251,41 |
| 46 | 19 | 143 | 110 | 56724 | 254,82 |
| 47 | 19 | 143 | 110 | 56725 | 258,40 |
| 48 | 19 | 143 | 110 | 56727 | 261,86 |
| 49 | 19 | 143 | 110 | 56728 | 265,42 |
| 50 | 19 | 143 | 110 | 56730 | 269,04 |



Ref. **4075**

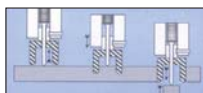
EXPULSORES

Pilot Pins

Ejecteurs



HSS



| D mm | L mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|---------------|------|--------------------|-------------|--------------|
| 7,98 | 154 | 4072 (110 mm) | 61504 | 22,95 |
| * 7,98 | 180 | 4072 (110 mm) | 71885 | 34,73 |

* Para uso con adaptador

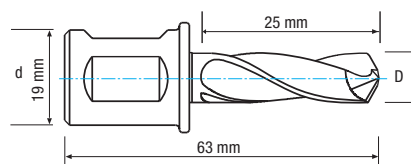
When using with adapter / Pour usage avec adaptateur

Ref. **4079**

BROCA MÁQUINAS ELECTROMAGNÉTICAS HSS

HSS Solid Drill

Foret pour unité de perçage électromagnétique HSS



| | | | | |
|-----|--|---|---|---------------------|
| HSS | Serie Corta Short Length Série courte | Aceros Construcción Structural Steels Aciers de construction | Apto con Poca Lubricación Suitable with Minimal Cooling Apte avec lubrification minimale | DOBLE WELDON |
|-----|--|---|---|---------------------|

| | | | | |
|----------|--------------------------|--------------------------------|----------|--|
| P | P.1 P.2 | Aceros Steels Aciers | K | Fundición Cast Iron Fonte |
|----------|--------------------------|--------------------------------|----------|--|

| D mm | d mm | L mm | I mm | Nº Art. HSS | € |
|------|------|------|------|-------------|--------------|
| 6 | 19 | 63 | 25 | 69758 | 24,89 |
| 8 | 19 | 63 | 25 | 69761 | 24,89 |
| 10 | 19 | 63 | 25 | 69763 | 25,86 |
| 12 | 19 | 63 | 25 | 69768 | 28,74 |
| 14 | 19 | 63 | 25 | 69769 | 29,79 |

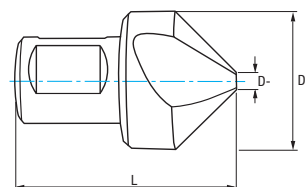



Ref. **4076**

AVELLANADOR MÁQUINA ELECTROMAGNÉTICA

Core Drill Countersink

Fraise à noyer pour unité de perçage électromagnétique



| | | | | | | | | | | |
|-----|--|-----|---------------------|----------|--------------------------|--------------------------------|----------|--|----------|--|
| HSS |  α 90° | 3 Z | DOBLE WELDON | P | P.1 P.5 | Aceros Steels Aciers | M | INOX Stainless Steel Acier INOX | K | Fundición Cast Iron Fonte |
|-----|--|-----|---------------------|----------|--------------------------|--------------------------------|----------|--|----------|--|

| | | | |
|----------|--|--|-------------------------------|
| N | N.1 - N.2 N.3 - N.4 N.5 | Cobre / Copper / Cuivre Latón / Brass / Laiton Aluminio / Aluminium | Madera Wood Bois |
|----------|--|--|-------------------------------|

| D+ mm | D- mm | d mm | L mm | Nº Art. HSS | € |
|-------|-------|------|------|-------------|---------------|
| 25 | 3 | 19 | 45 | 61505 | 119,89 |
| 30 | 3 | 19 | 47 | 61506 | 120,52 |
| 40 | 3 | 19 | 52 | 61507 | 139,70 |
| 50 | 3 | 19 | 57 | 61508 | 159,03 |
| 55 | 3 | 19 | 60 | 61509 | 177,87 |



Ref. **4074****ADAPTADOR FRESA HUECA MÁQUINA ELECTROMAGNÉTICA**

Core Drill Adaptor

Adaptateur fraise à carotter pour unité de perçage électromagnétique



| Fresa Cutter Fraise | Máquina Machine | Expulsor mm Pilot Pin Ejecteur | L mm | I mm | Nº Art. HSS | € |
|---------------------------|--------------------|--------------------------------------|---------|---------|----------------|--------------|
| Doble Weldon | Fein Quick In | 6,35 | 51,20 | 28,60 | 61510 | 29,35 |
| Doble Weldon | Fein Quick In | 7,98 | 51,20 | 28,60 | 61511 | 29,35 |



| Fresa Cutter Fraise | Máquina Machine | Expulsor mm Pilot Pin Ejecteur | L mm | I mm | Nº Art. HSS | € |
|---------------------------|--------------------|--------------------------------------|---------|---------|----------------|--------------|
| Doble Weldon | Universal | 6,35 | 51,20 | 28,60 | 61512 | 28,78 |
| Doble Weldon | Universal | 7,98 | 51,20 | 28,60 | 61513 | 28,78 |



| Entrada In Entrée | Salida Out Sortie | L mm | Nº Art. HSS | € |
|-------------------------|-------------------------|---------|----------------|--------------|
| Doble Weldon | 1/2x20h | 43 | 83450 | 29,93 |



















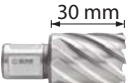





| Entrada In Entrée | Salida Out Sortie | L mm | Nº Art. HSS | € |
|-------------------------|-------------------------|---------|----------------|--------------|
| Doble Weldon | B16 | 57 | 83449 | 29,93 |



ELECCIÓN ADAPTADORES FRESAS HUECAS DOBLE WELDON

Double Weldon Core Drill Adaptor Choice

Choix d'adaptateurs pour fraises à carotter Double Weldon

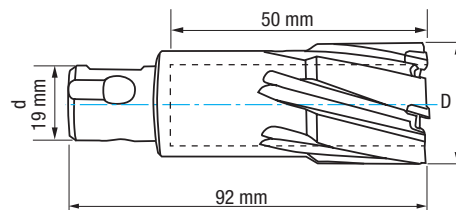
| | | Ref. 4075 | Ref. 4074 | Ref. 4075 | |
|---------------------------|--|--|--|---|--|
| Fresa Cutter Fraise | Expulsor sin Adaptador Pilot Pin without adapter Ejecteur sans adaptateur | Adaptador Máquina Adaptor Machine Adaptateur Machine | * Expulsor para uso con adaptador * Pilot Pin when using with Adapter * Ejecteur pour usage avec adaptateur | | |
| DOBLE WELDON |  | FEIN QUICK IN |  | | |
| 4078 |  35 mm (12-17 mm) 6,34 x 90 mm. Art. 65905 |  Art. 61510 In: 18 mm Out: 19 mm | (12-17 mm) * 6,34 x 116 mm. Art. 71750 | | |
| 4077 |  50 mm (12-17 mm) 6,34 x 106 mm. Art. 61501 | | (12-17 mm) * 6,34 x 127 mm. Art. 71878 | | |
| 4070 |  30 mm 6,34 x 77 mm. Art. 61502 | | * 6,34 x 102 mm. Art. 61500 | | |
| 4071 |  50 mm 6,34 x 102 mm. Art. 61500 | | * 6,34 x 127 mm. Art. 71878 | | |
| 4078 |  35 mm (18-60 mm) 7,98 x 90 mm. Art. 65907 | |  Art. 61511 In: 18 mm Out: 19 mm | (18-60 mm) * 7,98 x 118 mm. Art. 71880 | |
| 4077 |  50 mm (18-60 mm) 7,98 x 105 mm. Art. 61503 | | | (18-60 mm) * 7,98 x 130 mm. Art. 71883 | |
| 4072 |  110 mm 7,98 x 154 mm. Art. 61504 | * 7,98 x 180 mm. Art. 71885 | | | |
| Fresa Cutter Fraise | Expulsor sin Adaptador Pilot Pin without adapter Ejecteur sans adaptateur | Adaptador Máquina Adaptor Machine Adaptateur Machine | | * Expulsor para uso con adaptador * Pilot Pin when using with Adapter * Ejecteur pour usage avec adaptateur | |
| DOBLE WELDON |  | UNIVERSAL Nitto + Weldon |  | | |
| 4078 |  35 mm (12-17 mm) 6,34 x 90 mm. Art. 65905 |  Art. 61512 In: 19 mm Out: 19 mm | (12-17 mm) * 6,34 x 116 mm. Art. 71750 | | |
| 4077 |  50 mm (12-17 mm) 6,34 x 106 mm. Art. 61501 | | (12-17 mm) * 6,34 x 127 mm. Art. 71878 | | |
| 4070 |  30 mm 6,34 x 77 mm. Art. 61502 | | * 6,34 x 102 mm. Art. 61500 | | |
| 4071 |  50 mm 6,34 x 102 mm. Art. 61500 | | * 6,34 x 127 mm. Art. 71878 | | |
| 4078 |  35 mm (18-60 mm) 7,98 x 90 mm. Art. 65907 | |  Art. 61513 In: 19 mm Out: 19 mm | (18-60 mm) * 7,98 x 118 mm. Art. 71880 | |
| 4077 |  50 mm (18-60 mm) 7,98 x 105 mm. Art. 61503 | | | (18-60 mm) * 7,98 x 130 mm. Art. 71883 | |
| 4072 |  110 mm 7,98 x 154 mm. Art. 61504 | * 7,98 x 180 mm. Art. 71885 | | | |

Ref. **4067**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS TCT LARGA

Long TCT Core Drill

Fraise à carotter pour unité de perçage électromagnétique TCT longue



| | | |
|--|---|---|
| MD/HM TCT | Serie Larga Long Length Série longue | Apto con Poca Lubricación Suitable with Minimal Cooling Apte avec lubrification minimale |
| Apto para Madera Suitable for Wood Adapté au bois | UNIVERSAL: NITTO + WELDON | |



| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |
| | P.2 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | P.3 | 795 | 682 | 596 | 530 | 477 | 381 | 318 | 238 | 190 | 159 |
| M | | 530 | 454 | 397 | 353 | 318 | 254 | 212 | 159 | 127 | 106 |
| K | K.1 | 1591 | 1364 | 1193 | 1061 | 954 | 763 | 636 | 477 | 381 | 318 |
| N | N.1 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | N.2 | 928 | 795 | 696 | 618 | 557 | 445 | 371 | 278 | 222 | 185 |
| | N.3 | 2387 | 2046 | 1790 | 1591 | 1432 | 1145 | 954 | 716 | 572 | 477 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|--------------|
| 14 | 19 | 92 | 50 | 61248 | 60,24 |
| 15 | 19 | 92 | 50 | 61249 | 60,24 |
| 16 | 19 | 92 | 50 | 61250 | 60,24 |
| 17 | 19 | 92 | 50 | 61251 | 60,24 |
| 18 | 19 | 92 | 50 | 61252 | 60,24 |
| 19 | 19 | 92 | 50 | 61253 | 60,24 |
| 20 | 19 | 92 | 50 | 61254 | 60,24 |
| 21 | 19 | 92 | 50 | 61255 | 63,19 |
| 22 | 19 | 92 | 50 | 61256 | 63,19 |
| 23 | 19 | 92 | 50 | 61257 | 63,19 |
| 24 | 19 | 92 | 50 | 61258 | 63,27 |
| 25 | 19 | 92 | 50 | 61259 | 63,27 |
| 26 | 19 | 92 | 50 | 61260 | 75,76 |
| 27 | 19 | 92 | 50 | 61261 | 75,76 |
| 28 | 19 | 92 | 50 | 61262 | 75,89 |
| 29 | 19 | 92 | 50 | 61263 | 75,89 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|---------------|
| 30 | 19 | 92 | 50 | 61264 | 75,89 |
| 31 | 19 | 92 | 50 | 61265 | 91,37 |
| 32 | 19 | 92 | 50 | 61266 | 91,37 |
| 33 | 19 | 92 | 50 | 61267 | 91,37 |
| 34 | 19 | 92 | 50 | 61268 | 91,37 |
| 35 | 19 | 92 | 50 | 61269 | 91,37 |
| 36 | 19 | 92 | 50 | 61270 | 104,31 |
| 37 | 19 | 92 | 50 | 61271 | 104,70 |
| 38 | 19 | 92 | 50 | 61272 | 104,70 |
| 39 | 19 | 92 | 50 | 61273 | 104,70 |
| 40 | 19 | 92 | 50 | 61274 | 104,70 |
| 41 | 19 | 92 | 50 | 61275 | 126,30 |
| 42 | 19 | 92 | 50 | 61276 | 126,30 |
| 43 | 19 | 92 | 50 | 61277 | 126,30 |
| 44 | 19 | 92 | 50 | 61278 | 126,30 |
| 45 | 19 | 92 | 50 | 61279 | 126,30 |

| D mm | d mm | L mm | l mm | Nº Art. TCT | € |
|------|------|------|------|-------------|---------------|
| 46 | 19 | 92 | 50 | 61280 | 147,03 |
| 47 | 19 | 92 | 50 | 61281 | 147,12 |
| 48 | 19 | 92 | 50 | 61282 | 147,12 |
| 49 | 19 | 92 | 50 | 61283 | 147,12 |
| 50 | 19 | 92 | 50 | 61199 | 147,12 |
| 51 | 19 | 92 | 50 | 61284 | 166,26 |
| 52 | 19 | 92 | 50 | 61285 | 166,89 |
| 53 | 19 | 92 | 50 | 61286 | 166,89 |
| 54 | 19 | 92 | 50 | 61287 | 166,89 |
| 55 | 19 | 92 | 50 | 61288 | 166,89 |
| 56 | 19 | 92 | 50 | 61289 | 183,06 |
| 57 | 19 | 92 | 50 | 61290 | 183,06 |
| 58 | 19 | 92 | 50 | 61291 | 183,06 |
| 59 | 19 | 92 | 50 | 61292 | 194,04 |
| 60 | 19 | 92 | 50 | 61293 | 199,56 |

Ref. **4075**

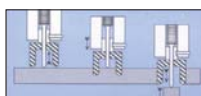
EXPULSORES

Pilot Pins

Ejecteurs



HSS



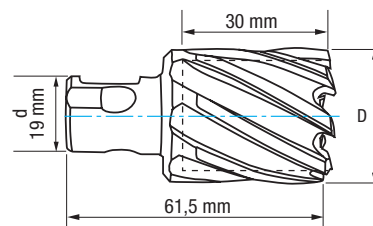
| D mm | L mm | Cap. mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|-------------|------|---------|--------------------|-------------|--------------|
| 6,34 | 106 | 12-17 | 4067 (50 mm) | 61501 | 22,05 |
| 7,98 | 105 | 18-60 | 4067 (50 mm) | 61503 | 26,46 |

Ref. **4060**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS HSS CORTA

Short HSS Core Drill

Fraise à carotter pour unité de perçage électromagnétique HSS courte



| | | | |
|-----|--|--|---|
| HSS | Serie Corta Short Length Série courte | Rectificado Ground Taillé meulé | Aceros Construcción Structural Steels Aciers de construction |
|-----|--|--|---|

Apto con Poca Lubricación
Suitable with Minimal Cooling
Apte avec lubrification minimale

UNIVERSAL:
NITTO +
WELDON

| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 344 | 295 | 258 | 229 | 206 | 165 | 137 | 103 | 82 | 68 |
| | P.2 | 265 | 227 | 198 | 176 | 159 | 127 | 106 | 79 | 63 | 53 |
| K | K.1 | 477 | 409 | 358 | 318 | 286 | 229 | 190 | 143 | 114 | 95 |
| N | N.3 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € | D mm | d mm | L mm | l mm | Nº Art. HSS | € | D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|-------|------|------|------|------|-------------|-------|------|------|------|------|-------------|--------|
| 12 | 19 | 61,5 | 30 | 61120 | 25,86 | 28 | 19 | 61,5 | 30 | 61136 | 45,74 | 44 | 19 | 61,5 | 30 | 61152 | 92,60 |
| 13 | 19 | 61,5 | 30 | 61121 | 25,86 | 29 | 19 | 61,5 | 30 | 61137 | 47,24 | 45 | 19 | 61,5 | 30 | 61153 | 93,67 |
| 14 | 19 | 61,5 | 30 | 61122 | 26,81 | 30 | 19 | 61,5 | 30 | 61138 | 48,54 | 46 | 19 | 61,5 | 30 | 61154 | 95,77 |
| 15 | 19 | 61,5 | 30 | 61123 | 27,93 | 31 | 19 | 61,5 | 30 | 61139 | 52,85 | 47 | 19 | 61,5 | 30 | 61155 | 97,56 |
| 16 | 19 | 61,5 | 30 | 61124 | 29,05 | 32 | 19 | 61,5 | 30 | 61140 | 56,60 | 48 | 19 | 61,5 | 30 | 61156 | 101,50 |
| 17 | 19 | 61,5 | 30 | 61125 | 29,98 | 33 | 19 | 61,5 | 30 | 61141 | 59,60 | 49 | 19 | 61,5 | 30 | 61157 | 102,21 |
| 18 | 19 | 61,5 | 30 | 61126 | 31,10 | 34 | 19 | 61,5 | 30 | 61142 | 68,00 | 50 | 19 | 61,5 | 30 | 61158 | 108,25 |
| 19 | 19 | 61,5 | 30 | 61127 | 31,86 | 35 | 19 | 61,5 | 30 | 61143 | 75,26 | 51 | 19 | 61,5 | 30 | 61159 | 110,39 |
| 20 | 19 | 61,5 | 30 | 61128 | 33,35 | 36 | 19 | 61,5 | 30 | 61144 | 75,50 | 52 | 19 | 61,5 | 30 | 61160 | 113,95 |
| 21 | 19 | 61,5 | 30 | 61129 | 35,61 | 37 | 19 | 61,5 | 30 | 61145 | 76,86 | 53 | 19 | 61,5 | 30 | 61161 | 116,57 |
| 22 | 19 | 61,5 | 30 | 61130 | 36,92 | 38 | 19 | 61,5 | 30 | 61146 | 77,62 | 54 | 19 | 61,5 | 30 | 61162 | 122,43 |
| 23 | 19 | 61,5 | 30 | 61131 | 38,43 | 39 | 19 | 61,5 | 30 | 61147 | 78,34 | 55 | 19 | 61,5 | 30 | 61163 | 124,16 |
| 24 | 19 | 61,5 | 30 | 61132 | 39,93 | 40 | 19 | 61,5 | 30 | 61148 | 78,64 | 56 | 19 | 61,5 | 30 | 61164 | 128,28 |
| 25 | 19 | 61,5 | 30 | 61133 | 41,23 | 41 | 19 | 61,5 | 30 | 61149 | 80,50 | 57 | 19 | 61,5 | 30 | 61165 | 132,43 |
| 26 | 19 | 61,5 | 30 | 61134 | 42,73 | 42 | 19 | 61,5 | 30 | 61150 | 85,83 | 58 | 19 | 61,5 | 30 | 61166 | 134,50 |
| 27 | 19 | 61,5 | 30 | 61135 | 43,10 | 43 | 19 | 61,5 | 30 | 61151 | 89,74 | 59 | 19 | 61,5 | 30 | 61167 | 142,08 |
| | | | | | | | | | | | | 60 | 19 | 61,5 | 30 | 61168 | 150,41 |



Set 6 Pcs

| Cont. Ø | Nº Art. HSS | € |
|-------------------|-------------|--------|
| 12-14-16-18-20-22 | 66860 | 183,08 |



Set 5 Pcs

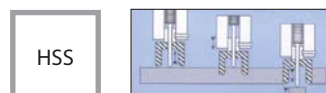
| Cont. Ø | Nº Art. HSS | € |
|----------------|-------------|--------|
| 24-26-28-30-32 | 66861 | 233,52 |

Ref. **4075**

EXPULSORES

Pilot Pins

Ejecteurs



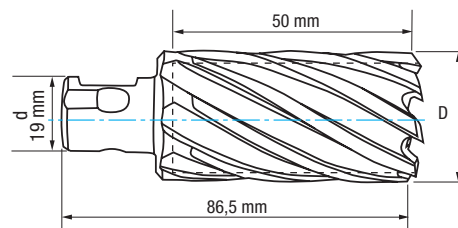
| D mm | L mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|------|------|--------------------|-------------|------|
| 6,34 | 77 | 4060 (30 mm) | 61502 | 9,39 |

Ref. **4061**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS HSS LARGA

Long HSS Core Drill

Fraise à carotter pour unité de perçage électromagnétique HSS longue



| | | | |
|-----|---|---|---|
| HSS | Serie Larga Long Length Série longue | Rectificado Ground Taillé meulé | Aceros Construcción Structural Steels Aciers de construction |
|-----|---|---|---|

Apto con Poca Lubricación
Suitable with Minimal Cooling
Apte avec lubrification minimale

UNIVERSAL:
NITTO +
WELDON

| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 344 | 295 | 258 | 229 | 206 | 165 | 137 | 103 | 82 | 68 |
| | P.2 | 265 | 227 | 198 | 176 | 159 | 127 | 106 | 79 | 63 | 53 |
| K | K.1 | 477 | 409 | 358 | 318 | 286 | 229 | 190 | 143 | 114 | 95 |
| N | N.3 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € | D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|-------|------|------|------|------|-------------|--------|
| 12 | 19 | 86,5 | 50 | 73340 | 35,82 | 37 | 19 | 86,5 | 50 | 61192 | 95,45 |
| 13 | 19 | 86,5 | 50 | 73342 | 35,82 | 38 | 19 | 86,5 | 50 | 61193 | 98,18 |
| 14 | 19 | 86,5 | 50 | 61169 | 37,13 | 39 | 19 | 86,5 | 50 | 61194 | 101,09 |
| 15 | 19 | 86,5 | 50 | 61170 | 38,62 | 40 | 19 | 86,5 | 50 | 61195 | 106,33 |
| 16 | 19 | 86,5 | 50 | 61171 | 41,23 | 41 | 19 | 86,5 | 50 | 61196 | 108,07 |
| 17 | 19 | 86,5 | 50 | 61172 | 42,73 | 42 | 19 | 86,5 | 50 | 61197 | 109,47 |
| 18 | 19 | 86,5 | 50 | 61173 | 45,93 | 43 | 19 | 86,5 | 50 | 61198 | 112,26 |
| 19 | 19 | 86,5 | 50 | 61174 | 46,85 | 44 | 19 | 86,5 | 50 | 61200 | 113,65 |
| 20 | 19 | 86,5 | 50 | 61175 | 48,18 | 45 | 19 | 86,5 | 50 | 61201 | 117,13 |
| 21 | 19 | 86,5 | 50 | 61176 | 53,60 | 46 | 19 | 86,5 | 50 | 61202 | 118,53 |
| 22 | 19 | 86,5 | 50 | 61177 | 55,11 | 47 | 19 | 86,5 | 50 | 61203 | 125,15 |
| 23 | 19 | 86,5 | 50 | 61178 | 56,98 | 48 | 19 | 86,5 | 50 | 61204 | 128,28 |
| 24 | 19 | 86,5 | 50 | 61179 | 58,67 | 49 | 19 | 86,5 | 50 | 61205 | 128,98 |
| 25 | 19 | 86,5 | 50 | 61180 | 60,35 | 50 | 19 | 86,5 | 50 | 61206 | 131,77 |
| 26 | 19 | 86,5 | 50 | 61181 | 62,23 | 51 | 19 | 86,5 | 50 | 61207 | 139,44 |
| 27 | 19 | 86,5 | 50 | 61182 | 65,22 | 52 | 19 | 86,5 | 50 | 61208 | 145,02 |
| 28 | 19 | 86,5 | 50 | 61183 | 68,22 | 53 | 19 | 86,5 | 50 | 61209 | 162,43 |
| 29 | 19 | 86,5 | 50 | 61184 | 70,83 | 54 | 19 | 86,5 | 50 | 61210 | 164,84 |
| 30 | 19 | 86,5 | 50 | 61185 | 71,65 | 55 | 19 | 86,5 | 50 | 61211 | 166,42 |
| 31 | 19 | 86,5 | 50 | 61186 | 75,26 | 56 | 19 | 86,5 | 50 | 61212 | 171,40 |
| 32 | 19 | 86,5 | 50 | 61187 | 78,55 | 57 | 19 | 86,5 | 50 | 61213 | 182,11 |
| 33 | 19 | 86,5 | 50 | 61188 | 82,19 | 58 | 19 | 86,5 | 50 | 61214 | 182,15 |
| 34 | 19 | 86,5 | 50 | 61189 | 85,82 | 59 | 19 | 86,5 | 50 | 61215 | 192,50 |
| 35 | 19 | 86,5 | 50 | 61190 | 89,45 | 60 | 19 | 86,5 | 50 | 61216 | 199,53 |
| 36 | 19 | 86,5 | 50 | 61191 | 92,00 | | | | | | |

Ref. **4075**

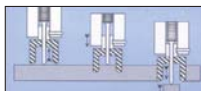
EXPULSORES

Pilot Pins

Ejecteurs



HSS



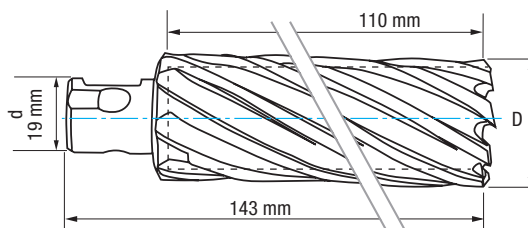
| D mm | L mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|------|------|--------------------|-------------|-------|
| 6,34 | 102 | 4061 (50 mm) | 61500 | 12,96 |

Ref. **4062**

FRESA HUECA MÁQUINAS ELECTROMAGNÉTICAS HSS EXTRA LARGA

Extra Long HSS Core Drill

Fraise à carotter pour unité de perçage électromagnétique HSS extra-longue



| | | |
|-----|---|---|
| HSS | Serie Extra-Larga Extra-Long Series Série extra-longue | Aceros Construcción Structural Steels Aciers de construction |
|-----|---|---|

Apto con Poca Lubricación
Suitable with Minimal Cooling
Apte avec lubrification minimale

UNIVERSAL:
NITTO +
WELDON

| Material | | RPM | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Grupo | Sub. | Ø 12 | Ø 14 | Ø 16 | Ø 18 | Ø 20 | Ø 25 | Ø 30 | Ø 40 | Ø 50 | Ø 60 |
| P | P.1 | 344 | 295 | 258 | 229 | 206 | 165 | 137 | 103 | 82 | 68 |
| | P.2 | 265 | 227 | 198 | 176 | 159 | 127 | 106 | 79 | 63 | 53 |
| K | K.1 | 477 | 409 | 358 | 318 | 286 | 229 | 190 | 143 | 114 | 95 |
| N | N.3 | 981 | 841 | 736 | 654 | 588 | 471 | 392 | 294 | 235 | 196 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|--------|
| 20 | 19 | 143 | 110 | 61217 | 96,17 |
| 21 | 19 | 143 | 110 | 61218 | 97,99 |
| 22 | 19 | 143 | 110 | 61219 | 99,84 |
| 23 | 19 | 143 | 110 | 61220 | 101,82 |
| 24 | 19 | 143 | 110 | 61221 | 107,88 |
| 25 | 19 | 143 | 110 | 61222 | 109,86 |
| 26 | 19 | 143 | 110 | 61223 | 121,30 |
| 27 | 19 | 143 | 110 | 61224 | 123,50 |
| 28 | 19 | 143 | 110 | 61225 | 125,93 |
| 29 | 19 | 143 | 110 | 61226 | 128,29 |
| 30 | 19 | 143 | 110 | 61227 | 130,74 |
| 31 | 19 | 143 | 110 | 61228 | 136,40 |
| 32 | 19 | 143 | 110 | 61229 | 138,81 |
| 33 | 19 | 143 | 110 | 61230 | 148,63 |
| 34 | 19 | 143 | 110 | 61231 | 151,32 |
| 35 | 19 | 143 | 110 | 61232 | 154,09 |

| D mm | d mm | L mm | l mm | Nº Art. HSS | € |
|------|------|------|------|-------------|--------|
| 36 | 19 | 143 | 110 | 61233 | 156,94 |
| 37 | 19 | 143 | 110 | 61234 | 160,20 |
| 38 | 19 | 143 | 110 | 61235 | 163,21 |
| 39 | 19 | 143 | 110 | 61236 | 166,29 |
| 40 | 19 | 143 | 110 | 61237 | 169,46 |
| 41 | 19 | 143 | 110 | 61238 | 198,37 |
| 42 | 19 | 143 | 110 | 61239 | 201,69 |
| 43 | 19 | 143 | 110 | 61240 | 205,09 |
| 44 | 19 | 143 | 110 | 61241 | 208,57 |
| 45 | 19 | 143 | 110 | 61242 | 251,41 |
| 46 | 19 | 143 | 110 | 61243 | 254,82 |
| 47 | 19 | 143 | 110 | 61244 | 258,40 |
| 48 | 19 | 143 | 110 | 61245 | 261,86 |
| 49 | 19 | 143 | 110 | 61246 | 265,42 |
| 50 | 19 | 143 | 110 | 61247 | 269,04 |

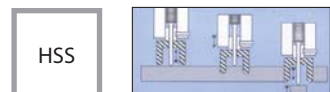


Ref. **4075**

EXPULSORES

Pilot Pins

Ejecteurs



HSS

| D mm | L mm | Para/For/Pour Ref. | Nº Art. HSS | € |
|------|------|--------------------|-------------|-------|
| 7,98 | 154 | 4062 (110 mm) | 61504 | 22,95 |

Ref. **1810****PORTABROCAS AUTOAPRIETE ALTA PRECISIÓN**

High Precision Self-Tightening Drill Chuck

Mandrin autofixation haute précision



| Cap. mm | Cap. Pulg. Inches/Pouces | Fijación Fix | L mm | Nº Art. | € |
|---------|--------------------------|--------------|------|---------|---------------|
| 0,5-10 | 0-3/8" | B-16 | 89 | 24547 | 198,50 |
| 1-13 | 1/32"-1/2" | B-16 | 103 | 24548 | 204,68 |
| 3-16 | 1/8"-5/8" | B-16 | 107 | 24549 | 217,52 |
| 3-16 | 1/8"-5/8" | B-18 | 107 | 24550 | 217,52 |

- Mecanismo de autoapriete que incrementa la fuerza de apriete en proporción al incremento de la torsión y evita el deslizamiento de la herramienta.
- Uso en taladros de precisión estacionarios, fresadoras y equipos de taladrado para producción en general.
- Partes expuestas al desgaste templadas y rectificadas para mantener la precisión y alargar la vida de la herramienta.
- Fijación a la máquina mediante conos DIN-238.
- Excentricidad giro broca máx. 0,04 mm.

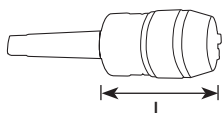
- Self-Tightening feature increases gripping force proportionally to increased torque, preventing tool shank slippage.
- Use on high accuracy drill presses, jig borers, milling machines & production drilling equipment.
- All components exposed to wear are completely hardened to maintain accuracy & extend tool life.
- Mounts available: DIN-238 tapers.
- Maximum drill run-out of 0,04 mm.

- Autofixation qui augmente la force dans l'attachement selon la torsion et ne permet pas le glissement de l'outil.
- Utilisation en perceuses de colonne, machines CNC et centres de perçage de production.
- Parties exposées à l'usure traitées et taillées meulées pour maintenir la précision et prolonger la vie de l'outil.
- Fixation de la machine par cône DIN 238
- Excentricité du tournage du foret max. 0.04 mm

Ref. **1812****PORTABROCAS AUTOAPRIETE COMPACTO ALTA PRECISIÓN ESPIGA INTEGRADA**

High Precision Compact Self-Tightening Drill Chuck with Integral Shank

Mandrin autofixation compact haute précision avec cheville intégrée



| Cap. mm | Cap. Pulg. Inches/Pouces | Fijación Fix | L mm | Nº Art. | € |
|---------|--------------------------|--------------|------|---------|---------------|
| 1-13 | 1/32"-1/2" | MT2 | 92 | 24554 | 249,22 |
| 1-13 | 1/32"-1/2" | MT3 | 92 | 24555 | 252,68 |
| 3-16 | 1/8"-5/8" | MT3 | 96 | 24556 | 276,16 |
| 3-16 | 1/8"-5/8" | MT4 | 96 | 24557 | 282,19 |



- Espiga integrada al casquillo interior => Imposibilidad de separación entre el portabrocas y la espiga => mayor solidez y precisión.
- Mecanismo de autoapriete que incrementa la fuerza de apriete en proporción al incremento de la torsión y evita el deslizamiento de la herramienta.
- Uso en taladros de precisión estacionarios, fresadoras y equipos de taladrado para producción en general.
- Dos ranuras fresadas + llave (incluida) para mayor par de apriete (hasta 3 veces superior respecto a sujeción manual).
- Fijación a máquina con conos morse.
- Excentricidad giro broca máx. 0,04 mm.

- Arbor is integrated into the internal socket => Impossible for the arbor & the drill chuck to become separated => Greater solidity & precision.
- Self-Tightening feature increases gripping force proportionally to increased torque, preventing tool shank slippage.
- Use on high accuracy drill presses, jig borers, milling machines & production drilling equipment.
- Milled wrench flats and spanner wrench (included) to allow higher gripping torque (up to 3 times higher than hand tightening).
- Mounts available: morse tapers.
- Maximum drill run-out of 0,04 mm.

- Cheville intégrée à la douille intérieur. Impossible séparer le mandrin et la cheville. Plus de précision et solidité
- Autofixation qui augmente la force dans l'attachement selon la torsion et ne permet pas le glissement de l'outil.
- Utilisation en perceuses de colonne, machines CNC et centres de perçage de production.
- 2 rainures fraisées + clé (inclus) pour plus de fixation (jusqu'à 3 fois supérieure à la fixation manuelle)
- Fixation à la machine avec cône morse
- Excentricité du tournage foret max. 0.04 mm

Refs. 1810-1812

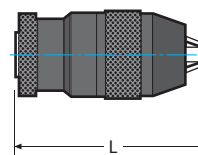
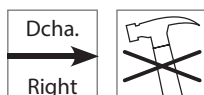
| Cap. mm | r.p.m. | Cap. mm | r.p.m. |
|---------|--------|---------|--------|
| 1,5 | 60.000 | 10,0 | 15.000 |
| 3,0 | 30.000 | 13,0 | 10.000 |
| 6,0 | 20.000 | 16,0 | 8.000 |
| 8,0 | 17.000 | | |

Ref. **1803**

PORTABROCAS TALADROS PORTÁTILES Y ESTACIONARIOS

Portable & Stationary Drilling Machine Drill Chuck

Mandrins perceuses portables et fixes



| Mod. | Cap. mm | Fijación Fix. | L mm | PesoWeight Poids gr. | Nº Art. | € | Garras Jaws Pincas Art. |
|-------|---------|---------------|------|----------------------|---------|---------------|-------------------------|
| 00101 | 0,8-10 | B12 | 86 | 619 | 16349 | 69,53 | 56894 |
| 00102 | 0,8-10 | 3/8X24 UNF | 78 | 451 | 16350 | 69,53 | 56894 |
| 00103 | 0,8-10 | 1/2X20UNF | 78 | 452 | 16351 | 69,53 | 56894 |
| 00131 | 1-13 | B16 | 103 | 800 | 16352 | 74,84 | 24565 |
| 00132 | 2-13 | 3/8X24 UNF | 83 | 764 | 16353 | 74,84 | 56894 |
| 00133 | 2-13 | 1/2X20 UNF | 83 | 583 | 16354 | 74,84 | 56894 |
| 00161 | 3-16 | B16 | 105 | 1.180 | 16355 | 127,33 | 24565 |
| 00162 | 3-16 | B18 | 105 | 1.152 | 16356 | 127,33 | 24565 |
| 00163 | 3-16 | 1/2X20 UNF | 105 | 1.185 | 16357 | 127,33 | 24565 |
| 00164 | 5-20 | B18 | 131 | 2.165 | 19957 | 160,71 | 24566 |



- **Uso Taladros industriales y profesionales**
- **Fijaciones:**
Rosca taladro portátil y Cónica taladro fijo
- **Autoapriete automático**
- **Giro a derechas**

- **Use for Industrial & professional drills**
- **Fixing:**
Threaded portable drills & Tapered for fixed drills
- **Automatic Self-Tightening**
- **Right turning**

- **Usage perceuses industrielles et professionnelles**
- **Fixations:**
Filet perceuse portable et conique perceuse à colonne
- **Amenchement automatique**
- **Tour à droite**

Ref. **1819**

ACCESORIOS PORTABROCAS PRECISIÓN

High Precision Drill Chuck Accessories

Accessoires mandrins précision



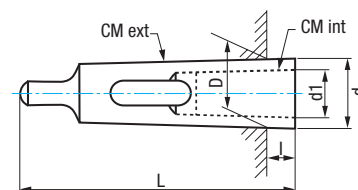
| Cap. mm | Garras Jaws Pincas | Icon | Nº Art. HSS | € |
|---------|--------------------|------|-------------|--------------|
| 0,5-10 | 1810 | 3 | 24564 | 38,58 |
| 1-13 | 1803/1810/1812 | 3 | 24565 | 38,91 |
| 3-16 | 1810/1812 | 3 | 24566 | 39,35 |
| 3-16 | 1803 | 3 | 56894 | 36,96 |



| Cap. mm | Tornillo Screw Vis | Icon | Nº Art. HSS | € |
|---------|--------------------|------|-------------|--------------|
| 10 | 1810 | 1 | 24593 | 14,87 |
| 13 | 1810 | 1 | 24596 | 16,02 |
| 13 | 1812 | 1 | 24598 | 16,02 |
| 16 | 1810 | 1 | 24597 | 16,02 |
| 16 | 1812 | 1 | 24601 | 19,85 |



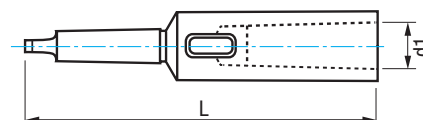
| Cap. mm | Llave Key Clé | Icon | Nº Art. HSS | € |
|---------|---------------|------|-------------|--------------|
| 13 | 1812 | 1 | 69318 | 23,40 |
| 16 | 1812 | 1 | 69319 | 23,40 |

Ref. **1101****CONO REDUCTOR**
Reduction Sleeve
Douille de réduction

HSS

DIN
2185

| CM EXT. | CM INT. | L mm | I mm | D mm | d1 mm | d mm | N° Art. HSS | € |
|---------|---------|------|-------|--------|--------|-------|-------------|--------------|
| 2 | 1 | 92 | 17,00 | 17,780 | 12,065 | 18,60 | 16415 | 18,82 |
| 3 | 1 | 99 | 5,00 | 23,825 | 12,065 | 24,10 | 16416 | 25,79 |
| 3 | 2 | 112 | 18,00 | 23,825 | 17,780 | 24,70 | 16417 | 26,16 |
| 4 | 1 | 124 | 6,50 | 31,267 | 12,065 | 31,60 | 16418 | 41,06 |
| 4 | 2 | 124 | 6,50 | 31,267 | 17,780 | 31,60 | 16419 | 41,06 |
| 4 | 3 | 140 | 22,50 | 31,267 | 23,825 | 32,40 | 16420 | 41,06 |
| 5 | 3 | 156 | 6,50 | 44,399 | 23,825 | 44,70 | 16421 | 63,15 |
| 5 | 4 | 171 | 21,50 | 44,399 | 31,267 | 45,50 | 16422 | 63,40 |

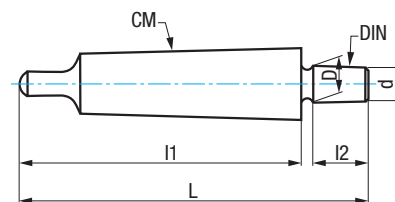
Ref. **1102****ALARGADOR CONOS**
Extension Socket
Douille d'augmentation

HSS


DIN
2187

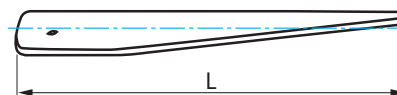
| CM EXT. | CM INT. | L mm | d1 mm | N° Art. HSS | € |
|---------|---------|------|-------|-------------|---------------|
| 1 | 2 | 160 | 17,78 | 16423 | 45,50 |
| 2 | 1 | 159 | 12,07 | 16427 | 35,23 |
| 2 | 2 | 176 | 17,78 | 16433 | 46,65 |
| 2 | 3 | 195 | 23,83 | 16424 | 60,09 |
| 3 | 1 | 176 | 12,07 | 16428 | 37,58 |
| 3 | 2 | 194 | 17,78 | 16429 | 44,31 |
| 3 | 3 | 215 | 23,83 | 16434 | 67,89 |
| 3 | 4 | 239 | 31,27 | 16425 | 90,14 |
| 4 | 1 | 200 | 12,07 | 16430 | 62,86 |
| 4 | 2 | 215 | 17,78 | 16431 | 63,55 |
| 4 | 3 | 240 | 23,83 | 16432 | 74,02 |
| 4 | 4 | 265 | 31,27 | 16435 | 106,96 |
| 4 | 5 | 299 | 44,39 | 16426 | 211,79 |




Ref. **1103****ESPIGA SUJECCIÓN**
Spike CM Taper
Arbre d'attachement

HSS

| CM | DIN | L mm | I1 mm | D mm | d mm | I2 mm |  | N° Art. HSS | € |
|----|-----|---------|----------|---------|---------|----------|---|----------------|--------------|
| 1 | B12 | 89,00 | 62,00 | 12,065 | 11,10 | 18,50 | 1 | 16440 | 11,88 |
| 2 | B12 | 106,00 | 75,00 | 12,065 | 11,10 | 18,50 | 1 | 16441 | 12,83 |
| 2 | B16 | 111,00 | 75,00 | 15,733 | 14,50 | 24,00 | 1 | 16442 | 12,83 |
| 2 | B18 | 118,00 | 75,00 | 17,780 | 16,20 | 32,00 | 1 | 16443 | 12,83 |
| 3 | B12 | 126,00 | 94,00 | 12,065 | 11,10 | 18,50 | 1 | 16444 | 15,59 |
| 3 | B16 | 134,00 | 94,00 | 15,733 | 14,50 | 24,00 | 1 | 16445 | 15,59 |
| 3 | B18 | 140,00 | 94,00 | 17,780 | 16,20 | 32,00 | 1 | 21873 | 15,59 |
| 4 | B16 | 158,00 | 117,50 | 15,733 | 14,50 | 24,00 | 1 | 16446 | 23,93 |
| 4 | B18 | 166,50 | 117,50 | 17,780 | 16,20 | 32,00 | 1 | 16447 | 23,93 |
| 5 | B16 | 194 | 149,50 | 15,733 | 14,50 | 24,00 | 1 | 66764 | 68,22 |
| 5 | B18 | 202 | 149,50 | 17,780 | 16,20 | 32,00 | 1 | 66765 | 68,22 |

Ref. **1104****CUÑA EXPULSORA**
Drill Drift
Chasse cône standard

HSS

| CM Ext. min. | CM Ext. max. | L mm |  | N° Art. HSS | € |
|-----------------|-----------------|---------|---|----------------|--------------|
| 1 | 2 | 116 | 1 | 16436 | 11,23 |
| 2 | 3 | 150 | 1 | 16437 | 13,57 |
| 3 | 4 | 199 | 1 | 16438 | 17,99 |
| 4 | 5 | 251 | 1 | 16439 | 24,30 |



MAQUINAS AFILADORAS BROCAS

Drill Bit Sharpening Machines

Machines affûteuse forets



Ref. **9995****MÁQUINA AFILADORA BROCAS HEAVY DUTY**

Heavy Duty Drill Bit Sharpening Machine

Machine affûteuse forets

Mod. **0391**

| Mod. | Cap. mm | Punta Point Pointe | Uso Use Usage | N° Art. | € |
|------|---------|-----------------------|--|---------|-----------|
| 0391 | 3-19 | 118°-140° | HSS, HSSE, TIN, MD/HM + Split Point | 60006 | Consultar |

Mod. **3000**

| Mod. | Cap. mm | Punta Point Pointe | Uso Use Usage | L mm min. | N° Art. | € |
|------|---------|-----------------------|--|-----------|---------|-----------|
| 3000 | 3-21 | 118°-150° | HSS, HSSE, TIN, MD/HM + Split Point | 50 | 60007* | Consultar |

* Mod. 3000 bajo demanda / upon request / sur demande

Las afiladoras de herramientas de corte industriales más vendidas del mundo

The World's Best-Selling Industrial Cutting Tool Sharpeners

Tanto si su taller se especializa en la producción en masa de alta tecnología como en la fabricación creativa a medida, hay una afiladora DAREX que reducirá sus costes de herramientas y hará que sus trabajos más difíciles se desarrollen con fluidez. Estas afiladoras son totalmente válidas para afilar brocas de metal duro.

IZAR ofrece una amplia gama de afiladoras para fabricantes y constructores de todos los tamaños. Para los talleres pequeños que requieren un volumen de afilado bajo o esporádico, el modelo 0391 de IZAR es nuestro modelo más popular.

El modelo 3000 de IZAR y el Modelo 3000 AUTO de IZAR son las piezas fundamentales versátiles para la mayoría de los fabricantes de tamaño medio-grande.

Whether your shop specializes in high-tech mass production or creative custom fabrication, there's a DAREX sharpener that will lower your tool costs and make your toughest Jobs run smoothly. These machines are perfectly suited for sharpening carbide material.

IZAR offers a wide range of sharpeners for manufacturers and fabricators of all sizes. For smaller shops with low-volume or intermittent sharpening needs, the IZAR Mod. 0391 is our most popular model

The IZAR Mod. 3000 and IZAR Mod. 3000 AUTO are the versatile workhorses for most mid-to-large size manufacturers.

Ref. **9995****MÁQUINA AFILADORA BROCAS HEAVY DUTY**

Heavy Duty Drill Bit Sharpening Machine

Machine affûteuse forets

Mod. **3000 AUTO**

- Afilado automatizado
- Mayor productividad
- Pantalla de configuración LCD

- Automated Sharpening
- Higher Efficiency
- LCD Setting Screen

- Affûtage automatisée
- Meilleure productivité
- Écran de configuration

| Mod. | Cap. mm | Punta Point Pointe | Uso Use Usage | L mm min. | Nº Art. | € |
|-----------|---------|--------------------|--|-----------|---------|-----------|
| 3000-Auto | 3-21 | 118°-150° | HSS, HSSE, TIN, MD/HM + Split Point | 50 | 69454* | Consultar |

* Mod. 3000-Auto bajo demanda / upon request / sur demande

PIEZAS RECAMBIO - Spare Parts - Pieces rechange**Porta Brocas - Drill Chucks - Mandrins**

| Mod. | Cap. mm | Punta Point Pointe | Nº Art. | € |
|------|---------|--------------------|---------|-----------|
| 0391 | 3-19 | 118°-140° | 60302 | Consultar |
| 3000 | 3-21 | 118°-150° | 60304* | Consultar |
| 3000 | 21-30 | 118°-150° | 67155* | Consultar |

* Art. bajo demanda / upon request / sur demande

Muela - Wheel - Meule

| Mod. | K | Cap. mm | Nº Art. | € |
|------|----------|---------|---------|-----------|
| 0391 | 180 | 3-19 | 60303 | Consultar |
| 0391 | Diamante | 3-19 | 61962* | Consultar |
| 3000 | 100 | 3-21 | 60306* | Consultar |
| 3000 | 180 | 3-21 | 60305* | Consultar |

* Art. bajo demanda / upon request / sur demande

Ref. **9994**

MÁQUINA AFILADORA BROCAS

Drill Bit Sharpening Machine
Machine affûteuse forets



Mod. **XP**



| Cap. mm | Punta Point Pointe | Uso Use Usage | Nº Art. | € |
|---------|--------------------|--|---------|---------------|
| 2,5-13 | 118° | HSS, TIN, HSSE, MD / HM / Carbure, Pared / Masonry / Béton + Split Point | 38416 | 161,01 |

Incluida Muela y medidor de ángulos
Wheel & Angle Meter included
Compris meule et compteur d'angle



Mod. **500**



| Cap. mm | Punta Point Pointe | Uso Use Usage | Nº Art. | € |
|---------|--------------------|--|---------|---------------|
| 2,5-13 | 118°-135° | HSS, TIN, HSSE, MD / HM / Carbure, Pared / Masonry / Béton + Split Point | 45121 | 327,38 |

Incluida Muela K180 y medidor de ángulos
Wheel K180 & Angle Meter included
Compris meule K180 et compteur d'angle



Mod. **750**



| Cap. mm | Punta Point Pointe | Uso Use Usage | Nº Art. | € |
|---------|--------------------|--|---------|---------------|
| 2,5-19 | 115°-140° | HSS, TIN, HSSE, MD / HM / Carbure, Pared / Masonry / Béton + Split Point | 38418 | 374,84 |

Incluida Muela K180 y medidor de ángulos
Wheel K180 & Angle Meter included
Compris meule K180 et compteur d'angle



* INSTRUCCIONES USO / Directions for use / Instructions d'emploi

PIEZAS RECAMBIO - Spare Parts - Pieces rechange

Porta Brocas - Drill Chucks - Mandrins

Muela - Wheel - Meule

| Mod. | Cap. mm | Punta Point Pointe | Nº Art. | € |
|---------|---------|--------------------|---------|---------------|
| XP | 2,5-13 | 118° | 39712 | 74,47 |
| 500 | 2,5-13 | 118°-135° | 47218 | 74,47 |
| 500-750 | 2,5-19 | 115°-140° | 40343 | 104,42 |

| Mod. | Grano Grain | Máquina Machine | Cap. mm | Nº Art. | € |
|------|--------------------|-----------------|---------|---------|--------------|
| K180 | Fino Fine Fin | XP-500-750 | 2,5-19 | 40344 | 52,11 |
| K100 | Grueso Coarse Gros | 750 | 13-19 | 43414 | 52,11 |

ESCARIADO - AVELLANADO METAL DURO

Carbide Reaming-Countersinking

Alésage-Fraisage carbure

ESCARIADORES MÁQUINA

Machine Reamers

Alésoirs à machine

162

AVELLANADORES MANGO CILÍNDRICO

Straight Shank Countersinks

Fraises à noyer

163

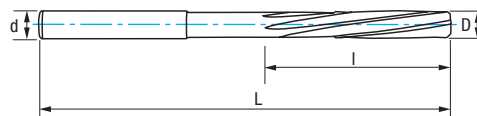


Ref. **9060**

ESCARIADOR MÁQUINA MANGO CILÍNDRICO METAL DURO

Solid Carbide Straight Shank Machine Reamer

Alésoir à machine queue cylindrique carbure



| | | |
|---------------------------------------|---------------|--|
| MD/HM Carbure Micrograno | DIN 8093 B | Tol. Agujero Hole Trou H7 |
|---------------------------------------|---------------|--|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| P | P.1 | 20-25 | 0,060 | 0,100 | 0,100 | 0,120 | 0,150 | 0,180 |
| | P.2 | 12-20 | 0,060 | 0,100 | 0,100 | 0,120 | 0,150 | 0,180 |
| | P.3 | 8-12 | 0,040 | 0,080 | 0,080 | 0,100 | 0,120 | 0,150 |
| | P.4 | 5-8 | 0,030 | 0,040 | 0,060 | 0,080 | 0,080 | 0,100 |
| | P.5 | 6-10 | 0,020 | 0,040 | 0,060 | 0,060 | 0,090 | 0,100 |
| M | | 8-12 | 0,020 | 0,040 | 0,060 | 0,060 | 0,070 | 0,080 |
| K | K.1 | 8-12 | 0,080 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 |
| | K.2 | 6-10 | 0,070 | 0,100 | 0,120 | 0,150 | 0,180 | 0,180 |
| S | | 15-30 | 0,020 | 0,040 | 0,060 | 0,060 | 0,090 | 0,100 |
| N | N.1 | 20-30 | 0,080 | 0,120 | 0,150 | 0,180 | 0,250 | 0,250 |
| | N.2 | 35-50 | 0,070 | 0,120 | 0,150 | 0,180 | 0,250 | 0,250 |
| | N.3 | 20-60 | 0,070 | 0,120 | 0,150 | 0,180 | 0,250 | 0,250 |
| | N.4 | 20-60 | 0,070 | 0,120 | 0,150 | 0,180 | 0,250 | 0,250 |
| | N.5 | 20-60 | 0,070 | 0,120 | 0,150 | 0,180 | 0,250 | 0,250 |
| | N.6 | 20-35 | 0,050 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 |
| | N.7 | 20-35 | 0,050 | 0,080 | 0,100 | 0,120 | 0,150 | 0,160 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | d mm | L mm | l mm | Nº Art. MD/HM | € |
|------------|------|------|------|---------------|--------------|
| *1,00 | 1,00 | 38 | 7 | 68651 | 40,29 |
| *1,10-1,50 | D | 40 | 10 | | |
| *1,60-1,70 | D | 43 | 11 | | |
| *1,80-1,90 | D | 49 | 12 | | |
| 2,00 | 2,00 | 49 | 12 | 44829 | 35,84 |
| *2,10-2,30 | D | 49 | 12 | | |
| *2,40-2,90 | D | 57 | 18 | | |
| 3,00 | 3,00 | 57 | 18 | 44832 | 44,10 |
| *3,10-3,70 | D | 57 | 18 | | |
| *3,80-3,90 | 4,00 | 75 | 19 | | |
| 4,00 | 4,00 | 75 | 19 | 44835 | 50,75 |
| *4,10-4,20 | 4,00 | 75 | 19 | | |
| *4,30-4,70 | 4,50 | 80 | 21 | | |
| *4,80-4,90 | 5,00 | 86 | 23 | | |
| 5,00 | 5,00 | 86 | 23 | 44838 | 60,59 |
| *5,10-5,30 | 5,00 | 86 | 23 | | |
| *5,40-5,80 | 5,50 | 93 | 26 | | |
| *5,90 | 6,00 | 101 | 28 | | |
| 6,00 | 6,00 | 101 | 28 | 44841 | 71,85 |
| *6,10-6,70 | 6,00 | 101 | 28 | | |
| *6,80-6,90 | 7,00 | 109 | 31 | | |
| 7,00 | 7,00 | 109 | 31 | 44844 | 89,41 |

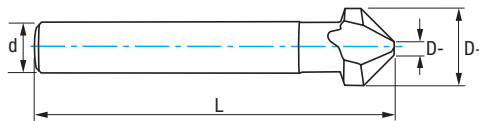
| D mm | d mm | L mm | l mm | Nº Art. MD/HM | € |
|--------------|-------|------|------|---------------|---------------|
| *7,10-7,50 | 7,00 | 109 | 31 | | |
| *7,60-7,90 | 8,00 | 117 | 33 | | |
| 8,00 | 8,00 | 117 | 33 | 44847 | 94,32 |
| *8,10-8,50 | 8,00 | 117 | 33 | | |
| *8,60-8,90 | 9,00 | 125 | 36 | | |
| 9,00 | 9,00 | 125 | 36 | 44850 | 113,82 |
| *9,10-9,50 | 9,00 | 125 | 36 | | |
| *9,60-9,90 | 10,00 | 133 | 38 | | |
| 10,00 | 10,00 | 133 | 38 | 44853 | 115,40 |
| *10,10-10,90 | 10,00 | 133 | 38 | | |
| 11,00 | 10,00 | 133 | 38 | 44856 | 127,34 |
| *11,10-11,30 | 10,00 | 133 | 38 | | |
| *11,40-11,90 | 12,00 | 151 | 44 | | |
| 12,00 | 12,00 | 151 | 44 | 44859 | 132,72 |
| *12,50-13,00 | 12,00 | 151 | 44 | | |
| *13,50-14,00 | 14,00 | 160 | 47 | | |
| *14,50-15,00 | 14,00 | 162 | 50 | | |
| *15,50-16,00 | 16,00 | 170 | 52 | | |
| *16,50-17,00 | 16,00 | 175 | 54 | | |
| *17,50-18,00 | 16,00 | 182 | 56 | | |
| *18,50-19,00 | 16,00 | 189 | 58 | | |
| *19,50-20,00 | 16,00 | 195 | 60 | | |



* Diam. bajo demanda / upon request / sur demande



Ref. **9575** **AVELLANADOR METAL DURO 90°**
 90° Solid Carbide Countersink
 Fraise à noyer carbure 90°



| | | | | | | | |
|---------------------------------------|--------------|----------------|--|--|-----|--------------------|----------------|
| MD/HM Carbure Micrograno | DIN 335 C | DIN 6535 HA | | | 3 Z | Tol. D (± 0,05) | Tol. d (h9) |
|---------------------------------------|--------------|----------------|--|--|-----|--------------------|----------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------|-------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 25 |
| P | P.1 | 40-80 | 0,050 | 0,050 | 0,050 | 0,060 | 0,080 | 0,100 |
| | P.2 | 30-60 | 0,040 | 0,050 | 0,050 | 0,060 | 0,080 | 0,100 |
| | P.3 | 20-40 | 0,040 | 0,050 | 0,050 | 0,060 | 0,080 | 0,100 |
| | P.4 | 10-12 | 0,040 | 0,040 | 0,040 | 0,050 | 0,050 | 0,080 |
| | P.5 | 20-40 | 0,050 | 0,050 | 0,060 | 0,070 | 0,070 | 0,080 |
| M | | 15-20 | 0,050 | 0,050 | 0,060 | 0,070 | 0,070 | 0,080 |
| K | K.1 | 40-80 | 0,050 | 0,050 | 0,060 | 0,080 | 0,100 | 0,100 |
| | K.2 | 40-80 | 0,050 | 0,050 | 0,060 | 0,080 | 0,100 | 0,100 |
| S | | 10-12 | 0,050 | 0,050 | 0,060 | 0,070 | 0,070 | 0,080 |
| N | N.1 | 50-80 | 0,120 | 0,120 | 0,140 | 0,140 | 0,180 | 0,220 |
| | N.2 | 50-80 | 0,120 | 0,120 | 0,140 | 0,140 | 0,180 | 0,220 |
| | N.3 | 40-100 | 0,120 | 0,120 | 0,140 | 0,140 | 0,180 | 0,220 |
| | N.4 | 40-100 | 0,120 | 0,120 | 0,140 | 0,140 | 0,180 | 0,220 |
| | N.5 | 40-80 | 0,120 | 0,120 | 0,140 | 0,140 | 0,180 | 0,220 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D+ mm | D- mm | d mm | L mm | Z | N° Art. MD/HM | € |
|-------|-------|-------|------|---|---------------|--------|
| 6,30 | 1,50 | 5,00 | 45 | 3 | 68440 | 53,30 |
| 8,30 | 2,00 | 6,00 | 50 | 3 | 68441 | 58,99 |
| 10,40 | 2,50 | 6,00 | 50 | 3 | 68442 | 64,61 |
| 12,40 | 2,80 | 8,00 | 56 | 3 | 68443 | 69,95 |
| 16,50 | 3,20 | 10,00 | 60 | 3 | 68444 | 78,89 |
| 20,50 | 3,50 | 10,00 | 63 | 3 | 68445 | 115,11 |
| 25,00 | 3,80 | 10,00 | 67 | 3 | 68446 | 155,82 |





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ESCARIADO - AVELLANADO PMX-HSSE-HSS

PMX-HSSE-HSS Reaming-Countersinking

Alésage-Fraisage PMX-HSSE-HSS

ESCARIADORES MÁQUINA

Machine Reamers

Alésoirs à machine

166

ESCARIADORES MANO

Hand Reamers

Alésoirs à main

175

AVELLANADORES MANGO CILÍNDRICO

Straight Shank Countersinks

Fraises à noyer

179

AVELLANADORES MANGO CÓNICO

Taper Shank Countersinks

Fraises à chambrer

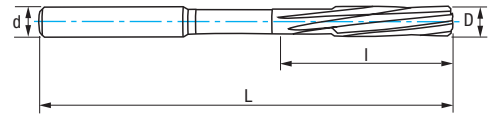
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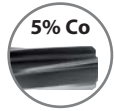
Ref. **2060**

ESCARIADOR MÁQUINA MANGO CILÍNDRICO HSSE

HSSE Straight Shank Machine Reamer
Alésoir à machine queue cylindrique HSSE



| | | | | | |
|---------------|----------------------------|--------------------------|--------------------------|------------|---------------------------------|
| HSSE 5% Co | HSSE 5% Co + TIALSIN | D ≤ 2,70 DIN 212 B | D ≥ 2,80 DIN 212 D | ISO 521 | Tol. Agujero Hole Trou H7 |
|---------------|----------------------------|--------------------------|--------------------------|------------|---------------------------------|



x3,5

Resistencia al desgaste
Wear Resistance
Résistant à l'usure



Video

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | Ø Previo mm Previous ø Précédent | | | |
|----------|------|------------|---------|--------------------------------------|-------|-------|-------|-------|----------------------------------|------|---------|---------|
| Grupo | Sub. | 5% Co | TIALSIN | Ø 4 | Ø 6 | Ø 10 | Ø 16 | Ø 20 | < 5 | 5-10 | 10-18 | 18-20 |
| P | P.1 | 8-12 | 9-14 | 0,080 | 0,120 | 0,180 | 0,250 | 0,300 | 0,2 | 0,2 | 0,2-0,3 | 0,3 |
| | P.2 | 6-8 | 7-9 | 0,080 | 0,100 | 0,120 | 0,200 | 0,220 | 0,2 | 0,2 | 0,2 | 0,3 |
| | P.3 | 4-6 | 5-7 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,2 | 0,2 | 0,2 | 0,3 |
| | P.5 | 4-6 | 5-7 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,2 | 0,2 | 0,2 | 0,3 |
| N | N.3 | 15-30 | 17-34 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,2 | 0,3 | 0,3-0,4 | 0,3-0,5 |
| | N.4 | 15-30 | 17-34 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,2 | 0,3 | 0,3-0,4 | 0,3-0,5 |
| | N.5 | 8-10 | 9-11 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,2 | 0,3 | 0,3-0,4 | 0,3-0,5 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



| D | d | L | l | Z | Nº Art. 5% Co | € | Nº Art. TIALSIN | € | D | d | L | l | Z | Nº Art. 5% Co | € | Nº Art. TIALSIN | € |
|------|------|----|----|---|---------------|-------|-----------------|-------|------|------|-----|----|---|---------------|-------|-----------------|-------|
| 2,00 | 2,00 | 49 | 11 | 4 | 74421 | 16,90 | 56499 | 33,97 | 5,20 | 5,00 | 86 | 23 | 6 | 80963 | 18,60 | 20822 | 39,58 |
| 2,10 | 2,10 | 49 | 11 | 4 | 20699 | 18,60 | 20795 | 35,61 | 5,30 | 5,00 | 86 | 23 | 6 | 20719 | 18,60 | 20823 | 39,58 |
| 2,20 | 2,20 | 53 | 12 | 4 | 20700 | 18,60 | 20796 | 35,61 | 5,40 | 5,60 | 93 | 26 | 6 | 20721 | 18,60 | 20824 | 39,58 |
| 2,30 | 2,30 | 53 | 12 | 4 | 20701 | 18,60 | 20797 | 35,61 | 5,50 | 5,60 | 93 | 26 | 6 | 75364 | 16,90 | 56517 | 37,96 |
| 2,40 | 2,40 | 57 | 14 | 4 | 19768 | 18,60 | 20798 | 35,61 | 5,60 | 5,60 | 93 | 26 | 6 | 20724 | 20,37 | 20825 | 41,27 |
| 2,50 | 2,50 | 57 | 14 | 4 | 74424 | 16,90 | 56502 | 33,97 | 5,70 | 5,60 | 93 | 26 | 6 | 80964 | 20,37 | 20826 | 41,27 |
| 2,60 | 2,60 | 57 | 14 | 4 | 19769 | 18,60 | 20799 | 35,61 | 5,80 | 5,60 | 93 | 26 | 6 | 20725 | 20,37 | 20827 | 41,27 |
| 2,70 | 2,70 | 61 | 15 | 4 | 20702 | 18,60 | 20800 | 35,61 | 5,90 | 5,60 | 93 | 26 | 6 | 20726 | 20,37 | 20828 | 41,27 |
| 2,80 | 2,80 | 61 | 15 | 4 | 20703 | 18,60 | 20801 | 35,61 | 6,00 | 5,60 | 93 | 26 | 6 | 74436 | 18,52 | 56520 | 39,47 |
| 2,90 | 2,90 | 61 | 15 | 4 | 20704 | 18,60 | 20802 | 35,61 | 6,10 | 6,30 | 101 | 28 | 6 | 20727 | 20,37 | 20829 | 42,80 |
| 3,00 | 3,00 | 61 | 15 | 6 | 74427 | 16,90 | 56505 | 33,97 | 6,20 | 6,30 | 101 | 28 | 6 | 20728 | 20,37 | 20830 | 42,80 |
| 3,10 | 3,10 | 65 | 16 | 6 | 20705 | 18,60 | 20803 | 37,13 | 6,30 | 6,30 | 101 | 28 | 6 | 20729 | 20,37 | 20832 | 42,80 |
| 3,20 | 3,20 | 65 | 16 | 6 | 20706 | 18,60 | 20805 | 37,13 | 6,40 | 6,30 | 101 | 28 | 6 | 20730 | 20,37 | 20833 | 42,80 |
| 3,30 | 3,30 | 65 | 16 | 6 | 19771 | 18,60 | 20806 | 37,13 | 6,50 | 6,30 | 101 | 28 | 6 | 74439 | 18,52 | 56523 | 41,03 |
| 3,40 | 3,40 | 70 | 18 | 6 | 20707 | 18,60 | 20807 | 37,13 | 6,60 | 6,30 | 101 | 28 | 6 | 20731 | 20,37 | 20835 | 42,80 |
| 3,50 | 3,50 | 70 | 18 | 6 | 74430 | 16,90 | 56508 | 35,51 | 6,70 | 6,30 | 101 | 28 | 6 | 20732 | 20,37 | 20836 | 42,80 |
| 3,60 | 3,60 | 70 | 18 | 6 | 20709 | 18,60 | 20808 | 37,13 | 6,80 | 7,10 | 101 | 28 | 6 | 20733 | 20,37 | 20837 | 42,80 |
| 3,70 | 3,70 | 70 | 18 | 6 | 20710 | 18,60 | 20809 | 37,13 | 6,90 | 7,10 | 101 | 28 | 6 | 20734 | 20,37 | 20838 | 42,80 |
| 3,80 | 4,00 | 75 | 19 | 6 | 20711 | 18,60 | 20810 | 37,13 | 7,00 | 7,10 | 109 | 31 | 6 | 74442 | 18,52 | 56526 | 41,03 |
| 3,90 | 4,00 | 75 | 19 | 6 | 20712 | 18,60 | 20811 | 37,13 | 7,10 | 7,10 | 109 | 31 | 6 | 20735 | 22,10 | 20839 | 46,22 |
| 4,00 | 4,00 | 75 | 19 | 6 | 74433 | 16,90 | 56511 | 35,51 | 7,20 | 7,10 | 109 | 31 | 6 | 20736 | 22,10 | 20841 | 46,22 |
| 4,10 | 4,00 | 75 | 19 | 6 | 20713 | 18,60 | 20812 | 38,68 | 7,30 | 7,10 | 109 | 31 | 6 | 20737 | 22,10 | 20842 | 46,22 |
| 4,20 | 4,00 | 75 | 19 | 6 | 80961 | 18,60 | 20814 | 38,68 | 7,40 | 7,10 | 109 | 31 | 6 | 20739 | 22,10 | 20844 | 46,22 |
| 4,30 | 4,50 | 80 | 21 | 6 | 20714 | 18,60 | 20815 | 38,68 | 7,50 | 7,10 | 109 | 31 | 6 | 74445 | 20,10 | 56529 | 44,28 |
| 4,40 | 4,50 | 80 | 21 | 6 | 45603 | 18,60 | 20816 | 38,68 | 7,60 | 8,00 | 117 | 33 | 6 | 20745 | 22,10 | 20845 | 46,22 |
| 4,50 | 4,50 | 80 | 21 | 6 | 75363 | 16,90 | 56514 | 37,06 | 7,70 | 8,00 | 117 | 33 | 6 | 20747 | 22,10 | 20847 | 46,22 |
| 4,60 | 4,50 | 80 | 21 | 6 | 20715 | 18,60 | 20817 | 38,68 | 7,80 | 8,00 | 117 | 33 | 6 | 20748 | 22,10 | 20848 | 46,22 |
| 4,70 | 4,50 | 80 | 21 | 6 | 80962 | 18,60 | 20818 | 38,68 | 7,90 | 8,00 | 117 | 33 | 6 | 20749 | 22,10 | 20849 | 46,22 |
| 4,80 | 5,00 | 86 | 23 | 6 | 20716 | 18,60 | 20819 | 38,68 | 8,00 | 8,00 | 117 | 33 | 6 | 74448 | 20,47 | 56532 | 44,65 |
| 4,90 | 5,00 | 86 | 23 | 6 | 20717 | 18,60 | 20820 | 38,68 | 8,10 | 8,00 | 117 | 33 | 6 | 20751 | 24,63 | 20850 | 51,05 |
| 5,00 | 5,00 | 86 | 23 | 6 | 26989 | 16,90 | 10587 | 37,06 | 8,20 | 8,00 | 117 | 33 | 6 | 20753 | 24,63 | 20851 | 51,05 |
| 5,10 | 5,00 | 86 | 23 | 6 | 20718 | 18,60 | 20821 | 39,58 | 8,30 | 8,00 | 117 | 33 | 6 | 20754 | 24,63 | 20852 | 51,05 |

Ref. **2060**

ESCARIADOR MÁQUINA MANGO CILÍNDRICO HSSE

HSSE Straight Shank Machine Reamer

Alésoir à machine queue cylindrique HSSE

| D mm | d mm | L mm | I mm | Z | N° Art. 5% Co | € | N° Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | N° Art. 5% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---------|---|------------------|-------|--------------------|-------|---------|---------|---------|---------|---|------------------|-------|--------------------|--------|
| 8,40 | 8,00 | 117 | 33 | 6 | 20755 | 24,63 | 20853 | 51,05 | 9,80 | 10,00 | 133 | 38 | 6 | 20769 | 27,11 | 20866 | 54,54 |
| 8,50 | 8,00 | 117 | 33 | 6 | 74451 | 22,38 | 56535 | 48,90 | 9,90 | 10,00 | 133 | 38 | 6 | 20770 | 27,11 | 20868 | 54,54 |
| 8,60 | 9,00 | 125 | 36 | 6 | 20757 | 27,11 | 20854 | 53,41 | 10,00 | 10,00 | 133 | 38 | 6 | 74933 | 25,04 | 56544 | 52,54 |
| 8,70 | 9,00 | 125 | 36 | 6 | 20758 | 27,11 | 20856 | 53,41 | 11,00 | 10,00 | 142 | 41 | 6 | 74934 | 29,58 | 56547 | 59,30 |
| 8,80 | 9,00 | 125 | 36 | 6 | 20760 | 27,11 | 20857 | 53,41 | 12,00 | 10,00 | 151 | 44 | 6 | 74457 | 28,91 | 56550 | 58,64 |
| 8,90 | 9,00 | 125 | 36 | 6 | 20761 | 27,11 | 20859 | 53,41 | 13,00 | 10,00 | 151 | 44 | 8 | 74460 | 49,71 | 56553 | 81,39 |
| 9,00 | 9,00 | 125 | 36 | 6 | 74930 | 24,67 | 56538 | 51,09 | 14,00 | 12,50 | 160 | 47 | 8 | 74463 | 47,54 | 56556 | 79,29 |
| 9,10 | 9,00 | 125 | 36 | 6 | 20763 | 27,11 | 20860 | 54,54 | 15,00 | 12,50 | 162 | 50 | 8 | 74466 | 51,89 | 56559 | 87,45 |
| 9,20 | 9,00 | 125 | 36 | 6 | 20764 | 27,11 | 20861 | 54,54 | 16,00 | 12,50 | 170 | 52 | 8 | 75160 | 55,51 | 56562 | 90,91 |
| 9,30 | 9,00 | 125 | 36 | 6 | 20765 | 27,11 | 20862 | 54,54 | 17,00 | 14,00 | 175 | 54 | 8 | 74469 | 64,06 | 56565 | 105,66 |
| 9,40 | 9,00 | 125 | 36 | 6 | 20766 | 27,11 | 20863 | 54,54 | 18,00 | 14,00 | 182 | 56 | 8 | 74935 | 66,82 | 56568 | 108,29 |
| 9,50 | 9,00 | 125 | 36 | 6 | 74454 | 25,04 | 56541 | 52,54 | 19,00 | 16,00 | 189 | 58 | 8 | 74472 | 71,00 | 56571 | 116,23 |
| 9,60 | 10,00 | 133 | 38 | 6 | 20767 | 27,11 | 20864 | 54,54 | 20,00 | 16,00 | 195 | 60 | 8 | 74475 | 71,45 | 56574 | 116,67 |
| 9,70 | 10,00 | 133 | 38 | 6 | 20768 | 27,11 | 20865 | 54,54 | | | | | | | | | |

Recubrimiento TIALSIN / ø centesimales bajo demanda
 TIALSIN Coating / Centesimal ø-s upon request
 Revêtement TIALSIN / ø centièmes sur demande



Ref. **2064**

ESCARIADOR MÁQUINA MANGO CILÍNDRICO GAMMON HSSE

Gammon HSSE Straight Shank Machine Reamer

Aleoir à machine queue cylindrique HSSE gammon



| | | | | | |
|---------------|--------|--------------|------------|-----|--|
| HSSE 5% Co | Gammon | DIN 212 E | ISO 521 | 45° | Tol. Agujero Hole Trou H7 |
|---------------|--------|--------------|------------|-----|--|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | Ø Previo mm Previous Ø Précédent | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|----------------------------------|------|---------|
| Grupo | Sub. | 5% Co | Ø 4 | Ø 6 | Ø 10 | Ø 16 | < 5 | 5-10 | 10-16 |
| P | P.1 | 8-12 | 0,080 | 0,120 | 0,180 | 0,250 | 0,2 | 0,2 | 0,2-0,3 |
| | P.2 | 6-8 | 0,080 | 0,100 | 0,120 | 0,200 | 0,2 | 0,2 | 0,2 |
| M | | 3-5 | 0,080 | 0,100 | 0,120 | 0,160 | 0,2 | 0,2 | 0,2 |
| K | K.1 | 8-12 | 0,080 | 0,100 | 0,120 | 0,160 | 0,2 | 0,2 | 0,2-0,3 |
| | K.2 | 4-8 | 0,120 | 0,160 | 0,200 | 0,250 | 0,2 | 0,2 | 0,2-0,3 |
| S | | 3-5 | 0,060 | 0,100 | 0,140 | 0,180 | 0,2 | 0,2 | 0,3 |
| N | N.1 | 8-15 | 0,080 | 0,100 | 0,120 | 0,160 | 0,2 | 0,2 | 0,2-0,3 |
| | N.2 | 15-20 | 0,120 | 0,160 | 0,200 | 0,250 | 0,2 | 0,2 | 0,2-0,3 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

* Se puede aumentar el avance hasta un 50%

* It is possible to grow feed up to 50%

* On peut augmenter l'avance jusqu'à un 50%

| D mm | d mm | L mm | I mm | Z | N° Art. 5% Co | € |
|-------|-------|------|------|---|---------------|-------|
| 3,00 | 3,00 | 61 | 15 | 3 | 40898 | 23,17 |
| 3,50 | 3,50 | 70 | 18 | 3 | 40901 | 23,17 |
| 4,00 | 4,00 | 75 | 19 | 3 | 40904 | 23,17 |
| 4,50 | 4,50 | 80 | 21 | 3 | 40907 | 23,57 |
| 5,00 | 5,00 | 86 | 23 | 3 | 40910 | 23,57 |
| 5,50 | 5,60 | 93 | 26 | 3 | 40913 | 34,33 |
| 6,00 | 5,60 | 93 | 26 | 3 | 40916 | 23,57 |
| 6,50 | 6,30 | 101 | 28 | 3 | 40919 | 35,00 |
| 7,00 | 7,10 | 109 | 31 | 3 | 40922 | 24,03 |
| 7,50 | 7,10 | 109 | 31 | 3 | 40925 | 35,62 |
| 8,00 | 8,00 | 117 | 33 | 3 | 40928 | 24,46 |
| 8,50 | 8,00 | 117 | 33 | 3 | 40931 | 37,82 |
| 9,00 | 9,00 | 125 | 36 | 3 | 40934 | 25,98 |
| 9,50 | 9,00 | 125 | 36 | 3 | 40937 | 39,37 |
| 10,00 | 10,00 | 133 | 38 | 3 | 40940 | 27,03 |
| 11,00 | 10,00 | 142 | 41 | 3 | 40946 | 33,80 |
| 12,00 | 10,00 | 151 | 44 | 4 | 40952 | 35,21 |
| 13,00 | 10,00 | 151 | 44 | 4 | 40958 | 45,23 |
| 14,00 | 12,50 | 160 | 47 | 4 | 40964 | 48,64 |
| 15,00 | 12,50 | 162 | 50 | 4 | 40970 | 65,37 |
| 16,00 | 12,50 | 170 | 52 | 4 | 40976 | 71,17 |



Recubrimiento TIALSIN bajo demanda

TIALSIN Coating upon request

Revêtement TIALSIN sur demande



Ref. **2160**

ESCARIADOR MÁQUINA MANGO CÓNICO HSSE

HSSE Morse Taper Shank Machine Reamer

Alésoir à machine pour alésage queue cône morse HSSE



| | | | |
|---------------|--------------|------------|--|
| HSSE 5% Co | DIN 208 B | ISO 521 | Tol. Agujero Hole Trou H7 |
|---------------|--------------|------------|--|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | Ø Previo mm Previous Ø Précédent | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|----------------------------------|------|---------|---------|
| Grupo | Sub. | 5% Co | Ø 4 | Ø 6 | Ø 10 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | < 5 | 5-10 | 10-18 | 18-30 |
| P | P.1 | 8-12 | 0,080 | 0,120 | 0,180 | 0,250 | 0,300 | 0,350 | 0,400 | 0,2 | 0,2 | 0,2-0,3 | 0,3 |
| | P.2 | 6-8 | 0,080 | 0,100 | 0,120 | 0,200 | 0,220 | 0,250 | 0,350 | 0,2 | 0,2 | 0,2 | 0,3 |
| | P.3 | 4-6 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,240 | 0,300 | 0,2 | 0,2 | 0,2 | 0,3 |
| | P.5 | 4-6 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,240 | 0,300 | 0,2 | 0,2 | 0,2 | 0,3 |
| N | N.3 | 15-30 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,400 | 0,500 | 0,2 | 0,3 | 0,3-0,4 | 0,3-0,5 |
| | N.4 | 15-30 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,400 | 0,500 | 0,2 | 0,3 | 0,3-0,4 | 0,3-0,5 |
| | N.5 | 8-10 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,400 | 0,500 | 0,2 | 0,3 | 0,3-0,4 | 0,3-0,5 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | L mm | I mm | CM | Z | Nº Art. 5% Co | € | D mm | L mm | I mm | CM | Z | Nº Art. 5% Co | € |
|-------|------|------|----|---|---------------|-------|-------|------|------|----|----|---------------|--------|
| 4,00 | 129 | 19 | 1 | 6 | 75354 | 49,64 | 14,00 | 189 | 47 | 1 | 8 | 75029 | 52,67 |
| 5,00 | 133 | 23 | 1 | 6 | 75155 | 35,97 | 14,50 | 204 | 50 | 2 | 8 | 75117 | 58,59 |
| 5,50 | 138 | 26 | 1 | 6 | 75345 | 38,66 | 15,00 | 204 | 50 | 2 | 8 | 75157 | 54,23 |
| 6,00 | 138 | 26 | 1 | 6 | 75156 | 36,46 | 15,50 | 210 | 52 | 2 | 8 | 75353 | 61,50 |
| 6,50 | 144 | 28 | 1 | 6 | 75220 | 39,42 | 16,00 | 210 | 52 | 2 | 8 | 74493 | 59,11 |
| 7,00 | 150 | 31 | 1 | 6 | 75352 | 37,13 | 16,50 | 214 | 54 | 2 | 8 | 74496 | 68,39 |
| 7,50 | 150 | 31 | 1 | 6 | 75346 | 40,28 | 17,00 | 214 | 54 | 2 | 8 | 74499 | 65,90 |
| 8,00 | 156 | 33 | 1 | 6 | 61043 | 38,01 | 18,00 | 219 | 56 | 2 | 8 | 74502 | 70,16 |
| 8,50 | 156 | 33 | 1 | 6 | 75159 | 42,74 | 19,00 | 223 | 58 | 2 | 8 | 74508 | 73,48 |
| 9,00 | 162 | 36 | 1 | 6 | 75347 | 40,66 | 20,00 | 228 | 60 | 2 | 8 | 74970 | 76,25 |
| 9,50 | 162 | 36 | 1 | 6 | 75348 | 43,16 | 21,00 | 232 | 62 | 2 | 8 | 74511 | 94,62 |
| 10,00 | 168 | 38 | 1 | 6 | 74481 | 38,53 | 22,00 | 237 | 64 | 2 | 8 | 75118 | 100,62 |
| 10,50 | 168 | 38 | 1 | 6 | 74915 | 43,71 | 23,00 | 241 | 66 | 2 | 8 | 74514 | 105,13 |
| 11,00 | 175 | 41 | 1 | 6 | 74484 | 39,03 | 24,00 | 268 | 68 | 2 | 10 | 74517 | 127,43 |
| 11,50 | 175 | 41 | 1 | 6 | 75221 | 46,01 | 25,00 | 268 | 68 | 2 | 10 | 74520 | 129,83 |
| 12,00 | 182 | 44 | 1 | 6 | 75049 | 39,80 | 26,00 | 273 | 70 | 3 | 10 | 74523 | 136,09 |
| 12,50 | 182 | 44 | 1 | 8 | 74487 | 53,99 | 27,00 | 277 | 71 | 3 | 10 | 74526 | 156,64 |
| 13,00 | 182 | 44 | 1 | 8 | 74490 | 51,26 | 28,00 | 277 | 71 | 3 | 10 | 74529 | 156,64 |
| 13,50 | 189 | 47 | 1 | 8 | 75222 | 55,64 | 30,00 | 281 | 73 | 3 | 10 | 74532 | 170,59 |



Recubrimiento TIALSIN bajo demanda
TIALSIN Coating upon request
Revêtement TIALSIN sur demande




Ref. **2164**

ESCARIADOR MÁQUINA MANGO CÓNICO HSSE GAMMON

Gammon HSSE Morse Taper Shank Machine Reamer

Alésoir à machine queue cône morse HSSE gammon



| | | | | | |
|---------------|--------|--------------|------------|---|--|
| HSSE 5% Co | Gammon | DIN 208 C | ISO 521 |  | Tol. Agujero Hole Trou H7 |
|---------------|--------|--------------|------------|---|--|

| Material | | Vc (m/min) 5% Co | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | Ø Previo mm Previous ø Précédent | | | |
|----------|------|---------------------|--------------------------------------|-------|-------|-------|-------|-------|-------|----------------------------------|------|---------|---------|
| Grupo | Sub. | | Ø 4 | Ø 6 | Ø 10 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | < 5 | 5-10 | 10-18 | 18-30 |
| P | P.1 | 8-12 | 0,080 | 0,120 | 0,180 | 0,250 | 0,300 | 0,350 | 0,400 | 0,2 | 0,2 | 0,2-0,3 | 0,3 |
| | P.2 | 6-8 | 0,080 | 0,100 | 0,120 | 0,200 | 0,220 | 0,250 | 0,350 | 0,2 | 0,2 | 0,2 | 0,3 |
| M | | 3-5 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,240 | 0,300 | 0,2 | 0,2 | 0,2 | 0,3 |
| K | K.1 | 8-12 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,240 | 0,300 | 0,2 | 0,2 | 0,2-0,3 | 0,3-0,4 |
| | K.2 | 4-8 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,400 | 0,500 | 0,2 | 0,2 | 0,2-0,3 | 0,3-0,4 |
| S | | 3-5 | 0,060 | 0,100 | 0,140 | 0,180 | 0,220 | 0,300 | 0,350 | 0,2 | 0,2 | 0,3 | 0,3-0,4 |
| N | N.1 | 8-15 | 0,080 | 0,100 | 0,120 | 0,160 | 0,200 | 0,240 | 0,300 | 0,2 | 0,2 | 0,2-0,3 | 0,3 |
| | N.2 | 15-20 | 0,120 | 0,160 | 0,200 | 0,250 | 0,300 | 0,400 | 0,500 | 0,2 | 0,2 | 0,2-0,3 | 0,3 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

* Se puede aumentar el avance hasta un 50%

* It is possible to grow feed up to 50%

* On peut augmenter l'avance jusqu'à un 50%

| D mm | L mm | I mm | CM | Z | Nº Art. 5% Co | € |
|-------|------|------|----|---|---------------|--------|
| 5,00 | 133 | 23 | 1 | 3 | 41306 | 57,96 |
| 6,00 | 138 | 26 | 1 | 3 | 41312 | 57,96 |
| 7,00 | 150 | 31 | 1 | 3 | 41318 | 57,96 |
| 8,00 | 156 | 33 | 1 | 3 | 41324 | 57,96 |
| 9,00 | 162 | 36 | 1 | 3 | 41330 | 55,83 |
| 10,00 | 168 | 38 | 1 | 4 | 41336 | 55,83 |
| 11,00 | 175 | 41 | 1 | 4 | 41342 | 58,30 |
| 12,00 | 182 | 44 | 1 | 4 | 41348 | 58,30 |
| 13,00 | 182 | 44 | 1 | 4 | 41354 | 86,73 |
| 14,00 | 189 | 47 | 1 | 4 | 41360 | 89,41 |
| 15,00 | 204 | 50 | 2 | 4 | 41366 | 97,93 |
| 16,00 | 210 | 52 | 2 | 4 | 41372 | 102,62 |
| 17,00 | 214 | 54 | 2 | 4 | 61070 | 111,11 |
| 18,00 | 219 | 56 | 2 | 4 | 61073 | 118,02 |
| 19,00 | 223 | 58 | 2 | 4 | 74535 | 125,19 |
| 20,00 | 228 | 60 | 2 | 4 | 74538 | 131,59 |
| 21,00 | 232 | 62 | 2 | 4 | 61076 | 142,24 |
| 22,00 | 237 | 64 | 2 | 4 | 74541 | 151,80 |
| 23,00 | 241 | 66 | 2 | 4 | 61079 | 162,79 |
| 24,00 | 268 | 68 | 3 | 4 | 61082 | 171,74 |
| 25,00 | 268 | 68 | 3 | 4 | 75218 | 182,29 |
| 26,00 | 273 | 70 | 3 | 6 | 75224 | 192,38 |
| 28,00 | 277 | 71 | 3 | 6 | 74544 | 212,67 |
| 30,00 | 281 | 73 | 3 | 6 | 74547 | 223,81 |



Recubrimiento TIALSIN bajo demanda
TIALSIN Coating upon request
Revêtement TIALSIN sur demande

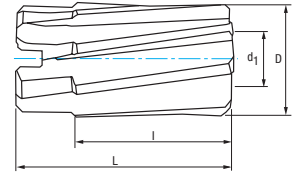


Ref. **2310**

ESCARIADOR MÁQUINA HUECO HSSE

HSSE Hole Machine Reamer

Alésoir creux finisseur à machine HSSE



| | | | | | |
|---------------|--------------|--|-------------|--|--|
| HSSE 5% Co | DIN 219 B |  d1=1:30 | ISO 2402 | Helicoidal 9° 9° Twist H. Hélicoïdal 9° | Tol. Agujero Hole Trou H7 |
|---------------|--------------|--|-------------|--|--|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | Ø Previo mm Previous Ø Précédent | |
|----------|------|------------|--------------------------------------|-------|-------|----------------------------------|---------|
| Grupo | Sub. | 5% Co | Ø 25 | Ø 40 | Ø 63 | 18-30 | > 30 |
| P | P.1 | 8-12 | 0,350 | 0,400 | 0,500 | 0,3 | 0,4 |
| | P.2 | 6-8 | 0,250 | 0,350 | 0,450 | 0,3 | 0,4 |
| | P.3 | 4-6 | 0,240 | 0,300 | 0,400 | 0,3 | 0,3-0,4 |
| | P.5 | 4-6 | 0,240 | 0,300 | 0,400 | 0,3 | 0,3 |
| N | N.3 | 15-30 | 0,400 | 0,500 | 0,600 | 0,3-0,5 | 0,4-0,6 |
| | N.4 | 15-30 | 0,400 | 0,500 | 0,600 | 0,3-0,5 | 0,4-0,6 |
| | N.5 | 8-10 | 0,400 | 0,500 | 0,600 | 0,3-0,5 | 0,4-0,6 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad Vf (mm/min.) = r.p.m. \times f$$

| D mm | d1 mm | L mm | I mm | Z | N° Art. 5% Co | € |
|-------|-------|------|------|----|---------------|--------|
| 25,00 | 13 | 45 | 32 | 8 | 73586 | 114,82 |
| 26,00 | 13 | 45 | 32 | 8 | 73589 | 115,79 |
| 27,00 | 13 | 45 | 32 | 8 | 73592 | 130,48 |
| 28,00 | 13 | 45 | 32 | 8 | 73595 | 126,49 |
| 30,00 | 13 | 45 | 32 | 8 | 73598 | 132,26 |
| 32,00 | 16 | 50 | 36 | 10 | 73601 | 141,14 |
| 34,00 | 16 | 50 | 36 | 10 | 73604 | 158,06 |
| 35,00 | 16 | 50 | 36 | 10 | 73607 | 160,24 |
| 36,00 | 19 | 56 | 40 | 10 | 73610 | 164,84 |
| 38,00 | 19 | 56 | 40 | 10 | 73613 | 174,78 |
| 40,00 | 19 | 56 | 40 | 10 | 73616 | 183,42 |
| 42,00 | 19 | 56 | 40 | 10 | 73619 | 195,38 |
| 45,00 | 22 | 63 | 45 | 12 | 73622 | 207,45 |
| 48,00 | 22 | 63 | 45 | 12 | 73628 | 225,18 |
| 50,00 | 22 | 63 | 45 | 12 | 73631 | 259,92 |
| 52,00 | 27 | 71 | 50 | 12 | 73634 | 276,18 |
| 55,00 | 27 | 71 | 50 | 12 | 73637 | 299,70 |
| 58,00 | 27 | 71 | 50 | 12 | 73640 | 338,52 |
| 60,00 | 27 | 71 | 50 | 12 | 73643 | 351,17 |



Ref. 2310 bajo demanda / upon request / sur demande

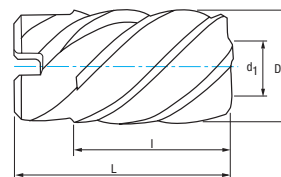


Ref. **2314**

ESCARIADOR MÁQUINA HUECO GAMMON

Gammon Hole Machine Reamer

Alésoir creux finisseur à machine gammon



| | | | | | |
|---------------|--------------|---------|-------------|---------------|--|
| HSSE 5% Co | DIN 219 C | d1=1:30 | ISO 2402 | Gammon 45° | Tol. Agujero Hole Trou H7 |
|---------------|--------------|---------|-------------|---------------|--|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | Ø Previo mm Previous ø Précédent | |
|----------|------|------------|--------------------------------------|-------|-------|----------------------------------|---------|
| Grupo | Sub. | 5% Co | Ø 25 | Ø 40 | Ø 63 | 18-30 | > 30 |
| P | P.1 | 8-12 | 0,350 | 0,400 | 0,500 | 0,3 | 0,2 |
| | P.2 | 6-8 | 0,250 | 0,350 | 0,450 | 0,3 | 0,4 |
| M | | 3-5 | 0,240 | 0,300 | 0,400 | 0,3 | 0,3 |
| K | K.1 | 8-12 | 0,240 | 0,300 | 0,400 | 0,3-0,4 | 0,4-0,6 |
| | K.2 | 4-8 | 0,400 | 0,500 | 0,600 | 0,3-0,4 | 0,3-0,5 |
| S | | 3-5 | 0,300 | 0,350 | 0,450 | 0,3-0,4 | 0,5 |
| N | N.1 | 8-15 | 0,240 | 0,300 | 0,500 | 0,3 | 0,4 |
| | N.2 | 15-20 | 0,400 | 0,500 | 0,600 | 0,3 | 0,4 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

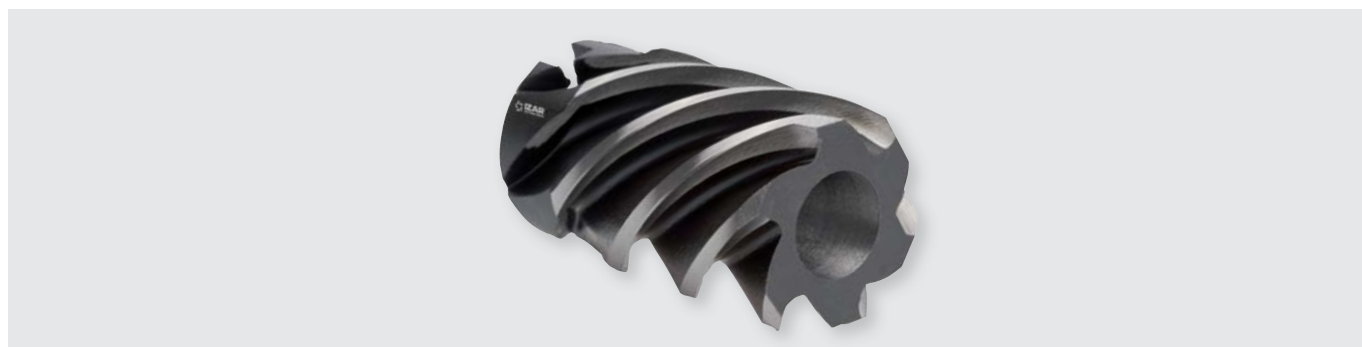
$$Vf (mm/min.) = r.p.m. \times f$$

* Se puede aumentar el avance hasta un 50%
 * It is possible to grow feed up to 50%
 * On peut augmenter l'avance jusqu'à un 50%

| D mm | d1 mm | L mm | l mm | Z | N° Art. 5% Co | € |
|-------|-------|------|------|---|---------------|--------|
| 25,00 | 13 | 45 | 32 | 6 | 73676 | 215,11 |
| 26,00 | 13 | 45 | 32 | 6 | 74952 | 217,53 |
| 27,00 | 13 | 45 | 32 | 6 | 73679 | 223,37 |
| 28,00 | 13 | 45 | 32 | 6 | 73682 | 227,97 |
| 30,00 | 13 | 45 | 32 | 6 | 73685 | 234,31 |
| 32,00 | 16 | 50 | 36 | 6 | 73688 | 242,01 |
| 34,00 | 16 | 50 | 36 | 6 | 73691 | 249,98 |
| 35,00 | 16 | 50 | 36 | 6 | 73694 | 274,20 |
| 36,00 | 19 | 56 | 40 | 6 | 73697 | 286,41 |
| 38,00 | 19 | 56 | 40 | 6 | 73700 | 302,11 |
| 40,00 | 19 | 56 | 40 | 6 | 73703 | 329,33 |
| 42,00 | 19 | 56 | 40 | 6 | 73706 | 356,10 |
| 45,00 | 22 | 63 | 45 | 6 | 74953 | 393,23 |
| 50,00 | 22 | 63 | 45 | 8 | 73715 | 475,92 |
| 52,00 | 27 | 71 | 50 | 8 | 73718 | 515,32 |
| 55,00 | 27 | 71 | 50 | 8 | 73721 | 573,82 |
| 60,00 | 27 | 71 | 50 | 8 | 73727 | 639,18 |



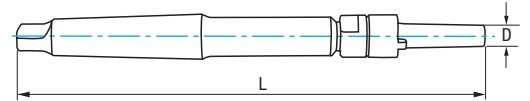
Ref. 2314 bajo demanda / upon request / sur demande



Ref. **2316**

MANDRINO ESCARIADOR MÁQUINA HUECO

Hole Machine Reamer Shell Holder
Mandrin alésoir creux finisseur à machine



| | |
|-----|---------|
| HSS | DIN 217 |
|-----|---------|

| D mm | L mm | CM | Apl. DIN 219 | Apl. DIN 222 | Apl. DIN 8054 | N° Art. HSS | € |
|-------|------|----|--------------|--------------|---------------|-------------|--------|
| 13,00 | 250 | 3 | 25-30 mm | 25-35 mm | 30-35 mm | 21098 | 137,48 |
| 16,00 | 261 | 3 | 31-35 mm | 36-45 mm | 36-45 mm | 21099 | 152,78 |
| 19,00 | 298 | 4 | 36-42 mm | 46-53 mm | 46-53 mm | 21100 | 181,16 |
| 22,00 | 312 | 4 | 43-50 mm | 54-63 mm | 54-63 mm | 21101 | 226,98 |
| 27,00 | 359 | 5 | 51-60 mm | 64-75 mm | 64-75 mm | 21102 | 333,94 |

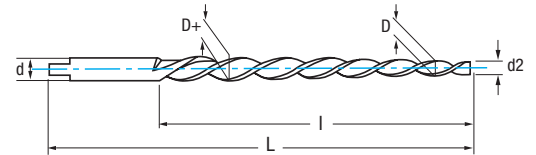




Ref. 2316 bajo demanda / upon request / sur demande

Ref. **2020**

ESCARIADOR MÁQUINA MANGO CILÍNDRICO HSS

HSS Straight Shank Machine Reamer
Alésoir à machine queue cylindrique HSS



| | | | | | |
|-----|------------|----------|-----|---|---|
| HSS | DIN 2179 E | ISO 3466 | 3 Z |  |  |
|-----|------------|----------|-----|---|---|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | Ø Previo mm Previous ø Précédent | |
|----------|------|------------|--------------------------------------|-------|-------|----------------------------------|-----|
| Grupo | Sub. | HSS | Ø 4 | Ø 6 | Ø 8 | < 5 | 5-8 |
| P | P.1 | 6-10 | 0,080 | 0,120 | 0,180 | 0,2 | 0,2 |
| N | N.5 | 8-10 | 0,120 | 0,160 | 0,200 | 0,2 | 0,3 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | D+ mm | d2 mm | d mm | L mm | I mm | N° Art. HSS | € |
|------|-------|-------|-------|------|------|-------------|-------|
| 3 | 4,06 | 2,90 | 4,00 | 100 | 58 | 26984 | 44,36 |
| 4 | 5,26 | 3,90 | 5,00 | 112 | 68 | 26985 | 41,20 |
| 5 | 6,36 | 4,90 | 6,30 | 122 | 73 | 26986 | 39,32 |
| 6 | 8,00 | 5,90 | 8,00 | 160 | 105 | 74415 | 45,54 |
| 8 | 10,80 | 7,90 | 10,00 | 207 | 145 | 26987 | 73,29 |



Ref. 2020 bajo demanda / upon request / sur demande



Ref. 2316

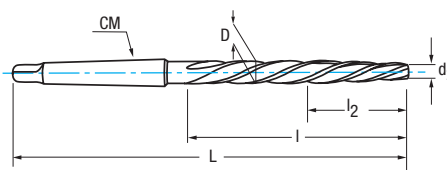
Ref. 2020

Ref. **2130**

ESCARIADOR MÁQUINA MANGO CÓNICO

Morse Shank Machine Reamer

Alésoir à machine queue cône morse



| | | | |
|-----|---------|----------|------|
| HSS | DIN 311 | ISO 2238 | 1:10 |
|-----|---------|----------|------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | Ø Previo mm Previous ø Précédent | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|----------------------------------|-------|
| Grupo | Sub. | HSS | Ø 10 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | 10-18 | 18-30 |
| P | P.1 | 6-10 | 0,180 | 0,250 | 0,300 | 0,350 | 0,400 | 0,2 | 0,2 |
| N | N.5 | 8-10 | 0,200 | 0,250 | 0,300 | 0,400 | 0,500 | 0,2 | 0,3 |

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

$$V_f (mm/min.) = r.p.m. \times f$$

| D mm | d2 mm | L mm | l mm | l2 mm | CM | Z | Nº Art. HSS | € |
|------|-------|------|------|-------|----|---|-------------|--------|
| 10 | 7,00 | 171 | 95 | 30 | 1 | 4 | 41036 | 62,84 |
| 11 | 7,70 | 176 | 100 | 33 | 1 | 4 | 41039 | 65,59 |
| 12 | 8,40 | 199 | 105 | 39 | 2 | 5 | 41042 | 70,71 |
| 13 | 9,10 | 199 | 105 | 39 | 2 | 5 | 41045 | 73,09 |
| 14 | 9,80 | 209 | 115 | 42 | 2 | 5 | 41048 | 77,86 |
| 15 | 10,50 | 219 | 125 | 45 | 2 | 5 | 41051 | 82,31 |
| 16 | 11,20 | 229 | 135 | 48 | 2 | 5 | 41054 | 88,45 |
| 17 | 11,90 | 251 | 135 | 51 | 3 | 5 | 41057 | 96,30 |
| 18 | 12,60 | 261 | 145 | 58 | 3 | 5 | 41060 | 104,18 |
| 19 | 13,30 | 261 | 145 | 58 | 3 | 5 | 41063 | 127,05 |
| 20 | 14,00 | 271 | 155 | 62 | 3 | 5 | 41066 | 129,45 |
| 21 | 14,70 | 271 | 155 | 62 | 3 | 5 | 41069 | 137,64 |
| 22 | 15,40 | 281 | 165 | 66 | 3 | 5 | 41072 | 145,85 |
| 23 | 16,40 | 281 | 165 | 66 | 3 | 5 | 41075 | 157,11 |
| 24 | 16,80 | 296 | 180 | 72 | 3 | 5 | 41078 | 178,61 |
| 25 | 17,50 | 296 | 180 | 72 | 3 | 5 | 41081 | 182,73 |
| 26 | 18,20 | 296 | 180 | 72 | 3 | 5 | 41084 | 199,79 |
| 27 | 18,90 | 311 | 195 | 78 | 3 | 5 | 41087 | 215,84 |
| 28 | 19,60 | 311 | 195 | 78 | 3 | 5 | 41090 | 228,17 |
| 29 | 20,30 | 311 | 195 | 78 | 3 | 5 | 41093 | 237,71 |
| 30 | 21,00 | 311 | 195 | 78 | 3 | 5 | 41096 | 264,33 |



Ref. 2130 bajo demanda / upon request / sur demande

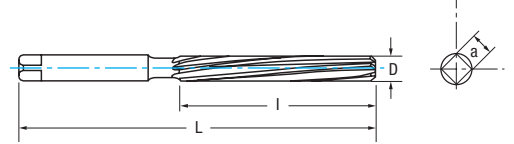


Ref. **2010**

ESCARIADOR MANO

Hand Reamer

Alésoir à main



| | | | | | | | | |
|-----|-----------|---------|---------------------------------|--|-------|----------------------------|-------|-----------------------|
| HSS | DIN 206 B | ISO 236 | Tol. Agujero Hole Trou H7 | | P P.1 | Aceros Steels Aciers | N N.5 | Aluminio Aluminium |
|-----|-----------|---------|---------------------------------|--|-------|----------------------------|-------|-----------------------|

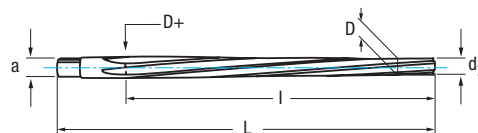
| | D mm | L mm | I mm | a mm | Nº Art. HSS | € | | D mm | L mm | I mm | a mm | Nº Art. HSS | € | D mm | L mm | I mm | a mm | Nº Art. HSS | € | |
|-------------|---------|---------|---------|---------|----------------|-------|-------------|---------|---------|---------|---------|----------------|-------|---------|---------|---------|---------|----------------|--------|--|
| New! | 1,00 | 37 | 12 | | 30685 | 45,16 | | 5,80 | 93 | 47 | 4,30 | 74274 | 25,58 | 10,20 | 133 | 66 | 8,00 | 74370 | 37,41 | |
| New! | 1,50 | 41 | 20 | 1,12 | 30689 | 36,25 | | 5,90 | 93 | 47 | 4,30 | 74277 | 25,58 | 10,30 | 133 | 66 | 8,00 | 74373 | 37,41 | |
| | 1,60 | 44 | 21 | 1,25 | 74178 | 24,49 | | 6,00 | 93 | 47 | 4,30 | 40403 | 19,16 | 10,50 | 133 | 66 | 8,00 | 40430 | 27,23 | |
| | 1,70 | 44 | 21 | 1,25 | 74181 | 24,49 | | 6,10 | 100 | 50 | 4,90 | 74280 | 25,58 | 10,60 | 142 | 71 | 8,00 | 74379 | 37,41 | |
| | 1,80 | 47 | 23 | 1,40 | 74184 | 24,49 | | 6,20 | 100 | 50 | 4,90 | 75172 | 25,58 | 10,70 | 142 | 71 | 9,00 | 74382 | 37,41 | |
| | 1,90 | 50 | 25 | 1,60 | 74187 | 24,49 | | 6,30 | 100 | 50 | 4,90 | 74283 | 25,58 | 10,80 | 142 | 71 | 9,00 | 74385 | 37,41 | |
| | 2,00 | 50 | 25 | 1,60 | 40379 | 18,35 | | 6,40 | 100 | 50 | 4,90 | 74286 | 25,58 | 11,00 | 142 | 71 | 9,00 | 40433 | 27,23 | |
| | 2,10 | 50 | 25 | 1,60 | 74190 | 24,49 | | 6,50 | 100 | 50 | 4,90 | 40406 | 19,16 | 11,10 | 142 | 71 | 9,00 | 74391 | 40,27 | |
| | 2,20 | 54 | 27 | 1,80 | 74193 | 24,49 | | 6,60 | 100 | 50 | 4,90 | 75233 | 25,58 | 11,20 | 142 | 71 | 9,00 | 74394 | 40,27 | |
| | 2,40 | 58 | 29 | 2,10 | 74199 | 24,49 | | 6,70 | 100 | 50 | 4,90 | 74289 | 25,58 | 11,30 | 142 | 71 | 9,00 | 74397 | 40,27 | |
| | 2,50 | 58 | 29 | 2,10 | 40382 | 18,35 | | 6,80 | 107 | 54 | 5,50 | 74292 | 25,58 | 11,40 | 142 | 71 | 9,00 | 74400 | 40,27 | |
| | 2,60 | 58 | 29 | 2,10 | 75397 | 24,49 | | 6,90 | 107 | 54 | 5,50 | 74295 | 25,58 | 11,50 | 142 | 71 | 9,00 | 40436 | 40,27 | |
| | 2,70 | 62 | 31 | 2,10 | 74202 | 24,49 | | 7,00 | 107 | 54 | 5,50 | 40409 | 19,16 | 11,60 | 142 | 71 | 9,00 | 74403 | 40,27 | |
| New! | 2,90 | 62 | 31 | 2,10 | 74208 | 24,49 | | 7,10 | 107 | 54 | 5,50 | 74298 | 27,01 | 11,70 | 142 | 71 | 9,00 | 74406 | 40,27 | |
| | 2,80 | 62 | 31 | 2,10 | 74205 | 24,49 | | 7,20 | 107 | 54 | 5,50 | 74301 | 27,01 | 11,80 | 152 | 76 | 9,00 | 74409 | 40,27 | |
| | 3,00 | 62 | 31 | 2,10 | 40385 | 18,35 | | 7,30 | 107 | 54 | 5,50 | 74947 | 27,01 | 11,90 | 152 | 76 | 10,00 | 74412 | 40,27 | |
| | 3,10 | 66 | 33 | 2,40 | 74211 | 24,49 | New! | 7,40 | 107 | 54 | 5,50 | 74304 | 27,01 | 12,00 | 152 | 76 | 10,00 | 40439 | 39,51 | |
| | 3,20 | 66 | 33 | 2,40 | 74214 | 24,49 | | 7,50 | 107 | 54 | 5,50 | 40412 | 20,25 | 12,50 | 152 | 76 | 10,00 | 40442 | 50,45 | |
| | 3,30 | 66 | 33 | 2,40 | 74217 | 24,49 | | 7,60 | 115 | 58 | 6,20 | 74307 | 27,01 | 13,00 | 152 | 76 | 10,00 | 40445 | 50,45 | |
| | 3,40 | 71 | 35 | 2,70 | 74220 | 24,49 | | 7,80 | 115 | 58 | 6,20 | 74313 | 27,01 | 13,50 | 163 | 81 | 11,00 | 40448 | 66,39 | |
| | 3,50 | 71 | 35 | 2,70 | 40388 | 19,24 | | 7,90 | 115 | 58 | 6,20 | 74316 | 27,01 | 14,00 | 163 | 81 | 11,00 | 40451 | 53,89 | |
| | 3,60 | 71 | 35 | 2,70 | 74223 | 24,49 | | 8,00 | 115 | 58 | 6,20 | 40415 | 20,25 | 14,50 | 163 | 81 | 11,00 | 40454 | 58,86 | |
| | 3,70 | 71 | 35 | 2,70 | 74226 | 24,49 | | 8,10 | 115 | 58 | 6,20 | 74319 | 28,36 | 15,00 | 163 | 81 | 11,00 | 40457 | 58,86 | |
| | 3,80 | 76 | 38 | 3,00 | 75398 | 24,49 | | 8,20 | 115 | 58 | 6,20 | 74322 | 28,36 | 15,50 | 175 | 87 | 12,00 | 40460 | 64,02 | |
| | 3,90 | 76 | 38 | 3,00 | 74229 | 24,49 | | 8,30 | 115 | 58 | 6,20 | 74325 | 28,36 | 16,00 | 175 | 87 | 12,00 | 40463 | 64,02 | |
| | 4,00 | 76 | 38 | 3,00 | 40391 | 18,35 | | 8,50 | 115 | 58 | 6,20 | 40418 | 21,23 | 16,50 | 175 | 87 | 12,00 | 40466 | 81,12 | |
| | 4,10 | 76 | 38 | 3,00 | 74232 | 25,58 | | 8,60 | 124 | 62 | 7,00 | 74331 | 28,36 | 17,00 | 175 | 87 | 12,00 | 40469 | 77,10 | |
| | 4,20 | 76 | 38 | 3,00 | 74235 | 25,58 | | 8,80 | 124 | 62 | 7,00 | 74337 | 28,36 | 17,50 | 188 | 93 | 14,50 | 40472 | 86,09 | |
| | 4,30 | 81 | 41 | 3,40 | 74238 | 25,58 | | 8,90 | 124 | 62 | 7,00 | 74340 | 28,36 | 18,00 | 188 | 93 | 14,50 | 40475 | 92,45 | |
| | 4,40 | 81 | 41 | 3,40 | 74241 | 25,58 | | 9,00 | 124 | 62 | 7,00 | 40421 | 23,34 | 18,50 | 188 | 93 | 14,50 | 40478 | 92,45 | |
| | 4,50 | 81 | 41 | 3,40 | 40394 | 19,16 | | 9,10 | 124 | 62 | 7,00 | 74343 | 29,60 | 19,00 | 188 | 93 | 14,50 | 40481 | 92,45 | |
| | 4,70 | 81 | 41 | 3,40 | 74247 | 25,58 | | 9,20 | 124 | 62 | 7,00 | 74346 | 29,60 | 20,00 | 201 | 100 | 16,00 | 40487 | 94,65 | |
| | 4,80 | 87 | 44 | 3,80 | 74250 | 25,58 | | 9,30 | 124 | 62 | 7,00 | 74349 | 29,60 | 21,00 | 201 | 100 | 16,00 | 40493 | 94,65 | |
| | 4,90 | 87 | 44 | 3,80 | 74253 | 25,58 | | 9,40 | 124 | 62 | 7,00 | 74352 | 29,60 | 22,00 | 215 | 107 | 18,00 | 40499 | 98,07 | |
| | 5,00 | 87 | 44 | 3,80 | 40397 | 19,16 | | 9,50 | 124 | 62 | 7,00 | 40424 | 24,36 | 23,00 | 215 | 107 | 18,00 | 40505 | 102,44 | |
| | 5,10 | 87 | 44 | 3,80 | 74256 | 25,58 | | 9,60 | 133 | 66 | 8,00 | 74355 | 29,60 | 24,00 | 231 | 115 | 20,00 | 40511 | 113,11 | |
| | 5,20 | 87 | 44 | 3,80 | 74259 | 25,58 | | 9,70 | 133 | 66 | 8,00 | 74358 | 29,60 | 25,00 | 231 | 115 | 20,00 | 40517 | 120,06 | |
| | 5,30 | 87 | 44 | 3,80 | 74262 | 25,58 | | 9,80 | 133 | 66 | 8,00 | 74361 | 29,60 | 26,00 | 231 | 115 | 20,00 | 40523 | 131,20 | |
| | 5,40 | 93 | 47 | 4,30 | 74265 | 25,58 | | 9,90 | 133 | 66 | 8,00 | 74364 | 29,60 | 27,00 | 247 | 124 | 22,40 | 40529 | 143,05 | |
| | 5,50 | 93 | 47 | 4,30 | 40400 | 19,16 | | 10,00 | 133 | 66 | 8,00 | 40427 | 24,36 | 28,00 | 247 | 124 | 22,40 | 40535 | 148,06 | |
| | 5,60 | 93 | 47 | 4,30 | 74268 | 25,58 | | 10,10 | 133 | 66 | 8,00 | 74367 | 37,41 | 30,00 | 247 | 124 | 22,40 | 40547 | 195,96 | |
| | 5,70 | 93 | 47 | 4,30 | 74271 | 25,58 | | | | | | | | | | | | | | |



Ref. **2026**

ESCARIADOR MANO

Hand Reamer
Alésoir à main



HSS

DIN 9 B

ISO 3465

1:50

P **P.1** **Aceros Steels Aciers**

N **N.3 - N.4 N.5 - N.6** **Aluminio / Aluminium Plásticos / Plastics / Plastiques**

| D mm | D+ mm | d2 mm | L mm | l mm | a mm | Nº Art. HSS | € |
|-------|-------|-------|------|------|-------|-------------|-------|
| 2,00 | 2,86 | 1,90 | 68 | 48 | 2,50 | 40739 | 31,74 |
| 2,50 | 3,36 | 2,40 | 68 | 48 | 2,50 | 40742 | 31,74 |
| 3,00 | 4,06 | 2,90 | 80 | 58 | 3,15 | 40745 | 30,24 |
| 4,00 | 5,26 | 3,90 | 93 | 68 | 4,00 | 40748 | 30,87 |
| 5,00 | 6,36 | 4,90 | 100 | 73 | 5,00 | 40751 | 29,39 |
| 6,00 | 8,00 | 5,90 | 135 | 105 | 6,30 | 40754 | 39,28 |
| 8,00 | 10,80 | 7,90 | 180 | 145 | 8,00 | 40757 | 52,05 |
| 10,00 | 13,40 | 9,90 | 215 | 175 | 10,00 | 40760 | 55,54 |



Ref. 2026 bajo demanda / upon request / sur demande



Ref. **2015**

ESCARIADOR MANO EXTENSIBLE REFORZADO

Reinforced Rapidly Adjustable Hand Reamer

Alésoir à lames réglables renforcée



| | | | | | | |
|-----|----------|------------|-----------------------------------|----------|------------|------------------------------|
| HSS | P | P.1 | Aceros Steels Aciers | N | N.5 | Aluminio Aluminium |
|-----|----------|------------|-----------------------------------|----------|------------|------------------------------|

| Cap. mm | L mm | I mm | Z | N° Art. HSS | € |
|-------------|------|------|---|-------------|--------|
| 06,40-07,20 | 85 | 34 | 4 | 21076 | 95,00 |
| 07,20-08,00 | 90 | 35 | 4 | 21077 | 95,00 |
| 08,00-09,00 | 100 | 39 | 5 | 21079 | 95,00 |
| 09,00-10,00 | 120 | 45 | 5 | 21080 | 95,00 |
| 10,00-11,00 | 125 | 45 | 5 | 21081 | 95,00 |
| 11,00-12,00 | 130 | 46 | 5 | 21082 | 95,00 |
| 12,00-13,50 | 135 | 48 | 5 | 21084 | 95,00 |
| 13,50-15,50 | 140 | 58 | 5 | 21085 | 95,00 |
| 15,50-18,00 | 165 | 69 | 5 | 21086 | 101,08 |

| Cap. mm | L mm | I mm | Z | N° Art. HSS | € |
|-------------|------|------|---|-------------|--------|
| 18,00-21,00 | 185 | 75 | 5 | 21087 | 104,63 |
| 21,00-24,00 | 195 | 80 | 5 | 21088 | 121,73 |
| 24,00-27,50 | 215 | 90 | 6 | 21089 | 132,53 |
| 27,50-31,50 | 240 | 100 | 6 | 21090 | 144,91 |
| 31,50-37,00 | 265 | 110 | 6 | 21091 | 188,92 |
| 37,00-45,00 | 310 | 130 | 6 | 21092 | 281,72 |
| 45,00-55,00 | 380 | 145 | 6 | 21093 | 405,28 |
| 55,00-67,00 | 152 | 440 | 6 | 21094 | 582,98 |



Ref. **2016**

ESCARIADOR MANO EXTENSIBLE CON GUÍA

Guided Rapidly Adjustable Hand Reamer

Alésoir à lames réglables avec guide



| | | | | | | |
|-----|----------|------------|-----------------------------------|----------|------------|------------------------------|
| HSS | P | P.1 | Aceros Steels Aciers | N | N.5 | Aluminio Aluminium |
|-----|----------|------------|-----------------------------------|----------|------------|------------------------------|

| Cap. mm | L mm | I mm | Z | N° Art. HSS | € |
|-------------|------|------|---|-------------|--------|
| 08,00-09,00 | 175 | 39 | 5 | 21346 | 110,93 |
| 09,00-10,00 | 185 | 39 | 5 | 21347 | 110,93 |
| 10,00-11,00 | 195 | 45 | 5 | 21348 | 110,93 |
| 11,00-12,00 | 200 | 45 | 5 | 21350 | 110,93 |
| 12,00-13,50 | 220 | 48 | 5 | 21351 | 113,14 |
| 13,50-15,50 | 243 | 58 | 5 | 21352 | 117,67 |
| 15,50-18,00 | 274 | 69 | 5 | 21353 | 123,21 |

| Cap. mm | L mm | I mm | Z | N° Art. HSS | € |
|-------------|------|------|---|-------------|--------|
| 18,00-21,00 | 300 | 75 | 5 | 21354 | 131,03 |
| 21,00-24,00 | 320 | 80 | 6 | 21355 | 149,87 |
| 24,00-27,50 | 350 | 90 | 6 | 21356 | 167,71 |
| 27,50-31,50 | 385 | 100 | 6 | 21357 | 188,84 |
| 31,50-37,00 | 424 | 110 | 6 | 21358 | 260,22 |
| 37,00-45,00 | 490 | 130 | 6 | 21360 | 364,40 |
| 45,00-55,00 | 600 | 145 | 6 | 21363 | 522,30 |



Ref. **2017**

CUCHILLA ESCARIADOR MANO EXTENSIBLE

Adjustable Hand Reamer Blade

Lame pour alésoir réglable à main



| | | | | | | |
|-----|----------|------------|-----------------------------------|----------|------------|------------------------------|
| HSS | P | P.1 | Aceros Steels Aciers | N | N.5 | Aluminio Aluminium |
|-----|----------|------------|-----------------------------------|----------|------------|------------------------------|

| Cap. mm | L mm | | N° Art. HSS | € pack |
|-------------|-------|---|-------------|--------|
| 06,40-07,20 | 34,00 | 4 | 49927 | 47,59 |
| 07,20-08,00 | 35,00 | 4 | 49928 | 47,59 |
| 08,00-09,00 | 39,00 | 5 | 49929 | 47,59 |
| 09,00-10,00 | 44,50 | 5 | 49930 | 47,59 |
| 10,00-11,00 | 45,00 | 5 | 49931 | 47,59 |
| 11,00-12,00 | 46,50 | 5 | 49932 | 47,59 |
| 12,00-13,50 | 48,00 | 5 | 26516 | 47,59 |
| 13,50-15,50 | 54,00 | 5 | 49933 | 47,59 |
| 15,50-18,00 | 69,00 | 5 | 43410 | 49,84 |

| Cap. mm | L mm | | N° Art. HSS | € pack |
|-------------|--------|---|-------------|--------|
| 18,00-21,00 | 75,00 | 5 | 19594 | 52,52 |
| 21,00-24,00 | 80,00 | 5 | 49934 | 60,31 |
| 24,00-27,50 | 90,00 | 6 | 22499 | 63,64 |
| 27,50-31,50 | 100,00 | 6 | 22500 | 70,03 |
| 31,50-37,00 | 110,00 | 6 | 49935 | 86,14 |
| 37,00-45,00 | 130,00 | 6 | 28820 | 133,32 |
| 45,00-55,00 | 145,00 | 6 | 49936 | 205,04 |
| 55,00-67,00 | 174,00 | 6 | 51333 | 323,13 |



New!

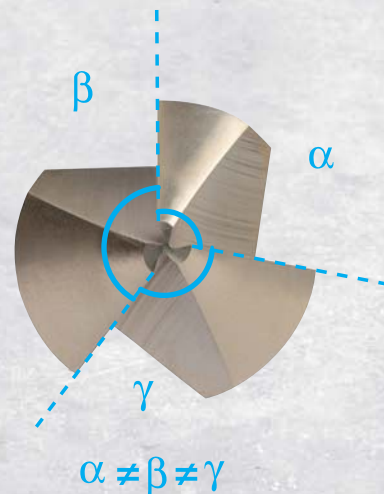
AVELLANADOR ANTIVIBRACIÓN 3Z DESPLAZAMIENTO DESIGUAL

Unequal Flute Spacing Anti-Vibration 3Z Countersink

Fraise à noyer anti-vibration 3Z déplacement inégal



- Avellanador 3Z a 90° "Antivibración"
- Desplazamiento desigual de los dientes que evita vibraciones y mejora los acabados superficiales de los avellanados.
- Recubrimiento especial de Zirkonio.
- Anti-vibration 90° 3Z countersink.
- Unequal flute spacing geometry avoids vibrations and improves the surface finishing.
- Special Zirkonio coating.
- Fraise anti-vibration 90° 3Z.
- Déplacement irrégulier des dents qui évite les vibrations et améliore les finitions de surface des fraises.
- Revêtement spécial Zirkonium.

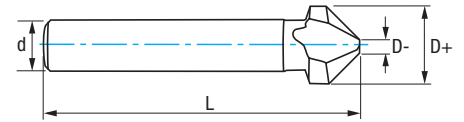


Ref. **6575**

AVELLANADOR PMX 90° MATERIALES MUY DUROS

Very Hard Materials 90° PMX Countersink

Fraise à noyer PMX 90° matériaux très durs



| | | | | | | | | |
|-----|-----------|--|--|-----|-----------------|-------------|--------------|-------------------------------------|
| PMX | DIN 335 C | | | 3 Z | Tol. D (± 0,05) | Tol. d (h9) | Tol. L (± 1) | Tol. α ⁰ / ₋₁ |
|-----|-----------|--|--|-----|-----------------|-------------|--------------|-------------------------------------|



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | Ø 6 | Ø 8 | Ø 10 | Ø 16 | Ø 20 | Ø 25 | Ø 28 | Ø 30 |
| P | P.3 | 6-10 | 0,030 | 0,040 | 0,050 | 0,080 | 0,090 | 0,100 | 0,140 | 0,140 |
| | P.4 | 5-12 | 0,030 | 0,040 | 0,050 | 0,080 | 0,090 | 0,100 | 0,140 | 0,140 |
| | P.5 | 4-8 | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,110 | 0,110 |
| M | | 4-8 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,110 | 0,120 | 0,120 |
| N | N.6 | 10-12 | 0,050 | 0,070 | 0,080 | 0,100 | 0,120 | 0,140 | 0,180 | 0,180 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| D+ mm | D- mm | d mm | L mm | N° Art. PMX | € |
|-------------------|-------|------|------|-------------|--------|
| 6,30 | 1,50 | 5 | 45 | 42829 | 33,59 |
| 8,30 | 2,00 | 6 | 50 | 42830 | 42,53 |
| 10,40 | 2,50 | 6 | 50 | 42832 | 53,74 |
| 12,40 | 2,80 | 8 | 56 | 42833 | 58,20 |
| 16,50 | 3,20 | 10 | 60 | 42836 | 64,90 |
| 20,50 | 3,50 | 10 | 63 | 42839 | 89,53 |
| 25,00 | 3,80 | 10 | 67 | 42845 | 123,11 |
| 28,00 | 4,00 | 12 | 71 | 69807 | 172,47 |
| 30,00 | 4,20 | 12 | 71 | 69808 | 184,49 |
| New! 40,00 | 5,00 | 15 | 80 | 76916 | 335,51 |



Set 6 Pcs

| Cont. Ø | N° Art. PMX | € |
|-----------------------------|-------------|--------|
| 6,3-8,3-10,4-12,4-16,5-20,5 | 65518 | 342,50 |



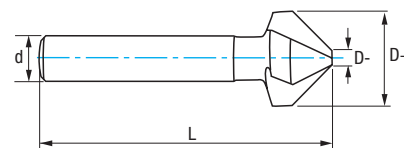
Ref. **2574**

AVELLANADOR ANTIVIBRACIÓN 3Z DESPLAZAMIENTO DESIGUAL

Unequal Flute Spacing **Anti-Vibration 3Z** Countersink

Fraise à noyer **anti-vibration 3Z** déplacement inégal

New!



| | | | | | | | | | | |
|---------------|----------|--------------|--|--|--|-----|--------------------|----------------|-----------------|---------------------------|
| HSSE 5% Co | Zirkonio | DIN 335 C | | | | 3 Z | Tol. D (± 0,05) | Tol. d (h9) | Tol. L (± 1) | Tol. α ⁰ -1 |
|---------------|----------|--------------|--|--|--|-----|--------------------|----------------|-----------------|---------------------------|

| Material | | Vc (m/min) | | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|----------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSSE | Zirkonio | Ø 6 | Ø 8 | Ø 10 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 |
| P | P.1 | 15-20 | 17-23 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 |
| | P.5 | 4-8 | 5-9 | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 | 0,100 | 0,120 |
| M | | 4-8 | 5-9 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 |
| N | N.1 | 20-30 | 23-35 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 |
| | N.3 | 15-25 | 17-29 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,290 |
| | N.4 | 15-25 | 17-29 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,290 |
| | N.5 | 8-12 | 9-14 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,290 |
| | N.6 | 20-30 | 23-35 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 | 0,320 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ $Vf (mm/min.) = r.p.m. \times f$

| D+ mm | D- mm | d mm | L mm | Nº Art. 5% Co | € | Nº Art. Zirkonio | € |
|-------|-------|------|------|---------------|--------|------------------|--------|
| 4,30 | 1,30 | 4 | 40 | 16599 | 15,41 | 16748 | 17,23 |
| 5,30 | 1,50 | 4 | 40 | 16600 | 15,27 | 16752 | 17,08 |
| 6,00 | 1,50 | 5 | 45 | 16606 | 15,61 | 16753 | 17,46 |
| 6,30 | 1,50 | 5 | 45 | 16622 | 15,06 | 16771 | 16,84 |
| 8,00 | 2,00 | 6 | 50 | 16642 | 16,26 | 16773 | 18,62 |
| 8,30 | 2,00 | 6 | 50 | 16629 | 16,43 | 16784 | 18,82 |
| 9,40 | 2,20 | 6 | 50 | 16643 | 17,18 | 16793 | 19,10 |
| 10,00 | 2,50 | 6 | 50 | 16646 | 18,02 | 16795 | 20,06 |
| 10,40 | 2,50 | 6 | 50 | 16633 | 21,45 | 16796 | 23,88 |
| 11,50 | 2,80 | 8 | 56 | 16661 | 20,11 | 16843 | 22,05 |
| 12,40 | 2,80 | 8 | 56 | 16634 | 20,80 | 16847 | 22,80 |
| 15,00 | 3,20 | 10 | 60 | 16691 | 25,75 | 16860 | 27,63 |
| 16,50 | 3,20 | 10 | 60 | 16635 | 29,54 | 16875 | 31,72 |
| 20,50 | 3,50 | 10 | 63 | 16640 | 39,38 | 16909 | 41,39 |
| 25,00 | 3,80 | 10 | 67 | 16694 | 51,62 | 16926 | 53,90 |
| 28,00 | 4,00 | 12 | 71 | 16739 | 72,12 | 16934 | 73,96 |
| 30,00 | 4,20 | 12 | 71 | 16741 | 76,12 | 16938 | 78,31 |
| 31,00 | 4,20 | 12 | 71 | 16746 | 76,12 | 16942 | 78,31 |
| 40,00 | 5,00 | 15 | 80 | 61826 | 138,43 | 61841 | 157,90 |



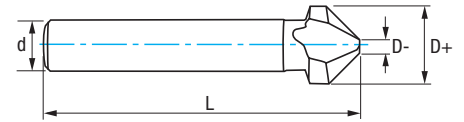
Set 6 Pcs

| Cont. Ø | Nº Art. Zirkonio | € |
|-----------------------------|------------------|--------|
| 6,3-8,3-10,4-12,4-16,5-20,5 | 16943 | 158,47 |



Ref. **2575**

AVELLANADOR MANGO CILÍNDRICO HSSE 3Z 90°
 90° 3Z HSSE Straight Shank Countersink
 Fraise à noyer HSSE 3Z 90°



| | | | | | | | | |
|---------------|--------------|--|--|-----|--------------------|----------------|-----------------|-------------------|
| HSSE 5% Co | DIN 335 C | | | 3 Z | Tol. D (± 0,05) | Tol. d (h9) | Tol. L (± 1) | Tol. α 0 -1 |
|---------------|--------------|--|--|-----|--------------------|----------------|-----------------|-------------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSSE | | | | | | | |
| P | P.1 | 15-20 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 |
| | P.5 | 4-8 | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 | 0,100 | 0,120 |
| M | | 4-8 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 |
| N | N.1 | 20-30 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 |
| | N.3 | 15-25 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,290 |
| | N.4 | 15-25 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,290 |
| | N.5 | 8-12 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,290 |
| | N.6 | 20-30 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 | 0,320 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f

| D+ mm | D- mm | d mm | L mm | N° Art. 5% Co | € |
|-------|-------|------|------|---------------|--------|
| 4,30 | 1,30 | 4 | 40 | 74653 | 13,49 |
| 5,00 | 1,50 | 4 | 40 | 74654 | 13,08 |
| 5,30 | 1,50 | 4 | 40 | 74655 | 13,38 |
| 5,80 | 1,50 | 5 | 45 | 74656 | 13,68 |
| 6,00 | 1,50 | 5 | 45 | 74657 | 13,68 |
| 6,30 | 1,50 | 5 | 45 | 74658 | 13,21 |
| 7,00 | 1,80 | 6 | 50 | 74659 | 13,36 |
| 7,30 | 1,80 | 6 | 50 | 74660 | 13,54 |
| 8,00 | 2,00 | 6 | 50 | 74661 | 14,29 |
| 8,30 | 2,00 | 6 | 50 | 74662 | 14,44 |
| 9,40 | 2,20 | 6 | 50 | 74663 | 15,06 |
| 10,00 | 2,50 | 6 | 50 | 74664 | 15,80 |
| 10,40 | 2,50 | 6 | 50 | 74665 | 18,83 |
| 11,50 | 2,80 | 8 | 56 | 74666 | 17,49 |
| 12,40 | 2,80 | 8 | 56 | 74667 | 18,08 |
| 13,40 | 2,90 | 8 | 56 | 74668 | 19,76 |
| 15,00 | 3,20 | 10 | 60 | 74669 | 22,33 |
| 16,50 | 3,20 | 10 | 60 | 74670 | 25,63 |
| 19,00 | 3,50 | 10 | 63 | 74671 | 33,42 |
| 20,50 | 3,50 | 10 | 63 | 74672 | 34,20 |
| 23,00 | 3,80 | 10 | 67 | 74673 | 41,80 |
| 25,00 | 3,80 | 10 | 67 | 74674 | 44,85 |
| 28,00 | 4,00 | 12 | 71 | 42714 | 62,82 |
| 30,00 | 4,20 | 12 | 71 | 12588 | 67,20 |
| 31,00 | 4,20 | 12 | 71 | 42715 | 67,20 |
| 40,00 | 5,00 | 15 | 80 | 11061 | 122,21 |

Recubrimiento bajo demanda
 Coating upon request
 Revêtement sur demande



Set 6 Pcs

| Cont. Ø | N° Art. 5% Co | € |
|-----------------------------|---------------|--------|
| 6,3-8,3-10,4-12,4-16,5-20,5 | 40515 | 124,37 |

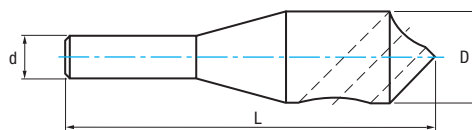


Ref. **2572**

AVELLANADOR MANGO CILÍNDRICO HSSE AGUJERO 90°

90° Hole HSSE Straight Shank Countersink

Fraise à ebavurer HSSE trou 90°



| | | | | | | | |
|---------------|--------------|--|--|----------------------|----------------|-----------------|---------------------------|
| HSSE 5% Co | IZAR Std. | | | Tol. D +0 +0,3 | Tol. d (h9) | Tol. L (± 1) | Tol. α ⁰ -1 |
|---------------|--------------|--|--|----------------------|----------------|-----------------|---------------------------|

| Material | | VC (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 6 | Ø 8 | Ø 10 | Ø 16 | Ø 20 | Ø 25 |
| P | P.1 | 10-20 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 |
| M | | 4-8 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 |
| N | N.3 | 15-25 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 |
| | N.4 | 15-25 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 |
| | N.5 | 8-12 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| Aplic. mm | D mm | d mm | L mm | N° Art. 5% Co | € |
|-----------|------|------|------|---------------|--------|
| 2-5 | 10 | 6 | 46 | 69183 | 23,49 |
| 5-10 | 14 | 8 | 55 | 69181 | 31,70 |
| 10-15 | 20 | 10 | 65 | 69184 | 58,65 |
| 15-20 | 28 | 12 | 85 | 69187 | 111,53 |
| 20-25 | 30 | 15 | 95 | 69186 | 158,50 |



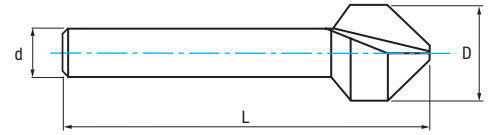
Set 4 Pcs

| Aplic. mm | N° Art. 5% Co | € |
|-------------------------|---------------|--------|
| 2-5, 5-10, 10-15, 15-20 | 40513 | 225,38 |



Ref. **2573**

AVELLANADOR MANGO CILÍNDRICO HSS 1Z 90°
 90° 1Z HSS Straight Shank Countersink
 Fraise à noyer HSS 1Z 90°



| | | | | | | | | |
|-----|-----------|--|--|-----|-----------------|-------------|--------------|-------------|
| HSS | DIN 335 C | | | 1 Z | Tol. D (± 0,05) | Tol. d (h9) | Tol. L (± 5) | Tol. α 0 -3 |
|-----|-----------|--|--|-----|-----------------|-------------|--------------|-------------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | | | | | | | |
| P | P.1 | 15-20 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,200 |
| | P.5 | 4-8 | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 | 0,100 | 0,100 |
| M | | 4-8 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,140 | 0,140 |
| N | N.1 | 20-30 | 0,060 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,200 |
| | N.3 | 15-25 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,260 |
| | N.4 | 15-25 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,260 |
| | N.5 | 8-12 | 0,090 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 | 0,260 | 0,260 |
| | N.6 | 20-30 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 | 0,280 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ $Vf (mm/min.) = r.p.m. \times f$

| D mm | d mm | L mm | N° Art. HSS | € |
|-------|------|------|-------------|-------|
| 6,00 | 5 | 45 | 13281 | 11,80 |
| 8,00 | 6 | 50 | 13284 | 12,91 |
| 10,00 | 6 | 50 | 13286 | 14,15 |
| 12,00 | 8 | 56 | 13287 | 14,62 |
| 16,00 | 10 | 60 | 13290 | 17,46 |
| 20,00 | 10 | 63 | 13293 | 21,04 |
| 25,00 | 10 | 67 | 13294 | 24,80 |
| 30,00 | 12 | 71 | 13296 | 40,84 |



New!

Set 6 Pcs

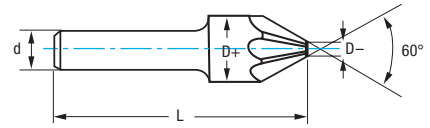
| Cont. Ø | N° Art. HSS | € |
|-----------------|-------------|-------|
| 6-8-10-12-16-20 | 62985 | 91,98 |



Ref. **2550**

AVELLANADOR MANGO CILÍNDRICO HSS 60°

60° HSS Straight Shank Countersink
Fraise à noyer HSS 60°



| | | | | | |
|-----|-----------|--|--|----------|-----------|
| HSS | DIN 334 A | | | ISO 3294 | Tol. d h9 |
|-----|-----------|--|--|----------|-----------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 8 | Ø 10 | Ø 16 | Ø 20 | Ø 25 |
| P | P.1 | 15-20 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 |
| | P.2 | 10-15 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 |
| S | | 8-12 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f

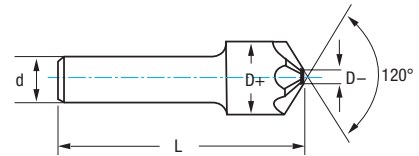
| D+ mm | D- mm | d mm | L mm | Z | N° Art. HSS | € |
|-------|-------|------|------|---|-------------|-------|
| 8,00 | 1,60 | 8 | 48 | 5 | 42119 | 41,94 |
| 10,00 | 2,00 | 8 | 50 | 5 | 42122 | 43,73 |
| 12,50 | 2,50 | 8 | 52 | 5 | 42125 | 45,72 |
| 16,00 | 3,20 | 10 | 60 | 7 | 42128 | 52,39 |
| 20,00 | 4,00 | 10 | 64 | 7 | 42131 | 62,04 |
| 25,00 | 7,00 | 10 | 69 | 9 | 42134 | 69,72 |



Ref. **2580**

AVELLANADOR MANGO CILÍNDRICO HSS 120°

120° HSS Straight Shank Countersink
Fraise à noyer HSS 120°



| | | | | | |
|-----|-----------|--|--|----------|-----------|
| HSS | DIN 347 A | | | ISO 3294 | Tol. d h9 |
|-----|-----------|--|--|----------|-----------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 8 | Ø 10 | Ø 16 | Ø 20 | Ø 25 |
| P | P.1 | 15-20 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 |
| | P.2 | 10-15 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 |
| S | | 8-12 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f

| D+ mm | D- mm | d mm | L mm | Z | N° Art. HSS | € |
|-------|-------|------|------|---|-------------|-------|
| 8,00 | 1,60 | 8 | 44 | 5 | 42170 | 39,94 |
| 10,00 | 2,00 | 8 | 46 | 5 | 42173 | 41,65 |
| 12,50 | 2,50 | 8 | 48 | 5 | 42176 | 43,54 |
| 16,00 | 3,20 | 10 | 56 | 7 | 42179 | 49,89 |
| 20,00 | 4,00 | 10 | 60 | 7 | 42182 | 59,08 |
| 25,00 | 7,00 | 10 | 65 | 9 | 42185 | 66,39 |

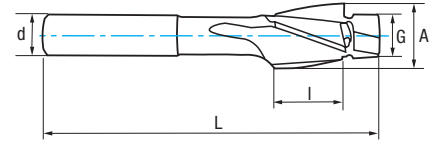


Ref. **2530**

AVELLANADOR MANGO CILÍNDRICO ALLEN

Allen Straight Shank Counterbore

Fraise à lamer et chambrer



| | | | | | | | |
|-----|---------|----------|--|--|-----------|-----------|-----------|
| HSS | DIN 373 | ISO 4206 | | | Tol. A z9 | Tol. G e8 | Tol. d h9 |
|-----|---------|----------|--|--|-----------|-----------|-----------|

PREPARACIÓN ASIENTOS CILÍNDRICOS ALLEN

Allen Straight Shank Hole Preparation

Préparation des trous cylindriques ALLEN

DIN-912, DIN-6912, DIN-84, DIN-7984

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | |
|----------|------|------------|--------------------------------------|-------|--------|--------|
| Grupo | Sub. | HSS | M - 6 | M - 8 | M - 10 | M - 16 |
| P | P.1 | 15-20 | 0,060 | 0,080 | 0,100 | 0,120 |
| | P.2 | 10-15 | 0,040 | 0,050 | 0,060 | 0,080 |
| | P.5 | 4-8 | 0,030 | 0,040 | 0,050 | 0,060 |
| K | K.1 | 10-20 | 0,080 | 0,100 | 0,120 | 0,150 |
| S | | 8-12 | 0,030 | 0,040 | 0,050 | 0,060 |
| N | N.1 | 20-30 | 0,060 | 0,080 | 0,100 | 0,120 |
| | N.2 | 20-30 | 0,090 | 0,110 | 0,130 | 0,160 |
| | N.5 | 8-12 | 0,090 | 0,110 | 0,130 | 0,160 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| M | A mm | G mm | d mm | L mm | I mm | Z | Nº Art. HSS | € |
|-----|-------|-------|-------|------|------|---|-------------|-------|
| M3 | 6,50 | 3,40 | 5,00 | 71 | 14 | 3 | 42029 | 20,16 |
| M4 | 8,00 | 4,50 | 5,00 | 71 | 14 | 3 | 42032 | 20,16 |
| M5 | 10,00 | 5,50 | 8,00 | 80 | 18 | 3 | 42035 | 20,16 |
| M6 | 11,00 | 6,60 | 8,00 | 80 | 18 | 3 | 42038 | 22,72 |
| M8 | 15,00 | 9,00 | 12,50 | 100 | 22 | 3 | 42041 | 28,12 |
| M10 | 18,00 | 11,00 | 12,50 | 100 | 22 | 3 | 42044 | 33,47 |
| M12 | 20,00 | 13,50 | 12,50 | 100 | 22 | 3 | 42047 | 39,62 |
| M14 | 24,00 | 15,50 | 16,00 | 100 | 22 | 4 | 42050 | 59,22 |
| M16 | 26,00 | 17,50 | 16,00 | 100 | 22 | 4 | 42053 | 65,48 |



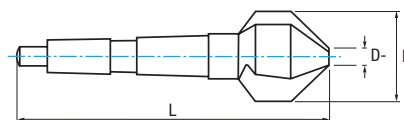
Set 6 Pcs

| Cont. | Nº Art. HSS | € |
|--------------------|-------------|--------|
| M3-M4-M5-M6-M8-M10 | 40512 | 144,81 |

Ref. **2685**

AVELLANADOR MANGO CÓNICO HSS 3Z 90°

90° 3Z HSS Morse Taper Shank Countersink
Fraise à noyer queue cône morse HSS 3Z 90°



| | | | | |
|-----|-----------|--|--|-----|
| HSS | DIN 335 D | | | 3 Z |
|-----|-----------|--|--|-----|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 20 | Ø 25 | Ø 32 | Ø 40 | Ø 60 | Ø 80 |
| P | P.1 | 15-20 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 | 0,280 |
| | P.5 | 4-8 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 |
| M | | 4-8 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 |
| N | N.1 | 20-30 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 | 0,280 |
| | N.3 | 15-25 | 0,190 | 0,210 | 0,260 | 0,290 | 0,330 | 0,360 |
| | N.4 | 15-25 | 0,190 | 0,210 | 0,260 | 0,290 | 0,330 | 0,360 |
| | N.5 | 8-12 | 0,190 | 0,210 | 0,260 | 0,290 | 0,330 | 0,360 |
| | N.6 | 20-30 | 0,200 | 0,220 | 0,280 | 0,320 | 0,360 | 0,400 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

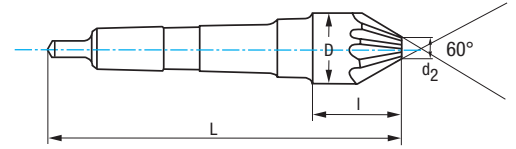
$$Vf (mm/min.) = r.p.m. \times f$$

| D mm | D-mm | L mm | Z | CM | Nº Art. HSS | € |
|--------------|-------|------|---|----|-------------|---------------|
| 16,50 | 3,20 | 85 | 3 | 1 | 42717 | 65,30 |
| 20,50 | 3,50 | 100 | 3 | 2 | 42719 | 75,48 |
| 25,00 | 3,80 | 106 | 3 | 2 | 42721 | 77,04 |
| 31,00 | 4,20 | 112 | 3 | 2 | 42725 | 84,83 |
| 40,00 | 10,00 | 140 | 3 | 3 | 42728 | 151,17 |
| 50,00 | 14,00 | 150 | 3 | 3 | 42729 | 188,89 |
| 63,00 | 16,00 | 180 | 3 | 4 | 42730 | 308,47 |
| 80,00 | 22,00 | 190 | 3 | 4 | 42731 | 523,43 |



Ref. **2660**

AVELLANADOR MANGO CÓNICO HSS 60°
60° HSS Morse Taper Shank Countersink
Fraise à noyer queue cône morse HSS 60°



| | | | | |
|-----|-----------|--|-----|----------|
| HSS | DIN 334 B | | 60° | ISO 3293 |
|-----|-----------|--|-----|----------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | Ø 60 | Ø 80 |
| P | P.1 | 15-20 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 | 0,280 | 0,280 |
| | P.2 | 10-15 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 | 0,200 |
| S | | 8-12 | 0,060 | 0,080 | 0,090 | 0,100 | 0,120 | 0,140 | 0,140 | 0,160 |

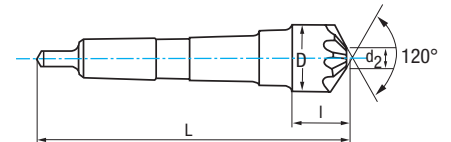
$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f

| D mm | d2 mm | L mm | I mm | Z | CM | Nº Art. HSS | € |
|-------|-------|------|------|----|----|-------------|--------|
| 16,00 | 3,20 | 97 | 24 | 7 | 1 | 42542 | 64,66 |
| 20,00 | 4,00 | 120 | 28 | 7 | 2 | 42545 | 75,69 |
| 25,00 | 7,00 | 125 | 33 | 9 | 2 | 42548 | 82,92 |
| 31,50 | 9,00 | 132 | 40 | 9 | 2 | 42551 | 108,85 |
| 40,00 | 12,50 | 160 | 45 | 11 | 3 | 42554 | 190,93 |
| 50,00 | 16,00 | 165 | 50 | 13 | 3 | 42557 | 228,19 |
| 63,00 | 20,00 | 200 | 58 | 15 | 4 | 42560 | 364,51 |
| 80,00 | 25,00 | 215 | 73 | 17 | 4 | 42563 | 563,35 |



Ref. **2690**

AVELLANADOR MANGO CÓNICO HSS 120°
120° HSS Morse Taper Shank Countersink
Fraise à noyer queue cône morse HSS 120°



| | | | | |
|-----|-----------|--|------|----------|
| HSS | DIN 347 B | | 120° | ISO 3293 |
|-----|-----------|--|------|----------|

| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | HSS | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | Ø 60 | Ø 80 |
| P | P.1 | 15-20 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 | 0,280 | 0,280 |
| | P.2 | 10-15 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 | 0,200 |
| S | | 8-12 | 0,060 | 0,080 | 0,090 | 0,100 | 0,120 | 0,140 | 0,140 | 0,160 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ Vf (mm/min.) = r.p.m. x f

| D mm | d2 mm | L mm | I mm | Z | CM | Nº Art. HSS | € |
|-------|-------|------|------|----|----|-------------|--------|
| 16,00 | 3,20 | 93 | 20 | 7 | 1 | 42590 | 67,88 |
| 20,00 | 4,00 | 116 | 24 | 7 | 2 | 42593 | 79,48 |
| 25,00 | 7,00 | 121 | 29 | 9 | 2 | 42596 | 87,08 |
| 31,50 | 9,00 | 124 | 32 | 9 | 2 | 42599 | 114,29 |
| 40,00 | 12,50 | 150 | 35 | 11 | 3 | 42602 | 200,47 |
| 50,00 | 16,00 | 153 | 38 | 13 | 3 | 42605 | 239,59 |
| 63,00 | 20,00 | 185 | 43 | 15 | 4 | 42608 | 382,73 |
| 80,00 | 25,00 | 196 | 54 | 17 | 4 | 42611 | 591,52 |

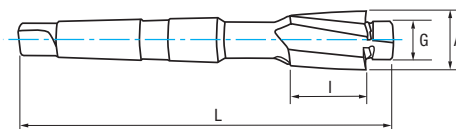


Ref. **2630**

AVELLANADOR MANGO CÓNICO ALLEN

Allen Morse Taper Shank Counterbore

Fraise à chambrer allen



| | | | | |
|-----|---------|--|-----------|-----------|
| HSS | DIN 375 | | Tol. A z9 | Tol. G e8 |
|-----|---------|--|-----------|-----------|

PREPARACIÓN ASIENTOS CILÍNDRICOS ALLEN

Allen Straight Shank Hole Preparation

Préparation des trous cylindriques ALLEN

DIN-912, DIN-6912, DIN-84, DIN-7984

| Material | | VC (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | |
|----------|------|------------|--------------------------------------|-------|--------|--------|--------|
| Grupo | Sub. | | HSS | M - 8 | M - 10 | M - 16 | M - 20 |
| P | P.1 | 15-20 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 |
| | P.2 | 10-15 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 |
| | P.5 | 4-8 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 |
| K | K.1 | 10-20 | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 |
| S | | 8-12 | 0,040 | 0,050 | 0,060 | 0,080 | 0,090 |
| N | N.1 | 20-30 | 0,080 | 0,100 | 0,120 | 0,150 | 0,180 |
| | N.2 | 20-30 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 |
| | N.5 | 8-12 | 0,110 | 0,130 | 0,160 | 0,190 | 0,210 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

| M | A mm | G mm | L mm | I mm | Z | CM | Nº Art. HSS | € |
|-----|------|-------|------|------|---|----|-------------|---------------|
| M8 | 15 | 9,00 | 130 | 20 | 3 | 2 | 42443 | 61,03 |
| M10 | 18 | 11,00 | 140 | 25 | 3 | 2 | 42446 | 63,83 |
| M12 | 20 | 13,50 | 140 | 25 | 3 | 2 | 42449 | 78,75 |
| M14 | 24 | 15,50 | 150 | 30 | 4 | 2 | 42452 | 103,65 |
| M16 | 26 | 17,50 | 180 | 35 | 4 | 3 | 42455 | 104,58 |
| M18 | 30 | 20,00 | 180 | 35 | 4 | 3 | 42458 | 112,23 |
| M20 | 33 | 22,00 | 190 | 40 | 4 | 3 | 42461 | 133,56 |
| M22 | 36 | 24,00 | 190 | 40 | 4 | 3 | 42464 | 148,80 |
| M24 | 40 | 26,00 | 190 | 40 | 4 | 3 | 42467 | 163,55 |



ROSCADO

Threading

Taraudage

MACHOS MÁQUINA MÉTRICA

Metric Machine Taps
Tarauds machine métrique

194

MACHOS UNEF-UN-NPT

UNEF-UN-NPT Taps
Tarauds UNEF-UN-NPT

259

SETS MACHOS

Tap Sets
Jeux de tarauds

232

MACHOS BSW (Whitworth) BSP (GAS)-BSPT (RC)-PG

BSW (Whitworth)- BSP (GAS)
BSPT (RC)-PG Taps
Tarauds BSW (Whitworth)-BSP (GAZ)
BSPT (RC)-PG

262

MACHOS MÁQUINA MÉTRICA ISO

ISO Metric Machine Taps
Tarauds machine métrique ISO

239

COJINETES MANO / MÁQUINA

Hand / Machine Dies
Filières à main / machine

273

MACHOS MANO MÉTRICA

Metric Hand Taps
Tarauds à main métrique

242

ACCESORIOS ROSCADO

Threading Accessories
Accessoires Taraudage

282

MACHOS UNC

UNC Taps
Tarauds UNC

250

REPARADORES ROSCAS

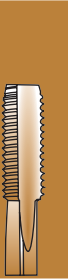
Thread Repairs
Filets rapportes

289

MACHOS UNF

UNF Taps
Tarauds UNF

255



DIÁMETROS DE TALADRADO Y EJES PREVIOS AL ROSCADO

Drilling & Axis Diameters Before Threading

Diametres Taraudage et axes Pré-Taraudage

| M | | | |
|-----|------|-------|-------|
| M | P | Ø | Ø |
| 1 | 0,25 | 0,75 | 0,97 |
| 1,1 | 0,25 | 0,85 | 1,07 |
| 1,2 | 0,25 | 0,95 | 1,17 |
| 1,4 | 0,30 | 1,10 | 1,36 |
| 1,6 | 0,35 | 1,25 | 1,54 |
| 1,7 | 0,35 | 1,30 | 1,64 |
| 1,8 | 0,35 | 1,45 | 1,74 |
| 2 | 0,40 | 1,60 | 1,93 |
| 2,2 | 0,45 | 1,75 | 2,13 |
| 2,3 | 0,40 | 1,90 | 2,23 |
| 2,5 | 0,45 | 2,05 | 2,43 |
| 2,6 | 0,45 | 2,10 | 2,53 |
| 3 | 0,50 | 2,50 | 2,92 |
| 3,5 | 0,60 | 2,90 | 3,41 |
| 4 | 0,70 | 3,30 | 3,91 |
| 4,5 | 0,75 | 3,70 | 4,41 |
| 5 | 0,80 | 4,20 | 4,90 |
| 6 | 1,00 | 5,00 | 5,88 |
| 7 | 1,00 | 6,00 | 6,88 |
| 8 | 1,25 | 6,80 | 7,87 |
| 9 | 1,25 | 7,80 | 8,87 |
| 10 | 1,50 | 8,50 | 9,85 |
| 11 | 1,50 | 9,50 | 10,85 |
| 12 | 1,75 | 10,20 | 11,83 |
| 14 | 2,00 | 12,00 | 13,82 |
| 16 | 2,00 | 14,00 | 15,82 |
| 18 | 2,50 | 15,50 | 17,79 |
| 20 | 2,50 | 17,50 | 19,79 |
| 22 | 2,50 | 19,50 | 21,79 |
| 24 | 3,00 | 21,00 | 23,77 |
| 27 | 3,00 | 24,00 | 26,77 |
| 30 | 3,50 | 26,50 | 29,73 |
| 33 | 3,50 | 29,50 | 32,73 |
| 36 | 4,00 | 32,00 | 35,70 |
| 39 | 4,00 | 35,00 | 38,70 |
| 42 | 4,50 | 37,50 | 41,69 |
| 45 | 4,50 | 40,50 | 44,69 |
| 48 | 5,00 | 43,00 | 47,66 |
| 52 | 5,00 | 47,00 | 51,66 |
| 56 | 5,50 | 50,50 | 55,56 |
| 60 | 5,50 | 54,50 | 59,56 |
| 64 | 6,00 | 58,00 | 63,52 |
| 68 | 6,00 | 62,00 | 67,52 |

| MF | | | |
|-----|------|-------|-------|
| MF | P | Ø | Ø |
| 2,5 | 0,35 | 2,15 | 2,44 |
| 3 | 0,35 | 2,65 | 2,94 |
| 3,5 | 0,35 | 3,15 | 3,44 |
| 4 | 0,35 | 3,65 | 3,94 |
| 4 | 0,50 | 3,50 | 3,93 |
| 4,5 | 0,50 | 4,00 | 4,43 |
| 5 | 0,50 | 4,50 | 4,93 |
| 5,5 | 0,50 | 5,00 | 5,43 |
| 6 | 0,50 | 5,50 | 5,93 |
| 6 | 0,75 | 5,20 | 5,90 |
| 7 | 0,75 | 6,20 | 6,90 |
| 8 | 0,50 | 7,50 | 7,93 |
| 8 | 0,75 | 7,20 | 7,90 |
| 8 | 1,00 | 7,00 | 7,88 |
| 9 | 0,75 | 8,20 | 8,90 |
| 9 | 1,00 | 8,00 | 8,88 |
| 10 | 0,50 | 9,50 | 9,93 |
| 10 | 0,75 | 9,20 | 9,90 |
| 10 | 1,00 | 9,00 | 9,88 |
| 10 | 1,25 | 8,80 | 9,86 |
| 11 | 0,75 | 10,20 | 10,90 |
| 11 | 1,00 | 10,00 | 10,88 |
| 12 | 0,75 | 11,25 | 11,90 |
| 12 | 1,00 | 11,00 | 11,88 |
| 12 | 1,25 | 10,80 | 11,86 |
| 12 | 1,50 | 10,50 | 11,85 |
| 13 | 1,00 | 12,00 | 12,88 |
| 13 | 1,50 | 11,50 | 12,85 |
| 13 | 1,75 | 11,25 | 12,83 |
| 14 | 1,00 | 13,00 | 13,88 |
| 14 | 1,25 | 12,80 | 13,86 |
| 14 | 1,50 | 12,50 | 13,85 |
| 15 | 1,00 | 14,00 | 14,88 |
| 15 | 2,00 | 13,00 | 14,82 |
| 16 | 1,00 | 15,00 | 15,88 |
| 16 | 1,50 | 14,50 | 15,85 |
| 17 | 1,00 | 16,00 | 16,88 |
| 17 | 1,50 | 15,50 | 16,85 |
| 18 | 1,00 | 17,00 | 17,88 |
| 18 | 1,50 | 16,50 | 17,85 |
| 18 | 2,00 | 16,00 | 17,82 |
| 20 | 1,00 | 19,00 | 19,88 |
| 20 | 1,50 | 18,50 | 19,85 |
| 20 | 2,00 | 18,00 | 19,82 |
| 22 | 1,00 | 21,00 | 21,88 |
| 22 | 1,50 | 20,50 | 21,85 |
| 22 | 2,00 | 20,00 | 21,82 |
| 24 | 1,00 | 23,00 | 23,88 |

| MF | | | |
|----|------|-------|-------|
| MF | P | Ø | Ø |
| 24 | 1,50 | 22,50 | 23,85 |
| 24 | 2,00 | 22,00 | 23,82 |
| 25 | 1,00 | 24,00 | 24,88 |
| 25 | 1,50 | 23,50 | 24,85 |
| 25 | 2,00 | 23,00 | 25,82 |
| 26 | 1,00 | 25,00 | 25,88 |
| 26 | 1,50 | 24,50 | 25,85 |
| 27 | 1,00 | 26,00 | 26,88 |
| 27 | 1,50 | 25,50 | 26,85 |
| 27 | 2,00 | 25,00 | 26,82 |
| 28 | 1,00 | 27,00 | 27,88 |
| 28 | 1,50 | 26,50 | 27,85 |
| 28 | 2,00 | 26,00 | 27,82 |
| 30 | 1,00 | 29,00 | 29,88 |
| 30 | 1,50 | 28,50 | 29,85 |
| 30 | 2,00 | 28,00 | 29,82 |
| 30 | 3,00 | 27,00 | 29,77 |
| 32 | 1,50 | 30,50 | 31,85 |
| 32 | 2,00 | 30,00 | 31,82 |
| 33 | 1,50 | 31,50 | 32,85 |
| 33 | 2,00 | 31,00 | 32,82 |
| 33 | 3,00 | 30,00 | 32,77 |
| 34 | 1,50 | 32,50 | 33,85 |
| 35 | 1,50 | 33,50 | 34,85 |
| 36 | 1,50 | 34,50 | 35,85 |
| 36 | 2,00 | 34,00 | 35,82 |
| 36 | 3,00 | 33,00 | 35,76 |
| 38 | 1,50 | 36,50 | 37,85 |
| 39 | 1,50 | 37,50 | 38,85 |
| 39 | 2,00 | 37,00 | 38,82 |
| 39 | 3,00 | 36,00 | 38,76 |
| 40 | 1,50 | 38,50 | 39,85 |
| 40 | 2,00 | 38,00 | 39,82 |
| 40 | 3,00 | 37,00 | 39,76 |
| 42 | 1,50 | 40,50 | 41,85 |
| 42 | 2,00 | 40,00 | 41,82 |
| 42 | 3,00 | 39,00 | 41,76 |
| 45 | 1,50 | 43,50 | 44,85 |
| 45 | 2,00 | 43,00 | 44,82 |
| 45 | 3,00 | 42,00 | 44,76 |
| 48 | 1,50 | 46,50 | 47,85 |
| 48 | 2,00 | 46,00 | 47,82 |
| 48 | 3,00 | 45,00 | 47,76 |
| 50 | 1,50 | 48,50 | 49,85 |
| 50 | 2,00 | 48,00 | 49,82 |
| 50 | 3,00 | 47,00 | 49,76 |
| 52 | 1,50 | 50,50 | 51,85 |
| 52 | 2,00 | 50,00 | 51,82 |
| 52 | 3,00 | 49,00 | 51,76 |

| LAMINACIÓN Cold Forming - Réfouleur | | |
|--|------|-------|
| M | P | Ø |
| 3 | 0,50 | 2,75 |
| 4 | 0,70 | 3,65 |
| 4,5 | 0,75 | 4,15 |
| 5 | 0,80 | 4,60 |
| 5 | 0,90 | 4,55 |
| 6 | 1,00 | 5,50 |
| 7 | 1,00 | 6,50 |
| 8 | 1,25 | 7,40 |
| 10 | 1,50 | 9,30 |
| 12 | 1,75 | 11,20 |
| 14 | 2,00 | 13,10 |
| 16 | 2,00 | 15,10 |
| 18 | 2,50 | 16,90 |
| 20 | 2,50 | 18,90 |
| 22 | 2,50 | 20,90 |
| 24 | 3,00 | 22,65 |

| BSW (Whitworth) | | | |
|-----------------|----------------------------|-------|-------|
| BSW | HILOS Threads Filets | Ø | Ø |
| 3/32 | 48 | 1,80 | 2,21 |
| 1/8 | 40 | 2,50 | 3,00 |
| 5/32 | 32 | 3,10 | 3,78 |
| 3/16 | 24 | 3,60 | 4,57 |
| 7/32 | 24 | 4,40 | 5,36 |
| 1/4 | 20 | 5,10 | 6,16 |
| 5/16 | 18 | 6,50 | 7,76 |
| 3/8 | 16 | 7,90 | 9,30 |
| 7/16 | 14 | 9,30 | 10,89 |
| 1/2 | 12 | 10,50 | 12,43 |
| 9/16 | 12 | 12,00 | 13,92 |
| 5/8 | 11 | 13,50 | 15,62 |
| 3/4 | 10 | 16,50 | 18,76 |
| 7/8 | 9 | 19,25 | 21,89 |
| 1 | 8 | 22,00 | 25,08 |
| 1 1/8 | 7 | 24,75 | 28,21 |
| 1 1/4 | 7 | 27,75 | 31,36 |
| 1 3/8 | 6 | 30,50 | 34,51 |
| 1 1/2 | 6 | 33,50 | 37,66 |
| 1 5/8 | 5 | 35,50 | 40,81 |
| 1 3/4 | 5 | 39,00 | 43,96 |
| 1 7/8 | 4,5 | 41,50 | 47,11 |
| 2 | 4,5 | 44,50 | 50,26 |
| 2 1/4 | 4 | 50,00 | 56,56 |
| 2 1/2 | 4 | 56,00 | 62,87 |
| 2 3/4 | 3,5 | 62,00 | 69,85 |
| 3 | 3,5 | 68,50 | 76,20 |



DIÁMETROS DE TALADRADO Y EJES PREVIOS AL ROSCADO

Drilling & Axis Diameters Before Threading

Diametres Taradage et axes Pré-Taradage

| UNC | | | |
|-------|----------------------------|-------|-------|
| UNC | HILOS Threads Filets | Ø | Ø |
| N°1 | 64 | 1,50 | 1,79 |
| N°2 | 56 | 1,80 | 2,12 |
| N°3 | 48 | 2,10 | 2,44 |
| N°4 | 40 | 2,30 | 2,76 |
| N°5 | 40 | 2,60 | 3,09 |
| N°6 | 32 | 2,85 | 3,41 |
| N°8 | 32 | 3,50 | 4,07 |
| N°10 | 24 | 3,90 | 4,71 |
| N°12 | 24 | 4,50 | 5,37 |
| 1/4 | 20 | 5,20 | 6,22 |
| 5/16 | 18 | 6,60 | 7,80 |
| 3/8 | 16 | 8,00 | 9,37 |
| 7/16 | 14 | 9,40 | 10,95 |
| 1/2 | 13 | 10,75 | 12,52 |
| 9/16 | 12 | 12,25 | 14,10 |
| 5/8 | 11 | 13,50 | 15,68 |
| 3/4 | 10 | 16,50 | 18,84 |
| 7/8 | 9 | 19,50 | 22,00 |
| 1 | 8 | 22,25 | 25,16 |
| 1 1/8 | 7 | 25,00 | 28,31 |
| 1 1/4 | 7 | 28,25 | 31,49 |
| 1 3/8 | 6 | 30,75 | 34,63 |
| 1 1/2 | 6 | 34,00 | 37,81 |
| 1 3/4 | 5 | 39,50 | 44,12 |
| 2 | 4,5 | 45,25 | 50,45 |
| 2 1/4 | 4,5 | 51,20 | 56,80 |
| 2 1/2 | 4 | 57,25 | 63,10 |
| 2 3/4 | 4 | 63,50 | 69,45 |
| 3 | 4 | 70,00 | 75,80 |

| UNF | | | |
|-------|----------------------------|-------|-------|
| UNF | HILOS Threads Filets | Ø | Ø |
| N°0 | 80 | 1,30 | 1,47 |
| N°1 | 72 | 1,60 | 1,79 |
| N°2 | 64 | 1,90 | 2,12 |
| N°3 | 56 | 2,10 | 2,44 |
| N°4 | 48 | 2,40 | 2,77 |
| N°5 | 44 | 2,70 | 3,10 |
| N°6 | 40 | 3,00 | 3,42 |
| N°8 | 36 | 3,50 | 4,08 |
| N°10 | 32 | 4,10 | 4,73 |
| N°12 | 28 | 4,70 | 5,38 |
| 1/4 | 28 | 5,50 | 6,24 |
| 5/16 | 24 | 6,90 | 7,82 |
| 3/8 | 24 | 8,50 | 9,41 |
| 7/16 | 20 | 9,90 | 10,98 |
| 1/2 | 20 | 11,50 | 12,56 |
| 9/16 | 18 | 12,90 | 14,14 |
| 5/8 | 18 | 14,50 | 15,73 |
| 3/4 | 16 | 17,50 | 18,89 |
| 7/8 | 14 | 20,40 | 22,05 |
| 1 | 12 | 23,30 | 25,21 |
| 1 1/8 | 12 | 26,50 | 28,38 |
| 1 1/4 | 12 | 29,50 | 31,56 |
| 1 3/8 | 12 | 32,70 | 34,73 |
| 1 1/2 | 12 | 36,50 | 37,91 |

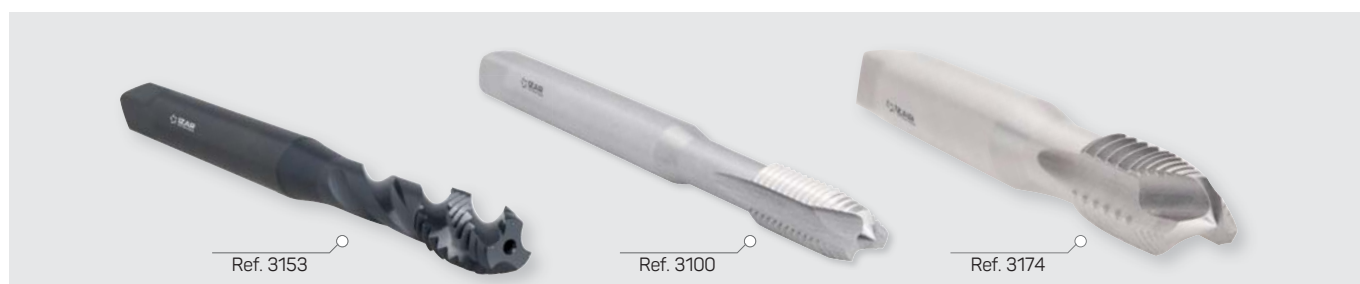
| BSP (GAS) | | | |
|-----------|----------------------------|-------|-------|
| Gas | HILOS Threads Filets | Ø | Ø |
| 1/8 | 28 | 8,80 | 9,62 |
| 1/4 | 19 | 11,80 | 13,03 |
| 3/8 | 19 | 15,25 | 16,53 |
| 1/2 | 14 | 19,00 | 20,81 |
| 5/8 | 14 | 21,00 | 22,77 |
| 3/4 | 14 | 24,50 | 26,30 |
| 7/8 | 14 | 28,25 | 30,06 |
| 1 | 11 | 30,75 | 33,07 |
| 1 1/8 | 11 | 35,50 | 37,71 |
| 1 1/4 | 11 | 39,50 | 41,73 |
| 1 3/8 | 11 | 42,00 | 44,14 |
| 1 1/2 | 11 | 45,20 | 47,62 |
| 1 3/4 | 11 | 51,40 | 53,56 |
| 2 | 11 | 57,20 | 59,43 |
| 2 1/4 | 11 | 63,30 | 65,48 |
| 2 3/8 | 11 | 67,00 | 69,15 |
| 2 1/2 | 11 | 72,80 | 74,94 |
| 2 3/4 | 11 | 79,10 | 81,27 |
| 3 | 11 | 85,50 | 87,57 |

| BSPT (RC) | | |
|-----------|----------------------------|-------|
| BSPT | HILOS Threads Filets | Ø |
| 1/16 | 28 | 6,30 |
| 1/8 | 28 | 8,30 |
| 1/4 | 19 | 11,00 |
| 3/8 | 19 | 14,50 |
| 1/2 | 14 | 18,10 |
| 3/4 | 14 | 23,50 |
| 1 | 11 | 29,60 |
| 1 1/4 | 11 | 38,10 |
| 1 1/2 | 11 | 44,00 |
| 2 | 11 | 55,60 |

| PG | | | |
|------|----------------------------|-------|-------|
| PG | HILOS Threads Filets | Ø | Ø |
| 07 | 20 | 11,40 | 12,40 |
| 09 | 18 | 14,00 | 15,10 |
| 11 | 18 | 17,25 | 18,50 |
| 13,5 | 18 | 19,00 | 20,30 |
| 16 | 18 | 21,25 | 22,40 |
| 21 | 16 | 26,75 | 28,15 |
| 29 | 16 | 35,50 | 36,85 |
| 36 | 16 | 45,50 | 46,85 |
| 42 | 16 | 52,50 | 53,85 |
| 48 | 16 | 58,00 | 59,15 |

| UNEF | | | |
|-------|----------------------------|-------|-------|
| UNEF | HILOS Threads Filets | Ø | Ø |
| N°12 | 32 | 4,70 | 5,39 |
| 1/4 | 32 | 5,55 | 6,25 |
| 5/16 | 32 | 7,15 | 7,84 |
| 3/8 | 32 | 8,70 | 9,42 |
| 7/16 | 28 | 10,20 | 11,00 |
| 1/2 | 28 | 11,80 | 12,59 |
| 9/16 | 24 | 13,20 | 14,18 |
| 5/8 | 24 | 14,80 | 15,75 |
| 3/4 | 20 | 17,80 | 18,91 |
| 7/8 | 20 | 20,95 | 22,09 |
| 1 | 20 | 24,10 | 25,26 |
| 1 1/8 | 18 | 27,15 | 28,40 |
| 1 1/4 | 18 | 30,35 | 31,59 |
| 1 3/8 | 18 | 33,60 | 34,76 |
| 1 1/2 | 18 | 36,70 | 37,94 |

| NPT | | | |
|-------|----------------------------|-------|-------|
| NPT | HILOS Threads Filets | Ø | Ø |
| 1/16 | 27 | 6,20 | 7,58 |
| 1/8 | 27 | 8,50 | 9,93 |
| 1/4 | 18 | 11,00 | 13,18 |
| 3/8 | 18 | 14,50 | 16,60 |
| 1/2 | 14 | 17,80 | 20,63 |
| 3/4 | 14 | 23,00 | 25,95 |
| 1 | 11,5 | 29,00 | 32,51 |
| 1 1/4 | 11,5 | 37,50 | 41,23 |
| 1 1/2 | 11,5 | 44,00 | 47,30 |
| 2 | 11,5 | 56,00 | 59,31 |



EQUIVALENCIA ROSCAS MM

Threading Equivalence mm

Equivalence Taraudage mm

| W / UNC / UNF / UNEF | mm |
|----------------------|--------|
| 3/32 | 2,381 |
| 1/8 | 3,175 |
| 5/32 | 3,969 |
| 3/16 | 4,762 |
| 7/32 | 5,556 |
| 1/4 | 6,350 |
| 9/32 | 7,144 |
| 5/16 | 7,938 |
| 3/8 | 9,525 |
| 7/16 | 11,112 |
| 1/2 | 12,700 |
| 9/16 | 14,288 |
| 5/8 | 15,875 |
| 3/4 | 19,050 |
| 7/8 | 22,225 |
| 1 | 25,400 |
| 1 1/8 | 28,575 |
| 1 1/4 | 31,750 |
| 1 3/8 | 34,925 |
| 1 1/2 | 38,100 |
| 1 5/8 | 41,275 |
| 1 3/4 | 44,450 |
| 1 7/8 | 47,625 |
| 2 | 50,800 |

| BSP (GAS) / BSPT (RC) | mm |
|-----------------------|--------|
| 1/8 | 9,728 |
| 1/4 | 13,157 |
| 3/8 | 16,662 |
| 1/2 | 20,955 |
| 5/8 | 22,911 |
| 3/4 | 26,441 |
| 7/8 | 30,201 |
| 1 | 33,249 |
| 1 1/8 | 37,897 |
| 1 1/4 | 41,910 |
| 1 3/8 | 44,323 |
| 1 1/2 | 47,803 |
| 1 5/8 | 51,988 |
| 1 3/4 | 53,746 |
| 2 | 59,614 |
| 2 1/4 | 65,710 |
| 2 3/8 | 69,390 |
| 2 1/2 | 75,184 |
| 2 3/4 | 81,534 |
| 3 | 87,844 |

| PG | mm |
|------|--------|
| 07 | 12,500 |
| 09 | 15,200 |
| 11 | 18,600 |
| 13,5 | 20,400 |
| 16 | 22,500 |
| 21 | 28,300 |
| 29 | 37,000 |
| 36 | 47,000 |
| 42 | 54,000 |
| 48 | 59,300 |

| NPT | mm |
|-------|--------|
| 1/8 | 10,287 |
| 1/4 | 13,716 |
| 3/8 | 17,145 |
| 1/2 | 21,336 |
| 3/4 | 23,670 |
| 1 | 33,401 |
| 1 1/4 | 42,164 |
| 1 1/2 | 48,260 |
| 2 | 60,325 |
| 2 1/2 | 73,025 |
| 3 | 88,900 |

ROTURA DE MACHOS

La rotura de un macho, en un porcentaje muy elevado, se produce en la zona más frágil del mismo. Por ejemplo, en el caso de machos DIN 371 con mango reforzado, se da en la terminación de la zona de roscado, con más posibilidades en los casos de roscado rígido con un macho para agujeros ciegos, a la salida del mismo.

Para evitar en un porcentaje elevado el riesgo de rotura, hay que tener en cuenta algunas recomendaciones:

- Ejecutar el taladrado previo con una broca en buenas condiciones.
- Utilizar el macho adecuado para cada material a trabajar.
- Usar un porta-machos flotante Ref. 3193 con compensación radial y axial, que alinea el eje del macho respecto al eje del orificio a roscar.
- Usar lubricante apropiado (ver gama lubricantes pag 555)

BROKEN TAPS

Breaking a tap, in a high percentage, happens in its most fragile side. For example, when using reinforced shank DIN 371 taps, this happens in the end of the threading area, most probably in rigid threading cases with a tap for blind holes, when turning it out.

In order to avoid this breaking risk, have in mind some recommendations:

- Make the previous drilling with a drill bit in good conditions.
- Use the proper tap for each working material
- Use a Ref. 3193 Floating Tap Holder with radial & axial compensation, that aligns the tap axis to the hole-to-thread axis.
- Use an appropriate lubricant (see range of lubricants on page 555)

RUPTURE DE TARAUDS

La ruptura d'un taraud dans la plupart des cas se produit dans la zone la plus fragile de l'outil. Par exemple, dans le cas de tarauds DIN 371 avec queue renforcée, se produit dans la fin de la partie fileté, avec plus de possibilités de casse dans les filetages rigides avec tarauds pour trous borgnes a la sortie du même.

Pour éviter un haut pourcentage de casse, il faut respecter les conseils suivants:

- Pré-taraudage avec un foret en bonnes conditions.
- Employer un taraud approprié pour chaque matériel à usiner.
- Employer un porte-tarauds flottant Ref. 3193 avec compensation rayon et axiale qui aligne l'axe du taraud par rapport à l'axe du trou à tarauder.
- Utilisez un lubrifiant approprié (voir gamme de lubrifiants à la page 555)

ROSCAS Y PASOS

Threads and Pitches
Filetages et pas

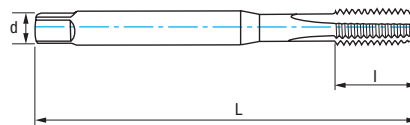
| Diam. | UNC 60° | UNF 60° | UNEF 60° | UN 60° | | | | | UNS 60° | | | | | NPT 60° | W 55° | BF 55° | BSP (Gas) 55° | BSB BRASS 55° | | | |
|---------|------------|------------|-------------|-----------|----|----|----|----|------------|----|----|----|----|------------|----------|-----------|---------------------|---------------------|----|----|----|
| | | | | | | | | | | | | | | | | | | | | | |
| N° 0 | | 80 | | | | | | | | | | | | | | | | | | | |
| N° 1 | 64 | 72 | | | | | | | | | | | | | | | | | | | |
| N° 2 | 56 | 64 | | | | | | | | | | | | | | | | | | | |
| N° 3 | 48 | 56 | | | | | | | | | | | | | | | | | | | |
| N° 4 | 40 | 48 | | | | | | | | | | | | | | | | | | | |
| N° 5 | 40 | 44 | | | | | | | | | | | | | | | | | | | |
| N° 6 | 32 | 40 | | | | | | | | | | | | | | | | | | | |
| N° 8 | 32 | 36 | | | | | | | | | | | | | | | | | | | |
| N° 10 | 24 | 32 | | | | | | | | 28 | 36 | 40 | 48 | 56 | | | | | | | |
| N° 12 | 24 | 28 | 32 | | | | | | | 36 | 40 | 48 | 56 | | | | | | | | |
| 1/16 | | | | | | | | | | | | | | | 27 | 60 | | 28 | | | |
| 3/32 | | | | | | | | | | | | | | | | 48 | | | | | |
| 1/8 | | | | | | | | | | | | | | | 27 | 40 | | 28 | | | |
| 5/32 | | | | | | | | | | | | | | | | 32 | | | | | |
| 3/16 | | | | | | | | | | | | | | | | 24 | 32 | | | | |
| 7/32 | | | | | | | | | | | | | | | | 24 | 28 | | | | |
| 1/4 | 20 | 28 | 32 | | | | | | | 24 | 27 | 36 | 40 | 48 | 56 | 18 | 20 | 26 | 19 | 26 | |
| 9/32 | | | | | | | | | | | | | | | | | 20 | 26 | | | |
| 5/16 | 18 | 24 | 32 | 20 | 28 | | | | | 27 | 36 | 40 | 48 | | | | 18 | 22 | | 26 | |
| 3/8 | 16 | 24 | 32 | 20 | 28 | | | | | 18 | 27 | 36 | 40 | | | | 18 | 16 | 20 | 19 | 26 |
| 7/16 | 14 | 20 | 28 | 16 | 32 | | | | | 18 | 24 | 27 | | | | | 14 | 18 | | | 26 |
| 1/2 | 13 | 20 | 28 | 16 | 32 | | | | | 12 | 14 | 18 | 24 | 27 | | | 14 | 12 | 16 | 14 | 26 |
| 9/16 | 12 | 18 | 24 | 16 | 20 | 28 | 32 | | | 14 | 27 | | | | | | | 12 | 16 | | 26 |
| 5/8 | 11 | 18 | 24 | 12 | 16 | 20 | 28 | 32 | | 14 | 27 | | | | | | 14 | 11 | 14 | 14 | 26 |
| 11/16 | | | 24 | 12 | 16 | 20 | 28 | 32 | | | | | | | | | | 11 | 14 | | |
| 3/4 | 10 | 16 | 20 | 12 | 28 | 32 | | | | 14 | 18 | 24 | 27 | | | | 14 | 10 | 12 | 14 | 26 |
| 13/16 | | | 20 | 12 | 16 | 28 | 32 | | | | | | | | | | | 10 | 12 | | |
| 7/8 | 9 | 14 | 20 | 12 | 16 | 28 | 32 | | | 10 | 18 | 24 | 27 | | | | | 9 | 11 | 14 | 26 |
| 15/16 | | | 20 | 16 | 28 | 32 | | | | | | | | | | | | | | | |
| 1" | 8 | 12 | 20 | 16 | 28 | 16 | | 28 | | 10 | 14 | 18 | 24 | 27 | | | 11,5 | 8 | 10 | 11 | 26 |
| 1 1/16 | | | 18 | 8 | 16 | 20 | 28 | | | | | | | | | | | | | | |
| 1 1/8 | 7 | 12 | 18 | 8 | 16 | 20 | 28 | | | 10 | 14 | 24 | | | | | | 7 | 9 | 11 | 26 |
| 1 3/16 | | | 18 | 8 | 16 | 20 | 28 | | | | | | | | | | | | | | |
| 1 1/4 | 7 | 12 | 18 | 8 | 16 | 20 | 28 | | | 10 | 14 | 24 | | | | | 11,5 | 7 | 9 | 11 | 26 |
| 1 5/16 | | | 18 | 8 | 16 | 20 | 28 | | | | | | | | | | | | | | |
| 1 3/8 | 6 | 12 | 18 | 6 | 8 | 12 | 16 | 20 | 28 | 10 | 14 | 24 | | | | | | 6 | 8 | 11 | 26 |
| 1 7/16 | | | 18 | 8 | 16 | 20 | 28 | | | | | | | | | | | | | | |
| 1 1/2 | 6 | 12 | 18 | 6 | 8 | 16 | 20 | | | 10 | 14 | 24 | | | | | 11,5 | 6 | 8 | 11 | 26 |
| 1 9/16 | | | 18 | 6 | 8 | 12 | 16 | 20 | | | | | | | | | | | | | |
| 1 5/8 | | | 18 | 6 | 8 | 12 | 16 | 20 | | 10 | 14 | 24 | | | | | | 5 | 8 | 11 | 26 |
| 1 11/16 | | | 18 | 6 | 8 | 12 | 16 | 20 | | | | | | | | | | | | | |
| 1 3/4 | 5 | | | 6 | 8 | 12 | 16 | 20 | | 10 | 14 | 24 | | | | | | 5 | 7 | 11 | 26 |
| 1 13/16 | | | | 6 | 8 | 12 | 16 | 20 | | | | | | | | | | | | | |
| 1 7/8 | | | | 6 | 8 | 12 | 16 | 20 | | 10 | 14 | 24 | | | | | | 4,5 | | | 26 |
| 1 15/16 | | | | 6 | 8 | 12 | 16 | 20 | | | | | | | | | | | | | |
| 2" | 26 | 4,5 | | 6 | 8 | 12 | 16 | 20 | | 10 | 14 | 24 | | | | | 11,5 | 4,5 | 7 | 11 | 26 |

Ref. 3130

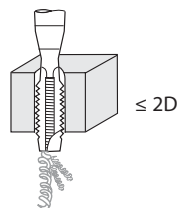
MACHO RECTO MÁQUINA MÉTRICA MATERIALES DUROS M. REFORZADO

Reinforced Shank Hard Materials Metric Machine Straight Tap

Taraud droit machine métrique matériaux durs queue renforcée



| | | | | | | | |
|-----|------|---------|----------|---------|-----|---------------|-----|
| PMX | HARD | DIN 371 | B 3,5-5h | Tol. 6H | GUN | α 2-4° | 60° |
|-----|------|---------|----------|---------|-----|---------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HARD |
| P | P.3 | 4-8 |
| | P.4 | 3-5 |
| S | | 10-15 |
| N | N.7 | 20-30 |

Avance $f = P$ (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|-----|------|------|------|-------|------|---|--------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 15354 | 24,12 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 15355 | 24,12 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 15357 | 23,31 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 15360 | 25,81 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 15361 | 29,95 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 15363 | 36,47 |

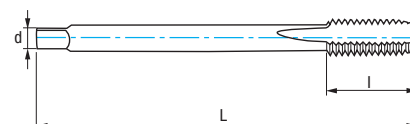


Ref. 3230

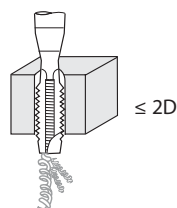
MACHO RECTO MÁQUINA MÉTRICA MATERIALES DUROS

Hard Materials Metric Machine Straight Tap

Taraud droit machine métrique matériaux durs



| | | | | | | | |
|-----|------|---------|----------|---------|-----|---------------|-----|
| PMX | HARD | DIN 376 | B 3,5-5h | Tol. 6H | GUN | α 2-4° | 60° |
|-----|------|---------|----------|---------|-----|---------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HARD |
| P | P.3 | 4-8 |
| | P.4 | 3-5 |
| S | | 10-15 |
| N | N.7 | 20-30 |

Avance $f = P$ (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

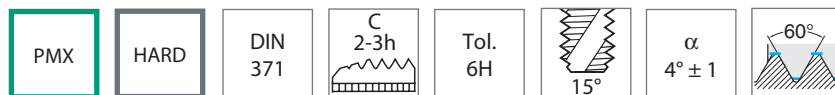
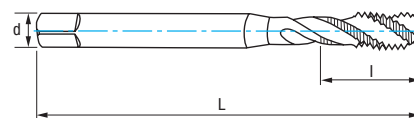
| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|-----|------|------|------|-------|------|---|--------------|--------|
| M12 | 1,75 | 110 | 29 | 9,00 | 7 | 3 | 16394 | 45,36 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9 | 3 | 16395 | 62,78 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9 | 3 | 16396 | 76,75 |
| M18 | 2,50 | 125 | 34 | 14,00 | 11 | 3 | 13216 | 144,08 |
| M20 | 2,50 | 140 | 34 | 16,00 | 12 | 3 | 13217 | 165,71 |



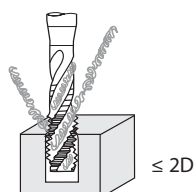
Ref. **3170****MACHO HELICOIDAL MÁQUINA MÉTRICA MATERIALES DUROS M. REFORZADO**

Reinforced Shank Hard Materials Metric Machine Spiral Tap

Taraud helicoidal machine métrique matériaux durs queue renforcée



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HARD |
| P | P.3 | 4-8 |
| | P.4 | 3-5 |
| S | | 10-15 |
| N | N.7 | 20-30 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|-----|------|------|------|-------|------|---|--------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 15366 | 26,45 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 15367 | 26,45 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 15369 | 26,45 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 15372 | 27,83 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 15373 | 33,31 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 15375 | 41,38 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

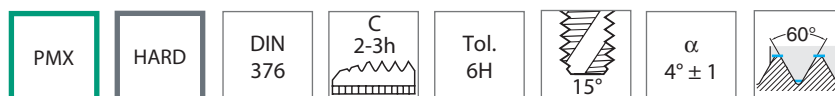
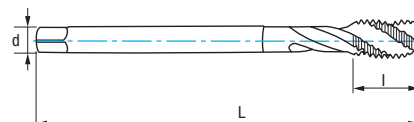
$$V_f \text{ (mm/min.)} = r.p.m. \times f$$

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

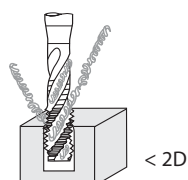
Ref. **3270****MACHO HELICOIDAL MÁQUINA MÉTRICA MATERIALES DUROS**

Hard Materials Metric Machine Spiral Tap

Taraud helicoidal machine métrique matériaux durs



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HARD |
| P | P.3 | 4-8 |
| | P.4 | 3-5 |
| S | | 10-15 |
| N | N.7 | 20-30 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|-----|------|------|------|-------|-------|---|--------------|--------|
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 3 | 16399 | 54,55 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 3 | 16400 | 71,56 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 4 | 16401 | 90,40 |
| M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 4 | 13218 | 123,86 |
| M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 4 | 13219 | 132,97 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = r.p.m. \times f$$

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

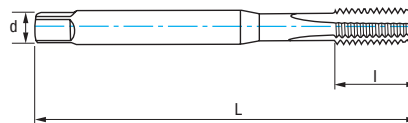


Ref. 3143

MACHO RECTO MÁQUINA MÉTRICA MATERIALES ALEADOS M. REFORZADO

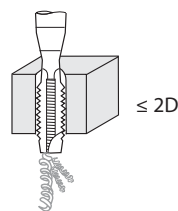
Reinforced Shank Alloy Materials Metric Machine Straight Tap

Taraut droit machine métrique matériaux alliages queue renforcée



| | | | | | | | |
|--------|---------|----------|-----|---------|-----------------|-----|--------------------------------------|
| HSSE V | DIN 371 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° | Vaporizado Vaporized Vaporisée |
|--------|---------|----------|-----|---------|-----------------|-----|--------------------------------------|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HSSE-V |
| P | P.2 | 6-8 |
| M | | 8-12 |
| K | K.2 | 7-10 |
| N | N.5 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSSE-V | € |
|------------------|------|------|------|-------|------|---|----------------|-------|
| New! M1 | 0,25 | 40 | 5 | 2,50 | 2,10 | 2 | 58965 | 46,65 |
| New! M1,6 | 0,35 | 40 | 8 | 2,50 | 2,10 | 2 | 58967 | 45,82 |
| New! M2 | 0,40 | 45 | 8 | 2,80 | 2,10 | 2 | 58970 | 17,95 |
| New! M2,5 | 0,45 | 50 | 9 | 2,80 | 2,10 | 2 | 58973 | 20,01 |
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 69532 | 13,75 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 69534 | 14,05 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 69535 | 14,05 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 69537 | 15,45 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 69538 | 17,32 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 15672 | 19,96 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

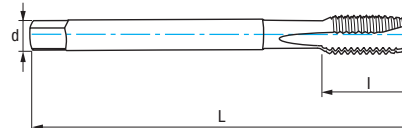
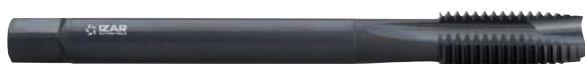


Ref. 3243

MACHO RECTO MÁQUINA MÉTRICA MATERIALES ALEADOS

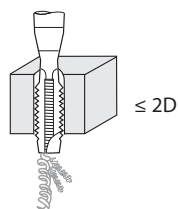
Alloy Materials Metric Machine Straight Tap

Taraut droit machine métrique matériaux alliages



| | | | | | | | |
|--------|---------|----------|-----|---------|-----------------|-----|--------------------------------------|
| HSSE V | DIN 376 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° | Vaporizado Vaporized Vaporisée |
|--------|---------|----------|-----|---------|-----------------|-----|--------------------------------------|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HSSE-V |
| P | P.2 | 6-8 |
| M | | 8-12 |
| K | K.2 | 7-10 |
| N | N.5 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSSE-V | € |
|------------------|------|------|------|-------|-------|---|----------------|-------|
| M8 | 1,25 | 90 | 22 | 6,00 | 4,90 | 3 | 69876 | 18,12 |
| M10 | 1,50 | 100 | 24 | 7,00 | 5,50 | 3 | 69877 | 22,27 |
| M12 | 1,75 | 110 | 28 | 9,00 | 7,00 | 3 | 69879 | 27,42 |
| New! MF14 | 1,50 | 100 | 22 | 11,00 | 9,00 | 3 | 82761 | 40,49 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 69880 | 34,31 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 69882 | 40,34 |
| M18 | 2,50 | 125 | 34 | 14,00 | 11,00 | 3 | 69883 | 57,17 |
| M20 | 2,50 | 140 | 34 | 16,00 | 12,00 | 3 | 69885 | 61,73 |
| New! M22 | 2,50 | 140 | 34 | 18,00 | 14,50 | 3 | 58976 | 71,24 |
| New! M24 | 3,00 | 160 | 38 | 18,00 | 14,50 | 3 | 58979 | 75,75 |

Avance f = P (Paso - Pitch - Pas)

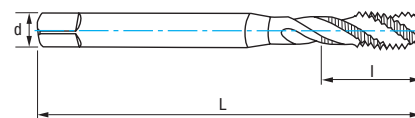
Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$



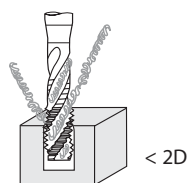
Ref. 3153

MACHO HELICOIDAL MÁQUINA MÉTRICA MATERIALES ALEADOS M. REFORZADO Reinforced Shank Alloy Materials Metric Machine Spiral Tap Taraud helicoidal machine métrique matériaux alliages queue renforcée



| | | | | | | | |
|---------------|---------|--------|-----|---------|-----------------|-----|---|
| HSSE V | DIN 371 | C 2-3h | 40° | Tol. 6H | α 6° ± 1 | 60° | Vaporizado Vaporized Vaporisée |
|---------------|---------|--------|-----|---------|-----------------|-----|---|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HSSE-V |
| P | P.2 | 6-8 |
| M | | 8-12 |
| K | K.2 | 7-10 |
| N | N.5 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSSE-V | € |
|------------------|------|------|------|-------|------|---|----------------|-------|
| New! M1 | 0,25 | 40 | 5 | 2,50 | 2,10 | 2 | 58982 | 51,32 |
| New! M1,6 | 0,35 | 40 | 7 | 2,50 | 2,10 | 2 | 58985 | 50,40 |
| New! M2 | 0,40 | 45 | 4 | 2,80 | 2,10 | 2 | 58988 | 20,68 |
| M2,5 | 0,45 | 50 | 4,5 | 2,80 | 2,10 | 2 | 58991 | 20,68 |
| M3 | 0,50 | 56 | 5 | 3,50 | 2,70 | 3 | 69412 | 15,14 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 3 | 69414 | 15,48 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 3 | 69415 | 15,48 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 3 | 69483 | 16,97 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 3 | 69484 | 19,05 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 3 | 69519 | 21,95 |

Avance f = P (Paso - Pitch - Pas)

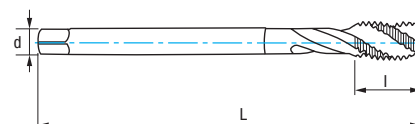
Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$



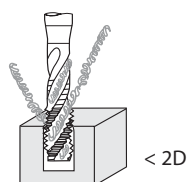
Ref. 3253

MACHO HELICOIDAL MÁQUINA MÉTRICA MATERIALES ALEADOS Alloy Materials Metric Machine Spiral Tap Taraud helicoidal machine métrique matériaux alliages



| | | | | | | | |
|---------------|---------|--------|-----|---------|-----------------|-----|---|
| HSSE V | DIN 376 | C 2-3h | 40° | Tol. 6H | α 6° ± 1 | 60° | Vaporizado Vaporized Vaporisée |
|---------------|---------|--------|-----|---------|-----------------|-----|---|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HSSE-V |
| P | P.2 | 6-8 |
| M | | 8-12 |
| K | K.2 | 7-10 |
| N | N.5 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSSE-V | € |
|-----------------|------|------|------|-------|-------|---|----------------|-------|
| M8 | 1,25 | 90 | 13 | 6,00 | 4,90 | 3 | 69864 | 19,92 |
| M10 | 1,50 | 100 | 15 | 7,00 | 5,50 | 3 | 69865 | 24,51 |
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 4 | 69867 | 30,18 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 4 | 69868 | 37,74 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 4 | 69870 | 44,38 |
| M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 4 | 69871 | 62,88 |
| M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 4 | 69873 | 67,94 |
| New! M22 | 2,50 | 140 | 25 | 18,00 | 14,50 | 4 | 58994 | 76,69 |
| New! M24 | 3,00 | 160 | 30 | 18,00 | 14,50 | 4 | 58997 | 80,57 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

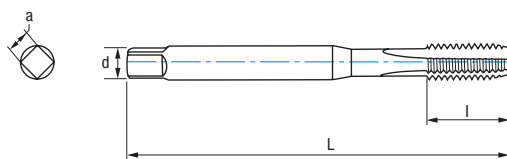
r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$



Ref. 3125

MACHO RECTO MÁQUINA MÉTRICA INOX GRAN RENDIMIENTO M. REFORZADO

Reinforced Shank High Performance **Stainless** Metric Machine Straight Tap
Taraud droit machine métrique **inox** haut rendement queue renforcée



PMX HARD DIN 371

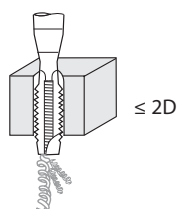
B 3,5-5h
GUN

Tol. 6H

α 10-12°

A.R.I.* Alto Rendimiento Intensivo
I.H.P.* Intensive High Performance
H.P.I.* Haute Performance Intensif

60°



INOX
Heavy Duty
ACEITES DE CORTE
Cutting Oils
Huiles de coupe
Pág. 557

| Material | Vc (m/min)* | |
|----------|-------------|-------|
| Grupo | Sub. | HARD |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| K | K.1 | 10-15 |
| | K.2 | 7-10 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

* Posible Uso en Seco: Vc -50 %
* Possible Dry-Use: Vc -50 %
* Emploi possible à sec: Vc -50 %

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

| M | P | L mm | I mm | d mm | a mm | Z | N° Art. HARD | € |
|-----|------|------|------|-------|------|---|--------------|-------|
| M2 | 0,40 | 45 | 9 | 2,80 | 2,10 | 3 | 69746 | 32,05 |
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 28059 | 24,13 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 28060 | 24,71 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 28062 | 26,05 |
| M6 | 1,00 | 80 | 17 | 6,00 | 4,90 | 3 | 28063 | 26,05 |
| M8 | 1,25 | 90 | 20 | 8,00 | 6,20 | 3 | 28064 | 30,19 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 28065 | 36,03 |

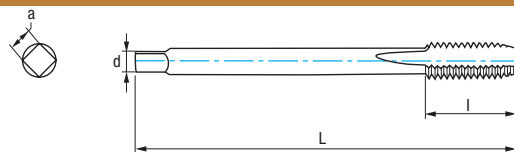


Set pag. 232

Ref. 3225

MACHO RECTO MÁQUINA MÉTRICA/ MÉTRICA FINA INOX GRAN RENDIMIENTO

High Performance **Stainless** Metric / Metric Fine Machine Straight Tap
Taraud droit machine métrique / métrique pas fin **inox** haut rendement



PMX HARD M DIN 376 MF DIN 374

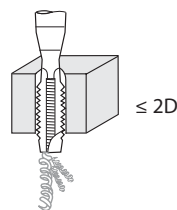
B 3,5-5h
GUN

Tol. 6H

α 10-12°

A.R.I.* Alto Rendimiento Intensivo
I.H.P.* Intensive High Performance
H.P.I.* Haute Performance Intensif

60°



| Material | Vc (m/min)* | |
|----------|-------------|-------|
| Grupo | Sub. | HARD |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| K | K.1 | 10-15 |
| | K.2 | 7-10 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

* Posible Uso en Seco: Vc -50 %
* Possible Dry-Use: Vc -50 %
* Emploi possible à sec: Vc -50 %

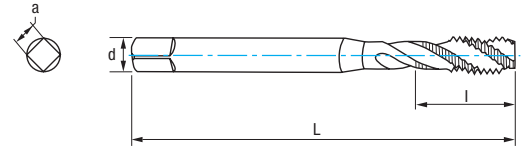
Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

| M/MF | P | L mm | I mm | d mm | a mm | Z | N° Art. HARD | € |
|------|------|------|------|------|------|---|--------------|-------|
| MF8 | 1,00 | 90 | 18 | 6 | 4,90 | 3 | 70265 | 41,61 |
| MF10 | 1,00 | 90 | 20 | 7 | 5,50 | 3 | 70268 | 44,30 |
| MF10 | 1,25 | 100 | 20 | 7 | 5,50 | 3 | 70270 | 44,30 |
| MF12 | 1,00 | 100 | 21 | 9 | 7,00 | 3 | 70198 | 57,09 |
| MF12 | 1,25 | 100 | 21 | 9 | 7,00 | 3 | 70200 | 57,09 |
| MF12 | 1,50 | 100 | 21 | 9 | 7,00 | 3 | 70202 | 57,09 |
| M12 | 1,75 | 110 | 29 | 9 | 7,00 | 3 | 28073 | 45,89 |
| MF14 | 1,25 | 100 | 21 | 11 | 9,00 | 3 | 70203 | 70,34 |
| MF14 | 1,50 | 100 | 21 | 11 | 9,00 | 3 | 70204 | 72,30 |
| M14 | 2,00 | 110 | 25 | 11 | 9,00 | 3 | 38383 | 59,73 |
| MF16 | 1,50 | 100 | 21 | 12 | 9,00 | 3 | 70205 | 74,90 |
| M16 | 2,00 | 110 | 25 | 12 | 9,00 | 3 | 38384 | 66,49 |

| M/MF | P | L mm | I mm | d mm | a mm | Z | N° Art. HARD | € |
|------|------|------|------|------|-------|---|--------------|--------|
| MF18 | 1,50 | 110 | 24 | 14 | 11,00 | 3 | 70211 | 83,80 |
| M18 | 2,50 | 125 | 30 | 14 | 11,00 | 3 | 38385 | 106,69 |
| MF20 | 1,50 | 125 | 24 | 16 | 12,00 | 3 | 70214 | 91,62 |
| M20 | 2,50 | 140 | 30 | 16 | 12,00 | 3 | 38386 | 113,42 |
| MF22 | 1,50 | 125 | 24 | 18 | 14,50 | 3 | 70217 | 104,46 |
| M22 | 2,50 | 140 | 30 | 18 | 14,50 | 3 | 69633 | 135,26 |
| MF24 | 1,50 | 140 | 26 | 18 | 14,50 | 4 | 70220 | 131,38 |
| M24 | 3,00 | 160 | 36 | 18 | 14,50 | 4 | 69635 | 127,21 |
| M27 | 3,00 | 160 | 30 | 20 | 16,00 | 4 | 69636 | 205,36 |
| MF30 | 1,50 | 150 | 28 | 22 | 18,00 | 4 | 70221 | 198,78 |
| M30 | 3,50 | 180 | 40 | 22 | 18,00 | 4 | 69638 | 224,90 |

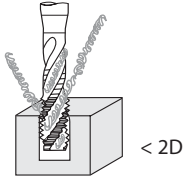
Ref. 3165

MACHO HELICOIDAL MÁQUINA MÉTRICA INOX GRAN RENDIMIENTO M. REFORZADO
 Reinforced Shank High Performance **Stainless** Metric Machine Spiral Tap
 Taraud hélicoïdal machine métrique **inox** haut rendement queue renforcée



| | | | | | | |
|-----|------|---------|--------|-----|---------|-----------|
| PMX | HARD | DIN 371 | C 2-3h | 35° | Tol. 6H | α 12° ± 2 |
|-----|------|---------|--------|-----|---------|-----------|

A.R.I.* Alto Rendimiento Intensivo
 I.H.P.* Intensive High Performance
 H.P.I.* Haute Performance Intensif



| Material | Vc (m/min)* | * Possible Uso en Seco: Vc -50 % * Possible Dry-Use: Vc -50% * Emploi possible à sec: Vc -50 % |
|------------|-------------|--|
| Grupo Sub. | HARD | |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| K | K.1 | 10-15 |
| | K.2 | 7-10 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

Avance f = P (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HARD | € |
|------|------|------|------|-------|------|---|--------------|-------|
| M2 | 0,40 | 45 | 9 | 2,80 | 2,10 | 3 | 69745 | 36,92 |
| M2,5 | 0,45 | 50 | 7,5 | 2,80 | 2,10 | 2 | 81703 | 36,92 |
| M3 | 0,50 | 56 | 9 | 3,50 | 2,70 | 3 | 28066 | 27,67 |
| M4 | 0,70 | 63 | 12 | 4,50 | 3,40 | 3 | 28068 | 27,67 |
| M5 | 0,80 | 70 | 13 | 6,00 | 4,90 | 3 | 28069 | 28,34 |
| M6 | 1,00 | 80 | 15 | 6,00 | 4,90 | 3 | 28070 | 29,53 |
| M8 | 1,25 | 90 | 18 | 8,00 | 6,20 | 3 | 28071 | 34,33 |
| M10 | 1,50 | 100 | 20 | 10,00 | 8,00 | 3 | 28072 | 40,56 |



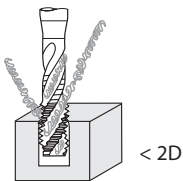
Ref. 3265

MACHO HELICOIDAL MÁQUINA MÉTRICA/ MÉTRICA FINA INOX GRAN RENDIMIENTO
 High Performance **Stainless** Metric / Metric Fine Machine Spiral Tap
 Taraud hélicoïdal machine métrique / métrique pas fin **inox** haut rendement



| | | | | | | | |
|-----|------|-----------|------------|--------|-----|---------|-----------|
| PMX | HARD | M DIN 376 | MF DIN 374 | C 2-3h | 35° | Tol. 6H | α 12° ± 2 |
|-----|------|-----------|------------|--------|-----|---------|-----------|

A.R.I.* Alto Rendimiento Intensivo
 I.H.P.* Intensive High Performance
 H.P.I.* Haute Performance Intensif



| Material | Vc (m/min)* | * Possible Uso en Seco: Vc -50 % * Possible Dry-Use: Vc -50% * Emploi possible à sec: Vc -50 % |
|------------|-------------|--|
| Grupo Sub. | HARD | |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| K | K.1 | 10-15 |
| | K.2 | 7-10 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

Avance f = P (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

| M/MF | P | L mm | l mm | d mm | a mm | Z | Nº Art. HARD | € |
|------|------|------|------|------|------|---|--------------|-------|
| MF8 | 1,00 | 90 | 13 | 6 | 4,90 | 3 | 70271 | 41,76 |
| MF10 | 1,00 | 90 | 12 | 7 | 5,50 | 3 | 70273 | 44,30 |
| MF10 | 1,25 | 100 | 15 | 7 | 5,50 | 3 | 70274 | 44,30 |
| MF12 | 1,00 | 100 | 14 | 9 | 7,00 | 3 | 69661 | 57,30 |
| MF12 | 1,25 | 100 | 14 | 9 | 7,00 | 3 | 69664 | 57,30 |
| MF12 | 1,50 | 100 | 14 | 9 | 7,00 | 3 | 69668 | 57,30 |
| M12 | 1,75 | 110 | 18 | 9 | 7,00 | 3 | 28074 | 55,00 |
| MF14 | 1,25 | 100 | 16 | 11 | 9,00 | 3 | 69670 | 72,50 |
| MF14 | 1,50 | 100 | 16 | 11 | 9,00 | 3 | 69671 | 72,50 |
| M14 | 2,00 | 110 | 20 | 11 | 9,00 | 3 | 38379 | 66,12 |
| MF16 | 1,50 | 100 | 16 | 12 | 9,00 | 4 | 69673 | 75,55 |
| M16 | 2,00 | 110 | 20 | 12 | 9,00 | 4 | 38380 | 79,98 |

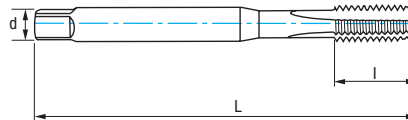
| M/MF | P | L mm | l mm | d mm | a mm | Z | Nº Art. HARD | € |
|------|------|------|------|------|-------|---|--------------|--------|
| MF18 | 1,50 | 110 | 20 | 14 | 11,00 | 4 | 69675 | 84,23 |
| M18 | 2,50 | 125 | 25 | 14 | 11,00 | 4 | 38381 | 113,80 |
| MF20 | 1,50 | 125 | 20 | 16 | 12,00 | 4 | 69676 | 92,05 |
| M20 | 2,50 | 140 | 25 | 16 | 12,00 | 4 | 38382 | 120,15 |
| MF22 | 1,50 | 125 | 20 | 18 | 14,50 | 4 | 69678 | 107,69 |
| M22 | 2,50 | 140 | 25 | 18 | 14,50 | 4 | 69621 | 143,88 |
| MF24 | 1,50 | 140 | 22 | 18 | 14,50 | 4 | 69681 | 135,47 |
| M24 | 3,00 | 160 | 30 | 18 | 14,50 | 4 | 69172 | 136,95 |
| M27 | 3,00 | 160 | 30 | 20 | 16,00 | 4 | 69622 | 210,15 |
| MF30 | 1,50 | 150 | 26 | 22 | 18,00 | 3 | 69683 | 204,95 |
| M30 | 3,50 | 180 | 35 | 22 | 18,00 | 4 | 69623 | 229,78 |

Ref. 3149

MACHO RECTO MÁQUINA MÉTRICA INOX MANGO REFORZADO

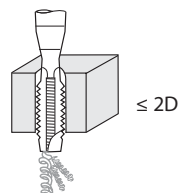
Reinforced Shank **Stainless** Metric Machine Straight Tap

Taraud droit machine métrique **inox** queue renforcée



| | | | | | | | |
|---------------|-----|------------|-------------|--|------------|--------------------|--|
| HSSE 5% Co | TIN | DIN 371 | B 3,5-5h | | Tol. 6H | α 10-12° | |
|---------------|-----|------------|-------------|--|------------|--------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.5 | 5-8 |
| M | | 8-12 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. TIN | € |
|------|------|---------|---------|---------|---------|---|----------------|-------|
| M2 | 0,40 | 45 | 8 | 2,80 | 2,10 | 3 | 81347 | 26,05 |
| M2,5 | 0,45 | 50 | 9 | 2,80 | 2,10 | 3 | 81348 | 24,88 |
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 21834 | 17,99 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 21835 | 18,22 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 21836 | 18,89 |
| M6 | 1,00 | 80 | 17 | 6,00 | 4,90 | 3 | 21837 | 19,02 |
| M8 | 1,25 | 90 | 20 | 8,00 | 6,20 | 3 | 21838 | 22,15 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 21839 | 25,78 |

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

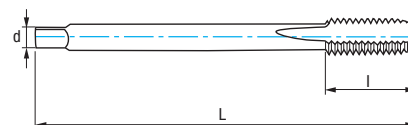


Ref. 3249

MACHO RECTO MÁQUINA MÉTRICA/ MÉTRICA FINA INOX

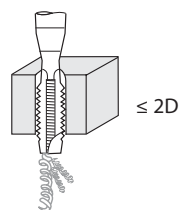
Stainless Metric / Metric Fine Machine Straight Tap

Taraud droit machine métrique / métrique pas fin **inox**



| | | | | | | | | |
|---------------|-----|--------------|---------------|-------------|--|------------|--------------------|--|
| HSSE 5% Co | TIN | M DIN 376 | MF DIN 374 | B 3,5-5h | | Tol. 6H | α 10-12° | |
|---------------|-----|--------------|---------------|-------------|--|------------|--------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.5 | 5-8 |
| M | | 8-12 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |

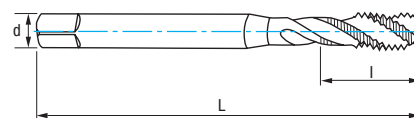




| M/MF | P | L mm | l mm | d mm | a mm | Z | N° Art. TIN | € |
|------|------|---------|---------|---------|---------|---|----------------|--------|
| MF6 | 0,75 | 80 | 15 | 4,5 | 3,40 | 3 | 81396 | 26,02 |
| MF8 | 1,00 | 90 | 18 | 6 | 4,90 | 3 | 81397 | 26,28 |
| M8 | 1,25 | 90 | 20 | 6 | 4,90 | 3 | 21840 | 24,39 |
| MF10 | 1,00 | 90 | 20 | 7 | 5,50 | 3 | 81398 | 30,63 |
| M10 | 1,50 | 100 | 22 | 7 | 5,50 | 3 | 21841 | 27,88 |
| MF12 | 1,00 | 100 | 21 | 9 | 7,00 | 3 | 81399 | 38,26 |
| MF12 | 1,50 | 100 | 21 | 9 | 7,00 | 3 | 81400 | 35,40 |
| M12 | 1,75 | 110 | 24 | 9 | 7,00 | 3 | 21843 | 32,94 |
| MF14 | 1,50 | 100 | 21 | 11 | 9,00 | 3 | 81401 | 44,58 |
| M14 | 2,00 | 110 | 26 | 11 | 9,00 | 3 | 21844 | 42,94 |
| MF16 | 1,50 | 100 | 21 | 12 | 9,00 | 3 | 81402 | 51,01 |
| M16 | 2,00 | 110 | 27 | 12 | 9,00 | 3 | 21846 | 47,35 |
| MF18 | 1,50 | 110 | 24 | 14 | 11,00 | 3 | 81403 | 63,96 |
| M18 | 2,50 | 125 | 30 | 14 | 11,00 | 3 | 21847 | 73,77 |
| MF20 | 1,50 | 125 | 24 | 16 | 12,00 | 3 | 81405 | 97,92 |
| M20 | 2,50 | 140 | 32 | 16 | 12,00 | 3 | 21848 | 76,78 |
| M22 | 2,50 | 140 | 34 | 18 | 14,50 | 3 | 16268 | 98,61 |
| M24 | 3,00 | 160 | 36 | 18 | 14,50 | 4 | 16269 | 83,23 |
| M27 | 3,00 | 160 | 36 | 20 | 16,00 | 4 | 81351 | 116,42 |
| M30 | 3,50 | 180 | 40 | 22 | 18,00 | 4 | 81352 | 140,51 |
| M33 | 3,50 | 180 | 42 | 25 | 20,00 | 4 | 81353 | 214,11 |
| M36 | 4,00 | 200 | 50 | 28 | 22,00 | 4 | 81354 | 287,72 |

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

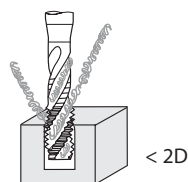
INOX
 Heavy Duty
ACEITES DE CORTE
 Cutting Oils
 Huiles de coupe
 Pág. 557



Ref. **3159****MACHO HELICOIDAL MÁQUINA MÉTRICA INOX MANGO REFORZADO**Reinforced Shank **Stainless** Metric Machine Spiral TapTaraud hélicoïdal machine métrique **inox** queue renforcée

| | | | | | | | |
|---------------|-----|------------|-----------|---|------------|--------------------|---|
| HSSE 5% Co | TIN | DIN 371 | C 2-3h |  | Tol. 6H | α 10-12° |  |
|---------------|-----|------------|-----------|---|------------|--------------------|---|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.5 | 5-8 |
| M | | 8-12 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |



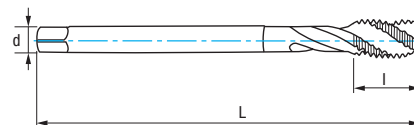
| M | P | L mm | l mm | d mm | ϕ a mm | Z | N° Art. TIN | € |
|------|------|---------|---------|---------|----------------|---|----------------|-------|
| M2 | 0,40 | 45 | 6 | 2,80 | 2,10 | 3 | 81349 | 28,66 |
| M2,5 | 0,45 | 50 | 7,5 | 2,80 | 2,10 | 3 | 81350 | 27,37 |
| M3 | 0,50 | 56 | 5 | 3,50 | 2,70 | 3 | 21849 | 19,57 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 3 | 21850 | 19,57 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 3 | 21851 | 20,03 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 3 | 21852 | 20,91 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 3 | 21853 | 24,19 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 3 | 21854 | 28,44 |





$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$$

$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$

Ref. **3259****MACHO HELICOIDAL MÁQUINA MÉTRICA INOX****Stainless** Metric Machine Spiral TapTaraud hélicoïdal machine métrique **inox**

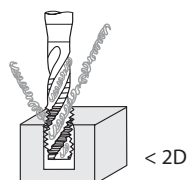
| | | | | | | | |
|---------------|-----|------------|-----------|---|------------|--------------------|---|
| HSSE 5% Co | TIN | DIN 376 | C 2-3h |  | Tol. 6H | α 10-12° |  |
|---------------|-----|------------|-----------|---|------------|--------------------|---|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.5 | 5-8 |
| M | | 8-12 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$$

$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$



| M | P | L mm | l mm | d mm | ϕ a mm | Z | N° Art. TIN | € |
|-----|------|---------|---------|---------|----------------|---|----------------|--------|
| M8 | 1,25 | 90 | 13 | 6,00 | 4,90 | 3 | 21855 | 25,63 |
| M10 | 1,50 | 100 | 15 | 7,00 | 5,50 | 3 | 21856 | 32,08 |
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 3 | 21857 | 37,34 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 3 | 21858 | 46,66 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 3 | 21859 | 51,28 |
| M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 3 | 21860 | 74,01 |
| M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 3 | 21861 | 76,49 |
| M22 | 2,50 | 140 | 25 | 18,00 | 14,50 | 3 | 16270 | 101,03 |
| M24 | 3,00 | 160 | 30 | 18,00 | 14,50 | 4 | 16271 | 96,14 |

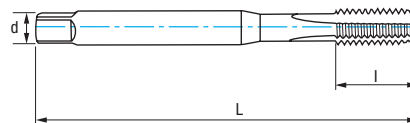


Ref. 3176

MACHO RECTO MÁQUINA MÉTRICA FUNDICIÓN MANGO REFORZADO

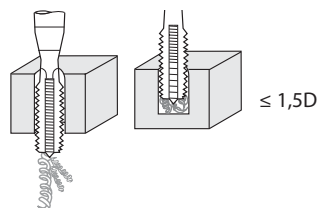
Reinforced Shank Cast Iron Metric Machine Straight Tap

Taraud droit machine métrique fonte queue renforcée



| | | | | | | | |
|---------------|------|------------|-----------|--|-------------|------------------|--|
| HSSE 5% Co | TICN | DIN 371 | C 2-3h | | Tol. 6HX | α 1-3° | |
|---------------|------|------------|-----------|--|-------------|------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TICN |
| K | K.1 | 15-20 |
| | K.2 | 10-15 |



Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. TICN | € |
|-----|------|---------|---------|---------|---------|---|-----------------|-------|
| M3 | 0,50 | 56 | 10 | 3,50 | 2,70 | 3 | 19680 | 15,79 |
| M4 | 0,70 | 63 | 12 | 4,50 | 3,40 | 3 | 19681 | 16,09 |
| M5 | 0,80 | 70 | 14 | 6,00 | 4,90 | 3 | 19682 | 16,09 |
| M6 | 1,00 | 80 | 16 | 6,00 | 4,90 | 4 | 19683 | 18,29 |
| M8 | 1,25 | 90 | 18 | 8,00 | 6,20 | 4 | 19685 | 20,54 |
| M10 | 1,50 | 100 | 20 | 10,00 | 8,00 | 4 | 19686 | 23,47 |

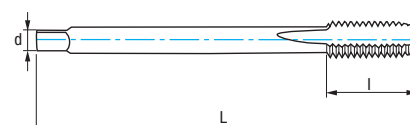


Ref. 3276

MACHO RECTO MÁQUINA MÉTRICA FUNDICIÓN

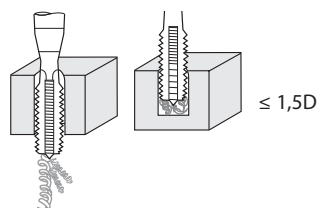
Cast Iron Metric Machine Straight Tap

Taraud droit machine métrique fonte



| | | | | | | | |
|---------------|------|------------|-----------|--|-------------|------------------|--|
| HSSE 5% Co | TICN | DIN 376 | C 2-3h | | Tol. 6HX | α 1-3° | |
|---------------|------|------------|-----------|--|-------------|------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TICN |
| K | K.1 | 15-20 |
| | K.2 | 10-15 |



Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. TICN | € |
|-----|------|---------|---------|---------|---------|---|-----------------|-------|
| M6 | 1,00 | 80 | 16 | 4,50 | 3,40 | 4 | 19687 | 19,08 |
| M8 | 1,25 | 90 | 18 | 6,00 | 4,90 | 4 | 19688 | 21,42 |
| M10 | 1,50 | 100 | 20 | 7,00 | 5,50 | 4 | 19690 | 24,57 |
| M12 | 1,75 | 110 | 22 | 9,00 | 7,00 | 4 | 19691 | 29,23 |
| M14 | 2,00 | 110 | 25 | 11,00 | 9,00 | 4 | 19694 | 48,06 |
| M16 | 2,00 | 110 | 28 | 12,00 | 9,00 | 4 | 19696 | 56,54 |
| M18 | 2,50 | 125 | 32 | 14,00 | 11,00 | 4 | 19697 | 81,34 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 4 | 19698 | 81,66 |

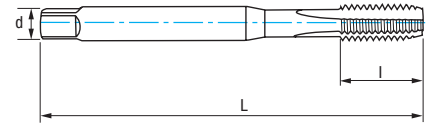


Ref. **3172**

MACHO RECTO MÁQUINA MÉTRICA ALUMINIO MANGO REFORZADO

Reinforced Shank **Aluminium** Metric Machine Straight Tap

Taraut droit machine métrique **aluminium** queue renforcée



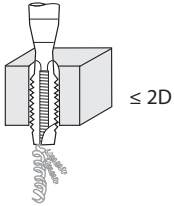
| | | | | | | |
|--------------|------------|-------------|-----|------------|--------------------|-----|
| HSSE 5%Co | DIN 371 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° |
|--------------|------------|-------------|-----|------------|--------------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| N | N.3 | 15-35 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 14557 | 18,89 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 14574 | 18,98 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 14745 | 18,89 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 14725 | 19,92 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 14746 | 23,87 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 14737 | 28,09 |

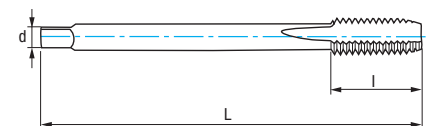


Ref. **3272**

MACHO RECTO MÁQUINA MÉTRICA ALUMINIO

Aluminium Metric Machine Straight Tap

Taraut droit machine métrique **aluminium**



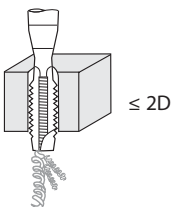
| | | | | | | |
|--------------|------------|-------------|-----|------------|--------------------|-----|
| HSSE 5%Co | DIN 376 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° |
|--------------|------------|-------------|-----|------------|--------------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| N | N.3 | 15-35 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 14751 | 35,05 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 14761 | 63,52 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 14764 | 69,24 |
| M18 | 2,50 | 125 | 30 | 14,00 | 11,00 | 4 | 14767 | 89,61 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 4 | 14773 | 95,34 |

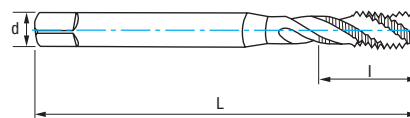


Ref. **3175**

MACHO HELICOIDAL MÁQUINA MÉTRICA ALUMINIO MANGO REFORZADO

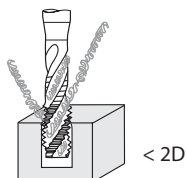
Reinforced Shank Aluminium Metric Machine Spiral Tap

Taraud helicoidal machine métrique aluminium queue renforcée



| | | | | | | |
|--------------|------------|-----------|-----|------------|--------------|-----|
| HSSE 5%Co | DIN 371 | C 2-3h | 45° | Tol. 6H | α 16° ± 2 | 60° |
|--------------|------------|-----------|-----|------------|--------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| N | N.3 | 15-35 |



Avance f = P (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|------|------|-------|------|---|---------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 2 | 14565 | 21,01 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 2 | 14577 | 21,08 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 2 | 14724 | 21,01 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 2 | 14730 | 22,15 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 2 | 14733 | 26,52 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 2 | 14739 | 31,21 |

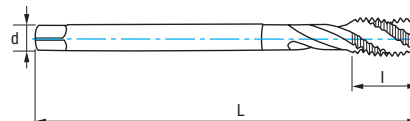


Ref. **3275**

MACHO HELICOIDAL MÁQUINA MÉTRICA ALUMINIO

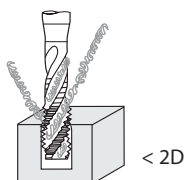
Aluminium Metric Machine Spiral Tap

Taraud helicoidal machine métrique aluminium



| | | | | | | |
|--------------|------------|-----------|-----|------------|--------------|-----|
| HSSE 5%Co | DIN 376 | C 2-3h | 45° | Tol. 6H | α 16° ± 2 | 60° |
|--------------|------------|-----------|-----|------------|--------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| N | N.3 | 15-35 |



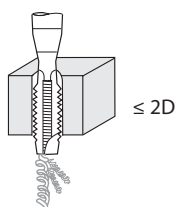
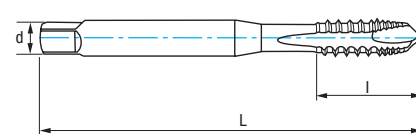
Avance f = P (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|------|------|-------|-------|---|---------------|--------|
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 2 | 14755 | 38,97 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 14763 | 70,55 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 14766 | 76,95 |
| M18 | 2,50 | 125 | 30 | 14,00 | 11,00 | 3 | 14769 | 99,57 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 3 | 14775 | 105,92 |



Ref. **3174**

MACHO RECTO MÁQUINA MÉTRICA ALUMINIO M. REFORZADO DENTADO ALTERNO
 Interrupted Thread Reinforced Shank Aluminium Metric Machine Straight Tap
 Taraud droit machine métrique aluminium queue renforcée denture alternée



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 69390 | 19,83 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 69393 | 19,83 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 69394 | 19,83 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 69396 | 20,87 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 69397 | 24,97 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 69399 | 29,42 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 20-25 |
| | P.2 | 8-18 |
| | P.5 | 8-10 |
| M | | 8-10 |
| N | N.1 | 10-25 |
| | N.2 | 10-25 |
| | N.3 | 12-25 |
| | N.4 | 12-25 |
| | N.5 | 15-20 |
| | N.6 | 20-25 |

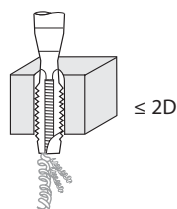
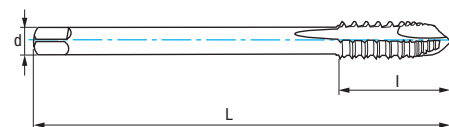
$$\text{Avance } f = P (\text{Paso} - \text{Pitch} - \text{Pas})$$

$$V_f (\text{mm/min.}) = r.p.m. \times f$$

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

Ref. **3274**

MACHO RECTO MÁQUINA MÉTRICA ALUMINIO DENTADO ALTERNO
 Interrupted Thread Aluminium Metric Machine Straight Tap
 Taraud droit machine métrique aluminium denture alternée



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M5 | 0,80 | 70 | 16 | 3,50 | 2,70 | 3 | 69853 | 19,83 |
| M6 | 1,00 | 80 | 19 | 4,50 | 3,40 | 3 | 69855 | 24,97 |
| M8 | 1,25 | 90 | 22 | 6,00 | 4,90 | 3 | 69856 | 24,97 |
| M10 | 1,50 | 100 | 24 | 7,00 | 5,50 | 3 | 69858 | 29,42 |
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 69859 | 36,73 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 69861 | 66,52 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 69862 | 66,93 |

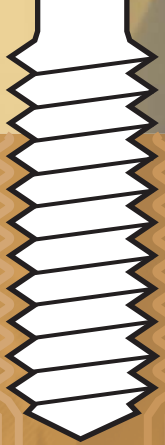
| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 20-25 |
| | P.2 | 8-18 |
| | P.5 | 8-10 |
| M | | 8-10 |
| N | N.1 | 10-25 |
| | N.2 | 10-25 |
| | N.3 | 12-25 |
| | N.4 | 12-25 |
| | N.5 | 15-20 |
| | N.6 | 20-25 |

$$\text{Avance } f = P (\text{Paso} - \text{Pitch} - \text{Pas})$$

$$V_f (\text{mm/min.}) = r.p.m. \times f$$

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$





MACHOS DE LAMINACIÓN

Forming Taps

Tarauds à réfooler

- No generan viruta.
- Vida útil muy superior a machos estándar de corte.
- La rosca formada es más resistente dado que el material se comprime en la superficie.
- No chips.
- Longer life than normal cutting taps.
- Formed threads are stronger because the material is compressed at the surface of it.
- Sans production de copeaux.
- Durée de vie plus longue que les tarauds de coupe standard.
- Le filetage formé est plus solide car le matériel est comprimé en surface.

Ref. 3171

Materiales con un Coeficiente de Alargamiento de 12-14%
12-14% Lengthening Coefficient Materials
Matériaux avec coefficient de rallonge 12-14%

Ref. 3171

MACHO MÁQUINA LAMINACIÓN ALTO RENDIMIENTO

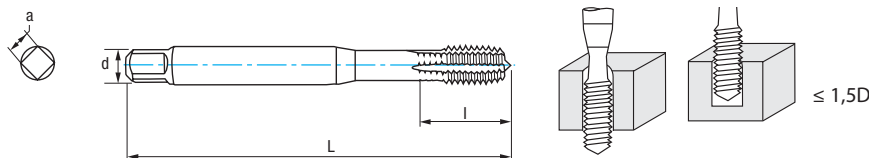
High Performance Cold Forming Machine Tap

Taraud machine réfoleur haut rendement



ALTO RENDIMIENTO
High Performance
Haut rendement

PMX
TIALN-TIN
DIN 371 < M10
DIN 376 ≥ M10
C 2-3h
Tol. 6HX
60°



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIALN-TIN |
| P | P.1 | 10-30 |
| | P.2 | 10-30 |
| | P.3 | 8-15 |
| | P.5 | 10-25 |
| M | | 10-25 |
| N | N.1 | 20-40 |
| | N.2 | 20-40 |
| | N.3 | 20-40 |
| | N.4 | 20-40 |
| | N.5 | 20-40 |

$Avance f = P$ (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

| M | P | L mm | I mm | d mm | a mm | Nº Art. TIALN-TIN | € |
|------|------|------|------|------|------|-------------------|-------|
| M2 | 0,40 | 45 | 8 | 2,80 | 2,10 | 78359 | 52,21 |
| M2,5 | 0,45 | 50 | 9 | 2,80 | 2,10 | 78360 | 52,21 |
| M3 | 0,50 | 56 | 10 | 3,50 | 2,70 | 67347 | 48,06 |
| MF4 | 0,50 | 63 | 7 | 4,50 | 3,40 | 78373 | 52,21 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 67348 | 48,06 |
| MF5 | 0,50 | 70 | 8 | 6,00 | 4,90 | 78374 | 74,53 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 67356 | 48,06 |
| MF6 | 0,50 | 80 | 10 | 6,00 | 4,90 | 78375 | 77,51 |
| MF6 | 0,75 | 80 | 10 | 6,00 | 4,90 | 78376 | 74,53 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 67362 | 52,21 |
| MF8 | 1,00 | 90 | 13 | 8,00 | 6,20 | 67054 | 74,53 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 65902 | 60,44 |
| MF10 | 1,00 | 90 | 10 | 7,00 | 5,50 | 78378 | 79,64 |
| MF10 | 1,25 | 100 | 15 | 7,00 | 5,50 | 67055 | 79,64 |

| M | P | L mm | I mm | d mm | a mm | Nº Art. TIALN-TIN | € |
|------|------|------|------|-------|-------|-------------------|--------|
| M10 | 1,50 | 100 | 15 | 7,00 | 5,50 | 67369 | 66,70 |
| MF12 | 1,00 | 100 | 10 | 9,00 | 7,00 | 78380 | 98,87 |
| MF12 | 1,25 | 100 | 15 | 9,00 | 7,00 | 67056 | 98,87 |
| MF12 | 1,50 | 100 | 15 | 9,00 | 7,00 | 78382 | 98,87 |
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 68955 | 78,49 |
| MF14 | 1,50 | 100 | 15 | 9,00 | 7,00 | 67057 | 145,74 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 68956 | 108,67 |
| MF16 | 1,50 | 100 | 15 | 12,00 | 9,00 | 67058 | 145,74 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 68958 | 132,58 |
| M18 | 2,50 | 125 | 32 | 14,00 | 11,00 | 78371 | 231,94 |
| MF20 | 1,50 | 125 | 17 | 16,00 | 12,00 | 83550 | 276,84 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 78372 | 237,79 |
| MF22 | 1,50 | 125 | 17 | 18,00 | 14,50 | 83551 | 289,95 |
| M22 | 2,50 | 140 | 25 | 18,00 | 14,50 | 83552 | 304,16 |

Ref. 3162

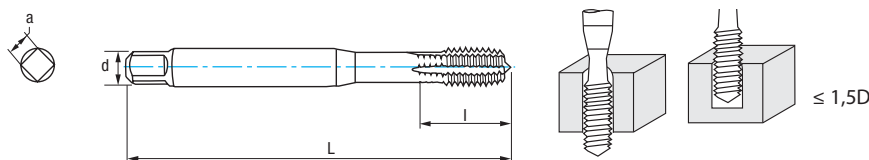
MACHO MÁQUINA MÉTRICA LAMINACIÓN

Cold Forming Metric Machine Tap

Taraud machine métrique réfoleur



PMX
TIN
DIN 2174
C 2-3h
Tol. 6HX
60°



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.1 | 10-30 |
| | P.2 | 10-30 |
| | P.3 | 8-15 |
| | P.5 | 10-20 |
| M | | 10-20 |
| N | N.1 | 20-40 |
| | N.2 | 20-40 |
| | N.3 | 20-50 |
| | N.4 | 20-50 |
| | N.5 | 20-50 |

$Avance f = P$ (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

| M/MF | P | L mm | I mm | d mm | a mm | Nº Art. TIN | € |
|------|------|------|------|-------|------|-------------|-------|
| M3 | 0,50 | 56 | 9 | 3,50 | 2,70 | 69345 | 39,99 |
| M4 | 0,70 | 63 | 12 | 4,50 | 3,40 | 69346 | 39,99 |
| M5 | 0,80 | 70 | 13 | 6,00 | 4,90 | 69348 | 39,99 |
| M6 | 1,00 | 80 | 15 | 6,00 | 4,90 | 69349 | 43,11 |
| MF8 | 1,00 | 90 | 22 | 8,00 | 6,20 | 69644 | 62,09 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 69351 | 50,35 |
| MF10 | 1,25 | 100 | 24 | 10,00 | 8,00 | 69645 | 66,56 |

| M/MF | P | L mm | I mm | d mm | a mm | Nº Art. TIN | € |
|------|------|------|------|-------|------|-------------|--------|
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 69352 | 55,96 |
| MF12 | 1,25 | 100 | 22 | 9,00 | 7,00 | 69648 | 86,37 |
| M12 | 1,75 | 110 | 28 | 9,00 | 7,00 | 69353 | 65,88 |
| MF14 | 1,50 | 100 | 22 | 11,00 | 9,00 | 69650 | 95,32 |
| M14 | 2,00 | 110 | 25 | 11,00 | 9,00 | 69354 | 90,78 |
| MF16 | 1,50 | 100 | 22 | 12,00 | 9,00 | 69658 | 120,78 |
| M16 | 2,00 | 110 | 25 | 12,00 | 9,00 | 69355 | 110,31 |

Ref. **3173**

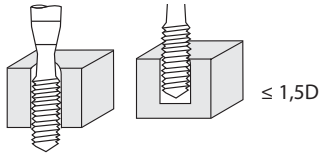
MACHO MÉTRICA LAMINACIÓN MAT.S DUROS PUNTA PLANA

Flat Tip Hard Materials **Cold Forming** Metric Machine Tap

Taraud machine métrique **réfouleur** matériaux durs pointe plat



PMX
TICN
DIN 371 < M10
DIN 376 ≥ M10
E 1,5-2h
Tol. 6HX
60°



ALTO RENDIMIENTO
High Performance
Haut rendement



$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$$

$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TICN |
| P | P.1 | 10-30 |
| | P.2 | 10-30 |
| | P.3 | 8-15 |
| | P.5 | 10-25 |
| M | | 10-25 |
| N | N.1 | 20-40 |
| | N.2 | 20-40 |
| | N.3 | 20-40 |
| | N.4 | 20-40 |
| | N.5 | 20-40 |

Entrada ultra-corta para agujeros ciegos con rosca hasta el fondo, por ejemplo en paredes delgadas.

Ultra-short chamfer for blind holes with threads tapped to bottom, for instance in thin wall work pieces.

Entrée ultra-courte pour trous borgnes avec filetage jusqu'au fond, par exemple pour des parois fines.

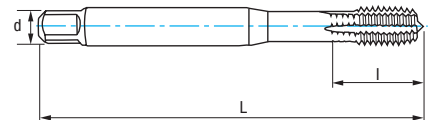
| M | P | L mm | l mm | d mm | a mm | N° Art. TICN | € |
|-----|------|------|------|-------|------|--------------|-------|
| M3 | 0,50 | 56 | 10 | 3,50 | 2,70 | 76109 | 62,49 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 75992 | 62,49 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 76110 | 62,49 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 76111 | 67,86 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 76116 | 78,58 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 76117 | 86,70 |

Ref. **3163**

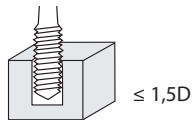
MACHO MÉTRICA LAMINACIÓN

Cold Forming Metric Machine Tap

Taraud machine métrique **réfouleur**



HSSE 5% Co
TICN
DIN 2174
C 2-3h
Tol. 6HX
60°



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TICN |
| N | N.1 | 15-30 |
| | N.2 | 15-30 |
| | N.3 | 15-35 |
| | N.4 | 15-30 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$$

$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$

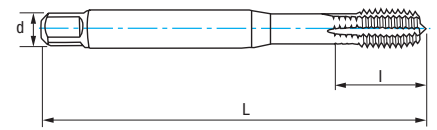
| M | P | L mm | l mm | d mm | a mm | N° Art. TICN | € |
|------|------|------|------|-------|------|--------------|-------|
| M3 | 0,50 | 56 | 10 | 3,50 | 2,70 | 21818 | 33,33 |
| M3,5 | 0,60 | 56 | 11 | 4,00 | 3,00 | 21819 | 34,94 |
| M4 | 0,70 | 63 | 12 | 4,50 | 3,40 | 21820 | 33,33 |
| M5 | 0,80 | 70 | 14 | 6,00 | 4,90 | 21821 | 33,33 |
| M6 | 1,00 | 80 | 16 | 6,00 | 4,90 | 21822 | 35,92 |
| M8 | 1,25 | 90 | 18 | 8,00 | 6,20 | 21823 | 41,97 |
| M10 | 1,50 | 100 | 20 | 10,00 | 8,00 | 21824 | 46,63 |
| M12 | 1,75 | 110 | 22 | 9,00 | 7,00 | 21825 | 54,90 |

Ref. **3164**

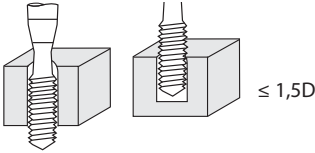
MACHO MÁQUINA MÉTRICA LAMINACIÓN REFRIGERACIÓN INTERIOR

Internal Cooling Cold Forming Metric Machine Tap

Taraut machine métrique réfoleur lubrification interne



| | | | | | |
|--------------|------|-------------|-----------|-------------|-----|
| HSSE 8%Co | TICN | DIN 2174 | C 2-3h | Tol. 6HX | 60° |
|--------------|------|-------------|-----------|-------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TICN |
| P | P.1 | 20-30 |
| | P.2 | 20-30 |
| | P.3 | 20-30 |
| | P.4 | 8-15 |
| N | N.1 | 15-22 |
| | N.2 | 15-22 |
| | N.3 | 20-40 |
| | N.4 | 20-40 |
| | N.5 | 20-40 |

| M | P | L mm | l mm | d mm | a mm | N° Art. TICN | € |
|-----|------|---------|---------|---------|---------|-----------------|--------|
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 69356 | 117,13 |
| M8 | 1,25 | 90 | 12 | 8,00 | 6,20 | 69357 | 146,00 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 69358 | 160,21 |
| M12 | 1,75 | 110 | 17 | 9,00 | 7,00 | 69360 | 186,87 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 69361 | 218,64 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 69363 | 291,57 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$



Ref. 3164 bajo demanda / upon request / sur demande

ACEITES DE CORTE Y REFRIGERANTES

Cutting Oils & Water Soluble Fluids

Huiles de coupe et lubrifiants

Pag. 555

| | | | | |
|------------|-------------|-------------|------------|------------|
| UNI | INOX | ALU | STD | TOP |
| Universal | Heavy Duty | Non Ferrous | Standard | Top Line |

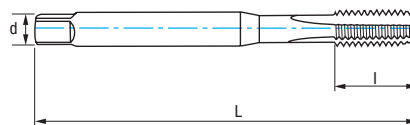


Ref. 3120

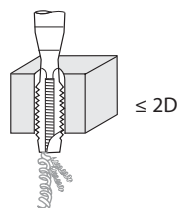
MACHO RECTO MÁQUINA MÉTRICA MULTIFUNCIÓN MANGO REFORZADO

Reinforced Shank Multipurpose Metric Machine Straight Tap

Taraud droit machine métrique multifonction queue renforcée



| | | | | | | | |
|-----------|-----|------------|-------------|-----|------------|----------------------|-----|
| HSSE V | TIN | DIN 371 | B 3,5-5h | GUN | Tol. 6H | α 10 - 12° | 60° |
|-----------|-----|------------|-------------|-----|------------|----------------------|-----|



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. TIN | € |
|-----|------|---------|---------|---------|---------|---|----------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 28046 | 24,70 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 28047 | 25,02 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 28048 | 26,01 |
| M6 | 1,00 | 80 | 17 | 6,00 | 4,90 | 3 | 28049 | 26,10 |
| M8 | 1,25 | 90 | 20 | 8,00 | 6,20 | 3 | 28050 | 30,22 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 28051 | 35,36 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.1 | 10-12 |
| | P.2 | 4-6 |
| | P.5 | 4-7 |
| M | | 6-10 |
| K | K.1 | 8-12 |
| | K.2 | 7-10 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |
| | N.4 | 12-20 |
| | N.5 | 12-20 |
| | N.6 | 10-15 |

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$



Ref. 3220

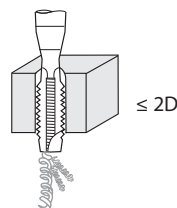
MACHO RECTO MÁQUINA MÉTRICA MULTIFUNCIÓN

Multipurpose Metric Machine Straight Tap

Taraud droit machine métrique multifonction



| | | | | | | | |
|-----------|-----|------------|-------------|-----|------------|----------------------|-----|
| HSSE V | TIN | DIN 376 | B 3,5-5h | GUN | Tol. 6H | α 10 - 12° | 60° |
|-----------|-----|------------|-------------|-----|------------|----------------------|-----|



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. TIN | € |
|-----|------|---------|---------|---------|---------|---|----------------|-------|
| M12 | 1,75 | 110 | 24 | 9,00 | 7,00 | 3 | 28075 | 44,92 |
| M14 | 2,00 | 110 | 26 | 11,00 | 9,00 | 3 | 28077 | 58,62 |
| M16 | 2,00 | 110 | 27 | 12,00 | 9,00 | 3 | 28079 | 64,74 |
| M18 | 2,50 | 125 | 30 | 14,00 | 11,00 | 4 | 28081 | 92,81 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 4 | 28083 | 95,51 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.1 | 10-12 |
| | P.2 | 4-6 |
| | P.5 | 4-7 |
| M | | 6-10 |
| K | K.1 | 8-12 |
| | K.2 | 7-10 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |
| | N.4 | 12-20 |
| | N.5 | 12-20 |
| | N.6 | 10-15 |

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

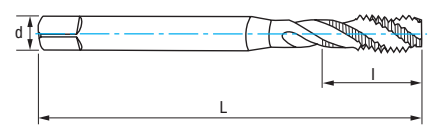


Ref. 3160

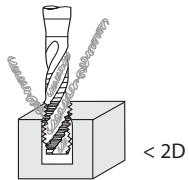
MACHO HELICOIDAL MÁQUINA MÉTRICA MULTIFUNCIÓN M. REFORZADO

Reinforced Shank Multipurpose Metric Machine Spiral Tap

Taraud hélicoïdal machine métrique multifonction queue renforcée



| | | | | | | | |
|-----------|-----|------------|-----------|-----|------------|-------------|-----|
| HSSE V | TIN | DIN 371 | C 2-3h | 35° | Tol. 6H | α 6° ± 2 | 60° |
|-----------|-----|------------|-----------|-----|------------|-------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.1 | 10-12 |
| | P.2 | 4-6 |
| | P.5 | 4-7 |
| M | | 6-10 |
| K | K.1 | 8-12 |
| | K.2 | 7-10 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |
| | N.4 | 12-20 |
| | N.5 | 12-20 |
| | N.6 | 10-15 |

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. TIN | € |
|-----|------|---------|---------|---------|---------|---|----------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 28052 | 26,75 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 28053 | 26,75 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 28054 | 27,41 |
| M6 | 1,00 | 80 | 17 | 6,00 | 4,90 | 3 | 28055 | 28,60 |
| M8 | 1,25 | 90 | 20 | 8,00 | 6,20 | 3 | 28056 | 33,18 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 28057 | 39,05 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times d}$

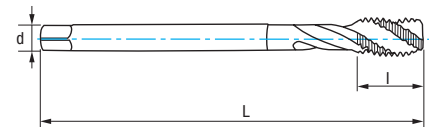


Ref. 3260

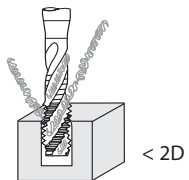
MACHO HELICOIDAL MÁQUINA MÉTRICA MULTIFUNCIÓN

Multipurpose Metric Machine Spiral Tap

Taraud hélicoïdal machine métrique multifonction



| | | | | | | | |
|-----------|-----|------------|-----------|-----|------------|-------------|-----|
| HSSE V | TIN | DIN 376 | C 2-3h | 35° | Tol. 6H | α 6° ± 2 | 60° |
|-----------|-----|------------|-----------|-----|------------|-------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | TIN |
| P | P.1 | 10-12 |
| | P.2 | 4-6 |
| | P.5 | 4-7 |
| M | | 6-10 |
| K | K.1 | 8-12 |
| | K.2 | 7-10 |
| N | N.1 | 8-12 |
| | N.2 | 12-20 |
| | N.4 | 12-20 |
| | N.5 | 12-20 |
| | N.6 | 10-15 |

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. TIN | € |
|-----|------|---------|---------|---------|---------|---|----------------|--------|
| M12 | 1,75 | 110 | 24 | 9,00 | 7,00 | 3 | 28076 | 51,01 |
| M14 | 2,00 | 110 | 26 | 11,00 | 9,00 | 3 | 28078 | 63,74 |
| M16 | 2,00 | 110 | 27 | 12,00 | 9,00 | 4 | 28080 | 70,06 |
| M18 | 2,50 | 125 | 30 | 14,00 | 11,00 | 4 | 28082 | 100,92 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 4 | 28084 | 104,20 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times d}$

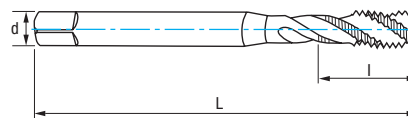


Ref. **3151**

MACHO HELICOIDAL MÁQUINA MÉTRICA MANGO REFORZADO VAPORIZADO

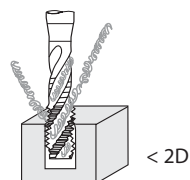
Vaporized Reinforced Shank Metric Machine Spiral Tap

Taraut helicoidal machine métrique queue renforcée vaporisée



| | | | | | | | |
|--------------|------------|-----------|------------|--|------------------------------|---|--|
| HSSE 5%Co | DIN 371 | C 2-3h | Tol. 6H | | α $10^\circ \pm 2$ | Rompe Virutas Chip Breaker Brise copeaux | |
|--------------|------------|-----------|------------|--|------------------------------|---|--|

| Material | | Vc (m/min) |
|----------|------------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.3 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 14779 | 18,50 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 14782 | 18,50 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 14785 | 18,88 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 14788 | 19,77 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 14790 | 22,97 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 14791 | 27,00 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

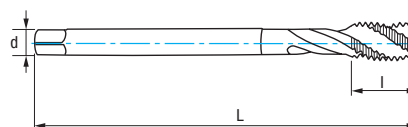


Ref. **3251**

MACHO HELICOIDAL MÁQUINA MÉTRICA VAPORIZADO

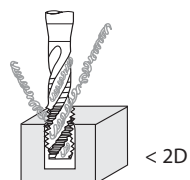
Vaporized Metric Machine Spiral Tap

Taraut helicoidal machine métrique vaporisée



| | | | | | | | |
|--------------|------------|-----------|------------|--|------------------------------|---|--|
| HSSE 5%Co | DIN 376 | C 2-3h | Tol. 6H | | α $10^\circ \pm 2$ | Rompe Virutas Chip Breaker Brise copeaux | |
|--------------|------------|-----------|------------|--|------------------------------|---|--|

| Material | | Vc (m/min) |
|----------|------------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.3 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 14793 | 35,29 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 14797 | 44,05 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 14802 | 48,38 |
| M18 | 2,50 | 125 | 30 | 14,00 | 11,00 | 4 | 14803 | 69,17 |
| M20 | 2,50 | 140 | 32 | 16,00 | 12,00 | 4 | 14806 | 72,15 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

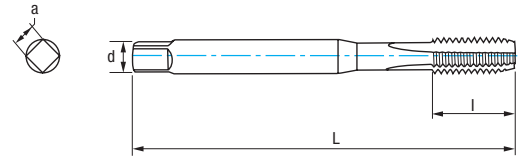


Ref. 3129

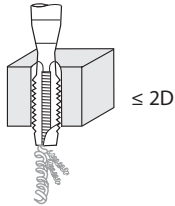
MACHO RECTO MÁQUINA MÉTRICA REFRIGERACIÓN INTERIOR

Internal Cooling Metric Machine Straight Tap

Taraud droit machine métrique lubrification interne



| | | | | | |
|-----|------|-------------|-------------|----------|-----|
| PMX | HARD | DIN 371/376 | B 3,5-6h | Tol. 6HX | 60° |
|-----|------|-------------|-------------|----------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HARD |
| P | P.1 | 22-26 |
| | P.2 | 22-26 |
| | P.3 | 18-22 |
| | P.4 | 18-22 |
| | P.5 | 12-15 |
| M | | 12-15 |
| K | K.1 | 18-22 |
| | K.2 | 15-18 |
| N | N.1 | 10-12 |
| | N.2 | 10-12 |
| | N.3 | 18-22 |
| | N.4 | 15-18 |
| | N.5 | 15-18 |

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HARD | € |
|-----|------|------|------|-------|------|---|--------------|--------|
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 70087 | 103,46 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 70089 | 123,16 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 70094 | 123,15 |
| M12 | 1,75 | 110 | 28 | 9,00 | 7,00 | 3 | 70101 | 160,11 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 4 | 70163 | 225,84 |

Advance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$

Ref. 3129 bajo demanda / upon request / sur demande

Ref. 3169

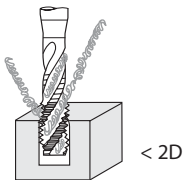
MACHO HELICOIDAL MÁQUINA MÉTRICA REFRIGERACIÓN INTERIOR

Internal Cooling Metric Machine Spiral Tap

Taraud helicoidal machine métrique lubrification interne



| | | | | | | |
|-----|------|-------------|-----------|-----|----------|-----|
| PMX | HARD | DIN 371/376 | C 2-3h | 50° | Tol. 6HX | 60° |
|-----|------|-------------|-----------|-----|----------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | HARD |
| P | P.1 | 18-22 |
| | P.2 | 18-22 |
| | P.3 | 10-12 |
| | P.4 | 10-12 |
| | P.5 | 10-12 |
| M | | 10-12 |
| K | K.1 | 15-18 |
| | K.2 | 12-16 |
| N | N.1 | 10-12 |
| | N.2 | 10-12 |
| | N.3 | 15-18 |
| | N.4 | 12-16 |
| | N.5 | 12-16 |

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HARD | € |
|-----|------|------|------|-------|------|---|--------------|--------|
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 70173 | 82,75 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 70175 | 111,97 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 70178 | 111,96 |
| M12 | 1,75 | 110 | 28 | 9,00 | 7,00 | 3 | 70182 | 145,55 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 4 | 70195 | 205,30 |

Advance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$

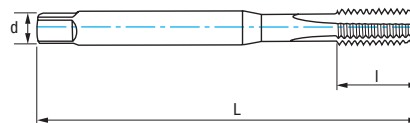
Ref. 3169 bajo demanda / upon request / sur demande

Ref. 3100

MACHO RECTO MÁQUINA MÉTRICA MANGO REFORZADO

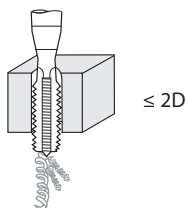
Reinforced Shank Metric Machine Straight Tap

Taraud droit machine métrique queue renforcée



| | | | | | | |
|--------------|------------|-------------|-----|------------|-------------|-----|
| HSSE 5%Co | DIN 371 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° |
|--------------|------------|-------------|-----|------------|-------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |



Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|-------|
| M2 | 0,40 | 45 | 9 | 2,80 | 2,10 | 3 | 62771 | 16,31 |
| M2,5 | 0,45 | 50 | 9 | 2,80 | 2,10 | 3 | 76724 | 16,31 |
| M2,6 | 0,45 | 50 | 9 | 2,80 | 2,10 | 3 | 76725 | 16,31 |
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 62774 | 9,25 |
| M3,5 | 0,60 | 56 | 13 | 4,00 | 3,00 | 3 | 62777 | 14,66 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 62780 | 9,78 |
| M4,5 | 0,75 | 70 | 16 | 6,00 | 4,90 | 3 | 76728 | 22,20 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 62783 | 9,78 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 62789 | 10,75 |
| M7 | 1,00 | 80 | 19 | 7,00 | 5,50 | 3 | 76733 | 17,00 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 62795 | 12,02 |
| M9 | 1,25 | 90 | 18 | 9,00 | 7,00 | 3 | 62798 | 20,08 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 62807 | 14,80 |



Set

pag. 235

New! PASTA DE CORTE - Cutting Paste - Pâte de coupe

Pasta con propiedades lubricantes extremas. La pasta se asienta en las aristas de corte y se licua durante la operación de corte.

Ideal para todas las operaciones como roscado, taladrado y fresado de materiales difíciles de cortar como acero inoxidable, acero Cr-Ni, titanio, acero al manganeso, etc.

Paste with extreme lubricating properties. The paste settles on the cutting edges and liquefies during the cutting operation.

Ideal for all operations such as the threading, drilling and milling of difficult-to-cut materials such as stainless steel, Cr-Ni steel, titanium, manganese steel, etc.

Pâte aux propriétés lubrifiantes extrêmes. La pâte se dépose sur les bords de coupe et se liquéfie pendant l'opération de coupe.

Idéale pour toutes les opérations telles que le taraudage, le perçage et le fraisage de matériaux difficiles à couper comme l'acier inoxydable, l'acier Cr-Ni, le titane, l'acier au manganèse, etc.



Cont. 250ml
Nº Art. 53954
€ 15,75



Cont. 750ml
Nº Art. 53956
€ 26,24



Sumerja la herramienta de corte en la pasta para obtener resultados optimizados

Dip the cutting tool into the paste for optimised results

Trempez l'outil de coupe dans la pâte pour des résultats optimisés

Gama completa en la pagina 555

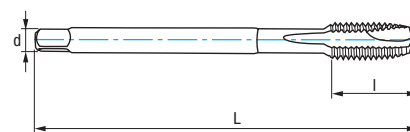
Complete range on page 555

Gamme complète à la page 555

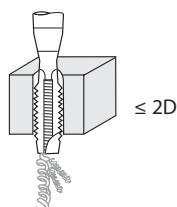
Ref. **3200****MACHO RECTO MÁQUINA MÉTRICA/ MÉTRICA FINA**

Metric / Metric Fine Machine Straight Tap

Taraud droit machine métrique / métrique pas fin



| | | | | | | | |
|--------------|--------------|---------------|-------------|-----|------------|--------------------|-----|
| HSSE 5%Co | M DIN 376 | MF DIN 374 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° |
|--------------|--------------|---------------|-------------|-----|------------|--------------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$$

$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$

| M/MF | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|--------|
| M3 | 0,50 | 56 | 11 | 2,20 | | | 70090 | 9,88 |
| M4 | 0,70 | 63 | 13 | 2,80 | 2,10 | 3 | 70092 | 10,01 |
| M5 | 0,80 | 70 | 16 | 3,50 | 2,70 | 3 | 70093 | 10,01 |
| M6 | 1,00 | 80 | 19 | 4,50 | 3,40 | 3 | 70095 | 10,99 |
| M7 | 1,00 | 80 | 19 | 5,50 | 4,30 | 3 | 70224 | 17,46 |
| MF8 | 0,75 | 80 | 19 | 6,00 | 4,90 | 3 | 70267 | 25,46 |
| MF8 | 1,00 | 90 | 22 | 6,00 | 4,90 | 3 | 70248 | 20,64 |
| M8 | 1,25 | 90 | 22 | 6,00 | 4,90 | 3 | 70096 | 12,34 |
| MF10 | 1,00 | 90 | 20 | 7,00 | 5,50 | 3 | 70249 | 23,00 |
| MF10 | 1,25 | 100 | 24 | 7,00 | 5,50 | 3 | 70251 | 27,42 |
| M10 | 1,50 | 100 | 24 | 7,00 | 5,40 | 3 | 70098 | 15,20 |
| M11 | 1,50 | 100 | 24 | 8,00 | 6,20 | 3 | 70225 | 29,33 |
| MF12 | 1,00 | 100 | 22 | 9,00 | 7,00 | 3 | 70252 | 30,29 |
| MF12 | 1,25 | 100 | 22 | 9,00 | 7,00 | 3 | 70254 | 30,59 |
| MF12 | 1,50 | 100 | 22 | 9,00 | 7,00 | 3 | 70255 | 27,33 |
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 70183 | 18,73 |
| MF14 | 1,00 | 100 | 22 | 11,00 | 9,00 | 3 | 70281 | 46,44 |
| MF14 | 1,25 | 100 | 22 | 11,00 | 9,00 | 3 | 70257 | 40,70 |
| MF14 | 1,50 | 100 | 22 | 11,00 | 9,00 | 3 | 70258 | 32,35 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 70185 | 30,04 |
| MF15 | 1,50 | 100 | 22 | 12,00 | 9,00 | 3 | 70282 | 51,56 |
| MF16 | 1,50 | 100 | 22 | 12,00 | 9,00 | 3 | 70260 | 40,44 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 70186 | 35,36 |
| MF18 | 1,00 | 110 | 25 | 14,00 | 11,00 | 3 | 70284 | 64,70 |
| MF18 | 1,50 | 110 | 25 | 14,00 | 11,00 | 3 | 70261 | 50,59 |
| MF18 | 2,00 | 125 | 34 | 14,00 | 11,00 | 3 | 70285 | 65,29 |
| M18 | 2,50 | 125 | 34 | 14,00 | 11,00 | 3 | 75215 | 50,07 |
| MF20 | 1,00 | 125 | 25 | 16,00 | 12,00 | 3 | 70287 | 85,39 |
| MF20 | 1,50 | 125 | 25 | 16,00 | 12,00 | 3 | 70263 | 57,20 |
| MF20 | 2,00 | 140 | 34 | 16,00 | 12,00 | 3 | 70288 | 75,02 |
| M20 | 2,50 | 140 | 34 | 16,00 | 12,00 | 3 | 70189 | 54,14 |
| MF22 | 1,50 | 125 | 25 | 18,00 | 14,50 | 3 | 75216 | 68,92 |
| MF22 | 2,00 | 140 | 34 | 18,00 | 14,50 | 3 | 70290 | 109,22 |
| M22 | 2,50 | 140 | 34 | 18,00 | 14,50 | 3 | 70212 | 65,49 |
| MF24 | 1,50 | 140 | 28 | 18,00 | 14,50 | 4 | 70264 | 84,73 |
| MF24 | 2,00 | 140 | 28 | 18,00 | 14,50 | 4 | 70291 | 107,10 |
| M24 | 3,00 | 160 | 38 | 18,00 | 14,50 | 4 | 70213 | 77,86 |
| MF26 | 1,50 | 140 | 28 | 18,00 | 14,50 | 4 | 70293 | 108,88 |



Ref. **3200****MACHO RECTO MÁQUINA MÉTRICA/ MÉTRICA FINA**

Metric / Metric Fine Machine Straight Tap

Taraud droit machine métrique / métrique pas fin

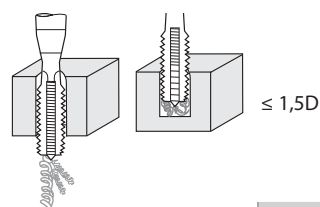
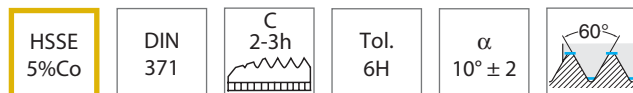
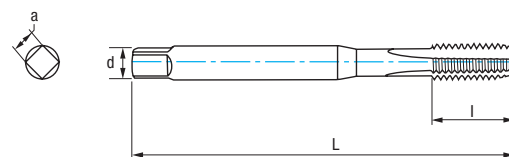
| M/MF | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------|-------------|---------|---------|---------|---------|---|------------------|---------------|
| MF27 | 2,00 | 140 | 28 | 20,00 | 16,00 | 4 | 70294 | 148,51 |
| M27 | 3,00 | 160 | 38 | 20,00 | 16,00 | 4 | 70215 | 97,57 |
| MF28 | 1,50 | 140 | 28 | 20,00 | 16,00 | 4 | 70296 | 124,53 |
| MF30 | 1,50 | 150 | 28 | 22,00 | 18,00 | 4 | 70266 | 130,06 |
| M30 | 3,50 | 180 | 45 | 22,00 | 18,00 | 4 | 70216 | 125,38 |
| MF32 | 1,50 | 150 | 28 | 22,00 | 18,00 | 4 | 70297 | 155,66 |
| MF33 | 1,50 | 160 | 30 | 25,00 | 20,00 | 4 | 70299 | 177,96 |
| MF33 | 2,00 | 160 | 30 | 25,00 | 20,00 | 4 | 70300 | 257,13 |
| M33 | 3,50 | 180 | 50 | 25,00 | 20,00 | 4 | 70218 | 157,70 |
| MF35 | 1,50 | 170 | 30 | 28,00 | 22,00 | 4 | 70302 | 206,16 |
| MF36 | 1,50 | 170 | 30 | 28,00 | 22,00 | 4 | 81355 | 228,53 |
| MF36 | 2,00 | 170 | 30 | 28,00 | 22,00 | 4 | 81356 | 228,73 |
| MF36 | 3,00 | 200 | 42 | 28,00 | 22,00 | 4 | 81357 | 262,40 |
| M36 | 4,00 | 200 | 56 | 28,00 | 22,00 | 4 | 70219 | 192,66 |
| MF39 | 1,50 | 170 | 30 | 32,00 | 24,00 | 4 | 81358 | 258,28 |
| MF39 | 2,00 | 170 | 30 | 32,00 | 24,00 | 4 | 81359 | 229,17 |
| MF39 | 3,00 | 200 | 42 | 32,00 | 24,00 | 4 | 81360 | 220,81 |
| M39 | 4,00 | 200 | 50 | 32,00 | 24,00 | 4 | 81361 | 215,88 |
| MF42 | 1,50 | 170 | 30 | 32,00 | 24,00 | 4 | 81362 | 242,18 |
| MF42 | 2,00 | 170 | 30 | 32,00 | 24,00 | 4 | 81363 | 237,41 |
| MF42 | 3,00 | 200 | 50 | 32,00 | 24,00 | 4 | 81364 | 367,86 |
| M42 | 4,50 | 200 | 56 | 32,00 | 24,00 | 4 | 14886 | 277,53 |
| MF45 | 1,50 | 180 | 32 | 36,00 | 29,00 | 6 | 70303 | 361,21 |
| M45 | 4,50 | 220 | 56 | 36,00 | 29,00 | 6 | 81365 | 350,54 |
| M48 | 5,00 | 250 | 63 | 36,00 | 29,00 | 6 | 81366 | 503,34 |
| M52 | 5,00 | 250 | 63 | 40,00 | 32,00 | 6 | 81367 | 566,25 |
| M56 | 5,50 | 250 | 65 | 40,00 | 32,00 | 6 | 81368 | 620,17 |
| M60 | 5,50 | 280 | 75 | 45,00 | 35,00 | 6 | 81369 | 659,12 |



Ref. **3110****MACHO RECTO MÁQUINA MÉTRICA MANGO REFORZADO**

Reinforced Shank Metric Machine Straight Tap

Taraud droit machine métrique queue renforcée



| Material | | Vc (m/min) |
|----------|------------|-------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 15-20 |
| N | N.1 | 5-8 |
| | N.5 | 12-15 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = r.p.m. \times f$$

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------------|-------------|---------|---------|---------|---------|---|------------------|--------------|
| M2 | 0,40 | 45 | 9 | 2,80 | 2,10 | 3 | 62945 | 15,33 |
| M2,5 | 0,45 | 50 | 9 | 2,80 | 2,10 | 3 | 77131 | 15,33 |
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 62948 | 9,16 |
| M3,5 | 0,60 | 56 | 13 | 4,00 | 3,00 | 3 | 62951 | 13,75 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 62954 | 9,31 |
| M4,5 | 0,75 | 70 | 16 | 6,00 | 4,90 | 3 | 77138 | 19,25 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 62957 | 9,31 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 62960 | 10,62 |
| M7 | 1,00 | 80 | 19 | 7,00 | 5,50 | 3 | 62963 | 15,54 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 62969 | 11,95 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 62984 | 13,59 |

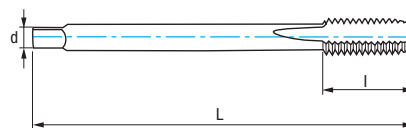


Ref. **3210**

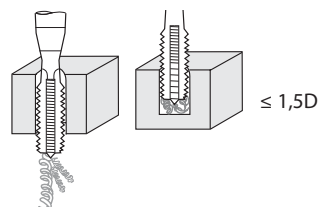
MACHO RECTO MÁQUINA MÉTRICA / MÉTRICA FINA

Metric / Metric Fine Machine Straight Tap

Taroud droit machine métrique / métrique pas fin



| | | | | | | | |
|--------------|---|--------------|---------------|-----------|------------|------------------------------|------------|
| HSSE 5%Co | M | M DIN 376 | MF DIN 374 | C 2-3h | Tol. 6H | α $10^\circ \pm 2$ | 60° |
|--------------|---|--------------|---------------|-----------|------------|------------------------------|------------|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 15-20 |
| N | N.1 | 5-8 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

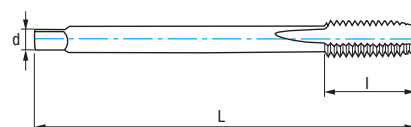
| M/MF | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 11 | 2,20 | | 3 | 69993 | 9,14 |
| MF4 | 0,50 | 63 | 10 | 2,80 | 2,10 | 3 | 70365 | 22,41 |
| M4 | 0,70 | 63 | 13 | 2,80 | 2,10 | 3 | 69850 | 9,28 |
| MF5 | 0,50 | 70 | 12 | 3,50 | 2,70 | 3 | 70366 | 23,07 |
| M5 | 0,80 | 70 | 16 | 3,50 | 2,70 | 3 | 69994 | 9,28 |
| MF6 | 0,50 | 80 | 14 | 4,50 | 3,40 | 3 | 74951 | 27,42 |
| MF6 | 0,75 | 80 | 14 | 4,50 | 3,40 | 3 | 70368 | 18,17 |
| M6 | 1,00 | 80 | 19 | 4,50 | 3,40 | 3 | 69996 | 10,57 |
| M7 | 1,00 | 80 | 19 | 5,50 | 4,30 | 3 | 70144 | 15,50 |
| MF8 | 0,50 | 80 | 13 | 6,00 | 4,90 | 3 | 70369 | 30,98 |
| MF8 | 0,75 | 80 | 19 | 6,00 | 4,90 | 3 | 70305 | 22,15 |
| MF8 | 1,00 | 90 | 22 | 6,00 | 4,90 | 3 | 70306 | 18,80 |
| M8 | 1,25 | 90 | 22 | 6,00 | 4,90 | 3 | 69997 | 11,89 |
| MF9 | 1,00 | 90 | 22 | 7,00 | 5,50 | 3 | 70371 | 27,42 |
| MF10 | 0,75 | 90 | 20 | 7,00 | 5,50 | 3 | 70372 | 33,80 |
| MF10 | 1,00 | 90 | 20 | 7,00 | 5,50 | 3 | 70308 | 20,84 |
| MF10 | 1,25 | 100 | 24 | 7,00 | 5,50 | 3 | 70309 | 23,85 |
| M10 | 1,50 | 100 | 24 | 7,00 | 5,50 | 3 | 69999 | 13,54 |
| MF11 | 1,00 | 90 | 20 | 8,00 | 6,20 | 3 | 70374 | 34,64 |
| MF12 | 1,00 | 100 | 22 | 9,00 | 7,00 | 3 | 70312 | 27,51 |
| MF12 | 1,25 | 100 | 22 | 9,00 | 7,00 | 3 | 70314 | 27,85 |
| MF12 | 1,50 | 100 | 22 | 9,00 | 7,00 | 3 | 70315 | 24,93 |
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 70117 | 16,15 |
| MF14 | 1,00 | 100 | 22 | 11,00 | 9,00 | 3 | 70317 | 42,23 |
| MF14 | 1,25 | 100 | 22 | 11,00 | 9,00 | 3 | 70318 | 37,33 |
| MF14 | 1,50 | 100 | 22 | 11,00 | 9,00 | 3 | 70320 | 29,39 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 70119 | 27,33 |
| MF15 | 1,00 | 100 | 22 | 12,00 | 9,00 | 3 | 70378 | 52,75 |
| MF16 | 1,00 | 100 | 22 | 12,00 | 9,00 | 3 | 70380 | 52,52 |
| MF16 | 1,50 | 100 | 22 | 12,00 | 9,00 | 3 | 70323 | 36,77 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 70120 | 32,14 |
| MF18 | 1,00 | 110 | 25 | 14,00 | 11,00 | 3 | 70326 | 58,82 |
| MF18 | 1,50 | 110 | 25 | 14,00 | 11,00 | 3 | 70327 | 46,00 |
| MF18 | 2,00 | 125 | 34 | 14,00 | 11,00 | 3 | 70329 | 59,35 |
| M18 | 2,50 | 125 | 34 | 14,00 | 11,00 | 3 | 70122 | 46,21 |



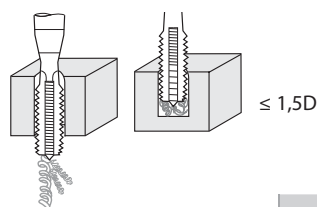
Ref. **3210****MACHO RECTO MÁQUINA MÉTRICA / MÉTRICA FINA**

Metric / Metric Fine Machine Straight Tap

Taraud droit machine métrique / métrique pas fin



| | | | | | | | |
|--------------|---|--------------|---------------|-----------|------------|------------------------------|--|
| HSSE 5%Co | M | M DIN 376 | MF DIN 374 | C 2-3h | Tol. 6H | α $10^\circ \pm 2$ | |
|--------------|---|--------------|---------------|-----------|------------|------------------------------|--|



| Material | | Vc (m/min) |
|----------|------|-------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 15-20 |
| N | N.1 | 5-8 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas) V_f (mm/min.) = r.p.m. x fr.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$

| M/MF | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------|-------------|---------|---------|---------|---------|---|------------------|---------------|
| MF20 | 1,00 | 125 | 25 | 16,00 | 12,00 | 3 | 70330 | 77,70 |
| MF20 | 1,50 | 125 | 25 | 16,00 | 12,00 | 3 | 70332 | 52,06 |
| MF20 | 2,00 | 140 | 34 | 16,00 | 12,00 | 3 | 70333 | 68,19 |
| M20 | 2,50 | 140 | 34 | 16,00 | 12,00 | 3 | 70123 | 49,21 |
| MF22 | 1,00 | 125 | 25 | 18,00 | 14,50 | 3 | 70381 | 87,09 |
| MF22 | 1,50 | 125 | 25 | 18,00 | 14,50 | 3 | 75023 | 62,67 |
| MF22 | 2,00 | 140 | 34 | 18,00 | 14,50 | 3 | 70335 | 87,09 |
| M22 | 2,50 | 140 | 34 | 18,00 | 14,50 | 3 | 70146 | 59,56 |
| MF24 | 1,00 | 140 | 28 | 18,00 | 14,50 | 4 | 70383 | 94,92 |
| MF24 | 1,50 | 140 | 28 | 18,00 | 14,50 | 4 | 70336 | 77,00 |
| MF24 | 2,00 | 140 | 28 | 18,00 | 14,50 | 4 | 70338 | 97,33 |
| M24 | 3,00 | 160 | 38 | 18,00 | 14,50 | 4 | 70147 | 71,32 |
| MF25 | 1,50 | 140 | 28 | 18,00 | 14,50 | 4 | 70384 | 113,45 |
| MF26 | 1,50 | 140 | 28 | 18,00 | 14,50 | 4 | 70339 | 103,86 |
| MF27 | 1,50 | 140 | 28 | 20,00 | 16,00 | 4 | 70386 | 113,62 |
| MF27 | 2,00 | 140 | 28 | 20,00 | 16,00 | 4 | 70341 | 135,00 |
| M27 | 3,00 | 160 | 38 | 20,00 | 16,00 | 4 | 70149 | 89,03 |
| MF28 | 1,50 | 140 | 28 | 20,00 | 16,00 | 4 | 70342 | 113,45 |
| MF30 | 1,00 | 150 | 28 | 22,00 | 18,00 | 4 | 70387 | 145,11 |
| MF30 | 1,50 | 150 | 28 | 22,00 | 18,00 | 4 | 70344 | 118,24 |
| MF30 | 2,00 | 150 | 28 | 22,00 | 18,00 | 4 | 70389 | 146,36 |
| M30 | 3,50 | 180 | 45 | 22,00 | 18,00 | 4 | 70150 | 114,00 |
| MF32 | 1,50 | 150 | 28 | 22,00 | 18,00 | 4 | 70345 | 141,58 |
| MF33 | 1,50 | 160 | 30 | 25,00 | 20,00 | 4 | 70347 | 162,32 |
| MF33 | 2,00 | 160 | 30 | 25,00 | 20,00 | 4 | 70348 | 276,26 |
| M33 | 3,50 | 180 | 50 | 25,00 | 20,00 | 4 | 70152 | 137,03 |
| MF35 | 1,50 | 170 | 30 | 28,00 | 22,00 | 4 | 70350 | 187,36 |
| M36 | 4,00 | 200 | 56 | 28,00 | 22,00 | 4 | 70153 | 175,20 |
| MF42 | 1,50 | 170 | 30 | 32,00 | 24,00 | 6 | 70390 | 265,17 |
| MF45 | 1,50 | 180 | 32 | 36,00 | 29,00 | 6 | 70351 | 328,39 |
| MF48 | 2,00 | 190 | 32 | 36,00 | 29,00 | 6 | 75037 | 505,09 |
| MF50 | 1,50 | 190 | 32 | 36,00 | 29,00 | 6 | 70393 | 392,34 |

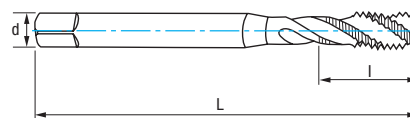


Ref. 3140

MACHO HELICOIDAL MÁQUINA MÉTRICA COBRE/BRONCE M. REFORZADO

Reinforced Shank Copper/Bronze Metric Machine Spiral Tap

Taraud helicoidal machine métrique cuivre/bronze queue renforcée



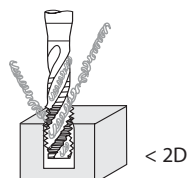
| | | | | | | |
|---------------|------------|-----------|-----|------------|--------------|-----|
| HSSE 5% Co | DIN 371 | C 2-3h | 15° | Tol. 6H | α 10° ± 2 | 60° |
|---------------|------------|-----------|-----|------------|--------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| N | N.1 | 10-15 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 5 | 3,50 | 2,70 | 3 | 69543 | 13,52 |
| M3,5 | 0,60 | 56 | 6 | 4,00 | 3,00 | 3 | 69411 | 19,92 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 3 | 69544 | 13,52 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 3 | 69546 | 12,95 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 3 | 69547 | 14,21 |
| M7 | 1,00 | 80 | 10 | 7,00 | 5,50 | 3 | 69520 | 22,10 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 3 | 69549 | 16,23 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 3 | 69550 | 19,23 |

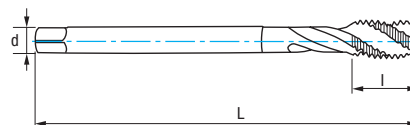


Ref. 3240

MACHO HELICOIDAL MÁQUINA MÉTRICA COBRE/BRONCE

Copper/Bronze Metric Machine Spiral Tap

Taraud helicoidal machine métrique cuivre/bronze



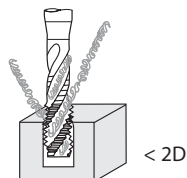
| | | | | | | |
|---------------|------------|-----------|-----|------------|--------------|-----|
| HSSE 5% Co | DIN 376 | C 2-3h | 15° | Tol. 6H | α 10° ± 2 | 60° |
|---------------|------------|-----------|-----|------------|--------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| N | N.1 | 10-15 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 5 | 2,20 | | 3 | 69573 | 13,86 |
| M4 | 0,70 | 63 | 7 | 2,80 | 2,10 | 3 | 69574 | 14,76 |
| M5 | 0,80 | 70 | 8 | 3,50 | 2,70 | 3 | 69576 | 14,13 |
| M6 | 1,00 | 80 | 10 | 4,50 | 3,40 | 3 | 69577 | 15,50 |
| M8 | 1,25 | 90 | 13 | 6,00 | 4,90 | 3 | 69579 | 16,94 |
| M10 | 1,50 | 100 | 15 | 7,00 | 5,50 | 3 | 69844 | 20,10 |
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 3 | 69846 | 25,89 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 3 | 69847 | 40,64 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 3 | 69400 | 49,09 |
| M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 4 | 16267 | 70,84 |
| M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 4 | 40153 | 73,10 |

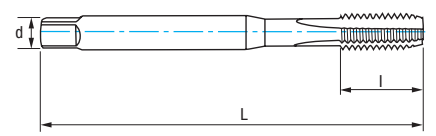


Ref. **3600**

MACHO RECTO MÁQUINA MÉTRICA MANGO REFORZADO FORMA A

A Form Reinforced Shank Metric Machine Straight Tap

Taraud droit machine métrique queue renforcée form A



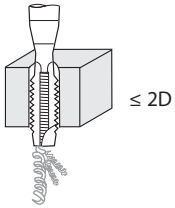
| | | | | | | | |
|--------------|---|------------|-----------|------------|--|------------------------------|--|
| HSSE 5%Co | M | DIN 371 | A 6-8h | Tol. 6H | | α $10^\circ \pm 2$ | |
|--------------|---|------------|-----------|------------|--|------------------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 10-14 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 76567 | 10,97 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 76573 | 11,18 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 76580 | 11,18 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 76586 | 12,29 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 76594 | 13,75 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 76602 | 16,90 |

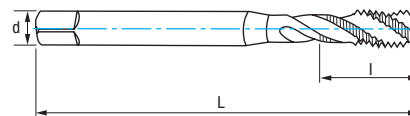


Ref. **3150**

MACHO HELICOIDAL MÁQUINA MÉTRICA MANGO REFORZADO

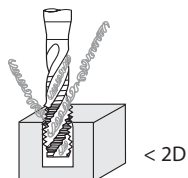
Reinforced Shank Metric Machine Spiral Tap

Taraud helicoidal machine métrique queue renforcée



| | | | | | | |
|--------------|------------|-----------|---|------------|------------------------------|---|
| HSSE 5%Co | DIN 371 | C 2-3h |  | Tol. 6H | α $10^\circ \pm 2$ |  |
|--------------|------------|-----------|---|------------|------------------------------|---|

| Material | | Vc (m/min) |
|----------|------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |





Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



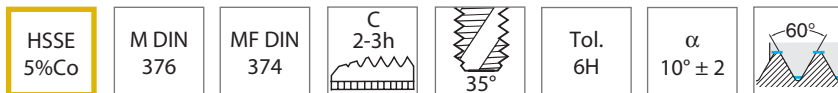
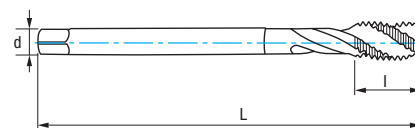
| M | P | L mm | l mm | d mm |  a mm |  Z | Nº Art. 5% Co | € |
|------|------|---------|---------|---------|---|---|------------------|-------|
| M3 | 0,50 | 56 | 5 | 3,50 | 2,70 | 3 | 63050 | 12,20 |
| M3,5 | 0,60 | 56 | 6 | 4,00 | 3,00 | 3 | 63053 | 17,94 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 3 | 63056 | 12,20 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 3 | 63059 | 11,64 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 3 | 63062 | 12,78 |
| M7 | 1,00 | 80 | 10 | 7,00 | 5,50 | 3 | 63065 | 19,92 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 3 | 63071 | 14,61 |
| M9 | 1,25 | 90 | 13 | 9,00 | 7,00 | 3 | 67882 | 24,90 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 3 | 63083 | 17,32 |



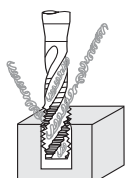
Ref. **3250****MACHO HELICOIDAL MÁQUINA MÉTRICA / MÉTRICA FINA**

Metric / Metric Fine Machine Spiral Tap

Taraud helicoidal machine métrique / métrique pas fin



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance $f = P$ (Paso - Pitch - Pas) V_f (mm/min.) = r.p.m. x f r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$ 

< 2D

| M/MF | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----------|------|---------|---------|---------|---------|---|------------------|--------|
| M3 | 0,50 | 56 | 5 | 2,20 | | 3 | 70063 | 11,89 |
| M4 | 0,70 | 63 | 7 | 2,80 | 2,10 | 3 | 70065 | 11,80 |
| M5 | 0,80 | 70 | 8 | 3,50 | 2,70 | 3 | 70066 | 11,30 |
| M6 | 1,00 | 80 | 10 | 4,50 | 3,40 | 3 | 70068 | 12,38 |
| MF8 | 1,00 | 90 | 13 | 6,00 | 4,90 | 3 | 70228 | 24,48 |
| M8 | 1,25 | 90 | 13 | 6,00 | 4,90 | 3 | 70069 | 14,52 |
| MF10 | 1,00 | 90 | 12 | 7,00 | 5,50 | 3 | 70230 | 28,85 |
| MF10 | 1,25 | 100 | 15 | 7,00 | 5,50 | 3 | 70231 | 31,41 |
| M10 | 1,50 | 100 | 15 | 7,00 | 5,50 | 3 | 70071 | 17,26 |
| MF12 | 1,00 | 100 | 14 | 9,00 | 7,00 | 3 | 70233 | 35,84 |
| MF12 | 1,25 | 100 | 14 | 9,00 | 7,00 | 3 | 70234 | 34,30 |
| MF12 | 1,50 | 100 | 14 | 9,00 | 7,00 | 3 | 70236 | 33,00 |
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 3 | 70161 | 22,20 |
| MF14 | 1,25 | 100 | 16 | 11,00 | 9,00 | 3 | 70237 | 50,67 |
| MF14 | 1,50 | 100 | 16 | 11,00 | 9,00 | 3 | 70239 | 40,57 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 3 | 70162 | 34,84 |
| MF16 | 1,50 | 100 | 16 | 12,00 | 9,00 | 3 | 70240 | 49,87 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 4 | 70164 | 42,09 |
| MF18 | 1,50 | 110 | 20 | 14,00 | 11,00 | 4 | 70242 | 60,24 |
| M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 4 | 75057 | 56,68 |
| MF20 | 1,50 | 125 | 20 | 16,00 | 12,00 | 4 | 70243 | 68,80 |
| M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 4 | 70167 | 60,34 |
| MF22 | 1,50 | 125 | 20 | 18,00 | 14,50 | 4 | 75192 | 90,05 |
| M22 | 2,50 | 140 | 25 | 18,00 | 14,50 | 4 | 70206 | 74,44 |
| MF24 | 1,50 | 140 | 22 | 18,00 | 14,50 | 4 | 70245 | 100,86 |
| MF24 | 2,00 | 140 | 28 | 18,00 | 14,50 | 4 | 24326 | 105,87 |
| M24 | 3,00 | 160 | 30 | 18,00 | 14,50 | 4 | 70207 | 89,10 |
| New! MF27 | 2,00 | 140 | 28 | 20,00 | 16,00 | 4 | 71566 | 166,97 |
| M27 | 3,00 | 160 | 30 | 20,00 | 16,00 | 4 | 70209 | 111,31 |
| MF30 | 1,50 | 150 | 28 | 22,00 | 18,00 | 4 | 70246 | 155,09 |
| M30 | 3,50 | 180 | 35 | 22,00 | 18,00 | 4 | 70210 | 142,57 |



Ref. 3166

MACHO RECTO LARGO MÁQUINA MÉTRICA MANGO REFORZADO

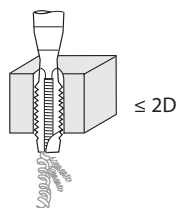
Reinforced Shank Metric Machine Long Straight Tap

Taraud droit long machine métrique queue renforcée



| | | | | | | |
|--------------|------------|-------------|-----|------------|--------------------|-----|
| HSSE 5%Co | DIN 371 | B 3,5-5h | GUN | Tol. 6H | α 10-12° | 60° |
|--------------|------------|-------------|-----|------------|--------------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|------|------|-------|------|---|------------------|-------|
| M3 | 0,50 | 100 | 11 | 3,50 | 2,70 | 3 | 69381 | 29,67 |
| M4 | 0,70 | 100 | 13 | 4,50 | 3,40 | 3 | 69382 | 30,33 |
| M5 | 0,80 | 120 | 16 | 6,00 | 4,90 | 3 | 69383 | 30,33 |
| M6 | 1,00 | 120 | 19 | 6,00 | 4,90 | 3 | 69384 | 33,33 |
| M8 | 1,25 | 150 | 22 | 8,00 | 6,20 | 3 | 69385 | 39,06 |
| M10 | 1,50 | 150 | 24 | 10,00 | 8,00 | 3 | 69387 | 48,10 |
| M12 | 1,75 | 150 | 29 | 12,00 | 9,00 | 3 | 69388 | 59,18 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

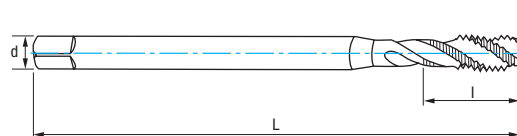


Ref. 3167

MACHO HELICOIDAL LARGO MÁQUINA MÉTRICA MANGO REFORZADO

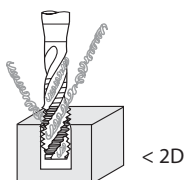
Reinforced Shank Metric Machine Long Spiral Tap

Taraud helicoidal long machine métrique queue renforcée



| | | | | | | |
|--------------|------------|-----------|-----|------------|---------------------|-----|
| HSSE 5%Co | DIN 371 | C 2-3h | 35° | Tol. 6H | α 10° ± 2 | 60° |
|--------------|------------|-----------|-----|------------|---------------------|-----|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |



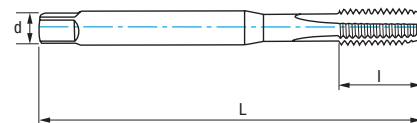
| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|------|------|-------|------|---|------------------|-------|
| M3 | 0,50 | 100 | 6 | 3,50 | 2,70 | 3 | 69389 | 36,72 |
| M4 | 0,70 | 100 | 7 | 4,50 | 3,40 | 3 | 69392 | 36,72 |
| M5 | 0,80 | 120 | 8 | 6,00 | 4,90 | 3 | 69395 | 35,17 |
| M6 | 1,00 | 120 | 10 | 6,00 | 4,90 | 3 | 69398 | 38,58 |
| M8 | 1,25 | 150 | 14 | 8,00 | 6,20 | 3 | 69401 | 46,88 |
| M10 | 1,50 | 150 | 16 | 10,00 | 8,00 | 3 | 69404 | 54,34 |
| M12 | 1,75 | 150 | 18 | 12,00 | 9,00 | 3 | 69407 | 70,28 |

Avance f = P (Paso - Pitch - Pas)

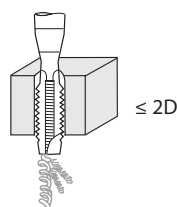
Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$



Ref. **3101****MACHO RECTO MÁQUINA MÉTRICA CORTE IZQUIERDA MANGO REFORZADO**Reinforced Shank **Left Cutting** Metric Machine Straight TapTaraud droit machine métrique **coupe à gauche** queue renforcée

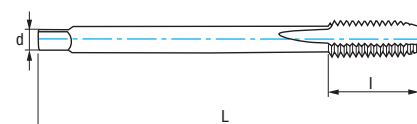
| Material | | Vc (m/min) |
|----------|------------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |



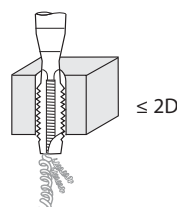
| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------|-------------|------|------|-------|------|---|---------------|--------------|
| M2 | 0,40 | 45 | 9 | 2,80 | 2,10 | 3 | 59469 | 32,63 |
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 59470 | 18,54 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 59471 | 19,54 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 59472 | 19,54 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 59473 | 21,49 |
| M7 | 1,00 | 80 | 19 | 7,00 | 5,50 | 3 | 59474 | 33,99 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 59475 | 24,05 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 59476 | 29,58 |

Avance $f = P$ (Paso - Pitch - Pas) V_f (mm/min.) = r.p.m. x fr.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$ Ref. **3201****MACHO RECTO MÁQUINA MÉTRICA CORTE IZQUIERDA**

Left Cutting Metric Machine Straight Tap

Taraud droit machine métrique **coupe à gauche**

| Material | | Vc (m/min) |
|----------|------------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------------------|-------------|------|------|-------|-------|---|---------------|---------------|
| M3 | 0,50 | 56 | 11 | 2,20 | | | 59840 | 19,78 |
| M4 | 0,70 | 63 | 13 | 2,80 | 2,10 | 3 | 20077 | 19,99 |
| M5 | 0,80 | 70 | 16 | 3,50 | 2,70 | 3 | 20078 | 19,99 |
| M6 | 1,00 | 80 | 19 | 4,50 | 3,40 | 3 | 20079 | 22,01 |
| M7 | 1,00 | 80 | 19 | 5,50 | 4,30 | 3 | 59843 | 34,92 |
| M8 | 1,25 | 90 | 22 | 6,00 | 4,90 | 3 | 10767 | 24,71 |
| M10 | 1,50 | 100 | 24 | 7,00 | 5,50 | 3 | 59844 | 30,40 |
| M11 | 1,50 | 100 | 24 | 8,00 | 6,20 | 3 | 59845 | 58,64 |
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 29501 | 37,44 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 59846 | 60,09 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 59847 | 70,70 |
| New! M18 | 2,50 | 125 | 34 | 14,00 | 11,00 | 3 | 62931 | 100,11 |
| New! M20 | 2,50 | 140 | 34 | 16,00 | 12,00 | 3 | 39047 | 108,25 |

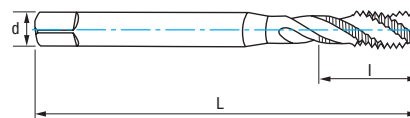
Avance $f = P$ (Paso - Pitch - Pas) V_f (mm/min.) = r.p.m. x fr.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$ 

Ref. 3161

MACHO HELICOIDAL MÁQUINA MÉTRICA CORTE IZQUIERDA M. REFORZADO

Reinforced Shank **Left Cutting** Metric Machine Spiral Tap

Taraud helicoidal machine métrique **coupe à gauche** queue renforcée



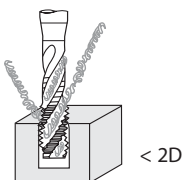
| | | | | | | | |
|--------------|------------|-----------|--|------------|------------------------------|--|--|
| HSSE 5%Co | DIN 371 | C 2-3h | | Tol. 6H | α $10^\circ \pm 2$ | | |
|--------------|------------|-----------|--|------------|------------------------------|--|--|

| Material | | Vc (m/min) |
|----------|------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 5 | 3,50 | 2,70 | 3 | 59477 | 24,38 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 3 | 59478 | 24,38 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 3 | 59479 | 23,28 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 3 | 59480 | 25,59 |
| M7 | 1,00 | 80 | 10 | 7,00 | 5,50 | 3 | 59481 | 39,82 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 3 | 59482 | 29,21 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 3 | 59483 | 34,66 |

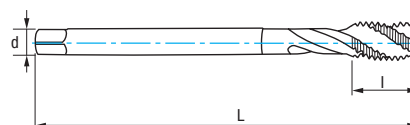


Ref. 3261

MACHO HELICOIDAL MÁQUINA MÉTRICA CORTE IZQUIERDA

Left Cutting Metric Machine Spiral Tap

Taraud helicoidal machine métrique **coupe à gauche**



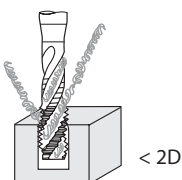
| | | | | | | | |
|--------------|------------|-----------|--|------------|------------------------------|--|--|
| HSSE 5%Co | DIN 376 | C 2-3h | | Tol. 6H | α $10^\circ \pm 2$ | | |
|--------------|------------|-----------|--|------------|------------------------------|--|--|

| Material | | Vc (m/min) |
|----------|------|--------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



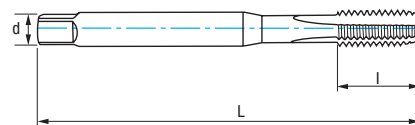
| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|--------------------|------|---------|---------|---------|---------|---|------------------|--------|
| M3 | 0,50 | 56 | 5 | 2,20 | | | 59848 | 23,79 |
| M4 | 0,70 | 63 | 7 | 2,80 | 2,10 | 3 | 59849 | 23,59 |
| M5 | 0,80 | 70 | 8 | 3,50 | 2,70 | 3 | 59850 | 22,58 |
| M6 | 1,00 | 80 | 10 | 4,50 | 3,40 | 3 | 59851 | 24,77 |
| M8 | 1,25 | 90 | 13 | 6,00 | 4,90 | 3 | 59852 | 29,04 |
| M10 | 1,50 | 100 | 15 | 7,00 | 5,50 | 3 | 59853 | 34,51 |
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 3 | 59854 | 44,39 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 3 | 59855 | 69,71 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 3 | 59856 | 84,22 |
| New! M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 4 | 62956 | 113,41 |
| New! M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 4 | 62959 | 120,73 |



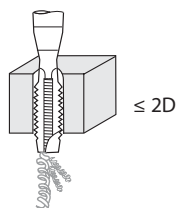
Ref. **3105****MACHO RECTO MÁQUINA MÉTRICA MANGO REFORZADO 6G**

6G Reinforced Shank Metric Machine Straight Tap

Taraud droit machine métrique queue renforcée 6G



| | | | | | | |
|--------------|------------|-------------|-----|------------|----------------------|-----|
| HSSE 5%Co | DIN 371 | B 3,5-5h | GUN | Tol. 6G | α 10 - 12° | 60° |
|--------------|------------|-------------|-----|------------|----------------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = r.p.m. \times f$$

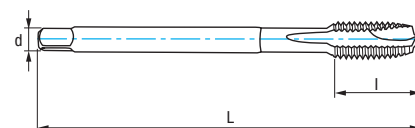
$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M3 | 0,50 | 56 | 11 | 3,50 | 2,70 | 3 | 38319 | 12,95 |
| M4 | 0,70 | 63 | 13 | 4,50 | 3,40 | 3 | 38320 | 12,95 |
| M5 | 0,80 | 70 | 16 | 6,00 | 4,90 | 3 | 38321 | 12,95 |
| M6 | 1,00 | 80 | 19 | 6,00 | 4,90 | 3 | 38322 | 13,08 |
| M8 | 1,25 | 90 | 22 | 8,00 | 6,20 | 3 | 38323 | 15,68 |
| M10 | 1,50 | 100 | 24 | 10,00 | 8,00 | 3 | 38324 | 18,42 |

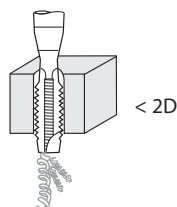
Ref. **3205****MACHO RECTO MÁQUINA MÉTRICA TOLERANCIA 6G**

6G Tolerance Metric Machine Straight Tap

Taraud droit machine métrique tolérance 6G



| | | | | | | |
|--------------|------------|-------------|-----|------------|----------------------|-----|
| HSSE 5%Co | DIN 376 | B 3,5-5h | GUN | Tol. 6G | α 10 - 12° | 60° |
|--------------|------------|-------------|-----|------------|----------------------|-----|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

$$\text{Avance } f = P \text{ (Paso - Pitch - Pas)}$$

$$V_f \text{ (mm/min.)} = r.p.m. \times f$$

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----|------|---------|---------|---------|---------|---|------------------|-------|
| M12 | 1,75 | 110 | 29 | 9,00 | 7,00 | 3 | 38325 | 23,04 |
| M14 | 2,00 | 110 | 30 | 11,00 | 9,00 | 3 | 38326 | 28,89 |
| M16 | 2,00 | 110 | 32 | 12,00 | 9,00 | 3 | 38327 | 34,95 |
| M18 | 2,50 | 125 | 34 | 14,00 | 11,00 | 3 | 38328 | 47,99 |
| M20 | 2,50 | 140 | 34 | 16,00 | 12,00 | 3 | 38329 | 50,17 |

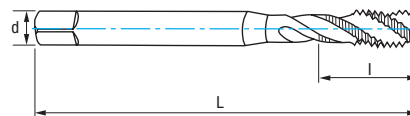


Ref. 3155

MACHO HELICOIDAL MÁQUINA MÉTRICA MANGO REFORZADO TOLERANCIA 6G

6G Tolerance Reinforced Shank Metric Machine Spiral Tap

Taraud helicoidal machine métrique queue renforcée tolérance 6G



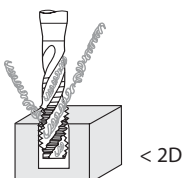
| | | | | | | |
|--------------|------------|-----------|------------|--|------------------------------|--|
| HSSE 5%Co | DIN 371 | C 2-3h | Tol. 6G | | α $10^\circ \pm 2$ | |
|--------------|------------|-----------|------------|--|------------------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. 5% Co | € |
|-----|------|------|------|-------|------|---|------------------|-------|
| M3 | 0,50 | 56 | 5 | 3,50 | 2,70 | 3 | 38330 | 14,28 |
| M4 | 0,70 | 63 | 7 | 4,50 | 3,40 | 3 | 38331 | 14,28 |
| M5 | 0,80 | 70 | 8 | 6,00 | 4,90 | 3 | 38332 | 13,78 |
| M6 | 1,00 | 80 | 10 | 6,00 | 4,90 | 3 | 38333 | 15,09 |
| M8 | 1,25 | 90 | 13 | 8,00 | 6,20 | 3 | 38334 | 18,01 |
| M10 | 1,50 | 100 | 15 | 10,00 | 8,00 | 3 | 38335 | 21,39 |

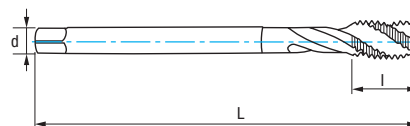


Ref. 3255

MACHO HELICOIDAL MÁQUINA MÉTRICA TOLERANCIA 6G

6G Tolerance Metric Machine Spiral Tap

Taraud helicoidal machine métrique tolérance 6G



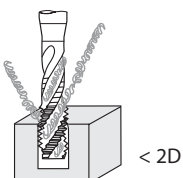
| | | | | | | |
|--------------|------------|-----------|------------|--|------------------------------|--|
| HSSE 5%Co | DIN 376 | C 2-3h | Tol. 6G | | α $10^\circ \pm 2$ | |
|--------------|------------|-----------|------------|--|------------------------------|--|

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance $f = P$ (Paso - Pitch - Pas)

V_f (mm/min.) = r.p.m. x f

r.p.m. = $\frac{V_c \times 1.000}{\pi \times \phi}$



| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. 5% Co | € |
|-----|------|------|------|-------|-------|---|------------------|-------|
| M12 | 1,75 | 110 | 18 | 9,00 | 7,00 | 3 | 38336 | 28,52 |
| M14 | 2,00 | 110 | 20 | 11,00 | 9,00 | 3 | 38337 | 32,94 |
| M16 | 2,00 | 110 | 20 | 12,00 | 9,00 | 4 | 38338 | 39,78 |
| M18 | 2,50 | 125 | 25 | 14,00 | 11,00 | 4 | 38339 | 54,18 |
| M20 | 2,50 | 140 | 25 | 16,00 | 12,00 | 4 | 38340 | 57,02 |

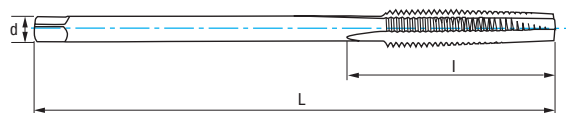


Ref. **3185**

MACHO MÁQUINA TUERCAS

Nut Tap

Taraud machine filières pour écrous



HSS

DIN 357

18h

Tol. 6H

Otras Tol. bajo demanda
Other Tol. upon request
Autres tol. sur demande

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|-----|------|------|------|-------|-------|---|-------------|---------------|
| M3 | 0,50 | 70 | 22 | 2,20 | | 3 | 16332 | 20,06 |
| M4 | 0,70 | 90 | 25 | 2,80 | 2,10 | 3 | 16333 | 20,06 |
| M5 | 0,80 | 100 | 28 | 3,50 | 2,70 | 3 | 16334 | 20,06 |
| M6 | 1,00 | 110 | 32 | 4,50 | 3,50 | 3 | 16335 | 20,06 |
| M7 | 1,00 | 110 | 36 | 5,50 | 4,30 | 3 | 16336 | 25,49 |
| M8 | 1,25 | 125 | 40 | 6,00 | 4,90 | 3 | 16337 | 23,69 |
| M10 | 1,50 | 140 | 45 | 7,00 | 5,50 | 3 | 16338 | 27,72 |
| M12 | 1,75 | 180 | 50 | 9,00 | 7,00 | 3 | 16339 | 45,40 |
| M14 | 2,00 | 200 | 56 | 11,00 | 9,00 | 3 | 16340 | 55,84 |
| M16 | 2,00 | 200 | 63 | 12,00 | 9,00 | 3 | 16342 | 71,77 |
| M18 | 2,50 | 220 | 63 | 14,00 | 11,00 | 3 | 59877 | 77,27 |
| M20 | 2,50 | 250 | 70 | 16,00 | 12,00 | 3 | 16343 | 106,93 |
| M22 | 2,50 | 280 | 80 | 18,00 | 14,50 | 3 | 59878 | 114,62 |
| M24 | 3,00 | 280 | 80 | 18,00 | 14,50 | 4 | 59879 | 135,20 |

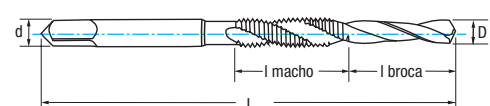


Ref. **3099**

BROCA-MACHO

Tap Drill

Foret taraudeur



HSSE 5%Co

Tol. 6H

Broca-Macho Tap Drill Foret taraudeur

| M | P | D Broca Drill Foret mm | L mm | l Broca Drill Foret mm | l Macho Tap Taraud mm | d mm | a mm | Nº Art. 5% Co | € |
|-----|------|------------------------|------|------------------------|-----------------------|-------|------|---------------|--------------|
| M3 | 0,50 | 2,50 | 56 | 16,00 | 11,00 | 3,00 | 2,40 | 63294 | 30,61 |
| M4 | 0,70 | 3,30 | 63 | 18,00 | 14,00 | 4,00 | 3,00 | 63297 | 30,61 |
| M5 | 0,80 | 4,20 | 71 | 20,00 | 18,00 | 5,00 | 3,80 | 63300 | 34,27 |
| M6 | 1,00 | 5,00 | 80 | 22,00 | 22,00 | 6,00 | 4,90 | 63303 | 46,31 |
| M8 | 1,25 | 6,80 | 95 | 26,00 | 25,00 | 8,00 | 6,20 | 63306 | 58,32 |
| M10 | 1,50 | 8,50 | 106 | 30,00 | 31,00 | 10,00 | 8,00 | 63309 | 79,26 |
| M12 | 1,75 | 10,20 | 115 | 32,00 | 35,00 | 12,00 | 9,00 | 63312 | 84,07 |



Ref. 3185

Ref. 3099

Ref. **4995**

EXPOSITOR MACHOS MÉTRICOS MÁQUINA

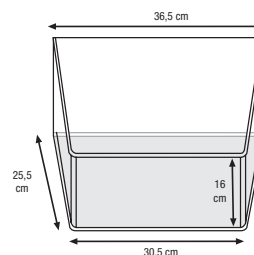
Machine Metric Tap Exhibitor

Présentoir tarauds métriques machine



66 Pcs

| N° Art. | € |
|---------|----------|
| 70077 | 1.561,67 |



Contenido:

| Ref. | Mat. | M | Uds. |
|-----------|--------|---------|------|
| 3130-3230 | HARD | | 1 |
| 3170-3270 | | | 1 |
| 3143-3243 | HSSE-V | 4x0,70 | 1 |
| 3153-3253 | | | 1 |
| 3125-3225 | HARD | 5x0,80 | 1 |
| 3165-3265 | | 6x1,00 | 1 |
| 3149-3249 | TIN | 8x1,25 | 1 |
| 3159-3259 | | 10x1,50 | 1 |
| 3172-3272 | 5% Co | 12x1,75 | 1 |
| 3100-3200 | 5% Co | | 1 |
| 3150-3250 | | | 1 |



Apilable/ Stackable/ Empilable

SETS MACHOS

Tap Sets
Jeux de tarauds



Sets 3125

MACHO RECTO MÁQUINA MÉTRICA INOX GRAN RENDIMIENTO M. REFORZADO
 Reinforced Shank High Performance **Stainless** Metric Machine Straight Tap
 Taraud droit machine métrique **inox** haut rendement queue renforcée

Ref. 3125 + 1016 TIALSIN



10 Pcs

Ref. 3125 + 1020 HSSE



10 Pcs

| Cont. | N° Art. TIALSIN | € |
|---|-----------------|--------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8-M10 | 32669 | 164,63 |
| Brocas / Drill Bits / Forets 1016 TIALSIN: 3,3-4,2-5,0-6,8-8,5 | | |

| Cont. | N° Art. 5% Co | € |
|--|---------------|--------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8-M10 | 32674 | 153,56 |
| Brocas / Drill Bits / Forets 1020 HSSE: 3,3-4,2-5,0-6,8-8,5 | | |

Sets 3165

MACHO HELICOIDAL MÁQUINA MÉTRICA INOX GRAN RENDIMIENTO M. REFORZADO
 Reinforced Shank High Performance **Stainless** Metric Machine Spiral Tap
 Taraud hélicoïdal machine métrique **inox** haut rendement queue renforcée

Ref. 3165 + 1016 TIALSIN



10 Pcs

Ref. 3165 + 1020 HSSE



10 Pcs

| Cont. | N° Art. TIALSIN | € |
|---|-----------------|--------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8-M10 | 32675 | 181,19 |
| Brocas / Drill Bits / Forets 1016 TIALSIN: 3,3-4,2-5,0-6,8-8,5 | | |

| Cont. | N° Art. 5% Co | € |
|---|---------------|--------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8-M10 | 32670 | 170,10 |
| Brocas / Drill Bits / Forets 1020 HSSE: 3,3-4,2-5,0-6,8-8,5 | | |

Sets
3143-3153

MACHO MÁQUINA MÉTRICA MATERIALES ALEADOS MANGO REFORZADO

Reinforced Shank Alloy Materials Metric Machine Tap

Taraud machine métrique matériaux alliages queue renforcée

Ref. 3143 + 1016 HSSE ○ **MACHO RECTO**
Straight Tap
Taraud Droit



10 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|-------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8-M10 | 82434 | 89,46 |
| Brocas / Drill Bits / Forets 1016 HSSE: 3,3-4,2-5,0-6,8-8,5 | | |

Ref. 3153 + 1016 HSSE ○ **MACHO HELICOIDAL**
Spiral Tap
Taraud Helicoïdal



10 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|-------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8-M10 | 10555 | 97,15 |
| Brocas / Drill Bits / Forets 1016 HSSE: 3,3-4,2-5,0-6,8-8,5 | | |

Sets
3149-3159

MACHO MÁQUINA MÉTRICA INOX MANGO REFORZADO

Reinforced Shank Stainless Metric Machine Tap

Taraud machine métrique inox queue renforcée

Ref. 3149 + 1016 HSSE ○ **MACHO RECTO**
Straight Tap
Taraud Droit



14 Pcs

| Cont. | N° Art. TIN | € |
|---|----------------|--------|
| Machos / Taps / Tarauds DIN 371: M3-M4-M5-M6-M8-M10-M12 | 77303 | 178,80 |
| Brocas / Drill Bits / Forets 1016 HSSE: 2,5-3,3-4,2-5,0-6,8-8,5-10,2 | | |

Ref. 3159 + 1016 HSSE ○ **MACHO HELICOIDAL**
Spiral Tap
Taraud Helicoïdal



14 Pcs

| Cont. | N° Art. TIN | € |
|---|----------------|--------|
| Machos / Taps / Tarauds DIN 371: M3-M4-M5-M6-M8-M10-M12 | 77304 | 193,86 |
| Brocas / Drill Bits / Forets 1016 HSSE: 2,5-3,3-4,2-5,0-6,8-8,5-10,2 | | |

Sets **3110****MACHO RECTO MÁQUINA MÉTRICA MANGO REFORZADO**

Reinforced Shank Metric Machine Straight Tap

Taraud droit machine métrique queue renforcée

Ref. 3110



7 Pcs

| Cont. | N° Art. 5% Co | € |
|---|------------------|-------|
| Machos / Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 43351 | 80,09 |

Ref. 3110 + 1010 HSS



14 Pcs

| Cont. | N° Art. HSS | € |
|--|----------------|-------|
| Machos / Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 43357 | 93,00 |
| Brocas / Drill Bits / Forets HSS: 2,5-3,3-4,2-5,0- 6,8-8,5-10,2 | | |

Ref. 3110 + 1016 HSSE



14 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos / Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 16198 | 103,89 |
| Brocas / Drill Bits / Forets HSSE: 2,5-3,3-4,2-5,0- 6,8-8,5-10,2 | | |

Sets **3100****MACHO RECTO MÁQUINA MÉTRICA MANGO REFORZADO**

Reinforced Shank Metric Machine Straight Tap

Taraud droit machine métrique queue renforcée

Ref. 3100



7 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|-------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 43348 | 85,12 |

Ref. 3100 + 1010 HSS



14 Pcs

| Cont. | N° Art. HSS | € |
|--|----------------|-------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 43354 | 98,03 |
| Brocas Drill Bits / Forets HSS: 2,5-3,3-4,2-5,0-6,8- 8,5-10,2 | | |

Ref. 3100 + 1016 HSSE



14 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 21801 | 108,93 |
| Brocas Drill Bits / Forets HSSE: 2,5-3,3-4,2-5,0- 6,8-8,5-10,2 | | |

Ref. 3100 + 1015 Zirkonio

New!



14 Pcs

| Cont. | N° Art. Zirkonio | € |
|--|---------------------|--------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 56424 | 109,55 |
| Brocas Drill Bits / Forets HSS: 2,5-3,3-4,2-5,0-6,8- 8,5-10,2 | | |



25 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8- M10 (5 pcs x M) | 38998 | 285,66 |

Sets **3200****MACHO RECTO MÁQUINA MÉTRICA**

Metric Machine Straight Tap

Taraud droit machine métrique



25 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos / Taps / Tarauds DIN 376: M4-M5-M6-M8- M10 (5 pcs x M) | 39000 | 292,69 |

Sets 3150

MACHO HELICOIDAL MÁQUINA MÉTRICA MANGO REFORZADO

Reinforced Shank Metric Machine Spiral Tap

Taraud helicoidal machine métrique queue renforcée

Ref. 3150



7 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 43353 | 102,94 |

Ref. 3150 + 1010 HSS



14 Pcs

| Cont. | N° Art. HSS | € |
|--|----------------|--------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 43359 | 115,85 |
| Brocas Drill Bits / Forets HSS: 2,5-3,3-4,2-5,0-6,8- 8,5-10,2 | | |

Ref. 3150 + 1016 HSSE



14 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 21802 | 126,74 |
| Brocas Drill Bits / Forets HSSE: 2,5-3,3-4,2-5,0- 6,8-8,5-10,2 | | |

Ref. 3150 + 1015 Zirkonio

New!



14 Pcs

| Cont. | N° Art. Zirkonio | € |
|--|---------------------|--------|
| Machos Taps / Tarauds DIN 371: M3-M4-M5- M6-M8-M10 + DIN 376: M12 | 56428 | 127,39 |
| Brocas Drill Bits / Forets HSSE: 2,5-3,3-4,2-5,0- 6,8-8,5-10,2 | | |



25 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos / Taps / Tarauds DIN 371: M4-M5-M6-M8- M10 (5 pcs x M) | 38999 | 342,74 |

Sets 3250

MACHO HELICOIDAL MÁQUINA MÉTRICA

Metric Machine Spiral Tap

Taraud helicoidal machine métrique



25 Pcs

| Cont. | N° Art. 5% Co | € |
|--|------------------|--------|
| Machos / Taps / Tarauds DIN 376: M4-M5-M6-M8- M10 (5 pcs x M) | 39001 | 336,27 |

Ref. **3405****JUEGO MACHOS MANO MÉTRICA**

Metric Hand Tap Set

Jeu de tarauds à main métrique

29 Pcs

| Cont. | | N° Art. HSS | € |
|---|-------------------------------|----------------|---------------|
| Juegos Machos / Tap Sets / Jeux Tarauds | M3-M4-M5-M6-M8-M10-M12 | | |
| Brocas / Drill Bits / Forets mm | 2,5-3,3-4,2-5,0-6,8-8,5-10,2 | 69624 | 102,05 |
| Gira-Machos / Tap-Wrench / Porte-Tarauds | M1-M12 | | |

Ref. **3404****JUEGO MACHOS MANO PERFIL ROSCA COMPLETA**

Whole Thread Profile Hand Tap Set

Jeu de tarauds à main profil filetage complet

15 Pcs

| Cont. | | N° Art. HSS | € |
|---|-------------------------------|----------------|--------------|
| Machos / Taps / Tarauds | M3-M4-M5-M6-M8-M10-M12 | | |
| Brocas / Drill Bits / Forets mm | 2,5-3,3-4,2-5,0-6,8-8,5-10,2 | 68214 | 83,94 |
| Gira-Machos / Tap-Wrench / Porte-Tarauds | M1-M12 | | |



Ref. 3406

JUEGO MACHOS Y COJINETES MANO MÉTRICA

Metric Hand Tap & Die Set

Jeu de tarauds et filières à main métrique

33 Pcs

Mod. 0 - Cont.

| | |
|---|-------------------------------|
| Juegos Machos Tap Sets / Jeux Tarauds | M3-M4-M5-M6-M8-M10-M12 |
| Gira-Machos Tap-Wrench / Porte-Tarauds | M1-M12 |
| Gira-Machos Tap-Wrench / Porte-Tarauds | Criqué M3-M10 Ratchet |
| Cojinetes Dies / Filières | M3-M4-M5-M6-M8-M10-M12 |
| Porta-Cojinetes Die Holder / Porte-Filières | 25x9 |
| Galga Gauge / Gabarit | 1 pc |
| Destornillador Screwdriver / Tournevis | 1 pc |



| Nº Art. HSS | € |
|-------------|--------|
| 70527 | 129,72 |

New! ISO



| Nº Art. HSS | € |
|-------------|--------|
| 18959 | 177,20 |

55 Pcs

Mod. 1 - Cont.

| | | | |
|---|---|-------|--------|
| Juegos Machos Tap Sets / Jeux Tarauds | M3-M4-M5-M6-M8-M10-M12-M14-M16-M18-M20 | 38404 | 387,95 |
| Gira-Machos Tap-Wrench / Porte-Tarauds | M1-M12, M5-M20 | | |
| Gira-Machos Tap-Wrench / Porte-Tarauds | Criqué M3-M10 + M5-M12 Ratchet | | |
| Cojinetes Dies / Filières | M3-M4-M5-M6-M8-M10-M12-M14-M16-M18-M20 | | |
| Porta-Cojinetes Die Holder / Porte-Filières | 20x5, 20x7, 25x9, 30x11, 38x14, 45x18 | | |
| Galga Gauge / Gabarit | 1 pc | | |
| Destornillador Screwdriver / Tournevis | 1 pc | | |



45 Pcs

Mod. 2 - Cont.

| | | | |
|---|--------------------------------|-------|--------|
| Juegos Machos Tap Sets / Jeux Tarauds | M3-M4-M5-M6-M8-M10-M12 | 38981 | 190,28 |
| Gira-Machos Tap-Wrench / Porte-Tarauds | M1-M10, M4-M12 | | |
| Gira-Machos Tap-Wrench / Porte-Tarauds | Criqué M3-M10 Ratchet | | |
| Cojinetes Dies / Filières | M3-M4-M5-M6-M8-M10-M12 | | |
| Porta-Cojinetes Die Holder / Porte-Filières | 20x5, 20x7, 25x9, 30x11, 38x14 | | |
| Galga Gauge / Gabarit | 1 pc | | |
| Destornillador Screwdriver / Tournevis | 1 pc | | |
| Brocas Drill Bits / Forets mm | 2,5-3,3-4,2-5,0-6,8-8,5-10,2 | | |

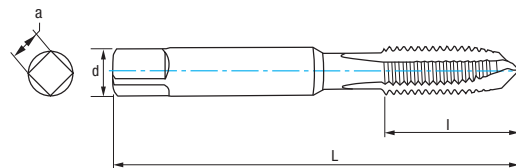


Ref. 3119

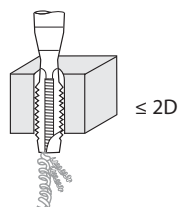
MACHO RECTO MÁQUINA MÉTRICA NORMA ISO 529

ISO 529 Norm Standard Metric Machine Straight Tap

Taraud droit machine métrique norme ISO 529



| | | | | | | | |
|--------------|------------|-----------|------------|-----|--------------------|-----|--------------------------------------|
| HSSE 5%Co | ISO 529 | B 4-5h | Tol. 6H | GUN | α 10-12° | 60° | Vaporizado Vaporized Vaporisée |
|--------------|------------|-----------|------------|-----|--------------------|-----|--------------------------------------|



| | M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------------|------|------|---------|---------|---------|---------|---|------------------|--------|
| New! | M2 | 0,40 | 41 | 8 | 2,50 | 2,00 | 2 | 77478 | 14,59 |
| New! | M2,5 | 0,45 | 44 | 9,5 | 2,80 | 2,24 | 2 | 77479 | 14,59 |
| | M3 | 0,50 | 48 | 11 | 3,15 | 2,50 | 3 | 69558 | 8,26 |
| New! | M3,5 | 0,60 | 53 | 13 | 4,00 | 3,15 | 3 | 69562 | 13,09 |
| | M4 | 0,70 | 53 | 13 | 4,00 | 3,15 | 3 | 69567 | 8,26 |
| New! | M4,5 | 0,75 | 58 | 16 | 5,00 | 4,00 | 3 | 69570 | 13,09 |
| | M5 | 0,80 | 58 | 16 | 5,00 | 4,00 | 3 | 69575 | 8,26 |
| | M6 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 69582 | 8,26 |
| New! | M7 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 69583 | 15,58 |
| | M8 | 1,25 | 72 | 22 | 8,00 | 6,30 | 3 | 69586 | 12,14 |
| | M10 | 1,50 | 80 | 24 | 10,00 | 8,00 | 3 | 69588 | 14,57 |
| | M12 | 1,75 | 89 | 29 | 9,00 | 7,10 | 3 | 69607 | 18,71 |
| | M14 | 2,00 | 95 | 30 | 11,20 | 9,00 | 3 | 69608 | 24,29 |
| | M16 | 2,00 | 102 | 32 | 12,50 | 10,00 | 3 | 69610 | 33,96 |
| | M18 | 2,50 | 112 | 37 | 14,00 | 11,20 | 3 | 69611 | 44,53 |
| | M20 | 2,50 | 112 | 37 | 14,00 | 11,20 | 3 | 69613 | 59,95 |
| | M22 | 2,50 | 118 | 38 | 16,00 | 12,50 | 3 | 69614 | 72,59 |
| | M24 | 3,00 | 130 | 45 | 18,00 | 14,00 | 3 | 69616 | 95,69 |
| | M27 | 3,00 | 135 | 45 | 20,00 | 16,00 | 3 | 69617 | 117,86 |
| | M30 | 3,50 | 138 | 48 | 20,00 | 16,00 | 3 | 69619 | 151,88 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| M | | 8-12 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance f = P (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

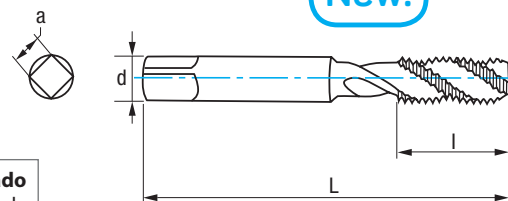


Ref. 3113

MACHO HELICOIDAL MÁQUINA MÉTRICA NORMA ISO 529

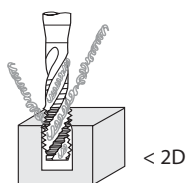
ISO 529 Standard Metric Machine Spiral Tap

Taraud helicoidal machine métrique norme ISO 529



New!

| | | | | | | | |
|--------------|------------|-----------|------------|-----|--------------------|-----|--------------------------------------|
| HSSE 5%Co | ISO 529 | C 2-3h | Tol. 6H | 45° | α 12-14° | 60° | Vaporizado Vaporized Vaporisée |
|--------------|------------|-----------|------------|-----|--------------------|-----|--------------------------------------|



| | M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|--|------|------|---------|---------|---------|---------|---|------------------|--------|
| | M2 | 0,40 | 41 | 8 | 2,50 | 2,00 | 2 | 48989 | 17,13 |
| | M2,5 | 0,45 | 44 | 9,5 | 2,80 | 2,24 | 2 | 48992 | 17,13 |
| | M3 | 0,50 | 48 | 6 | 3,15 | 2,50 | 3 | 49004 | 9,72 |
| | M3,5 | 0,60 | 50 | 6 | 3,55 | 2,80 | 3 | 49016 | 15,40 |
| | M4 | 0,70 | 53 | 7 | 4,00 | 3,15 | 3 | 49019 | 9,72 |
| | M5 | 0,80 | 58 | 8 | 5,00 | 4,00 | 3 | 49022 | 9,72 |
| | M6 | 1,00 | 66 | 10 | 6,30 | 5,00 | 3 | 49025 | 9,72 |
| | M7 | 1,00 | 66 | 13 | 7,10 | 5,60 | 3 | 49028 | 18,34 |
| | M8 | 1,25 | 72 | 12 | 8,00 | 6,30 | 3 | 49031 | 12,97 |
| | M10 | 1,50 | 80 | 15 | 10,00 | 8,00 | 3 | 49034 | 16,50 |
| | M12 | 1,75 | 89 | 16 | 9,00 | 7,10 | 3 | 49187 | 21,23 |
| | M14 | 2,00 | 95 | 18 | 11,20 | 9,00 | 3 | 49190 | 27,01 |
| | M16 | 2,00 | 102 | 18 | 12,50 | 10,00 | 4 | 49193 | 37,73 |
| | M18 | 2,50 | 112 | 29 | 14,00 | 11,20 | 4 | 49196 | 49,52 |
| | M20 | 2,50 | 112 | 29 | 14,00 | 11,20 | 4 | 49199 | 66,61 |
| | M22 | 2,50 | 118 | 29 | 16,00 | 12,50 | 4 | 49202 | 80,67 |
| | M24 | 3,00 | 130 | 35 | 18,00 | 14,00 | 4 | 49205 | 106,32 |
| | M27 | 3,00 | 135 | 45 | 20,00 | 16,00 | 3 | 77480 | 133,23 |
| | M30 | 3,50 | 138 | 48 | 20,00 | 16,00 | 3 | 77481 | 171,04 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5% Co |
| P | P.1 | 6-10 |
| M | | 8-12 |
| N | N.1 | 5-8 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |

Avance f = P (Paso - Pitch - Pas)
 Vf (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

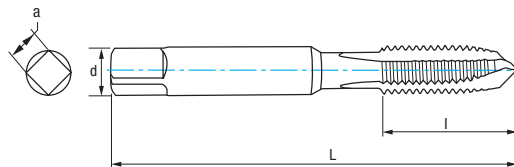


Ref. 3109

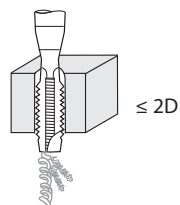
MACHO RECTO MÁQUINA MÉTRICA NORMA ISO 529

ISO 529 Norm Standard Metric Machine Straight Tap

Taraud droit machine métrique norme ISO 529



| | | | | | | | |
|-----|-----------|---------|--------|---------|-----|----------|-----|
| HSS | HSS + TIN | ISO 529 | B 4-5h | Tol. 6H | GUN | α 10-12° | 60° |
|-----|-----------|---------|--------|---------|-----|----------|-----|



| Material | | Vc (m/min) | |
|----------|------|------------|-------|
| Grupo | Sub. | HSS | TIN |
| P | P.1 | 6-10 | 9-13 |
| N | N.1 | 5-8 | 8-12 |
| | N.3 | 15-35 | 20-45 |
| | N.4 | 14-20 | 18-30 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

(New!)

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € | N° Art. TIN | € |
|-------------------|------|------|------|-------|-------|---|-------------|--------|-------------|--------|
| M3 | 0,50 | 48 | 11 | 3,15 | 2,50 | 3 | 38180 | 7,18 | 31717 | 9,93 |
| M3,5 | 0,60 | 53 | 13 | 4,00 | 3,15 | 3 | 38181 | 11,37 | 70208 | 14,45 |
| M4 | 0,70 | 53 | 13 | 4,00 | 3,15 | 3 | 38182 | 7,18 | 31718 | 10,16 |
| M4,5 | 0,75 | 58 | 16 | 5,00 | 4,00 | 3 | 38183 | 11,37 | 70229 | 14,45 |
| M5 | 0,80 | 58 | 16 | 5,00 | 4,00 | 3 | 38373 | 7,18 | 31719 | 10,16 |
| M6 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 38185 | 7,18 | 31720 | 10,16 |
| M7 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 38186 | 11,63 | 70235 | 15,42 |
| M8 | 1,25 | 72 | 22 | 8,00 | 6,30 | 3 | 38187 | 9,59 | 31721 | 13,38 |
| M10 | 1,50 | 80 | 24 | 10,00 | 8,00 | 3 | 38188 | 12,20 | 31722 | 18,11 |
| M12 | 1,75 | 89 | 29 | 9,00 | 7,10 | 3 | 38189 | 15,67 | 31729 | 22,12 |
| M14 | 2,00 | 95 | 30 | 11,20 | 9,00 | 3 | 38190 | 18,74 | 31730 | 26,44 |
| M16 | 2,00 | 102 | 32 | 12,50 | 10,00 | 3 | 38191 | 23,27 | 31732 | 32,64 |
| M18 | 2,50 | 112 | 37 | 14,00 | 11,20 | 3 | 38192 | 35,03 | 31734 | 44,94 |
| M20 | 2,50 | 112 | 37 | 14,00 | 11,20 | 3 | 38193 | 39,16 | 31736 | 51,10 |
| M22 | 2,50 | 118 | 38 | 16,00 | 12,50 | 3 | 38194 | 45,27 | 31737 | 59,08 |
| M24 | 3,00 | 130 | 45 | 18,00 | 14,00 | 3 | 38195 | 51,15 | 31746 | 66,01 |
| M27 | 3,00 | 135 | 45 | 20,00 | 16,00 | 3 | 38196 | 62,99 | 31747 | 104,19 |
| M30 | 3,50 | 138 | 48 | 20,00 | 16,00 | 3 | 38197 | 93,59 | 31748 | 134,79 |
| (New!) M33 | 3,50 | 151 | 51 | 22,40 | 18,00 | 4 | 31585 | 117,27 | 31749 | 158,47 |
| (New!) M36 | 4,00 | 162 | 57 | 25,00 | 20,00 | 4 | 31588 | 143,27 | 31751 | 191,75 |
| (New!) M39 | 4,00 | 170 | 60 | 28,00 | 22,40 | 4 | 31605 | 160,54 | 31752 | 209,02 |
| (New!) M42 | 4,50 | 170 | 60 | 28,00 | 22,40 | 4 | 31607 | 206,39 | 31753 | 264,07 |
| (New!) M45 | 4,50 | 187 | 67 | 31,50 | 25,00 | 4 | 31609 | 260,69 | 31754 | 318,37 |
| (New!) M48 | 5,00 | 187 | 67 | 31,50 | 25,00 | 4 | 31616 | 374,32 | 31755 | 435,87 |

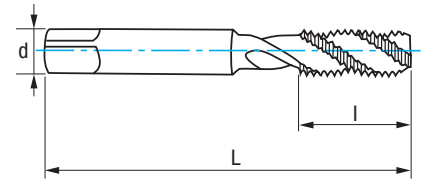


Ref. **3157**

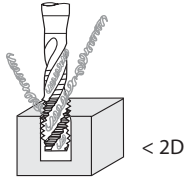
MACHO HELICOIDAL MÁQUINA MÉTRICA NORMA ISO 529

ISO 529 Norm Standard Metric Machine Spiral Tap

Taraud hélicoïdal machine métrique norme ISO 529



| | | | | | | | |
|-----|-----------|---------|--------|---------|-----|----------|-----|
| HSS | HSS + TIN | ISO 529 | C 2-3h | Tol. 6H | 35° | α 12-14° | 60° |
|-----|-----------|---------|--------|---------|-----|----------|-----|



| Material | | Vc (m/min) | |
|----------|------|------------|-------|
| Grupo | Sub. | HSS | TIN |
| P | P.1 | 6-10 | 9-13 |
| N | N.1 | 5-8 | 8-12 |
| | N.3 | 15-35 | 20-45 |
| | N.4 | 14-20 | 18-30 |

Avance f = P (Paso - Pitch - Pas)

Vf (mm/min.) = r.p.m. x f

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

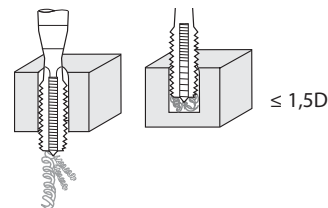
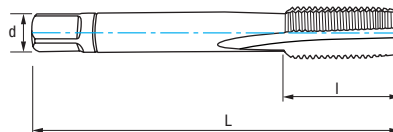
New!

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € | N° Art. TIN | € |
|------|------|------|------|-------|-------|---|-------------|--------|-------------|--------|
| M3 | 0,50 | 48 | 11 | 3,15 | 2,50 | 3 | 38198 | 8,65 | 31723 | 11,40 |
| M3,5 | 0,60 | 53 | 13 | 4,00 | 3,15 | 3 | 38199 | 13,70 | 70194 | 16,78 |
| M4 | 0,70 | 53 | 13 | 4,00 | 3,15 | 3 | 38201 | 8,65 | 31724 | 11,73 |
| M5 | 0,80 | 58 | 16 | 5,00 | 4,00 | 3 | 38206 | 8,65 | 31725 | 11,73 |
| M6 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 38209 | 8,84 | 12168 | 11,92 |
| M7 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 38211 | 14,01 | 70197 | 17,80 |
| M8 | 1,25 | 72 | 22 | 8,00 | 6,30 | 3 | 38214 | 9,91 | 31726 | 13,70 |
| M10 | 1,50 | 80 | 24 | 10,00 | 8,00 | 3 | 38216 | 12,77 | 31728 | 18,68 |
| M12 | 1,75 | 89 | 29 | 9,00 | 7,10 | 3 | 38226 | 16,60 | 31756 | 23,05 |
| M14 | 2,00 | 95 | 30 | 11,20 | 9,00 | 3 | 38228 | 22,69 | 31757 | 30,39 |
| M16 | 2,00 | 102 | 32 | 12,50 | 10,00 | 3 | 38229 | 26,32 | 31758 | 35,69 |
| M18 | 2,50 | 112 | 37 | 14,00 | 11,20 | 4 | 31627 | 39,62 | 31759 | 49,53 |
| M20 | 2,50 | 118 | 38 | 16,00 | 12,50 | 4 | 31629 | 44,29 | 31760 | 56,23 |
| M22 | 2,50 | 130 | 45 | 18,00 | 14,00 | 4 | 31630 | 51,20 | 31761 | 65,01 |
| M24 | 3,00 | 135 | 45 | 20,00 | 16,00 | 4 | 31634 | 57,80 | 31762 | 83,89 |
| M27 | 3,00 | 138 | 48 | 20,00 | 16,00 | 4 | 31635 | 71,18 | 31763 | 112,38 |
| M30 | 3,50 | 151 | 51 | 22,40 | 18,00 | 4 | 31638 | 105,76 | 31764 | 146,96 |
| M33 | 3,50 | 162 | 57 | 25,00 | 20,00 | 4 | 31586 | 132,52 | 31766 | 173,72 |
| M36 | 4,00 | 170 | 60 | 28,00 | 22,40 | 4 | 31604 | 162,27 | 31767 | 210,75 |
| M39 | 4,00 | 170 | 60 | 28,00 | 22,40 | 4 | 31606 | 181,83 | 31768 | 230,31 |
| M42 | 4,50 | 187 | 67 | 31,50 | 25,00 | 4 | 31608 | 233,76 | 31769 | 291,44 |
| M45 | 4,50 | 187 | 67 | 31,50 | 25,00 | 4 | 31612 | 295,26 | 31772 | 352,94 |
| M48 | 5,00 | 187 | 67 | 31,50 | 25,00 | 4 | 31620 | 423,96 | 31775 | 485,51 |



Ref. 3036

JUEGO MACHOS MANO MÉTRICA/ MÉTRICA FINA COBALTO INOX STAINLESS Cobalt Metric / Metric Fine Hand Tap Set Jeu de tarauds à main métrique / métrique pas fin cobalt INOX



| | | | | | | |
|--------------|--------------|----------------|-----------|------------|--------------------------------------|--|
| HSSE 5%Co | M DIN 352 | MF DIN 2181 | C 2-3h | Tol. 6H | Vaporizado Vaporized Vaporisée | |
|--------------|--------------|----------------|-----------|------------|--------------------------------------|--|

| | | | | | | | | | |
|--------------------|--|-------------------------------------|--|--------------------------------------|--|-----------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|
| α 6 - 8° | | N°1 Desbaste Roughing Ébauche | N°2 Semidesbaste Semiroughing Semi-Ébauche | N°3 Acabado Finishing Finition | N°1-N°2 Con guía Guided Avec Guide | Grupo Group-Gruppe P | Subgrup. Subgroup. P.5 | Grupo Group-Gruppe M | Grupo Group-Gruppe K |
|--------------------|--|-------------------------------------|--|--------------------------------------|--|-----------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|-------|
| M2 | 0,40 | 36 | 8 | 2,80 | 2,10 | 3 | 69229 | 37,04 |
| M3 | 0,50 | 40 | 11 | 3,50 | 2,70 | 3 | 16404 | 29,63 |
| M4 | 0,70 | 45 | 13 | 4,50 | 3,40 | 3 | 16405 | 29,63 |
| M5 | 0,80 | 50 | 16 | 6,00 | 4,90 | 3 | 16406 | 30,85 |
| MF6 | 0,75 | 56 | 14 | 6,00 | 4,90 | 3 | 82254 | 57,34 |
| M6 | 1,00 | 56 | 19 | 6,00 | 4,90 | 3 | 16407 | 30,85 |
| MF8 | 1,00 | 63 | 18 | 6,00 | 4,90 | 3 | 82255 | 57,34 |
| M8 | 1,25 | 63 | 22 | 6,00 | 4,90 | 3 | 16408 | 35,83 |
| MF10 | 1,00 | 63 | 18 | 7,00 | 5,50 | 3 | 82256 | 63,66 |
| M10 | 1,50 | 70 | 24 | 7,00 | 5,50 | 3 | 16409 | 46,08 |

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|--------|
| MF12 | 1,00 | 70 | 18 | 9,00 | 7,00 | 3 | 82257 | 72,71 |
| MF12 | 1,50 | 70 | 22 | 9,00 | 7,00 | 3 | 82258 | 71,03 |
| M12 | 1,75 | 75 | 29 | 9,00 | 7,00 | 3 | 16410 | 65,94 |
| MF14 | 1,50 | 70 | 22 | 11,00 | 9,00 | 4 | 82259 | 88,52 |
| M14 | 2,00 | 80 | 30 | 11,00 | 9,00 | 4 | 16411 | 73,03 |
| MF16 | 1,50 | 70 | 22 | 12,00 | 9,00 | 4 | 82290 | 91,70 |
| M16 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 16412 | 100,09 |
| MF18 | 1,50 | 80 | 22 | 14,00 | 11,00 | 4 | 82260 | 133,86 |
| M18 | 2,50 | 95 | 40 | 14,00 | 11,00 | 4 | 16413 | 136,71 |
| MF20 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 82261 | 130,27 |
| M20 | 2,50 | 95 | 40 | 16,00 | 12,00 | 4 | 16414 | 151,79 |

Ref. 3037

MACHO ÚNICO MÉTRICA/ MÉTRICA FINA COBALTO INOX STAINLESS Cobalt Metric / Metric Fine Hand Single Tap Taraud à main **únique** métrique / métrique pas fin cobalt INOX



N°3 Acabado
Finishing
Finition

N°1 Desbaste
Roughing
Ébauche

N°2 Semidesbaste
Semiroughing
Semi-Ébauche

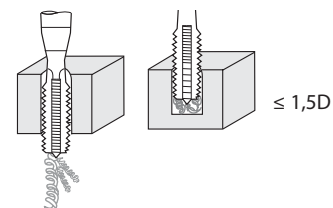
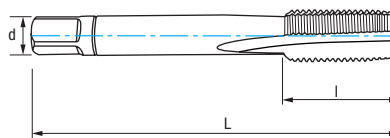
| M | P | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | N° Art. 5% Co | N° Art. 5% Co | € |
|------|------|---------|---------|---------|---------|---|------------------|------------------|------------------|-------|
| M2 | 0,40 | 36 | 8 | 2,80 | 2,10 | 3 | 83127 | 83125 | 83126 | 12,58 |
| M3 | 0,50 | 40 | 11 | 3,50 | 2,70 | 3 | 74981 | 74979 | 74980 | 10,07 |
| M4 | 0,70 | 45 | 13 | 4,50 | 3,40 | 3 | 75010 | 74982 | 74983 | 10,07 |
| M5 | 0,80 | 50 | 16 | 6,00 | 4,90 | 3 | 74986 | 74984 | 74985 | 10,48 |
| MF6 | 0,75 | 56 | 14 | 6,00 | 4,90 | 3 | 82264 | 82262 | | 28,65 |
| M6 | 1,00 | 56 | 19 | 6,00 | 4,90 | 3 | 74990 | 74988 | 74989 | 10,48 |
| MF8 | 1,00 | 63 | 18 | 6,00 | 4,90 | 3 | 82267 | 82265 | | 28,65 |
| M8 | 1,25 | 63 | 22 | 6,00 | 4,90 | 3 | 74993 | 74991 | 74992 | 12,18 |
| MF10 | 1,00 | 63 | 18 | 7,00 | 5,50 | 3 | 82270 | 82268 | | 31,85 |
| M10 | 1,50 | 70 | 24 | 7,00 | 5,50 | 3 | 74998 | 74994 | 74997 | 15,67 |
| MF12 | 1,00 | 70 | 18 | 9,00 | 7,00 | 3 | 82273 | 82271 | | 36,38 |
| MF12 | 1,50 | 70 | 22 | 9,00 | 7,00 | 3 | 82276 | 82274 | | 35,52 |
| M12 | 1,75 | 75 | 29 | 9,00 | 7,00 | 3 | 75003 | 74999 | 75000 | 22,42 |
| MF14 | 1,50 | 70 | 22 | 11,00 | 9,00 | 4 | 82279 | 82277 | | 44,27 |
| M14 | 2,00 | 80 | 30 | 11,00 | 9,00 | 4 | 75006 | 75004 | 75005 | 24,84 |
| MF16 | 1,50 | 70 | 22 | 12,00 | 9,00 | 4 | 82283 | 82280 | | 45,84 |
| M16 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 74974 | 72865 | 72864 | 34,04 |
| MF18 | 1,50 | 80 | 22 | 14,00 | 11,00 | 4 | 82286 | 82284 | | 66,89 |
| M18 | 2,50 | 95 | 40 | 14,00 | 11,00 | 4 | 75009 | 75007 | 75008 | 46,49 |
| MF20 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 82289 | 82287 | | 65,15 |
| M20 | 2,50 | 95 | 40 | 16,00 | 12,00 | 4 | 59960 | 74131 | 74977 | 51,61 |

Ref. 3030

JUEGO MACHOS MANO MÉTRICA

Metric Hand Tap Set

Jeu de tarauds à main métrique



| | | | | | | |
|-----|---------|--------|---------|--|------------------|--|
| HSS | DIN 352 | C 2-3h | Tol. 6H | | α 10° ± 2 | |
|-----|---------|--------|---------|--|------------------|--|

| | | | | | | | |
|-------------------------------------|--|--|----------------------------------|------------------------------------|----------------------------------|----------------------------------|--|
| Nº1 Desbaste Roughing Ébauche | Nº2 Semidesbaste Semiroughing Semi-Ébauche | Nº3 Acabado Finishing - Finition (Ref. 3010) | Grupo Group-Group P | Subgrup. Subgrup. P.1 | Grupo Group-Group K | Grupo Group-Group N | Subgrup. Subgrup. N.1 - N.3 N.4 - N.5 |
|-------------------------------------|--|--|----------------------------------|------------------------------------|----------------------------------|----------------------------------|--|

| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € | M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|------|------|------|------|-------|------|---|-------------|-------|-----|------|------|------|-------|-------|---|-------------|----------|
| M2 | 0,40 | 36 | 8 | 2,80 | 2,10 | 3 | 62531 | 28,32 | M15 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 62588 | 79,27 |
| M2,5 | 0,45 | 40 | 9 | 2,80 | 2,10 | 3 | 62534 | 28,32 | M16 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 62591 | 56,26 |
| M3 | 0,50 | 40 | 11 | 3,50 | 2,70 | 3 | 62537 | 16,03 | M18 | 2,50 | 95 | 34 | 14,00 | 11,00 | 4 | 62594 | 74,56 |
| M3,5 | 0,60 | 45 | 13 | 4,00 | 3,00 | 3 | 62540 | 18,88 | M20 | 2,50 | 95 | 34 | 16,00 | 12,00 | 4 | 62597 | 84,01 |
| M4 | 0,70 | 45 | 13 | 4,50 | 3,40 | 3 | 62543 | 16,03 | M22 | 2,50 | 100 | 34 | 18,00 | 14,50 | 4 | 62603 | 112,33 |
| M4 | 0,75 | 45 | 14 | 4,50 | 3,40 | 3 | 76377 | 27,75 | M24 | 3,00 | 110 | 50 | 18,00 | 14,50 | 4 | 62606 | 131,64 |
| M4,5 | 0,75 | 50 | 16 | 6,00 | 4,90 | 3 | 62546 | 28,32 | M27 | 3,00 | 110 | 50 | 20,00 | 16,00 | 4 | 62609 | 169,41 |
| M5 | 0,80 | 50 | 16 | 6,00 | 4,90 | 3 | 62549 | 16,99 | M30 | 3,50 | 125 | 50 | 22,00 | 18,00 | 4 | 62612 | 217,05 |
| M6 | 1,00 | 56 | 19 | 6,00 | 4,90 | 3 | 62552 | 16,99 | M33 | 3,50 | 125 | 50 | 25,00 | 20,00 | 4 | 62615 | 273,69 |
| M7 | 1,00 | 56 | 19 | 6,00 | 4,90 | 3 | 62555 | 20,77 | M36 | 4,00 | 150 | 56 | 28,00 | 22,00 | 4 | 62618 | 349,16 |
| M8 | 1,25 | 56 | 22 | 6,00 | 4,90 | 4 | 62561 | 20,77 | M39 | 4,00 | 150 | 60 | 32,00 | 24,00 | 4 | 62621 | 390,74 |
| M9 | 1,25 | 63 | 22 | 7,00 | 5,50 | 4 | 62567 | 33,97 | M42 | 4,50 | 150 | 60 | 32,00 | 24,00 | 4 | 62624 | 488,87 |
| M10 | 1,50 | 70 | 24 | 7,00 | 5,50 | 4 | 62573 | 25,50 | M45 | 4,50 | 160 | 65 | 36,00 | 29,00 | 6 | 73760 | 564,38 |
| M11 | 1,50 | 70 | 24 | 8,00 | 6,20 | 4 | 62576 | 42,46 | M48 | 5,00 | 180 | 70 | 36,00 | 29,00 | 6 | 62627 | 679,50 |
| M12 | 1,75 | 75 | 28 | 9,00 | 7,00 | 4 | 62579 | 35,85 | M52 | 5,00 | 180 | 70 | 40,00 | 32,00 | 6 | 76382 | 824,86 |
| M13 | 1,75 | 75 | 28 | 9,00 | 7,00 | 4 | 62582 | 65,11 | M56 | 5,50 | 180 | 70 | 40,00 | 32,00 | 6 | 76383 | 1.272,04 |
| M14 | 2,00 | 80 | 30 | 11,00 | 9,00 | 4 | 62585 | 39,65 | M60 | 5,50 | 200 | 85 | 45,00 | 35,00 | 6 | 76384 | 1.592,06 |

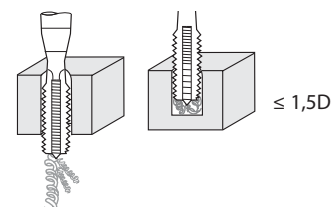
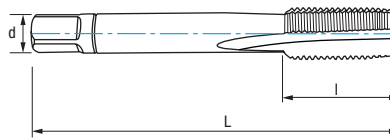
Macho único Ref. 3010 disponible en pag. 247 / Single Tap Ref. 3010 available in page 247 / Taraud unique Ref. 3010 disponible pag. 247

Ref. 3031

JUEGO MACHOS MANO MÉTRICA CORTE IZQUIERDA

Left Cutting Metric Hand Tap Set

Jeu de tarauds à main métrique coupe à gauche



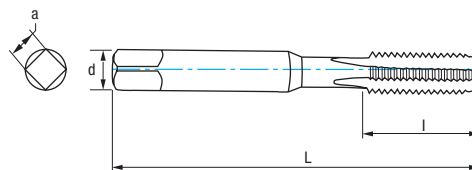
| M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € | M | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|------|------|------|------|------|------|---|-------------|-------|-----|------|------|------|-------|-------|---|-------------|--------|
| M3 | 0,50 | 40 | 11 | 3,50 | 2,70 | 3 | 23302 | 33,01 | M9 | 1,25 | 63 | 22 | 7,00 | 5,50 | 4 | 23310 | 69,95 |
| M3,5 | 0,60 | 45 | 13 | 4,00 | 3,00 | 3 | 23303 | 38,85 | M10 | 1,50 | 70 | 24 | 7,00 | 5,50 | 4 | 23311 | 52,46 |
| M4 | 0,70 | 45 | 13 | 4,50 | 3,40 | 3 | 23304 | 33,01 | M11 | 1,50 | 70 | 24 | 8,00 | 6,20 | 4 | 23312 | 87,41 |
| M4,5 | 0,75 | 50 | 16 | 6,00 | 4,90 | 3 | 23305 | 58,28 | M12 | 1,75 | 75 | 29 | 9,00 | 7,00 | 4 | 23313 | 73,80 |
| M5 | 0,80 | 50 | 16 | 6,00 | 4,90 | 3 | 23306 | 34,99 | M14 | 2,00 | 80 | 30 | 11,00 | 9,00 | 4 | 23314 | 81,62 |
| M6 | 1,00 | 50 | 19 | 6,00 | 4,90 | 3 | 23307 | 34,99 | M16 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 23315 | 115,81 |
| M7 | 1,00 | 50 | 19 | 6,00 | 4,90 | 3 | 23308 | 42,73 | M18 | 2,50 | 95 | 40 | 14,00 | 11,00 | 4 | 23316 | 153,46 |
| M8 | 1,25 | 56 | 22 | 6,00 | 4,90 | 4 | 23309 | 42,73 | M20 | 2,50 | 95 | 40 | 16,00 | 12,00 | 4 | 23317 | 172,89 |

Ref. 3040

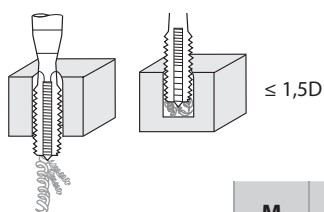
JUEGO MACHOS ÚNICOS MANO MÉTRICA NORMA ISO

ISO Standard Metric Hand Single Tap Set

Jeu de tarauds *uniques* à main métrique *norme ISO*



| | | | | | | | | | |
|-----|---------|---------|------|----------|--------|--|------------------|--|--------------------------------|
| HSS | ISO 529 | Tol. 6H | A 8h | B 3,5-5h | C 2-3h | | α 10° ± 2 | | N°3 Acabado Finishing Finition |
|-----|---------|---------|------|----------|--------|--|------------------|--|--------------------------------|



| | | | | |
|-------------------|------------|-------------------|-------------------|--------------------------------------|
| Grupo Group-Group | Subgrup. | Grupo Group-Group | Grupo Group-Group | Subgrup. |
| P | P.1 | K | N | N.1 - N.2 N.3 - N.4 - N.5 |

| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|-----|------|------|------|-------|-------|---|-------------|-------|
| M2 | 0,40 | 41 | 8 | 2,50 | 2,00 | 3 | 83527 | 28,32 |
| M3 | 0,50 | 48 | 11 | 3,15 | 2,50 | 3 | 68870 | 16,03 |
| M4 | 0,70 | 53 | 13 | 4,00 | 3,15 | 3 | 68871 | 16,03 |
| M5 | 0,80 | 58 | 16 | 5,00 | 4,00 | 3 | 68872 | 16,99 |
| M6 | 1,00 | 66 | 19 | 6,30 | 5,00 | 3 | 68873 | 16,99 |
| M8 | 1,25 | 72 | 22 | 8,00 | 6,30 | 4 | 68874 | 20,77 |
| M10 | 1,50 | 80 | 24 | 10,00 | 8,00 | 4 | 68875 | 25,50 |
| M12 | 1,75 | 89 | 29 | 9,00 | 7,10 | 4 | 68876 | 35,85 |
| M14 | 2,00 | 95 | 30 | 11,20 | 9,00 | 4 | 68877 | 39,65 |
| M16 | 2,00 | 102 | 32 | 12,50 | 10,00 | 4 | 68878 | 56,26 |



PASTA DE CORTE
Cutting Paste
Pâte de coupe
Pág. 559



Ref. 3030

Ref. 3031

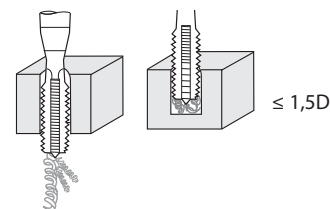
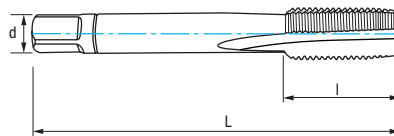
Ref. 3040

Ref. 3020

JUEGO MACHOS MANO MÉTRICA FINA

Metric Fine Hand Tap Set

Jeu de tarauds à main métrique pas fin



| | | | | | | | | |
|-----|----------|--------|---------|--|------------------|--|-------------------------------------|--|
| HSS | DIN 2181 | C 2-3h | Tol. 6H | | α 10° ± 2 | | Nº1 Desbaste Roughing Ébauche | Nº3 Acabado Finishing - Finition (Ref. 3010) |
|-----|----------|--------|---------|--|------------------|--|-------------------------------------|--|

| | | | | |
|-----------------------------------|-----------------|-----------------------------------|-----------------------------------|------------------------------------|
| Grupo Group-Groupe P | Subgrup. P.1 | Grupo Group-Groupe K | Grupo Group-Groupe N | Subgrup. N.1 - N.3 N.4 - N.5 |
|-----------------------------------|-----------------|-----------------------------------|-----------------------------------|------------------------------------|



| MF | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|------|------|------|------|-------|-------|---|-------------|--------|
| MF4 | 0,50 | 45 | 10 | 4,50 | 3,40 | 3 | 62336 | 31,91 |
| MF5 | 0,50 | 50 | 12 | 6,00 | 4,90 | 3 | 62342 | 31,75 |
| MF5 | 0,75 | 50 | 12 | 6,00 | 4,90 | 3 | 62345 | 32,11 |
| MF6 | 0,50 | 50 | 14 | 6,00 | 4,90 | 3 | 62351 | 22,68 |
| MF6 | 0,75 | 50 | 14 | 6,00 | 4,90 | 3 | 62354 | 19,21 |
| MF7 | 0,75 | 50 | 14 | 6,00 | 4,90 | 3 | 62360 | 29,23 |
| MF8 | 0,50 | 50 | 19 | 6,00 | 4,90 | 4 | 62366 | 43,49 |
| MF8 | 0,75 | 50 | 19 | 6,00 | 4,90 | 4 | 62369 | 26,40 |
| MF8 | 1,00 | 56 | 20 | 6,00 | 4,90 | 4 | 62372 | 19,13 |
| MF9 | 1,00 | 63 | 20 | 7,00 | 5,50 | 4 | 75090 | 32,46 |
| MF10 | 0,50 | 63 | 20 | 7,00 | 5,50 | 4 | 21727 | 41,48 |
| MF10 | 0,75 | 63 | 20 | 7,00 | 5,50 | 4 | 76309 | 49,09 |
| MF10 | 1,00 | 63 | 20 | 7,00 | 5,50 | 4 | 62378 | 20,61 |
| MF10 | 1,25 | 70 | 24 | 7,00 | 5,50 | 4 | 62381 | 20,87 |
| MF11 | 0,75 | 63 | 20 | 8,00 | 6,20 | 4 | 16118 | 101,71 |
| MF11 | 1,00 | 63 | 20 | 8,00 | 6,20 | 4 | 76311 | 45,26 |
| MF11 | 1,25 | 63 | 20 | 8,00 | 6,20 | 4 | 75298 | 45,26 |
| MF12 | 0,75 | 70 | 22 | 9,00 | 7,00 | 4 | 76312 | 56,21 |
| MF12 | 1,00 | 70 | 20 | 9,00 | 7,00 | 4 | 62387 | 36,04 |
| MF12 | 1,25 | 70 | 22 | 9,00 | 7,00 | 4 | 62390 | 36,11 |
| MF12 | 1,50 | 70 | 22 | 9,00 | 7,00 | 4 | 62393 | 30,78 |
| MF13 | 0,75 | 70 | 22 | 11,00 | 9,00 | 4 | 56832 | 101,71 |
| MF13 | 1,00 | 70 | 20 | 11,00 | 9,00 | 4 | 76314 | 64,38 |
| MF13 | 1,25 | 70 | 22 | 11,00 | 9,00 | 4 | 76315 | 56,88 |
| MF13 | 1,50 | 70 | 22 | 11,00 | 9,00 | 4 | 62399 | 56,88 |
| MF14 | 0,75 | 70 | 22 | 11,00 | 9,00 | 4 | 56833 | 100,13 |
| MF14 | 1,00 | 70 | 20 | 11,00 | 9,00 | 4 | 62402 | 64,38 |
| MF14 | 1,25 | 70 | 20 | 11,00 | 9,00 | 4 | 62405 | 44,11 |
| MF14 | 1,50 | 70 | 20 | 11,00 | 9,00 | 4 | 62408 | 34,27 |
| MF14 | 1,75 | 70 | 30 | 11,00 | 9,00 | 4 | 10875 | 131,45 |
| MF15 | 1,00 | 70 | 20 | 12,00 | 9,00 | 4 | 76318 | 90,09 |
| MF15 | 1,25 | 70 | 22 | 12,00 | 9,00 | 4 | 76319 | 82,10 |
| MF15 | 1,50 | 70 | 20 | 12,00 | 9,00 | 4 | 75299 | 83,45 |
| MF16 | 1,00 | 70 | 20 | 12,00 | 9,00 | 4 | 62414 | 90,14 |
| MF16 | 1,25 | 70 | 20 | 12,00 | 9,00 | 4 | 76320 | 94,89 |
| MF16 | 1,50 | 70 | 20 | 12,00 | 9,00 | 4 | 62417 | 42,90 |
| MF17 | 1,00 | 70 | 22 | 12,00 | 9,00 | 4 | 76321 | 121,01 |
| MF17 | 1,25 | 70 | 22 | 12,00 | 9,00 | 4 | 56834 | 121,01 |
| MF17 | 1,50 | 70 | 22 | 12,00 | 9,00 | 4 | 62420 | 121,01 |
| MF18 | 1,00 | 80 | 22 | 14,00 | 11,00 | 4 | 62423 | 100,24 |
| MF18 | 1,25 | 80 | 22 | 14,00 | 11,00 | 4 | 76323 | 119,27 |
| MF18 | 1,50 | 80 | 22 | 14,00 | 11,00 | 4 | 62426 | 56,66 |

| MF | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|------|------|------|------|-------|-------|---|-------------|--------|
| MF18 | 2,00 | 80 | 22 | 14,00 | 11,00 | 4 | 62429 | 106,94 |
| MF19 | 1,00 | 80 | 22 | 14,00 | 11,00 | 4 | 10831 | 175,63 |
| MF19 | 1,25 | 80 | 22 | 14,00 | 11,00 | 4 | 56835 | 175,49 |
| MF19 | 1,50 | 80 | 22 | 14,00 | 11,00 | 4 | 76326 | 175,63 |
| MF19 | 2,00 | 80 | 22 | 14,00 | 11,00 | 4 | 56837 | 209,21 |
| MF20 | 1,00 | 80 | 22 | 16,00 | 12,00 | 4 | 76327 | 132,79 |
| MF20 | 1,25 | 80 | 22 | 16,00 | 12,00 | 4 | 74816 | 175,63 |
| MF20 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 62435 | 71,03 |
| MF20 | 2,00 | 80 | 22 | 16,00 | 12,00 | 4 | 62438 | 111,35 |
| MF21 | 1,00 | 80 | 22 | 16,00 | 12,00 | 4 | 56838 | 226,97 |
| MF21 | 1,25 | 80 | 22 | 16,00 | 12,00 | 4 | 56840 | 226,97 |
| MF21 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 75300 | 179,48 |
| MF22 | 1,00 | 80 | 22 | 18,00 | 14,50 | 4 | 76330 | 148,83 |
| MF22 | 1,25 | 80 | 22 | 18,00 | 14,50 | 4 | 74601 | 175,63 |
| MF22 | 1,50 | 80 | 22 | 18,00 | 14,50 | 4 | 62441 | 77,45 |
| MF22 | 2,00 | 80 | 22 | 18,00 | 14,50 | 4 | 62444 | 124,01 |
| MF23 | 1,00 | 80 | 22 | 18,00 | 14,50 | 4 | 56841 | 226,74 |
| MF23 | 1,50 | 80 | 22 | 18,00 | 14,50 | 4 | 56842 | 226,74 |
| MF24 | 1,00 | 90 | 22 | 18,00 | 14,50 | 4 | 76333 | 139,37 |
| MF24 | 1,25 | 90 | 22 | 18,00 | 14,50 | 4 | 62447 | 226,97 |
| MF24 | 1,50 | 90 | 22 | 18,00 | 14,50 | 4 | 62450 | 98,85 |
| MF24 | 2,00 | 90 | 22 | 18,00 | 14,50 | 4 | 62453 | 166,39 |
| MF25 | 1,00 | 90 | 22 | 18,00 | 14,50 | 4 | 76334 | 198,59 |
| MF25 | 1,25 | 90 | 22 | 18,00 | 14,50 | 4 | 56843 | 323,36 |
| MF25 | 1,50 | 90 | 22 | 18,00 | 14,50 | 4 | 75301 | 195,12 |
| MF25 | 2,00 | 90 | 22 | 18,00 | 14,50 | 4 | 56844 | 332,60 |
| MF26 | 1,00 | 90 | 22 | 18,00 | 14,50 | 4 | 56846 | 173,54 |
| MF26 | 1,50 | 90 | 22 | 18,00 | 14,50 | 4 | 75302 | 188,34 |
| MF26 | 2,00 | 90 | 22 | 18,00 | 14,50 | 4 | 56847 | 191,04 |
| MF27 | 1,00 | 90 | 22 | 20,00 | 16,00 | 4 | 76338 | 191,08 |
| MF27 | 1,50 | 90 | 22 | 20,00 | 16,00 | 4 | 76339 | 207,65 |
| MF27 | 2,00 | 90 | 22 | 20,00 | 16,00 | 4 | 75303 | 230,67 |
| MF28 | 1,00 | 90 | 22 | 20,00 | 16,00 | 4 | 76340 | 323,66 |
| MF28 | 1,50 | 90 | 22 | 20,00 | 16,00 | 4 | 76341 | 209,20 |
| MF30 | 1,00 | 90 | 22 | 22,00 | 18,00 | 4 | 76342 | 200,83 |
| MF30 | 1,50 | 90 | 22 | 22,00 | 18,00 | 4 | 76343 | 216,99 |
| MF30 | 2,00 | 90 | 22 | 22,00 | 18,00 | 4 | 75304 | 250,12 |
| MF30 | 3,00 | 90 | 22 | 22,00 | 18,00 | 4 | 14421 | 250,12 |
| MF32 | 1,50 | 90 | 22 | 22,00 | 18,00 | 4 | 76345 | 250,51 |
| MF33 | 1,50 | 100 | 25 | 25,00 | 20,00 | 4 | 76348 | 294,45 |
| MF33 | 2,00 | 100 | 25 | 25,00 | 20,00 | 4 | 75305 | 371,86 |
| MF34 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 76349 | 306,89 |

New!

Ref. 3020

JUEGO MACHOS MANO MÉTRICA FINA

Metric Fine Hand Tap Set

Jeu de tarauds à main métrique pas fin

Cont.

| MF | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|------|------|------|------|-------|-------|---|-------------|--------|
| MF35 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 76350 | 306,89 |
| MF36 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 76351 | 338,01 |
| MF36 | 2,00 | 125 | 33 | 28,00 | 22,00 | 4 | 76140 | 432,53 |
| MF36 | 3,00 | 125 | 33 | 28,00 | 22,00 | 4 | 76352 | 496,23 |
| MF38 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 76353 | 380,15 |
| MF38 | 2,00 | 125 | 40 | 28,00 | 22,00 | 4 | 75306 | 451,89 |
| MF39 | 1,50 | 110 | 25 | 32,00 | 24,00 | 4 | 76354 | 496,23 |
| MF39 | 2,00 | 125 | 33 | 32,00 | 24,00 | 4 | 76355 | 592,67 |
| MF39 | 3,00 | 125 | 33 | 32,00 | 24,00 | 4 | 76356 | 496,23 |
| MF40 | 1,50 | 110 | 25 | 32,00 | 24,00 | 6 | 76357 | 446,56 |
| MF40 | 2,00 | 110 | 25 | 32,00 | 24,00 | 6 | 76358 | 436,15 |
| MF40 | 3,00 | 125 | 40 | 32,00 | 24,00 | 6 | 76359 | 432,10 |

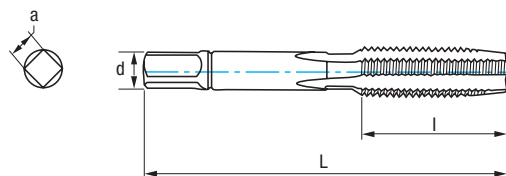
| MF | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|------|------|------|------|-------|-------|---|-------------|--------|
| MF42 | 2,00 | 125 | 33 | 32,00 | 24,00 | 6 | 76361 | 593,47 |
| MF42 | 3,00 | 125 | 33 | 32,00 | 24,00 | 6 | 76362 | 593,47 |
| MF45 | 1,50 | 110 | 25 | 36,00 | 29,00 | 6 | 76363 | 467,59 |
| MF45 | 2,00 | 125 | 33 | 36,00 | 29,00 | 6 | 76364 | 712,49 |
| MF45 | 3,00 | 125 | 33 | 36,00 | 29,00 | 6 | 76365 | 763,87 |
| MF48 | 1,50 | 140 | 33 | 36,00 | 29,00 | 6 | 76366 | 526,90 |
| MF48 | 2,00 | 140 | 33 | 36,00 | 29,00 | 6 | 76367 | 863,36 |
| MF48 | 3,00 | 140 | 33 | 36,00 | 29,00 | 6 | 76368 | 863,42 |
| MF50 | 1,50 | 140 | 40 | 36,00 | 29,00 | 6 | 76369 | 576,23 |
| MF52 | 1,50 | 140 | 40 | 40,00 | 32,00 | 6 | 76370 | 611,28 |
| MF52 | 2,00 | 140 | 40 | 40,00 | 32,00 | 6 | 77643 | 879,43 |
| MF52 | 3,00 | 140 | 40 | 40,00 | 32,00 | 6 | 76372 | 816,49 |

Ref. 3021

JUEGO MACHOS MANO MÉTRICA FINA CORTE IZQUIERDA

Left Cutting Metric Fine Hand Tap Set

Jeu de tarauds à main métrique pas fin coupe à gauche



| | | | | | | | | | |
|-----|----------|--------|---------|--|------------------|-------------------------------------|-------------------------------------|-----|--|
| HSS | DIN 2181 | C 2-3h | Tol. 6H | | α 10° ± 2 | N°1 Desbaste Roughing Ébauche | N°3 Acabado Finishing - Finition | 60° | |
|-----|----------|--------|---------|--|------------------|-------------------------------------|-------------------------------------|-----|--|

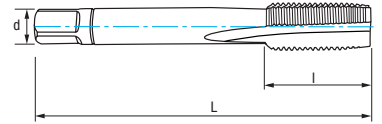
| | | | | |
|--------------------|--------------|--------------------|--------------------|---------------------------------|
| Grupo Group-Groupe | Subgrup. P.1 | Grupo Group-Groupe | Grupo Group-Groupe | Subgrup. N.1 - N.3 N.4 - N.5 |
| P | | K | N | |

| MF | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|------|------|------|------|-------|-------|---|-------------|--------|
| MF8 | 1,00 | 56 | 22 | 6,00 | 4,90 | 4 | 18877 | 38,29 |
| MF10 | 1,00 | 63 | 20 | 7,00 | 5,50 | 4 | 22028 | 41,22 |
| MF10 | 1,25 | 70 | 24 | 7,00 | 5,50 | 4 | 21874 | 41,76 |
| MF12 | 1,25 | 70 | 22 | 9,00 | 7,00 | 4 | 34029 | 72,23 |
| MF12 | 1,50 | 70 | 22 | 9,00 | 7,00 | 4 | 34030 | 61,58 |
| MF14 | 1,25 | 70 | 22 | 11,00 | 9,00 | 4 | 38318 | 88,18 |
| MF14 | 1,50 | 70 | 22 | 11,00 | 9,00 | 4 | 10531 | 68,55 |
| MF16 | 1,50 | 70 | 22 | 12,00 | 9,00 | 4 | 13143 | 85,78 |
| MF20 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 19101 | 142,04 |

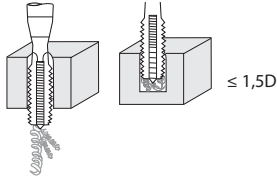


Ref. **3010**

MACHO ÚNICO MANO MÉTRICA/ MÉTRICA FINA
 Metric / Metric Fine Hand **Single Tap**
 Taraud à main **unique** métrique / métrique pas fin



| | | | | | | | |
|-----|-----------------------------|-------------------------------|-----------|------------|--|------------------------------|--|
| HSS | M DIN 352 (Ref. 3030) | MF DIN 2181 (Ref. 3020) | C 2-3h | Tol. 6H | | α $10^\circ \pm 2$ | |
|-----|-----------------------------|-------------------------------|-----------|------------|--|------------------------------|--|



| | | | | |
|-----------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|---|
| Grupo Group-Gruppe P | Subgrup. Subgroup. P.1 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. Subgroup. N.1 - N.3 N.4 - N.5 |
|-----------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|---|

Nº 3 Acabado
Finishing Finition
(M Ref. 3030 / MF Ref. 3020)

Nº 1 Desbaste M
Roughing Ébauche
(Ref. 3030)

Nº 2 Semidesbaste M
Semiroughing Semi-ébauche
(Ref. 3030)

| M/MF | P | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € | Nº Art. HSS | € | Nº Art. HSS | € |
|------|------|---------|---------|---------|---------|---|----------------|-------|----------------|-------|----------------|-------|
| M2 | 0,40 | 36 | 8 | 2,80 | 2,10 | 3 | 76385 | 9,68 | | | 33368 | 9,68 |
| M2 | 0,45 | 41 | 8 | 2,50 | 2,00 | 3 | 16451 | 9,68 | | | | |
| M2,5 | 0,45 | 40 | 9 | 2,80 | 2,10 | 3 | 76387 | 9,68 | | | | |
| M3 | 0,50 | 40 | 11 | 3,50 | 2,70 | 3 | 76389 | 5,50 | 11158 | 5,50 | 12723 | 5,50 |
| M3,5 | 0,60 | 45 | 13 | 4,00 | 3,00 | 3 | 76391 | 6,50 | 66186 | 6,50 | 20538 | 6,50 |
| MF4 | 0,50 | 45 | 10 | 4,50 | 3,40 | 3 | 76393 | 15,95 | | | | |
| M4 | 0,70 | 45 | 13 | 4,50 | 3,40 | 3 | 76394 | 5,50 | 18943 | 5,50 | 11263 | 5,50 |
| M4,5 | 0,75 | 50 | 16 | 6,00 | 4,90 | 3 | 76397 | 9,70 | 66187 | 9,70 | 66192 | 9,70 |
| MF5 | 0,50 | 50 | 12 | 6,00 | 4,90 | 3 | 59484 | 16,86 | | | | |
| MF5 | 0,75 | 50 | 12 | 6,00 | 4,90 | 3 | 59485 | 15,97 | | | | |
| M5 | 0,80 | 50 | 16 | 6,00 | 4,90 | 3 | 76400 | 5,84 | 11262 | 5,84 | 26620 | 5,84 |
| MF6 | 0,50 | 50 | 14 | 6,00 | 4,90 | 3 | 59486 | 11,60 | | | | |
| MF6 | 0,75 | 50 | 14 | 6,00 | 4,90 | 3 | 76405 | 9,60 | | | | |
| M6 | 1,00 | 50 | 19 | 6,00 | 4,90 | 3 | 75383 | 5,84 | 10630 | 5,84 | 10833 | 5,84 |
| MF7 | 0,75 | 50 | 14 | 6,00 | 4,90 | 3 | 46217 | 14,62 | | | | |
| M7 | 1,00 | 50 | 19 | 6,00 | 4,90 | 3 | 76408 | 7,13 | 66201 | 7,13 | 32812 | 7,13 |
| MF8 | 0,50 | 50 | 19 | 6,00 | 4,90 | 4 | 59487 | 17,98 | | | | |
| MF8 | 0,75 | 50 | 19 | 6,00 | 4,90 | 4 | 59488 | 14,24 | | | | |
| MF8 | 1,00 | 56 | 20 | 6,00 | 4,90 | 4 | 76411 | 9,57 | | | | |
| M8 | 1,25 | 56 | 22 | 6,00 | 4,90 | 4 | 75449 | 7,13 | 10938 | 7,13 | 26629 | 7,13 |
| MF9 | 1,00 | 63 | 20 | 7,00 | 5,50 | 4 | 34577 | 16,23 | | | | |
| M9 | 1,25 | 63 | 22 | 7,00 | 5,50 | 4 | 76414 | 11,64 | 66208 | 11,64 | 20543 | 11,64 |
| MF10 | 0,50 | 63 | 20 | 7,00 | 5,50 | 4 | 59489 | 20,74 | | | | |
| MF10 | 0,75 | 63 | 20 | 7,00 | 5,50 | 4 | 59490 | 20,25 | | | | |
| MF10 | 1,00 | 63 | 20 | 7,00 | 5,50 | 4 | 76417 | 10,29 | | | | |
| MF10 | 1,25 | 70 | 24 | 7,00 | 5,50 | 4 | 76418 | 10,44 | | | | |
| M10 | 1,50 | 70 | 24 | 7,00 | 5,50 | 4 | 74995 | 8,73 | 11148 | 8,73 | 15086 | 8,73 |
| MF11 | 0,75 | 63 | 20 | 8,00 | 6,20 | 4 | 59491 | 50,02 | | | | |
| MF11 | 1,00 | 63 | 20 | 8,00 | 6,20 | 4 | 59492 | 18,00 | | | | |
| MF11 | 1,25 | 63 | 22 | 8,00 | 6,20 | 4 | 59493 | 18,15 | | | | |
| M11 | 1,50 | 70 | 24 | 8,00 | 6,20 | 4 | 76422 | 14,59 | 25211 | 14,59 | 21282 | 14,59 |
| MF12 | 0,75 | 70 | 22 | 9,00 | 7,00 | 4 | 59494 | 28,81 | | | | |
| MF12 | 1,00 | 70 | 20 | 9,00 | 7,00 | 4 | 22221 | 18,04 | | | | |
| MF12 | 1,25 | 70 | 22 | 9,00 | 7,00 | 4 | 76425 | 18,07 | | | | |
| MF12 | 1,50 | 70 | 22 | 9,00 | 7,00 | 4 | 76426 | 15,40 | | | | |
| M12 | 1,75 | 75 | 29 | 9,00 | 7,00 | 4 | 74996 | 12,31 | 10834 | 12,31 | 28407 | 12,31 |
| MF13 | 0,75 | 70 | 22 | 11,00 | 9,00 | 4 | 59495 | 51,07 | | | | |
| MF13 | 1,00 | 70 | 20 | 11,00 | 9,00 | 4 | 59496 | 28,91 | | | | |
| MF13 | 1,25 | 70 | 22 | 11,00 | 9,00 | 4 | 59497 | 29,14 | | | | |
| MF13 | 1,50 | 70 | 22 | 11,00 | 9,00 | 4 | 59498 | 29,20 | | | | |
| MF14 | 0,75 | 70 | 22 | 11,00 | 9,00 | 4 | 59499 | 50,48 | | | | |
| MF14 | 1,00 | 70 | 20 | 11,00 | 9,00 | 4 | 76433 | 32,18 | | | | |
| MF14 | 1,25 | 70 | 20 | 11,00 | 9,00 | 4 | 45040 | 22,05 | | | | |
| MF14 | 1,50 | 70 | 20 | 11,00 | 9,00 | 4 | 76435 | 17,14 | | | | |
| MF14 | 1,75 | 70 | 30 | 11,00 | 9,00 | 4 | 59500 | 65,73 | | | | |
| M14 | 2,00 | 80 | 30 | 11,00 | 9,00 | 4 | 76436 | 13,60 | 11772 | 13,60 | 20529 | 13,60 |
| MF15 | 1,00 | 70 | 20 | 12,00 | 9,00 | 4 | 59501 | 39,01 | | | | |
| MF15 | 1,25 | 70 | 22 | 12,00 | 9,00 | 4 | 59503 | 41,74 | | | | |
| MF15 | 1,50 | 70 | 20 | 12,00 | 9,00 | 4 | 76439 | 41,73 | | | | |
| MF16 | 1,00 | 70 | 22 | 12,00 | 9,00 | 4 | 59504 | 37,25 | | | | |
| MF16 | 1,25 | 70 | 22 | 12,00 | 9,00 | 4 | 59505 | 39,20 | | | | |
| MF16 | 1,50 | 70 | 20 | 12,00 | 9,00 | 4 | 76443 | 21,44 | | | | |
| M16 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 76444 | 19,29 | 17461 | 19,29 | 16312 | 19,29 |
| MF17 | 1,00 | 70 | 22 | 12,00 | 9,00 | 4 | 59506 | 60,00 | | | | |
| MF17 | 1,25 | 70 | 22 | 12,00 | 9,00 | 4 | 59507 | 60,24 | | | | |



MF N°1
bajo demanda
upon request
sur demande

Cont.

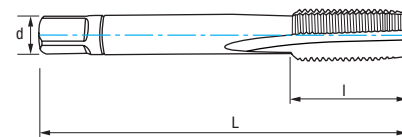
| M/MF | P | L mm | I mm | d mm | a mm | Z | N° Art. HSS | € | N° Art. HSS | € | N° Art. HSS | € |
|-----------------|-------------|---------|---------|---------|---------|---|----------------|---------------|----------------|---------------|----------------|---------------|
| MF17 | 1,50 | 70 | 22 | 12,00 | 9,00 | 4 | 59562 | 28,26 | | | | |
| MF18 | 1,00 | 80 | 22 | 14,00 | 11,00 | 4 | 59508 | 41,39 | | | | |
| MF18 | 1,25 | 80 | 22 | 14,00 | 11,00 | 4 | 59509 | 58,66 | | | | |
| MF18 | 1,50 | 80 | 22 | 14,00 | 11,00 | 4 | 45039 | 28,33 | | | | |
| MF18 | 2,00 | 80 | 22 | 14,00 | 11,00 | 4 | 59510 | 44,97 | | | | |
| M18 | 2,50 | 95 | 40 | 14,00 | 11,00 | 4 | 76452 | 25,58 | 11916 | 25,58 | 66249 | 25,58 |
| MF19 | 1,25 | 80 | 22 | 14,00 | 11,00 | 4 | 59511 | 86,31 | | | | |
| MF19 | 1,50 | 80 | 22 | 14,00 | 11,00 | 4 | 59512 | 87,82 | | | | |
| MF19 | 2,00 | 80 | 22 | 14,00 | 11,00 | 4 | 59513 | 104,60 | | | | |
| MF20 | 1,00 | 80 | 22 | 16,00 | 12,00 | 4 | 59514 | 55,13 | | | | |
| MF20 | 1,25 | 80 | 22 | 16,00 | 12,00 | 4 | 59515 | 86,39 | | | | |
| MF20 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 76476 | 35,50 | | | | |
| MF20 | 2,00 | 80 | 22 | 16,00 | 12,00 | 4 | 59516 | 46,61 | | | | |
| M20 | 2,50 | 95 | 40 | 16,00 | 12,00 | 4 | 76478 | 28,80 | 11917 | 28,80 | 17261 | 28,80 |
| MF21 | 1,00 | 80 | 22 | 16,00 | 12,00 | 4 | 59517 | 112,55 | | | | |
| MF21 | 1,25 | 80 | 22 | 16,00 | 12,00 | 4 | 59518 | 111,62 | | | | |
| MF21 | 1,50 | 80 | 22 | 16,00 | 12,00 | 4 | 59519 | 89,74 | | | | |
| MF22 | 1,00 | 80 | 22 | 18,00 | 14,50 | 4 | 59521 | 60,97 | | | | |
| MF22 | 1,25 | 80 | 22 | 18,00 | 14,50 | 4 | 59522 | 87,82 | | | | |
| MF22 | 1,50 | 80 | 22 | 18,00 | 14,50 | 4 | 76484 | 38,72 | | | | |
| MF22 | 2,00 | 80 | 22 | 18,00 | 14,50 | 4 | 76485 | 62,01 | | | | |
| M22 | 2,50 | 100 | 40 | 18,00 | 14,50 | 4 | 76486 | 38,53 | 65789 | 38,53 | 15241 | 38,53 |
| MF23 | 1,00 | 80 | 22 | 18,00 | 14,50 | 4 | 59523 | 112,46 | | | | |
| MF23 | 1,50 | 80 | 22 | 18,00 | 14,50 | 4 | 59524 | 111,52 | | | | |
| MF24 | 1,25 | 90 | 22 | 18,00 | 14,50 | 4 | 59525 | 113,49 | | | | |
| MF24 | 2,00 | 90 | 22 | 18,00 | 14,50 | 4 | 59526 | 68,75 | | | | |
| M24 | 3,00 | 110 | 50 | 18,00 | 14,50 | 4 | 76493 | 45,16 | 58475 | 45,16 | 12505 | 45,16 |
| MF25 | 1,00 | 90 | 22 | 18,00 | 14,50 | 4 | 59527 | 98,50 | | | | |
| MF25 | 1,25 | 90 | 22 | 18,00 | 14,50 | 4 | 59528 | 159,03 | | | | |
| MF25 | 2,00 | 90 | 22 | 18,00 | 14,50 | 4 | 59561 | 166,29 | | | | |
| MF26 | 1,00 | 90 | 22 | 18,00 | 14,50 | 4 | 59529 | 86,76 | | | | |
| MF26 | 1,50 | 90 | 22 | 18,00 | 14,50 | 4 | 59530 | 77,78 | | | | |
| MF26 | 2,00 | 90 | 22 | 18,00 | 14,50 | 4 | 59531 | 95,52 | | | | |
| MF27 | 1,00 | 90 | 22 | 20,00 | 16,00 | 4 | 59532 | 96,65 | | | | |
| MF27 | 1,50 | 90 | 22 | 20,00 | 16,00 | 4 | 59533 | 86,20 | | | | |
| M27 | 3,00 | 110 | 50 | 20,00 | 16,00 | 4 | 76505 | 58,14 | 10836 | 58,14 | 66294 | 58,14 |
| MF28 | 1,00 | 90 | 22 | 20,00 | 16,00 | 4 | 59534 | 160,49 | | | | |
| MF28 | 1,50 | 90 | 22 | 20,00 | 16,00 | 4 | 59535 | 86,41 | | | | |
| MF30 | 1,00 | 90 | 22 | 22,00 | 18,00 | 4 | 16388 | 120,54 | | | | |
| MF30 | 1,50 | 90 | 22 | 22,00 | 18,00 | 4 | 59536 | 89,63 | | | | |
| M30 | 3,50 | 125 | 50 | 22,00 | 18,00 | 4 | 76512 | 74,44 | 26582 | 74,44 | 13046 | 74,44 |
| New! M32 | 1,50 | 90 | 22 | 22,00 | 18,00 | 4 | 25967 | 125,06 | | | | |
| MF33 | 1,50 | 100 | 25 | 25,00 | 20,00 | 4 | 59537 | 121,59 | | | | |
| MF33 | 2,00 | 100 | 25 | 25,00 | 20,00 | 4 | 59538 | 144,57 | | | | |
| M33 | 3,50 | 125 | 56 | 25,00 | 20,00 | 4 | 76519 | 93,89 | 66307 | 93,89 | 66308 | 93,89 |
| MF34 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 59539 | 131,58 | | | | |
| MF35 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 59540 | 145,92 | | | | |
| MF36 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 59541 | 140,93 | | | | |
| MF36 | 3,00 | 125 | 40 | 28,00 | 22,00 | 4 | 59542 | 246,06 | | | | |
| M36 | 4,00 | 150 | 63 | 28,00 | 22,00 | 4 | 76525 | 119,80 | 66317 | 119,80 | 38036 | 119,80 |
| MF38 | 1,50 | 100 | 25 | 28,00 | 22,00 | 4 | 59543 | 158,55 | | | | |
| MF38 | 2,00 | 125 | 40 | 28,00 | 22,00 | 4 | 59544 | 225,95 | | | | |
| MF39 | 1,50 | 110 | 25 | 32,00 | 24,00 | 4 | 59545 | 212,64 | | | | |
| MF39 | 2,00 | 125 | 40 | 32,00 | 24,00 | 4 | 59546 | 210,88 | | | | |
| MF39 | 3,00 | 125 | 40 | 28,00 | 22,00 | 4 | 59547 | 208,64 | | | | |
| M39 | 4,00 | 150 | 63 | 32,00 | 24,00 | 4 | 76531 | 134,04 | 66328 | 134,04 | 66329 | 134,04 |
| MF40 | 1,50 | 110 | 25 | 32,00 | 24,00 | 4 | 59548 | 187,75 | | | | |
| MF40 | 2,00 | 125 | 40 | 32,00 | 24,00 | 4 | 59549 | 214,49 | | | | |
| MF40 | 3,00 | 125 | 40 | 32,00 | 24,00 | 4 | 59550 | 216,06 | | | | |
| MF42 | 1,50 | 110 | 25 | 32,00 | 24,00 | 4 | 14781 | 248,40 | | | | |
| MF42 | 2,00 | 125 | 40 | 32,00 | 24,00 | 4 | 59551 | 249,49 | | | | |
| MF42 | 3,00 | 125 | 40 | 32,00 | 24,00 | 4 | 59552 | 245,41 | | | | |
| M42 | 4,50 | 150 | 63 | 32,00 | 24,00 | 4 | 76538 | 167,70 | 66342 | 167,70 | 61071 | 167,70 |
| MF45 | 1,50 | 110 | 25 | 36,00 | 29,00 | 6 | 16389 | 280,64 | | | | |
| MF45 | 2,00 | 125 | 40 | 36,00 | 29,00 | 6 | 59553 | 292,16 | | | | |
| MF45 | 3,00 | 125 | 40 | 36,00 | 29,00 | 6 | 59554 | 297,02 | | | | |
| M45 | 4,50 | 160 | 70 | 36,00 | 29,00 | 6 | 76542 | 193,61 | 32663 | 193,61 | 32664 | 193,61 |
| MF48 | 1,50 | 140 | 40 | 36,00 | 29,00 | 6 | 16390 | 316,29 | | | | |
| MF48 | 2,00 | 140 | 40 | 36,00 | 29,00 | 6 | 59555 | 390,80 | | | | |
| MF48 | 3,00 | 140 | 40 | 36,00 | 29,00 | 6 | 59556 | 353,71 | | | | |
| M48 | 5,00 | 180 | 75 | 36,00 | 29,00 | 6 | 76546 | 233,10 | 66355 | 233,10 | 66356 | 233,10 |
| MF50 | 1,50 | 140 | 40 | 36,00 | 29,00 | 6 | 59557 | 283,39 | | | | |
| MF52 | 1,50 | 140 | 40 | 40,00 | 32,00 | 6 | 59558 | 303,14 | | | | |
| MF52 | 2,00 | 140 | 40 | 40,00 | 32,00 | 6 | 59559 | 439,72 | | | | |
| MF52 | 3,00 | 140 | 40 | 40,00 | 32,00 | 6 | 59560 | 401,56 | | | | |
| M52 | 5,00 | 180 | 75 | 40,00 | 32,00 | 6 | 76551 | 282,96 | 66367 | 282,96 | 66368 | 282,96 |

MF N°1
bajo demanda
upon request
sur demande

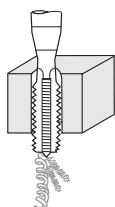
Ref. **3023****MACHO MANO PERFIL ROSCA COMPLETA**

Whole Thread Profile Hand Tap

Taraud à main profil filetage complet



HSS

DIN
352Tol.
6H α
 $10^\circ \pm 2$ Grupo
Group-Groupe
PSubgrup.
Subgroup-
P.1Grupo
Group-Groupe
KGrupo
Group-Groupe
NSubgrup.
Subgroup-
N.1 - N.3
N.4 - N.5 $\leq 2D$

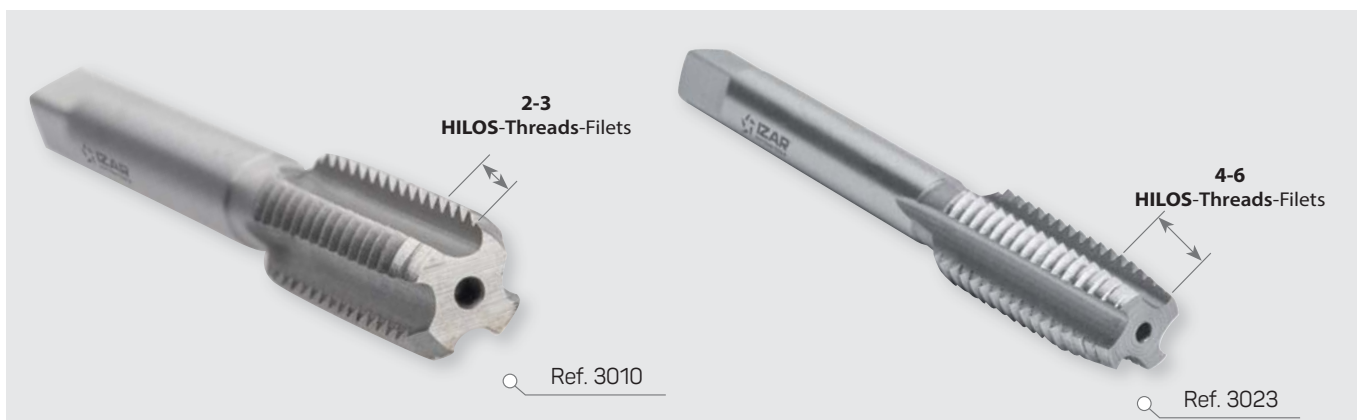
| M | P | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|-----|------|---------|---------|---------|---------|---|----------------|-------|
| M3 | 0,50 | 40 | 11 | 3,50 | 2,70 | 3 | 46263 | 8,25 |
| M4 | 0,70 | 45 | 13 | 4,50 | 3,40 | 3 | 46264 | 8,25 |
| M5 | 0,80 | 50 | 16 | 6,00 | 4,90 | 3 | 46265 | 8,75 |
| M6 | 1,00 | 50 | 19 | 6,00 | 4,90 | 3 | 46266 | 8,75 |
| M8 | 1,25 | 56 | 22 | 6,00 | 4,90 | 4 | 46267 | 10,68 |
| M10 | 1,50 | 70 | 24 | 7,00 | 5,50 | 4 | 46268 | 13,12 |
| M12 | 1,75 | 75 | 29 | 9,00 | 7,00 | 4 | 46269 | 18,48 |
| M16 | 2,00 | 80 | 32 | 12,00 | 9,00 | 4 | 46270 | 28,94 |
| M20 | 2,50 | 95 | 40 | 16,00 | 12,00 | 4 | 46271 | 43,20 |



Macho único que **finaliza la rosca completa** en agujeros pasantes. Espesor material <1,5 mm. Viruta media/larga.

Single tap for **whole thread finishing** in through holes. Material thickness <1,5 mm. Medium/long chip removal.

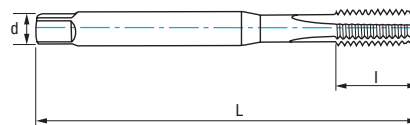
Guidage et filetage **complet** sur trous débouchants. Épaisseur matériel <1,5 mm. Copeaux moyens/longs.



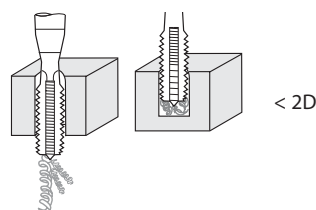
Ref. 3144

MACHO RECTO MÁQUINA UNC

UNC Machine Straight Tap
Taraud droit machine UNC



| | | | | | | |
|-----|------|---------|--------|---------|-----------------|--|
| PMX | HARD | DIN 371 | C 2-3h | Tol. 2B | α 10-14° | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|-----|------|---------|--------|---------|-----------------|--|



| Material | | Vc (m/min) * |
|----------|------|--------------|
| Grupo | Sub. | HARD |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

* Posible Uso en Seco: Vc -50 %
 * Possible Dry-Use: Vc -50%
 * Emploi possible à sec: Vc -50 %

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

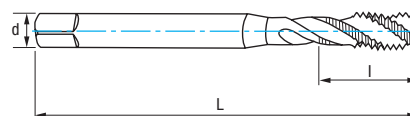
| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|----------|-------------------------|---------|---------|---------|---------|---|-----------------|-------|
| UNC N°10 | 24 | 70 | 13 | 6,00 | 4,90 | 3 | 71378 | 43,91 |
| UNC 1/4 | 20 | 80 | 15 | 7,00 | 5,50 | 3 | 71372 | 47,87 |
| UNC 5/16 | 18 | 90 | 18 | 8,00 | 6,20 | 3 | 71376 | 54,59 |
| UNC 3/8 | 16 | 90 | 20 | 9,00 | 7,00 | 3 | 71374 | 65,27 |



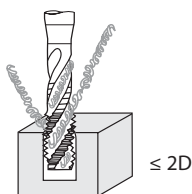
Ref. 3104

MACHO HELICOIDAL MÁQUINA UNC

UNC Machine Spiral Tap
Taraud hélicoïdal machine UNC



| | | | | | | |
|-----|------|---------|--------|---------|-----------------|--|
| PMX | HARD | DIN 371 | C 2-3h | Tol. 2B | α 10-14° | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|-----|------|---------|--------|---------|-----------------|--|



| Material | | Vc (m/min) * |
|----------|------|--------------|
| Grupo | Sub. | HARD |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

* Posible Uso en Seco: Vc -50 %
 * Possible Dry-Use: Vc -50%
 * Emploi possible à sec: Vc -50 %

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|----------|-------------------------|---------|---------|---------|---------|---|-----------------|-------|
| UNC N°10 | 24 | 70 | 8 | 6,00 | 4,90 | 3 | 69500 | 48,78 |
| UNC 1/4 | 20 | 80 | 10 | 7,00 | 5,50 | 3 | 69502 | 50,39 |
| UNC 5/16 | 18 | 90 | 13 | 8,00 | 6,20 | 3 | 69503 | 60,65 |
| UNC 3/8 | 16 | 90 | 15 | 9,00 | 7,00 | 3 | 69505 | 72,53 |



Ref. **3134**

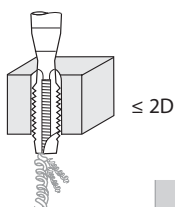
MACHO RECTO MÁQUINA UNC MANGO REFORZADO

Reinforced Shank UNC Machine Straight Tap

Taraud droit machine UNC queue renforcée



| | | | | | | | |
|--------------|------------|-------------|------------|-----|--------------------|-----|--|
| HSSE 5%Co | DIN 371 | B 3,5-5h | Tol. 2B | GUN | α 10-14° | 60° | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|--------------|------------|-------------|------------|-----|--------------------|-----|--|



| UNC | Hilos Threads | Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|----------|------------------|--------|---------|---------|---------|---------|---|------------------|-------|
| UNC N°5 | 40 | | 56 | 9 | 3,50 | 2,70 | 3 | 75627 | 30,58 |
| UNC N°6 | 32 | | 56 | 11 | 4,00 | 3,00 | 3 | 75628 | 29,14 |
| UNC N°8 | 32 | | 63 | 12 | 4,50 | 3,40 | 3 | 75629 | 29,14 |
| UNC N°10 | 24 | | 70 | 13 | 6,00 | 4,90 | 3 | 75630 | 30,58 |
| UNC N°12 | 24 | | 80 | 15 | 6,00 | 4,90 | 3 | 75631 | 32,09 |
| UNC 1/4 | 20 | | 80 | 15 | 7,00 | 5,50 | 3 | 75527 | 24,71 |
| UNC 5/16 | 18 | | 90 | 18 | 8,00 | 6,20 | 3 | 75531 | 28,80 |
| UNC 3/8 | 16 | | 90 | 20 | 9,00 | 7,00 | 3 | 75529 | 31,08 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas)
 $P = \frac{25,40}{\text{Hilos Threads - Filets}}$
 $V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$
 $\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$



Ref. **3234**

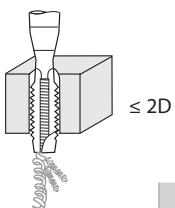
MACHO RECTO MÁQUINA UNC

UNC Machine Straight Tap

Taraud droit machine UNC



| | | | | | | | |
|--------------|------------|-------------|------------|-----|--------------------|-----|--|
| HSSE 5%Co | DIN 376 | B 3,5-5h | Tol. 2B | GUN | α 10-14° | 60° | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|--------------|------------|-------------|------------|-----|--------------------|-----|--|



| UNC | Hilos Threads | Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|----------|------------------|--------|---------|---------|---------|---------|---|------------------|--------|
| UNC 7/16 | 14 | | 100 | 20 | 8,00 | 6,20 | 3 | 70521 | 44,11 |
| UNC 1/2 | 13 | | 110 | 23 | 9,00 | 7,00 | 3 | 70512 | 48,35 |
| UNC 9/16 | 12 | | 110 | 25 | 11,00 | 9,00 | 3 | 70522 | 65,84 |
| UNC 5/8 | 11 | | 110 | 25 | 12,00 | 9,00 | 3 | 70516 | 64,13 |
| UNC 3/4 | 10 | | 125 | 30 | 14,00 | 11,00 | 3 | 70513 | 84,82 |
| UNC 7/8 | 9 | | 140 | 30 | 18,00 | 14,50 | 3 | 70519 | 111,53 |
| UNC 1" | 8 | | 160 | 36 | 18,00 | 14,50 | 3 | 70524 | 146,51 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas)
 $P = \frac{25,40}{\text{Hilos Threads - Filets}}$
 $V_f \text{ (mm/min.)} = \text{r.p.m.} \times f$
 $\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$

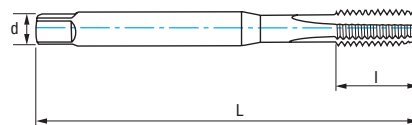


Ref. 3114

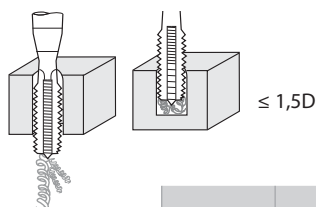
MACHO RECTO MÁQUINA UNC MANGO REFORZADO

Reinforced Shank UNC Machine Straight Tap

Taraud droit machine UNC queue renforcée



| | | | | | | | |
|--------------|------------|-----------|------------|--|---------------------|--|--|
| HSSE 5%Co | DIN 371 | C 2-3h | Tol. 2B | | α 10° ± 2 | | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|--------------|------------|-----------|------------|--|---------------------|--|--|



| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|----------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| UNC N°5 | 40 | 56 | 11 | 3,50 | 2,70 | 3 | 75615 | 25,51 |
| UNC N°6 | 32 | 56 | 13 | 4,00 | 3,00 | 3 | 75616 | 24,26 |
| UNC N°8 | 32 | 63 | 13 | 4,50 | 3,40 | 3 | 75617 | 24,26 |
| UNC N°10 | 24 | 70 | 16 | 6,00 | 4,90 | 3 | 75618 | 25,51 |
| UNC N°12 | 24 | 80 | 17 | 6,00 | 4,90 | 3 | 75619 | 26,75 |
| UNC 1/4 | 20 | 80 | 19 | 7,00 | 5,50 | 3 | 75507 | 22,63 |
| UNC 5/16 | 18 | 90 | 22 | 8,00 | 6,20 | 3 | 16693 | 26,07 |
| UNC 3/8 | 16 | 90 | 22 | 9,00 | 7,00 | 3 | 75509 | 29,81 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

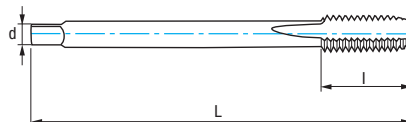


Ref. 3214

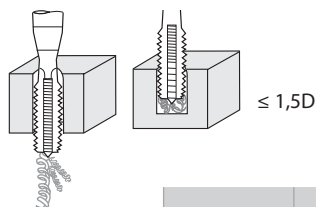
MACHO RECTO MÁQUINA UNC

UNC Machine Straight Tap

Taraud droit machine UNC



| | | | | | | | |
|--------------|------------|-----------|------------|--|---------------------|--|--|
| HSSE 5%Co | DIN 376 | C 2-3h | Tol. 2B | | α 10° ± 2 | | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|--------------|------------|-----------|------------|--|---------------------|--|--|



| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| UNC 7/16 | 14 | 100 | 22 | 8,00 | 6,20 | 4 | 70485 | 40,18 |
| UNC 1/2 | 13 | 110 | 25 | 9,00 | 7,00 | 4 | 70486 | 44,05 |
| UNC 9/16 | 12 | 110 | 26 | 11,00 | 9,00 | 4 | 70488 | 60,03 |
| UNC 5/8 | 11 | 110 | 28 | 12,00 | 9,00 | 4 | 70489 | 58,26 |
| UNC 3/4 | 10 | 125 | 30 | 14,00 | 11,00 | 4 | 70491 | 77,15 |
| UNC 7/8 | 9 | 140 | 32 | 18,00 | 14,50 | 4 | 70492 | 101,48 |
| UNC 1" | 8 | 160 | 36 | 18,00 | 14,50 | 4 | 70494 | 133,23 |
| UNC 1"1/8 | 7 | 180 | 40 | 22,00 | 18,00 | 4 | 75339 | 161,57 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

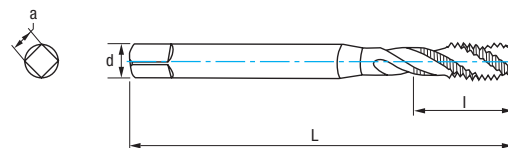
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$



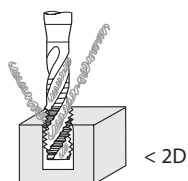
Ref. 3154

MACHO HELICOIDAL MÁQUINA UNC MANGO REFORZADO

Reinforced Shank UNC Machine Spiral Tap
Taraud hélicoïdal machine UNC queue renforcée



| | | | | | | | |
|--------------|------------|-----------|------------|--|------------------------------|--|--|
| HSSE 5%Co | DIN 371 | C 2-3h | Tol. 2B | | α $10^\circ \pm 2$ | | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|--------------|------------|-----------|------------|--|------------------------------|--|--|



| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|----------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| UNC N°5 | 40 | 56 | 5 | 3,50 | 2,70 | 3 | 10621 | 33,21 |
| UNC N°6 | 32 | 56 | 7 | 4,00 | 3,00 | 3 | 75634 | 33,21 |
| UNC N°8 | 32 | 63 | 7 | 4,50 | 3,40 | 3 | 59071 | 33,21 |
| UNC N°10 | 24 | 70 | 8 | 6,00 | 4,90 | 3 | 75636 | 34,84 |
| UNC N°12 | 24 | 80 | 10 | 6,00 | 4,90 | 3 | 10624 | 33,21 |
| UNC 1/4 | 20 | 80 | 10 | 7,00 | 5,40 | 3 | 75537 | 33,59 |
| UNC 5/16 | 18 | 90 | 13 | 8,00 | 6,20 | 3 | 75541 | 37,92 |
| UNC 3/8 | 16 | 90 | 15 | 9,00 | 7,00 | 3 | 75539 | 42,67 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$



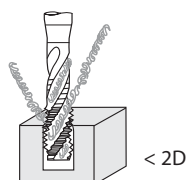
Ref. 3254

MACHO HELICOIDAL MÁQUINA UNC

UNC Machine Spiral Tap
Taraud hélicoïdal machine UNC



| | | | | | | | |
|--------------|------------|-----------|------------|--|------------------------------|--|--|
| HSSE 5%Co | DIN 376 | C 2-3h | Tol. 2B | | α $10^\circ \pm 2$ | | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|--------------|------------|-----------|------------|--|------------------------------|--|--|



| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| UNC 7/16 | 14 | 100 | 18 | 8,00 | 6,20 | 3 | 70507 | 51,72 |
| UNC 1/2 | 13 | 110 | 20 | 9,00 | 7,00 | 3 | 70495 | 56,54 |
| UNC 9/16 | 12 | 110 | 20 | 11,00 | 9,00 | 3 | 70509 | 76,77 |
| UNC 5/8 | 11 | 110 | 20 | 12,00 | 9,00 | 3 | 70500 | 74,70 |
| UNC 3/4 | 10 | 125 | 25 | 14,00 | 11,00 | 4 | 70497 | 98,91 |
| UNC 7/8 | 9 | 140 | 25 | 18,00 | 14,50 | 4 | 70506 | 154,77 |
| UNC 1" | 8 | 160 | 30 | 18,00 | 14,50 | 4 | 70510 | 194,16 |
| UNC 1 1/8" | 7 | 180 | 35 | 22,00 | 18,00 | 4 | 10627 | 240,89 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

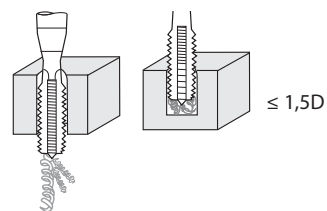
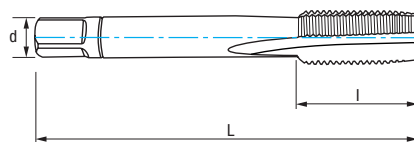


Ref. 3034

JUEGO MACHOS MANO UNC

UNC Hand Tap Set

Jeu de tarauds à main UNC



| | | | | | | | | | |
|-----|---------|--------|---------|--|---------|---------------------------|-------------------------------------|--|--|
| HSS | DIN 352 | C 2-3h | DIN 352 | | Tol. 2B | α $10^\circ \pm 2$ | N°1 Desbaste Roughing Ébauche | N°2 Semidesbaste Semiroughing Semi-Ébauche | N°3 Acabado Finishing - Finition (Ref. 3004) |
|-----|---------|--------|---------|--|---------|---------------------------|-------------------------------------|--|--|

| | | | | | | |
|-----------------------------------|---------------------------------------|-----------------------------------|-----------------------------------|--|--|--|
| Grupo Group-Gruppe P | Subgrup. Subgroup-Subgroupe P.1 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. Subgroup-Subgroupe N.1 - N.3 N.4 - N.5 | | Estándar americano para rosca gruesa U.S standard for coarse thread Norme américaine pour le filetage grossier |
|-----------------------------------|---------------------------------------|-----------------------------------|-----------------------------------|--|--|--|

| UNC | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|----------|----------------------------|---------|---------|---------|---------|---|----------------|--------|
| UNC N°4 | 40 | 40 | 12 | 3,50 | 2,70 | 3 | 75595 | 49,47 |
| UNC N°5 | 40 | 40 | 12 | 3,50 | 2,70 | 3 | 75594 | 47,11 |
| UNC N°6 | 32 | 45 | 14 | 4,00 | 3,00 | 3 | 75596 | 47,11 |
| UNC N°8 | 32 | 45 | 14 | 4,50 | 3,40 | 3 | 75597 | 47,11 |
| UNC N°10 | 24 | 50 | 16 | 6,00 | 4,90 | 3 | 75598 | 47,11 |
| UNC N°12 | 24 | 50 | 18 | 6,00 | 4,90 | 3 | 75599 | 47,11 |
| UNC 1/4 | 20 | 56 | 19 | 6,00 | 4,90 | 3 | 62732 | 47,11 |
| UNC 5/16 | 18 | 56 | 22 | 6,00 | 4,90 | 3 | 62744 | 50,89 |
| UNC 3/8 | 16 | 63 | 24 | 7,00 | 5,50 | 3 | 62738 | 57,47 |
| UNC 7/16 | 14 | 70 | 24 | 8,00 | 6,20 | 3 | 62750 | 74,93 |
| UNC 1/2 | 13 | 75 | 29 | 9,00 | 7,00 | 3 | 75115 | 86,20 |
| UNC 9/16 | 12 | 80 | 30 | 11,00 | 9,00 | 4 | 62753 | 101,78 |
| UNC 5/8 | 11 | 80 | 32 | 12,00 | 9,00 | 4 | 62741 | 140,39 |
| UNC 3/4 | 10 | 95 | 40 | 14,00 | 11,00 | 4 | 62735 | 191,10 |
| UNC 7/8 | 9 | 100 | 40 | 18,00 | 14,50 | 4 | 62747 | 235,43 |
| UNC 1" | 8 | 110 | 50 | 18,00 | 14,50 | 4 | 62756 | 317,94 |



Macho único Ref. 3004 bajo demanda

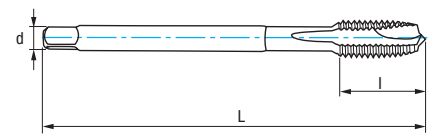
Single Tap Ref. 3004 upon request

Taraud Ref. 3004 sur demande

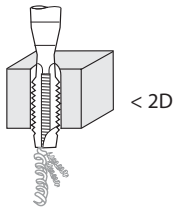


Ref. 3127

MACHO RECTO MÁQUINA UNF UNF Machine Straight Tap Taraud droit machine UNF



| | | | | | | | | |
|-----|------|---------|-------------|------------|-----|------------------------------|-----|---|
| PMX | HARD | DIN 374 | B 3,5-5h | Tol. 2B | GUN | α $10^\circ \pm 2$ | 60° | Estándar americano para rosca fina U.S. standard for fine thread Norme américaine pour le filetage fin |
|-----|------|---------|-------------|------------|-----|------------------------------|-----|---|



| Material | | Vc (m/min) * |
|----------|------|--------------|
| Grupo | Sub. | HARD |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

* Posible Uso en Seco: Vc -50 %
* Possible Dry-Use: Vc -50%
* Emploi possible à sec: Vc -50 %

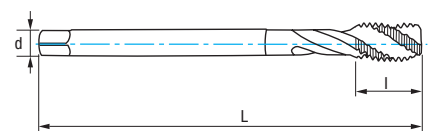
Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

| UNF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|----------|-------------------------|---------|---------|---------|---------|---|-----------------|-------|
| UNF N°10 | 32 | 70 | 13 | 3,50 | 2,70 | 3 | 71386 | 38,68 |
| UNF 1/4 | 28 | 80 | 15 | 4,50 | 3,40 | 3 | 71380 | 43,06 |
| UNF 5/16 | 24 | 90 | 18 | 6,00 | 4,90 | 3 | 71384 | 45,96 |
| UNF 3/8 | 24 | 90 | 20 | 7,00 | 5,50 | 3 | 71382 | 54,48 |

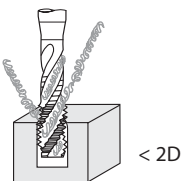


Ref. 3124

MACHO HELICOIDAL MÁQUINA UNF UNF Machine Spiral Tap Taraud hélicoïdal machine UNF



| | | | | | | | | |
|-----|------|---------|-----------|------------|-----|------------------------------|-----|---|
| PMX | HARD | DIN 374 | C 2-3h | Tol. 2B | 35° | α $10^\circ \pm 2$ | 60° | Estándar americano para rosca fina U.S. standard for fine thread Norme américaine pour le filetage fin |
|-----|------|---------|-----------|------------|-----|------------------------------|-----|---|



| Material | | Vc (m/min) * |
|----------|------|--------------|
| Grupo | Sub. | HARD |
| P | P.2 | 6-8 |
| | P.5 | 6-10 |
| M | | 8-14 |
| N | N.1 | 10-15 |
| | N.2 | 12-20 |

* Posible Uso en Seco: Vc -50 %
* Possible Dry-Use: Vc -50%
* Emploi possible à sec: Vc -50 %

Avance $f = P$ (Paso - Pitch - Pas)
 V_f (mm/min.) = r.p.m. x f
 $r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$

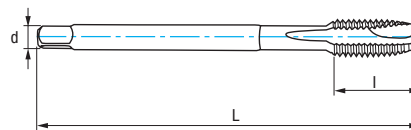
| UNF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HARD | € |
|----------|-------------------------|---------|---------|---------|---------|---|-----------------|-------|
| UNF N°10 | 32 | 70 | 8 | 3,50 | 2,70 | 3 | 69506 | 42,98 |
| UNF 1/4 | 28 | 80 | 10 | 4,50 | 3,40 | 3 | 69508 | 47,85 |
| UNF 5/16 | 24 | 90 | 13 | 6,00 | 4,90 | 3 | 69509 | 51,07 |
| UNF 3/8 | 24 | 90 | 15 | 7,00 | 5,50 | 3 | 69511 | 60,53 |



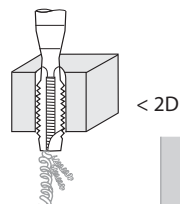
Ref. 3204

MACHO RECTO MÁQUINA UNF

UNF Machine Straight Tap
Taraud droit machine UNF



| | | | | | | | |
|--------------|------------|-------------|------------|-----|----------------------|-----|---|
| HSSE 5%Co | DIN 374 | B 3,5-5h | Tol. 2B | GUN | α 10 - 14° | 60° | Estándar americano para rosca fina U.S. standard for fine thread Norme américaine pour le filetage fin |
|--------------|------------|-------------|------------|-----|----------------------|-----|---|



| UNF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| UNF N°5 | 44 | 56 | 9 | 2,20 | | 3 | 59868 | 19,38 |
| UNF N°6 | 40 | 56 | 11 | 2,50 | 2,10 | 3 | 59869 | 17,52 |
| UNF N°8 | 36 | 63 | 12 | 2,80 | 2,10 | 3 | 59870 | 17,52 |
| UNF N°10 | 32 | 70 | 13 | 3,50 | 2,70 | 3 | 59073 | 18,16 |
| UNF N°12 | 28 | 80 | 15 | 4,00 | 3,00 | 3 | 59871 | 21,42 |
| UNF 1/4 | 28 | 80 | 15 | 4,50 | 3,40 | 3 | 75744 | 18,91 |
| UNF 5/16 | 24 | 90 | 18 | 6,00 | 4,90 | 3 | 75751 | 21,78 |
| UNF 3/8 | 24 | 90 | 20 | 7,00 | 5,50 | 3 | 62933 | 22,23 |
| UNF 7/16 | 20 | 100 | 20 | 8,00 | 6,20 | 3 | 70461 | 32,15 |
| UNF 1/2 | 20 | 100 | 22 | 9,00 | 7,00 | 3 | 70465 | 34,27 |
| UNF 9/16 | 18 | 100 | 22 | 11,00 | 9,00 | 3 | 70467 | 42,03 |
| UNF 5/8 | 18 | 100 | 22 | 12,00 | 9,00 | 3 | 70468 | 47,32 |
| UNF 3/4 | 16 | 100 | 25 | 14,00 | 11,00 | 3 | 70470 | 60,61 |
| UNF 7/8 | 14 | 125 | 24 | 18,00 | 14,50 | 3 | 59872 | 67,54 |
| UNF 1" | 12 | 140 | 26 | 18,00 | 14,50 | 3 | 59873 | 88,50 |
| UNF 1 1/8" | 12 | 150 | 28 | 22,00 | 18,00 | 4 | 59874 | 120,69 |

| Material | Vc (m/min) | |
|------------|------------|-------|
| Grupo Sub. | 5%Co | |
| P P.1 | 6-10 | |
| K K.1 | 7-10 | |
| K K.2 | 4-7 | |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

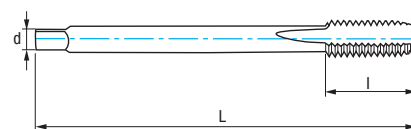


Ref. 3204
bajo demanda
upon request
sur demande

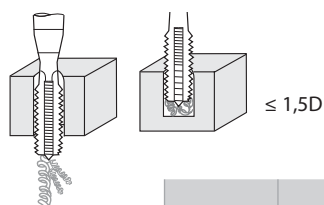
Ref. 3224

MACHO RECTO MÁQUINA UNF

UNF Machine Straight Tap
Taraud droit machine UNF



| | | | | | | | |
|--------------|------------|-----------|------------|--|---------------------|-----|---|
| HSSE 5%Co | DIN 374 | C 2-3h | Tol. 2B | | α 10° ± 2 | 60° | Estándar americano para rosca fina U.S. standard for fine thread Norme américaine pour le filetage fin |
|--------------|------------|-----------|------------|--|---------------------|-----|---|



| UNF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|----------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| UNF 5/16 | 24 | 90 | 22 | 6,00 | 4,90 | 3 | 22576 | 17,87 |
| UNF 3/8 | 24 | 90 | 20 | 7,00 | 5,50 | 3 | 20655 | 19,22 |
| UNF 7/16 | 20 | 100 | 20 | 8,00 | 6,20 | 3 | 22578 | 26,42 |
| UNF 1/2 | 20 | 100 | 22 | 9,00 | 7,00 | 3 | 22579 | 28,13 |
| UNF 9/16 | 18 | 100 | 22 | 11,00 | 9,00 | 3 | 70543 | 34,58 |
| UNF 5/8 | 18 | 100 | 22 | 12,00 | 9,00 | 3 | 70537 | 38,91 |
| UNF 3/4 | 16 | 110 | 25 | 14,00 | 11,00 | 3 | 70534 | 49,79 |
| UNF 7/8 | 14 | 125 | 25 | 18,00 | 14,50 | 3 | 70540 | 62,62 |



| Material | Vc (m/min) | |
|------------|------------|-------|
| Grupo Sub. | 5%Co | |
| P P.1 | 6-10 | |
| K K.1 | 7-10 | |
| K K.2 | 4-7 | |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance $f = P$ (Paso - Pitch - Pas)

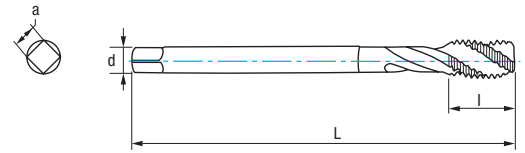
$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

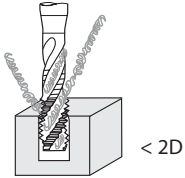
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

Ref. **3244**

MACHO HELICOIDAL MÁQUINA UNF
 UNF Machine Spiral Tap
 Taraud hélicoïdal machine UNF



| | | | | | | | |
|--------------|------------|-----------|------------|-----|--------------|-----|---|
| HSSE 5%Co | DIN 374 | C 2-3h | Tol. 2B | 35° | α 10° ± 2 | 60° | Estándar americano para rosca fina U.S. standard for fine thread Norme américaine pour le filetage fin |
|--------------|------------|-----------|------------|-----|--------------|-----|---|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

| UNF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|------------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| UNF N°5 | 44 | 56 | 5 | 2,20 | | 3 | 10633 | 24,73 |
| UNF N°6 | 40 | 56 | 7 | 2,50 | 2,10 | 3 | 10641 | 23,37 |
| UNF N°8 | 36 | 63 | 7 | 2,80 | 2,10 | 3 | 10642 | 23,45 |
| UNF N°10 | 32 | 70 | 8 | 3,50 | 2,70 | 3 | 10645 | 25,03 |
| UNF N°12 | 28 | 80 | 10 | 4,00 | 3,00 | 3 | 10648 | 29,05 |
| UNF 1/4 | 28 | 80 | 10 | 4,00 | 3,00 | 3 | 24118 | 30,01 |
| UNF 5/16 | 24 | 90 | 12 | 6,00 | 4,90 | 3 | 70459 | 30,96 |
| UNF 3/8 | 24 | 90 | 13 | 7,00 | 5,50 | 3 | 70471 | 35,62 |
| UNF 7/16 | 20 | 100 | 15 | 8,00 | 6,20 | 3 | 70479 | 46,82 |
| UNF 1/2 | 20 | 100 | 16 | 9,00 | 7,00 | 3 | 70474 | 49,83 |
| UNF 9/16 | 18 | 100 | 17 | 11,00 | 9,00 | 3 | 70480 | 61,67 |
| UNF 5/8 | 18 | 100 | 19 | 12,00 | 9,00 | 3 | 70477 | 68,91 |
| UNF 3/4 | 16 | 110 | 21 | 14,00 | 11,00 | 4 | 70476 | 88,13 |
| UNF 7/8 | 14 | 125 | 23 | 18,00 | 14,50 | 4 | 70473 | 134,82 |
| UNF 1" | 12 | 140 | 22 | 18,00 | 14,50 | 4 | 10651 | 165,25 |
| UNF 1 1/8" | 12 | 150 | 25 | 22,00 | 18,00 | 4 | 10654 | 195,68 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

$$Vf (\text{mm/min.}) = r.p.m. \times f$$

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

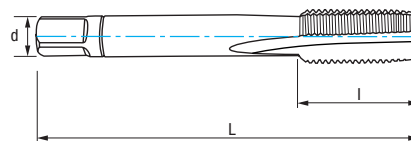


Ref. 3024

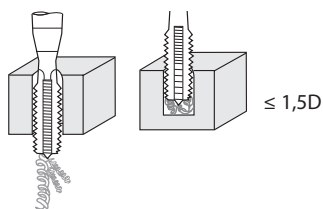
JUEGO MACHOS MANO UNF

UNF Hand Tap Set

Jeu de tarauds à main UNF



| | | | | | | | | |
|-------------------------------------|----------|--|------------|-----------------------------------|------------------------------------|-----------------------------------|--|--|
| HSS | DIN 2181 | C 2-3h | Tol. 2B | | α $10^\circ \pm 2$ | | Estándar americano para rosca fina U.S. standard for fine thread Norme américaine pour le filetage fin | |
| N°1 Desbaste Roughing Ébauche | | N°3 Acabado Finishing - Finition (Ref. 3014) | | Grupo Group-Gruppe P | Subgrup. Subgrup. P.1 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. Subgrup. N.1 - N.3 N.4 - N.5 |



| UNF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|-----------|-------------------------|---------|---------|---------|---------|---|----------------|--------|
| UNF N°5 | 44 | 40 | 9 | 3,50 | 2,70 | 3 | 75601 | 37,45 |
| UNF N°6 | 40 | 45 | 10 | 4,00 | 3,00 | 3 | 75602 | 35,90 |
| UNF N°8 | 36 | 45 | 10 | 4,50 | 3,40 | 3 | 75603 | 35,90 |
| UNF N°10 | 32 | 50 | 12 | 6,00 | 4,90 | 3 | 75604 | 35,90 |
| UNF N°12 | 28 | 50 | 12 | 6,00 | 4,90 | 3 | 75605 | 37,45 |
| UNF 1/4 | 28 | 50 | 14 | 6,00 | 4,90 | 3 | 62462 | 30,11 |
| UNF 5/16 | 24 | 56 | 22 | 6,00 | 4,90 | 3 | 62477 | 32,90 |
| UNF 3/8 | 24 | 63 | 20 | 7,00 | 5,50 | 3 | 62471 | 37,25 |
| UNF 7/16 | 20 | 63 | 20 | 8,00 | 6,20 | 3 | 62483 | 49,47 |
| UNF 1/2 | 20 | 70 | 22 | 9,00 | 7,00 | 3 | 62459 | 50,53 |
| UNF 9/16 | 18 | 70 | 22 | 11,00 | 9,00 | 4 | 62486 | 65,89 |
| UNF 5/8 | 18 | 70 | 22 | 12,00 | 9,00 | 4 | 62474 | 85,09 |
| UNF 3/4 | 16 | 80 | 22 | 14,00 | 11,00 | 4 | 62465 | 114,38 |
| UNF 7/8 | 14 | 80 | 22 | 18,00 | 14,50 | 4 | 62480 | 146,92 |
| UNF 1" | 12 | 80 | 22 | 18,00 | 14,50 | 4 | 62489 | 194,85 |
| UNF 1"1/4 | 12 | 90 | 22 | 22,00 | 18,00 | 4 | 76158 | 379,52 |



Macho único Ref. 3014 bajo demanda

Single Tap Ref. 3014 upon request

Taraud Ref. 3014 sur demande

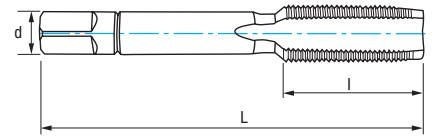


Ref. **3025**

JUEGO MACHOS MANO UNEF

UNEF Hand Tap Set

Jeu de tarauds à main UNEF



| | | | | | | |
|-----|----------|--------|---------|---------------------------|------------|--|
| HSS | DIN 2181 | C 2-3h | Tol. 2B | α $10^\circ \pm 2$ | 60° | Estándar americano para rosca extra fina U.S. standard for extra fine thread Norme américaine pour le filetage extra fin |
|-----|----------|--------|---------|---------------------------|------------|--|

N°1 Desbaste
Roughing
Ébauche

N°3 Acabado
Finishing - Finition
(Ref. 3014)

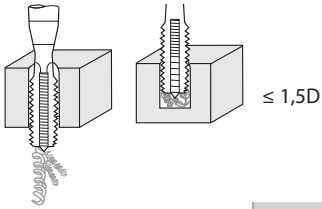
Grupo
Group-Gruppe
P

Subgrup.
Subgroup.
P.1

Grupo
Group-Gruppe
K

Grupo
Group-Gruppe
N

Subgrup.
Subgroup.
N.1 - N.3
N.4 - N.5



| UNEF | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|-----------|-------------------------|---------|---------|---------|---------|---|----------------|---------------|
| UNEF 1/4 | 32 | 50 | 18 | 6 | 4,90 | 3 | 38269 | 76,29 |
| UNEF 5/16 | 32 | 56 | 22 | 6 | 4,90 | 3 | 75857 | 85,22 |
| UNEF 3/8 | 32 | 63 | 22 | 7 | 5,50 | 3 | 75863 | 97,51 |
| UNEF 7/16 | 28 | 63 | 22 | 8 | 6,20 | 4 | 38270 | 124,12 |
| UNEF 1/2 | 28 | 75 | 24 | 9 | 7,00 | 4 | 75876 | 140,25 |
| UNEF 9/16 | 24 | 80 | 28 | 11 | 9,00 | 4 | 16853 | 164,07 |
| UNEF 5/8 | 24 | 80 | 28 | 12 | 9,00 | 4 | 38271 | 228,36 |
| UNEF 3/4 | 20 | 95 | 32 | 14 | 11,00 | 4 | 38272 | 338,15 |
| UNEF 1" | 20 | 110 | 40 | 18 | 14,50 | 4 | 38273 | 483,86 |

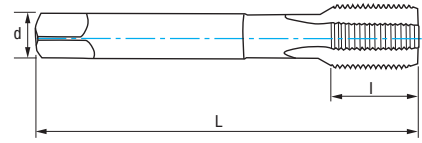


Ref. **3209**

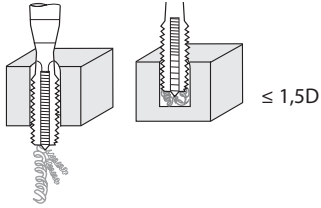
MACHO RECTO MÁQUINA UN

UN Machine Straight Tap

Taraud droit machine UN



| | | | | | | | |
|---------------------|------------|-----------|------------|--|------------------------------|--|---|
| HSSE 5%Co | DIN 374 | C 2-3h | Tol. 2B | | α $10^\circ \pm 2$ | | Estándar americano para rosca de paso fijo U.S. standard for fixed pitch Norme américaine pour le filetage à pas fixe |
|---------------------|------------|-----------|------------|--|------------------------------|--|---|



| Material | | Vc (m/min) |
|----------|------------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

| UN | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|----------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| UN 1"1/8 | 8 | 180 | 45 | 22 | 18,00 | 4 | 38311 | 190,74 |
| UN 1"1/4 | 8 | 180 | 45 | 22 | 18,00 | 4 | 38312 | 246,07 |
| UN 1"3/8 | 8 | 200 | 56 | 28 | 22,00 | 4 | 38313 | 279,14 |
| UN 1"1/2 | 8 | 200 | 60 | 32 | 24,00 | 5 | 38314 | 366,50 |
| UN 1"5/8 | 8 | 200 | 60 | 32 | 24,00 | 5 | 38315 | 428,71 |
| UN 1"3/4 | 8 | 200 | 50 | 36 | 29,00 | 5 | 38316 | 522,23 |
| UN 2" | 8 | 225 | 50 | 40 | 32,00 | 5 | 38317 | 559,56 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

V_f (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

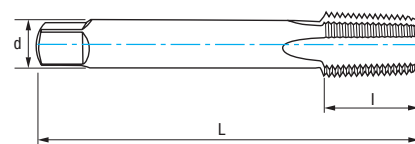


Ref. 3107

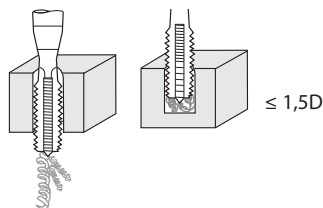
MACHO RECTO MÁQUINA NPT

NPT Machine Straight Tap

Taraud droit machine NPT



| | | | | | | |
|--------------|------------|-----------|--|---------------------|--|---|
| HSSE 5%Co | DIN 374 | C 2-3h | | α 10° ± 2 | | Estándar americano para tubos y acoples U.S. standard thread for sealing pipes and fittings Norme américaine pour les tuyaux et les raccords |
|--------------|------------|-----------|--|---------------------|--|---|



| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

| NPT | Hilos Threads | Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-----------|------------------|--------|---------|---------|---------|---------|---|------------------|--------|
| NPT 1/8 | 27,00 | | 90 | 20,00 | 7 | 5,50 | 3 | 77890 | 41,92 |
| NPT 1/4 | 18,00 | | 100 | 22,00 | 11 | 9,00 | 3 | 15165 | 51,11 |
| NPT 3/8 | 18,00 | | 100 | 22,00 | 12 | 9,00 | 4 | 75872 | 65,68 |
| NPT 1/2 | 14,00 | | 125 | 28,00 | 16 | 12,00 | 4 | 15830 | 85,50 |
| NPT 3/4 | 14,00 | | 140 | 28,00 | 20 | 16,00 | 4 | 77892 | 132,46 |
| NPT 1" | 11,50 | | 160 | 38,00 | 25 | 20,00 | 4 | 17937 | 172,15 |
| NPT 1"1/2 | 11,50 | | 190 | 42,00 | 36 | 29,00 | 6 | 17941 | 370,16 |
| NPT 2" | 11,50 | | 220 | 52,00 | 45 | 35,00 | 6 | 17946 | 580,56 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

$$Vf (\text{mm/min.}) = \text{r.p.m.} \times f$$

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$



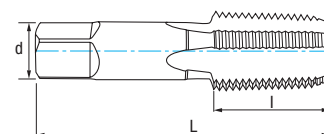
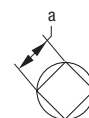
Ref. 3107 bajo demanda / upon request / sur demande

Ref. 3017

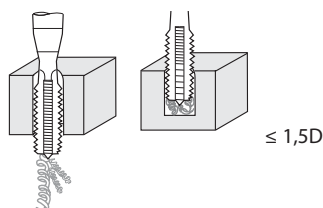
MACHO ÚNICO MANO NPT

NPT Hand Single Tap

Taraud à main NPT



| | | | | | | |
|-----|-------------|--|--------|---------------------|--|---|
| HSS | DIN 2181 | | 1,5-2h | α 10° ± 2 | | Estándar americano para tubos y acoples U.S. standard thread for sealing pipes and fittings Norme américaine pour les tuyaux et les raccords |
|-----|-------------|--|--------|---------------------|--|---|



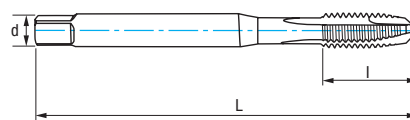
| NPT | Hilos Threads | Filets | L mm | l mm | d mm | a mm | Z | N° Art. HSS | € |
|-----------|------------------|--------|---------|---------|---------|---------|---|----------------|--------|
| NPT 1/8 | 27,00 | | 65 | 19 | 7 | 5,50 | 3 | 62315 | 28,16 |
| NPT 1/4 | 18,00 | | 70 | 25 | 11 | 9,00 | 3 | 62309 | 39,52 |
| NPT 3/8 | 18,00 | | 75 | 26 | 12 | 9,00 | 4 | 62327 | 54,51 |
| NPT 1/2 | 14,00 | | 80 | 31 | 16 | 12,00 | 4 | 62303 | 76,29 |
| NPT 3/4 | 14,00 | | 100 | 33 | 20 | 16,00 | 4 | 62321 | 116,54 |
| NPT 1" | 11,50 | | 110 | 38 | 25 | 20,00 | 4 | 62330 | 129,83 |
| NPT 1"1/4 | 11,50 | | 125 | 41 | 32 | 24,00 | 6 | 17945 | 212,87 |
| NPT 1"1/2 | 11,50 | | 140 | 42 | 36 | 29,00 | 6 | 17944 | 323,43 |
| NPT 2" | 11,50 | | 160 | 44 | 36 | 29,00 | 6 | 76063 | 504,88 |

Ref. 3102

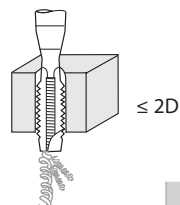
MACHO RECTO MÁQUINA BSW (WHITWORTH) MANGO REFORZADO

Reinforced Shank BSW (Whitworth) Machine Straight Tap

Taraud droit machine BSW (Whitworth) queue renforcée



| | | | | | |
|--------------|------------|-------------|-----|--------------------|---|
| HSSE 5%Co | DIN 371 | B 3,5-5h | GUN | α 10-12° | <p>Estándar británico para rosca gruesa British standard for coarse thread Norme britannique pour le filetage grossier</p> |
|--------------|------------|-------------|-----|--------------------|---|



| BSW | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| W1/8 | 40 | 56 | 11 | 3,50 | 2,70 | 3 | 62897 | 20,64 |
| W5/32 | 32 | 63 | 13 | 4,50 | 3,40 | 3 | 62915 | 20,64 |
| W3/16 | 24 | 70 | 15 | 6,00 | 4,90 | 3 | 62903 | 20,64 |
| W1/4 | 20 | 80 | 17 | 7,00 | 5,50 | 3 | 62894 | 23,50 |
| W5/16 | 18 | 90 | 20 | 8,00 | 6,20 | 3 | 62912 | 27,51 |
| W3/8 | 16 | 100 | 22 | 9,00 | 7,00 | 3 | 73766 | 30,40 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

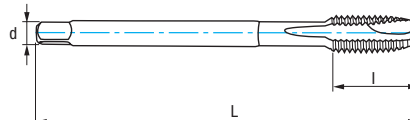


Ref. 3202

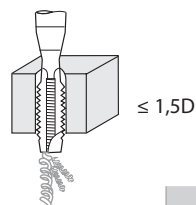
MACHO RECTO MÁQUINA BSW (WHITWORTH)

BSW (Whitworth) Machine Straight Tap

Taraud droit machine BSW (Whitworth)



| | | | | | |
|--------------|------------|-------------|-----|--------------------|---|
| HSSE 5%Co | DIN 376 | B 3,5-5h | GUN | α 10-12° | <p>Estándar británico para rosca gruesa British standard for coarse thread Norme britannique pour le filetage grossier</p> |
|--------------|------------|-------------|-----|--------------------|---|



| BSW | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| W1/4 | 20 | 80 | 17 | 4,50 | 3,40 | 3 | 59861 | 18,98 |
| W5/16 | 18 | 90 | 20 | 6,00 | 4,90 | 3 | 14979 | 22,23 |
| W3/8 | 16 | 100 | 22 | 7,00 | 5,50 | 3 | 70420 | 24,56 |
| W7/16 | 14 | 100 | 22 | 8,00 | 6,20 | 3 | 70446 | 31,02 |
| W1/2 | 12 | 110 | 24 | 9,00 | 7,00 | 3 | 70417 | 32,46 |
| W9/16 | 12 | 110 | 26 | 11,00 | 9,00 | 3 | 70447 | 44,59 |
| W5/8 | 11 | 110 | 27 | 12,00 | 9,00 | 3 | 70443 | 42,14 |
| W3/4 | 10 | 125 | 30 | 14,00 | 11,00 | 4 | 70419 | 62,86 |
| W7/8 | 9 | 140 | 32 | 18,00 | 14,50 | 4 | 70444 | 76,45 |
| W1" | 8 | 160 | 36 | 20,00 | 16,00 | 4 | 70449 | 96,11 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

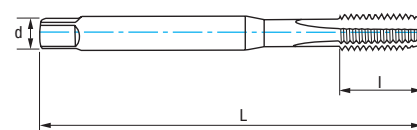
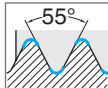
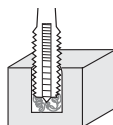
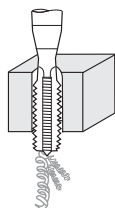
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$



Ref. **3112****MACHO RECTO MÁQUINA BSW (WHITWORTH) MANGO REFORZADO**

Reinforced Shank BSW (Whitworth) Machine Straight Tap

Taraud droit machine BSW (Whitworth) queue renforcée

HSSE
5%CoDIN
371C
2-3h α
 $10^\circ \pm 2$ 
Estándar británico para rosca gruesa
British standard for coarse thread
 Norme britannique pour le filetage grossier
 $\leq 1,5D$

| BSW | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| W3/32 | 48 | 50 | 9 | 2,80 | 2,10 | 3 | 75415 | 22,39 |
| W1/8 | 40 | 56 | 11 | 3,50 | 2,70 | 3 | 75413 | 18,69 |
| W5/32 | 32 | 63 | 13 | 4,50 | 3,40 | 3 | 75129 | 18,69 |
| W3/16 | 24 | 70 | 15 | 6,00 | 4,90 | 3 | 75414 | 18,69 |
| W7/32 | 24 | 80 | 16 | 6,00 | 4,90 | 3 | 75418 | 28,41 |
| W1/4 | 20 | 80 | 17 | 7,00 | 5,50 | 3 | 75412 | 21,32 |
| W5/16 | 18 | 90 | 20 | 8,00 | 6,20 | 3 | 75458 | 19,11 |
| W3/8 | 16 | 100 | 22 | 9,00 | 7,00 | 3 | 75456 | 27,70 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

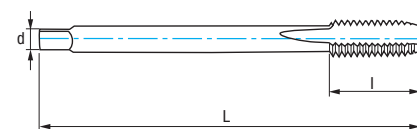
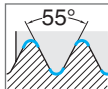
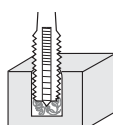
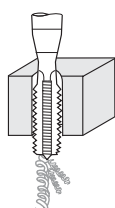
Vf (mm/min.) = r.p.m. x f

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$

Ref. **3212****MACHO RECTO MÁQUINA BSW (WHITWORTH)**

BSW (Whitworth) Machine Straight Tap

Taraud droit machine BSW (Whitworth)

HSSE
5%CoDIN
376C
2-3h α
 $10^\circ \pm 2$ 
Estándar británico para rosca gruesa
British standard for coarse thread
 Norme britannique pour le filetage grossier
 $\leq 1,5D$

| BSW | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|--------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| W3/8 | 16,00 | 100 | 22 | 7,00 | 5,50 | 3 | 70395 | 23,53 |
| W7/16 | 14,00 | 100 | 22 | 8,00 | 6,20 | 3 | 70396 | 30,99 |
| W1/2 | 12,00 | 110 | 24 | 9,00 | 7,00 | 3 | 70398 | 29,75 |
| W9/16 | 12,00 | 110 | 26 | 11,00 | 9,00 | 3 | 70399 | 42,67 |
| W5/8 | 11,00 | 110 | 27 | 12,00 | 9,00 | 3 | 70401 | 40,38 |
| W3/4 | 10,00 | 125 | 30 | 14,00 | 11,00 | 4 | 70402 | 57,18 |
| W7/8 | 9,00 | 140 | 32 | 18,00 | 14,50 | 4 | 70416 | 73,14 |
| W1" | 8,00 | 160 | 36 | 20,00 | 16,00 | 4 | 70404 | 91,96 |
| W1"1/8 | 7,00 | 180 | 40 | 22,00 | 18,00 | 4 | 70450 | 140,32 |
| W1"1/4 | 7,00 | 180 | 40 | 22,00 | 18,00 | 4 | 70452 | 203,70 |
| W1"3/8 | 6,00 | 200 | 50 | 28,00 | 22,00 | 4 | 70453 | 334,91 |
| W1"1/2 | 6,00 | 200 | 50 | 32,00 | 24,00 | 4 | 70455 | 363,60 |
| W1"5/8 | 5,00 | 220 | 58 | 36,00 | 29,00 | 4 | 70456 | 507,70 |
| W1"7/8 | 4,50 | 220 | 58 | 36,00 | 29,00 | 4 | 70458 | 663,03 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

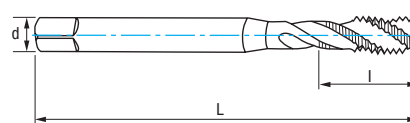
$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$



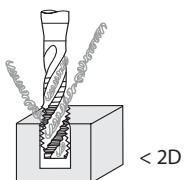
Ref. 3152

MACHO HELICOIDAL MÁQUINA BSW (WHITWORTH) MANGO REFORZADO

Reinforced Shank BSW (Whitworth) Spiral Machine Tap
Taraud helicoidal machine BSW (Whitworth) queue reforcée



| | | | | | | |
|--------------|------------|-----------|--|------------------------------|--|---|
| HSSE 5%Co | DIN 371 | C 2-3h | | α $10^\circ \pm 2$ | | Estándar británico para rosca gruesa British standard for coarse thread Norme britannique pour le filetage grossier |
|--------------|------------|-----------|--|------------------------------|--|---|



< 2D

| BSW | Hilos Threads Filets | L mm | I mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------|-------------------------|---------|---------|---------|---------|---|------------------|-------|
| W1/8 | 40 | 56 | 5 | 3,50 | 2,70 | 3 | 63152 | 23,50 |
| W5/32 | 32 | 63 | 7 | 4,50 | 3,40 | 3 | 63170 | 23,50 |
| W3/16 | 24 | 70 | 8 | 6,00 | 4,90 | 3 | 63161 | 23,50 |
| W1/4 | 20 | 80 | 10 | 7,00 | 5,50 | 3 | 63149 | 26,52 |
| W5/16 | 18 | 90 | 12 | 8,00 | 6,20 | 3 | 63167 | 31,09 |
| W3/8 | 16 | 100 | 14 | 9,00 | 7,00 | 3 | 63158 | 35,51 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

$$Vf (\text{mm/min.}) = r.p.m. \times f$$

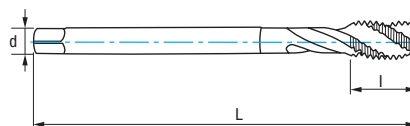
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$



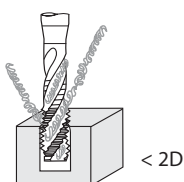
Ref. 3252

MACHO HELICOIDAL MÁQUINA BSW (WHITWORTH)

BSW (Whitworth) Machine Spiral Tap
Taraud helicoidal machine BSW (Whitworth)



| | | | | | | |
|--------------|------------|-----------|--|------------------------------|--|---|
| HSSE 5%Co | DIN 376 | C 2-3h | | α $10^\circ \pm 2$ | | Estándar británico para rosca gruesa British standard for coarse thread Norme britannique pour le filetage grossier |
|--------------|------------|-----------|--|------------------------------|--|---|



< 2D

| BSW | Hilos Threads Filets | L mm | I mm | d mm | a mm | Z | N° Art. 5% Co | € |
|-------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| W3/16 | 24 | 70 | 8 | 3,50 | 2,70 | 3 | 59857 | 18,08 |
| W1/4 | 20 | 80 | 13 | 4,50 | 3,40 | 3 | 59858 | 24,50 |
| W5/16 | 18 | 90 | 14 | 6,00 | 4,90 | 3 | 59859 | 28,72 |
| W3/8 | 16 | 100 | 16 | 7,00 | 5,50 | 3 | 70408 | 31,70 |
| W7/16 | 14 | 100 | 16 | 8,00 | 6,20 | 3 | 70411 | 45,65 |
| W1/2 | 12 | 110 | 18 | 9,00 | 7,00 | 3 | 70405 | 43,76 |
| W9/16 | 12 | 110 | 20 | 11,00 | 9,00 | 3 | 70413 | 62,21 |
| W5/8 | 11 | 110 | 20 | 12,00 | 9,00 | 3 | 70410 | 59,33 |
| W3/4 | 10 | 125 | 25 | 14,00 | 11,00 | 4 | 70407 | 79,47 |
| W7/8 | 9 | 140 | 27 | 18,00 | 14,50 | 4 | 10909 | 84,83 |
| W1" | 8 | 160 | 30 | 20,00 | 16,00 | 4 | 70414 | 134,96 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

$$Vf (\text{mm/min.}) = r.p.m. \times f$$

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

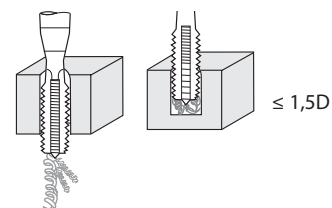
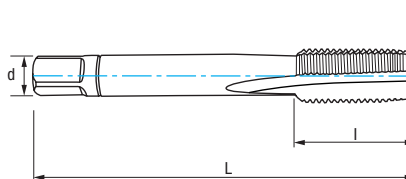


Ref. **3032**

JUEGO MACHOS MANO BSW (WHITWORTH)

BSW (Whitworth) Hand Tap Set

Jeu de tarauds à main BSW (Whitworth)



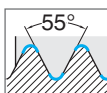
HSS

DIN 352

C 2-3h



α $10^\circ \pm 2$



Estándar británico para rosca gruesa
British standard for coarse thread

Norme britannique pour le filetage grossier

Nº1 Desbaste
Roughing
Ébauche

Nº2 Semidesbaste
Semiroughing
Semi-Ébauche

Nº3 Acabado
Finishing - Finition
(Ref. 3012)

Grupo Group-Gruppe
P

Subgrup. Subgroup.
P.1

Grupo Group-Gruppe
K

Grupo Group-Gruppe
N

Subgrup. Subgroup.
N.1 - N.3
N.4 - N.5

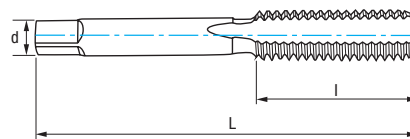
| BSW | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|--------|----------------------------|---------|---------|---------|---------|---|----------------|----------|
| W3/32 | 48,00 | 36 | 10 | 2,80 | 2,10 | 3 | 62663 | 31,28 |
| W1/8 | 40,00 | 40 | 12 | 3,50 | 2,70 | 3 | 62642 | 25,45 |
| W5/32 | 32,00 | 45 | 14 | 4,50 | 3,40 | 3 | 62675 | 25,45 |
| W3/16 | 24,00 | 50 | 18 | 6,00 | 4,90 | 3 | 62660 | 25,45 |
| W7/32 | 24,00 | 50 | 18 | 6,00 | 4,90 | 3 | 62684 | 38,48 |
| W1/4 | 20,00 | 50 | 19 | 6,00 | 4,90 | 3 | 62633 | 28,96 |
| W5/16 | 18,00 | 56 | 22 | 6,00 | 4,90 | 4 | 62669 | 34,47 |
| W3/8 | 16,00 | 70 | 24 | 7,00 | 5,50 | 4 | 62654 | 38,14 |
| W7/16 | 14,00 | 70 | 24 | 8,00 | 6,20 | 4 | 62681 | 49,96 |
| W1/2 | 12,00 | 75 | 29 | 9,00 | 7,00 | 4 | 62630 | 55,19 |
| W9/16 | 12,00 | 80 | 30 | 11,00 | 9,00 | 4 | 62687 | 74,57 |
| W5/8 | 11,00 | 80 | 32 | 12,00 | 9,00 | 4 | 62666 | 86,26 |
| W3/4 | 10,00 | 95 | 40 | 14,00 | 11,00 | 4 | 62645 | 122,77 |
| W7/8 | 9,00 | 100 | 40 | 18,00 | 14,50 | 4 | 62678 | 152,47 |
| W1" | 8,00 | 110 | 50 | 18,00 | 14,50 | 4 | 62693 | 188,26 |
| W1"1/8 | 7,00 | 132 | 56 | 22,00 | 18,00 | 4 | 62702 | 279,09 |
| W1"1/4 | 7,00 | 132 | 56 | 22,00 | 18,00 | 4 | 62699 | 330,09 |
| W1"3/8 | 6,00 | 150 | 63 | 28,00 | 22,00 | 4 | 42713 | 410,54 |
| W1"1/2 | 6,00 | 150 | 63 | 32,00 | 24,00 | 4 | 62696 | 494,26 |
| W1"5/8 | 5,00 | 160 | 70 | 32,00 | 24,00 | 4 | 59880 | 636,54 |
| W1"3/4 | 5,00 | 160 | 70 | 36,00 | 29,00 | 6 | 59881 | 783,45 |
| W1"7/8 | 4,50 | 190 | 80 | 36,00 | 29,00 | 6 | 59882 | 1.011,88 |
| W2" | 4,50 | 190 | 80 | 40,00 | 32,00 | 6 | 59883 | 1.062,27 |



Ref. **3012**

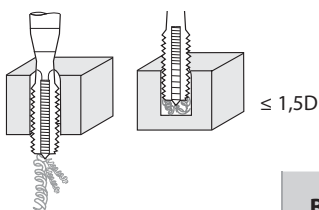
MACHO ÚNICO MANO BSW (WHITWORTH)

BSW (Whitworth) Hand Tap
Taraud à main BSW (Whitworth)



| | | | | | | |
|-----|---------|--------|--|------------------------------|--------------------------------------|---|
| HSS | DIN 352 | C 2-3h | | α $10^\circ \pm 2$ | Nº3 Acabado Finishing Finition | Estándar británico para rosca gruesa British standard for coarse thread Norme britannique pour le filetage grossier |
|-----|---------|--------|--|------------------------------|--------------------------------------|---|

| | | | | |
|-----------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|---|
| Grupo Group-Groupe P | Subgrup. Subgroup. P.1 | Grupo Group-Groupe K | Grupo Group-Groupe N | Subgrup. Subgroup. N.1 - N.3 N.4 - N.5 |
|-----------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|---|



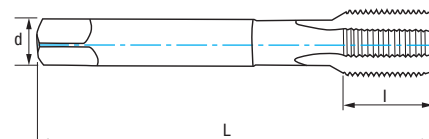
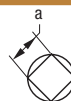
| BSW | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|---------|----------------------------|---------|---------|---------|---------|---|----------------|--------|
| W3/32 | 48,00 | 40 | 9 | 2,80 | 2,10 | 3 | 75404 | 10,43 |
| W1/8 | 40,00 | 40 | 14 | 3,50 | 2,70 | 3 | 75401 | 8,50 |
| W5/32 | 32,00 | 45 | 17 | 4,50 | 3,40 | 3 | 75069 | 8,50 |
| W3/16 | 24,00 | 50 | 19 | 6,00 | 4,90 | 3 | 74825 | 8,50 |
| W7/32 | 24,00 | 50 | 19 | 6,00 | 4,90 | 3 | 75409 | 12,84 |
| W1/4 | 20,00 | 50 | 20 | 6,00 | 4,90 | 3 | 75400 | 9,64 |
| W5/16 | 18,00 | 56 | 20 | 6,00 | 4,90 | 4 | 75406 | 11,51 |
| W3/8 | 16,00 | 63 | 22 | 7,00 | 5,50 | 4 | 75403 | 12,71 |
| W7/16 | 14,00 | 70 | 22 | 8,00 | 6,20 | 4 | 75408 | 16,65 |
| W1/2 | 12,00 | 75 | 25 | 9,00 | 7,00 | 4 | 75399 | 18,39 |
| W9/16 | 12,00 | 80 | 26 | 11,00 | 9,00 | 4 | 75448 | 24,83 |
| W5/8 | 11,00 | 80 | 27 | 12,00 | 9,00 | 4 | 75405 | 28,75 |
| W3/4 | 10,00 | 95 | 32 | 14,00 | 11,00 | 4 | 75402 | 40,93 |
| W7/8 | 9,00 | 100 | 32 | 18,00 | 14,50 | 4 | 75407 | 50,83 |
| W1" | 8,00 | 110 | 36 | 18,00 | 14,50 | 4 | 75410 | 62,76 |
| W1" 1/8 | 7,00 | 125 | 40 | 22,00 | 18,00 | 4 | 76255 | 93,03 |
| W1" 1/4 | 7,00 | 125 | 40 | 22,00 | 18,00 | 4 | 76259 | 112,03 |
| W1" 3/8 | 6,00 | 150 | 50 | 28,00 | 22,00 | 4 | 76264 | 139,97 |
| W1" 1/2 | 6,00 | 150 | 50 | 32,00 | 24,00 | 4 | 76269 | 168,54 |
| W1" 5/8 | 5,00 | 150 | 56 | 32,00 | 24,00 | 4 | 76274 | 219,91 |
| W1" 3/4 | 5,00 | 160 | 58 | 36,00 | 29,00 | 4 | 76280 | 270,54 |
| W1" 7/8 | 4,50 | 180 | 65 | 36,00 | 29,00 | 4 | 76286 | 349,44 |
| W2" | 4,50 | 180 | 65 | 40,00 | 32,00 | 4 | 76291 | 366,86 |



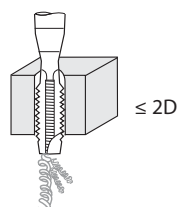
Ref. 3126

MACHO RECTO MÁQUINA BSP (GAS) INOX MANGO REFORZADO

Reinforced Shank **Stainless** BSP (Gas) Metric Machine Straight Tap
Taraud droit machine BSP (Gaz) **inox** queue renforcée



| | | | | | | | |
|--------------|-----|-------------|-------------|-----|------------|-----|---|
| HSSE 5%Co | TIN | DIN 5156 | B 3,5-5h | GUN | Tol. 2B | 55° | Rosca británica para tubo paralelo (BSPP-GAS) British Standard Parallel Pipe (BSPP-GAS) Filetage britannique pour tuyau parallèle (BSPP-GAS) |
|--------------|-----|-------------|-------------|-----|------------|-----|---|



| Material | | Vc (m/min) |
|----------|------------|------------|
| Grupo | Sub. | TIN |
| P | P.5 | 5-8 |
| M | | 8-12 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

$$Vf \text{ (mm/min.)} = r.p.m. \times f$$

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

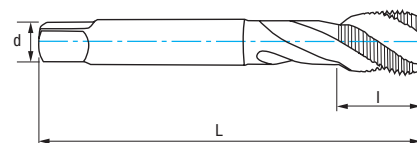
| G | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. TIN | € |
|--------|-------------------------|---------|---------|---------|---------|---|----------------|--------|
| G1/8 | 28 | 90 | 12 | 7 | 5,50 | 3 | 28636 | 48,20 |
| G1/4 | 19 | 100 | 16 | 11 | 9,00 | 3 | 28635 | 64,95 |
| G3/8 | 19 | 100 | 16 | 12 | 9,00 | 3 | 28638 | 77,09 |
| G1/2 | 14 | 125 | 20 | 16 | 12,00 | 3 | 28634 | 95,98 |
| G5/8 | 14 | 125 | 20 | 18 | 14,50 | 4 | 28639 | 113,23 |
| G3/4 | 14 | 140 | 22 | 20 | 16,00 | 4 | 28637 | 152,47 |
| G1" | 11 | 160 | 30 | 25 | 20,00 | 4 | 28641 | 236,55 |
| G1"1/2 | 11 | 190 | 32 | 36 | 29,00 | 6 | 28642 | 852,59 |



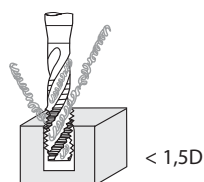
Ref. 3136

MACHO HELICOIDAL MÁQUINA BSP (GAS) INOX

Stainless BSP (Gas) Metric Machine Spiral Tap
Taraud helicoidal machine BSP (Gaz) **inox**



| | | | | | | |
|--------------|-----|-------------|-----------|-----|-----|---|
| HSSE 5%Co | TIN | DIN 5156 | C 2-3h | 35° | 55° | Rosca británica para tubo paralelo (BSPP-GAS) British Standard Parallel Pipe (BSPP-GAS) Filetage britannique pour tuyau parallèle (BSPP-GAS) |
|--------------|-----|-------------|-----------|-----|-----|---|



| Material | | Vc (m/min) |
|----------|------------|------------|
| Grupo | Sub. | TIN |
| P | P.5 | 5-8 |
| M | | 8-12 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

$$Vf \text{ (mm/min.)} = r.p.m. \times f$$

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

| G | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. TIN | € |
|------|-------------------------|---------|---------|---------|---------|---|----------------|--------|
| G1/8 | 28 | 90 | 12 | 7 | 5,50 | 3 | 28647 | 46,43 |
| G1/4 | 19 | 100 | 16 | 11 | 9,00 | 3 | 28646 | 66,62 |
| G3/8 | 19 | 100 | 16 | 12 | 9,00 | 3 | 28649 | 79,51 |
| G1/2 | 14 | 125 | 20 | 16 | 12,00 | 4 | 28645 | 100,35 |
| G3/4 | 14 | 140 | 22 | 20 | 16,00 | 4 | 28648 | 157,07 |
| G1" | 11 | 160 | 30 | 25 | 20,00 | 4 | 28652 | 243,76 |

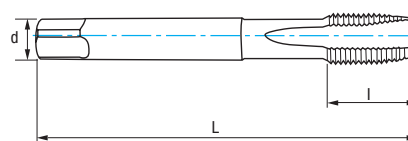


Ref. 3106

MACHO RECTO MÁQUINA BSP (GAS)

BSP (Gas) Machine Straight Tap

Taraud droit machine BSP (Gaz)



HSSE
5%Co

DIN
5156

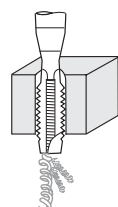
B
3,5-5h



α
 $10^\circ \pm 2$



Rosca británica para tubo **paralelo** (BSPP-GAS)
British Standard **Parallel** Pipe (BSPP-GAS)
Filetage britannique pour tuyau **parallèle** (BSPP-GAS)



| G | Hilos Threads | Filets | L mm | l mm | d mm | ϕ a mm | Z | N° Art. 5% Co | € |
|--------|------------------|--------|---------|---------|---------|----------------|---|------------------|--------|
| G1/8 | 28 | | 90 | 20 | 7 | 5,50 | 3 | 75479 | 35,71 |
| G1/4 | 19 | | 100 | 22 | 11 | 9,00 | 3 | 62936 | 48,12 |
| G3/8 | 19 | | 100 | 22 | 12 | 9,00 | 3 | 75481 | 57,10 |
| G1/2 | 14 | | 125 | 25 | 16 | 12,00 | 3 | 75478 | 72,07 |
| G5/8 | 14 | | 125 | 24 | 18 | 14,50 | 4 | 75482 | 91,09 |
| G3/4 | 14 | | 140 | 28 | 20 | 16,00 | 4 | 75480 | 112,92 |
| G1" | 11 | | 160 | 30 | 25 | 20,00 | 4 | 75483 | 175,22 |
| G1"1/2 | 11 | | 190 | 32 | 36 | 29,00 | 6 | 76221 | 488,54 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$



Ref. 3116

MACHO RECTO MÁQUINA BSP (GAS)

BSP (Gas) Machine Straight Tap

Taraud droit machine BSP (Gaz)

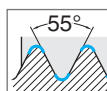


HSSE
5%Co

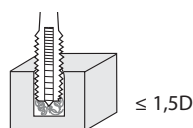
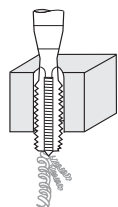
DIN
5156

C
2-3h

α
 $10^\circ \pm 2$



Rosca británica para tubo **paralelo** (BSPP-GAS)
British Standard **Parallel** Pipe (BSPP-GAS)
Filetage britannique pour tuyau **parallèle** (BSPP-GAS)



| G | Hilos Threads | Filets | L mm | l mm | d mm | ϕ a mm | Z | N° Art. 5% Co | € |
|--------|------------------|--------|---------|---------|---------|----------------|---|------------------|--------|
| G1/8 | 28 | | 90 | 20 | 7 | 5,50 | 3 | 75467 | 31,38 |
| G1/4 | 19 | | 100 | 22 | 11 | 9,00 | 3 | 75466 | 43,34 |
| G3/8 | 19 | | 100 | 22 | 12 | 9,00 | 3 | 75143 | 51,88 |
| G1/2 | 14 | | 125 | 25 | 16 | 12,00 | 3 | 75465 | 65,56 |
| G5/8 | 14 | | 125 | 25 | 18 | 14,50 | 4 | 75469 | 81,69 |
| G3/4 | 14 | | 140 | 28 | 20 | 16,00 | 4 | 75468 | 102,66 |
| G7/8 | 14 | | 150 | 28 | 22 | 18,00 | 4 | 77647 | 150,52 |
| G1" | 11 | | 160 | 30 | 25 | 20,00 | 4 | 75470 | 159,28 |
| G1"1/8 | 11 | | 170 | 30 | 28 | 22,00 | 4 | 76197 | 243,33 |
| G1"1/4 | 11 | | 170 | 30 | 32 | 24,00 | 4 | 76205 | 285,30 |
| G1"1/2 | 11 | | 190 | 32 | 36 | 29,00 | 6 | 76219 | 453,13 |
| G1"3/4 | 11 | | 190 | 32 | 40 | 32,00 | 6 | 76227 | 538,58 |
| G2" | 11 | | 220 | 40 | 45 | 35,00 | 6 | 76233 | 686,28 |

| Material | | Vc (m/min) |
|----------|------|------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

Avance f = P (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

Vf (mm/min.) = r.p.m. x f

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

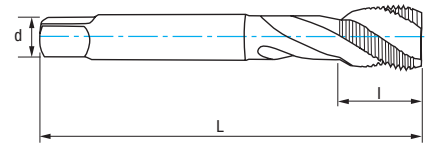


Ref. **3156**

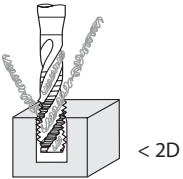
MACHO HELICOIDAL MÁQUINA BSP (GAS)

BSP (Gas) Machine Spiral Tap

Taraud helicoidal machine BSP (Gaz)



| | | | | | | |
|--------------|-------------|-----------|--|------------------------------|--|---|
| HSSE 5%Co | DIN 5156 | C 2-3h | | α $10^\circ \pm 2$ | | Rosca británica para tubo paralelo (BSPP-GAS) British Standard Parallel Pipe (BSPP-GAS) Filetage britannique pour tuyau parallèle (BSPP-GAS) |
|--------------|-------------|-----------|--|------------------------------|--|---|



| Material | | Vc (m/min) |
|----------|------------|-------------|
| Grupo | Sub. | 5%Co |
| P | P.1 | 6-10 |
| K | K.1 | 7-10 |
| | K.2 | 4-7 |
| N | N.1 | 5-8 |
| | N.2 | 8-12 |
| | N.3 | 15-35 |
| | N.4 | 14-20 |
| | N.5 | 12-15 |

| G | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | N° Art. 5% Co | € |
|--------|-------------------------|---------|---------|---------|---------|---|------------------|--------|
| G1/8 | 28 | 90 | 20 | 7 | 5,50 | 3 | 63188 | 37,91 |
| G1/4 | 19 | 100 | 22 | 11 | 9,00 | 3 | 63185 | 54,42 |
| G3/8 | 19 | 100 | 22 | 12 | 9,00 | 3 | 75142 | 64,95 |
| G1/2 | 14 | 125 | 25 | 16 | 12,00 | 4 | 75484 | 81,96 |
| G3/4 | 14 | 140 | 28 | 20 | 16,00 | 4 | 75485 | 128,27 |
| G1" | 11 | 160 | 30 | 25 | 20,00 | 4 | 75487 | 199,06 |
| G1"1/4 | 11 | 170 | 30 | 32 | 24,00 | 5 | 76208 | 289,76 |
| G1"1/2 | 11 | 190 | 32 | 36 | 29,00 | 5 | 76222 | 523,95 |

Avance $f = P$ (Paso - Pitch - Pas)

$$P = \frac{25,40}{\text{Hilos Threads - Filets}}$$

V_f (mm/min.) = r.p.m. x f

$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$

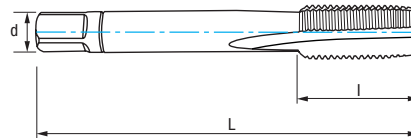


Ref. 3026

JUEGO MACHOS MANO BSP (GAS)

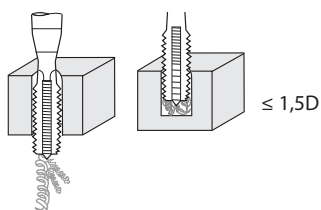
BSP (Gas) Hand Tap Set

Jeu tarauds à main BSP (Gaz)



| | | | | | | | |
|-----|----------|----------|-----------|-----------|--|------------------------------|--|
| HSS | DIN 5157 | ISO 2284 | B 4-5h | C 2-3h | | α $10^\circ \pm 2$ | Rosca Whitworth Paralela (BSPP) Whitworth Parallel Thread (BSPP) Filetage Whitworth Parallèle (BSPP) |
|-----|----------|----------|-----------|-----------|--|------------------------------|--|

| | | | | |
|-----------------------|-----------------|-----------------------|-----------------------|------------------------------------|
| Grupo Group-Gruppe | Subgrup. P.1 | Grupo Group-Gruppe | Grupo Group-Gruppe | Subgrup. N.1 - N.3 N.4 - N.5 |
| P | | K | N | |



| | | |
|----------|-------------------------------------|--------------------------------------|
| DIN 5157 | Nº1 Desbaste Roughing Ébauche | Nº3 Acabado Finishing Finition |
|----------|-------------------------------------|--------------------------------------|



| G | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|---------|----------------------------|---------|---------|---------|---------|---|----------------|--------|
| G1/8 | 28 | 63 | 20 | 7,00 | 5,50 | 3 | 62510 | 26,10 |
| G1/4 | 19 | 70 | 22 | 11,00 | 9,00 | 4 | 62504 | 36,72 |
| G3/8 | 19 | 70 | 22 | 12,00 | 9,00 | 4 | 62516 | 45,12 |
| G1/2 | 14 | 80 | 22 | 16,00 | 12,00 | 4 | 62498 | 64,74 |
| G5/8 | 14 | 80 | 22 | 18,00 | 14,50 | 4 | 62522 | 82,80 |
| G3/4 | 14 | 90 | 22 | 20,00 | 16,00 | 4 | 62513 | 101,08 |
| G7/8 | 14 | 90 | 22 | 22,00 | 18,00 | 4 | 62525 | 134,82 |
| G1" | 11 | 100 | 25 | 25,00 | 20,00 | 4 | 62528 | 160,17 |
| G1" 1/8 | 11 | 125 | 40 | 28,00 | 22,00 | 4 | 76195 | 250,86 |
| G1" 1/4 | 11 | 125 | 40 | 32,00 | 24,00 | 4 | 76203 | 273,38 |
| G1" 3/8 | 11 | 125 | 40 | 36,00 | 29,00 | 4 | 76211 | 371,31 |
| G1" 1/2 | 11 | 140 | 40 | 36,00 | 29,00 | 6 | 74823 | 413,15 |
| G1" 3/4 | 11 | 140 | 40 | 40,00 | 32,00 | 6 | 76225 | 686,86 |
| G2" | 11 | 160 | 40 | 45,00 | 35,00 | 8 | 76231 | 763,73 |

New!

| | |
|----------|--------------------------------------|
| ISO 2284 | Nº3 Acabado Finishing Finition |
|----------|--------------------------------------|

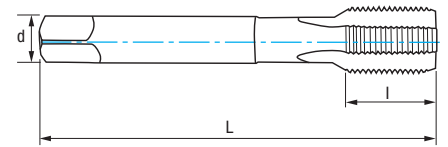


| G | Hilos Threads Filets | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|---------|----------------------------|---------|---------|---------|---------|---|----------------|--------|
| G1/8 | 28 | 59 | 15 | 8,00 | 6,30 | 4 | 26780 | 22,97 |
| G1/4 | 19 | 67 | 19 | 10,00 | 8,00 | 4 | 26789 | 32,31 |
| G3/8 | 19 | 75 | 21 | 12,50 | 10,00 | 4 | 26814 | 40,59 |
| G1/2 | 14 | 87 | 26 | 16,00 | 12,50 | 4 | 26830 | 56,97 |
| G5/8 | 14 | 91 | 26 | 18,00 | 14,00 | 4 | 26845 | 72,86 |
| G3/4 | 14 | 96 | 28 | 20,00 | 16,00 | 4 | 26852 | 88,95 |
| G7/8 | 14 | 102 | 29 | 22,40 | 18,00 | 6 | 26857 | 118,64 |
| G1" | 11 | 109 | 33 | 25,00 | 20,00 | 6 | 26860 | 140,95 |
| G1" 1/8 | 11 | 116 | 34 | 28,00 | 22,40 | 6 | 26891 | 220,76 |
| G1" 1/4 | 11 | 119 | 36 | 31,50 | 25,00 | 6 | 26950 | 240,57 |
| G1" 3/8 | 11 | 120 | 36 | 31,50 | 25,00 | 6 | 26954 | 326,75 |
| G1" 1/2 | 11 | 125 | 37 | 35,50 | 28,00 | 6 | 26973 | 363,57 |
| G1" 3/4 | 11 | 132 | 39 | 35,50 | 28,00 | 6 | 26988 | 604,44 |
| G2" | 11 | 140 | 41 | 40,00 | 31,50 | 6 | 27002 | 672,08 |

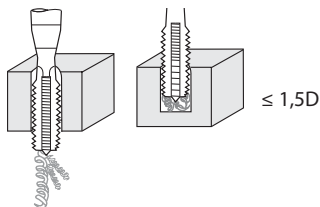
Ref. **3016**

MACHO ÚNICO MANO BSP (GAS)

BSP (Gas) Hand Tap
Taraud à main BSP (Gaz)



| | | | | | | |
|-----|----------|----------|--|---------------------|---|--|
| HSS | DIN 5157 | ISO 2284 | | α 10° ± 2 | Rosca Whitworth Paralela (BSPP) Whitworth Parallel Thread (BSPP) Filetage Whitworth Parallèle (BSPP) | N°3 Acabado Finishing Finition |
|-----|----------|----------|--|---------------------|---|--|



| | | | | |
|--|---|--|--|---|
| Grupo Group-Groupo P | Subgrup. Subgroup-Subgroupe P.1 | Grupo Group-Groupo K | Grupo Group-Groupo N | Subgrup. Subgroup-Subgroupe N.1 - N.3 N.4 - N.5 |
|--|---|--|--|---|



| | |
|----------|----------------------|
| DIN 5157 | C 2-3h |
|----------|----------------------|

N°3



| G | Entrada Chamfer Entrée | Hilos Threads Filets | L mm | l mm | d mm | ϕ a mm | Z | N° Art. HSS | € |
|---------|------------------------|----------------------|------|------|-------|-------------|---|-------------|--------|
| G1/8 | C | 28 | 63 | 20 | 7,00 | 5,50 | 3 | 75461 | 13,08 |
| G1/4 | | 19 | 70 | 22 | 11,00 | 9,00 | 4 | 75460 | 18,37 |
| G3/8 | | 19 | 70 | 22 | 12,00 | 9,00 | 4 | 75462 | 23,08 |
| G1/2 | | 14 | 80 | 22 | 16,00 | 12,00 | 4 | 75459 | 32,35 |
| G5/8 | | 14 | 80 | 22 | 18,00 | 14,50 | 4 | 75463 | 41,40 |
| G3/4 | | 14 | 90 | 22 | 20,00 | 16,00 | 4 | 75106 | 50,52 |
| G7/8 | | 14 | 90 | 22 | 22,00 | 18,00 | 4 | 76246 | 67,41 |
| G1" | | 11 | 100 | 25 | 25,00 | 20,00 | 4 | 75464 | 80,08 |
| G1" 1/8 | | 11 | 125 | 40 | 28,00 | 22,00 | 4 | 76196 | 125,43 |
| G1" 1/4 | | 11 | 125 | 40 | 32,00 | 24,00 | 4 | 76204 | 136,69 |
| G1" 3/8 | | 11 | 140 | 40 | 36,00 | 29,00 | 4 | 76212 | 185,66 |
| G1" 1/2 | | 11 | 140 | 40 | 36,00 | 29,00 | 6 | 76218 | 206,58 |
| G1" 3/4 | | 11 | 140 | 40 | 40,00 | 32,00 | 6 | 76226 | 343,43 |
| G2" | | 11 | 160 | 40 | 45,00 | 35,00 | 8 | 76232 | 381,87 |

New!

| | | |
|----------|----------------------|----------------------|
| ISO 2284 | B 4-5h | C 2-3h |
|----------|----------------------|----------------------|

N°3

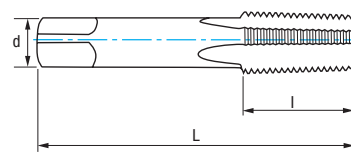


| G | Entrada Chamfer Entrée | Hilos Threads Filets | L mm | l mm | d mm | ϕ a mm | Z | N° Art. HSS | € |
|---------|------------------------|----------------------|------|------|-------|-------------|---|-------------|--------|
| G1/8 | B | 28 | 59 | 15 | 8,00 | 6,30 | 4 | 26759 | 11,48 |
| | C | | | | | | | 26779 | 11,48 |
| G1/4 | B | 19 | 67 | 19 | 10,00 | 8,00 | 4 | 26781 | 16,16 |
| | C | | | | | | | 26783 | 16,16 |
| G3/8 | B | 19 | 75 | 21 | 12,50 | 10,00 | 4 | 26790 | 20,29 |
| | C | | | | | | | 26791 | 20,29 |
| G1/2 | B | 14 | 87 | 26 | 16,00 | 12,50 | 4 | 26823 | 28,49 |
| | C | | | | | | | 26827 | 28,49 |
| G5/8 | B | 14 | 91 | 26 | 18,00 | 14,00 | 4 | 26832 | 36,43 |
| | C | | | | | | | 26843 | 36,43 |
| G3/4 | B | 14 | 96 | 28 | 20,00 | 16,00 | 4 | 26849 | 44,48 |
| | C | | | | | | | 26850 | 44,48 |
| G7/8 | B | 11 | 102 | 29 | 22,40 | 18,00 | 6 | 26853 | 59,32 |
| | C | | | | | | | 26855 | 59,32 |
| G1" | B | 11 | 109 | 33 | 25,00 | 20,00 | 6 | 26858 | 70,47 |
| | C | | | | | | | 26859 | 70,47 |
| G1" 1/8 | B | 11 | 116 | 34 | 28,00 | 22,40 | 6 | 26862 | 110,38 |
| | C | | | | | | | 26873 | 110,38 |
| G1" 1/4 | B | 11 | 119 | 36 | 31,50 | 25,00 | 6 | 26941 | 120,29 |
| | C | | | | | | | 26948 | 120,29 |
| G1" 3/8 | B | 11 | 120 | 36 | 31,50 | 25,00 | 6 | 26951 | 163,38 |
| | C | | | | | | | 26953 | 163,38 |
| G1" 1/2 | B | 11 | 125 | 37 | 35,50 | 28,00 | 6 | 26956 | 181,79 |
| | C | | | | | | | 26971 | 181,79 |
| G1" 3/4 | B | 11 | 132 | 39 | 35,50 | 28,00 | 6 | 26974 | 302,22 |
| | C | | | | | | | 26976 | 302,22 |
| G2" | B | 11 | 140 | 41 | 40,00 | 31,50 | 8 | 26991 | 336,04 |
| | C | | | | | | | 26997 | 336,04 |

Ref. **3019**

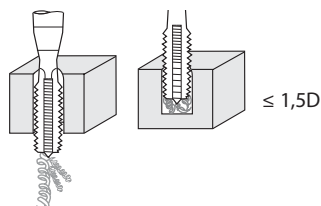
MACHO ÚNICO MANO BSPT (RC)

BSPT (RC) Hand Single Tap
Taraud à main BSPT (RC)



| | | | | | | | |
|-----|----------|--------|--|------------------------------|--------------------------------------|---------|---|
| HSS | DIN 5157 | C 2-3h | | α $10^\circ \pm 2$ | Nº3 Acabado Finishing Finition | 55° | Rosca británica para tubo cónica British Standard Pipe Taper Raccord BSPT |
|-----|----------|--------|--|------------------------------|--------------------------------------|---------|---|

| | | | | |
|-----------------------------------|-----------------|-----------------------------------|-----------------------------------|------------------------------------|
| Grupo Group-Gruppe P | Subgrup. P.1 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. N.1 - N.3 N.4 - N.5 |
|-----------------------------------|-----------------|-----------------------------------|-----------------------------------|------------------------------------|



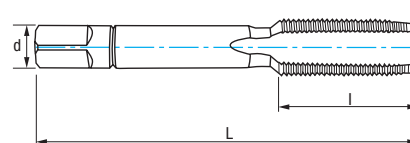
| BSPT | Hilos Threads | Filets | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|------|------------------|--------|---------|---------|---------|---------|---|----------------|--------|
| B1/8 | 28 | | 65 | 19 | 7 | 5,50 | 3 | 38254 | 24,22 |
| B1/4 | 19 | | 70 | 25 | 11 | 9,00 | 4 | 38255 | 34,13 |
| B3/8 | 19 | | 75 | 25 | 12 | 9,00 | 5 | 38256 | 47,39 |
| B1/2 | 14 | | 80 | 31 | 16 | 12,00 | 5 | 38257 | 66,36 |
| B5/8 | 14 | | 80 | 36 | 18 | 14,00 | 5 | 38258 | 121,44 |
| B3/4 | 14 | | 85 | 33 | 20 | 17,00 | 5 | 76138 | 112,61 |
| B7/8 | 14 | | 100 | 36 | 22 | 17,00 | 6 | 38259 | 202,40 |
| B1" | 11 | | 110 | 38 | 25 | 21,50 | 6 | 38260 | 171,47 |



Ref. **3011**

MACHO ÚNICO MANO PG

PG Hand Single Tap
Taraud à main PG



| | | | | | | | |
|-----|-----------|--------|--|------------------------------|--------------------------------------|---------|---|
| HSS | DIN 40432 | C 2-3h | | α $10^\circ \pm 2$ | Nº3 Acabado Finishing Finition | 80° | Rosca para tubos eléctricos en acero Steel Electric Pipe Thread Filetage tubes electriques en acier |
|-----|-----------|--------|--|------------------------------|--------------------------------------|---------|---|

| | | | | |
|-----------------------------------|-----------------|-----------------------------------|-----------------------------------|------------------------------------|
| Grupo Group-Gruppe P | Subgrup. P.1 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. N.1 - N.3 N.4 - N.5 |
|-----------------------------------|-----------------|-----------------------------------|-----------------------------------|------------------------------------|

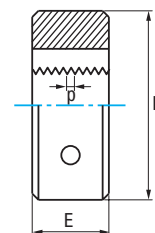
| PG | D mm | Hilos Threads | Filets | L mm | l mm | d mm | a mm | Z | Nº Art. HSS | € |
|---------|---------|------------------|--------|---------|---------|---------|---------|---|----------------|--------|
| PG 07 | 12,50 | 20 | | 70 | 22 | 9 | 7,00 | 4 | 38291 | 25,46 |
| PG 09 | 15,20 | 18 | | 70 | 22 | 12 | 9,00 | 4 | 38292 | 32,36 |
| PG 11 | 18,60 | 18 | | 80 | 22 | 14 | 11,00 | 4 | 38293 | 44,95 |
| PG 13,5 | 20,40 | 18 | | 80 | 22 | 16 | 12,00 | 4 | 38294 | 49,30 |
| PG 16 | 22,50 | 18 | | 80 | 22 | 18 | 14,50 | 4 | 38295 | 59,20 |
| PG 21 | 28,30 | 16 | | 90 | 22 | 22 | 18,00 | 4 | 38296 | 87,07 |
| PG 29 | 37,00 | 16 | | 100 | 25 | 28 | 22,00 | 6 | 38297 | 172,83 |
| PG 36 | 47,00 | 16 | | 140 | 40 | 36 | 29,00 | 6 | 38298 | 288,72 |
| PG 42 | 54,00 | 16 | | 140 | 40 | 40 | 32,00 | 6 | 38299 | 342,89 |
| PG 48 | 59,30 | 16 | | 160 | 40 | 45 | 35,00 | 6 | 38300 | 432,42 |



Ref. **3540****COJINETE MÁQUINA MÉTRICA**

Metric Machine Die

Filière à machine métrique



HSS

Métrica

DIN
223Tol.
6g α
10 - 17°
Chaflán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets
Rompe Virutas ≥ M4
Chip Breaker ≥ M4
Brise copeaux ≥ M4

| M | P | D mm | E mm | N° Art. HSS | € |
|------|------|---------|---------|----------------|--------|
| M2 | 0,40 | 16 | 5 | 76867 | 30,34 |
| M2,5 | 0,45 | 16 | 5 | 76869 | 30,34 |
| M3 | 0,50 | 20 | 5 | 77259 | 25,65 |
| M3,5 | 0,60 | 20 | 5 | 77260 | 30,34 |
| M4 | 0,70 | 20 | 5 | 77263 | 25,65 |
| M5 | 0,80 | 20 | 5 | 76882 | 25,65 |
| M6 | 1,00 | 20 | 7 | 76888 | 25,65 |
| M7 | 1,00 | 25 | 9 | 76891 | 27,98 |
| M8 | 1,25 | 25 | 9 | 76895 | 27,98 |
| M9 | 1,25 | 25 | 9 | 76898 | 37,32 |
| M10 | 1,50 | 30 | 11 | 76903 | 37,32 |
| M11 | 1,50 | 30 | 11 | 76907 | 48,96 |
| M12 | 1,75 | 38 | 14 | 76912 | 39,65 |
| M14 | 2,00 | 38 | 14 | 76922 | 39,65 |
| M16 | 2,00 | 45 | 18 | 76930 | 53,64 |
| M18 | 2,50 | 45 | 18 | 76938 | 53,64 |
| M20 | 2,50 | 45 | 18 | 76946 | 53,64 |
| M22 | 2,50 | 55 | 22 | 76954 | 79,25 |
| M24 | 3,00 | 55 | 22 | 76961 | 79,25 |
| M27 | 3,00 | 65 | 25 | 76972 | 118,87 |
| M30 | 3,50 | 65 | 25 | 76979 | 118,87 |
| M33 | 3,50 | 65 | 25 | 76986 | 123,57 |



Ref. **3536**

COJINETE MANO MÉTRICA / MÉTRICA FINA INOX

Stainless Metric / Metric Fine Hand Die

Filière à main métrique / métrique pas fin inox



HSSE
5%Co

DIN
22568

Tol.
6g

Métrica

α
20°

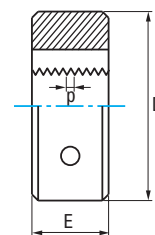


Chafilán Entrada 2,25h
Chamfer 2,25 threads
Chanfrein 2,25 filets

Vaporizado
Vaporized
Vaporisée

Grupo
Group-Groupe
P

Grupo
Group-Groupe
M



| M/MF | P | D mm | E mm | N° Art. 5% Co | € |
|------|------|------|------|------------------|-------|
| M3 | 0,50 | 20 | 5 | 34255 | 23,51 |
| M4 | 0,70 | 20 | 5 | 34256 | 23,51 |
| M5 | 0,80 | 20 | 7 | 34257 | 23,51 |
| M6 | 1,00 | 20 | 7 | 34258 | 23,73 |
| M7 | 1,00 | 25 | 9 | 55515 | 25,56 |
| M8 | 1,25 | 25 | 9 | 34259 | 25,56 |
| MF10 | 0,75 | 30 | 11 | 81370 | 62,10 |
| MF10 | 1,00 | 30 | 11 | 81371 | 48,81 |
| MF10 | 1,25 | 30 | 11 | 81372 | 52,97 |
| M10 | 1,50 | 30 | 11 | 34260 | 34,19 |
| MF12 | 1,00 | 38 | 10 | 81373 | 61,76 |
| MF12 | 1,25 | 38 | 10 | 81374 | 61,76 |
| MF12 | 1,50 | 38 | 10 | 81375 | 55,21 |
| M12 | 1,75 | 38 | 14 | 34261 | 44,19 |
| MF14 | 1,00 | 38 | 10 | 81376 | 63,36 |
| MF14 | 1,50 | 38 | 10 | 81377 | 57,70 |
| M14 | 2,00 | 38 | 14 | 34262 | 44,19 |
| MF15 | 1,00 | 38 | 10 | 81378 | 58,81 |
| MF16 | 1,00 | 45 | 14 | 81379 | 92,53 |

| M/MF | P | D mm | E mm | N° Art. 5% Co | € |
|------|------|------|------|------------------|--------|
| MF16 | 1,50 | 45 | 14 | 81380 | 83,52 |
| M16 | 2,00 | 45 | 18 | 34263 | 61,28 |
| MF17 | 1,00 | 45 | 14 | 81381 | 74,01 |
| MF18 | 1,00 | 45 | 14 | 81382 | 89,63 |
| MF18 | 1,50 | 45 | 14 | 81383 | 79,25 |
| MF18 | 2,00 | 45 | 14 | 81384 | 89,63 |
| M18 | 2,50 | 45 | 18 | 34264 | 61,28 |
| MF20 | 1,00 | 45 | 14 | 81385 | 89,23 |
| MF20 | 1,50 | 45 | 14 | 81386 | 81,79 |
| MF20 | 2,00 | 45 | 14 | 81387 | 89,87 |
| M20 | 2,50 | 45 | 18 | 34265 | 61,28 |
| MF22 | 1,00 | 55 | 16 | 81388 | 132,89 |
| MF22 | 1,50 | 55 | 16 | 81389 | 121,36 |
| MF22 | 2,00 | 55 | 16 | 81390 | 132,89 |
| M22 | 2,50 | 55 | 22 | 81391 | 115,68 |
| MF24 | 1,50 | 55 | 16 | 81392 | 121,36 |
| M24 | 3,00 | 55 | 22 | 81393 | 115,68 |
| M27 | 3,00 | 65 | 25 | 81394 | 179,06 |
| M30 | 3,50 | 65 | 25 | 81395 | 186,66 |
| M33 | 3,50 | 65 | 25 | 83117 | 224,03 |



7 Pcs

| Cont. | N° Art. HSS | € |
|--|----------------|--------|
| Cojinetes / Dies / Filières DIN 223: M3-M4-M5-M6- M8-M10-M12 | 76494 | 198,19 |



Ref. **3500****COJINETE MANO MÉTRICA / MÉTRICA FINA**

Metric / Metric Fine Hand Die

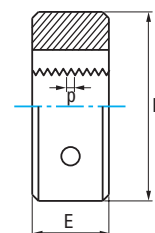
Filière à main métrique / métrique pas fin



HSS

DIN
223Tol.
6g α
10 - 17°

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets



| M/MF | P | D mm | E mm | N° Art. HSS | € |
|-------------|-------------|---------|---------|----------------|--------------|
| M2 | 0,40 | 16 | 5 | 63191 | 25,25 |
| M2,5 | 0,45 | 16 | 5 | 75001 | 25,25 |
| M3 | 0,50 | 20 | 5 | 63194 | 21,38 |
| M3,5 | 0,60 | 20 | 5 | 63197 | 25,25 |
| MF4 | 0,50 | 20 | 5 | 77025 | 34,74 |
| M4 | 0,70 | 20 | 5 | 63200 | 21,38 |
| M4,5 | 0,75 | 20 | 7 | 77028 | 23,33 |
| MF5 | 0,50 | 20 | 5 | 77029 | 37,30 |
| M5 | 0,80 | 20 | 7 | 63203 | 21,38 |
| MF6 | 0,50 | 20 | 5 | 77034 | 37,30 |
| MF6 | 0,75 | 20 | 7 | 77035 | 33,50 |
| M6 | 1,00 | 20 | 7 | 63206 | 21,38 |
| MF7 | 0,75 | 25 | 9 | 77037 | 23,61 |
| M7 | 1,00 | 25 | 9 | 63209 | 23,33 |
| MF8 | 0,50 | 25 | 9 | 77038 | 36,32 |
| MF8 | 0,75 | 25 | 9 | 77039 | 36,32 |
| MF8 | 1,00 | 25 | 9 | 63212 | 36,32 |
| M8 | 1,25 | 25 | 9 | 63215 | 23,33 |
| MF9 | 1,00 | 25 | 9 | 77041 | 40,41 |
| M9 | 1,25 | 25 | 9 | 63218 | 31,08 |
| MF10 | 0,75 | 30 | 11 | 77043 | 56,51 |
| MF10 | 1,00 | 30 | 11 | 63221 | 44,42 |
| MF10 | 1,25 | 30 | 11 | 63224 | 48,20 |
| M10 | 1,50 | 30 | 11 | 63227 | 31,08 |
| MF11 | 1,00 | 30 | 11 | 77045 | 55,27 |
| MF11 | 1,25 | 30 | 11 | 77046 | 60,27 |
| M11 | 1,50 | 30 | 11 | 63230 | 40,80 |
| MF12 | 1,00 | 38 | 10 | 63233 | 56,20 |
| MF12 | 1,25 | 38 | 10 | 63236 | 56,20 |
| MF12 | 1,50 | 38 | 10 | 63239 | 50,24 |
| M12 | 1,75 | 38 | 14 | 63242 | 33,02 |
| MF13 | 1,00 | 38 | 10 | 77049 | 47,06 |
| MF13 | 1,50 | 38 | 10 | 77050 | 49,48 |
| MF14 | 1,00 | 38 | 10 | 63251 | 57,66 |
| MF14 | 1,25 | 38 | 10 | 63254 | 61,42 |
| MF14 | 1,50 | 38 | 10 | 63257 | 52,51 |
| M14 | 2,00 | 38 | 14 | 63260 | 33,02 |
| MF15 | 1,00 | 38 | 10 | 75307 | 53,52 |
| MF15 | 1,50 | 38 | 10 | 77053 | 71,98 |
| MF16 | 1,00 | 45 | 14 | 63266 | 77,99 |
| MF16 | 1,25 | 45 | 14 | 77054 | 50,49 |
| MF16 | 1,50 | 45 | 14 | 63269 | 72,12 |
| M16 | 2,00 | 45 | 18 | 63272 | 44,67 |
| MF18 | 1,00 | 45 | 14 | 77057 | 81,56 |
| MF18 | 1,25 | 45 | 14 | 77058 | 66,01 |
| MF18 | 1,50 | 45 | 14 | 63278 | 72,12 |
| MF18 | 2,00 | 45 | 14 | 63281 | 81,56 |
| M18 | 2,50 | 45 | 18 | 63284 | 44,67 |
| MF20 | 1,00 | 45 | 14 | 77061 | 81,20 |
| MF20 | 1,50 | 45 | 14 | 63287 | 74,43 |

| M/MF | P | D mm | E mm | N° Art. HSS | € |
|------------|-------------|---------|---------|----------------|---------------|
| MF20 | 2,00 | 45 | 14 | 63290 | 81,78 |
| M20 | 2,50 | 45 | 18 | 63293 | 44,67 |
| MF22 | 1,00 | 55 | 16 | 77066 | 110,89 |
| MF22 | 1,50 | 55 | 16 | 63296 | 95,42 |
| MF22 | 2,00 | 55 | 16 | 63299 | 106,14 |
| M22 | 2,50 | 55 | 22 | 63302 | 66,06 |
| MF24 | 1,00 | 55 | 16 | 77069 | 106,14 |
| MF24 | 1,50 | 55 | 16 | 77070 | 95,42 |
| MF24 | 2,00 | 55 | 16 | 63308 | 106,15 |
| M24 | 3,00 | 55 | 22 | 63311 | 66,06 |
| MF25 | 1,00 | 55 | 16 | 77072 | 143,05 |
| MF25 | 1,50 | 55 | 16 | 77073 | 129,68 |
| MF26 | 1,00 | 55 | 16 | 77075 | 154,86 |
| MF26 | 1,50 | 55 | 16 | 77076 | 131,21 |
| MF27 | 1,00 | 65 | 18 | 70103 | 113,80 |
| MF27 | 1,50 | 65 | 18 | 77656 | 144,26 |
| MF27 | 2,00 | 65 | 18 | 77079 | 156,91 |
| M27 | 3,00 | 65 | 25 | 63314 | 99,07 |
| MF28 | 1,50 | 65 | 18 | 77081 | 102,72 |
| MF30 | 1,00 | 65 | 18 | 77082 | 120,61 |
| MF30 | 1,50 | 65 | 18 | 77083 | 144,22 |
| MF30 | 2,00 | 65 | 18 | 75310 | 161,08 |
| M30 | 3,50 | 65 | 25 | 63317 | 99,07 |
| MF32 | 1,50 | 65 | 18 | 77085 | 152,44 |
| MF33 | 1,50 | 65 | 18 | 77088 | 144,26 |
| MF33 | 2,00 | 65 | 18 | 77089 | 111,85 |
| M33 | 3,50 | 65 | 25 | 77090 | 102,97 |
| MF35 | 1,50 | 65 | 18 | 77093 | 156,11 |
| MF36 | 1,50 | 65 | 18 | 75311 | 147,76 |
| MF36 | 2,00 | 65 | 18 | 77095 | 157,08 |
| MF36 | 3,00 | 65 | 25 | 77096 | 120,24 |
| M36 | 4,00 | 65 | 25 | 77097 | 102,97 |
| M39 | 4,00 | 75 | 30 | 77103 | 157,33 |
| MF40 | 1,50 | 75 | 20 | 77104 | 233,14 |
| MF40 | 2,00 | 75 | 20 | 77105 | 168,88 |
| MF40 | 3,00 | 75 | 30 | 70104 | 184,20 |
| MF42 | 2,00 | 75 | 20 | 77108 | 250,17 |
| MF42 | 3,00 | 75 | 30 | 70106 | 232,51 |
| M42 | 4,50 | 75 | 30 | 77110 | 157,33 |
| MF45 | 1,50 | 90 | 22 | 77112 | 306,56 |
| MF45 | 2,00 | 90 | 22 | 77113 | 258,72 |
| MF45 | 3,00 | 90 | 36 | 77114 | 269,92 |
| M45 | 4,50 | 90 | 36 | 77115 | 246,69 |
| MF48 | 1,50 | 90 | 22 | 70107 | 232,91 |
| MF48 | 3,00 | 90 | 36 | 35159 | 244,00 |
| M48 | 5,00 | 90 | 36 | 77119 | 246,69 |
| MF50 | 1,50 | 90 | 22 | 77120 | 306,56 |
| MF52 | 1,50 | 90 | 22 | 77121 | 306,56 |
| M52 | 5,00 | 90 | 36 | 77124 | 246,69 |



Ref. **3500**

COJINETE MANO MÉTRICA / MÉTRICA FINA

Metric / Metric Fine Hand Die

Filière à main métrique / métrique pas fin



7 Pcs

| Cont. | N° Art. HSS | € |
|--|-------------|--------|
| Cojinetes / Dies / Filières DIN 223: M3-M4-M5-M6- M8-M10-M12 | 56518 | 172,96 |

Ref. **3501**

COJINETE MANO MÉTRICA CORTE IZQUIERDA

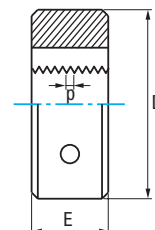
Left Cutting Metric Hand Die

Filière à main métrique coupe à gauche



| | | | | | | |
|-----|---------|---------|--|---------|-------------------|--|
| HSS | Métrica | DIN 223 | | Tol. 6g | α 10 - 17° | |
|-----|---------|---------|--|---------|-------------------|--|


Chaflán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets

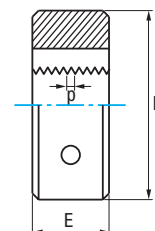


| M | P | D mm | E mm | N° Art. HSS | € |
|-----|------|------|------|-------------|-------|
| M2 | 0,40 | 16 | 5 | 59875 | 50,53 |
| M3 | 0,50 | 20 | 5 | 23318 | 42,73 |
| M4 | 0,70 | 20 | 5 | 23319 | 42,73 |
| M5 | 0,80 | 20 | 7 | 23320 | 42,73 |
| M6 | 1,00 | 20 | 7 | 23321 | 42,73 |
| M7 | 1,00 | 25 | 9 | 11007 | 46,65 |
| M8 | 1,00 | 25 | 9 | 10941 | 72,64 |
| M8 | 1,25 | 25 | 9 | 23322 | 46,63 |
| M10 | 1,50 | 30 | 11 | 23323 | 62,17 |
| M11 | 1,50 | 30 | 11 | 59876 | 81,62 |
| M12 | 1,75 | 38 | 14 | 23324 | 66,06 |
| M14 | 2,00 | 38 | 14 | 23325 | 66,06 |
| M16 | 2,00 | 45 | 18 | 23326 | 89,35 |
| M18 | 2,50 | 45 | 18 | 23327 | 89,35 |
| M20 | 2,50 | 45 | 18 | 23328 | 89,35 |



Ref. **3510****COJINETE MANO MÉTRICA ISO**ISO Metric Hand Die
Filière à main métrique ISO

| | | | |
|------------|----------------------|--------------------------------------|--|
| HSS | ISO 529 | Ajustable BS 1127 A Adjustable |  |
| Tol. 6g | α 10 - 17° | Forma A Form | |



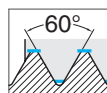
| M | P | D mm | E mm | N° Art. HSS | € |
|-----|------|---------|---------|----------------|-------|
| M3 | 0,50 | 25,4 | 9,5 | 38230 | 8,25 |
| M4 | 0,70 | 25,4 | 9,5 | 38231 | 8,25 |
| M5 | 0,80 | 25,4 | 9,5 | 38232 | 8,25 |
| M6 | 1,00 | 25,4 | 9,5 | 38233 | 8,25 |
| M7 | 1,00 | 25,4 | 9,5 | 38234 | 9,67 |
| M8 | 1,25 | 25,4 | 9,5 | 38235 | 8,71 |
| M10 | 1,50 | 25,4 | 9,5 | 38237 | 11,10 |
| M12 | 1,75 | 25,4 | 9,5 | 38238 | 11,10 |

| M | P | D mm | E mm | N° Art. HSS | € |
|-----|------|---------|---------|----------------|-------|
| M8 | 1,25 | 38,1 | 12,7 | 38239 | 25,81 |
| M10 | 1,50 | 38,1 | 12,7 | 38240 | 26,89 |
| M12 | 1,75 | 38,1 | 12,7 | 38242 | 26,89 |
| M14 | 2,00 | 38,1 | 12,7 | 38243 | 26,89 |
| M16 | 2,00 | 38,1 | 12,7 | 38244 | 26,89 |
| M18 | 2,50 | 38,1 | 12,7 | 38245 | 39,78 |
| M20 | 2,50 | 38,1 | 12,7 | 38246 | 39,78 |

| M | P | D mm | E mm | N° Art. HSS | € |
|-----|------|---------|---------|----------------|-------|
| M18 | 2,50 | 50,8 | 15,9 | 38250 | 48,38 |
| M20 | 2,50 | 50,8 | 15,9 | 38251 | 48,38 |
| M22 | 2,50 | 50,8 | 15,9 | 38252 | 48,38 |
| M24 | 3,00 | 50,8 | 15,9 | 38253 | 50,53 |

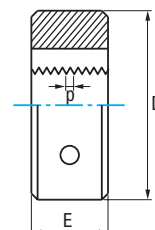
Ref. **3534****COJINETE MANO UNC**UNC Hand Die
Filière à main UNC

| | | | | | |
|-----|-----|---------|---|----------------------|------------|
| HSS | UNC | DIN 223 |  | α 10 - 17° | Tol. 2A |
|-----|-----|---------|---|----------------------|------------|



Estándar americano para rosca gruesa
U.S standard for coarse thread
Norme américaine pour le filetage grossier

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets



| UNC | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|----------|-------------------------|---------|---------|----------------|--------|
| UNC 1/4 | 20 | 20 | 7 | 75557 | 37,39 |
| UNC 5/16 | 18 | 25 | 9 | 75561 | 39,11 |
| UNC 3/8 | 16 | 30 | 11 | 75559 | 57,58 |
| UNC 7/16 | 14 | 30 | 11 | 75563 | 57,58 |
| UNC 1/2 | 13 | 38 | 14 | 75556 | 59,30 |
| UNC 9/16 | 12 | 38 | 14 | 75564 | 62,05 |
| UNC 5/8 | 11 | 45 | 18 | 75560 | 81,45 |
| UNC 3/4 | 10 | 45 | 18 | 75558 | 81,45 |
| UNC 7/8 | 9 | 55 | 22 | 75562 | 106,49 |
| UNC 1" | 8 | 55 | 22 | 75565 | 106,49 |



Ref. 3510



Ref. 3534



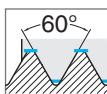
Ref. 3504

COJINETE MANO UNF

UNF Hand Die
Filière à main UNF

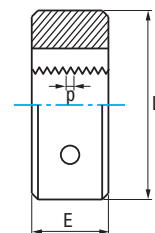


| | | | | | |
|-----|---------|--|-----|---------|-------------------|
| HSS | DIN 223 | | UNF | Tol. 2A | α 10 - 17° |
|-----|---------|--|-----|---------|-------------------|



Estándar americano para rosca fina
U.S. standard for fine thread
Norme américaine pour le filetage fin

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets



| UNF | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|----------|-------------------------|---------|---------|----------------|--------|
| UNF N°4 | 48 | 16 | 5 | 75688 | 35,75 |
| UNF N°5 | 44 | 20 | 5 | 75689 | 35,75 |
| UNF N°6 | 40 | 20 | 7 | 75690 | 35,75 |
| UNF N°8 | 36 | 20 | 7 | 75691 | 35,75 |
| UNF N°10 | 32 | 20 | 7 | 75692 | 35,75 |
| UNF N°12 | 28 | 20 | 7 | 75693 | 35,75 |
| UNF 1/4 | 28 | 20 | 7 | 63422 | 35,75 |
| UNF 5/16 | 24 | 25 | 9 | 63434 | 39,11 |
| UNF 3/8 | 24 | 30 | 11 | 63428 | 54,89 |
| UNF 7/16 | 20 | 30 | 11 | 63440 | 54,89 |
| UNF 1/2 | 20 | 38 | 10 | 63419 | 57,58 |
| UNF 9/16 | 18 | 38 | 10 | 75747 | 62,05 |
| UNF 5/8 | 18 | 45 | 14 | 63431 | 79,32 |
| UNF 3/4 | 16 | 45 | 14 | 63425 | 79,32 |
| UNF 7/8 | 14 | 55 | 16 | 63437 | 106,49 |



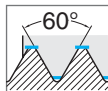
Ref. 3505

COJINETE MANO UNEF

UNEF Hand Die
Filière à main UNEF

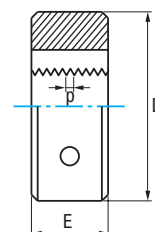


| | | | | | |
|-----|------|-----------|--|---------|-------------------|
| HSS | UNEF | DIN 22568 | | Tol. 2A | α 10 - 17° |
|-----|------|-----------|--|---------|-------------------|



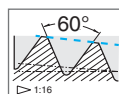
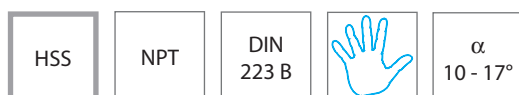
Estándar americano para rosca extra fina
U.S. standard for extra fine thread
Norme américaine pour le filetage extra fin

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets



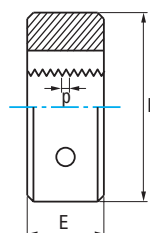
| UNEF | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|-----------|-------------------------|---------|---------|----------------|--------|
| UNEF 1/4 | 32 | 20 | 7 | 38275 | 79,18 |
| UNEF 5/16 | 32 | 25 | 9 | 38279 | 79,18 |
| UNEF 3/8 | 32 | 30 | 11 | 38277 | 122,95 |
| UNEF 7/16 | 28 | 30 | 11 | 38280 | 122,95 |
| UNEF 1/2 | 28 | 38 | 10 | 38274 | 122,95 |
| UNEF 9/16 | 24 | 38 | 10 | 15217 | 122,95 |
| UNEF 5/8 | 24 | 45 | 14 | 38278 | 197,02 |
| UNEF 3/4 | 20 | 45 | 14 | 38276 | 197,02 |
| UNEF 1" | 20 | 55 | 16 | 38281 | 240,83 |



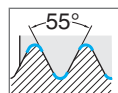
Ref. **3507****COJINETE MANO NPT**NPT Hand Die
Filière à main NPT

Estándar americano para tubos y acoples
U.S. standard thread for sealing pipes and fittings
Norme américaine pour les tuyaux et les raccords

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets

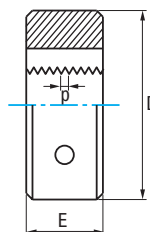


| NPT | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|-----------|-------------------------|---------|---------|----------------|--------|
| NPT 1/8 | 27,00 | 30 | 11 | 76043 | 66,49 |
| NPT 1/4 | 18,00 | 38 | 14 | 77707 | 66,49 |
| NPT 3/8 | 18,00 | 45 | 18 | 22395 | 86,68 |
| NPT 1/2 | 14,00 | 45 | 18 | 45894 | 86,68 |
| NPT 3/4 | 14,00 | 55 | 22 | 76052 | 158,51 |
| NPT 1" | 11,50 | 65 | 25 | 63476 | 190,60 |
| NPT 1"1/4 | 11,50 | 75 | 26 | 22456 | 236,81 |
| NPT 1"1/2 | 11,50 | 90 | 27 | 22460 | 330,40 |
| NPT 2" | 11,50 | 105 | 28 | 22475 | 459,97 |

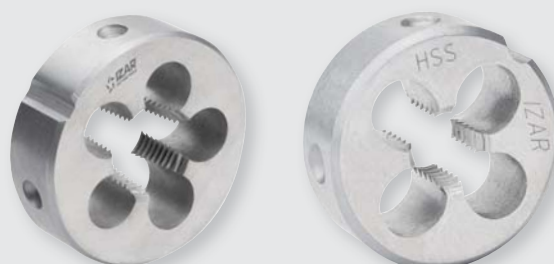
Ref. **3502****COJINETE MANO BSW (WHITWORTH)**BSW (Whitworth) Hand Die
Filiere a main BSW (Whitworth)

Estándar británico para rosca gruesa
British standard for coarse thread
Norme britannique pour le filetage grossier

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets



| W | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|---------|-------------------------|---------|---------|----------------|--------|
| W3/32 | 48 | 16 | 5 | 63344 | 39,71 |
| W1/8 | 40 | 20 | 5 | 63329 | 32,08 |
| W5/32 | 32 | 20 | 7 | 63356 | 33,41 |
| W3/16 | 24 | 20 | 7 | 63341 | 33,41 |
| W7/32 | 24 | 20 | 7 | 63365 | 43,80 |
| W1/4 | 20 | 20 | 7 | 63323 | 32,08 |
| W5/16 | 18 | 25 | 9 | 63350 | 33,41 |
| W3/8 | 16 | 30 | 11 | 63335 | 48,40 |
| W7/16 | 14 | 30 | 11 | 63362 | 48,40 |
| W1/2 | 12 | 38 | 14 | 63320 | 48,40 |
| W9/16 | 12 | 38 | 14 | 63368 | 57,96 |
| W5/8 | 11 | 45 | 18 | 63347 | 70,41 |
| W3/4 | 10 | 45 | 18 | 63332 | 70,41 |
| W7/8 | 9 | 55 | 22 | 63359 | 103,53 |
| W1" | 8 | 55 | 22 | 63374 | 103,53 |
| W1" 1/8 | 7 | 65 | 25 | 63383 | 162,96 |



Ref. **3546**

COJINETE MANO BSP (GAS) INOX

Stainless BSP (Gas) Hand Die

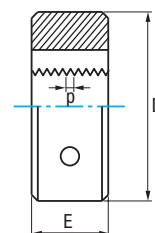
Filière à main BSP (Gaz) Inoxy



| | | | | | | |
|--------------|--------------|--------------|-----------------|--|-----------|---|
| HSSE 5%Co | Gas (BSP) | DIN 24231 | α 20° | | Tol. A | Vaporizado Vaporized Vaporisée |
|--------------|--------------|--------------|-----------------|--|-----------|---|

Chablán Entrada 2,25h
Chamfer 2,25 threads
Chanfrein 2,25 filets

Rosca británica para tubo paralelo (BSPP-GAS)
British Standard Parallel Pipe (BSPP-GAS)
Filetage britannique pour tuyau parallèle (BSPP-GAS)



| | |
|-----------------------------------|-----------------------------------|
| Grupo Group-Groupe P | Grupo Group-Groupe M |
|-----------------------------------|-----------------------------------|

| G | Hilos Threads Filets | D mm | E mm | N° Art. 5% Co | € |
|------|-------------------------|---------|---------|------------------|--------|
| G1/8 | 28 | 30 | 11 | 81341 | 46,59 |
| G1/4 | 19 | 38 | 10 | 81342 | 46,59 |
| G3/8 | 19 | 45 | 14 | 81343 | 63,28 |
| G1/2 | 14 | 45 | 14 | 81344 | 63,28 |
| G3/4 | 14 | 55 | 16 | 81345 | 124,33 |
| G1" | 11 | 65 | 18 | 81346 | 190,02 |



Ref. **3506**

COJINETE MANO BSP (GAS)

BSP (Gas) Hand Die

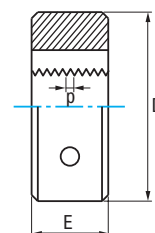
Filière à main BSP (Gaz)



| | | | | | |
|-----|--------------|--------------|----------------------|--|-----------|
| HSS | Gas (BSP) | DIN 24231 | α 10 - 17° | | Tol. A |
|-----|--------------|--------------|----------------------|--|-----------|

Chablán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets

Rosca británica para tubo paralelo (BSPP-GAS)
British Standard Parallel Pipe (BSPP-GAS)
Filetage britannique pour tuyau parallèle (BSPP-GAS)

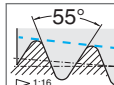


| G | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|---------------------|-------------------------|---------|---------|----------------|--------|
| G1/8 | 28 | 30 | 11 | 63461 | 42,35 |
| G1/4 | 19 | 38 | 10 | 63455 | 42,35 |
| G3/8 | 19 | 45 | 14 | 63467 | 54,78 |
| G1/2 | 14 | 45 | 14 | 63452 | 54,78 |
| G5/8 | 14 | 55 | 16 | 75496 | 83,59 |
| G3/4 | 14 | 55 | 16 | 63464 | 113,53 |
| G7/8 | 14 | 65 | 18 | 76252 | 118,84 |
| G1" | 11 | 65 | 18 | 63470 | 118,84 |
| G1" 1/8 | 11 | 75 | 20 | 76202 | 217,67 |
| G1" 1/4 | 11 | 75 | 20 | 76210 | 217,67 |
| G1" 1/2 | 11 | 90 | 22 | 76224 | 217,67 |
| New! G1" 3/4 | 11 | 105 | 22 | 76230 | 223,99 |
| New! G2" | 11 | 105 | 22 | 76236 | 269,57 |

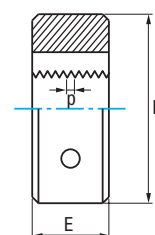


Ref. **3519****COJINETE MANO BSPT (RC)**BSPT (RC) Hand Die
Filière à main BSPT (RC)

Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets



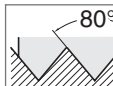
Rosca británica para tubo cónica
British Standard Pipe Taper
Raccord BSPT



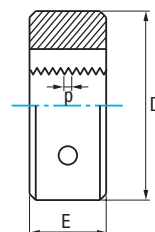
| BSPT | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|----------|-------------------------|---------|---------|----------------|--------|
| BSPT 1/8 | 28 | 30 | 11 | 38263 | 77,45 |
| BSPT 1/4 | 19 | 38 | 14 | 38262 | 77,45 |
| BSPT 3/8 | 19 | 45 | 18 | 38265 | 100,87 |
| BSPT 1/2 | 14 | 55 | 22 | 38261 | 100,87 |
| BSPT 5/8 | 14 | 55 | 22 | 38266 | 194,38 |
| BSPT 3/4 | 14 | 55 | 22 | 38264 | 190,46 |
| BSPT 7/8 | 14 | 65 | 22 | 38267 | 253,68 |
| BSPT 1" | 11 | 65 | 25 | 38268 | 202,96 |

Ref. **3509****COJINETE MANO PG**PG Hand Die
Filière à main PG

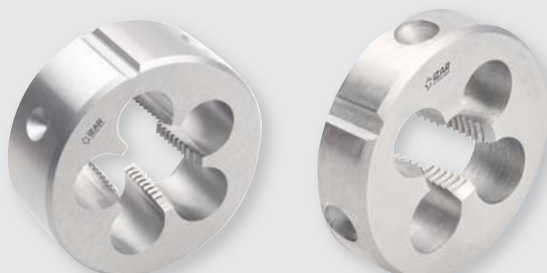
Chafilán Entrada 1,75h
Chamfer 1,75 threads
Chanfrein 1,75 filets

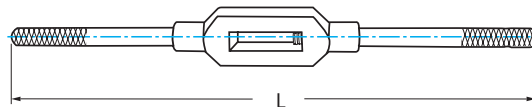


Rosca para tubos eléctricos en acero
Steel Electric Pipe Thread
Filetage tubes electriques en acier



| PG | Hilos Threads Filets | D mm | E mm | N° Art. HSS | € |
|----------|-------------------------|---------|---------|----------------|--------|
| PG 07 | 20 | 38 | 10 | 38301 | 47,03 |
| PG 09 | 18 | 45 | 14 | 38302 | 47,03 |
| PG 11 | 18 | 45 | 14 | 38303 | 58,91 |
| PG 13,50 | 18 | 45 | 14 | 38304 | 58,91 |
| PG 16 | 18 | 55 | 16 | 38305 | 75,95 |
| PG 21 | 16 | 65 | 18 | 38306 | 107,94 |
| PG 29 | 16 | 65 | 18 | 38307 | 107,94 |
| PG 36 | 16 | 90 | 22 | 38308 | 276,64 |
| PG 42 | 16 | 105 | 22 | 38309 | 276,64 |
| PG 48 | 16 | 105 | 22 | 38310 | 366,89 |



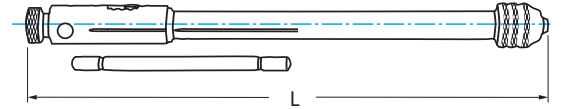
Ref. **3191****GIRA-MACHOS**Tap Wrench
Porte-taroudDIN
1814

| Mod. | Uso Use Usage | L mm | Cuadrado Square / Carré mm | Nº Art. | € |
|---------------------|---------------------|---------|----------------------------------|------------|---------------|
| 000 | M1-M8 | 125 | 2,10-4,90 | 69826 | 15,14 |
| 010 | M1-M10 | 180 | 2,10-5,50 | 69828 | 15,82 |
| 015 | M1-M12 | 200 | 2,10-7,00 | 69829 | 17,26 |
| 020 | M4-M12 | 280 | 3,40-7,00 | 69831 | 22,07 |
| 030 | M5-M20 | 375 | 4,90-12,00 | 69832 | 30,84 |
| 040 | M11-M27 | 500 | 6,20-16,00 | 69834 | 48,91 |
| 050 | M13-M32 | 750 | 7,00-20,00 | 69835 | 101,20 |
| * 060 | M18-M42 | 870 | 7,00-28,00 | 83111 | 115,83 |
| * 070 | M25-M52 | 1250 | 16,00-32,00 | 26694 | 194,64 |
| (New!) * 080 | M25-M75 | 1015 | 14,50-40,00 | 24537 | 207,06 |



* Acero / Steel / Acier



Ref. **3912****GIRA-MACHOS CRIQUÉ**Tap Wrench
Porte-taraud"T" +
Criqué

| Mod. | M | L mm | Cap. mm | N° Art. | € |
|------|--------|---------|------------|------------|-------|
| 01 | M3-M10 | 85 | 2,4-5,5 | 25340 | 22,38 |
| 02 | M5-M12 | 100 | 4,5-8,0 | 25341 | 30,40 |
| 10 | M3-M10 | 250 | 2,4-5,5 | 25342 | 35,29 |
| 20 | M5-M12 | 300 | 4,5-8,0 | 25343 | 42,09 |

Ref. **3900****GALGA**Pitch Gauge
Jauge

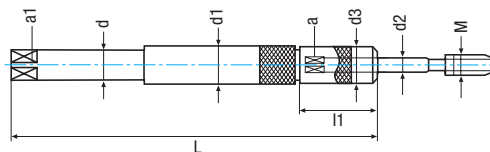
| Cap. M | Cap. W | N° Art. | € |
|-----------|-----------|------------|------|
| 0,25-6,00 | 4G-62G | 44612 | 7,89 |
| 0,40-6,00 | | 67641 | 3,05 |



Ref. **3194**

ALARGADOR MACHOS MÁQUINA

Machine Tap Extension
Rallonge tarauds machine



CNC

Apto para escariadores
Suitable for Reamers
Conseillé pour alésoirs

| M 371 | M 376 | d2 mm | a mm | d1 mm | d = d3 mm | a1 mm | L mm | l1 mm | N° Art. | € |
|---------|---------|-------|------|-------|-----------|-------|------|-------|---------|--------|
| M2-M2,6 | M4 | 2,80 | 2,10 | 6,10 | 6 | 4,90 | 130 | 22 | 10784 | 162,83 |
| M3 | M4,5-M5 | 3,50 | 2,70 | 7,50 | 6 | 4,90 | 130 | 23 | 11299 | 162,83 |
| M4 | M6 | 4,50 | 3,40 | 8,40 | 6 | 4,90 | 130 | 23 | 11794 | 187,27 |
| M4,5-M6 | M8 | 6,00 | 4,90 | 12,10 | 7 | 5,50 | 130 | 26 | 11832 | 187,27 |
| M7 | M9-M10 | 7,00 | 5,50 | 12,10 | 7 | 5,50 | 130 | 26 | 11875 | 191,01 |
| M8 | M11 | 8,00 | 6,20 | 13,00 | 8 | 6,20 | 130 | 30 | 12092 | 192,92 |
| M9 | M12 | 9,00 | 7,00 | 15,00 | 9 | 7,00 | 130 | 31 | 12104 | 192,92 |
| M10 | | 10,00 | 8,00 | 15,00 | 10 | 8,00 | 130 | 33 | 12107 | 192,92 |
| | M14 | 11,00 | 9,00 | 18,00 | 11 | 9,00 | 130 | 36 | 12113 | 208,35 |
| | M16 | 12,00 | 9,00 | 18,00 | 12 | 9,00 | 130 | 36 | 12116 | 208,35 |
| M2-M2,6 | M4 | 2,80 | 2,10 | 6,10 | 6 | 4,90 | 230 | 22 | 12122 | 176,96 |
| M3 | M4,5-M5 | 3,50 | 2,70 | 7,50 | 6 | 4,90 | 230 | 23 | 12125 | 176,96 |
| M4 | M6 | 4,50 | 3,40 | 8,40 | 6 | 4,90 | 230 | 23 | 12128 | 203,50 |
| M4,5-M6 | M8 | 6,00 | 4,90 | 12,10 | 7 | 5,50 | 230 | 26 | 12137 | 203,50 |
| M7 | M9-M10 | 7,00 | 5,50 | 12,10 | 7 | 5,50 | 230 | 26 | 12140 | 207,57 |
| M8 | M11 | 8,00 | 6,20 | 13,00 | 8 | 6,20 | 230 | 30 | 12143 | 209,66 |
| M9 | M12 | 9,00 | 7,00 | 15,00 | 9 | 7,00 | 230 | 31 | 12174 | 209,66 |
| M10 | | 10,00 | 8,00 | 15,00 | 10 | 8,00 | 230 | 33 | 12177 | 209,66 |
| | M14 | 11,00 | 9,00 | 18,00 | 11 | 9,00 | 230 | 36 | 12180 | 226,41 |
| | M16 | 12,00 | 9,00 | 18,00 | 12 | 9,00 | 230 | 36 | 12183 | 226,41 |



Ref. **3190**

ALARGADOR MACHOS MANO

Hand Tap Extension
Rallonge tarauds à main



DIN 377

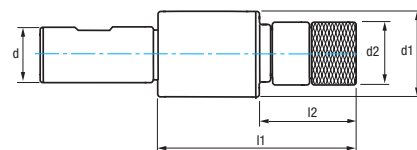
| M | W | G | D mm | d mm | L mm | l mm | a mm | N° Art. | € |
|---------|-------------|----------|------|------|------|------|-------|---------|--------|
| M1-M2,6 | 1/16-3/32 | | 5 | 2,8 | 60 | 15 | 2,10 | 12994 | 7,42 |
| M3 | 1/8 | | 7 | 3,5 | 80 | 20 | 2,70 | 12997 | 7,42 |
| M3,5 | | | 7 | 4 | 90 | 20 | 3,00 | 12999 | 7,42 |
| M4 | 5/32 | | 8 | 4,5 | 95 | 22 | 3,40 | 13003 | 7,91 |
| M4,5 | 3/16 | | 9 | 5 | 100 | 23 | 3,80 | 13006 | 7,91 |
| M5-M8 | 7/32-5/16 | | 11 | 6 | 110 | 25 | 4,90 | 13024 | 8,48 |
| M9-M10 | 3/8 | 1/8 | 12 | 7 | 115 | 27 | 5,50 | 13026 | 8,61 |
| M11 | 7/16 | | 14 | 8 | 120 | 29 | 6,20 | 13009 | 10,76 |
| M12 | 1/2 | | 15 | 9 | 125 | 31 | 7,00 | 13012 | 11,24 |
| M13-M16 | 9/16-5/8 | 1/4-3/8 | 19 | 12 | 130 | 33 | 9,00 | 13030 | 13,61 |
| M18 | 11/16-3/4 | | 23 | 14 | 150 | 39 | 11,00 | 13015 | 17,87 |
| M20 | 13/16 | 1/2 | 25 | 16 | 155 | 41 | 12,00 | 12448 | 18,98 |
| M22-M26 | 7/8-15/16 | 5/8 | 29 | 18 | 175 | 47 | 14,50 | 12451 | 32,16 |
| M27-M28 | 1" | 3/4 | 30 | 20 | 185 | 47 | 16,00 | 12457 | 34,75 |
| M30-M32 | 1"1/8 | 7/8 | 33 | 22 | 195 | 48 | 18,00 | 12459 | 41,15 |
| M33 | 1"1/4 | 1 | 36 | 25 | 220 | 52 | 20,00 | 12463 | 47,38 |
| M34-M38 | 1"3/8 | 1"1/8 | 38 | 28 | 220 | 60 | 22,00 | 12465 | 63,89 |
| M39-M42 | 1"1/2-1"5/8 | 1"1/4 | 42 | 32 | 235 | 63 | 24,00 | 12469 | 80,43 |
| M45-M50 | 1"3/4-1"7/8 | 1"3/8-2" | 50 | 36 | 265 | 70 | 29,00 | 12472 | 122,49 |
| M52 | 2" | 2"1/4 | 55 | 40 | 285 | 75 | 32,00 | 12475 | 158,89 |



Ref. **3193****PORTA-MACHOS COMPENSACIÓN RADIAL/AXIAL***

Radial/Axial Compensation Tap Holder*

Porte-tarauds compensation rayon / axe*



| Cap. | d1 mm | d2 mm | d mm | l1 mm | l2 mm | N° Art. | € |
|--------|----------|----------|---------|----------|----------|------------|----------|
| M3-M12 | 45 | 29 | 20 | 96 | 44 | 20031 | 1.449,74 |



Ref. 3193 bajo demanda / upon request / sur demande

*Para evitar la rotura de machos en máquinas automáticas

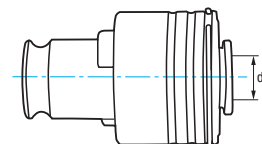
*For avoiding broken taps in automatic machines

*Pour éviter les ruptures de tarauds sur machines automatiques

Ref. **3195****ADAPTADOR PORTA-MACHOS DE CAMBIO RÁPIDO CON EMBRAGUE**

Quick Change Tap Collet with Safety Clutch

Adaptateur porte-tarauds changement rapide avec embrayage



| M 371 | M 376 | d2 mm | a1 mm | N° Art. | € |
|----------|----------|----------|----------|------------|--------|
| M3 | M5 | 3,50 | 2,70 | 20183 | 141,78 |
| M4 | M6 | 4,50 | 3,40 | 20185 | 141,78 |
| M4,5-M6 | M8 | 6,00 | 4,90 | 20186 | 141,78 |
| M8 | M11 | 8,00 | 6,20 | 20742 | 141,78 |
| | M12 | 9,00 | 7,00 | 21231 | 141,78 |
| M10 | | 10,00 | 8,00 | 21253 | 141,78 |



Ref. 3195 bajo demanda / upon request / sur demande



Ref. **3181**

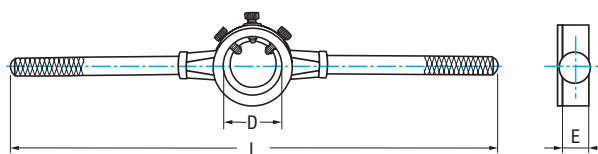
PORTA-COJINETES

Die Holder
Porte filières

¡NUEVO MODELO MEJORADO!

New improved model!

Nouveau modèle amélioré



DIN
225

| Mod. | D mm | E mm | L mm | M/MF | W | G | N° Art. | € |
|-------|------|------|------|----------------|-----------------|-----------------|---------|---------------|
| 000 | 16 | 5 | 160 | M1-M2,6 | W1/16-W3/32 | | 69792 | 8,47 |
| 010 | 20 | 5 | 200 | M3-M4 | W1/8-W5/32 | | 69790 | 9,19 |
| 020 | 20 | 7 | 200 | M4,5-M6 | W3/16-W1/4 | | 69798 | 9,19 |
| 030 | 25 | 9 | 224 | M7-M9 | W5/16 | G1/16 | 69799 | 10,55 |
| 040 | 30 | 11 | 280 | M10-M11 | W3/8-W7/16 | G1/8 | 69811 | 13,08 |
| 050 | 38 | 14 | 315 | M12-M15 | W1/2-W9/16 | | 69813 | 16,60 |
| 060 | 38 | 10 | 315 | MF12-MF15 | | G1/4 | 69814 | 16,60 |
| 070 | 45 | 18 | 450 | M16-M20 | W5/8-W3/4 | | 69816 | 20,54 |
| 080 | 45 | 14 | 450 | MF16-MF20 | | G3/8-G1/2 | 69817 | 20,54 |
| 090 | 55 | 22 | 560 | M22-M24 | W7/8-W1 | | 69819 | 27,59 |
| 100 | 55 | 16 | 560 | MF21-MF26 | | G5/8-G3/4 | 69795 | 26,28 |
| 110 | 65 | 25 | 630 | M27-M36 | W1 1/8 - W1 3/8 | | 69796 | 38,72 |
| 120 | 65 | 18 | 630 | MF27-MF36 | | G7/8-G1 | 30484 | 38,72 |
| * 130 | 75 | 30 | 920 | M39-M42 | W1 1/2 - W1 5/8 | | 32600 | 120,43 |
| * 140 | 75 | 20 | 920 | MF38-MF42 | | G1 1/8 - G1 1/4 | 43515 | 120,43 |
| * 150 | 90 | 36 | 950 | M45-M52 | W1 3/4 - W2 | | 43516 | 175,50 |
| * 160 | 90 | 22 | 950 | MF45-MF52 | | G1 1/2 | 43517 | 175,50 |

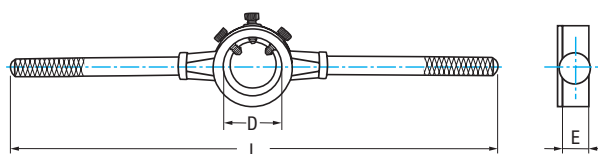


* Acero / Steel / Acier

Ref. **3184**

PORTA-COJINETES ISO 529

ISO 529 Die Holder
Porte filières ISO 529



DIN
225

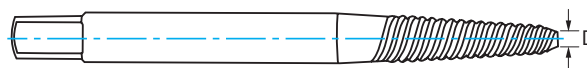
| D mm | E mm | M | W | N° Art. | € |
|--------------|-------|----------------|------------|---------|--------------|
| 25,40 | 9,50 | M3-M12 | W1/8-W1/2 | 43317 | 10,99 |
| 38,10 | 12,70 | M8-M20 | W5/16-W3/4 | 43318 | 16,42 |
| 50,80 | 15,90 | M18-M24 | W11/16-W1 | 43319 | 23,73 |



Ref. **3409****EXTRACTOR TORNILLOS**

Screw Extractor

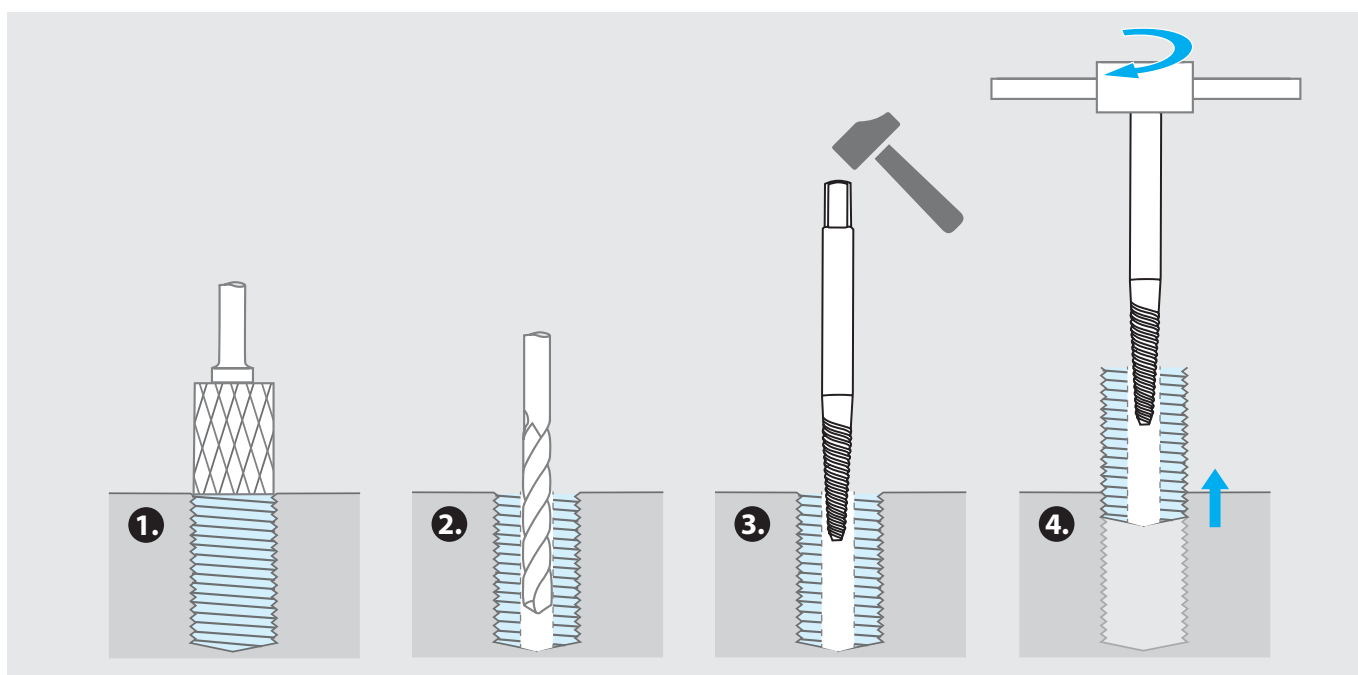
Extracteur vis



| Mod. | Para tornillos For Screws Pour vis | Para tornillos For Screws Pour vis | D mm | a mm | Nº Art. | € |
|------|--|--|---------|---------|------------|--------------|
| 010 | M3-M6 | 1/8-1/4 | 2,50 | 2,70 | 40639 | 2,99 |
| 020 | M6-M8 | 1/4-5/16 | 3,00 | 3,80 | 40641 | 2,99 |
| 030 | M8-M11 | 5/16-7/16 | 4,50 | 4,90 | 40642 | 3,12 |
| 040 | M11-M14 | 7/16-9/16 | 6,00 | 7,00 | 40644 | 4,41 |
| 050 | M15-M18 | 9/16-3/4 | 8,00 | 9,00 | 40645 | 6,91 |
| 060 | M18-M24 | 3/4-1 | 11,00 | 12,00 | 40647 | 10,97 |

**Set 5 Pcs**

| Juego para tornillos Set for Screws Jeu pour vis | Juego para tornillos Set for Screws Jeu pour vis | Nº Art. | € |
|--|--|------------|--------------|
| M3-M18 | 1/8-3/4 | 75905 | 20,42 |

**INSTRUCCIONES USO:**

1. Alisar la superficie del tornillo con rotativa Ref. 9260.
2. Taladrar un agujero centrado con broca apropiada. Recomendamos Ref. 1016.
3. Introducir el extractor asegurándose de que quede fijo.
4. Girar el extractor hacia la izquierda hasta extraer el tornillo.

DIRECTIONS FOR USE:

1. Grind the surface of the screw head with Rotary Burr Ref. 9260.
2. Drill a hole on the screw using a suitable drill bit. We recommend our Ref. 1016.
3. Introduce the extractor and make sure it gets fixed/locked.
4. Turn left the extractor until the screw gets out.

INSTRUCTIONS D'EMPLOI:

1. Lissez la surface de la vis avec une fraise lime rotative Réf. 9260.
2. Percez un trou centré avec un foret approprié. Nous recommandons notre Réf. 1016.
3. Insérez l'extracteur et assurez-vous qu'il est fixé.
4. Tournez à gauche l'extracteur jusqu'à retirer la vis.



REPARADORES ROSCAS

Thread Repairs

Filets rapportés

Descripción

Desgaste, corrosión, excesiva torsión al ajustar el tornillo... son algunas de las causas que llevan a dañar una rosca sin posibilidad de reparación.

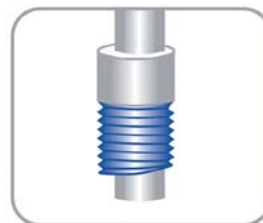
La gama de reparadores de roscas IZARCOIL permite reparar dichas roscas dañadas de manera rápida y económica. Unos reparadores de acero de gran calidad, para crear una rosca resistente a la temperatura y a la corrosión.

Ventajas

- Instalación rápida y sencilla
- Resistente al desgaste y a la tensión
- Resistente a la corrosión y termoestable

Ejemplos de aplicaciones

- Refuerzo para roscar materiales con una reducida resistencia (p.e. aleaciones de aluminio y aleaciones de magnesio)
- Ingeniería mecánica
- Ingeniería de automoción y electricidad



Uso

- 1- Taladrar la rosca dañada con una broca
- 2- Roscar con un macho IZARCOIL
- 3- Biselar el diámetro exterior a 90° y retirar la rebaba
- 4- Insertar el reparador de roscas con la ayuda del vástago
- 5- En caso de agujeros pasantes, usar un rompedor para la muesca

Description

Wear, corrosion or excessive screw tightening torque... are some of the reasons that lead to threads getting damaged beyond repair.

IZARCOIL thread repair range enables worn and damaged threads to be repaired quickly and at low cost.

In high-quality steel for a good thread, resistant to temperature and corrosion.

Advantages

- Fast and easy to install
- Stress resistant and wear-free
- Corrosion resistant and thermostable

Examples of Applications

- Thread reinforcement for materials with low shearing strength (e.g. aluminium or magnesium alloys)
- Mechanical engineering
- Automotive and electrical engineering

Description

Usure et trop de pression dans la fixation de la vis son des raisons pour endommager un filetage sans possibilité de réparation.

La gamme de filets rapportés IZARCOIL vous permet de réparer les filets endommagés rapidement et d'une façon économique.

Filets rapportés en aciers haute qualité pour avoir un filetage résistant à la température et à l'usure.

Avantages

- Installation rapide et simple
- Résistant à l'usure et a la tension
- Résistant aux variations de température

Exemples d'applications

- Soutien pour fileter aciers avec faible résistances (alliage aluminium et magnesium).
- Ingénierie mécanique
- Ingénierie auto et électricité

Use

- 1- Drill the thread with a Drill Bit
- 2- Thread with an IZARCOIL tap
- 3- Bevel the external diameter at 90° and remove the burr
- 4- Insert the thread repair using the fitting tool
- 5- In case of through holes, use a pin-breaker for the notch

Emploi

- 1- Percer le filet endommagé avec un foret
- 2- Tarauder avec un taraud IZARCOIL
- 3- Chanfreiner le diamètre extérieur à 90° et retirer les copeaux
- 4- Insérer le réparateur de filets avec l'aide du guide
- 5- Pour trous débouchants, employer un brise-copeaux

Ref. **3300**

INSERTO REPARACIÓN ROSCAS

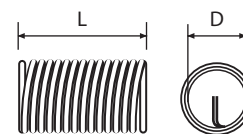
Thread Repair Insert

Filet rapportés



INOX
304

M/MF



D = M (aprox.)

P Aceros Steels Aciers

N Aleaciones Alum. Alloys / Alliages
Aleaciones Mg Alloys / Alliages

| M | P | L = 1xD | | L = 1,5xD | | L = 2xD | | L = 2,5xD | | L = 3xD | | | | | | |
|-------------------|------|---------|---------|------------|------|---------|------------|-----------|---------|------------|------|---------|------------|----|-------|------|
| | | Icon | Nº Art. | € 1 ud. | Icon | Nº Art. | € 1 ud. | Icon | Nº Art. | € 1 ud. | Icon | Nº Art. | € 1 ud. | | | |
| M3 | 0,50 | 25 | 56287 | 0,21 | 25 | 56288 | 0,21 | 25 | 56289 | 0,23 | 25 | 56291 | 0,27 | 25 | 56292 | 0,37 |
| M4 | 0,70 | 25 | 56293 | 0,21 | 25 | 56294 | 0,21 | 25 | 56297 | 0,23 | 25 | 56299 | 0,27 | 25 | 56300 | 0,34 |
| M5 | 0,80 | 25 | 56302 | 0,23 | 25 | 56303 | 0,21 | 25 | 56304 | 0,27 | 25 | 56306 | 0,33 | 25 | 56309 | 0,41 |
| M6+ * | 1,00 | 25 | 56310 | 0,23 | 25 | 56311 | 0,21 | 25 | 56312 | 0,27 | 25 | 56313 | 0,33 | 25 | 56315 | 0,49 |
| New! M6- * | 1,00 | 25 | 14857 | 0,23 | 25 | 14859 | 0,21 | 25 | 14863 | 0,27 | 25 | 14865 | 0,33 | 25 | 14866 | 0,49 |
| M7 | 1,00 | 25 | 56316 | 0,24 | 25 | 56318 | 0,30 | 25 | 56319 | 0,33 | 25 | 56320 | 0,38 | 25 | 56321 | 0,58 |
| M8 | 1,00 | 25 | 56322 | 0,27 | 25 | 56324 | 0,30 | 25 | 56325 | 0,37 | 25 | 56326 | 0,45 | 25 | 56327 | 0,61 |
| M8 | 1,25 | 25 | 56332 | 0,24 | 25 | 56333 | 0,27 | 25 | 56334 | 0,35 | 25 | 56336 | 0,43 | 25 | 56337 | 0,58 |
| M9 | 1,25 | 25 | 56339 | 0,37 | 25 | 56340 | 0,43 | 25 | 56341 | 0,51 | 25 | 56342 | 0,53 | 25 | 56343 | 0,70 |
| MF10 | 1,00 | 25 | 56344 | 0,30 | 25 | 56345 | 0,35 | 25 | 56346 | 0,40 | 25 | 56347 | 0,51 | 25 | 56348 | 0,68 |
| MF10 | 1,25 | 25 | 56349 | 0,30 | 25 | 56351 | 0,35 | 25 | 56352 | 0,40 | 25 | 56353 | 0,51 | 25 | 56354 | 0,68 |
| M10 | 1,50 | 25 | 56355 | 0,30 | 25 | 56357 | 0,35 | 25 | 56360 | 0,40 | 25 | 56361 | 0,51 | 10 | 56362 | 0,68 |
| M11 | 1,50 | 25 | 56363 | 0,45 | 25 | 56364 | 0,61 | 10 | 56365 | 0,65 | 10 | 56366 | 0,82 | 10 | 56367 | 1,00 |
| MF12 | 1,00 | 25 | 56369 | 0,38 | 25 | 56371 | 0,56 | 10 | 56372 | 0,64 | 10 | 56373 | 0,75 | 10 | 56374 | 1,00 |
| MF12 | 1,25 | 25 | 56375 | 0,38 | 25 | 56377 | 0,56 | 10 | 56378 | 0,64 | 10 | 56379 | 0,75 | 10 | 56381 | 1,00 |
| MF12 | 1,50 | 25 | 56384 | 0,38 | 25 | 56385 | 0,56 | 10 | 56387 | 0,64 | 10 | 56388 | 0,75 | 10 | 56389 | 1,00 |
| M12 | 1,75 | 25 | 56390 | 0,38 | 25 | 56391 | 0,56 | 10 | 56392 | 0,64 | 10 | 56393 | 0,75 | 10 | 56394 | 1,00 |
| MF14 | 1,00 | 10 | 56395 | 0,85 | 10 | 56396 | 0,87 | 10 | 56397 | 1,00 | 10 | 56399 | 1,21 | 10 | 56400 | 1,72 |
| MF14 | 1,25 | 10 | 56401 | 0,71 | 10 | 56402 | 0,80 | 10 | 56403 | 0,85 | 10 | 56404 | 1,00 | 10 | 56405 | 1,33 |
| MF14 | 1,50 | 10 | 56406 | 0,71 | 10 | 56407 | 0,80 | 10 | 56408 | 0,85 | 10 | 56409 | 1,00 | 10 | 56410 | 1,33 |
| M14 | 2,00 | 10 | 58844 | 0,71 | 10 | 58845 | 0,80 | 10 | 58846 | 0,85 | 10 | 58847 | 1,01 | 10 | 58848 | 1,33 |
| MF16 | 1,50 | 10 | 56411 | 0,94 | 10 | 56412 | 0,99 | 10 | 56413 | 1,23 | 10 | 56414 | 1,34 | 10 | 56416 | 1,72 |
| M16 | 2,00 | 10 | 56417 | 0,94 | 10 | 56419 | 0,99 | 10 | 56420 | 1,23 | 10 | 56422 | 1,34 | 10 | 56423 | 1,72 |
| MF18 | 2,00 | 10 | 56425 | 1,37 | 10 | 56427 | 1,60 | 10 | 56430 | 2,16 | 10 | 56431 | 2,46 | 10 | 56433 | 3,17 |
| M18 | 2,50 | 10 | 56434 | 1,37 | 10 | 56436 | 1,60 | 10 | 56439 | 2,16 | 10 | 56440 | 2,46 | 10 | 56442 | 3,17 |
| M20 | 2,50 | 10 | 67788 | 1,73 | 10 | 67790 | 2,16 | 10 | 67792 | 2,75 | 10 | 67794 | 3,13 | 10 | 70628 | 3,66 |
| M22 | 2,50 | 10 | 56445 | 1,74 | 10 | 56446 | 2,16 | 10 | 56448 | 2,76 | 10 | 56451 | 3,15 | 10 | 56452 | 4,16 |
| MF24 | 2,00 | 10 | 56454 | 2,16 | 10 | 56457 | 2,29 | 10 | 56458 | 2,90 | 10 | 56460 | 3,79 | 10 | 56463 | 4,43 |
| M24 | 3,00 | 10 | 56464 | 2,16 | 10 | 56466 | 2,29 | 10 | 56467 | 2,90 | 10 | 56473 | 3,79 | 5 | 56476 | 4,43 |

* M6+ → ø7,6 - ø7,7

* M6- → ø7,3 - ø7,4



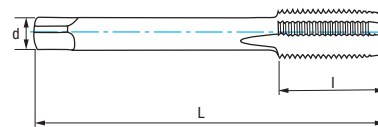
Ref. **3305**

IZARCOIL

MACHO PARA INSERTO REPARACIÓN ROSCAS

Thread Repair Insert Tap

Taraud filet rapportés



HSS

M/MF



P Aceros Steels Aciers


N Aleaciones Alum. Alloys / Alliages Aleaciones Mg Alloys / Alliages

| M | P | D mm | d mm | L mm | l mm | a mm | Z | Nº Art. | € |
|------|------|-------|-------|------|------|-------|---|---------|-------|
| M3 | 0,50 | 3,65 | 4,00 | 53 | 13 | 3,15 | 3 | 56615 | 8,29 |
| M4 | 0,70 | 4,91 | 5,00 | 58 | 16 | 4,00 | 3 | 56617 | 8,97 |
| M5 | 0,80 | 6,04 | 6,30 | 66 | 19 | 5,00 | 3 | 56620 | 9,11 |
| M6 | 1,00 | 7,30 | 8,00 | 72 | 22 | 6,30 | 3 | 56622 | 9,11 |
| M7 | 1,00 | 8,30 | 9,00 | 72 | 22 | 7,10 | 3 | 56623 | 12,72 |
| M8 | 1,00 | 9,30 | 10,00 | 80 | 24 | 8,00 | 3 | 56628 | 12,72 |
| M8 | 1,25 | 9,62 | 10,00 | 80 | 24 | 8,00 | 3 | 56626 | 11,87 |
| M9 | 1,25 | 10,60 | 8,00 | 85 | 25 | 6,30 | 3 | 56629 | 15,57 |
| MF10 | 1,00 | 11,30 | 8,00 | 85 | 25 | 6,30 | 3 | 56638 | 15,57 |
| MF10 | 1,25 | 11,62 | 8,00 | 85 | 25 | 6,30 | 3 | 56634 | 15,57 |
| M10 | 1,50 | 11,95 | 9,00 | 89 | 29 | 7,10 | 3 | 56632 | 15,57 |
| M11 | 1,50 | 12,95 | 9,00 | 89 | 29 | 7,10 | 3 | 56640 | 17,62 |
| MF12 | 1,00 | 13,30 | 11,20 | 95 | 30 | 9,00 | 3 | 56646 | 21,52 |
| MF12 | 1,25 | 13,62 | 11,20 | 95 | 30 | 9,00 | 3 | 56648 | 21,52 |
| MF12 | 1,50 | 13,95 | 11,20 | 95 | 30 | 9,00 | 3 | 56647 | 21,52 |
| M12 | 1,75 | 14,27 | 11,20 | 95 | 30 | 9,00 | 3 | 56644 | 16,71 |
| MF14 | 1,00 | 15,30 | 12,50 | 102 | 32 | 10,00 | 3 | 56650 | 24,50 |
| MF14 | 1,25 | 15,62 | 12,50 | 102 | 32 | 10,00 | 3 | 56652 | 24,50 |
| MF14 | 1,50 | 15,95 | 12,50 | 102 | 32 | 10,00 | 3 | 56651 | 24,50 |
| M14 | 2,00 | 16,70 | 12,50 | 102 | 32 | 10,00 | 4 | 58849 | 24,50 |
| MF16 | 1,50 | 18,00 | 14,00 | 104 | 29 | 11,20 | 4 | 56654 | 29,32 |
| M16 | 2,00 | 18,60 | 14,00 | 112 | 37 | 11,20 | 4 | 56653 | 29,32 |
| MF18 | 2,00 | 20,60 | 14,00 | 104 | 29 | 11,20 | 4 | 56657 | 37,12 |
| M18 | 2,50 | 21,30 | 16,00 | 118 | 38 | 12,50 | 4 | 56656 | 37,12 |
| M20 | 2,50 | 23,32 | 16,00 | 118 | 38 | 12,50 | 4 | 72852 | 42,03 |
| M22 | 2,50 | 25,30 | 18,00 | 130 | 45 | 14,00 | 4 | 56658 | 46,95 |
| MF24 | 2,00 | 26,60 | 20,00 | 127 | 37 | 16,00 | 4 | 56660 | 59,35 |
| M24 | 3,00 | 27,90 | 20,00 | 138 | 48 | 16,00 | 4 | 56659 | 59,35 |


| D Broca Drill Bit / Foret mm |
|------------------------------------|
| 3,20 |
| 4,20 |
| 5,20 |
| 6,30 |
| 7,30 |
| 8,30 |
| 8,30 |
| 9,40 |
| 10,30 |
| 10,30 |
| 10,40 |
| 11,50 |
| 12,30 |
| 12,30 |
| 12,50 |
| 12,50 |
| 14,30 |
| 14,30 |
| 14,50 |
| 14,50 |
| 14,50 |
| 16,50 |
| 16,50 |
| 18,50 |
| 18,75 |
| 20,75 |
| 23,00 |
| 24,50 |
| 25,00 |



Ref. **3303****INSERTADOR**
Fitting Tool
Appareil de pose

| M | L mm | D mm |  | N° Art. | € |
|-----|---------|---------|---|------------|-------|
| M3 | 132 | 2,20 | 1 | 70226 | 10,61 |
| M4 | 132 | 3,00 | 1 | 66774 | 10,61 |
| M5 | 132 | 4,00 | 1 | 66775 | 10,61 |
| M6 | 132 | 4,90 | 1 | 66776 | 10,61 |
| M8 | 132 | 6,50 | 1 | 66777 | 12,03 |
| M10 | 132 | 7,00 | 1 | 66778 | 12,03 |
| M12 | 132 | 9,50 | 1 | 66779 | 14,95 |
| M14 | 132 | 11,00 | 1 | 66780 | 17,61 |
| M16 | 132 | 12,75 | 1 | 79464 | 18,83 |
| M18 | 132 | 14,90 | 1 | 79466 | 18,83 |
| M20 | 132 | 15,95 | 1 | 79467 | 18,83 |
| M22 | 132 | 17,95 | 1 | 83203 | 21,17 |
| M24 | 132 | 20,00 | 1 | 79468 | 23,52 |

Ref. **3307****ROMPE ARRASTRES**
Pin-Breaker
Rupteur

| M | L mm | D mm |  | N° Art. | € |
|-----|---------|---------|---|------------|-------|
| M3 | 100 | 2,20 | 1 | 70238 | 4,55 |
| M4 | 100 | 3,00 | 1 | 66781 | 4,55 |
| M5 | 100 | 4,00 | 1 | 66782 | 4,55 |
| M6 | 100 | 4,90 | 1 | 66783 | 4,55 |
| M8 | 100 | 6,50 | 1 | 66784 | 4,98 |
| M10 | 100 | 7,00 | 1 | 66785 | 4,98 |
| M12 | 100 | 9,50 | 1 | 66786 | 5,98 |
| M14 | 100 | 11,00 | 1 | 66787 | 7,96 |
| M16 | 100 | 12,75 | 1 | 79470 | 8,51 |
| M18 | 100 | 14,90 | 1 | 79476 | 8,51 |
| M20 | 100 | 15,95 | 1 | 79477 | 8,51 |
| M22 | 100 | 17,95 | 1 | 83205 | 9,58 |
| M24 | 100 | 20,00 | 1 | 79478 | 10,63 |



Ref. 3303

Ref. 3307

Ref. **3310**

SET REPARACIÓN ROSCAS

Thread Repair Set
Set filet rapportés



| | | | |
|----------|-----------------------------|----------|---|
| P | Aceros Steels Aciers | N | Aleaciones Alum. Alloys / Alliages Aleaciones Mg Alloys / Alliages |
|----------|-----------------------------|----------|---|

Set 95 Pcs

| Cont. M5-M12 | | | | Nº Art. | € | |
|--|----------------------------------|------------------------------------|-------------|---------------------------------------|-------|--------|
| Insertos Inserts Rapportés | | M5 | 0,80 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | 56481 | 267,19 |
| | | M6 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| | | M8 | 1,25 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| | | M10 | 1,50 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| | | M12 | 1,75 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| Brocas Drill Bits Forets (D mm) | | 5,20 - 6,30 - 8,30 - 10,40 - 12,50 | | | | |
| Machos Taps Tarauds (D mm) | | 6,04 - 7,30 - 9,62 - 11,95 - 14,27 | | | | |
| Insertadores Fitting Tools Appareils de pose (D mm) | 4,00 - 4,50 - 6,25 - 7,20 - 9,50 | | | | | |
| Rompe arrastres Pin-Breakers Rupteurs (D mm) | 4,00 - 4,50 - 6,25 - 7,20 - 9,50 | | | | | |

Ref. **3311**

SET REPARACIÓN ROSCAS BUJÍAS

Spark Plug Thread Repair Set
Set filet rapportés bougies



| | | | |
|----------|-----------------------------|----------|---|
| P | Aceros Steels Aciers | N | Aleaciones Alum. Alloys / Alliages Aleaciones Mg Alloys / Alliages |
|----------|-----------------------------|----------|---|

Set 94 Pcs

| Cont. M6-MF14 | | | | Nº Art. | € | |
|--|-----------------------------------|-------------------------------------|-------------|---------------------------------------|-------|--------|
| Insertos Inserts Rapportés | | M6 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | 56482 | 307,90 |
| | | M8 | 1,25 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| | | M10 | 1,50 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| | | M12 | 1,75 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| | | MF14 | 1,25 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5XD | | |
| Brocas Drill Bits Forets (D mm) | | 6,30 - 8,30 - 10,40 - 12,50 | | | | |
| Machos Taps Tarauds (D mm) | | 7,30 - 9,62 - 11,95 - 14,27 - 15,60 | | | | |
| Insertadores Fitting Tools Appareils de pose (D mm) | 4,50 - 6,25 - 7,20 - 9,50 - 11,00 | | | | | |
| Rompe arrastres Pin-Breakers Rupteurs (D mm) | 4,50 - 6,25 - 7,20 - 9,50 - 11,00 | | | | | |

Ref. **3312****SET REPARACIÓN ROSCAS COMPLETO**

Complete Thread Repair Set

Set filet rapportés complet



M/MF

P Aceros
Steels
Aciers

N Aleaciones Alum. Alloys / Alliages
Aleaciones Mg Alloys / Alliages

Set 19 Pcs

| M | P | Insertos Inserts Rapportés | INOX 304 | Brocas Drill Bits Forets (D mm) | HSS | Machos Taps Tarauds (D mm) | HSS | Insertadores Fitting Tools Appareils de pose (D mm) | Rompe arrastres Pin-Breakers Rupteurs (D mm) | Nº Art. | € |
|------------------|-------------|---------------------------------------|-------------|--|-----|-------------------------------------|-----|--|---|---------|--------------|
| M3 | 0,50 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 3,20 | | 3,65 | | 2,20 | 2,20 | 60330 | 37,92 |
| M4 | 0,70 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 4,20 | | 4,91 | | 3,00 | 3,00 | 56484 | 37,92 |
| M5 | 0,80 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 5,20 | | 6,04 | | 4,00 | 4,00 | 56487 | 37,73 |
| M6 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 6,30 | | 7,30 | | 4,90 | 4,90 | 56488 | 40,62 |
| M7 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 7,30 | | 8,30 | | 4,90 | 4,90 | 67804 | 49,44 |
| MF8 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 8,30 | | 9,30 | | 6,50 | 6,50 | 56497 | 49,44 |
| M8 | 1,25 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 8,30 | | 9,62 | | 6,50 | 6,50 | 56490 | 49,44 |
| New! MF10 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 10,30 | | 11,30 | | 7,00 | 7,00 | 12675 | 55,31 |
| MF10 | 1,25 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 10,30 | | 11,62 | | 7,00 | 7,00 | 56500 | 55,31 |
| M10 | 1,50 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 10,40 | | 11,95 | | 7,00 | 7,00 | 56493 | 55,31 |
| MF12 | 1,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 12,30 | | 13,30 | | 9,50 | 9,50 | 57967 | 63,44 |
| MF12 | 1,50 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 12,50 | | 13,95 | | 9,50 | 9,50 | 57964 | 63,44 |
| M12 | 1,75 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | 12,50 | | 14,27 | | 9,50 | 9,50 | 56496 | 63,44 |
| MF14 | 1,25 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | *14,30 | | 15,62 | | 11,00 | 11,00 | 57973 | 64,45 |
| M14 | 2,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | *14,50 | | 16,60 | | 11,00 | 11,00 | 57970 | 72,92 |
| New! MF16 | 1,50 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | *16,50 | | 18,00 | | 12,75 | 12,75 | 23220 | 83,93 |
| New! MF16 | 2,00 | 5 pcs 1xD + 5 pcs 1,5xD + 5 pcs 2,5xD | | *16,50 | | 18,60 | | 12,75 | 12,75 | 23221 | 83,93 |

* Diámetro de broca correspondiente. Broca no incluida

Corresponding drill bit diameter. Drill bit not included

Diamètre de foret correspondant. Foret non inclus





Expertise in upon demand products

izartool.com

FRESADO METAL DURO

Carbide Milling

Fraisage carbure

FRESAS FRONTALES DESBASTE

Roughing End Mills
Fraises Ébauche

296

FRESAS FRONTALES ACABADO

Finishing End Mills
Fraises finition

299

FRESAS ACABADO TURBINAS

Turbines Finishing End Mills
Fraises finition turbinas

327

FRESAS ACABADOS ESPECIALES

Special Finishes End Mills
Fraises finitions spéciales

330

FRESAS FIBRAS / COMPOSITES

Fiber Composites End Mills
Fraises fibres / composites

336

FRESAS ROTATIVAS METAL DURO

HM Rotary Burrs
Fraises Limes Rotatives Carbure

342

JUEGOS FRESAS

End Mill Sets
Jeux de fraises

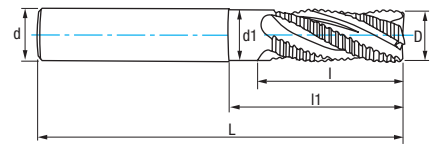
356



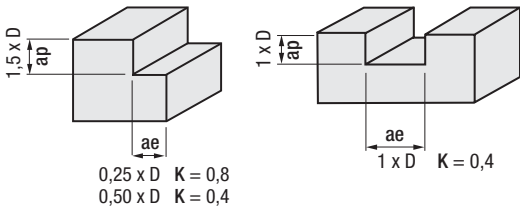
Ref. **9644**

FRESA METAL DURO DESBASTE USO GENERAL

General Purpose Roughing Carbide End Mill
Fraise carbure ébauche utilisation générale



| | | | | | | | | | |
|---------------------------------------|---------------|--------------------|--|-------|--|--|----------------|---------------------------|--|
| MD/HM Carbure Micrograno | CROMAX | IZAR Std. NR | | 4-5 Z | | | DIN 6535 HA | Tol. D (h10) d (h6) | |
|---------------------------------------|---------------|--------------------|--|-------|--|--|----------------|---------------------------|--|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|-------------|---------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | CROMAX | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 110-140 | 130-170 | 0,030 | 0,050 | 0,060 | 0,070 | 0,115 | 0,115 |
| | P.2 | 95-120 | 120-150 | 0,030 | 0,050 | 0,060 | 0,070 | 0,115 | 0,115 |
| | P.3 | 45-70 | 50-85 | 0,030 | 0,050 | 0,060 | 0,070 | 0,075 | 0,075 |
| K | K.1 | 50-75 | 60-85 | 0,030 | 0,050 | 0,060 | 0,070 | 0,075 | 0,075 |
| | K.2 | 50-75 | 60-90 | 0,030 | 0,050 | 0,060 | 0,070 | 0,127 | 0,150 |
| N | N.1 | 60-120 | 80-160 | 0,030 | 0,050 | 0,060 | 0,070 | 0,127 | 0,150 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

New!

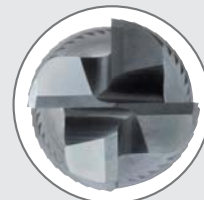
| D mm | d mm | L mm | l1 mm | l mm | d1 mm | Z | N° Art. MD/HM | € | N° Art. CROMAX | € |
|---------|---------|---------|----------|---------|----------|---|------------------|---------------|-------------------|---------------|
| 6,00 | 6,00 | 57 | 21 | 13,00 | 5,50 | 4 | 43531 | 36,35 | 43240 | 45,59 |
| 8,00 | 8,00 | 63 | 27 | 19,00 | 7,50 | 4 | 43532 | 41,03 | 43246 | 49,83 |
| 10,00 | 10,00 | 72 | 32 | 22,00 | 9,50 | 4 | 43533 | 49,24 | 43248 | 57,11 |
| 12,00 | 12,00 | 83 | 38 | 26,00 | 11,50 | 4 | 43534 | 71,26 | 43249 | 79,32 |
| 16,00 | 16,00 | 92 | 44 | 32,00 | 15,50 | 5 | 43536 | 110,25 | 43251 | 120,28 |
| 20,00 | 20,00 | 104 | 54 | 38,00 | 19,50 | 5 | 43537 | 183,70 | 43252 | 195,68 |



DIN 6535 HB
Bajo demanda / upon request / sur demande



Video

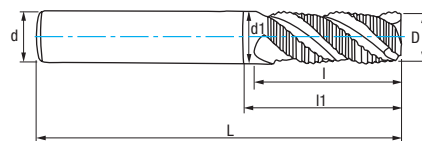


Ref. **9647**

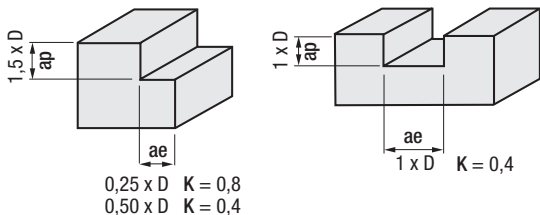
FRESA METAL DURO 3Z DESBASTE 45° INOX

Stainless 45° Roughing 3Z Carbide End Mill

Fraise carbure 3Z ébauche 45° Inox



| | | | | | | | | | |
|---------------------------------------|---------------|--------------------|--|-----|--|--|----------------|---------------------------|--|
| MD/HM Carbure Micrograno | CROMAX | IZAR Std. WR | | 3 Z | | | DIN 6535 HA | Tol. D (h10) d (h6) | |
|---------------------------------------|---------------|--------------------|--|-----|--|--|----------------|---------------------------|--|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|-------------|---------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | CROMAX | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.5 | 75-90 | 90-110 | 0,030 | 0,050 | 0,060 | 0,070 | 0,090 | 0,120 |
| M | | 40-60 | 50-80 | 0,030 | 0,050 | 0,060 | 0,070 | 0,090 | 0,120 |
| S | | 40-70 | 50-80 | 0,060 | 0,070 | 0,080 | 0,100 | 0,150 | 0,180 |
| N | N.5 | 90-200 | 100-230 | 0,040 | 0,060 | 0,070 | 0,100 | 0,150 | 0,180 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

(New!)

| D mm | d mm | L mm | l1 mm | l mm | d1 mm | Z | N° Art. MD/HM | € | N° Art. CROMAX | € |
|---------|---------|---------|----------|---------|----------|---|------------------|---------------|-------------------|---------------|
| 6,00 | 6,00 | 57 | 21 | 13 | 5,50 | 3 | 43538 | 40,25 | 43253 | 49,49 |
| 8,00 | 8,00 | 63 | 27 | 19 | 7,50 | 3 | 43539 | 46,10 | 43260 | 54,09 |
| 10,00 | 10,00 | 72 | 32 | 22 | 9,50 | 3 | 43540 | 50,64 | 43261 | 58,51 |
| 12,00 | 12,00 | 83 | 38 | 26 | 11,50 | 3 | 43542 | 72,52 | 43285 | 80,58 |
| 16,00 | 16,00 | 92 | 44 | 32 | 15,50 | 3 | 43543 | 117,16 | 43286 | 127,19 |
| 20,00 | 20,00 | 104 | 54 | 38 | 19,50 | 3 | 43544 | 195,41 | 43288 | 207,39 |



DIN 6535 HB
Bajo demanda / upon request / sur demande



IKRA, UN RECUBRIMIENTO SUPERIOR

NUEVO RECUBRIMIENTO PARA TRABAJOS EXIGENTES EN MATERIALES ENDURECIDOS 55-70 HRC

IKRA

IKRA, the supreme coating

New coating for demanding works in hardened materials 55-70 HRC

IKRA, un revêtement supérieur

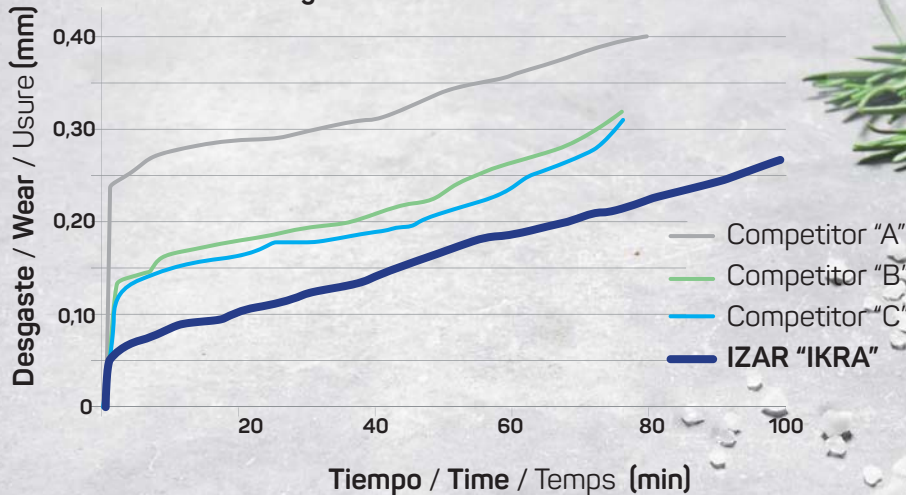
Nouveau revêtement pour les travaux exigeants dans les matériaux durcis 55-70 HRC



| Base AlTiN AlTiN Base Base AlTiN | |
|--|----------|
| Dureza / Hardness / Dureté HV(0,05) | 3500+300 |
| Oxidación / Oxidation / Oxidation | 1000°C |
| Coeficiente Fricción | |
| Rubbing Coefficient / Coéfficient Friction | 0,35 |
| Color / Colour / Couleur: | |
| Gris / Grey / Gris | |

Mat. 90MnCrV8 (63-65 HRC)

Evolución de desgastes / Wear evolution / Evolution de l'usure



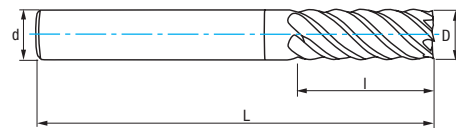
* Testado contra las marcas más conocidas del mercado
 * Comparative test against well-known brands in the market
 * Testé contre les marques les plus connues du marché



Ref. 9405

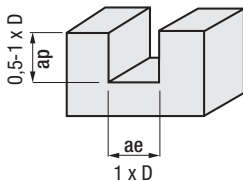
FRESA METAL DURO SUPER-ACABADO 48-70 HRC

48-70 HRC Super-Finishing Carbide End Mill
Fraise carbure super-finition 48-70 HRC

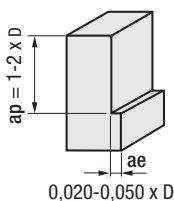


| | | | | | | | | |
|-------------------------------------|------|---------------|--|-------|--|----------------|--------------------------|--|
| MD/HM Carbure Grano UF | IKRA | DIN 6528 N | | 6-8 Z | | DIN 6535 HA | Tol. D (e8) d (h6) | |
|-------------------------------------|------|---------------|--|-------|--|----------------|--------------------------|--|

Ranurado Slotting Rainurage



Acabado Precisión Finishing Finition précision



Mecanizado Alta Velocidad High Speed Machining / Usinage haute vitesse

Recomendado trabajo en seco
Dry-working recommended - Recommandé travail en sec

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | IKRA | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 250-300 | 0,060 | 0,060 | 0,060 | 0,050 | 0,040 | 0,040 |
| | P.3 | 120-180 | 0,050 | 0,050 | 0,050 | 0,040 | 0,030 | 0,030 |
| H | | 75-130 | 0,045 | 0,045 | 0,040 | 0,030 | 0,025 | 0,025 |

| D mm | d mm | L mm | I mm | Z | Nº Art. IKRA | € |
|-------|-------|------|------|---|--------------|--------|
| 6,00 | 6,00 | 57 | 13 | 6 | 28751 | 46,32 |
| 8,00 | 8,00 | 63 | 19 | 6 | 28752 | 58,72 |
| 10,00 | 10,00 | 72 | 22 | 6 | 28753 | 87,91 |
| 12,00 | 12,00 | 83 | 26 | 6 | 28754 | 119,46 |
| 16,00 | 16,00 | 92 | 32 | 8 | 28755 | 200,88 |
| 20,00 | 20,00 | 104 | 38 | 8 | 28756 | 295,15 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

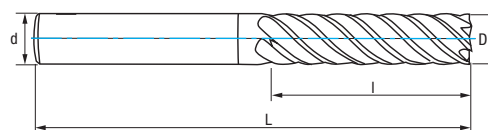


DIN 6535 HB
Bajo demanda / upon request / sur demande

Ref. 9415

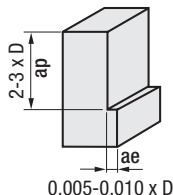
FRESA METAL DURO SERIE LARGA SUPER-ACABADO 48-70 HRC

48-70 HRC Super-Finishing Long Series Carbide End Mill
Fraise carbure série longue super-finition 48-70 HRC



| | | | | | | | | |
|-------------------------------------|------|---------------|--|-------|--|----------------|--------------------------|--|
| MD/HM Carbure Grano UF | IKRA | DIN 6528 N | | 6-8 Z | | DIN 6535 HA | Tol. D (e8) d (h6) | |
|-------------------------------------|------|---------------|--|-------|--|----------------|--------------------------|--|

Acabado Precisión Finishing Finition précision



Mecanizado Alta Velocidad High Speed Machining / Usinage haute vitesse

Recomendado trabajo en seco
Dry-working recommended - Recommandé travail en sec

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | IKRA | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 250-300 | 0,060 | 0,060 | 0,060 | 0,050 | 0,040 | 0,040 |
| | P.3 | 120-180 | 0,050 | 0,050 | 0,050 | 0,040 | 0,030 | 0,030 |
| H | | 75-130 | 0,045 | 0,045 | 0,040 | 0,030 | 0,025 | 0,025 |

Serie Larga
Long Series
Série Longue

| D mm | d mm | L mm | I mm | Z | Nº Art. IKRA | € |
|-------|-------|------|------|---|--------------|--------|
| 6,00 | 6,00 | 75 | 20 | 6 | 10661 | 63,07 |
| 8,00 | 8,00 | 75 | 25 | 6 | 10691 | 82,91 |
| 10,00 | 10,00 | 100 | 30 | 6 | 10694 | 128,99 |
| 12,00 | 12,00 | 100 | 45 | 6 | 10697 | 181,31 |
| 16,00 | 16,00 | 100 | 50 | 8 | 10700 | 315,37 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction



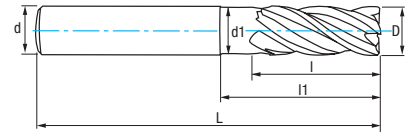
DIN 6535 HB
Bajo demanda / upon request / sur demande

Ref. **9406**

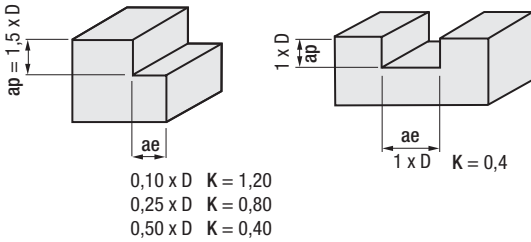
FRESA METAL DURO HÉLICE ALTERNA ALTO RENDIMIENTO 48-70 HRC

48-70 HRC High Performance Unequal Helix Carbide End Mill

Fraise carbure hélice alternée haut rendement 48-70 HRC



| | | | | | | | |
|-------------------------------------|------|---------------|--|-------|----------------|--|--|
| MD/HM Carbure Grano UF | IKRA | DIN 6528 N | | 4-5 Z | DIN 6535 HA | | |
|-------------------------------------|------|---------------|--|-------|----------------|--|--|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|-------------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | IKRA | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 112-150 | 0,018 | 0,030 | 0,040 | 0,056 | 0,070 | 0,090 | 0,112 | 0,140 |
| | P.3 | 60-130 | 0,015 | 0,027 | 0,036 | 0,050 | 0,056 | 0,070 | 0,084 | 0,105 |
| | P.5 | 100-130 | 0,011 | 0,019 | 0,025 | 0,035 | 0,035 | 0,056 | 0,080 | 0,100 |
| M | | 50-80 | 0,015 | 0,027 | 0,036 | 0,049 | 0,049 | 0,070 | 0,070 | 0,080 |
| K | K.1 | 80-120 | 0,018 | 0,030 | 0,040 | 0,056 | 0,077 | 0,091 | 0,112 | 0,140 |
| | K.2 | 80-100 | 0,018 | 0,030 | 0,040 | 0,056 | 0,077 | 0,091 | 0,112 | 0,140 |
| S | Ti6Al4V | 70-90 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,065 |
| | Inconel 718 | 100-130 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,065 |
| N | N.1 | 140-350 | 0,020 | 0,039 | 0,051 | 0,070 | 0,084 | 0,105 | 0,112 | 0,175 |
| | N.2 | 140-350 | 0,020 | 0,039 | 0,051 | 0,070 | 0,084 | 0,105 | 0,112 | 0,175 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l1 mm | l mm | d1 mm | Z | Nº Art. IKRA | € |
|-------|-------|------|-------|------|-------|---|--------------|--------|
| 2,00 | 3,00 | 38 | 6 | 3 | 1,95 | 4 | 67260 | 30,34 |
| 3,00 | 3,00 | 38 | 12 | 8 | 2,85 | 4 | 36210 | 30,34 |
| 4,00 | 4,00 | 50 | 16 | 11 | 3,50 | 4 | 35245 | 30,34 |
| 5,00 | 5,00 | 50 | 19 | 13 | 4,50 | 4 | 36211 | 30,34 |
| 6,00 | 6,00 | 57 | 21 | 13 | 5,50 | 4 | 28762 | 32,57 |
| 8,00 | 8,00 | 63 | 27 | 19 | 7,50 | 4 | 28763 | 44,86 |
| 10,00 | 10,00 | 72 | 32 | 22 | 9,50 | 4 | 28764 | 56,90 |
| 12,00 | 12,00 | 83 | 38 | 26 | 11,50 | 4 | 28765 | 79,21 |
| 14,00 | 14,00 | 83 | 38 | 26 | 13,50 | 4 | 67250 | 107,19 |
| 16,00 | 16,00 | 92 | 44 | 32 | 15,50 | 5 | 28766 | 120,28 |
| 18,00 | 18,00 | 92 | 44 | 32 | 17,50 | 5 | 69716 | 142,58 |
| 20,00 | 20,00 | 104 | 54 | 38 | 19,50 | 5 | 39057 | 185,21 |



6 Pcs

| Cont. Ø | Nº Art. IKRA | € |
|------------------|--------------|--------|
| 4-5-6-8-10-12 mm | 67688 | 260,51 |

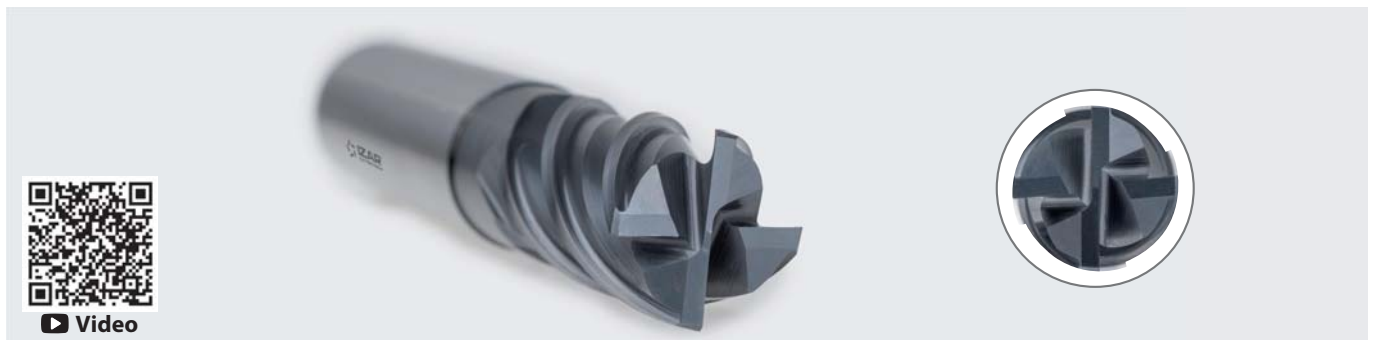
Set Price!

DIN 6535 HB
Bajo demanda / upon request / sur demande

1. Eliminación de vibraciones.
2. Gran calidad superficial.
3. Mayores avances (hasta 40-50%).
4. Mayor vida de la herramienta
→ Mayor productividad
5. Mejor evacuación de viruta.

1. No vibrations.
2. Good surface quality.
3. Higher feed (up to 40-50%).
4. Longer tool life
→ Higher Productivity
5. Better chipping.

1. Sans vibrations.
2. Haute qualité de surface.
3. Meilleurs avances (jusqu'au 40-50%).
4. Vie utile de l'outil plus longue
→ Haute Productivité
5. Meilleure évacuation copeaux.



Video

Ref. 9446

FRESA TÓRICA METAL DURO HÉLICE ALTERNA 48-70 HRC

Unequal Helix Radius 48-70 HRC Carbide End Mill

Fraise torique carbure hélice alternée 48-70 HRC



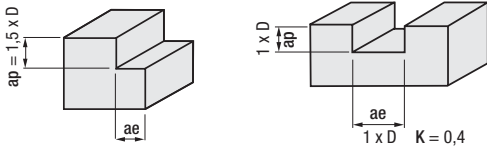
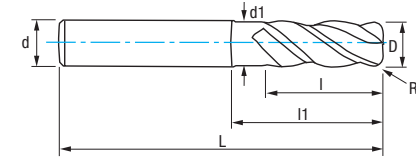
MD/HM
Carbure
Grano UF

IKRA

DIN
6528 N



4-5 Z



0,10 x D K = 1,20
0,25 x D K = 0,80
0,50 x D K = 0,40

| Material | | Vc (m/min) | Refs. 9446-9447 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|-------------|------------|---|-------|-------|-------|-------|-------|
| Grupo | Sub. | IKRA | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 112-150 | 0,040 | 0,056 | 0,070 | 0,090 | 0,112 | 0,140 |
| | P.3 | 60-130 | 0,036 | 0,050 | 0,056 | 0,070 | 0,084 | 0,105 |
| | P.5 | 100-130 | 0,025 | 0,035 | 0,035 | 0,056 | 0,080 | 0,100 |
| M | | 50-80 | 0,036 | 0,049 | 0,049 | 0,070 | 0,070 | 0,080 |
| S | Ti6Al4V | 70-90 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,065 |
| | Inconel 718 | 100-130 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,065 |
| N | N.1 | 140-350 | 0,051 | 0,070 | 0,084 | 0,105 | 0,112 | 0,175 |
| | N.2 | 140-350 | 0,051 | 0,070 | 0,084 | 0,105 | 0,112 | 0,175 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K \quad K = \begin{matrix} \text{Coeficiente corrección} \\ \text{Correction coefficient - Coefficient correction} \end{matrix}$$



| D | d | L | l1 | l | d1 | Z | R | Nº Art. IKRA | € |
|-------|-------|-----|----|-------|-------|---|------|--------------|--------|
| 6,00 | 6,00 | 57 | 21 | 13,00 | 5,50 | 4 | 1,00 | 80809 | 35,84 |
| 6,00 | 6,00 | 57 | 21 | 13,00 | 5,50 | 4 | 2,00 | 80810 | 35,84 |
| 8,00 | 8,00 | 63 | 27 | 19,00 | 7,50 | 4 | 1,00 | 80811 | 49,34 |
| 8,00 | 8,00 | 63 | 27 | 19,00 | 7,50 | 4 | 2,00 | 80812 | 49,34 |
| 10,00 | 10,00 | 72 | 32 | 22,00 | 9,50 | 4 | 1,00 | 80813 | 62,60 |
| 10,00 | 10,00 | 72 | 32 | 22,00 | 9,50 | 4 | 2,00 | 80814 | 62,60 |
| 10,00 | 10,00 | 72 | 32 | 22,00 | 9,50 | 4 | 3,00 | 80815 | 62,60 |
| 12,00 | 12,00 | 83 | 38 | 26,00 | 11,50 | 4 | 1,00 | 80816 | 87,13 |
| 12,00 | 12,00 | 83 | 38 | 26,00 | 11,50 | 4 | 2,00 | 80817 | 87,13 |
| 12,00 | 12,00 | 83 | 38 | 26,00 | 11,50 | 4 | 3,00 | 80796 | 87,13 |
| 14,00 | 14,00 | 83 | 38 | 26,00 | 13,50 | 4 | 1,00 | 80818 | 117,91 |
| 14,00 | 14,00 | 83 | 38 | 26,00 | 13,50 | 4 | 2,00 | 80819 | 117,91 |
| 14,00 | 14,00 | 83 | 38 | 26,00 | 13,50 | 4 | 3,00 | 80820 | 117,91 |
| 16,00 | 16,00 | 92 | 44 | 32,00 | 15,50 | 5 | 2,00 | 80824 | 132,31 |
| 16,00 | 16,00 | 92 | 44 | 32,00 | 15,50 | 5 | 3,00 | 80825 | 132,31 |
| 20,00 | 20,00 | 104 | 54 | 38,00 | 19,50 | 5 | 2,00 | 80826 | 203,73 |
| 20,00 | 20,00 | 104 | 54 | 38,00 | 19,50 | 5 | 3,00 | 80827 | 203,73 |

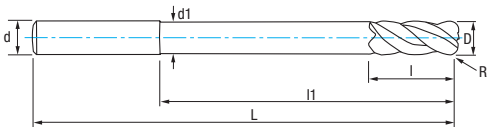
1. Eliminación de vibraciones
 2. Mayores avances (hasta 40-50%)
 3. Mayor vida de la herramienta => Mayor productividad
 4. Óptimo para la fabricación aditiva 3D
1. No vibrations
 2. Higher feed (up to 40-50%)
 3. Longer tool life => Higher Productivity
 4. Suitable for 3D metal additive manufacturing
1. Sans vibrations
 2. Meilleurs avances (jusqu'au 40-50%)
 3. Vie utile de l'outil plus longue => Haute Productivité
 4. Optimal pour la fabrication additive de métaux 3D

Ref. 9447

FRESA TÓRICA METAL DURO HÉLICE ALTERNA 48-70 HRC. SERIE LARGA

Unequal Helix Radius 48-70 HRC Carbide End Mill. Long Series

Fraise torique carbure hélice alternée 48-70 HRC. Série longue



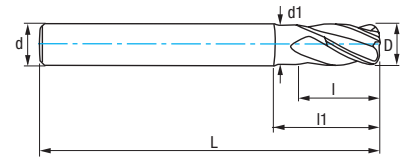
| D | d | L | l1 | l | d1 | Z | R | Nº Art. IKRA | € |
|-------|-------|-----|-----|-------|-------|---|------|--------------|--------|
| 6,00 | 6,00 | 100 | 64 | 13,00 | 5,50 | 4 | 1,00 | 80821 | 57,34 |
| 6,00 | 6,00 | 100 | 64 | 13,00 | 5,50 | 4 | 2,00 | 80822 | 57,34 |
| 8,00 | 8,00 | 100 | 64 | 19,00 | 7,50 | 4 | 1,00 | 80935 | 74,02 |
| 8,00 | 8,00 | 100 | 64 | 19,00 | 7,50 | 4 | 2,00 | 80936 | 74,02 |
| 10,00 | 10,00 | 100 | 60 | 22,00 | 9,50 | 4 | 1,00 | 80937 | 93,91 |
| 10,00 | 10,00 | 100 | 60 | 22,00 | 9,50 | 4 | 2,00 | 80942 | 93,91 |
| 10,00 | 10,00 | 100 | 60 | 22,00 | 9,50 | 4 | 3,00 | 80943 | 93,91 |
| 12,00 | 12,00 | 150 | 105 | 26,00 | 11,50 | 4 | 1,00 | 80944 | 130,70 |
| 12,00 | 12,00 | 150 | 105 | 26,00 | 11,50 | 4 | 2,00 | 80945 | 130,70 |
| 12,00 | 12,00 | 150 | 105 | 26,00 | 11,50 | 4 | 3,00 | 80797 | 130,70 |
| 14,00 | 14,00 | 150 | 105 | 26,00 | 13,50 | 4 | 1,00 | 80946 | 176,87 |
| 14,00 | 14,00 | 150 | 105 | 26,00 | 13,50 | 4 | 2,00 | 80947 | 176,87 |
| 14,00 | 14,00 | 150 | 105 | 26,00 | 13,50 | 4 | 3,00 | 80949 | 176,87 |
| 16,00 | 16,00 | 150 | 102 | 32,00 | 15,50 | 5 | 2,00 | 80950 | 198,45 |
| 16,00 | 16,00 | 150 | 102 | 32,00 | 15,50 | 5 | 3,00 | 80951 | 198,45 |
| 20,00 | 20,00 | 150 | 100 | 38,00 | 19,50 | 5 | 2,00 | 80952 | 264,86 |
| 20,00 | 20,00 | 150 | 100 | 38,00 | 19,50 | 5 | 3,00 | 80954 | 264,86 |

Ref. **9461**

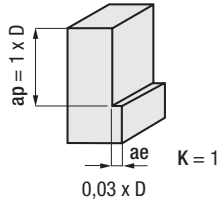
FRESA TÓRICA METAL DURO 4Z 48-70 HRC

48-70 HRC 4Z Radius Carbide End Mill

Fraise torique carbure 4Z 48-70 HRC



| | | | | | | |
|-------------------------------------|------|---------------|--|-----|--|----------------|
| MD/HM Carbure Grano UF | IKRA | DIN 6528 N | | 4 Z | | DIN 6535 HA |
|-------------------------------------|------|---------------|--|-----|--|----------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | IKRA | Ø 1 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 130-160 | 0,008 | 0,025 | 0,037 | 0,047 | 0,057 | 0,065 | 0,075 | 0,085 |
| | P.3 | 100-130 | 0,007 | 0,024 | 0,033 | 0,043 | 0,051 | 0,060 | 0,070 | 0,078 |
| | P.4 | 60-90 | 0,006 | 0,024 | 0,033 | 0,043 | 0,051 | 0,060 | 0,070 | 0,078 |
| H | | 40-70 | 0,003 | 0,012 | 0,017 | 0,020 | 0,025 | 0,030 | 0,035 | 0,040 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction



| D | d | L | l1 | l | d1 | R | Z | N° Art. IKRA | € | D | d | L | l1 | l | d1 | R | Z | N° Art. IKRA | € |
|-------|-------|----|----|-------|------|------|---|--------------|-------|-------|-------|-----|----|-------|-------|------|---|--------------|--------|
| 1,00 | 3,00 | 38 | 3 | 1,50 | | 0,10 | 4 | 22694 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 1,00 | 4 | 80601 | 58,61 |
| 1,50 | 3,00 | 38 | 4 | 2,20 | | 0,10 | 4 | 22695 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 1,50 | 4 | 80602 | 58,61 |
| 2,00 | 3,00 | 38 | 6 | 3,00 | 1,95 | 0,10 | 4 | 22802 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 2,00 | 4 | 80603 | 58,61 |
| 2,00 | 3,00 | 38 | 6 | 3,00 | 1,95 | 0,50 | 4 | 80567 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 3,00 | 4 | 80604 | 58,61 |
| 2,50 | 3,00 | 38 | 8 | 4,00 | 2,40 | 0,10 | 4 | 22865 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 0,30 | 4 | 24207 | 81,59 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 0,10 | 4 | 22868 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 0,50 | 4 | 24646 | 81,59 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 0,20 | 4 | 80568 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 1,00 | 4 | 80605 | 81,59 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 0,50 | 4 | 80569 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 1,50 | 4 | 80606 | 81,59 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 1,00 | 4 | 80570 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 2,00 | 4 | 80607 | 81,59 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 0,10 | 4 | 22871 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 3,00 | 4 | 80608 | 81,59 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 0,30 | 4 | 80574 | 31,25 | 14,00 | 14,00 | 83 | 29 | 16,00 | 13,50 | 0,30 | 4 | 68611 | 110,41 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 0,50 | 4 | 80575 | 31,25 | 14,00 | 14,00 | 83 | 29 | 16,00 | 13,50 | 0,50 | 4 | 68612 | 110,41 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 1,00 | 4 | 80576 | 31,25 | 14,00 | 14,00 | 83 | 29 | 16,00 | 13,50 | 1,00 | 4 | 80609 | 110,41 |
| 5,00 | 5,00 | 50 | 13 | 6,00 | 4,85 | 0,20 | 4 | 22880 | 31,25 | 14,00 | 14,00 | 83 | 29 | 16,00 | 13,50 | 1,50 | 4 | 80610 | 110,41 |
| 5,00 | 5,00 | 50 | 13 | 6,00 | 4,85 | 0,50 | 4 | 80577 | 31,25 | 14,00 | 14,00 | 83 | 29 | 16,00 | 13,50 | 2,00 | 4 | 80611 | 110,41 |
| 5,00 | 5,00 | 50 | 13 | 6,00 | 4,85 | 1,00 | 4 | 80578 | 31,25 | 14,00 | 14,00 | 83 | 29 | 16,00 | 13,50 | 3,00 | 4 | 80612 | 110,41 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 0,20 | 4 | 22889 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 0,30 | 4 | 24852 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 0,50 | 4 | 22895 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 0,50 | 4 | 25352 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 1,00 | 4 | 80579 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 1,00 | 4 | 25383 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 1,50 | 4 | 80581 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 1,50 | 4 | 80613 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 2,00 | 4 | 80582 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 2,00 | 4 | 80614 | 123,88 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 0,20 | 4 | 22898 | 46,21 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 3,00 | 4 | 80615 | 123,88 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 0,50 | 4 | 22904 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 0,30 | 4 | 25514 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 1,00 | 4 | 80598 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 0,50 | 4 | 25527 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 1,50 | 4 | 80599 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 1,00 | 4 | 26267 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 2,00 | 4 | 80600 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 1,50 | 4 | 80616 | 190,78 |
| 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 0,20 | 4 | 22925 | 58,61 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 2,00 | 4 | 80618 | 190,78 |
| 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 0,50 | 4 | 23049 | 58,61 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 3,00 | 4 | 80619 | 190,78 |

DIN 6535 HB
Bajo demanda / upon request / sur demande

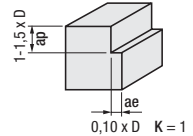
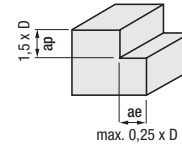
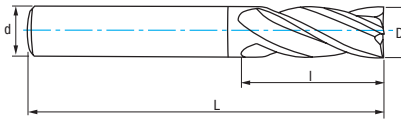


Ref. **9401**

FRESA METAL DURO 4Z USO GENERAL

General Purpose 4Z Carbide End Mill

Fraise carbure 4Z utilisation générale



| | | |
|------------------------------------|-------------|---------------------|
| MD/HM Carbure Micrograno | | CROMAX |
| DIN 6528 N | | 4 Z |
| | DIN 6535 HA | Tol. D (h10) d (h6) |

| Material | Vc (m/min) | | Refs. 9401-9410 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------------|------|---|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Grupo | Sub. | MD/HM/Carb. | CROMAX | Ø 1 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P | P.1 | 100-130 | 125-160 | 0,002 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,150 |
| | | P.2 | 90-120 | 112-150 | 0,002 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | | P.3 | 50-100 | 60-130 | 0,002 | 0,020 | 0,025 | 0,035 | 0,040 | 0,050 | 0,060 | 0,075 |
| | | P.5 | 80-100 | 100-130 | 0,002 | 0,010 | 0,025 | 0,025 | 0,025 | 0,040 | 0,080 | 0,100 |
| M | | | 40-60 | 50-80 | 0,002 | 0,010 | 0,025 | 0,025 | 0,025 | 0,040 | 0,080 | 0,100 |
| K | K | K.1 | 55-70 | 68-95 | 0,008 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | | K.2 | 30-50 | 40-60 | 0,008 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| S | | | 40-55 | 50-68 | 0,015 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 |
| N | N | N.1 | 100-250 | 140-350 | 0,006 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| | | N.2 | 100-250 | 140-350 | 0,006 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| | | N.3 | 100-300 | 140-420 | 0,005 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | | N.4 | 100-300 | 140-420 | 0,005 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | | N.5 | 90-200 | 100-300 | 0,005 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | | N.6 | 100-200 | 140-280 | 0,002 | 0,020 | 0,030 | 0,030 | 0,040 | 0,050 | 0,100 | 0,150 |
| | | N.7 | 50-125 | 70-175 | 0,001 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,080 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction



| D | d | L | l | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|------|------|----|----|---|---------------|-------|----------------|-------|
| 1,00 | 3,00 | 38 | 3 | 4 | 30475 | 13,27 | 30479 | 18,65 |
| 1,50 | 3,00 | 38 | 4 | 4 | 30476 | 13,27 | 30480 | 18,65 |
| 2,00 | 3,00 | 38 | 6 | 4 | 30477 | 13,27 | 30481 | 18,65 |
| 2,50 | 3,00 | 38 | 8 | 4 | 30478 | 13,27 | 30482 | 18,65 |
| 3,00 | 3,00 | 38 | 8 | 4 | 28447 | 13,27 | 28551 | 18,65 |
| 3,50 | 3,50 | 50 | 10 | 4 | 21946 | 13,27 | 21945 | 18,65 |
| 4,00 | 4,00 | 50 | 11 | 4 | 28448 | 13,27 | 28552 | 18,65 |
| 5,00 | 5,00 | 50 | 13 | 4 | 28449 | 14,43 | 28553 | 19,80 |
| 6,00 | 6,00 | 57 | 13 | 4 | 28450 | 15,60 | 28554 | 20,98 |
| 7,00 | 7,00 | 60 | 16 | 4 | 79585 | 23,81 | 79593 | 29,99 |

| D | d | L | l | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|-----|----|---|---------------|--------|----------------|--------|
| 8,00 | 8,00 | 63 | 19 | 4 | 28451 | 24,87 | 28555 | 31,06 |
| 9,00 | 9,00 | 67 | 19 | 4 | 79586 | 32,65 | 79594 | 39,46 |
| 10,00 | 10,00 | 72 | 22 | 4 | 28452 | 34,81 | 28556 | 41,61 |
| 11,00 | 11,00 | 83 | 26 | 4 | 79588 | 45,53 | 79595 | 52,90 |
| 12,00 | 12,00 | 83 | 26 | 4 | 28453 | 47,93 | 28557 | 55,30 |
| 13,00 | 13,00 | 83 | 26 | 4 | 79589 | 65,42 | 79596 | 72,15 |
| 14,00 | 14,00 | 83 | 26 | 4 | 28454 | 71,66 | 28558 | 79,95 |
| 16,00 | 16,00 | 92 | 32 | 4 | 28455 | 79,98 | 28559 | 89,69 |
| 18,00 | 18,00 | 92 | 32 | 4 | 28456 | 131,75 | 28560 | 142,68 |
| 20,00 | 20,00 | 104 | 38 | 4 | 28457 | 141,80 | 28561 | 153,77 |

DIN 6535 HB
Bajo demanda / upon request / sur demande

Ref. **9410**

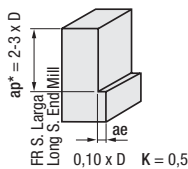
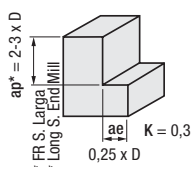
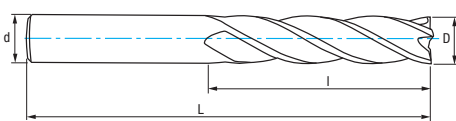
FRESA METAL DURO 4Z SERIE LARGA USO GENERAL

General Purpose 4Z Long Series Carbide End Mill

Fraise carbure 4Z Série longue utilisation générale



| | | | | |
|---|---------------|-----------------------|---------------------|-----|
| MD/HM/Carbure Micrograno | CROMAX | IZAR Std. N | | 4 Z |
| Serie Larga Long Series Série longue | | DIN 6535 HA | Tol. D (h10) d (h6) | |



| D | d | L | l | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|-----|----|---|---------------|--------|----------------|--------|
| 3,00 | 3,00 | 75 | 20 | 4 | 28516 | 14,43 | 28727 | 19,80 |
| 4,00 | 4,00 | 75 | 20 | 4 | 28517 | 14,43 | 28728 | 19,80 |
| 5,00 | 5,00 | 75 | 20 | 4 | 28518 | 20,20 | 28729 | 25,59 |
| 6,00 | 6,00 | 100 | 25 | 4 | 28519 | 21,98 | 28730 | 27,91 |
| 8,00 | 8,00 | 100 | 25 | 4 | 28520 | 27,73 | 28731 | 34,53 |
| 10,00 | 10,00 | 100 | 40 | 4 | 28521 | 41,84 | 28732 | 49,32 |
| 12,00 | 12,00 | 100 | 50 | 4 | 28522 | 57,48 | 28733 | 65,60 |
| 12,00 | 12,00 | 150 | 50 | 4 | 34872 | 64,71 | 30485 | 72,18 |
| 14,00 | 14,00 | 100 | 50 | 4 | 28523 | 103,52 | 28734 | 110,42 |
| 14,00 | 14,00 | 150 | 50 | 4 | 34927 | 113,98 | 30486 | 121,45 |
| 16,00 | 16,00 | 100 | 50 | 4 | 28524 | 108,85 | 28735 | 117,82 |
| 16,00 | 16,00 | 150 | 50 | 4 | 34929 | 119,93 | 30505 | 129,61 |
| 18,00 | 18,00 | 125 | 55 | 4 | 28525 | 157,06 | 28736 | 167,13 |
| 18,00 | 18,00 | 150 | 55 | 4 | 34947 | 172,75 | 32036 | 183,84 |
| 20,00 | 20,00 | 125 | 55 | 4 | 28526 | 159,66 | 28737 | 170,70 |
| 20,00 | 20,00 | 150 | 55 | 4 | 35017 | 175,76 | 30509 | 187,77 |

DIN 6535 HB
Bajo demanda / upon request / sur demande

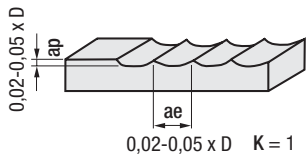
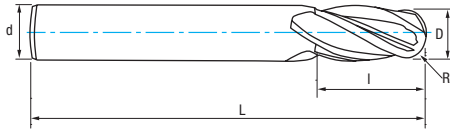
Ref. **9412**

FRESA METAL DURO 4Z CABEZA ESFÉRICA < 55 HRC

< 55 HRC Ball Nose 4Z Carbide End Mill
Fraise carbure 4Z hémisphérique. < 55 HRC



| | | | | | | | | |
|-----------------------------|--------|---------------|--|-----|--|--|----------------|---------------------------|
| MD/HM/Carbure Micrograno | CROMAX | DIN 6528 N | | 4 Z | | | DIN 6535 HA | Tol. D (h10) d (h6) |
|-----------------------------|--------|---------------|--|-----|--|--|----------------|---------------------------|



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

| Material | | Vc (m/min) | | Refs. 9412-9407 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|-------------|---------|---|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | CROMAX | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 100-130 | 125-160 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,150 |
| | P.2 | 90-120 | 112-150 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | P.3 | 50-100 | 60-130 | 0,020 | 0,025 | 0,035 | 0,040 | 0,050 | 0,060 | 0,075 |
| | P.5 | 80-100 | 100-130 | 0,010 | 0,025 | 0,025 | 0,025 | 0,040 | 0,080 | 0,100 |
| M | | 40-60 | 50-80 | 0,010 | 0,025 | 0,035 | 0,035 | 0,050 | 0,070 | 0,080 |
| K | K.1 | 55-70 | 68-95 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | K.2 | 30-50 | 40-60 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| S | | 40-55 | 50-68 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 |
| N | N.1 | 100-250 | 140-350 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| | N.2 | 100-250 | 140-350 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| | N.3 | 100-300 | 140-420 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.4 | 100-300 | 140-420 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.5 | 90-200 | 100-300 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.6 | 100-200 | 140-280 | 0,020 | 0,030 | 0,030 | 0,040 | 0,050 | 0,100 | 0,150 |
| | N.7 | 50-125 | 70-175 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,080 | 0,100 |

| D mm | R mm | d mm | L mm | I mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|---------|---------|---------|---------|---------|---|------------------|--------|-------------------|--------|
| 3,00 | 1,50 | 3,00 | 38 | 12 | 4 | 28458 | 15,47 | 28705 | 20,84 |
| 4,00 | 2,00 | 4,00 | 50 | 12 | 4 | 28459 | 16,41 | 28706 | 21,78 |
| 5,00 | 2,50 | 5,00 | 50 | 16 | 4 | 28460 | 17,26 | 28707 | 22,63 |
| 6,00 | 3,00 | 6,00 | 57 | 16 | 4 | 28461 | 19,19 | 28708 | 24,56 |
| 8,00 | 4,00 | 8,00 | 63 | 20 | 4 | 28462 | 31,95 | 28709 | 38,14 |
| 10,00 | 5,00 | 10,00 | 72 | 22 | 4 | 28463 | 54,15 | 28710 | 60,95 |
| 12,00 | 6,00 | 12,00 | 83 | 22 | 4 | 28464 | 70,88 | 28711 | 78,25 |
| 14,00 | 7,00 | 14,00 | 83 | 25 | 4 | 28465 | 83,72 | 28712 | 92,01 |
| 16,00 | 8,00 | 16,00 | 92 | 25 | 4 | 28466 | 113,52 | 28713 | 123,23 |
| 20,00 | 10,00 | 20,00 | 104 | 32 | 4 | 28468 | 177,85 | 28715 | 189,82 |

New!



DIN 6535 HB
Bajo demanda
upon request
sur demande

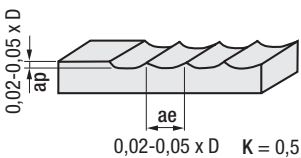
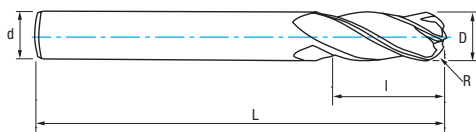
Ref. **9407**

FRESA METAL DURO 4Z SERIE LARGA CABEZA ESFÉRICA < 55 HRC

< 55 HRC Ball Nose 4Z Long Series Carbide End Mill
Fraise carbure 4Z série longue hémisphérique < 55 HRC



| | | | | | | | | | |
|-----------------------------|--------|---------------|--|-----|--|--|----------------|---------------------------|--|
| MD/HM/Carbure Micrograno | CROMAX | DIN 6528 N | | 4 Z | | | DIN 6535 HA | Tol. D (h10) d (h6) | Serie Larga Long Series Série longue |
|-----------------------------|--------|---------------|--|-----|--|--|----------------|---------------------------|--|



DIN 6535 HB
Bajo demanda
upon request
sur demande

| D mm | R mm | d mm | L mm | I mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|---------|---------|---------|---------|---------|---|------------------|--------|-------------------|--------|
| 3,00 | 1,50 | 3,00 | 75 | 10 | 4 | 28527 | 52,38 | 13157 | 57,75 |
| 4,00 | 2,00 | 4,00 | 75 | 12 | 4 | 28528 | 54,24 | 13158 | 59,61 |
| 5,00 | 2,50 | 5,00 | 75 | 16 | 4 | 28529 | 56,14 | 13160 | 61,53 |
| 6,00 | 3,00 | 6,00 | 100 | 20 | 4 | 28530 | 59,37 | 13161 | 65,30 |
| 8,00 | 4,00 | 8,00 | 100 | 25 | 4 | 28531 | 89,42 | 13162 | 96,22 |
| 10,00 | 5,00 | 10,00 | 100 | 25 | 4 | 28532 | 140,46 | 13164 | 147,94 |
| 12,00 | 6,00 | 12,00 | 100 | 30 | 4 | 28533 | 178,05 | 13184 | 186,17 |
| 14,00 | 7,00 | 14,00 | 100 | 30 | 4 | 28534 | 223,60 | 13200 | 230,50 |
| 16,00 | 8,00 | 16,00 | 100 | 40 | 4 | 28535 | 297,00 | 13208 | 305,97 |
| 20,00 | 10,00 | 20,00 | 125 | 40 | 4 | 28537 | 498,47 | 13330 | 509,51 |

New!

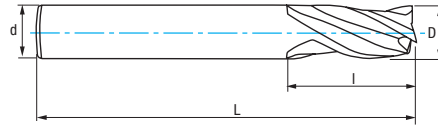


Ref. **9431**

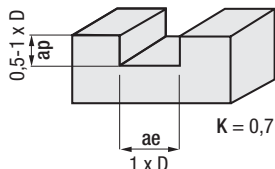
FRESA METAL DURO SERIE CORTA 3Z USO GENERAL

General Purpose 3Z Short Series Carbide End Mill

Fraise carbure série courte 3Z utilisation générale



| | | | | | | | |
|---------------------------------------|---------------|---------------|--|-----|--|----------------|--------------------------|
| MD/HM Carbure Micrograno | CROMAX | DIN 6528 N | | 3 Z | | DIN 6535 HA | Tol. D (e8) d (h6) |
|---------------------------------------|---------------|---------------|--|-----|--|----------------|--------------------------|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|-------------|---------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | CROMAX | Ø 1 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 100-130 | 125-160 | 0,002 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | P.2 | 90-120 | 112-150 | 0,002 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | P.3 | 50-100 | 60-130 | 0,002 | 0,015 | 0,025 | 0,035 | 0,040 | 0,050 | 0,060 | 0,075 |
| K | K.1 | 55-70 | 68-95 | 0,008 | 0,030 | 0,050 | 0,050 | 0,070 | 0,075 | 0,180 | 0,200 |
| | K.2 | 55-70 | 68-95 | 0,008 | 0,010 | 0,020 | 0,020 | 0,035 | 0,050 | 0,070 | 0,100 |
| S | | 30-50 | 40-70 | 0,002 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

New!

| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|------|------|---|---------------|--------|----------------|--------|
| 1,00 | 3,00 | 38 | 3 | 3 | 25317 | 13,27 | 30471 | 18,65 |
| 1,50 | 3,00 | 38 | 4 | 3 | 25318 | 13,27 | 30472 | 18,65 |
| 2,00 | 3,00 | 38 | 6 | 3 | 25320 | 13,27 | 30473 | 18,65 |
| 2,50 | 3,00 | 38 | 8 | 3 | 25322 | 13,27 | 30474 | 18,65 |
| 3,00 | 3,00 | 38 | 8 | 3 | 28432 | 13,27 | 28738 | 18,65 |
| 4,00 | 4,00 | 50 | 8 | 3 | 28433 | 13,27 | 28739 | 18,65 |
| 5,00 | 5,00 | 50 | 10 | 3 | 28434 | 14,43 | 28740 | 19,80 |
| 6,00 | 6,00 | 57 | 10 | 3 | 28435 | 15,60 | 28741 | 20,98 |
| 7,00 | 7,00 | 60 | 13 | 3 | 28436 | 23,81 | 28742 | 29,99 |
| 8,00 | 8,00 | 63 | 16 | 3 | 28438 | 24,87 | 28743 | 31,06 |
| 9,00 | 9,00 | 67 | 16 | 3 | 28437 | 32,65 | 28744 | 39,46 |
| 10,00 | 10,00 | 72 | 19 | 3 | 28439 | 34,81 | 28745 | 41,61 |
| 12,00 | 12,00 | 83 | 22 | 3 | 28440 | 47,93 | 28746 | 55,30 |
| 14,00 | 14,00 | 83 | 22 | 3 | 28441 | 71,66 | 28747 | 79,93 |
| 16,00 | 16,00 | 92 | 26 | 3 | 28443 | 79,98 | 28748 | 89,71 |
| 18,00 | 18,00 | 92 | 26 | 3 | 28444 | 131,75 | 28749 | 142,68 |
| 20,00 | 20,00 | 104 | 32 | 3 | 28445 | 141,80 | 28750 | 153,76 |



6 Pcs

| Cont. Ø | Nº Art. CROMAX | € |
|------------------|----------------|--------|
| 4-5-6-8-10-12 mm | 67686 | 178,02 |

Set Price!

DIN 6535 HB
Bajo demanda / upon request / sur demande

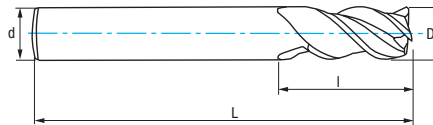


Ref. **9436**

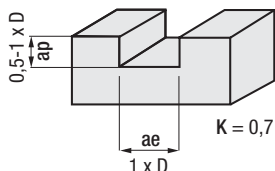
FRESA METAL DURO SERIE CORTA 3Z INOX 45°

45° Stainless 3Z Short Series Carbide End Mill

Fraise carbure série courte 3Z inox 45°



| | | | | | | | |
|---------------------------------------|---------------|---------------|--|-----|--|----------------|--------------------------|
| MD/HM Carbure Micrograno | CROMAX | DIN 6528 W | | 3 Z | | DIN 6535 HA | Tol. D (e8) d (h6) |
|---------------------------------------|---------------|---------------|--|-----|--|----------------|--------------------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | CROMAX | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 125-160 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | P.2 | 112-150 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | P.5 | 55-110 | 0,010 | 0,025 | 0,025 | 0,035 | 0,050 | 0,080 | 0,100 |
| M | | 50-80 | 0,010 | 0,025 | 0,025 | 0,035 | 0,050 | 0,070 | 0,080 |
| N | N.1 | 84-140 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,085 | 0,125 |
| | N.2 | 140-350 | 0,025 | 0,050 | 0,050 | 0,050 | 0,050 | 0,080 | 0,120 |
| | N.3 | 140-420 | 0,010 | 0,050 | 0,050 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.4 | 140-420 | 0,010 | 0,050 | 0,050 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.5 | 100-300 | 0,010 | 0,050 | 0,050 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.6 | 140-280 | 0,020 | 0,030 | 0,030 | 0,040 | 0,050 | 0,100 | 0,150 |
| | N.7 | 70-175 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,080 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | N° Art. CROMAX | € |
|-------|-------|------|------|---|----------------|--------|
| 3,00 | 3,00 | 38 | 8 | 3 | 30096 | 19,48 |
| 4,00 | 4,00 | 50 | 8 | 3 | 30097 | 19,48 |
| 5,00 | 5,00 | 50 | 10 | 3 | 30098 | 20,67 |
| 6,00 | 6,00 | 57 | 10 | 3 | 30099 | 21,83 |
| 7,00 | 7,00 | 60 | 13 | 3 | 30100 | 26,69 |
| 8,00 | 8,00 | 63 | 16 | 3 | 30101 | 31,56 |
| 9,00 | 9,00 | 67 | 16 | 3 | 30102 | 36,85 |
| 10,00 | 10,00 | 72 | 19 | 3 | 30103 | 42,14 |
| 12,00 | 12,00 | 83 | 22 | 3 | 30104 | 60,71 |
| 14,00 | 14,00 | 83 | 22 | 3 | 30105 | 81,05 |
| 16,00 | 16,00 | 92 | 26 | 3 | 30106 | 101,37 |
| 18,00 | 18,00 | 92 | 26 | 3 | 30107 | 129,79 |
| 20,00 | 20,00 | 104 | 32 | 3 | 30108 | 158,21 |



DIN 6535 HB
Bajo demanda / upon request / sur demande

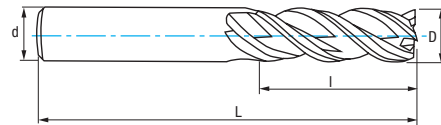


Ref. **9437**

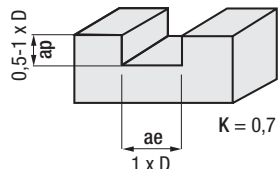
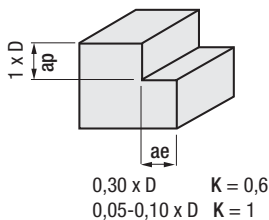
FRESA METAL DURO 3Z ALUMINIO PULIDO ESPEJO 45°

Mirror Polished 45° Aluminium 3Z Carbide End Mill

Fraise carbure 3Z aluminium 45° polyglass



| | | | | | | | |
|--|--------------|--|-----|--|----------------|---------------------------|--|
| MD/HM Carbure Micrograno ⁺ | IZAR Std. | | 3 Z | | DIN 6535 HA | Tol. D (h10) d (h6) | Pulido Espejo Mirror Polished Polyglass |
|--|--------------|--|-----|--|----------------|---------------------------|--|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|-------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| N | N.1 | 180-250 | 0,020 | 0,040 | 0,040 | 0,060 | 0,060 | 0,080 | 0,120 |
| | N.2 | 180-250 | 0,020 | 0,040 | 0,040 | 0,060 | 0,060 | 0,080 | 0,120 |
| | N.3 | 350-500 | 0,035 | 0,060 | 0,060 | 0,070 | 0,070 | 0,090 | 0,120 |
| | N.4 | 350-500 | 0,035 | 0,060 | 0,060 | 0,070 | 0,070 | 0,090 | 0,120 |
| | N.5 | 190-290 | 0,035 | 0,050 | 0,050 | 0,070 | 0,070 | 0,090 | 0,120 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| | D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € |
|-------------|---------|---------|---------|---------|---|------------------|---------------|
| New! | 3,00 | 6,00 | 50 | 8 | 3 | 83749 | 28,11 |
| | 4,00 | 6,00 | 50 | 12 | 3 | 77214 | 28,12 |
| New! | 5,00 | 6,00 | 50 | 13 | 3 | 83750 | 31,24 |
| | 6,00 | 6,00 | 50 | 15 | 3 | 77215 | 31,24 |
| New! | 7,00 | 8,00 | 60 | 18 | 3 | 83751 | 46,86 |
| | 8,00 | 8,00 | 60 | 20 | 3 | 77216 | 46,86 |
| New! | 9,00 | 10,00 | 75 | 23 | 3 | 83752 | 61,59 |
| | 10,00 | 10,00 | 75 | 30 | 3 | 77217 | 61,60 |
| | 12,00 | 12,00 | 75 | 30 | 3 | 77218 | 84,35 |
| | 16,00 | 16,00 | 100 | 40 | 3 | 77219 | 129,44 |
| New! | 18,00 | 20,00 | 100 | 40 | 3 | 31015 | 198,78 |
| New! | 20,00 | 20,00 | 100 | 45 | 3 | 31016 | 214,22 |



DIN 6535 HB
Bajo demanda / upon request / sur demande

- **Diseño especial del canal para una óptima evacuación de la viruta.**
- **Special wide-space flute design for an excellent chip extraction.**
- **Permite avances elevados y mejores acabados en altas velocidades.**
- **Suitable for high feeds. Better finishing surface at high speed machining.**
- **Conception spéciale des goujures avec grand espace pour une excellente extraction des copeaux.**
- **Il permet des avancées élevées et meilleures finitions à grande vitesse.**



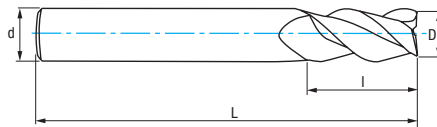
Video

Ref. **9439**

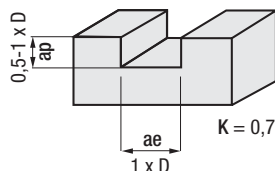
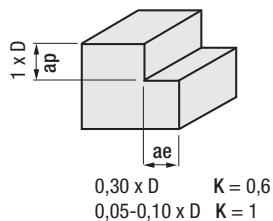
FRESA METAL DURO 3Z ALUMINIO PULIDO ESPEJO 45°

Mirror Polished 45° Aluminium 3Z Carbide End Mill

Fraise carbure 3Z aluminium 45° polyglass



| | | | | | | | | | |
|--|---------------|--|-----|--|-----|----------------|---------------------------|--|--|
| MD/HM Carbure Micrograno+ | DIN 6528 W | | 3 Z | | 45° | DIN 6535 HA | Tol. D (h10) d (h6) | | Pulido Espejo Mirror Polished Polyglass |
|--|---------------|--|-----|--|-----|----------------|---------------------------|--|--|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|-------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| N | N.1 | 180-250 | 0,020 | 0,040 | 0,040 | 0,060 | 0,060 | 0,080 | 0,120 |
| | N.2 | 180-250 | 0,020 | 0,040 | 0,040 | 0,060 | 0,060 | 0,080 | 0,120 |
| | N.3 | 350-500 | 0,035 | 0,060 | 0,060 | 0,070 | 0,070 | 0,090 | 0,120 |
| | N.4 | 350-450 | 0,035 | 0,060 | 0,060 | 0,070 | 0,070 | 0,090 | 0,120 |
| | N.5 | 190-290 | 0,035 | 0,050 | 0,050 | 0,070 | 0,070 | 0,090 | 0,120 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

| D mm | d mm | L mm | l mm | | N° Art. MD/HM | € |
|-------|-------|------|------|---|---------------|--------|
| 3,00 | 3,00 | 38 | 8 | 3 | 30438 | 23,89 |
| 4,00 | 4,00 | 50 | 8 | 3 | 30439 | 23,89 |
| 5,00 | 5,00 | 50 | 10 | 3 | 30440 | 23,89 |
| 6,00 | 6,00 | 57 | 10 | 3 | 30442 | 26,55 |
| 8,00 | 8,00 | 63 | 16 | 3 | 30443 | 39,83 |
| 10,00 | 10,00 | 72 | 19 | 3 | 30445 | 52,35 |
| 12,00 | 12,00 | 83 | 22 | 3 | 30446 | 71,71 |
| 16,00 | 16,00 | 92 | 26 | 3 | 30447 | 110,02 |
| 20,00 | 20,00 | 104 | 32 | 3 | 30452 | 181,72 |



DIN 6535 HB
Bajo demanda / upon request / sur demande

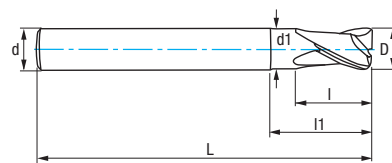


Ref. **9460**

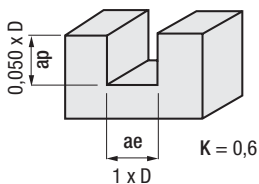
FRESA METAL DURO 2Z TÓRICA 48-70 HRC

48-70 HRC Radius 2Z Carbide End Mill

Fraise carbure 2Z torique 48-70 HRC



| | | | | | | |
|-------------------------------------|------|---------------|--|-----|--|----------------|
| MD/HM Carbure Grano UF | IKRA | DIN 6528 N | | 2 Z | | DIN 6535 HA |
|-------------------------------------|------|---------------|--|-----|--|----------------|



| Material | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | |
|--------------|-------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Ø 1 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | |
| Grupo | Sub. | | | | | | | | | |
| P | P.2 | 130-160 | 0,008 | 0,025 | 0,037 | 0,047 | 0,057 | 0,065 | 0,075 | 0,085 |
| | P.3 | 100-130 | 0,007 | 0,024 | 0,033 | 0,043 | 0,051 | 0,060 | 0,070 | 0,078 |
| | P.4 | 60-90 | 0,006 | 0,024 | 0,033 | 0,043 | 0,051 | 0,060 | 0,070 | 0,078 |
| H | | 40-70 | 0,003 | 0,012 | 0,017 | 0,020 | 0,025 | 0,030 | 0,035 | 0,040 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$



| D | d | L | l1 | l | d1 | R | Z | Nº Art. IKRA | € | D | d | L | l1 | l | d1 | R | Z | Nº Art. IKRA | € |
|------|------|----|----|------|------|------|---|--------------|-------|-------|-------|-----|----|-------|-------|------|---|--------------|--------|
| 1,00 | 3,00 | 38 | 3 | 1,50 | | 0,10 | 2 | 26943 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 0,20 | 2 | 28677 | 58,61 |
| 1,50 | 3,00 | 38 | 4 | 2,20 | | 0,10 | 2 | 27148 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 0,50 | 2 | 28679 | 58,61 |
| 2,00 | 3,00 | 38 | 6 | 3,00 | 1,95 | 0,10 | 2 | 27530 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 1,00 | 2 | 80633 | 58,61 |
| 2,50 | 3,00 | 38 | 8 | 4,00 | 2,40 | 0,10 | 2 | 27531 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 1,50 | 2 | 80634 | 58,61 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 0,10 | 2 | 27533 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 2,00 | 2 | 80635 | 58,61 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 0,20 | 2 | 80620 | 31,25 | 10,00 | 10,00 | 72 | 22 | 12,00 | 9,70 | 3,00 | 2 | 80637 | 58,61 |
| 3,00 | 3,00 | 38 | 8 | 4,00 | 2,85 | 0,50 | 2 | 80621 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 0,30 | 2 | 28680 | 81,59 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 0,10 | 2 | 27534 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 0,50 | 2 | 30135 | 81,59 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 0,20 | 2 | 80622 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 1,00 | 2 | 80638 | 81,59 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 0,50 | 2 | 80623 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 1,50 | 2 | 80639 | 81,59 |
| 4,00 | 4,00 | 50 | 11 | 5,00 | 3,85 | 1,00 | 2 | 80624 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 2,00 | 2 | 80640 | 81,59 |
| 5,00 | 5,00 | 50 | 13 | 6,00 | 4,85 | 0,20 | 2 | 28202 | 31,25 | 12,00 | 12,00 | 83 | 26 | 15,00 | 11,70 | 3,00 | 2 | 80641 | 81,59 |
| 5,00 | 5,00 | 50 | 13 | 6,00 | 4,85 | 0,50 | 2 | 80625 | 31,25 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 0,30 | 2 | 30422 | 123,88 |
| 5,00 | 5,00 | 50 | 13 | 6,00 | 4,85 | 1,00 | 2 | 80626 | 31,25 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 0,50 | 2 | 30423 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 0,20 | 2 | 28337 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 1,00 | 2 | 30424 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 0,50 | 2 | 28469 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 1,50 | 2 | 80642 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 1,00 | 2 | 80627 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 2,00 | 2 | 80643 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 1,50 | 2 | 80628 | 33,55 | 16,00 | 16,00 | 92 | 32 | 18,00 | 15,70 | 3,00 | 2 | 80644 | 123,88 |
| 6,00 | 6,00 | 57 | 13 | 7,00 | 5,85 | 2,00 | 2 | 80629 | 33,55 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 0,30 | 2 | 30425 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 0,20 | 2 | 28496 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 0,50 | 2 | 30426 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 0,50 | 2 | 28511 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 1,00 | 2 | 30427 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 1,00 | 2 | 80630 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 1,50 | 2 | 80645 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 1,50 | 2 | 80631 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 2,00 | 2 | 80646 | 190,78 |
| 8,00 | 8,00 | 63 | 19 | 9,00 | 7,70 | 2,00 | 2 | 80632 | 46,21 | 20,00 | 20,00 | 104 | 38 | 24,00 | 19,70 | 3,00 | 2 | 80647 | 190,78 |

DIN 6535 HB
Bajo demanda / upon request / sur demande



Ref. 9421

FRESA METAL DURO 2Z USO GENERAL

General Purpose 2Z Carbide End Mill
Fraise carbure 2Z utilisation générale



MD/HM/Carbure
Micrograno

CROMAX

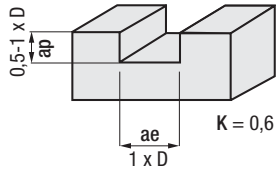
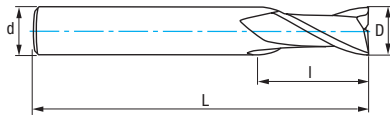
DIN
6528 N

2 Z

30°

DIN
6535 HA

Tol.
D (e8)
d (h6)



| Material | | Vc (m/min) | | Refs. 9421-9424 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|-------------|---------|---|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | CROMAX | Ø 1 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 100-130 | 125-160 | 0,002 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,150 |
| | P.2 | 90-120 | 112-150 | 0,002 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | P.3 | 50-100 | 60-130 | 0,002 | 0,020 | 0,025 | 0,035 | 0,040 | 0,050 | 0,060 | 0,075 |
| | P.5 | 80-100 | 100-130 | 0,002 | 0,010 | 0,025 | 0,025 | 0,025 | 0,040 | 0,080 | 0,100 |
| M | | 40-60 | 50-80 | 0,002 | 0,010 | 0,025 | 0,035 | 0,035 | 0,050 | 0,070 | 0,080 |
| K | K.1 | 55-70 | 68-95 | 0,008 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| | K.2 | 30-50 | 40-60 | 0,008 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| S | | 40-55 | 50-68 | 0,0015 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 |
| N | N.1 | 100-250 | 140-350 | 0,006 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| | N.2 | 100-250 | 140-350 | 0,006 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| | N.3 | 100-300 | 140-420 | 0,005 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.4 | 100-300 | 140-420 | 0,005 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.5 | 90-200 | 100-300 | 0,005 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| | N.6 | 100-200 | 140-280 | 0,002 | 0,020 | 0,030 | 0,030 | 0,040 | 0,050 | 0,100 | 0,150 |
| | N.7 | 50-125 | 70-175 | 0,001 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,080 | 0,100 |

r.p.m. = $\frac{Vc \times 1.000}{\pi \times \phi}$

Vf (mm/min.) = r.p.m. x Z x fz x K

K = Coeficiente corrección
Correction coefficient - Coefficient correction

| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|------|-------|---|---------------|--------|----------------|--------|
| 1,00 | 3,00 | 38 | 3,00 | 2 | 33593 | 13,27 | 36198 | 18,65 |
| 1,50 | 3,00 | 38 | 4,00 | 2 | 33610 | 13,27 | 36199 | 18,65 |
| 2,00 | 3,00 | 38 | 6,00 | 2 | 33620 | 13,27 | 36200 | 18,65 |
| 2,50 | 3,00 | 38 | 8,00 | 2 | 36197 | 13,27 | 36201 | 18,65 |
| 3,00 | 3,00 | 38 | 8,00 | 2 | 28410 | 13,27 | 28562 | 18,65 |
| 4,00 | 4,00 | 50 | 8,00 | 2 | 28411 | 13,27 | 28563 | 18,65 |
| 5,00 | 5,00 | 50 | 10,00 | 2 | 28412 | 14,43 | 28564 | 19,80 |
| 6,00 | 6,00 | 57 | 10,00 | 2 | 28413 | 15,60 | 28565 | 20,98 |
| 8,00 | 8,00 | 63 | 16,00 | 2 | 28414 | 24,86 | 28566 | 31,06 |
| 10,00 | 10,00 | 72 | 19,00 | 2 | 28415 | 34,81 | 28567 | 41,61 |
| 12,00 | 12,00 | 83 | 22,00 | 2 | 28416 | 47,93 | 28568 | 55,30 |
| 14,00 | 14,00 | 83 | 22,00 | 2 | 28417 | 71,66 | 28569 | 79,93 |
| 16,00 | 16,00 | 92 | 26,00 | 2 | 28418 | 79,98 | 28570 | 89,71 |
| 18,00 | 18,00 | 92 | 26,00 | 2 | 28420 | 131,75 | 28571 | 142,68 |
| 20,00 | 20,00 | 104 | 32,00 | 2 | 28421 | 141,79 | 28572 | 153,76 |

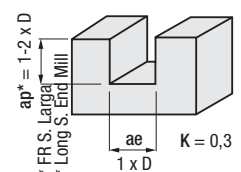
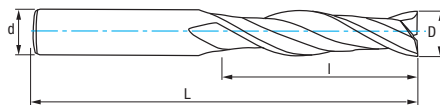


DIN 6535 HB
Bajo demanda
upon request
sur demande

Ref. 9424

FRESA METAL DURO SERIE LARGA 2Z USO GENERAL

General Purpose 2Z Long Series Carbide End Mill
Fraise carbure série longue 2Z utilisation générale



MD/HM/Carbure
Micrograno

CROMAX

IZAR
Std. N

2 Z

30°

DIN
6535 HA

ToL.
D (e8)
d (h6)

Serie Larga
Long Series
Série Longue

DIN 6535 HB
Bajo demanda
upon request
sur demande

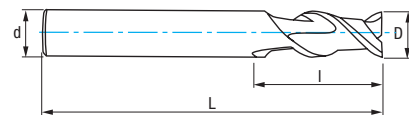
| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|------|------|---|---------------|--------|----------------|--------|
| 3,00 | 3,00 | 75 | 20 | 2 | 28387 | 14,43 | 28716 | 19,80 |
| 4,00 | 4,00 | 75 | 20 | 2 | 28388 | 14,43 | 28717 | 19,80 |
| 5,00 | 5,00 | 75 | 20 | 2 | 28497 | 20,20 | 28718 | 25,58 |
| 6,00 | 6,00 | 100 | 25 | 2 | 28498 | 21,98 | 28719 | 27,91 |
| 8,00 | 8,00 | 100 | 25 | 2 | 28499 | 27,73 | 28720 | 34,52 |
| 10,00 | 10,00 | 100 | 40 | 2 | 28500 | 41,84 | 28721 | 49,31 |
| 12,00 | 12,00 | 100 | 50 | 2 | 28501 | 57,48 | 28722 | 65,62 |
| 12,00 | 12,00 | 150 | 50 | 2 | 81512 | 64,71 | 36202 | 72,18 |
| 14,00 | 14,00 | 100 | 50 | 2 | 28502 | 103,52 | 28723 | 110,43 |
| 14,00 | 14,00 | 150 | 50 | 2 | 36360 | 113,98 | 36203 | 121,47 |
| 16,00 | 16,00 | 100 | 50 | 2 | 28503 | 108,85 | 28724 | 117,83 |
| 16,00 | 16,00 | 150 | 50 | 2 | 36362 | 119,93 | 36204 | 129,61 |
| 18,00 | 18,00 | 125 | 55 | 2 | 28504 | 157,06 | 28725 | 167,14 |
| 18,00 | 18,00 | 150 | 55 | 2 | 36363 | 172,75 | 36205 | 183,84 |
| 20,00 | 20,00 | 125 | 55 | 2 | 28505 | 159,66 | 28726 | 170,70 |
| 20,00 | 20,00 | 150 | 55 | 2 | 36370 | 175,76 | 36206 | 187,76 |

Ref. 9427

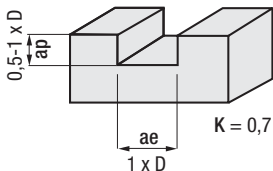
FRESA METAL DURO 2Z 45° ALUMINIO

45° Aluminium 2Z Carbide End Mill

Fraise carbure 2Z aluminium 45°



| | | | | | | |
|--|-------------------|--|-----|--|----------------|--------------------------|
| MD/HM Carbure Micrograno+ | IZAR Std. W | | 2 Z | | DIN 6535 HA | Tol. D (e8) d (h6) |
|--|-------------------|--|-----|--|----------------|--------------------------|



| Material | | Vc (m/min) | Refs. 9427-9429 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|-------------|---|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| N | N.1 | 180-250 | 0,010 | 0,020 | 0,040 | 0,040 | 0,060 | 0,060 | 0,080 | 0,120 |
| | N.2 | 180-250 | 0,010 | 0,020 | 0,040 | 0,040 | 0,060 | 0,060 | 0,080 | 0,120 |
| | N.3 | 350-500 | 0,018 | 0,035 | 0,060 | 0,060 | 0,070 | 0,070 | 0,090 | 0,120 |
| | N.4 | 350-450 | 0,018 | 0,035 | 0,060 | 0,060 | 0,070 | 0,070 | 0,090 | 0,120 |
| | N.5 | 190-290 | 0,018 | 0,035 | 0,050 | 0,050 | 0,070 | 0,070 | 0,090 | 0,120 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € |
|---------|---------|---------|---------|---|------------------|--------|
| 2,00 | 3,00 | 38 | 8 | 2 | 30453 | 23,89 |
| 3,00 | 3,00 | 38 | 8 | 2 | 30454 | 23,89 |
| 4,00 | 4,00 | 50 | 8 | 2 | 30455 | 23,89 |
| 5,00 | 5,00 | 50 | 10 | 2 | 30456 | 23,89 |
| 6,00 | 6,00 | 57 | 10 | 2 | 30461 | 26,55 |
| 8,00 | 8,00 | 63 | 16 | 2 | 30463 | 39,83 |
| 10,00 | 10,00 | 72 | 19 | 2 | 30464 | 52,35 |
| 12,00 | 12,00 | 83 | 22 | 2 | 30465 | 71,71 |
| 16,00 | 16,00 | 92 | 26 | 2 | 30466 | 110,02 |
| 20,00 | 20,00 | 104 | 32 | 2 | 30468 | 181,72 |



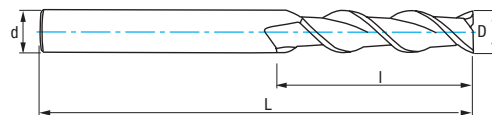
DIN 6535 HB
Bajo demanda / upon request / sur demande

Ref. 9429

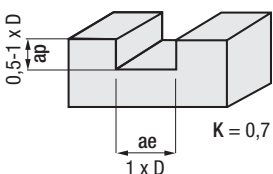
FRESA METAL DURO SERIE LARGA 2Z 45° ALUMINIO

45° Aluminium 2Z Long Series Carbide End Mill

Fraise carbure série longue 2Z aluminium 45°



| | | | | | | | |
|--|-------------------|--|-----|--|----------------|--------------------------|--|
| MD/HM Carbure Micrograno+ | IZAR Std. W | | 2 Z | | DIN 6535 HA | Tol. D (e8) d (h6) | Serie Larga Long Series Série Longue |
|--|-------------------|--|-----|--|----------------|--------------------------|--|



| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € |
|---------|---------|---------|---------|---|------------------|--------|
| 5,00 | 5,00 | 75 | 20 | 2 | 66001 | 26,29 |
| 6,00 | 6,00 | 100 | 25 | 2 | 81094 | 29,21 |
| 8,00 | 8,00 | 100 | 25 | 2 | 81095 | 43,82 |
| 10,00 | 10,00 | 100 | 40 | 2 | 81096 | 57,58 |
| 12,00 | 12,00 | 100 | 50 | 2 | 81097 | 78,87 |
| 16,00 | 16,00 | 100 | 50 | 2 | 81099 | 121,02 |



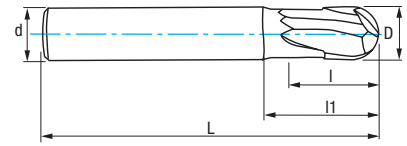
DIN 6535 HB
Bajo demanda / upon request / sur demande

Ref. **9465**

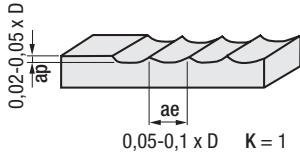
FRESA METAL DURO 2Z RADIAL 48-70 HRC

48-70 HRC Ball Nose 2Z Carbide End Mill
Fraise carbure 2Z hémisphérique 48-70 HRC

New!



| | | | | | | | |
|-------------------------------------|------------|--------------|--|-----|--|----------------|--------------------------------------|
| MD/HM Carbure Grano UF | SUA | IZAR Std. | | 2 Z | | DIN 6535 HA | R Tol. D<12 ±0,010 D>12 ±0,015 |
|-------------------------------------|------------|--------------|--|-----|--|----------------|--------------------------------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | SUA | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 |
| P | P.4 | 60-90 | 0,013 | 0,025 | 0,037 | 0,047 | 0,057 | 0,065 | 0,075 |
| H | 45-55 HRC | 85-130 | 0,010 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 |
| | 55-60 HRC | 75-120 | 0,010 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 |
| | 60-70 HRC | 45-65 | 0,005 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,050 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

| D mm | R mm | d mm | L mm | l1 mm | l mm | Z | Nº Art. SUA | € |
|---------|---------|---------|---------|----------|---------|---|----------------|--------|
| 2,00 | 1,00 | 6,00 | 50 | 4 | 2 | 2 | 53684 | 43,20 |
| 3,00 | 1,50 | 6,00 | 50 | 6 | 3 | 2 | 53690 | 43,20 |
| 4,00 | 2,00 | 6,00 | 50 | 8 | 4 | 2 | 53696 | 43,20 |
| 5,00 | 2,50 | 6,00 | 50 | 10 | 5 | 2 | 53704 | 43,20 |
| 6,00 | 3,00 | 6,00 | 50 | 12 | 6 | 2 | 53708 | 43,20 |
| 8,00 | 4,00 | 8,00 | 60 | 16 | 8 | 2 | 53714 | 56,95 |
| 10,00 | 5,00 | 10,00 | 75 | 20 | 10 | 2 | 53720 | 87,63 |
| 12,00 | 6,00 | 12,00 | 75 | 24 | 12 | 2 | 53726 | 115,23 |
| 16,00 | 8,00 | 16,00 | 100 | 32 | 16 | 2 | 53729 | 260,25 |



DIN 6535 HB
Bajo demanda / upon request / sur demande

- **Adecuada para materiales templados a 50 HRC y hasta un máximo de 70 HRC.**
- **Geometría robusta con gran rigidez que proporciona un excelente acabado superficial.**
- **Ángulos de hélice y de corte especiales para materiales templados.**
- **Designed for 50 HRC hardened materials and even up to 70 HRC hardness.**
- **Robust geometry which provides an excellent surface finish.**
- **Helix and cutting angles specifically designed for hardened materials.**
- **Conçu pour les matériaux supérieurs 50 HRC et même jusqu'à 70 HRC de dureté.**
- **Géométrie robuste qui offre une excellente finition de surface.**
- **Angles d'hélice et de coupe spécialement conçus pour les matériaux supérieurs.**

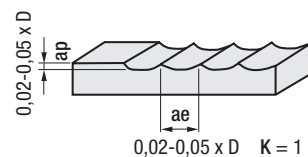
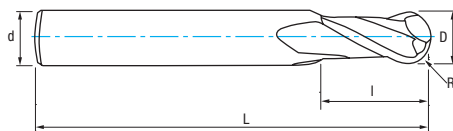


Ref. 9425

FRESA METAL DURO 2Z CABEZA ESFÉRICA < 55 HRC

< 55 HRC Ball Nose 2Z Carbide End Mill

Fraise carbure 2Z hémisphérique < 55 HRC



| | | |
|--------------------------|--------------------|------------|
| MD/HM/Carbure Micrograno | CROMAX | DIN 6528 N |
| | 2 Z | |
| DIN 6535 HA | Tol. D (e8) d (h6) | |

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

$$V_f (mm/min.) = r.p.m. \times Z \times f_z \times K$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

| Material | | Vc (m/min) | |
|----------|------|-------------|---------|
| Grupo | Sub. | MD/HM/Carb. | CROMAX |
| P | P.1 | 100-130 | 125-160 |
| | P.2 | 90-120 | 112-150 |
| | P.3 | 50-100 | 60-130 |
| | P.5 | 80-100 | 100-130 |
| M | | 40-60 | 50-80 |
| K | K.1 | 55-70 | 68-95 |
| | K.2 | 30-50 | 40-60 |
| S | | 40-55 | 50-68 |
| N | N.1 | 100-250 | 140-350 |
| | N.2 | 100-250 | 140-350 |
| | N.3 | 100-300 | 140-420 |
| | N.4 | 100-300 | 140-420 |
| | N.5 | 90-200 | 100-300 |
| | N.6 | 100-200 | 140-280 |
| | N.7 | 50-125 | 70-175 |

| Refs. 9425-9426 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|
| Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| 0,010 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,150 |
| 0,010 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| 0,010 | 0,020 | 0,025 | 0,035 | 0,040 | 0,050 | 0,060 | 0,075 |
| 0,006 | 0,010 | 0,025 | 0,025 | 0,025 | 0,040 | 0,080 | 0,100 |
| 0,006 | 0,010 | 0,025 | 0,035 | 0,035 | 0,050 | 0,070 | 0,080 |
| 0,010 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| 0,010 | 0,020 | 0,030 | 0,040 | 0,055 | 0,065 | 0,080 | 0,100 |
| 0,006 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 |
| 0,010 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| 0,010 | 0,020 | 0,050 | 0,050 | 0,060 | 0,075 | 0,080 | 0,125 |
| 0,006 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| 0,006 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| 0,006 | 0,010 | 0,050 | 0,080 | 0,080 | 0,100 | 0,150 | 0,200 |
| 0,010 | 0,020 | 0,030 | 0,030 | 0,040 | 0,050 | 0,100 | 0,150 |
| 0,008 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,080 | 0,100 |

New!

| D mm | R mm | d mm | L mm | I mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|-------|------|------|---|---------------|--------|----------------|--------|
| 2,00 | 1,00 | 3,00 | 38 | 5 | 2 | 21761 | 14,33 | 21762 | 19,72 |
| 2,50 | 1,25 | 3,00 | 38 | 6 | 2 | 21760 | 14,33 | 21666 | 19,72 |
| 3,00 | 1,50 | 3,00 | 38 | 12 | 2 | 28422 | 14,33 | 28695 | 19,72 |
| 4,00 | 2,00 | 4,00 | 50 | 12 | 2 | 28423 | 16,41 | 28696 | 21,78 |
| 5,00 | 2,50 | 5,00 | 50 | 16 | 2 | 28424 | 16,88 | 28697 | 22,24 |
| 6,00 | 3,00 | 6,00 | 57 | 16 | 2 | 28425 | 18,79 | 28698 | 24,16 |
| 8,00 | 4,00 | 8,00 | 63 | 20 | 2 | 28426 | 26,55 | 28699 | 32,74 |
| 10,00 | 5,00 | 10,00 | 72 | 22 | 2 | 28427 | 36,52 | 28700 | 43,32 |
| 12,00 | 6,00 | 12,00 | 83 | 22 | 2 | 28428 | 54,49 | 28701 | 61,86 |
| 14,00 | 7,00 | 14,00 | 83 | 25 | 2 | 28429 | 74,50 | 28702 | 82,79 |
| 16,00 | 8,00 | 16,00 | 92 | 25 | 2 | 28430 | 94,01 | 28703 | 103,73 |
| 20,00 | 10,00 | 20,00 | 104 | 32 | 2 | 28431 | 148,57 | 28704 | 160,54 |



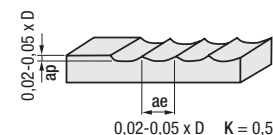
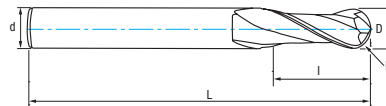
DIN 6535 HB
Bajo demanda upon request sur demande

Ref. 9426

FRESA METAL DURO SERIE LARGA 2Z CABEZA ESFÉRICA < 55 HRC

< 55 HRC Ball Nose 2Z Long Series Carbide End Mill

Fraise carbure série longue 2Z hémisphérique < 55 HRC

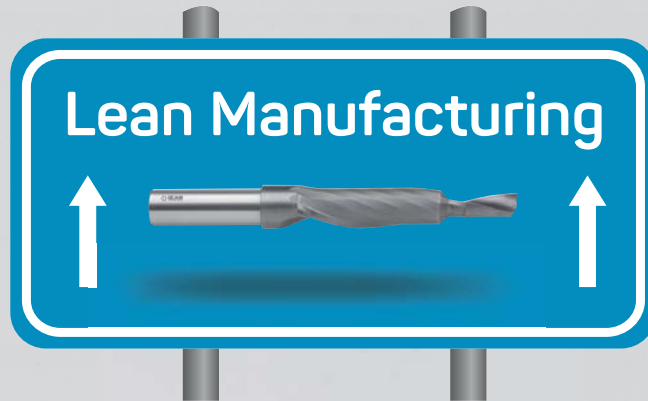


| | | |
|--------------------------|--------------------|-------------|
| MD/HM/Carbure Micrograno | CROMAX | IZAR Std. N |
| | 2 Z | |
| DIN 6535 HA | Tol. D (e8) d (h6) | |



DIN 6535 HB
Bajo demanda upon request sur demande

| D mm | R mm | d mm | L mm | I mm | Z | Nº Art. MD/HM | € | Nº Art. CROMAX | € |
|-------|-------|-------|------|-------|---|---------------|--------|----------------|--------|
| 2,00 | 1,00 | 3,00 | 75 | 8,00 | 2 | 21771 | 25,75 | 21769 | 31,12 |
| 2,50 | 1,25 | 3,00 | 75 | 10,00 | 2 | 21772 | 25,75 | 21770 | 31,12 |
| 3,00 | 1,50 | 3,00 | 75 | 12,00 | 2 | 28506 | 25,75 | 13389 | 31,12 |
| 4,00 | 2,00 | 4,00 | 75 | 12,00 | 2 | 28507 | 27,19 | 13392 | 32,56 |
| 5,00 | 2,50 | 5,00 | 75 | 16,00 | 2 | 28508 | 35,02 | 13395 | 40,41 |
| 6,00 | 3,00 | 6,00 | 100 | 20,00 | 2 | 28509 | 37,72 | 13398 | 43,65 |
| 8,00 | 4,00 | 8,00 | 100 | 25,00 | 2 | 28510 | 57,31 | 13130 | 64,11 |
| 10,00 | 5,00 | 10,00 | 100 | 25,00 | 2 | 28512 | 82,23 | 13401 | 89,71 |
| 12,00 | 6,00 | 12,00 | 100 | 30,00 | 2 | 28513 | 125,81 | 13404 | 133,93 |
| 12,00 | 6,00 | 12,00 | 150 | 30,00 | 2 | 41089 | 139,19 | 30429 | 147,31 |
| 14,00 | 7,00 | 14,00 | 100 | 30,00 | 2 | 28514 | 163,50 | 13407 | 171,62 |
| 14,00 | 7,00 | 14,00 | 150 | 30,00 | 2 | 41091 | 180,67 | 30431 | 188,79 |
| 16,00 | 8,00 | 16,00 | 100 | 40,00 | 2 | 28515 | 217,53 | 13410 | 226,50 |
| 16,00 | 8,00 | 16,00 | 150 | 40,00 | 2 | 41092 | 239,47 | 30432 | 249,15 |
| 20,00 | 10,00 | 20,00 | 125 | 40,00 | 2 | 41094 | 339,49 | 30433 | 350,53 |
| 20,00 | 10,00 | 20,00 | 150 | 40,00 | 2 | 41095 | 373,58 | 30434 | 385,59 |



DISEÑAMOS Y FABRICAMOS A MEDIDA CUALQUIERA QUE SEAN SUS NECESIDADES

Los procesos de fabricación "Next Generation" proporcionan un mejor servicio y control de calidad

La implementación del sistema "Lean Manufacturing" en nuestro entorno productivo se centra en la fabricación pieza a pieza ("one-piece-flow"), lo que da como resultado una flexibilidad excepcional y reduce drásticamente el tamaño del lote y el plazo de entrega, garantizando un plazo de 2-3 semanas para la herramienta especial.

WE DESIGN SPECIAL TOOLS BASED ON YOUR REQUIREMENTS

Next generation manufacturing processes provide an improved service and quality control.

Lean Manufacturing implementation in our production environment focuses on the one-piece-flow, resulting in outstanding flexibility and reducing the batch size and lead time dramatically. Therefore we guarantee a lead time of 2-3 weeks in custom made products.

NOUS CONCEVONS ET FABRIQUONS N'IMPORTE QUELS SONT VOS BESOINS

Les processus de fabrication de «nouvelle génération» offrent un meilleur service et contrôle de la qualité.

La mise en œuvre du système «Lean Manufacturing» dans notre environnement de production se concentre sur la fabrication pièce par pièce (flux en une seule pièce), ce qui se traduit par une flexibilité exceptionnelle et réduit considérablement la taille des lots et les délais. C'est pourquoi nous garantissons un délai de 2 à 3 semaines pour les produits sur demande.



Ref. **9470**

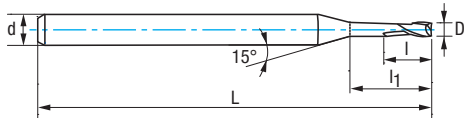
MICRO FRESA METAL DURO 2Z PLANA ALTO RENDIMIENTO

High Performance Square 2Z Carbide Micro End Mill

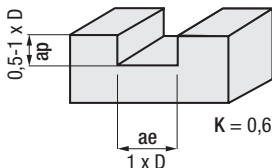
Micro Fraise carbure 2Z haut rendement



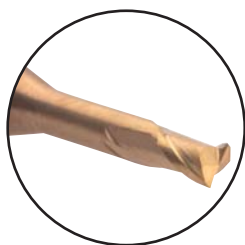
| | | | | | | | | | | |
|-------------------------------------|------------|--------------|--|-----|--|--|-----|----------------|------------------|-----------|
| MD HM/Carbure Grano UF | SUA | IZAR std. | | 2 Z | | | 30° | DIN 6535 HA | Tol. 0/-0.005 | 65 HRC |
|-------------------------------------|------------|--------------|--|-----|--|--|-----|----------------|------------------|-----------|



* **Con radio bajo demanda**
With radius upon request
Avec rayon sur demande



Video



- Geometría con cuello apto para mecanizados profundos.
- Diseño reforzado que reduce las vibraciones y el riesgo de roturas.
- Long-neck geometry suitable for deep milling.
- Reinforced design for avoiding vibrations and causing less damage to the end mill.
- Géométrie avec cou apte pour usinages profonds.
- Design renforcé qui réduit les vibrations et le risque de ruptures.

Materiales y condiciones de corte

Materials and Cutting conditions / Matériaux et conditions de coupe

| D mm | d mm | L mm | l mm | l1 mm | Z | N° Art. SUA | € |
|------------------|------|------|------|-------|---|-------------|-------|
| 0,20 | 4,00 | 50 | 0,30 | 2,00 | 2 | 78397 | 43,08 |
| 0,30 | 4,00 | 50 | 0,40 | 1,00 | 2 | 78400 | 36,26 |
| 0,30 | 4,00 | 50 | 0,40 | 3,00 | 2 | 78401 | 36,26 |
| 0,40 | 4,00 | 50 | 0,50 | 2,00 | 2 | 78402 | 36,26 |
| 0,40 | 4,00 | 50 | 0,50 | 4,00 | 2 | 78403 | 39,05 |
| 0,50 | 4,00 | 50 | 0,60 | 2,00 | 2 | 78405 | 35,50 |
| 0,50 | 4,00 | 50 | 0,60 | 4,00 | 2 | 78406 | 35,50 |
| 0,60 | 4,00 | 50 | 0,70 | 2,00 | 2 | 78407 | 33,60 |
| 0,60 | 4,00 | 50 | 0,70 | 6,00 | 2 | 78408 | 33,60 |
| 0,80 | 4,00 | 50 | 1,00 | 4,00 | 2 | 78409 | 33,60 |
| 0,80 | 4,00 | 50 | 1,00 | 6,00 | 2 | 78410 | 33,60 |
| 0,80 | 4,00 | 50 | 1,00 | 8,00 | 2 | 78411 | 33,60 |
| 1,00 | 4,00 | 50 | 1,20 | 4,00 | 2 | 78412 | 22,48 |
| 1,00 | 4,00 | 50 | 1,20 | 6,00 | 2 | 78413 | 22,48 |
| New! 1,00 | 4,00 | 50 | 1,20 | 10,00 | 2 | 12934 | 22,48 |
| 1,00 | 4,00 | 50 | 1,20 | 12,00 | 2 | 78414 | 22,48 |
| New! 1,20 | 4,00 | 50 | 1,50 | 6,00 | 2 | 78415 | 23,78 |
| New! 1,20 | 4,00 | 50 | 1,50 | 10,00 | 2 | 12937 | 23,78 |
| 1,20 | 4,00 | 50 | 1,50 | 12,00 | 2 | 78416 | 23,78 |
| 1,50 | 4,00 | 50 | 1,80 | 6,00 | 2 | 78417 | 22,77 |
| New! 1,50 | 4,00 | 50 | 1,80 | 10,00 | 2 | 12946 | 23,78 |
| 1,50 | 4,00 | 50 | 1,80 | 12,00 | 2 | 78419 | 23,78 |
| 1,50 | 4,00 | 50 | 1,80 | 18,00 | 2 | 79122 | 23,78 |
| 1,80 | 4,00 | 50 | 2,00 | 10,00 | 2 | 78420 | 23,78 |
| 2,00 | 4,00 | 50 | 2,50 | 6,00 | 2 | 78421 | 26,62 |
| 2,00 | 4,00 | 50 | 2,50 | 10,00 | 2 | 78423 | 26,62 |
| New! 2,00 | 4,00 | 50 | 2,50 | 16,00 | 2 | 12949 | 26,62 |
| 2,00 | 4,00 | 50 | 2,50 | 20,00 | 2 | 78424 | 26,62 |
| 3,00 | 6,00 | 50 | 3,50 | 16,00 | 2 | 78425 | 31,37 |
| 4,00 | 6,00 | 60 | 4,50 | 20,00 | 2 | 78426 | 34,95 |

Avances fz/rev. (mm/z) - Feed - Pas

| Material | D (mm) | 0,20 | 0,30 | 0,30 | 0,40 | 0,40 | 0,50 | 0,50 | 0,60 | 0,60 | 0,80 | 0,80 | 0,80 | 1,00 | 1,00 | 1,00 | 1,20 | 1,20 | 1,50 | 1,50 | 1,50 | 1,80 | 2,0 | 2,0 | 2,0 | 3,0 | 4,0 | |
|--|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | l1 (mm) | 2,00 | 1,00 | 3,00 | 2,00 | 4,00 | 2,00 | 4,00 | 2,00 | 6,00 | 4,00 | 6,00 | 8,00 | 4,00 | 6,00 | 12,00 | 6,00 | 12,00 | 6,00 | 12,00 | 18,00 | 10,00 | 6,00 | 10,00 | 20,00 | 16,00 | 20,00 |
| P | P.3 | Vf (mm/min) | 320 | 420 | 330 | 590 | 350 | 470 | 370 | 560 | 330 | 590 | 475 | 360 | 540 | 445 | 350 | 590 | 350 | 830 | 630 | 430 | 580 | 570 | 455 | 340 | 720 | 530 |
| | | RPM | 50000 | 50000 | 43000 | 50000 | 31400 | 33000 | 25650 | 35200 | 20900 | 26400 | 21275 | 16150 | 18700 | 15500 | 12300 | 17600 | 10450 | 17600 | 13350 | 9100 | 11900 | 10550 | 8450 | 6350 | 5670 | 4250 |
| | | ap (mm) | 0,010 | 0,015 | 0,006 | 0,028 | 0,005 | 0,035 | 0,006 | 0,030 | 0,007 | 0,040 | 0,024 | 0,009 | 0,028 | 0,020 | 0,011 | 0,070 | 0,025 | 0,077 | 0,047 | 0,017 | 0,080 | 0,140 | 0,080 | 0,021 | 0,013 | 0,170 |
| P | P.5 | Vf (mm/min) | 280 | 310 | 265 | 340 | 295 | 315 | 285 | 290 | 260 | 310 | 295 | 280 | 280 | 265 | 250 | 280 | 250 | 280 | 265 | 250 | 410 | 300 | 285 | 270 | 480 | 350 |
| | | RPM | 50000 | 46200 | 39900 | 35200 | 30500 | 26000 | 23750 | 22000 | 19900 | 16700 | 15950 | 15200 | 11500 | 11000 | 10500 | 10000 | 9100 | 8000 | 7500 | 7000 | 7000 | 6700 | 6400 | 6100 | 4300 | 3200 |
| | | ap (mm) | 0,009 | 0,011 | 0,004 | 0,020 | 0,003 | 0,025 | 0,004 | 0,021 | 0,005 | 0,028 | 0,017 | 0,006 | 0,020 | 0,014 | 0,008 | 0,042 | 0,015 | 0,055 | 0,035 | 0,012 | 0,055 | 0,100 | 0,055 | 0,015 | 0,095 | 0,125 |
| S | | Vf (mm/min) | 256 | 336 | 264 | 472 | 280 | 376 | 296 | 448 | 264 | 472 | 380 | 288 | 432 | 356 | 280 | 472 | 280 | 664 | 504 | 344 | 464 | 456 | 364 | 272 | 576 | 424 |
| | | RPM | 40000 | 40000 | 34400 | 40000 | 25120 | 26400 | 20520 | 28160 | 16720 | 21120 | 17020 | 12920 | 14960 | 12400 | 9840 | 14080 | 8360 | 14080 | 10680 | 7280 | 9520 | 8440 | 6760 | 5080 | 4536 | 3400 |
| | | ap (mm) | 0,009 | 0,011 | 0,004 | 0,020 | 0,003 | 0,025 | 0,004 | 0,021 | 0,005 | 0,028 | 0,017 | 0,006 | 0,020 | 0,014 | 0,008 | 0,042 | 0,015 | 0,055 | 0,035 | 0,012 | 0,055 | 0,100 | 0,055 | 0,015 | 0,095 | 0,125 |
| H MATS. TEMPLADOS Hardened Steel Trempeés | | Vf (mm/min) | 240 | 185 | 105 | 200 | 120 | 130 | 115 | 120 | 100 | 125 | 117 | 110 | 115 | 112 | 110 | 115 | 100 | 115 | 112 | 110 | 110 | 120 | 110 | 100 | 200 | 150 |
| | | RPM | 50000 | 32300 | 23900 | 24600 | 18300 | 18000 | 14200 | 15500 | 11900 | 11700 | 16200 | 9000 | 8050 | 7175 | 6300 | 7000 | 5400 | 5500 | 4900 | 4300 | 4500 | 4700 | 4150 | 3600 | 2800 | 2100 |
| | | ap (mm) | 0,008 | 0,007 | 0,003 | 0,012 | 0,002 | 0,015 | 0,003 | 0,013 | 0,003 | 0,017 | 0,010 | 0,004 | 0,012 | 0,008 | 0,005 | 0,026 | 0,009 | 0,033 | 0,020 | 0,007 | 0,035 | 0,060 | 0,035 | 0,009 | 0,055 | 0,075 |

Si no es posible alcanzar las RPM indicadas debemos de reducir el avance proporcionalmente.

If it is not possible to get the above suggested RPM conditions please reduce the feed accordingly.

Si ce n'est pas possible d'arriver aux RPM indiqués son doit réduire l'avance proportionnellement.

- Valores ap típicos de ranurado. Para contorneado x 1,5




- ap values for grooving. For contouring use the above values x 1,5

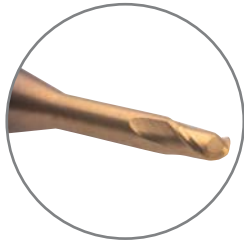
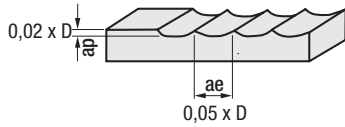
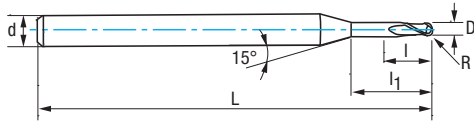
- Valeurs ap pour le rainurage. Pour le contourage, utilisez les valeurs ci-dessus x 1,5

Ref. **9475**

MICRO FRESA METAL DURO 2Z CABEZA ESFÉRICA ALTO RENDIMIENTO
 High Performance Ball Nose 2Z Carbide Micro End Mill
 Micro Fraise carbure 2Z haut rendement



MD HM/Carbure Grano UF **SUA** IZAR std. 2 Z    **DIN 6535 HA** R Tol. ±0,01 **65 HRC**



| D mm | R mm | d mm | L mm | l mm | l1 mm | Z | Nº Art. SUA | € |
|------------------|------|------|------|------|-------|---|-------------|-------|
| 0,30 | 0,15 | 4,00 | 50 | 0,30 | 1,00 | 2 | 78427 | 54,67 |
| 0,30 | 0,15 | 4,00 | 50 | 0,30 | 3,00 | 2 | 78428 | 54,67 |
| 0,40 | 0,20 | 4,00 | 50 | 0,40 | 2,00 | 2 | 78429 | 48,00 |
| 0,40 | 0,20 | 4,00 | 50 | 0,40 | 4,00 | 2 | 78430 | 49,77 |
| 0,50 | 0,25 | 4,00 | 50 | 0,50 | 2,00 | 2 | 78431 | 44,45 |
| 0,50 | 0,25 | 4,00 | 50 | 0,50 | 4,00 | 2 | 78432 | 44,45 |
| 0,60 | 0,30 | 4,00 | 50 | 0,60 | 2,00 | 2 | 78433 | 42,95 |
| 0,60 | 0,30 | 4,00 | 50 | 0,60 | 4,00 | 2 | 78434 | 42,95 |
| 0,60 | 0,30 | 4,00 | 50 | 0,60 | 6,00 | 2 | 78435 | 42,95 |
| 0,80 | 0,40 | 4,00 | 50 | 0,80 | 4,00 | 2 | 78436 | 42,95 |
| 0,80 | 0,40 | 4,00 | 50 | 0,80 | 6,00 | 2 | 78437 | 42,95 |
| 0,80 | 0,40 | 4,00 | 50 | 0,80 | 8,00 | 2 | 78438 | 42,95 |
| 1,00 | 0,50 | 4,00 | 50 | 1,00 | 4,00 | 2 | 78439 | 35,76 |
| 1,00 | 0,50 | 4,00 | 50 | 1,00 | 6,00 | 2 | 78440 | 35,76 |
| New! 1,00 | 0,50 | 4,00 | 50 | 1,20 | 10,00 | 2 | 12971 | 37,42 |
| 1,00 | 0,50 | 4,00 | 50 | 1,00 | 12,00 | 2 | 78441 | 37,42 |
| 1,20 | 0,60 | 4,00 | 50 | 1,20 | 6,00 | 2 | 78442 | 37,42 |
| New! 1,20 | 0,60 | 4,00 | 50 | 1,50 | 10,00 | 2 | 12995 | 37,42 |
| 1,20 | 0,60 | 4,00 | 50 | 1,20 | 12,00 | 2 | 78443 | 37,42 |
| 1,50 | 0,75 | 4,00 | 50 | 1,50 | 6,00 | 2 | 78444 | 37,42 |
| New! 1,50 | 0,75 | 4,00 | 50 | 1,80 | 10,00 | 2 | 13033 | 37,42 |
| 1,50 | 0,75 | 4,00 | 50 | 1,50 | 12,00 | 2 | 78445 | 37,42 |
| 2,00 | 1,00 | 4,00 | 50 | 2,00 | 6,00 | 2 | 78446 | 33,92 |
| 2,00 | 1,00 | 4,00 | 50 | 2,00 | 10,00 | 2 | 78447 | 33,92 |
| New! 2,00 | 1,00 | 4,00 | 50 | 2,50 | 16,00 | 2 | 13036 | 33,92 |
| 2,00 | 1,00 | 4,00 | 50 | 2,00 | 20,00 | 2 | 78448 | 33,92 |
| 3,00 | 1,50 | 6,00 | 60 | 3,00 | 16,00 | 2 | 78449 | 42,72 |
| 4,00 | 2,00 | 6,00 | 60 | 4,00 | 20,00 | 2 | 78450 | 42,72 |

- Geometría con cuello apto para mecanizados profundos. **New!**
- Diseño reforzado que reduce las vibraciones y el riesgo de roturas. **New!**
- Long-neck geometry suitable for deep milling. **New!**
- Reinforced design for avoiding vibrations and causing less damage to the end mill. **New!**
- Géométrie avec cou apte pour usinages profonds.
- Design renforcé qui réduit les vibrations et le risque de ruptures.

Materiales y condiciones de corte

Materials and Cutting Conditions / Matériaux et conditions de coupe

Avances fz*/rev. (mm/min.) Feed / Pas

| Material | D (mm) | 0,30 | 0,30 | 0,40 | 0,40 | 0,50 | 0,50 | 0,60 | 0,60 | 0,60 | 0,80 | 0,80 | 0,80 | 1,00 | 1,00 | 1,00 | 1,20 | 1,20 | 1,50 | 1,50 | 2,0 | 2,0 | 2,0 | 3,0 | 4,0 |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo Sub. | l1 (mm) | 1,00 | 3,00 | 2,00 | 4,00 | 2,00 | 4,00 | 2,00 | 4,00 | 6,00 | 4,00 | 6,00 | 8,00 | 4,00 | 6,00 | 12,00 | 6,00 | 12,00 | 6,00 | 12,00 | 6,00 | 10,00 | 20,00 | 16,00 | 20,00 |
| P P.3 | Vf (mm/min) | 520 | 480 | 790 | 720 | 870 | 600 | 850 | 720 | 590 | 890 | 760 | 640 | 850 | 720 | 600 | 780 | 590 | 760 | 580 | 800 | 690 | 590 | 860 | 830 |
| | RPM | 50000 | 48000 | 50000 | 48000 | 49500 | 34100 | 40700 | 34600 | 28600 | 30800 | 26400 | 22000 | 24200 | 21000 | 17800 | 18700 | 14300 | 14300 | 11000 | 11000 | 9700 | 8500 | 6900 | 5200 |
| | ap (mm) | 0,017 | 0,010 | 0,032 | 0,013 | 0,028 | 0,007 | 0,034 | 0,020 | 0,007 | 0,064 | 0,040 | 0,016 | 0,080 | 0,045 | 0,008 | 0,032 | 0,024 | 0,048 | 0,031 | 0,160 | 0,090 | 0,024 | 0,150 | 0,200 |
| P P.5 | Vf (mm/min) | 460 | 440 | 550 | 450 | 540 | 490 | 540 | 510 | 480 | 550 | 520 | 490 | 540 | 500 | 470 | 540 | 480 | 540 | 480 | 530 | 500 | 470 | 620 | 580 |
| | RPM | 50000 | 48000 | 50000 | 48000 | 35200 | 31900 | 29700 | 28000 | 26400 | 22000 | 20900 | 19800 | 17600 | 16500 | 15400 | 14000 | 12000 | 11500 | 10000 | 8800 | 8300 | 7900 | 5500 | 4100 |
| | ap (mm) | 0,014 | 0,008 | 0,026 | 0,011 | 0,023 | 0,005 | 0,028 | 0,017 | 0,006 | 0,052 | 0,032 | 0,013 | 0,065 | 0,036 | 0,007 | 0,026 | 0,020 | 0,039 | 0,025 | 0,130 | 0,075 | 0,020 | 0,120 | 0,045 |
| S | Vf (mm/min) | 416 | 384 | 632 | 576 | 696 | 480 | 680 | 576 | 472 | 712 | 608 | 512 | 680 | 576 | 480 | 624 | 472 | 608 | 464 | 640 | 552 | 472 | 688 | 664 |
| | RPM | 40000 | 38400 | 40000 | 38400 | 39600 | 27280 | 32560 | 27680 | 22880 | 24640 | 21120 | 17600 | 19360 | 16800 | 14240 | 14960 | 11440 | 11440 | 8800 | 8800 | 7760 | 6800 | 5520 | 4160 |
| | ap (mm) | 0,014 | 0,008 | 0,026 | 0,011 | 0,023 | 0,005 | 0,028 | 0,017 | 0,006 | 0,052 | 0,032 | 0,013 | 0,065 | 0,036 | 0,007 | 0,026 | 0,020 | 0,039 | 0,025 | 0,130 | 0,075 | 0,020 | 0,120 | 0,045 |
| H MATS. TEMPLADOS Hardened Steel Tremprés | Vf (mm/min) | 420 | 390 | 460 | 400 | 480 | 440 | 480 | 440 | 400 | 500 | 470 | 440 | 500 | 470 | 440 | 480 | 420 | 480 | 420 | 480 | 460 | 440 | 580 | 550 |
| | RPM | 45652 | 42545 | 41818 | 42667 | 31289 | 28645 | 26400 | 24157 | 22000 | 20000 | 18890 | 17780 | 16296 | 15510 | 14417 | 12444 | 10500 | 10222 | 8750 | 7970 | 7636 | 7396 | 5145 | 3888 |
| | ap (mm) | 0,013 | 0,007 | 0,024 | 0,01 | 0,021 | 0,005 | 0,025 | 0,015 | 0,006 | 0,048 | 0,030 | 0,012 | 0,060 | 0,030 | 0,006 | 0,024 | 0,018 | 0,036 | 0,023 | 0,120 | 0,07 | 0,018 | 0,080 | 0,150 |

Si no es posible alcanzar las RPM indicadas debemos de reducir el avance proporcionalmente.

If it is not possible to get the above suggested RPM conditions please reduce the feed accordingly.

Si ce n'est pas possible d'arriver aux RPM indiqués son doit réduire l'avance proportionnellement.

- Valores ap típicos de ranurado. Para contorneado x 1,5

- ap values for grooving. For contouring use the above values x 1,5

- Valeurs ap pour le rainage. Pour le contourage, utilisez les valeurs ci-dessus x 1,5



FRESADO 1Z ALUMINIO

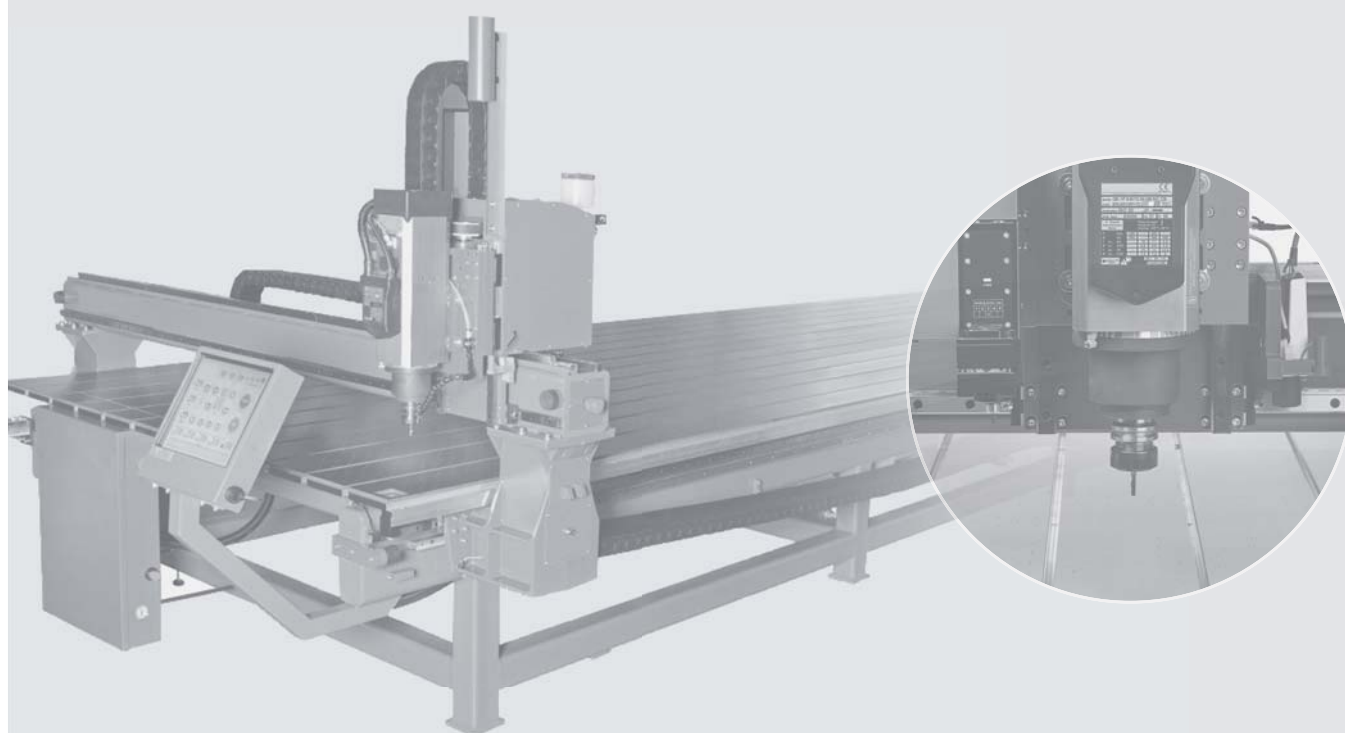
Aluminium Milling 1Z

Fraisage 1Z aluminium

Completa gama de fresas 1Z para mecanizado de alta velocidad de planchas o perfiles de aluminio y PVC

Wide Range of 1Z End Mills for High Speed Machining of Aluminium, PVC and others

Gamme complète de fraises 1Z pour l'usinage à grande vitesse de tôles ou profils aluminium et PVC



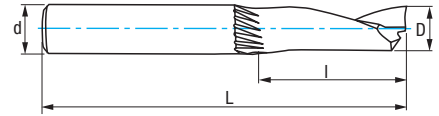
Ref. **9441**

FRESA METAL DURO 1Z PULIDO ESPEJO ALUMINIO

Aluminium 1Z Mirror Polished Carbide End Mill

Fraise carbure 1Z polyglass aluminium

New!



| | | | | | | | | |
|--|--------------|--|-----|--|----------------|--|--|--|
| MD/HM Carbure Micrograno+ | IZAR Std. | | 1 Z | | DIN 6535 HA | | | Pulido Espejo Mirror Polished Polyglass |
|--|--------------|--|-----|--|----------------|--|--|--|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|-------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-350 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.4 | 100-350 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.5 | 100-350 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.6 | 100-200 | 0,020 | 0,030 | 0,030 | 0,040 |
| | N.7 | 50-125 | 0,015 | 0,025 | 0,025 | 0,030 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$K = 1$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

Coeficiente corrección
 Correction coefficient
 Coefficient correction

| D mm | d mm | L mm | l mm | Nº Art. MD/HM | € |
|---------|---------|---------|---------|------------------|-------|
| 3,00 | 3,00 | 38 | 12 | 82944 | 14,92 |
| 4,00 | 4,00 | 40 | 15 | 82943 | 18,16 |
| 5,00 | 5,00 | 50 | 16 | 82942 | 22,46 |
| 6,00 | 6,00 | 50 | 18 | 82941 | 26,68 |
| 8,00 | 8,00 | 63 | 22 | 82940 | 40,49 |
| 10,00 | 10,00 | 72 | 30 | 82939 | 56,61 |
| 12,00 | 12,00 | 83 | 35 | 10365 | 81,04 |



Ref. **9441**
Mat. Alum 7574 – Alum 2024

| | | | | |
|--|---|--------------|--------------|--------------------------|
| | Calidad Superficial Surface Quality Qualité de surface | ★★★★ | ★★★★★ | |
| | Consumo Máquina Machine Effort Effort de la machine | ★★★★ | ★★★★★ | |
| | Vida de Herramienta Tool Life Vie de l'outil | ★★★★ | ★★★★ | |
| | | Competitor A | Competitor B | IZAR Ref. 9441 |



Ref. **9416**

FRESA METAL DURO 1Z PULIDO ESPEJO ALUMINIO/TERMOPLÁSTICOS

Aluminium/Thermoplastics 1Z Mirror Polished Carbide End Mill

Fraise carbure 1Z polyglass Aluminium/Thermoplastiques



| | | | | | | | | |
|--|--------------|--|-----|--|----------------|--|--|--|
| MD/HM Carbure Micrograno ⁺ | IZAR Std. | | 1 Z | | DIN 6535 HA | | | Pulido Espejo Mirror Polished Polyglass |
|--|--------------|--|-----|--|----------------|--|--|--|

| Material | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | | |
|----------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Ø 1 | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 | Ø 16 | Ø 20 | |
| N | N.3 | 100-350 | 0,012 | 0,020 | 0,030 | 0,050 | 0,050 | 0,080 | 0,100 | 0,120 | 0,150 | 0,200 |
| | N.4 | 100-350 | 0,012 | 0,020 | 0,030 | 0,050 | 0,050 | 0,080 | 0,100 | 0,120 | 0,150 | 0,200 |
| | N.5 | 100-350 | 0,012 | 0,020 | 0,030 | 0,050 | 0,050 | 0,080 | 0,100 | 0,120 | 0,150 | 0,200 |
| | N.6 | 100-200 | 0,010 | 0,015 | 0,020 | 0,030 | 0,030 | 0,040 | 0,050 | 0,080 | 0,100 | 0,150 |
| | N.7 | 50-125 | 0,008 | 0,010 | 0,015 | 0,025 | 0,025 | 0,030 | 0,040 | 0,060 | 0,080 | 0,100 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad K = 1$$

Coeficiente corrección
Correction coefficient
Coefficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | N° Art. MD/HM | € |
|-------------------|-------|------|------|---|---------------|--------|
| 1,00 | 3,00 | 38 | 5 | 1 | 59213 | 8,71 |
| 1,50 | 3,00 | 38 | 6 | 1 | 78324 | 8,71 |
| 2,00 | 3,00 | 38 | 6 | 1 | 78325 | 8,71 |
| 2,50 | 3,00 | 38 | 6 | 1 | 60852 | 8,71 |
| 3,00 | 3,00 | 38 | 12 | 1 | 78326 | 13,57 |
| 4,00 | 4,00 | 45 | 15 | 1 | 78327 | 16,51 |
| 5,00 | 5,00 | 50 | 16 | 1 | 78328 | 20,42 |
| 6,00 | 6,00 | 50 | 17 | 1 | 78329 | 24,25 |
| 8,00 | 8,00 | 60 | 22 | 1 | 78331 | 36,81 |
| 10,00 | 10,00 | 75 | 32 | 1 | 78332 | 51,46 |
| 12,00 | 12,00 | 75 | 35 | 1 | 78333 | 73,66 |
| New! 14,00 | 14,00 | 100 | 42 | 1 | 26737 | 162,21 |
| New! 16,00 | 16,00 | 100 | 52 | 1 | 26738 | 199,75 |
| New! 20,00 | 20,00 | 100 | 40 | 1 | 26603 | 262,31 |



| Cont. | N° Art. MD/HM | € |
|-----------------|---------------|--------|
| 3-4-5 6-8 mm | 78335 | 105,99 |

5 Pcs

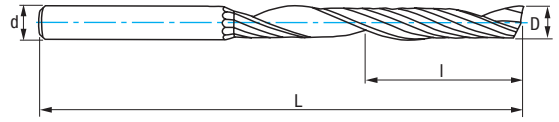
Set Price!

- Canal Especial con Pulido Espejo.
- Mejora de Rendimiento en Perfilera de Aluminio.
- Excelentes resultados en materiales termoplásticos como el metacrilato (PMMA), dejando acabados superficiales brillantes.
- Special Mirror-Polished Flute.
- Improved performance for aluminium profiles.
- Excellent results on thermoplastic materials such as methacrylate (PMMA), leaving shiny surface finishes.
- Goujure spécial polyglass.
- Augmentation de la performance dans profils en aluminium.
- Excellents résultats sur les matériaux thermoplastiques tels que le méthacrylate (PMMA). Finition de surface brillante.



Ref. **9417**

FRESA METAL DURO 1Z PULIDO ESPEJO SERIE LARGA ALUMINIO/TERMOPLÁSTICOS
 Aluminium/Thermoplastics 1Z Mirror Long Series Polished Carbide End Mill
 Fraise carbure série longue 1Z polyglass Aluminium/Thermoplastiques



| | | | | | | | | | |
|--|--------------|--|-----|--|----------------|--|--|--|---|
| MD/HM Carbure Micrograno ⁺ | IZAR Std. | | 1 Z | | DIN 6535 HA | | | Pulido Espejo Mirror Polished Polyglass | Serie Larga Long Series Série Longue |
|--|--------------|--|-----|--|----------------|--|--|--|---|

| Material | Grupo | Sub. | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|-------|------|-------------|--|-------------------------------------|-------|-------|-------|
| | | | MD/HM/Carb. | | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | | N.3 | 100-250 | | 0,030 | 0,050 | 0,050 | 0,080 |
| | | N.4 | 100-250 | | 0,030 | 0,050 | 0,050 | 0,080 |
| | | N.5 | 100-250 | | 0,030 | 0,050 | 0,050 | 0,080 |
| | | N.6 | 100-200 | | 0,020 | 0,030 | 0,030 | 0,040 |
| | | N.7 | 50-125 | | 0,015 | 0,025 | 0,025 | 0,030 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

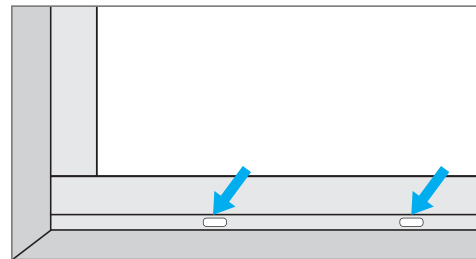
$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = 1
 Coeficiente corrección
 Correction coefficient
 Coefficient correction

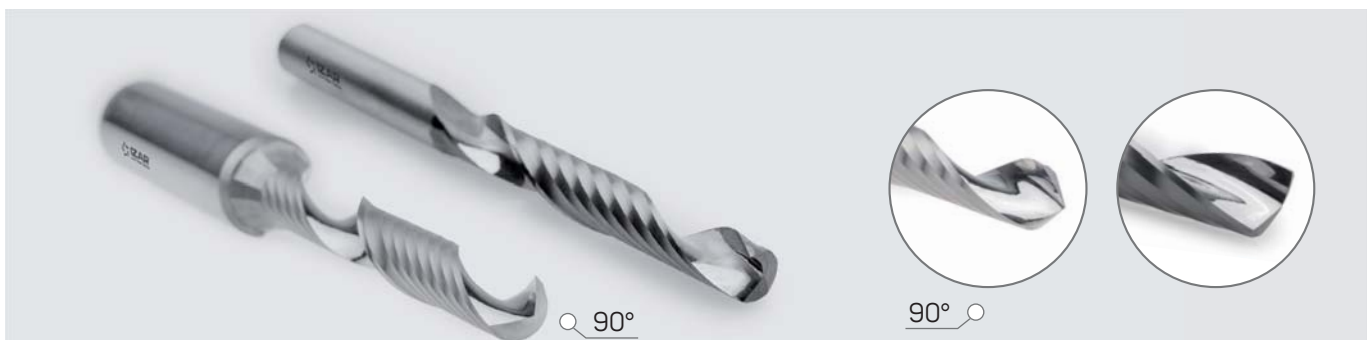


| | D mm | d mm | L mm | l mm | Z | N° Art. MD/HM | € |
|-------------|-------|-------|------|------|---|---------------|--------|
| New! | 3,00 | 3,00 | 70 | 12 | 1 | 21583 | 23,37 |
| New! | 3,00 | 3,00 | 70 | 22 | 1 | 22080 | 24,67 |
| | 3,00 | 3,00 | 70 | 42 | 1 | 76541 | 25,97 |
| New! | 4,00 | 4,00 | 70 | 15 | 1 | 21584 | 28,93 |
| New! | 4,00 | 4,00 | 70 | 22 | 1 | 22081 | 30,00 |
| New! | 4,00 | 4,00 | 70 | 32 | 1 | 22085 | 31,08 |
| | 4,00 | 4,00 | 70 | 42 | 1 | 78454 | 32,15 |
| New! | 5,00 | 5,00 | 75 | 16 | 1 | 21585 | 34,67 |
| | 5,00 | 5,00 | 75 | 42 | 1 | 78455 | 38,53 |
| New! | 6,00 | 6,00 | 85 | 17 | 1 | 21586 | 45,38 |
| | 6,00 | 6,00 | 85 | 52 | 1 | 78456 | 50,42 |
| New! | 8,00 | 8,00 | 90 | 22 | 1 | 21587 | 65,88 |
| | 8,00 | 8,00 | 90 | 52 | 1 | 78457 | 73,20 |
| New! | 10,00 | 10,00 | 100 | 32 | 1 | 21589 | 90,63 |
| | 10,00 | 10,00 | 100 | 52 | 1 | 78458 | 100,70 |
| | 12,00 | 12,00 | 100 | 52 | 1 | 78459 | 132,62 |
| | 14,00 | 14,00 | 100 | 55 | 1 | 83341 | 151,52 |
| | 16,00 | 16,00 | 100 | 55 | 1 | 83342 | 180,83 |

| | D mm | d mm | L mm | l mm | Z | N° Art. MD/HM | € |
|-------------|------|------|------|------|---|---------------|-------|
| | 5,00 | 5,00 | 80 | 40 | 1 | 83200 | 45,02 |
| | 5,00 | 8,00 | 80 | 40 | 1 | 53735 | 72,03 |
| New! | 5,00 | 8,00 | 110 | 40 | 1 | 19806 | 81,85 |



- Agujeros de desague en perfilera metálica.
- For drain holes and slots of window profiles.
- Trous de drainage dans les profils métalliques.

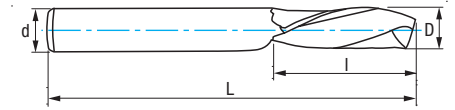


Ref. **9456**

FRESA METAL DURO 1Z PULIDO ESPEJO HÉLICE IZQUIERDA ALUMINIO

Aluminium Left Helix 1Z Polished Carbide End Mill

Fraise carbure 1Z polyglass hélice à gauche aluminium



| | | | | | | | | |
|--|--------------|--|-----|--|--|----------------|--|--|
| MD/HM Carbure Micrograno ⁺ | IZAR Std. | | 1 Z | | | DIN 6535 HA | | Pulido Espejo Mirror Polished Polyglass |
|--|--------------|--|-----|--|--|----------------|--|--|

| | | |
|-------------------------|------------|-----------------|
| CORTE DERECHA | Right cut | Coupe Droite |
| HÉLICE IZQUIERDA | Left helix | Hélice à gauche |

EXTRACCIÓN DE VIRUTA Chip Evacuación Évacuation des copeaux

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|-------------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 1 | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-300 | 0,012 | 0,020 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.4 | 100-300 | 0,012 | 0,020 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.5 | 100-300 | 0,012 | 0,020 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.6 | 100-200 | 0,010 | 0,015 | 0,020 | 0,030 | 0,030 | 0,040 |
| | N.7 | 50-125 | 0,008 | 0,010 | 0,015 | 0,025 | 0,025 | 0,030 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ **K = 1**
 Coeficiente corrección
 Correction coefficient
 Coéfficient correction

Vf (mm/min.) = r.p.m. x Z x fz x K

| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € |
|-------|-------|------|------|---|---------------|-------|
| 1,00 | 3,00 | 38 | 4 | 1 | 78368 | 10,48 |
| 1,50 | 3,00 | 38 | 4 | 1 | 78369 | 10,48 |
| 2,00 | 3,00 | 38 | 6 | 1 | 78370 | 10,48 |
| 2,50 | 3,00 | 38 | 6 | 1 | 78377 | 10,48 |
| 3,00 | 3,00 | 38 | 12 | 1 | 78379 | 16,15 |
| 4,00 | 4,00 | 45 | 15 | 1 | 78381 | 18,89 |
| 5,00 | 5,00 | 50 | 22 | 1 | 78383 | 23,34 |
| 6,00 | 6,00 | 50 | 17 | 1 | 78496 | 34,37 |
| 8,00 | 8,00 | 60 | 25 | 1 | 78497 | 46,77 |
| 10,00 | 10,00 | 75 | 32 | 1 | 78498 | 71,47 |
| 12,00 | 12,00 | 75 | 35 | 1 | 78499 | 86,66 |

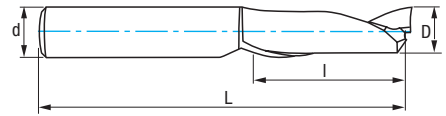


Ref. **9419**

FRESA METAL DURO 1Z ALUMINIO

Aluminium 1Z Carbide End Mill

Fraise carbure 1Z aluminium



| | | | | | | | |
|--|--------------|--------------|--|-----|--|----------------|--|
| MD/HM Carbure Micrograno+ | ALTIN | IZAR Std. | | 1 Z | | DIN 6535 HA | |
|--|--------------|--------------|--|-----|--|----------------|--|

| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|-------------|---------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | ALTIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-350 | 140-420 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.4 | 100-350 | 140-420 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.5 | 100-350 | 140-420 | 0,030 | 0,050 | 0,050 | 0,080 |
| | N.6 | 100-200 | 140-280 | 0,020 | 0,030 | 0,030 | 0,040 |
| | N.7 | 50-125 | 70-175 | 0,015 | 0,025 | 0,025 | 0,030 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad K = 1$$

Vf (mm/min.) = r.p.m. x Z x fz x K
 Coeficiente corrección
 Correction coefficient
 Coefficient correction

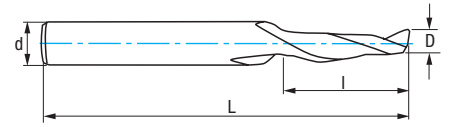
| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € | Nº Art. ALTIN | € |
|-------|-------|------|------|---|---------------|-------|---------------|-------|
| 3,00 | 3,00 | 38 | 12 | 1 | 58984 | 13,57 | 59195 | 20,79 |
| 4,00 | 4,00 | 40 | 15 | 1 | 58856 | 16,51 | 59196 | 23,62 |
| 5,00 | 5,00 | 50 | 16 | 1 | 58857 | 20,42 | 59197 | 27,33 |
| 6,00 | 6,00 | 50 | 18 | 1 | 58859 | 24,25 | 59198 | 30,98 |
| 8,00 | 8,00 | 63 | 22 | 1 | 58860 | 36,81 | 59199 | 44,17 |
| 10,00 | 10,00 | 72 | 30 | 1 | 58862 | 51,46 | 59201 | 57,96 |



Ref. **9413**

FRESA METAL DURO 1Z TERMOPLÁSTICOS

Thermoplastics 1Z Carbide End Mill
Fraise carbure 1Z thermoplastiques



| | | | | | | | | |
|--|---------------|--------------|--|-----|--|----------------|----------------------------|-------------------------------------|
| MD/HM Carbure Micrograno ⁺ | CARBEX | IZAR Std. | | 1 Z | | DIN 6535 HA | Tol.* D (k10) d (h6) | *øD=ød → Tol. D (js14) d (h6) |
|--|---------------|--------------|--|-----|--|----------------|----------------------------|-------------------------------------|

| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | |
|----------|------|-------------|---------|-------------------------------------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | CARBEX | Ø 4 | Ø 6 | Ø 8 |
| N | N.3 | 100-350 | 140-420 | 0,020 | 0,050 | 0,050 |
| | N.4 | 100-350 | 140-420 | 0,040 | 0,050 | 0,050 |
| | N.5 | 100-350 | 140-420 | 0,080 | 0,050 | 0,050 |
| | N.6 | 100-200 | 140-280 | 0,010 | 0,030 | 0,030 |
| | N.7 | 50-125 | 70-175 | 0,012 | 0,025 | 0,025 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = 1
Coeficiente corrección
Correction coefficient
Coéfficient correction

| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € | Nº Art. CARBEX | € |
|------|------|------|------|---|---------------|-------|----------------|-------|
| 2,50 | 6,00 | 50 | 12 | 1 | 43300 | 36,64 | 43299 | 52,66 |
| 3,00 | 6,00 | 50 | 12 | 1 | 43302 | 36,64 | 43311 | 52,66 |
| 4,00 | 6,00 | 50 | 15 | 1 | 43303 | 36,64 | 43312 | 52,66 |
| 5,00 | 6,00 | 50 | 15 | 1 | 43307 | 36,64 | 43314 | 52,66 |
| 6,00 | 6,00 | 50 | 18 | 1 | 43309 | 36,64 | 43315 | 52,66 |



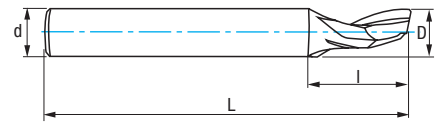
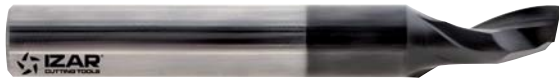
- Aplicación en plásticos, polyester, fibra... con un rendimiento 40% mayor que una fresa convencional gracias a su recubrimiento CARBEX.
- For plastics, polyester, fibre... 40% better performance than conventional end mills thanks to its CARBEX coating.
- Utilisation sur des plastiques, polyester, fibre... avec un rendement 40% de plus par rapport a une fraise conventionelle grâce a son revêtement CARBEX.



Ref. **9411**

FRESA METAL DURO 1Z TERMOPLÁSTICOS

Thermoplastics 1Z Carbide End Mill
Fraise carbure 1Z thermoplastiques



| | | | | |
|--|--------------|--------------|--|-----|
| MD/HM Carbure Micrograno+ | ALTIN | IZAR Std. | | 1 Z |
|--|--------------|--------------|--|-----|

| | | |
|--|----------------|---------------------------|
| | DIN 6535 HA | Tol. D (h10) d (h6) |
|--|----------------|---------------------------|

| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|-------------|---------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | ALTIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-350 | 140-420 | 0,010 | 0,050 | 0,050 | 0,080 |
| | N.4 | 100-350 | 140-420 | 0,010 | 0,050 | 0,050 | 0,080 |
| | N.5 | 100-350 | 140-420 | 0,010 | 0,050 | 0,050 | 0,080 |
| | N.6 | 100-200 | 140-280 | 0,020 | 0,030 | 0,030 | 0,040 |
| | N.7 | 50-125 | 70-175 | 0,015 | 0,025 | 0,025 | 0,030 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad K = 1$$

Vf (mm/min.) = r.p.m. x Z x fz x K

Coeficiente corrección
Correction coefficient
Coéfficient correction

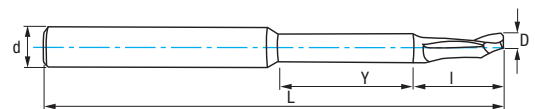
| D mm | d mm | L mm | l mm | Z | Nº Art. MD/HM | € | Nº Art. ALTIN | € |
|---------|---------|---------|---------|---|------------------|-------|------------------|-------|
| 3,00 | 3,00 | 38 | 12 | 1 | 13075 | 13,57 | 13114 | 20,79 |
| 4,00 | 4,00 | 40 | 12 | 1 | 13078 | 16,51 | 13123 | 23,62 |
| 5,00 | 5,00 | 50 | 12 | 1 | 13084 | 20,42 | 13126 | 27,33 |
| 6,00 | 6,00 | 50 | 14 | 1 | 13096 | 24,25 | 13135 | 30,98 |
| 8,00 | 8,00 | 63 | 15 | 1 | 13105 | 36,81 | 13138 | 44,17 |
| 10,00 | 10,00 | 72 | 15 | 1 | 13111 | 51,46 | 13144 | 57,96 |



Ref. **9414**

FRESA METAL DURO 1Z SERIE LARGA

1Z Long Series Carbide End Mill
Fraise carbure série longue 1Z



| | | | | |
|--|-------------------|--|-----|----------------|
| MD/HM Carbure Micrograno+ | IZAR Std. W | | 1 Z | DIN 6535 HA |
|--|-------------------|--|-----|----------------|

| | | |
|----------------------------|-------------------------------------|---|
| Tol.* D (k10) d (h6) | *ØD=Ød → Tol. D (js14) d (h6) | Serie Larga Long Series Série Longue |
|----------------------------|-------------------------------------|---|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|-------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-200 | 0,005 | 0,025 | 0,030 | 0,040 |
| | N.4 | 100-200 | 0,005 | 0,025 | 0,030 | 0,040 |
| | N.5 | 100-200 | 0,005 | 0,025 | 0,030 | 0,040 |
| | N.4 | 100-200 | 0,020 | 0,030 | 0,030 | 0,040 |
| | N.5 | 50-125 | 0,015 | 0,025 | 0,025 | 0,030 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad K = 1$$

Vf (mm/min.) = r.p.m. x Z x fz x K

Coeficiente corrección
Correction coefficient
Coéfficient correction

| D mm | d mm | L mm | l mm | Y mm | Z | Nº Art. MD/HM | € |
|---------|---------|---------|---------|---------|---|------------------|--------|
| 4,00 | 8,00 | 80 | 16 | 29 | 1 | 42847 | 57,97 |
| 5,00 | 8,00 | 80 | 16 | 29 | 1 | 42848 | 57,97 |
| 6,00 | 8,00 | 90 | 16 | 29 | 1 | 42851 | 57,97 |
| 8,00 | 8,00 | 100 | 28 | 40 | 1 | 42865 | 75,61 |
| 10,00 | 10,00 | 120 | 40 | 40 | 1 | 42868 | 104,33 |



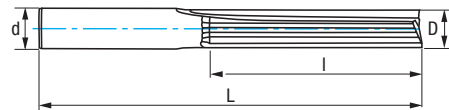
Ref. **1689**

FRESA METAL DURO 2Z TERMOPLÁSTICOS

Thermoplastics 2Z Carbide End Mill

Fraise carbure 2Z thermoplastiques

New!



| | | | | | | | |
|---------------------------------------|--------------|--|-----|----------------|-----------------------------------|------------------------|-------------------------------------|
| MD/HM Carbure Micrograno | IZAR Std. | | 2 Z | DIN 6535 HA | Espumas EVA Foam Caoutchouc | Madera Wood Bois | Plásticos Plastics Plastiques |
|---------------------------------------|--------------|--|-----|----------------|-----------------------------------|------------------------|-------------------------------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|-------------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM/Carb. | Ø 1 | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-350 | 0,010 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 |
| N | N.6 | 100-200 | 0,010 | 0,015 | 0,020 | 0,030 | 0,030 | 0,040 |
| F | | 50-125 | 0,005 | 0,010 | 0,015 | 0,025 | 0,025 | 0,030 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = 1
 Coeficiente corrección
 Correction coefficient
 Coefficient correction

| D mm | d mm | L mm | l mm | Z | | Nº Art. MD/HM | € |
|---------|---------|---------|---------|---|---|------------------|-------|
| 1,00 | 3,00 | 38 | 3 | 2 | 1 | 79346 | 9,21 |
| 1,50 | 3,00 | 38 | 7 | 2 | 1 | 79421 | 9,21 |
| 2,00 | 3,00 | 38 | 17 | 2 | 1 | 79422 | 9,21 |
| 2,50 | 3,00 | 38 | 17 | 2 | 1 | 79423 | 9,21 |
| 3,00 | 3,00 | 55 | 32 | 2 | 1 | 79435 | 10,39 |
| 4,00 | 4,00 | 65 | 42 | 2 | 1 | 79436 | 19,47 |
| 6,00 | 6,00 | 70 | 42 | 2 | 1 | 79437 | 25,61 |
| 8,00 | 8,00 | 75 | 42 | 2 | 1 | 79438 | 40,00 |
| 10,00 | 10,00 | 85 | 42 | 2 | 1 | 79440 | 76,22 |



- Geometría Multi Material válida para una amplia gama de productos como espumas, acrílicos, PVC, ABS, tableros, madera contrachapada, resinas, nylon, etc.
- Special Multi Material geometry suitable for a wide range of products such as foams, acrylic, PVC, ABS, hardwood, plywood, resins, nylon, etc.
- Géométrie Multi Matériaux pour une gamme large de produits comme mousses, acryliques, PVC, ABC, tableaux, bois contreplaqués, résines, nylon, etc.
- Utilizado en el mecanizado de las espumas de bandejas de herramientas.
- Machining of tool tray foams.
- Usinage des mousses des plateaux d'outils.






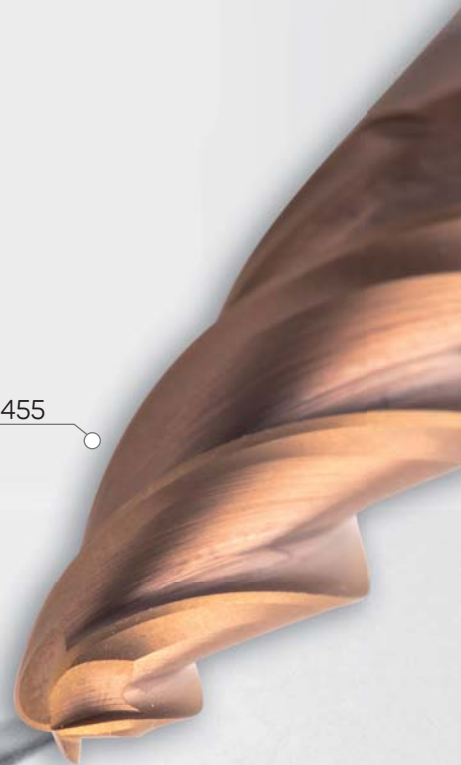
FRESAS CÓNICAS METAL DURO REDONDEADAS PARA TURBINAS, IMPULSORES Y MOLDES

Taper Nosed Carbide End Mills for Turbines,
Impellers and Moulds


Fraises coniques carbure rayon pour turbines,
moteurs et moules



Ref. 9457



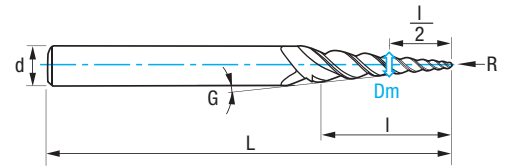
Ref. 9455



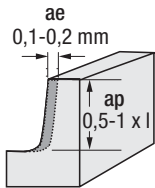
Ref. 9453

Ref. **9453**

FRESA METAL DURO CÓNICA REDONDEADA 1 RADIO
 1-Radius Tapered Ball Nose Carbide End Mill
 Fraise carbure conique 1 rayon



| | | | | | | |
|-------------------------------------|------------|--------------|--|-----|--|----------------|
| MD/HM Carbure Grano UF | SUA | IZAR Std. | | 3 Z | | DIN 6535 HA |
|-------------------------------------|------------|--------------|--|-----|--|----------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | |
|----------|------|------------|-------------------------------------|-------|
| Grupo | Sub. | SUA | R=0,5 | R=1,0 |
| P | P.1 | 105 | 0,005 | 0,010 |
| | P.2 | 90 | 0,004 | 0,008 |
| | P.3 | 70 | 0,004 | 0,008 |
| | P.4 | 65 | 0,003 | 0,006 |
| | P.5 | 55 | 0,003 | 0,006 |
| K | K.1 | 110 | 0,004 | 0,008 |
| | K.2 | 80 | 0,003 | 0,006 |
| S | | 40 | 0,003 | 0,006 |
| N | N.1 | 80 | 0,004 | 0,008 |
| | N.3 | 260 | 0,006 | 0,012 |
| | N.4 | 180 | 0,006 | 0,012 |
| | | | | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times Dm}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
 Correction coefficient
 Coefficient correction

| Dm | R | G | I | L | d | Z | Nº Art. SUA | € |
|------|------|----|----|----|------|---|-------------|-------|
| 3,00 | 0,5 | 6° | 20 | 60 | 6,00 | 3 | 79381 | 89,62 |
| 3,40 | 0,5 | 8° | 18 | 60 | 6,00 | 3 | 79386 | 89,62 |
| 3,80 | 1,00 | 6° | 19 | 60 | 6,00 | 3 | 79387 | 89,62 |
| 3,85 | 1,00 | 8° | 15 | 60 | 6,00 | 3 | 79388 | 89,62 |



DIN 6535 HB
 Bajo demanda / upon request / sur demande

- Fresa multi funcional con diferentes ángulos de conicidad.
- Válido para acabados en todo tipo de materiales.
- Adecuado para máquinas CNC de 5 ejes para cuyo programa facilitamos los perfiles de las fresas en formato .dxf (CAD-CAM).
- Para trabajos de difícil accesibilidad.
- Multi-functional end mill available in various taper angles.
- Suitable for finishing in almost all kind of materials.
- Suitable for 5-Axis machining. Profiles of the end mills are available in .dxf format (CAD-CAM).
- Suitable for hard to reach areas.
- Fraise multifonction avec différent angles de conicité.
- Valide pour finitions dans tout type des matériaux.
- Valide pour machines 5-axes. Profils des fraises disponibles en format .dxf (CAD-CAM).
- Pour travaux de difficile accès.

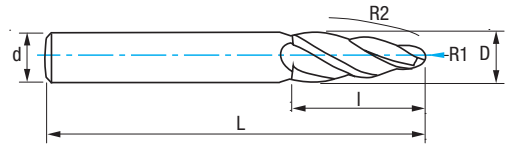


Ref. **9455**

FRESA METAL DURO CÓNICA REDONDEADA 2 RADIOS

2-Radius Tapered Ball Nose Carbide End Mill

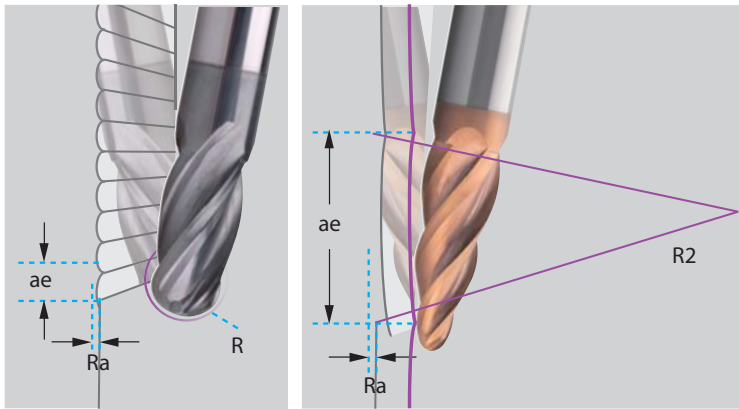
Fraise carbure conique 2 rayons



| | | | | | | |
|-------------------------------------|------------|--------------|--|-------|--|----------------|
| MD/HM Carbure Grano UF | SUA | IZAR Std. | | 3-4 Z | | DIN 6535 HA |
|-------------------------------------|------------|--------------|--|-------|--|----------------|

Fresa estándar
Standard End Mill - Fraise standard

Ref. **9455**



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) Feed - Pas | |
|----------|------|------------|--------------------------------------|-------|
| Grupo | Sub. | | D=8 | D=10 |
| P | P.1 | 375 | 0,025 | 0,030 |
| | P.2 | 320 | 0,025 | 0,030 |
| | P.3 | 300 | 0,016 | 0,020 |
| | P.4 | 265 | 0,016 | 0,020 |
| | P.5 | 130 | 0,032 | 0,040 |
| K | K.1 | 250 | 0,024 | 0,030 |
| | K.2 | 200 | 0,024 | 0,030 |
| S | | 80 | 0,032 | 0,030 |
| N | N.1 | 260 | 0,024 | 0,030 |
| | N.3 | 500 | 0,032 | 0,040 |
| H | | 110 | 0,032 | 0,040 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

$$K = 1$$

Coefficiente corrección
Correction coefficient
Coefficient correction

| D | R1 | R2 | I | L | d | Z | Nº Art. SUA | € |
|-------|------|----|----|----|-------|---|-------------|--------|
| 8,00 | 1,00 | 90 | 25 | 75 | 8,00 | 3 | 79389 | 119,36 |
| 10,00 | 2,00 | 85 | 25 | 75 | 10,00 | 4 | 79391 | 131,91 |

DIN 6535 HB
Bajo demanda / upon request / sur demande



- Manteniendo la misma **rugosidad superficial (Ra)**, con la fresa 9455 conseguimos una mayor altura de trabajo (ae), avanzando en el mecanizado hasta 10 veces más rápido que con una fresa de cabeza esférica convencional usada habitualmente en este tipo de trabajos.
- Geometría especial tipo barril con muy bajas vibraciones en el mecanizado. Alta eficiencia en acabados.
- Especial para acabados redondeados tanto internos como externos, como por ejemplo juntas de tubos de combustible en la industria de la aviación.
- Adecuado para máquinas CNC de 5 ejes para cuyo programa facilitamos los perfiles de las fresas en formato .dxf (CAD-CAM).
- Keeping the same **surface roughness (Ra)**. Our ref. 9455 end mill increases the working height (ae) at a constant roughness value. Up to 10 times faster than a conventional ball nose end mill.
- Special barrel geometry for low-vibration machining. High efficiency finishing.
- Finishing of the round inner and outer contours; for instance flanges of fuel pipes in aviation industry.
- Suitable for 5-Axis machining. Profiles of the end mills are available in .dxf format (CAD-CAM).
- Avec la même **rugosité de surface (Ra)**, avec la fraise 9455, nous obtenons une plus grande hauteur de travail (ae), en avançant dans l'usinage jusqu'à 10 fois plus vite qu'avec une fraise hémisphérique conventionnelle couramment utilisée dans ce type de travail.
- Géométrie spécial tonneau avec très faibles vibrations quand usinage. Haute efficacité dans les finitions.
- Spécial pour finitions arrondies internes et aussi externes, telles que par exemple joints de tubes de carburant dans l'industrie de l'aviation.
- Valide pour machines 5-axes. Profils des fraises disponibles en format .dxf (CAD-CAM).

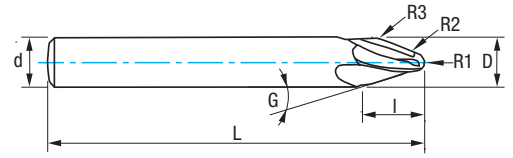


Ref. **9457**

FRESA METAL DURO CÓNICA REDONDEADA 3 RADIOS

3-Radius Tapered Ball Nose Carbide End Mill

Fraise carbure conique 3 rayons



| | | | | | |
|-------------------------------------|-----|--|-----|--------------|----------------|
| MD/HM Carbure Grano UF | SUA | | 3 Z | IZAR Std. | DIN 6535 HA |
|-------------------------------------|-----|--|-----|--------------|----------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | |
|----------|------|------------|-------------------------------------|-------|
| Grupo | Sub. | SUA | D=8 | D=10 |
| P | P.1 | 375 | 0,028 | 0,035 |
| | P.2 | 320 | 0,028 | 0,035 |
| | P.3 | 300 | 0,028 | 0,025 |
| | P.4 | 265 | 0,028 | 0,025 |
| | P.5 | 130 | 0,032 | 0,035 |
| K | K.1 | 250 | 0,048 | 0,050 |
| | K.2 | 200 | 0,032 | 0,040 |
| S | | 80 | 0,024 | 0,030 |
| N | N.1 | 260 | 0,032 | 0,045 |
| | N.3 | 500 | 0,024 | 0,035 |
| H | | 110 | 0,040 | 0,035 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

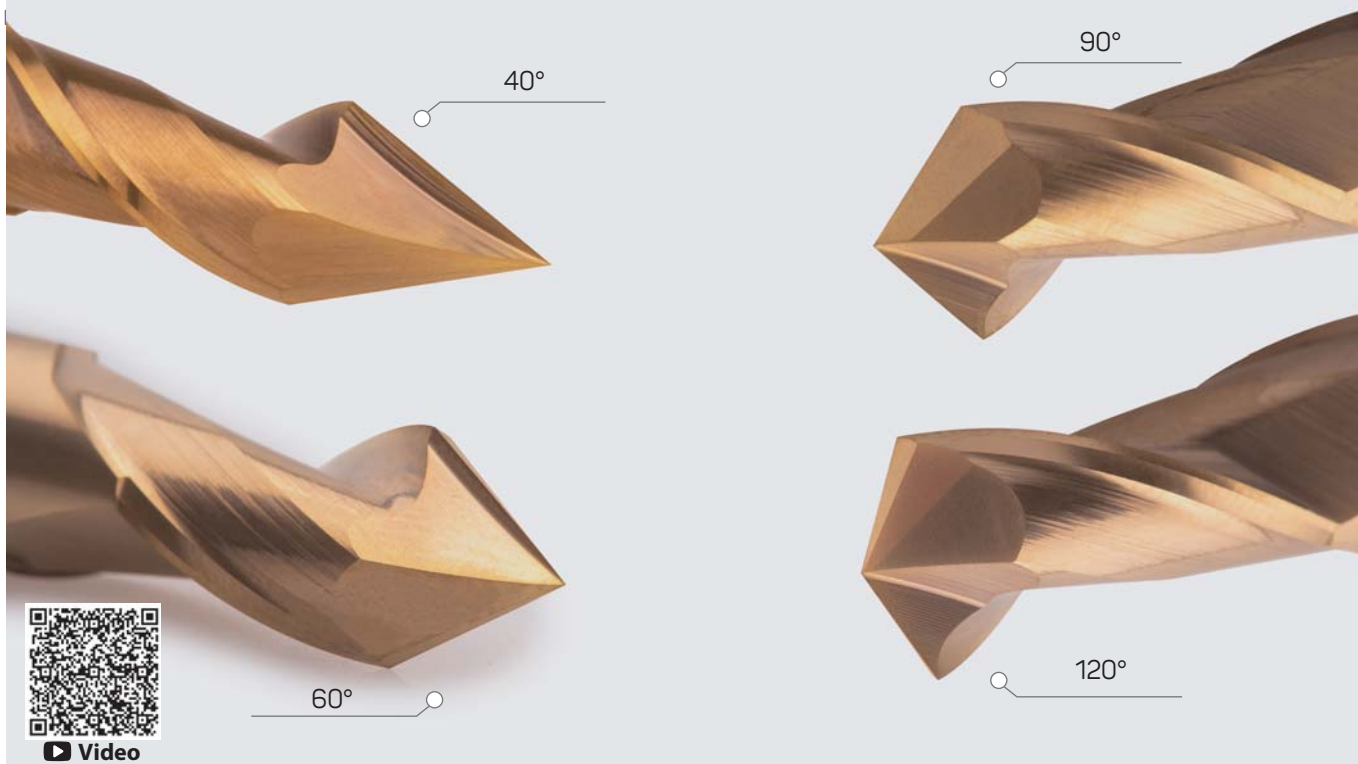
| D | d | R1 | R2 | R3 | G | I | L | Z | Nº Art. SUA | € |
|-------|-------|------|-----|----|----|-------|----|---|-------------|--------|
| 8,00 | 8,00 | 1,50 | 250 | 4 | 20 | 10,50 | 75 | 3 | 79392 | 119,36 |
| 10,00 | 10,00 | 2,00 | 250 | 5 | 20 | 12,50 | 75 | 3 | 79394 | 131,91 |



DIN 6535 HB
Bajo demanda / upon request / sur demande

- Geometría especial tipo barril con muy bajas vibraciones en el mecanizado. Alta eficiencia en acabados.
- Válido para acabados en alta velocidad en todo tipo de materiales.
- Adecuado para máquinas CNC de 5 ejes para cuyo programa facilitamos los perfiles de las fresas en formato .dxf (CAD-CAM).
- Special barrel geometry for low-vibration machining. High efficiency finishing.
- Suitable for High Speed Finishing in almost all kind of materials.
- Suitable for 5-Axis machining. Profiles of the end mills are available in .dxf format (CAD-CAM).
- Géométrie spécial tonneau avec très faibles vibrations quand usinage. Haute efficacité dans les finitions.
- Spécial pour finitions arrondies internes et aussi externes, telles que par exemple joints de tubes de carburant dans l'industrie de l'aviation.
- Valide pour machines 5-axes. Profils des fraises disponibles en format .dxf (CAD-CAM).

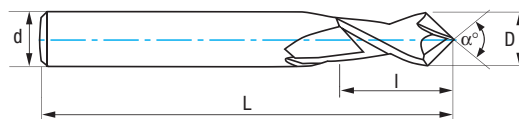




Video

Ref. **9450**

FRESA METAL DURO MULTIFUNCIÓN PUNTA V
 V-Point Multifunction Carbide End Mill
 Fraise carbure multifonction-V



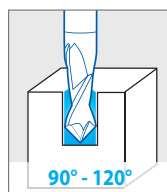
| | | | | | | | | |
|-------------------------------------|------------|--------------|--|-----|--|----------------|---------------------------|--------------------------|
| MD/HM Carbure Grano UF | SUA | IZAR Std. | | 2 Z | | DIN 6535 HA | Tol. 3-10mm 0/-0,03 | Tol. >10mm 0/-0,04 |
|-------------------------------------|------------|--------------|--|-----|--|----------------|---------------------------|--------------------------|

| Material | | Vc (m/min) | Vf Vertical (mm/min) | | | | | | Vf Horizontal (mm/min) | | | | | |
|----------|------|------------|----------------------|-----|-----|-----|------|------|------------------------|-----|-----|-----|------|------|
| Grupo | Sub. | | Ø 3 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 3 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| P | P.1 | 60 | 25 | 25 | 25 | 25 | 25 | 25 | 50 | 55 | 60 | 65 | 70 | 70 |
| | P.2 | 60 | 25 | 25 | 25 | 25 | 25 | 25 | 50 | 55 | 60 | 65 | 70 | 70 |
| | P.3 | 50 | 20 | 20 | 20 | 20 | 20 | 20 | 40 | 45 | 50 | 55 | 60 | 60 |
| M | | 40 | 20 | 20 | 20 | 20 | 20 | 20 | 40 | 45 | 50 | 55 | 60 | 60 |
| N | N.6 | 100 | 40 | 40 | 40 | 40 | 40 | 40 | 80 | 85 | 90 | 110 | 110 | 120 |
| | N.7 | 100 | 40 | 40 | 40 | 40 | 40 | 40 | 80 | 85 | 90 | 110 | 110 | 120 |

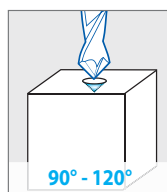
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
 Correction coefficient
 Coefficient correction

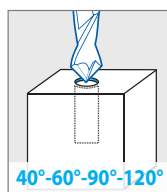
$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$



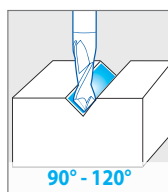
Taladrado
Drilling
Perçage



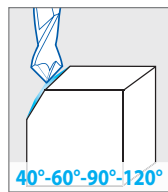
Punteado
Spotting
Pointillage



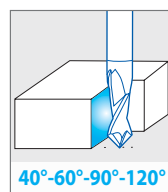
Avellanado
Countersinking
Chanfreinage



Ranurado en V
V Grooving
Rainurage V



Achafanado
Chamfering
Chanfreins
longitudinaux



Fresado lateral
Side milling
Fraisage latéral



Grabado
Engraving
Gravure

9450

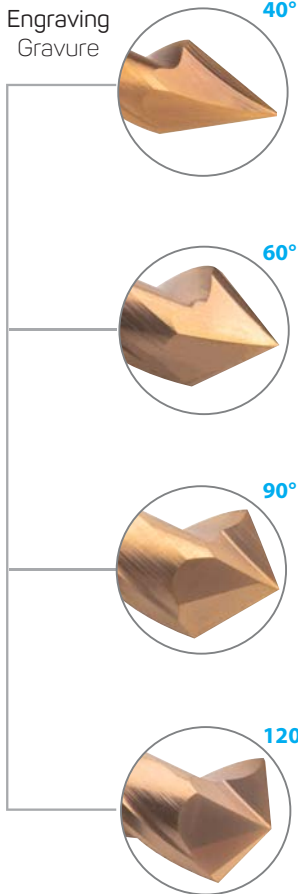
FRESA METAL DURO MULTIFUNCIÓN PUNTA V

V-Point Multifunction Carbide End Mill

Fraise carbure multifonction-V

ESPECIAL GRABADO
Engraving
Gravure

- Afilado de precisión
- High point-geometry accuracy
- Affûtage de précision



| D mm | d mm | L mm | l mm | α° | Z | N° Art. SUA | € |
|--------------------|---------|---------|---------|----------------|---|----------------|--------|
| $\alpha=40^\circ$ | | | | | | | |
| 3,00 | 6,00 | 50 | 6 | 40° | 2 | 82435 | 67,02 |
| 4,00 | 6,00 | 50 | 8 | 40° | 2 | 82436 | 67,02 |
| 5,00 | 6,00 | 50 | 10 | 40° | 2 | 82437 | 73,83 |
| 6,00 | 6,00 | 50 | 12 | 40° | 2 | 82438 | 75,33 |
| 8,00 | 8,00 | 60 | 16 | 40° | 2 | 82439 | 89,68 |
| 10,00 | 10,00 | 75 | 20 | 40° | 2 | 82440 | 132,63 |
| 12,00 | 12,00 | 75 | 24 | 40° | 2 | 82441 | 165,59 |
| $\alpha=60^\circ$ | | | | | | | |
| 3,00 | 6,00 | 50 | 6 | 60° | 2 | 78337 | 67,02 |
| 4,00 | 6,00 | 50 | 8 | 60° | 2 | 78339 | 67,02 |
| 5,00 | 6,00 | 50 | 10 | 60° | 2 | 78340 | 73,83 |
| 6,00 | 6,00 | 50 | 12 | 60° | 2 | 78341 | 75,33 |
| 8,00 | 8,00 | 60 | 16 | 60° | 2 | 78342 | 89,68 |
| 10,00 | 10,00 | 75 | 20 | 60° | 2 | 78343 | 132,63 |
| 12,00 | 12,00 | 75 | 24 | 60° | 2 | 78344 | 165,59 |
| $\alpha=90^\circ$ | | | | | | | |
| 3,00 | 6,00 | 50 | 6 | 90° | 2 | 78345 | 67,02 |
| 4,00 | 6,00 | 50 | 8 | 90° | 2 | 78346 | 67,02 |
| 5,00 | 6,00 | 50 | 10 | 90° | 2 | 78347 | 73,83 |
| 6,00 | 6,00 | 50 | 12 | 90° | 2 | 78348 | 75,33 |
| 8,00 | 8,00 | 60 | 16 | 90° | 2 | 78349 | 89,68 |
| 10,00 | 10,00 | 75 | 20 | 90° | 2 | 78350 | 132,63 |
| 12,00 | 12,00 | 75 | 24 | 90° | 2 | 78351 | 165,59 |
| $\alpha=120^\circ$ | | | | | | | |
| 3,00 | 6,00 | 50 | 6 | 120° | 2 | 78352 | 67,02 |
| 4,00 | 6,00 | 50 | 8 | 120° | 2 | 78353 | 67,02 |
| 5,00 | 6,00 | 50 | 10 | 120° | 2 | 78354 | 73,83 |
| 6,00 | 6,00 | 50 | 12 | 120° | 2 | 78355 | 75,33 |
| 8,00 | 8,00 | 60 | 16 | 120° | 2 | 78356 | 89,68 |
| 10,00 | 10,00 | 75 | 20 | 120° | 2 | 78357 | 132,63 |
| 12,00 | 12,00 | 75 | 24 | 120° | 2 | 78358 | 165,59 |



 **DIN 6335 HB**
Bajo demanda / upon request / sur demande



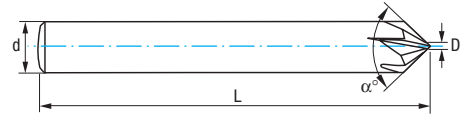
3 Pcs

| Cont. | N° Art. SUA | € |
|-----------------------------------|----------------|--------|
| 6 mm 60° 6 mm 90° 6 mm 120° | 80509 | 214,69 |

Set Price!

Ref. **9451**

FRESA METAL DURO ACHAFLANADO
Chamfer Carbide End Mill
Fraise carbure chanfreinage



| | | | | | |
|---------------------------------------|---------------|--------------|--|-------|----------------|
| MD/HM Carbure Micrograno | TIALCN | IZAR Std. | | 4-6 Z | DIN 6535 HA |
|---------------------------------------|---------------|--------------|--|-------|----------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | | | | | | |
|----------|------|------------|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Grupo | Sub. | TIALCN | Ø 4 | | | Ø 6 | | | Ø 8 | | | Ø 10 | | | Ø 12 | | |
| | | | fz(mm) | ap(mm) | ae(mm) | fz(mm) | ap(mm) | ae(mm) | fz(mm) | ap(mm) | ae(mm) | fz(mm) | ap(mm) | ae(mm) | fz(mm) | ap(mm) | ae(mm) |
| P | P.2 | 80-230 | 0,040 | 0,200 | 0,200 | 0,040 | 0,300 | 0,300 | 0,050 | 0,400 | 0,400 | 0,060 | 0,500 | 0,500 | 0,070 | 0,600 | 0,600 |
| | P.3 | 60-180 | 0,040 | 0,200 | 0,200 | 0,040 | 0,300 | 0,300 | 0,050 | 0,400 | 0,400 | 0,060 | 0,500 | 0,500 | 0,070 | 0,600 | 0,600 |
| M | | 45-140 | 0,040 | 0,200 | 0,200 | 0,040 | 0,300 | 0,300 | 0,050 | 0,400 | 0,400 | 0,060 | 0,500 | 0,500 | 0,070 | 0,600 | 0,600 |
| H | | 25-30 | 0,040 | 0,200 | 0,200 | 0,040 | 0,300 | 0,300 | 0,050 | 0,400 | 0,400 | 0,060 | 0,500 | 0,500 | 0,070 | 0,600 | 0,600 |

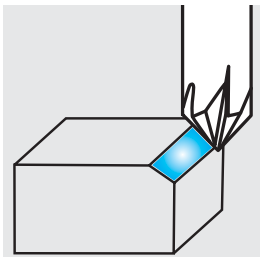
$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

Para mecanizado a dos caras como en ranuras, reducimos el avance hasta un 30%
For double side machining, like in slots, please reduce the feed up to 30%
Pour usinage à double face, on réduit l'avance jusqu'au 30%

Para mecanizado vertical tipo taladrado, reducimos el avance hasta un 40%
For vertical machining like drilling, please reduce the feed up to 40%
Pour usage vertical type perçage, on réduit l'avance jusqu'au 40%



| d mm | D mm | L mm | α ° | Z | N° Art. TIALCN | € |
|-------|------|------|-----|---|----------------|-------|
| 4,00 | 0,50 | 50 | 90 | 4 | 80557 | 28,75 |
| 6,00 | 1,00 | 60 | 90 | 4 | 80562 | 28,75 |
| 8,00 | 1,50 | 60 | 90 | 5 | 80563 | 42,98 |
| 10,00 | 1,50 | 75 | 90 | 6 | 80564 | 57,67 |
| 12,00 | 2,00 | 75 | 90 | 6 | 80565 | 76,97 |



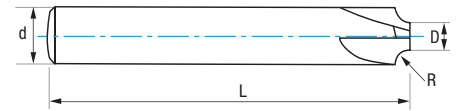
DIN 6535 HB
Bajo demanda / upon request / sur demande

- El diseño específico para achaflanado asegura el mejor acabado posible para este tipo de mecanizado, superior a otras soluciones como pueden ser plaquitas u otro tipo de fresas multifunción o punteado.
- Recubrimiento y pulidos especiales que reducen el coeficiente de fricción y aumentan la vida de la herramienta.
- The specific chamfering design ensures the best possible surface finishing quality, much superior than other options like carbide inserts or other multipurpose end mills.
- Special coating and polishing which reduces the friction coefficient, improving the performance and tool life.
- Le design spécifique pour chanfreinage assure la meilleure finition possible pour ce type de usinage, supérieur à des autres solutions comme les Plaquettes ou autre type de fraises multifonction.
- Revêtements et polissages spéciaux qui réduisent le coefficient de friction et augmentent la vie utile de l'outil.



Ref. **9454**

FRESA METAL DURO 4Z 1/4 RADIO
 1/4 Corner Radius 4Z Carbide End Mill
 Fraise carbure 4Z 1/4 de cercle concave



| | | | | | |
|---------------------------|--------|--------------|-----|--|----------------|
| MD/HM/Carbure Grano UF | TIALCN | IZAR Std. | 4 Z | | DIN 6535 HA |
|---------------------------|--------|--------------|-----|--|----------------|

Refs. 9454 - 9452 - Materiales y condiciones de corte / Materials and Cutting conditions / Matériaux et conditions de coupe

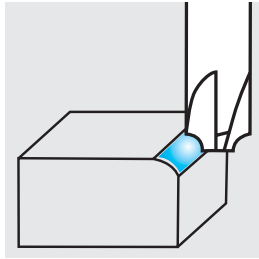
| Material | R0,50 | | | R1,00 | | | R1,50 | | | R2,00 | | | R2,50 | | | R3,00 | | | R4,00 | | | R5,00 | | | R6,00 | | |
|----------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|-------|----------------------|------------------------|
| | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition | RPM | Desb. Rough. Ébauch. | Acab. Finish. Finition |
| P.1 | 8800 | 50 | 80 | 5000 | 50 | 80 | 3000 | 50 | 80 | 2600 | 50 | 80 | 2200 | 50 | 80 | 2000 | 50 | 80 | 1500 | 50 | 80 | 1300 | 50 | 80 | 1200 | 50 | 80 |
| P.3 | 6400 | 40 | 55 | 3500 | 40 | 55 | 2200 | 40 | 55 | 1900 | 40 | 55 | 1800 | 40 | 55 | 1600 | 40 | 55 | 1200 | 40 | 55 | 960 | 40 | 55 | 880 | 40 | 55 |
| P.4 | 5100 | 30 | 50 | 3400 | 30 | 50 | 2600 | 30 | 50 | 2200 | 30 | 50 | 2000 | 30 | 50 | 1700 | 30 | 50 | 1300 | 30 | 50 | 1000 | 30 | 50 | 900 | 30 | 50 |

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
 Correction coefficient
 Coéfficient correction

$$V_f (mm/min.) = r.p.m. \times Z \times f_z \times K$$

| R mm | D mm | d mm | L mm | Z | N° Art. TIALCN | € |
|------|------|-------|------|---|----------------|--------|
| 0,50 | 4,90 | 6,00 | 50 | 4 | 78621 | 57,36 |
| 1,00 | 5,90 | 8,00 | 60 | 4 | 78622 | 79,33 |
| 1,50 | 4,90 | 8,00 | 60 | 4 | 78623 | 79,33 |
| 2,00 | 5,90 | 10,00 | 75 | 4 | 78625 | 111,59 |
| 2,50 | 4,90 | 10,00 | 75 | 4 | 78626 | 111,59 |
| 3,00 | 5,90 | 12,00 | 75 | 4 | 78627 | 138,33 |
| 4,00 | 3,90 | 12,00 | 75 | 4 | 78628 | 138,33 |
| 5,00 | 5,90 | 16,00 | 75 | 4 | 78629 | 184,25 |
| 6,00 | 3,90 | 16,00 | 75 | 4 | 78630 | 184,25 |



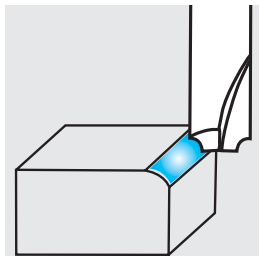
DIN 6535 HB
 Bajo demanda / upon request / sur demande

Ref. **9452**

FRESA METAL DURO 2Z 1/4 RADIO
 1/4 Corner Radius 2Z Carbide End Mill
 Fraise carbure 2Z 1/4 de cercle concave



| | | | | | |
|---------------------------|--------|--------------|-----|--|----------------|
| MD/HM/Carbure Grano UF | TIALCN | IZAR Std. | 2 Z | | DIN 6535 HA |
|---------------------------|--------|--------------|-----|--|----------------|



| R mm | D mm | d mm | L mm | Z | N° Art. TIALCN | € |
|------|------|-------|------|---|----------------|--------|
| 0,50 | 2,90 | 4,00 | 50 | 2 | 79566 | 54,66 |
| 0,50 | 4,90 | 6,00 | 50 | 2 | 78600 | 54,66 |
| 1,00 | 1,90 | 4,00 | 50 | 2 | 79569 | 54,66 |
| 1,00 | 3,90 | 6,00 | 50 | 2 | 79570 | 54,66 |
| 1,00 | 5,90 | 8,00 | 60 | 2 | 78601 | 75,28 |
| 1,50 | 4,90 | 8,00 | 60 | 2 | 78602 | 75,28 |
| 2,00 | 5,90 | 10,00 | 75 | 2 | 78603 | 105,32 |
| 2,50 | 4,90 | 10,00 | 75 | 2 | 78605 | 105,32 |
| 3,00 | 5,90 | 12,00 | 75 | 2 | 78607 | 131,87 |
| 4,00 | 3,90 | 12,00 | 75 | 2 | 78609 | 131,87 |
| 5,00 | 5,90 | 16,00 | 75 | 2 | 78618 | 175,29 |
| 6,00 | 3,90 | 16,00 | 75 | 2 | 78619 | 175,29 |

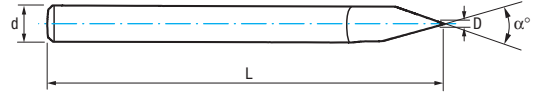


DIN 6535 HB
 Bajo demanda / upon request / sur demande

Ref. **9459**

FRESA METAL DURO 1Z GRABADO

1Z Engraving Carbide End Mill
Fraise carbure 1Z gravure

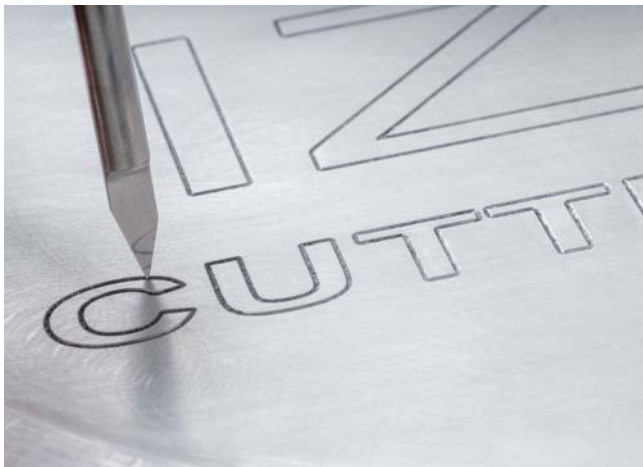


| | | | | |
|---------------------------------------|----------------|----|--------------|--------------------------|
| MD/HM Carbure Micrograno | DIN 6535 HA | 1Z | IZAR Std. | 6000- 10000 r.p.m. |
|---------------------------------------|----------------|----|--------------|--------------------------|



| D mm | d mm | L mm | N° Art. MD/HM | € | D mm | d mm | L mm | N° Art. MD/HM | € | D mm | d mm | L mm | N° Art. MD/HM | € | D mm | d mm | L mm | N° Art. MD/HM | € |
|-------------------|------|------|---------------|------|-------------------|------|------|---------------|-------|-------------------|------|------|---------------|-------|-------------------|------|------|---------------|-------|
| $\alpha=30^\circ$ | | | | | $\alpha=45^\circ$ | | | | | $\alpha=60^\circ$ | | | | | $\alpha=90^\circ$ | | | | |
| 0,10 | 3,00 | 38 | 81048 | 8,54 | 0,10 | 3,00 | 38 | 81052 | 8,54 | 0,10 | 3,00 | 38 | 81055 | 8,54 | 0,10 | 3,00 | 38 | 81058 | 8,54 |
| 0,20 | 3,00 | 38 | 81049 | 8,54 | 0,20 | 3,00 | 38 | 81053 | 8,54 | 0,20 | 3,00 | 38 | 81056 | 8,54 | 0,20 | 3,00 | 38 | 81059 | 8,54 |
| 0,40 | 3,00 | 38 | 81050 | 8,54 | 0,20 | 4,00 | 45 | 81062 | 11,29 | 0,20 | 4,00 | 45 | 81065 | 11,29 | 0,20 | 4,00 | 45 | 81068 | 11,29 |
| 0,80 | 3,00 | 38 | 81051 | 8,54 | 0,20 | 6,00 | 50 | 81071 | 18,05 | 0,20 | 6,00 | 50 | 81080 | 18,05 | 0,20 | 6,00 | 50 | 81084 | 18,05 |
| | | | | | 0,40 | 3,00 | 38 | 81054 | 8,54 | 0,40 | 3,00 | 38 | 81057 | 8,54 | 0,40 | 3,00 | 38 | 81060 | 8,54 |
| | | | | | 0,40 | 4,00 | 45 | 81063 | 11,29 | 0,40 | 4,00 | 45 | 81066 | 11,29 | 0,40 | 4,00 | 45 | 81069 | 11,29 |
| | | | | | 0,40 | 6,00 | 50 | 81072 | 18,05 | 0,40 | 6,00 | 50 | 81081 | 18,05 | 0,40 | 6,00 | 50 | 81086 | 18,05 |
| | | | | | 0,80 | 4,00 | 45 | 81064 | 11,29 | 0,80 | 4,00 | 45 | 81067 | 11,29 | 0,80 | 4,00 | 45 | 81070 | 11,29 |
| | | | | | 0,80 | 6,00 | 50 | 81077 | 18,05 | 0,80 | 6,00 | 50 | 81082 | 18,05 | 0,80 | 6,00 | 50 | 81088 | 18,05 |
| | | | | | 2,00 | 6,00 | 50 | 81079 | 18,05 | 2,00 | 6,00 | 50 | 81083 | 18,05 | 2,00 | 6,00 | 50 | 81089 | 18,05 |

ALTIN bajo demanda / upon request / sur demande



4 Pcs

| Cont. Ø | N° Art. MD/HM | € |
|------------|---------------|-------|
| 0,1 mm 30° | 81958 | 32,49 |
| 0,2 mm 30° | | |
| 0,4 mm 30° | | |
| 0,8 mm 30° | | |

4 Pcs

| Cont. Ø | N° Art. MD/HM | € |
|------------|---------------|-------|
| 0,1 mm 30° | 81959 | 32,49 |
| 0,1 mm 45° | | |
| 0,1 mm 60° | | |
| 0,1 mm 90° | | |

- **Afilado especial para grabado de metales, plásticos y maderas como: Aluminio, Cobre, Hierro, PVC, ABS, Metacrilato acrílico, Paneles bicolors, Madera MDF, etc.**
- **Specially designed geometry for engraving on Metal, Plastic and Wood. Valid for Aluminium, Copper, Iron, PVC, ABS, Acrylic, Bi-color panel, MDF fibreboard, etc.**
- **Géométrie spécial pour gravure de métaux, plastiques et bois telles que: Aluminium, cuivre, fer, PVC, ABS, méthacrylate acrylique, panneaux bicolors, bois MDF, etc.**





POLIMEROS REFORZADOS CON FIBRAS

Fibra de Carbono (CFRP) - Fibra de Vidrio (GFRP)

Estructuras de panal

FIBER REINFORCED POLYMERS

Carbon Fiber (CFRP) - Fiberglass (GFRP)

Honeycomb materials

POLYMÈRES DE FIBRES RENFORCÉS

Fibre de carbone (CFRP) - Fibre de verre (GFRP)

Matériaux en structure nid d'abeilles



Ref. 9281

Ref. 9282

Ref. 9283

Los materiales compuestos se forman de al menos dos materiales que combinándolos se obtienen propiedades mecánicas deseadas para multitud de aplicaciones en automoción, en la industria aeroespacial, generación de energía o en material deportivo por ejemplo. Uno de los componentes hará de cohesión y el otro será el material de refuerzo, como pueden ser fibras sintéticas de vidrio o carbono. Esta combinación produce materiales abrasivos que requieren ser mecanizados con fresas de geometrías y recubrimientos especiales que presentamos en esta gama. El acabado final de estas superficies mecanizadas es un factor clave en el diseño de estas fresas, debido a fenómenos típicos de estos materiales, como la delaminación.

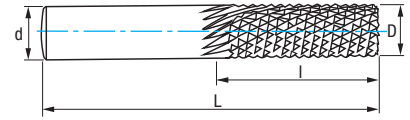
Composite materials are formed by at least two elements that when combined provide unique mechanical properties for a number of different applications in several industries like automotive, aerospace, power generation or sports equipment. One of the elements acts as the binding agent that form the structure and the other material acts as the reinforcement. This combination produces very abrasive materials which require end mills with special geometries and coatings that we include in this new range. The surface finishing quality is a key factor in these fiber-reinforced composites due to common problems such as delamination, burring or uncut fibers.

Les matériaux composites sont formés d'au moins deux éléments qui, lorsqu'ils sont combinés, offrent des propriétés mécaniques uniques pour un certain nombre d'applications différentes dans plusieurs secteurs comme l'automobile, l'aérospatiale, la production d'énergie ou les équipements sportifs. Un des éléments agit comme un liant qui forme la structure tandis que l'autre matériau agit comme renfort. Cette combinaison produit des matériaux très abrasifs qui nécessitent des fraises à géométrie spéciale et des revêtements spécifiques, que nous incluons dans cette nouvelle gamme. La qualité de la finition de la surface est un facteur clé dans ces composites renforcés de fibres, en raison de problèmes courants tels que la delamination, l'ébarbage ou les fibres non coupées.

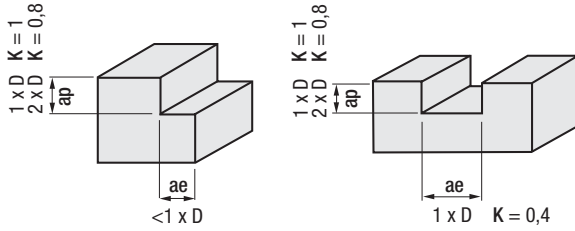
Ref. **9280**

FRESA METAL DURO COMPOSITES

Composites Carbide End Mill
Fraise lime carbure composites



| | | |
|---------------------------------------|--------------|----------------|
| MD/HM Carbure Micrograno | IZAR Std. | DIN 6535 HA |
|---------------------------------------|--------------|----------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | MD/HM | Ø 3 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| F | | 80-150 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéficent correction

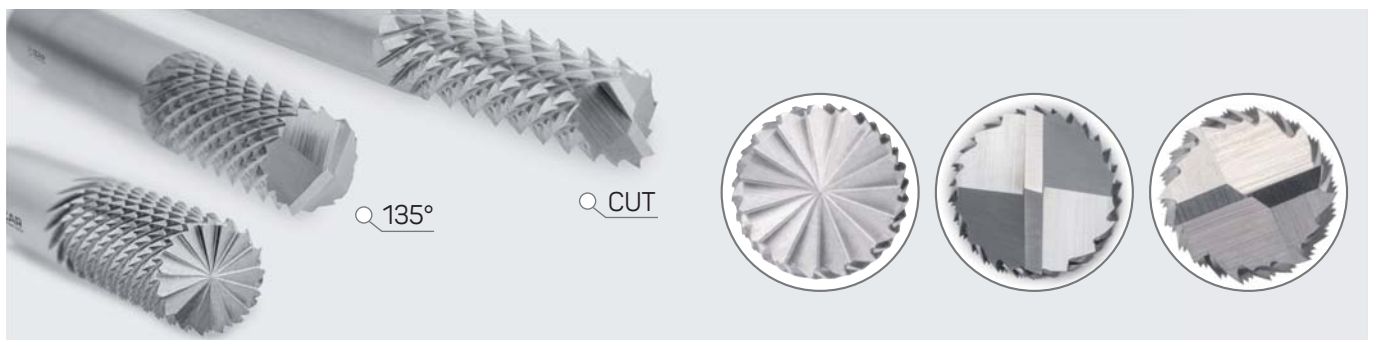
New!

- 135°**
Canted / Edging / Bordure
- 135°**
Taladrado / Drilling / Perçage
- CUT**
Escuadrado / Ranurado / Squaring/Slotting / Carrelage / Rainurage

| D mm | d mm | L mm | l mm | Z | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € |
|------------------|-------|------|-------|----|---------------|-------|---------------|-------|---------------|-------|
| New! 1,60 | 3,00 | 38 | 5,00 | 5 | 20386 | 8,87 | 20391 | 10,38 | 20399 | 10,38 |
| New! 2,40 | 3,00 | 38 | 9,50 | 5 | 20387 | 8,87 | 20393 | 10,38 | 20400 | 10,38 |
| | 3,00 | 38 | 12,00 | 7 | 55883 | 8,87 | 82797 | 10,38 | 20401 | 10,38 |
| New! 4,00 | 4,00 | 50 | 16,00 | 8 | 20390 | 16,32 | 20394 | 18,18 | 20402 | 18,18 |
| | 6,00 | 63 | 19,00 | 10 | 55884 | 17,91 | 82798 | 19,83 | 20404 | 19,83 |
| | 8,00 | 63 | 25,00 | 12 | 82750 | 36,11 | 82799 | 38,32 | 20405 | 38,32 |
| | 10,00 | 63 | 25,00 | 14 | 55886 | 42,01 | 82800 | 44,47 | 20407 | 44,47 |
| | 12,00 | 75 | 30,00 | 17 | 55885 | 62,92 | 82801 | 64,37 | 20408 | 64,37 |



- **Válido para recantados manuales y CNCs.** • Both for hand-machines and CNCs.
- **Diseñado para un amplio abanico de materiales compuestos incluyendo fibras de vidrio o paneles fenólicos.** • Designed for a wide range of composites, including fiberglass and phenolic panels.
- **À la fois pour les machines à main et pour les CNC.**
- **Conçu pour une large gamme de composites, y compris la fibre de verre et les panneaux phénoliques.**

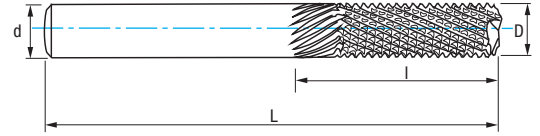


Ref. **9281**

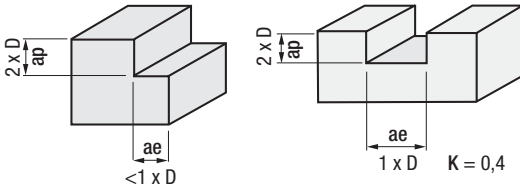
FRESA METAL DURO DESBASTE FIBRA DE CARBONO / VIDRIO

Roughing Carbide End Mill for Carbon Fiber / Fiberglass

Fraise ébauche carbure fibre carbone / verre



| | | | |
|--|---------------|--------------|----------------|
| MD/HM Carbure Micrograno ⁺ | DIAMAX | IZAR Std. | DIN 6535 HA |
|--|---------------|--------------|----------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | |
|----------|-------|------------|-------------------------------------|-------|-------|-------|-------|
| Grupo | Sub. | DIAMAX | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| F | CFRP* | 140-280 | 0,015 | 0,020 | 0,030 | 0,030 | 0,035 |
| | GFRP* | 120-200 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 |

* **CFRP:** Polímero reforzado de Fibra de Carbono
Carbon Fiber Reinforced Polymer / Polymère renforcé de fibres de carbone

* **GFRP:** Polímero reforzado de Fibra de Vidrio
Glass fiber reinforced polymer / Polymère renforcé de fibres de verre

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

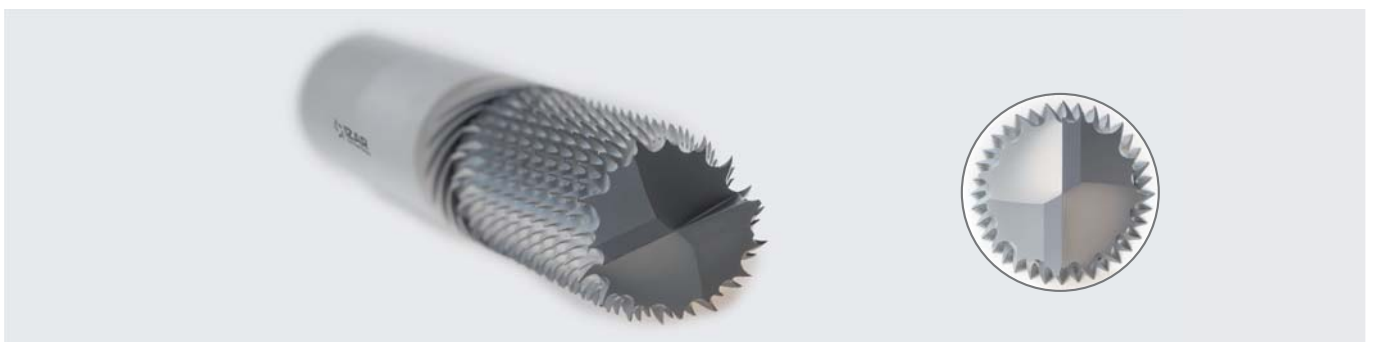
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf \text{ (mm/min.)} = r.p.m. \times Z \times fz \times K$$

| D | d | L | l | Z | Nº Art. DIAMAX | € |
|--------------|-------|-----|----|----|----------------|---------------|
| 3,00 | 6,00 | 60 | 9 | 7 | 25941 | 93,03 |
| 4,00 | 6,00 | 60 | 12 | 8 | 82758 | 93,03 |
| 6,00 | 6,00 | 60 | 18 | 11 | 81928 | 93,03 |
| 8,00 | 8,00 | 60 | 24 | 14 | 81930 | 123,28 |
| 10,00 | 10,00 | 75 | 30 | 16 | 81932 | 157,26 |
| 12,00 | 12,00 | 100 | 36 | 17 | 81934 | 195,80 |



- **Diseñado para desbaste en CFRP/GFRP.**
- **Recubrimiento especial DIAMAX, con un espesor extra de diamante nanocristalino.**
- **Special design for CFRP/GFRP rough milling.**
- **Special DIAMAX thick-layer diamond coating for extremely long tool life.**
- **Conception spéciale pour le fraisage primaire des CFRP/GFRP.**
- **Revêtement diamanté spécial DIAMAX en couche épaisse pour une très longue durée de vie des outils.**



Ref. **9282**

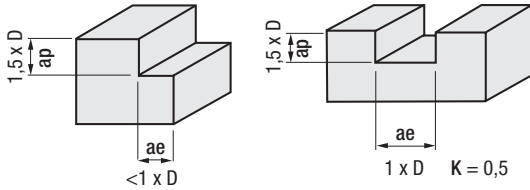
FRESA METAL DURO ACABADO FIBRA DE CARBONO / VIDRIO

Finishing Carbide End Mill for for Carbon Fiber / Fiberglass

Fraise finition carbure fibre carbone / verre



| | | | | | |
|--|---------------|--------------|-------|----------------|--|
| MD/HM Carbure Micrograno ⁺ | DIAMAX | IZAR Std. | 6-8 Z | DIN 6535 HA | |
|--|---------------|--------------|-------|----------------|--|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|-------|------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | DIAMAX | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| F | CFRP* | 160-220 | 0,020 | 0,030 | 0,030 | 0,035 |
| | GFRP* | 100-160 | 0,020 | 0,030 | 0,030 | 0,035 |

* CFRP: Polímero reforzado de Fibra de Carbono
Carbon Fiber Reinforced Polymer / Polymère renforcé de fibres de carbone

* GFRP: Polímero reforzado de Fibra de Vidrio
Glass fiber reinforced polymer / Polymère renforcé de fibres de verre

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times f \times K$$

| D mm | d mm | L mm | l mm | Z | Nº Art. DIAMAX | € |
|-------|-------|------|------|---|----------------|--------|
| 6,00 | 6,00 | 60 | 15 | 6 | 81936 | 111,69 |
| 8,00 | 8,00 | 60 | 20 | 6 | 81938 | 147,93 |
| 10,00 | 10,00 | 75 | 25 | 8 | 81940 | 189,03 |
| 12,00 | 12,00 | 100 | 30 | 8 | 81942 | 235,34 |



- **Diseño especial para acabados limpios.**
- **Se requiere menos fuerza de mecanizado, alargando notablemente la vida útil de la herramienta.**
- **Con esta fresa se consiguen evitar problemas típicos de los materiales compuestos de fibras, como pueden ser la delaminación, la rebaba o las fibras sueltas sin cortar.**
- **Excelentes resultados en paneles fenólicos.**
- **Unique geometry provide the best surface finish.**
- **Less cutting force required, resulting in a very long tool life.**
- **Avoids typical problems when dealing with fiber composites, which are delamination, burring and uncut fibers.**
- **Excelent results in phenolic panels.**
- **Une géométrie unique pour une meilleure finition de surface.**
- **Moins de force de coupe nécessaire, d'où une très longue durée de vie de l'outil.**
- **Évite les problèmes typiques rencontrés avec les fibres composites, à savoir la délamination, l'ébarbage et les fibres non coupées.**
- **Excellents résultats sur panneaux phénoliques.**

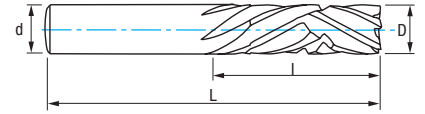


Ref. **9283**

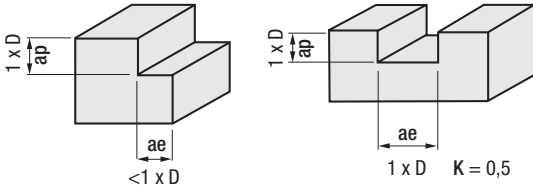
FRESA METAL DURO DE COMPRESIÓN FIBRA DE CARBONO

Compression Carbide End Mill for Carbon Fiber

Fraise à compression carbure pour fibre carbone



| | | | | | |
|--|---------------|--------------|--|-----|----------------|
| MD/HM Carbure Micrograno ⁺ | DIAMAX | IZAR Std. | | 6 Z | DIN 6535 HA |
|--|---------------|--------------|--|-----|----------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|--------------|---------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | DIAMAX | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| F | CFRP* | 160-220 | 0,015 | 0,020 | 0,025 | 0,030 |

* CFRP: Polímero reforzado de Fibra de Carbono
Carbon Fiber Reinforced Polymer
Polymère renforcé de fibres de carbone

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

Reducción de los valores de avance en función del grosor de la pieza:

Feed reduction in accordance with the material thickness:

Réduction du pas en fonction de l'épaisseur du matériau:

Espesor
Thickness
Épaisseur:

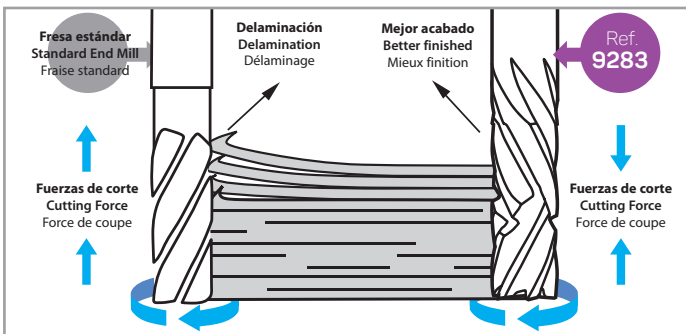
K

≤ 0,5xD → K = 1,50

0,5xD - 1xD → K = 1,20

1xD - 2xD → K = 0,80

3xD - 4xD → K = 0,50



| D | d | L | I | Z | Nº Art. DIAMAX | € |
|-------|-------|----|----|---|----------------|---------------|
| 6,00 | 6,00 | 75 | 30 | 6 | 81944 | 105,92 |
| 8,00 | 8,00 | 75 | 30 | 6 | 81946 | 126,57 |
| 10,00 | 10,00 | 80 | 35 | 6 | 81948 | 153,14 |
| 12,00 | 12,00 | 80 | 35 | 6 | 81950 | 189,51 |

- **Diseño especial para reducir la delaminación.**
- **Esta nueva geometría requiere de menores fuerzas de corte.**
- **Recubrimiento DIAMAX gran espesor especial diamante para una vida de la herramienta extremadamente larga.**
- **Uso alternativo para mecanizar composites tipo panel de abeja aumentando las condiciones de corte x2 aprox.**
- **Special design for reducing delamination.**
- **This new geometry requires less cutting force.**
- **Special DIAMAX thick-layer diamond coating for extremely long tool life.**
- **Alternative use for machining honeycomb-panel-composites increasing cutting conditions approx. x2.**
- **Conception spéciale pour réduire la délaminage.**
- **Cette nouvelle géométrie nécessite moins de force de coupe.**
- **Revêtement diamanté spécial DIAMAX en couche épaisse pour une très longue durée de vie des outils.**
- **Utilisation alternative pour l'usinage de panneaux composites à structure en nid d'abeilles en augmentant par 2 la dimension de la coupe.**



FRESAS ROTATIVAS

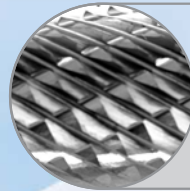
Rotary Burrs

Fraises limes rotatives



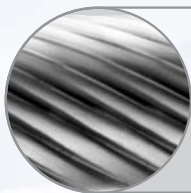
Dentado
Teeth
Denture **1**

MATERIALES NO FERROSOS
Non-Ferrous Materials
Matériaux non ferreux



Dentado
Teeth
Denture **6**

MATERIALES DUROS
Hard Materials
Matériaux Durs



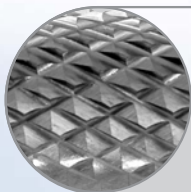
Dentado
Teeth
Denture **3**

USO GENERAL
General Purpose
Utilisation Générale



Dentado
Teeth
Denture **M**

INOXIDABLES
Stainless Steels
Aciers Inox



Dentado
Teeth
Denture **4**

VIRUTA CORTA
Short Chipping
Copeaux Courts



Dentado
Teeth
Denture **S**

TITANIO, INCONEL...
Titanium, Inconel...
Titane, Inconel...



TABLA USO FRESAS ROTATIVAS

Rotary Burrs Use Table

Tableau usage fraises limes rotatives

Recomendaciones Uso:


- Trabajar con las máximas revoluciones, menos en materiales malos conductores del calor, como INOX o Titanio.
- Aplicar un movimiento constante y una ligera presión de la rotativa.
- Es posible modificar las condiciones de la tabla.
- Los materiales duros y las series largas requieren de menos r.p.m. (max. 15.000)
- Dejar que la viruta se caliente mucho por contacto puede causar que se ablande la soldadura y se suelte la cabeza del mango.
- No profundizar la rotativa más de 1/3 de su periferia.
- Usar gafas protectoras para su seguridad.

Suggestions for Use:

- Working with maximum revolutions, except for bad heat-conducting materials, like Stainless Steel or Titanium.
- Employ constant movement and soft pressure.
- It's possible to modify table's conditions.
- Hard materials and long series need less r.p.m. (max. 15.000)
- If you let chipping to heat too much, welding could get softened and shank's head could drop.
- Don't go deeper than 1/3 of burrs' periphery.
- Use protecting glasses for your own security.

Conseils d'utilisation:

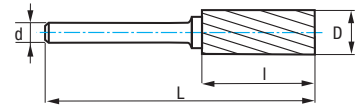
- Travailler aux maximales tours par minute, moins sur des matériaux mauvais conducteurs de la chaleur comme les INOX où les Titans.
- Employer un mouvement constant et une faible pression de la fraise lime.
- C'est possible de modifier les conditions du tableau.
- Les matériaux durs et les séries longues ont besoin de tours par minute inférieurs. (max. 15.000)
- Laisser les copeaux s'échauffer par contact peut provoquer l'amollissement de la soudure et la séparation de la tête de la queue.
- Pas approfondir la fraise lime plus de 1/3 de sa périphérie.
- Travailler toujours avec lunettes de protection.

| Material | | | RPM | Ø 3 mm | Ø 6 mm | Ø 10 mm | Ø 12 mm | Ø 16 mm | Ø 20 mm |
|----------|---|-----|--|--------|--------|---------|---------|---------|---------|
| P |  | P.1 | <850 N/mm ² | 80.000 | 50.000 | 30.000 | 25.000 | 20.000 | 15.000 |
| | | P.2 | < 1000 N/mm ² | 80.000 | 50.000 | 30.000 | 25.000 | 20.000 | 15.000 |
| | | P.3 | 1000-1300 N/mm ² | 80.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| | | P.5 | MARTENSÍTICO Martensitic | 80.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| M | INOX AUSTENÍTICO Austenitic Stainless Steel Aciers Inox Austénitique | | | 80.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| K | FUNDICIÓN Cast Iron Fonte | K.1 | < 700 N/mm ² | 65.000 | 45.000 | 30.000 | 25.000 | 20.000 | 12.000 |
| | | K.2 | 700-1000 N/mm ² | 65.000 | 45.000 | 30.000 | 25.000 | 20.000 | 12.000 |
| S | ALEACIONES TERMORRESISTENTES Heat-Resistant Alloys Alliages résistants à la chaleur | | | 80.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| N | Cu - BRONCE - LATÓN Copper - Bronze - Brass Cuivre - Bronze - Laiton | N.1 | VIRUTA CORTA Short Chip Copeaux Courts | 65.000 | 45.000 | 30.000 | 25.000 | 20.000 | 12.000 |
| | | N.2 | VIRUTA LARGA Long Chip Copeaux Longs | 65.000 | 45.000 | 30.000 | 25.000 | 20.000 | 12.000 |
| | ALUMINIO - MAGNESIO Aluminium - Magnesium | N.3 | NO ALEADO Unalloyed Sans Alliage | 65.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| | | N.4 | < 10% Si | 65.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| | | N.5 | > 10% Si | 65.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| |  | N.6 | TERMOPLÁSTICOS Thermoplastics Thermoplastiques | 65.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |
| | | N.7 | DUROPLÁSTICOS Hard-Plastics Plastiques Durs | 65.000 | 40.000 | 25.000 | 20.000 | 15.000 | 10.000 |

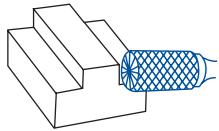
$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

Ref. 9260

FRESA ROTATIVA MD TIPO B
 B Type HM Rotary Burr
 Fraise lime rotative carbure type B



| | | | | |
|-------------------------|-----------------------------------|--------------------------|-------------------------------|--|
| MD/HM Carbure | MD/HM + ALTIN | Tipo B Type | Norma ZYA-S Norm | |
|-------------------------|-----------------------------------|--------------------------|-------------------------------|--|



1
MATERIALES NO FERROSOS
 Non-Ferrous Materials
 Matériaux non ferreux



3
USO GENERAL
 General Purpose
 Utilisation Générale



4
VIRUTA CORTA
 Short Chipping
 Copeaux Courts

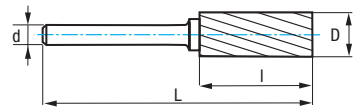


6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs

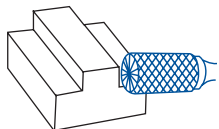
| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 1 ALTIN | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture 6 ALTIN | | | |
|--------------|-------------|---------|---------|--|---------------|--|--------------|--|---------------|--|--------------|--|---------------|--|--------------|------------------|--------------|
| | | | | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € |
| | | | | 3,00 | 3,00 | 38,00 | 14,00 | 55677 | 11,37 | | | 44072 | 10,05 | 44079 | 11,37 | 44086 | 11,00 |
| 6,00 | 6,00 | 50,00 | 18,00 | 55680 | 24,33 | | | 44074 | 21,42 | 44081 | 24,33 | 44141 | 23,59 | 66486 | 31,07 | | |
| 6,30 | 3,00 | 45,00 | 12,70 | 55679 | 19,78 | | | 44073 | 16,95 | 44080 | 19,78 | 44122 | 18,65 | | | | |
| 8,00 | 6,00 | 64,00 | 19,00 | 55681 | 30,69 | | | 44075 | 25,57 | 44082 | 30,69 | 44142 | 28,12 | 66487 | 36,11 | | |
| 9,60 | 6,00 | 64,00 | 19,00 | 44070 | 34,81 | 55864 | 42,12 | 44076 | 29,04 | 44083 | 34,81 | 44143 | 31,92 | 43567 | 38,64 | | |
| 12,70 | 6,00 | 70,00 | 25,00 | 44071 | 46,93 | 55866 | 76,29 | 44077 | 40,75 | 44084 | 48,93 | 44144 | 44,86 | 66488 | 69,99 | | |
| 12,70 | 8,00 | 70,00 | 25,00 | 55691 | 46,95 | | | 55689 | 39,16 | | | 55690 | 43,08 | | | | |
| 16,00 | 6,00 | 70,00 | 25,00 | 55682 | 63,85 | | | 44078 | 53,22 | 44085 | 63,85 | 44145 | 58,52 | | | | |
| 16,00 | 8,00 | 70,00 | 25,00 | 55695 | 59,20 | | | 55692 | 49,36 | | | 55693 | 54,30 | | | | |
| 19,00 | 6,00 | 70,00 | 25,00 | 55685 | 88,04 | | | 55683 | 73,43 | | | 55684 | 80,77 | | | | |
| 25,00 | 6,00 | 70,00 | 25,00 | 55688 | 123,10 | | | 55686 | 102,66 | | | 55687 | 112,93 | | | | |

Ref. 9240

FRESA ROTATIVA MD TIPO B LARGA
 Long B Type HM Rotary Burr
 Fraise lime rotative carbure type B longue



| | | | |
|-------------------------|--------------------------|--|-------------------------------|
| MD/HM Carbure | Tipo B Type | | Norma ZYA-S Norm |
|-------------------------|--------------------------|--|-------------------------------|



3
USO GENERAL
 General Purpose
 Utilisation Générale

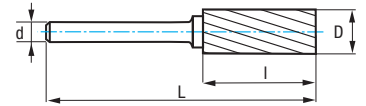


6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs

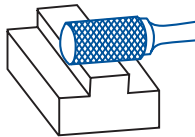
| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 6 | |
|--------------|-------------|---------|---------|--|--------------|--|--------------|
| | | | | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 6,00 | 6,00 | 150,00 | 18,00 | 55832 | 73,04 | 55833 | 80,35 |
| 9,60 | 6,00 | 172,00 | 19,00 | 55834 | 48,96 | 55835 | 53,88 |
| 12,70 | 6,00 | 178,00 | 25,00 | 55836 | 69,31 | 55837 | 76,25 |

Ref. 9250

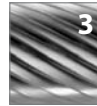
FRESA ROTATIVA MD TIPO A
 A Type HM Rotary Burr
 Fraise lime rotative carbure type A



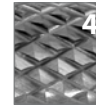
| | | | | |
|-------------------------|-----------------------------------|--------------------------|-----------------------------|--|
| MD/HM Carbure | MD/HM + ALTIN | Tipo A Type | Norma ZYA Norm | |
|-------------------------|-----------------------------------|--------------------------|-----------------------------|--|



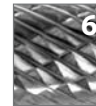
1
MATERIALES NO FERROSOS
 Non-Ferrous Materials
 Matériaux non ferreux



3
USO GENERAL
 General Purpose
 Utilisation Générale



4
VIRUTA CORTA
 Short Chipping
 Copeaux Courts

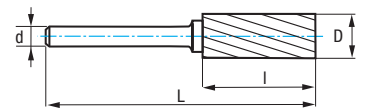


6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs

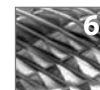
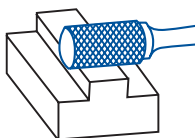
| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 1 ALTIN | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture 6 ALTIN | |
|---------|---------|---------|---------|--|--------|--|-------|--|-------|--|-------|--|--------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € |
| 3,00 | 3,00 | 38,00 | 14,00 | 55644 | 10,38 | | | 44149 | 8,99 | 44156 | 10,38 | 44245 | 9,88 | 66489 | 16,20 |
| 6,00 | 6,00 | 50,00 | 18,00 | 55648 | 22,10 | | | 44151 | 19,36 | 44158 | 22,10 | 44417 | 21,27 | 66490 | 27,95 |
| 6,30 | 3,00 | 45,00 | 12,70 | 55645 | 17,97 | | | 44150 | 15,20 | 44157 | 17,97 | 44301 | 16,73 | | |
| 8,00 | 6,00 | 64,00 | 19,00 | 55651 | 28,19 | | | 44152 | 23,50 | 44159 | 28,19 | 44418 | 25,83 | 66491 | 32,86 |
| 9,60 | 6,00 | 64,00 | 19,00 | 44147 | 31,49 | 55861 | 47,86 | 44153 | 26,26 | 44160 | 31,49 | 44419 | 28,90 | 63933 | 43,92 |
| 12,70 | 6,00 | 70,00 | 25,00 | 44148 | 42,67 | 55863 | 69,37 | 44154 | 37,32 | 44161 | 44,77 | 44421 | 41,04 | 66492 | 63,64 |
| 12,70 | 8,00 | 70,00 | 25,00 | 55671 | 44,73 | | | 55669 | 37,32 | | | 55670 | 41,04 | | |
| 16,00 | 6,00 | 70,00 | 25,00 | 55653 | 58,05 | | | 44155 | 48,37 | 44173 | 58,05 | 44422 | 53,22 | | |
| 16,00 | 8,00 | 70,00 | 25,00 | 55675 | 53,81 | | | 55672 | 44,88 | | | 55673 | 49,36 | | |
| 19,00 | 6,00 | 70,00 | 25,00 | 55664 | 80,04 | | | 55655 | 66,75 | | | 55657 | 73,43 | | |
| 25,00 | 6,00 | 70,00 | 25,00 | 55668 | 111,91 | | | 55666 | 93,33 | | | 55667 | 102,67 | | |

Ref. 9230

FRESA ROTATIVA MD TIPO A LARGA
 Long A Type HM Rotary Burr
 Fraise lime rotative carbure type A longue



| | | | |
|-------------------------|--------------------------|--|-----------------------------|
| MD/HM Carbure | Tipo A Type | | Norma ZYA Norm |
|-------------------------|--------------------------|--|-----------------------------|



6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs



| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|--|-------|
| | | | | N° Art. MD/HM | € |
| 6,00 | 6,00 | 150,00 | 18,00 | 55829 | 73,04 |
| 9,60 | 6,00 | 172,00 | 19,00 | 55830 | 48,96 |
| 12,70 | 6,00 | 178,00 | 25,00 | 55831 | 69,31 |

Ref. 9251

FRESA ROTATIVA MD TIPO C RADIAL

Radial C Type HM Rotary Burr

Fraise lime rotative carbure type C hemisphérique

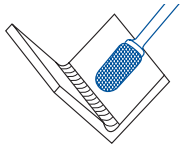
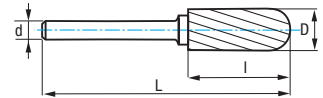


MD/HM
Carbure

MD/HM
+
ALTIN

Tipo
C
Type

Norma
WRC
Norm



1
MATERIALES NO FERROSOS
Non-Ferrous Materials
Matériaux non ferreux



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



6
MATERIALES DUROS
Hard Materials
Matériaux Durs



S
TITANIO, INCONEL...
Titanium, Inconel...
Titane, Inconel...

| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 1 ALTIN | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture 6 ALTIN | | Dentado Teeth / Denture S ALTIN | |
|---------|---------|---------|---------|--|-------|--|-------|--|-------|--|-------|--|--------|--|-------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. ALTIN | € |
| | | | | 3,00 | 3,00 | 38,00 | 14,00 | 55696 | 13,29 | | | 44425 | 11,06 | 44431 | 13,29 | 44437 | 12,16 |
| 6,00 | 6,00 | 50,00 | 18,00 | 55698 | 24,90 | | | 44426 | 20,72 | 44432 | 24,90 | 44438 | 22,81 | 66494 | 28,64 | | |
| 8,00 | 6,00 | 64,00 | 18,00 | 55699 | 30,69 | | | 44427 | 25,57 | 44433 | 30,69 | 44439 | 28,12 | 66495 | 35,75 | | |
| 9,60 | 6,00 | 64,00 | 19,00 | 44423 | 35,65 | 55867 | 53,29 | 44428 | 29,70 | 44434 | 35,65 | 44440 | 32,67 | 66496 | 48,89 | | |
| 12,70 | 6,00 | 70,00 | 25,00 | 44424 | 49,74 | 55868 | 77,80 | 44429 | 41,47 | 44435 | 49,74 | 44441 | 45,60 | 66497 | 71,37 | | |
| 12,70 | 8,00 | 70,00 | 25,00 | 55708 | 47,87 | | | 55706 | 39,93 | | | 55707 | 43,93 | | | | |
| 16,00 | 6,00 | 70,00 | 25,00 | 12138 | 64,67 | | | 44430 | 53,90 | 44436 | 64,67 | 44442 | 59,30 | | | | |
| 16,00 | 8,00 | 70,00 | 25,00 | 55711 | 60,25 | | | 55709 | 50,24 | | | 55710 | 55,27 | | | | |
| 19,00 | 6,00 | 70,00 | 25,00 | 55702 | 86,49 | | | 55700 | 72,13 | | | 55701 | 79,35 | | | | |
| 25,00 | 6,00 | 70,00 | 25,00 | | | | | 55704 | 98,01 | | | 55705 | 107,79 | | | | |

New!



M
INOXIDABLES
Stainless Steels
Aciers Inox



| D mm | d mm | L mm | l mm | Dentado Teeth / Denture M | |
|---------|---------|---------|---------|--|-------|
| | | | | N° Art. MD/HM | € |
| 9,60 | 6,00 | 64,00 | 19,00 | 20076 | 32,67 |
| 12,70 | 6,00 | 70,00 | 25,00 | 20080 | 45,60 |

Ref. 9231

FRESA ROTATIVA MD TIPO C RADIAL LARGA

Long Radial C Type HM Rotary Burr

Fraise lime rotative carbure type C hemisphérique longue



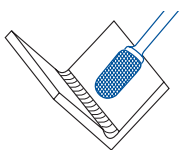
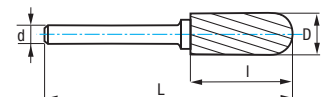
MD/HM
Carbure

Tipo
C
Type

Norma
WRC
Norm



6
MATERIALES DUROS
Hard Materials
Matériaux Durs



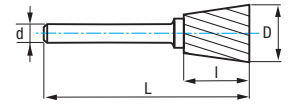
| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|--|-------|
| | | | | N° Art. MD/HM | € |
| 6,00 | 6,00 | 150,00 | 18,00 | 55838 | 74,69 |
| 9,60 | 6,00 | 172,00 | 19,00 | 55839 | 45,96 |
| 12,70 | 6,00 | 178,00 | 25,00 | 55840 | 65,20 |

Ref. **9252**

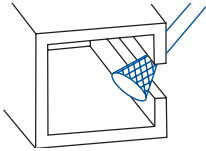
FRESA ROTATIVA MD TIPO N CONO INVERTIDO

Inverted Cone N Type HM Rotary Burr

Fraise lime rotative carbure type N sans coupe en bout



| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo N Type | Norma WKN Norm |
|-------------------------|--------------------------|-----------------------------|



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



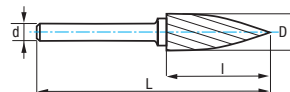
6
MATERIALES DUROS
Hard Materials
Matériaux Durs



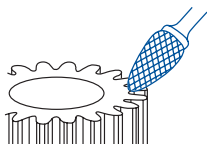
| D mm | d mm | L mm | l mm | Ang. | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|------|--|-------|--|-------|--|-------|
| | | | | | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 3,00 | 3,00 | 38,00 | 4,00 | 10° | 44443 | 11,06 | 44450 | 13,29 | 44455 | 12,16 |
| 6,00 | 6,00 | 50,00 | 8,00 | 10° | 44447 | 19,36 | 44452 | 23,22 | 44458 | 21,28 |
| 6,30 | 3,00 | 39,00 | 6,00 | 12° | 44445 | 17,29 | 44451 | 20,74 | 44457 | 19,03 |
| 12,70 | 6,00 | 57,00 | 12,00 | 28° | 44448 | 30,51 | 44453 | 36,61 | 44460 | 33,55 |
| 12,70 | 8,00 | 58,00 | 12,70 | 28° | 55825 | 39,70 | | | 55826 | 43,68 |
| 16,00 | 6,00 | 64,00 | 19,00 | 18° | 44449 | 51,00 | 44454 | 61,13 | 44461 | 56,08 |
| 16,00 | 8,00 | 64,00 | 19,00 | 18° | 55827 | 51,00 | | | 55828 | 56,08 |
| 19,00 | 6,00 | 61,00 | 16,00 | 30° | 55823 | 57,29 | | | 55824 | 63,02 |

Ref. **9254**

FRESA ROTATIVA MD TIPO G OJIVA
 Tree G Type HM Rotary Burr
 Fraise lime rotative carbure type G ogive



| | | | |
|-------------------------|----------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | MD/HM + ALTIN | Tipo G Type | Norma SPG Norm |
|-------------------------|----------------------------|--------------------------|-----------------------------|



1
MAT. NO FERROSOS
 Non-Ferrous Mat.
 Mat. non ferreux



3
USO GENERAL
 General Purpose
 Utilisation Générale



4
VIRUTA CORTA
 Short Chipping
 Copeaux Courts



6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs

| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture 6 ALTIN | |
|---------|---------|---------|---------|--|-------|--|-------|--|-------|--|-------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € |
| 3,00 | 3,00 | 38,00 | 14,00 | 55783 | 13,29 | 44466 | 11,06 | 44472 | 13,29 | 44487 | 12,16 | 66505 | 16,20 |
| 6,00 | 6,00 | 50,00 | 18,00 | 55784 | 24,90 | 44467 | 20,72 | 44473 | 24,90 | 44488 | 22,81 | 66506 | 28,36 |
| 8,00 | 6,00 | 64,00 | 19,00 | 55785 | 28,19 | 44468 | 23,50 | 44474 | 28,19 | 44494 | 25,79 | | |
| 9,60 | 6,00 | 64,00 | 19,00 | 44463 | 33,17 | 44469 | 27,66 | 44475 | 33,17 | 44500 | 30,40 | 55882 | 40,83 |
| 12,70 | 6,00 | 70,00 | 25,00 | 44464 | 41,47 | 44470 | 34,55 | 44476 | 41,47 | 44512 | 38,01 | 27566 | 51,56 |
| 12,70 | 8,00 | 70,00 | 25,00 | 55787 | 43,22 | 17105 | 36,04 | | | 55786 | 39,67 | | |
| 16,00 | 6,00 | 70,00 | 25,00 | | | | | 44482 | 58,05 | | | | |
| 16,00 | 6,00 | 75,00 | 30,00 | 44465 | 58,05 | 44471 | 48,37 | | | 44518 | 53,22 | | |
| 16,00 | 8,00 | 70,00 | 25,00 | 55790 | 60,12 | 55788 | 50,15 | | | 55789 | 55,16 | | |

New!



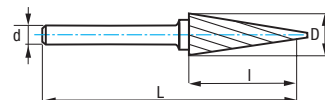
M
INOXIDABLES
 Stainless Steels
 Aciers Inox

| D mm | d mm | L mm | l mm | Dentado Teeth / Denture M | |
|---------|---------|---------|---------|--|-------|
| | | | | N° Art. MD/HM | € |
| 9,60 | 6,00 | 64,00 | 19,00 | 20087 | 30,40 |
| 12,70 | 6,00 | 70,00 | 25,00 | 20088 | 38,01 |

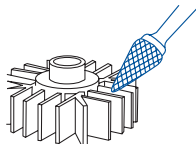


Ref. **9255**

FRESA ROTATIVA MD TIPO M CÓNICA
Cone M Type HM Rotary Burr
Fraise lime rotative carbure type M conique



| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo M Type | Norma SKM Norm |
|-------------------------|--------------------------|-----------------------------|



1
MAT. NO FERROSOS
Non-Ferrous Mat.
Mat. non ferreux



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



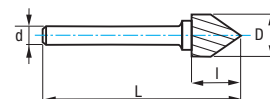
6
MATERIALES DUROS
Hard Materials
Matériaux Durs



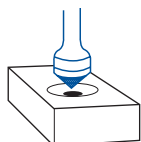
| D mm | d mm | L mm | l mm | Ang. | Dentado 1 Teeth / Denture 1 | | Dentado 3 Teeth / Denture 3 | | Dentado 4 Teeth / Denture 4 | | Dentado 6 Teeth / Denture 6 | |
|-------|------|-------|-------|------|--------------------------------|-------|--------------------------------|-------|--------------------------------|-------|--------------------------------|-------|
| | | | | | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 6,00 | 6,00 | 50,00 | 20,00 | 14° | 55817 | 22,97 | 44530 | 19,13 | 44598 | 22,97 | 44616 | 21,04 |
| 6,30 | 3,00 | 49,00 | 12,70 | 22° | 55816 | 19,13 | 44524 | 15,96 | 44595 | 19,13 | 44613 | 17,54 |
| 8,00 | 6,00 | 64,00 | 18,00 | 22° | | | 44583 | 20,42 | 44601 | 24,50 | 44617 | 22,47 |
| 9,60 | 6,00 | 64,00 | 16,00 | 28° | 55818 | 27,56 | 44586 | 22,97 | 44604 | 27,56 | 44619 | 25,27 |
| 12,70 | 6,00 | 71,00 | 22,00 | 28° | 25335 | 36,76 | 44589 | 30,60 | 44607 | 36,76 | 44620 | 33,68 |
| 12,70 | 8,00 | 71,00 | 22,00 | 28° | | | 55819 | 39,87 | | | 55820 | 43,86 |
| 16,00 | 6,00 | 71,00 | 25,00 | 31° | | | 44592 | 41,47 | 44610 | 49,75 | 44622 | 45,60 |
| 16,00 | 8,00 | 71,00 | 25,00 | 31° | | | 55821 | 53,21 | | | 55822 | 58,53 |

Ref. **9256**

FRESA ROTATIVA MD TIPO K CÓNICA 90°
90° Cone K Type HM Rotary Burr
Fraise lime rotative carbure type K conique 90°



| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo K Type | Norma KSK Norm |
|-------------------------|--------------------------|-----------------------------|



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



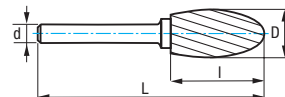
6
MATERIALES DUROS
Hard Materials
Matériaux Durs



| D mm | d mm | L mm | l mm | Dentado 3 Teeth / Denture 3 | | Dentado 4 Teeth / Denture 4 | | Dentado 6 Teeth / Denture 6 | |
|-------|------|-------|-------|--------------------------------|-------|--------------------------------|-------|--------------------------------|-------|
| | | | | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 6,00 | 6,00 | 50,00 | 3,00 | 44625 | 16,59 | 44628 | 19,89 | 44631 | 18,25 |
| 12,70 | 6,00 | 55,00 | 6,30 | 44626 | 27,66 | 44629 | 33,15 | 44632 | 30,40 |
| 12,70 | 8,00 | 55,00 | 6,30 | 55802 | 27,59 | | | 55803 | 30,36 |
| 16,00 | 6,00 | 57,00 | 8,00 | 55796 | 36,77 | | | 55797 | 40,44 |
| 16,00 | 8,00 | 57,00 | 8,00 | 55804 | 36,77 | | | 55805 | 40,44 |
| 19,00 | 6,00 | 59,00 | 9,50 | 55798 | 48,27 | | | 55799 | 53,11 |
| 25,00 | 6,00 | 61,00 | 12,70 | 55800 | 77,45 | | | 55801 | 85,19 |

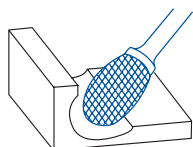
Ref. **9257**

FRESA ROTATIVA MD TIPO E GOTA
 Oval E Type HM Rotary Burr
 Fraise lime rotative carbure type E ovale



| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo E Type | Norma TRE Norm |
|-------------------------|--------------------------|-----------------------------|

New!



1
MAT. NO FERROSOS
 Non-Ferrous Mat.
 Mat. non ferreux



3
USO GENERAL
 General Purpose
 Utilisation Générale



4
VIRUTA CORTA
 Short Chipping
 Copeaux Courts



6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs

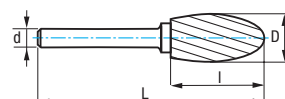


M
INOXIDABLES
 Stainless Steels
 Aciers Inox

| D mm | d mm | L mm | I mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture M | |
|---------|---------|---------|---------|--|-------|--|-------|--|-------|--|-------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 3,00 | 3,00 | 38,00 | 6,00 | 55733 | 13,29 | 44637 | 11,06 | 44648 | 13,29 | 44655 | 12,16 | | |
| 6,00 | 6,00 | 50,00 | 10,00 | 55735 | 24,90 | 44640 | 20,72 | 44650 | 24,90 | 44657 | 22,81 | | |
| 6,30 | 3,00 | 42,00 | 9,50 | 55734 | 20,72 | 44638 | 17,29 | 44649 | 20,72 | 44656 | 19,00 | | |
| 8,00 | 6,00 | 60,00 | 15,00 | 55737 | 28,19 | 44643 | 23,50 | 44651 | 28,19 | 44658 | 25,83 | | |
| 9,60 | 6,00 | 61,00 | 16,00 | 44634 | 33,17 | 44644 | 27,66 | 44652 | 33,17 | 44659 | 30,40 | 20652 | 30,40 |
| 12,70 | 6,00 | 67,00 | 22,00 | 44635 | 41,47 | 44646 | 34,55 | 44653 | 41,47 | 44660 | 38,01 | 20653 | 38,01 |
| 12,70 | 8,00 | 67,00 | 22,00 | 55746 | 44,58 | 55743 | 37,21 | | | 55744 | 40,91 | | |
| 16,00 | 6,00 | 70,00 | 25,00 | 55738 | 58,05 | 44647 | 48,37 | 44654 | 58,05 | 44661 | 53,22 | | |
| 16,00 | 8,00 | 70,00 | 25,00 | 55749 | 61,97 | 55747 | 51,69 | | | 55748 | 56,85 | | |
| 19,00 | 6,00 | 70,00 | 25,00 | 55741 | 83,23 | 55739 | 69,41 | | | 55740 | 76,35 | | |

Ref. **9237**

FRESA ROTATIVA MD TIPO E GOTA LARGA
 Long Oval E Type HM Rotary Burr
 Fraise Llime rotative carbure type E ovale longue



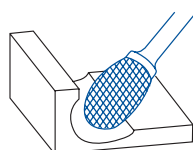
| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo E Type | Norma TRE Norm |
|-------------------------|--------------------------|-----------------------------|



3
USO GENERAL
 General Purpose
 Utilisation Générale



6
MATERIALES DUROS
 Hard Materials
 Matériaux Durs



| D mm | d mm | L mm | I mm | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|--|-------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 9,60 | 6,00 | 168,00 | 16,00 | 55849 | 42,04 | 55851 | 46,24 |
| 12,70 | 6,00 | 184,00 | 22,00 | 55852 | 52,15 | 55854 | 57,37 |

Ref. 9258

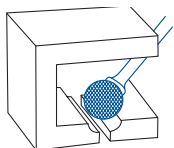
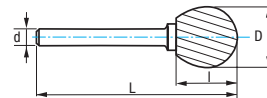
FRESA ROTATIVA MD TIPO D ESFÉRICA

Ball D Type HM Rotary Burr

Fraise lime rotative carbure type D sphérique



| | | | |
|-------------------------|----------------------|-----------------------|--------------------------|
| MD/HM Carbure | MD/HM + ALTIN | Tipo D Type | Norma KUD Norm |
|-------------------------|----------------------|-----------------------|--------------------------|



1
MATERIALES NO FERROSOS
Non-Ferrous Materials
Matériaux non ferreux



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



6
MATERIALES Duros
Hard Materials
Matériaux Durs

| D mm | d mm | L mm | I mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 1 ALTIN | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture 6 ALTIN | |
|---------|---------|---------|---------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € |
| | | | | 3,00 | 3,00 | 38,00 | 2,50 | 55713 | 12,26 | | | 44705 | 10,21 | 44712 | 12,26 |
| 6,00 | 6,00 | 50,00 | 4,70 | 55716 | 22,97 | | | 44707 | 19,13 | 44714 | 22,97 | 44721 | 21,04 | 66499 | 26,10 |
| 6,30 | 3,00 | 38,00 | 5,00 | 55714 | 19,13 | | | 44706 | 15,96 | 44713 | 19,13 | 44720 | 17,54 | | |
| 8,00 | 6,00 | 52,00 | 6,00 | 55717 | 26,04 | | | 44708 | 21,70 | 44715 | 26,04 | 44722 | 23,82 | 66500 | 28,89 |
| 9,60 | 6,00 | 54,00 | 8,00 | 44662 | 29,09 | 55869 | 43,73 | 44709 | 24,23 | 44716 | 29,09 | 44723 | 26,63 | 66501 | 40,11 |
| 12,70 | 6,00 | 56,00 | 11,00 | 44671 | 36,76 | 55870 | 54,80 | 44710 | 30,60 | 44717 | 36,76 | 44724 | 33,68 | 66502 | 50,29 |
| 12,70 | 8,00 | 56,00 | 11,00 | 55728 | 33,73 | | | 55725 | 28,12 | | | 55726 | 30,94 | | |
| 16,00 | 6,00 | 59,00 | 14,00 | 58481 | 51,80 | | | 44711 | 43,35 | 44718 | 52,04 | 44725 | 47,52 | | |
| 16,00 | 8,00 | 59,00 | 14,00 | 55732 | 41,80 | | | 55729 | 34,85 | | | 55731 | 38,35 | | |
| 19,00 | 6,00 | 62,00 | 16,50 | 55720 | 57,69 | | | 55718 | 48,11 | | | 55719 | 52,93 | | |
| 25,00 | 6,00 | 67,00 | 22,00 | 55724 | 99,11 | | | 55722 | 82,66 | | | 55723 | 90,92 | | |

New!



M
INOXIDABLES
Stainless Steels
Aciers Inox



| D mm | d mm | L mm | I mm | Dentado Teeth / Denture M | |
|---------|---------|---------|---------|--|-------|
| | | | | N° Art. MD/HM | € |
| 9,60 | 6,00 | 54,00 | 8,00 | 20081 | 26,63 |
| 12,70 | 6,00 | 56,00 | 11,00 | 20082 | 33,68 |

Ref. 9238

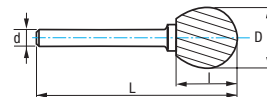
FRESA ROTATIVA MD TIPO D ESFÉRICA LARGA

Long Ball D Type HM Rotary Burr

Fraise lime rotative carbure type D sphérique longue



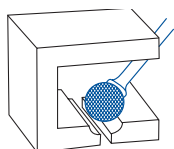
| | | |
|-------------------------|-----------------------|--------------------------|
| MD/HM Carbure | Tipo D Type | Norma KUD Norm |
|-------------------------|-----------------------|--------------------------|



3
USO GENERAL
General Purpose
Utilisation Générale



6
MATERIALES Duros
Hard Materials
Matériaux Durs



| D mm | d mm | L mm | I mm | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|--|-------|--|-------|
| | | | | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 8,00 | 6,00 | 182,00 | 6,00 | 55841 | 35,40 | 55842 | 38,93 |
| 9,60 | 6,00 | 170,00 | 8,00 | 55843 | 35,98 | 55845 | 39,58 |
| 12,70 | 6,00 | 175,00 | 11,00 | 55846 | 44,11 | 55848 | 48,52 |

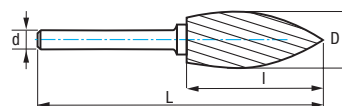


Ref. **9266**

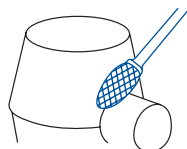
FRESA ROTATIVA MD TIPO H LLAMA

Flame H Type HM Rotary Burr

Fraise lime rotative carbure type H flamme



| | | |
|-------------------------|--------------------------|---------------------------|
| MD/HM Carbure | Tipo H Type | Norma B Norm |
|-------------------------|--------------------------|---------------------------|



1
MAT. NO FERROSOS
Non-Ferrous Mat.
Mat. non ferreux



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



6
MATERIALES Duros
Hard Materials
Matériaux Durs



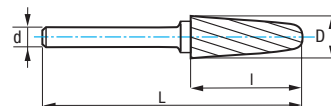
| D mm | d mm | L mm | l mm | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|--|-------|--|-------|--|-------|--|-------|
| | | | | Nº Art. MD/HM | € | Nº Art. MD/HM | € | Nº Art. MD/HM | € | Nº Art. MD/HM | € |
| 3,00 | 3,00 | 38,00 | 6,00 | | | 44728 | 9,47 | 44735 | 11,34 | 44757 | 10,40 |
| 6,00 | 3,00 | 43,00 | 10,00 | | | 44729 | 15,53 | 44736 | 18,61 | 44760 | 17,07 |
| 6,00 | 6,00 | 50,00 | 14,00 | | | 44730 | 19,71 | 44737 | 26,52 | 44763 | 24,33 |
| 8,00 | 6,00 | 64,00 | 19,00 | 55791 | 29,87 | 44731 | 24,90 | 44738 | 29,87 | 44766 | 27,36 |
| 9,60 | 6,00 | 65,00 | 19,00 | 44726 | 35,65 | 44732 | 29,70 | 44739 | 35,65 | 44769 | 32,67 |
| 12,70 | 6,00 | 77,00 | 32,00 | 44727 | 43,12 | 44733 | 35,96 | 44740 | 43,12 | 44771 | 39,52 |
| 12,70 | 8,00 | 77,00 | 32,00 | | | 55792 | 53,21 | | | 55793 | 58,53 |
| 16,00 | 6,00 | 81,00 | 36,00 | 44773 | 61,34 | 44734 | 51,13 | 44742 | 61,34 | 44772 | 56,24 |
| 16,00 | 8,00 | 81,00 | 36,00 | | | 55794 | 73,49 | | | 55795 | 80,86 |

Ref. 9267

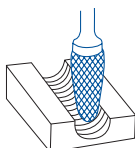
FRESA ROTATIVA MD TIPO L CÓNICA REDONDEADA

Ball Nosed Cone L Type HM Rotary Burr

Fraise lime rotative carbure type L conique rayon



| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo L Type | Norma KEL Norm |
|-------------------------|--------------------------|-----------------------------|



1
MAT. NO FERROSOS
Non-Ferrous Mat.
Mat. non ferreux



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



6
MATERIALES DUROS
Hard Materials
Matériaux Durs

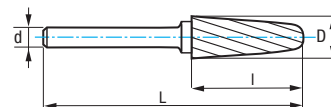
| D mm | d mm | L mm | l mm | Ang. | Dentado Teeth / Denture 1 | | Dentado Teeth / Denture 1 ALTIN | | Dentado Teeth / Denture 3 | | Dentado Teeth / Denture 4 | | Dentado Teeth / Denture 6 | | Dentado Teeth / Denture 6 ALTIN | |
|---------|---------|---------|---------|------|--|-------|--|-------|--|-------|--|-------|--|-------|--|-------|
| | | | | | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € |
| | | | | | 3,00 | 3,00 | 38,00 | 14,00 | 10° | 55806 | 13,29 | | | 44776 | 11,06 | 44783 |
| 6,00 | 6,00 | 50,00 | 18,00 | 14° | 55808 | 27,36 | | | 44778 | 22,81 | 44785 | 27,36 | 44792 | 25,07 | | |
| 6,30 | 3,00 | 48,00 | 15,80 | 22° | 55807 | 20,72 | | | 44777 | 17,29 | 44784 | 20,72 | 44791 | 19,03 | | |
| 8,00 | 6,00 | 70,00 | 25,40 | 14° | 55809 | 33,25 | | | 44779 | 27,66 | 44786 | 33,25 | 44793 | 30,40 | | |
| 10,00 | 6,00 | 65,00 | 20,00 | 14° | 21959 | 39,82 | | | 44780 | 33,17 | 44787 | 39,82 | 44794 | 36,45 | | |
| 12,70 | 6,00 | 77,00 | 32,00 | 14° | 44774 | 49,74 | 66508 | 60,84 | 44781 | 41,47 | 44788 | 49,74 | 44795 | 45,60 | 20159 | 55,83 |
| 12,70 | 8,00 | 77,00 | 32,00 | 14° | 55812 | 46,54 | | | 55810 | 38,82 | | | 55811 | 42,70 | | |
| 16,00 | 6,00 | 78,00 | 33,00 | 14° | 44775 | 74,63 | | | 44782 | 62,18 | 44789 | 74,63 | 44796 | 68,42 | | |
| 16,00 | 8,00 | 78,00 | 33,00 | 14° | 55815 | 91,59 | | | 55813 | 76,39 | | | 55814 | 84,03 | | |

Ref. 9247

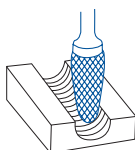
FRESA ROTATIVA MD TIPO L CÓNICA REDONDEADA LARGA

Long Ball Nosed Cone L Type HM Rotary Burr

Fraise lime rotative carbure type L conique rayon longue



| | | | |
|-------------------------|--------------------------|---|-----------------------------|
| MD/HM Carbure | Tipo L Type |  | Norma KEL Norm |
|-------------------------|--------------------------|---|-----------------------------|



6
MATERIALES DUROS
Hard Materials
Matériaux Durs



| D mm | d mm | L mm | l mm | Ang. | Dentado Teeth / Denture 6 | |
|---------|---------|---------|---------|------|--|-------|
| | | | | | N° Art. MD/HM | € |
| 9,60 | 6,00 | 183,00 | 30,00 | 14° | 55858 | 56,26 |
| 12,70 | 6,00 | 185,00 | 30,20 | 14° | 55860 | 63,29 |

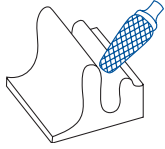
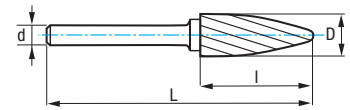
Ref. **9268**

FRESA ROTATIVA MD TIPO F OJIVA REDONDEADA

Ball Nosed Tree F Type HM Rotary Burr
Fraise lime rotative carbure type F ogive rayon



| | | | |
|-------------------------|----------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | MD/HM + ALTIN | Tipo F Type | Norma RBF Norm |
|-------------------------|----------------------------|--------------------------|-----------------------------|



1
MATERIALES NO FERROSOS
Non-Ferrous Materials
Matériaux non ferreux



3
USO GENERAL
General Purpose
Utilisation Générale



4
VIRUTA CORTA
Short Chipping
Copeaux Courts



6
MATERIALES DUROS
Hard Materials
Matériaux Durs

| D mm | d mm | L mm | l mm | Dentado Teeth / Denture | | Dentado Teeth / Denture | | Dentado Teeth / Denture | | Dentado Teeth / Denture | | Dentado Teeth / Denture | | | |
|---------|---------|---------|---------|----------------------------|--------|----------------------------|-------|----------------------------|-------|----------------------------|-------|----------------------------|--------|------------------|-------|
| | | | | 1 | | 1 ALTIN | | 3 | | 4 | | 6 | | 6 ALTIN | |
| | | | | N° Art. MD/HM | € | N° Art. ALTIN | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. MD/HM | € | N° Art. ALTIN | € |
| 3,00 | 3,00 | 38,00 | 14,00 | 55753 | 11,34 | | | 55750 | 9,47 | | | 17118 | 10,40 | 66503 | 16,20 |
| 6,00 | 6,00 | 50,00 | 18,00 | 55759 | 27,36 | | | 44797 | 22,81 | 44802 | 27,36 | 44808 | 25,07 | 66504 | 30,87 |
| 6,30 | 3,00 | 45,00 | 12,70 | 55758 | 18,61 | | | 55755 | 15,53 | | | 55756 | 17,07 | | |
| 8,00 | 6,00 | 65,00 | 20,00 | 55760 | 33,17 | | | 44798 | 27,66 | 44803 | 33,17 | 44809 | 30,40 | | |
| 9,60 | 6,00 | 64,00 | 19,00 | 55761 | 39,82 | 55880 | 41,71 | 44799 | 33,17 | 44804 | 39,82 | 44811 | 36,45 | 17250 | 38,27 |
| 12,70 | 6,00 | 70,00 | 25,00 | 55762 | 49,74 | 55881 | 57,29 | 44800 | 41,47 | 44805 | 49,74 | 44814 | 45,60 | 23849 | 52,58 |
| 12,70 | 8,00 | 70,00 | 25,00 | 55777 | 44,09 | | | 55774 | 36,77 | | | 55776 | 40,44 | | |
| 16,00 | 6,00 | 70,00 | 25,00 | 55765 | 74,63 | | | 44801 | 62,18 | 44806 | 74,63 | 44817 | 68,42 | | |
| 16,00 | 8,00 | 70,00 | 25,00 | 55782 | 60,87 | | | 55779 | 50,75 | | | 55780 | 55,84 | | |
| 19,00 | 6,00 | 83,00 | 38,00 | 55771 | 118,32 | | | 55768 | 98,69 | | | 55769 | 108,53 | | |

New!



M
INOXIDABLES
Stainless Steels
Aciers Inox

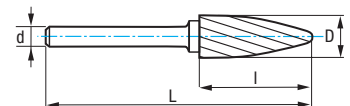


| D mm | d mm | L mm | l mm | Dentado Teeth / Denture | |
|---------|---------|---------|---------|----------------------------|-------|
| | | | | M | |
| | | | | N° Art. MD/HM | € |
| 9,60 | 6,00 | 64,00 | 19,00 | 20083 | 36,45 |
| 12,70 | 6,00 | 70,00 | 25,00 | 20085 | 45,60 |

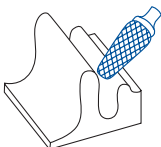
Ref. **9248**

FRESA ROTATIVA MD TIPO F OJIVA REDONDEADA LARGA

Long Ball Nosed Tree F Type HM Rotary Burr
Fraise lime rotative carbure type F ogive rayon longue



| | | |
|-------------------------|--------------------------|-----------------------------|
| MD/HM Carbure | Tipo F Type | Norma RBF Norm |
|-------------------------|--------------------------|-----------------------------|



6
MATERIALES DUROS
Hard Materials
Matériaux Durs



| D mm | d mm | L mm | l mm | Dentado Teeth / Denture | |
|---------|---------|---------|---------|----------------------------|-------|
| | | | | 6 | |
| | | | | N° Art. MD/HM | € |
| 9,60 | 6,00 | 172,00 | 19,00 | 55855 | 44,05 |
| 12,70 | 6,00 | 178,00 | 25,00 | 55857 | 57,55 |

Ref. **9200**

JUEGOS FRESAS ROTATIVAS MD
 HM Rotary Burr Sets
 Jeux fraises limes rotatives carbure



Mod. 1
5 Pcs



MAT. NO FERROSOS
 Non-Ferrous Mat.
 Mat. non ferreux



MATERIALES DUROS
 Hard Materials
 Matériaux Durs

| Cont. (1 x ref.) | D mm | d mm | Dentado 1 Teeth / Denture 1 | | Dentado 6 Teeth / Denture 6 | |
|------------------|-------|------|--------------------------------|--------|--------------------------------|--------|
| | | | N° Art. MD/HM | € | N° Art. MD/HM | € |
| 9260 | | | | | | |
| 9251 | 12,70 | 6,00 | 60052 | 215,07 | 45810 | 197,32 |
| 9255 | | | | | | |
| 9258 | 9,60 | 6,00 | | | 68857 | 149,14 |
| 9266 | | | | | | |



Mod. 2
10 Pcs



MATERIALES DUROS
 Hard Materials
 Matériaux Durs

| Cont. (1 x ref.) | D mm | d mm | Dentado 6 Teeth / Denture 6 | |
|------------------|------|------|--------------------------------|--------|
| | | | N° Art. MD/HM | € |
| 9260 | | | | |
| 9250 | | | | |
| 9251 | | | | |
| 9254 | | | | |
| 9255 | 6,00 | 6,00 | 45811 | 218,92 |
| 9257 | | | | |
| 9258 | | | | |
| 9266 | | | | |
| 9267 | | | | |
| 9268 | | | | |



Mod. 3
8 Pcs



MATERIALES DUROS
 Hard Materials
 Matériaux Durs

| Cont. (1 x ref.) | D mm | d mm | Dentado 6 Teeth / Denture 6 | |
|------------------|------|------|--------------------------------|-------|
| | | | N° Art. MD/HM | € |
| 9260 | | | | |
| 9250 | | | | |
| 9251 | | | | |
| 9254 | | | | |
| 9257 | 3,00 | 3,00 | 45813 | 92,89 |
| 9258 | | | | |
| 9267 | | | | |
| 9268 | | | | |



Mod. 4
3 Pcs



MATERIALES DUROS
 Hard Materials
 Matériaux Durs

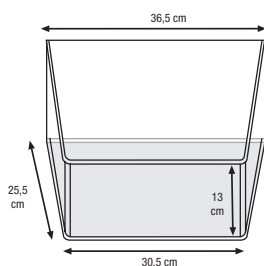
| Cont. (1 x ref.) | D mm | d mm | Dentado 6 Teeth / Denture 6 | |
|------------------|------|------|--------------------------------|-------|
| | | | N° Art. MD/HM | € |
| 9260 | | | | |
| 9251 | 9,60 | 6,00 | 79826 | 94,98 |
| 9254 | | | | |

Expo 9200

EXPOSITOR FRESAS ROTATIVAS

Rotary Burr Display

Présentoirs fraises limes rotatives carbure



Dentado
Teeth / Denture
6

48 Pcs

| Cont. Ref. | Diam. mm | N° Art. MD/HM | € |
|-------------|-------------|---------------|---|
| 9260 | 06,00X06,00 | 44141 | 2 |
| | 08,00X06,00 | 44142 | 2 |
| | 09,60X06,00 | 44143 | 2 |
| | 12,70X06,00 | 44144 | 2 |
| 9251 | 06,00X06,00 | 44438 | 2 |
| | 08,00X06,00 | 44439 | 2 |
| | 09,60X06,00 | 44440 | 2 |
| | 12,70X06,00 | 44441 | 2 |
| 9254 | 06,00X06,00 | 44488 | 2 |
| | 08,00X06,00 | 44494 | 2 |
| | 09,60X06,00 | 44500 | 2 |
| | 12,70X06,00 | 44512 | 2 |
| 9258 | 06,00X06,00 | 44721 | 2 |
| | 08,00X06,00 | 44722 | 2 |
| | 09,60X06,00 | 44723 | 2 |
| | 12,70X06,00 | 44724 | 2 |
| 9267 | 06,00X06,00 | 44792 | 2 |
| | 08,00X06,00 | 44793 | 2 |
| | 10,00X06,00 | 44794 | 2 |
| | 12,70X06,00 | 44795 | 2 |
| 9268 | 06,00X06,00 | 44808 | 2 |
| | 08,00X06,00 | 44809 | 2 |
| | 09,60X06,00 | 44811 | 2 |
| | 12,70X06,00 | 44814 | 2 |

| N° Art. MD/HM | € |
|---------------|-----------------|
| 57079 | 1.509,78 |

SETS FRESADO METAL DURO

Carbide Milling Sets
Jeux de fraisage carbure



Set 9406

FRESA METAL DURO HÉLICE ALTERNA ALTO RENDIMIENTO 48-70 HRC

48-70 HRC High Performance Unequal Helix Carbide End Mill

Fraise carbure hélice alternée haut rendement 48-70 HRC



6 Pcs

| Cont. | N° Art. IKRA | € |
|------------------|--------------|--------|
| 4-5-6-8-10-12 mm | 67688 | 260,51 |

Set Price!

Set 9401

FRESA METAL DURO 4Z USO GENERAL

4Z General Purpose Carbide End Mill

Fraise carbure 4Z utilisation générale



6 Pcs

| Cont. | N° Art. CROMAX | € |
|------------------|----------------|--------|
| 4-5-6-8-10-12 mm | 67685 | 178,02 |

Set Price!

Set 9431

FRESA METAL DURO SERIE CORTA 3Z USO GENERAL

General Purpose 3Z Short Series Carbide End Mill

Fraise carbure série courte 3Z utilisation générale



6 Pcs

| Cont. | N° Art. CROMAX | € |
|------------------|----------------|--------|
| 4-5-6-8-10-12 mm | 67686 | 178,02 |

Set Price!

Set **9421**

FRESA METAL DURO 2Z USO GENERAL

General Purpose 2Z Carbide End Mill

Fraise carbure 2Z utilisation générale



6 Pcs

| Cont. | N° Art. CROMAX | € |
|----------------------|-------------------|-------------------------|
| 4-5-6-8-10- 12 mm | 67687 | Set Price! 178,02 |

Set **9416**

FRESA METAL DURO 1Z

PULIDO ESPEJO ALUMINIO/TERMOPLÁSTICOS

Aluminium/Thermoplastics 1Z Mirror Polished Carbide End Mill

Fraise carbure 1Z polyglass

Aluminium/Thermoplastiques



5 Pcs

| Cont. | N° Art. MD/HM | € |
|-----------------|------------------|-------------------------|
| 3-4-5 6-8 mm | 78335 | Set Price! 105,99 |

Set 9450

FRESA METAL DURO MULTIFUNCIÓN PUNTA V

V-Point Multifunction Carbide End Mill
Fraise carbure multifonction-V



3 Pcs

| Cont. | N° Art. SUA | € |
|-----------------------------------|-------------|----------------------|
| 6 mm 60° 6 mm 90° 6 mm 120° | 80509 | Set Price! 214,69 |

Set 9459

FRESA METAL DURO 1Z GRABADO

1Z Engraving Carbide End Mill
Fraise carbure 1Z gravure



4 Pcs

| | Cont. Ø | N° Art. MD/HM | € |
|---|------------|---------------|---------------------|
| 1 | 0,1 mm 30° | 81958 | Set Price! 32,49 |
| | 0,2 mm 30° | | |
| | 0,4 mm 30° | | |
| | 0,8 mm 30° | | |

4 Pcs

| | Cont. Ø | N° Art. MD/HM | € |
|---|------------|---------------|---------------------|
| 2 | 0,1 mm 30° | 81959 | Set Price! 32,49 |
| | 0,1 mm 45° | | |
| | 0,1 mm 60° | | |
| | 0,1 mm 90° | | |

FRESADO PMX-HSSE-HSS

PMX-HSSE-HSS Milling

Fraisage PMX-HSSE-HSS

FRESAS FRONTALES DESBASTE

Roughing End Mills
Fraises Ébauche

360

FRESAS FRONTALES ACABADO

Finishing End Mills
Fraises Finition

370

JUEGOS FRESAS

End Mill Sets
Jeux de fraises

389

FRESAS ESPECIALES

Shank Tools
Fraises spéciales

395

FRESAS FRONTALES MANGO CÓNICO

Taper Shank End Mills
Fraises queue conique

400

FRESAS AGUJERO / FRESAS MADRE

Milling Cutters / Gear Hobs
Fraises à trou

407



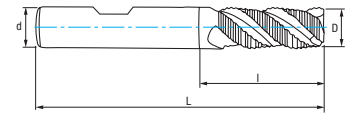
Ref. 6644

IZARMAX

FRESA FRONTAL DESBASTE FINO PMX NZ

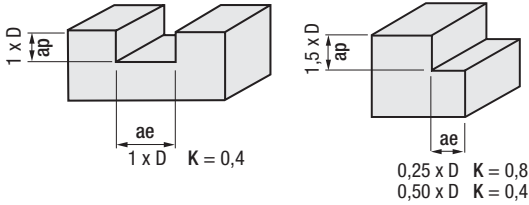
NZ PMX Fine Pitch Roughing End Mill

Fraise ébauche pas fin PMX NZ



PMX
PMX + TIALN-TOP
DIN 844 NR-F
4-6 Z
45°
30°
DIN 1835 B
Tol. D (k12) d (h6)

* Con radio bajo demanda
With radius upon request
Avec rayon sur demande



| Material | | Vc (m/min) | | Refs. 6644-6696 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|------------|-----------|---|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 |
| P | P.2 | 30-42 | 45-75 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | P.3 | 12-18 | 20-35 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| | P.5 | 18-24 | 30-45 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| S | | 18-24 | 30-45 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$



Set pag. 389

| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € | D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|------------------|-------|-------|------|------|------|---|-------------|--------|------------------|--------|
| 6,00 | 6 | 57 | 13 | 4 | 45201 | 38,56 | 45529 | 44,82 | 18,00 | 16 | 92 | 32 | 5 | 45213 | 85,45 | 45543 | 97,84 |
| 7,00 | 10 | 66 | 16 | 4 | 23132 | 48,54 | 23140 | 55,26 | 20,00 | 20 | 104 | 38 | 5 | 45216 | 107,99 | 45546 | 121,21 |
| 8,00 | 10 | 69 | 19 | 4 | 45204 | 42,05 | 45532 | 48,98 | 22,00 | 20 | 104 | 38 | 5 | 14815 | 131,77 | 14880 | 150,33 |
| 9,00 | 10 | 69 | 19 | 4 | 23133 | 50,35 | 23141 | 57,84 | 25,00 | 25 | 121 | 45 | 5 | 45219 | 159,93 | 45549 | 177,54 |
| 10,00 | 10 | 72 | 22 | 5 | 45207 | 39,80 | 45535 | 47,64 | 28,00 | 25 | 121 | 45 | 5 | 13223 | 175,49 | 12822 | 198,28 |
| 12,00 | 12 | 83 | 26 | 5 | 45209 | 52,59 | 45537 | 61,19 | 30,00 | 25 | 121 | 45 | 5 | 14817 | 212,91 | 14883 | 239,83 |
| 14,00 | 12 | 83 | 26 | 5 | 45210 | 63,44 | 45538 | 72,89 | 32,00 | 32 | 133 | 53 | 6 | 45717 | 233,50 | 45248 | 258,07 |
| 16,00 | 16 | 92 | 32 | 5 | 45211 | 78,51 | 45540 | 89,47 | | | | | | | | | |

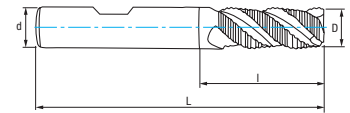
Ref. 6696

IZARMAX

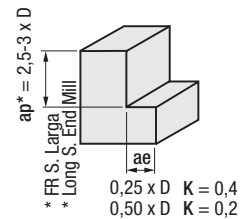
FRESA FRONTAL DESBASTE FINO PMX NZ LARGA

Long NZ PMX Fine Pitch Roughing End Mill

Fraise ébauche pas fin PMX NZ longue



PMX
PMX + TIALN-TOP
DIN 844 NR-F
4-6 Z
45°
30°
DIN 1835 B
Tol. D (k12) d (h6)



| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € | D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|------------------|-------|-------|------|------|------|---|-------------|--------|------------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 45239 | 62,12 | 45558 | 67,82 | 16,00 | 16 | 123 | 63 | 4 | 45244 | 101,37 | 45570 | 113,71 |
| 8,00 | 10 | 88 | 38 | 4 | 45240 | 64,28 | 45561 | 70,77 | 18,00 | 16 | 123 | 63 | 4 | 45245 | 114,28 | 45571 | 128,09 |
| 10,00 | 10 | 95 | 45 | 4 | 45241 | 56,38 | 45564 | 64,24 | 20,00 | 20 | 141 | 75 | 4 | 45246 | 149,12 | 45573 | 164,23 |
| 12,00 | 12 | 110 | 53 | 4 | 45242 | 72,19 | 45567 | 80,71 | 25,00 | 25 | 166 | 90 | 5 | 45247 | 229,38 | 45574 | 252,38 |
| 14,00 | 12 | 110 | 53 | 4 | 45243 | 83,43 | 45568 | 92,16 | 32,00 | 32 | 186 | 106 | 6 | 45249 | 330,08 | 45261 | 359,37 |

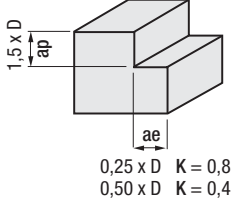
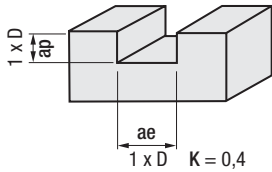
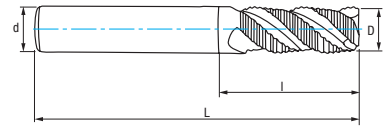
Ref. 6647

IZARMAX

FRESA FRONTAL DESBASTE FINO PMX NZ INOX

Stainless NZ PMX Fine Pitch Roughing End Mill

Fraise ébauche pas fin PMX NZ inox



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
| M | | 20-35 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

| D mm | d mm | L mm | l mm | Z | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|------------------|--------|
| 6,00 | 6 | 57 | 13 | 4 | 29139 | 48,64 |
| 7,00 | 10 | 66 | 16 | 4 | 29140 | 60,11 |
| 8,00 | 10 | 69 | 19 | 4 | 29141 | 53,19 |
| 9,00 | 10 | 69 | 19 | 4 | 29142 | 62,88 |
| 10,00 | 10 | 72 | 22 | 4 | 29143 | 51,61 |
| 12,00 | 12 | 83 | 26 | 4 | 29144 | 66,45 |
| 14,00 | 12 | 83 | 26 | 4 | 29145 | 79,24 |
| 16,00 | 16 | 92 | 32 | 5 | 29146 | 97,33 |
| 18,00 | 16 | 92 | 32 | 5 | 29147 | 106,38 |
| 20,00 | 20 | 104 | 38 | 5 | 29148 | 132,00 |
| 22,00 | 20 | 104 | 38 | 5 | 29150 | 163,54 |
| 25,00 | 25 | 121 | 45 | 5 | 29152 | 193,53 |

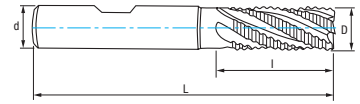


Ref. 6640

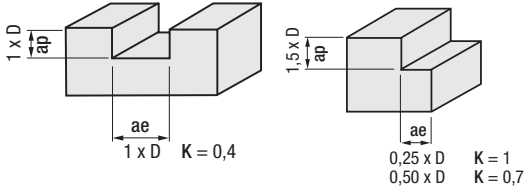
IZARMAX

FRESA FRONTAL DESBASTE GRUESO PMX NZ

NZ PMX Coarse Roughing End Mill
Fraise ébauche PMX NZ



PMX
PMX + TIALN-TOP
DIN 844 NR
4-6 Z
DIN 1835 B
Tol. D (k12) d (h6)



| Material | | Vc (m/min) | | Refs. 6640-6690 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|------------|-----------|---|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 |
| P | P.1 | 35-45 | 55-80 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | N.1 | 70-120 | 110-210 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| N | N.2 | 70-120 | 110-210 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | N.3 | 190-240 | 290-420 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | N.4 | 190-240 | 290-420 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | N.5 | 60-96 | 90-170 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (\text{mm/min.}) = \text{r.p.m.} \times Z \times fz \times K$$



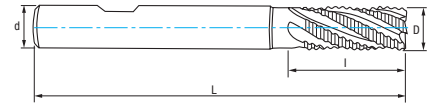
| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € | D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|-------------------|-------|-------|------|------|------|---|-------------|--------|-------------------|--------|
| 6,00 | 6 | 57 | 13 | 4 | 20903 | 35,03 | 21029 | 40,71 | 18,00 | 16 | 92 | 32 | 5 | 20912 | 77,69 | 21035 | 89,19 |
| 7,00 | 10 | 66 | 16 | 4 | 23138 | 44,12 | 23142 | 50,63 | 20,00 | 20 | 104 | 38 | 5 | 20915 | 98,19 | 21036 | 110,79 |
| 8,00 | 10 | 69 | 19 | 4 | 20904 | 38,22 | 21030 | 44,72 | 22,00 | 20 | 104 | 38 | 5 | 21078 | 119,81 | 21095 | 137,15 |
| 9,00 | 10 | 69 | 19 | 4 | 23139 | 45,78 | 23143 | 52,88 | 25,00 | 25 | 121 | 45 | 5 | 20917 | 145,43 | 21037 | 162,76 |
| 10,00 | 10 | 72 | 22 | 5 | 20905 | 36,18 | 21031 | 43,36 | 28,00 | 25 | 121 | 45 | 5 | 22117 | 159,72 | 22400 | 208,70 |
| 12,00 | 12 | 83 | 26 | 5 | 20907 | 47,80 | 21032 | 55,58 | 30,00 | 25 | 121 | 45 | 5 | 21083 | 193,53 | 21096 | 218,14 |
| 14,00 | 12 | 83 | 26 | 5 | 20908 | 57,67 | 21033 | 66,39 | 32,00 | 32 | 133 | 53 | 6 | 20922 | 212,24 | 21038 | 236,85 |
| 16,00 | 16 | 92 | 32 | 5 | 20909 | 71,38 | 21034 | 81,62 | | | | | | | | | |

Ref. 6690

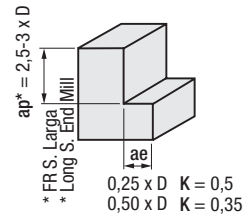
IZARMAX

FRESA FRONTAL DESBASTE GRUESO PMX NZ LARGA

Long NZ PMX Coarse Roughing End Mill
Fraise ébauche PMX NZ longue



PMX
PMX + TIALN-TOP
DIN 844 NR
4-6 Z
DIN 1835 B
Tol. D (k12) d (h6)



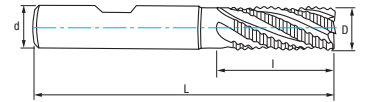
| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € | D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|-------------------|-------|-------|------|------|------|---|-------------|--------|-------------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 20568 | 55,92 | 20578 | 61,62 | 16,00 | 16 | 123 | 63 | 4 | 20573 | 91,26 | 20583 | 103,54 |
| 8,00 | 10 | 88 | 38 | 4 | 20569 | 57,84 | 20579 | 64,36 | 18,00 | 16 | 123 | 63 | 4 | 20574 | 102,86 | 20584 | 116,67 |
| 10,00 | 10 | 95 | 45 | 4 | 20570 | 50,73 | 20580 | 58,60 | 20,00 | 20 | 141 | 75 | 4 | 20575 | 134,21 | 20585 | 149,31 |
| 12,00 | 12 | 110 | 53 | 4 | 20571 | 64,95 | 20581 | 73,45 | 25,00 | 25 | 166 | 90 | 5 | 20576 | 206,47 | 20586 | 229,46 |
| 14,00 | 12 | 110 | 53 | 4 | 20572 | 75,08 | 20582 | 83,80 | 32,00 | 32 | 186 | 106 | 6 | 20577 | 297,08 | 20587 | 326,36 |

Ref. 6642

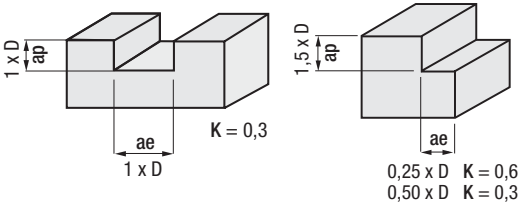
IZARMAX

FRESA FRONTAL DESBASTE MEDIO PMX NZ

NZ PMX Roughing & Finishing End Mill
Fraise semi-finition PMX NZ



| | | | | | | | | | |
|-----|-----------------|------------|--|-------|--|--|------------|---------------------|--|
| PMX | PMX + TIALN-TOP | DIN 844 NF | | 4-5 Z | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|-----|-----------------|------------|--|-------|--|--|------------|---------------------|--|



| Material | | Vc (m/min) | | Refs. 6642-6692 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|------------|-----------|---|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 35-45 | 55-80 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 |
| S | | 18-24 | 30-45 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 |
| N | N.1 | 70-120 | 110-210 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 |
| | N.2 | 60-100 | 90-190 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|------------------|--------|
| 6,00 | 6 | 57 | 13 | 4 | 13231 | 33,84 | 13224 | 40,03 |
| 8,00 | 10 | 69 | 19 | 4 | 13233 | 42,45 | 13225 | 49,79 |
| 10,00 | 10 | 72 | 22 | 5 | 13235 | 33,06 | 13226 | 41,77 |
| 12,00 | 12 | 83 | 26 | 5 | 13236 | 43,98 | 13227 | 54,04 |
| 14,00 | 12 | 83 | 26 | 5 | 13237 | 50,15 | 13228 | 61,43 |
| 16,00 | 16 | 92 | 32 | 5 | 13242 | 58,96 | 13229 | 72,89 |
| 20,00 | 20 | 104 | 38 | 5 | 13245 | 86,62 | 13230 | 103,82 |

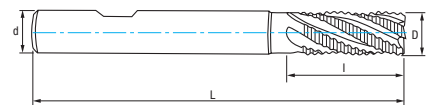


Ref. 6692

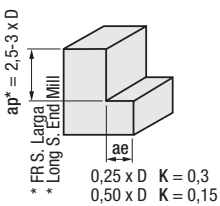
IZARMAX

FRESA FRONTAL DESBASTE MEDIO PMX NZ LARGA

Long NZ PMX Roughing & Finishing End Mill
Fraise Semi-Finition PMX NZ longue



| | | | | | | | | | |
|-----|-----------------|------------|--|-----|--|--|------------|---------------------|--|
| PMX | PMX + TIALN-TOP | DIN 844 NF | | 4 Z | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|-----|-----------------|------------|--|-----|--|--|------------|---------------------|--|

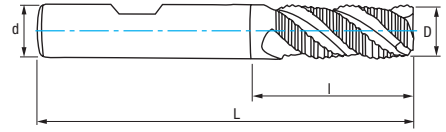


| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|--------|------------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 13263 | 49,71 | 13248 | 55,43 |
| 8,00 | 10 | 88 | 38 | 4 | 13266 | 57,25 | 13251 | 63,77 |
| 10,00 | 10 | 95 | 45 | 4 | 13269 | 53,56 | 13254 | 62,26 |
| 12,00 | 12 | 110 | 53 | 4 | 13272 | 73,01 | 13257 | 82,70 |
| 16,00 | 16 | 123 | 63 | 4 | 13275 | 100,39 | 13260 | 115,46 |
| 20,00 | 20 | 141 | 75 | 4 | 13278 | 138,79 | 13262 | 157,55 |

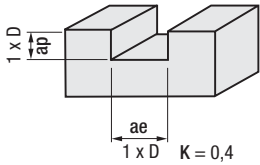


Ref. **6444**
IZARMAX

FRESA FRONTAL DESBASTE FINO PMX 3Z
 3Z PMX Fine Pitch Roughing End Mill
 Fraise ébauche pas fin PMX 3Z



| | | | | | | | | |
|-----|-----------------|--------------|--|--|--|------------|---------------------|--|
| PMX | PMX + TIALN-TOP | DIN 844 NR-F | | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|-----|-----------------|--------------|--|--|--|------------|---------------------|--|



| Grupo | Sub. | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|-------|------|------------|-----------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| | | PMX | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 |
| P | P.2 | 30-42 | 45-75 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | P.3 | 12-18 | 20-35 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| | P.5 | 18-24 | 30-45 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$
 $Vf (mm/min.) = r.p.m. \times Z \times fz \times K$
 K = Coeficiente corrección
 Correction coefficient
 Coéfficient correction

| D mm | d mm | L mm | I mm | Z | N° Art. PMX | € | N° Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|--------|------------------|--------|
| 4,00 | 6 | 55 | 11 | 3 | 20875 | 42,63 | 21017 | 49,56 |
| 5,00 | 6 | 57 | 13 | 3 | 20881 | 42,63 | 21018 | 49,56 |
| 6,00 | 6 | 57 | 13 | 3 | 20884 | 42,63 | 21019 | 49,56 |
| 8,00 | 10 | 69 | 19 | 3 | 20888 | 46,49 | 21020 | 54,18 |
| 10,00 | 10 | 72 | 22 | 3 | 20889 | 46,23 | 21021 | 52,67 |
| 12,00 | 12 | 83 | 26 | 3 | 20890 | 57,29 | 21022 | 65,50 |
| 14,00 | 12 | 83 | 26 | 3 | 20893 | 69,45 | 21023 | 78,68 |
| 16,00 | 16 | 92 | 32 | 3 | 20895 | 82,08 | 21024 | 92,90 |
| 18,00 | 16 | 92 | 32 | 3 | 20897 | 94,50 | 21025 | 108,18 |
| 20,00 | 20 | 104 | 38 | 3 | 20898 | 116,84 | 21026 | 130,19 |
| 25,00 | 25 | 121 | 45 | 3 | 20899 | 172,82 | 21027 | 191,16 |
| 28,00 | 25 | 121 | 45 | 3 | 11129 | 173,90 | 13195 | 208,72 |
| 30,00 | 25 | 121 | 45 | 3 | 20900 | 231,77 | 21028 | 257,77 |

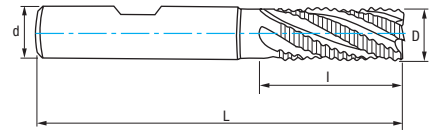


Ref. 4644

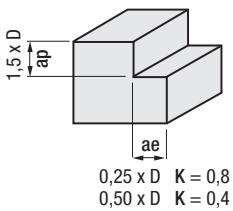
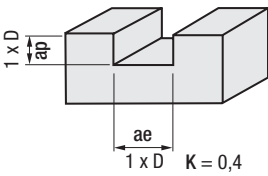
FRESA FRONTAL DESBASTE FINO HSSE 8% CO NZ

NZ HSSE 8% Co Fine Pitch Roughing End Mill

Fraise ébauche pas fin HSSE 8% Co NZ



| | | | | | | | | | | |
|------------|----------------------|--------------|----------|--|-------|--|--|------------|---------------------|--|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 NR-F | ISO 1641 | | 3-5 Z | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|------------|----------------------|--------------|----------|--|-------|--|--|------------|---------------------|--|



| Material | | Vc (m/min) | | Refs. 4644-4696 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------|------------|---------|---|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | |
| P | P.2 | 25-35 | 35-46 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| K | K.1 | 20-30 | 25-45 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | K.2 | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| S | | 15-20 | 20-25 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,110 | 0,130 | 0,130 | 0,130 | |
| N | N.1 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | N.2 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$



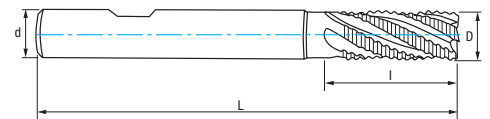
| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 4,00 | 6 | 55 | 11 | 3 | 41857 | 38,90 | 41860 | 45,06 | 14,00 | 12 | 83 | 26 | 4 | 46535 | 49,80 | 41788 | 61,63 |
| 5,00 | 6 | 57 | 13 | 3 | 41803 | 41,92 | 41856 | 48,06 | 15,00 | 12 | 83 | 26 | 4 | 69540 | 65,49 | 41789 | 77,33 |
| 6,00 | 6 | 57 | 13 | 4 | 46517 | 34,05 | 41780 | 41,09 | 16,00 | 16 | 92 | 32 | 4 | 46538 | 58,80 | 41790 | 72,46 |
| 7,00 | 10 | 66 | 16 | 4 | 46520 | 41,01 | 41781 | 49,11 | 17,00 | 16 | 92 | 32 | 4 | 69541 | 80,70 | 41791 | 93,80 |
| 8,00 | 10 | 69 | 19 | 4 | 46523 | 35,51 | 41782 | 43,63 | 18,00 | 16 | 92 | 32 | 4 | 46541 | 64,40 | 41792 | 79,97 |
| 9,00 | 10 | 69 | 19 | 4 | 46526 | 42,57 | 41783 | 51,43 | 19,00 | 16 | 92 | 32 | 4 | 69552 | 94,67 | 41793 | 107,07 |
| 10,00 | 10 | 72 | 22 | 4 | 46529 | 35,59 | 41784 | 42,69 | 20,00 | 20 | 104 | 38 | 4 | 46544 | 80,73 | 41794 | 96,99 |
| 11,00 | 12 | 79 | 22 | 4 | 68800 | 52,04 | 41785 | 60,96 | 25,00 | 25 | 121 | 45 | 5 | 52347 | 119,30 | 41795 | 141,74 |
| 12,00 | 12 | 83 | 26 | 4 | 46532 | 42,58 | 41786 | 52,64 | 30,00 | 25 | 121 | 45 | 5 | 52362 | 153,24 | 41796 | 186,40 |
| 13,00 | 12 | 83 | 26 | 4 | 69564 | 60,48 | 41787 | 70,41 | | | | | | | | | |

Ref. 4696

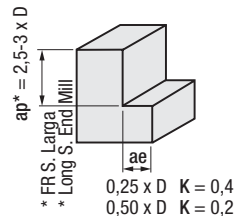
FRESA FRONTAL DESBASTE FINO HSSE 8% CO NZ LARGA

Long NZ HSSE 8% Co Fine Pitch Roughing End Mill

Fraise ébauche pas fin HSSE 8% Co NZ longue



| | | | | | | | | | |
|------------|----------------------|--------------|--|-------|--|--|------------|---------------------|--|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 NR-F | | 4-5 Z | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|------------|----------------------|--------------|--|-------|--|--|------------|---------------------|--|



| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 43263 | 48,31 | 18764 | 54,23 | 14,00 | 12 | 110 | 53 | 4 | 43276 | 62,35 | 17895 | 72,27 |
| 7,00 | 10 | 80 | 30 | 4 | 43264 | 54,79 | 18765 | 61,66 | 16,00 | 16 | 123 | 63 | 4 | 43278 | 72,96 | 17896 | 87,35 |
| 8,00 | 10 | 88 | 38 | 4 | 43266 | 49,96 | 18766 | 56,95 | 18,00 | 16 | 123 | 63 | 4 | 43281 | 86,20 | 18782 | 102,32 |
| 9,00 | 10 | 88 | 38 | 4 | 43269 | 54,79 | 18767 | 62,42 | 20,00 | 20 | 141 | 75 | 4 | 43282 | 103,49 | 18778 | 120,81 |
| 10,00 | 10 | 95 | 45 | 4 | 43272 | 43,82 | 18768 | 52,71 | 25,00 | 25 | 166 | 90 | 5 | 43287 | 159,22 | 18779 | 185,51 |
| 11,00 | 12 | 102 | 45 | 4 | 43273 | 71,15 | 18769 | 80,53 | 30,00 | 25 | 166 | 90 | 5 | 43289 | 241,79 | 18780 | 274,20 |
| 12,00 | 12 | 110 | 53 | 4 | 43275 | 53,94 | 18770 | 63,80 | | | | | | | | | |

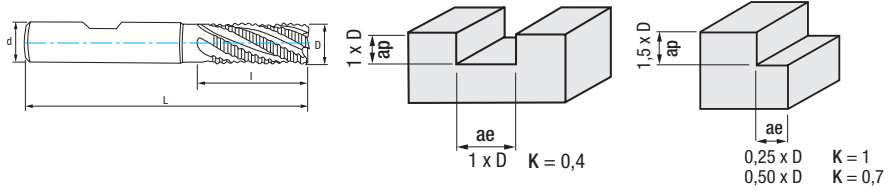
TIALSIN bajo demanda / upon request / sur demande

Ref. 4640

FRESA FRONTAL DESBASTE GRUESO HSSE 8% CO NZ

NZ HSSE 8% Co Coarse Roughing End Mill

Fraise ébauche HSSE 8% Co NZ



| | | | |
|----------------|----------------------|---------------------|----------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 NR | ISO 1641 |
| $\phi \leq 25$ | $\phi > 25$ | 4-6 Z | |
| 30° | DIN 1835 B | Tol. D (k12) d (h6) | |

| Material | | Vc (m/min) | | Refs. 4640-4690 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------|------------|---------|---|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| Grupo | Sub. | 8% Co | TIALSIN | $\phi 6$ | $\phi 8$ | $\phi 10$ | $\phi 12$ | $\phi 16$ | $\phi 20$ | $\phi 25$ | $\phi 32$ | $\phi 40$ | |
| P | P.1 | 30-40 | 40-56 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| K | K.1 | 20-30 | 25-45 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | K.2 | 15-20 | 20-25 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| N | N.1 | 60-100 | 80-140 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | N.2 | 60-100 | 80-140 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$
 $Vf (mm/min.) = r.p.m. \times Z \times fz \times K$
 K = Coeficiente corrección / Correction coefficient - Coefficient correction

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|
| 4,00 | 6 | 55 | 11 | 3 | 45862 | 35,33 | 21813 | 41,53 |
| 5,00 | 6 | 57 | 13 | 3 | 45864 | 38,12 | 21814 | 44,24 |
| 6,00 | 6 | 57 | 13 | 4 | 46457 | 30,94 | 41756 | 37,37 |
| 7,00 | 10 | 66 | 16 | 4 | 77662 | 37,27 | 41757 | 44,62 |
| 8,00 | 10 | 69 | 19 | 4 | 46460 | 32,31 | 41758 | 39,78 |
| 9,00 | 10 | 69 | 19 | 4 | 77663 | 38,70 | 41759 | 46,76 |
| 10,00 | 10 | 72 | 22 | 4 | 46463 | 32,35 | 41760 | 39,44 |
| 11,00 | 12 | 79 | 22 | 4 | 77664 | 47,32 | 41761 | 56,35 |
| 12,00 | 12 | 83 | 26 | 4 | 46466 | 38,71 | 41762 | 47,99 |
| 13,00 | 12 | 83 | 26 | 4 | 77665 | 54,97 | 41763 | 65,07 |
| 14,00 | 12 | 83 | 26 | 4 | 46469 | 45,27 | 41764 | 55,69 |
| 15,00 | 12 | 83 | 26 | 4 | 77666 | 59,53 | 41765 | 71,53 |
| 16,00 | 16 | 92 | 32 | 4 | 46472 | 53,35 | 41766 | 65,59 |
| 17,00 | 16 | 92 | 32 | 4 | 77667 | 73,35 | 41767 | 86,68 |
| 18,00 | 16 | 92 | 32 | 4 | 46475 | 58,57 | 41768 | 72,27 |

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 19,00 | 16 | 92 | 32 | 4 | 77668 | 86,07 | 41769 | 100,50 |
| 20,00 | 20 | 104 | 38 | 4 | 46478 | 73,38 | 41770 | 88,18 |
| 22,00 | 20 | 104 | 38 | 5 | 46481 | 86,87 | 41771 | 107,57 |
| 24,00 | 25 | 121 | 45 | 5 | 77669 | 109,25 | 41772 | 126,60 |
| 25,00 | 25 | 121 | 45 | 5 | 46484 | 108,48 | 41773 | 125,81 |

$\phi > 25$ mm sin Corte al Centro (antigua 4440) / Non Center Cutting (old 4440) / Sans coupe au centre (vieux 4440)

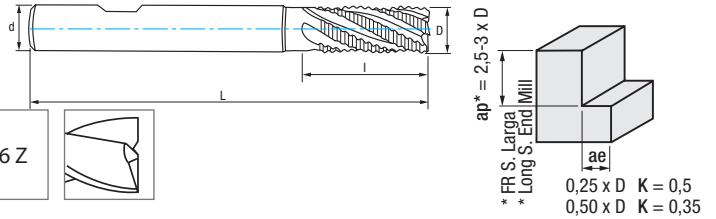
| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 26,00 | 25 | 121 | 45 | 5 | 77670 | 114,46 | 41774 | 143,77 |
| 28,00 | 25 | 121 | 45 | 5 | 46487 | 114,06 | 41775 | 143,37 |
| 30,00 | 25 | 121 | 45 | 5 | 46490 | 126,66 | 41776 | 155,58 |
| 32,00 | 32 | 133 | 53 | 6 | 46493 | 138,91 | 41777 | 167,48 |
| 36,00 | 32 | 133 | 53 | 6 | 77671 | 164,48 | 41778 | 195,84 |
| 40,00 | 40 | 155 | 63 | 6 | 77672 | 184,93 | 41779 | 225,59 |

Ref. 4690

FRESA FRONTAL DESBASTE GRUESO HSSE 8% CO NZ LARGA

Long NZ HSSE 8% Co Coarse Roughing End Mill

Fraise ébauche HSSE 8% Co NZ longue



| | | | |
|----------------|----------------------|---------------------|----------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 NR | ISO 1641 |
| $\phi \leq 25$ | $\phi > 25$ | 4-6 Z | |
| 30° | DIN 1835 B | Tol. D (k12) d (h6) | |

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 77784 | 43,92 | 17883 | 49,97 |
| 7,00 | 10 | 80 | 30 | 4 | 77785 | 49,83 | 18157 | 56,82 |
| 8,00 | 10 | 88 | 38 | 4 | 77786 | 45,41 | 18159 | 52,53 |
| 9,00 | 10 | 88 | 38 | 4 | 77787 | 49,83 | 18160 | 57,57 |
| 10,00 | 10 | 95 | 45 | 4 | 46634 | 39,86 | 43084 | 48,82 |
| 11,00 | 12 | 102 | 45 | 4 | 77788 | 64,69 | 18162 | 74,24 |
| 12,00 | 12 | 110 | 53 | 4 | 46637 | 49,05 | 43086 | 59,03 |
| 14,00 | 12 | 110 | 53 | 4 | 46640 | 56,68 | 43087 | 66,78 |
| 16,00 | 16 | 123 | 63 | 4 | 46643 | 66,35 | 43089 | 80,90 |
| 18,00 | 16 | 123 | 63 | 4 | 46646 | 78,36 | 43090 | 94,68 |
| 20,00 | 20 | 141 | 75 | 4 | 46649 | 94,11 | 43092 | 111,68 |

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 22,00 | 20 | 141 | 75 | 5 | 46652 | 120,06 | 18163 | 144,63 |
| 25,00 | 25 | 166 | 90 | 5 | 46655 | 144,76 | 18165 | 171,43 |

$\phi > 25$ mm sin Corte al Centro / Non Center Cutting / Sans coupe au centre

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 28,00 | 25 | 166 | 90 | 5 | 46658 | 163,35 | 18168 | 198,33 |
| 30,00 | 25 | 166 | 90 | 5 | 79047 | 199,83 | 18174 | 233,43 |
| 32,00 | 32 | 186 | 106 | 6 | 46661 | 207,35 | 18180 | 241,21 |
| 36,00 | 32 | 186 | 106 | 6 | 79050 | 248,55 | 18183 | 285,17 |
| 40,00 | 40 | 217 | 125 | 6 | 79052 | 293,85 | 18184 | 352,47 |

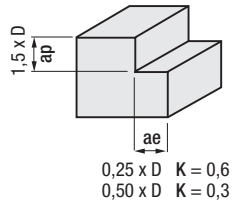
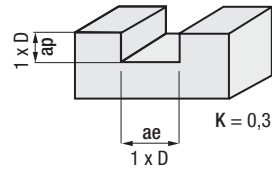
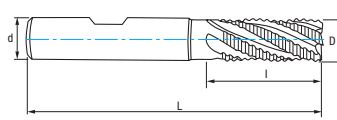
TIALSIN bajo demanda / upon request / sur demande

Ref. 4680

FRESA FRONTAL DESBASTE MEDIO HSSE 8% CO NZ

NZ HSSE 8% Co Roughing & Finishing End Mill

Fraise semi-finition HSSE 8% Co NZ



| | | | |
|----------------|----------------------|------------|----------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 NF | ISO 1641 |
| $\phi \leq 25$ | $\phi > 25$ | | |
| | Tol. D (k12) d (h6) | | |

| Material | | Vc (m/min) | | Refs. 4680-4692 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------|------------|---------|---|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| Grupo | Sub. | 8% Co | TIALSIN | $\phi 6$ | $\phi 8$ | $\phi 10$ | $\phi 12$ | $\phi 16$ | $\phi 20$ | $\phi 25$ | $\phi 32$ | $\phi 40$ | |
| P | P.1 | 25-35 | 35-46 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| K | K.1 | 20-30 | 25-45 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | K.2 | 15-20 | 20-25 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| N | N.1 | 60-100 | 80-140 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | N.2 | 60-100 | 80-140 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K \quad K = \begin{matrix} \text{Coeficiente corrección} \\ \text{Correction coefficient} - \text{Coéficent correction} \end{matrix}$$

| D mm | d mm | L mm | l mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|
| 6,00 | 6 | 57 | 13 | 4 | 77713 | 29,87 | 17714 | 36,35 |
| 7,00 | 10 | 66 | 16 | 4 | 77714 | 36,39 | 21867 | 43,77 |
| 8,00 | 10 | 69 | 19 | 4 | 77715 | 35,88 | 17715 | 43,28 |
| 9,00 | 10 | 69 | 19 | 4 | 77716 | 39,86 | 21868 | 47,91 |
| 10,00 | 10 | 72 | 22 | 4 | 46613 | 27,91 | 17716 | 36,28 |
| 11,00 | 12 | 79 | 22 | 4 | 77717 | 43,86 | 17717 | 52,99 |
| 12,00 | 12 | 83 | 26 | 4 | 46616 | 35,62 | 17718 | 45,00 |
| 13,00 | 12 | 83 | 26 | 4 | 77718 | 52,47 | 21869 | 62,66 |
| 14,00 | 12 | 83 | 26 | 4 | 40526 | 40,62 | 17947 | 51,12 |
| 15,00 | 12 | 83 | 26 | 4 | 77719 | 55,17 | 21870 | 67,31 |
| 16,00 | 16 | 92 | 32 | 4 | 46619 | 45,82 | 15099 | 58,24 |
| 18,00 | 16 | 92 | 32 | 4 | 40550 | 53,11 | 19300 | 66,94 |

| D mm | d mm | L mm | l mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|--------|
| 20,00 | 20 | 104 | 38 | 4 | 46622 | 64,74 | 16611 | 79,78 |
| 22,00 | 20 | 104 | 38 | 5 | 78051 | 78,04 | 21831 | 98,97 |
| 25,00 | 25 | 121 | 45 | 5 | 46625 | 98,12 | 16612 | 118,54 |

| $\phi > 25$ mm sin Corte al Centro | | | | | | | | |
|---|----|-----|----|---|-------|--------|-------|--------|
| Non Center Cutting / Sans coupe au centre | | | | | | | | |
| 28,00 | 25 | 121 | 45 | 5 | 78054 | 107,74 | 21900 | 137,57 |
| 30,00 | 25 | 121 | 45 | 5 | 78061 | 126,65 | 22192 | 155,95 |
| 32,00 | 32 | 133 | 53 | 6 | 78065 | 117,70 | 19532 | 147,26 |
| 36,00 | 32 | 133 | 53 | 6 | 78068 | 164,48 | 22193 | 196,29 |
| 40,00 | 40 | 155 | 63 | 6 | 78134 | 208,06 | 22194 | 248,57 |

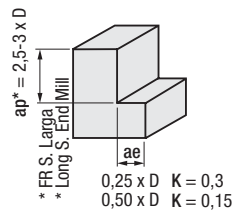
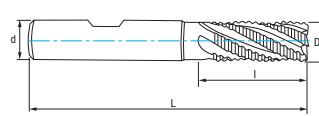
TIALSIN bajo demanda / upon request / sur demande

Ref. 4692

FRESA FRONTAL DESBASTE MEDIO HSSE 8% CO NZ LARGA

Long NZ HSSE 8% Co Roughing & Finishing End Mill

Fraise semi-finition HSSE 8% Co NZ longue



| | | | |
|----------------|----------------------|------------|----------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 NF | ISO 1641 |
| $\phi \leq 25$ | $\phi > 25$ | | |
| | Tol. D (k12) d (h6) | | |

| D mm | d mm | L mm | l mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 77789 | 43,92 | 13074 | 49,97 |
| 7,00 | 10 | 80 | 30 | 4 | 77790 | 49,83 | 13076 | 56,82 |
| 8,00 | 10 | 88 | 38 | 4 | 77791 | 48,36 | 21816 | 55,39 |
| 9,00 | 10 | 88 | 38 | 4 | 77792 | 58,01 | 13077 | 65,56 |
| 10,00 | 10 | 95 | 45 | 4 | 52371 | 45,26 | 21483 | 54,07 |
| 11,00 | 12 | 102 | 45 | 4 | 77793 | 64,69 | 13080 | 74,24 |
| 12,00 | 12 | 110 | 53 | 4 | 52374 | 59,11 | 18901 | 68,83 |
| 14,00 | 12 | 110 | 53 | 4 | 52377 | 65,15 | 13082 | 75,00 |
| 16,00 | 16 | 123 | 63 | 4 | 52380 | 78,04 | 13083 | 92,26 |
| 18,00 | 16 | 123 | 63 | 4 | 52383 | 84,42 | 13085 | 100,52 |
| 20,00 | 20 | 141 | 75 | 4 | 52386 | 103,75 | 19515 | 121,05 |

| D mm | d mm | L mm | l mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 22,00 | 20 | 141 | 75 | 5 | 52389 | 121,41 | 13086 | 145,79 |
| 25,00 | 25 | 166 | 90 | 5 | 52392 | 149,58 | 13087 | 176,13 |

| $\phi > 25$ mm sin Corte al Centro | | | | | | | | |
|---|----|-----|-----|---|-------|--------|-------|--------|
| Non Center Cutting / Sans coupe au centre | | | | | | | | |
| 28,00 | 25 | 166 | 90 | 5 | 52395 | 158,63 | 13088 | 193,39 |
| 30,00 | 25 | 166 | 90 | 5 | 52398 | 177,65 | 13089 | 211,83 |
| 32,00 | 32 | 186 | 106 | 6 | 52401 | 192,26 | 13090 | 226,07 |
| 36,00 | 32 | 186 | 106 | 6 | 79086 | 248,55 | 13091 | 285,17 |
| 40,00 | 40 | 217 | 125 | 6 | 79087 | 299,72 | 16562 | 358,34 |

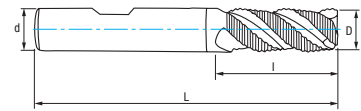
TIALSIN bajo demanda / upon request / sur demande

Ref. **4447**

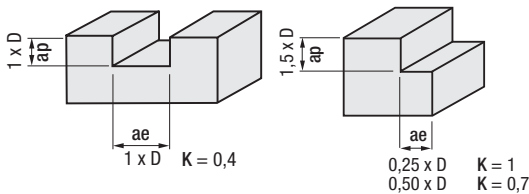
FRESA FRONTAL DESBASTE GRUESO HSSE 8% CO 3Z

3Z HSSE 8% Co Coarse Roughing End Mill

Fraise ébauche HSSE 8% Co 3Z



| | | | | | | | | | |
|------------|----------------------|------------|------------|--|--|--|------------|---------------------|--|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 WR | ISO 1641/1 | | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|------------|----------------------|------------|------------|--|--|--|------------|---------------------|--|



| Material | | Vc (m/min) | | Refs. 4447-4497 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|---------|---|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 |
| P | P.1 | 30-40 | 40-56 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.1 | 60-100 | 80-140 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 |
| N | N.2 | 60-100 | 80-140 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.3 | 160-200 | 220-280 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 |
| | N.4 | 160-200 | 220-280 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 |
| | N.5 | 50-80 | 70-110 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|--------------|------|------|------|---|---------------|--------------|-----------------|--------------|
| 6,00 | 6 | 57 | 13 | 3 | 44741 | 32,52 | 24366 | 38,20 |
| 8,00 | 10 | 69 | 19 | 3 | 44744 | 35,48 | 17623 | 41,17 |
| 9,00 | 10 | 69 | 19 | 3 | 78849 | 42,38 | 17624 | 49,49 |
| 10,00 | 10 | 72 | 22 | 3 | 44747 | 35,50 | 17626 | 43,69 |
| 11,00 | 12 | 79 | 22 | 3 | 78850 | 51,76 | 17174 | 59,52 |
| 12,00 | 12 | 83 | 26 | 3 | 44750 | 42,60 | 17597 | 50,36 |
| 13,00 | 12 | 83 | 26 | 3 | 78851 | 56,39 | 17175 | 65,12 |
| 14,00 | 12 | 83 | 26 | 3 | 44753 | 48,68 | 17627 | 57,38 |

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|--------------|------|------|------|---|---------------|---------------|-----------------|---------------|
| 15,00 | 12 | 83 | 26 | 3 | 78852 | 63,70 | 17176 | 73,91 |
| 16,00 | 16 | 92 | 32 | 3 | 44756 | 59,01 | 17599 | 71,17 |
| 18,00 | 16 | 92 | 32 | 3 | 44759 | 64,70 | 17600 | 78,84 |
| 20,00 | 20 | 104 | 38 | 3 | 44762 | 79,72 | 17601 | 92,33 |
| 22,00 | 20 | 104 | 38 | 3 | 44765 | 97,28 | 24367 | 114,54 |
| 25,00 | 25 | 121 | 45 | 3 | 44768 | 119,24 | 17628 | 136,59 |
| 30,00 | 25 | 121 | 45 | 3 | 40334 | 148,79 | 17629 | 175,13 |

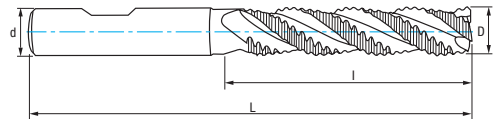
TIALSIN bajo demanda / upon request / sur demande

Ref. **4497**

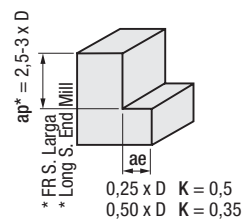
FRESA FRONTAL DESBASTE GRUESO HSSE 8% CO 3Z LARGA

Long 3Z HSSE 8% Co Coarse Roughing End Mill

Fraise ébauche HSSE 8% Co 3Z longue



| | | | | | | | | | |
|------------|----------------------|------------|------------|--|--|--|------------|---------------------|--|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 WR | ISO 1641/1 | | | | DIN 1835 B | Tol. D (k12) d (h6) | |
|------------|----------------------|------------|------------|--|--|--|------------|---------------------|--|



| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|--------------|------|------|------|---|---------------|--------------|-----------------|--------------|
| 8,00 | 10 | 88 | 38 | 3 | 78862 | 42,16 | 17155 | 48,98 |
| 10,00 | 10 | 95 | 45 | 3 | 78863 | 43,80 | 20784 | 52,67 |
| 12,00 | 12 | 110 | 53 | 3 | 78864 | 48,74 | 43137 | 58,78 |
| 14,00 | 12 | 110 | 53 | 3 | 78865 | 53,18 | 19653 | 64,51 |
| 16,00 | 16 | 123 | 63 | 3 | 78866 | 60,30 | 17872 | 77,53 |

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|--------------|------|------|------|---|---------------|---------------|-----------------|---------------|
| 18,00 | 16 | 123 | 63 | 3 | 78867 | 71,86 | 21069 | 86,74 |
| 20,00 | 20 | 141 | 75 | 3 | 78868 | 80,74 | 21070 | 96,99 |
| 25,00 | 25 | 166 | 90 | 3 | 40338 | 119,42 | 21071 | 141,55 |
| 30,00 | 25 | 166 | 90 | 3 | 40342 | 153,24 | 21072 | 185,11 |

TIALSIN bajo demanda / upon request / sur demande

Continuous improvement in quality control

izartool.com

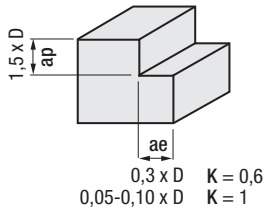
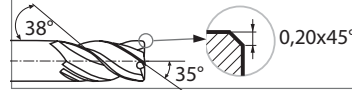
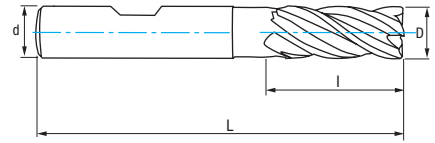


Ref. **6666**
HV

FRESA FRONTAL PMX NZ HÉLICE ALTERNA

Unequal Helix NZ PMX End Mill

Fraise PMX NZ hélice alternée



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
| P | P.2 | 45-75 | 0,037 | 0,044 | 0,072 | 0,086 | 0,144 | 0,144 | 0,144 |
| | P.3 | 20-35 | 0,031 | 0,037 | 0,065 | 0,065 | 0,094 | 0,094 | 0,094 |
| | P.5 | 30-45 | 0,031 | 0,037 | 0,065 | 0,065 | 0,094 | 0,094 | 0,094 |
| M | | 20-35 | 0,031 | 0,037 | 0,065 | 0,065 | 0,094 | 0,094 | 0,094 |
| K | K.1 | 35-65 | 0,037 | 0,044 | 0,072 | 0,086 | 0,144 | 0,144 | 0,144 |
| | K.2 | 35-65 | 0,037 | 0,044 | 0,072 | 0,086 | 0,144 | 0,144 | 0,144 |
| S | | 30-45 | 0,052 | 0,077 | 0,096 | 0,115 | 0,159 | 0,187 | 0,187 |
| N | N.1 | 110-210 | 0,052 | 0,077 | 0,096 | 0,115 | 0,159 | 0,187 | 0,187 |
| | N.4 | 290-420 | 0,052 | 0,077 | 0,096 | 0,115 | 0,159 | 0,187 | 0,187 |
| | N.5 | 90-170 | 0,037 | 0,044 | 0,072 | 0,086 | 0,144 | 0,144 | 0,144 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | N° Art TIALN-TOP | € |
|-------|------|------|------|---|------------------|--------|
| 6,00 | 6 | 57 | 13 | 4 | 28488 | 26,75 |
| 8,00 | 10 | 69 | 19 | 4 | 28489 | 34,52 |
| 10,00 | 10 | 72 | 22 | 4 | 28478 | 36,89 |
| 12,00 | 12 | 83 | 26 | 4 | 28479 | 46,57 |
| 16,00 | 16 | 92 | 32 | 5 | 28492 | 69,88 |
| 18,00 | 16 | 92 | 32 | 5 | 28494 | 84,26 |
| 20,00 | 20 | 104 | 38 | 5 | 28495 | 98,15 |
| 25,00 | 25 | 121 | 45 | 6 | 28484 | 162,94 |

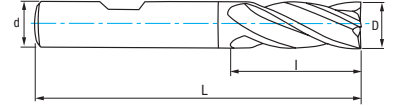


- Acero Pulvimetalúrgico de gran rendimiento, elevada resistencia, tenacidad y homogeneidad
- Geometría con hélice alterna = Evita vibraciones y daños por desconchamiento en los filos de corte
- Reducción del ruido = Mecanizado suave y silencioso
- Mejora la calidad de la superficie mecanizada
- Mayor productividad = Aumento de hasta un 40% en los avances standard
- Menor desgaste + ausencia de vibraciones = Mayor vida útil de la herramienta
- High performance powder metal steel: high resistance, toughness and homogeneity
- Unequal helix geometry = Vibrations and cutting edge scaling caused damages avoided
- Noise reduction = Silent & soft machining
- Machined surface quality improved
- Higher productivity = Standard feed improved up to 40%
- Less wear + no vibrations = Longer tool life
- Acier Fritté d'haute performance, grand rendement et résistance à l'usure.
- Géométrie Hélice Alternée = Pas de vibrations et pas de dommages sur les arêtes de coupe.
- Reduction du bruit = Usinage tendre et sans bruit
- Augmente la qualité de la surface usinée
- Meilleure Productivité = Augmentation d'un 40% sur les avances standards.
- Moins d'usure et manque de vibrations = Meilleure vie utile de l'outil

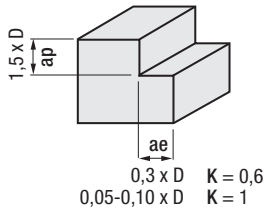


Ref. **6600**
IZARMAX

FRESA FRONTAL ACABADO PMX NZ
NZ PMX Finishing End Mill
Fraise finition PMX NZ



| | | | | | | | | |
|-----|-----------------|-----------|--|-------|--|--|------------|---------------------|
| PMX | PMX + TIALN-TOP | DIN 844 N | | 4-6 Z | | | DIN 1835 B | Tol. D (k10) d (h6) |
|-----|-----------------|-----------|--|-------|--|--|------------|---------------------|



| Material | | Vc (m/min) | | Refs. 6600-6606 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|------|------------|-----------|---|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 |
| P | P.2 | 30-42 | 45-75 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | P.3 | 12-18 | 20-35 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| | P.5 | 18-24 | 30-45 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| M | | 16-22 | 20-35 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| K | K.1 | 24-36 | 35-65 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | K.2 | 24-36 | 35-65 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| S | | 18-24 | 30-45 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| N | N.1 | 70-120 | 110-210 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | N.4 | 190-240 | 290-420 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | N.5 | 60-96 | 90-170 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

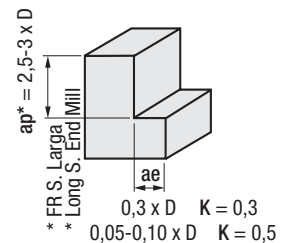
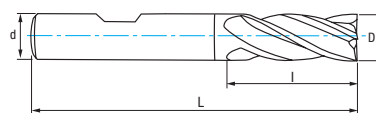
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € | D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|-------------------|-------|-------|------|------|------|---|-------------|--------|-------------------|--------|
| 2,00 | 6 | 51 | 7 | 4 | 45718 | 15,59 | 45932 | 21,56 | 12,00 | 12 | 83 | 26 | 4 | 45183 | 28,58 | 45523 | 37,00 |
| 3,00 | 6 | 52 | 8 | 4 | 45166 | 15,59 | 45481 | 21,56 | 14,00 | 12 | 83 | 26 | 4 | 45186 | 38,69 | 45525 | 47,39 |
| 4,00 | 6 | 55 | 11 | 4 | 45168 | 15,59 | 45482 | 21,56 | 16,00 | 16 | 92 | 32 | 4 | 45189 | 44,67 | 45526 | 54,90 |
| 5,00 | 6 | 57 | 13 | 4 | 45169 | 15,59 | 45483 | 21,56 | 18,00 | 16 | 92 | 32 | 4 | 45192 | 54,52 | 45528 | 66,01 |
| 6,00 | 6 | 57 | 13 | 4 | 45171 | 15,59 | 45933 | 21,56 | 20,00 | 20 | 104 | 38 | 4 | 45195 | 64,08 | 45531 | 76,68 |
| 7,00 | 10 | 66 | 16 | 4 | 45174 | 21,01 | 45496 | 28,49 | 25,00 | 25 | 121 | 45 | 6 | 45198 | 109,02 | 45534 | 126,35 |
| 8,00 | 10 | 69 | 19 | 4 | 45177 | 20,87 | 45510 | 27,55 | 28,00 | 25 | 121 | 45 | 6 | 11135 | 130,38 | 13221 | 169,72 |
| 9,00 | 10 | 69 | 19 | 4 | 23134 | 24,91 | 23147 | 32,01 | 30,00 | 25 | 121 | 45 | 6 | 14826 | 152,28 | 14895 | 176,90 |
| 10,00 | 10 | 72 | 22 | 4 | 45180 | 22,23 | 45522 | 29,47 | 32,00 | 32 | 133 | 53 | 6 | 45720 | 160,26 | 45222 | 184,87 |

Ref. **6606**
IZARMAX

FRESA FRONTAL ACABADO PMX NZ LARGA
Long NZ PMX Finishing End Mill
Fraise finition PMX NZ longue

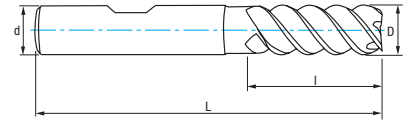


| | | | | | | | | |
|-----|-----------------|-----------|--|-------|--|--|------------|---------------------|
| PMX | PMX + TIALN-TOP | DIN 844 N | | 4-6 Z | | | DIN 1835 B | Tol. D (k10) d (h6) |
|-----|-----------------|-----------|--|-------|--|--|------------|---------------------|

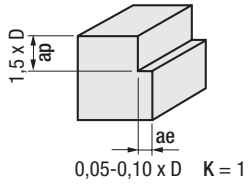
| D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € | D mm | d mm | L mm | I mm | Z | Nº Art. PMX | € | Nº Art. TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|-------------------|-------|-------|------|------|------|---|-------------|--------|-------------------|--------|
| 6,00 | 6 | 68 | 24 | 4 | 45225 | 19,00 | 45541 | 25,25 | 16,00 | 16 | 123 | 63 | 4 | 45235 | 53,52 | 45555 | 67,06 |
| 8,00 | 10 | 88 | 38 | 4 | 45228 | 27,42 | 45544 | 33,25 | 18,00 | 16 | 123 | 63 | 4 | 45236 | 67,78 | 45559 | 82,54 |
| 10,00 | 10 | 95 | 45 | 4 | 45231 | 27,34 | 45547 | 35,92 | 20,00 | 20 | 141 | 75 | 4 | 45237 | 79,36 | 45562 | 95,27 |
| 12,00 | 12 | 110 | 53 | 4 | 45233 | 37,42 | 45550 | 46,77 | 25,00 | 25 | 166 | 90 | 6 | 45238 | 145,95 | 45565 | 168,94 |
| 14,00 | 12 | 110 | 53 | 4 | 45234 | 48,94 | 45553 | 54,07 | 32,00 | 32 | 186 | 106 | 6 | 45724 | 203,89 | 45726 | 233,18 |

Ref. **6604**
IZARMAX

FRESA FRONTAL SUPER-ACABADO PMX 4Z
 4Z PMX Super-Finishing End Mill
 Fraise super-finition PMX 4Z



| | | | | | | | | |
|-----|-----------------|-----------|--|-----|--|--|------------|---------------------|
| PMX | PMX + TIALN-TOP | DIN 844 N | | 4 Z | | | DIN 1835 B | Tol. D (k10) d (h6) |
|-----|-----------------|-----------|--|-----|--|--|------------|---------------------|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | |
|----------|------|------------|-----------|-------------------------------------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 35-45 | 55-80 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 |
| | P.2 | 30-42 | 45-75 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 |
| S | | 18-24 | 30-45 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 |
| N | N.1 | 70-120 | 110-210 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 |
| | N.2 | 70-120 | 110-210 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
 Correction coefficient
 Coefficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | N° Art. PMX | € | N° Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|-------|------------------|--------|
| 6,00 | 6 | 57 | 13 | 4 | 45384 | 22,31 | 45479 | 28,80 |
| 8,00 | 10 | 69 | 19 | 4 | 45385 | 29,07 | 45480 | 36,36 |
| 10,00 | 10 | 72 | 22 | 4 | 45387 | 32,41 | 45276 | 40,33 |
| 12,00 | 12 | 83 | 26 | 4 | 45388 | 44,45 | 45345 | 52,99 |
| 14,00 | 12 | 83 | 26 | 4 | 45390 | 56,47 | 45396 | 65,73 |
| 16,00 | 16 | 92 | 32 | 4 | 45391 | 65,46 | 45484 | 76,35 |
| 18,00 | 16 | 92 | 32 | 4 | 45393 | 80,53 | 45495 | 92,44 |
| 20,00 | 20 | 104 | 38 | 4 | 45394 | 94,36 | 45509 | 107,06 |

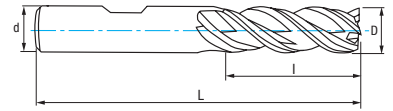


Ref. **6430**
IZARMAX

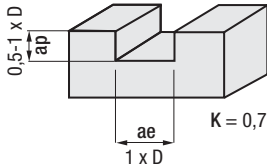
FRESA FRONTAL ACABADO PMX 3Z ALUMINIO

Aluminium 3Z PMX Finishing End Mill

Fraise finition PMX 3Z aluminium



| | | | | | | | |
|-----|-----------------|-----------|--|--|--|------------|--------------------|
| PMX | PMX + TIALN-TOP | DIN 844 W | | | | DIN 1835 B | Tol. D (e8) d (h6) |
|-----|-----------------|-----------|--|--|--|------------|--------------------|



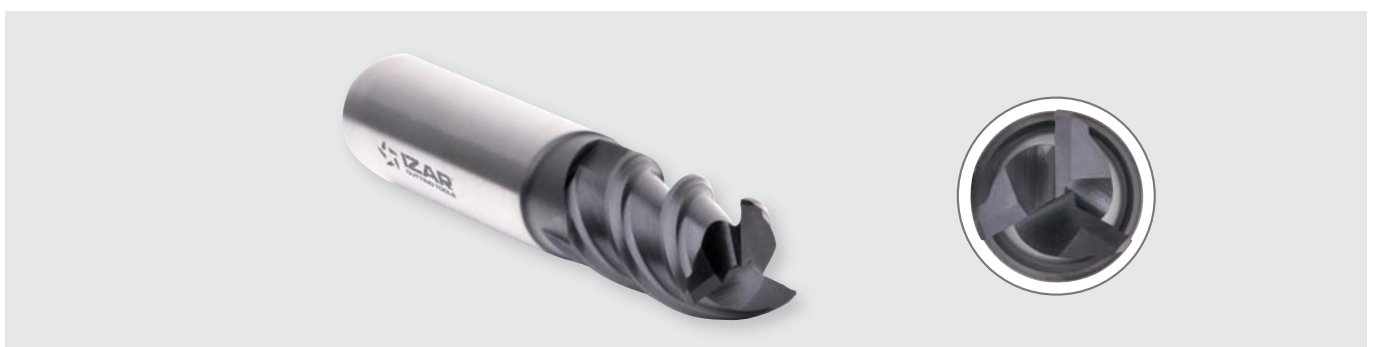
| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | |
|----------|------|------------|-----------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 28 |
| M | | 16-22 | 20-35 | 0,012 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| S | | 18-24 | 30-45 | 0,025 | 0,042 | 0,060 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| N | N.1 | 70-120 | 110-210 | 0,025 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,127 | 0,150 | 0,150 |
| | N.2 | 70-120 | 110-210 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | N.3 | 190-240 | 290-420 | 0,025 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | N.4 | 190-240 | 290-420 | 0,025 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | N.5 | 60-96 | 90-170 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
 Correction coefficient
 Coéficent correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | N° Art. PMX | € | N° Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|--------|------------------|--------|
| 4,00 | 6 | 55 | 11 | 3 | 45277 | 17,24 | 45415 | 23,48 |
| 5,00 | 6 | 57 | 13 | 3 | 45279 | 17,24 | 45417 | 23,48 |
| 6,00 | 6 | 57 | 13 | 3 | 45280 | 17,24 | 45420 | 23,48 |
| 7,00 | 10 | 66 | 16 | 3 | 45312 | 23,12 | 45423 | 29,61 |
| 8,00 | 10 | 69 | 19 | 3 | 45333 | 23,12 | 45426 | 29,61 |
| 9,00 | 10 | 69 | 19 | 3 | 23136 | 27,31 | 23146 | 34,49 |
| 10,00 | 10 | 72 | 22 | 3 | 45336 | 24,54 | 45429 | 31,66 |
| 12,00 | 12 | 83 | 26 | 3 | 45339 | 31,45 | 45432 | 39,22 |
| 14,00 | 12 | 83 | 26 | 3 | 45340 | 42,55 | 45438 | 51,26 |
| 16,00 | 16 | 92 | 32 | 3 | 45342 | 49,16 | 45441 | 59,82 |
| 18,00 | 16 | 92 | 32 | 3 | 45343 | 59,95 | 45444 | 71,45 |
| 20,00 | 20 | 104 | 38 | 3 | 45344 | 70,48 | 45447 | 83,09 |
| 25,00 | 25 | 121 | 45 | 3 | 11124 | 119,93 | 13159 | 148,26 |
| 28,00 | 25 | 121 | 45 | 3 | 11126 | 143,39 | 13177 | 180,19 |



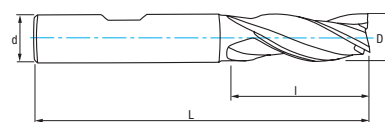
Ref. **6439**

IZARMAX

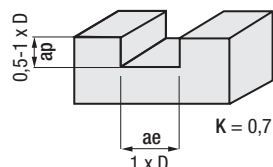
FRESA FRONTAL ACABADO PMX 3Z

3Z PMX Finishing End Mill

Fraise finition PMX 3Z



| | | | | | | | |
|-----|-----------------|-----------|--|--|--|------------|--------------------|
| PMX | PMX + TIALN-TOP | DIN 844 N | | | | DIN 1835 B | Tol. D (e8) d (h6) |
|-----|-----------------|-----------|--|--|--|------------|--------------------|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | |
|----------|------|------------|-----------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | PMX | TIALN-TOP | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 28 |
| P | P.2 | 30-42 | 45-75 | 0,014 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | P.3 | 12-18 | 20-35 | 0,012 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| | P.5 | 18-24 | 30-45 | 0,012 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

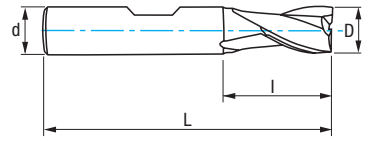
$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|--------|------------------|--------|
| 2,00 | 6 | 51 | 7 | 3 | 45721 | 15,67 | 45723 | 22,74 |
| 3,00 | 6 | 52 | 8 | 3 | 45262 | 15,67 | 45453 | 22,74 |
| 4,00 | 6 | 55 | 11 | 3 | 45263 | 15,67 | 45456 | 22,74 |
| 5,00 | 6 | 57 | 13 | 3 | 45264 | 15,67 | 45459 | 22,74 |
| 6,00 | 6 | 57 | 13 | 3 | 45265 | 15,67 | 45462 | 22,74 |
| 7,00 | 10 | 66 | 16 | 3 | 45266 | 21,01 | 45463 | 29,12 |
| 8,00 | 10 | 69 | 19 | 3 | 45267 | 21,01 | 45465 | 29,12 |
| 9,00 | 10 | 69 | 19 | 3 | 23137 | 24,81 | 23145 | 33,96 |
| 10,00 | 10 | 72 | 22 | 3 | 45268 | 22,31 | 45468 | 31,47 |
| 12,00 | 12 | 83 | 26 | 3 | 45269 | 28,58 | 45469 | 38,59 |
| 14,00 | 12 | 83 | 26 | 3 | 45270 | 38,69 | 45471 | 50,32 |
| 16,00 | 16 | 92 | 32 | 3 | 45271 | 44,67 | 45474 | 57,87 |
| 18,00 | 16 | 92 | 32 | 3 | 45272 | 54,52 | 45475 | 69,59 |
| 20,00 | 20 | 104 | 38 | 3 | 45273 | 64,08 | 45477 | 80,38 |
| 25,00 | 25 | 121 | 45 | 3 | 45274 | 109,02 | 45478 | 131,71 |
| 28,00 | 25 | 121 | 45 | 3 | 11128 | 130,38 | 13192 | 170,90 |

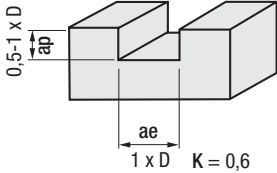


Ref. **6420**
IZARMAX

FRESA FRONTAL ACABADO PMX 2Z
 2Z PMX Finishing End Mill
 Fraise finition PMX 2Z



| | | | | | | |
|-----|-----------------|-----------|--|--|--|--------------------|
| PMX | PMX + TIALN-TOP | DIN 327 N | | | | Tol. D (e8) d (h6) |
|-----|-----------------|-----------|--|--|--|--------------------|



| Material | Grupo | Sub. | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | |
|----------|-------|------|------------|-----------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | PMX | TIALN-TOP | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 28 |
| P | P | P.1 | 35-45 | 55-80 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | | P.2 | 30-42 | 45-75 | 0,014 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | | P.3 | 12-18 | 20-35 | 0,012 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| | | P.5 | 18-24 | 30-45 | 0,012 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| K | K | K.1 | 24-36 | 35-65 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | | K.2 | 24-36 | 35-65 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| M | M | | 16-22 | 20-35 | 0,012 | 0,025 | 0,030 | 0,052 | 0,052 | 0,075 | 0,075 | 0,075 | 0,075 |
| S | S | | 18-24 | 30-45 | 0,025 | 0,042 | 0,060 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| N | N | N.1 | 70-120 | 110-210 | 0,025 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | | N.2 | 70-120 | 110-210 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |
| | | N.3 | 190-240 | 290-420 | 0,025 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | | N.4 | 190-240 | 290-420 | 0,025 | 0,042 | 0,062 | 0,077 | 0,092 | 0,127 | 0,150 | 0,150 | 0,150 |
| | | N.5 | 60-96 | 90-170 | 0,020 | 0,030 | 0,035 | 0,058 | 0,069 | 0,115 | 0,115 | 0,115 | 0,115 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

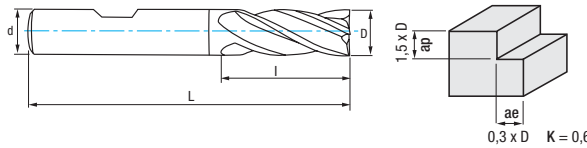
K = Coeficiente corrección
 Correction coefficient
 Coefficient correction

| D mm | d mm | L mm | l mm | Z | Nº Art. PMX | € | Nº Art TIALN-TOP | € |
|-------|------|------|------|---|-------------|--------|------------------|--------|
| 4,00 | 6 | 51 | 7 | 2 | 45250 | 14,31 | 45400 | 20,60 |
| 5,00 | 6 | 52 | 8 | 2 | 45251 | 14,31 | 45401 | 20,60 |
| 6,00 | 6 | 52 | 8 | 2 | 45252 | 14,31 | 45402 | 20,60 |
| 7,00 | 10 | 60 | 10 | 2 | 45253 | 21,58 | 45403 | 28,52 |
| 8,00 | 10 | 61 | 11 | 2 | 45254 | 18,66 | 45404 | 25,78 |
| 9,00 | 10 | 61 | 11 | 2 | 23135 | 23,11 | 23144 | 30,71 |
| 10,00 | 10 | 63 | 13 | 2 | 45255 | 20,79 | 45405 | 28,51 |
| 12,00 | 12 | 73 | 16 | 2 | 45256 | 26,45 | 45406 | 36,92 |
| 14,00 | 12 | 73 | 16 | 2 | 45257 | 36,25 | 45408 | 45,56 |
| 16,00 | 16 | 79 | 19 | 2 | 45258 | 42,02 | 45409 | 53,92 |
| 18,00 | 16 | 79 | 19 | 2 | 45259 | 51,69 | 45410 | 63,77 |
| 20,00 | 20 | 88 | 22 | 2 | 45260 | 60,57 | 45411 | 73,56 |
| 25,00 | 25 | 102 | 26 | 2 | 11119 | 103,56 | 13147 | 129,25 |
| 28,00 | 25 | 102 | 26 | 2 | 11120 | 131,03 | 13156 | 168,25 |



Ref. 4600

FRESA FRONTAL ACABADO HSSE 8% CO NZ NZ HSSE 8% Co Finishing End Mill Fraise finition HSSE 8% Co NZ



| | | | |
|-------------------|-----------------------------|---------------------|----------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 N | ISO 1641 |
| | | 4-6 Z | |
| | DIN 1835 B | Tol. D (k10) d (h6) | |

| Material | | Vc (m/min) | | Refs. 4600-4606 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | | |
|----------|------|------------|---------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | |
| P | P.1 | 25-35 | 35-46 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| K | K.1 | 20-30 | 25-45 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | K.2 | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| N | N.1 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | N.2 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient - Coefficient correction

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|
| 2,00 | 6 | 51 | 7 | 4 | 46277 | 12,08 | 41718 | 19,03 |
| 2,50 | 6 | 52 | 8 | 4 | 46280 | 12,08 | 41719 | 19,03 |
| 3,00 | 6 | 52 | 8 | 4 | 46283 | 12,08 | 41721 | 19,03 |
| 3,50 | 6 | 54 | 10 | 4 | 46286 | 12,47 | 41722 | 19,40 |
| 4,00 | 6 | 55 | 11 | 4 | 46289 | 12,08 | 41724 | 19,03 |
| 4,50 | 6 | 55 | 11 | 4 | 46292 | 13,30 | 41725 | 20,25 |
| 5,00 | 6 | 57 | 13 | 4 | 46295 | 12,08 | 41727 | 19,03 |
| 5,50 | 6 | 57 | 13 | 4 | 46298 | 19,36 | 41728 | 26,09 |
| 6,00 | 6 | 57 | 13 | 4 | 46301 | 12,68 | 41730 | 19,62 |
| 6,50 | 10 | 66 | 16 | 4 | 46304 | 19,36 | 41731 | 27,20 |
| 7,00 | 10 | 66 | 16 | 4 | 46307 | 17,73 | 41732 | 25,60 |
| 7,50 | 10 | 66 | 16 | 4 | 46310 | 22,85 | 41733 | 30,61 |
| 8,00 | 10 | 69 | 19 | 4 | 46313 | 15,83 | 41734 | 23,79 |
| 8,50 | 10 | 69 | 19 | 4 | 46316 | 23,85 | 41735 | 32,34 |
| 9,00 | 10 | 69 | 19 | 4 | 46319 | 19,82 | 41736 | 28,41 |
| 9,50 | 10 | 69 | 19 | 4 | 46322 | 25,23 | 41737 | 33,67 |
| 10,00 | 10 | 72 | 22 | 4 | 46325 | 17,16 | 41738 | 25,83 |
| 11,00 | 12 | 79 | 22 | 4 | 46331 | 23,90 | 41740 | 33,56 |
| 12,00 | 12 | 83 | 26 | 4 | 46334 | 21,54 | 41741 | 29,79 |
| 13,00 | 12 | 83 | 26 | 4 | 46337 | 30,76 | 41742 | 41,55 |

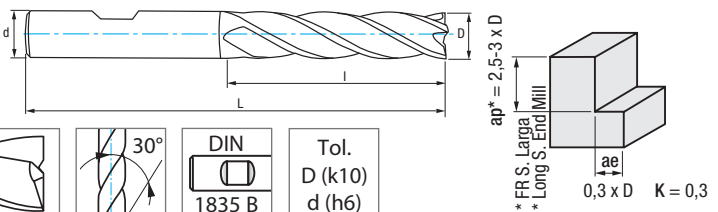
| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|--------|
| 14,00 | 12 | 83 | 26 | 4 | 46340 | 29,58 | 41743 | 40,41 |
| 15,00 | 12 | 83 | 26 | 4 | 46343 | 33,13 | 41744 | 45,89 |
| 16,00 | 16 | 92 | 32 | 4 | 46346 | 32,35 | 41745 | 45,10 |
| 17,00 | 16 | 92 | 32 | 4 | 46349 | 39,81 | 41746 | 54,04 |
| 18,00 | 16 | 92 | 32 | 4 | 46352 | 40,58 | 41747 | 54,80 |
| 19,00 | 16 | 92 | 32 | 4 | 46355 | 46,62 | 41748 | 62,17 |
| 20,00 | 20 | 104 | 38 | 4 | 46358 | 46,62 | 41749 | 62,17 |
| 22,00 | 20 | 104 | 38 | 6 | 46361 | 64,74 | 41750 | 86,06 |
| 24,00 | 25 | 121 | 45 | 6 | 77694 | 80,42 | 41751 | 101,31 |
| 25,00 | 25 | 121 | 45 | 6 | 46364 | 80,42 | 41752 | 101,31 |

Ø > 25 mm sin Corte al Centro (antigua 4400) / Non Center Cutting (old 4400) / Sans coupe au centre (vieux 4400)

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 26,00 | 25 | 121 | 45 | 6 | 78872 | 92,27 | 41753 | 122,55 |
| 28,00 | 25 | 121 | 45 | 6 | 46367 | 92,27 | 41754 | 122,55 |
| 30,00 | 25 | 121 | 45 | 6 | 46370 | 106,75 | 41755 | 136,63 |
| 32,00 | 32 | 133 | 53 | 6 | 46373 | 109,98 | 41947 | 139,75 |
| 36,00 | 32 | 133 | 53 | 6 | 46376 | 143,93 | 41948 | 176,34 |
| 40,00 | 40 | 155 | 63 | 8 | 46379 | 173,00 | 41949 | 214,50 |

Ref. 4606

FRESA FRONTAL ACABADO HSSE 8% CO NZ LARGA Long NZ HSSE 8% Co Finishing End Mill Fraise finition HSSE 8% Co NZ longue



| | | | | | | | | | |
|-------------------|-----------------------------|-----------|----------|--|--|--|--|------------|---------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 N | ISO 1641 | | | | | DIN 1835 B | Tol. D (k10) d (h6) |
|-------------------|-----------------------------|-----------|----------|--|--|--|--|------------|---------------------|

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|
| 2,00 | 6 | 54 | 10 | 4 | 46382 | 14,79 | 17889 | 21,63 |
| 2,50 | 6 | 56 | 12 | 4 | 46385 | 14,79 | 18144 | 21,63 |
| 3,00 | 6 | 56 | 12 | 4 | 46388 | 14,79 | 17890 | 21,63 |
| 3,50 | 6 | 59 | 15 | 4 | 77781 | 19,44 | 18145 | 26,19 |
| 4,00 | 6 | 63 | 19 | 4 | 46391 | 14,79 | 17651 | 21,63 |
| 4,50 | 6 | 63 | 19 | 4 | 77782 | 19,44 | 18147 | 26,19 |
| 5,00 | 6 | 68 | 24 | 4 | 46394 | 14,79 | 17891 | 21,63 |
| 5,50 | 6 | 68 | 24 | 4 | 77783 | 19,44 | 18148 | 26,19 |
| 6,00 | 6 | 68 | 24 | 4 | 46397 | 14,79 | 18149 | 21,63 |
| 7,00 | 10 | 80 | 30 | 4 | 46400 | 22,45 | 17892 | 30,20 |
| 8,00 | 10 | 88 | 38 | 4 | 46403 | 20,51 | 18150 | 27,23 |
| 9,00 | 10 | 88 | 38 | 4 | 46406 | 23,19 | 17894 | 31,68 |
| 10,00 | 10 | 95 | 45 | 4 | 46409 | 20,44 | 17260 | 29,95 |
| 11,00 | 12 | 102 | 45 | 4 | 46412 | 29,03 | 18151 | 39,57 |
| 12,00 | 12 | 110 | 53 | 4 | 46415 | 26,93 | 15399 | 37,55 |

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 14,00 | 12 | 110 | 53 | 4 | 46418 | 35,21 | 18152 | 45,89 |
| 16,00 | 16 | 123 | 63 | 4 | 46421 | 38,51 | 15624 | 53,84 |
| 18,00 | 16 | 123 | 63 | 4 | 46424 | 47,03 | 18153 | 64,17 |
| 20,00 | 20 | 141 | 75 | 4 | 46427 | 55,09 | 17219 | 73,79 |
| 22,00 | 20 | 141 | 75 | 6 | 46430 | 76,42 | 17171 | 97,20 |
| 25,00 | 25 | 166 | 90 | 6 | 46433 | 101,30 | 18154 | 124,30 |

Ø > 25 mm sin Corte al Centro
Non Center Cutting / Sans coupe au centre

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 28,00 | 25 | 166 | 90 | 6 | 46436 | 112,57 | 17189 | 148,57 |
| 30,00 | 25 | 166 | 90 | 6 | 46439 | 127,58 | 17191 | 163,14 |
| 32,00 | 32 | 186 | 106 | 6 | 46442 | 128,64 | 18155 | 164,20 |
| 36,00 | 32 | 186 | 106 | 6 | 46445 | 183,48 | 17396 | 221,93 |
| 40,00 | 40 | 217 | 125 | 8 | 46448 | 203,99 | 18156 | 263,49 |

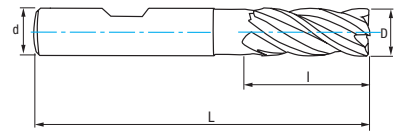
TIALSIN bajo demanda / upon request / sur demande

Ref. **4400**

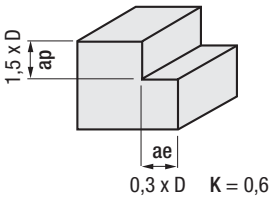
FRESA FRONTAL ACABADO HSSE 8% CO NZ

NZ HSSE 8% Co Finishing End Mill

Fraise finition HSSE 8% Co NZ



| | | | | | | | | |
|---------------|----------------------------|--------------|-------------|--|--|--|---------------|---------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 N | ISO 1641 | | | | DIN 1835 B | Tol. D (k10) d (h6) |
|---------------|----------------------------|--------------|-------------|--|--|--|---------------|---------------------------|



No válida Trabajo Axial
Not Valid for Axial Work

Invalide pour travail dans l'axe

| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | | |
|----------|------|------------|---------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | |
| P | P.1 | 25-35 | 35-46 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| K | K.1 | 20-30 | 25-45 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | K.2 | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| N | N.1 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | N.2 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

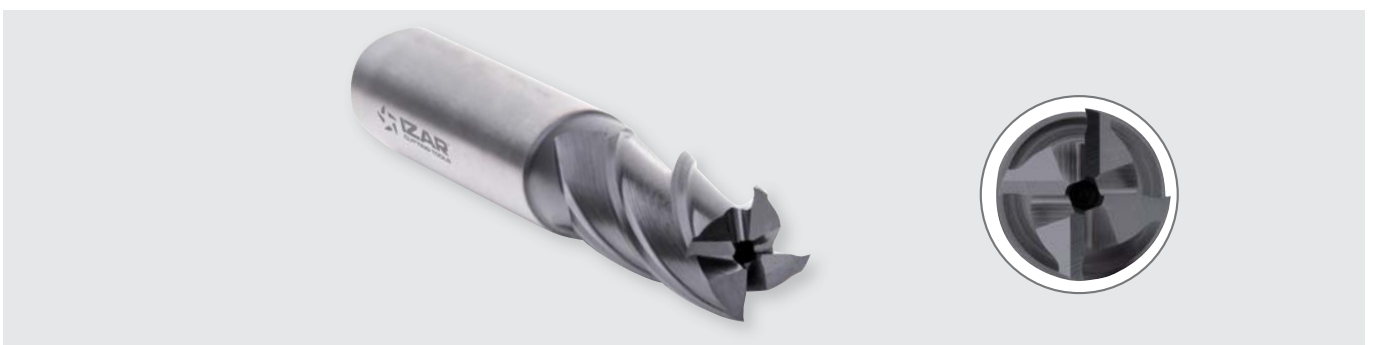
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---------|---|------------------|-------|--------------------|--------|
| 2,00 | 6 | 51 | 7 | 4 | 43778 | 12,08 | 17528 | 19,03 |
| 2,50 | 6 | 52 | 8 | 4 | 43781 | 12,08 | 17529 | 19,03 |
| 3,00 | 6 | 52 | 8 | 4 | 43784 | 12,08 | 17530 | 19,03 |
| 3,50 | 6 | 54 | 10 | 4 | 43787 | 12,47 | 17531 | 19,40 |
| 4,00 | 6 | 55 | 11 | 4 | 43790 | 12,08 | 17533 | 19,03 |
| 4,50 | 6 | 55 | 11 | 4 | 43793 | 13,30 | 17590 | 20,25 |
| 5,00 | 6 | 57 | 13 | 4 | 43796 | 12,08 | 17536 | 19,03 |
| 5,50 | 6 | 57 | 13 | 4 | 43799 | 19,36 | 17537 | 26,09 |
| 6,00 | 6 | 57 | 13 | 4 | 43802 | 12,68 | 43903 | 19,62 |
| 6,50 | 10 | 66 | 16 | 4 | 43805 | 19,36 | 17538 | 27,20 |
| 7,00 | 10 | 66 | 16 | 4 | 43808 | 17,73 | 17539 | 25,60 |
| 7,50 | 10 | 66 | 16 | 4 | 43811 | 22,85 | 17540 | 30,61 |
| 8,00 | 10 | 69 | 19 | 4 | 43814 | 15,83 | 43904 | 23,79 |
| 8,50 | 10 | 69 | 19 | 4 | 43817 | 23,85 | 17542 | 32,34 |
| 9,00 | 10 | 69 | 19 | 4 | 43820 | 19,82 | 17543 | 28,41 |
| 9,50 | 10 | 69 | 19 | 4 | 43823 | 25,23 | 17544 | 33,67 |
| 10,00 | 10 | 72 | 22 | 4 | 43826 | 17,16 | 43905 | 25,83 |
| 11,00 | 12 | 79 | 22 | 4 | 43829 | 23,90 | 17545 | 33,56 |
| 12,00 | 12 | 83 | 26 | 4 | 43832 | 21,54 | 43906 | 29,79 |
| 13,00 | 12 | 83 | 26 | 4 | 43835 | 30,76 | 17546 | 41,55 |
| 14,00 | 12 | 83 | 26 | 4 | 43838 | 29,58 | 43907 | 40,41 |
| 15,00 | 12 | 83 | 26 | 4 | 43841 | 33,13 | 17548 | 45,89 |
| 16,00 | 16 | 92 | 32 | 4 | 43844 | 32,35 | 43908 | 45,10 |
| 17,00 | 16 | 92 | 32 | 4 | 43847 | 39,81 | 17549 | 54,04 |
| 18,00 | 16 | 92 | 32 | 4 | 43850 | 40,58 | 43909 | 54,80 |
| 19,00 | 16 | 92 | 32 | 4 | 43853 | 46,62 | 17551 | 62,17 |
| 20,00 | 20 | 104 | 38 | 4 | 43856 | 46,62 | 43910 | 62,17 |
| 22,00 | 20 | 104 | 38 | 6 | 43859 | 64,74 | 17552 | 86,06 |
| 24,00 | 25 | 121 | 42 | 6 | 43862 | 80,42 | 17553 | 101,31 |
| 25,00 | 25 | 121 | 42 | 6 | 43865 | 80,42 | 17554 | 101,31 |



TIALSIN bajo demanda
upon request / sur demande

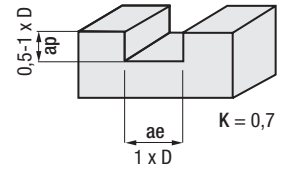
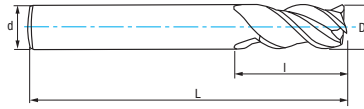


Ref. **4430**

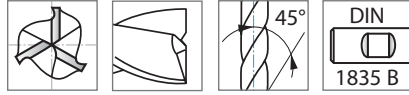
FRESA FRONTAL ACABADO HSSE 8% CO 3Z ALUMINIO

Aluminium 3Z HSSE 8% Co Finishing End Mill

Fraise finition HSSE 8% Co 3Z aluminium



| | | | |
|---------------|----------------------------|--------------|-------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 W | ISO 1641 |
|---------------|----------------------------|--------------|-------------|



Tol.
D (e8)
d (h6)

| Material | | Vc (m/min) | | Refs. 4430-4432 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | |
|----------|------|------------|---------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 |
| P | P.1 | 30-40 | 40-56 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.3 | 160-200 | 220-280 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 |
| N | N.4 | 160-200 | 220-280 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 |
| | N.5 | 50-80 | 70-110 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient - Coefficient correction

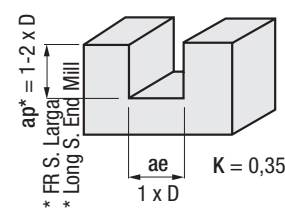
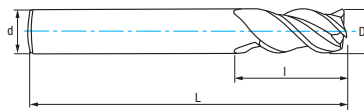
| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 2,00 | 6 | 51 | 7 | 3 | 44477 | 13,29 | 41665 | 20,48 | 10,00 | 10 | 72 | 22 | 3 | 44513 | 18,89 | 41694 | 28,41 |
| 2,50 | 6 | 52 | 8 | 3 | 44480 | 13,29 | 41667 | 20,48 | 11,00 | 12 | 79 | 22 | 3 | 44516 | 26,31 | 41697 | 36,93 |
| 3,00 | 6 | 52 | 8 | 3 | 44483 | 12,95 | 41668 | 19,98 | 12,00 | 12 | 83 | 26 | 3 | 44519 | 23,70 | 41698 | 32,76 |
| 3,50 | 6 | 55 | 11 | 3 | 44486 | 13,70 | 41670 | 21,32 | 13,00 | 12 | 83 | 26 | 3 | 44522 | 33,82 | 41700 | 45,70 |
| 4,00 | 6 | 55 | 11 | 3 | 44489 | 13,29 | 41671 | 20,72 | 14,00 | 12 | 83 | 26 | 3 | 44525 | 33,32 | 41701 | 44,44 |
| 4,50 | 6 | 57 | 11 | 3 | 44492 | 14,64 | 41673 | 22,27 | 15,00 | 12 | 83 | 26 | 3 | 44528 | 36,45 | 41703 | 49,86 |
| 5,00 | 6 | 57 | 13 | 3 | 44495 | 13,29 | 41676 | 20,94 | 16,00 | 16 | 92 | 32 | 3 | 44531 | 35,59 | 41704 | 49,63 |
| 5,50 | 6 | 57 | 13 | 3 | 44498 | 17,42 | 41677 | 24,25 | 17,00 | 16 | 92 | 32 | 3 | 67508 | 49,45 | 41706 | 61,53 |
| 6,00 | 6 | 57 | 13 | 3 | 44501 | 14,38 | 41679 | 21,58 | 18,00 | 16 | 92 | 32 | 3 | 44534 | 44,64 | 41707 | 60,29 |
| 6,50 | 10 | 66 | 16 | 3 | 77449 | 21,28 | 41682 | 29,92 | 19,00 | 16 | 92 | 32 | 3 | 68886 | 59,88 | 41709 | 72,82 |
| 7,00 | 10 | 66 | 16 | 3 | 44504 | 19,50 | 41683 | 28,15 | 20,00 | 20 | 104 | 38 | 3 | 44537 | 51,27 | 41710 | 68,39 |
| 7,50 | 10 | 66 | 16 | 3 | 77450 | 22,74 | 41685 | 30,38 | 22,00 | 20 | 104 | 38 | 3 | 44540 | 71,22 | 41712 | 94,67 |
| 8,00 | 10 | 69 | 19 | 3 | 44507 | 17,53 | 41686 | 26,17 | 25,00 | 25 | 121 | 45 | 3 | 44543 | 92,58 | 41713 | 111,45 |
| 8,50 | 10 | 69 | 19 | 3 | 77451 | 23,96 | 41688 | 32,35 | 28,00 | 25 | 121 | 45 | 3 | 77824 | 110,55 | 41715 | 143,60 |
| 9,00 | 10 | 69 | 19 | 3 | 44510 | 21,80 | 41691 | 31,26 | 30,00 | 25 | 121 | 45 | 3 | 44546 | 127,96 | 41716 | 160,49 |
| 9,50 | 10 | 69 | 19 | 3 | 77452 | 25,95 | 41692 | 34,20 | 32,00 | 32 | 133 | 53 | 3 | 77827 | 134,72 | 41946 | 164,23 |

Ref. **4432**

FRESA FRONTAL ACABADO HSSE 8% CO 3Z ALUMINIO LARGA

Long Aluminium 3Z HSSE 8% Co Finishing End Mill

Fraise finition HSSE 8% Co 3Z aluminium longue



| | | | | | | | | |
|---------------|----------------------------|--------------|-------------|--|--|--|---------------|--------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 W | ISO 1641 | | | | DIN 1835 B | Tol. D (e8) d (h6) |
|---------------|----------------------------|--------------|-------------|--|--|--|---------------|--------------------------|

| D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 2,00 | 6 | 54 | 10 | 3 | 77453 | 16,24 | 18084 | 23,81 | 10,00 | 10 | 95 | 45 | 3 | 44555 | 22,71 | 15051 | 32,94 |
| 2,50 | 6 | 56 | 12 | 3 | 77454 | 16,58 | 18087 | 23,81 | 11,00 | 12 | 102 | 45 | 3 | 77463 | 34,87 | 18103 | 44,84 |
| 3,00 | 6 | 56 | 12 | 3 | 77455 | 16,24 | 18088 | 23,81 | 12,00 | 12 | 110 | 53 | 3 | 44558 | 29,08 | 15052 | 40,28 |
| 3,50 | 6 | 59 | 15 | 3 | 77456 | 18,24 | 18090 | 25,42 | 14,00 | 12 | 110 | 53 | 3 | 44561 | 37,91 | 18105 | 49,17 |
| 4,00 | 6 | 63 | 19 | 3 | 77457 | 16,24 | 18093 | 23,81 | 16,00 | 16 | 123 | 63 | 3 | 44564 | 42,37 | 15046 | 59,22 |
| 4,50 | 6 | 63 | 19 | 3 | 77458 | 18,24 | 17380 | 25,42 | 18,00 | 16 | 123 | 63 | 3 | 44567 | 51,72 | 18106 | 70,25 |
| 5,00 | 6 | 68 | 24 | 3 | 77459 | 16,24 | 18097 | 23,81 | 20,00 | 20 | 141 | 75 | 3 | 44570 | 60,58 | 15047 | 80,37 |
| 5,50 | 6 | 68 | 24 | 3 | 77460 | 18,24 | 18099 | 25,42 | 22,00 | 20 | 141 | 75 | 3 | 44573 | 76,53 | 18108 | 103,78 |
| 6,00 | 6 | 68 | 24 | 3 | 44549 | 18,32 | 15049 | 24,81 | 25,00 | 25 | 166 | 90 | 3 | 44576 | 111,44 | 18109 | 136,73 |
| 7,00 | 10 | 80 | 30 | 3 | 77461 | 24,69 | 18100 | 33,21 | 28,00 | 25 | 166 | 90 | 3 | 80326 | 123,84 | 18112 | 163,42 |
| 8,00 | 10 | 88 | 38 | 3 | 44552 | 22,57 | 15050 | 29,97 | 30,00 | 25 | 166 | 90 | 3 | 44579 | 138,40 | 15048 | 175,94 |
| 9,00 | 10 | 88 | 38 | 3 | 77462 | 27,50 | 18102 | 35,51 | 32,00 | 32 | 186 | 106 | 3 | 77464 | 163,43 | 18114 | 196,50 |

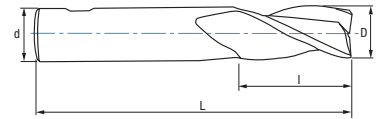
TIALSIN bajo demanda / upon request / sur demande

Ref. **4439**

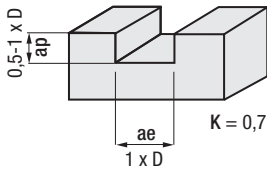
FRESA FRONTAL ACABADO HSSE 8% CO 3Z

3Z HSSE 8% Co Finishing End Mill

Fraise finition HSSE 8% Co 3Z



| | | | | | | | |
|---------------|----------------------------|--------------|--|--|--|---------------|--------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 844 N | | | | DIN 1835 B | Tol. D (e8) d (h6) |
|---------------|----------------------------|--------------|--|--|--|---------------|--------------------------|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|---------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.1 | 30-40 | 40-56 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 |
| K | K.1 | 20-30 | 25-45 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 |
| | K.2 | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 |
| S | | 15-20 | 30-45 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,110 | 0,130 |
| N | N.1 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 |
| | N.2 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

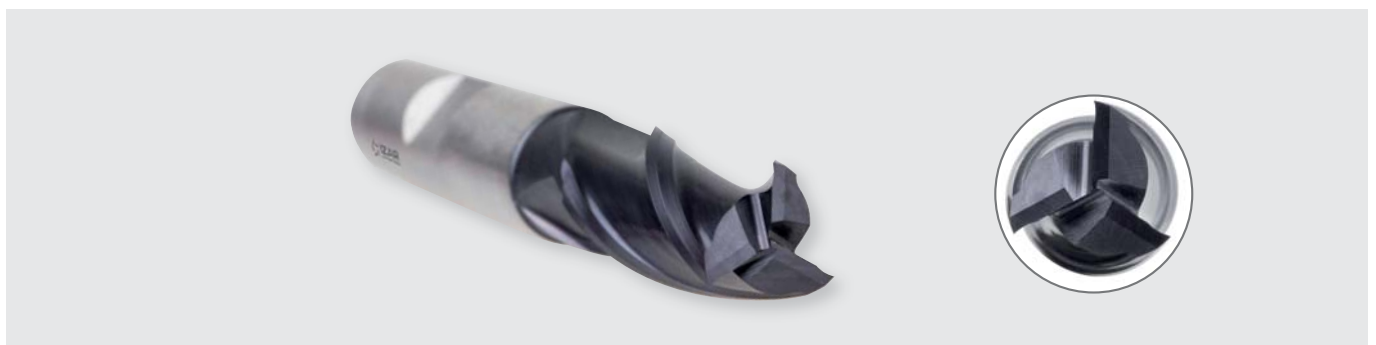
K = Coeficiente corrección
Correction coefficient
Coefficient correction

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

| D mm | d mm | L mm | l mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---------|---|------------------|-------|--------------------|-------|
| 2,00 | 6 | 51 | 7 | 3 | 43147 | 12,08 | 17602 | 19,03 |
| 2,50 | 6 | 52 | 8 | 3 | 43148 | 12,08 | 17603 | 19,03 |
| 3,00 | 6 | 52 | 8 | 3 | 43149 | 12,08 | 17604 | 19,03 |
| 3,50 | 6 | 54 | 10 | 3 | 43150 | 12,47 | 17605 | 19,40 |
| 4,00 | 6 | 55 | 11 | 3 | 43152 | 12,08 | 17606 | 19,03 |
| 4,50 | 6 | 57 | 11 | 3 | 43153 | 13,30 | 17607 | 20,25 |
| 5,00 | 6 | 57 | 13 | 3 | 43154 | 12,08 | 17221 | 19,10 |
| 5,50 | 6 | 57 | 13 | 3 | 43155 | 19,36 | 17608 | 26,09 |
| 6,00 | 6 | 57 | 13 | 3 | 43156 | 12,68 | 17222 | 21,42 |
| 6,50 | 10 | 66 | 16 | 3 | 75763 | 19,33 | 77230 | 27,22 |
| 7,00 | 10 | 66 | 16 | 3 | 43158 | 17,73 | 17224 | 25,60 |
| 7,50 | 10 | 66 | 16 | 3 | 75765 | 20,66 | 77231 | 28,63 |
| 8,00 | 10 | 69 | 19 | 3 | 43160 | 15,83 | 17612 | 23,79 |
| 8,50 | 10 | 69 | 19 | 3 | 75768 | 21,77 | 77232 | 30,37 |
| 9,00 | 10 | 69 | 19 | 3 | 43162 | 19,82 | 17225 | 28,41 |
| 9,50 | 10 | 72 | 19 | 3 | 75769 | 23,57 | 77233 | 32,26 |
| 10,00 | 10 | 72 | 22 | 3 | 43165 | 17,16 | 17616 | 25,83 |
| 12,00 | 12 | 83 | 26 | 3 | 43168 | 21,54 | 17617 | 30,66 |
| 14,00 | 12 | 83 | 26 | 3 | 43170 | 29,58 | 17618 | 40,41 |
| 16,00 | 16 | 92 | 32 | 3 | 43172 | 32,35 | 17620 | 45,10 |
| 18,00 | 16 | 92 | 32 | 3 | 43174 | 40,58 | 17621 | 54,80 |
| 20,00 | 20 | 104 | 38 | 3 | 43176 | 46,62 | 17622 | 62,17 |

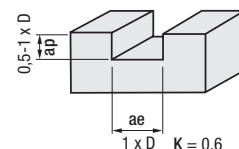
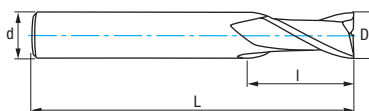


TIALSIN bajo demanda / upon request / sur demande



Ref. **4420**

FRESA FRONTAL ACABADO HSSE 8% CO 2Z
2Z HSSE 8% Co Finishing End Mill
Fraise finition HSSE 8% Co 2Z



HSSE 8% Co
HSSE 8% Co + TIALSIN
 DIN 327 N
 ISO 1641/1

 30°

 Tol. D (e8) d (h6)
Set pag. 392

| Material | | Vc (m/min) | | Refs. 4420-4426 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | | | |
|----------|------|------------|---------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | | |
| P | P.1 | 30-40 | 40-56 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | | |
| K | K.1 | 20-30 | 25-45 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | | |
| | K.2 | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | | |
| N | N.1 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | | |
| | N.2 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | | |
| | N.3 | 160-200 | 220-280 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 | 0,130 | | |
| | N.4 | 160-200 | 220-280 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 | 0,130 | | |
| | N.5 | 50-80 | 70-110 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

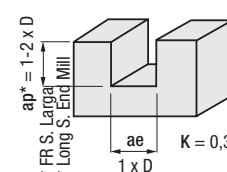
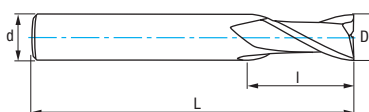
$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 1,00 | 6 | 48 | 3 | 2 | 77335 | 12,34 | 77336 | 19,30 | 11,00 | 12 | 70 | 13 | 2 | 44303 | 21,54 | 41641 | 31,27 |
| 1,50 | 6 | 48 | 3 | 2 | 77334 | 12,57 | 77337 | 19,54 | 12,00 | 12 | 73 | 16 | 2 | 44306 | 18,89 | 41643 | 28,73 |
| 2,00 | 6 | 48 | 4 | 2 | 44249 | 11,02 | 41613 | 17,99 | 13,00 | 12 | 73 | 16 | 2 | 44309 | 27,76 | 41644 | 38,63 |
| 2,50 | 6 | 49 | 5 | 2 | 44252 | 11,02 | 41614 | 17,99 | 14,00 | 12 | 73 | 16 | 2 | 44312 | 27,76 | 41646 | 38,63 |
| 3,00 | 6 | 49 | 5 | 2 | 44255 | 11,02 | 41616 | 17,99 | 15,00 | 12 | 73 | 16 | 2 | 44315 | 31,05 | 41647 | 43,84 |
| 3,50 | 6 | 50 | 6 | 2 | 44258 | 11,99 | 41617 | 18,94 | 16,00 | 16 | 79 | 19 | 2 | 44318 | 27,31 | 41649 | 40,21 |
| 4,00 | 6 | 51 | 7 | 2 | 44261 | 11,02 | 41619 | 17,99 | 17,00 | 16 | 79 | 19 | 2 | 44321 | 36,95 | 41650 | 51,25 |
| 4,50 | 6 | 52 | 8 | 2 | 44264 | 13,19 | 41620 | 20,12 | 18,00 | 16 | 79 | 19 | 2 | 44324 | 36,95 | 41652 | 51,25 |
| 5,00 | 6 | 52 | 8 | 2 | 44267 | 11,02 | 41622 | 17,99 | 19,00 | 16 | 79 | 19 | 2 | 44327 | 46,61 | 41653 | 62,11 |
| 5,50 | 6 | 52 | 8 | 2 | 44270 | 13,57 | 41623 | 20,47 | 20,00 | 20 | 88 | 22 | 2 | 44330 | 44,11 | 41655 | 59,69 |
| 6,00 | 6 | 52 | 8 | 2 | 44273 | 11,02 | 41625 | 17,99 | 22,00 | 20 | 88 | 22 | 2 | 44333 | 57,72 | 41658 | 79,21 |
| 6,50 | 10 | 60 | 10 | 2 | 44276 | 17,74 | 41626 | 25,63 | 24,00 | 25 | 102 | 26 | 2 | 44336 | 77,27 | 41659 | 98,22 |
| 7,00 | 10 | 60 | 10 | 2 | 44279 | 17,23 | 41628 | 25,11 | 25,00 | 25 | 102 | 26 | 2 | 44339 | 73,12 | 41661 | 94,21 |
| 7,50 | 10 | 61 | 11 | 2 | 44282 | 17,08 | 41629 | 24,97 | 28,00 | 25 | 102 | 26 | 2 | 44342 | 92,52 | 41662 | 122,72 |
| 8,00 | 10 | 61 | 11 | 2 | 44285 | 14,19 | 41631 | 22,18 | 30,00 | 25 | 102 | 26 | 2 | 44345 | 105,43 | 41664 | 135,26 |
| 8,50 | 10 | 61 | 11 | 2 | 44288 | 19,18 | 41634 | 27,78 | 32,00 | 32 | 112 | 32 | 2 | 44348 | 108,28 | 41943 | 138,01 |
| 9,00 | 10 | 61 | 11 | 2 | 44291 | 17,64 | 41635 | 26,26 | 36,00 | 32 | 112 | 32 | 2 | 44351 | 144,85 | 41944 | 177,13 |
| 9,50 | 10 | 61 | 11 | 2 | 44294 | 18,75 | 41637 | 27,37 | 40,00 | 40 | 130 | 38 | 2 | 44354 | 177,84 | 41945 | 219,08 |
| 10,00 | 10 | 63 | 13 | 2 | 44297 | 14,10 | 41638 | 22,85 | | | | | | | | | |

Ref. **4426**

FRESA FRONTAL ACABADO HSSE 8% CO 2Z LARGA
Long 2Z HSSE 8% Co Finishing End Mill
Fraise finition HSSE 8% Co 2Z longue



HSSE 8% Co
HSSE 8% Co + TIALSIN
 IZAR Std. N
 ISO 1641

 30°

 Tol. D (e8) d (h6)

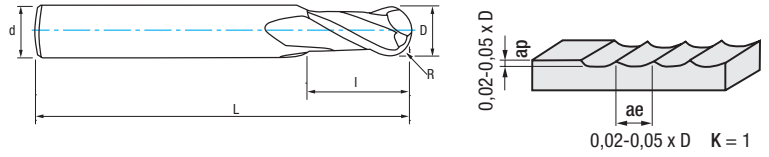
| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 2,00 | 6 | 54 | 7 | 2 | 44357 | 12,16 | 16074 | 19,10 | 14,00 | 12 | 110 | 26 | 2 | 44393 | 37,27 | 17194 | 47,90 |
| 2,50 | 6 | 56 | 8 | 2 | 44360 | 12,16 | 16092 | 19,10 | 14,00 | 12 | 110 | 53 | 2 | 13500 | 37,27 | 13509 | 47,90 |
| 3,00 | 6 | 56 | 8 | 2 | 44363 | 12,16 | 45029 | 19,10 | 16,00 | 16 | 123 | 32 | 2 | 44396 | 43,85 | 17195 | 59,03 |
| 4,00 | 6 | 63 | 11 | 2 | 44366 | 12,16 | 45030 | 19,10 | 16,00 | 16 | 123 | 63 | 2 | 13506 | 43,85 | 13515 | 59,03 |
| 5,00 | 6 | 68 | 13 | 2 | 44369 | 12,16 | 45031 | 19,10 | 18,00 | 16 | 123 | 32 | 2 | 44399 | 52,29 | 14562 | 69,23 |
| 6,00 | 6 | 68 | 13 | 2 | 44372 | 12,16 | 45032 | 19,10 | 18,00 | 16 | 123 | 63 | 2 | 13512 | 52,29 | 13532 | 69,23 |
| 7,00 | 10 | 80 | 16 | 2 | 44375 | 20,19 | 17192 | 27,99 | 20,00 | 20 | 141 | 38 | 2 | 44402 | 57,38 | 17197 | 75,98 |
| 8,00 | 10 | 88 | 19 | 2 | 44378 | 17,66 | 45034 | 25,56 | 20,00 | 20 | 141 | 75 | 2 | 13514 | 57,38 | 13535 | 75,98 |
| 9,00 | 10 | 88 | 19 | 2 | 44381 | 23,91 | 15849 | 32,39 | 22,00 | 20 | 141 | 38 | 2 | 44405 | 77,46 | 17198 | 103,10 |
| 10,00 | 10 | 95 | 22 | 2 | 44384 | 20,19 | 14538 | 29,70 | 25,00 | 25 | 166 | 45 | 2 | 44408 | 111,12 | 17199 | 138,74 |
| 11,00 | 12 | 102 | 22 | 2 | 44387 | 30,91 | 17193 | 41,42 | 28,00 | 25 | 166 | 45 | 2 | 44411 | 133,36 | 17200 | 168,77 |
| 12,00 | 12 | 110 | 26 | 2 | 44390 | 28,66 | 14550 | 39,19 | 30,00 | 25 | 166 | 45 | 2 | 81024 | 147,39 | 17201 | 182,42 |
| 12,00 | 12 | 110 | 53 | 2 | 13494 | 28,66 | 13497 | 39,19 | 32,00 | 32 | 186 | 53 | 2 | 44414 | 205,09 | 17202 | 238,53 |

TIALSIN bajo demanda / upon request / sur demande

Ref. **4422**

FRESA FRONTAL ACABADO HSSE 8% CO 2Z RADIAL

Radial 2Z HSSE 8% Co Finishing End Mill
Fraise finition HSSE 8% Co 2Z hemisférica



| | | | |
|---------------|----------------------------|---------------|--------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 327 N | |
| | | DIN 1835 B | Tol. D (e8) d (h6) |

| Material | | Vc (m/min) | | Refs. 4422-4470 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------|------------|---------|---|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 30 | |
| P | P.1 | 30-40 | 40-56 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| K | K.1 | 20-30 | 25-45 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | K.2 | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| N | N.1 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | N.2 | 60-100 | 80-140 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

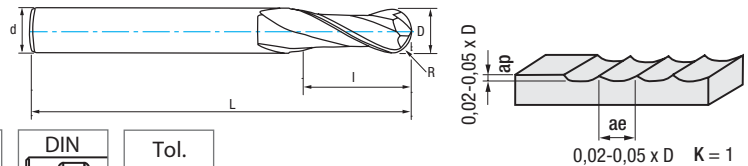
| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 2,00 | 6 | 48 | 4 | 2 | 69568 | 22,50 | 17181 | 29,16 | 13,00 | 12 | 73 | 16 | 2 | 69652 | 42,43 | 17888 | 52,92 |
| 3,00 | 6 | 49 | 5 | 2 | 69625 | 22,50 | 17182 | 29,16 | 14,00 | 12 | 73 | 16 | 2 | 69654 | 42,43 | 17161 | 52,92 |
| 4,00 | 6 | 51 | 7 | 2 | 69628 | 22,50 | 15427 | 29,16 | 15,00 | 12 | 73 | 16 | 2 | 69655 | 47,48 | 17162 | 59,82 |
| 5,00 | 6 | 52 | 8 | 2 | 69631 | 22,50 | 17156 | 29,16 | 16,00 | 16 | 79 | 19 | 2 | 69657 | 46,39 | 17163 | 58,77 |
| 6,00 | 6 | 52 | 8 | 2 | 69634 | 22,50 | 15428 | 29,16 | 18,00 | 16 | 79 | 19 | 2 | 69660 | 56,48 | 18061 | 70,27 |
| 7,00 | 10 | 60 | 10 | 2 | 69637 | 27,10 | 19597 | 34,75 | 20,00 | 20 | 88 | 22 | 2 | 69663 | 67,46 | 17180 | 82,39 |
| 8,00 | 10 | 61 | 11 | 2 | 69640 | 24,15 | 16191 | 31,85 | 22,00 | 20 | 88 | 22 | 2 | 69666 | 88,27 | 21809 | 108,95 |
| 9,00 | 10 | 61 | 11 | 2 | 69643 | 27,76 | 18810 | 36,11 | 24,00 | 25 | 102 | 26 | 2 | 69667 | 105,46 | 21606 | 125,68 |
| 10,00 | 10 | 63 | 13 | 2 | 69646 | 23,95 | 17158 | 32,43 | 25,00 | 25 | 102 | 26 | 2 | 69669 | 96,93 | 18243 | 117,37 |
| 11,00 | 12 | 70 | 13 | 2 | 69649 | 33,90 | 17887 | 43,30 | 30,00 | 25 | 102 | 26 | 2 | 69672 | 139,72 | 18244 | 168,66 |
| 12,00 | 12 | 73 | 16 | 2 | 69651 | 32,11 | 17159 | 41,58 | | | | | | | | | |

TIALSIN bajo demanda / upon request / sur demande

Ref. **4470**

FRESA FRONTAL ACABADO HSSE 8% CO 2Z RADIAL LARGA

Long Radial 2Z HSSE 8% Co Finishing End Mill
Fraise finition HSSE 8% Co 2Z hemisférica longue



| | | | | | | | |
|---------------|----------------------------|----------------|--|--|--|---------------|--------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | IZAR Std. N | | | | DIN 1835 B | Tol. D (e8) d (h6) |
|---------------|----------------------------|----------------|--|--|--|---------------|--------------------------|

| D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € | D mm | d mm | L mm | I mm | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|-------|------|------|------|---|---------------|-------|-----------------|-------|-------|------|------|------|---|---------------|--------|-----------------|--------|
| 2,00 | 6 | 54 | 7 | 2 | 45281 | 24,63 | 18115 | 31,25 | 12,00 | 12 | 110 | 26 | 2 | 45314 | 43,51 | 17293 | 53,65 |
| 2,50 | 6 | 56 | 8 | 2 | 45284 | 24,63 | 18117 | 31,25 | 14,00 | 12 | 110 | 26 | 2 | 45317 | 57,38 | 18130 | 67,44 |
| 3,00 | 6 | 56 | 8 | 2 | 45287 | 24,63 | 18120 | 31,25 | 16,00 | 16 | 123 | 32 | 2 | 45320 | 65,08 | 18132 | 79,66 |
| 4,00 | 6 | 63 | 11 | 2 | 45290 | 24,63 | 18121 | 31,25 | 18,00 | 16 | 123 | 32 | 2 | 45323 | 78,20 | 18133 | 94,47 |
| 5,00 | 6 | 68 | 13 | 2 | 45293 | 26,09 | 18124 | 32,67 | 20,00 | 20 | 141 | 38 | 2 | 45326 | 84,78 | 18135 | 102,60 |
| 6,00 | 6 | 68 | 13 | 2 | 45296 | 23,55 | 17252 | 30,21 | 22,00 | 20 | 141 | 38 | 2 | 45329 | 105,12 | 18136 | 129,97 |
| 7,00 | 10 | 80 | 16 | 2 | 45299 | 29,74 | 18126 | 37,29 | 24,00 | 25 | 166 | 45 | 2 | 40908 | 142,22 | 18138 | 168,99 |
| 8,00 | 10 | 88 | 19 | 2 | 45302 | 29,74 | 17255 | 37,29 | 25,00 | 25 | 166 | 45 | 2 | 45332 | 129,29 | 18139 | 156,40 |
| 9,00 | 10 | 88 | 19 | 2 | 45305 | 32,67 | 18128 | 40,89 | 30,00 | 25 | 166 | 45 | 2 | 77816 | 190,04 | 18141 | 223,87 |
| 10,00 | 10 | 95 | 22 | 2 | 45308 | 32,67 | 17257 | 41,82 | 32,00 | 32 | 186 | 53 | 2 | 45338 | 247,05 | 18142 | 279,29 |
| 11,00 | 12 | 102 | 22 | 2 | 45311 | 43,51 | 18129 | 53,65 | | | | | | | | | |

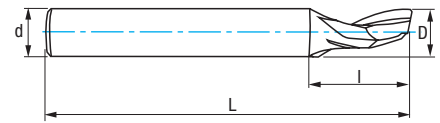
TIALSIN bajo demanda / upon request / sur demande

Ref. 4410

FRESA FRONTAL ACABADO HSSE 5% CO 1Z ALUMINIO

Aluminium 1Z HSSE 5% Co Finishing End Mill

Fraise finition HSSE 5% Co 1Z aluminium



| | | | | |
|---------------|-------------------|---------------|----------------------------|-------------------------------------|
| HSSE 5% Co | IZAR Std. W | DIN 1835 A | Tol.* D (k10) d (h6) | *øD=ød =>Tol. D (js14) d (h6) |
|---------------|-------------------|---------------|----------------------------|-------------------------------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 160-200 | 0,025 | 0,042 | 0,062 | 0,067 |
| | N.4 | 160-200 | 0,025 | 0,042 | 0,062 | 0,067 |
| | N.5 | 50-80 | 0,020 | 0,030 | 0,035 | 0,050 |
| | N.6 | 40-70 | 0,018 | 0,030 | 0,040 | 0,055 |

| D mm | d mm | L mm | l mm | Z | N° Art. 5% Co | € |
|---------|---------|---------|---------|---|------------------|-------|
| 3,00 | 8 | 60 | 12 | 1 | 13932 | 16,36 |
| 4,00 | 8 | 60 | 12 | 1 | 13933 | 16,36 |
| 5,00 | 8 | 60 | 12 | 1 | 13935 | 16,36 |
| 6,00 | 8 | 60 | 14 | 1 | 13936 | 16,36 |
| 7,00 | 8 | 60 | 14 | 1 | 13937 | 19,97 |
| 8,00 | 8 | 80 | 15 | 1 | 13938 | 19,97 |
| 10,00 | 10 | 80 | 15 | 1 | 13939 | 20,55 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

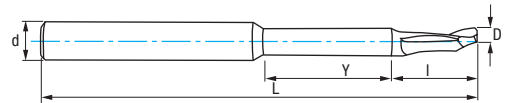
K = Coeficiente corrección
Correction coefficient
Coefficient correction

Ref. 4411

FRESA FRONTAL ACABADO HSSE 5% CO 1Z ALUMINIO LARGA

Long Aluminium 1Z HSSE 5% Co Finishing End Mill

Fraise finition HSSE 5% Co 1Z aluminium longue



| | | | | | |
|---------------|-------------------|---------------|---|----------------------------|-------------------------------------|
| HSSE 5% Co | IZAR Std. W | DIN 1835 A | Y | Tol.* D (k10) d (h6) | *øD=ød =>Tol. D (js14) d (h6) |
|---------------|-------------------|---------------|---|----------------------------|-------------------------------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | |
|----------|------|------------|-------------------------------------|-------|-------|
| Grupo | Sub. | 5% Co | Ø 4 | Ø 6 | Ø 8 |
| N | N.3 | 160-200 | 0,025 | 0,042 | 0,062 |
| | N.4 | 160-200 | 0,025 | 0,042 | 0,062 |
| | N.5 | 50-80 | 0,020 | 0,030 | 0,035 |
| | N.6 | 40-70 | 0,018 | 0,030 | 0,040 |

| D mm | d mm | L mm | l mm | Y mm | Z | N° Art. 5% Co | € |
|---------|---------|---------|---------|---------|---|------------------|-------|
| 4,00 | 8 | 80 | 16 | 29 | 1 | 13941 | 23,11 |
| 5,00 | 8 | 80 | 16 | 29 | 1 | 13943 | 23,11 |
| 6,00 | 8 | 90 | 16 | 29 | 1 | 13944 | 23,11 |
| 8,00 | 8 | 100 | 28 | 40 | 1 | 13945 | 25,65 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction



Ref. 4410



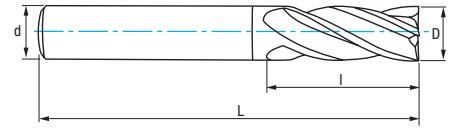
Ref. 4411

Ref. **4401**

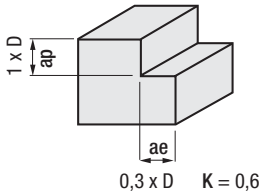
FRESA FRONTAL ACABADO HSS NZ

NZ HSS Finishing End Mill

Fraise finition HSS NZ



| | | | | | | | | |
|-----|-----------|----------|--|-------|--|--|------------|---------------------|
| HSS | DIN 844 N | ISO 1641 | | 4-8 Z | | | DIN 1835 B | Tol. D (k10) d (h6) |
|-----|-----------|----------|--|-------|--|--|------------|---------------------|



No válida Trabajo Axial
Not Valid for Axial Work
 Invalide pour travail dans l'axe

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 |
| P | P.1 | 20-28 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

| D mm | d mm | L mm | l mm | Z | Nº Art. HSS | € |
|-------|------|------|------|---|-------------|--------|
| 2,00 | 6 | 51 | 7 | 4 | 43691 | 9,33 |
| 2,50 | 6 | 52 | 8 | 4 | 43694 | 9,33 |
| 3,00 | 6 | 52 | 8 | 4 | 43697 | 9,33 |
| 3,50 | 6 | 54 | 10 | 4 | 43700 | 9,59 |
| 4,00 | 6 | 55 | 11 | 4 | 43703 | 9,33 |
| 4,50 | 6 | 55 | 11 | 4 | 77567 | 9,70 |
| 5,00 | 6 | 57 | 13 | 4 | 43706 | 9,33 |
| 5,50 | 6 | 57 | 13 | 4 | 77568 | 14,45 |
| 6,00 | 6 | 57 | 13 | 4 | 43709 | 9,33 |
| 6,50 | 10 | 66 | 16 | 4 | 77569 | 14,45 |
| 7,00 | 10 | 66 | 16 | 4 | 43712 | 13,64 |
| 7,50 | 10 | 66 | 16 | 4 | 78894 | 17,10 |
| 8,00 | 10 | 69 | 19 | 4 | 43715 | 10,58 |
| 8,50 | 10 | 69 | 19 | 4 | 78895 | 17,81 |
| 9,00 | 10 | 69 | 19 | 4 | 43718 | 14,27 |
| 9,50 | 10 | 69 | 19 | 4 | 78896 | 19,38 |
| 10,00 | 10 | 72 | 22 | 4 | 43721 | 12,95 |
| 11,00 | 12 | 79 | 22 | 4 | 43724 | 17,86 |
| 12,00 | 12 | 83 | 26 | 4 | 43727 | 15,37 |
| 13,00 | 12 | 83 | 26 | 4 | 43730 | 22,96 |
| 14,00 | 12 | 83 | 26 | 4 | 43733 | 21,69 |
| 15,00 | 12 | 83 | 26 | 4 | 43736 | 24,77 |
| 16,00 | 16 | 92 | 32 | 4 | 43739 | 24,16 |
| 17,00 | 16 | 92 | 32 | 4 | 43742 | 29,74 |
| 18,00 | 16 | 92 | 32 | 4 | 43745 | 29,74 |
| 19,00 | 16 | 92 | 32 | 4 | 43748 | 35,29 |
| 20,00 | 20 | 104 | 38 | 4 | 43751 | 34,87 |
| 22,00 | 20 | 104 | 38 | 6 | 43754 | 48,39 |
| 24,00 | 25 | 121 | 45 | 6 | 43757 | 60,09 |
| 25,00 | 25 | 121 | 45 | 6 | 43760 | 60,09 |
| 26,00 | 25 | 121 | 45 | 6 | 78897 | 75,13 |
| 28,00 | 25 | 121 | 45 | 6 | 43763 | 75,13 |
| 30,00 | 25 | 121 | 45 | 6 | 43766 | 86,95 |
| 32,00 | 32 | 133 | 53 | 6 | 43769 | 89,55 |
| 36,00 | 32 | 133 | 53 | 6 | 43772 | 117,24 |
| 40,00 | 40 | 155 | 63 | 8 | 43775 | 140,92 |

$$r.p.m. = \frac{V_c \times 1.000}{\pi \times \phi}$$

$$V_f (mm/min.) = r.p.m. \times Z \times f_z \times K$$

K = Coeficiente corrección
 Correction coefficient
 Coéefficient correction

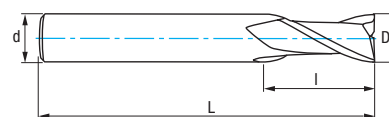


Ref. **4421**

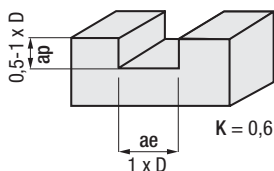
FRESA FRONTAL ACABADO HSS 2Z

2Z HSS Finishing End Mill

Fraise finition HSS 2Z



| | | | | | | | |
|-----|-----------|------------|--|--|--|------------|--------------------|
| HSS | DIN 327 N | ISO 1641/1 | | | | DIN 1835 B | Tol. D (e8) d (h6) |
|-----|-----------|------------|--|--|--|------------|--------------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 |
| P | P.1 | 20-28 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

| D mm | d mm | L mm | l mm | Z | Nº Art. HSS | € |
|-------|------|------|------|---|-------------|--------|
| 2,00 | 6 | 48 | 4 | 2 | 44162 | 8,84 |
| 2,50 | 6 | 49 | 5 | 2 | 44165 | 8,84 |
| 3,00 | 6 | 49 | 5 | 2 | 44168 | 8,84 |
| 3,50 | 6 | 50 | 6 | 2 | 44171 | 9,23 |
| 4,00 | 6 | 51 | 7 | 2 | 44174 | 8,84 |
| 4,50 | 6 | 52 | 8 | 2 | 73802 | 9,95 |
| 5,00 | 6 | 52 | 8 | 2 | 44177 | 8,84 |
| 5,50 | 6 | 52 | 8 | 2 | 73805 | 10,85 |
| 6,00 | 6 | 52 | 8 | 2 | 44180 | 8,84 |
| 6,50 | 10 | 60 | 10 | 2 | 73808 | 13,91 |
| 7,00 | 10 | 60 | 10 | 2 | 44183 | 13,13 |
| 7,50 | 10 | 61 | 11 | 2 | 73811 | 13,66 |
| 8,00 | 10 | 61 | 11 | 2 | 44186 | 10,76 |
| 8,50 | 10 | 61 | 11 | 2 | 73814 | 15,33 |
| 9,00 | 10 | 61 | 11 | 2 | 44189 | 13,74 |
| 9,50 | 10 | 61 | 11 | 2 | 73817 | 15,03 |
| 10,00 | 10 | 63 | 13 | 2 | 44192 | 11,28 |
| 11,00 | 12 | 70 | 13 | 2 | 44195 | 17,18 |
| 12,00 | 12 | 73 | 16 | 2 | 44198 | 14,80 |
| 13,00 | 12 | 73 | 16 | 2 | 44201 | 22,10 |
| 14,00 | 12 | 73 | 16 | 2 | 44204 | 20,87 |
| 15,00 | 12 | 73 | 16 | 2 | 44207 | 23,84 |
| 16,00 | 16 | 79 | 19 | 2 | 44210 | 21,81 |
| 17,00 | 16 | 79 | 19 | 2 | 44213 | 28,64 |
| 18,00 | 16 | 79 | 19 | 2 | 44216 | 28,64 |
| 19,00 | 16 | 79 | 19 | 2 | 44219 | 35,20 |
| 20,00 | 20 | 88 | 22 | 2 | 44222 | 33,57 |
| 22,00 | 20 | 88 | 22 | 2 | 44225 | 46,16 |
| 24,00 | 25 | 102 | 26 | 2 | 44228 | 57,84 |
| 25,00 | 25 | 102 | 26 | 2 | 44231 | 57,84 |
| 28,00 | 25 | 102 | 26 | 2 | 44234 | 72,32 |
| 30,00 | 25 | 102 | 26 | 2 | 44237 | 83,70 |
| 32,00 | 32 | 112 | 32 | 2 | 44240 | 86,20 |
| 36,00 | 32 | 112 | 32 | 2 | 44243 | 112,86 |
| 40,00 | 40 | 130 | 38 | 2 | 44246 | 135,65 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coéficent correction

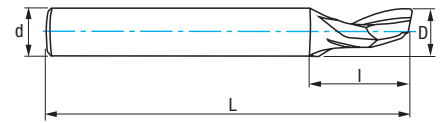


Ref. **4412**

FRESA FRONTAL ACABADO HSS 1Z ALUMINIO

Aluminium 1Z HSS Finishing End Mill

Fraise finition HSS 1Z aluminium



| | | | | | | |
|-----|-------------------|--|---------------|---------------|----------------------------|--------------------------------------|
| HSS | IZAR Std. W | Serie Corta Short Length Série courte | DIN 1835 A | d= 8-10 mm | Tol.* D (k10) d (h6) | *øD=ød => Tol. D (js14) d (h6) |
|-----|-------------------|--|---------------|---------------|----------------------------|--------------------------------------|

| D mm | d mm | L mm | l mm | Z | N° Art. HSS | € |
|---------|---------|---------|---------|---|----------------|-------|
| 3,00 | 8 | 60 | 12 | 1 | 44087 | 12,00 |
| 4,00 | 8 | 60 | 12 | 1 | 44090 | 12,00 |
| 5,00 | 8 | 60 | 12 | 1 | 44093 | 12,00 |
| 6,00 | 8 | 60 | 14 | 1 | 44096 | 12,00 |
| 7,00 | 8 | 60 | 14 | 1 | 44099 | 14,66 |
| 8,00 | 8 | 80 | 15 | 1 | 44102 | 14,66 |
| 10,00 | 10 | 80 | 15 | 1 | 44105 | 15,08 |

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-160 | 0,024 | 0,040 | 0,060 | 0,090 |
| | N.4 | 100-160 | 0,024 | 0,040 | 0,060 | 0,090 |
| | N.5 | 100-160 | 0,015 | 0,025 | 0,035 | 0,060 |
| | N.6 | 40-70 | 0,012 | 0,022 | 0,035 | 0,055 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

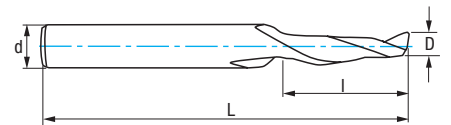
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

Ref. **4413**

FRESA FRONTAL ACABADO HSS 1Z ALUMINIO

Aluminium 1Z HSS Finishing End Mill

Fraise finition HSS 1Z aluminium



| | | | | | | |
|-----|-------------------|--|---------------|------------|----------------------------|--------------------------------------|
| HSS | IZAR Std. W | Serie Corta Short Length Série courte | DIN 1835 A | d= 6 mm | Tol.* D (k10) d (h6) | *øD=ød => Tol. D (js14) d (h6) |
|-----|-------------------|--|---------------|------------|----------------------------|--------------------------------------|

| D mm | d mm | L mm | l mm | Z | N° Art. HSS | € |
|---------|---------|---------|---------|---|----------------|-------|
| 3,00 | 6 | 60 | 12 | 1 | 44108 | 12,00 |
| 4,00 | 6 | 60 | 12 | 1 | 44111 | 12,00 |
| 5,00 | 6 | 60 | 12 | 1 | 44114 | 12,00 |
| 6,00 | 6 | 60 | 14 | 1 | 44117 | 12,00 |



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | |
|----------|------|------------|-------------------------------------|-------|
| Grupo | Sub. | HSS | Ø 4 | Ø 6 |
| N | N.3 | 100-160 | 0,024 | 0,040 |
| | N.4 | 100-160 | 0,024 | 0,040 |
| | N.5 | 100-160 | 0,015 | 0,025 |
| | N.6 | 40-70 | 0,012 | 0,022 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

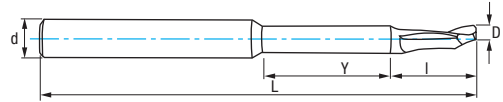
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

Ref. **4414**

FRESA FRONTAL ACABADO HSS 1Z ALUMINIO

Aluminium 1Z HSS Finishing End Mill

Fraise finition HSS 1Z aluminium



| | | | | | | | |
|-----|-------------------|---|---------------|---------------|--|----------------------------|-------------------------------------|
| HSS | IZAR Std. W | Serie Larga Long Length Série longue | d= 8-10 mm | DIN 1835 A | | Tol.* D (k10) d (h6) | *øD=ød =>Tol. D (js14) d (h6) |
|-----|-------------------|---|---------------|---------------|--|----------------------------|-------------------------------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|
| Grupo | Sub. | HSS | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
| N | N.3 | 100-160 | 0,024 | 0,040 | 0,060 | 0,090 |
| | N.4 | 100-160 | 0,024 | 0,040 | 0,060 | 0,090 |
| | N.5 | 100-160 | 0,015 | 0,025 | 0,035 | 0,060 |
| | N.6 | 40-70 | 0,012 | 0,022 | 0,035 | 0,055 |

| D mm | d mm | L mm | I mm | Y mm | Z | N° Art. HSS | € |
|---------|---------|---------|---------|---------|---|----------------|-------|
| 4,00 | 8 | 80 | 16 | 29 | 1 | 44120 | 16,96 |
| 5,00 | 8 | 80 | 16 | 29 | 1 | 44123 | 16,96 |
| 6,00 | 8 | 90 | 16 | 29 | 1 | 44126 | 16,96 |
| 8,00 | 8 | 100 | 28 | 40 | 1 | 44129 | 18,83 |
| 10,00 | 10 | 120 | 40 | 40 | 1 | 29178 | 19,40 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

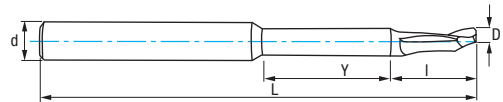
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

Ref. **4415**

FRESA FRONTAL ACABADO HSS 1Z ALUMINIO

Aluminium 1Z HSS Finishing End Mill

Fraise finition HSS 1Z aluminium



| | | | | | | | |
|-----|-------------------|---|------------|---------------|--|----------------------------|-------------------------------------|
| HSS | IZAR Std. W | Serie Larga Long Length Série longue | d= 6 mm | DIN 1835 A | | Tol.* D (k10) d (h6) | *øD=ød =>Tol. D (js14) d (h6) |
|-----|-------------------|---|------------|---------------|--|----------------------------|-------------------------------------|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas |
|----------|------|------------|-------------------------------------|
| Grupo | Sub. | HSS | Ø 6 |
| N | N.3 | 100-160 | 0,040 |
| | N.4 | 100-160 | 0,040 |
| | N.5 | 100-160 | 0,025 |
| | N.6 | 40-70 | 0,022 |

| D mm | d mm | L mm | I mm | Y mm | Z | N° Art. HSS | € |
|---------|---------|---------|---------|---------|---|----------------|-------|
| 5,00 | 6 | 80 | 14 | 31 | 1 | 44132 | 16,96 |
| 6,00 | 6 | 80 | 14 | 31 | 1 | 44135 | 16,96 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

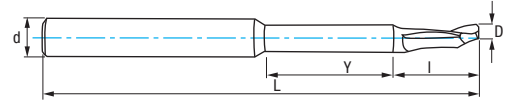
K = Coeficiente corrección
Correction coefficient
Coéfficient correction

Ref. **4416**

FRESA FRONTAL ACABADO HSS 1Z ALUMINIO

Aluminium 1Z HSS Finishing End Mill

Fraise finition HSS 1Z aluminium



| | | | | | | | |
|-----|-------------|---|---------|--|--|----------------------------|--|
| HSS | IZAR Std. W | Serie Larga Long Length Série longue | d= 8 mm | | | Tol.* D (k10) d (h6) | * $\varnothing D = \varnothing d \Rightarrow$ Tol. D (js14) d (h6) |
|-----|-------------|---|---------|--|--|----------------------------|--|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | |
|----------|------|------------|-------------------------------------|-----------------|
| Grupo | Sub. | | HSS | |
| N | N.3 | 100-160 | $\varnothing 4$ | $\varnothing 5$ |
| | N.4 | 100-160 | 0,024 | 0,040 |
| | N.5 | 100-160 | 0,024 | 0,040 |
| | N.6 | 40-70 | 0,015 | 0,025 |
| | | | 0,012 | 0,022 |

| D mm | d mm | L mm | I mm | Y mm | Z | N° Art. HSS | € |
|------|------|------|------|------|---|-------------|-------|
| 4,00 | 8 | 80 | 16 | 19 | 1 | 74142 | 16,96 |
| 5,00 | 8 | 80 | 16 | 19 | 1 | 74145 | 16,96 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \varnothing}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

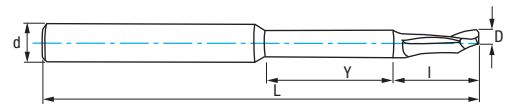
K = Coeficiente corrección
Correction coefficient
Coefficient correction

Ref. **4417**

FRESA FRONTAL ACABADO HSS 1Z ALUMINIO

Aluminium 1Z HSS Finishing End Mill

Fraise finition HSS 1Z aluminium



| | | | | | | | |
|-----|-------------|---|---------|------------|--|----------------------------|--|
| HSS | IZAR Std. W | Serie Larga Long Length Série longue | d= 8 mm | DIN 1835 A | | Tol.* D (k10) d (h6) | * $\varnothing D = \varnothing d \Rightarrow$ Tol. D (js14) d (h6) |
|-----|-------------|---|---------|------------|--|----------------------------|--|

| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | |
|----------|------|------------|-------------------------------------|--|
| Grupo | Sub. | | HSS | |
| N | N.3 | 100-160 | $\varnothing 5$ | |
| | N.4 | 100-160 | 0,040 | |
| | N.5 | 100-160 | 0,040 | |
| | N.6 | 40-70 | 0,025 | |
| | | | 0,022 | |

| D mm | d mm | L mm | I mm | Y mm | Z | N° Art. HSS | € |
|------|------|------|------|------|---|-------------|-------|
| 5,00 | 8 | 100 | 35 | 20 | 1 | 44138 | 16,96 |



$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \varnothing}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

SETS FRESADO PMX - HSSE

PMX – HSSE Milling Sets

Jeux de fraisage PMX - HSSE



Sets 6644

FRESA FRONTAL DESBASTE FINO PMX NZ
 NZ PMX Fine Pitch Roughing End Mill
 Fraise ébauche pas fin PMX NZ



8 Pcs

| Cont. | N° Art. PMX | € |
|--------------------------|-------------|--------|
| 6-8-10-12-14-16-18-20 mm | 14904 | 482,97 |



4 Pcs

| Cont. | N° Art. PMX | € |
|--------------|-------------|--------|
| 6-8-10-12 mm | 14241 | 164,34 |



8 Pcs

| Cont. | N° Art TIALN-TOP | € |
|--------------------------|------------------|--------|
| 6-8-10-12-14-16-18-20 mm | 14907 | 554,85 |



4 Pcs

| Cont. | N° Art TIALN-TOP | € |
|--------------|------------------|--------|
| 6-8-10-12 mm | 14275 | 192,51 |

Sets 6647

FRESA FRONTAL DESBASTE FINO PMX NZ INOX
 Stainless NZ PMX Fine Pitch Roughing End Mill
 Fraise ébauche pas fin PMX NZ Inox



8 Pcs

| Cont. | N° Art TIALN-TOP | € |
|--------------------------|------------------|--------|
| 6-8-10-12-14-16-18-20 mm | 66387 | 603,10 |



4 Pcs

| Cont. | N° Art TIALN-TOP | € |
|--------------|------------------|--------|
| 6-8-10-12 mm | 14293 | 208,89 |

Sets 4644

FRESA FRONTAL DESBASTE FINO HSSE 8% CO NZ

NZ HSSE 8% Co Fine Pitch Roughing End Mill

Fraise ébauche pas fin HSSE 8% Co NZ



6 Pcs

| Cont. | N° Art. 8% Co | € |
|------------------|------------------|--------|
| 4-5-6-8-10-12 mm | 14300 | 217,13 |



6 Pcs

| Cont. | N° Art. TIALSIN | € |
|------------------|--------------------|--------|
| 4-5-6-8-10-12 mm | 14303 | 259,50 |

Sets 6600

FRESA FRONTAL ACABADO PMX NZ

NZ PMX Finishing End Mill

Fraise finition PMX NZ



10 Pcs

| Cont. | N° Art. PMX | € |
|------------------------------|----------------|--------|
| 4-5-6-8-10-12-14-16-18-20 mm | 14911 | 304,37 |



10 Pcs

| Cont. | N° Art. TIALN-TOP | € |
|------------------------------|----------------------|--------|
| 4-5-6-8-10-12-14-16-18-20 mm | 14913 | 383,49 |



6 Pcs

| Cont. | N° Art. PMX | € |
|------------------|----------------|--------|
| 4-5-6-8-10-12 mm | 14294 | 112,52 |



6 Pcs

| Cont. | N° Art. TIALN-TOP | € |
|------------------|----------------------|--------|
| 4-5-6-8-10-12 mm | 14295 | 150,75 |

Sets 6430

FRESA FRONTAL ACABADO PMX 3Z ALUMINIO

Aluminium 3Z PMX Finishing End Mill

Fraise finition PMX 3Z aluminium



10 Pcs

| Cont. | N° Art. PMX | € |
|------------------------------|-------------|--------|
| 4-5-6-8-10-12-14-16-18-20 mm | 14919 | 335,31 |



10 Pcs

| Cont. | N° Art. TIALN-TOP | € |
|------------------------------|-------------------|--------|
| 4-5-6-8-10-12-14-16-18-20 mm | 14922 | 414,71 |



6 Pcs

| Cont. | N° Art. PMX | € |
|------------------|-------------|--------|
| 4-5-6-8-10-12 mm | 14296 | 124,25 |



6 Pcs

| Cont. | N° Art. TIALN-TOP | € |
|------------------|-------------------|--------|
| 4-5-6-8-10-12 mm | 14297 | 162,38 |

Sets 6420

FRESA FRONTAL ACABADO PMX 2Z

2Z PMX Finishing End Mill

Fraise finition PMX 2Z



10 Pcs

| Cont. | N° Art. PMX | € |
|------------------------------|-------------|--------|
| 4-5-6-8-10-12-14-16-18-20 mm | 14914 | 284,37 |



10 Pcs

| Cont. | N° Art. TIALN-TOP | € |
|------------------------------|-------------------|--------|
| 4-5-6-8-10-12-14-16-18-20 mm | 14916 | 370,33 |



6 Pcs

| Cont. | N° Art. PMX | € |
|------------------|-------------|--------|
| 4-5-6-8-10-12 mm | 14298 | 103,36 |



6 Pcs

| Cont. | N° Art. TIALN-TOP | € |
|------------------|-------------------|--------|
| 4-5-6-8-10-12 mm | 14299 | 145,36 |

Sets 4600

FRESA FRONTAL ACABADO HSSE 8% CO NZ

NZ HSSE 8% Co Finishing End Mill

Fraise finition HSSE 8% Co NZ



6 Pcs

| Cont. | N° Art. 8% Co | € |
|------------------|------------------|-------|
| 4-5-6-8-10-12 mm | 14382 | 86,81 |



6 Pcs

| Cont. | N° Art. TIALSIN | € |
|------------------|--------------------|--------|
| 4-5-6-8-10-12 mm | 14383 | 130,23 |

Sets 4420

FRESA FRONTAL ACABADO HSSE 8% CO 2Z

2Z HSSE 8% Co Finishing End Mill

Fraise finition HSSE 8% Co 2Z



6 Pcs

| Cont. | N° Art. 8% Co | € |
|------------------|------------------|-------|
| 4-5-6-8-10-12 mm | 14384 | 76,24 |



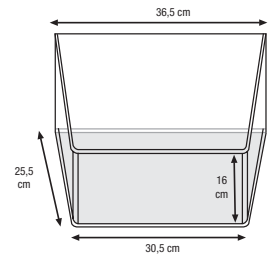
6 Pcs

| Cont. | N° Art. TIALSIN | € |
|------------------|--------------------|--------|
| 4-5-6-8-10-12 mm | 15076 | 121,32 |

Ref. **4995**

EXPOSITOR FRESAS FRONTALES

End Mill Exhibitor
Présentoir Fraises



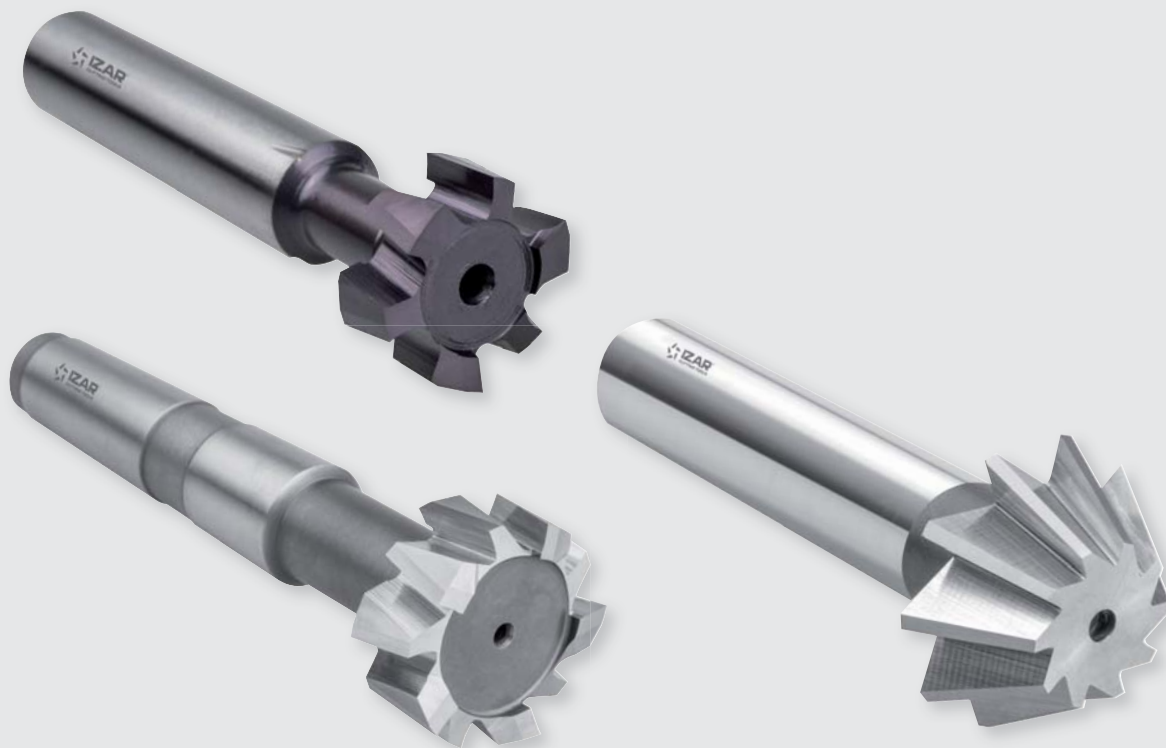
56 Pcs

| Cont. Ref. | Diam. mm | Uds. | |
|------------------|-------------|------|---|
| 4600 | 3 | 1 | |
| | 4 | 1 | |
| | 4606 | 5 | 1 |
| | | 6 | 1 |
| | 4432 | 8 | 1 |
| | 4420 | 10 | 1 |
| 4426 | 12 | 1 | |
| 4640 | 10 | 1 | |
| | 4690 | 12 | 1 |
| | | 16 | 1 |
| Refs. HSS | 4 | 1 | |
| | 4412 | 5 | 1 |
| | 4414 | 6 | 1 |
| | | 8 | 1 |

| N° Art. 8% Co | € |
|---------------|-----------------|
| 67841 | 1.037,72 |

| N° Art. TIALSIN | € |
|-----------------|-----------------|
| 67842 | 1.411,77 |





FRESAS EN "T", WOODRUFF, 1/4 RADIO, ANGULARES


"T" Slot, Woodruff, 1/4 Radius, Angle Shank Tool

Fraises à T, Woodruff, rayon 1/4, coniques

TABLA USO

Use Table

Tableau d'usage

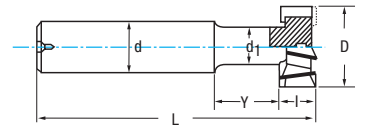
| Material | | | | Velocidad Corte Cutting Speed Vitesse de coupe (m/min.) | | Avance Feed Avance fz/rev. (mm/min.) | | | | | | | | | | | | |
|----------|---|------------|--|--|---------|--|---------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | | | | Grupo / Subgrupo Group / Subgroup Groupe / S. Groupe | HSSE 5% Co | TIALSIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 |
| P |  | P.1 | <850 N/mm ² | 20-30 | 28-40 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | | P.2 | < 1000 N/mm ² | 15-20 | 20-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| K | FUNDICIÓN Cast Iron Fonte | K.1 | < 700 N/mm ² | 15-20 | 20-25 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | | K.2 | 700-1000 N/mm ² | 12-18 | 16-25 | 0,014 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| N | Cu - BRONCE - LATÓN Copper - Bronze - Brass Cuivre - Bronze - Laiton | N.1 | VIRUTA CORTA Short Chip Copeaux courts | 60-100 | 80-130 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | |
| | | N.2 | VIRUTA LARGA Long Chip Copeaux longs | 60-100 | 80-130 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | ALUMINIO - MAGNESIO Aluminium - Magnesium | N.3 | NO ALEADO Unalloyed Sans alliage | 160-200 | 190-240 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 | 0,130 | 0,130 | 0,130 | 0,130 |
| | | N.4 | < 10% Si | 160-200 | 190-240 | 0,025 | 0,042 | 0,062 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 | 0,130 | 0,130 | 0,130 | 0,130 |
| | | N.5 | > 10% Si | 50-80 | 60-90 | 0,020 | 0,030 | 0,035 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

Ref. **4800**

FRESA HSSE 8% CO RANURAS "T"

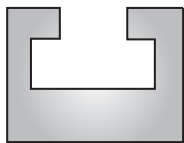
"T" Slots HSSE 8% Co Shank Tool

Fraise HSSE 8% Co rainures à "T"



| | | | | | | |
|---------------|----------------------------|--------------------|-------------|--|---------------|-----------------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 851 AA N | ISO 3337 | | DIN 1835 A | Tol. D (d11) d (h8) l (d11) |
|---------------|----------------------------|--------------------|-------------|--|---------------|-----------------------------------|

| | | | | |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|
| Grupo Group-Groupe P | Subgrup. P.1 P.2 | Grupo Group-Groupe K | Grupo Group-Groupe N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|



| D mm | l mm | d mm | L mm | d1 mm | Y mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---------|----------|---------|----|------------------|---------------|--------------------|---------------|
| 11,00 | 4 | 10 | 53,50 | 4 | 10,00 | 6 | 68868 | 82,62 | 17164 | 101,38 |
| 12,50 | 6 | 10 | 57,00 | 5 | 10,50 | 6 | 57822 | 85,90 | 17165 | 107,22 |
| 16,00 | 8 | 10 | 62,00 | 7 | 12,50 | 6 | 57831 | 94,47 | 13120 | 119,66 |
| 18,00 | 8 | 12 | 70,00 | 8 | 16,00 | 8 | 57840 | 99,46 | 17167 | 127,94 |
| 21,00 | 9 | 12 | 74,00 | 10 | 18,00 | 8 | 57849 | 109,59 | 14929 | 153,67 |
| 25,00 | 11 | 16 | 82,00 | 12 | 20,00 | 8 | 57858 | 123,67 | 15667 | 167,34 |
| 32,00 | 14 | 16 | 90,00 | 15 | 22,50 | 10 | 57867 | 155,57 | 17168 | 218,12 |
| 40,00 | 18 | 25 | 108,00 | 19 | 31,00 | 10 | 57876 | 215,77 | 17589 | 304,04 |



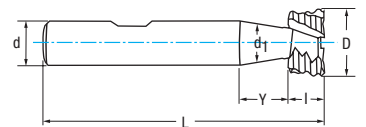
TIALSIN bajo demanda / upon request / sur demande

Ref. **4802**

FRESA HSSE 8% CO RANURAS "T"

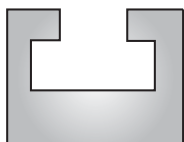
"T" Slots HSSE 8% Co Shank Tool

Fraise HSSE 8% Co rainures à "T"



| | | | | | | |
|---------------|----------------------------|---------------------|-------------|--|---------------|-----------------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 851 AB NR | ISO 3337 | | DIN 1835 B | Tol. D (d11) d (h8) l (d11) |
|---------------|----------------------------|---------------------|-------------|--|---------------|-----------------------------------|

| | | | | |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|
| Grupo Group-Groupe P | Subgrup. P.1 P.2 | Grupo Group-Groupe K | Grupo Group-Groupe N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|



| D mm | l mm | d mm | L mm | d1 mm | Y mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---------|----------|---------|---|------------------|---------------|--------------------|---------------|
| 16,00 | 8 | 10 | 62 | 7 | 11,00 | 4 | 77751 | 94,05 | 22012 | 118,09 |
| 18,00 | 8 | 12 | 70 | 8 | 14,00 | 4 | 77753 | 104,01 | 22013 | 131,01 |
| 21,00 | 9 | 12 | 74 | 10 | 17,00 | 5 | 77756 | 119,20 | 21074 | 160,93 |
| 25,00 | 11 | 16 | 82 | 12 | 18,00 | 5 | 77757 | 139,02 | 21075 | 180,22 |
| 32,00 | 14 | 16 | 90 | 15 | 23,00 | 6 | 77758 | 182,30 | 18925 | 241,10 |
| 40,00 | 18 | 25 | 108 | 19 | 28,00 | 6 | 77759 | 279,24 | 18928 | 361,59 |



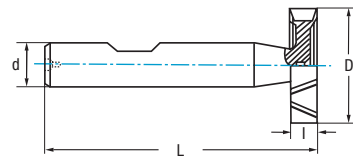
TIALSIN bajo demanda / upon request / sur demande

Ref. **4834**

FRESA HSSE 8% CO RANURAS WOODRUFF

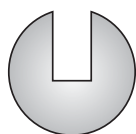
Woodruff Slots HSSE 8% Co Shank Tool

Fraise HSSE 8% Co rainures Woodruff



| | | | | | |
|---------------|----------------------------|-------------------|---------------|----------------------------------|---|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 850 D N | DIN 1835 B | Tol. D (h11) d (h8) l (e8) | * Ref. 4830 bajo demanda upon request sur demande |
|---------------|----------------------------|-------------------|---------------|----------------------------------|---|

| | | | | |
|------------------------------------|------------------------|------------------------------------|------------------------------------|--|
| Grupo Group-Groupes P | Subgrup. P.1 P.2 | Grupo Group-Groupes K | Grupo Group-Groupes N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|------------------------------------|------------------------|------------------------------------|------------------------------------|--|



| D mm | I mm | d mm | L mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|---------|---------|---------|---------|----|------------------|--------|--------------------|--------|
| 4,50 | 1,00 | 6 | 50 | 6 | 22506 | 44,95 | 22533 | 51,48 |
| 7,50 | 1,50 | 6 | 50 | 6 | 22507 | 46,80 | 22534 | 54,48 |
| 7,50 | 2,00 | 6 | 50 | 6 | 22509 | 46,80 | 22536 | 54,48 |
| 10,50 | 2,00 | 6 | 50 | 8 | 22521 | 50,36 | 22537 | 58,68 |
| 10,50 | 2,50 | 6 | 50 | 8 | 22523 | 50,36 | 22539 | 58,78 |
| 10,50 | 3,00 | 6 | 50 | 8 | 22510 | 50,36 | 22540 | 58,78 |
| 13,50 | 3,00 | 10 | 56 | 8 | 22512 | 51,18 | 22542 | 61,77 |
| 13,50 | 4,00 | 10 | 56 | 8 | 22513 | 51,18 | 22543 | 61,77 |
| 16,50 | 3,00 | 10 | 56 | 8 | 22514 | 51,63 | 22545 | 65,99 |
| 16,50 | 4,00 | 10 | 56 | 8 | 22515 | 51,63 | 22546 | 65,99 |
| 16,50 | 5,00 | 10 | 56 | 8 | 22516 | 51,63 | 22547 | 65,99 |
| 19,50 | 4,00 | 10 | 63 | 10 | 22517 | 58,79 | 22548 | 74,44 |
| 19,50 | 5,00 | 10 | 63 | 10 | 22518 | 58,79 | 22549 | 74,44 |
| 19,50 | 6,00 | 10 | 63 | 10 | 22519 | 58,79 | 22550 | 74,44 |
| 22,50 | 5,00 | 10 | 63 | 10 | 22520 | 64,61 | 22551 | 86,64 |
| 22,50 | 6,00 | 10 | 63 | 10 | 22522 | 64,61 | 22552 | 86,64 |
| 22,50 | 8,00 | 10 | 63 | 10 | 22524 | 64,61 | 22553 | 86,64 |
| 25,50 | 6,00 | 10 | 63 | 10 | 22525 | 75,37 | 22554 | 107,05 |
| 28,50 | 6,00 | 10 | 63 | 10 | 22527 | 76,70 | 22555 | 108,34 |
| 28,50 | 8,00 | 10 | 63 | 10 | 22528 | 76,70 | 22556 | 108,34 |
| 28,50 | 10,00 | 12 | 71 | 10 | 22373 | 76,70 | 22557 | 108,34 |
| 32,50 | 7,00 | 12 | 71 | 12 | 22374 | 95,02 | 22558 | 129,84 |
| 32,50 | 8,00 | 12 | 71 | 12 | 22530 | 95,02 | 22560 | 129,84 |
| 32,50 | 10,00 | 12 | 71 | 12 | 22531 | 95,02 | 22563 | 129,84 |
| 45,50 | 10,00 | 12 | 71 | 14 | 22532 | 150,46 | 22564 | 213,36 |

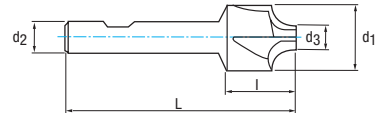


TIALSIN bajo demanda / upon request / sur demande



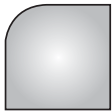
Ref. **5080**

FRESA HSSE 8% CO RADIO 1/4
 1/4 Radius HSSE 8% Co Shank Tool
 Fraise HSSE 8% Co rayon 1/4



| | | | | | | |
|---------------|----------------------------|--------------------|--|---------------|----------------------------|-----|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 6518 B N | Serie Corta Short Length Série courte | DIN 1835 B | Tol. R (H11) d2 (h6) | 1/4 |
|---------------|----------------------------|--------------------|--|---------------|----------------------------|-----|

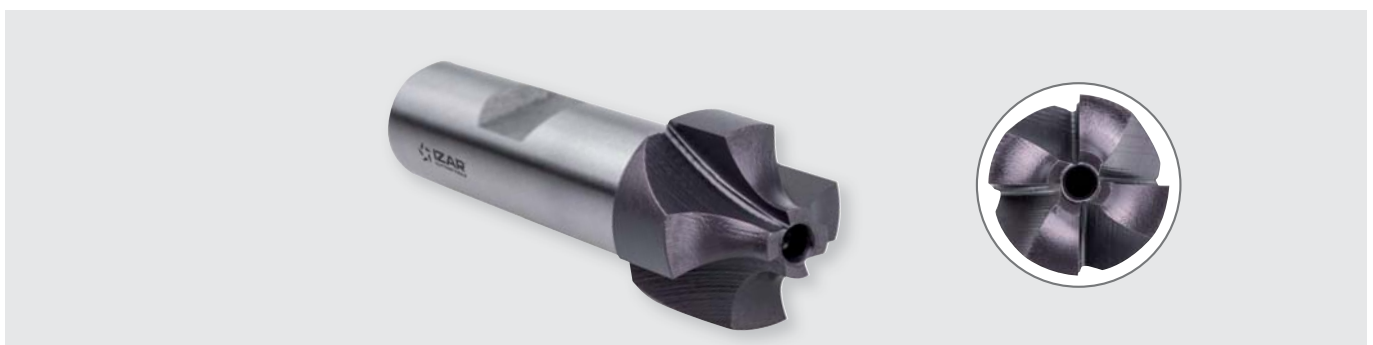
| | | | | |
|--|-------------------------------|--|--|---|
| Grupo Group-Gruppe P | Subgrup. P.1 P.2 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|--|-------------------------------|--|--|---|



| R | d3 mm | d1 mm | d2 mm | L mm | l mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|----------|----------|----------|---------|---------|---|------------------|--------|--------------------|--------|
| 1,00 | 6,00 | 10,00 | 10 | 60 | | 4 | 77762 | 52,35 | 19925 | 69,42 |
| 1,60 | 6,00 | 10,00 | 10 | 60 | | 4 | 77763 | 47,66 | 19379 | 64,86 |
| 2,00 | 6,00 | 11,00 | 10 | 60 | | 4 | 77764 | 41,89 | 18048 | 59,23 |
| 2,50 | 6,00 | 11,00 | 10 | 60 | 8 | 4 | 77765 | 48,15 | 19928 | 66,95 |
| 3,00 | 6,00 | 12,00 | 12 | 60 | | 4 | 77766 | 48,15 | 18049 | 66,95 |
| 4,00 | 6,00 | 14,00 | 12 | 60 | 10 | 4 | 77767 | 53,27 | 18052 | 74,47 |
| 5,00 | 6,00 | 16,00 | 12 | 60 | 10 | 4 | 77768 | 60,78 | 17591 | 85,69 |
| 6,00 | 8,00 | 20,00 | 16 | 67 | 12 | 4 | 77769 | 60,78 | 18056 | 91,83 |
| 7,00 | 8,00 | 22,00 | 16 | 71 | 16 | 4 | 77770 | 83,21 | 19934 | 125,95 |
| 8,00 | 8,00 | 24,00 | 16 | 71 | 16 | 4 | 77771 | 83,21 | 17593 | 125,95 |
| 9,00 | 8,00 | 26,00 | 25 | 85 | 18 | 4 | 77772 | 108,44 | 19946 | 169,30 |
| 10,00 | 8,00 | 28,00 | 25 | 85 | 18 | 4 | 77773 | 108,44 | 19952 | 169,30 |
| 12,00 | 10,00 | 34,00 | 25 | 90 | 24 | 4 | 77774 | 118,73 | 19953 | 186,27 |
| 12,50 | 16,00 | 41,00 | 25 | 100 | 28 | 6 | 77775 | 134,63 | 19954 | 257,80 |
| 16,00 | 16,00 | 48,00 | 25 | 100 | 28 | 6 | 77776 | 229,94 | 19956 | 350,49 |
| 20,00 | 16,00 | 56,00 | 32 | 112 | 32 | 6 | 77777 | 333,72 | 21999 | 451,40 |

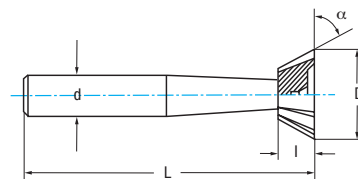


TIALSIN bajo demanda / upon request / sur demande



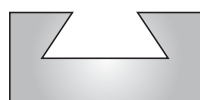
Ref. **4330**

FRESA HSSE 8% CO ANGULAR
Single Angle HSSE 8% Co Shank Tool
Fraise HSSE 8% Co conique



| | | | | | |
|---------------|----------------------------|--------------------|-------------|---------------|----------------------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 1833 A N | ISO 3859 | DIN 1835 A | Tol. D (js16) d (h8) |
|---------------|----------------------------|--------------------|-------------|---------------|----------------------------|

| | | | | |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|
| Grupo Group-Groupe P | Subgrup. P.1 P.2 | Grupo Group-Groupe K | Grupo Group-Groupe N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|



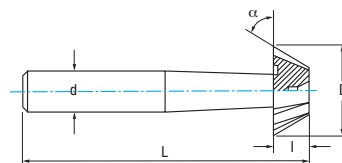
| D mm | Ang. | d mm | L mm | I mm | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|---------|------|---------|---------|---------|----|------------------|---------------|--------------------|---------------|
| 16,00 | 45° | 12 | 60 | 4,00 | 8 | 58656 | 83,86 | 19628 | 108,14 |
| 20,00 | 45° | 12 | 63 | 5,00 | 8 | 58674 | 89,21 | 22407 | 119,49 |
| 25,00 | 45° | 12 | 67 | 6,30 | 10 | 58701 | 108,77 | 22405 | 150,77 |
| 32,00 | 45° | 16 | 71 | 8,00 | 12 | 58719 | 121,37 | 22406 | 181,86 |
| 16,00 | 60° | 12 | 60 | 6,30 | 8 | 58665 | 83,86 | 21549 | 108,14 |
| 20,00 | 60° | 12 | 63 | 8,00 | 8 | 58683 | 89,21 | 17857 | 119,49 |
| 25,00 | 60° | 12 | 67 | 10,00 | 10 | 58710 | 108,77 | 17923 | 150,77 |
| 32,00 | 60° | 16 | 71 | 12,50 | 12 | 58728 | 121,37 | 21469 | 181,86 |



TIALSIN bajo demanda / upon request / sur demande

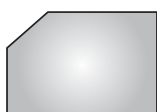
Ref. **4340**

FRESA HSSE 8% CO ANGULAR
Single Angle HSSE 8% Co Shank Tool
Fraise HSSE 8% Co conique



| | | | | |
|---------------|--------------------|-------------|---------------|----------------------------|
| HSSE 8% Co | DIN 1833 B N | ISO 3859 | DIN 1835 A | Tol. D (js16) d (h8) |
|---------------|--------------------|-------------|---------------|----------------------------|

| | | | | |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|
| Grupo Group-Groupe P | Subgrup. P.1 P.2 | Grupo Group-Groupe K | Grupo Group-Groupe N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|-----------------------------------|------------------------|-----------------------------------|-----------------------------------|--|



| D mm | Ang. | d mm | L mm | I mm | Z | N° Art. 8% Co | € |
|---------|------|---------|---------|---------|----|------------------|--------------|
| 16,00 | 45° | 12 | 60 | 4,00 | 8 | 58737 | 67,52 |
| 20,00 | 45° | 12 | 63 | 5,00 | 8 | 58764 | 75,95 |
| 25,00 | 45° | 12 | 67 | 6,30 | 10 | 58791 | 85,38 |
| 32,00 | 45° | 16 | 71 | 8,00 | 12 | 58818 | 97,09 |
| 16,00 | 60° | 12 | 60 | 6,30 | 8 | 58746 | 67,52 |
| 20,00 | 60° | 12 | 63 | 8,00 | 8 | 58773 | 75,95 |
| 25,00 | 60° | 12 | 67 | 10,00 | 10 | 58800 | 85,38 |
| 32,00 | 60° | 16 | 71 | 12,50 | 12 | 58827 | 97,09 |

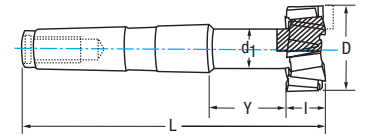



Ref. **4810**

FRESA MANGO CÓNICO HSSE 8% CO RANURAS "T"

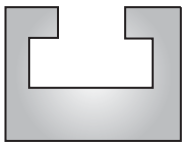
"T" Slots HSSE 8% Co Taper Shank Tool


Fraise queue conique HSSE 8% Co rainures à "T"



| | | | | |
|---------------|-------------------|-------------|---|----------------------------|
| HSSE 8% Co | DIN 851 B N | ISO 1641 |  | Tol. D (d11) I (d11) |
|---------------|-------------------|-------------|---|----------------------------|

| | | | | |
|--|-------------------------------|--|--|---|
| Grupo Group-Gruppe P | Subgrup. P.1 P.2 | Grupo Group-Gruppe K | Grupo Group-Gruppe N | Subgrup. N.1 - N.2 N.3 - N.4 - N.5 |
|--|-------------------------------|--|--|---|



| D mm | I mm | L mm | CM | d1 mm | Y mm |  Z | N° Art. 8% Co | € |
|---------|---------|---------|----|----------|---------|---|------------------|--------|
| 18,00 | 8 | 82 | 1 | 8 | 17,00 | 8 | 79164 | 110,45 |
| 21,00 | 9 | 102 | 2 | 10 | 24,00 | 8 | 79165 | 121,75 |
| 25,00 | 11 | 104 | 2 | 12 | 24,00 | 8 | 79166 | 126,20 |
| 32,00 | 14 | 111 | 2 | 15 | 28,00 | 10 | 79167 | 187,46 |
| 40,00 | 18 | 140 | 3 | 19 | 36,00 | 10 | 79168 | 247,04 |
| 50,00 | 22 | 187 | 4 | 25 | 46,00 | 10 | 79169 | 300,01 |
| * 60,00 | 28 | 201 | 4 | 30 | 54,00 | 10 | 79170 | 433,47 |
| *72,00 | 35 | 248 | 5 | 36 | 50,00 | 12 | 79171 | 564,62 |



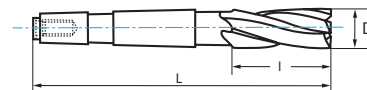
* Art. bajo demanda / upon request / sur demande

Ref. **4675**

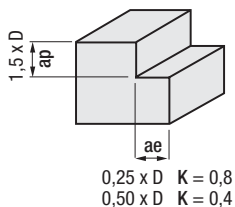
FRESA FRONTAL MANGO CÓNICO DESBASTE FINO HSSE 8% CO NZ

NZ HSSE 8% Co Fine Pitch Roughing Taper Shank End Mill

Fraise queue conique ébauche pas fin HSSE 8% Co NZ



| | | | | | | | | |
|---------------|----------------------------|----------------------|----------------|-------------|-------|------------|-----------------|--|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 845 B NR-F | $\phi \leq 25$ | $\phi > 25$ | 4-6 Z | 30° | Tol. D (k12) | |
|---------------|----------------------------|----------------------|----------------|-------------|-------|------------|-----------------|--|



| Material | | Vc (m/min) | | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|---------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 8% Co | TIALSIN | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | Ø 50 |
| P | P.2 | 25-35 | 30-40 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| K | K.1 | 20-30 | 24-35 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | K.2 | 15-20 | 18-24 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| S | | 15-20 | 18-24 | 0,067 | 0,080 | 0,110 | 0,130 | 0,130 | 0,130 | 0,130 |
| N | N.1 | 60-100 | 70-120 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.2 | 60-100 | 70-120 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

$$\text{r.p.m.} = \frac{Vc \times 1.000}{\pi \times \phi}$$

K = Coeficiente corrección
Correction coefficient
Coéfficient correction

$$Vf (\text{mm/min.}) = \text{r.p.m.} \times Z \times fz \times K$$

| D mm | L mm | I mm | CM | Z | Nº Art. 8% Co | € | Nº Art. TIALSIN | € |
|--|------|------|----|---|---------------|--------|-----------------|--------|
| 12,00 | 96 | 26 | 1 | 4 | 78137 | 87,44 | 78151 | 108,18 |
| 14,00 | 111 | 26 | 2 | 4 | 78156 | 87,44 | 79527 | 109,71 |
| 16,00 | 117 | 32 | 2 | 4 | 79528 | 93,21 | 79532 | 118,88 |
| 18,00 | 117 | 32 | 2 | 4 | 79533 | 99,51 | 79537 | 125,03 |
| 20,00 | 123 | 38 | 2 | 4 | 79538 | 107,05 | 79542 | 136,56 |
| 22,00 | 123 | 38 | 2 | 4 | 79543 | 152,48 | 79547 | 180,69 |
| 25,00 | 147 | 45 | 3 | 5 | 79548 | 148,83 | 79552 | 185,34 |
| Ø > 25 mm sin Corte al Centro Non Center Cutting / Sans coupe au centre | | | | | | | | |
| 28,00 | 147 | 45 | 3 | 5 | 79553 | 167,88 | 79557 | 203,89 |
| 30,00 | 147 | 45 | 3 | 5 | 79558 | 188,18 | 79562 | 234,60 |
| 32,00 | 178 | 53 | 4 | 5 | 79563 | 259,56 | 79567 | 314,86 |
| 36,00 | 178 | 53 | 4 | 6 | 79568 | 296,49 | 79572 | 352,29 |
| 40,00 | 188 | 63 | 4 | 6 | 79573 | 359,70 | 79577 | 425,70 |
| 45,00 | 188 | 63 | 4 | 6 | 79578 | 438,66 | 79582 | 518,14 |
| 50,00 | 233 | 75 | 5 | 6 | 79583 | 520,01 | 79587 | 597,23 |

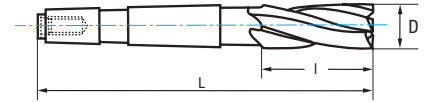


TIALSIN bajo demanda / upon request / sur demande

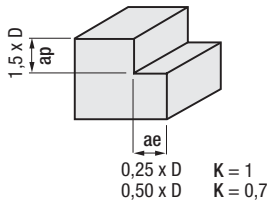


Ref. 4570

FRESA FRONTAL MANGO CÓNICO DESBASTE GRUESO HSSE 8% CO NZ NZ HSSE 8% Co Coarse Roughing Taper Shank End Mill Fraise queue conique ébauche HSSE 8% Co NZ



| | | | | | | | |
|---------------|--------------------|-------------|--|-------|--|-----------------|--|
| HSSE 8% Co | DIN 845 B NR | ISO 1641 | | 4-8 Z | | Tol. D (k12) | |
|---------------|--------------------|-------------|--|-------|--|-----------------|--|



| Material | Vc (m/min) | Refs. 4570-4580 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | | | | |
|----------|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Grupo | Sub. | 8% Co | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 | Ø 50 | Ø 63 |
| P | P.1 | 30-45 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| K | K.1 | 20-30 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | K.2 | 15-20 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| N | N.1 | 60-100 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.2 | 60-100 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$ K = Coeficiente corrección
Correction coefficient
Coéfficient correction

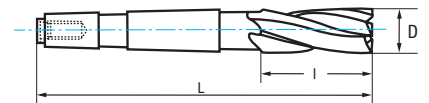
$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$

| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € | D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € |
|-------|------|------|----|---|---------------|--------|-------|------|------|----|---|---------------|--------|
| 10,00 | 92 | 22 | 1 | 4 | 45962 | 67,85 | 26,00 | 147 | 45 | 3 | 5 | 45989 | 165,05 |
| 12,00 | 96 | 26 | 1 | 4 | 45965 | 69,19 | 28,00 | 147 | 45 | 3 | 5 | 45992 | 165,05 |
| 14,00 | 111 | 26 | 2 | 4 | 45968 | 78,58 | 30,00 | 147 | 45 | 3 | 5 | 45995 | 193,72 |
| 15,00 | 111 | 26 | 2 | 4 | 67160 | 98,20 | 32,00 | 178 | 53 | 4 | 6 | 45998 | 241,15 |
| 16,00 | 117 | 32 | 2 | 4 | 45971 | 81,05 | 36,00 | 178 | 53 | 4 | 6 | 46001 | 265,85 |
| 18,00 | 117 | 32 | 2 | 4 | 45974 | 88,94 | 40,00 | 188 | 63 | 4 | 6 | 46004 | 371,35 |
| 20,00 | 123 | 38 | 2 | 4 | 45977 | 97,86 | 45,00 | 188 | 63 | 4 | 6 | 46007 | 402,38 |
| 22,00 | 123 | 38 | 2 | 5 | 45980 | 107,73 | 50,00 | 233 | 75 | 5 | 6 | 46010 | 447,67 |
| 24,00 | 147 | 45 | 3 | 5 | 45983 | 150,22 | 56,00 | 233 | 75 | 5 | 8 | 46013 | 607,63 |
| 25,00 | 147 | 45 | 3 | 5 | 45986 | 150,22 | 63,00 | 248 | 90 | 5 | 8 | 46016 | 763,18 |

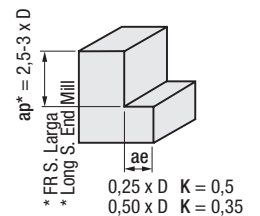


Ref. 4580

FRESA FRONTAL MANGO CÓNICO DESBASTE GRUESO HSSE 8% CO NZ LARGA Long NZ HSSE 8% Co Coarse Roughing Taper Shank End Mill Fraise queue conique ébauche HSSE 8% Co NZ longue



| | | | | | | | |
|---------------|--------------------|-------------|--|-------|--|-----------------|--|
| HSSE 8% Co | DIN 845 B NR | ISO 1641 | | 4-8 Z | | Tol. D (k12) | |
|---------------|--------------------|-------------|--|-------|--|-----------------|--|



| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € | D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € |
|-------|------|------|----|---|---------------|--------|-------|------|------|----|---|---------------|----------|
| 10,00 | 115 | 45 | 1 | 4 | 67322 | 121,18 | 26,00 | 192 | 90 | 3 | 5 | 46124 | 236,21 |
| 12,00 | 123 | 53 | 1 | 4 | 67325 | 123,53 | 28,00 | 192 | 90 | 3 | 5 | 46127 | 236,21 |
| 14,00 | 138 | 53 | 2 | 4 | 67328 | 155,64 | 30,00 | 192 | 90 | 3 | 5 | 46130 | 279,65 |
| 15,00 | 138 | 53 | 2 | 4 | 67331 | 178,99 | 32,00 | 231 | 106 | 4 | 6 | 46133 | 333,04 |
| 16,00 | 148 | 63 | 2 | 4 | 46106 | 129,47 | 36,00 | 231 | 106 | 4 | 6 | 46136 | 381,44 |
| 18,00 | 148 | 63 | 2 | 4 | 46109 | 134,40 | 40,00 | 250 | 125 | 4 | 6 | 46139 | 469,39 |
| 20,00 | 160 | 75 | 2 | 4 | 46112 | 154,19 | 45,00 | 250 | 125 | 4 | 6 | 46142 | 597,90 |
| 22,00 | 160 | 75 | 2 | 5 | 46115 | 160,11 | 50,00 | 308 | 150 | 5 | 6 | 46145 | 746,14 |
| 24,00 | 192 | 90 | 3 | 5 | 46118 | 217,41 | 56,00 | 308 | 150 | 5 | 8 | 46148 | 869,48 |
| 25,00 | 192 | 90 | 3 | 5 | 46121 | 227,29 | 63,00 | 338 | 180 | 5 | 8 | 46151 | 1.094,62 |

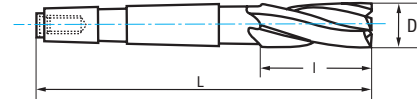


Ref. **4610**

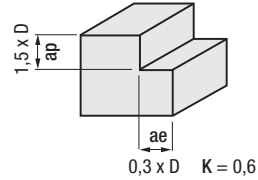
FRESA FRONTAL MANGO CÓNICO ACABADO HSSE 8% CO NZ

NZ HSSE 8% Co Finishing Taper Shank End Mill

Fraise queue conique finition HSSE 8% Co NZ



| | | | | | | | | |
|------------|----------------------|-------------|----------|----------------|-------------|--|--|--------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 845 B N | ISO 1641 | $\phi \leq 25$ | $\phi > 25$ | | | Tol. D (k10) |
|------------|----------------------|-------------|----------|----------------|-------------|--|--|--------------|



| Material | | Vc (m/min) | | Refs. 4610-4516 - Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | | |
|----------|------|------------|---------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Grupo | Sub. | 8% Co | TIALSIN | ϕ 10 | ϕ 12 | ϕ 16 | ϕ 20 | ϕ 25 | ϕ 32 | ϕ 40 | ϕ 50 | ϕ 63 |
| P | P.1 | 30-45 | 35-45 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | P.2 | 25-35 | 30-40 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| K | K.1 | 20-30 | 24-35 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | K.2 | 15-20 | 18-24 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| N | N.1 | 60-100 | 70-120 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.2 | 60-100 | 70-120 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$

$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$ $K =$ Coeficiente corrección / Correction coefficient - Coefficient correction

| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|----|---|---------------|--------|-----------------|--------|
| 10,00 | 92 | 22 | 1 | 4 | 60033 | 45,66 | 78013 | 65,39 |
| 12,00 | 96 | 26 | 1 | 4 | 60037 | 60,34 | 78014 | 81,82 |
| 14,00 | 111 | 26 | 2 | 4 | 60042 | 66,86 | 78015 | 89,75 |
| 15,00 | 111 | 26 | 2 | 4 | 60046 | 71,74 | 78016 | 98,03 |
| 16,00 | 117 | 32 | 2 | 4 | 60051 | 66,31 | 78017 | 92,74 |
| 18,00 | 117 | 32 | 2 | 4 | 60055 | 70,67 | 78018 | 96,99 |
| 20,00 | 123 | 38 | 2 | 4 | 60060 | 78,81 | 78019 | 109,06 |
| 22,00 | 123 | 38 | 2 | 6 | 60064 | 89,15 | 78020 | 119,12 |
| 24,00 | 147 | 45 | 3 | 6 | 60069 | 134,82 | 78021 | 165,50 |
| 25,00 | 147 | 45 | 3 | 6 | 60073 | 121,75 | 78022 | 159,02 |

| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|----|---|---------------|--------|-----------------|--------|
| 26,00 | 147 | 45 | 3 | 6 | 60078 | 122,54 | 78023 | 159,77 |
| 28,00 | 147 | 45 | 3 | 6 | 60082 | 122,54 | 78024 | 159,77 |
| 30,00 | 147 | 45 | 3 | 6 | 60087 | 135,39 | 78025 | 183,34 |
| 32,00 | 178 | 53 | 4 | 6 | 60091 | 177,89 | 78026 | 235,43 |
| 36,00 | 178 | 53 | 4 | 6 | 60096 | 202,61 | 78027 | 261,05 |
| 40,00 | 188 | 63 | 4 | 8 | 60100 | 244,08 | 78028 | 313,31 |
| 45,00 | 188 | 63 | 4 | 8 | 60105 | 314,36 | 78029 | 397,29 |
| 50,00 | 233 | 75 | 5 | 8 | 60109 | 378,71 | 78030 | 459,86 |
| 56,00 | 233 | 75 | 5 | 8 | 60114 | 522,46 | 78031 | 599,62 |
| 63,00 | 248 | 90 | 5 | 8 | 60118 | 655,97 | 79125 | 729,40 |

Ø > 25 mm sin Corte al Centro
Non Center Cutting / Sans coupe au centre

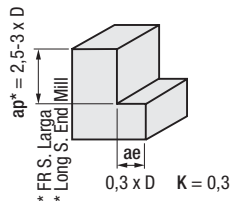
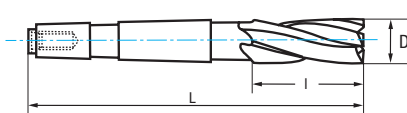
TIALSIN bajo demanda / upon request / sur demande

Ref. **4516**

FRESA FRONTAL MANGO CÓNICO ACABADO HSSE 8% CO NZ LARGA

Long NZ HSSE 8% Co Finishing Taper Shank End Mill

Fraise queue conique finition HSSE 8% Co NZ longue



| | | | | | | |
|------------|----------------------|-------------|----------|--|--|--------------|
| HSSE 8% Co | HSSE 8% Co + TIALSIN | DIN 845 B N | ISO 1641 | | | Tol. D (k10) |
|------------|----------------------|-------------|----------|--|--|--------------|



| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|----|---|---------------|--------|-----------------|--------|
| 10,00 | 115 | 45 | 1 | 4 | 45746 | 83,41 | 78165 | 104,28 |
| 12,00 | 123 | 53 | 1 | 4 | 45749 | 85,04 | 78166 | 107,60 |
| 14,00 | 138 | 53 | 2 | 4 | 45752 | 90,79 | 78167 | 114,87 |
| 15,00 | 138 | 53 | 2 | 4 | 45755 | 92,62 | 78168 | 120,15 |
| 16,00 | 148 | 63 | 2 | 4 | 45758 | 89,58 | 78169 | 117,10 |
| 18,00 | 148 | 63 | 2 | 4 | 45761 | 101,29 | 78170 | 128,83 |
| 20,00 | 160 | 75 | 2 | 4 | 45764 | 112,41 | 78171 | 144,00 |
| 22,00 | 160 | 75 | 2 | 6 | 45767 | 127,23 | 78172 | 158,82 |
| 24,00 | 192 | 90 | 3 | 6 | 45770 | 172,97 | 78173 | 206,52 |
| 25,00 | 192 | 90 | 3 | 6 | 45773 | 172,97 | 78174 | 212,51 |

| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € | N° Art. TIALSIN | € |
|-------|------|------|----|---|---------------|--------|-----------------|--------|
| 26,00 | 192 | 90 | 3 | 6 | 45776 | 190,25 | 78175 | 229,79 |
| 28,00 | 192 | 90 | 3 | 6 | 45779 | 203,83 | 78176 | 243,40 |
| 30,00 | 192 | 90 | 3 | 6 | 45782 | 222,36 | 78177 | 272,66 |
| 32,00 | 231 | 106 | 4 | 6 | 45785 | 261,88 | 78178 | 322,71 |
| 36,00 | 231 | 106 | 4 | 6 | 45788 | 300,19 | 78179 | 362,51 |
| 40,00 | 250 | 125 | 4 | 8 | 45791 | 333,55 | 78180 | 407,49 |
| 45,00 | 250 | 125 | 4 | 8 | 45794 | 453,61 | 78181 | 542,83 |
| 50,00 | 308 | 150 | 5 | 8 | 45797 | 548,47 | 78182 | 636,88 |
| 56,00 | 308 | 150 | 5 | 8 | 45800 | 577,00 | 78183 | 665,15 |
| 63,00 | 338 | 180 | 5 | 8 | 45803 | 763,18 | 78491 | 849,62 |

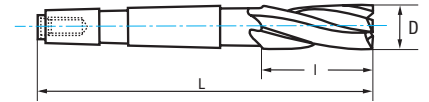
TIALSIN bajo demanda / upon request / sur demande

Ref. **4550**

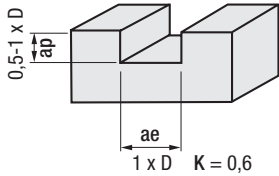
FRESA FRONTAL MANGO CÓNICO ACABADO HSSE 8% CO 2Z

2Z HSSE 8% Co Finishing Taper Shank End Mill

Fraise queue conique finition HSSE 8% Co 2Z



| | | | | | | | |
|---------------|-------------------|--|-----|--|--|--|----------------|
| HSSE 8% Co | DIN 326 D N | | 2 Z | | | | Tol. D (e8) |
|---------------|-------------------|--|-----|--|--|--|----------------|



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | |
|----------|------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | 8% Co | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 | Ø 32 | Ø 40 |
| P | P.1 | 30-40 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | P.5 | 15-20 | 0,045 | 0,045 | 0,065 | 0,065 | 0,065 | 0,065 | 0,065 |
| M | | 15-20 | 0,045 | 0,045 | 0,065 | 0,065 | 0,065 | 0,065 | 0,065 |
| K | K.1 | 20-30 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | K.2 | 15-20 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| N | N.1 | 60-100 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.2 | 60-100 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |
| | N.3 | 160-200 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 | 0,130 |
| | N.4 | 160-200 | 0,067 | 0,080 | 0,100 | 0,130 | 0,130 | 0,130 | 0,130 |
| | N.5 | 50-80 | 0,050 | 0,060 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient - Coefficient correction

| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € |
|-------|------|------|----|---|---------------|--------|
| 10,00 | 83 | 13 | 1 | 2 | 79925 | 57,24 |
| 12,00 | 86 | 16 | 1 | 2 | 79928 | 59,24 |
| 14,00 | 101 | 16 | 2 | 2 | 79931 | 63,26 |
| 16,00 | 104 | 19 | 2 | 2 | 79934 | 69,95 |
| 18,00 | 104 | 19 | 2 | 2 | 79937 | 70,91 |
| 20,00 | 107 | 22 | 2 | 2 | 45920 | 74,15 |
| 22,00 | 107 | 22 | 2 | 2 | 79940 | 87,02 |
| 24,00 | 128 | 26 | 3 | 2 | 79943 | 116,06 |

| D mm | L mm | I mm | CM | Z | N° Art. 8% Co | € |
|-------|------|------|----|---|---------------|--------|
| 25,00 | 128 | 26 | 3 | 2 | 79946 | 119,27 |
| 26,00 | 128 | 26 | 3 | 2 | 79949 | 124,67 |
| 28,00 | 128 | 26 | 3 | 2 | 79952 | 139,60 |
| 30,00 | 128 | 26 | 3 | 2 | 79955 | 155,13 |
| 32,00 | 157 | 32 | 4 | 2 | 79958 | 175,85 |
| 36,00 | 157 | 32 | 4 | 2 | 79961 | 213,75 |
| 40,00 | 163 | 38 | 4 | 2 | 79964 | 244,27 |

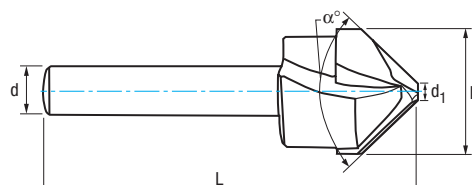


Ref. **9674**

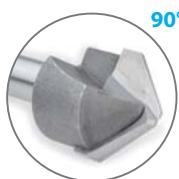
FRESA RANURADO ALUCOBOND / DIBOND

Alucobond / Dibond Sheet Bending End Mill

Fraise rainurage Alucobond/Dibond

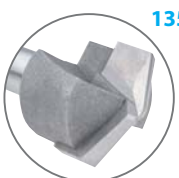


| | | | | |
|----------------------------|--------------|--|--------------------|-----------------------|
| MD HM Carbure | IZAR std. | | 12000-15000 rpm | Vf: 400-600 mm/min |
|----------------------------|--------------|--|--------------------|-----------------------|



90°

| D mm | d mm | L mm | d ₁ mm | α ° | N° Art. MD/HM | € |
|--------------|---------|---------|----------------------|-----|------------------|-------|
| α=90° | | | | | | |
| 16 | 8 | 59 | 2,5 | 90 | 81516 | 50,06 |
| 18 | 8 | 59 | 2,5 | 90 | 81519 | 50,77 |
| 20 | 8 | 59 | 2,5 | 90 | 81520 | 52,16 |



135°

| D mm | d mm | L mm | d ₁ mm | α ° | N° Art. MD/HM | € |
|---------------|---------|---------|----------------------|-----|------------------|-------|
| α=135° | | | | | | |
| 16 | 8 | 59 | 2,3 | 135 | 81521 | 50,06 |
| 18 | 8 | 59 | 2,3 | 135 | 81522 | 50,77 |
| 20 | 8 | 59 | 2,3 | 135 | 81523 | 52,16 |

90°

2,5 mm

Aluminium 90°

0,8 mm

90°

135°

2,3 mm

Aluminium 135°

0,8 mm

45°

45°

- Fresa especial para ranurados en Alucobond, Dibond, Durabond, Alupanel, Plexiglas, Alpolic, ACP, ACM...
- Se recomienda cortar casi hasta el fondo para poder doblar las planchas fácilmente.
- Special end mill for bending sheets of Alucobond, Dibond, Durabond, Alupanel, Plexiglas, Alpolic, ACP, ACM...
- The material should be cut almost until the bottom part leaving little amount of material left, that way the sheet will be bended easily.
- Fraise spécial pour rainurage sur Alucobond, Dibond, Durabond, Alupanel, Plexiglas, Alpolic, ACP, ACM...
- Il est recommandé de couper presque jusqu'au fond pour pouvoir plier les plaques facilement.



Technical Expertise in Heat Treatment

izartool.com

TABLAS USO FRESAS AGUJERO

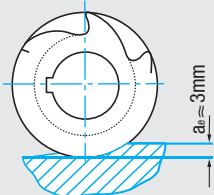
Milling Cutter Use Tables

Tableaux usage fraises à trou

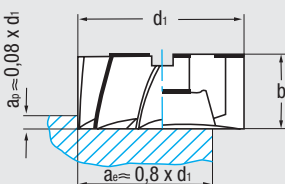
FRESAS AGUJERO Milling Cutters Fraises à trou

GRUPOS TRABAJO Working Groups Groupes travail

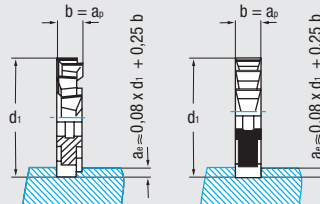
Grupo 1: Fr. Planear
Plain Milling Cut. Fraises à surfacer



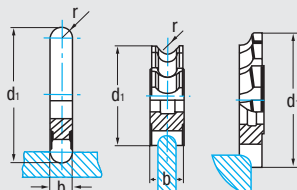
Grupo 2: Fr. Cilíndricas Frontales
Shell End Mills Fraises Cylindriques frontales



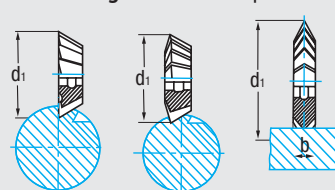
Grupo 3: Fresas Fresadas Agujero
Side & Face Milling Cutters Fraises à trou



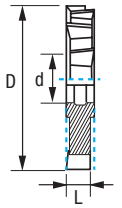
Grupo 4: Convexas y Cóncavas
Convex & Concave Half Circle Fraises convexas et concaves demi-cercle



Grupo 5: Cónicas Frontales e Isósceles
Angular & Double Angle Fraises cónicas frontales et isocèle



| Material | | | | Velocidad Corte Cutting Speed Vitesse de coupe (m/min.) | | | Avance (disminuir hasta 0,35 x fz al incrementar ap) Feed (reduce up to 0,35 x fz when growing ap) Avance : Réduire jusqu'à 0.35 x fz si augmente ap (fz/rev.) | | | | |
|----------|--|------------|--|---|---------------|---------|--|---------|---------|---------|---------|
| | | | | HSS | HSSE 5% Co | PMX | Grupo 1 | Grupo 2 | Grupo 3 | Grupo 4 | Grupo 5 |
| P | | P.1 | <850 N/mm² | 17-25 | 24-35 | 31-41 | 0,18 | 0,15 | 0,06 | 0,04 | 0,06 |
| | | P.2 | < 1000 N/mm² | 13-17 | 18-24 | 23-30 | 0,15 | 0,12 | 0,07 | 0,04 | 0,04 |
| | | P.3 | 1000-1300 N/mm² | 10-13 | 14-19 | 18-24 | 0,10 | 0,08 | 0,04 | 0,04 | 0,03 |
| | | P.5 | MARTENSÍTICO Martensitic Martensitique | 13-17 | 18-24 | 23-30 | 10-14 | 14-20 | 18-24 | 0,04 | 0,03 |
| M | INOX AUSTENÍTICO Austenitic Stainless Steel Aciers inox austénitique | | | 13-17 | 18-24 | 23-30 | 0,12 | 0,10 | 0,08 | 0,06 | 0,03 |
| K | FUNDICIÓN Cast Iron Fonte | K.1 | < 700 N/mm² | 10-14 | 14-20 | 18-24 | 0,25 | 0,22 | 0,08 | 0,08 | 0,01 |
| | | K.2 | 700-1000 N/mm² | 10-14 | 14-20 | 18-24 | 21-27 | 30-38 | 39-51 | 0,06 | 0,06 |
| S | ALEACIONES TERMORESISTENTES Heat-Resistant Alloys Alliages résistants à la chaleur | | | 17-24 | 24-35 | 31-41 | 0,13 | 0,11 | 0,07 | 0,05 | 0,04 |
| N | Cu - BRONCE - LATÓN Copper - Bronze - Brass Cuivre - Bronze - Laiton | N.1 | VIRUTA CORTA Short Chip Copeaux courts | 21-27 | 30-38 | 39-51 | 0,20 | 0,15 | 0,10 | 0,08 | 0,05 |
| | | N.2 | VIRUTA LARGA Long Chip Copeaux longs | 49-84 | 70-120 | 91-183 | 0,25 | 0,20 | 0,10 | 0,08 | 0,08 |
| | ALUMINIO - MAGNESIO Aluminium - Magnesium | N.3 | NO ALEADO Unalloyed Sans alliage | 147-210 | 210-300 | 273-355 | 0,20 | 0,15 | 0,07 | 0,05 | 0,07 |
| | | N.4 | < 10% Si | 147-210 | 210-300 | 273-355 | 0,20 | 0,15 | 0,07 | 0,05 | 0,07 |
| | | N.5 | > 10% Si | 42-49 | 60-70 | 78-101 | 0,12 | 0,10 | 0,07 | 0,04 | 0,06 |
| | | N.6 | TERMOPLÁSTICOS Thermoplastics Thermoplastiques | 84-126 | 120-180 | 156-203 | 0,16 | 0,12 | 0,06 | 0,05 | 0,06 |
| | | N.7 | DUROPLÁSTICOS Hard-Plastics Plastiques durs | | | | | | | | |

Ref. **4120**
FRESA 3 CORTES HSSE 5% CO DENTADO CRUZADO
 Staggered Teeth HSSE 5% Co Side & Face Milling Cutter
 Fraise 3 tailles HSSE 5% Co denture alternée


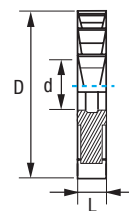
| | | | | | |
|---------------|--------------|-------------|--|--|--|
| HSSE 5% Co | DIN 885 A | ISO 2587 | Tol. \varnothing (js16) d (H7) L (k11) | | Mejor Desalojo Viruta Better Chip Off Meilleure évacuation copeaux |
|---------------|--------------|-------------|--|--|--|

| D mm | L mm | d mm | z | N° Art. 5% Co | € | D mm | L mm | d mm | z | N° Art. 5% Co | € | |
|------------|-----------|---------------|---------------|------------------|---|------------|---------------|-----------------|---------------|------------------|---------------|--|
| 50 | 4 | 16 | 12 | 52584 | 78,20 | 125 | 8 | 32 | 16 | 52725 | 271,79 | |
| | 5 | | 52587 | 78,20 | 16 | | 52728 | | 278,86 | | | |
| | 6 | | 52590 | 90,64 | 16 | | 52731 | | 289,46 | | | |
| | 8 | | 52593 | 88,27 | 16 | | 52734 | | 314,33 | | | |
| | 10 | | 52596 | 97,19 | 16 | | 52737 | | 333,77 | | | |
| 63 | 4 | 22 | 12 | 52611 | 90,65 | 18 | 16 | 52740 | 353,17 | | | |
| | 5 | | 52614 | 90,65 | 20 | 16 | 52743 | 375,74 | | | | |
| | 6 | | 52620 | 92,34 | 22 | 16 | 52746 | 427,84 | | | | |
| | 8 | | 52623 | 100,38 | 25 | 16 | 52749 | 431,99 | | | | |
| | 10 | | 52626 | 107,99 | 28 | 16 | 52752 | 472,16 | | | | |
| | 12 | | 52629 | 115,68 | 160 | 10 | 40 | 18 | 52758 | 450,60 | | |
| | 14 | | 52632 | 124,59 | | 12 | 18 | 52761 | 450,60 | | | |
| | 16 | | 52635 | 130,89 | 14 | 18 | 52764 | 448,42 | | | | |
| | 18 | | 52638 | 157,40 | 16 | 18 | 52767 | 490,77 | | | | |
| | 80 | | 5 | 27 | 14 | 52644 | 122,57 | 18 | 18 | 52770 | 517,10 | |
| 6 | | 52647 | 125,79 | | 20 | 18 | 52773 | 530,83 | | | | |
| 8 | | 52650 | 132,75 | | 22 | 18 | 52776 | 583,43 | | | | |
| 10 | | 52653 | 141,70 | | 25 | 18 | 52779 | 632,21 | | | | |
| 12 | | 52656 | 151,74 | | 28 | 18 | 52782 | 694,96 | | | | |
| 14 | | 52659 | 162,24 | | 32 | 18 | 52785 | 743,04 | | | | |
| 16 | | 52662 | 166,49 | | 200 | 12 | 40 | 24 | 52788 | 687,41 | | |
| 18 | | 52665 | 178,61 | | | 14 | 24 | 52791 | 694,12 | | | |
| 20 | | 52668 | 196,38 | | 16 | 24 | 52794 | 715,12 | | | | |
| 100 | | 6 | 32 | | 14 | 52674 | 172,30 | 18 | 24 | 52797 | 750,30 | |
| | 8 | 52677 | | 175,96 | 20 | 24 | 52800 | 802,43 | | | | |
| | 10 | 52680 | | 182,42 | 22 | 24 | 52803 | 805,11 | | | | |
| | 12 | 52683 | | 196,48 | 25 | 24 | 52806 | 933,87 | | | | |
| | 14 | 52686 | | 216,29 | 28 | 24 | 52809 | 963,38 | | | | |
| | 16 | 52689 | | 229,17 | 32 | 24 | 52812 | 1.201,51 | | | | |
| | 18 | 52692 | | 250,85 | >125 mm bajo demanda / upon request / sur demande | | | | | | | |
| | 20 | 52698 | | 250,85 | | | | | | | | |
| 22 | 52701 | 280,40 | | | | | | | | | | |
| 25 | 52707 | 305,93 | | | | | | | | | | |



Ref. **4130**

FRESA 3 CORTES HSSE 5% CO DENTADO RECTO
 Straight Teeth HSSE 5% Co Side & Face Milling Cutter
 Fraise 3 tailles HSSE 5% Co denture droite



| | | | | | |
|---------------|--------------|-------------|---|--|---|
| HSSE 5% Co | DIN 885 B | ISO 2587 | Tol. ϕ (js16) d (H7) L (k11) | | Materiales Tenaces Tough Materials Matériaux tenaces |
|---------------|--------------|-------------|---|--|---|

| D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|------|------|------|----|---------------|--------|
| 50 | 4 | 16 | 16 | 52815 | 78,20 |
| | 5 | | 16 | 52818 | 78,20 |
| | 6 | | 16 | 52821 | 90,64 |
| | 8 | | 16 | 52827 | 88,27 |
| | 10 | | 16 | 52833 | 97,19 |
| 63 | 4 | 22 | 18 | 52860 | 90,65 |
| | 5 | | 18 | 52863 | 90,65 |
| | 6 | | 18 | 52866 | 92,34 |
| | 8 | | 18 | 52872 | 100,38 |
| | 10 | | 18 | 52878 | 107,99 |
| | 12 | | 18 | 52881 | 115,68 |
| | 14 | | 18 | 52884 | 124,59 |
| | 16 | | 18 | 52887 | 130,89 |
| 80 | 5 | 27 | 20 | 52893 | 122,57 |
| | 6 | | 20 | 52935 | 125,79 |
| | 8 | | 20 | 52938 | 132,75 |
| | 10 | | 20 | 52944 | 141,70 |
| | 12 | | 20 | 52947 | 151,74 |
| | 14 | | 20 | 52950 | 162,24 |
| | 16 | | 20 | 52953 | 166,49 |
| | 18 | | 20 | 52959 | 178,61 |
| | 20 | | 20 | 52962 | 196,38 |
| | 6 | | 24 | 52992 | 172,30 |
| | 8 | | 24 | 53004 | 175,96 |
| 100 | 10 | 32 | 24 | 53010 | 182,42 |
| | 12 | | 24 | 53016 | 196,48 |
| | 14 | | 24 | 53019 | 216,29 |
| | 16 | | 24 | 53022 | 229,17 |
| | 18 | | 24 | 53025 | 250,85 |
| | 20 | | 24 | 53028 | 250,85 |
| | 22 | | 24 | 53031 | 280,40 |
| | 25 | | 24 | 53034 | 305,93 |

| D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|------|------|-------|----------|---------------|--------|
| 125 | 8 | 32 | 24 | 53049 | 271,79 |
| | 10 | | 24 | 53052 | 278,86 |
| | 12 | | 24 | 53055 | 289,46 |
| | 14 | | 24 | 53058 | 314,33 |
| | 16 | | 24 | 53061 | 333,77 |
| | 18 | | 24 | 53064 | 353,17 |
| | 20 | | 24 | 53067 | 375,74 |
| | 22 | | 24 | 53070 | 427,84 |
| | 25 | | 24 | 53076 | 431,99 |
| | 28 | | 24 | 53079 | 472,16 |
| 160 | 10 | 40 | 24 | 53103 | 450,60 |
| | 12 | | 24 | 53106 | 450,60 |
| | 14 | | 24 | 53109 | 448,42 |
| | 16 | | 24 | 53112 | 490,77 |
| | 18 | | 24 | 53115 | 517,10 |
| | 20 | | 24 | 53118 | 530,83 |
| | 22 | | 24 | 53121 | 583,43 |
| | 25 | | 24 | 53124 | 632,21 |
| | 28 | | 24 | 53127 | 694,96 |
| | 32 | | 24 | 53130 | 743,04 |
| 200 | 12 | 40 | 32 | 53136 | 687,41 |
| | 14 | | 32 | 53139 | 694,12 |
| | 16 | | 32 | 53142 | 715,12 |
| | 18 | | 32 | 53145 | 750,30 |
| | 20 | | 32 | 53148 | 802,43 |
| | *22 | | 32 | 53151 | 805,11 |
| | *25 | | 32 | 53154 | 933,87 |
| | *28 | | 32 | 53157 | 963,38 |
| *32 | 32 | 53160 | 1.201,51 | | |



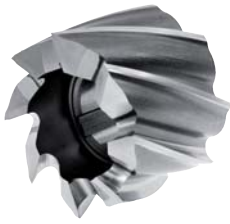
>125 mm bajo demanda / upon request / sur demande

Ref. 6040

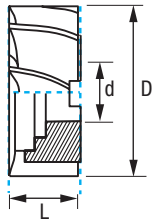
FRESA FRONTAL AGUJERO PMX ACABADO

Finishing PMX Milling Cutter

Fraise à trou PMX finition



| | | | | | | |
|-----|-----------------|------------|----------|--|------------------------------------|--|
| PMX | PMX + TIALN-TOP | DIN 1880 N | ISO 2586 | | Tol. ø (js16) d (H7) L (K16) | |
|-----|-----------------|------------|----------|--|------------------------------------|--|



| D mm | L mm | d mm | Z | N° Art. PMX | € | N° Art TIALN-TOP | € |
|------|------|------|----|-------------|--------|------------------|--------|
| 40 | 32 | 16 | 6 | 39013 | 141,85 | 39018 | 195,89 |
| 50 | 36 | 22 | 8 | 39014 | 192,56 | 39019 | 266,04 |
| 63 | 40 | 27 | 8 | 39015 | 274,71 | 39020 | 357,61 |
| 80 | 45 | 27 | 8 | 39016 | 413,01 | 39022 | 528,33 |
| 100 | 50 | 32 | 12 | 39017 | 627,03 | 39023 | 802,05 |



Ref. 6040 bajo demanda / upon request / sur demande

Ref. 6080

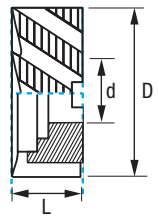
FRESA FRONTAL AGUJERO PMX DESBASTE GRUESO

Coarse Roughing PMX Milling Cutter

Fraise à trou PMX ébauche



| | | | | | | | |
|-----|-----------------|-------------|----------|--|------------------------------------|--|--|
| PMX | PMX + TIALN-TOP | DIN 1880 NR | ISO 2586 | | Tol. ø (js16) d (H7) L (K16) | | |
|-----|-----------------|-------------|----------|--|------------------------------------|--|--|



| D mm | L mm | d mm | Z | N° Art. PMX | € | N° Art TIALN-TOP | € |
|------|------|------|----|-------------|--------|------------------|----------|
| 40 | 32 | 16 | 6 | 39032 | 185,25 | 39027 | 239,28 |
| 50 | 36 | 22 | 6 | 39033 | 250,53 | 39028 | 323,97 |
| 63 | 40 | 27 | 8 | 39034 | 340,53 | 39029 | 423,45 |
| 80 | 45 | 27 | 10 | 39035 | 503,62 | 39030 | 618,93 |
| 100 | 50 | 32 | 10 | 39036 | 832,97 | 39031 | 1.008,00 |



Ref. 6080 bajo demanda / upon request / sur demande

Ref. 6090

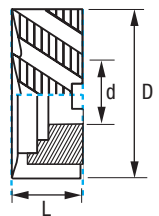
FRESA FRONTAL AGUJERO PMX DESBASTE MEDIO

Roughing & Finishing PMX Milling Cutter

Fraise à trou PMX semi-finition



| | | | | | | | |
|-----|-----------------|-------------|----------|--|------------------------------------|--|--|
| PMX | PMX + TIALN-TOP | DIN 1880 NF | ISO 2586 | | Tol. ø (js16) d (H7) L (K16) | | |
|-----|-----------------|-------------|----------|--|------------------------------------|--|--|



| D mm | L mm | d mm | Z | N° Art. PMX | € | N° Art TIALN-TOP | € |
|------|------|------|----|-------------|--------|------------------|----------|
| 40 | 32 | 16 | 6 | 39062 | 185,25 | 39056 | 239,28 |
| 50 | 36 | 22 | 6 | 39063 | 250,53 | 39058 | 323,97 |
| 63 | 40 | 27 | 8 | 39064 | 340,53 | 39059 | 423,45 |
| 80 | 45 | 27 | 8 | 39065 | 503,62 | 39060 | 618,93 |
| 100 | 50 | 32 | 10 | 39066 | 798,50 | 39061 | 1.008,00 |



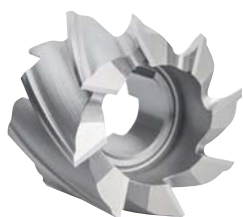
Ref. 6090 bajo demanda / upon request / sur demande

Ref. **4040**

FRESA FRONTAL AGUJERO HSSE 5% CO ACABADO

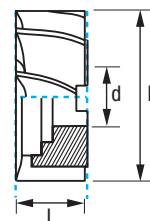
Finishing HSSE 5% Co Milling Cutter

Fraise à trou HSSE 5% Co finition



| | | | | | |
|---------------|---------------|-------------|--|---|--|
| HSSE 5% Co | DIN 1880 N | ISO 2586 | | Tol. ϕ (js16) d (H7) L (K16) | |
|---------------|---------------|-------------|--|---|--|

| D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|---------|---------|---------|----|------------------|----------|
| 40 | 32 | 16 | 6 | 55557 | 105,79 |
| 50 | 36 | 22 | 8 | 55575 | 145,55 |
| 63 | 40 | 27 | 8 | 55593 | 198,86 |
| 80 | 45 | 27 | 10 | 55611 | 281,60 |
| 100 | 50 | 32 | 10 | 55647 | 453,43 |
| 125 | 56 | 40 | 14 | 55665 | 728,15 |
| *160 | 63 | 50 | 16 | 55674 | 1.301,35 |



* $\phi > 125$ mm bajo demanda / upon request / sur demande

Ref. **4080**

FRESA FRONTAL AGUJERO HSSE 5% CO DESBASTE GRUESO

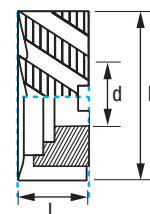
Coarse Roughing HSSE 5% Co Milling Cutter

Fraise à trou HSSE 5% Co ébauche



| | | | | | | |
|---------------|----------------|-------------|--|---|--|--|
| HSSE 5% Co | DIN 1880 NR | ISO 2586 | | Tol. ϕ (js16) d (H7) L (K16) | | |
|---------------|----------------|-------------|--|---|--|--|

| D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|---------|---------|---------|----|------------------|----------|
| 40 | 32 | 16 | 6 | 77752 | 153,35 |
| 50 | 36 | 22 | 6 | 77754 | 190,43 |
| 63 | 40 | 27 | 8 | 77755 | 252,42 |
| 80 | 45 | 27 | 8 | 42863 | 370,69 |
| 100 | 50 | 32 | 10 | 42866 | 611,62 |
| * 125 | 56 | 40 | 12 | 42869 | 1.037,59 |
| *160 | 63 | 50 | 14 | 42872 | 1.800,41 |



* $\phi > 100$ mm bajo demanda / upon request / sur demande

Ref. **4010**

FRESA DE PLANEAR HSSE 5% CO

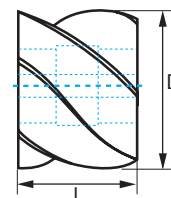
Plain HSSE 5% Co Shell End Mill

Fraise surfacer HSSE 5% Co



| | | | | | |
|---------------|--------------|-------------|--|--|--|
| HSSE 5% Co | DIN 884 N | ISO 2584 | | Tol. ϕ (js16) d (H7) L (js16) | |
|---------------|--------------|-------------|--|--|--|

| D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|---------|---------|---------|----|------------------|--------|
| 50 | 40 | 22 | 8 | 53952 | 124,34 |
| 50 | 63 | 22 | 8 | 53961 | 132,51 |
| 50 | 80 | 22 | 8 | 53970 | 197,52 |
| 63 | 50 | 27 | 8 | 54015 | 173,89 |
| 63 | 70 | 27 | 8 | 54024 | 211,58 |
| 80 | 63 | 32 | 8 | 54096 | 293,07 |
| 80 | 100 | 32 | 8 | 54123 | 430,84 |
| 100 | 70 | 40 | 10 | 54141 | 455,98 |



Ref. **4300**

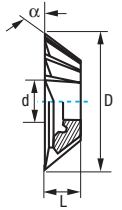
FRESA FRONTAL CÓNICA HSSE 5% CO

Single Angle HSSE 5% Co Milling Cutter

Fraise conique 2 tailles HSSE 5% Co



| | | | |
|---------------|------------|--|---|
| HSSE 5% Co | DIN 842 | | Tol. \varnothing (js16) d (H7) L (js14) |
|---------------|------------|--|---|



| | D mm | L mm | d mm | Ang. | Z | N° Art. 5% Co | € |
|-------|---------|---------|---------|------|----|------------------|----------|
| ± 25° | 40 | 13 | 10 | 50° | 14 | 54177 | 111,70 |
| | 50 | 16 | 13 | 50° | 16 | 54195 | 137,73 |
| | 63 | 20 | 16 | 50° | 18 | 54213 | 174,09 |
| ± 20° | 80 | 25 | 22 | 50° | 20 | 54231 | 250,82 |
| | 100 | 32 | 27 | 50° | 22 | 54249 | 363,76 |
| | 125 | 40 | 32 | 50° | 24 | 54267 * | 600,70 |
| | 160 | 50 | 40 | 50° | 28 | 54285 * | 1.050,78 |



| | | | | | | | |
|-------|-----|----|----|-----|----|---------|----------|
| ± 25° | 40 | 13 | 10 | 60° | 14 | 54186 | 111,70 |
| | 50 | 16 | 13 | 60° | 16 | 54204 | 137,73 |
| | 63 | 20 | 16 | 60° | 16 | 54222 | 174,09 |
| ± 20° | 80 | 25 | 22 | 60° | 18 | 54240 | 250,82 |
| | 100 | 32 | 27 | 60° | 20 | 54258 | 363,76 |
| | 125 | 40 | 32 | 60° | 26 | 54276 * | 600,70 |
| | 160 | 50 | 40 | 60° | 28 | 54294 * | 1.050,78 |

45° & 55° bajo demanda
upon request / sur demande

* HSS

Ref. **4352**

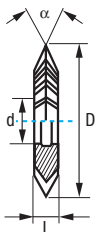
FRESA ANGULAR ISÓSCELES HSSE 5% CO

Double Angle HSSE 5% Co Milling Cutter

Fraise isosceles 2 tailles HSSE 5% Co



| | | | | | |
|---------------|------------|-------------|--|---|------------------|
| HSSE 5% Co | DIN 847 | ISO 6108 | | Tol. \varnothing (js16) d (H7) L (js16) | α ±30° |
|---------------|------------|-------------|--|---|------------------|



| D mm | L mm | d mm | Ang. | Z | N° Art. 5% Co | € |
|---------|---------|---------|------|----|------------------|--------|
| 50 | 8 | 16 | 45° | 16 | 53736 | 144,02 |
| 63 | 10 | 22 | 45° | 16 | 53790 | 171,33 |
| 80 | 12 | 27 | 45° | 20 | 53835 | 239,21 |
| 100 | 18 | 32 | 45° | 20 | 53871 | 299,06 |



| | | | | | | |
|-----|----|----|-----|----|-------|--------|
| 50 | 10 | 16 | 60° | 16 | 53745 | 144,02 |
| 63 | 14 | 22 | 60° | 16 | 53808 | 171,33 |
| 80 | 18 | 27 | 60° | 18 | 53853 | 239,21 |
| 100 | 25 | 32 | 60° | 20 | 53880 | 299,06 |

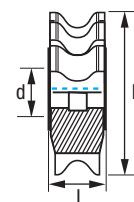
| | | | | | | |
|-----|----|----|-----|----|-------|--------|
| 50 | 14 | 16 | 90° | 16 | 53754 | 144,02 |
| 63 | 20 | 22 | 90° | 16 | 53826 | 171,33 |
| 80 | 22 | 27 | 90° | 18 | 53862 | 239,21 |
| 100 | 32 | 32 | 90° | 20 | 53889 | 299,06 |

Ref. **5050**

FRESA CÔNCAVA HSSE 5% CO
 Concave Half Circle HSSE 5% Co Cutter
 Fraise à demi-cercle concave HSSE 5% Co



| | | | |
|---------------|------------|--|---|
| HSSE 5% Co | DIN 855 | | Tol. ϕ (js16) d (H7) R (H11) |
|---------------|------------|--|---|



| R | D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|-------|------|------|------|----|------------------|--------|
| 1,50 | 50 | 8 | 16 | 14 | 54501 | 146,49 |
| 1,60 | 50 | 8 | 16 | 14 | 54510 * | 146,49 |
| 2,00 | 50 | 9 | 16 | 14 | 54519 | 146,49 |
| 2,50 | 63 | 10 | 22 | 14 | 54528 | 149,95 |
| 3,00 | 63 | 12 | 22 | 12 | 54537 | 186,67 |
| 3,50 | 63 | 16 | 22 | 12 | 54546 * | 192,34 |
| 4,00 | 63 | 16 | 22 | 12 | 54555 | 195,21 |
| 5,00 | 63 | 20 | 22 | 10 | 54564 | 202,70 |
| 6,00 | 80 | 24 | 27 | 10 | 54582 | 252,23 |
| 7,00 | 80 | 24 | 27 | 12 | 54591 * | 270,05 |
| 8,00 | 80 | 32 | 27 | 10 | 54600 | 349,86 |
| 9,00 | 100 | 36 | 32 | 10 | 54609 | 420,80 |
| 10,00 | 100 | 36 | 32 | 10 | 54618 | 442,85 |
| 11,00 | 100 | 40 | 32 | 10 | 54627 | 526,41 |
| 12,00 | 100 | 40 | 32 | 10 | 54636 | 557,24 |
| 12,50 | 100 | 40 | 32 | 12 | 54645 * | 550,43 |
| 14,00 | 100 | 50 | 32 | 10 | 54654 * | 586,73 |



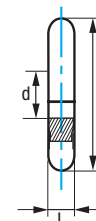
R > 12,50 mm bajo demanda * HSS
 upon request / sur demande

Ref. **5040**

FRESA CONVEXA HSSE 5% CO
 Convex Half Circle HSSE 5% Co Cutter
 Fraise à demi-cercle convexe HSSE 5% Co



| | | | |
|---------------|------------|--|---|
| HSSE 5% Co | DIN 856 | | Tol. ϕ (js16) d (H7) R (h11) |
|---------------|------------|--|---|



| R | D mm | L mm | d mm | Z | N° Art. 5% Co | € |
|-------|------|-------|------|----|------------------|--------|
| 1,50 | 50 | 3,00 | 16 | 14 | 77802 | 118,39 |
| 1,60 | 50 | 3,20 | 16 | 14 | 54312 * | 118,39 |
| 2,00 | 50 | 4,00 | 16 | 16 | 54321 | 118,39 |
| 2,50 | 63 | 5,00 | 22 | 12 | 54330 | 122,95 |
| 3,00 | 63 | 6,00 | 22 | 12 | 54339 | 124,13 |
| 3,50 | 63 | 7,00 | 22 | 12 | 54348 | 159,38 |
| 4,00 | 63 | 8,00 | 22 | 12 | 54357 | 159,38 |
| 5,00 | 63 | 10,00 | 22 | 12 | 54375 | 167,59 |
| 6,00 | 80 | 12,00 | 27 | 12 | 54393 | 198,73 |
| 7,00 | 80 | 14,00 | 27 | 12 | 54411 | 211,18 |
| 8,00 | 80 | 16,00 | 27 | 12 | 54420 | 211,18 |
| 9,00 | 100 | 18,00 | 32 | 12 | 54429 | 301,85 |
| 10,00 | 100 | 20,00 | 32 | 12 | 54447 | 301,85 |
| 11,00 | 100 | 22,00 | 32 | 12 | 77803 * | 341,19 |
| 12,00 | 100 | 24,00 | 32 | 12 | 54456 | 341,19 |
| 12,50 | 100 | 25,00 | 32 | 12 | 77804 * | 481,05 |
| 14,00 | 125 | 28,00 | 32 | 12 | 77805 * | 481,05 |
| 16,00 | 125 | 32,00 | 32 | 12 | 54465 * | 481,05 |
| 18,00 | 125 | 36,00 | 32 | 12 | 54474 * | 513,98 |
| 20,00 | 125 | 40,00 | 32 | 12 | 54483 * | 779,26 |

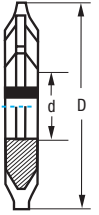


R > 14 mm bajo demanda * HSS
 upon request / sur demande

Ref. 5100

FRESA TALLADO ENGRANAJES HSS MODULAR

Modular Involute Gear HSS Cutter
Fraise à tailler les engranages HSS modulaire



| Mod. | D mm | d mm | Nº Cortes Cuts Coupes | € |
|------|------|------|-----------------------|--------|
| 0,50 | 40 | 16 | 14 | 100,70 |
| 0,75 | 40 | 16 | 12 | 100,70 |
| 1,00 | 50 | 16 | 12 | 100,70 |
| 1,25 | 50 | 16 | 12 | 100,70 |
| 1,50 | 60 | 22 | 12 | 100,70 |
| 1,75 | 60 | 22 | 12 | 100,70 |
| 2,00 | 60 | 22 | 12 | 100,70 |
| 2,25 | 60 | 22 | 12 | 118,02 |
| 2,50 | 65 | 22 | 12 | 118,02 |
| 2,75 | 70 | 27 | 12 | 118,02 |
| 3,00 | 70 | 27 | 12 | 118,02 |
| 3,25 | 75 | 27 | 12 | 155,75 |

| Mod. | D mm | d mm | Nº Cortes Cuts Coupes | € |
|-------|------|------|-----------------------|--------|
| 3,50 | 75 | 27 | 12 | 155,75 |
| 3,75 | 80 | 27 | 12 | 155,75 |
| 4,00 | 80 | 27 | 12 | 155,75 |
| 4,50 | 85 | 27 | 11 | 213,48 |
| 5,00 | 90 | 32 | 11 | 213,48 |
| 5,50 | 95 | 32 | 11 | 270,30 |
| 6,00 | 100 | 32 | 11 | 270,30 |
| 6,50 | 105 | 32 | 10 | 310,75 |
| 7,00 | 105 | 32 | 10 | 310,75 |
| 8,00 | 110 | 32 | 9 | 353,68 |
| 9,00 | 115 | 32 | 9 | 502,18 |
| 10,00 | 120 | 32 | 9 | 539,21 |

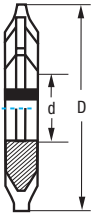
| Mod. | D mm | d mm | Nº Cortes Cuts Coupes | € |
|-------|------|------|-----------------------|---|
| 11,00 | 135 | 40 | 9 | |
| 12,00 | 145 | 40 | 9 | |
| 13,00 | 155 | 40 | 9 | |
| 14,00 | 160 | 40 | 9 | |
| 15,00 | 165 | 40 | 9 | |
| 16,00 | 170 | 40 | 9 | |
| 18,00 | 190 | 50 | 9 | |
| 20,00 | 205 | 50 | 9 | |

* Precio por Nº / Price per Nr / Prix pour Nº
> Mod. 10 bajo demanda upon request / sur demande

Ref. 5120

FRESA TALLADO ENGRANAJES HSS DIAMETRAL PITCH

Diametral Pitch Involute Gear HSS Cutter
Fraise à tailler les engranages HSS Diametral Pitch



Refs. 5100-5120

JUEGOS DE FRESAS PARA TALLADO DE ENGRANAJES CILÍNDRICOS

Gear Cutter Sets for Gear Profile Sharpening - Jeux de fraises pour taillage d'engrenages cylindriques

| SISTEMA MODULAR (REF. 5100) Form Relieved Système modulaire | | | | | | | | | SISTEMA DIAMETRAL PITCH (REF. 5120) Form Relieved Diametral Pitch Système diamétral pitch | | | | | | | | |
|---|-------|-------|-------|-------|-------|--------|--------|-------|---|-------|--------|--------|-------|-------|-------|-------|-------|
| Juego Normal de 8 Fresas para Módulos 1-10 8 Gear Cutter Usual Set for 1-10 Modules Jeu normal 8 fraises module 1 à 10 | | | | | | | | | Serie de 15 Fresas 15 Gear Cutter Series Série 15 fraises | | | | | | | | |
| Nº Fresa Cutter Nº Numéro de fraise | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Nº Fresa Cutter Nº Numéro de fraise | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 |
| Dientes a Tallar Teeth to Sharp Dents à tailler | 12-13 | 14-16 | 17-20 | 21-25 | 26-34 | 35-54 | 55-134 | 135-∞ | Dientes a Tallar Teeth to Sharp Dents à tailler | 135-∞ | 80-134 | 55-134 | 42-54 | 35-54 | 30-34 | 26-34 | 23-25 |
| Juego de 15 Fresas para Módulos >10 15 Gear Cutter Set for >10 Modules Jeux de 15 fraises pour Modules > 10 | | | | | | | | | Nº Fresa Cutter Nº Numéro de fraise | | | | | | | | |
| Nº Fresa Cutter Nº Numéro de fraise | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | Dientes a Tallar Teeth to Sharp Dents à tailler | 21-25 | 19-20 | 17-20 | 15-16 | 14-16 | 13 | 12-13 | |
| Dientes a Tallar Teeth to Sharp Dents à tailler | 12 | 13 | 14 | 15-16 | 17-18 | 19-20 | 21-22 | 23-25 | OBSERVACIONES: El perfil de la fresa de disco corresponde siempre al nº inferior de dientes. El nº 8 de fresa puede servir para el tallado de las cremalleras, pero en casos que requieran gran exactitud se recomienda el uso de fresas especiales de flancos totalmente rectos. COMMENTS: Gear cutter profile always corresponds to teeth inferior nº. Cutter's nº 8 could be used to sharp racks, but when high precision is needed totally straight flanks special cutters use is advised. | | | | | | | | |
| Nº Fresa Cutter Nº Numéro de fraise | 5 | 5 1/2 | 6 | 6 1/2 | 7 | 7 1/2 | 8 | | OBSERVATIONS: Le profil de la fraise disque correspond toujours au numéro inférieur de dents. Le nº 8 peut servir pour tailler les cremailères, mais dans des cas qui ont besoin de forte précision on conseille l'utilisation de fraises spéciales de profils complètement droits. | | | | | | | | |
| Dientes a Tallar Teeth to Sharp Dents à tailler | 26-29 | 30-34 | 35-41 | 42-54 | 55-79 | 80-134 | 135-∞ | | | | | | | | | | |

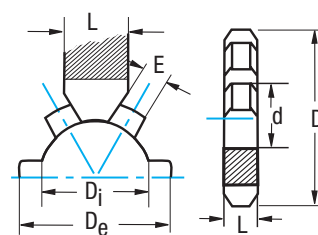
Ref. **5512**

FRESA TALLADO EJES ESTRIADOS

Spline Cutter
Fraise à tailler les arbres cannelés



A



| | |
|---------------------|---|
| HSS | Perfil Profile Profil A* |
| DIN 5462 5463 | 6 Estrías 6 grooves 6 rainures |

| Eje Axis / Axe DIN 5463 | Eje Axis / Axe DIN 5462 | Nº Estrías Grooves Rainures | D mm | d mm | L mm | Nº Cortes Cuts Coupes | Nº Art. HSS | € |
|-------------------------------|-------------------------------|-----------------------------------|---------|---------|---------|-----------------------------|----------------|--------|
| 11x14x3 | | 6 | 50 | 16 | 5,25 | 12 | 50237 | 190,74 |
| 13x16x3,5 | | 6 | 50 | 16 | 6,00 | 12 | 50240 | 190,74 |
| 16x20x4 | | 6 | 50 | 16 | 7,50 | 12 | 50243 | 178,60 |
| 18x22x5 | | 6 | 50 | 16 | 7,50 | 12 | 50246 | 178,60 |
| 21x25x5 | | 6 | 56 | 22 | 8,50 | 12 | 50249 | 186,56 |
| 23x28x6 | 23x26x6 | 6 | 56 | 22 | 10,00 | 12 | 50255 | 186,56 |
| 26x32x6 | 26x30x6 | 6 | 63 | 22 | 12,50 | 12 | 50261 | 232,38 |
| 28x34x7 | 28x32x7 | 6 | 63 | 22 | 12,50 | 12 | 50267 | 232,38 |

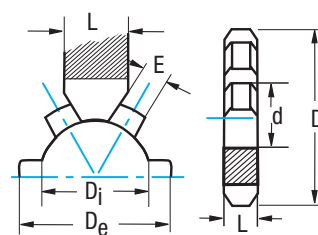
Ref. **5522**

FRESA TALLADO EJES ESTRIADOS

Spline Cutter
Fraise à tailler les arbres cannelés



A



| | |
|---------------------|---|
| HSS | Perfil Profile Profil A* |
| DIN 5462 5463 | 8 Estrías 8 grooves 8 rainures |

| Eje Axis / Axe DIN 5463 | Eje Axis / Axe DIN 5462 | Nº Estrías Grooves Rainures | D mm | d mm | L mm | Nº Cortes Cuts Coupes | Nº Art. HSS | € |
|-------------------------------|-------------------------------|-----------------------------------|---------|---------|---------|-----------------------------|----------------|--------|
| 32x38x6 | 32x36x6 | 8 | 70 | 27 | 10,50 | 12 | 50387 | 263,62 |
| 36x42x7 | 36x40x7 | 8 | 70 | 27 | 11,25 | 12 | 50393 | 263,62 |
| 42x48x8 | 42x46x8 | 8 | 70 | 27 | 12,50 | 12 | 50399 | 263,62 |
| 46x54x9 | 46x50x9 | 8 | 70 | 27 | 14,00 | 12 | 50405 | 263,62 |
| 52x60x10 | 52x58x10 | 8 | 70 | 27 | 15,50 | 12 | 50411 | 263,62 |
| 56x65x10 | 56x62x10 | 8 | 80 | 27 | 17,50 | 12 | 50417 | 348,45 |
| 62x72x12 | 62x68x12 | 8 | 80 | 27 | 18,50 | 12 | 50423 | 348,45 |

Refs. 5512 - 5522

* Otros Perfiles bajo demanda

* Other Profiles upon request

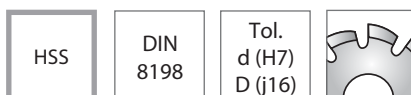
* Autres profils sur demande

| | | | | |
|----------|--|---|---|---|
| B | | Acabado / Desbaste Protuberancias | Finishing / Roughing Protuberances | Finition / Ébauche Protubérances |
| C | | Acabado. Chaflanes | Finishing. Chamfers | Finition / Rayons |
| D | | Acabado / Desbaste Chaflanes + Protuberancias | Finishing / Roughing Chamfers + Protuberances | Finition / Ébauche Rayons + Protubérances |
| E | | Especial Desbaste Protuberancias Laterales + Chaflanes | Special Roughing Side Protuberances + Chamfers | Spécial Ébauche Protub. Latérales + Rayons |

Ref. **5700****FRESA TALLADO RUEDAS CADENA**

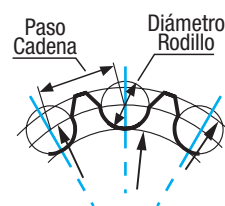
Roller Chain Sprocket Cutter

Fraise pour roues à chaîne



Ruedas Cadena
Roller Chains
Pignons chaînes

Ejecución Terminada Cuchilla
Insert Finished
Exécution terminée lame



| Paso Pitch Pas | Ø Rodillo Roller / Rouleau | D mm | d mm | Nº Cortes Cuts Coupes |
|----------------------|----------------------------------|---------|---------|-----------------------------|
| 6,00 | 4,00 | 56 | 22 | 11 |
| 6,35 | 3,30 | 56 | 22 | 11 |
| 8,00 | 5,00 | 63 | 22 | 11 |
| 9,53 | 5,00 | 70 | 22 | 11 |
| 9,53 | 6,00 | 70 | 22 | 11 |
| 9,53 | 6,35 | 70 | 22 | 11 |
| 12,70 | 7,75 ** | 70 | 22 | 10 |
| 12,70 | 7,94 | 70 | 22 | 10 |
| 12,70 | 8,51 | 70 | 22 | 10 |
| 15,88 | 10,16 | 80 | 27 | 9 |
| 19,05 | 11,91 ** | 90 | 27 | 9 |
| 19,05 | 12,07 | 90 | 27 | 9 |
| 25,40 | 15,88 | 100 | 27 | 9 |
| *30,00 | 15,88 | 110 | 32 | 9 |
| 31,75 | 19,05 | 110 | 32 | 9 |
| 38,10 | 22,23 | 125 | 32 | 9 |
| 38,10 | 25,40 | 125 | 32 | 9 |
| 44,45 | 25,40 | 140 | 40 | 9 |
| 44,45 | 27,94 | 140 | 40 | 9 |
| 50,80 | 28,57 ** | 140 | 40 | 8 |
| 50,80 | 29,21 | 140 | 40 | 8 |
| 57,15 | 35,71 | 160 | 40 | 7 |
| 63,50 | 39,37 ** | 160 | 40 | 7 |
| 63,50 | 39,68 | 160 | 40 | 7 |
| 76,20 | 47,63 ** | 200 | 50 | 7 |
| 76,20 | 48,26 | 200 | 50 | 7 |



Ref. 5700 bajo demanda / upon request / sur demande

* 30,00 evitar en lo posible / avoid when possible / à éviter si possible

| Perfil Ref. Nº Profile Ref. Nº Profil ref. n° | Dientes a Tallar Teeth to Sharp Dents à tailler |
|---|---|
| I | 6-8 Z |
| II | 9-11 Z |
| III | 12-16 Z |
| IV | 17-29 Z |
| V | >29 Z |

** Para estos Ø -s de Rodillo sirven los Perfiles del Ø de Rodillo inmediatamente superior de igual paso.

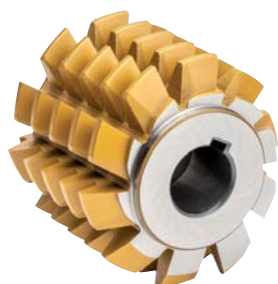
** For these Roller Chain Ø-s are suitable the Profiles of the superior Roller Chain Ø-s with equivalent Pitch.

** Pour ces Ø de rouleau on peut utiliser les profils de rouleau immédiatement supérieur de même pas.

Ref. **5206****FRESA MADRE TALLADO ENGRANAJES**

Involute Gear Hob

Fraise mère à tailler les engranages



| | | | | | | |
|--|-----|------------|--|----------------|--|---------|
| HSSE 5% Co | TIN | DIN 858 | Ang. Presión β 20° | Tol. ø (H6) |  | Modular |
| Perfil Rectificado Ground Profile Profil rectifié P. Ref. II DIN 3972 | | | Perfil Acabado Finish Profile Profil finition | | | |

| Mod. | D mm | d mm | L mm | N° Cortes Cuts Coupes | N° Art. 5% Co | € | N° Art. TIN* | € |
|--------|---------|---------|---------|-----------------------------|------------------|----------|-----------------|----------|
| 0,50 | 45 | 22 | 35 | 12 | 49349 | 568,35 | 71569 | 668,65 |
| 0,75 | 45 | 22 | 45 | 12 | 49352 | 568,35 | 71570 | 668,65 |
| 1,00 | 50 | 22 | 50 | 12 | 49355 | 568,35 | 20550 | 668,65 |
| 1,25 | 50 | 22 | 50 | 12 | 49358 | 568,35 | 71571 | 668,65 |
| 1,50 | 55 | 22 | 55 | 12 | 49361 | 639,39 | 52335 | 752,24 |
| 1,75 | 55 | 22 | 55 | 10 | 68042 | 639,39 | 60644 | 752,24 |
| 2,00 | 60 | 22 | 60 | 10 | 49364 | 745,96 | 49365 | 877,61 |
| 2,25 | 60 | 22 | 60 | 10 | 49367 | 745,96 | 52338 | 877,61 |
| 2,50 | 65 | 22 | 65 | 10 | 49370 | 745,96 | 68048 | 877,61 |
| 2,75 | 65 | 22 | 65 | 10 | 49373 | 745,96 | 71572 | 877,61 |
| 3,00 | 70 | 27 | 70 | 10 | 49376 | 799,25 | 79860 | 940,28 |
| 3,25 | 75 | 27 | 70 | 9 | 68045 | 888,04 | 71574 | 1.044,77 |
| 3,50 | 75 | 27 | 75 | 9 | 49379 | 888,04 | 71518 | 1.044,77 |
| 3,75 | 80 | 27 | 75 | 9 | 49382 | 994,62 | 71575 | 1.170,14 |
| 4,00 | 80 | 27 | 80 | 9 | 49385 | 994,62 | 77580 | 1.170,14 |
| 4,50 | 85 | 27 | 85 | 9 | 49391 | 994,62 | 41453 | 1.170,14 |
| 5,00 | 95 | 27 | 90 | 9 | 49397 | 1.136,71 | 13050 | 1.337,31 |
| 5,50 | 100 | 32 | 95 | 9 | 49400 | 1.207,74 | 41966 | 1.420,88 |
| 6,00 | 105 | 32 | 100 | 9 | 49403 | 1.349,85 | 16940 | 1.588,04 |
| *6,50 | 110 | 32 | 110 | 9 | 49406 | 1.562,97 | 71576 | 1.838,78 |
| *7,00 | 115 | 32 | 115 | 9 | 49409 | 1.669,55 | 71577 | 1.964,17 |
| *8,00 | 120 | 32 | 130 | 9 | 49412 | 1.989,23 | 68051 | 2.340,26 |
| *9,00 | 125 | 32 | 145 | 8 | 49415 | 2.308,93 | 71578 | 2.716,39 |
| *10,00 | 140 | 32 | 160 | 8 | 49418 | 3.196,98 | 49420 | 3.761,17 |




* Mod. bajo demanda / upon request / sur demande

* TIN bajo demanda / upon request / sur demande

FRESAS MADRE BAJO DEMANDA

Gear Hobs upon request

Fraises mère sur demande

| Ref. | DIN | Descrip. |
|---|------------------------------|--|
|  | 5226 858 Pitch | Perfil Rectificado Ground Profile Profil rectifié P. Ref. II DIN 3972 |
|  | 5246 8002 B | Perfil Rectificado Ground Profile Profil rectifié P. Ref. II DIN 3972 |
|  | 5616 5626 5462-63 5636 | Tallar Ejes Estriados Spline Soft Hobs Taillade axes striés |
|  | 5800 2315 | Ruedas Cadena Roller Chains Roues à chaîne |

SIERRAS CINTA - CIRCULARES
Band Saw Blades - Slitting Saws
Scies à ruban - Fraises scies

HOJAS DE SIERRAS DE CINTA

Band Saw Blades
Lames de scie à ruban

422

FRESAS SIERRAS CIRCULARES

Slitting Saws
Fraises scies

433



SELECCIÓN DE LA HOJA DE SIERRA DE CINTA CORRECTA

Selecting the right Band Saw Blade

Selection de la lame de scie à ruban adaptée

1. Material del Filo de Corte

Los filos de corte de las sierras de cinta IZAR son bimetálicas HSSE 8% Co (+ 4% Cr según los casos).

La mecanizabilidad del material a cortar determina el material del filo de corte.

1. Material of the Cutting Edge

IZAR band saw blades cutting edges are bimetal HSSE 8% Co (+ 4% Cr in some cases).

The working material machinability determines the cutting edge material.

1. Qualités des Rubans

Les rubans des scies IZAR sont bimétalliques HSSE 8% Co (+ 4% Cr selon les cas).

L'usinabilité du matériau déterminera le choix de l'outil.

2. Longitud de la Cinta (L)

La dimensión de la cinta depende únicamente de la máquina de corte empleada.

Encontrará información adicional en el manual de instrucciones de la máquina.

2. Band Length (L)

The band dimension individually depends on the used cutting machine.

You will find further information in the operation instructions for your machine.

2. Longueur de Lame (L)

La dimension d'une lame dépend de la machine utilisée.

Vous trouverez des informations complémentaires dans le manuel d'utilisation de votre machine.

3. Ancho de la Cinta (A)

En las máquinas horizontales la anchura de la cinta es especificada por el fabricante.

Las máquinas verticales permiten mayores variaciones en la anchura de la cinta.

Sin embargo, la norma general es que cuanto más ancha es la hoja de sierra de cinta, mayor es su estabilidad.

Para el corte de contornos, el radio más pequeño a cortar es el factor que limita el ancho de la cinta.

3. Band Width (A)

With horizontal machines the band width is specified by the manufacturer.

Vertical band saw machines allow higher variations of the band width.

However, the general rule is the wider the band saw blade the higher its stability.

In case of contour cuts the smallest radius to be cut is the limiting factor for the band width.

3. Largeur de la Lame (A)







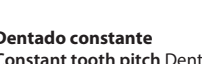

Sur des machines horizontales, la largeur de la lame est spécifiée par le fabricant.

Les machines verticales permettent de plus grandes variations dans les largeurs de lames.

La règle est généralement la suivante: Plus la lame est large, plus la rigidité est importante.

En cas de contourage, la largeur du ruban est limitée par le plus petit rayon à scier.

Ancho cinta y radio más pequeño
Band widths and smallest radius
Largeurs de lames et plus petit rayon

| | |
|---|----------------|
|  | 20 mm; r = 14c |
|  | 16 mm; r = 95 |
|  | 13 mm; r = 65 |
|  | 10 mm; r = 40 |
|  | 8 mm; r = 30 |
|  | 6 mm; r = 16 |
|  | 4 mm; r = 8 |
|  | 3 mm; r = 3 |

4. Espesor de la Cinta (E)

Cuanto más ancha es la hoja de sierra de cinta, mayor es su espesor.

4. Band Thickness (E)

The wider the band saw blade the higher its thickness.

4. Epaisseur de Lame (E)

Plus la lame est large, plus la épaisseur est importante.

5. Dentado (TPI)

El dentado es el n° de dientes por pulgada (25,4 mm).

Los dentados se diferencian en constantes, paso de diente uniforme, y variables, con diferente paso de diente dentro de cada intervalo.

Los dentados variables se definen con dos medidas, p.e. 2-3 TPI.

De forma que, 2 TPI significa el paso de diente máximo, y 3 TPI significa el paso de diente mínimo en el intervalo de dentado.

Aquí, la longitud de contacto de la sierra de cinta con la pieza a cortar es decisiva.

*Las tablas de la pag. 420 muestran los valores límites.

5. Tooth pitch (TPI)

Tooth pitch is the number of teeth per inch (25,4 mm).

A difference is made between constant tooth pitches with regular tooth distance and variable tooth pitches with differing tooth distance within one interval.

Variable tooth pitches are marked by two measures, e.g. 2-3 TPI.

With this, 2 TPI signifies the maximum tooth distance and 3 TPI signifies the minimum tooth distance in the toothing interval.

Here the contact length of the blade in the work piece is decisive.

*Both tables on page 420 show the limit values.

5. Dentures (TPI)

La denture est au n° de dents par pouce (25,4 mm).

Une différence réside entre les dentures constantes, où l'écart entre deux pointes de dents reste égal et les dentures variables, où les valeurs des pas de dents sont différentes.

La denture variable est caractérisée par deux chiffres, par exemple: 2-3 TPI.

Le chiffre 2 TPI désigne l'écart maxi entre les dents et le chiffre 3 TPI l'écart mini entre les dents sur une séquence de denture.

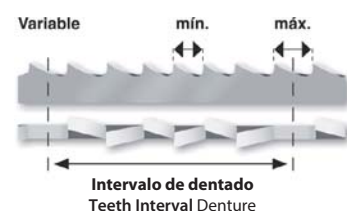
La surface de contact de la lame sur la pièce à débiter est décisive.

*Les tableaux (page 420) vous permettront de choisir aisément la denture adaptée à votre cas.

Dentado constante
Constant tooth pitch Denture constante



Dentado variable
Variable tooth pitch Denture variable



SELECCIÓN DE LA HOJA DE SIERRA DE CINTA CORRECTA

Selecting the right Band Saw Blade

Selection de la lame de scie à ruban adaptée

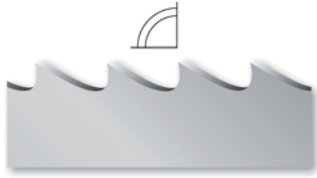
6. Forma Diente (TZ)

Nuestras diferentes formas de dientes han sido combinadas de forma óptima por nuestros técnicos, teniendo en cuenta nuestros materiales del filo de corte y las dimensiones de las máquinas.

Diente estándar (S)

Angulo desprendimiento 0°:

- materiales de viruta corta
- aceros de alto contenido en carbono
- preferiblemente acero de herramienta y hierro fundido
- materiales de poca sección de corte
- perfiles de pared delgada



Diente para perfil (P)

Angulo desprendimiento positivo para mayor productividad:

- perfiles huecos y angulares
- vigas
- cortes de paquetes y capas
- tareas de corte sujetas a aparición de vibraciones



Positivo
Positive
Positif



Diente de garra (K)

Angulo de desprendimiento positivo para macizos:

- empleo universal
- metales no ferrosos y aceros con un contenido en carbono de < 0,8%
- aceros estructurales, aceros para extrusión en frío y aceros templados

Diente trapezoidal (T)

Ángulo de ataque positivo para un alto rendimiento de corte y un acabado óptimo.

Geometría del filo de corte trapezoidal
Trapezoid Cutting Blade Geometry
Géométrie du filet de coupe trapézoïdal



6. Tooth Shape (TZ)

Our different tooth shapes have been optimally combined with our cutting edge materials and band saw dimensions by our technologists.

Raker tooth (S)

0° rake angle for:

- short-chipping materials
- steels with high carbon content
- preferably tool steel and cast iron
- materials with small cross-sections
- thin-walled profiles

Profile tooth (P)

Positive rake angle for higher productivity:

- hollow and angle profiles
- beams
- bundle and layer cuts
- applications that are susceptible to vibrations

Hook tooth (K)

Positive rake angle for solids:

- universal use
- non-ferrous metals and steels with a carbon content of < 0,8%
- structural steels, steels for cold extrusion, tempered steels

Trapezoid Tooth (T)

Positive rake angle for a high cutting performance and an optimal surface finishing.

6. Forme de Dent (TZ)

Nos différentes formes de dents sont optimisées, selon la qualité des lames et leurs dimensions, par nos ingénieurs.

Dent standard (S)

Angle de coupe 0° pour:

- matériaux à copeaux courts
- aciers à forte teneur en carbone
- les fontes et aciers à outil
- pièces de petites sections
- profils à parois minces

Dent profilée (P)

Angle de coupe positif pour meilleure productivité:

- tubes et profils
- poutrelles
- coupes en nappes et en paquets
- pièces sensibles aux vibrations

Dent griffe (K)

Angle de coupe positif pour matériaux pleins:

- usage universel
- métaux non ferreux et aciers à teneur en carbone de < 0,8%
- aciers de construction, aciers pour extrusion à froid et aciers trempés

Dent trapèze (T)

Angle de coupe positif pour coupe à haut rendement et meilleur état de surface.

7. Tipos de Triscado (TR)

A través del triscado, con el que los dientes sobresalen alternativamente a izquierda y derecha del fleje de la cinta, se logra el corte de la hoja de sierra de cinta.

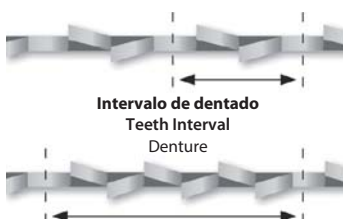
Triscado estándar (SD)

El triscado estándar es un triscado multiuso para cortar espesores de más de 5 mm de aceros, fundición y metales duros no ferrosos.

En el dentado constante la secuencia es izquierda / derecha / recto.

En el dentado variable, hay un diente no triscado por cada intervalo de dentado.

Los dientes restantes del intervalo, están triscados repetidamente a izquierda / derecha.



7. Types of Tooth Set (TR)

By means of the tooth set, where the teeth protrude alternately left and right beyond the blade body, free-cutting action of the band saw blade is achieved.

Standard set (SD)

The standard set is an all-purpose set for cutting thicknesses of more than 5 mm of steels, castings and hard non-ferrous metals.

With constant tooth pitch the set sequence is left / right / straight.

With variable tooth pitch one tooth in each toothing interval is unset.

The remaining teeth in the interval are recurrently set left / right.

7. Types d'Avoyages (TR)

Par avoyage d'une lame de scie, on entend le déport bilatéral des dents de celle-ci par rapport au dossier.

L'avoyage est destiné à assurer le dégagement de la lame.

Avoyage standard (SD)

L'avoyage standard est utilisé pour les aciers, les fontes, les métaux non ferreux dont l'épaisseur est supérieure à 5 mm.

Pour les dentures constantes, l'avoyage est gauche / droite / centre.

Pour les dentures variables, une seule dent est au centre tandis que les autres dents sont déportées alternativement à gauche et à droite.

SELECCIÓN DE LA HOJA DE SIERRA DE CINTA CORRECTA

Selecting the right Band Saw Blade

Selection de la lame de scie à ruban adaptée

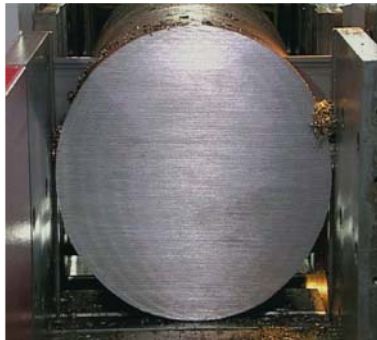


| ESPESOR DE LA PARED Wall Thickness Épaisseur de paroi | DIÁMETRO EXTERIOR DE TUBO (MM) / Pipe External Diameter (mm) / Diamètre extérieure du tube (mm) | | | | | | | | | | | | | | | | | |
|---|---|-------|-------|-------|-------|-------|-------|-------|------|------|-------|-------|---------|---------|-----------|-----------|-----------|-----------|
| | DIENTES POR PULGADA / t.p.i. / d.p.p. | | | | | | | | | | | | | | | | | |
| | mm | 20 | 40 | 60 | 80 | 100 | 120 | 150 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1500 |
| 2 | 14 | 14 | 14 | 14 | 14 | 14 | 10-14 | 10-14 | 8-12 | 8-12 | 6-10 | 6-10 | 5-8 | 5-8 | 5-8 | 5-8 | 5-8 | 5-8 |
| 3 | 14 | 14 | 10-14 | 10-14 | 10-14 | 10-14 | 8-12 | 8-12 | 6-10 | 6-10 | 5-8 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 4-6 | 4-6 |
| 4 | 14 | 14 | 10-14 | 10-14 | 8-12 | 8-12 | 8-12 | 8-12 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 4-6 | 4-6 | 4-6 | 4-6 | 3-4 |
| 5 | 14 | 10-14 | 10-14 | 8-12 | 8-12 | 8-12 | 6-10 | 6-10 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 3-4 | 3-4 |
| 6 | 14 | 10-14 | 10-14 | 8-12 | 8-12 | 8-12 | 8-12 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 3-4 | 3-4 | 3-4 |
| 8 | 14 | 10-14 | 8-12 | 8-12 | 8-12 | 6-10 | 6-10 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 |
| 10 | | 8-12 | 6-10 | 6-10 | 6-10 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 | 2-3 |
| 12 | | 8-12 | 6-10 | 6-10 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 |
| 15 | | 8-12 | 6-10 | 5-8 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 |
| 20 | | | 6-10 | 5-8 | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 |
| 30 | | | | 4-6 | 4-6 | 4-6 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 1,4-2 |
| 50 | | | | | 3-4 | 3-4 | 3-4 | 3-4 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 |
| 75 | | | | | | | | 2-3 | 2-3 | 2-3 | 2-3 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 |
| 100 | | | | | | | | | 2-3 | 2-3 | 2-3 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 |
| 150 | | | | | | | | | | 2-3 | 1,4-2 | 1,4-2 | 1,4-2 | 1,4-2 | 1,0-1,4 | 1,0-1,4 | 1,0-1,4 | 1,0-1,4 |
| 200 | | | | | | | | | | | 1,4-2 | 1,4-2 | 1,4-2 | 1,0-1,4 | 1,0-1,4 | 1,0-1,4 | 0,75-1,25 | 0,75-1,25 |
| 250 | | | | | | | | | | | | 1,4-2 | 1,0-1,4 | 1,0-1,4 | 1,0-1,4 | 0,75-1,25 | 0,75-1,25 | 0,75-1,25 |
| 300 | | | | | | | | | | | | | 1,0-1,4 | 1,0-1,4 | 0,75-1,25 | 0,75-1,25 | 0,75-1,25 | 0,75-1,25 |

ELECCIÓN DEL DENTADO CORRECTO PARA MACIZOS

Selecting the correct tooth pitch for solids

Élection de la denture correcte pour matériaux pleins



DENTADO CONSTANTE Constant Tooth Pitch Denture constante

| Dentado t.p.i./d.p.p. | LONGITUD DE CONTACTO Contact length / Longueur de contact | |
|--------------------------|--|--|
| | INTERVALO DE DENTADO Toothing interval / Intervalle des dents | |
| | | |
| 24 | 6 | |
| 18 | 10 | |
| 14 | 15 | |
| 10 | 15 - 30 | |
| 8 | 30 - 50 | |
| 6 | 50 - 80 | |
| 4 | 80 - 120 | |
| 3 | 120 - 200 | |
| 2 | 200 - 400 | |
| 1,25 | 300 - 800 | |

Los dentados constantes son adecuados para materiales macizos.

Constant tooth pitches are suitable for solid materials.

Les dentures constantes sont appropriées pour des matériaux pleins.

DENTADO VARIABLE Variable Tooth Pitch Denture variable

| Dentado t.p.i./d.p.p. | LONGITUD DE CONTACTO Contact length / Longueur de contact | |
|--------------------------|--|--|
| | INTERVALO DE DENTADO Toothing interval / Intervalle des dents | |
| | | |
| 10-14 | 30 | |
| 8-12 | 20 - 50 | |
| 6-10 | 25 - 60 | |
| 5-8 | 35 - 80 | |
| 4-6 | 50 - 100 | |
| 4-5 | 70 - 120 | |
| 3-4 | 80 - 150 | |
| 2-3 | 120 - 350 | |
| 1,4-2 | 250 - 600 | |
| 1,0-1,4 | 400 - 1000 | |
| 0,75-1,25 | 700 - 1400 | |
| 0,7-1,0 | 900 - 3000 | |

Los dentados variables son recomendados para suprimir los fenómenos de resonancia y las vibraciones.

Variable tooth pitches are recommended to suppress the resonance phenomena and vibrations.

Les dentures variables sont recommandées pour supprimer les phénomènes de résonance et les vibrations.

Tabla selección dentado Tooth selection table Tableau sélection denture

| Dentado Tooth Denture | Perfil Profile Profil | Macizo Solid Plein |
|-----------------------------|-----------------------------|--------------------------|
| 10 / 14 | 0-1 mm | 0-10 mm |
| 8 / 12 | 1-2,5 mm | 10-20 mm |
| 6 / 10 | 2,5-5 mm | 20-40 mm |
| 5 / 8 | 5-7 mm | 40-50 mm |
| 4 / 6 | 7-10 mm | 50-90 mm |
| 3 / 4 | >10 mm | 90-120 mm |
| 2 / 3 | | >120 mm |
| 1,4 / 2 | | >250 mm |

PREVENCIÓN DE PROBLEMAS

Preventive Measures Prevention des problèmes

- 1- Elija la hoja de sierra adecuada (Ref., L, AxE, TPI, TZ, TR) para su máquina y para el material a cortar.
- 2- Cíñase a las condiciones de corte adecuadas (Vc, refrigeración) para cada material.
- 3- Ajuste la tensión de la hoja de sierra en la máquina a 43.500 psi / 300 N/mm².
- 4- Revise la máquina: estado de las guías laterales y de apoyo, posición del cepillo limpiaviruta...
- 5- Haga un rodaje de la hoja de sierra (avance al 50%) para eliminar la arista viva del diente, durante 300 cm² en piezas pequeñas ó 15 min. en piezas de grandes dimensiones.

- 1- Select the right band saw blade (Ref., L, AxE, TPI, TZ, TR) for your machine and the cutting material.
- 2- Keep to the right cutting conditions (Vc, cooling) for each material.
- 3- Adjust the band saw blade tension in the machine to 43.500 psi / 300 N/mm².
- 4- Check the machine: side & support slides condition, chip-removing brush position...
- 5- Make a run of the band saw blade (50% feed) to remove the tooth sharp edge, for 300 cm² with small pieces or 15 min. with big ones.

- 1- Choisissez la lame de scie plus convenable (Ref., AxE, TPI, TZ, TR) pour votre machine et le matériel à couper.
- 2- Mettez les conditions de coupe correctes (Vc, réfrigération) pour chaque matériel.
- 3- Ajustez la tension de chaque lame de scie sur la machine à 43.500 psi / 300 N/mm².
- 4- Revisez la machine: état des guides latérales et d'appui, position de la brosse pour nettoyer les copeaux...
- 5- Faites le rodage de la lame de scie (avance au 50%) pour éliminer les arêtes vives du dent, pendant 300 cm² sur des pièces petites où 15 min. en pièces grandes.



SELECCIÓN DE LA HOJA DE SIERRA DE CINTA CORRECTA

Selecting the right Band Saw Blade

Selection de la lame de scie à ruban adaptée

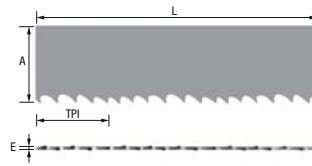
MATERIALES Y VELOCIDADES DE CORTE Materials And Cutting Speeds Matières et Vitesses de Coupe

| GRUPO DE MATERIAL / Material / Matière | | DIN | VELOCIDAD (mtrs./min.) Speed / Vitesse | REFRIGERACIÓN (%) Coolant / Lubrification | |
|--|--|---|---|--|--------------------|
| P | P.1 | Aceros construcción / Construction steels / Aciers de construction | St 37/St 42 | 60-90 | 10 |
| | | | St 52/St 60 | 50-80 | 10 |
| | | Aceros cementación / Case-hardening steels / Aciers de cémentation | C 10/C 15 | 65-105 | 15 |
| | | | 21 Ni Cr Mo 2 | 40-60 | 10 |
| | | Aceros de construcción fundidos / Cast steels / Aciers de construction fonte | 16 Mn Cr 5 | 40-70 | 10 |
| | | | GS - 38 | 40-70 | 3 |
| | P.2 | Aceros nitruración / Nitriding steels / Aciers de nitruration | GS - 60 | 35-60 | 3 |
| | | | 34 Cr Al 6 | 20-45 | 5 |
| | | Aceros bonificados / Alloyed heat-treatable steels / Aciers supérieurs | C 35 / C 45 | 40-90 | 5 |
| | | | 34 Cr Ni Mo 6 | 40-70 | 5 |
| | | Aceros aleados para herramientas / Alloyed tool steels / Aciers alliés por outils | 42 Cr Mo 4 | 40-70 | 5 |
| | | | 100 Cr 6 | 30-75 | 3 |
| | | Aceros para muelles / Spring steels / Aciers pour ressorts | 100 Cr Mo 7 3 | 30-60 | 3 |
| | | | 65 Si 7 | 30-70 | 3 |
| | | | 50 Cr V 4 | 30-70 | 3 |
| | | | C 80 W 1 | 35-70 | 3 |
| | | Aceros aleados para herramientas / Alloyed tool steels / Aciers alliés por outils | 125 Cr 1 | 30-65 | 3 |
| | | | X 210 Cr 12 | 15-40 | Seco / Dry / À sec |
| | X 155 Cr V Mo 12 1 | | 15-40 | Seco / Dry / À sec | |
| | 90 Mn Cr V 8 | | 20-45 | 3 | |
| | Aceros rápidos / High speed steels / Aciers rapides | | S 6 - 5 - 2 | 25-50 | 3 |
| | | | S3- 3 - 2 | 30-55 | 3 |
| | | S2- 10 - 1 - 8 | 20-45 | 3 | |
| | | S18 - 0 - 1 | 20-45 | 3 | |
| | | S10-4-3-10 | 20-45 | 3 | |
| | P.3 | Aceros para válvulas / Valve steels / Aciers pour soupapes | X 45 Cr Si 93 | 25-55 | 5 |
| | | | X 45 Cr Ni W 18 9 | 20-50 | 5 |
| | | Aceros altamente refractarios / High temperature steels / Aciers très refractaires | X 12 Cr Co Ni 21 20 | 15-30 | 10 |
| X 20 Cr Mo WV 12 1 | | | 25-40 | 10 | |
| Aceros refractarios / Heat-resistant steels / Aciers refractaires | | X 15 Cr Ni Si 25 20 | 10-25 | 15 | |
| | | X 12 Ni Cr Si 36 16 | 10-25 | 15 | |
| Aceros bonificados / Alloyed heat-treatable steels / Aciers supérieurs | | 1000 -1200 N/mm ² | 20-35 | 5 | |
| | | 1200 -1 400 N/mm ² | 15-30 | 5 | |
| M | Aceros Inox. austeníticos / Austenitic stainless steel / Aciers inox austénitiques | 1400 -1 600 N/mm ² | 10-25 | 5 | |
| | | X 5 Cr Ni 18 10 | 20-50 | 10 | |
| K | Fundición / Cast / Fonte | X 6 Cr Ni Mo Ti 17 12 2 | 20-50 | 10 | |
| | | GG - 30 | 30-60 | Seco / Dry / À sec | |
| S | Titanio puro / Unalloyed titanium / Titane pur | GGG - 50 | 25-55 | Seco / Dry / À sec | |
| | | Ti 1 | 15-45 | 10 | |
| N | N.1 | Cobre / Copper / Cuivre | Ke - Cu | 60-200 | 10 |
| | | | Cu Zn 40 | 80-300 | 3 |
| | | Latón / Brass / Laiton | Cu Zn 40 Pb 2 | 80-300 | 3 |
| | | | Cu Zn 15 Si 4 | 80-300 | 3 |
| | | Bronces Estaño / Tin bronze / Bronze | Cu Sn 6 | 80-160 | 3 |
| | | | Cu Sn 8 | 80-160 | 3 |
| | | Fundición Bronce / Bronze casting / Fonte de bronze | Cu Sn 5 Zn Pb | 60-150 | 3 |
| | | | Cu Sn 10 Zn | 60-150 | 3 |
| | N.2 | Bronce Aluminio* / Aluminium bronze* / Bronze Aluminium* | Cu Al 8 | 40-60 | 15 |
| | | | Cu Al 10 Fe | 30-40 | 15 |
| | | | AMPCO 18 | 40-65 | 15 |
| | N.3 | Aluminio sin alear / Unalloyed aluminium / Aluminium sans alliage | AMPCO 25 | 30-50 | 15 |
| | | | Al 99,8 | 80-800 | 25 |
| | N.4 | Aleación ligera / Aluminium ligh alloy / Faible alliage d'aluminium | Al Mg 3 | 80-800 | 25 |
| | | | Al Mg 4,5 Mn | 80-800 | 25 |
| | N.5 | Fundición aleada de Aluminio / Aluminium cast alloy / Fonte alliée d'aluminium | G - Al Si 6 Cu 4 | 80-800 | 25 |
| | | | G - Al Si 12 | 80-800 | 25 |
| | | | G - Al Mg3 | 80-800 | 25 |
| | | | G - Al Cu 4 Ti | 80-800 | 25 |
| | N.6 | Materias Sintéticas Termoplásticas Thermoplastic plastics / Termoplastiques plastiques | PVC | 100-400 | Seco / Dry / À sec |
| | | | Teflón | 100-400 | Seco / Dry / À sec |
| | | | Hostalen | 100-400 | Seco / Dry / À sec |
| | | | Polystyrol | 100-400 | Seco / Dry / À sec |
| | | Aceros tornos automáticos / Automatic steels / Aciers de décolletage | 9 S 20 | 60-120 | 15 |
| Aceros para hta. sin alear / Unalloyed tool steels / Aciers pour outils non alliés | | | C 125 W | 30-65 | 3 |
| Aleaciones especiales / Special alloys / Alliages spéciaux | | Inconel 718 | 8-20 | 20 | |
| | | Hastelloy B | 10-25 | 12 | |
| | | Nimonic 901 | 8-20 | 20 | |
| | | Nimonic 263 | 10-22 | 15 | |
| | | Incoloy 840 | 11-23 | 15 | |
| Aceros templados / Hardened steels / Aciers trempés | | 50 HRC | - | 5 | |
| | | 55 HRC | - | 5 | |
| | | 60 HRC | - | 5 | |
| Aleación / Alloy / Alliage | | (Ni Cr Mo) | 15-40 | Seco / Dry / À sec | |
| Bronce estaño Plomo / Tin bronze lead / Bronze étain plomb | | Cu Pb 20 SnS | 80-160 | 3 | |



Ref. **4223**

HOJA DE SIERRA DE CINTA HSSE 8% Co IZARFLEX
 IZARFLEX HSSE 8% Co Band Saw Blade
 Lame de scie à ruban HSSE 8% Co IZARFLEX



Ideal para trabajos de taller exigentes, con los dientes de una calidad especial resistente al desgaste. Fleje flexible, bimetal, combina dentados 0 y +

Ideal for heavy duty workshop cutting tasks, with special wear resistant quality teeth. Flexible strip, bimetal, 0 & + teeth combined.

Idéal pour des travaux d'atelier exigeants, avec dents d'une qualité spéciale résistante à l'usure. Feuillard flexible, bimétal, possibilité dentures 0 et +

HSSE 8% Co

Grupo Group-Grpoue **P** Subgrup. P.1 P.2 Grupo Group-Grpoue **N**

| New! | | | | | New! | | | | | New! | | | | | New! | | | | |
|-------------|----|------|-------|---------|-------------|----|------|-------|---------|-------------|----|------|-------|---------|-------------|----|------|-------|---------|
| L | A | E | 8% Co | € 1 ud. | L | A | E | 8% Co | € 1 ud. | L | A | E | 8% Co | € 1 ud. | L | A | E | 8% Co | € 1 ud. |
| mm | mm | mm | | | mm | mm | mm | | | mm | mm | mm | | | mm | mm | mm | | |
| 1030 | 13 | 0,65 | 3 | 17,49 | 1875 | 13 | 0,65 | 3 | 27,88 | 2100 | 20 | 0,90 | 2 | 34,16 | 2060 | 27 | 0,90 | 2 | 34,23 |
| 1080 | | | | 18,34 | 2120 | | | | 28,65 | 2110 | | | | 34,31 | 2070 | | | | 34,41 |
| 1104 | | | | 18,74 | 2125 | | | | 28,72 | 2115 | | | | 34,39 | 2080 | | | | 34,55 |
| 1115 | | | | 18,93 | 2150 | | | | 29,05 | 2120 | | | | 34,47 | 2085 | | | | 34,64 |
| 1125 | | | | 19,10 | 2230 | | | | 30,14 | 2130 | | | | 34,60 | 2090 | | | | 34,81 |
| 1130 | | | | 19,21 | 2240 | | | | 30,25 | 2140 | | | | 34,72 | 2100 | | | | 34,93 |
| 1138 | | | | 19,31 | 2242 | | | | 30,29 | 2215 | | | | 35,57 | 2110 | | | | 35,04 |
| 1140 | | | | 19,36 | 2390 | | | | 31,48 | 2225 | | | | 35,72 | 2140 | | | | 35,38 |
| 1270 | | | | 20,39 | 2440 | | | | 32,15 | 2240 | | | | 35,98 | 2145 | | | | 35,46 |
| 1300 | | | | 20,87 | 2490 | | | | 32,81 | 2265 | | | | 36,36 | 2150 | | | | 35,53 |
| 1310 | | | | 20,96 | 2500 | | | | 32,94 | 2300 | | | | 36,93 | 2155 | | | | 35,64 |
| 1325 | | | | 21,08 | 2550 | | | | 33,59 | 2355 | | | | 37,55 | 2360 | | | | 38,26 |
| 1328 | | | | 21,10 | 2560 | | | | 33,69 | 2360 | | | | 37,62 | 2375 | | | | 38,49 |
| 1330 | | | | 21,13 | 2580 | | | | 33,99 | 2362 | | | | 37,64 | 2400 | | | | 38,89 |
| 1335 | | | | 21,15 | 2650 | | | | 34,58 | 2365 | | | | 37,70 | 2410 | | | | 39,05 |
| 1340 | | | | 21,21 | 2735 | | | | 35,30 | 2370 | | | | 37,77 | 2440 | | | | 39,53 |
| 1350 | | | | 21,35 | 2800 | | | | 35,97 | 2375 | | | | 37,82 | 2445 | | | | 39,61 |
| 1365 | | | | 21,42 | 2840 | | | | 36,45 | 2380 | | | | 37,92 | 2448 | | | | 39,66 |
| 1385 | | | | 21,59 | 2845 | | | | 36,52 | 2400 | | | | 38,22 | 2450 | | | | 39,69 |
| 1400 | | | | 21,83 | 2890 | | | | 37,13 | 2450 | | | | 38,77 | 2455 | | | | 39,76 |
| 1410 | | | | 22,38 | 2900 | | | | 37,24 | 2465 | | | | 39,01 | 2459 | | | | 39,81 |
| 1425 | | | | 22,22 | 3115 | | | | 39,39 | 2470 | | | | 39,09 | 2460 | | | | 39,82 |
| 1435 | | | | 22,38 | 3140 | | | | 39,67 | 2480 | | | | 39,25 | 2465 | | | | 39,90 |
| 1440 | | | | 22,46 | 3160 | | | | 39,89 | 2490 | | | | 39,41 | 2470 | | | | 39,97 |
| 1445 | | | | 22,52 | 3200 | | | | 40,31 | 2520 | | | | 39,73 | 2480 | | | | 40,10 |
| 1450 | | | | 22,58 | 3355 | | | | 41,99 | 2530 | | | | 39,87 | 2485 | | | | 40,18 |
| 1460 | | | | 23,14 | 3370 | | | | 42,17 | 2540 | | | | 40,03 | 2500 | | | | 40,44 |
| 1470 | | | | 23,70 | 3430 | | | | 42,93 | 2542 | | | | 40,06 | 2515 | | | | 40,68 |
| 1480 | | | | 23,71 | 3590 | | | | 44,93 | 2560 | | | | 40,34 | 2520 | | | | 40,76 |
| 1490 | | | | 23,87 | 3600 | | | | 45,06 | 2600 | | | | 40,98 | 2535 | | | | 40,86 |
| 1514 | | | | 23,97 | 3830 | | | | 47,05 | 2610 | | | | 41,13 | 2540 | | | | 40,89 |
| 1525 | | | | 24,01 | 3857 | | | | 47,38 | 2625 | | | | 41,37 | 2550 | | | | 41,06 |
| 1550 | | | | 24,14 | 4100 | | | | 48,77 | 2630 | | | | 41,45 | 2560 | | | | 41,20 |
| 1575 | | | | 24,26 | 4180 | | | | 49,72 | 2650 | | | | 41,76 | 2565 | | | | 41,28 |
| 1580 | | | | 24,30 | 4400 | | | | 52,23 | 2665 | | | | 42,01 | 2570 | | | | 41,35 |
| 1600 | | | | 24,41 | 4440 | | | | 52,64 | 2710 | | | | 42,72 | 2580 | | | | 41,50 |
| 1620 | | | | 24,52 | 4600 | | | | 54,59 | 2750 | | | | 43,34 | 2590 | | | | 41,64 |
| 1630 | | | | 24,56 | 5140 | | | | 61,00 | 2770 | | | | 43,65 | 2600 | | | | 41,76 |
| 1635 | | | | 24,66 | 1350 | 20 | 0,90 | 2 | 23,31 | 2950 | | | | 44,59 | 2615 | | | | 42,01 |
| 1638 | | | | 24,70 | 1710 | | | | 28,10 | 2970 | | | | 44,71 | 2625 | | | | 42,17 |
| 1640 | | | | 24,72 | 1735 | | | | 28,50 | 2980 | | | | 44,77 | 2655 | | | | 42,38 |
| 1645 | | | | 24,78 | 1740 | | | | 28,59 | 3000 | | | | 44,88 | 2660 | | | | 42,45 |
| 1650 | | | | 24,86 | 1750 | | | | 28,75 | 3084 | | | | 45,28 | 2680 | | | | 42,89 |
| 1660 | | | | 25,03 | 2000 | | | | 30,85 | 3240 | | | | 46,13 | 2700 | | | | 43,15 |
| 1710 | | | | 25,42 | 2005 | | | | 31,76 | 3280 | | | | 46,70 | 2710 | | | | 43,32 |
| 1715 | | | | 25,49 | 2010 | | | | 32,67 | 3454 | | | | 48,78 | 2715 | | | | 43,40 |
| 1718 | | | | 25,54 | 2020 | | | | 32,82 | 3950 | | | | 54,26 | 2720 | | | | 43,49 |
| 1730 | | | | 25,72 | 2035 | | | | 33,22 | 3960 | | | | 54,66 | 2725 | | | | 43,56 |
| 1735 | | | | 25,79 | 2037 | | | | 33,28 | 4000 | | | | 55,21 | 2730 | | | | 43,63 |
| 1740 | | | | 25,86 | 2040 | | | | 33,32 | 4185 | | | | 57,48 | 2735 | | | | 43,71 |
| 1745 | | | | 25,95 | 2058 | | | | 33,64 | 4270 | | | | 58,65 | 2740 | | | | 43,79 |
| 1750 | | | | 26,02 | 2060 | | | | 33,66 | 4400 | | | | 60,44 | 2750 | | | | 43,84 |
| 1770 | | | | 26,33 | 2065 | | | | 33,72 | 4485 | | | | 61,61 | 2755 | | | | 43,92 |
| 1790 | | | | 26,62 | 2070 | | | | 33,77 | 4700 | | | | 64,55 | 2759 | | | | 45,90 |
| 1838 | | | | 27,33 | 2075 | | | | 33,85 | 4900 | | | | 67,30 | 2760 | | | | 43,98 |
| 1840 | | | | 27,35 | 2080 | | | | 33,92 | 5130 | | | | 70,47 | 2765 | | | | 44,04 |
| 1845 | | | | 27,43 | 2085 | | | | 33,97 | 5800 | | | | 76,43 | 2770 | | | | 44,13 |
| | | | | | 2090 | | | | 34,05 | 7220 | | | | 99,17 | | | | | |
| | | | | | 2095 | | | | 34,11 | 7320 | | | | 100,54 | | | | | |







Ref. **4223**

HOJA DE SIERRA DE CINTA HSSE 8% Co IZARFLEX


IZARFLEX HSSE 8% Co Band Saw Blade

Lame de scie à ruban HSSE 8% Co IZARFLEX

| New! | | | | | New! | | | | | New! | | | | | New! | | | | |
|------|----|------|---|---------|------|----|------|---|---------|------|----|------|---|---------|------|----|------|---|---------|
| L | A | E |  | 8% Co | L | A | E |  | 8% Co | L | A | E |  | 8% Co | L | A | E |  | 8% Co |
| mm | mm | mm | | € 1 ud. | mm | mm | mm | | € 1 ud. | mm | mm | mm | | € 1 ud. | mm | mm | mm | | € 1 ud. |
| 2795 | 27 | 0,90 | 2 | 44,40 | 3440 | 27 | 0,90 | 2 | 53,43 | 2600 | 34 | 1,10 | 1 | 47,93 | 4990 | 34 | 1,10 | 1 | 88,70 |
| 2800 | | | | 44,48 | 3460 | | | | 53,59 | 2620 | | | | 48,29 | 5000 | | | | 88,87 |
| 2810 | | | | 44,65 | 3490 | | | | 53,88 | 2630 | | | | 48,47 | 5070 | | | | 90,09 |
| 2820 | | | | 44,81 | 3495 | | | | 53,92 | 2970 | | | | 54,74 | 5080 | | | | 90,27 |
| 2825 | | | | 44,88 | 3500 | | | | 54,00 | 3505 | | | | 64,33 | 5090 | | | | 90,44 |
| 2830 | | | | 44,95 | 3505 | | | | 54,07 | 3530 | | | | 64,80 | 5150 | | | | 91,34 |
| 2835 | | | | 45,03 | 3550 | | | | 54,77 | 3634 | | | | 66,71 | 5200 | | | | 92,11 |
| 2840 | | | | 45,09 | 3560 | | | | 54,93 | 3655 | | | | 67,09 | 5270 | | | | 93,35 |
| 2845 | | | | 45,17 | 3600 | | | | 55,54 | 3660 | | | | 67,18 | 5320 | | | | 94,24 |
| 2847 | | | | 45,21 | 3630 | | | | 56,00 | 3730 | | | | 68,47 | 5400 | | | | 95,65 |
| 2850 | | | | 45,26 | 3640 | | | | 56,15 | 3770 | | | | 69,20 | 5500 | | | | 97,41 |
| 2855 | | | | 45,34 | 3650 | | | | 56,31 | 3780 | | | | 69,38 | 5600 | | | | 99,19 |
| 2860 | | | | 45,41 | 3660 | | | | 56,47 | 3800 | | | | 69,75 | 5700 | | | | 100,98 |
| 2865 | | | | 45,46 | 3667 | | | | 56,57 | 3820 | | | | 70,12 | 5720 | | | | 101,33 |
| 2870 | | | | 45,51 | 3670 | | | | 56,62 | 3830 | | | | 70,30 | 5800 | | | | 102,74 |
| 2880 | | | | 45,59 | 3700 | | | | 57,09 | 3840 | | | | 70,48 | 6000 | | | | 103,77 |
| 2884 | | | | 45,65 | 3800 | | | | 58,40 | 3851 | | | | 70,68 | 6060 | | | | 104,81 |
| 2890 | | | | 45,73 | 3810 | | | | 58,55 | 3870 | | | | 71,03 | 6340 | | | | 105,54 |
| 2900 | | | | 45,88 | 3820 | | | | 58,70 | 3920 | | | | 71,49 | 6350 | | | | 105,72 |
| 2910 | | | | 46,07 | 3830 | | | | 58,85 | 4020 | | | | 72,65 | 6360 | | | | 105,90 |
| 2915 | | | | 46,12 | 3850 | | | | 59,16 | 4030 | | | | 72,83 | 7000 | | | | 115,87 |
| 2920 | | | | 46,19 | 3851 | | | | 59,18 | 4100 | | | | 74,10 | 7002 | | | | 115,88 |
| 2925 | | | | 46,27 | 3853 | | | | 59,20 | 4115 | | | | 74,34 | 7010 | | | | 116,04 |
| 2927 | | | | 46,30 | 3900 | | | | 59,93 | 4120 | | | | 74,41 | 8730 | | | | 144,51 |
| 2940 | | | | 46,44 | 3930 | | | | 60,39 | 4130 | | | | 74,60 | 4115 | 41 | 1,30 | 1 | 106,08 |
| 2945 | | | | 46,52 | 3950 | | | | 60,69 | 4160 | | | | 75,14 | 4500 | | | | 116,01 |
| 2950 | | | | 46,62 | 4000 | | | | 61,46 | 4180 | | | | 75,50 | 4570 | | | | 117,81 |
| 2960 | | | | 46,77 | 4038 | | | | 61,85 | 4200 | | | | 75,86 | 4650 | | | | 119,21 |
| 2964 | | | | 46,84 | 4050 | | | | 61,96 | 4250 | | | | 76,77 | 4670 | | | | 119,73 |
| 2965 | | | | 46,85 | 4079 | | | | 62,24 | 4260 | | | | 76,95 | 4800 | | | | 122,57 |
| 2985 | | | | 47,05 | 4090 | | | | 62,41 | 4300 | | | | 77,68 | 4930 | | | | 125,40 |
| 3000 | | | | 47,30 | 4100 | | | | 62,56 | 4335 | | | | 77,95 | 5000 | | | | 127,17 |
| 3010 | | | | 47,46 | 4115 | | | | 62,79 | 4340 | | | | 78,04 | 5090 | | | | 129,46 |
| 3015 | | | | 47,53 | 4150 | | | | 62,97 | 4350 | | | | 78,22 | 5200 | | | | 132,26 |
| 3020 | | | | 47,59 | 4240 | | | | 63,41 | 4370 | | | | 78,59 | 5334 | | | | 135,67 |
| 3025 | | | | 47,68 | 4250 | | | | 63,46 | 4380 | | | | 78,77 | 5400 | | | | 137,35 |
| 3035 | | | | 47,85 | 4270 | | | | 63,56 | 4400 | | | | 79,13 | 5450 | | | | 138,61 |
| 3050 | | | | 48,08 | 4310 | | | | 63,75 | 4420 | | | | 79,47 | 5500 | | | | 139,89 |
| 3084 | | | | 48,42 | 4470 | | | | 64,52 | 4440 | | | | 79,84 | 5600 | | | | 142,43 |
| 3090 | | | | 48,54 | 4500 | | | | 64,88 | 4470 | | | | 80,38 | 5700 | | | | 144,28 |
| 3100 | | | | 48,71 | 4590 | | | | 66,18 | 4520 | | | | 80,90 | 5800 | | | | 146,12 |
| 3110 | | | | 48,83 | 4600 | | | | 66,32 | 4570 | | | | 81,78 | 5920 | | | | 149,15 |
| 3120 | | | | 48,99 | 4870 | | | | 69,76 | 4600 | | | | 82,32 | 5940 | | | | 149,65 |
| 3140 | | | | 49,24 | 4875 | | | | 69,82 | 4610 | | | | 82,50 | 6192 | | | | 156,02 |
| 3150 | | | | 49,39 | 4900 | | | | 70,18 | 4640 | | | | 83,04 | 6500 | | | | 161,97 |
| 3160 | | | | 49,54 | 4960 | | | | 70,95 | 4670 | | | | 83,58 | 6600 | | | | 164,45 |
| 3175 | | | | 49,75 | 5000 | | | | 71,45 | 4720 | | | | 84,28 | 6675 | | | | 166,32 |
| 3180 | | | | 49,83 | 5035 | | | | 71,94 | 4750 | | | | 84,69 | 6775 | | | | 168,81 |
| 3200 | | | | 50,14 | 5060 | | | | 72,30 | 4770 | | | | 85,04 | 6800 | | | | 169,43 |
| 3215 | | | | 50,36 | 5090 | | | | 72,68 | 4780 | | | | 85,23 | 6990 | | | | 174,18 |
| 3220 | | | | 50,45 | 5430 | | | | 77,18 | 4800 | | | | 85,58 | 7250 | | | | 180,53 |
| 3230 | | | | 50,60 | 5445 | | | | 77,39 | 4900 | | | | 87,08 | 7400 | | | | 184,27 |
| 3250 | | | | 50,91 | 5600 | | | | 82,10 | 4930 | | | | 87,61 | 7470 | | | | 186,02 |
| 3270 | | | | 51,03 | 5725 | | | | 83,93 | 4970 | | | | 88,34 | 7880 | | | | 196,23 |
| 3280 | | | | 51,09 | 6200 | | | | 89,14 | | | | | | | | | | |
| 3285 | | | | 51,12 | 6500 | | | | 93,44 | | | | | | | | | | |
| 3300 | | | | 51,35 | 7400 | | | | 103,18 | | | | | | | | | | |
| 3310 | | | | 51,49 | | | | | | | | | | | | | | | |
| 3320 | | | | 51,65 | | | | | | | | | | | | | | | |
| 3345 | | | | 52,05 | | | | | | | | | | | | | | | |
| 3350 | | | | 52,13 | | | | | | | | | | | | | | | |
| 3352 | | | | 52,16 | | | | | | | | | | | | | | | |
| 3365 | | | | 52,37 | | | | | | | | | | | | | | | |
| 3370 | | | | 52,45 | | | | | | | | | | | | | | | |
| 3378 | | | | 52,57 | | | | | | | | | | | | | | | |
| 3380 | | | | 52,59 | | | | | | | | | | | | | | | |
| 3400 | | | | 52,86 | | | | | | | | | | | | | | | |
| 3420 | | | | 53,13 | | | | | | | | | | | | | | | |
| 3430 | | | | 53,27 | | | | | | | | | | | | | | | |
| 3435 | | | | 53,35 | | | | | | | | | | | | | | | |

Tipo Dentado (TZ) / Teeth Type (TZ) / Type Denture (TZ)

| A x E | TPI | | | | | | | | | |
|-----------|-----|-----|---|-----|---|-----|-----|------|------|-------|
| | 2 | 2-3 | 3 | 3-4 | 4 | 4-6 | 5-8 | 6-10 | 8-12 | 10-14 |
| 13 x 0,65 | | | | | | | | S | S | S |
| 20 x 0,90 | | | K | | K | K | S | S | S | S |
| 27 x 0,90 | K | | K | K | K | K | S | S | S | S |
| 34 x 1,10 | | K | K | K | | K | S | S | S | |
| 41 x 1,30 | | | K | K | | K | | | | |

 Unidades pedido mínimo
Minimum order units
Unités commande minimale

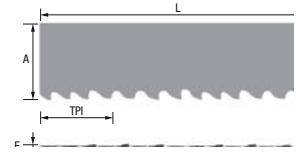
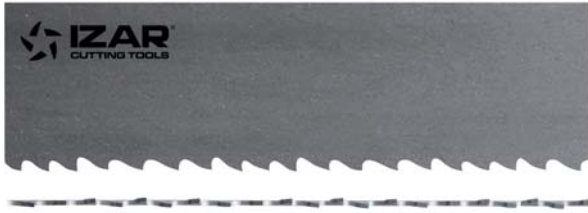
Rollos sin Soldadura
Rolls without Welding
Rouleaux non soudées

| L | A | E | 8% Co |
|--------|----|------|----------|
| mm | mm | mm | € |
| 30500 | 13 | 0,65 | 329,09 |
| 100000 | 20 | 0,90 | 1.184,72 |
| 100000 | 27 | 0,90 | 1.259,81 |
| 100000 | 34 | 1,10 | 1.489,25 |
| 75000 | 41 | 1,30 | 1.626,92 |

Ejemplo Pedido / Order Example / Exemple commande Ref. 4223 + L 2450 + A 27 + E 0,90 + TPI 6-10 + TZ S

Ref. **4224**

HOJA DE SIERRA DE CINTA HSSE 8% Co IZARMAX
 IZARMAX HSSE 8% Co Band Saw Blade
 Lame de scie à ruban HSSE 8% Co IZARMAX



HSSE 8% Co

Grupo Group-Groupe **P** Subgrup. P.1 P.2

Dentado reforzado variable 6°. Geometría de diente especial para el corte de perfiles, vigas y tubos (también corte en paquetes). Similar a Ref. 4228 para grandes rendimientos.

Variable reinforced tooth pitch 6°. Tooth geometry specially developed to cut profiles, beams and pipes (also for bundle cuts). Similar to Ref. 4228 for high performances.

Denture renforcé variable 6°. Géométrie du dent spécialement développée pour la coupe des profils, poutres et tubes (aussi pour paquets). Similaire ref. 4228 pour grandes rendements.

| New! | | | | | New! | | | | | New! | | | | | New! | | | | |
|------|------|------|---------------|---|------|------|------|---------------|---|------|------|------|---------------|---|------|------|------|---------------|---|
| L mm | A mm | E mm | 8% Co € 1 ud. | | L mm | A mm | E mm | 8% Co € 1 ud. | | L mm | A mm | E mm | 8% Co € 1 ud. | | L mm | A mm | E mm | 8% Co € 1 ud. | |
| 2000 | 20 | 0,90 | 36,42 | 2 | 2530 | 27 | 0,90 | 44,65 | 2 | 3180 | 27 | 0,90 | 53,82 | 2 | 4400 | 34 | 1,10 | 94,99 | 1 |
| 2060 | | | 37,32 | | 2550 | | | 44,72 | | 3300 | | | 55,06 | | 4520 | | | 97,26 | |
| 2070 | | | 37,48 | | 2570 | | | 44,99 | | 3320 | | | 55,39 | | 4570 | | | 98,25 | |
| 2080 | | | 37,63 | | 2575 | | | 45,06 | | 3345 | | | 55,81 | | 4600 | | | 98,91 | |
| 2090 | | | 37,79 | | 2600 | | | 45,47 | | 3350 | | | 55,89 | | 4640 | | | 99,64 | |
| 2095 | | | 37,87 | | 2680 | | | 46,26 | | 3370 | | | 56,23 | | 4780 | | | 102,43 | |
| 2100 | | | 37,95 | | 2700 | | | 47,00 | | 3420 | | | 57,47 | | 4970 | | | 106,19 | |
| 2110 | | | 38,10 | | 2750 | | | 47,32 | | 3440 | | | 57,78 | | 4990 | | | 106,58 | |
| 2140 | | | 38,56 | | 2755 | | | 47,42 | | 3495 | | | 58,58 | | 5000 | | | 106,82 | |
| 2240 | | | 40,00 | | 2760 | | | 47,48 | | 3505 | | | 58,73 | | 5040 | | | 107,66 | |
| 2265 | | | 40,45 | | 2765 | | | 47,53 | | 3660 | | | 59,24 | | 5104 | | | 108,89 | |
| 2360 | | | 41,86 | | 2825 | | | 48,43 | | 3800 | | | 60,20 | | 5200 | | | 110,76 | |
| 2362 | | | 41,91 | | 2835 | | | 48,50 | | 3810 | | | 60,37 | | 5300 | | | 112,74 | |
| 2370 | | | 42,03 | | 2845 | | | 48,52 | | 3820 | | | 60,52 | | 5334 | | | 113,46 | |
| 2375 | | | 42,09 | | 2910 | | | 48,75 | | 3830 | | | 60,68 | | 5500 | | | 117,03 | |
| 2400 | | | 42,48 | | 2920 | | | 48,93 | | 3853 | | | 61,06 | | 5870 | | | 121,95 | |
| 2450 | | | 43,20 | | 2925 | | | 49,00 | | 3857 | | | 61,12 | | 6350 | | | 128,32 | |
| 2465 | | | 43,46 | | 2927 | | | 49,03 | | 3900 | | | 62,33 | | 4115 | 41 | 1,30 | 124,55 | 1 |
| 2470 | | | 43,55 | | 2945 | | | 49,30 | | 3925 | | | 62,73 | | 4640 | | | 139,35 | |
| 2530 | | | 44,44 | | 2950 | | | 49,37 | | 4014 | | | 63,57 | | 5040 | | | 150,60 | |
| 3000 | | | 52,92 | | 2965 | | | 49,62 | | 4090 | | | 64,36 | | 5265 | | | 156,94 | |
| 2080 | 27 | 0,90 | 42,50 | 2 | 2995 | | | 50,17 | | 4500 | | | 73,73 | | 5450 | | | 162,17 | |
| 2150 | | | 42,61 | | 3010 | | | 50,41 | | 5000 | | | 81,92 | | 5800 | | | 172,03 | |
| 2450 | | | 43,29 | | 3080 | | | 53,28 | | 3505 | 34 | 1,10 | 77,10 | 1 | 5920 | | | 175,41 | |
| 2455 | | | 43,33 | | 3090 | | | 53,45 | | 3660 | | | 80,51 | | 6175 | | | 182,96 | |
| 2460 | | | 43,36 | | 3100 | | | 53,61 | | 3925 | | | 85,12 | | 6300 | | | 186,66 | |
| 2480 | | | 44,46 | | 3150 | | | 53,73 | | 4100 | | | 88,92 | | 6585 | | | 194,16 | |
| 2520 | | | 44,61 | | 3160 | | | 53,76 | | 4120 | | | 89,34 | | 6775 | | | 199,50 | |
| | | | | | | | | | | 4250 | | | 91,73 | | 6900 | | | 203,02 | |
| | | | | | | | | | | 4335 | | | 93,59 | | 6990 | | | 205,67 | |
| | | | | | | | | | | | | | | | 7470 | | | 219,08 | |

Rollos sin Soldadura
 Rolls without Welding
 Rouleaux non soudés

| L mm | A mm | E mm | 8% Co € |
|--------|------|------|----------|
| 100000 | 20 | 0,90 | 1.414,06 |
| 100000 | 27 | 0,90 | 1.469,64 |
| 100000 | 34 | 1,10 | 1.804,64 |
| 75000 | 41 | 1,30 | 1.921,41 |

Tipo Dentado (TZ) / Teeth Type (TZ) / Type denture (TZ)

| A x E | TPI | | | | |
|-----------|-----|-----|-----|------|-------|
| | 2-3 | 3-4 | 5-7 | 8-11 | 12-16 |
| 20 x 0,90 | | | P | P | P |
| 27 x 0,90 | | P | P | P | P |
| 34 x 1,10 | P | P | P | P | |
| 41 x 1,30 | P | P | P | P | |



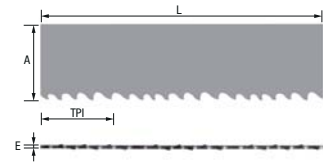
Unidades pedido mínimo
 Minimum order units
 Unités commande minimale

Ejemplo Pedido / Order Example / Exemple commande

Ref. 4224 + L 2080 + A 27 + E 0,90 + TPI 8-11 + TZ P

Ref. **4228**

HOJA DE SIERRA DE CINTA HSSE 8% Co + 4% Cr IZARPLUS
 IZARPLUS HSSE 8% Co + 4% Cr Band Saw Blade
 Lame de scie à ruban HSSE 8% Co + 4% Cr IZARPLUS



| | | | | |
|--|-------------------------------------|--|--|--|
| Grupo Group-Gruppe P | Subgrup. P.1 - P.2 P.5 | Grupo Group-Gruppe M | Grupo Group-Gruppe K | Grupo Group-Gruppe N |
|--|-------------------------------------|--|--|--|

Especial Perfiles. Dentado variable 0° adecuado para perfiles y tareas de corte en serie, susceptibles de vibraciones.

Special Profiles. Variable tooth pitch 0° for profiles and bundle sawing tasks, susceptible of vibrations.

Spécial profils. Denture variable 0° convenable pour profils et travaux de coupe en paquet, susceptibles des vibrations.

New!

| L | A | E | | 8% Co |
|------|----|------|---|---------|
| mm | mm | mm | | € 1 ud. |
| 1100 | 13 | 0,65 | 3 | 23,88 |
| 1130 | | | | 24,53 |
| 1138 | | | | 24,71 |
| 1140 | | | | 24,74 |
| 1300 | | | | 27,21 |
| 1310 | | | | 27,42 |
| 1325 | | | | 27,58 |
| 1330 | | | | 27,71 |
| 1335 | | | | 27,79 |
| 1340 | | | | 27,90 |
| 1350 | | | | 28,09 |
| 1368 | | | | 28,46 |
| 1400 | | | | 28,81 |
| 1425 | | | | 29,13 |
| 1430 | | | | 29,17 |
| 1435 | | | | 29,30 |
| 1440 | | | | 29,39 |
| 1450 | | | | 30,18 |
| 1460 | | | | 30,39 |
| 1470 | | | | 30,59 |
| 1500 | | | | 30,94 |
| 1550 | | | | 31,55 |
| 1575 | | | | 32,05 |
| 1580 | | | | 32,16 |
| 1605 | | | | 32,29 |
| 1620 | | | | 32,35 |
| 1635 | | | | 32,41 |
| 1638 | | | | 32,46 |
| 1640 | | | | 32,49 |
| 1645 | | | | 32,60 |
| 1650 | | | | 32,70 |
| 1680 | | | | 33,29 |
| 1730 | | | | 33,87 |
| 1732 | | | | 33,91 |
| 1735 | | | | 33,96 |
| 1740 | | | | 34,02 |
| 1750 | | | | 34,19 |
| 1974 | | | | 38,57 |
| 2180 | | | | 42,56 |
| 2240 | | | | 43,73 |
| 2265 | | | | 44,23 |
| 2900 | | | | 56,61 |
| 3700 | | | | 66,88 |
| 3800 | | | | 68,68 |
| 3825 | | | | 69,13 |
| 4180 | | | | 73,02 |

New!

| L | A | E | | 8% Co |
|------|----|------|---|---------|
| mm | mm | mm | | € 1 ud. |
| 1125 | 13 | 0,90 | 3 | 24,42 |
| 1140 | | | | 24,74 |
| 1325 | | | | 27,58 |
| 1330 | | | | 27,70 |
| 1335 | | | | 27,79 |
| 1338 | | | | 27,85 |
| 1375 | | | | 28,60 |
| 1470 | | | | 30,59 |
| 1485 | | | | 30,90 |
| 1638 | | | | 32,46 |
| 1640 | | | | 32,48 |
| 1650 | | | | 32,70 |
| 1735 | | | | 33,96 |
| 1750 | | | | 34,19 |
| 1840 | | | | 35,97 |
| 2240 | | | | 43,73 |

New!

| L | A | E | | 8% Co |
|------|----|------|---|---------|
| mm | mm | mm | | € 1 ud. |
| 1735 | 20 | 0,90 | 2 | 33,96 |
| 2000 | | | | 36,42 |
| 2010 | | | | 36,60 |
| 2035 | | | | 36,87 |
| 2045 | | | | 37,05 |
| 2060 | | | | 37,33 |
| 2070 | | | | 37,48 |
| 2080 | | | | 37,63 |
| 2082 | | | | 37,65 |
| 2085 | | | | 37,71 |
| 2090 | | | | 37,79 |
| 2100 | | | | 37,95 |
| 2110 | | | | 38,10 |
| 2130 | | | | 38,37 |
| 2140 | | | | 38,56 |
| 2150 | | | | 38,73 |
| 2265 | | | | 40,45 |
| 2360 | | | | 41,87 |
| 2362 | | | | 41,92 |
| 2370 | | | | 42,03 |
| 2375 | | | | 42,09 |
| 2400 | | | | 42,47 |
| 2465 | | | | 43,46 |
| 2480 | | | | 43,73 |
| 2500 | | | | 43,99 |
| 2520 | | | | 44,27 |
| 2530 | | | | 44,44 |
| 2600 | | | | 45,68 |
| 2825 | | | | 48,43 |
| 2960 | | | | 50,75 |
| 2970 | | | | 50,92 |
| 2980 | | | | 51,09 |
| 3000 | | | | 51,43 |

New!

| L | A | E | | 8% Co |
|------|----|------|---|---------|
| mm | mm | mm | | € 1 ud. |
| 2080 | 27 | 0,90 | 2 | 42,50 |
| 2100 | | | | 42,53 |
| 2110 | | | | 42,54 |
| 2145 | | | | 42,60 |
| 2150 | | | | 42,60 |
| 2190 | | | | 43,39 |
| 2360 | | | | 43,09 |
| 2375 | | | | 43,10 |
| 2400 | | | | 43,13 |
| 2430 | | | | 43,17 |
| 2435 | | | | 43,18 |
| 2440 | | | | 43,18 |
| 2445 | | | | 43,20 |
| 2450 | | | | 43,29 |
| 2455 | | | | 43,32 |
| 2460 | | | | 43,34 |
| 2470 | | | | 43,91 |
| 2480 | | | | 44,46 |
| 2490 | | | | 44,51 |
| 2500 | | | | 44,54 |
| 2520 | | | | 44,59 |
| 2535 | | | | 44,66 |
| 2550 | | | | 44,72 |
| 2560 | | | | 44,84 |
| 2565 | | | | 44,89 |
| 2570 | | | | 44,99 |
| 2600 | | | | 45,47 |
| 2640 | | | | 45,73 |
| 2655 | | | | 45,82 |
| 2660 | | | | 45,91 |
| 2680 | | | | 46,26 |
| 2700 | | | | 47,00 |
| 2710 | | | | 47,18 |
| 2715 | | | | 47,18 |
| 2720 | | | | 47,18 |
| 2730 | | | | 47,22 |
| 2740 | | | | 47,24 |
| 2745 | | | | 47,28 |
| 2750 | | | | 47,32 |
| 2755 | | | | 47,42 |
| 2760 | | | | 47,48 |
| 2765 | | | | 47,53 |
| 2780 | | | | 47,78 |
| 2800 | | | | 48,03 |
| 2805 | | | | 48,11 |
| 2820 | | | | 48,36 |
| 2825 | | | | 48,43 |


Ref. **4228**

HOJA DE SIERRA DE CINTA HSSE 8% Co + 4% Cr IZARPLUS


IZARPLUS HSSE 8% Co + 4% Cr Band Saw Blade

Lame de scie à ruban HSSE 8% Co + 4% Cr IZARPLUS


New!

| L mm | A mm | E mm |  | 8% Co € 1 ud. |
|---------|---------|---------|---|------------------|
| 2830 | 27 | 0,90 | 2 | 48,48 |
| 2835 | | | | 48,50 |
| 2840 | | | | 48,51 |
| 2845 | | | | 48,52 |
| 2850 | | | | 48,59 |
| 2860 | | | | 48,59 |
| 2865 | | | | 48,60 |
| 2870 | | | | 48,60 |
| 2885 | | | | 48,61 |
| 2900 | | | | 48,61 |
| 2910 | | | | 48,78 |
| 2920 | | | | 48,89 |
| 2925 | | | | 49,00 |
| 2927 | | | | 49,03 |
| 2950 | | | | 49,37 |
| 2965 | | | | 49,64 |
| 3000 | | | | 50,25 |
| 3010 | | | | 50,41 |
| 3025 | | | | 50,67 |
| 3035 | | | | 50,84 |
| 3080 | | | | 53,27 |
| 3090 | | | | 53,45 |
| 3100 | | | | 53,61 |
| 3110 | | | | 53,64 |
| 3120 | | | | 53,67 |
| 3135 | | | | 53,71 |
| 3140 | | | | 53,72 |
| 3150 | | | | 53,74 |
| 3160 | | | | 53,77 |
| 3180 | | | | 53,82 |
| 3200 | | | | 54,16 |
| 3270 | | | | 54,56 |
| 3300 | | | | 55,06 |
| 3320 | | | | 55,39 |
| 3335 | | | | 55,65 |
| 3340 | | | | 55,72 |
| 3345 | | | | 55,82 |
| 3350 | | | | 55,89 |


New!

| L mm | A mm | E mm |  | 8% Co € 1 ud. |
|---------|---------|---------|---|------------------|
| 3352 | 27 | 0,90 | 2 | 55,93 |
| 3370 | | | | 56,23 |
| 3400 | | | | 57,36 |
| 3420 | | | | 57,47 |
| 3440 | | | | 57,80 |
| 3454 | | | | 58,05 |
| 3485 | | | | 58,07 |
| 3505 | | | | 58,08 |
| 3560 | | | | 58,50 |
| 3630 | | | | 58,78 |
| 3650 | | | | 59,08 |
| 3660 | | | | 59,24 |
| 3670 | | | | 59,41 |
| 3800 | | | | 60,20 |
| 3810 | | | | 60,37 |
| 3820 | | | | 60,52 |
| 3830 | | | | 60,66 |
| 3835 | | | | 60,75 |
| 3850 | | | | 60,99 |
| 3851 | | | | 61,00 |
| 3857 | | | | 61,11 |
| 3900 | | | | 61,79 |
| 3930 | | | | 62,26 |
| 4090 | | | | 64,36 |
| 4115 | | | | 64,76 |
| 4160 | | | | 65,46 |
| 4230 | | | | 66,55 |
| 4250 | | | | 66,86 |
| 4280 | | | | 67,35 |
| 4500 | | | | 70,81 |
| 4600 | | | | 72,39 |
| 4820 | | | | 80,90 |
| 4870 | | | | 81,73 |
| 4880 | | | | 81,90 |
| 5030 | | | | 84,42 |
| 5200 | | | | 87,28 |

New!

| L mm | A mm | E mm |  | 8% Co € 1 ud. |
|---------|---------|---------|---|------------------|
| 3320 | 34 | 1,10 | 1 | 73,03 |
| 3505 | | | | 77,10 |
| 3660 | | | | 79,38 |
| 3730 | | | | 80,91 |
| 3770 | | | | 81,78 |
| 3800 | | | | 82,43 |
| 3820 | | | | 82,85 |
| 3860 | | | | 83,72 |
| 3920 | | | | 84,98 |
| 3950 | | | | 85,64 |
| 4020 | | | | 87,15 |
| 4030 | | | | 87,37 |
| 4100 | | | | 88,89 |
| 4120 | | | | 89,34 |
| 4160 | | | | 90,21 |
| 4250 | | | | 91,74 |
| 4335 | | | | 93,59 |
| 4380 | | | | 94,58 |
| 4400 | | | | 95,01 |
| 4420 | | | | 95,44 |
| 4450 | | | | 95,86 |
| 4470 | | | | 96,29 |
| 4500 | | | | 96,87 |
| 4520 | | | | 97,26 |
| 4570 | | | | 98,25 |
| 4610 | | | | 98,99 |
| 4620 | | | | 99,22 |
| 4640 | | | | 99,64 |
| 4780 | | | | 102,43 |
| 4800 | | | | 102,86 |
| 4930 | | | | 105,33 |
| 4970 | | | | 106,19 |
| 4990 | | | | 106,58 |
| 5040 | | | | 107,51 |
| 5050 | | | | 107,72 |
| 5080 | | | | 108,25 |
| 5090 | | | | 108,42 |
| 5200 | | | | 110,76 |
| 5270 | | | | 112,15 |
| 5300 | | | | 112,74 |
| 6350 | | | | 127,21 |
| 6500 | | | | 130,02 |
| 6550 | | | | 131,02 |
| 7000 | | | | 139,52 |
| 7550 | | | | 149,89 |
| 8730 | | | | 173,32 |

New!

| L mm | A mm | E mm |  | 8% Co € 1 ud. |
|---------|---------|---------|---|------------------|
| 4115 | 41 | 1,30 | 1 | 124,55 |
| 4500 | | | | 135,14 |
| 4640 | | | | 139,35 |
| 4930 | | | | 147,33 |
| 5000 | | | | 149,42 |
| 5040 | | | | 150,62 |
| 5090 | | | | 152,10 |
| 5265 | | | | 156,94 |
| 5300 | | | | 158,00 |
| 5340 | | | | 159,20 |
| 5350 | | | | 159,50 |
| 5450 | | | | 162,17 |
| 5700 | | | | 168,88 |
| 5920 | | | | 175,41 |
| 6175 | | | | 182,96 |
| 6300 | | | | 186,15 |
| 6400 | | | | 189,10 |
| 6585 | | | | 194,16 |
| 6775 | | | | 199,50 |
| 6800 | | | | 200,23 |
| 6900 | | | | 203,03 |
| 7470 | | | | 219,08 |
| 7880 | | | | 231,11 |
| 8200 | | | | 240,49 |

Tipo Dentado (TZ) / Teeth Type (TZ) / Type denture (TZ)

| A x E | TPI | | | | | |
|-----------|-----|-----|-----|------|------|-------|
| | 3-4 | 4-6 | 5-8 | 6-10 | 8-12 | 10-14 |
| 13 x 0,65 | | | | S | S | S |
| 13 x 0,90 | | | | S | S | S |
| 20 x 0,90 | | S | S | S | S | S |
| 27 x 0,90 | S | S | S | S | S | S |
| 34 x 1,10 | S | S | S | S | S | |
| 41 x 1,30 | S | S | S | S | | |

Rollos sin Soldadura / Rolls without Welding / Rouleaux non soudées

| L mm | A mm | E mm | 8% Co € | L mm | A mm | E mm | 8% Co € |
|---------|---------|---------|------------|---------|---------|---------|------------|
| 30500 | 13 | 0,65 | 413,62 | 100000 | 27 | 0,90 | 1.469,64 |
| 123000 | | | 1.666,73 | 134000 | | | 2.023,02 |
| 30500 | 13 | 0,90 | 413,62 | 100000 | 34 | 1,10 | 1.804,64 |
| 100000 | 20 | 0,90 | 1.414,06 | 75000 | 41 | 1,30 | 1.921,33 |



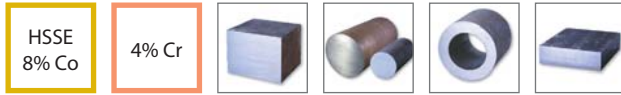
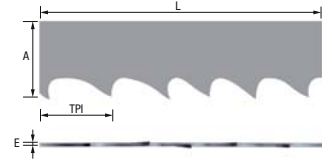
Unidades pedido mínimo
Minimum order units
Unités commande minimale

Ejemplo Pedido / Order Example / Exemple commande

Ref. 4228 + L 2080 + A 27 + E 0,90 + TPI 8-12 + TZ S

Ref. 4229

HOJA DE SIERRA DE CINTA HSSE 8% Co + 4% Cr IZARPLUS IZARPLUS HSSE 8% Co + 4% Cr Band Saw Blade Lame de scie à ruban HSSE 8% Co + 4% Cr IZARPLUS



| | | | |
|--|-------------------------------------|--|--|
| Grupo Group-Gruppe P | Subgrup. P.1 - P.2 P.5 | Grupo Group-Gruppe M | Grupo Group-Gruppe N |
|--|-------------------------------------|--|--|

Especial Macizos. Dentado variable 10°.
Mayores rendimientos de corte, ideal para el corte de piezas macizas grandes.

Special Solid Pieces. Variable tooth pitch 10°.
Higher cutting performance, suitable to cut big solid pieces.

Spécial pièces pleins. Denture variable 10°.
Rendements de coupe supérieures, convenable pour la coupe de grandes pièces pleins.

| New! | | | | | New! | | | | | New! | | | | | New! | | | | |
|------|----|------|-------|---------|------|----|------|-------|---------|------|----|------|-------|---------|------|----|------|-------|---------|
| L | A | E | 8% Co | € 1 ud. | L | A | E | 8% Co | € 1 ud. | L | A | E | 8% Co | € 1 ud. | L | A | E | 8% Co | € 1 ud. |
| mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| 2080 | 27 | 0,90 | 2 | 42,50 | 3150 | 27 | 0,90 | 2 | 53,74 | 3350 | 34 | 1,10 | 1 | 70,51 | 4115 | 41 | 1,30 | 1 | 124,55 |
| 2150 | | | | 42,61 | 3160 | | | | 53,76 | 3505 | | | | 77,10 | 4500 | | | | 135,14 |
| 2450 | | | | 43,29 | 3180 | | | | 53,82 | 3770 | | | | 81,77 | 4640 | | | | 139,35 |
| 2455 | | | | 43,31 | 3200 | | | | 54,19 | 3820 | | | | 82,85 | 4650 | | | | 139,63 |
| 2459 | | | | 43,33 | 3222 | | | | 54,54 | 3850 | | | | 83,50 | 4700 | | | | 141,14 |
| 2460 | | | | 43,34 | 3240 | | | | 54,84 | 4020 | | | | 87,19 | 4900 | | | | 146,44 |
| 2480 | | | | 44,46 | 3270 | | | | 54,95 | 4100 | | | | 88,92 | 4930 | | | | 147,33 |
| 2550 | | | | 44,72 | 3300 | | | | 55,06 | 4115 | | | | 89,22 | 5000 | | | | 149,40 |
| 2565 | | | | 44,92 | 3320 | | | | 55,39 | 4120 | | | | 89,33 | 5040 | | | | 150,60 |
| 2570 | | | | 44,99 | 3345 | | | | 55,82 | 4130 | | | | 89,55 | 5080 | | | | 151,80 |
| 2590 | | | | 45,30 | 3350 | | | | 55,89 | 4160 | | | | 90,20 | 5090 | | | | 152,10 |
| 2600 | | | | 45,47 | 3352 | | | | 55,93 | 4210 | | | | 91,28 | 5340 | | | | 159,20 |
| 2680 | | | | 46,26 | 3400 | | | | 57,12 | 4220 | | | | 91,50 | 5350 | | | | 159,50 |
| 2700 | | | | 47,00 | 3420 | | | | 57,47 | 4250 | | | | 92,14 | 5450 | | | | 162,47 |
| 2710 | | | | 47,18 | 3445 | | | | 57,89 | 4335 | | | | 93,59 | 5800 | | | | 172,03 |
| 2720 | | | | 47,23 | 3495 | | | | 58,56 | 4420 | | | | 95,10 | 5890 | | | | 174,53 |
| 2740 | | | | 47,30 | 3500 | | | | 58,64 | 4440 | | | | 95,54 | 5920 | | | | 175,41 |
| 2750 | | | | 47,32 | 3505 | | | | 58,73 | 4450 | | | | 95,75 | 6300 | | | | 185,75 |
| 2755 | | | | 47,42 | 3520 | | | | 58,78 | 4470 | | | | 96,18 | 6500 | | | | 191,65 |
| 2760 | | | | 47,48 | 3550 | | | | 58,89 | 4500 | | | | 96,83 | 6585 | | | | 194,16 |
| 2765 | | | | 47,53 | 3640 | | | | 59,18 | 4520 | | | | 97,27 | 6675 | | | | 196,81 |
| 2800 | | | | 48,01 | 3660 | | | | 59,24 | 4530 | | | | 97,47 | 6775 | | | | 199,50 |
| 2825 | | | | 48,43 | 3770 | | | | 59,74 | 4570 | | | | 98,25 | 6800 | | | | 200,23 |
| 2835 | | | | 48,48 | 3800 | | | | 60,20 | 4640 | | | | 99,77 | 6900 | | | | 203,02 |
| 2845 | | | | 48,52 | 3810 | | | | 60,36 | 4720 | | | | 101,13 | 7470 | | | | 219,08 |
| 2855 | | | | 48,69 | 3820 | | | | 60,52 | 4770 | | | | 102,19 | 8200 | | | | 228,23 |
| 2910 | | | | 48,78 | 3830 | | | | 60,67 | 4780 | | | | 102,43 | 8400 | | | | 233,70 |
| 2925 | | | | 49,00 | 3900 | | | | 61,79 | 4860 | | | | 104,15 | 5800 | 54 | 1,60 | 1 | 212,61 |
| 2950 | | | | 49,37 | 3930 | | | | 62,26 | 4865 | | | | 104,23 | 6040 | | | | 225,22 |
| 3000 | | | | 50,25 | 4090 | | | | 64,36 | 4970 | | | | 106,19 | 6096 | | | | 227,31 |
| 3010 | | | | 50,41 | 4110 | | | | 64,68 | 4990 | | | | 106,58 | 6200 | | | | 233,60 |
| 3025 | | | | 50,67 | 4115 | | | | 64,76 | 5000 | | | | 106,82 | 6270 | | | | 236,10 |
| 3035 | | | | 50,84 | 4310 | | | | 70,85 | 5090 | | | | 108,73 | 6500 | | | | 244,28 |
| 3100 | | | | 53,61 | 4500 | | | | 73,73 | 5156 | | | | 109,83 | 7140 | | | | 267,12 |
| 3105 | | | | 53,63 | 4800 | | | | 78,64 | 5200 | | | | 110,76 | 7200 | | | | 269,25 |
| 3120 | | | | 53,68 | | | | | | 5270 | | | | 112,11 | 7310 | | | | 273,36 |
| 3140 | | | | 53,73 | | | | | | 5300 | | | | 112,74 | 7450 | | | | 278,11 |
| | | | | | | | | | | | | | | | 7460 | | | | 278,48 |
| | | | | | | | | | | | | | | | 7545 | | | | 281,45 |
| | | | | | | | | | | | | | | | 7600 | | | | 283,50 |
| | | | | | | | | | | | | | | | 8900 | | | | 339,68 |
| | | | | | | | | | | | | | | | 9750 | | | | 372,12 |

Tipo Dentado (TZ) / Teeth Type (TZ) / Type denture (TZ)

| A x E | TPI | | | | |
|-----------|-------|-----|-----|-----|-----|
| | 1,4-2 | 2-3 | 3-4 | 4-6 | 5-8 |
| 27 x 0,90 | | K | K | K | K |
| 34 x 1,10 | K | K | K | K | K |
| 41 x 1,30 | K | K | K | K | K |
| 54 x 1,60 | K | K | K | K | K |



Unidades pedido mínimo
Minimum order units
Unités commande minimale

Rollos sin Soldadura - Rouleaux non soudés

| L | A | E | 8% Co |
|--------|----|------|----------|
| mm | mm | mm | € |
| 100000 | 20 | 0,90 | 1.414,06 |
| 100000 | 27 | 0,90 | 1.469,64 |
| 134000 | | | 2.023,02 |
| 100000 | 34 | 1,10 | 1.804,64 |
| 75000 | 41 | 1,30 | 1.921,41 |

Ejemplo Pedido / Order Example / Exemple commande

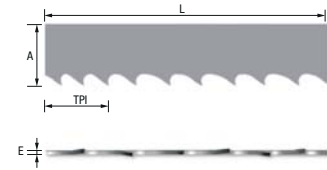
Ref. 4229 + L 2080 + A 27 + E 0,90 + TPI 5-8 + TZ K

Ref. **4231**

HOJA DE SIERRA DE CINTA ALTO RENDIMIENTO PLUS

Plus High Performance Band Saw Blade

Lame de scie à ruban haut rendement plus



| | | | | | |
|-----------------------------------|------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------|
| Grupo Group-Gruppe P | Subgrup. P.1 - P.2 P.3 | Grupo Group-Gruppe M | Grupo Group-Gruppe S | Grupo Group-Gruppe N | Subgrup. N.1 N.2 |
|-----------------------------------|------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------|

Usos universal en perfiles y macizos. Corte en capas y paquetes. Aleaciones a base de níquel, aceros dúplex, resistentes al calor, titanio y sus aleaciones, bronce al aluminio, materiales duros, aceros inoxidables austeníticos resistentes al ácido.

Universal use in profiles & solid materials. Layer and bundle cutting. Nickel-based alloys, duplex and heat-resistant steels, titanium & alloys, aluminium bronze, hard materials, acid-resistant austenitic stainless steels.

Utilisation universelle en profils et matériaux massifs. Coupes en nappe et en paquet. Alliages à base de nickel, aciers duplex et résistants à la chaleur, titane et alliages, bronze d'aluminium, matériaux durs, aciers inox austénitiques résistants aux acides.

| L mm | A mm | E mm | | 10% Co € 1 ud. | L mm | A mm | E mm | | 10% Co € 1 ud. | L mm | A mm | E mm | | 10% Co € 1 ud. | L mm | A mm | E mm | | 10% Co € 1 ud. |
|------|------|------|---|----------------|------|------|------|---|----------------|------|------|------|---|----------------|-------|------|------|---|----------------|
| 2080 | 27 | 0,90 | 2 | 42,57 | 3505 | 34 | 1,10 | 1 | 83,40 | 4115 | 41 | 1,30 | 1 | 135,22 | 5800 | 54 | 1,60 | 1 | 250,21 |
| 2150 | | | | 43,78 | 3770 | | | | 87,67 | 4570 | | | | 149,27 | 6040 | | | | 260,03 |
| 2450 | | | | 49,13 | 3851 | | | | 89,56 | 4640 | | | | 151,45 | 6200 | | | | 266,58 |
| 2480 | | | | 49,64 | 4100 | | | | 96,36 | 5040 | | | | 163,79 | 6500 | | | | 278,90 |
| 2550 | | | | 50,89 | 4160 | | | | 97,68 | 5265 | | | | 170,74 | 6800 | | | | 291,11 |
| 2600 | | | | 51,76 | 4250 | | | | 99,64 | 5450 | | | | 176,45 | 7200 | | | | 307,55 |
| 2700 | | | | 53,54 | 4335 | | | | 101,48 | 5730 | | | | 184,99 | 7600 | | | | 323,93 |
| 2750 | | | | 54,42 | 4520 | | | | 105,49 | 5800 | | | | 187,24 | 8900 | | | | 377,14 |
| 2825 | | | | 55,76 | 4600 | | | | 107,27 | 5920 | | | | 190,96 | 10000 | | | | 422,21 |
| 2845 | | | | 56,14 | 4640 | | | | 108,20 | 6000 | | | | 193,43 | | | | | |
| 2910 | | | | 57,26 | 4780 | | | | 111,16 | 6175 | | | | 198,85 | | | | | |
| 2925 | | | | 57,52 | 4800 | | | | 111,62 | 6585 | | | | 211,47 | | | | | |
| 2950 | | | | 57,96 | 4970 | | | | 115,30 | 6775 | | | | 217,36 | | | | | |
| 3010 | | | | 59,02 | 5040 | | | | 116,83 | 6900 | | | | 221,23 | | | | | |
| 3100 | | | | 60,61 | 5090 | | | | 117,99 | 6990 | | | | 223,99 | | | | | |
| 3120 | | | | 60,99 | 5200 | | | | 120,30 | 7470 | | | | 238,83 | | | | | |
| 3150 | | | | 61,58 | 5300 | | | | 122,47 | 7880 | | | | 251,46 | | | | | |
| 3200 | | | | 62,55 | 5500 | | | | 126,82 | 8200 | | | | 261,36 | | | | | |
| 3300 | | | | 64,09 | 6350 | | | | 145,33 | 9880 | | | | 314,91 | | | | | |
| 3320 | | | | 64,48 | 7000 | | | | 163,73 | | | | | | | | | | |
| 3350 | | | | 65,06 | 8730 | | | | 202,00 | | | | | | | | | | |
| 3370 | | | | 65,46 | | | | | | | | | | | | | | | |
| 3420 | | | | 66,28 | | | | | | | | | | | | | | | |
| 3505 | | | | 67,79 | | | | | | | | | | | | | | | |
| 3660 | | | | 70,55 | | | | | | | | | | | | | | | |
| 3800 | | | | 73,01 | | | | | | | | | | | | | | | |
| 3830 | | | | 73,59 | | | | | | | | | | | | | | | |
| 3900 | | | | 74,93 | | | | | | | | | | | | | | | |
| 4090 | | | | 78,18 | | | | | | | | | | | | | | | |
| 4500 | | | | 85,43 | | | | | | | | | | | | | | | |
| 4900 | | | | 92,51 | | | | | | | | | | | | | | | |
| 5090 | | | | 95,89 | | | | | | | | | | | | | | | |
| 7400 | | | | 136,80 | | | | | | | | | | | | | | | |



Tipo Dentado (TZ) / Teeth Type (TZ) / Type denture (TZ)

| A x E | TPI | | | | |
|-----------|-------|-----|-----|-----|-----|
| | 1,4-2 | 2-3 | 3-4 | 4-6 | 5-8 |
| 27 x 0,90 | | | K | K | K |
| 34 x 1,10 | | K | K | K | |
| 41 x 1,30 | | K | K | K | |
| 54 x 1,60 | K | K | K | K | |



Unidades pedido mínimo
Minimum order units
Unités commande minimale

Ejemplo Pedido / Order Example / Exemple commande

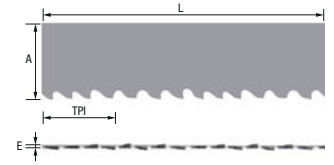
Ref. 4231 + L 2450 + A 27 + E 0,90 + TPI 5-8 + TZ K

Ref. **4232**

HOJA DE SIERRA DE CINTA METAL DURO

HM Band Saw Blade

Lame de scie à ruban carbure



Uso general en aceros y metales no ferrosos. Aluminio y otros materiales que tienden a acumularse en el filo de corte. Secciones transversales hasta 600 mm. Materiales dureza hasta 60 HRC.

General use in steel & non-ferrous metal. Aluminium and other materials with Built-Up edge risk. Cross cut up to 600 mm. Material hardness up to 60 HRC.

Pour usiner des aciers et métaux non ferreux. Aluminium et autres aciers qui s'accumulent sur les filets de coupe. Sections transversales jusqu'à 600 mm. Aciers dureté jusqu'à 60 HRC.



| L mm | A mm | E mm | | TPI 1,4-2 € 1 ud. | TPI 2-3 € 1 ud. | TPI 3-4 € 1 ud. |
|------|------|------|---|----------------------|--------------------|--------------------|
| 1140 | 13 | 0,80 | 3 | | | 113,85 |
| 1325 | | | | | | 131,27 |
| 1640 | | | | | | 160,98 |
| 1750 | | | | | | 171,34 |
| 2240 | | | | | | 219,30 |
| 2000 | 20 | 0,80 | 2 | | | 178,74 |
| 2060 | | | | | | 183,94 |
| 2110 | | | | | | 188,23 |
| 2140 | | | | | | 190,82 |
| 2265 | | | | | | 201,60 |
| 2360 | | | | | | 209,77 |
| 2370 | | | | | | 210,63 |
| 2400 | | | | | | 213,20 |
| 2465 | | | | | | 218,85 |
| 2550 | | | | | | 226,13 |
| 2080 | 27 | 0,90 | 2 | | 154,72 | 193,64 |
| 2150 | | | | | 159,73 | 199,99 |
| 2450 | | | | | 181,20 | 227,04 |
| 2550 | | | | | 188,35 | 236,07 |
| 2600 | | | | | 191,91 | 240,59 |
| 2700 | | | | | 199,09 | 249,63 |
| 2765 | | | | | 203,74 | 255,47 |
| 2845 | | | | | 209,45 | 262,69 |
| 2910 | | | | | 214,11 | 268,58 |
| 2950 | | | | | 216,96 | 272,20 |
| 3010 | | | | | 221,28 | 277,60 |

| L mm | A mm | E mm | | TPI 1,4-2 € 1 ud. | TPI 2-3 € 1 ud. | TPI 3-4 € 1 ud. |
|------|------|------|---|----------------------|--------------------|--------------------|
| 3100 | 27 | 0,90 | 2 | | 227,71 | 285,71 |
| 3160 | | | | | 231,98 | 291,09 |
| 3180 | | | | | 233,42 | 292,92 |
| 3350 | | | | | 245,59 | 308,28 |
| 3420 | | | | | 250,63 | 314,62 |
| 3505 | | | | | 256,69 | 322,27 |
| 3660 | | | | | 267,78 | 336,25 |
| 3800 | | | | | 277,79 | 348,89 |
| 4090 | | | | | 298,51 | 375,08 |
| 3505 | 34 | 1,10 | 1 | 238,61 | 276,54 | 348,81 |
| 4100 | | | | 277,89 | 322,27 | 406,82 |
| 4335 | | | | 293,41 | 340,36 | 429,72 |
| 4520 | | | | 305,62 | 354,57 | 447,75 |
| 4640 | | | | 313,54 | 363,81 | 459,43 |
| 4780 | | | | 322,79 | 374,55 | 473,09 |
| 4970 | | | | 335,34 | 389,14 | 491,62 |
| 5200 | | | | 350,52 | 406,82 | 514,05 |
| 5500 | | | | 370,32 | 429,90 | 543,28 |
| 8730 | | | | 642,09 | 745,22 | 941,76 |
| 4115 | 41 | 1,30 | 1 | 313,09 | 373,30 | 447,98 |
| 4640 | | | | 351,98 | 419,89 | 504,07 |
| 5040 | | | | 381,63 | 455,39 | 546,82 |
| 5450 | | | | 412,00 | 491,78 | 590,67 |
| 5920 | | | | 446,84 | 533,46 | 640,89 |
| 6585 | | | | 496,14 | 592,47 | 711,96 |
| 6900 | | | | 519,44 | 620,42 | 745,63 |
| 7470 | | | | 561,73 | 671,02 | 806,55 |

Tipo Dentado (TZ) / Teeth Type (TZ) / Type denture (TZ)

| A x E | TPI | | |
|---------|-------|-----|-----|
| | 1,4-2 | 2-3 | 3-4 |
| 13x0,80 | | | T |
| 20x0,80 | | | T |
| 27x0,90 | | T | T |
| 34x1,10 | T | T | T |
| 41x1,30 | T | T | T |



Unidades pedido mínimo
Minimum order units
Unités commande minimale

Ejemplo Pedido / Order Example / Exemple commande

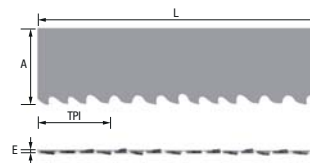
Ref. 4232 + L 2450 + A 27 + E 0,90 + TPI 3-4 + TZ T

Ref. **4235**

HOJA DE SIERRA DE CINTA METAL DURO

HM Band Saw Blade

Lame de scie à ruban carbure



| | | | | | |
|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
| Grupo Group-Groupe | Subgrup. P.1 P.2 | Grupo Group-Groupe | Grupo Group-Groupe | Grupo Group-Groupe | Subgrup. N.1 N.2 |
| P | | K | S | N | |

Suavidad extrema para una alta Vc. Apta para Zirconio, Molibdeno y aceros endurecidos hasta 62 HRC.

Extremely soft for a high Vc. Use in Zirconium, Molybdenum and hardened steels up to 62 HRC.

Polissage maximale avec une haute VC idéale pour Zirconium, Molibdène et aciers jusqu'à 62 HRC.

| L mm | A mm | E mm | | TPI 1,4-2 € 1 ud. | TPI 2-3 € 1 ud. | TPI 3-4 € 1 ud. |
|---------|---------|---------|---|----------------------|--------------------|--------------------|
| 2080 | 27 | 0,90 | 2 | | | 232,61 |
| 2150 | | | | | | 240,24 |
| 2450 | | | | | | 272,93 |
| 2460 | | | | | | 274,04 |
| 2550 | | | | | | 283,79 |
| 2590 | | | | | | 288,13 |
| 2600 | | | | | | 289,24 |
| 2700 | | | | | | 300,14 |
| 2765 | | | | | | 307,25 |
| 2845 | | | | | | 315,94 |
| 2910 | | | | | | 323,05 |
| 2950 | | | | | | 327,39 |
| 3010 | | | | | | 333,94 |
| 3100 | | | | | | 343,74 |
| 3180 | | | | | | 352,46 |
| 3200 | | | | | | 354,68 |
| 3350 | | | | | | 370,99 |
| 3420 | | | | | | 378,62 |
| 3505 | | | | | | 387,84 |
| 3660 | | | | | | 404,76 |
| 3800 | | | | | | 420,00 |
| 4090 | | | | | | 451,62 |

| L mm | A mm | E mm | | TPI 1,4-2 € 1 ud. | TPI 2-3 € 1 ud. | TPI 3-4 € 1 ud. |
|---------|---------|---------|---|----------------------|--------------------|--------------------|
| 3505 | 34 | 1,10 | 1 | | 333,84 | 428,72 |
| 4100 | | | | | 389,30 | 500,31 |
| 4335 | | | | | 411,16 | 528,55 |
| 4520 | | | | | 428,43 | 550,79 |
| 4640 | | | | | 439,59 | 565,23 |
| 4780 | | | | | 452,65 | 582,10 |
| 4970 | | | | | 470,38 | 604,93 |
| 5090 | | | | | 481,40 | |
| 5200 | | | | | 491,80 | 632,58 |
| 5500 | | | | | 519,75 | 668,66 |
| 7000 | | | | | | 867,97 |
| 4115 | 41 | 1,30 | 1 | 400,27 | 442,90 | 564,09 |
| 4640 | | | | 450,30 | 498,35 | 635,01 |
| 5040 | | | | 488,41 | 540,60 | 689,03 |
| 5450 | | | | 527,49 | 583,93 | 744,44 |
| 5920 | | | | 572,26 | 633,56 | 807,92 |
| 6585 | | | | 635,63 | 703,83 | 897,78 |
| 6900 | | | | 665,64 | 737,11 | 940,29 |
| 7470 | | | | 719,95 | 797,32 | 1.017,29 |



Tipo Dentado (TZ) / Teeth Type (TZ) / Type denture (TZ)

| A x E | TPI | | |
|---------|-------|-----|-----|
| | 1,4-2 | 2-3 | 3-4 |
| 27x0,90 | | | T |
| 34x1,10 | | T | T |
| 41x1,30 | T | T | T |



Unidades pedido mínimo
Minimum order units
Unités commande minimale

Ejemplo Pedido / Order Example / Exemple commande

Ref. 4235 + L 2450 + A 27 + E 0,90 + TPI 3-4 + TZ T

HOJAS DE SIERRA DE CINTA

Band Saw Blades

Lames de scie à ruban

IZAR CUTTING TOOLS S.A.L.
Parque Empresarial Boroa 2B2
48340 AMOREBIETA (Bizkaia) - Spain

comercial@izartool.com
Tel. 94 630 02 41
Fax 94 630 02 36

export@izartool.com
Tel. +34 94 630 02 45/46
Fax +34 94 630 02 37

izartool.com

Cliente
Customer _____
Client _____
Dirección
Address _____
Adresse _____
Contacto
Contact _____
Contact _____
E-mail
E-mail _____
E-mail _____

Fecha
Date _____
Date _____
Ciudad
Town _____
Ville _____
Teléfono
Phone _____
Téléphone _____
Fax
Fax _____
Fax _____

CONSULTA SIERRAS CINTA ESPECIALES / INQUIRY FOR SPECIAL BAND SAW BLADES / ENQUÊTE POUR LAMES DE SCIE À RUBAN SPÉCIALES

Nº / DENOMINACIÓN MATERIAL
MATERIAL Nº / DENOMINATION _____
Nº / DÉNOMINATION MATÉRIEL _____

Dureza (N/mm²)
Strength (N/mm²) _____
Dureté (N/mm²) _____

FORMA PIEZA
PIECE SHAPE _____
FORME PIÈCE _____

Redonda
Round
Rond

Cuadrada
Square
Carré

Tubo
Pipe
Tube

Perfil
Profile
Profil

Otra
Another one
Autre _____

SECCIÓN TRANSVERSAL (TUBOS)
CROSS-SECTION (PIPES)
SECTION TRANSVERSALE (TUBES)

Diámetro (mm)
Diameter (mm)
Diamètre (mm) _____

Espesor Pared (mm)
Wall Thickness (mm)
Épaisseur paroi (mm) _____

ESTADO SUPERFICIE
SURFACE CONDITIONS
CONDITIONS SURFACE

Forjado
Forged
Forgée

Laminado
Rolled
Laminée

Fundido
Cast
Fonte

Estirado
Drawn
Étirée

Otro
Another one
Autre _____

TIPO CORTE
CUTTING TYPE
TYPE COUPE

Unitario
Individual
Unitaire

Nº Capas
Nº Layers
Nº couches _____

Nº Paquetes
Nº Bundles
Nº paquets _____

SUJECCIÓN (MAT. PLANOS / CUADRADOS, PERFILES)
CLAMPING (FLAT / SQUARE MATERIALS, PROFILES)
ATTACHEMENT (MAT. PLANS / CARRÉS, PROFILS)

Firme
Flat
Plat

Solo en los Extremos
On Edge
Seulement les filets

DIMENSIONES HOJA DE SIERRA
BAND SAW BLADE DIMENSIONS
DIMENSIONS LAME DE SCIE À RUBAN

Longitud (mm)
Length (mm)
Longueur (mm) _____

Ancho (mm)
Width (mm)
Largeur (mm) _____

Espesor (mm)
Thickness (mm)
Épaisseur (mm) _____

MODELO MÁQUINA
MACHINE TYPE
MODÈLE MACHINE _____

PEDIDO SIERRAS DE CINTA STÁNDAR / STANDARD BAND SAW BLADE ORDER / COMMANDE POUR LAMES DE SCIE À RUBAN STANDARD


| Cantidad Quantity Quantité | Descripción Producto Product Description Description produite | Longitud x Ancho x Espesor (mm) Length x Width x Thickness (mm) Longueur x largeur x épaisseur (mm) | Dientes / Pulgada (TPI) Tooth Pitch (TPI) Dents / Pouce (TPI) | Forma Diente Tooth Shape Forme dent | Triscado Set Type Avoyage |
|----------------------------------|---|---|---|---|---------------------------------|
| 2 | Ref. 4223 IZARFLEX | 2450 x 27 x 0,90 | 6-10 | S | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |


EJEMPLO / Example / Exemple

SIERRAS CIRCULARES

Slitting Saws

Fraises scies

| Material | | | | Vc (m/min.) | Avance Feed Pas (fz/rev.) |
|----------|---|------------|---|----------------|---------------------------------|
| P |  | P.1 | <850 N/mm ² | 20-40 | 0,020 - 0,030 |
| | | P.2 | < 1000 N/mm ² | 10-30 | 0,015 |
| | | P.3 | 1000-1300 N/mm ² | 8-15 | 0,010 |
| | | P.5 | MARTENSÍTICO Martensitic Martensitique | 8-15 | 0,010 |
| M | INOX AUSTENÍTICO Austenitic Stainless Steel Aciers Inox austénitique | | | 8-15 | 0,010 |
| K | FUNDICIÓN Cast Iron Fonte | K.1 | < 700 N/mm ² | 30-40 | 0,030 |
| | | K.2 | 700-1000 N/mm ² | | |

| Material | | | | Vc (m/min.) | Avance Feed Pas (fz/rev.) |
|--|---|------------|---|----------------|---------------------------------|
| N | Cu - BRONCE - LATÓN Copper - Bronze - Brass Cuivre - Bronze - Laiton | N.1 | VIRUTA CORTA Short Chip Copeaux courts | 150-200 | 0,035 |
| | | N.2 | VIRUTA LARGA Long Chip Copeaux longs | | |
| | ALUMINIO - MAGNESIO Aluminium - Magnesium | N.3 | NO ALEADO Unalloyed Sans alliage | 600-750 | 0,050 |
| | | N.4 | < 10% Si | | |
| | | N.5 | > 10% Si | | |
| |  | N.6 | TERMOPLÁSTICOS Thermoplastics Thermoplastiques | 100-130 | 0,050 |
| | | N.7 | DUROPLÁSTICOS Hard Plastics Plastiques durs | | |
| Tubos Acero y Perfiles Steel Pipes & Profiles Tubes aciers et profils | | | | 50 | 0,025 |

$$r.p.m. = \frac{Vc/Cs \times 1.000}{\pi \times \phi}$$

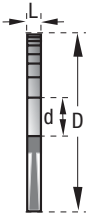
* Los valores indicados son orientativos, disminuir estos valores al aumentar la profundidad de corte.

* These figures are orientative, reduce figures as cutting depth grows.

* Les données indiquées sont une orientation, on conseille les réduire au moment d'augmenter la profondeur de coupe.

Ref. **4200**

FRESA SIERRA CIRCULAR DENTADO A
 A Small Pitch Slitting Saw
 Fraise scie denture A



Dentado A de paso pequeño, para mecanizados finos y trabajos de orfebrería.

Small pitch A toothing, mainly used for fine machining & craftsmanship in precious metals.

Denture A à pas fin, principalement utilisée pour les travaux d'usinage de précision et d'orfèvrerie.

| D mm | L mm | d mm | Z | N° Art. HSS | € |
|------|------|------|-----|-------------|--------|
| 20 | 0,20 | 5 | 80 | 64436 | 13,17 |
| | 0,25 | 5 | 64 | 64439 | 13,17 |
| | 0,30 | 5 | 64 | 64442 | 11,84 |
| | 0,40 | 5 | 64 | 64445 | 11,84 |
| | 0,50 | 5 | 48 | 64448 | 11,40 |
| | 0,60 | 5 | 48 | 64451 | 11,40 |
| | 0,80 | 5 | 48 | 64454 | 11,40 |
| | 1,00 | 5 | 40 | 64457 | 11,40 |
| | 1,20 | 5 | 40 | 64460 | 13,17 |
| | 1,60 | 5 | 40 | 64463 | 14,46 |
| 25 | 2,00 | 5 | 32 | 64466 | 15,14 |
| | 0,20 | 8 | 80 | 64484 | 13,52 |
| | 0,25 | 8 | 80 | 64487 | 13,52 |
| | 0,30 | 8 | 80 | 64490 | 12,62 |
| | 0,40 | 8 | 64 | 64493 | 12,62 |
| | 0,50 | 8 | 64 | 64496 | 12,01 |
| | 0,60 | 8 | 64 | 64499 | 12,01 |
| | 0,80 | 8 | 48 | 64502 | 12,01 |
| | 1,00 | 8 | 48 | 64505 | 12,01 |
| | 1,20 | 8 | 48 | 64508 | 13,83 |
| 32 | 1,60 | 8 | 40 | 64511 | 14,80 |
| | 2,00 | 8 | 40 | 64514 | 15,73 |
| | 2,50 | 8 | 40 | 64517 | 17,06 |
| | 0,20 | 8 | 100 | 64532 | 14,46 |
| | 0,25 | 8 | 100 | 64535 | 14,46 |
| | 0,30 | 8 | 80 | 64538 | 13,17 |
| | 0,40 | 8 | 80 | 64541 | 13,17 |
| | 0,50 | 8 | 80 | 64544 | 12,62 |
| | 0,60 | 8 | 64 | 64547 | 12,62 |
| | 0,80 | 8 | 64 | 64550 | 12,62 |
| 40 | 1,00 | 8 | 64 | 64553 | 12,62 |
| | 1,20 | 8 | 48 | 64556 | 14,80 |
| | 1,60 | 8 | 48 | 64559 | 14,80 |
| | 2,00 | 8 | 48 | 64562 | 16,72 |
| | 2,50 | 8 | 40 | 64565 | 17,99 |
| | 3,00 | 8 | 40 | 64568 | 19,30 |
| | 0,20 | 10 | 128 | 64580 | 15,73 |
| | 0,25 | 10 | 100 | 64583 | 15,73 |
| | 0,30 | 10 | 100 | 64586 | 15,14 |
| | 0,40 | 10 | 100 | 64589 | 15,14 |
| 50 | 0,50 | 10 | 80 | 64592 | 14,15 |
| | 0,60 | 10 | 80 | 64595 | 14,15 |
| | 0,80 | 10 | 80 | 64598 | 14,15 |
| | 1,00 | 10 | 64 | 64601 | 14,15 |
| | 1,20 | 10 | 64 | 64604 | 15,14 |
| | 1,60 | 10 | 64 | 64610 | 16,07 |
| | 2,00 | 10 | 64 | 64613 | 17,38 |
| | 2,50 | 10 | 48 | 64616 | 19,30 |
| | 3,00 | 10 | 48 | 64619 | 22,77 |
| | 4,00 | 10 | 40 | 64622 | 26,38 |
| 63 | 0,25 | 13 | 128 | 64634 | 18,62 |
| | 0,30 | 13 | 128 | 64637 | 17,06 |
| | 0,40 | 13 | 100 | 64640 | 17,06 |
| | 0,50 | 13 | 100 | 64643 | 16,07 |
| | 0,60 | 13 | 100 | 64646 | 16,07 |
| | 0,80 | 13 | 80 | 64649 | 16,07 |
| | 1,00 | 13 | 80 | 64652 | 16,07 |
| | 1,20 | 13 | 80 | 64655 | 17,06 |
| | 1,60 | 13 | 64 | 64661 | 18,62 |
| | 2,00 | 13 | 64 | 64664 | 19,95 |
| 80 | 2,50 | 13 | 64 | 64667 | 21,54 |
| | 3,00 | 13 | 48 | 64670 | 24,43 |
| | 4,00 | 13 | 48 | 64676 | 28,30 |
| | 5,00 | 13 | 48 | 64679 | 37,30 |
| | 0,30 | 16 | 128 | 64688 | 19,30 |
| | 0,40 | 16 | 128 | 64691 | 19,30 |
| | 0,50 | 16 | 128 | 64694 | 18,62 |
| | 0,60 | 16 | 100 | 64697 | 18,62 |
| | 0,80 | 16 | 100 | 64700 | 18,62 |
| | 1,00 | 16 | 100 | 64703 | 18,62 |
| 100 | 1,20 | 16 | 80 | 64706 | 19,30 |
| | 1,60 | 16 | 80 | 64712 | 21,54 |
| | 2,00 | 16 | 80 | 64715 | 23,15 |
| | 2,50 | 16 | 64 | 64718 | 24,43 |
| | 3,00 | 16 | 64 | 64721 | 27,04 |
| | 4,00 | 16 | 64 | 64724 | 34,09 |
| | 5,00 | 16 | 48 | 64727 | 43,10 |
| | 6,00 | 16 | 48 | 64730 | 48,22 |
| | 0,50 | 22 | 128 | 64742 | 22,18 |
| | 0,60 | 22 | 128 | 64745 | 22,18 |
| 125 | 0,80 | 22 | 128 | 64748 | 22,18 |
| | 1,00 | 22 | 100 | 64751 | 22,18 |
| | 1,20 | 22 | 100 | 64754 | 22,84 |
| | 1,60 | 22 | 100 | 64757 | 24,09 |
| | 2,00 | 22 | 80 | 64760 | 26,72 |
| | 2,50 | 22 | 80 | 64763 | 31,84 |
| | 3,00 | 22 | 80 | 64766 | 34,74 |
| | 4,00 | 22 | 64 | 64769 | 42,44 |
| | 5,00 | 22 | 64 | 64772 | 52,10 |
| | 6,00 | 22 | 64 | 64775 | 58,51 |
| 160 | 0,60 | 22 | 160 | 64784 | 25,69 |
| | 0,80 | 22 | 128 | 64787 | 25,69 |
| | 1,00 | 22 | 100 | 64790 | 26,72 |
| | 1,20 | 22 | 128 | 64793 | 26,72 |
| | 1,60 | 22 | 100 | 64796 | 32,15 |
| | 2,00 | 22 | 100 | 64799 | 32,15 |
| | 2,50 | 22 | 100 | 64802 | 35,37 |
| | 3,00 | 22 | 80 | 64805 | 39,87 |
| | 4,00 | 22 | 80 | 64808 | 43,10 |
| | 5,00 | 22 | 80 | 64811 | 58,51 |
| 200 | 6,00 | 22 | 80 | 64814 | 65,57 |
| | 8,00 | 22 | 64 | 64817 | 76,50 |
| | 1,00 | 22 | 160 | 64826 | 39,23 |
| | 1,20 | 22 | 160 | 64829 | 39,23 |
| | 1,60 | 22 | 128 | 64832 | 39,23 |
| | 1,60 | 22 | 128 | 64838 | 41,15 |
| | 2,00 | 22 | 128 | 64841 | 43,10 |
| | 2,50 | 22 | 100 | 64844 | 45,66 |
| | 3,00 | 22 | 100 | 64850 | 50,81 |
| | 4,00 | 22 | 100 | 64856 | 75,87 |
| 250 | 5,00 | 22 | 80 | 64862 | 88,65 |
| | 6,00 | 22 | 80 | 64868 | 99,03 |
| | 1,20 | 32 | 160 | 64886 | 55,29 |
| | 1,60 | 32 | 160 | 64892 | 56,60 |
| | 2,00 | 32 | 128 | 64895 | 58,51 |
| | 2,50 | 32 | 128 | 64898 | 65,57 |
| | 3,00 | 32 | 128 | 64901 | 74,61 |
| | 4,00 | 32 | 100 | 64904 | 104,82 |
| | 5,00 | 32 | 100 | 64907 | 124,13 |
| | 6,00 | 32 | 100 | 64910 | 141,47 |
| 315 | 1,60 | 32 | 160 | 64922 | 78,76 |
| | 2,00 | 32 | 160 | 64925 | 83,74 |
| | 2,50 | 32 | 160 | 64928 | 94,88 |
| | 3,00 | 32 | 128 | 64931 | 106,03 |
| | 4,00 | 32 | 128 | 64934 | 150,06 |
| | 5,00 | 32 | 128 | 64937 | 178,59 |
| | 6,00 | 32 | 100 | 64940 | 205,85 |
| | 2,00 | 32 | 200 | 64946 | 115,94 |
| | 2,50 | 32 | 160 | 64949 | 132,68 |
| | 3,00 | 32 | 160 | 64952 | 146,32 |
| 400 | 4,00 | 32 | 160 | 64955 | 212,07 |
| | 5,00 | 32 | 128 | 64958 | 251,74 |
| | 6,00 | 32 | 128 | 64964 | 296,39 |
| | 2,50 | 40 | 200 | 64970 | 207,10 |
| | 3,00 | 40 | 200 | 64973 | 233,16 |
| | 4,00 | 40 | 160 | 64976 | 300,11 |
| | 5,00 | 40 | 160 | 64979 | 365,81 |
| | 6,00 | 40 | 160 | 64982 | 434,02 |

| D mm | L mm | d mm | Z | N° Art. HSS | € |
|------|------|------|-----|-------------|--------|
| 200 | 1,00 | 22 | 128 | 64790 | 26,72 |
| | 1,20 | 22 | 128 | 64793 | 26,72 |
| | 1,60 | 22 | 100 | 64796 | 32,15 |
| | 2,00 | 22 | 100 | 64802 | 35,37 |
| | 2,50 | 22 | 100 | 64805 | 39,87 |
| | 3,00 | 22 | 80 | 64808 | 43,10 |
| | 4,00 | 22 | 80 | 64811 | 58,51 |
| | 5,00 | 22 | 80 | 64814 | 65,57 |
| | 6,00 | 22 | 64 | 64817 | 76,50 |
| | 8,00 | 22 | 64 | 64826 | 39,23 |
| 250 | 1,00 | 22 | 160 | 64829 | 39,23 |
| | 1,20 | 22 | 128 | 64832 | 39,23 |
| | 1,60 | 22 | 128 | 64838 | 41,15 |
| | 2,00 | 22 | 128 | 64841 | 43,10 |
| | 2,50 | 22 | 100 | 64844 | 45,66 |
| | 3,00 | 22 | 100 | 64850 | 50,81 |
| | 4,00 | 22 | 100 | 64856 | 75,87 |
| | 5,00 | 22 | 80 | 64862 | 88,65 |
| | 6,00 | 22 | 80 | 64868 | 99,03 |
| | 1,20 | 32 | 160 | 64886 | 55,29 |
| 315 | 1,60 | 32 | 160 | 64892 | 56,60 |
| | 2,00 | 32 | 128 | 64895 | 58,51 |
| | 2,50 | 32 | 128 | 64898 | 65,57 |
| | 3,00 | 32 | 128 | 64901 | 74,61 |
| | 4,00 | 32 | 100 | 64904 | 104,82 |
| | 5,00 | 32 | 100 | 64907 | 124,13 |
| | 6,00 | 32 | 100 | 64910 | 141,47 |
| | 1,60 | 32 | 160 | 64922 | 78,76 |
| | 2,00 | 32 | 160 | 64925 | 83,74 |
| | 2,50 | 32 | 160 | 64928 | 94,88 |
| 400 | 3,00 | 32 | 128 | 64931 | 106,03 |
| | 4,00 | 32 | 128 | 64934 | 150,06 |
| | 5,00 | 32 | 128 | 64937 | 178,59 |
| | 6,00 | 32 | 100 | 64940 | 205,85 |
| | 2,00 | 32 | 200 | 64946 | 115,94 |
| | 2,50 | 32 | 160 | 64949 | 132,68 |
| | 3,00 | 32 | 160 | 64952 | 146,32 |
| | 4,00 | 32 | 160 | 64955 | 212,07 |
| | 5,00 | 32 | 128 | 64958 | 251,74 |
| | 6,00 | 32 | 128 | 64964 | 296,39 |
| 500 | 2,50 | 40 | 200 | 64970 | 207,10 |
| | 3,00 | 40 | 200 | 64973 | 233,16 |
| | 4,00 | 40 | 160 | 64976 | 300,11 |
| | 5,00 | 40 | 160 | 64979 | 365,81 |
| | 6,00 | 40 | 160 | 64982 | 434,02 |

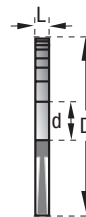
| D mm | L mm | d mm | Z | N° Art. HSS | € |
|------|------|------|-----|-------------|--------|
| 200 | 1,00 | 22 | 128 | 64790 | 26,72 |
| | 1,20 | 22 | 128 | 64793 | 26,72 |
| | 1,60 | 22 | 100 | 64796 | 32,15 |
| | 2,00 | 22 | 100 | 64802 | 35,37 |
| | 2,50 | 22 | 100 | 64805 | 39,87 |
| | 3,00 | 22 | 80 | 64808 | 43,10 |
| | 4,00 | 22 | 80 | 64811 | 58,51 |
| | 5,00 | 22 | 80 | 64814 | 65,57 |
| | 6,00 | 22 | 64 | 64817 | 76,50 |
| | 8,00 | 22 | 64 | 64826 | 39,23 |
| 250 | 1,00 | 22 | 160 | 64829 | 39,23 |
| | 1,20 | 22 | 128 | 64832 | 39,23 |
| | 1,60 | 22 | 128 | 64838 | 41,15 |
| | 2,00 | 22 | 128 | 64841 | 43,10 |
| | 2,50 | 22 | 100 | 64844 | 45,66 |
| | 3,00 | 22 | 100 | 64850 | 50,81 |
| | 4,00 | 22 | 100 | 64856 | 75,87 |
| | 5,00 | 22 | 80 | 64862 | 88,65 |
| | 6,00 | 22 | 80 | 64868 | 99,03 |
| | 1,20 | 32 | 160 | 64886 | 55,29 |
| 315 | 1,60 | 32 | 160 | 64892 | 56,60 |
| | 2,00 | 32 | 128 | 64895 | 58,51 |
| | 2,50 | 32 | 128 | 64898 | 65,57 |
| | 3,00 | 32 | 128 | 64901 | 74,61 |
| | 4,00 | 32 | 100 | 64904 | 104,82 |
| | 5,00 | 32 | 100 | 64907 | 124,13 |
| | 6,00 | 32 | 100 | 64910 | 141,47 |
| | 1,60 | 32 | 160 | 64922 | 78,76 |
| | 2,00 | 32 | 160 | 64925 | 83,74 |
| | 2,50 | 32 | 160 | 64928 | 94,88 |
| 400 | 3,00 | 32 | 128 | 64931 | 106,03 |
| | 4,00 | 32 | 128 | 64934 | 150,06 |
| | 5,00 | 32 | 128 | 64937 | 178,59 |
| | 6,00 | 32 | 100 | 64940 | 205,85 |
| | 2,00 | 32 | 200 | 64946 | 115,94 |
| | 2,50 | 32 | 160 | 64949 | 132,68 |
| | 3,00 | 32 | 160 | 64952 | 146,32 |
| | 4,00 | 32 | 160 | 64955 | 212,07 |
| | 5,00 | 32 | 128 | 64958 | 251,74 |
| | 6,00 | 32 | 128 | 64964 | 296,39 |
| 500 | 2,50 | 40 | 200 | 64970 | 207,10 |
| | 3,00 | 40 | 200 | 64973 | 233,16 |
| | 4,00 | 40 | 160 | 64976 | 300,11 |
| | 5,00 | 40 | | | |

Ref. **4210**

FRESA SIERRA CIRCULAR DENTADO B

B Small Pitch Slitting Saw

Fraise scie denture B



HSS

DIN 1838 N

ISO 2296



Tol. \varnothing (j15)
d (H7)

Tol. L (j11)



Dentado B de paso medio y grande, para mecanizados con un importante arranque de viruta.

Medium & big pitch **B** toothing, mainly used for machining operations of high chip volume.

Denture **B** à pas moyen et gros, principalement utilisée pour les travaux d'usinage impliquant un volume important de limaille.

| D mm | L mm | d mm | Z | N° Art. HSS | € |
|------|------|------|----|-------------|-------|
| 50 | 0,50 | 13 | 48 | 65066 | 16,07 |
| | 0,60 | 13 | 48 | 65069 | 16,07 |
| | 0,80 | 13 | 40 | 65072 | 16,07 |
| | 1,00 | 13 | 40 | 65075 | 16,07 |
| | 1,20 | 13 | 40 | 65078 | 17,06 |
| | 1,60 | 13 | 32 | 65084 | 18,62 |
| | 2,00 | 13 | 32 | 65087 | 19,95 |
| | 2,50 | 13 | 32 | 65090 | 21,54 |
| | 3,00 | 13 | 24 | 65093 | 24,43 |
| | 4,00 | 13 | 24 | 65096 | 28,30 |
| 63 | 0,50 | 16 | 64 | 65111 | 18,62 |
| | 0,60 | 16 | 48 | 65114 | 18,62 |
| | 0,80 | 16 | 48 | 65117 | 18,62 |
| | 1,00 | 16 | 48 | 65120 | 18,62 |
| | 1,20 | 16 | 40 | 65123 | 19,30 |
| | 1,60 | 16 | 40 | 65132 | 21,54 |
| | 2,00 | 16 | 40 | 65135 | 23,15 |
| | 2,50 | 16 | 32 | 65138 | 24,43 |
| | 3,00 | 16 | 32 | 65141 | 27,04 |
| | 4,00 | 16 | 32 | 65144 | 34,06 |
| 80 | 0,50 | 16 | 64 | 65147 | 43,10 |
| | 0,60 | 16 | 24 | 65150 | 48,22 |
| | 0,60 | 22 | 64 | 65156 | 22,18 |
| | 0,80 | 22 | 64 | 65159 | 22,18 |
| | 1,00 | 22 | 48 | 65162 | 22,18 |
| | 1,20 | 22 | 48 | 65165 | 22,84 |
| | 1,60 | 22 | 48 | 65171 | 24,09 |
| | 2,00 | 22 | 40 | 65174 | 26,72 |
| | 2,50 | 22 | 40 | 65177 | 31,84 |
| | 3,00 | 22 | 40 | 65180 | 34,74 |
| 100 | 4,00 | 22 | 32 | 65183 | 42,44 |
| | 5,00 | 22 | 32 | 65186 | 52,10 |
| | 6,00 | 22 | 32 | 65189 | 58,51 |
| | 0,80 | 22 | 64 | 65198 | 25,69 |
| | 1,00 | 22 | 64 | 65201 | 25,69 |
| | 1,20 | 22 | 64 | 65204 | 26,72 |
| | 1,60 | 22 | 48 | 65207 | 32,15 |
| | 2,00 | 22 | 48 | 65210 | 35,37 |

| D mm | L mm | d mm | Z | N° Art. HSS | € | |
|------|------|------|-----|-------------|--------|--------|
| 125 | 2,50 | 22 | 48 | 65213 | 39,87 | |
| | 3,00 | 22 | 40 | 65216 | 43,10 | |
| | 4,00 | 22 | 40 | 65222 | 58,51 | |
| | 5,00 | 22 | 40 | 65225 | 65,57 | |
| | 6,00 | 22 | 32 | 65228 | 76,50 | |
| | 0,80 | 22 | 80 | 65234 | 39,23 | |
| | 1,00 | 22 | 80 | 65237 | 39,23 | |
| | 1,20 | 22 | 64 | 65240 | 39,23 | |
| | 1,60 | 22 | 64 | 65246 | 41,15 | |
| | 2,00 | 22 | 64 | 65249 | 43,10 | |
| 160 | 2,50 | 22 | 48 | 65252 | 45,66 | |
| | 3,00 | 22 | 48 | 65255 | 50,81 | |
| | 4,00 | 22 | 48 | 65258 | 75,87 | |
| | 5,00 | 22 | 40 | 65261 | 88,75 | |
| | 6,00 | 22 | 40 | 65264 | 99,03 | |
| | 1,20 | 32 | 80 | 65270 | 55,29 | |
| | 1,60 | 32 | 80 | 65276 | 57,16 | |
| | 2,00 | 32 | 64 | 65279 | 58,51 | |
| | 2,50 | 32 | 64 | 65282 | 65,57 | |
| | 3,00 | 32 | 64 | 65285 | 74,61 | |
| 200 | 4,00 | 32 | 48 | 65288 | 104,82 | |
| | 5,00 | 32 | 48 | 65291 | 124,13 | |
| | 6,00 | 32 | 48 | 65294 | 141,47 | |
| | 1,60 | 32 | 80 | 65303 | 78,76 | |
| | 2,00 | 32 | 80 | 65306 | 83,74 | |
| | 2,50 | 32 | 80 | 65309 | 94,88 | |
| | 3,00 | 32 | 64 | 65312 | 106,03 | |
| | 4,00 | 32 | 64 | 65318 | 150,06 | |
| | 5,00 | 32 | 64 | 65321 | 178,59 | |
| | 6,00 | 32 | 48 | 65324 | 205,85 | |
| 250 | 2,00 | 32 | 100 | 65330 | 115,94 | |
| | 2,50 | 32 | 80 | 65333 | 132,68 | |
| | 3,00 | 32 | 80 | 65339 | 146,32 | |
| | 4,00 | 32 | 80 | 65342 | 215,13 | |
| | 5,00 | 32 | 64 | 65345 | 251,74 | |
| | 6,00 | 32 | 64 | 65348 | 296,39 | |
| | 315 | 2,50 | 40 | 100 | 65351 | 207,10 |
| | | 3,00 | 40 | 100 | 65354 | 233,16 |
| | | 4,00 | 40 | 80 | 65357 | 300,11 |
| | | 5,00 | 40 | 80 | 65360 | 365,81 |
| 6,00 | | 40 | 80 | 65363 | 434,02 | |



Ref. **4240**

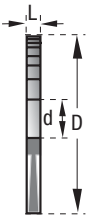
FRESA SIERRA CIRCULAR TRONZADO

Cutting Off Slitting Saw

Fraise scie Tronçonnage



Tol.
 \varnothing (j15) d (H7)
 L (j11)



Dentado Bw de paso medio, usado en trabajos de corte para secciones medianas y pequeñas. Los dientes están chaflanados alternativamente.

Medium pitch **Bw** toothing, used for cutting medium & small sections. The teeth are chamfered alternately.

Denture **Bw** à pas moyen, utilisée pour découper des sections de petite et moyenne dimensions. Les dents sont chanfreinées en alternance.



Dentado C de paso grande, con dientes alternativamente altos y bajos, usado para cortar secciones grandes. Los dientes altos tienen chaflanes rompevirutas.

Big pitch **C** toothing, with teeth alternately high & low, used for cutting big sections. The high teeth are provided with chamfers for chip breaking.

Denture **C** à pas gros, avec dents supérieures et inférieures alternées, utilisée pour découper de grandes sections. Les dents supérieures sont pourvues de chanfreins brise-copeaux.

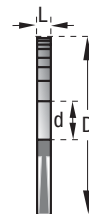
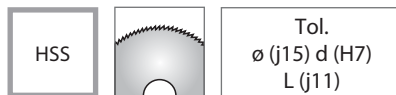
| D mm | L mm | d mm | Z | Taladros Arrastre Pinholes Trous d'épingle | Dentado Teeth Denture | N° Art. HSS | € |
|---------|---------|---------|-----|--|-----------------------------|----------------|--------|
| 200 | 2,00 | 32 | 160 | F (2/8,5/45 - 2/11/63) | Bw | 65450 | 81,20 |
| 225 | 2,00 | 32 | 180 | F (2/8,5/45 - 2/11/63) | Bw | 65456 | 91,92 |
| 250 | 2,00 | 32 | 200 | F (2/8,5/45 - 2/11/63) | Bw | 65462 | 108,31 |
| 250 | 2,50 | 32 | 160 | F (2/8,5/45 - 2/11/63) | C | 65468 | 108,31 |
| 275 | 2,00 | 32 | 180 | F (2/8,5/45 - 2/11/63) | C | 65471 | 142,25 |
| 275 | 2,50 | 32 | 180 | F (2/8,5/45 - 2/11/63) | C | 65474 | 142,25 |
| 300 | 2,00 | 32 | 190 | F (2/8,5/45 - 2/11/63) | C | 65477 | 201,40 |
| 300 | 2,50 | 40 | 190 | H (2/8,8/55 - 4/12/64) | C | 65483 | 201,40 |
| 315 | 2,50 | 40 | 200 | H (2/8,8/55 - 4/12/64) | C | 65495 | 193,37 |
| 315 | 3,00 | 40 | 200 | H (2/8,8/55 - 4/12/64) | C | 65501 | 218,21 |
| 350 | 2,50 | 40 | 220 | H (2/8,8/55 - 4/12/64) | Bw | 65504 | 232,13 |
| 350 | 3,00 | 40 | 160 | H (2/8,8/55 - 4/12/64) | C | 65507 | 232,13 |
| 370 | 3,00 | 50 | 160 | S (4/15/80 - 4/14/85) | C | 65510 | 367,64 |
| 400 | 3,00 | 50 | 200 | S (4/15/80 - 4/14/85) | C | 65513 | 408,09 |
| 400 | 3,50 | 50 | 200 | S (4/15/80 - 4/14/85) | C | 65516 | 408,09 |
| 425 | 3,50 | 50 | 180 | S (4/15/80 - 4/14/85) | C | 75571 | 493,48 |



Ref. **4250**

FRESA SIERRA CIRCULAR TRONZADO ANTIGRIP

AntiGrip Cutting Off Slitting Saw
Fraise scie Tronçonnage AntiGrip



| D mm | L mm | d mm | Z | Taladros Arrastre Pinholes Trous d'épingle | Dentado Teeth Denture | Nº Art. HSS | € |
|------|------|------|-----|--|-----------------------|-------------|--------|
| 200 | 2,00 | 32 | 160 | F (2/8,5/45 - 2/11/63) | Bw | 65588 | 88,66 |
| 225 | 2,00 | 32 | 180 | F (2/8,5/45 - 2/11/63) | Bw | 65591 | 100,63 |
| 250 | 2,00 | 32 | 200 | F (2/8,5/45 - 2/11/63) | Bw | 65597 | 117,03 |
| 250 | 2,50 | 32 | 160 | F (2/8,5/45 - 2/11/63) | C | 65603 | 131,14 |
| 275 | 2,00 | 32 | 180 | F (2/8,5/45 - 2/11/63) | C | 65606 | 153,63 |
| 275 | 2,50 | 32 | 180 | F (2/8,5/45 - 2/11/63) | C | 65609 | 159,36 |
| 300 | 2,00 | 32 | 190 | F (2/8,5/45 - 2/11/63) | C | 65612 | 215,08 |
| 300 | 2,50 | 40 | 190 | H (2/8,8/55 - 4/12/64) | C | 65618 | 215,08 |
| 315 | 2,50 | 40 | 200 | H (2/8,8/55 - 4/12/64) | C | 65627 | 208,32 |
| 315 | 3,00 | 40 | 200 | H (2/8,8/55 - 4/12/64) | C | 65630 | 233,34 |
| 350 | 2,50 | 40 | 220 | H (2/8,8/55 - 4/12/64) | Bw | 65633 | 252,99 |
| 350 | 3,00 | 40 | 160 | H (2/8,8/55 - 4/12/64) | C | 65636 | 285,35 |
| 370 | 3,00 | 50 | 160 | S (4/15/80 - 4/14/85) | C | 65639 | 392,22 |
| 400 | 3,00 | 50 | 200 | S (4/15/80 - 4/14/85) | C | 65642 | 440,72 |
| 400 | 3,50 | 50 | 200 | S (4/15/80 - 4/14/85) | C | 65645 | 480,86 |
| 425 | 3,50 | 50 | 180 | S (4/15/80 - 4/14/85) | C | 75572 | 526,93 |



Forma Bw Form

Dentado **Bw** de paso medio, usado en trabajos de corte para secciones medianas y pequeñas. Los dientes están chaflanados alternativamente.

Medium pitch **Bw** toothing, used for cutting medium & small sections. The teeth are chamfered alternately.

Denture **Bw** à pas moyen, utilisée pour découper des sections de petite et moyenne dimensions. Les dents sont chanfreinées en alternance.



Forma C Form

Dentado **C** de paso grande, con dientes alternativamente altos y bajos, usado para cortar secciones grandes. Los dientes altos tienen chaflanes rompevirutas.

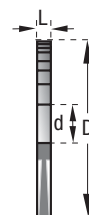
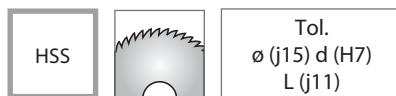
Big pitch **C** toothing, with teeth alternately high & low, used for cutting big sections. The high teeth are provided with chamfers for chip breaking.

Denture **C** à pas gros, avec dents supérieures et inférieures alternées, utilisée pour découper de grandes sections. Les dents supérieures sont pourvues de chanfreins brise-copeaux.

Ref. **4252**

FRESA SIERRA CIRCULAR TRONZADO ANTIGRIP

AntiGrip Cutting Off Slitting Saw
Fraise scie Tronçonnage AntiGrip



| D mm | L mm | d mm | Z | Taladros Arrastre Pinholes Trous d'épingle | Dentado Teeth Denture | Nº Art. HSS | € |
|------|------|------|-----|--|-----------------------|-------------|--------|
| 200 | 2,00 | 32 | 100 | F (2/8,5/45 - 2/11/63) | C | 65651 | 88,66 |
| 225 | 2,00 | 32 | 120 | F (2/8,5/45 - 2/11/63) | C | 65654 | 100,63 |
| 250 | 2,00 | 32 | 100 | F (2/8,5/45 - 2/11/63) | C | 65657 | 117,03 |
| 250 | 2,50 | 32 | 100 | F (2/8,5/45 - 2/11/63) | C | 65660 | 131,14 |
| 275 | 2,00 | 32 | 110 | F (2/8,5/45 - 2/11/63) | C | 75581 | 153,63 |
| 275 | 2,50 | 32 | 110 | F (2/8,5/45 - 2/11/63) | C | 75582 | 159,36 |
| 300 | 2,00 | 32 | 120 | F (2/8,5/45 - 2/11/63) | C | 65663 | 215,08 |
| 300 | 2,50 | 40 | 120 | H (2/8,8/55 - 4/12/64) | C | 75583 | 215,08 |
| 315 | 2,50 | 40 | 100 | H (2/8,8/55 - 4/12/64) | C | 65666 | 208,32 |
| 315 | 3,00 | 40 | 100 | H (2/8,8/55 - 4/12/64) | C | 75584 | 233,34 |
| 350 | 2,50 | 40 | 120 | H (2/8,8/55 - 4/12/64) | C | 75585 | 252,99 |
| 350 | 3,00 | 40 | 100 | H (2/8,8/55 - 4/12/64) | C | 75586 | 285,35 |
| 370 | 3,00 | 50 | 100 | S (4/15/80 - 4/14/85) | C | 75587 | 392,22 |
| 400 | 3,00 | 50 | 128 | S (4/15/80 - 4/14/85) | C | 75588 | 440,72 |
| 400 | 3,50 | 50 | 128 | S (4/15/80 - 4/14/85) | C | 65669 | 480,86 |
| 425 | 3,50 | 50 | 96 | S (4/15/80 - 4/14/85) | C | 75589 | 526,93 |



TORNEADO

Turning

Tournage

HERRAMIENTAS SOLDADAS

Brazed Turning Tools
Outils de tour plaquette soudé

439

CUCHILLAS HSSE

HSSE Turning Blades
Outils de tour HSSE

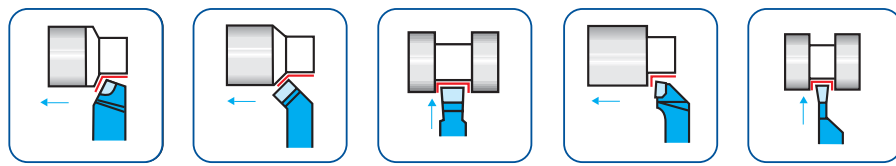
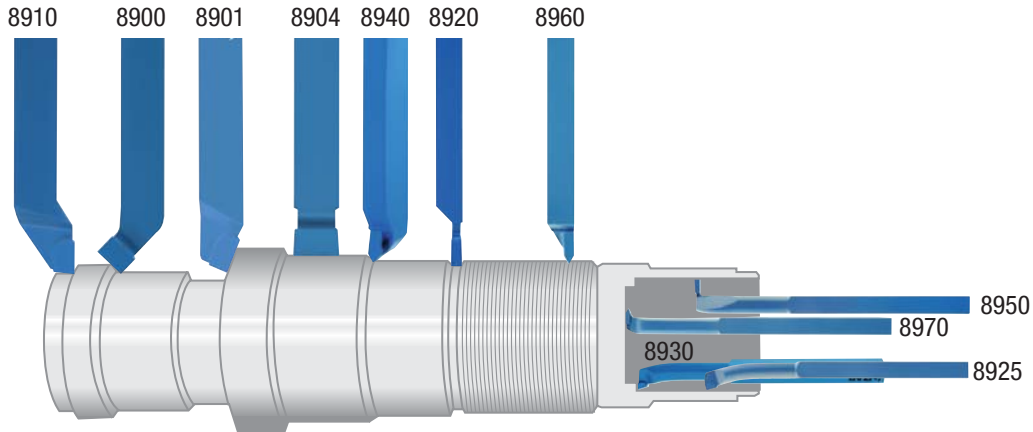
445



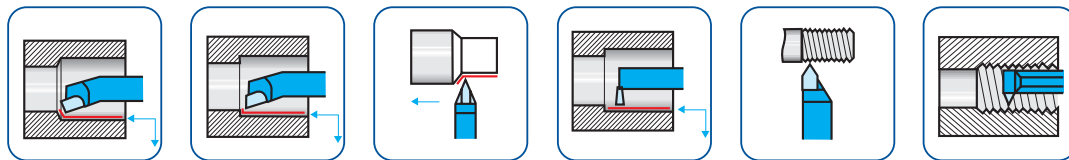
HERRAMIENTAS TORNEADO

Brazed Turning Tools

Outils de tour



ISO 1 - 8901 ISO 2 - 8900 ISO 4 - 8904 ISO 6 - 8910 ISO 7 - 8920



ISO 8 - 8925 ISO 9 - 8930 ISO 10 - 8940 ISO 11 - 8950 ISO 12 - 8960 ISO 13 - 8970

| P20 | | Avance 0,1-1,2 mm/rev. Feed Pas |
|------------|------------|--|
| Material | | Velocidad Corte Cutting Speed Vitesse de Coupe (m/min.) |
| P | P.1 | 160 - 100 - 60 |
| | P.2 | 140 - 80 - 40 |
| | P.3 | 60 - 40 - 25 |
| | P.5 | 50 - 40 - 24 |
| M | | 50 - 40 - 24 |
| K | K.1 | 90 - 70 - 45 |
| | K.2 | 70 - 50 - 30 |

Calidad P20

Especialmente destinada a mecanizados de gran precisión y semi-acabado en aceros al carbono y aleados, a grandes velocidades de corte y avances moderados.

P20 Quality

Specially destined for high precision and semi-finishing machining of carbon & alloy steels, at high cutting speeds and moderate feeds.

Qualité P20

Notamment pour usinages haute précision et semi-finition en aciers au carbone et alliés, a hautes vitesses de coupe et avances modérés.

| M20 | | Avance 0,1-1,2 mm/rev. Feed Pas |
|------------|------------|--|
| Material | | Velocidad Corte Cutting Speed Vitesse de Coupe (m/min.) |
| P | P.1 | 110 - 80 - 45 |
| P | P.5 | 40 - 30 - 20 |
| M | | 40 - 30 - 20 |
| K | K.1 | 100 - 60 - 40 |
| | K.2 | 80 - 50 - 25 |

Calidad M20

Especial para acabado y desbaste suave de aceros, aceros al manganeso, fundición y metales resistentes al calor o no ferrosos, a velocidades de corte medias o bajas.

M20 Quality

Special for finishing and soft roughing of steels, manganese-steels, cast iron and heat-resistant or non-ferrous materials, at medium or low cutting speed.

Qualité M20

Spécial finition et ébauche tendre d'aciers, aciers au manganèse, fonte et aciers résistants au chaud et non ferreux à faibles ou moyennes vitesses de coupe.

| K10 | | Avance 0,1-1,2 mm/rev. Feed Pas |
|------------|------------|--|
| Material | | Velocidad Corte Cutting Speed Vitesse de Coupe (m/min.) |
| K | K.1 | 140 - 100 - 50 |
| | K.2 | 120 - 80 - 40 |
| N | N.1 | 400-300-200 |
| | N.2 | |
| | N.3 | 400-300-200 |
| | N.4 | |
| | N.5 | |

Calidad K10

Especial para mecanizados de gran precisión y semi-acabado en fundición, aceros aleados, materiales de viruta corta y no ferrosos.

K10 Quality

Special for high precision and semi-finishing machining of cast iron, alloyed steels, short chipping and non-ferrous materials.

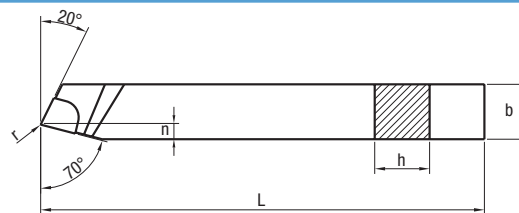
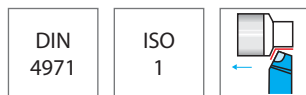
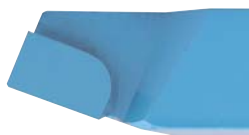
Qualité K10

Spéciale pour usinage d'haute précision et semi-finition fonte, alliages aciers, aciers copeaux courts et non ferreux.

Ref. **8901**

HERRAMIENTA TORNEADO PLACA SOLDADA CILINDRADO 70°

70° Straight Brazed Turning Tool
Outil de tour plaquette soudé cylindrage 70°



P P.1 - P.2
P.3 - P.5
Aceros
Steels
Aciers

M INOX
Stainless Steel
Acier INOX

K Fundición
Cast Iron
Fonte

K Fundición
Cast Iron
Fonte

N N.1 - N.2
N.3 - N.4
N.5
Cobre / Copper / Cuivre
Aluminio / Aluminium

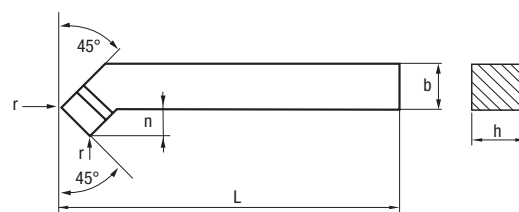
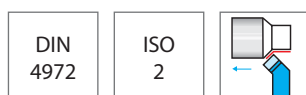
| h mm | b mm | L mm | R/L | n mm | r mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | | | | |
|---------|---------|---------|-----|---------|---------|--------------------------------------|----|--------------------------------------|-------|-------|-------|-------|
| | | | | | | N° Art. | € | N° Art. | € | | | |
| 10 | x | 10 | x | 90 | - | L | 4 | 0,2 | 55888 | 7,92 | 55889 | 7,92 |
| 10 | x | 10 | x | 90 | - | R | 4 | 0,2 | 55893 | 7,92 | 55891 | 7,92 |
| 12 | x | 12 | x | 100 | - | L | 5 | 0,4 | 55894 | 8,51 | 55897 | 8,51 |
| 12 | x | 12 | x | 100 | - | R | 5 | 0,4 | 55896 | 8,51 | 55899 | 8,51 |
| 16 | x | 16 | x | 110 | - | L | 6 | 0,4 | 55903 | 10,71 | 55905 | 10,71 |
| 16 | x | 16 | x | 110 | - | R | 6 | 0,4 | 55904 | 10,71 | 55906 | 10,71 |
| 20 | x | 20 | x | 125 | - | L | 8 | 0,8 | 55911 | 14,62 | 55913 | 14,62 |
| 20 | x | 20 | x | 125 | - | R | 8 | 0,8 | 55912 | 14,62 | 55914 | 14,62 |
| 25 | x | 25 | x | 140 | - | L | 10 | 0,8 | 55917 | 21,62 | 55919 | 21,62 |
| 25 | x | 25 | x | 140 | - | R | 10 | 0,8 | 55918 | 21,62 | 55920 | 21,62 |



Ref. **8900**

HERRAMIENTA TORNEADO PLACA SOLDADA ESCUADRADO 45°

45° Bent Brazed Turning Tool
Outil de tour plaquette soudé décolletage 45°



P P.1 - P.2
P.3 - P.5
Aceros
Steels
Aciers

M INOX
Stainless Steel
Acier INOX

K Fundición
Cast Iron
Fonte

M INOX
Stainless Steel
Acier INOX

K Fundición
Cast Iron
Fonte

N.1 - N.2
N.3 - N.4
N.5
Cobre / Copper / Cuivre
Aluminio / Aluminium

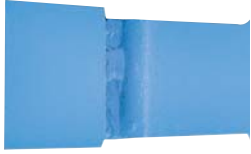
| h mm | b mm | L mm | R/L | n mm | r mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité M-20 | | Calidad Quality / Qualité K-10 | | | | |
|---------|---------|---------|-----|---------|---------|--------------------------------------|----|--------------------------------------|-------|--------------------------------------|-------|-------|-------|-------|
| | | | | | | N° Art. | € | N° Art. | € | N° Art. | € | | | |
| 12 | x | 12 | x | 100 | - | L | 7 | 0,4 | 13586 | 9,46 | 56073 | 9,46 | 29179 | 9,46 |
| 12 | x | 12 | x | 100 | - | R | 7 | 0,4 | 13585 | 9,46 | 56074 | 9,46 | 29153 | 9,46 |
| 16 | x | 16 | x | 110 | - | L | 8 | 0,4 | 13589 | 11,79 | 56076 | 11,79 | 29181 | 11,79 |
| 16 | x | 16 | x | 110 | - | R | 8 | 0,4 | 13588 | 11,79 | 56077 | 11,79 | 18258 | 11,79 |
| 20 | x | 20 | x | 125 | - | L | 10 | 0,8 | 13592 | 14,97 | 56078 | 14,97 | 13051 | 14,97 |
| 20 | x | 20 | x | 125 | - | R | 10 | 0,8 | 13591 | 14,97 | 56079 | 14,97 | 28343 | 14,97 |
| 25 | x | 25 | x | 140 | - | L | 12 | 0,8 | 13597 | 21,19 | 56080 | 21,19 | 29182 | 21,19 |
| 25 | x | 25 | x | 140 | - | R | 12 | 0,8 | 13594 | 21,19 | 56082 | 21,19 | 26003 | 21,19 |



Ref. **8904**

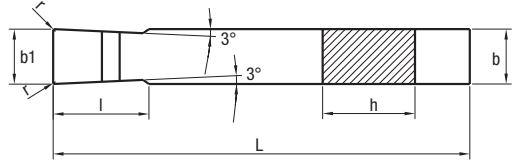
HERRAMIENTA TORNEADO PLACA SOLDADA RANURADO EXTERIOR

Wide Face Square Nose Brazed Turning Tool
Outil de tour plaquette soudé rainurage extérieur



DIN 4976

ISO 4



P P.1 - P.2 Aceros Steels
P.3 - P.5 Aciers

M INOX Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

K Fundición Cast Iron
Fonte

N N.1 - N.2 Cobre / Copper / Cuivre
N.3 - N.4 Aluminio / Aluminium
N.5

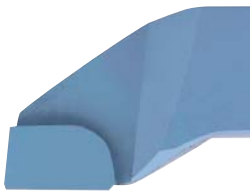
| h mm | b mm | L mm | r mm | l mm | b1 mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | |
|------|------|-------|------|------|-------|--------------------------------|-------|--------------------------------|-------|
| | | | | | | N° Art. | € | N° Art. | € |
| 20 | x 12 | x 125 | 0,4 | 20 | 12 | 55924 | 11,51 | 55926 | 11,51 |
| 25 | x 16 | x 140 | 0,4 | 25 | 16 | 55928 | 16,03 | 55932 | 16,03 |
| 32 | x 20 | x 170 | 0,4 | 32 | 20 | 55936 | 24,04 | 55938 | 24,04 |



Ref. **8910**

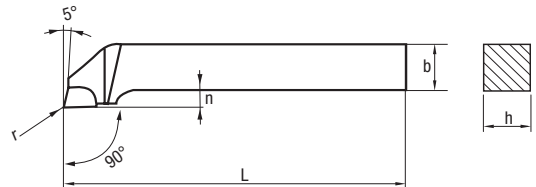
HERRAMIENTA TORNEADO PLACA SOLDADA ESCUADRADO 90°

90° Offset Side Brazed Turning Tool
Outil de tour plaquette soudé décolletage 90°



DIN 4980

ISO 6



P P.1 - P.2 Aceros Steels
P.3 - P.5 Aciers

M INOX Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

M INOX Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

N N.1 - N.2 Cobre / Copper / Cuivre
N.3 - N.4 Aluminio / Aluminium
N.5

| h mm | b mm | L mm | R/L | n mm | r mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité M-20 | | Calidad Quality / Qualité K-10 | |
|------|------|-------|-----|------|------|--------------------------------|-------|--------------------------------|-------|--------------------------------|-------|
| | | | | | | N° Art. | € | N° Art. | € | N° Art. | € |
| 10 | x 10 | x 090 | - L | 4 | 0,2 | 13601 | 8,56 | 56083 | 8,56 | 29183 | 8,56 |
| 10 | x 10 | x 090 | - R | 4 | 0,2 | 13600 | 8,56 | 56085 | 8,56 | 26488 | 8,56 |
| 12 | x 12 | x 100 | - L | 5 | 0,4 | 13604 | 9,50 | 56086 | 9,50 | 29185 | 9,50 |
| 12 | x 12 | x 100 | - R | 5 | 0,4 | 13603 | 9,50 | 56088 | 9,50 | 26707 | 9,50 |
| 16 | x 16 | x 110 | - L | 6 | 0,4 | 13607 | 11,52 | 56089 | 11,52 | 13058 | 11,52 |
| 16 | x 16 | x 110 | - R | 6 | 0,4 | 13606 | 11,52 | 56091 | 11,52 | 27460 | 11,52 |
| 20 | x 20 | x 125 | - L | 8 | 0,8 | 13612 | 15,34 | 56092 | 15,34 | 10825 | 15,34 |
| 20 | x 20 | x 125 | - R | 8 | 0,8 | 13609 | 15,34 | 56093 | 15,34 | 27461 | 15,34 |
| 25 | x 25 | x 140 | - L | 10 | 0,8 | 13616 | 22,33 | 56094 | 22,33 | 17090 | 22,33 |
| 25 | x 25 | x 140 | - R | 10 | 0,8 | 13615 | 22,33 | 56095 | 22,33 | 11181 | 22,33 |



Ref. **8920**

HERRAMIENTA TORNEADO PLACA SOLDADA TRONZADO

Parting Brazed Turning Tool
Outil de tour plaquette soudé tronçonnage



DIN 4981

ISO 7



| | | |
|----------|---------------------------------------|-------------------------|
| P | P.1 - P.2 P.3 - P.5 | Aceros Steels Aciers |
| M | INOX Stainless Steel Acier INOX | |
| K | Fundición Cast Iron Fonte | |

| | |
|----------|---------------------------------------|
| M | INOX Stainless Steel Acier INOX |
|----------|---------------------------------------|

| | | |
|----------|---------------------------------|---|
| K | Fundición Cast Iron Fonte | |
| N | N.1 - N.2 N.3 - N.4 N.5 | Cobre / Copper / Cuivre Aluminio / Aluminium |

| h mm | b mm | L mm | R/L | r mm | l mm | b1 mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité M-20 | | Calidad Quality / Qualité K-10 | |
|------|------|-------|-----|------|------|-------|--------------------------------|-------|--------------------------------|-------|--------------------------------|-------|
| | | | | | | | N° Art. | € | N° Art. | € | N° Art. | € |
| 12 | x 8 | x 100 | - L | 0,2 | 12 | 3 | 13619 | 8,88 | | | 28344 | 8,88 |
| 12 | x 8 | x 100 | - R | 0,2 | 12 | 3 | 13618 | 8,88 | 56098 | 8,88 | 27519 | 8,88 |
| 16 | x 10 | x 110 | - L | 0,2 | 14 | 4 | 13622 | 9,69 | | | 29186 | 9,69 |
| 16 | x 10 | x 110 | - R | 0,2 | 14 | 4 | 13621 | 9,69 | 56100 | 9,69 | 19523 | 9,69 |
| 20 | x 12 | x 125 | - L | 0,2 | 16 | 5 | 13625 | 11,20 | | | 29187 | 11,20 |
| 20 | x 12 | x 125 | - R | 0,2 | 16 | 5 | 13624 | 11,20 | 56102 | 11,20 | 22685 | 11,20 |
| 25 | x 16 | x 140 | - L | 0,3 | 20 | 6 | 13628 | 14,85 | | | 29189 | 14,85 |
| 25 | x 16 | x 140 | - R | 0,3 | 20 | 6 | 13627 | 14,85 | 56104 | 14,85 | 29188 | 14,85 |



Ref. **8925**

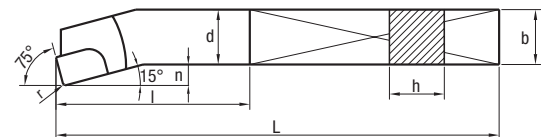
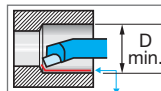
HERRAMIENTA TORNEADO PLACA SOLDADA MANDRINADO

Boring Straight Brazed Turning Tool
Outil de tour plaquette soudé alésage



DIN 4973

ISO 8



| | | |
|----------|---------------------------------------|-------------------------|
| P | P.1 - P.2 P.3 - P.5 | Aceros Steels Aciers |
| M | INOX Stainless Steel Acier INOX | |
| K | Fundición Cast Iron Fonte | |

| | | |
|----------|---------------------------------|---|
| K | Fundición Cast Iron Fonte | |
| N | N.1 - N.2 N.3 - N.4 N.5 | Cobre Coppe/ Cuivre Aluminio / Aluminium |

| h mm | b mm | L mm | n mm | r mm | D min. mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | |
|------|------|-------|------|------|-----------|--------------------------------|-------|--------------------------------|-------|
| | | | | | | N° Art. | € | N° Art. | € |
| 8 | x 8 | x 125 | 3 | 0,4 | 14 | 38218 | 11,33 | 38220 | 11,33 |
| 10 | x 10 | x 150 | 4 | 0,4 | 18 | 38222 | 11,67 | 38224 | 11,67 |
| 12 | x 12 | x 180 | 5 | 0,4 | 21 | 38227 | 12,00 | 38391 | 12,00 |
| 16 | x 16 | x 210 | 6 | 0,4 | 27 | 38393 | 13,47 | 38395 | 13,47 |
| 20 | x 20 | x 250 | 8 | 0,4 | 34 | 38397 | 17,50 | 38399 | 17,50 |
| 25 | x 25 | x 300 | 10 | 0,8 | 43 | 38401 | 27,55 | 38403 | 27,55 |



Ref. **8930**

HERRAMIENTA TORNEADO PLACA SOLDADA CILINDRADO INTERIOR

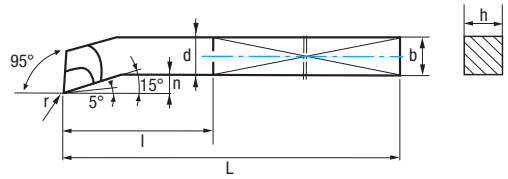
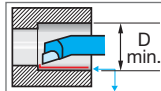
Internal Sharped Brazed Turning Tool

Outil de tour plaquette soudé cylindrage interieur



DIN 4974

ISO 9



P P.1 - P.2 Aceros Steels
P.3 - P.5 Aciers

M INOX
Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

M INOX
Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

N N.1 - N.2 Cobre / Copper / Cuivre
N.3 - N.4 Aluminio / Aluminium
N.5

| h mm | b mm | L mm | d mm | n mm | r mm | l mm | D min. mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité M-20 | | Calidad Quality / Qualité K-10 | |
|---------|---------|---------|---------|---------|---------|---------|-----------------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|-------|
| | | | | | | | | N° Art. | € | N° Art. | € | N° Art. | € |
| 8 | x 8 | x 125 | 8 | 3 | 0,2 | 40 | 14 | 13630 | 11,67 | 56114 | 11,67 | 14971 | 11,67 |
| 10 | x 10 | x 150 | 10 | 4 | 0,2 | 50 | 18 | 13631 | 11,52 | 56115 | 11,52 | 27462 | 11,52 |
| 12 | x 12 | x 180 | 12 | 5 | 0,2 | 63 | 21 | 13633 | 12,22 | 56116 | 12,22 | 27464 | 12,22 |
| 16 | x 16 | x 210 | 16 | 6 | 0,2 | 80 | 27 | 13634 | 14,56 | 56117 | 14,56 | 11152 | 14,56 |
| 20 | x 20 | x 250 | 20 | 8 | 0,4 | 100 | 34 | 13636 | 18,41 | 56118 | 18,41 | 11754 | 18,41 |
| 25 | x 25 | x 300 | 25 | 10 | 0,4 | 125 | 43 | 13639 | 27,96 | 56119 | 27,96 | 27518 | 27,96 |
| 32 | x 32 | x 355 | 32 | 12 | 0,8 | 160 | 52 | 13642 | 49,21 | 56121 | 49,21 | 13896 | 49,21 |

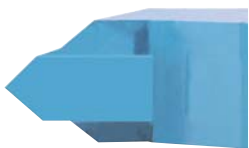


Ref. **8940**

HERRAMIENTA TORNEADO PLACA SOLDADA CILINDRADO RECTO

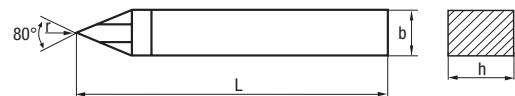
Sharped Straight Brazed Turning Tool

Outil de tour plaquette soudé cylindrage droit



DIN 4975

ISO 10



P P.1 - P.2 Aceros Steels
P.3 - P.5 Aciers

M INOX
Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

K Fundición Cast Iron
Fonte

N N.1 - N.2 Cobre / Copper / Cuivre
N.3 - N.4 Aluminio / Aluminium
N.5

| h mm | b mm | L mm | r mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | |
|---------|---------|---------|---------|--------------------------------------|-------|--------------------------------------|-------|
| | | | | N° Art. | € | N° Art. | € |
| 16 | x 10 | x 110 | 0,2 | 13645 | 8,71 | 29190 | 8,71 |
| 20 | x 12 | x 125 | 0,4 | 13646 | 10,09 | 29191 | 10,09 |
| 25 | x 16 | x 140 | 0,4 | 13648 | 12,88 | 29192 | 12,88 |



Ref. **8950**

HERRAMIENTA TORNEADO PLACA SOLDADA RANURADO INTERIOR

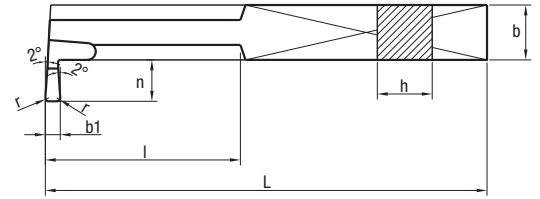
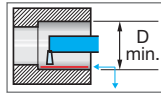
Internal Undercutting Brazed Turning Tool

Outil de tour plaquette soudé rainurado interieur



DIN
263

ISO
11



P P.1 - P.2 Aceros Steels
P.3 - P.5 Aciers

M INOX Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

K Fundición Cast Iron
Fonte

N N.1 - N.2 Cobre / Copper / Cuivre
N.3 - N.4 Aluminio / Aluminium
N.5

| h mm | b mm | L mm | n mm | r mm | b1 mm | D min. mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | |
|---------|---------|---------|---------|---------|----------|-----------------|--------------------------------------|-------|--------------------------------------|-------|
| | | | | | | | N° Art. | € | N° Art. | € |
| 12 | x 12 | x 180 | 10 | 0,2 | 4 | 32 | 38405 | 19,05 | 38407 | 19,05 |
| 16 | x 16 | x 210 | 12 | 0,2 | 5 | 40 | 38409 | 23,81 | 38411 | 23,81 |
| 20 | x 20 | x 250 | 16 | 0,4 | 6 | 50 | 38413 | 30,06 | 38415 | 30,06 |
| 25 | x 25 | x 300 | 20 | 0,4 | 8 | 63 | 38417 | 37,78 | 38419 | 37,78 |



Ref. **8960**

HERRAMIENTA TORNEADO PLACA SOLDADA ROSCADO EXTERIOR

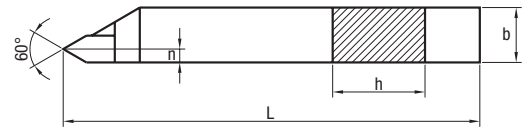
External Threading Brazed Turning Tool

Outil de tour plaquette soudé taraudage exterior



DIN
282

ISO
12



P P.1 - P.2 Aceros Steels
P.3 - P.5 Aciers

M INOX Stainless Steel
Acier INOX

K Fundición Cast Iron
Fonte

K Fundición Cast Iron
Fonte

N N.1 - N.2 Cobre / Copper / Cuivre
N.3 - N.4 Aluminio / Aluminium
N.5

| h mm | b mm | L mm | R/L | n mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | |
|---------|---------|---------|-----|---------|--------------------------------------|-------|--------------------------------------|-------|
| | | | | | N° Art. | € | N° Art. | € |
| 16 | x 10 | x 110 | - L | 2,0 | 38422 | 10,58 | 38424 | 10,58 |
| 16 | x 10 | x 110 | - R | 2,0 | 38421 | 10,58 | 38423 | 10,58 |
| 20 | x 12 | x 125 | - L | 2,5 | 38426 | 12,40 | 38428 | 12,40 |
| 20 | x 12 | x 125 | - R | 2,5 | 38425 | 12,40 | 38427 | 12,40 |
| 25 | x 16 | x 140 | - L | 3,0 | 38430 | 16,14 | 38432 | 16,14 |
| 25 | x 16 | x 140 | - R | 3,0 | 38429 | 16,14 | 38431 | 16,14 |



Ref. **8970**

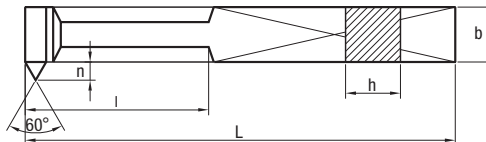
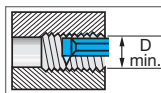
HERRAMIENTA TORNEADO PLACA SOLDADA ROSCADO INTERIOR

Internal Threading Brazed Turning Tool
Outil de tour plaquette soudé taraudage interieur



DIN
283

ISO
13



P P.1 - P.2 Aceros
P.3 - P.5 Steels
Aciers

M INOX
Stainless Steel
Acier INOX

K Fundición
Cast Iron
Fonte

K Fundición
Cast Iron
Fonte

N N.1 - N.2
N.3 - N.4
N.5 Cobre / Copper / Cuivre
Aluminio / Aluminium

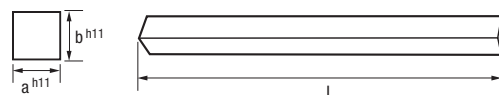
| h mm | x | b mm | x | L mm | - | R/L | n mm | D min. mm | Calidad Quality / Qualité P-20 | | Calidad Quality / Qualité K-10 | |
|---------|---|---------|---|---------|---|-----|---------|-----------------|--------------------------------------|-------|--------------------------------------|-------|
| | | | | | | | | | N° Art. | € | N° Art. | € |
| 10 | x | 10 | x | 150 | - | L | 5 | 22 | 38434 | 18,16 | 38436 | 18,16 |
| 10 | x | 10 | x | 150 | - | R | 5 | 22 | 38433 | 18,16 | 38435 | 18,16 |
| 12 | x | 12 | x | 180 | - | L | 6 | 24 | 38438 | 18,49 | 38440 | 18,49 |
| 12 | x | 12 | x | 180 | - | R | 6 | 24 | 38437 | 18,49 | 38439 | 18,49 |
| 16 | x | 16 | x | 210 | - | L | 8 | 32 | 38442 | 24,30 | 38444 | 24,30 |
| 16 | x | 16 | x | 210 | - | R | 8 | 32 | 38441 | 24,30 | 38443 | 24,30 |
| 20 | x | 20 | x | 250 | - | L | 10 | 40 | 38446 | 28,84 | 38448 | 28,84 |
| 20 | x | 20 | x | 250 | - | R | 10 | 40 | 38445 | 28,84 | 38447 | 28,84 |
| 25 | x | 25 | x | 300 | - | L | 12 | 49 | 38450 | 40,91 | 38452 | 40,91 |
| 25 | x | 25 | x | 300 | - | R | 12 | 49 | 38449 | 40,91 | 38451 | 40,91 |



Ref. **8990**

CUCHILLA CUADRADA TORNEADO

Square Turning Blade
Outil de tour carré



HSSE
10%Co

DIN
4964B

Cuchillas Torno
Turning Tools
Outils de tour

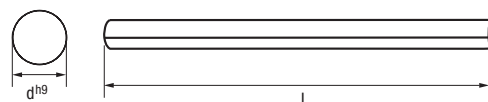
| a mm | b mm | L mm | N° Art. 10% Co | € |
|---------|---------|---------|-------------------|--------|
| 6 | x 6 | x 100 | 35462 | 11,31 |
| 6 | x 6 | x 160 | 35463 | 16,88 |
| 6 | x 6 | x 200 | 35464 | 20,97 |
| 8 | x 8 | x 100 | 35465 | 19,01 |
| 8 | x 8 | x 160 | 35466 | 26,19 |
| 8 | x 8 | x 200 | 35467 | 31,25 |
| 10 | x 10 | x 100 | 35468 | 27,15 |
| 10 | x 10 | x 160 | 35469 | 40,35 |
| 10 | x 10 | x 200 | 35470 | 51,75 |
| 12 | x 12 | x 100 | 35471 | 33,15 |
| 12 | x 12 | x 160 | 35472 | 46,41 |
| 12 | x 12 | x 200 | 35473 | 60,32 |
| 14 | x 14 | x 200 | 35474 | 71,60 |
| 16 | x 16 | x 200 | 35475 | 89,15 |
| 18 | x 18 | x 200 | 35476 | 129,51 |
| 20 | x 20 | x 200 | 35477 | 166,94 |
| 25 | x 25 | x 200 | 35478 | 261,56 |



Ref. **8991**

CUCHILLA REDONDA TORNEADO

Round Turning Blade
Outil de tour rond



HSSE
10%Co

DIN
4964A

Cuchillas Torno
Turning Tools
Outils de tour

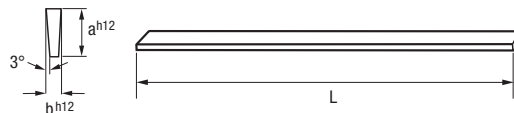
| d mm | L mm | N° Art. 10% Co | € |
|---------|---------|-------------------|--------|
| 4 | x 100 | 35479 | 9,62 |
| 5 | x 100 | 35480 | 11,04 |
| 5 | x 200 | 35481 | 22,14 |
| 6 | x 100 | 35482 | 12,48 |
| 6 | x 160 | 35484 | 18,75 |
| 6 | x 200 | 35483 | 22,80 |
| 8 | x 100 | 35485 | 16,32 |
| 8 | x 160 | 35486 | 25,70 |
| 8 | x 200 | 35487 | 30,54 |
| 10 | x 100 | 35488 | 24,17 |
| 10 | x 160 | 35489 | 42,90 |
| 10 | x 200 | 35490 | 53,04 |
| 12 | x 100 | 35491 | 26,43 |
| 12 | x 200 | 35492 | 68,60 |
| 14 | x 200 | 35493 | 95,64 |
| 16 | x 200 | 35494 | 100,68 |
| 18 | x 200 | 35495 | 174,75 |
| 20 | x 200 | 35497 | 176,03 |



Ref. **8992**

CUCHILLA TRAPEZOIDAL TORNEADO

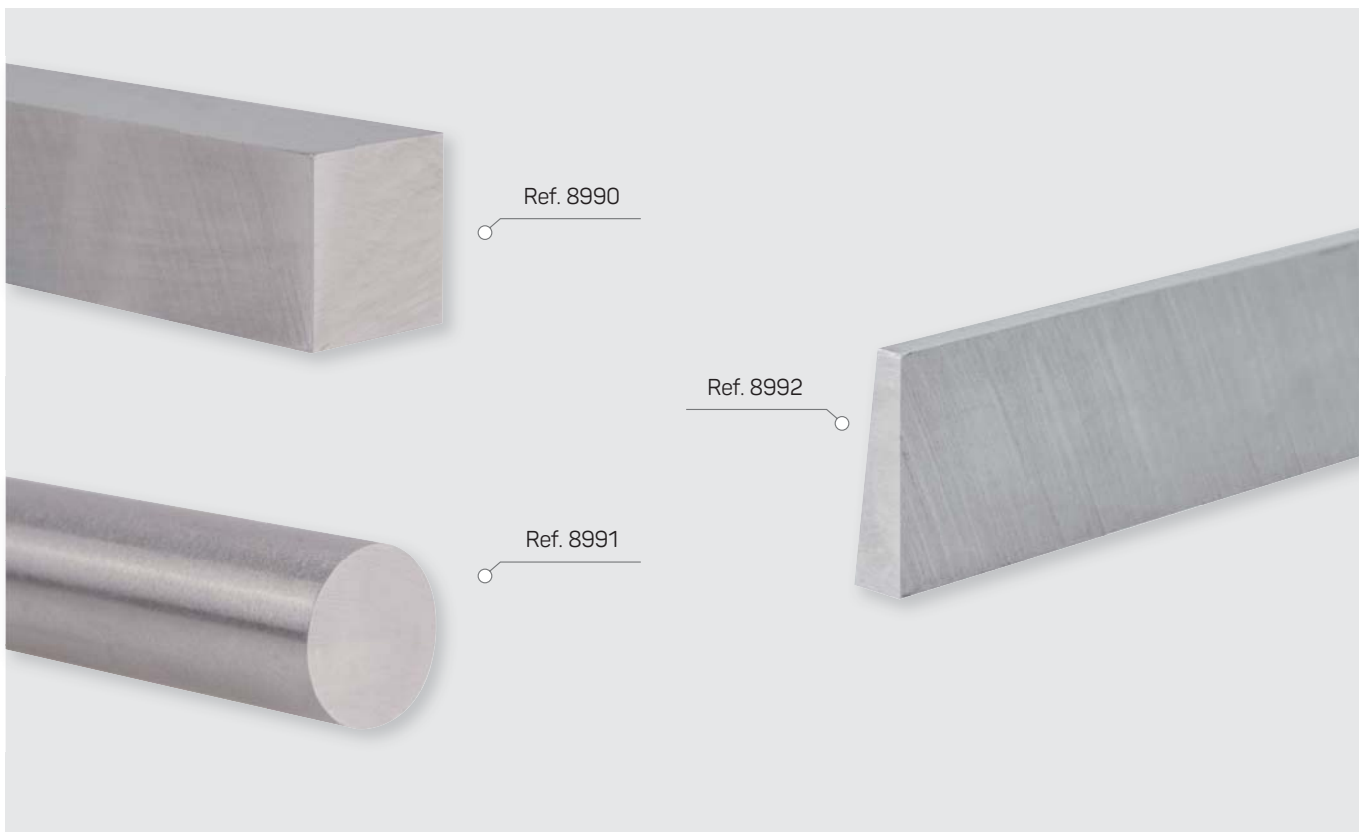
Trapezoidal Turning Blade
Outil de tour trapézoidal



HSSE
10%Co

DIN
4964E

| a mm | b mm | L mm | N° Art. 10% Co | € |
|---------|---------|---------|-------------------|--------|
| 10 | x 2,50 | x 100 | 13690 | 18,90 |
| 12 | x 3,00 | x 100 | 13691 | 20,90 |
| 12 | x 3,00 | x 160 | 13693 | 29,90 |
| 16 | x 4,00 | x 100 | 13782 | 30,32 |
| 16 | x 4,00 | x 160 | 13786 | 61,55 |
| 20 | x 5,00 | x 160 | 13787 | 76,01 |
| 20 | x 5,00 | x 200 | 14213 | 104,99 |
| 25 | x 6,00 | x 160 | 14225 | 102,44 |



Ref. 8990

Ref. 8992

Ref. 8991



PROGRAMA PLAQUITAS INTERCAMBIABLES

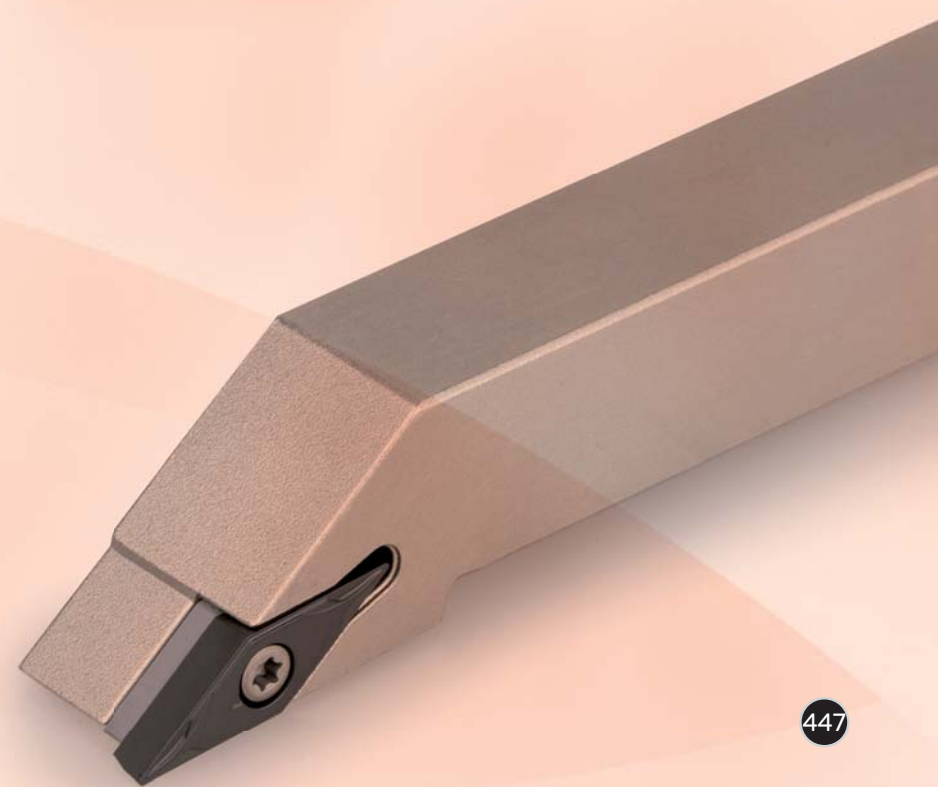
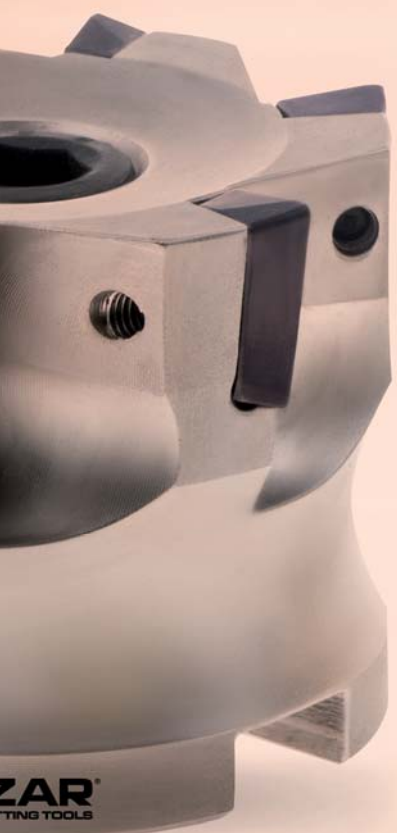
| | Pag. |
|---------------------|------|
| - INFO TÉCNICA | 448 |
| - TALADRADO | 453 |
| - TORNEADO | 468 |
| - TRONZADO-RANURADO | 500 |
| - ROSCADO | 511 |
| - FRESADO | 523 |

INDEXABLE INSERTS

| | Pag. |
|----------------------|------|
| - TECHNICAL INFO | 448 |
| - DRILLING | 453 |
| - TURNING | 468 |
| - PARTING & GROOVING | 500 |
| - THREADING | 511 |
| - MILLING | 523 |

PROGRAMME DE PLAQUETTES

| | Pag. |
|---------------------------|------|
| - INFO TECHNIQUE | 448 |
| - PERÇAGE | 453 |
| - TOURNAGE | 468 |
| - TONÇONNAGE ET RAINURAGE | 500 |
| - TARAUDAGE | 511 |
| - FRAISAGE | 523 |



TALADRADO Drilling - Perçage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|-----------------|------------------------------------|-------------------|
| 8450 |  | 453 | | WCMX |
| 8425 |  | 453 | | ISO 9766 (3XD) |
| 8465 |  | New! 455 | | SOGX |
| 8470 |  | New! 455 | | SOMX |
| 8475 |  | New! 456 | | TOMX |
| 8460 |  | New! 456 | | DOEX |
| 8431 |  | New! 457 | | SPS.. 90° |
| 8432 |  | New! 457 | | SPS.. 90° |
| 8430 |  | New! 458 | | SPS.. 60° |

Set 8431

SET PORTA-PLAQUITAS PUNTEADO SPS.. 90°
SPS.. 90° Spotting Tool-Holder Set
Jeu de porte-plaquettes de repérage SPS.. 90°



457

Set 8432




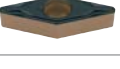




SET PORTA-PLAQUITAS PUNTEADO SPS.. 90°
SPS.. 90° Spotting Tool-Holder Set
Jeu de porte-plaquettes de repérage SPS.. 90°



457

TORNEADO Turning - Tournage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|--------------|
| 8500 |  | 468 | + | CCMT |
| 8501 |  | 469 | + | CCGT |
| 8510 |  | 470 | - | CNMG |
| 8512 |  | 471 | - | CNMM |
| 8515 |  | 471 | + | DCGT |
| 8520 |  | 472 | + | DCMT |
| 8530 |  | 473 | - | DNMG |
| 8535 |  | 474 | - | KNUX |
| 8540 |  | 474 | + | SCMT |
| 8550 |  | 475 | - | SNMG |
| 8554 |  | 475 | + | SPUN |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|--------------|
| 8558 |  | 476 | + | TCGT |
| 8560 |  | 476 | + | TCMT |
| 8570 |  | 477 | - | TNMG |
| 8571 |  | 478 | + | TPMR |
| 8572 |  | 478 | + | TPUN |
| 8575 |  | 479 | + | VBMT |
| 8576 |  | 479 | + | VCGT |
| 8577 |  | 480 | + | VCMT |
| 8578 |  | 480 | - | VNMG |
| 8580 |  | 481 | - | WNMG |

TORNEADO Turning - Tournage

Exterior - External - Extérieur

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|---------------|
| 8726 | | 485 | — | CKJN -93° |
| 8706 | | 485 | + | CSBP. -75° |
| 8707 | | 486 | + | CTGP. -90° |
| 8790 | | 486 | — | DWLN. -95° |
| 8710 | | 487 | — | MCLN. -95° |
| 8700 | | 487 | — | MTJN. -93° |
| 8724 | | 488 | — | MVJN. -93° |
| 8770 | | 488 | — | MWLN. -95° |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|---------------|
| 8709 | | 489 | — | PCLN. -95° |
| 8725 | | 489 | — | PDJN. -93° |
| 8791 | | 490 | — | PSSN -45° |
| 8704 | | 490 | + | SCLC. -95° |
| 8729 | | 491 | + | SDJC. -93° |
| 8703 | | 491 | + | STJC. -93° |
| 8727 | | 492 | + | SVJB -93° |
| 8728 | | 492 | + | SVJC -93° |

Interior - Internal - Intérieur

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|-----------------|
| 8715 | | 493 | + | S-CTFP. -90° |
| 8731 | | 493 | — | S-MCLN. -95° |
| 8732 | | 494 | — | S-MTUN. -93° |
| 8769 | | 494 | — | S-MVUN -93° |
| 8780 | | 495 | — | S-MWLN. -95° |
| 8800 | | 495 | — | S-MWLN. -95° |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|-----------------|
| 8733 | | 496 | — | S-PCLN. -95° |
| 8765 | | 496 | — | S-PDUN. -93° |
| 8751 | | 497 | + | S-SCLC. -95° |
| 8761 | | 497 | + | S-SDUC. -93° |
| 8718 | | 498 | + | S-STFC. -90° |
| 8768 | | 498 | + | S-SVUC. -93° |





| | | | | |
|---|--|--|--|--|
| Set 8799 | 516 | SET DE TORNEADO - Turning Inserts Set - Jeu de tournage | | |
| <div style="background-color: #f96; padding: 5px; display: inline-block;">Set 1</div> | <div style="background-color: #f96; padding: 5px; display: inline-block;">New!</div> <div style="background-color: #f96; padding: 5px; display: inline-block;">Set 2</div> | <div style="background-color: #f96; padding: 5px; display: inline-block;">New!</div> <div style="background-color: #f96; padding: 5px; display: inline-block;">Set 3</div> | | |

TABLA USO PLAQUITAS MD




HM Inserts Use Table - Tableau usage Plaquettes carbure

TRONZADO Y RANURADO

Parting & Grooving - Tonçonnage et rainurage







| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|--------------|
| 8600 |  | 500 | | LFMX |
| 8601 |  New! | 501 | | MGMN |
| 8603 |  | 502 | EXT. | TN..ER.A |
| 8606 |  | 503 | INT. | TN..IR.A |



| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|--------------|
| 8850 |  | 504 | | XLCF |
| 8860 |  | 504 | | MS-EN |
| 8870 |  | 505 | | XLCFN |
| 8875 |  | 505 | | XLCFN |
| 8865 |  New! | 506 | | XMCG |
| 8866 |  New! | 506 | | S-GMGG |

| | | | | |
|-------------|--|---|---|-----|
| Set 8605 | SET RANURADO SEEGER® Grooving Set Seeger® Jeu rainurage Seeger® | | | 503 |
| |  |  Ref. 8603 EXT. |  Ref. 8606 INT. | |

ROSCADO

Threading - Taraudage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|------------------|
| 8610 |  | 511 | EXT. PERFIL TOTAL | MÉTRICA 60° |
| 8615 |  | 511 | EXT. PERFIL PARCIAL | TN..ER.M 60° |
| 8620 |  | 512 | INT. PERFIL TOTAL | MÉTRICA 60° |
| 8625 |  | 512 | INT. PERFIL PARCIAL | TN..IR.M 60° |
| 8612 |  | 513 | EXT. PERFIL TOTAL | WHITWORTH 55° |
| 8622 |  | 513 | INT. PERFIL TOTAL | WHITWORTH 55° |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|---|------|------------------------------------|--------------|
| 8820 |  | 515 | EXT. | SER |
| 8830 |  | 515 | INT. | SIR |

| | | | | |
|-------------|--|---|---|-----|
| Set 8610 | SET ROSCADO EXTERIOR ROSCA MÉTRICA ISO ISO Metric External Threading Set Jeu taraudage extérieur filetage métrique ISO | | | 511 |
| |  |  |  | |

TABLA USO PLAQUITAS MD

HM Inserts Use Table - Tableau usage Plaquettes carbure

FRESADO Milling - Fraisage

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|-------------------|------|------------------------------------|---------------------|
| 8232 | | 523 | | A50060 |
| 8230 | | 524 | | S45SE12F -45° |
| 8235 | | 525 | | W45SE123F -45° |
| 8240 | | 526 | | S45OD06 -45° |
| 8241 | New! | 527 | | S90XN08 |
| 8245 | New! | 528 | | S90AP10D -90° |
| 8247 | | 529 | | S90AP10D-RF -90° |
| 8250 | | 530 | | S90AP16D -90° |
| 8255 | | 531 | | W90TP16D -90° |
| 8260 | | 532 | | W90TP22D -90° |
| 8264 | | 533 | | SAP-06 |
| 8265 | | 534 | | SAP-10D |
| 8270 | | 535 | | SAP-16D |
| 8275 | | 536 | | S90SN12 |
| 8280 | | 537 | | SCMORD |
| 8285 | | 538 | | SRD |
| 8290 | | 539 | | SRC |
| 8295 | | 540 | | SLC |
| 8633 | | 543 | + | APHT-16-FA |
| 8636 | | 543 | + | APET-10-FA |
| 8639 | | 543 | + | APKT-10-M |

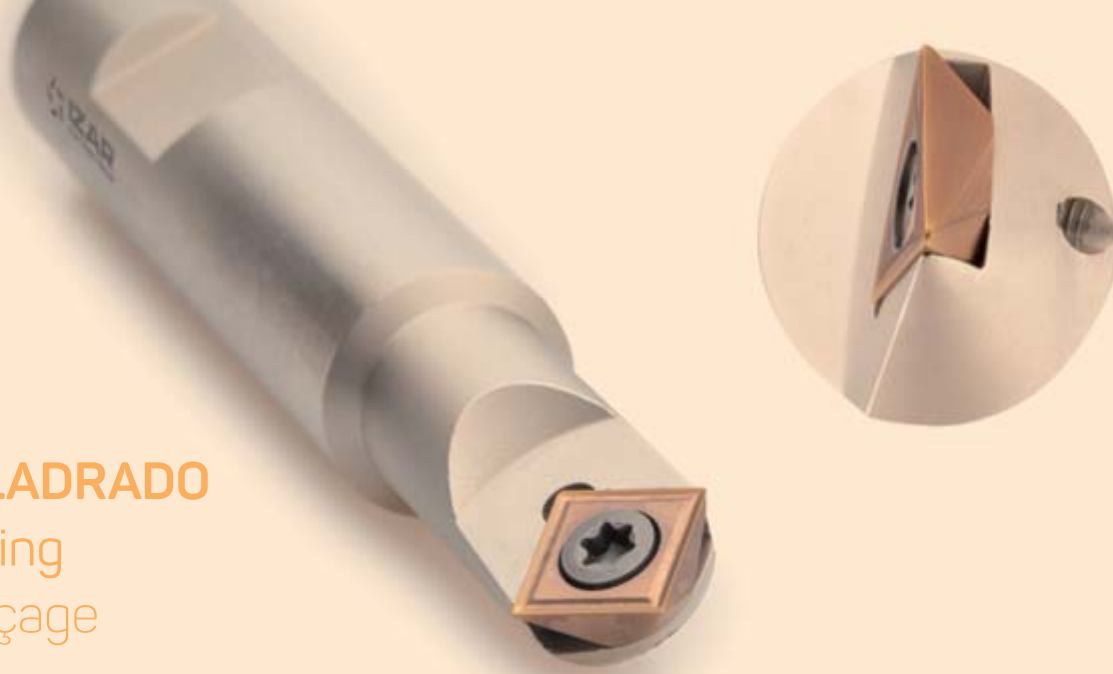
| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|-------------------|------|------------------------------------|--------------|
| 8642 | | 544 | + | APKT-16 |
| 8645 | | 544 | + | LC |
| 8648 | | 544 | + | ODMT |
| 8651 | | 545 | + | RC |
| 8654 | | 545 | + | RDHT |
| 8657 | | 545 | + | RDHW |
| 8660 | | 546 | + | SEKN-12 |
| 8663 | | 546 | + | SEKR-12 |
| 8666 | | 546 | + | SEHT-12 |
| 8667 | | 547 | + | SEET-12 |
| 8669 | | 547 | + | SEHT-12 |
| 8672 | | 547 | + | SNHQ |
| 8675 | | 548 | + | TPKN |
| 8678 | | 548 | + | TPKR |
| 8679 | New! | 548 | - | XNMX |
| 8680 | | 549 | + | XOET |
| 8690 | | 549 | + | WNMW |

| Ref. | | Pag. | Geometría Geometry Géométrie | Tipo Type |
|------|--|------|------------------------------------|----------------|
| 8200 | | 554 | | DIN 69871-A-AD |
| 8201 | | 554 | | JIS B 6339-BT |

TALADRADO

Drilling

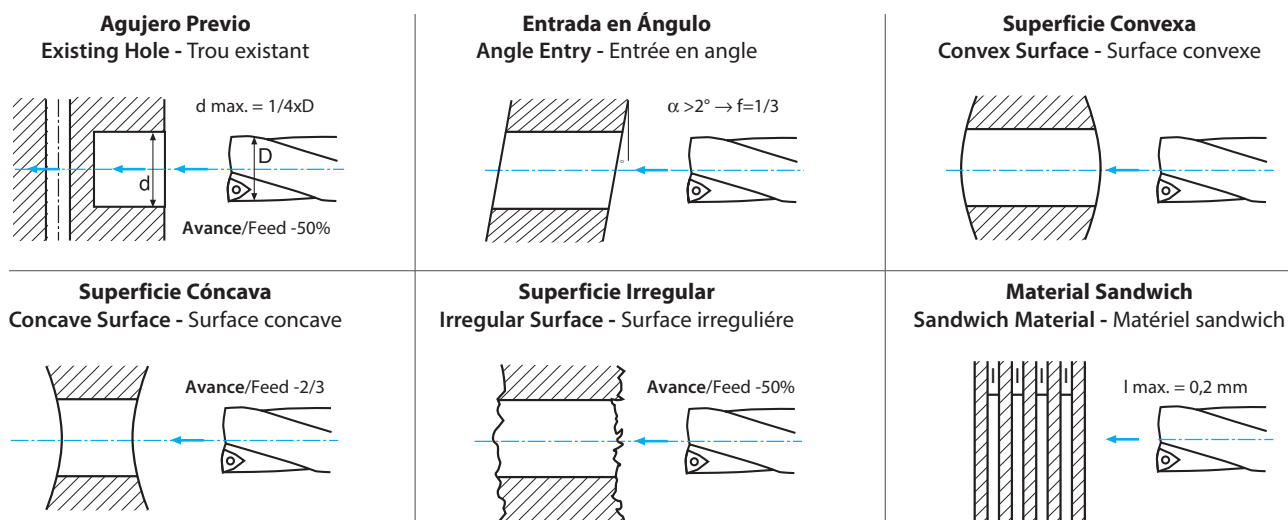
Perçage



RECOMENDACIONES PLAQUITAS TALADRADO

Drilling Insert Recommendations

Suggestions plaquettes perçage



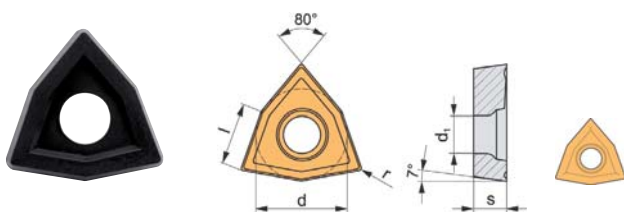
Avances Plaquetas MD Ref. 8450 HM Insert Feed Avance plaquettes carbure (f=mm/rev.)

| Material | Vc (m/min.) | Ø | Ø | Ø | Ø | Ø | Ø | |
|----------|---|---------|-------|-------|-------|-------|-------|-------------|
| | MD HM/Carbure | 17-20 | 21-25 | 26-30 | 31-40 | 41-50 | 51-55 | |
| P | <450 N/mm ² | 180-260 | 0,050 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100-0,120 |
| | 400-700 N/mm ² | 150-240 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,180-0,200 |
| | 500-900 N/mm ² | 120-240 | 0,110 | 0,150 | 0,180 | 0,200 | 0,220 | 0,220-0,250 |
| | 900-1200 N/mm ² | 130-220 | 0,100 | 0,150 | 0,180 | 0,200 | 0,220 | 0,220-0,250 |
| M | AUSTENÍTICO Austenitic Austénitique | 150-220 | 0,070 | 0,090 | 0,110 | 0,120 | 0,130 | 0,100-0,180 |
| K | | 120-200 | 0,150 | 0,160 | 0,180 | 0,200 | 0,230 | 0,150-0,220 |
| S | | 40-80 | 0,070 | 0,090 | 0,100 | 0,110 | 0,120 | 0,090-0,120 |
| N | | 300-380 | 0,060 | 0,070 | 0,080 | 0,120 | 0,160 | 0,100-0,140 |
| H | HRC 45-60 | | | | | | | |

Ref. 8450

PLAQUITA INTERCAMBIABLE TALADRADO WCMX

WCMX Drilling Indexable Insert
Plaquette perçage WCMX

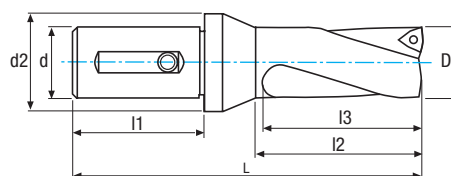


| ISO | l mm | d mm | s mm | r mm | d ₁ mm | | N° Art. P-620 | € |
|-------------|---------|---------|---------|---------|----------------------|----|------------------|-------------|
| WCMX-030208 | 3,46 | 5,56 | 2,38 | 0,80 | 2,60 | 10 | 17667 | 9,18 |
| WCMX-040208 | 3,99 | 6,35 | 2,38 | 0,80 | 2,90 | 10 | 17680 | 9,18 |
| WCMX-050308 | 5,07 | 7,94 | 3,18 | 0,80 | 3,50 | 10 | 17681 | 9,18 |
| WCMX-06T308 | 6,14 | 9,52 | 3,97 | 0,80 | 3,90 | 10 | 17706 | 9,18 |
| WCMX-080412 | 8,14 | 12,70 | 4,76 | 1,20 | 4,50 | 10 | 17708 | 9,18 |

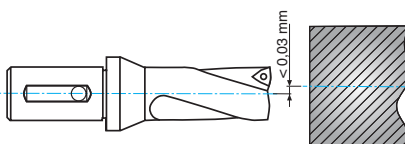
Ref. 8425

PORTA-PLAQUITAS TALADRADO ISO 9766 (3XD)

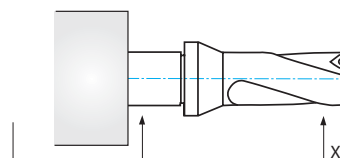
(3XD) ISO 9766 Drilling Tool-Holder
Porte-Plaquettes perçage ISO 9766 (3XD)



Ejemplo Ajuste Radial
Radial Adjustment Example
Exemple fixation rayon



Refrigerante
Coolant
Reffroidissant



| D mm | L mm | l ₁ mm | l ₂ mm | l ₃ mm | d mm | d ₂ mm | Ajuste radial Radial Fit Réglage Rayon D max | N° Art. | € | Plaquita Insert Plaquette | Ref. 8805 | Ref. 8801 |
|---------|---------|----------------------|----------------------|----------------------|---------|----------------------|---|------------|---------------|------------------------------|--|--|
| 17,50 | 122 | 50 | 56 | 53 | 25 | 40 | +1,00 → 19,5 | 17385 | 371,06 | | | |
| 18,00 | 123 | 50 | 57 | 54 | 25 | 40 | +0,90 → 19,8 | 17386 | 371,06 | WCMX 030208 | T-03 Ref. 8805 Art. 19572 5,43 € | ZT-07 Ref. 8801 Art. 19569 10,74 € |
| 18,50 | 125 | 50 | 59 | 56 | 25 | 40 | +0,85 → 20,2 | 17407 | 371,06 | | | |
| 19,00 | 126 | 50 | 60 | 57 | 25 | 40 | +0,80 → 20,6 | 17444 | 371,06 | | | |
| 20,00 | 131 | 50 | 64 | 60 | 25 | 40 | +0,75 → 21,5 | 17448 | 371,06 | | | |
| 22,00 | 142 | 55 | 69 | 66 | 25 | 40 | +1,25 → 24,5 | 17452 | 371,06 | | | |
| 24,00 | 150 | 55 | 76 | 72 | 25 | 40 | +0,75 → 25,5 | 17453 | 371,06 | WCMX 040208 | T-04 Ref. 8805 Art. 19573 3,59 € | ZT-08 Ref. 8801 Art. 10506 10,74 € |
| 25,00 | 154 | 55 | 79 | 75 | 25 | 40 | +0,50 → 26,0 | 17454 | 371,06 | WCMX 050308 | ZM-4 Ref. 8816 Art. 10544 1,79 € | ZT-09 Ref. 8801 Art. 13707 10,74 € |
| 26,00 | 157 | 55 | 81 | 78 | 32 | 50 | +2,50 → 31,0 | 17467 | 443,85 | | | |
| 27,00 | 160 | 55 | 84 | 81 | 32 | 50 | +2,20 → 31,4 | 17476 | 443,85 | | | |
| 28,00 | 164 | 55 | 87 | 84 | 32 | 50 | +2,10 → 32,2 | 17479 | 443,85 | | | |
| 29,00 | 167 | 55 | 90 | 87 | 32 | 50 | +1,80 → 32,6 | 17494 | 443,85 | | | |
| 30,00 | 172 | 55 | 94 | 90 | 32 | 50 | +1,80 → 33,0 | 17587 | 443,85 | WCMX 06T308 | T-06 Ref. 8805 Art. 19576 3,59 € | ZT-10 Ref. 8801 Art. 19570 10,74 € |
| 31,00 | 181 | 60 | 97 | 93 | 40 | 60 | +3,50 → 38,0 | 17592 | 494,78 | | | |
| 32,00 | 184 | 60 | 100 | 96 | 40 | 60 | +3,20 → 38,4 | 17595 | 494,78 | | | |
| 34,00 | 191 | 60 | 106 | 102 | 40 | 60 | +2,80 → 39,6 | 17596 | 494,78 | | | |
| 35,00 | 195 | 60 | 109 | 105 | 40 | 60 | +2,50 → 40,0 | 17610 | 494,78 | | | |
| 38,00 | 206 | 60 | 118 | 114 | 40 | 60 | +1,80 → 41,0 | 17614 | 560,73 | WCMX 080412 | T-08 Ref. 8805 Art. 19579 3,59 € | ZT-15 Ref. 8801 Art. 10512 10,74 € |
| 39,00 | 209 | 60 | 121 | 117 | 40 | 60 | +1,50 → 41,6 | 17625 | 560,73 | | | |
| 40,00 | 213 | 60 | 124 | 120 | 40 | 60 | +1,20 → 42,0 | 17631 | 560,73 | | | |
| 42,00 | 225 | 65 | 130 | 126 | 40 | 60 | +4,20 → 51,0 | 17634 | 570,35 | | | |
| 43,00 | 229 | 65 | 133 | 129 | 40 | 60 | +4,00 → 51,4 | 17643 | 570,35 | | | |
| 45,00 | 237 | 65 | 140 | 135 | 40 | 60 | +3,60 → 52,2 | 17650 | 570,35 | | | |
| 48,00 | 248 | 65 | 149 | 144 | 40 | 60 | +2,70 → 53,4 | 17652 | 570,35 | | | |
| 49,00 | 251 | 65 | 152 | 147 | 40 | 60 | +2,50 → 54,0 | 17655 | 631,52 | | | |
| 50,00 | 255 | 65 | 155 | 150 | 40 | 60 | +2,20 → 54,4 | 17658 | 631,52 | | | |
| 52,00 | 262 | 65 | 161 | 156 | 40 | 60 | +1,80 → 55,6 | 17660 | 631,52 | | | |
| 54,00 | 269 | 65 | 167 | 162 | 40 | 60 | +1,20 → 56,4 | 17661 | 631,52 | | | |
| 55,00 | 274 | 65 | 171 | 165 | 40 | 60 | +0,80 → 56,6 | 17664 | 631,52 | | | |

AVANCES PLAQUITAS MD TALADRADO

Drilling HM Inserts Feed

Avance plaquettes carbure perçage

Refs. 8465-8470-8475-8460-8431

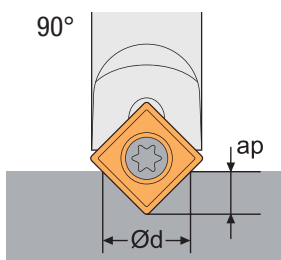
| Punteado - Spotting - Pointillage | | | | | |
|-----------------------------------|-----|-------------|---------|-------------|-----------|
| | | 90° | | | |
| Material | | Vc (m/min.) | | f (mm/rev.) | |
| | | Ø2 - Ø4,9 | Ø >4,9 | Ø2 - Ø4,9 | Ø >4,9 |
| P | P.1 | 80-120 | 90-220 | 0,04-0,08 | 0,06-0,1 |
| | P.2 | 70-100 | 80-180 | 0,04-0,08 | 0,06-0,1 |
| | P.3 | 60-90 | 70-150 | 0,03-0,06 | 0,05-0,08 |
| | P.5 | 50-70 | 70-130 | 0,03-0,06 | 0,05-0,08 |
| M | | 30-60 | 50-120 | 0,02-0,04 | 0,04-0,06 |
| K | | 80-110 | 100-150 | 0,04-0,06 | 0,06-0,01 |
| N | | | | | |
| H | | 20-40 | 30-60 | 0,02-0,04 | 0,04-0,08 |

| Achaflanado/Avellanado - Chamfering/Countersinking - Chanfreins longitudinaux/ Chanfreinage | | | | | |
|---|--------|-------------|-------------|-------------|-------------|
| | | 90° | | 60° | |
| Material | | Vc (m/min.) | f (mm/rev.) | Vc (m/min.) | f (mm/rev.) |
| | | P | P.1 | 80-270 | 0,15-0,24 |
| P.2 | 70-220 | | 0,15-0,24 | 12-180 | 0,05-0,15 |
| P.3 | 60-160 | | 0,12-0,2 | 12-180 | 0,03-0,12 |
| P.5 | 50-140 | | 0,12-0,2 | 12-180 | 0,05-0,15 |
| M | | 40-120 | 0,1-0,2 | 12-180 | 0,05-0,15 |
| K | | 80-220 | 0,15-0,25 | 12-180 | 0,05-0,15 |
| N | | | | 12-180 | 0,1-0,2 |
| H | | 20-60 | 0,03-0,08 | 12-180 | 0,03-0,1 |

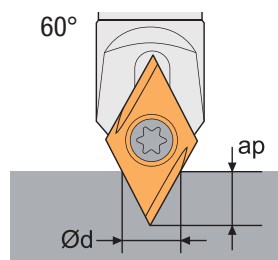
| Ranurado - Grooving - Rainurage | | | | | |
|---------------------------------|--------|-------------|-------------|-------------|-------------|
| | | 90° | | 60° | |
| Material | | Vc (m/min.) | f (mm/rev.) | Vc (m/min.) | f (mm/rev.) |
| | | P | P.1 | 60-140 | 0,12-0,18 |
| P.2 | 70-100 | | 0,04-0,08 | 10-170 | 0,005-0,05 |
| P.3 | 60-90 | | 0,03-0,06 | 10-170 | 0,005-0,03 |
| P.5 | 50-70 | | 0,03-0,06 | 10-170 | 0,005-0,03 |
| M | | 30-60 | 0,02-0,04 | 10-170 | 0,005-0,05 |
| K | | 80-110 | 0,04-0,06 | 10-170 | 0,005-0,03 |
| N | | | | 10-170 | 0,005-0,08 |
| H | | 20-40 | 0,02-0,04 | 10-170 | 0,005-0,02 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$



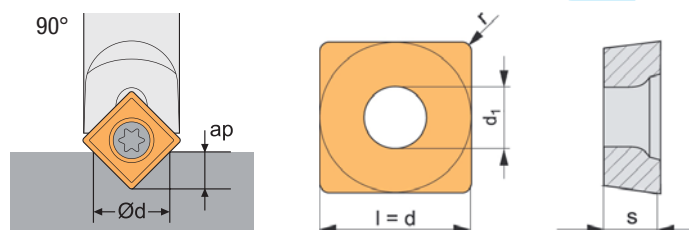
$$\phi d = (ap + 0.3) \times 2$$



$$\phi d = [(0,577 \times ap) + (0,5 \times r)] \times 2$$

Ref. **8465**
PLAQUITA INTERCAMBIABLE PUNTEADO SOGX
 SOGX Spotting Indexable Insert
 Plaquette de repérage SOGX

New!

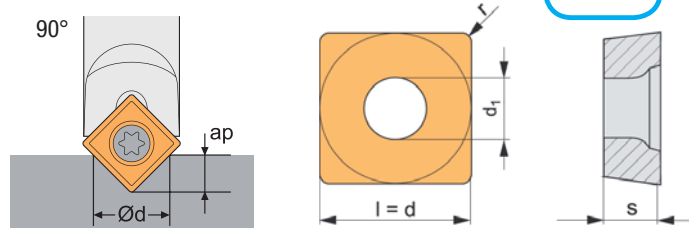


| ISO | Dimensiones Dimensions | | | | Ød | | Punteado Spotting Pointillage | Grabado Engraving Gravure | N° Art. P-010 | € |
|---|------------------------|------|------|------|------|---------|-------------------------------|---------------------------|---------------|---|
| | l mm | d mm | s mm | r mm | | | | | | |
| Aluminio / Aluminium / Aluminium | | | | | | | | | | |
| SOGX-09T304-ZAL | 9,52 | 9,52 | 3,97 | 0,40 | 2-11 | 0,8-2,5 | 10 | 82213 | 24,30 | |


 Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8465 SOGX-09T304-ZAL P-010

 Porta Plaquetas / Tool Holder / Porte-Plaquettes:
 Pag. 457
Ref. **8470**
PLAQUITA INTERCAMBIABLE PUNTEADO SOMX
 SOMX Spotting Indexable Insert
 Plaquette de repérage SOMX

New!



| ISO | Dimensiones Dimensions | | | | Ød | | Punteado Spotting Pointillage | Grabado Engraving Gravure | N° Art. P-730 | € |
|---------------------------------------|------------------------|------|------|------|------|---------|-------------------------------|---------------------------|---------------|---|
| | l mm | d mm | s mm | r mm | | | | | | |
| INOX / Stainless / INOX | | | | | | | | | | |
| SOMX-09T304-ZMS | 9,52 | 9,52 | 3,97 | 0,40 | 2-11 | 0,8-2,5 | 10 | 82214 | 20,25 | |
| Acabado / Finishing / Finition | | | | | | | | | | |
| SOMX-09T304-ZMF | 9,52 | 9,52 | 3,97 | 0,40 | 2-11 | 0,8-2,5 | 10 | 82215 | 20,25 | |


 Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8470 SOMX-09T304-ZMS P-730

 Porta Plaquetas / Tool Holder / Porte-Plaquettes:
 Pag. 457

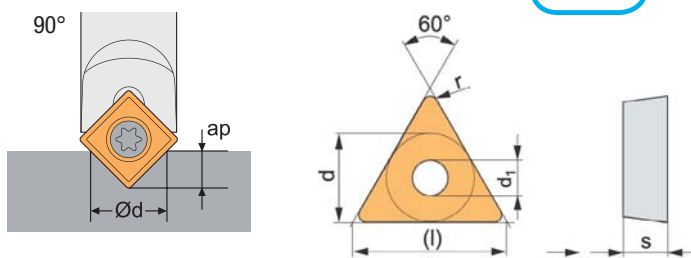
Ref. 8475

PLAQUITA INTERCAMBIABLE PUNTEADO TOMX

TOMX Spotting Indexable Insert

Plaquette de repérage TOMX

New!



| ISO | Dimensiones Dimensions | | | | Ød | | N° Art. P-730 | € | |
|---|------------------------|------|------|------|-------------------------------|---------------------------|---------------|-------|--------------|
| | l mm | d mm | s mm | r mm | Punteado Spotting Pointillage | Grabado Engraving Gravure | | | |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | |
| TOMX-16T308-ZM | 16,5 | 9,52 | 3,97 | 0,8 | 3-20 | 1,5-4 | 10 | 82216 | 20,25 |



Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8475 TOMX-16T308-ZM P-730

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 457

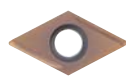
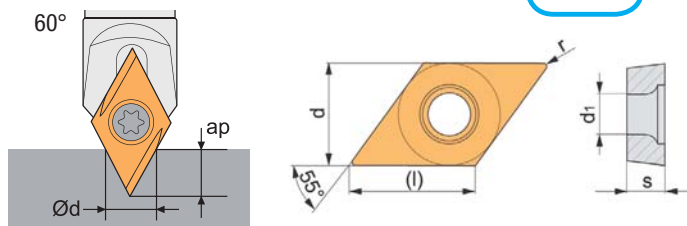
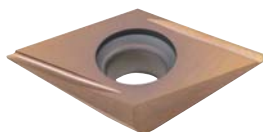
Ref. 8460

PLAQUITA INTERCAMBIABLE PUNTEADO DOEX

DOEX Spotting Indexable Insert

Plaquette de repérage DOEX

New!



| ISO | Dimensiones Dimensions | | | | Ød | | N° Art. P-730 | € | |
|---------------------------------------|------------------------|------|------|------|-------------------------------|---------------------------|---------------|-------|--------------|
| | l mm | d mm | s mm | r mm | Punteado Spotting Pointillage | Grabado Engraving Gravure | | | |
| Acabado / Finishing / Finition | | | | | | | | | |
| DOEX-11T301-ER-ZSX | 11,6 | 9,52 | 3,97 | 0,1 | 0,2-6,8 | 0,2-1 | 10 | 82208 | 44,53 |
| DOEX-11T302-ER-ZSX | 11,6 | 9,52 | 3,97 | 0,2 | 0,4-6,8 | 0,4-2 | 10 | 82209 | 31,83 |
| DOEX-11T304-ER-ZSX | 11,6 | 9,52 | 3,97 | 0,4 | 0,8-6,8 | 0,8-3 | 10 | 82210 | 31,83 |
| Desbaste / Roughing / Ébauche | | | | | | | | | |
| DOEX-11T304-ER-ZR | 11,6 | 9,52 | 3,97 | 0,4 | 0,8-6,8 | 0,8-3 | 10 | 82211 | 31,83 |
| DOEX-11T308-ER-ZR | 11,6 | 9,52 | 3,97 | 0,8 | 0,8-6,8 | 0,8-3 | 10 | 82212 | 31,83 |



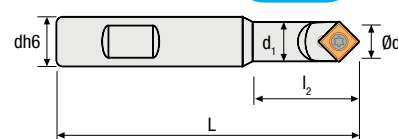
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8460 DOEX-11T301-ER-ZSX P-730

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 458

Ref. 8431

PORTA-PLAQUITAS PUNTEADO SPS.. 90°
 SPS.. 90° Spotting Tool-Holder
 Porte-plaquettes de repérage SPS.. 90°

New!



| ISO | | dh6 mm | d1 mm | L mm | l2 mm | N° Art. | € | | | |
|-------------------|-----------------|--------|-------|------|-------|---------|--------|---|---|--|
| SPS10H-N09-90 | SOGX09 / SOMX09 | 10 | 12,2 | 100 | 29 | 82219 | 95,39 | Ref. 8816 T-15-M3,5-7x 3,5xØ5,5 Art. 83387 3,32 € | Ref. 8801 ZT-15 Art. 10512 10,74 € | Tornillo Screw Vis Destornillador Screwdriver Tournevis |
| SPS12H-N09-90 | | 12 | 12,2 | 100 | 29 | 82220 | 95,39 | | | |
| SPS16H-N09-90 | | 16 | 12,2 | 100 | 29 | 82221 | 101,36 | | | |
| SPS16L 130-N09-90 | | 16 | 12,2 | 130 | 29 | 82222 | 105,40 | | | |

Plaquita / Insert / Plaqueette: Pag. 455

Set 3 Pcs



| | Cont. | | | N° Art. | € |
|---|--|--|--|---------|--------|
| 1 | Ref. 8431 - Art. 82220 - SPS12H-N09-90 (1pc) + Ref. 8470 - Art. 82215 - SOMX-09T304-ZMF (4pcs) + Destornillador-Screwdriver-Tournevis - T-15 (1pc) | | | 82224 | 167,54 |

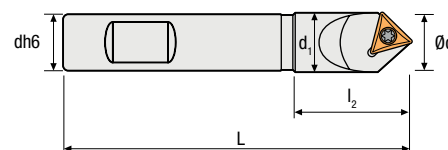
Set 3 Pcs

| | Cont. | | | N° Art. | € |
|---|--|--|--|---------|--------|
| 2 | Ref. 8431 - Art. 82221 - SPS16H-N09-90 (1pc) + Ref. 8470 - Art. 82215 - SOMX-09T304-ZMF (4pcs) + Destornillador-Screwdriver-Tournevis - T-15 (1pc) | | | 82225 | 173,21 |

Ref. 8432

PORTA-PLAQUITAS PUNTEADO SPS.. 90°
 SPS.. 90° Spotting Tool-Holder
 Porte-plaquettes de repérage SPS.. 90°

New!



| ISO | | dh6 mm | d1 mm | L mm | l2 mm | N° Art. | € | | | |
|-------------------|----------|--------|-------|------|-------|---------|--------|---|---|--|
| SPS20L 120-N09-90 | TOMX16.. | 20 | 21,2 | 120 | 42 | 82223 | 172,59 | Ref. 8816 T-15-M3,5-8x 5xØ5,3 Art. 83388 3,32 € | Ref. 8801 ZT-15 Art. 10512 10,74 € | Tornillo Screw Vis Destornillador Screwdriver Tournevis |
| | | | | | | | | | | |

Plaquita / Insert / Plaqueette: Pag. 456

Set 3 Pcs



| | Cont. | | | N° Art. | € |
|--|---|--|--|---------|--------|
| | Ref. 8432 - Art. 82223 - SPS20L 120-N09-90 (1pc) + Ref. 8475 - Art. 82216 - TOMX-16T308-ZM (4pcs) + Destornillador-Screwdriver-Tournevis - T-15 (1pc) | | | 82207 | 240,89 |

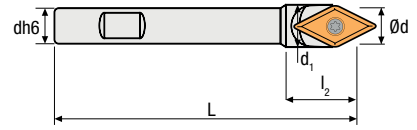
Ref. 8430

PORTA-PLAQUITAS PUNTEADO SPS.. 60°

SPS.. 60° Spotting Tool-Holder

Porte-plaquettes de repérage SPS.. 60°

New!



| ISO | | dh6 mm | d ₁ mm | L mm | I ₂ mm | N° Art. | € | | |
|---------------|-----------|-----------|----------------------|---------|----------------------|------------|-------|---|--|
| SPS10D-N11-60 | DOEX-11.. | 10 | 12 | 60 | 30 | 82217 | 91,41 | Ref. 8816 T-15-M3,5-7x 5xØ5,5 Art. 83387 3,32 € | Ref. 8801 ZT-15 Art. 10512 10,74 € |
| SPS12H-N11-60 | | 12 | 12 | 100 | - | 82218 | 95,39 | | Tornillo Screw Vis |
| | | | | | | | | | Destornillador Screwdriver Tournevis |

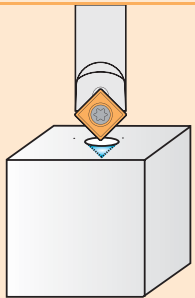
Plaquita / Insert / Plaque: Pag. 456

APLICACIONES REFS. 8430 - 8431 - 8432

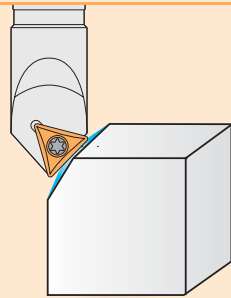
Applications refs. 8430 - 8431 - 8432

Applications refs. 8430 - 8431 - 8432

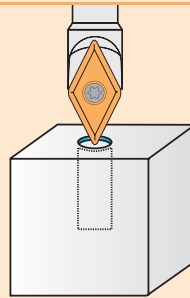
Punteado
Spotting
Pointillage



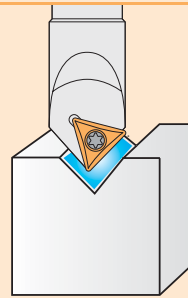
Achaflanado
Chamfering
Chanfreins longitudinaux



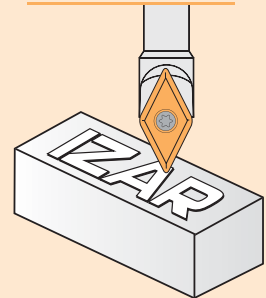
Avellanado
Countersinking
Chanfreinage



Ranurado
Grooving
Rainurage



Grabado
Engraving
Gravure





Ancho: 1050 mm. **Fondo:** 970 mm. **Alto:** 1825 mm.

- 7 bandejas hasta 10 carriles/bandeja
- Regulables en ancho y alto
- Hasta 27 unidades de fondo
- **Más armarios y sistemas de dispensación disponibles**

PROBLEMAS A LOS QUE HACE FRENTE



- Abuso en el consumo de productos.
- Conciencia del gasto por los empleados.
- Con elevador, evita las roturas de herramienta.
- Identificación (tarjeta) compatible con el de la empresa.

BENEFICIOS PARA EL USUARIO



OPTIMIZACIÓN DE PRODUCTIVIDAD EN TIEMPOS Y COSTES

- Producen un efecto autorregulador en los empleados racionalizando el consumo.
- Optimizan el trabajo y la gestión en los almacenes.
- Sencillez en la implantación de cambios en el sistema según las necesidades particulares.

Precio: A consultar
comercial@izartool.com - 94 630 02 41

Servicio Técnico 24h 365 días

Sencilla instalación y uso

Width: 1050 mm. **Depth:** 970 mm. **Height:** 1825 mm.

- 7 trays. Up to 10 rails/tray
- Adjustable height and width
- Up to 27 units in depth per lane
- **Other cabinet models available**

IT ADDRESSES THE FOLLOWING PROBLEMS



- Unnecessary consumption.
- Consumption awareness.
- The elevator avoids the damaging of the tools.
- Identification card compatible with the employee's company card.

BENEFITS FOR THE USER



PRODUCTIVITY OPTIMISATION BOTH IN TIME AND COST

- It produces a self-regulatory effect, reducing the average consumption.
- It improves the warehouse workflow.
- Easily customizable to suit the needs of each particular client.

Price: Please contact us for quotation requests at:
export@izartool.com - +34 94 630 02 46

24/7/365 Technical support

Simple installation. Ease of use.

Largeur: 1050 mm. **Profondeur:** 970 mm. **Hauteur:** 1825 mm.

- 7 plateaux jusqu'à 10 voies / plateau.
- Réglable en largeur et en hauteur.
- Jusqu'à 27 unités d'arrière-plan.
- **Plus de systèmes de vente et de distribution disponibles.**

PROBLÈMES QUI IL FACE



- Abus dans la consommation de produits.
- Conscience des dépenses des employés.
- Avec ascenseur, empêche la casse de l'outil.
- Identification (carte) compatible avec celle de l'entreprise.

AVANTAGES POUR L'UTILISATEUR



OPTIMISATION DE LA PRODUCTIVITÉ EN TEMPS ET EN COÛTS

- Ils produisent un effet d'autorégulation sur les employés en rationalisant la consommation.
- Ils optimisent le travail et la gestion dans les entrepôts.
- Simplicité dans la mise en œuvre des changements dans le système en fonction des besoins particuliers.

Prix : Consulter
france@izartool.com - +34 94 630 02 45

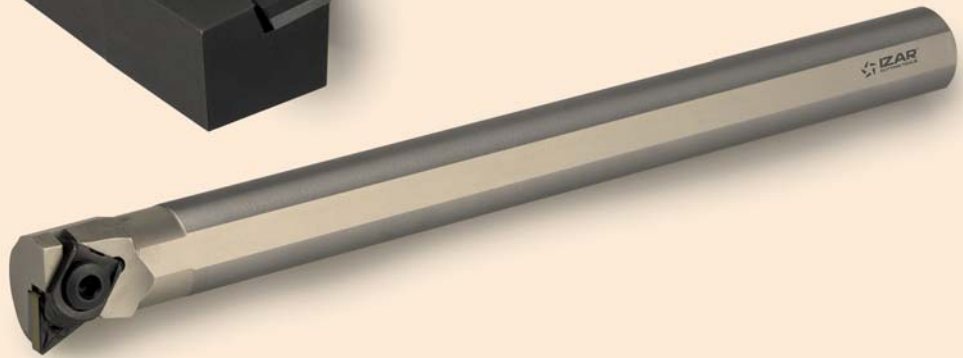
Service technique 24h/24 / 365

Installation et utilisation simples

TORNEADO

Turning

Tournage



GRADOS RECUBRIMIENTO MÉTODOS CVD-PVD TORNEADO

Turning CVD-PVD Methods Coating Grades

Degré revêtement méthodes CVD-PVD tournage

NUEVOS GRADOS PVD - PVD NEW GRADES - NOUVEAUX DEGRÉS PVD

M

Inox

Stainless Steel
Inox

Algunos grados
Some grades
Quelques degrés

P-6..
P-7..

serán reemplazados por
will be replaced by
seront remplacés pour

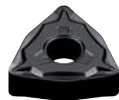


P-H..

S

Resistencia al desgaste
Wear Resistance
Résistant à l'usure

Grado actual
Current grade
Degré actuel



Nuevo Grado
New Grade
Nouveau degré



NUEVOS GRADOS CVD - CVD NEW GRADES - NOUVEAUX DEGRÉS CVD

P

Acero
Steel
Acier

C-5.. > C-G..

Nuevo Grado
New Grade
Nouveau degré



M

Inox
Stainless Steel
Inox

C-5.. > C-S..

Nuevo Grado
New Grade
Nouveau degré



CLASIFICACIÓN CALIDADES - ELECCIÓN PRINCIPAL TORNEADO

Turning Grade Classification - Main Choice

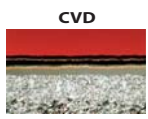

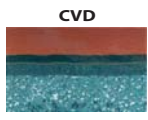

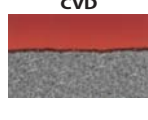


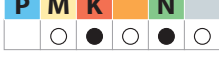


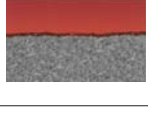







Classement des qualités - Choix principal tournage

| Grupo ISO ISO Group Groupe ISO | Torneado - Turning - Tournage | | | | |
|--|--|----------------|------------------------|---|-------|
| | Calidades con Recubrimiento Coated Grades - Qualités avec revêtement | | | Sin Recubrimiento Uncoated - Sans revêtement | |
| | Metal Duro - Carbide - Carbure | | Cermet | MD/HM Carbure | |
| | CVD | PVD | PVD | | |
| Resistencia al desgaste Wear resistance Résistance à l'usure P Tenacidad Toughness Ténacité | P01 | | | | |
| | P05 | | | | |
| | P10 | | P-710 | | |
| | P15 | C-G15 C-515 | | P-CERMET | |
| | P20 | C-G25 C-525 | P-620 | P-720 | |
| | P25 | | | | |
| | P30 | C-G40 C-540 | | | |
| | P35 | | P-625 | | |
| | P40 | | | | |
| | P45 | | | | |
| P50 | | | | | |
| Resistencia al desgaste Wear resistance Résistance à l'usure M Tenacidad Toughness Ténacité | M01 | | New! P-H10 P-710 | | |
| | M05 | | | | |
| | M10 | | | P-CERMET | |
| | M15 | C-S25 C-525 | | | P-010 |
| | M20 | | P-620 | New! P-H20 P-720 | |
| | M25 | | P-625 | | |
| | M30 | C-S40 C-540 | | | |
| | M35 | | | | |
| | M40 | | | | |
| | Resistencia al desgaste Wear resistance Résistance à l'usure K Tenacidad Toughness Ténacité | K01 | | | |
| K05 | | | | | |
| K10 | | | | P-CERMET | |
| K15 | | C-S15 | | | P-010 |
| K20 | | | | | |
| K25 | | C-S25 | | | |
| K30 | | | | | |
| K40 | | C-S40 | | | |
| Resistencia al desgaste Wear resistance Résistance à l'usure S Tenacidad Toughness Ténacité | S01 | | New! P-H10 P-610 | | |
| | S05 | | | | |
| | S10 | | | | |
| | S15 | | | New! P-H20 P-720 | P-010 |
| | S20 | C-S25 | P-620 | | |
| | S25 | C-S40 | P-625 | | |
| | S30 | | | | |
| | Resistencia al desgaste Wear resistance Résistance à l'usure N Tenacidad Toughness Ténacité | N01 | | | |
| N05 | | | | | |
| N10 | | | | | |
| N15 | | | P-610 | | |
| N20 | | | | | P-010 |
| N25 | | | | | |
| N30 | | | | | |
| Resistencia al desgaste Wear resistance Résistance à l'usure H Tenacidad Toughness Ténacité | H01 | | | | |
| | H05 | | | | |
| | H10 | | P-610 | | |
| | H15 | | | | |
| | H20 | | | | P-010 |
| | H25 | | P-625 | | |
| | H30 | | | | |

GRADOS RECUBRIMIENTO MÉTODOS CVD-PVD TORNEADO

Turning CVD-PVD Methods Coating Grades

Degré revêtement méthodes CVD-PVD tournage

| Grado Grades Degré | Microestructura Microstructure Microstructure | Grupo Material Pieza Trabajo Workpiece Material Group Groupe matériel pièce travail | Aplicación Recomendada Recommended Application Application conseillée |
|--------------------------|---|---|---|
| C-515 C-G15 |  |  | <ul style="list-style-type: none"> - Sustrato de bajo contenido en cobalto - Recubrimiento de doble capa, con capa principal de TiCN, aplicadas por metodos MTCVD y PVD con capas Al₂O₃ - Para materiales del grupo P-K - Elevadas velocidades de corte en condiciones estables y moderadamente interrumpidas |
| C-525 C-G25 |  |  | <ul style="list-style-type: none"> - Sustrato versatil y funcional para trabajar en materiales P-M-K - Nuevo recubrimiento por metodo MTCVD de media capa - Pulido después del recubrimiento - Medias y altas velocidades de corte en cortes continuos e interrumpidos |
| C-540 C-G40 |  |  | <ul style="list-style-type: none"> - Sustrato de micrograno con carburos - Recubrimiento fino por metodo MTCVD con capa principal de TiCN - Aplicación en desbaste y semi-desbaste en materiales del grupo P-M - Condiciones de corte bajas en cortes interrumpidos |
| P-010 |  |  | <ul style="list-style-type: none"> - Sustrato de submicrograno sin carburos y bajo contenido en cobalto - Aplicación general para todos los grupos de materiales menos el P - Sección de viruta corta en condiciones estables |
| P-620 |  |  | <ul style="list-style-type: none"> - Sustrato de micrograno de elevada resistencia al desgaste, con bajo contenido en cobalto y con carburos - Nanorecubrimiento por metodo PVD - Recomendada para aplicaciones generales con gran estrés térmico - Secciones de viruta corta en elevadas condiciones de corte - Condiciones de corte estables |
| P-625 |  |  | <ul style="list-style-type: none"> - Sustrato de micrograno - Nanorecubrimiento por metodo PVD - Velocidades de corte moderadas - Condiciones de corte menos favorables |
| P-710 P-H10 |  |  | <ul style="list-style-type: none"> - Grado PVD de metal duro recubierta (AlTiN) con sustrato micrograno muy duro, que mejora la resistencia al desgaste, la disipación del calor y evita el filo de aportación. Gran rendimiento en materiales viscosos. Para torneado ligero de aceros, aceros endurecidos, inoxidables y superaleaciones termo-resistentes (HRSA). |
| P-720 P-H20 |  |  | <ul style="list-style-type: none"> - Sustrato micrograno combinado con recubrimiento ALTiN-PVD - Operaciones de desbaste y acabado en buenas condiciones de corte y ligeramente interrumpido en aceros INOX y HRSA |
| P-CERMET |  |  | <ul style="list-style-type: none"> - Sustrato de micrograno con bajo contenido en cobalto combinado con recubrimiento PVD - Aplicaciones en los grupos de materiales P-M - Pequeñas secciones de viruta - Elevadas velocidades de corte en condiciones estables |

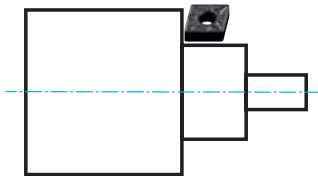
CRITERIOS ELECCIÓN PLAQUITAS TORNEADO

Turning Insert Choice Norms

Critères choix plaquettes tournage

IDENTIFICAR TIPO DE MECANIZADO

Identify Machining Type
Identifier type d'usinage



Exterior / External / Extérieur

1ª Rompevirutas Wiper: doble avance y mejor acabado.

2ª Plaquetas positivas: Mecanizado inestable y piezas largas.

3ª Plaquetas negativas: Piezas estables.

1st Wiper: Double feed & better surface finishing.

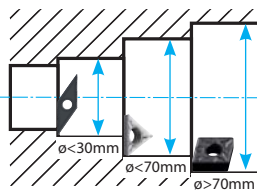
2nd Positive inserts: Unstable machining & long pieces.

3rd Negative inserts: Stable pcs.

1. Brisecopeaux Wiper: Double avance et meilleure finition

2. Plaquettes Positives: Usinage Inestable et pieces longues

3. Plaquettes négatives: Pièces stables



Interior / Internal / Intérieur

1ª Plaquetas positivas: ϕ pequeños + gran voladizo.

2ª Plaquetas negativas: ϕ grandes y estables.

1st Positive inserts: small ϕ -s with big projected piece length.

2nd Negative inserts: Big & stable ϕ -s

1. Plaquettes Positives: Petit ϕ -s + grand saillant

2. Plaquettes négatives: Grand et stable ϕ -s

ELECCIÓN GEOMETRÍA PLAQUITAS

Insert Geometry Choice

Coix taille Plaqueette

| Criterio Elección Criterion Choice Critère choix | Prioridad Elección Choice Priority / Priorité choix | | | | | | |
|--|--|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Filos Corte Utilizables Utilizable Cutting Edges Aretes de coupe a utiliser | | | | | | | |
| Estabilidad Corte Interrumpido Interrupted Cut Stability Stabilité coupe interrompue | | | | | | | |
| Accesibilidad Accessibility Accessibilité | | | | | | | |
| Resistencia Deformación Plástica Plastic Deformation Resistance Plastic deformation resistance | | | | | | | |

| Exterior External Extérieur | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|---|
| | ● | ○ | ○ | ○ | ○ | | ○ |
| | ○ | ○ | ● | ○ | ○ | | ○ |
| | | ● | | ○ | | ● | ○ |

● Recomendado
Recommended

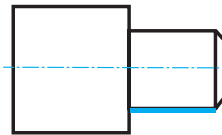
○ Posible
Possible

| Interior Internal Intérieur | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|--|
| | ○ | ○ | ○ | ● | ○ | | |
| | ● | ○ | | ○ | ○ | | |
| | | ● | | ○ | | ● | |

IDENTIFICAR TIPO DE OPERACIÓN

Identify Operation Type
Identifier type d'opération

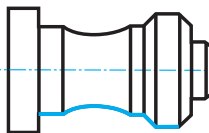
Exterior - External - Extérieur



Torneado Longitudinal
Longitudinal Turning
Tournage longitudinal

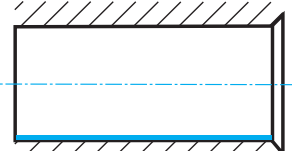


Refrentado
Facing
Façage

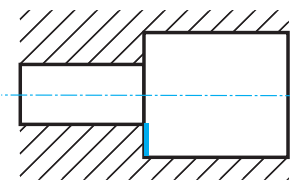


Perfilado
Profiling
Profilage

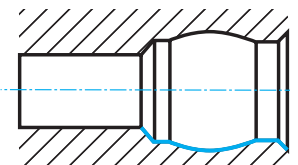
Interior - Internal - Intérieur



Torneado Longitudinal
Longitudinal Turning
Tournage longitudinal



Refrentado
Facing
Façage

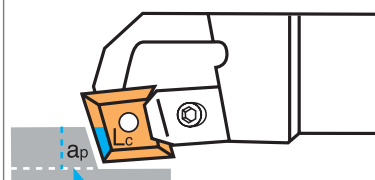


Perfilado
Profiling
Profilage

ELECCIÓN TAMAÑO PLAQUITA

Insert Size Choice

Choix taille Plaqueette



a_p = Profundidad corte Cutting depth Profondeur coupe

L = Arista corte efectiva Effective cutting edge Arete coupe qui travaille

Determinar la **Profundidad de Corte más grande (a_p)** a torner para la elección del tamaño de la plaqueta.

Decide on the **biggest Cutting Depth (a_p)** for turning in order to select the insert size.

Determiner la **Profondeur de coupe plus grande (a_p)** a tourner pour le choix de la taille de la plaquette

| FORMA PLAQ. Insert Shape Forme plaq. | Acabado Fino Fine Finishing Finition fine | Acabado Finishing Finition | Semi Desbaste Semi-Roughing Semi-Ébauche | Desbaste Roughing Ébauche |
|--|---|----------------------------------|--|---------------------------------|
| | $a_p=0,2-1mm$ | $a_p=0,8-2 mm$ | $a_p=2-4 mm$ | $a_p=4-10 mm$ |
| | 06.... 09.... | 06.... 09.... | 12.... | 16.... 19.... |
| | 07.... | 07.... | 11.... 15.... | |
| | 09.... | 09.... | 12.... | 15.... 19.... |
| | 11.... | 11.... 16.... | 16.... | 22.... |
| | 06.... | 06.... 08.... | 08.... | |
| | 11.... | 11.... | 16.... | |
| | 16.... | 16.... | 16.... | |

CONDICIONES CORTE* CALIDADES TORNEADO

Turning Qualities Cutting Conditions*

Conditions coupe* qualités tournage

*Para vida herramienta de 15 min. sin refrigerante / *For 15 min. tool life without coolant / *Pour vie outil 15 min. sans réfrigération

| Calidad Quality Qualité | P | | | | |
|-------------------------------|-----------|---------|---|------------------------------|------------------------------|
| | f (mm) | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | | |
| C-515 | 0,2 | 350-220 | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,80 | |
| | 0,4 | 270-205 | | | |
| | 0,8 | 220-200 | | | |
| C-525 | 0,2 | 295-215 | Torneado interior Internal turning Tournage intérieur | K = 0,75-0,85 | |
| | 0,4 | 240-185 | | | |
| | 0,8 | 215-170 | | | |
| C-540 | 0,2 | 250-210 | Corte interrumpido Interrupted cut Coupe interrompue | K = 0,80-0,90 | |
| | 0,4 | 220-180 | | | |
| | 0,8 | 210-175 | | | |
| P-620 | 0,2 | 225-215 | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 | |
| | 0,4 | 230-210 | | | |
| | 0,8 | 210-210 | | | |
| P-625 | 0,2 | 230-220 | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,85-0,95 | |
| | 0,4 | 220-210 | | | |
| | 0,8 | 200-200 | | | |
| P-720 | 0,2 | 230-125 | Vida plaqueta Insert life Vie plaquette | T _{min} 10 K = 1,10 | |
| | 0,4 | 220-115 | | | T _{min} 15 K = 1,00 |
| | 0,8 | 210-100 | | | T _{min} 20 K = 0,93 |
| P-Cermet | 0,2 | 390-250 | | T _{min} 30 K = 0,84 | |
| | 0,4 | | | T _{min} 45 K = 0,76 | |
| | 0,8 | | | T _{min} 60 K = 0,71 | |
| P-010 | 0,2 | | | | |
| | 0,4 | | | | |
| | 0,8 | | | | |

| Calidad Quality Qualité | M | | | | |
|-------------------------------|-----------|---------|---|------------------------------|------------------------------|
| | f (mm) | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | | |
| C-515 | 0,2 | 260-230 | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,80 | |
| | 0,4 | 220-185 | | | |
| | 0,6 | 200-145 | | | |
| C-525 | 0,2 | 230-190 | Torneado interior Internal turning Tournage intérieur | K = 0,75-0,85 | |
| | 0,4 | 175-150 | | | |
| | 0,6 | 135-110 | | | |
| C-540 | 0,2 | 180-160 | Corte interrumpido Interrupted cut Coupe interrompue | K = 0,80-0,90 | |
| | 0,4 | 160-135 | | | |
| | 0,6 | 135-105 | | | |
| P-620 | 0,2 | 310-260 | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 | |
| | 0,4 | 255-205 | | | |
| | 0,6 | 200-155 | | | |
| P-625 | 0,2 | 300-250 | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,85-0,95 | |
| | 0,4 | 245-195 | | | |
| | 0,6 | 190-145 | | | |
| P-720 | 0,2 | 235-125 | Vida plaqueta Insert life Vie plaquette | T _{min} 10 K = 1,10 | |
| | 0,4 | 225-115 | | | T _{min} 15 K = 1,00 |
| | 0,6 | 220-100 | | | T _{min} 20 K = 0,93 |
| P-Cermet | 0,2 | 175-110 | | T _{min} 30 K = 0,84 | |
| | 0,4 | | | T _{min} 45 K = 0,76 | |
| | 0,6 | | | T _{min} 60 K = 0,71 | |
| P-010 | 0,2 | | | | |
| | 0,4 | | | | |
| | 0,6 | | | | |

| Calidad Quality Qualité | K | | | | |
|-------------------------------|-----------|---------|---|------------------------------|------------------------------|
| | f (mm) | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | | |
| C-515 | 0,2 | 360-280 | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,80 | |
| | 0,4 | 280-265 | | | |
| | 0,6 | 235-220 | | | |
| C-525 | 0,2 | 330-250 | Torneado interior Internal turning Tournage intérieur | K = 0,75-0,85 | |
| | 0,4 | 240-230 | | | |
| | 0,6 | 220-220 | | | |
| C-540 | 0,2 | 230-220 | Corte interrumpido Interrupted cut Coupe interrompue | K = 0,80-0,90 | |
| | 0,4 | 215-205 | | | |
| | 0,6 | 190-185 | | | |
| P-620 | 0,2 | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 | |
| | 0,4 | | | | |
| | 0,6 | | | | |
| P-625 | 0,2 | 220-200 | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,85-0,95 | |
| | 0,4 | 210-190 | | | |
| | 0,6 | 200-180 | | | |
| P-Cermet | 0,2 | 130-85 | Vida plaqueta Insert life Vie plaquette | T _{min} 10 K = 1,10 | |
| | 0,4 | | | | T _{min} 15 K = 1,00 |
| | 0,6 | | | | T _{min} 20 K = 0,93 |
| P-010 | 0,2 | | | T _{min} 30 K = 0,84 | |
| | 0,4 | | | T _{min} 45 K = 0,76 | |
| | 0,6 | | | T _{min} 60 K = 0,71 | |

CONDICIONES CORTE* CALIDADES TORNEADO

Turning Qualities Cutting Conditions*

Conditions coupe* qualités tournage

*Para vida herramienta de 15 min. sin refrigerante / *For 15 min. tool life without coolant / *Pour vie outil 15 min. sans réfrigération

| Calidad Quality Qualité | S | | |
|-------------------------------|--------------|----------------|--|
| | f (mm) | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de |
| C-515 | 0,10 0,50 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse K = 0,70-0,80 |
| C-525 | 0,10 0,50 | | Torneado interior Internal turning Tournage intérieur K = 0,75-0,85 |
| C-540 | 0,10 0,50 | | Corte interrumpido Interrupted cut Coupe interrompue K = 0,80-0,90 |
| P-620 | 0,10 0,50 | 75-45 50-25 | Maq. en buen estado Good condition mach. Mach. en bon état K = 1,05-1,20 |
| P-625 | 0,10 0,50 | 75-45 50-25 | Maq. en mal estado Bad condition mach. Mach. en mauvais état K = 0,85-0,95 |
| P-720 | 0,10 0,50 | 35-80 23-70 | Vida plaqueta Insert life Vie plaquette T _{min} 10 K = 1,10 T _{min} 15 K = 1,00 T _{min} 20 K = 0,93 T _{min} 30 K = 0,84 T _{min} 45 K = 0,76 T _{min} 60 K = 0,71 |
| P-Cermet | 0,10 0,50 | | |
| P-010 | 0,10 0,50 | | |

| Calidad Quality Qualité | N | | |
|-------------------------------|--------------|--------------------|--|
| | f (mm) | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de |
| C-515 | 0,15 0,80 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse K = 0,70-0,80 |
| C-525 | 0,15 0,80 | | Torneado interior Internal turning Tournage intérieur K = 0,75-0,85 |
| C-540 | 0,15 0,80 | | Corte interrumpido Interrupted cut Coupe interrompue K = 0,80-0,90 |
| P-620 | 0,15 0,80 | | Maq. en buen estado Good condition mach. Mach. en bon état K = 1,05-1,20 |
| P-625 | 0,15 0,80 | | Maq. en mal estado Bad condition mach. Mach. en mauvais état K = 0,85-0,95 |
| P-Cermet | 0,15 0,80 | | Vida plaqueta Insert life Vie plaquette T _{min} 10 K = 1,10 T _{min} 15 K = 1,00 T _{min} 20 K = 0,93 T _{min} 30 K = 0,84 T _{min} 45 K = 0,76 T _{min} 60 K = 0,71 |
| P-010 | 0,15 0,80 | 2400-360 240-65 | |

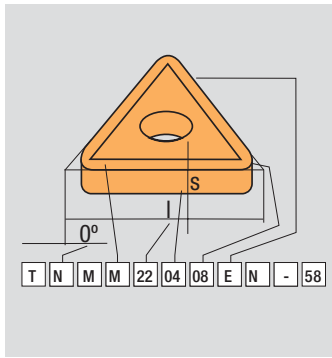
| Calidad Quality Qualité | H | | |
|-------------------------------|--------------|--|--|
| | f (mm) | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de |
| C-515 | 0,15 0,80 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse K = 0,70-0,80 |
| C-525 | 0,15 0,80 | | Torneado interior Internal turning Tournage intérieur K = 0,75-0,85 |
| C-540 | 0,15 0,80 | | Corte interrumpido Interrupted cut Coupe interrompue K = 0,80-0,90 |
| P-620 | 0,15 0,80 | | Maq. en buen estado Good condition mach. Mach. en bon état K = 1,05-1,20 |
| P-625 | 0,15 0,80 | | Maq. en mal estado Bad condition mach. Mach. en mauvais état K = 0,85-0,95 |
| P-Cermet | 0,15 0,80 | | Vida plaqueta Insert life Vie plaquette T _{min} 10 K = 1,10 T _{min} 15 K = 1,00 T _{min} 20 K = 0,93 T _{min} 30 K = 0,84 T _{min} 45 K = 0,76 T _{min} 60 K = 0,71 |
| P-010 | 0,15 0,80 | | |

CÓDIGOS ISO ELECCIÓN PLAQUITAS TORNEADO

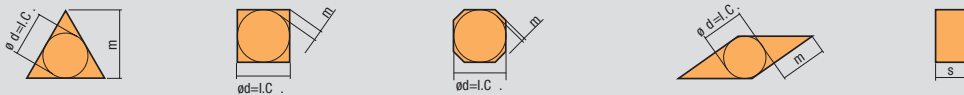
Turning Insert Choice ISO Codes

Codes ISO choix plaquettes tournage

| 1 | | | | 2 | | | | 4 | | | |
|---|---|---|---|--|---|---|---|---|---|---|---|
| Forma Plaquita / Insert Shape / Forme plaquette | | | | Angulo Incidencia Clearance Angle / Angle d'incidence | | | | Tipo Plaquita Insert type / Type plaquette | | | |
| H | O | P | R | A | B | C | D | N | R | F | A |
| S | T | C | D | E | F | G | N | M | G | W | T |
| E | M | V | W | G | N | P | | W | T | Q | |
| L | A | B | K | | | | | | | | |



| | 3 | | | | | |
|---|--|-------|--------------|--|-------|---------------|
| | Tolerancias / Tolerances / Tolérances | | | | | |
| | Tolerancias / Tolerances / Tolérances [mm] | | | Tolerancias [Pulg.] / Tolerances [Inch] / Tolérances [Pouc.] | | |
| | m (±) | s (±) | d = I.C. (±) | m (±) | s (±) | d = I.C. (±) |
| A | 0,005 | 0,025 | 0,025 | 0,0002 | 0,001 | 0,0010 |
| F | 0,005 | 0,025 | 0,013 | 0,0002 | 0,001 | 0,0005 |
| C | 0,013 | 0,025 | 0,025 | 0,0005 | 0,001 | 0,0010 |
| H | 0,013 | 0,025 | 0,013 | 0,0005 | 0,001 | 0,0005 |
| E | 0,025 | 0,025 | 0,025 | 0,0010 | 0,001 | 0,0010 |
| G | 0,025 | 0,130 | 0,025 | 0,0010 | 0,005 | 0,0010 |
| J | 0,005 | 0,025 | 0,05 ÷ 0,13 | 0,0002 | 0,001 | 0,002 ÷ 0,005 |
| K | 0,013 | 0,025 | 0,05 ÷ 0,13 | 0,0005 | 0,001 | 0,002 ÷ 0,005 |
| L | 0,025 | 0,025 | 0,05 ÷ 0,13 | 0,0010 | 0,001 | 0,002 ÷ 0,005 |
| M | 0,08 ÷ 0,18 | 0,130 | 0,05 ÷ 0,13 | 0,003 ÷ 0,007 | 0,005 | 0,002 ÷ 0,005 |
| N | 0,08 ÷ 0,18 | 0,025 | 0,05 ÷ 0,13 | 0,003 ÷ 0,007 | 0,001 | 0,002 ÷ 0,005 |
| U | 0,05 ÷ 0,38 | 0,130 | 0,08 ÷ 0,25 | 0,005 ÷ 0,015 | 0,005 | 0,003 ÷ 0,010 |



CÓDIGOS ISO ELECCIÓN PLAQUITAS TORNEADO


Turning Insert Choice ISO Codes

Codes ISO choix plaquettes tournage

| | | 5 | | | | | | |
|--------|-------------------|---|----|----|----|----|----|----|
| | | Longitud Filo Corte / Cutting Edge Length / Longuer arête coupe | | | | | | |
| d=I.C. | | R | S | T | C | D | V | W |
| mm | pulg. inch. pouc. | | | | | | | |
| 3,97 | 5/32" | | | 06 | | | | |
| 5,00 | | 05 | | | | | | |
| 5,56 | 7/32" | | | 09 | | | | 03 |
| 6,00 | | 06 | | | | | | |
| 6,35 | 1/4" | | | 11 | 06 | 07 | | 04 |
| 8,00 | | 08 | | | | | | |
| 9,525 | 3/8" | 09 | 09 | 16 | 09 | 11 | 16 | 06 |
| 10,0 | | 10 | | | | | | |
| 12,0 | | 12 | | | | | | |
| 12,7 | 1/2" | 12 | 12 | 22 | 12 | 15 | | 08 |
| 15,875 | 5/8" | 15 | 15 | 27 | 16 | | | |
| 16,0 | | 16 | | | | | | |
| 19,05 | 3/4" | 19 | 19 | 33 | 19 | | | |
| 20,0 | | 20 | | | | | | |
| 25,0 | | 25 | | | | | | |
| 25,4 | 1" | 25 | 25 | | 25 | | | |
| 31,75 | 1 1/4" | 31 | | | | | | |
| 32,0 | | 32 | | | | | | |

| | | | 6 | |
|-------------|--|--|---------------------------------|-------------|
| | | | Espesor / Thickness / Épaisseur | |
| | | | | |
| | | | | |
| | | | s | |
| simb. symb. | | | mm | pulg. inch. |
| 01 | | | 1,59 | 1/16" |
| T1 | | | 1,98 | |
| 02 | | | 2,38 | 3/32" |
| 03 | | | 3,18 | 1/8" |
| T3 | | | 3,97 | 5/32" |
| 04 | | | 4,76 | 3/16" |
| 05 | | | 5,56 | |
| 06 | | | 6,35 | 1/4" |
| 07 | | | 7,94 | 5/16" |
| 09 | | | 9,52 | 3/8" |

| | | | 7 | |
|-------------|--|--|--|-------------------|
| | | | Radio Vértice / Nose Radius / Rayon pointe | |
| | | | r ₁ | |
| simb. symb. | | | mm | pulg. inch. pouc. |
| 00 | | | 0 | 0" |
| 02 | | | 0,2 | |
| 04 | | | 0,4 | 1/64" |
| 08 | | | 08 | 1/32" |
| 12 | | | 1,2 | 3/64" |
| 16 | | | 1,6 | 1/16" |
| 24 | | | 2,4 | 3/32" |
| 32 | | | 3,2 | 1/8" |



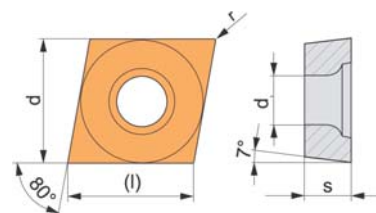
| | | | | |
|----|----|----|---|---|
| 5 | 6 | 7 | 8 | 9 |
| 12 | 04 | 08 | E | - |

| | | 8 | |
|--|---|---|---|
| | | Longitud Filo Corte / Cutting Edge Length / Longuer arête coupe | |
| | Filos Agudos Sharp Edges Arêtes aiguës | | Filos Reforzados Rounded Edges Arêtes renforcées |
| | Filos con Faceta Edges with facet Arêtes avec facette | | Filos achaflanados y reforzados Rounded Edges with facet Arêtes arrondies et renforcées |

| | | | 9 | |
|---|--|----------------|--|--|
| | | | Dirección Avance / Feed Direction / Direction avance | |
| R | | Avance Feed | | |
| L | | Avance Feed | | |
| N | | Avance Feed | Avance Feed | |

Ref. **8500**

PLAQUITA INTERCAMBIABLE TORNEADO CCMT
 CCMT Turning Indexable Insert
 Plaquette tournage CCMT

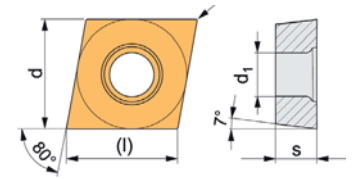


Condiciones Corte
 Cutting Conditions
 Conditions coupe

| ISO | Dimensiones Dimensions | | | | | f mm | a _p mm | | N° Art. C-G25 | N° Art. P-H20 P-720 | N° Art. P-Cermet | € |
|--|------------------------|-------|------|-------------------|------|-----------|-------------------|----|---------------|---------------------|------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | | | | | | | |
| Acabado Fino / Fine Finishing / Finition Fine | | | | | | | | | | | | |
| CCMT-060202-E-ZMM | 6,40 | 6,35 | 2,38 | 2,80 | 0,20 | 0,03-0,11 | 0,06-1,70 | 10 | 59269 | 59271 | | 8,25 |
| CCMT-060204-E-ZMM | 6,40 | 6,35 | 2,38 | 2,80 | 0,40 | 0,05-0,17 | 0,10-1,70 | 10 | 59270 | 59272 | | 8,25 |
| CCMT-09T304-E-ZMM | 9,70 | 9,52 | 3,97 | 4,40 | 0,40 | 0,06-0,23 | 0,11-2,00 | 10 | 42895 | 42896 | | 8,25 |
| CCMT-09T308-E-ZMM | 9,70 | 9,52 | 3,97 | 4,40 | 0,80 | 0,08-0,45 | 0,15-2,00 | 10 | 17842 | 17844 | | 8,25 |
| CCMT-120404-E-ZMM | 12,90 | 12,70 | 4,76 | 5,50 | 0,40 | 0,07-0,27 | 0,14-2,40 | 10 | 42898 | 42899 | | 10,39 |
| CCMT-120408-E-ZMM | 12,90 | 12,70 | 4,76 | 5,50 | 0,80 | 0,12-0,45 | 0,60-3,60 | 10 | 17845 | 17856 | | 10,39 |
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | | | |
| CCMT-060202-E-ZRR | 6,40 | 6,35 | 2,38 | 2,80 | 0,20 | 0,03-0,11 | 0,06-1,70 | 10 | 26277 | 10233 | | 8,25 |
| CCMT-060204-E-ZRR | 6,40 | 6,35 | 2,38 | 2,80 | 0,40 | 0,06-0,17 | 0,20-2,40 | 10 | 26278 | 10242 | | 8,25 |
| CCMT-09T304-E-ZRR | 9,70 | 9,52 | 3,97 | 4,40 | 0,40 | 0,08-0,23 | 0,25-3,00 | 10 | 26280 | 10278 | | 8,25 |
| CCMT-09T308-E-ZRR | 9,70 | 9,52 | 3,97 | 4,40 | 0,80 | 0,10-0,40 | 0,50-3,00 | 10 | 26281 | 10287 | | 8,25 |
| CCMT-120404-E-ZRR | 12,90 | 12,70 | 4,76 | 5,50 | 0,40 | 0,09-0,27 | 0,30-3,60 | 10 | 42901 | | | 10,39 |
| CCMT-120408-E-ZRR | 12,90 | 12,70 | 4,76 | 5,50 | 0,80 | 0,12-0,45 | 0,60-3,60 | 10 | 10131 | | | 10,39 |
| Acabado / Finishing / Finition | | | | | | | | | | | | |
| CCMT-060204-ZFCE | 6,40 | 6,35 | 2,38 | 2,80 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | 19983 | 9,13 |
| CCMT-09T304-ZFCE | 9,70 | 9,52 | 3,97 | 4,40 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | 19987 | 11,89 |
| CCMT-09T308-ZFCE | 9,70 | 9,52 | 3,97 | 4,40 | 0,80 | 0,05-0,40 | 0,20-1,50 | 10 | | | 19989 | 11,89 |

Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8500 CCMT-09T304-E-ZMM C-G25

Porta Plaquitas / Tool Holder / Porte-Plaquettes:
 Pag. 490, 497

Ref. **8501**
PLAQUITA INTERCAMBIABLE TORNEADO CCGT
 CCGT Turning Indexable Insert
 Plaquette tournage CCGT

 Condiciones Corte
 Cutting Conditions
 Conditions coupe

Dimensiones Dimensions

| ISO | Dimensiones Dimensions | | | | | f mm | a _p mm | | N° Art. P-710 | N° Art. P-010 | € |
|--------------------------------|------------------------|---------|---------|----------------------|---------|-----------|----------------------|----|------------------|------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | | | | | | |
| Aluminio / Aluminium | | | | | | | | | | | |
| CCGT-060202-F-ZAL | 6,40 | 6,35 | 2,38 | 2,80 | 0,20 | 0,05-0,12 | 0,05-3,00 | 10 | | 42877 | 12,54 |
| CCGT-060204-F-ZAL | 6,40 | 6,35 | 2,38 | 2,80 | 0,40 | 0,10-0,20 | 0,10-3,00 | 10 | | 42880 | 12,54 |
| CCGT-09T304-F-ZAL | 9,70 | 9,52 | 3,97 | 4,40 | 0,40 | 0,10-0,22 | 0,10-5,00 | 10 | | 42883 | 13,61 |
| CCGT-09T308-F-ZAL | 9,70 | 9,52 | 3,97 | 4,40 | 0,80 | 0,15-0,45 | 0,10-5,00 | 10 | | 42894 | 13,61 |
| CCGT-120402-F-ZAL | 12,90 | 12,70 | 4,76 | 5,50 | 0,20 | 0,05-0,12 | 0,05-4,00 | 10 | | 72544 | 14,67 |
| CCGT-120404-F-ZAL | 12,90 | 12,70 | 4,76 | 5,50 | 0,40 | 0,10-0,26 | 0,10-5,00 | 10 | 72061 | 71634 | 14,67 |
| CCGT-120408-F-ZAL | 12,90 | 12,70 | 4,76 | 5,50 | 0,80 | 0,15-0,50 | 0,10-5,50 | 10 | 72064 | 72066 | 14,67 |
| INOX / Stainless / Inox | | | | | | | | | | | |
| CCGT-060202-E-ZNF | 6,40 | 6,35 | 2,38 | 2,80 | 0,20 | 0,05-0,12 | 0,05-3,00 | 10 | 42875 | | 12,54 |
| CCGT-060204-E-ZNF | 6,40 | 6,35 | 2,38 | 2,80 | 0,40 | 0,10-0,20 | 0,10-3,00 | 10 | 42878 | | 12,54 |
| CCGT-09T304-E-ZNF | 9,70 | 9,52 | 3,97 | 4,40 | 0,40 | 0,10-0,22 | 0,10-5,00 | 10 | 42881 | | 13,61 |

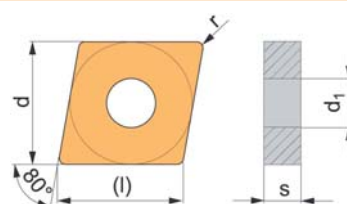

 Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8501 CCGT-060202-F-AL P-010

 Porta Plaquitas / Tool Holder / Porte-Plaquettes:
 Pag. 490, 497

Ref. **8510****PLAQUITA INTERCAMBIABLE TORNEADO CNMG**

CNMG Turning Indexable Insert

Plaquette tournage CNMG



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 C-515 | N° Art. C-G25 C-525 | N° Art. C-G40 C-540 | N° Art. P-710 | N° Art. P-720 | N° Art. P-Cermet | N° Art. P-010 | € |
|-----|------------------------|---------|---------|----------------------|---------|---|----------------------|--|---------------------------|---------------------------|---------------------------|------------------|------------------|---------------------|------------------|---|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|-------------------|-------|-------|------|------|------|-----------|-----------|----|--|-------|--|--|--|--|--|-------|
| Wiper | | | | | | | | | | | | | | | | |
| CNMG-120408-E-ZWM | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,60 | 0,50-5,00 | 10 | | 17922 | | | | | | 10,39 |



| | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|-------|------|------|------|-----------|-----------|----|-------|-------|-------|--|--|--|--|------|
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | | |
| CNMG-090304-E-ZFM | 9,70 | 9,52 | 3,18 | 3,81 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | | 59273 | | | | | | 7,89 |
| CNMG-090308-E-ZFM | 9,70 | 9,52 | 3,18 | 3,81 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | | 59274 | | | | | | 7,89 |
| CNMG-120404-E-ZFM | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,07-0,30 | 0,40-2,50 | 10 | 17863 | 26286 | 17866 | | | | | 9,33 |
| CNMG-120408-E-ZFM | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,10-0,40 | 0,40-2,50 | 10 | 42902 | 42903 | | | | | | 9,33 |



| | | | | | | | | | | | | | | | | |
|---|-------|-------|------|------|------|-----------|-----------|----|-------|-------|-------|--|--|--|--|-------|
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | | |
| CNMG-120404-E-ZM | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,10-0,30 | 0,40-5,50 | 10 | 42905 | 42906 | | | | | | 9,33 |
| CNMG-120408-E-ZM | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-5,50 | 10 | 17867 | 26292 | 17873 | | | | | 9,33 |
| CNMG-120412-E-ZM | 12,90 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-5,50 | 10 | 17885 | 26290 | 28592 | | | | | 9,33 |
| CNMG-190608-E-ZM | 19,30 | 19,05 | 6,35 | 7,94 | 0,80 | 0,15-0,60 | 0,80-6,00 | 10 | 42907 | 42908 | | | | | | 25,07 |
| CNMG-190612-E-ZM | 19,30 | 19,05 | 6,35 | 7,94 | 1,20 | 0,18-0,60 | 0,80-8,60 | 10 | 42910 | 42912 | | | | | | 25,07 |



| | | | | | | | | | | | | | | | | |
|--------------------------------------|-------|-------|------|------|------|-----------|------------|----|-------|-------|-------|--|--|--|--|-------|
| Desbaste / Roughing / Ébauche | | | | | | | | | | | | | | | | |
| CNMG-120408-E-ZR | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,55 | 1,00-7,00 | 10 | 17893 | 26289 | 17902 | | | | | 9,33 |
| CNMG-120412-E-ZR | 12,90 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,60 | 1,00-7,00 | 10 | 17909 | 26293 | 17911 | | | | | 9,33 |
| CNMG-160608-E-ZR | 16,10 | 15,88 | 6,35 | 6,35 | 0,80 | 0,20-0,55 | 1,00-8,00 | 10 | 21949 | 21951 | | | | | | 19,61 |
| CNMG-160612-E-ZR | 16,10 | 15,88 | 6,35 | 6,35 | 1,20 | 0,20-0,55 | 1,00-8,00 | 10 | 21952 | 21953 | | | | | | 19,61 |
| CNMG-190608-E-ZR | 19,30 | 19,05 | 6,35 | 7,94 | 0,80 | 0,25-0,60 | 3,00-8,00 | 10 | 42913 | 42914 | | | | | | 25,07 |
| CNMG-190612-E-ZR | 19,30 | 19,05 | 6,35 | 7,94 | 1,20 | 0,25-0,70 | 2,00-10,00 | 10 | 42915 | 42916 | | | | | | 25,07 |



| | | | | | | | | | | | | | | | | |
|---------------------------------------|-------|-------|------|------|------|-----------|-----------|----|--|--|--|--|--|-------|--|-------|
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | | |
| CNMG-120404-E-ZFCE | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,05-0,40 | 0,30-3,00 | 10 | | | | | | 16630 | | 15,04 |



| | | | | | | | | | | | | | | | | |
|--|-------|-------|------|------|------|-----------|-----------|----|--|--|--|--|--|-------|--|-------|
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | | | | | | | |
| CNMG-120408-E-ZMCE | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,10-4,00 | 0,30-3,00 | 10 | | | | | | 19981 | | 15,04 |



| | | | | | | | | | | | | | | | | |
|---|-------|-------|------|------|------|-----------|-----------|----|--|--|--|--|-------|--|--|------|
| INOX Semi-Desbaste / Semi-Roughing Stainless / INOX Semi-Ébauche | | | | | | | | | | | | | | | | |
| CNMG-120404-E-ZNM | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,10-0,25 | 0,50-5,70 | 10 | | | | | 35197 | | | 9,33 |
| CNMG-120408-E-ZNM | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,12-0,45 | 0,50-5,70 | 10 | | | | | 35198 | | | 9,33 |

(New!)

| | | | | | | | | | | | | | | | | |
|---|-------|-------|------|------|------|-----------|-----------|----|--|--|--|--|--|--|-------|------|
| ALUMINIUM Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | | |
| CNMG-120404-ZAL | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,10-0,30 | 0,40-5,50 | 10 | | | | | | | 70097 | 9,33 |
| CNMG-120408-ZAL | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-5,50 | 10 | | | | | | | 70100 | 9,33 |
| CNMG-120412-ZAL | 12,90 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-5,50 | 10 | | | | | | | 70105 | 9,33 |



| ISO | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | N° Art. C-G15 | N° Art. C-G25 | N° Art. C-515 | N° Art. C-525 | € |
|--|---------|---------|---------|----------------------|---------|-----------|----------------------|------------------|------------------|------------------|------------------|-------|
| Semi-Desbaste Alto Rendimiento / High Performance Semi-Roughing / Semi-Ébauche Haut Rendement | | | | | | | | | | | | |
| CNMG-120404-ZPM | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,10-0,30 | 0,40-5,50 | 10 | 71279 | 71280 | | 10,26 |
| CNMG-120408-ZPM | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-5,50 | 10 | 71281 | 71282 | | 10,26 |
| CNMG-120412-ZPM | 12,90 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-5,50 | 10 | 71283 | 71284 | | 10,26 |



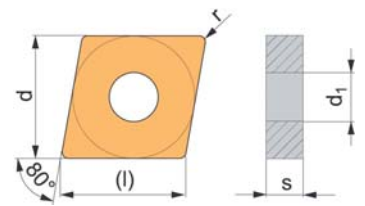
| | | | | | | | | | | | | |
|--|-------|-------|------|------|------|-----------|-----------|----|--|-------|-------|-------|
| INOX Acabado Alto Rendimiento / High Performance Finishing Stainless / INOX Finition Haut Rendement | | | | | | | | | | | | |
| CNMG-120404-ZNF | 12,90 | 12,70 | 4,76 | 5,16 | 0,40 | 0,10-0,30 | 0,40-5,50 | 10 | | 16950 | 16954 | 10,26 |
| CNMG-120408-ZNF | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-5,50 | 10 | | 82849 | 16955 | 10,26 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8510 CNMG-120408-ZWM C-G25Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 487, 489, 493, 496

Ref. **8512****PLAQUITA INTERCAMBIABLE TORNEADO CNMM**

CNMM Turning Indexable Insert

Plaquette tournage CNMM


 Condiciones Corte
 Cutting Conditions
 Conditions coupe

| ISO | Dimensiones Dimensions | | | | | f mm | a _p mm | | N° Art. | N° Art. | € |
|--|------------------------|---------|---------|----------------------|---------|-----------|----------------------|----|---------|---------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | | | | C-G25 | P-625* | |
| Desbaste / Roughing / Ébauche | | | | | | | | | | | |
| CNMM-120408-E-ZR | 12,90 | 12,70 | 4,76 | 5,16 | 0,80 | 0,25-0,60 | 1,00-8,50 | 10 | 10750 | 10756 | 13,60 |
| CNMM-120412-E-ZR | 12,90 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,80 | 1,20-8,50 | 10 | 10753 | | 13,60 |
| New! CNMM-160608-E-ZR | 16,10 | 15,88 | 6,35 | 6,35 | 0,80 | 0,20-0,55 | 1,00-8,00 | 10 | 51335 | | 17,92 |
| New! CNMM-160612-E-ZR | 16,10 | 15,88 | 6,35 | 6,35 | 1,20 | 0,25-0,60 | 1,00-8,00 | 10 | 32996 | | 17,92 |
| New! CNMM-190612-E-ZR | 19,30 | 19,05 | 6,35 | 7,94 | 1,20 | 0,25-0,70 | 2,00-10,00 | 10 | 25718 | | 24,77 |
| New! CNMM-190616-E-ZR | 19,30 | 19,05 | 6,35 | 7,94 | 1,60 | 0,32-0,80 | 2,00-10,00 | 10 | 25719 | | 24,77 |
| Desbaste Pesado / Heavy Roughing / Ebauche lourde | | | | | | | | | | | |
| New! CNMM-190612-E-ZHR | 19,30 | 19,05 | 6,35 | 7,94 | 1,20 | 0,50-0,80 | 2,40-12,00 | 10 | 59747 | | 24,77 |
| New! CNMM-190616-E-ZHR | 19,30 | 19,05 | 6,35 | 7,94 | 1,60 | 0,50-1,10 | 2,40-12,00 | 10 | 74857 | | 24,77 |

**New!****New!****New!****New!****New!****New!**
 Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8512 CNMM-120408-E-ZR C-525

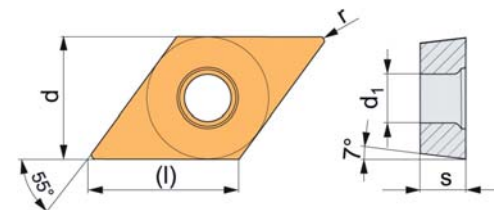
 Porta Plaquetas / Tool Holder / Porte-Plaquettes:
 Pag. 487, 489, 493, 496

* P-625 hasta fin de existencias / while stock lasts / jusqu'à la fin de stock

Ref. **8515****PLAQUITA INTERCAMBIABLE TORNEADO DCGT**

DCGT Turning Indexable Insert

Plaquette tournage DCGT


 Condiciones Corte
 Cutting Conditions
 Conditions coupe

| ISO | Dimensiones Dimensions | | | | | f mm | a _p mm | | N° Art. | N° Art. | € |
|--------------------------------|------------------------|---------|---------|----------------------|---------|-----------|----------------------|----|---------|---------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | | | | P-010 | P-H20 | |
| Aluminio / Aluminium | | | | | | | | | | | |
| DCGT-070202-F-ZAL | 7,80 | 6,35 | 2,38 | 2,80 | 0,20 | 0,02-0,12 | 0,10-1,50 | 10 | 29902 | | 12,54 |
| DCGT-070204-F-ZAL | 7,80 | 6,35 | 2,38 | 2,80 | 0,40 | 0,10-0,20 | 0,10-4,00 | 10 | 29903 | | 12,54 |
| DCGT-11T302-F-ZAL | 11,60 | 9,52 | 3,97 | 4,40 | 0,20 | 0,05-0,12 | 0,05-4,00 | 10 | 29906 | | 13,61 |
| DCGT-11T304-F-ZAL | 11,60 | 9,52 | 3,97 | 4,40 | 0,40 | 0,10-0,22 | 0,10-5,00 | 10 | 29910 | | 13,61 |
| INOX / Stainless / Inox | | | | | | | | | | | |
| DCGT-070202-E-ZNF | 7,80 | 6,35 | 2,38 | 2,80 | 0,20 | 0,02-0,12 | 0,10-1,50 | 10 | | 29901 | 12,54 |
| DCGT-070204-E-ZNF | 7,80 | 6,35 | 2,38 | 2,80 | 0,40 | 0,10-0,20 | 0,10-4,00 | 10 | | 29905 | 12,54 |
| DCGT-11T302-E-ZNF | 11,60 | 9,52 | 3,97 | 4,40 | 0,20 | 0,05-0,12 | 0,05-4,00 | 10 | | 29908 | 13,61 |
| DCGT-11T304-E-ZNF | 11,60 | 9,52 | 3,97 | 4,40 | 0,40 | 0,10-0,22 | 0,10-5,00 | 10 | | 29911 | 13,61 |

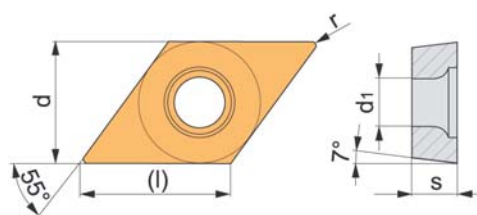

 Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8515 DCGT-070202-F-ZAL P-010

 Porta Plaquetas / Tool Holder / Porte-Plaquettes:
 Pag. 491, 497

Ref. **8520****PLAQUITA INTERCAMBIABLE TORNEADO DCMT**

DCMT Turning Indexable Insert

Plaquette tournage DCMT



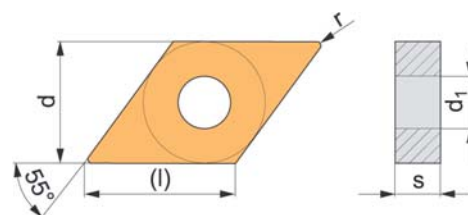
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G25 | N° Art. P-H20 P-720 | N° Art. P-Cermet | € |
|---|------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|---------------------------|---------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | 10 | | | | |
| Acabado Fino / Fine Finishing / Finition Fine | | | | | | | | | | | | |
| DCMT-070202-E-ZRR | 7,80 | 6,35 | 2,38 | 2,80 | 0,20 | 0,03-0,11 | 0,06-1,50 | 10 | 59275 | 43990 | | 8,25 |
| DCMT-070204-E-ZRR | 7,80 | 6,35 | 2,38 | 2,80 | 0,40 | 0,05-0,17 | 0,08-1,50 | 10 | 26295 | 17927 | | 8,25 |
| DCMT-11T302-E-ZRR | 11,60 | 9,52 | 3,97 | 4,40 | 0,20 | 0,04-0,15 | 0,08-2,00 | 10 | 59276 | 43449 | | 8,25 |
| DCMT-11T304-E-ZRR | 11,60 | 9,52 | 3,97 | 4,40 | 0,40 | 0,06-0,23 | 0,11-2,00 | 10 | 26296 | 17962 | | 8,25 |
| DCMT-11T308-E-ZRR | 11,60 | 9,52 | 3,97 | 4,40 | 0,80 | 0,08-0,30 | 0,15-2,00 | 10 | 26298 | 28593 | | 8,25 |
| Acabado / Finishing / Finition | | | | | | | | | | | | |
| DCMT-070204-ZFCE | 7,80 | 6,35 | 2,38 | 2,80 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | 19990 | 9,09 |
| DCMT-11T304-ZFCE | 11,60 | 9,52 | 3,97 | 4,40 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | 19994 | 12,60 |
| DCMT-11T308-ZFCE | 11,60 | 9,52 | 3,97 | 4,40 | 0,80 | 0,05-0,40 | 0,20-1,50 | 10 | | | 19996 | 12,60 |
| INOX Semi-Desbaste / Semi-Roughing Stainless / Inox Semi-Ébauche | | | | | | | | | | | | |
| DCMT-11T304-E-ZMM | 11,60 | 9,52 | 3,97 | 4,40 | 0,4 | 0,08-0,23 | 0,25-3,00 | 10 | | 66820 | | 8,25 |
| DCMT-11T308-E-ZMM | 11,60 | 9,52 | 3,97 | 4,40 | 0,8 | 0,10-0,40 | 0,50-3,00 | 10 | | 66821 | | 8,25 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8520 DCMT-070202-E-ZRR C-G25Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 491, 497

Ref. **8530****PLAQUITA INTERCAMBIABLE TORNEADO DNMG**

DNMG Turning Indexable Insert

Plaquette tournage DNMG



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 C-515 | N° Art. C-G25 | N° Art. C-540 | N° Art. P-H20 | N° Art. P-720 | N° Art. P-Cermet | € |
|---|------------------------|-------|------|-------------------|------|---|-------------------|----|---------------------|---------------|---------------|---------------|---------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | | | |
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | |
| DNMG-110404-E-ZF | 11,60 | 9,52 | 4,76 | 3,81 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | 42917 | 42918 | | | | | 9,33 |
| DNMG-110408-E-ZF | 11,60 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | 59277 | 59279 | | | | | 9,33 |
| DNMG-150404-E-ZF | 15,50 | 12,70 | 4,76 | 5,16 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | 17965 | 26299 | | 17968 | | | 12,89 |
| DNMG-150408-E-ZF | 15,50 | 12,70 | 4,76 | 5,16 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | 59278 | 59280 | | | | | 12,89 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | |
| DNMG-110408-E-ZM | 11,60 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | | 26301 | 15413 | | | | 9,33 |
| DNMG-150408-E-ZM | 15,50 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-6,00 | 10 | 17973 | 26302 | 17976 | | | | 12,89 |
| DNMG-150604-E-ZM | 15,50 | 12,70 | 6,35 | 5,16 | 0,40 | 0,10-0,30 | 0,40-6,00 | 10 | 59281 | 59282 | | | | | 13,61 |
| DNMG-150608-E-ZM | 15,50 | 12,70 | 6,35 | 5,16 | 0,80 | 0,15-0,50 | 0,50-6,00 | 10 | 17977 | 26304 | 17989 | | | | 13,61 |
| DNMG-150612-E-ZM | 15,50 | 12,70 | 6,35 | 5,16 | 1,20 | 0,18-0,60 | 0,80-6,00 | 10 | 17997 | 26305 | 18003 | | | | 13,61 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | |
| DNMG-150608-EL-ZSX | 15,50 | 12,70 | 6,35 | 5,16 | 0,80 | 0,14-0,50 | 0,80-5,00 | 10 | | 26272 | | | | | 13,61 |
| DNMG-150608-ER-ZSX | 15,50 | 12,70 | 6,35 | 5,16 | 0,80 | 0,14-0,50 | 0,80-5,00 | 10 | | 10341 | | | | | 13,61 |
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | |
| DNMG-150404-ZFCE | 15,50 | 12,70 | 4,76 | 5,16 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | | | | 20001 | 18,20 |
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | | | | | | |
| DNMG-150404-ZMCE | 15,50 | 12,70 | 4,76 | 5,16 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | | | | 20002 | 18,20 |
| INOX Semi-Desbaste / Semi-Roughing Stainless / INOX Semi-Ébauche | | | | | | | | | | | | | | | |
| DNMG-150604-E-ZNM | 15,50 | 12,70 | 6,35 | 5,16 | 0,40 | 0,10-0,30 | 0,30-6,00 | 10 | | | | | 35199 | | 13,61 |
| DNMG-150608-E-ZNM | 15,50 | 12,70 | 6,35 | 5,16 | 0,80 | 0,12-0,45 | 0,50-6,40 | 10 | | | | | 35200 | | 13,61 |

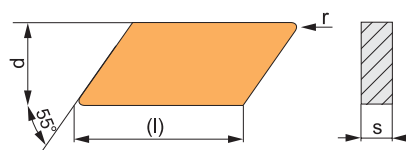
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 | N° Art. C-G25 | N° Art. C-S15 | N° Art. C-S25 | € |
|--|------------------------|-------|------|-------------------|------|---|-------------------|----|---------------|---------------|---------------|---------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | |
| Semi-Desbaste Alto Rendimiento / High Performance Semi-Roughing / Semi-Ébauche Haut Rendement | | | | | | | | | | | | | |
| DNMG-150404-ZPM | 15,50 | 12,70 | 4,76 | 5,16 | 0,40 | 0,15-0,50 | 0,50-6,00 | 10 | 71285 | 71286 | | | 14,18 |
| DNMG-150408-ZPM | 15,50 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-6,00 | 10 | 71287 | 71288 | | | 14,18 |
| DNMG-150608-ZPM | 15,50 | 12,70 | 6,35 | 5,16 | 0,80 | 0,15-0,50 | 0,50-6,00 | 10 | 71289 | 71290 | | | 14,98 |
| INOX Acabado Alto Rendimiento / High Performance Finishing Stainless / INOX Finition Haut Rendement | | | | | | | | | | | | | |
| DNMG-150604-ZNF | 15,50 | 12,70 | 6,35 | 5,16 | 0,40 | 0,10-0,30 | 0,30-6,00 | 10 | | | 16956 | 16958 | 14,98 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8530 DNMG-110404-E-ZF C-G15Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 489, 496

Ref. 8535

PLAQUITA INTERCAMBIABLE TORNEADO KNUX

KNUX Turning Indexable Insert
Plaquette tournage KNUX



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G25 | € |
|---|------------------------|---------|---------|---------|---|----------------------|----|------------------|--------------|
| | l mm | d mm | s mm | r mm | f mm | a _p mm | | | |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | |
| KNUX-160405-SR-Z3 | 16,50 | 9,52 | 4,76 | 0,50 | 0,20-0,35 | 1,00-6,00 | 10 | 13393 | 13,25 |
| KNUX-160405-SL-Z3 | 16,50 | 9,52 | 4,76 | 0,50 | 0,20-0,35 | 1,00-6,00 | 10 | 13396 | 13,25 |
| KNUX-160410-SR-Z3 | 16,50 | 9,52 | 4,76 | 1,00 | 0,40-0,70 | 1,50-6,00 | 10 | 13399 | 13,25 |
| KNUX-160410-SL-Z3 | 16,50 | 9,52 | 4,76 | 1,00 | 0,40-0,70 | 1,50-6,00 | 10 | 13400 | 13,25 |



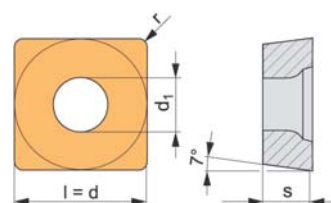
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8535 KNUX-160405-SR-Z3 C-G25

Porta Plaquitas / Tool Holder / Porte-Plaquettes:
Pag. 485

Ref. 8540

PLAQUITA INTERCAMBIABLE TORNEADO SCMT

SCMT Turning Indexable Insert
Plaquette tournage SCMT



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-525 | N° Art. P-720 | € |
|--|------------------------|---------|---------|----------------------|---|-----------|----------------------|------------------|------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | |
| Acabado / Finishing / Finition | | | | | | | | | | |
| SCMT-09T304-E-Z7 | 9,52 | 9,52 | 3,97 | 4,40 | 0,40 | 0,06-0,23 | 0,11-2,00 | 10 | 26307 | 8,60 |
| SCMT-09T308-E-Z7 | 9,52 | 9,52 | 3,97 | 4,40 | 0,80 | 0,08-0,30 | 0,15-2,00 | 10 | 26308 | 8,60 |
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | |
| SCMT-120408-E-Z8 | 12,70 | 12,70 | 4,76 | 5,50 | 0,80 | 0,12-0,45 | 0,60-3,60 | 10 | 26310 | 10,39 |
| SCMT-120412-E-Z8 | 12,70 | 12,70 | 4,76 | 5,50 | 1,20 | 0,14-0,60 | 0,72-3,60 | 10 | 26311 | 10,39 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | |
| SCMT-120404-E-ZRR | 12,70 | 12,70 | 4,76 | 5,50 | 0,40 | 0,09-0,27 | 0,30-3,60 | 10 | 81193 | 10,39 |
| SCMT-120408-E-ZRR | 12,70 | 12,70 | 4,76 | 5,50 | 0,80 | 0,12-0,45 | 0,60-3,60 | 10 | 18015 18021 | 10,39 |



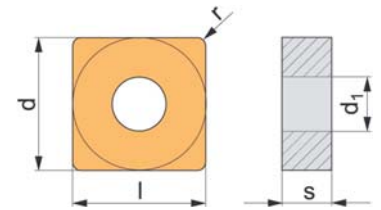
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8540 SCMT-09T304-E-Z7 C-525





Porta Plaquitas bajo demanda / Tool Holder upon request
/ Porte-Plaquettes sur demande


Ref. **8550****PLAQUITA INTERCAMBIABLE TORNEADO SNMG**

SNMG Turning Indexable Insert

Plaquette tournage SNMG



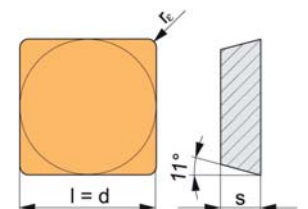
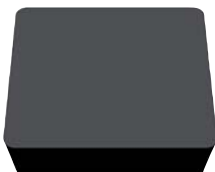
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 C-515 | N° Art. C-G25 C-525 | N° Art. C-G40 C-540 | N° Art. P-710 | N° Art. P-720 | € | |
|---|------------------------|---------|---------|----------------------|---------|---|----------------------|-----------|---------------------------|---------------------------|---------------------------|------------------|------------------|-------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | | | |
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | |
|  | SNMG-120404-E-ZFM | 12,70 | 12,70 | 4,76 | 5,16 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | 18039 | 26313 | | 18044 | | 9,32 |
| | SNMG-120408-E-ZFM | 12,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | | 42919 | | | | 9,32 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | |
|  | SNMG-120408-E-ZM | 12,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-6,00 | 10 | 18045 | 26314 | | | | 9,32 |
| | SNMG-120412-E-ZM | 12,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-6,00 | 10 | 18047 | 26316 | 18055 | | | 9,32 |
| Desbaste / Roughing / Ébauche | | | | | | | | | | | | | | | |
|  | SNMG-120408-E-ZR | 12,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,55 | 0,80-7,00 | 10 | | 18078 | 18079 | | | 9,32 |
| | SNMG-120412-E-ZR | 12,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,70 | 1,00-7,00 | 10 | 18085 | | 18171 | | | 9,32 |
| INOX Semi-Desbaste / Semi-Roughing Stainless / INOX Semi-Ébauche | | | | | | | | | | | | | | | |
|  | SNMG-090304-E-ZNM | 9,52 | 9,52 | 3,18 | 3,81 | 0,40 | 0,10-0,30 | 0,50-4,50 | 10 | | | | | 73532 | 8,64 |
| | SNMG-120408-E-ZNM | 12,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,12-0,45 | 0,50-6,40 | 10 | | | | | 35206 | 9,32 |
| | SNMG-120412-E-ZNM | 12,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,15-0,60 | 0,50-6,40 | 10 | | | | | 72894 | 10,34 |


| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-S15 | N° Art. C-S25 | € | |
|---|------------------------|---------|---------|----------------------|---------|---|----------------------|-----------|------------------|------------------|-------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | |
| INOX Acabado Alto Rendimiento/ High Performance Finishing Stainless / INOX Finition Haut Rendement | | | | | | | | | | | | |
|  | SNMG-120408-ZNF | 12,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,12-0,45 | 0,50-6,40 | 10 | 81957 | 16979 | 10,34 |
| | SNMG-120412-ZNF | 12,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,15-0,60 | 0,50-6,40 | 10 | 16984 | 16985 | 10,34 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8550 SNMG-120404-E-ZFM C-515Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 490Ref. **8554****PLAQUITA INTERCAMBIABLE TORNEADO SPUN**

SPUN Turning Indexable Insert

Plaquette tournage SPUN



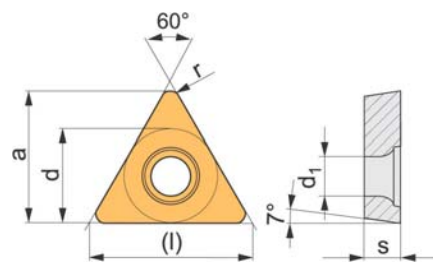
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-525 | € |
|---|------------------------|---------|---------|---------|---------|---|-----------|----|------------------|------|
| | l mm | d mm | s mm | r mm | f mm | a _p mm | | | | |
|  | SPUN-120308 | 12,70 | 12,70 | 3,18 | 0,80 | 0,15-0,40 | 1,00-5,00 | 10 | 42920 | 8,25 |
| | SPUN-120312 | 12,70 | 12,70 | 3,18 | 1,20 | 0,20-0,50 | 1,00-5,00 | 10 | 42921 | 8,25 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8554 SPUN-120308 C-525Porta Plaquetas / Tool Holder
Porte-Plaquettes: Pag. 485

Ref. 8558

PLAQUITA INTERCAMBIABLE TORNEADO TCGT

TCGT Turning Indexable Insert
Plaquette tournage TCGT



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-010 | N° Art. P-710 | N° Art. P-720 | € |
|--------------------------------|------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | 10 | | | | |
| Aluminio / Aluminium | | | | | | | | | | | | |
| TCGT-110202-F-ZAL | 11,00 | 6,35 | 2,38 | 2,80 | 0,20 | 0,07-0,15 | 0,05-4,00 | 10 | 18177 | 18172 | | 11,84 |
| TCGT-110204-F-ZAL | 11,00 | 6,35 | 2,38 | 2,80 | 0,40 | 0,10-0,20 | 0,10-4,00 | 10 | 18345 | | | 11,84 |
| TCGT-16T304-F-ZAL | 16,50 | 9,52 | 3,97 | 4,40 | 0,40 | 0,10-0,20 | 0,10-5,50 | 10 | 18388 | 18351 | | 15,04 |
| TCGT-16T308-F-ZAL | 16,50 | 9,52 | 3,97 | 4,40 | 0,80 | 0,15-0,50 | 0,10-5,50 | 10 | 18400 | 18391 | | 15,04 |
| INOX / Stainless / Inox | | | | | | | | | | | | |
| TCGT-110204-E-ZNF | 11,00 | 6,35 | 2,38 | 2,80 | 0,40 | 0,10-0,20 | 0,10-4,00 | 10 | | | 18318 | 11,84 |



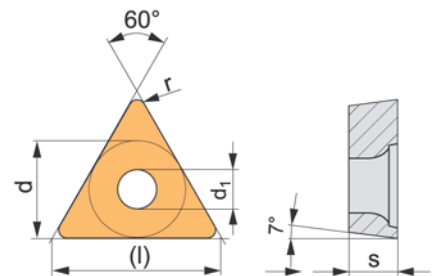
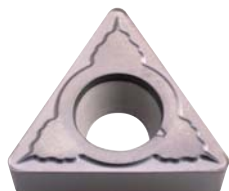
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8558 TCGT-110202-F-ZAL P-010

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 491, 498

Ref. 8560

PLAQUITA INTERCAMBIABLE TORNEADO TCMT

TCMT Turning Indexable Insert
Plaquette tournage TCMT



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G25 | N° Art. P-H20 P-720 | N° Art. P-Cermet | € |
|--|------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|---------------------------|---------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | 10 | | | | |
| Acabado / Finishing / Finition | | | | | | | | | | | | |
| TCMT-090204-E-ZMM | 9,63 | 5,56 | 2,38 | 2,50 | 0,40 | 0,05-0,19 | 0,10-1,70 | 10 | | 77228 | | 8,25 |
| TCMT-110202-E-ZMM | 11,00 | 6,35 | 2,38 | 2,80 | 0,20 | 0,03-0,13 | 0,06-1,70 | 10 | | 26317 | | 8,25 |
| TCMT-110204-E-ZMM | 11,00 | 6,35 | 2,38 | 2,80 | 0,40 | 0,05-0,19 | 0,10-1,70 | 10 | | 26320 | | 8,25 |
| TCMT-16T304-E-ZMM | 16,50 | 9,52 | 3,97 | 4,40 | 0,40 | 0,06-0,23 | 0,11-2,00 | 10 | | 26322 | | 8,60 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | |
| TCMT-16T304-E-ZRR | 16,50 | 9,52 | 3,97 | 4,40 | 0,40 | 0,08-0,25 | 0,25-3,00 | 10 | 23957 | | | 8,60 |
| TCMT-16T308-E-ZRR | 16,50 | 9,52 | 3,97 | 4,40 | 0,80 | 0,10-0,45 | 0,50-3,00 | 10 | 26323 | 10778 | | 8,60 |
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | | | |
| TCMT-16T308-ZMCE | 16,50 | 9,52 | 3,97 | 4,40 | 0,80 | 0,10-0,40 | 0,30-3,00 | 10 | | | 20029 | 13,48 |



Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8560 TCMT-110202-E-ZMM P-H20

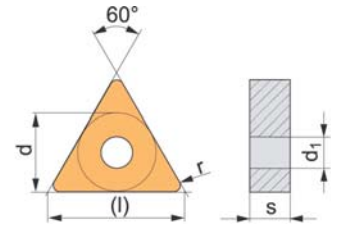
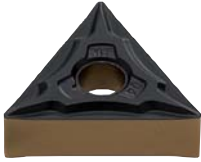
Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 491, 498

Ref. 8570

PLAQUITA INTERCAMBIABLE TORNEADO TNMG

TNMG Turning Indexable Insert

Plaquette tournage TNMG



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | Cub | N° Art. | N° Art. | N° Art. | N° Art. | N° Art. | N° Art. | N° Art. | € |
|---|---------------------------|---------|---------|----------------------|---------|---|----------------------|----------------|-------|----------------|----------------|---------|---------|----------|---------|---------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | C-G15 C-515 | | C-G25 C-525 | C-G40 C-540 | P-625 | P-720 | P-Cermet | P-010 | | |
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | | | |
| TNMG-160404-E-ZFM | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | 18811 | 26325 | | 18812 | | | | | 9,32 |
| TNMG-160408-E-ZFM | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | 42922 | 42924 | | | | | | | 9,32 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | | | |
| TNMG-160404-E-ZM | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,10-0,30 | 0,40-5,00 | 10 | 42925 | 42927 | | | | | | | 9,32 |
| TNMG-160408-E-ZM | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,15-0,40 | 0,50-5,00 | 10 | 18924 | 26326 | 19006 | | | | | | 9,32 |
| TNMG-160412-E-ZM | 16,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,18-0,60 | 0,80-5,00 | 10 | | 26327 | 19195 | | | | | | 9,32 |
| TNMG-220408-E-ZM | 22,00 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,50 | 0,50-6,50 | 10 | 42928 | 42929 | | | | | | | 13,61 |
| TNMG-220412-E-ZM | 22,00 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-6,60 | 10 | 42930 | 42931 | | | | | | | 13,61 |
| Desbaste / Roughing / Ébauche | | | | | | | | | | | | | | | | | |
| TNMG-160408-E-ZR | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,20-0,55 | 0,80-6,00 | 10 | 59284 | 59285 | | | | | | | 9,32 |
| TNMG-160412-E-ZR | 16,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,18-0,60 | 0,80-5,00 | 10 | 59286 | 59287 | | | | | | | 9,32 |
| TNMG-220408-E-ZR | 22,00 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,55 | 0,80-6,50 | 10 | 19213 | 26275 | 19215 | | | | | | 13,61 |
| TNMG-220412-E-ZR | 22,00 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,70 | 1,00-7,00 | 10 | 19228 | 11272 | 10790 | | | | | | 13,61 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | | | |
| TNMG-160404-ER-ZSX | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,12-0,30 | 1,00-3,50 | 10 | | 11274 | | | | | | | 9,32 |
| TNMG-160408-ER-ZSX | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,15-0,50 | 1,30-3,50 | 10 | | 11277 | | | | | | | 9,32 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | | | |
| TNMG-160404-EL-ZSX | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,12-0,30 | 1,00-3,50 | 10 | | 11275 | | | | | | | 9,32 |
| TNMG-160408-EL-ZSX | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,15-0,50 | 1,30-3,50 | 10 | | 11278 | | | | | | | 9,32 |
| Acabado / Finishing / Finition | | | | | | | | | | | | | | | | | |
| TNMG-160404-ZFCE | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,05-0,40 | 0,20-1,50 | 10 | | | | | | 20032 | | | 13,29 |
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | | | | | | | | |
| TNMG-160408-ZMCE | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,30-3,00 | 10 | | | | | | 20033 | | | 13,29 |
| INOX Semi-Desbaste / Semi-Roughing Stainless / INOX Semi-Ébauche | | | | | | | | | | | | | | | | | |
| TNMG-160404-E-ZNM | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,10-0,30 | 0,50-4,00 | 10 | | | | | 35207 | | | | 9,32 |
| TNMG-160408-E-ZNM | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,12-0,45 | 0,50-4,80 | 10 | | | | | 35209 | | | | 9,32 |
| ALUMINIUM Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | | | | | |
| TNMG-160404-ZAL | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,10-0,20 | 0,30-3,80 | 10 | | | | | | | | 70118 | 9,32 |
| TNMG-160408-ZAL | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,30-3,80 | 10 | | | | | | | | 70124 | 9,32 |
| TNMG-160412-ZAL | 16,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,15-0,60 | 0,40-3,80 | 10 | | | | | | | | 70136 | 9,32 |

| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | Cub | N° Art. | N° Art. | N° Art. | N° Art. | € |
|--|---------------------------|---------|---------|----------------------|---------|---|----------------------|-------|-------|---------|---------|---------|---------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | C-G15 | | C-G25 | C-S15 | C-S25 | | |
| Semi-Desbaste Alto Rendimiento / High Performance Semi-Roughing / Semi-Ébauche Haut Rendement | | | | | | | | | | | | | | |
| TNMG-160404-ZPM | 15,50 | 12,70 | 4,76 | 3,81 | 0,40 | 0,15-0,50 | 0,50-6,00 | 10 | 71291 | 71292 | | | | 10,25 |
| TNMG-160408-ZPM | 15,50 | 12,70 | 4,76 | 3,81 | 0,80 | 0,15-0,50 | 0,50-6,00 | 10 | 71293 | 71294 | | | | 10,25 |
| TNMG-160412-ZPM | 15,50 | 12,70 | 6,35 | 3,81 | 1,20 | 0,15-0,50 | 0,50-6,00 | 10 | 71295 | 71296 | | | | 10,25 |
| TNMG-220408-ZPM | 22,00 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,55 | 0,80-6,50 | 10 | 17073 | 62421 | | | | 14,76 |
| TNMG-220412-ZPM | 22,00 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,70 | 1,00-7,00 | 10 | 17074 | 17085 | | | | 14,76 |
| INOX Acabado Alto Rendimiento / High Performance Finishing Stainless / INOX Finition Haut Rendement | | | | | | | | | | | | | | |
| TNMG-160404-ZNF | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,10-0,30 | 0,50-4,00 | 10 | | | 16992 | 77508 | | 10,25 |
| TNMG-160408-ZNF | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,12-0,45 | 0,50-4,80 | 10 | | | 81956 | 77509 | | 10,25 |
| TNMG-160412-ZNF | 16,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,18-0,60 | 0,80-5,00 | 10 | | | 16993 | 17019 | | 10,25 |
| TNMG-220404-ZNF | 22,00 | 12,70 | 4,76 | 5,16 | 0,40 | 0,12-0,40 | 0,40-6,00 | 10 | | | 82749 | 17027 | | 14,76 |
| TNMG-220408-ZNF | 22,00 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,55 | 0,80-6,50 | 10 | | | 17038 | 17042 | | 14,76 |
| TNMG-220412-ZNF | 22,00 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,70 | 1,00-7,00 | 10 | | | 17052 | 17068 | | 14,76 |

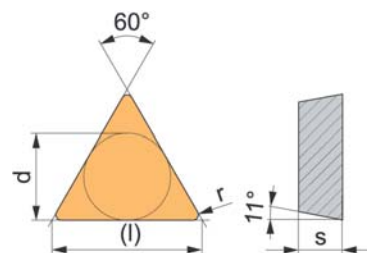
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8570 TNMG-160404-E-ZFM C-G15

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 487, 494

Ref. **8571**

PLAQUITA INTERCAMBIABLE TORNEADO TPMR

TPMR Turning Indexable Insert
Plaquette tournage TPMR



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-515 | N° Art. C-525 | € |
|---|------------------------|------|------|------|---|-------------------|----|---------------|---------------|------|
| | l mm | d mm | s mm | r mm | f mm | a _p mm | | | | |
| Acabado / Finishing / Finition | | | | | | | | | | |
| TPMR-160304-E-Z7 | 16,50 | 9,52 | 3,18 | 0,40 | 0,08-0,20 | 0,50-2,00 | 10 | 29914 | 13406 | 8,25 |
| TPMR-160308-E-Z7 | 16,50 | 9,52 | 3,18 | 0,80 | 0,08-0,35 | 0,50-3,00 | 10 | 29915 | 13408 | 8,25 |
| TPMR-160312-E-Z7 | 16,50 | 9,52 | 3,18 | 1,20 | 0,08-0,55 | 0,50-3,00 | 10 | 29917 | 13411 | 8,25 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | |
| TPMR-160308-E-Z1 | 16,50 | 9,52 | 3,18 | 0,80 | 0,13-0,40 | 1,00-5,00 | 10 | 29919 | 13414 | 8,25 |



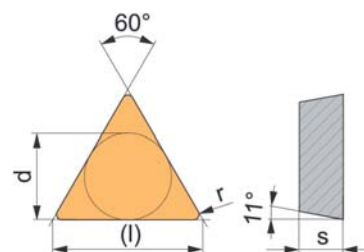
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8571 TPMR-160304-E-Z7 C-525

Porta Plaquetas / Tool Holder
Porte-Plaquettes: Pag. 486, 493

Ref. **8572**

PLAQUITA INTERCAMBIABLE TORNEADO TPUN

TPUN Turning Indexable Insert
Plaquette tournage TPUN

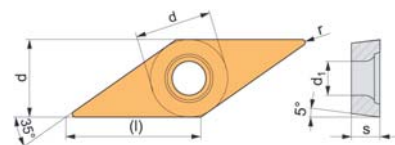
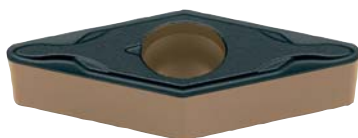


| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-525 | N° Art. P-620 | € |
|---|------------------------|-------|------|------|---|-------------------|----|---------------|---------------|-------|
| | l mm | d mm | s mm | r mm | f mm | a _p mm | | | | |
| Acabado/Semi-Desbaste/Desbaste - Finishing/Semi-Roughing/Roughing- Finition/Semi-Ébauche/Ébauche | | | | | | | | | | |
| TPUN-160304 | 16,50 | 9,52 | 3,18 | 0,40 | 0,10-0,30 | 1,00-5,00 | 10 | 11291 | 29930 | 8,96 |
| TPUN-160308 | 16,50 | 9,52 | 3,18 | 0,80 | 0,15-0,40 | 1,00-5,00 | 10 | 11292 | 29933 | 8,96 |
| TPUN-220408 | 22,00 | 12,70 | 4,76 | 0,80 | 0,15-0,40 | 1,50-7,00 | 10 | 11293 | 29935 | 12,18 |
| TPUN-220412 | 22,00 | 12,70 | 4,76 | 1,20 | 0,20-0,50 | 1,50-7,00 | 10 | 11295 | 29937 | 12,18 |

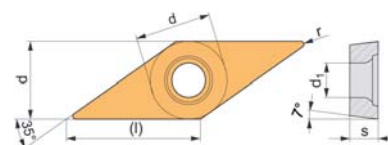


Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8572 TPUN-160304 C-525

Porta Plaquetas / Tool Holder
Porte-Plaquettes: Pag. 486, 493

Ref. **8575****PLAQUITA INTERCAMBIABLE TORNEADO VBMT**VBMT Turning Indexable Insert
Plaquette tournage VBMT

| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G25 | € |
|---|------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | |
| Acabado/Semi-Acabado - Finishing/Semi-Finishing - Finition/Semi-Finition | | | | | | | | | | |
| VBMT-110304-E-ZRR | 11,10 | 6,35 | 3,18 | 2,80 | 0,40 | 0,05-0,19 | 0,10-1,70 | 10 | 11284 | 11,10 |
| VBMT-110308-E-ZRR | 11,10 | 6,35 | 3,18 | 2,80 | 0,80 | 0,05-0,19 | 0,10-1,70 | 10 | 11286 | 11,10 |
| VBMT-160404-E-ZRR | 16,60 | 9,52 | 4,76 | 4,40 | 0,40 | 0,05-0,20 | 0,10-1,80 | 10 | 11288 | 15,75 |
| VBMT-160408-E-ZRR | 16,60 | 9,52 | 4,76 | 4,40 | 0,80 | 0,07-0,27 | 0,14-1,80 | 10 | 11289 | 15,75 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8575 VBMT-1103-04-E-ZRR C-G25Porta Plaquitas / Tool Holder / Porte-Plaquettes:
Pag. 492Ref. **8576****PLAQUITA INTERCAMBIABLE TORNEADO VCGT**VCGT Turning Indexable Insert
Plaquette tournage VCGT

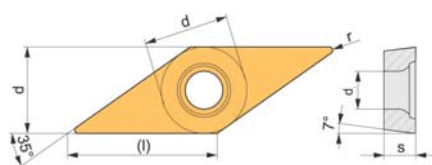
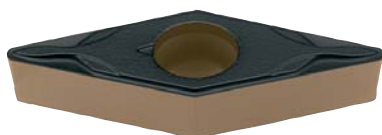
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-010 | N° Art. P-710 | € |
|--|------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|---|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | |
| Semi-Acabado / Semi-Finishing / Semi-Finition | | | | | | | | | | | |
| VCGT-110302-F-ZAL | 11,10 | 6,35 | 3,18 | 2,80 | 0,20 | 0,05-0,12 | 0,05-3,00 | 10 | 78838 | 15,27 | |
| VCGT-110304-F-ZAL | 11,10 | 6,35 | 3,18 | 2,80 | 0,40 | 0,10-0,25 | 0,05-3,00 | 10 | 29870 | 15,27 | |
| VCGT-110308-F-ZAL | 11,10 | 6,35 | 3,18 | 2,80 | 0,80 | 0,15-0,45 | 0,05-3,00 | 10 | 78839 | 15,27 | |
| VCGT-160404-F-ZAL | 16,60 | 9,52 | 4,76 | 4,40 | 0,40 | 0,10-0,25 | 0,10-5,00 | 10 | 71115 | 17,55 | |
| VCGT-160408-F-ZAL | 16,60 | 9,52 | 4,76 | 4,40 | 0,80 | 0,15-0,45 | 0,10-5,00 | 10 | 78841 | 17,55 | |
| INOX / Stainless / Inox | | | | | | | | | | | |
| VCGT-110302-E-ZNF | 11,10 | 6,35 | 3,18 | 2,80 | 0,20 | 0,05-0,12 | 0,05-3,00 | 10 | 81513 | 15,27 | |
| VCGT-110304-E-ZNF | 11,10 | 6,35 | 3,18 | 2,80 | 0,40 | 0,10-0,25 | 0,05-3,00 | 10 | 81514 | 15,27 | |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8576 VCGT-110302-F-ZAL P-010Porta Plaquitas / Tool Holder / Porte-Plaquettes:
Pag. 492, 498

Ref. 8577

PLAQUITA INTERCAMBIABLE TORNEADO VCMT

VCMT Turning Indexable Insert
Plaquette tournage VCMT



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 | N° Art. C-G25 | N° Art. P-720 | € |
|--|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | |
| Acabado / Finishing / Finition | | | | | | | | | | | | |
| VCMT-110304-E-ZMM | 11,10 | 6,35 | 3,18 | 2,80 | 0,40 | 0,05-0,20 | 0,10-1,50 | 10 | | 19317 | 19325 | 11,67 |
| VCMT-110308-E-ZMM | 11,10 | 6,35 | 3,18 | 2,80 | 0,80 | 0,13-0,33 | 0,60-2,55 | 10 | | 19334 | 19348 | 11,67 |
| VCMT-160404-E-ZMM | 16,60 | 9,52 | 4,76 | 4,40 | 0,40 | 0,05-0,20 | 0,10-1,80 | 10 | 81646 | 19359 | 19372 | 15,06 |
| VCMT-160408-E-ZMM | 16,60 | 9,52 | 4,76 | 4,40 | 0,80 | 0,07-0,27 | 0,14-1,80 | 10 | 17086 | 19373 | 19378 | 15,06 |
| Semidesbaste / Semiroughing / Semiébauche | | | | | | | | | | | | |
| VCMT-160404-E-ZRR | 16,60 | 9,52 | 4,76 | 4,40 | 0,40 | 0,07-0,20 | 0,20-2,70 | 10 | | 18873 | | 15,06 |
| VCMT-160408-E-ZRR | 16,60 | 9,52 | 4,76 | 4,40 | 0,80 | 0,09-0,27 | 0,50-2,70 | 10 | | 19345 | | 15,06 |

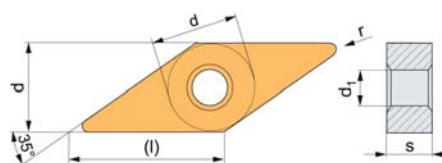
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8577 VCMT-110304-E-ZMM C-G25

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 492, 498

Ref. 8578

PLAQUITA INTERCAMBIABLE TORNEADO VNMG

VNMG Turning Indexable Insert
Plaquette tournage VNMG



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 | N° Art. C-G25 | N° Art. C-S15 | N° Art. C-S25 | € |
|--|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|------------------|--------------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | |
| Acabado / Finishing / Finition | | | | | | | | | | | | | |
| VNMG-160404-E-ZFM | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | 29938 | 29939 | | | 13,28 |
| VNMG-160408-E-ZFM | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | 29940 | 29941 | | | 13,28 |
| VNMG-160412-E-ZFM | 16,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,15-0,60 | 1,20-3,00 | 10 | 29942 | 29944 | | | 13,28 |
| INOX Acabado Alto Rendimiento / High Performance Finishing Stainless / INOX Finition Haut Rendement | | | | | | | | | | | | | |
| VNMG-160404-ZNF | 16,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,05-0,25 | 0,10-1,50 | 10 | | | 17092 | 17096 | 13,85 |
| VNMG-160408-ZNF | 16,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,10-0,40 | 0,10-1,50 | 10 | | | 17100 | 17102 | 13,85 |
| VNMG-160412-ZNF | 16,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,15-0,60 | 1,20-3,00 | 10 | | | 17107 | 17108 | 13,85 |

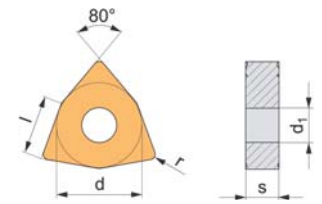
Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8578 VNMG-160404-E-ZFM C-G15

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 488, 494

Ref. **8580****PLAQUITA INTERCAMBIABLE TORNEADO WNMG**

WNMG Turning Indexable Insert

Plaquette tournage WNMG



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 C-515 | N° Art. C-G25 C-525 | N° Art. C-G40 | N° Art. P-720 | € |
|---|------------------------|---------|---------|----------------------|---------|---|----------------------|----|---------------------------|---------------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | |
| Wiper | | | | | | | | | | | | | |
| WNMG-060408-E-ZWM | 6,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,15-0,60 | 0,50-3,50 | 10 | | 19401 | | | 9,32 |
| WNMG-060412-E-ZWM | 6,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,20-0,90 | 0,80-3,50 | 10 | | 19402 | | | 9,32 |
| WNMG-080408-E-ZWM | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,60 | 0,50-5,00 | 10 | | 19404 | | | 11,47 |
| Acabado / Finishing / Finition | | | | | | | | | | | | | |
| WNMG-080404-E-ZF | 8,70 | 12,70 | 4,76 | 5,16 | 0,40 | 0,05-0,30 | 0,10-2,00 | 10 | 19383 | 26331 | | | 10,76 |
| WNMG-080408-E-ZF | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,10-0,40 | 0,10-2,00 | 10 | | 30519 | | | 10,76 |
| Semi-Desbaste / Semi-Roughing / Semi-Ébauche | | | | | | | | | | | | | |
| WNMG-060404-E-ZM | 6,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,10-0,30 | 0,50-3,00 | 10 | | 42933 | | | 8,60 |
| WNMG-060408-E-ZM | 6,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,15-0,50 | 0,50-3,00 | 10 | 19386 | 26328 | | | 8,60 |
| WNMG-080408-E-ZFM | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,40 | 0,70-4,00 | 10 | 42934 | | | 42935 | 10,76 |
| WNMG-080408-E-ZM | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,15-0,40 | 0,50-4,00 | 10 | 19389 | 26332 | 19392 | | 10,76 |
| WNMG-080412-E-ZM | 8,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-4,00 | 10 | | 26333 | | | 10,76 |
| Desbaste / Roughing / Ébauche | | | | | | | | | | | | | |
| WNMG-080408-E-ZR | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,55 | 0,80-5,00 | 10 | 13854 | 11281 | 19396 | | 10,76 |
| WNMG-080412-E-ZR | 8,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,25-0,70 | 1,50-5,00 | 10 | 13855 | 11280 | 19398 | | 10,76 |
| INOX / Stainless / INOX | | | | | | | | | | | | | |
| WNMG-080404-E-ZNM | 8,70 | 12,70 | 4,76 | 5,16 | 0,40 | 0,12-0,30 | 0,50-3,00 | 10 | | | | 35210 | 10,76 |
| WNMG-080408-E-ZNM | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,40 | 0,70-4,00 | 10 | | | | 35211 | 10,76 |

| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-G15 | N° Art. C-G25 | N° Art. C-S15 | N° Art. C-S25 | € |
|--|------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | | |
| Semi-Desbaste Alto Rendimiento / High Performance Semi-Roughing / Semi-Ébauche Haut Rendement | | | | | | | | | | | | | |
| WNMG-080404-ZPM | 8,70 | 12,70 | 4,76 | 5,16 | 0,40 | 0,20-0,40 | 0,50-4,00 | 10 | 71298 | 71299 | | | 11,83 |
| WNMG-080408-ZPM | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,40 | 0,50-4,00 | 10 | 71300 | 71301 | | | 11,83 |
| WNMG-080412-ZPM | 8,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-4,00 | 10 | 71302 | 71303 | | | 11,83 |
| INOX Acabado Alto Rendimiento / High Performance Finishing Stainless / INOX Finition Haut Rendement | | | | | | | | | | | | | |
| WNMG-060404-ZNF | 6,50 | 9,52 | 4,76 | 3,81 | 0,40 | 0,10-0,30 | 0,50-3,00 | 10 | | | 17120 | 17122 | 9,58 |
| WNMG-060408-ZNF | 6,50 | 9,52 | 4,76 | 3,81 | 0,80 | 0,15-0,50 | 0,50-3,00 | 10 | | | 17125 | 17126 | 9,58 |
| WNMG-060412-ZNF | 6,50 | 9,52 | 4,76 | 3,81 | 1,20 | 0,20-0,90 | 0,80-3,50 | 10 | | | 81332 | 81333 | 9,58 |
| WNMG-080404-ZNF | 8,70 | 12,70 | 4,76 | 5,16 | 0,40 | 0,20-0,40 | 0,50-4,00 | 10 | | | 17127 | 17132 | 11,83 |
| WNMG-080408-ZNF | 8,70 | 12,70 | 4,76 | 5,16 | 0,80 | 0,20-0,40 | 0,50-4,00 | 10 | | | 79345 | 17137 | 11,83 |
| WNMG-080412-ZNF | 8,70 | 12,70 | 4,76 | 5,16 | 1,20 | 0,18-0,60 | 0,80-4,00 | 10 | | | 17140 | 17141 | 11,83 |

Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8580 WNMG-060408-E-ZWM C-G25

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 486, 488, 495

ELECCIÓN PORTA-PLAQUITAS TORNEADO

Turning Tool-Holder Choice

Choix Porte-Plaquettes tournage

SISTEMAS ANCLAJE - Clamping Systems - Systèmes fixation

ISO P

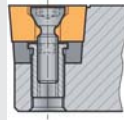


Anclaje para plaquetas negativas con agujero en torneado exterior (acabado o desbaste). Alternativa en torneado interior de agujeros de grandes diámetros

Clamping for negative hole-inserts in external turning (finishing or roughing). Alternate for large diameters holes internal turning

Fixation pour plaquettes négatives avec trou sur tournage extérieur (finition ou ébauche). Option pour tournage intérieur trous de grands diamètres

ISO S

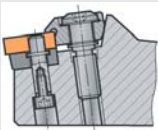


Para portas con cuadradillo pequeño usados en torneado interior o exterior. Con esta solución se evitan obstáculos para evacuar la viruta

For small cross-section holders, used in external or internal turning. Convenient solution as there is no obstacle for chip flow

Pour portes plaquettes avec cage petite employées en tournage intérieur où extérieur. Avec cette solution, on supprime les obstacles pour évacuer les copeaux

ISO M (D)

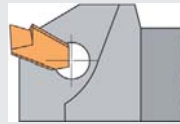


Para mismo tipo de plaquetas que el ISO-P. Usado sobre todo en portas con carga dinámica elevada para torneado exterior

For the same insert-type as ISO-P. Used mainly in enhanced dynamic load holders for external turning

Mêmes plaquettes que l'ISO-P. Employées sur Porteplaquettes avec charge dynamique pour tournage extérieur

ISO X



Marca que identifica portas con sistema de anclaje especial (diferente según el fabricante). Para tronzado y ranurado

Marking that identifies an special clamping-system (different depending on the manufacturer). For parting & grooving

Marque qui identifie porteplaquettes avec système de fixation spécial (différent selon le fabricant). Pour tronzage et rainurage

ISO C



Para plaquetas positivas o negativas sin agujero, con o sin rompevirutas y para torneado interior o exterior

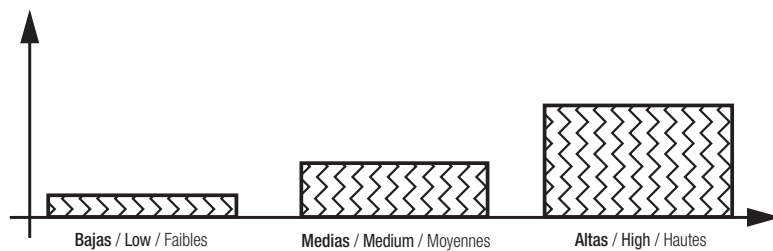
For positive or negative inserts without hole, with or without chipbreakers and for internal or external turning

Pour plaquettes positives où negatives sans trou, avec ou sans briscopeaux pour tournage intérieur ou extérieur

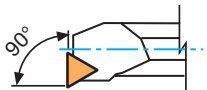
BARRAS MANDRINAR

Boring Bars

Barreaux mandrins



1. Seleccionar un **Angulo de Posición** aproximado a **90°** con un **Radio de Punta** pequeño.

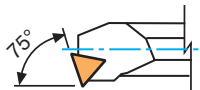


1. Select a **Position Angle** approximately at **90°** with a **small Nose Radius**.



1. Selectionner l'**angle de position** approximatif à **90°** avec un **rayon petit** de la pointe.

2. **Nunca** seleccionar un **Angulo de Posición** menor de **75°**

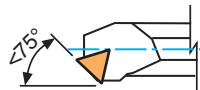


2. **Never** select a **Position Angle** smaller than **75°**



2. **Jamás** seleccionar un **angle de position** inferior a **75°**

3. A **mayor Radio** en la Punta **mayor Vibración**



3. **Bigger** Nose **Radius** = **more** **Vibration**



3. A **plus grand Rayon** sur la **Pointe** = **plus de** **Vibrations**

Seleccionar Herramientas y Plaquetas positivas.

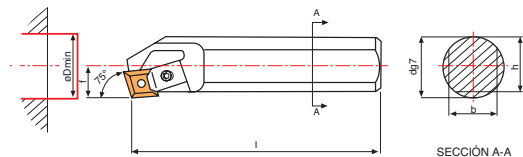
Dm/mm = Tener en cuenta el **diámetro menor del agujero** para que la herramienta no roce contra el material a trabajar.

Select Positive Tools & Inserts.

Dm/mm = Have in mind the **hole minor diameter** in order the tool not to touch the working material.

Selectionner outils et plaquettes positives.

Dm/mm = Prendre en considération le **diamètre inférieur du trou** pour que le trou ne touche pas le matériel à usiner.



| | d mm | f mm | l mm | D _{min} mm |
|-----------------|---------|---------|---------|------------------------|
| CNMG 1204... | 25 | 17 | 250 | 32 |
| | 25 | 17 | 250 | 32 |
| | 32 | 22 | 300 | 40 |
| | 32 | 22 | 300 | 40 |

CÓDIGOS ISO ELECCIÓN PORTA-PLAQUITAS TORNEADO EXTERIOR

External Turning Tool-Holder Choice ISO Codes

Codes ISO choix Porte-Plaquettes tournage extérieur

| 1 | 2 | 3 | 4 |
|--|---|--|---|
| Designación Amarre Clamping Designation Type attachement | Forma Plaquita Insert Shape Forme plaquette | Tipo Herramienta - Ángulo Filo Corte Tool Style - Cutting Edge Angle Type outil - Angle arête de coupe | Angulo Incidencia Clearance Angle Angle d'incidence |
| C | S | A | α_n |
| D | C | B | N |
| P | T | C | C |
| M | D | D | P |
| S | R | E | $\alpha_n=0^\circ$ |
| X | K | F | $\alpha_n=7^\circ$ |
| G | V | G | $\alpha_n=11^\circ$ |
| | W | H | |
| | L | J | |
| | | K | |
| | | L | |
| | | M | |
| | | N | |
| | | P | |
| | | Q | |
| | | R | |
| | | S | |
| | | S | |
| | | T | |
| | | U | |
| | | V | |
| | | W | |
| | | Y | |
| | | Z | |

| 5 |
|--|
| Dirección Corte Direction of Cut Direction coupe |
| R |
| L |
| N |

| | | | | | | | | | |
|---|---|---|---|---|---|----|----|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| P | C | L | N | R | - | 32 | 25 | L | 12 |

| 6 | | | | | |
|--|----|----|----|----|----|
| Altura Mango (mm) Shank Height (mm) Hauteur queue (mm) | | | | | |
| 08 | 10 | 12 | 16 | 20 | 25 |
| 32 | 38 | 40 | 45 | 50 | |

| 7 | | | | | |
|--|----|----|----|----|----|
| Ancho Mango (mm) Shank Width (mm) Epaisseur queue (mm) | | | | | |
| 08 | 10 | 12 | 16 | 20 | 25 |
| 32 | 38 | 40 | 45 | 50 | |

| 8 | |
|---|------------|
| Longitud Total Total Length Longueur totale | |
| | l_1 [mm] |
| D | 60 |
| E | 70 |
| F | 80 |
| H | 100 |
| J | 110 |
| K | 125 |
| L | 140 |
| M | 150 |
| N | 160 |
| P | 170 |
| Q | 180 |
| R | 200 |
| S | 250 |
| T | 300 |
| U | 350 |
| V | 400 |
| W | 450 |
| X | Spec. |
| Y | 500 |

| 9 | | | | | | | | |
|--|----|----|----|----|----|----|----|----|
| Longitud Filo Corte Cutting Edge Length Longueur arête coupe | | | | | | | | |
| | S | C | D | V | K | W | T | R |
| d [mm] | | | | | | | | |
| 6,00 | | | | | | | | 06 |
| 6,35 | | 06 | 07 | 11 | | | 11 | |
| 8,00 | | | | | | | | 08 |
| 9,525 | 09 | 09 | 11 | 16 | 19 | 06 | 16 | |
| 10,00 | | | | | | | | 10 |
| 12,00 | | | | | | | | 12 |
| 12,70 | 12 | 12 | 15 | | | 08 | 22 | 12 |
| 15,875 | 15 | 16 | | | | | 27 | 15 |
| 16,00 | | | | | | | | 16 |
| 19,05 | 19 | 19 | | | | | | 19 |
| 20,00 | | | | | | | | 20 |
| 25,00 | | | | | | | | 25 |
| 25,40 | 25 | 25 | | | | | | 25 |

CÓDIGOS ISO ELECCIÓN PORTA-PLAQUITAS TORNEADO INTERIOR

Internal Turning Tool-Holder Choice ISO Codes

Codes ISO choix Porte-Plaquettes tournage intérieur

| 1 | |
|-------------------------|---|
| Mango Shank Queue | |
| S | Mango Acero Steel Shank Queue acier |
| A | Mango Acero Agujero Refrigeración Steel Shank with Coolant Hole Queue acier lubrification interne |

| 2 | | | | |
|--|----|----|----|----|
| Mango Ø (mm) Shank Ø (mm) Queue Ø (mm) | | | | |
| 08 | 10 | 12 | 16 | 20 |
| 25 | 32 | 40 | 50 | 60 |

| | | | | | | | | | |
|---|----|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| A | 40 | T | - | P | C | L | N | L | 12 |

| 3 | |
|---|---------------------|
| Longitud Total Total Length Longueur totale | |
| | l ₁ [mm] |
| D | 60 |
| E | 70 |
| F | 80 |
| H | 100 |
| J | 110 |
| K | 125 |
| L | 140 |
| M | 150 |
| N | 160 |
| P | 170 |
| Q | 180 |
| R | 200 |
| S | 250 |
| T | 300 |
| U | 350 |
| V | 400 |
| W | 450 |
| X | Spec. |
| Y | 500 |

| 4 | |
|--|--|
| Designación Amarre Clamping Designation Type attachement | |
| C | |
| D | |
| P | |
| M | |
| S | |
| X | |
| G | |

| 5 | |
|---|--|
| Forma Plaquita Insert Shape Forme plaquette | |
| S | |
| T | |
| R | |
| W | |
| L | |
| C | |
| D | |
| K | |
| V | |

| 6 | | | | |
|--|--------|-----|---------|---------|
| Tipo Herramienta - Angulo Filo Corte Tool Style - Cutting Edge Angle Type outil - Angle arête de coupe | | | | |
| A | B | C | D | D |
| 90° | 75° | 90° | 45° | |
| E | F | G | H | J |
| 60° | 90° | 90° | 107°30' | 93° |
| K | L | M | N | P |
| 75° | 95° | 50° | 62°30' | 117°30' |
| Q | R | S | S | T |
| 107°30' | 75° | 45° | | 60° |
| U | V | W | | Y |
| 93° | 72°30' | 60° | | 85° |
| Z | | | | |

| 7 | | |
|---|--------------------|---------------------|
| Angulo Incidencia Clearance Angle Angle d'incidence | | |
| | | |
| N | C | P |
| α _n =0° | α _n =7° | α _n =11° |

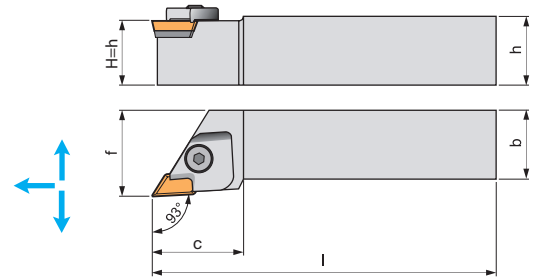
| 9 | | | | | | | | |
|---|----|----|----|----|----|----|----|----|
| Longitud Filo de Corte Cutting Edge Length Longueur arête coupe | | | | | | | | |
| d [mm] | S | C | D | V | K | W | T | R |
| 6,00 | | | | | | | 11 | 06 |
| 6,35 | | 06 | 07 | 11 | | | | 08 |
| 8,00 | | | | | | | | |
| 9,525 | 09 | 09 | 11 | 16 | 19 | 06 | 16 | |
| 10,00 | | | | | | | | 10 |
| 12,00 | | | | | | | | 12 |
| 12,70 | 12 | 12 | 15 | | | 08 | 22 | 12 |
| 15,875 | 15 | 16 | | | | | 27 | 15 |
| 16,00 | | | | | | | | 16 |
| 19,05 | 19 | 19 | | | | | | 19 |
| 20,00 | | | | | | | | 20 |
| 25,00 | | | | | | | | 25 |
| 25,40 | 25 | 25 | | | | | | 25 |

| 8 | |
|--|--|
| Dirección Corte Direction of Cut Direction coupe | |
| R | |
| L | |

Ref. **8726****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS CKJN-93°**

CKJN-93° Negative Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes negatives CKJN-93°



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|---------------|--|--|---|---|
| CKJNR-2525M16 | ● | 13517 | | | KNUX 1604.. | 25 | 25 | 150 | 34 | 32 | 166,44 | Ref. 8815 9,25x14,5 Art. 13824 11,80 € | Ref. 8814 3x10 Art. 10955 1,28 € | Ref. 8812 23,5x2,5 Art. 13827 13,65 € | Ref. 8816 4-W1/4x 25,5xØ10 Art. 13832 3,41 € |
| CKJNL-2525M16 | | | ● | 13519 | | 25 | 25 | 150 | 34 | 32 | 166,44 | 9,25x14,5 Art. 13825 11,80 € | | 2,5x23,5 Art. 13829 13,65 € | |

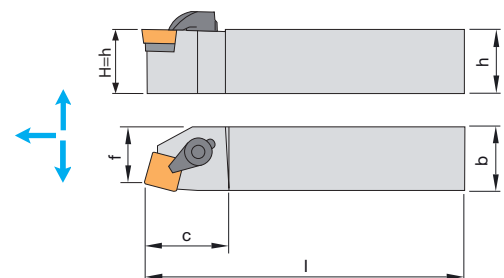
Plaquita / Insert / Plaquette: **Pag. 474**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Tornillo - Screw - Vis |

Ref. **8706****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS CSBP.-75°**

CSBP.-75° Positive Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes positives CSBP.-75°



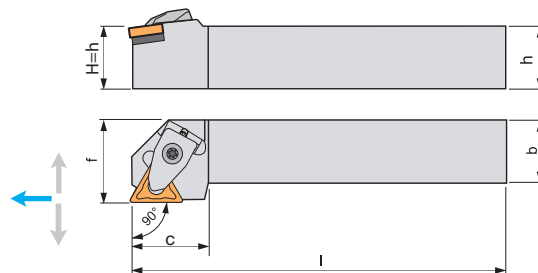
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | |
|----------------|---------|---------|---------|---------|-------------|------|------|------|------|------|--------------|--|---|--|
| CSBPR-2020-K12 | ● | 42954 | | | SPUN 1203.. | 20 | 20 | 125 | 34 | 17 | 90,88 | Ref. 8814 2,1x10 Art. 13826 0,78 € | Ref. 8812 M6x1 - 21x5 Art. 10945 14,70 € | Ref. 8815 CSB- PR-20-25 Art. 43592 9,71 € |
| CSBPL-2020-K12 | | | ● | 42955 | | 20 | 20 | 125 | 34 | 17 | 90,88 | | | |
| CSBPR-2525-M12 | ● | 42957 | | | | 25 | 25 | 150 | 34 | 22 | 99,46 | | | |
| CSBPL-2525-M12 | | | ● | 42958 | | 25 | 25 | 150 | 34 | 22 | 99,46 | | | |

Plaquita / Insert / Plaquette: **Pag. 475**

| | |
|--|--|
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Placa Base - Base Plate - Plaque de base |

Ref. 8707

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS CTGP.-90° CTGP.-90° Positive Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes positives CTGP.-90°



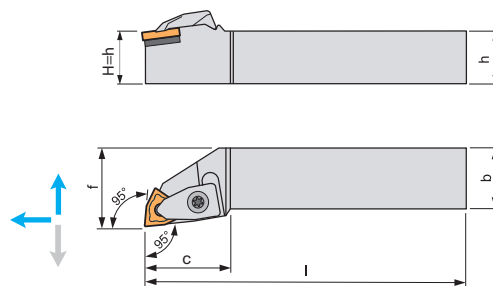
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|--------|--------------------------------|--------------------------|----------------------------------|
| CTGPR-2525M16 | ● | 19407 | | | TP.. 1603.. | 25 | 25 | 150 | 28 | 32,0 | 104,64 | Ref. 8815 | Ref. 8814 | Ref. 8812 |
| CTGPL-2525M16 | | | ● | 19408 | | 25 | 25 | 150 | 28 | 32,0 | 104,64 | CTG-PR-2525 Art. 13834 10,28 € | 2,1x10 Art. 13826 0,78 € | M6x1 - 21x5 Art. 10945 14,70 € |
| CTGPR-3232P22 | ● | 19410 | | | TP.. 2204.. | 32 | 32 | 170 | 34 | 40,0 | 132,15 | Ref. 8815 | Ref. 8814 | Ref. 8812 |
| CTGPL-3232P22 | | | ● | 19411 | | 32 | 32 | 170 | 34 | 40,0 | 132,15 | CTG-PR-3232 Art. 13835 14,21 € | 3x10 Art. 10955 1,28 € | M8x1 - 24x7,6 Art. 10954 17,49 € |

Plaquita / Insert / Plaquette: **Pag. 478**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |

Ref. 8790

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS DWLN.-95° DWLN.-95° Negative Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes negatives DWLN.-95°



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | | |
|--------------|---------|---------|---------|---------|-------------|------|------|------|------|------|--------|-------------------------------|----------------------------|---------------------------|------------------------------------|--|--|
| DWLN-2020K08 | ● | 26511 | | | WNMG 0804.. | 20 | 20 | 125 | 34 | 25 | 101,77 | Ref. 8815 | Ref. 8812 | Ref. 8816 | Ref. 8816 | Ref. 8812 | Ref. 8812 |
| DWLN-2020K08 | | | ● | 26512 | | 20 | 20 | 125 | 34 | 25 | 101,77 | DWLN-20-25 Art. 10843 15,78 € | STJC-16 Art. 31240 11,34 € | DWLN M6 Art. 35215 3,41 € | M4x1x13,5x9,5xø8 Art. 30568 4,61 € | Muelle Spring Ressort M6 Art. 31246 0,83 € | Arandela Clamp Rondelle M6 Art. 31248 0,83 € |
| DWLN-2525M08 | ● | 26514 | | | | 25 | 25 | 150 | 34 | 32 | 107,36 | | | | | | |
| DWLN-2525M08 | | | ● | 26515 | | 25 | 25 | 150 | 34 | 32 | 107,36 | | | | | | |

Plaquita / Insert / Plaquette: **Pag. 481**

| | | | |
|--|--|--|---|
| | Placa Base - Base Plate - Plaque de base | | Tornillo Placa - Plate Screw - Vis Plaque |
| | Brida - Clamp - Bride | | Muelle - Spring - Ressort |
| | Tornillo Brida - Clamp Screw - Vis Bride | | Arandela - Clamp - Rondelle |

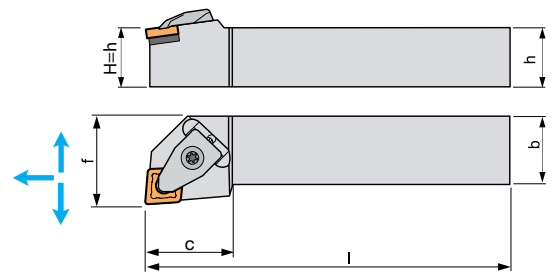
Ref. **8710****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS MCLN.-95°**

MCLN.-95° Negative Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes negatives MCLN.-95°



| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Tornillo - Screw - Vis |



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|---------------|---|---|---|--|
| | | | | | | | | | | | | Ref. 8815 | Ref. 8814 | Ref. 8812 | Ref. 8816 |
| MCLNR-2020K12 | ● | 26439 | | | CNM. 1204.. | 20 | 20 | 125 | 34 | 25 | 98,83 | 7,4x12,45x 12,45 Art. 26553 11,10 € | 5 MCLN-20-25 Art. 26562 3,41 € | 1 MCLN Art. 26557 17,49 € | 5 M4x0,7-8, 6x6,1x ø6,9 Art. 35214 1,79 € |
| MCLNL-2020K12 | | | ● | 26440 | | 20 | 20 | 125 | 34 | 25 | 98,83 | | | | |
| MCLNR-2525M12 | ● | 26442 | | | | 25 | 25 | 150 | 34 | 32 | 104,60 | | | | |
| MCLNL-2525M12 | | | ● | 26443 | | 25 | 25 | 150 | 34 | 32 | 104,60 | | | | |
| MCLNR-2525M19 | ● | 42948 | | | CNM. 19.. | 25 | 25 | 150 | 42 | 32 | 106,63 | 26x17,85x 4,76 Art. 66181 20,81 € | 5 16,5x9 Art. 66182 5,90 € | 1 20x7,75 Art. 66183 20,85 € | 5 M6x1- 13,9x10x 9,75 Art. 66184 1,84 € |
| MCLNL-2525M19 | | | ● | 42949 | | 25 | 25 | 150 | 42 | 32 | 106,63 | | | | |
| MCLNR-3225P19 | ● | 42951 | | | | 32 | 25 | 170 | 42 | 40 | 128,95 | | | | |
| MCLNL-3225P19 | | | ● | 42952 | | 32 | 25 | 170 | 42 | 40 | 128,95 | | | | |

Plaquita / Insert / Plaquette: Pag. 470, 471

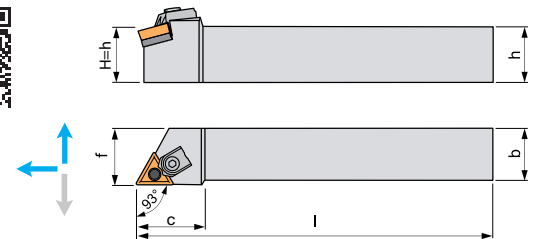
Ref. **8700****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS MTJN.-93°**

MTJN.-93° Negative Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes negatives MTJN.-93°



| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Brida - Clamp - Bride |
| | Tornillo Brida - Clamp Screw - Vis Bride |
| | Pasador - Pin - Goupille |
| | Muelle - Spring - Ressort |
| | Arandela - Clamp - Rondelle |

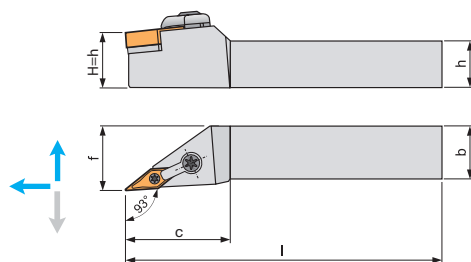


| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|---------------|---|---|--|--|---|---|
| | | | | | | | | | | | | Ref. 8815 | Ref. 8812 | Ref. 8816 | Ref. 8816 | Ref. 8812 | Ref. 8812 |
| MTJNR-2020K16 | ● | 26431 | | | TNMG 1604.. | 20 | 20 | 125 | 34 | 25 | 98,83 | MTJN-20-25 Art. 26554 7,52 € | 5 15,56x 19 Art. 26556 17,49 € | 5 DWLN M5 Art. 69818 3,41 € | 5 ø6x10 Art. 26560 3,41 € | 5 Muelle Spring Ressort M5 Art. 69821 0,83 € | 5 Arandela Clamp Rondelle M5 Art. 69824 0,83 € |
| MTJNL-2020K16 | | | ● | 26433 | | 20 | 20 | 125 | 34 | 25 | 98,83 | | | | | | |
| MTJNR-2525M16 | ● | 26434 | | | | 25 | 25 | 150 | 34 | 32 | 104,60 | | | | | | |
| MTJNL-2525M16 | | | ● | 26437 | | 25 | 25 | 150 | 34 | 32 | 104,60 | | | | | | |
| MTJNR-2525M22 | ● | 11296 | | | TNMG 2204.. | 25 | 25 | 150 | 42 | 32 | 104,60 | MTJN-25 Art. 13864 11,45 € | 5 15,52x 23,5 Art. 13866 20,85 € | 5 DWLN M6 Art. 35215 3,41 € | 5 ø7x15 Art. 30575 3,41 € | 5 Muelle Spring Ressort M6 Art. 31246 0,83 € | 5 Arandela Clamp Rondelle M6 Art. 31248 0,83 € |
| MTJNL-2525M22 | | | ● | 11298 | | 25 | 25 | 150 | 42 | 32 | 104,60 | | | | | | |

Plaquita / Insert / Plaquette: Pag. 477

Ref. 8724

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS MVJN.-93° MVJN.-93° Negative Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes negatives MVJN.-93°



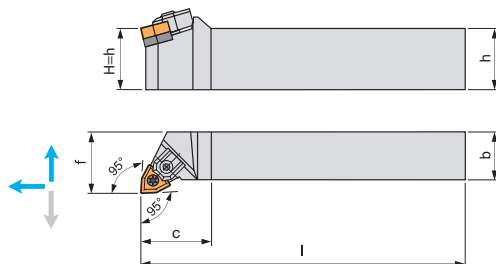
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|---------------|---|---|--|--|
| MVJNR-2020K16 | ● | 29960 | | | VNMG 1604.. | 20 | 20 | 125 | 43 | 25 | 159,48 | 6,7x 25,9x9,2 Art. 29971 14,91 € | M5x 0,8-13x 2,3x5 Art. 29967 10,72 € | M6x1-24x 13,5xø9,5 Art. 29964 13,08 € | M6x1-R-L-20,5x7,1 Art. 29965 3,79 € |
| MVJNL-2020K16 | | | ● | 29961 | | 20 | 20 | 125 | 43 | 25 | 159,48 | | | | |
| MVJNR-2525K16 | ● | 29962 | | | | 25 | 25 | 150 | 43 | 32 | 171,57 | | | | |
| MVJNL-2525K16 | | | ● | 29963 | | 25 | 25 | 150 | 43 | 32 | 171,57 | | | | |

Plaquita / Insert / Plaquette: **Pag. 480**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Tornillo - Screw - Vis |

Ref. 8770

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS MWLN.-95° MWLN.-95° Negative Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes negatives MWLN.-95°



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | |
|--------------|---------|---------|---------|---------|-------------|------|------|------|------|------|---------------|---|---|--|---|
| MWLN-2020K06 | ● | 26499 | | | WNMG 0604.. | 20 | 20 | 125 | 25 | 25 | 98,83 | 5,1x 10,85x 11,3 Art. 10567 9,21 € | M3x0,8-7x4x ø5,5 Art. 10544 1,79 € | M5x0,5-16,6x 6,8 Art. 10540 14,70 € | M3x 0,5-ø4,5x 13,2x7,6 Art. 26560 3,41 € |
| MWLN-2020K06 | | | ● | 26500 | | 20 | 20 | 125 | 25 | 25 | 98,83 | | | | |
| MWLN-2525M06 | ● | 26502 | | | | 25 | 25 | 150 | 25 | 32 | 104,60 | | | | |
| MWLN-2525M06 | | | ● | 26503 | | 25 | 25 | 150 | 25 | 32 | 104,60 | | | | |

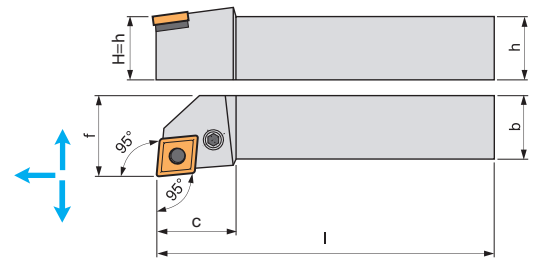
Plaquita / Insert / Plaquette: **Pag. 481**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Tornillo - Screw - Vis |
| | Brida - Clamp - Bride |
| | Pasador - Pin - Goupille |

Ref. **8709****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS PCLN.-95°**

PCLN.-95° Negative Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes negatives PCLN.-95°



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|---------------|---|---|--|
| PCLNR-2020K12 | ● | 34924 | | | CNM. 1204.. | 20 | 20 | 125 | 28 | 25 | 98,83 | Ref. 8815 | Ref. 8813 | Ref. 8816 |
| PCLNL-2020K12 | | | ● | 72037 | | 20 | 20 | 125 | 28 | 25 | 98,83 | 6,4x3,18x 11,6x17,1 Art. 44952 11,10 € | 13,1x 13,5 Art. 35231 9,51 € | 3-M8x 1-20,7x 8,75xø8 Art. 35230 3,41 € |
| PCLNR-2525M12 | ● | 23095 | | | | 25 | 25 | 150 | 28 | 32 | 104,60 | | | |
| PCLNL-2525M12 | | | ● | 72040 | | 25 | 25 | 150 | 28 | 32 | 104,60 | | | |

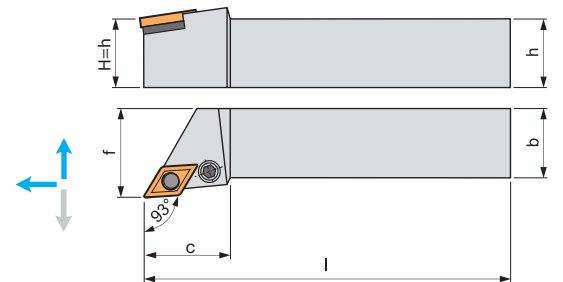
Plaquita / Insert / Plaquette: **Pag. 470, 471**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Palanca - Lever - Levier |
| | Tornillo - Screw - Vis |

Ref. **8725****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS PDJN.-93°**

PDJN.-93° Negative Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes negatives PDJN.-93°



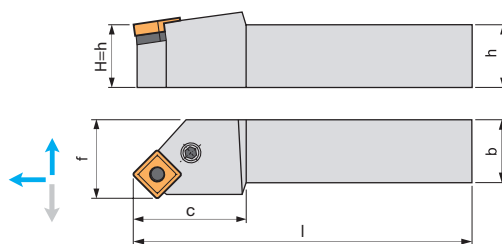
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|--------------|--|--|---|
| PDJNR-2020K11 | ● | 13520 | | | DNM. 1104.. | 20 | 20 | 125 | 28 | 25 | 98,83 | Ref. 8815 | Ref. 8816 | Ref. 8813 |
| PDJNL-2020K11 | | | ● | 13522 | | 20 | 20 | 125 | 28 | 25 | 98,83 | 4,9x 17x8,5 Art. 13794 8,80 € | M6x1-16,7x 8,65xø6 Art. 13795 3,40 € | 12x10,2 Art. 13797 11,38 € |
| PDJNR-2020K15 | ● | 11300 | | | DNM. 1506.. | 20 | 20 | 125 | 34 | 25 | 98,83 | | | |
| PDJNL-2020K15 | | | ● | 11301 | | 20 | 20 | 125 | 34 | 25 | 98,83 | 6,4x 23,4x11,6 Art. 13869 15,33 € | M8x1-21,1x 10,35xø8 Art. 13822 3,11 € | 14,7x16,2 Art. 13868 12,92 € |

Plaquita / Insert / Plaquette: **Pag. 473**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Tornillo - Screw - Vis |
| | Palanca - Lever - Levier |

Ref. 8791

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS NEGATIVAS PSSN-45° PSSN-45° Negative Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes negatives PSSN-45°



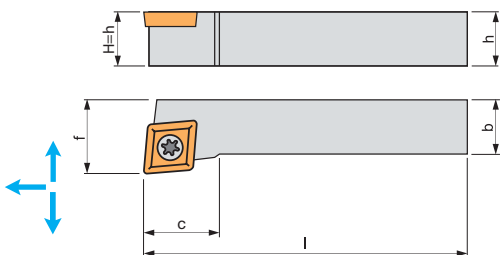
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | |
|---------------|---------|---------|---------|---------|----------------|------|------|------|------|---------------|---------------|---|--|--|
| PSSNR-2020K12 | ● | 35223 | | | SNM. 1204.. | 20 | 20 | 125 | 28 | 25 | 96,93 | Ref. 8815 6,35x 11,66 Art. 35229 8,89 € | Ref. 8816 M8x 1-20,7x 8,75xø8 Art. 35230 3,41 € | Ref. 8813 13,1x13,5 Art. 35231 9,51 € |
| PSSNL-2020K12 | | | ● | 35224 | | 20 | 20 | 125 | 28 | 25 | 96,93 | | | |
| PSSNR-2525M12 | ● | 35225 | | | | 25 | 25 | 150 | 28 | 32 | 102,60 | | | |
| PSSNL-2525M12 | | | ● | 35226 | | 25 | 25 | 150 | 28 | 32 | 102,60 | | | |
| PSSNR-3225P12 | ● | 35227 | | | | 32 | 25 | 170 | 28 | 32 | 112,25 | | | |
| PSSNL-3225P12 | | | ● | 35228 | 32 | 25 | 170 | 28 | 32 | 112,25 | | | | |

Plaquita / Insert / Plaquette: **Pag. 475**

| | | | | | |
|--|--|--|------------------------|--|--------------------------|
| | Placa Base - Base Plate - Plaque de base | | Tornillo - Screw - Vis | | Palanca - Lever - Levier |
|--|--|--|------------------------|--|--------------------------|

Ref. 8704

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS SCLC.-95° SCLC.-95° Positive Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes positives SCLC.-95°



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | | |
|----------------|---------|---------|---------|---------|----------|------|------|------|------|--------------|--------------|--|---|---|-----------|---------------------------------|-----------------------------------|
| SCLCR-0808-D06 | ● | 42936 | | | CC..06.. | 08 | 8 | 60 | 10 | 10 | 76,51 | Ref. 8816 | Ref. 8816 | Ref. 8801 | Ref. 8815 | | |
| SCLCL-0808-D06 | | | ● | 42937 | | 08 | 8 | 60 | 10 | 10 | 76,51 | | | | | T-07 Art. 10846 3,11 € | ZT-07 Art. 19569 10,74 € |
| SCLCR-1010-E06 | ● | 42938 | | | | 10 | 10 | 70 | 10 | 12 | 76,51 | | | | | | |
| SCLCL-1010-E06 | | | ● | 42940 | 10 | 10 | 70 | 10 | 12 | 76,51 | | | | | | | |
| SCLCR-1212-F09 | ● | 42941 | | | CC..09.. | 12 | 12 | 80 | 16 | 16 | 81,90 | Ref. 8816 | Ref. 8816 | Ref. 8801 | Ref. 8815 | | |
| SCLCL-1212-F09 | | | ● | 42942 | | 12 | 12 | 80 | 16 | 16 | 81,90 | | | | | T-15 Art. 10895 3,32 € | ZT-15 Art. 10512 10,74 € |
| SCLCR-1616-H09 | ● | 42943 | | | | 16 | 16 | 100 | 16 | 20 | 84,80 | | | | | | |
| SCLCL-1616-H09 | | | ● | 42944 | 16 | 16 | 100 | 16 | 20 | 84,80 | | | | | | | |
| SCLCR-2020-K09 | ● | 42945 | | | CC..12.. | 20 | 20 | 125 | 16 | 25 | 90,88 | M4x0,5x M6x0,75x 10x5,5xø7,7 Art. 19007 8,19 € | T-15 Art. 30686 3,32 € | 3,95x11,40 x11,40 Art. 54065 10,14 € | | | |
| SCLCL-2020-K09 | | | ● | 42946 | | 20 | 20 | 125 | 16 | 25 | 90,88 | | | | | | |
| SCLCR-2525-M12 | ● | 67771 | | | CC..12.. | 25 | 25 | 150 | 25 | 32 | 99,57 | T-15 Art. 30686 3,32 € | 3,95x11,40 x11,40 Art. 54065 10,14 € | | | | |
| SCLCL-2525-M12 | | | ● | 72069 | | 25 | 25 | 150 | 25 | 32 | 99,57 | | | | | | |

Plaquita / Insert / Plaquette: **Pag. 468**

| | | | | | | | |
|--|------------------------|--|------------------------|--|--|--|--|
| | Tornillo - Screw - Vis | | Tornillo - Screw - Vis | | Destornillador - Screwdriver - Tournevis | | Placa Base - Base Plate - Plaque de base |
|--|------------------------|--|------------------------|--|--|--|--|

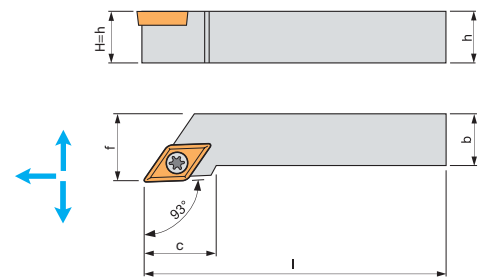
Ref. **8729****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS SDJC.-93°**

SDJC.-93° Positive Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes positives SDJC.-93°



| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | | | |
|---------------|---------|---------|---------|---------|------------|------|------|------|------|------|---------------|--|-----------|---|-----------|--|--|--|
| | | | | | | | | | | | | Ref. 8815 | Ref. 8816 | Ref. 8816 | Ref. 8801 | | | |
| SDJCR-1010E07 | ● | 29946 | | | DC..0702.. | 10 | 10 | 70 | 16 | 12 | 113,91 | | | | | | | |
| SDJCL-1010E07 | | | ● | 29947 | | 10 | 10 | 70 | 16 | 12 | 113,91 | | | | | | | |
| SDJCR-1212F07 | ● | 29949 | | | | 12 | 12 | 80 | 18 | 16 | 121,86 | | | | | | | |
| SDJCL-1212F07 | | | ● | 29950 | | 12 | 12 | 80 | 18 | 16 | 121,86 | | | | | | | |
| SDJCR-1212F11 | ● | 29951 | | | DC..11T3.. | 12 | 12 | 80 | 18 | 16 | 121,86 | | | | | | | |
| SDJCL-1212F11 | | | ● | 29952 | | 12 | 12 | 80 | 18 | 16 | 121,86 | | | | | | | |
| SDJCR-1616H11 | ● | 29953 | | | | 16 | 16 | 100 | 22 | 20 | 126,22 | 6,6x17,48x8,5 Art. 29958 15,33 € | | M3,5x0,6xM5x0,5x8,5x5xø6,25 Art. 29959 8,19 € | | T-15 Art. 10847 3,32 € | | ZT-16 Art. 10856 10,74 € |
| SDJCL-1616H11 | | | ● | 29954 | | 16 | 16 | 100 | 22 | 20 | 126,22 | | | | | | | |

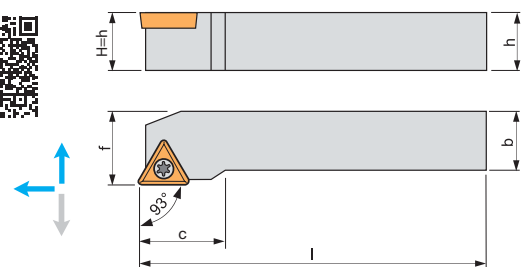
Plaquita / Insert / Plaquette: **Pag. 471, 472**Ref. **8703****PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS STJC.-93°**

STJC.-93° Positive Inserts External Turning Tool-Holder

Porte-Plaquettes tournage extérieur plaquettes positives STJC.-93°



| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

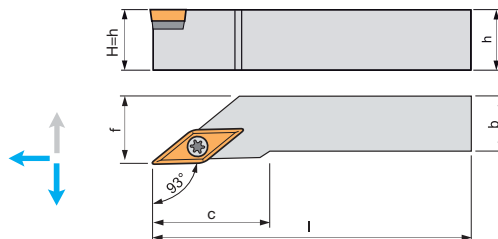


| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | |
|---------------------------|---------|---------|---------|---------|------------|------|------|------|------|------|--------------|---|-----------|--|--|--|
| | | | | | | | | | | | | Ref. 8815 | Ref. 8816 | Ref. 8801 | | |
| New! STJCR-1010E09 | ● | 83741 | | | TC..0902.. | 10 | 10 | 70 | 14 | 12 | 85,99 | | | | | |
| New! STJCL-1010E09 | | | ● | 83742 | | 10 | 10 | 70 | 14 | 12 | 85,99 | | | | | |
| STJCR-1616H11 | ● | 18596 | | | TC..1102.. | 16 | 16 | 100 | 22 | 20 | 89,25 | | | | | |
| STJCL-1616H11 | | | ● | 18649 | | 16 | 16 | 100 | 22 | 20 | 89,25 | | | | | |
| STJCR-2020K16 | ● | 18660 | | | TC..16T3.. | 20 | 20 | 125 | 22 | 25 | 96,04 | 6,6x11,95x13,55 Art. 26554 7,52 € | | T-15 Art. 10847 3,32 € | | ZT-16 Art. 10856 10,74 € |
| STJCL-2020K16 | | | ● | 18664 | | 20 | 20 | 125 | 22 | 25 | 96,04 | | | | | |

Plaquita / Insert / Plaquette: **Pag. 476**

Ref. 8727

PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS SVJB-93° SVJB-93° Positive Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes positives SVJB-93°



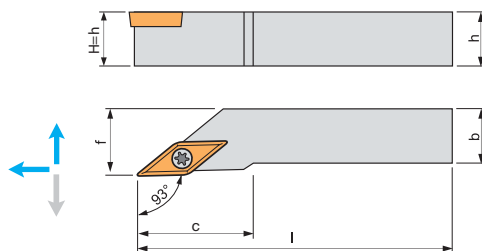
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|--------|--|------------------------------|---------------------------------|--------------------------------|--|---|-----------------------------------|---|
| SVJBR-1616H11 | ● | 82835 | | | VBMT 1103.. | 16 | 16 | 100 | 20 | 20 | 110,87 | Ref. 8815 | Ref. 8816 | Ref. 8816 | Ref. 8801 | | | | |
| SVJBL-1616H11 | | | ● | 82836 | | 16 | 16 | 100 | 20 | 20 | 110,87 | | T-07 Art. 10846 3,11 € | | ZT-07 Art. 19569 10,74 € | | | | |
| SVJBR-2020K16 | ● | 22041 | | | VBMT 1604.. | 20 | 20 | 125 | 34 | 25 | 118,08 | 6,7x 26x8,4 Art. 10865 10,22 € | 5 | T-15 Art. 10847 3,32 € | 5 | M3,5x 0,6xM5x 0,5x 8,5x 5x6,2 Art. 29959 8,19 € | 5 | ZT-16 Art. 10856 10,74 € | 1 |
| SVJBL-2020K16 | | | ● | 64137 | | 20 | 20 | 125 | 34 | 25 | 118,08 | | | | | | | | |
| SVJBR-2525M16 | ● | 82833 | | | | 25 | 25 | 150 | 34 | 32 | 126,35 | | | | | | | | |
| SVJBL-2525M16 | | | ● | 82834 | | 25 | 25 | 150 | 34 | 32 | 126,35 | | | | | | | | |

Plaquita / Insert / Plaquette: Pag. 479

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

Ref. 8728

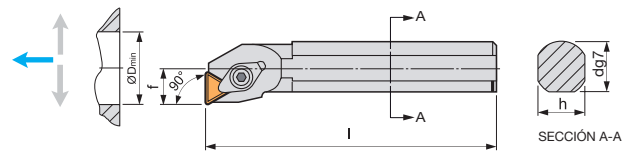
PORTA-PLAQUITAS TORNEADO EXTERIOR PLAQUITAS POSITIVAS SVJC-93° SVJC-93° Positive Inserts External Turning Tool-Holder Porte-Plaquettes tournage extérieur plaquettes positives SVJC-93°



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | h mm | b mm | l mm | c mm | f mm | € | | | | | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|------|------|--------|-------------------------------------|-----------|---|--------------------------------|------------------------------|---|--------------------------------|---|
| SVJCR-1212F11 | ● | 19413 | | | VC.. 1103.. | 12 | 12 | 80 | 25 | 16 | 95,37 | Ref. 8815 | Ref. 8816 | Ref. 8816 | Ref. 8801 | | | | |
| SVJCL-1212F11 | | | ● | 19414 | | 12 | 12 | 80 | 25 | 16 | 95,37 | | | T-07 Art. 10846 3,11 € | ZT-07 Art. 19569 10,74 € | | | | |
| SVJCR-2020K16 | ● | 19417 | | | VC.. 1604.. | 20 | 20 | 125 | 37 | 25 | 111,80 | 6,7x26x8,4 Art. 10865 10,22 € | 5 | M3,5x0,6x M5x0,5x 8,5x 5x6,25 Art. 29959 8,19 € | 5 | T-15 Art. 10847 3,32 € | 5 | ZT-16 Art. 10856 10,74 € | 1 |
| SVJCL-2020K16 | | | ● | 19419 | | 20 | 20 | 125 | 37 | 25 | 111,80 | | | | | | | | |

Plaquita / Insert / Plaquette: Pag. 479

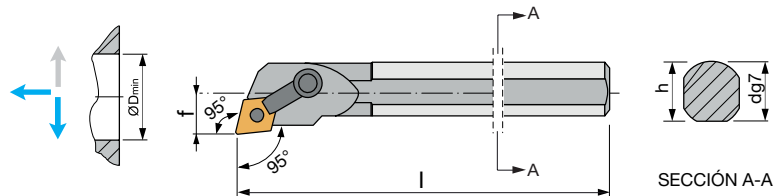
| | | | | | | | |
|--|--|--|------------------------|--|------------------------|--|--|
| | Placa Base - Base Plate - Plaque de base | | Tornillo - Screw - Vis | | Tornillo - Screw - Vis | | Destornillador - Screwdriver - Tournevis |
|--|--|--|------------------------|--|------------------------|--|--|

Ref. **8715**
PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS POSITIVAS S-CTFP.-90°
 S-CTFP.-90° Positive Inserts Internal Turning Tool-Holder
 Porte-Plaquettes tournage intérieur plaquettes positives S-CTFP.-90°

 D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | h mm | l mm | D _{min} mm | € | | |
|------------------|---------|---------|---------|---------|---------------|------|------|------|------|---------------------|---------------|--|--|
| Ref. 8812 | | | | | | | | | | | | | |
| S16R-CTFPR16 | ● | 10882 | | | TP. 1603.. | 16 | 11 | 15 | 200 | 20 | 124,87 | | M6x1-15,3X5,2 Art. 10886 14,70 € |
| S16R-CTFPL16 | | | ● | 10883 | | 16 | 11 | 15 | 200 | 20 | 124,87 | | |
| S25T-CTFPR16 | ● | 11546 | | | | 25 | 17 | 23 | 300 | 32 | 172,49 | | M6x1-16,3X5 Art. 35216 14,70 € |
| S25T-CTFPL16 | | | ● | 11560 | | 25 | 17 | 23 | 300 | 32 | 172,49 | | |

Plaquita / Insert / Plaquette: **Pag. 478**

Brida - Clamp - Bride

Ref. **8731**
PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-MCLN.-95°
 S-MCLN.-95° Negative Inserts Internal Turning Tool-Holder
 Porte-Plaquettes tournage intérieur plaquettes negatives S-MCLN.-95°

 D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

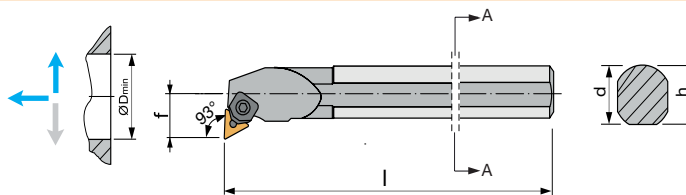
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | D _{min} mm | € | | | | | |
|------------------|---------|---------|---------|---------|----------------|------|------|------|---------------------|---------------|---|--|--|--|--|
| Ref. 8815 | | | | | | | | | | | | | | | |
| S25T-MCLNR12 | ● | 19420 | | | CNM. 1204.. | 25 | 17 | 300 | 32 | 202,79 | | | | | |
| S25T-MCLNL12 | | | ● | 19425 | | 25 | 17 | 300 | 32 | 202,79 | | | | | 2,5-1/4"x26-13,3x3,5x4,2 Art. 10897 4,61 € |
| S32U-MCLNR12 | ● | 19426 | | | | 32 | 22 | 350 | 40 | 262,50 | 7,4x12,45x12,45 Art. 26553 11,10 € | | | | |
| S32U-MCLNL12 | | | ● | 19429 | | 32 | 22 | 350 | 40 | 262,50 | 2,5-1/4"x26-17,2x4x5,3 Art. 10900 10,72 € | | | | |

Plaquita / Insert / Plaquette: **Pag. 470, 471**

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| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |

Ref. 8732

PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-MTUN.-93° S-MTUN.-93° Negative Inserts Internal Turning Tool-Holder Porte-Plaquettes tournage intérieur plaquettes negatives S-MTUN.-93°



D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

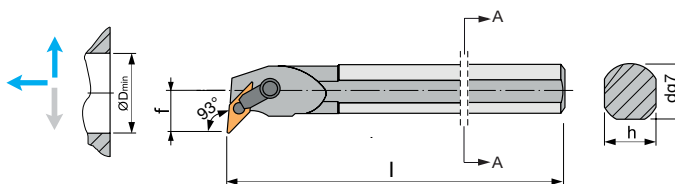
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | D _{min} mm | € | | | | | | | | |
|--------------|---------|---------|---------|---------|-------------|------|------|------|---------------------|--------|--|--|--|---|---|--|--|---|
| | | | | | | | | | | | Ref. 8815 | Ref. 8814 | Ref. 8812 | Ref. 8816 | | | | |
| S25T-MTUNR16 | ● | 35233 | | | TNM. 1604.. | 25 | 17 | 300 | 34 | 213,12 | 6,6x11,95 x13,55 Art. 26554 7,52 € | M3x0,5- ø4,5x 10,1x5 Art. 30573 3,41 € | M8x 1-23,7 Art. 26556 17,49 € | M3x0,5- 5,9x4,1xø5,5 Art. 35239 3,41 € | | | | |
| S25T-MTUNL16 | | | ● | 35234 | | 25 | 17 | 300 | 34 | 213,12 | | | | | 7,4x17,3 x19,7 Art. 13864 11,45 € | | | M3x0,8- 7x4xø5,5 Art. 10544 1,79 € |
| S32U-MTUNR16 | ● | 35235 | | | | 32 | 22 | 350 | 39 | 275,91 | | | | | | | | |
| S32U-MTUNL16 | | | ● | 35236 | TNM. 2204.. | 32 | 22 | 350 | 39 | 275,91 | | | | | | | | |
| S40V-MTUNR22 | ● | 35237 | | | | 40 | 27 | 400 | 48 | 312,74 | | | | | | | | |
| S40V-MTUNL22 | | | ● | 35238 | 40 | 27 | 400 | 48 | 312,74 | | | | | | | | | |

Plaquita / Insert / Plaquette: **Pag. 477**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Tornillo - Screw - Vis |

Ref. 8769

PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-MVUN-93° S-MVUN-93° Negative Inserts Internal Turning Tool-Holder Porte-Plaquettes Tournage Intérieur Plaquettes Negatives S-MVUN-93°

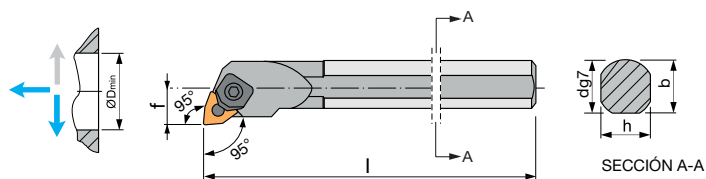


D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | h mm | l mm | D _{min} mm | € | | | | |
|--------------|---------|---------|---------|---------|-------------|------|------|------|------|---------------------|--------|----------------------------------|--|---|---|
| | | | | | | | | | | | | Ref. 8815 | Ref. 8814 | Ref. 8816 | Ref. 8812 |
| S25T-MVUNR16 | ● | 29968 | | | VNMG 1604.. | 25 | 17 | 23 | 300 | 31 | 307,33 | MVJN-16 Art. 30576 14,91 € | M5x 0,8-13x 2,3x5 Art. 29967 10,72 € | M6x 1-R-L- 20,5x 7,1 Art. 29965 3,79 € | M6x 1-21,7x 13,5 Art. 29970 13,08 € |
| S25T-MVUNL16 | | | ● | 29969 | | 25 | 17 | 23 | 300 | 31 | 307,33 | | | | |

Plaquita / Insert / Plaquette: **Pag. 480**

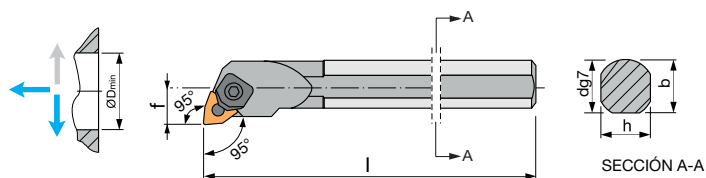
| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Tornillo - Screw - Vis |
| | Brida - Clamp - Bride |

Ref. **8780**
PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-MWLN.-95°
 S-MWLN.-95° Negative Inserts Internal Turning Tool-Holder
 Porte-Plaquettes tournage intérieur plaquettes negatives S-MWLN.-95°

 D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | D _{min} mm | € | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|---------------------|---------------|---|---|---|--|
| S25T-MWLN R06 | ● | 19461 | | | WNMG 0604.. | 25 | 17 | 300 | 32 | 202,79 | Ref. 8815 5,1x 10,85 x11,3 Art. 10567 9,21 € | Ref. 8814 M3x 0,5-ø4,5x 10,1x5 Art. 30573 3,41 € | Ref. 8812 M5x0,5-16,6x6,8 Art. 10540 14,70 € | Ref. 8816 M3x0,8-7x4xø5,5 Art. 10544 1,79 € |
| S25T-MWLN L06 | | | ● | 19463 | | 25 | 17 | 300 | 32 | 202,79 | | | | |

Plaquita / Insert / Plaquette: **Pag. 481**

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|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Tornillo - Screw - Vis |

Ref. **8800**
PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-MWLN.-95°
 S-MWLN.-95° Negative Inserts Internal Turning Tool-Holder
 Porte-Plaquettes tournage intérieur plaquettes negatives S-MWLN.-95°

 D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

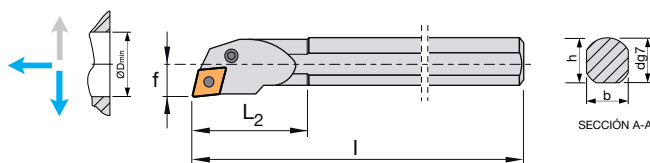
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | D _{min} mm | € | | | | |
|---------------|---------|---------|---------|---------|-------------|------|------|------|---------------------|---------------|---|--|---|---|
| S25T-MWLN R08 | ● | 19527 | | | WNMG 0804.. | 25 | 17 | 300 | 32 | 202,79 | Ref. 8815 | Ref. 8814 S25-MWLN-08 Art. 30574 3,41 € | Ref. 8812 P/MW-08 Art. 61061 14,72 € | Ref. 8816 2,5-M4x 0,7-5,5x 3,7 Art. 30571 8,14 € |
| S25T-MWLN L08 | | | ● | 19529 | | 25 | 17 | 300 | 32 | 202,79 | | | | |
| S32U-MWLN R08 | ● | 19551 | | | | 32 | 22 | 350 | 40 | 262,50 | 7,4x15,35 x15,95 Art. 35232 15,78 € | M4x0,7-ø6x12,5x5,6 Art. 30575 3,41 € | | |
| S32U-MWLN L08 | | | ● | 19567 | | 32 | 22 | 350 | 40 | 262,50 | | | | |

Plaquita / Insert / Plaquette: **Pag. 481**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Brida - Clamp - Bride |
| | Tornillo - Screw - Vis |

Ref. 8733

PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-PCLN.-95° S-PCLN.-95° Negative Inserts Internal Turning Tool-Holder Porte-Plaquettes tournage intérieur plaquettes negatives S-PCLN.-95°



D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

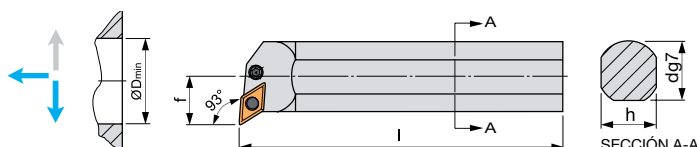
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | D _{min} mm | € | | | |
|--------------|---------|---------|---------|---------|-------------|------|------|------|---------------------|--------|--|--|-------------------------------------|
| S25T-PCLNR12 | ● | 72042 | | | CNM. 1204.. | 25 | 17 | 300 | 25 | 210,76 | Ref. 8815 | Ref. 8813 | |
| S25T-PCLNL12 | | | ● | 72043 | | 25 | 17 | 300 | 25 | 210,76 | | 13,4X12,1X4,7 Art. 72057 11,59 € | M6X1-13,4X6 Art. 72060 3,51 € |
| S32U-PCLNR12 | ● | 44562 | | | | 32 | 22 | 350 | 32 | 273,20 | 11,68X6,80X3,18 Art. 44952 11,10 € | 13,5X13,2X4,2 Art. 72058 11,59 € | M8X1-17X8 Art. 44950 3,51 € |
| S32U-PCLNL12 | | | ● | 72046 | | 32 | 22 | 350 | 32 | 273,20 | | | |

Plaquita / Insert / Plaquette: Pag. 470, 471

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Palanca - Lever - Levier |
| | Tornillo - Screw - Vis |

Ref. 8765

PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS NEGATIVAS S-PDUN.-93° S-PDUN.-93° Negative Inserts Internal Turning Tool-Holder Porte-Plaquettes tournage intérieur plaquettes negatives S-PDUN.-93°

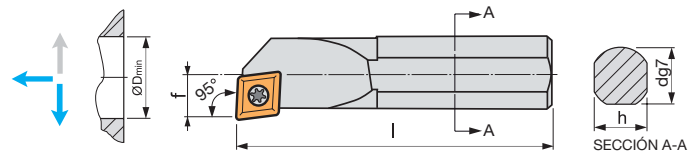


D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | h mm | l mm | D _{min} mm | € | | | | |
|--------------|---------|---------|---------|---------|-------------|------|------|------|------|---------------------|--------|---|-------------------------------------|---|---|
| S25T-PDUNR11 | ● | 13528 | | | DNMG 1104.. | 25 | 17 | 23 | 300 | 32 | 202,79 | Ref. 8815 | Ref. 8813 | Ref. 8814 | |
| S25T-PDUNL11 | | | ● | 13529 | | 25 | 17 | 23 | 300 | 32 | 202,79 | 4,9x 17x8,5 Art. 13794 8,80 € | 12x 10,2 Art. 13797 11,38 € | 4,9x ø5,79x 4,6x5,2 Art. 35218 0,88 € | M6x 1-16,7x 8,65xø6 Art. 13795 3,40 € |
| S32U-PDUNR15 | ● | 11346 | | | DNMG 1504.. | 32 | 22 | 30 | 350 | 40 | 262,50 | 6,4x 23,4x11,6 Art. 13869 15,33 € | 14,7x 16,2 Art. 13868 12,92 € | 6,6x ø7x 5,8x5,2 Art. 35219 1,08 € | M8x 1-17x 9,1xø8 Art. 13819 3,41 € |
| S32U-PDUNL15 | | | ● | 11488 | | 32 | 22 | 30 | 350 | 40 | 262,50 | | | | |

Plaquita / Insert / Plaquette: Pag. 473

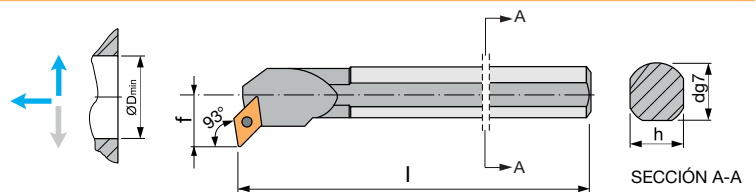
| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Palanca - Lever - Levier |
| | Pasador - Pin - Goupille |
| | Tornillo - Screw - Vis |

Ref. **8751**
PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS POSITIVAS S-SCLC.-95°
 S-SCLC.-95° Positive Inserts Internal Turning Tool-Holder
 Porte-Plaquettes tournage intérieur plaquettes positives S-SCLC.-95°

 D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | h mm | D _{min} mm | € | | |
|--------------|---------|---------|---------|---------|--------|------|------|------|------|---------------------|--------|--|--|
| S08K-SCLCR06 | ● | 19432 | | | | 08 | 5 | 125 | 7 | 11 | 107,38 | Ref. 8816 | Ref. 8801 |
| S08K-SCLCL06 | | | ● | 19434 | | 08 | 5 | 125 | 7 | 11 | 107,38 | T-07 Art. 21056 3,11 € | ZT-07 Art. 19569 10,74 € |
| S10M-SCLCR06 | ● | 19435 | | | CC.. | 10 | 7 | 150 | 9 | 13 | 107,38 | | |
| S10M-SCLCL06 | | | ● | 19438 | 060204 | 10 | 7 | 150 | 9 | 13 | 107,38 | T-15 Art. 35217 3,32 € | ZT-15 Art. 10512 10,74 € |
| S12M-SCLCR06 | ● | 26469 | | | | 12 | 9 | 150 | 11 | 16 | 107,38 | | |
| S12M-SCLCL06 | | | ● | 26473 | | 12 | 9 | 150 | 11 | 16 | 107,38 | T-15 Art. 35217 3,32 € | ZT-15 Art. 10512 10,74 € |
| S16R-SCLCR09 | ● | 19440 | | | | 16 | 11 | 200 | 15 | 20 | 111,83 | | |
| S16R-SCLCL09 | | | ● | 19441 | CC.. | 16 | 11 | 200 | 15 | 20 | 111,83 | T-15 Art. 35217 3,32 € | ZT-15 Art. 10512 10,74 € |
| S20S-SCLCR09 | ● | 19443 | | | | 20 | 13 | 250 | 18 | 25 | 140,97 | | |
| S20S-SCLCL09 | | | ● | 19444 | 09T308 | 20 | 13 | 250 | 18 | 25 | 140,97 | T-15 Art. 35217 3,32 € | ZT-15 Art. 10512 10,74 € |

Plaquita / Insert / Plaquette: Pag. 468

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| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

Ref. **8761**
PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS POSITIVAS S-SDUC.-93°
 S-SDUC.-93° Positive Inserts Internal Turning Tool-Holder
 Porte-Plaquettes tournage intérieur plaquettes positives S-SDUC.-93°

 D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

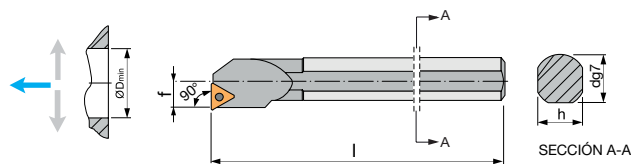
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | l mm | h mm | D _{min} mm | € | | |
|--------------|---------|---------|---------|---------|--------|------|------|------|------|---------------------|--------|--|--|
| S12M-SDUCR07 | ● | 26478 | | | | 12 | 9 | 150 | 11 | 16 | 107,38 | Ref. 8816 | Ref. 8801 |
| S12M-SDUCL07 | | | ● | 26479 | | 12 | 9 | 150 | 11 | 16 | 107,38 | T-07 Art. 10846 3,11 € | ZT-07 Art. 19569 10,74 € |
| S16R-SDUCR07 | ● | 19446 | | | DC.. | 16 | 11 | 200 | 15 | 20 | 111,83 | | |
| S16R-SDUCL07 | | | ● | 19449 | 0702.. | 16 | 11 | 200 | 15 | 20 | 111,83 | T-15 Art. 10895 3,32 € | ZT-15 Art. 10512 10,74 € |
| S20S-SDUCR11 | ● | 19450 | | | | 20 | 13 | 250 | 18 | 25 | 140,97 | | |
| S20S-SDUCL11 | | | ● | 19452 | DC.. | 20 | 13 | 250 | 18 | 25 | 140,97 | T-15 Art. 10895 3,32 € | ZT-15 Art. 10512 10,74 € |
| | | | | | 11T3.. | 20 | 13 | 250 | 18 | 25 | 140,97 | | |

Plaquita / Insert / Plaquette: Pag. 471, 472

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| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

Ref. 8718

PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS POSITIVAS S-STFC.-90° S-STFC.-90° Positive Inserts Internal Turning Tool-Holder Porte-Plaquettes tournage intérieur plaquettes positives S-STFC.-90°



D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

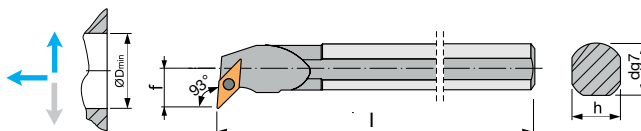
| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | h mm | l mm | D _{min} mm | € | | |
|--------------------------|---------|---------|---------|---------|----------------|------|------|------|------|---------------------|---------------|--|--|
| New! S10M-STFCR09 | ● | 17134 | | | TC.. 0902.. | 10 | 7 | 9 | 150 | 13 | 99,23 | Ref. 8816 T-06 Art. 83748 3,11 € | Ref. 8801 ZT-06 Art. 83747 10,74 € |
| New! S10M-STFCL09 | | | ● | 83743 | | 10 | 7 | 9 | 150 | 13 | 99,23 | | |
| S12M-STFCR11 | ● | 18761 | | | TC.. 1102.. | 12 | 9 | 11 | 150 | 16 | 107,38 | T-07 Art. 10846 3,11 € | ZT-07 Art. 19569 10,74 € |
| S12M-STFCL11 | | | ● | 18791 | | 12 | 9 | 11 | 150 | 16 | 107,38 | | |
| S25T-STFCR16 | ● | 18789 | | | TC.. 16T3.. | 25 | 17 | 23 | 300 | 32 | 154,51 | T-15 Art. 10895 3,32 € | ZT-15 Art. 10512 10,74 € |
| S25T-STFCL16 | | | ● | 18804 | | 25 | 17 | 23 | 300 | 32 | 154,51 | | |

Plaquita / Insert / Plaquette: **Pag. 476**

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| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

Ref. 8768

PORTA-PLAQUITAS TORNEADO INTERIOR PLAQUITAS POSITIVAS S-SVUC.-93° S-SVUC.-93° Positive Inserts Internal Turning Tool-Holder Porte-Plaquettes tournage intérieur plaquettes positives S-SVUC.-93°



D_{min} = Diám. mín. Int. Pieza / Piece Int. min. Diam. / Diam. min intérieur pièce

| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | d mm | f mm | h mm | l mm | D _{min} mm | € | | | | |
|--------------|---------|---------|---------|---------|----------------|------|------|------|------|---------------------|---------------|--|---|--|--|
| S16R-SVUCR11 | ● | 19455 | | | VC.. 1103.. | 16 | 11 | 15 | 200 | 20 | 111,83 | Ref. 8815 | Ref. 8816 | Ref. 8816 T-07 Art. 10846 3,11 € | Ref. 8801 ZT-07 Art. 19569 10,74 € |
| S16R-SVUCL11 | | | ● | 19456 | | 16 | 11 | 15 | 200 | 20 | 111,83 | | | | |
| S25T-SVUCR16 | ● | 19457 | | | VC.. 1604.. | 25 | 17 | 23 | 300 | 32 | 170,20 | 6,7x 26x8,4 Art. 10865 10,22 € | M3,5x0,6x M5x0,5 x8,5x5xø6,25 Art. 29959 8,19 € | T-15 Art. 10847 3,32 € | ZT-16 Art. 10856 10,74 € |
| S25T-SVUCL16 | | | ● | 10910 | | 25 | 17 | 23 | 300 | 32 | 170,20 | | | | |

Plaquita / Insert / Plaquette: **Pag. 479**

| | |
|--|--|
| | Placa Base - Base Plate - Plaque de base |
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

TRONZADO Y RANURADO

Parting & Grooving

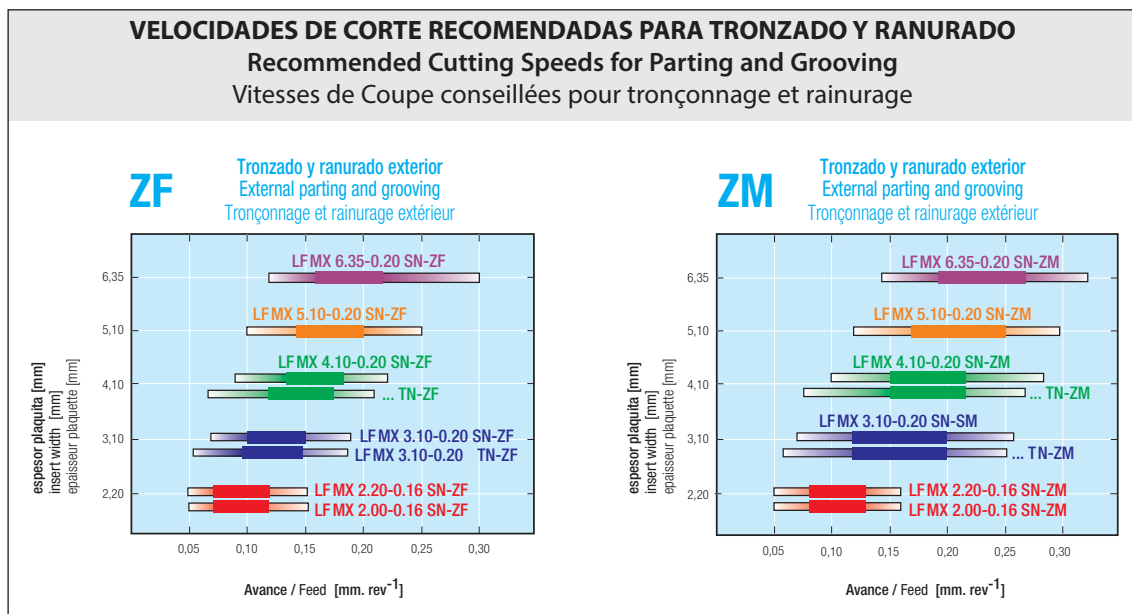
Tonçonnage et rainurage



PLAQUITAS INTERCAMBIABLES TRONZADO Y RANURADO

Parting & Grooving Indexable Inserts

Plaquettes interchangeables tonçonnage et rainurage



VELOCIDADES INICIALES RECOMENDADAS TRONZADO Y RANURADO EXTERIOR
Recommended initial Speeds for External Parting & Grooving
Vitesses initiales conseillées tonçonnage et rainurage

| Grad. | P | M | K | S | N-Al | N-Cu | H |
|--------------|---------|--------|--------|---|------|--------|---|
| C-540 | 120-230 | 70-120 | 60-120 | - | - | - | - |
| P-625 | 110-220 | 60-115 | 55-110 | - | - | 80-120 | - |

VC. INICIALES RECOMENDADAS PARA RANURADO
Recommended initial Speeds for Grooving
Vc initiales conseillées pour rainurage

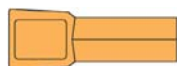
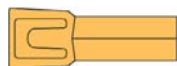
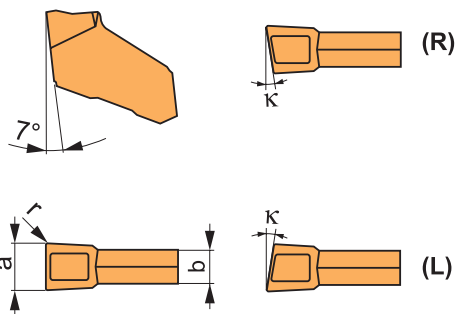
| Grad. | P | M | K | S | N-Al | N-Cu | H |
|--------------|--------|--------|-------|---|------|------|---|
| C-540 | 90-160 | 50-100 | 40-90 | - | - | - | - |
| P-625 | 80-130 | 40-85 | 40-80 | - | - | - | - |

Ref. **8600**

PLAQUITA INTERCAMBIABLE TRONZADO Y RANURADO LFMX

LFMX Parting & Grooving Indexable Insert

Plaquette tronçonnage et rainurage LFMX



| ISO | Dimensiones / Dimensions | | | | N° Art. C-540 | N° Art. P-625 | € |
|---|--------------------------|------|------|----|---------------|---------------|--------------|
| | a ±0,06 mm | b mm | r mm | k° | | | |
| Corte continuo - Constant cut - Coupe constante | | | | | | | |
| LFMX-2.00-0.16-SN-ZF | 2,00 | 1,60 | 0,16 | | 10 | 29981 13418 | 13,44 |
| LFMX-3.10-0.20-SN-ZF | 3,10 | 2,60 | 0,20 | | 10 | 13421 13423 | 14,32 |
| LFMX-3.10-0.20-TN-ZF | 3,10 | 2,60 | 0,20 | | 10 | 30441 13429 | 14,32 |
| Corte interrumpido - Interrupted cut - Coupe interrompue | | | | | | | |
| LFMX-2.00-0.16-SN-ZM | 2,00 | 1,60 | 0,16 | | 10 | 30153 13420 | 13,44 |
| LFMX-3.10-0.20-SN-ZM | 3,10 | 2,60 | 0,20 | | 10 | 30154 13424 | 14,32 |
| LFMX-3.10-0.20-SL-ZM | 3,10 | 2,60 | 0,20 | 8 | 10 | | 14,32 |
| LFMX-3.10-0.20-SR-ZM | 3,10 | 2,60 | 0,20 | 8 | 10 | | 14,32 |
| LFMX-3.10-0.20-TN-ZM | 3,10 | 2,60 | 0,20 | | 10 | 30448 13430 | 14,32 |
| LFMX-4.10-0.20-SN-ZM | 4,10 | 3,60 | 0,20 | | 10 | 13432 13433 | 15,56 |
| LFMX-4.10-0.20-SL-ZM | 4,10 | 3,60 | 0,20 | 8 | 10 | | 15,56 |
| LFMX-4.10-0.20-SR-ZM | 4,10 | 3,60 | 0,20 | 8 | 10 | | 15,56 |



Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8600 LFMX-2,00-0,16-SN-ZF C-540

Porta Plaquitas / Tool Holder
Porte-Plaquettes: **Pag. 504, 505**

SN

Geometría idónea para aceros al carbono, fundición y piezas forjadas.

Ideal geometry for carbon steels, cast iron & forged pieces.

Géométrie idéal pour aciers carbure, fonte et pièces forgés.

TN

Geometría idónea para aluminio, cobre y aleaciones de titanio.

Ideal geometry for aluminium, copper & titanium alloys.

Géométrie idéal pour aluminium, cuivre et alliages de titane.

ZF

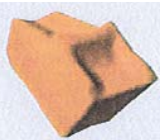


Rompevirutas ZF para tronizado y ranurado en acero y fundición. Para corte continuo.

ZF Chipbreaker for parting & grooving in steel & cast iron. For constant cut.

Briscopeaux ZF pour tronçonnage et rainurage en acier et fonte. Pour coupe constante.

ZM



Rompevirutas ZM para tronzar aceros de baja aleación e INOX austenítico. Corte interrumpido moderado.

ZM Chipbreaker for parting in low alloy steel & austenitic stainless. Reasonably interrupted cut.

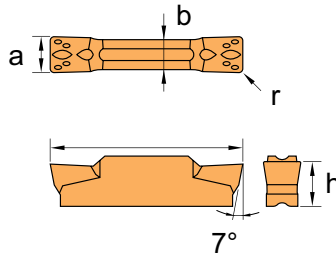
Briscopeaux ZM pour tronçonnage aciers de faible alliage et INOX Austénitique. Coupe raisonnablement interrompue.

Ref. **8601**

PLACA INTERCAMBIABLE TRONZADO Y RANURADO MGMN

MGMN Parting & Grooving Indexable Insert
 Plaquette tronçonnage et rainurage MGMN

New!



| ISO | a mm | b mm | l mm | h mm | r mm | | N° Art. P-625 | N° Art. P-640 | € |
|-----------------------------|---------|---------|---------|---------|---------|----|------------------|------------------|--------------|
| MGMN-2.00-0.20-GC-ZF | 2 | 1,60 | 16 | 3,50 | 0,20 | 10 | 12708 | 19184 | 15,51 |
| MGMN-3.00-0.40-GC-ZF | 3 | 2,35 | 21 | 4,80 | 0,40 | 10 | 12712 | 19188 | 16,57 |
| MGMN-4.00-0.40-GC-ZF | 4 | 3,30 | 21 | 4,80 | 0,40 | 10 | 12713 | 19190 | 17,06 |



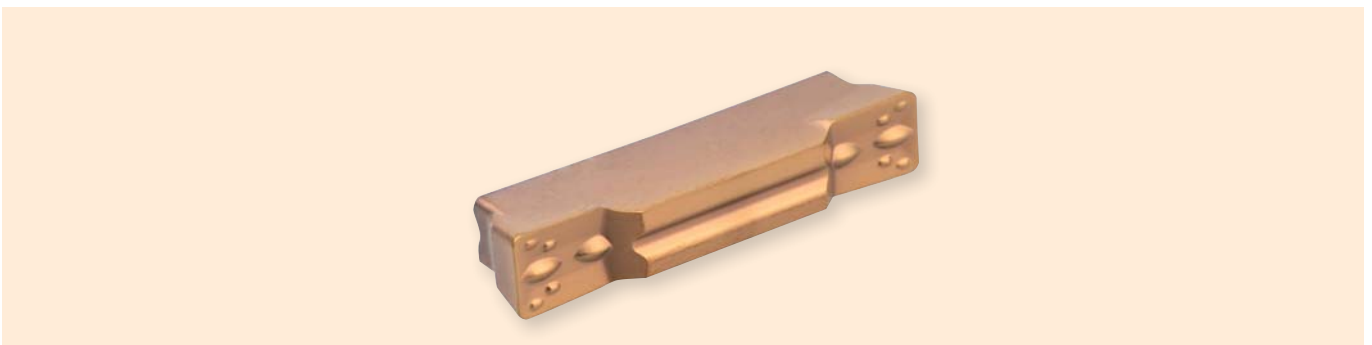
* Recomendamos la calidad P-625 para corte continuo y la calidad P-640 para corte discontinuo

* We recommend grade P-625 for continuous cutting and grade P-640 for interrupted cutting

* Nous recommandons le degré P-625 pour une coupe continue et le degré P-640 pour une coupe interrompue

Ejemplo Pedido / Order Example / Exemple commande:
 Ref. 8601 MGMN-2.00-0.20-GC-ZF P-625

Porta Plaquetas / Tool Holder
 Porte-Plaquettes: **Pag. 506**

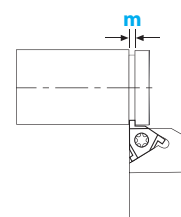
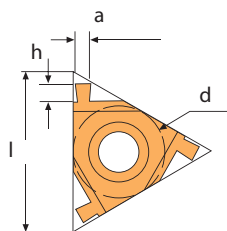


Ref. **8603**

PLAQUITA INTERCAMBIABLE RANURADO EXTERIOR TN..ER.A

TN..ER.A External Grooving Indexable Insert

Plaque rainurage extérieur TN..ER.A



| ISO * ER=IL | DIN 471 m mm (min.) | Dimensiones Dimensions | | | | N° Art. P-625 | € | |
|----------------|---------------------------|------------------------|---------|---------|---------|------------------|-------|--------------|
| | | d mm | l mm | a mm | h mm | | | |
| TN-16-ER-A-100 | 0,90 | 9,525 | 16,00 | 1,00 | 1,40 | 10 | 79738 | 24,70 |
| TN-16-ER-A-120 | 1,10 | 9,525 | 16,00 | 1,20 | 1,60 | 10 | 79739 | 24,70 |
| TN-16-ER-A-140 | 1,30 | 9,525 | 16,00 | 1,40 | 1,80 | 10 | 79740 | 24,70 |
| TN-16-ER-A-170 | 1,60 | 9,525 | 16,00 | 1,70 | 2,00 | 10 | 79741 | 24,70 |
| TN-16-ER-A-195 | 1,85 | 9,525 | 16,00 | 1,95 | 2,00 | 10 | 79742 | 24,70 |
| TN-16-ER-A-225 | 2,15 | 9,525 | 16,00 | 2,25 | 2,25 | 10 | 79743 | 24,70 |



Ejemplo Pedido / Order Example / Exemple
commande: Ref. 8603 TN-16-ER-A-100 P-625

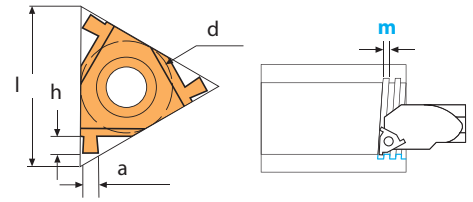
Porta Plaquitas / Tool Holder
Porte-Plaquettes: Pag. 515

* ER = IL → Exterior Derecha válida para Interior Izquierda
Right External valid for Left Internal
Extérieur droit valide pour intérieur gauche

Ref. **8606**

PLAQUITA INTERCAMBIABLE RANURADO INTERIOR TN..IR.A

TN..IR.A Internal Grooving Indexable Insert
Plaquelette rainurage intérieur TN..IR.A



| ISO * EL=IR | DIN 472 m mm (min.) | Dimensiones Dimensions | | | | N° Art. P-625 | € | |
|----------------|---------------------------|------------------------|---------|---------|---------|------------------|-------|-------|
| | | d mm | l mm | a mm | h mm | | | |
| TN-16-IR-A-100 | 0,90 | 9,525 | 16,00 | 1,00 | 1,40 | 10 | 79748 | 24,70 |
| TN-16-IR-A-120 | 1,10 | 9,525 | 16,00 | 1,20 | 1,60 | 10 | 79749 | 24,70 |
| TN-16-IR-A-140 | 1,30 | 9,525 | 16,00 | 1,40 | 1,80 | 10 | 79750 | 24,70 |
| TN-16-IR-A-170 | 1,60 | 9,525 | 16,00 | 1,70 | 2,00 | 10 | 79751 | 24,70 |
| TN-16-IR-A-195 | 1,85 | 9,525 | 16,00 | 1,95 | 2,00 | 10 | 79752 | 24,70 |
| TN-16-IR-A-225 | 2,15 | 9,525 | 16,00 | 2,25 | 2,25 | 10 | 79753 | 24,70 |



Ejemplo Pedido / Order Example / Exemple
commande: Ref. 8606 TN-16-IR-A-100 P-625

Porta Plaquetas / Tool Holder
Porte-Plaquettes: Pag. 515

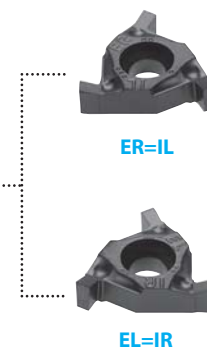
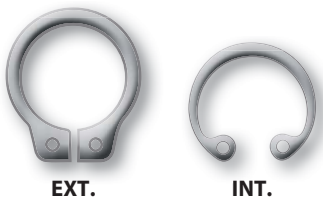
* EL = IR → Exterior Izquierda válida para Interior Derecha
Left External valid for Right Internal
Extérieur gauche valide pour intérieur droit

Ref. **8605**

SET RANURADO SEEGER®

Grooving Set Seeger®
Jeu rainurage Seeger®

Plaquetas especiales para ranuras de anillos tipo Seeger®
Special inserts for Seeger® type rings
Plaquettes spéciales pour bagues Seeger®



Ref. 8603
RANURADO EXTERIOR
External Grooving
Rainurage extérieur

Ref. 8606
RANURADO INTERIOR
Internal Grooving
Rainurage intérieur

Set 10 Pcs

| Cont | N° Art. | € |
|---|---------|--------|
| Ref. 8603 EXT (DIN 471) - TN-16-ER-A 1,20 - 1,40 - 1,70 1,95 - 2,25 | 79672 | 246,96 |
| Ref. 8606 INT (DIN 472) - TN-16-IR-A 1,20 - 1,40 - 1,70 1,95 - 2,25 | | |



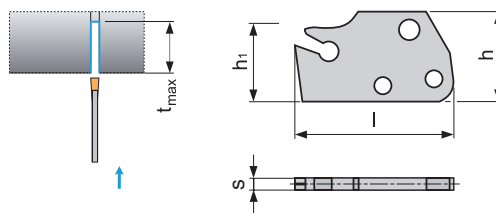
Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 515

Ref. 8850

LAMA PORTA-PLAQUITAS TRONZADO Y RANURADO XLCF

XLCF Parting & Grooving Tool-Holder Blade

Lame Porte-Plaquettes tronçonnage et rainurage XLCF



| ISO | N° Art. | | h ₁ mm | h mm | l mm | s mm | t _{max} mm | € |
|----------------|---------|---------------|-------------------|------|------|------|---------------------|---------------|
| XLCFR-160115-2 | 13543 | LFMX-2.00.... | 12,3 | 25 | 34 | 1,4 | 15 | 155,40 |
| XLCFL-160115-2 | 13544 | | 12,3 | 25 | 34 | 1,4 | 15 | 155,40 |
| XLCFN-160220-3 | 13549 | LFMX-3.10.... | 12,3 | 25 | 40 | 2,4 | 20 | 155,40 |
| XLCFR-250115-2 | 13546 | LFMX-2.00.... | 24,0 | 29 | 40 | 1,4 | 15 | 170,82 |
| XLCFL-250115-2 | 13547 | | 24,0 | 29 | 40 | 1,4 | 15 | 170,82 |
| XLCFN-250225-3 | 13550 | LFMX-3.10.... | 24,0 | 29 | 50 | 2,4 | 25 | 170,82 |
| XLCFN-250325-4 | 13552 | LFMX-4.10.... | 24,0 | 29 | 50 | 3,4 | 25 | 170,82 |

XLCFN: Neutra Neutral Neutre

XLCFR: Derecha Right Droite

XLCFL: Izquierda Left Gauche



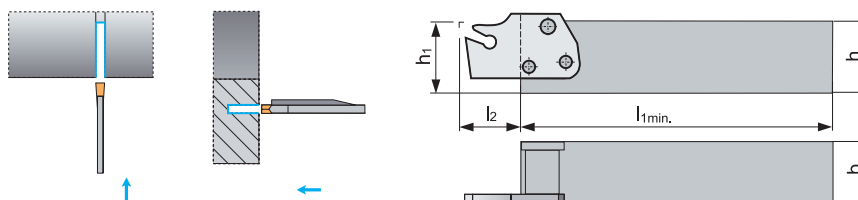
Plaquita / Insert / Plaque: Pag. 500

Ref. 8860

PORTA-PLAQUITAS TRONZADO Y RANURADO MS-EN

MS-EN Parting & Grooving Tool-Holder

Porte-Plaquettes tronçonnage et rainurage MS-EN



| ISO | N° Art. | | h ₁ mm | h mm | b mm | l ₁ mm | l ₂ mm | € | | | | | | |
|--------------|---------|------------------------|-------------------|------|------|-------------------|-------------------|---------------|--|---|---------------------------------------|---|---------------------------------------|---|
| MS-EN-1616-H | 13553 | XLCF - 160115 / 160220 | 16 | 16 | 16 | 100 | 20 | 215,20 | T-15 Ref. 8816 Art. 10895 3,32 € | 5 | Ref. 8802 | - | ZT-1 Art. 10512 10,74 € | 1 |
| | | | | | | | | | | | | | | |
| MS-EN-2020-K | 13555 | XLCF - 250115 / 250225 | 20 | 20 | 20 | 125 | 25 | 240,05 | ZUS-45 Ref. 8802 Art. 13852 7,71 € | 5 | ZUS-46 Art. 13853 7,71 € | 5 | ZT-20 Art. 13845 10,74 € | 1 |
| MS-EN-2525-M | 13556 | XLCF - 25..15 / 25..25 | 25 | 25 | 25 | 150 | 25 | 245,37 | | | | | | |

Plaquita / Insert / Plaque: Pag. 500



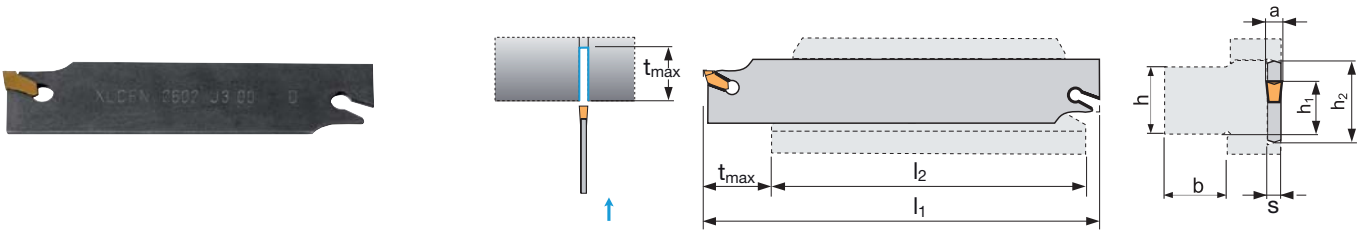
| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

Ref. **8870**

LAMA PORTA-PLAQUITAS TRONZADO Y RANURADO XLCFN

XLCFN Parting & Grooving Tool-Holder Blade

Lame Porte-Plaquettes tronçonnage et rainurage XLCFN



| ISO | N° Art. | | h ₁ mm | h ₂ mm | l ₁ mm | s mm | t _{max} mm | € |
|-------------------|---------|---------------|-------------------|-------------------|-------------------|------|---------------------|---------------|
| XLCFN-2601-J-2.00 | 13558 | LFMX-2.00.... | 20 | 26 | 110 | 1,6 | 25 | 155,40 |
| XLCFN-2602-J-3.00 | 13561 | LFMX-3.10.... | 20 | 26 | 110 | 2,4 | 40 | 155,40 |
| XLCFN-2603-J-4.00 | 13564 | LFMX-4.10.... | 20 | 26 | 110 | 3,4 | 40 | 155,40 |
| XLCFN-3201-M-2.00 | 13565 | LFMX-2.00.... | 25 | 32 | 150 | 1,6 | 25 | 170,82 |
| XLCFN-3202-M-3.00 | 13567 | LFMX-3.10.... | 25 | 32 | 150 | 2,4 | 50 | 170,82 |
| XLCFN-3203-M-4.00 | 13568 | LFMX-4.10.... | 25 | 32 | 150 | 3,4 | 50 | 170,82 |



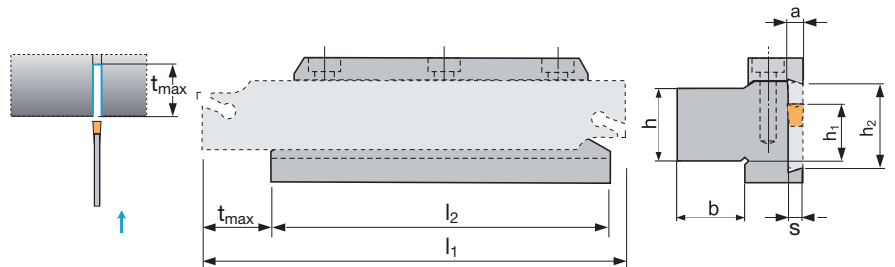
Plaquita / Insert / Plaquette: **Pag. 500**

Ref. **8875**

PORTA-PLAQUITAS TRONZADO Y RANURADO XLCFN

XLCFN Parting & Grooving Tool-Holder

Porte-Plaquettes tronçonnage et rainurage XLCFN



| ISO | N° Art. | | h ₁ mm | h ₂ mm | b mm | l ₂ mm | € | |
|------------|---------|--------------|-------------------|-------------------|------|-------------------|---------------|---|
| 26-DU-2020 | 13570 | XLCFN-26.... | 20 | 26 | 20 | 90 | 317,37 | Ref. 8802 |
| 32-DU-2532 | 13571 | XLCFN-32.... | 25 | 32 | 25 | 110 | 334,07 | ZM-6X20 Art. 13849 0,73 € |



Plaquita / Insert / Plaquette: **Pag. 500**

Tornillo - Screw - Vis

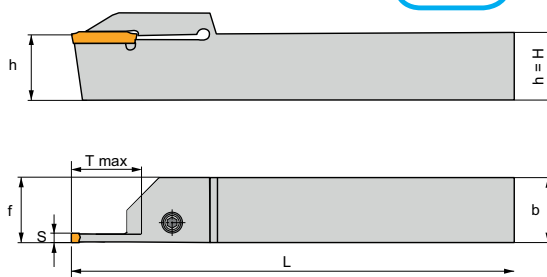
Ref. 8865

PORTA-PLAQUITAS TRONZADO Y RANURADO XMCG

XMCG Parting & Grooving Tool-Holder Blade

Porte plaquettes tronçonnage et rainurage XMCG

New!



| ISO | R Dcha. | N° Art. | L Izda. | N° Art. | | H mm | b mm | f mm | S mm | L mm | Tmax mm | € | |
|-------------------|---------|---------|---------|---------|---------------|------|------|------|------|------|---------|--------|---|
| Ref. 8816 | | | | | | | | | | | | | |
| XMCGR-1212-K-2.00 | ● | 24534 | | | MGMN-2.00.... | 12 | 12 | 12 | 2 | 125 | 16 | 109,85 | 5 M5x16 Art. 19194 7,71 € |
| XMCG-1212-K-2.00 | | | ● | 70269 | | 12 | 12 | 12 | 2 | 125 | 16 | 109,85 | |
| XMCGR-1616-K-2.00 | ● | 12727 | | | MGMN-2.00.... | 16 | 16 | 16 | 2 | 125 | 16 | 116,31 | 5 M5x16 Art. 19194 7,71 € |
| XMCG-1616-K-2.00 | | | ● | 20052 | | 16 | 16 | 16 | 2 | 125 | 16 | 116,31 | |
| XMCGR-1616-K-3.00 | ● | 19699 | | | MGMN-3.00.... | 16 | 16 | 16 | 3 | 125 | 18 | 116,31 | 5 M5x20 Art. 19196 7,71 € |
| XMCG-1616-K-3.00 | | | ● | 19700 | | 16 | 16 | 16 | 3 | 125 | 18 | 116,31 | |
| XMCGR-2020-K-3.00 | ● | 12729 | | | MGMN-3.00.... | 20 | 20 | 20 | 3 | 125 | 18 | 118,68 | 5 M5x20 Art. 19196 7,71 € |
| XMCG-2020-K-3.00 | | | ● | 20060 | | 20 | 20 | 20 | 3 | 125 | 18 | 118,68 | |
| XMCGR-2020-K-4.00 | ● | 70280 | | | MGMN-4.00.... | 20 | 20 | 20 | 4 | 150 | 18 | 118,89 | 5 M6x20 Art. 19216 7,71 € |
| XMCG-2020-K-4.00 | | | ● | 70272 | | 20 | 20 | 20 | 4 | 150 | 18 | 118,89 | |
| XMCGR-2525-K-4.00 | ● | 12730 | | | MGMN-4.00.... | 25 | 25 | 25 | 4 | 150 | 18 | 121,05 | 5 M6x20 Art. 19216 7,71 € |
| XMCG-2525-K-4.00 | | | ● | 20067 | | 25 | 25 | 25 | 4 | 150 | 18 | 121,05 | |

Plaquita / Insert / Plaque: **Pag. 501**



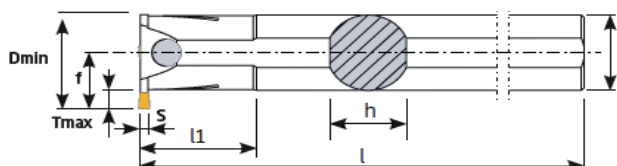
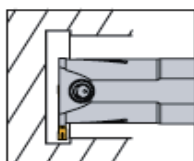
Ref. 8866

PORTA-PLAQUITAS DE RANURADO INTERIOR S-GMGG

S-GMGG Internal Grooving Tool-Holder

Porte-plaquettes rainurage intérieur S-GMGG

New!



| ISO | R Dcha. | N° Art. | | d mm | h mm | f mm | l mm | l1 mm | Dmin mm | Tmax mm | s mm | € | |
|------------------|---------|---------|---------------|------|------|-------|------|-------|---------|---------|------|--------|---|
| Ref. 8816 | | | | | | | | | | | | | |
| S16Q-GMGR02 | ● | 25493 | MGMN-2.00.... | 16 | 15 | 12,50 | 180 | 35 | 21 | 5,00 | 2 | 108,13 | 5 M5x12 Art. 25531 7,71 € |
| S20Q-GMGR03 | ● | 25494 | | 20 | 18 | 15,50 | 180 | 35 | 26 | 6,00 | 3 | 121,32 | |
| S25R-GMGR03 | ● | 25504 | MGMN-3.00.... | 25 | 23 | 19,00 | 200 | 40 | 32 | 6,70 | 3 | 131,86 | 5 M5x16 Art. 19194 7,71 € |
| S25R-GMGR04 | ● | 25506 | | 25 | 23 | 18,20 | 200 | 40 | 31 | 6,00 | 4 | 131,86 | |
| S32S-GMGR04 | ● | 25507 | MGMN-4.00.... | 32 | 30 | 21,50 | 250 | 60 | 38 | 6,00 | 4 | 147,69 | 5 M6x20 Art. 19216 - 7,71 € |

* Portaplaquetas a izquierdas bajo demanda

* Left-Hand Tool-Holder upon request

* Porte-plaquettes à gauche sur demande

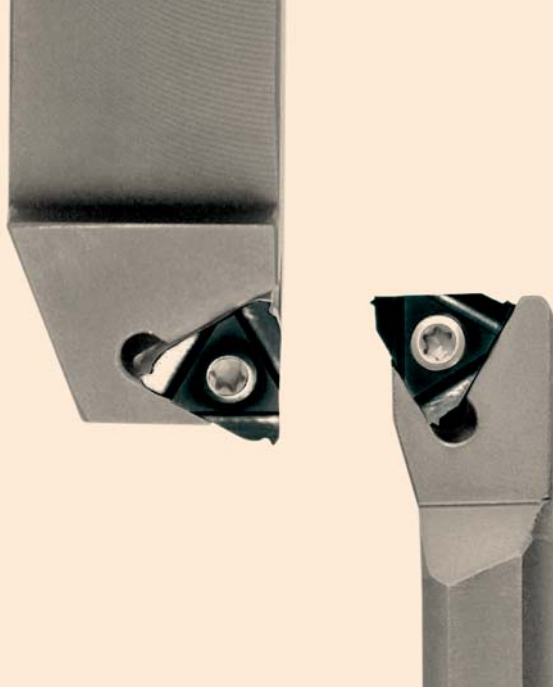
Plaquita / Insert / Plaque: **Pag. 501**



ROSCADO

Threading



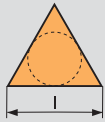
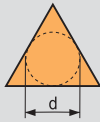
Taraudage



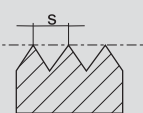
CÓDIGOS ISO ELECCIÓN PLAQUITAS ROSCADO

Threading insert Choice ISO Codes

Codes ISO choix plaquettes taraudage

| 1 | 2 | 3 | | 4 |
|---|---|---|---|---|
| Forma Plaquita Insert Shape Forme plaquette | Angulo Incidencia Clearance Angle Angle d'incidence | Longitud Filo de Corte Cutting Edge Length Longueur arête coupe | | Exterior - Interior External - Internal Extérieur - Intérieur |
|  |  |  |  | Exterior - External - Extérieur |
| T | N | 11 | 11,0 | E |
| | | 16 | 9,525 | Interior - Internal - Intérieur |
| | | 22 | 12,7 | I |

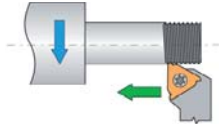
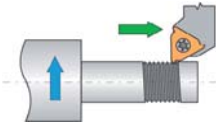
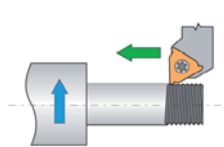
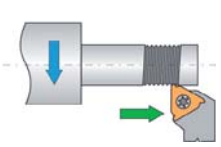
T N 16 E R 175 M

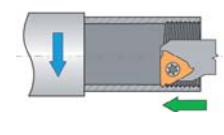
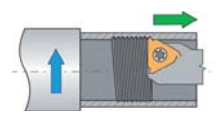
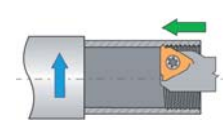
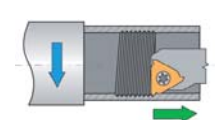
| 5 | 6 | | 7 |
|--|--|--|---|
| Tipo Plaquita Insert type Type plaquette | Paso Rosca Thread pitch Pas filetage | | Perfil Rosca Thread profile Profil filetage |
| Dcha. - Right - Droit | Paso Rosca Thread pitch Pas filetage | | M métrica / metric / métrique 60° ISO |
| R | N.º Pasos / Pulgada Number of pitches per inch Nombre Pas / Pouces | | W Whitworth 55° |
| Izda. - Left - Gauche |  | | |
| L | N.º Pasos / Pulgada x 10 Number of pitches per inch x 10 Nombre Pas / Pouces x 10 | | |
| Neutra - Neutral - Neutre | s x 100 | | |
| N | | | |

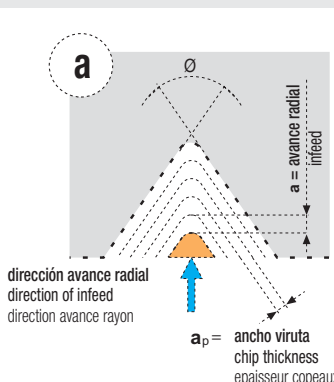
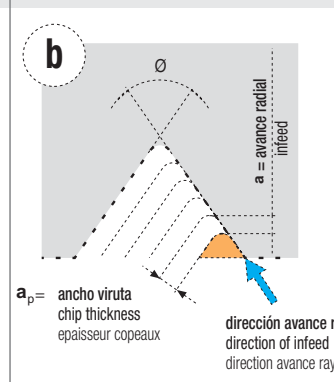
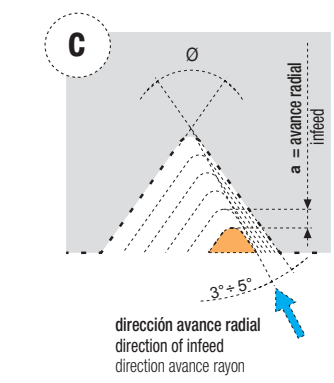
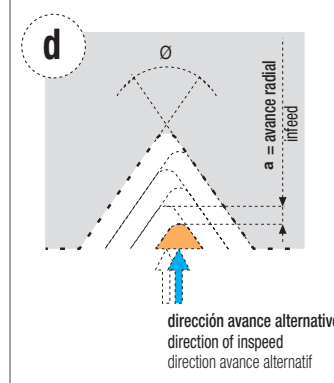
TÉCNICAS PRODUCCIÓN Y AVANCE PLAQUITAS ROSCADO

Threading Insert Production & Feed Techniques

Téchniques production et avance plaquettes taraudage

| | | | |
|--|---|--|---|
| <p>Roscado hacia el Plato: Los apoyos originales sirven para la mayoría de las operaciones.</p> <p>Threading through the Face Plate: The original supports are suitable for most operations.</p> <p>Taraudage vers le plateau: Les appuis originaux s'emploient dans la plupart des opérations.</p> | <p>Roscado Exterior Derecha External Right Threading Taraudage Extérieur Droite</p>  | <p>Roscado desde el Plato</p> <p>Threading from the Face Plate</p> <p>Taraudage depuis le plateau</p> | <p>Roscado Exterior Derecha External Right Threading Taraudage Extérieur Droite</p>  |
| | <p>Roscado Exterior Izquierda External Left Threading Taraudage Extérieur Gauche</p>  | | <p>Roscado Exterior Izquierda External Left Threading Taraudage Extérieur Gauche</p>  |

| | | | |
|--|--|---|--|
| <p>Roscado hacia el Plato: Los apoyos originales sirven para la mayoría de las operaciones.</p> <p>Threading through the Face Plate: The original supports are suitable for most operations.</p> <p>Taraudage vers le plateau: Les appuis originaux s'emploient dans la plupart des opérations.</p> | <p>Roscado Interior Derecha Internal Right Threading Taraudage Intérieur Droite</p>  | <p>Roscado desde el Plato: La viruta se evacua correctamente hacia el exterior.</p> <p>Threading from the Face Plate: Good chipping-off through the outside.</p> <p>Taraudage depuis le plateau: Les copeaux s'évacuent correctement vers l'extérieur.</p> | <p>Roscado Interior Derecha Internal Right Threading Taraudage Intérieur Droite</p>  |
| | <p>Roscado Interior Izquierda Internal Left Threading Taraudage Intérieur Gauche</p>  | | <p>Roscado Interior Izquierda Internal Left Threading Taraudage Intérieur Gauche</p>  |

| | | | | |
|--|---|---|--|--|
| <p>Existen diferentes Técnicas de Avance: There are different Infeed Techniques: Ils existent Différentes types d'avance:</p> | <p>a) Avance Radial a) Radial Infeed a) Avance rayon</p> | <p>b) Avance Lateral b) Side Infeed b) Avance latéral</p> | <p>c) Avance Lateral Modificado c) Modified Side Infeed c) Avance latéral modifié</p> | <p>d) Avance Alternativo d) Alternate Infeed d) Avance alternatif</p> |
|  <p>El metodo más común, para máquinas convencionales. 1ª elección en materiales que se auto-endurecen al ser mecanizados, p.e. INOX austenítico.</p> <p>Commonest technique, for conventional machines. 1st choice in auto-hardened materials while machining, f.e. austenitic stainless.</p> <p>La méthode la plus employée pour machines conventionnelles. 1er Choix pour matériaux qui augmentent sa dureté sur l'usinage, Par exemple. INOX Austénitique.</p> |  <p>Para máquinas convencionales y CNC, buen control de viruta y no apropiado para materiales que se auto-endurecen.</p> <p>For conventional & CNC machines, good chip-control & not suitable for auto-hardened materials.</p> <p>Pour machines conventionnelles et CNC, bon contrôle des copeaux et pas convenable pour matériaux qui augmentent eux même sa dureté.</p> |  <p>Buen control de viruta, adecuada para roscas de grandes pasos e interiores. Para evitar un excesivo desgaste por el roce del filo posterior, el áng. de avance debe ser 3-5° menor que el áng. de rosca.</p> <p>Good chip-control, suitable for internal & large pitch threads. To avoid an excessive wear due to the back edge friction, feed angle should be 3-5° smaller than thread angle.</p> <p>Bon Contrôle des copeaux, Idéale pour taraudages grands pas e interiores. Pour éviter une excessive usure du au filet postérieur, l'angle d'avance doit être 3-5° inférieur que l'angle de taraudage.</p> |  <p>Permite un desgaste uniforme de la plaqueta e incrementa su vida. 1ª opción en roscas de paso grande.</p> <p>Allows a uniform insert wear and in-creases its life. 1st choice in big pitch threads.</p> <p>Permet une usure uniforme de la plaquette et augmente sa vie utile. 1ere option pour taraudages avec pas grand.</p> | |

ELECCIÓN ANGULO INCLINACIÓN Y VC PLAQUITAS ROSCADO

Threading Insert Inclination Angle & Vc Choice

Choix angle inclinaison & Vc plaquettes taraudage

Las placas de apoyo para los portas de roscado tienen una inclinación de 1,5°, que sirven para la mayoría de los pasos de roscado, como se indica en el diagrama inferior.

Ejemplo: Diámetro torneado 50 mm + Paso 3 mm = Placa apoyo 1,5°

Las placas de apoyo que no se correspondan con estos grados de inclinación se servirán bajo demanda.

Shims for threading tool-holders have an **inclination of 1,5°**, that make them suitable for most threading pitches, as showed in the diagram below.

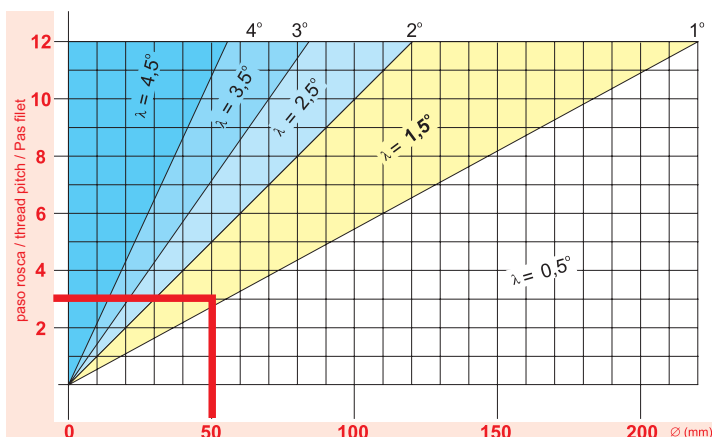
Example: Turning diameter 50 mm + Pitch 3 mm = Shim 1,5°

Shims that do not belong to these inclination grades will be served upon request.

Les plaques d'appui pour les porte-outils taraudage ont une **inclinaison de 1,5°**, qui s'emploient pour la plupart des pas de taraudage, comme on indique sur le diagramme.

Exemple: Diamètre tournage 50 mm + Pas 3 mm : Plaque d'appui 1,5°

Les plaques d'appui qui ne se correspondent avec ces degrés d'inclinaison seront livrées à la demande.

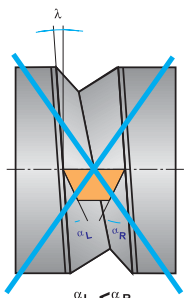


| Angulo Inclinación Inclination Angle Angle d'inclinaison | Positivo Positive | | | | | Negativo Negative | | |
|--|--|-----------|-----------|-----------|-----------|-------------------|-----------|--|
| | 4,5° | 3,5° | 2,5° | 1,5° | 0,5° | -0,5° | -1,5° | |
| Porta-Roscado Threading Tool - Mandrin-Filetage | Placa Apoyo Shim Plaque - Plaque d'appui | | | | | | | |
| SER16 SIL16 | PE16+4,5 | PE16+3,5 | PE16+2,5 | PE16+1,5 | PE16+0,5 | PE16-0,5 | PE16-1,5 | |
| SEL16 SIR16 | PI16+4,5 | PI16+3,5 | PI16+2,5 | PI16+1,5 | PI16+0,5 | PI16-0,5 | PI16-1,5 | |
| SER22 SIL22 | PE22+4,5 | PE22+3,5 | PE22+2,5 | PE22+1,5 | PE22+0,5 | PE22-0,5 | PE22-1,5 | |
| SEL22 SIR22 | PI22+4,5 | PI22+3,5 | PI22+2,5 | PI22+1,5 | PI22+0,5 | PI22-0,5 | PI22-1,5 | |
| SER-S16 SIL16 | PE16S+4,5 | PE16S+3,5 | PE16S+2,5 | PE16S+1,5 | PE16S+0,5 | PE16S-0,5 | PE16S-1,5 | |
| SEL-S16 SIR16 | PI16S+4,5 | PI16S+3,5 | PI16S+2,5 | PI16S+1,5 | PI16S+0,5 | PI16S-0,5 | PI16S-1,5 | |
| SER-S16 SIL16 | PE22S+4,5 | PE22S+3,5 | PE22S+2,5 | PE22S+1,5 | PE22S+0,5 | PE22S-0,5 | PE22S-1,5 | |
| SEL-S16 SIR16 | PI22S+4,5 | PI22S+3,5 | PI22S+2,5 | PI22S+1,5 | PI22S+0,5 | PI22S-0,5 | PI22S-1,5 | |

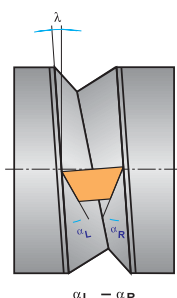
APOYO PLAQUITA

Insert Setting - Appui plaquette

¡Incorrecto!
Wrong! Incorrect!



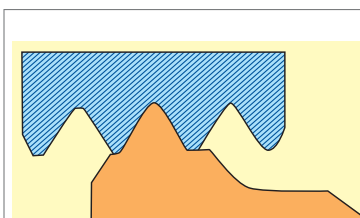
Correcto
Correct



Para obtener un perfil de rosca correcto y un desgaste uniforme de la plaquita, el ángulo de inclinación del filo de corte debe ser igual al ángulo de la hélice.

In order to obtain a correct thread profile and an insert uniform wear, the cutting edge inclination angle should be the same as the helix angle.

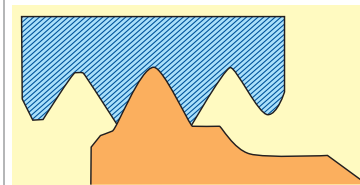
Pour obtenir un profil de taraudage correct et une usure uniforme de la plaquette, l'angle d'inclinaison du filet de coupe doit être égal à l'angle d'hélice.



Perfil Total: Hace la rosca completa sin rebaba, solo se necesita una herramienta y a la pieza no le hace falta ser premecanizada al diámetro exacto.

Full Profile: It makes the whole thread without burrs, only one tool is needed and the piece does not need premachining the exact diameter.

Profil total: Permet que le filetage soit complet et sans bavures, seulement on a besoin d'un outil et que la pièce ne soit pas usinée au diamètre exact.



Perfil Parcial: Cubre una amplia gama de diferentes pasos. Se requiere que la pieza a roscar tenga un diámetro correcto.

Partial Profile: It covers a wide range of different pitches. It is needed the thread-piece to have a correct diameter.

Profil parcial: Couvre une gamme longue de différents pas. On a besoin que la pièce à tarauder soit usinée au diamètre exact.

VELOCIDADES INICIALES DE CORTE RECOMENDADAS

Recommended Initial Cutting Speeds

Vitesses de coupe initiales recommandées

| Grados Recubiertos Coated Grades Degré Revêtements | P-620 | | | | | |
|---|-------|-----|-----|----|-----|----|
| | P | M | K | S | N | H |
| Tipo Plaquita Insert Type - Type Plaquette | | | | | | |
| TN. | 120 | 110 | 120 | 10 | 200 | 30 |
| | - | - | - | - | - | - |
| | 160 | 130 | 150 | 20 | 300 | 45 |

DATOS CORTE ROSCADO

Threading Cutting Data

Données coupe taraudage

- No conviene hacer una rosca de una sola pasada a causa de la fragilidad del filo de corte.
- Debe dividirse la profundidad total en varias pasadas.
- Todas las pasadas deben llevar una misma área de viruta.
- Seguir las recomendaciones de las tablas en esta misma página para encontrar el correcto número de pasadas y la profundidad de cada una, tanto en roscado exterior como interior.
- En ningún caso las pasadas deben ser inferiores a 0,05 mm.
- Threads should not be made just by one infeed due to the edge fragility.
- Total Depth should be divided into some infeeds.
- Every infeed should obtain the same chipping volume.
- Follow this same page tables in order to find the correct number of infeeds and their depths, both in external or internal threading.
- Never make an infeed smaller than 0,05 mm.
- Pas faire un taraudage d'une seule passée à cause de la fragilité du filet de coupe.
- Pas diviser la profondeur totale en différentes passades.
- Toutes les passades doivent évacuer une même quantité de copeaux.
- Suivre les conseils des tableaux sur cette page pour trouver le nombre correct de passades et leur profondeur en taraudage extérieur et intérieur.
- En aucun cas, les passades doivent être inférieures à 0.05 mm.

Rosca ISO Métrica Interna Internal Metric ISO Thread Taraudage ISO métrique interne

| N° Pasadas N° Infeed N° Passades | reduzca la velocidad de corte proporcionalmente al incremento del paso reduce cutting speed proportionally to increasing the thread pitch réglez la vitesse de coupe en proportion à l'augmentation du pas | | | | | | | | | | | | | | | | |
|--|---|--|------|------|--------------------|------|------|------|-------------------|------|------|------|------|------|------|------|------|
| | paso (mm) pitch pas | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,50 | 3,00 | 3,50 | 4,00 | 4,50 | 5,00 | 5,50 | 6,00 | |
| | Avance Radial (mm) | | | | Radial Infeed (mm) | | | | Avance Rayon (mm) | | | | | | | | |
| 1 | | 0,11 | 0,17 | 0,19 | 0,20 | 0,22 | 0,22 | 0,25 | 0,27 | 0,28 | 0,32 | 0,33 | 0,36 | 0,41 | 0,41 | 0,44 | |
| 2 | | 0,09 | 0,14 | 0,16 | 0,17 | 0,21 | 0,21 | 0,23 | 0,25 | 0,26 | 0,30 | 0,31 | 0,33 | 0,38 | 0,38 | 0,41 | |
| 3 | | 0,07 | 0,10 | 0,11 | 0,13 | 0,15 | 0,15 | 0,17 | 0,18 | 0,20 | 0,23 | 0,24 | 0,27 | 0,30 | 0,32 | 0,35 | |
| 4 | | 0,07 | 0,07 | 0,09 | 0,10 | 0,13 | 0,13 | 0,14 | 0,15 | 0,16 | 0,19 | 0,21 | 0,23 | 0,25 | 0,26 | 0,28 | |
| 5 | | 0,34 | 0,48 | 0,08 | 0,09 | 0,11 | 0,10 | 0,12 | 0,13 | 0,14 | 0,17 | 0,18 | 0,21 | 0,22 | 0,22 | 0,24 | |
| 6 | | | | 0,63 | 0,08 | 0,08 | 0,09 | 0,11 | 0,12 | 0,13 | 0,15 | 0,15 | 0,19 | 0,20 | 0,20 | 0,22 | |
| 7 | | | | | 0,77 | 0,90 | 0,09 | 0,10 | 0,11 | 0,13 | 0,14 | 0,14 | 0,16 | 0,17 | 0,18 | 0,20 | |
| 8 | | | | | | | 0,08 | 0,08 | 0,10 | 0,11 | 0,13 | 0,13 | 0,15 | 0,16 | 0,17 | 0,19 | |
| 9 | | | | | | | 1,07 | 1,20 | 0,10 | 0,10 | 0,12 | 0,12 | 0,14 | 0,15 | 0,16 | 0,18 | |
| 10 | | | | | | | | | 0,08 | 0,10 | 0,11 | 0,12 | 0,13 | 0,15 | 0,15 | 0,16 | |
| 11 | | | | | | | | | 1,49 | 0,09 | 0,10 | 0,11 | 0,12 | 0,14 | 0,14 | 0,15 | |
| 12 | | | | | | | | | | 0,08 | 0,08 | 0,10 | 0,12 | 0,14 | 0,14 | 0,15 | |
| 13 | | | | | | | | | | 1,77 | 2,04 | 0,10 | 0,11 | 0,12 | 0,13 | 0,14 | |
| 14 | | | | | | | | | | | | 0,08 | 0,10 | 0,10 | 0,12 | 0,13 | |
| 15 | | | | | | | | | | | | 2,32 | 2,62 | 2,89 | 0,12 | 0,12 | |
| 16 | | | | | | | | | | | | | | | 0,10 | 0,10 | |
| | | Profundidad Total Total Depth Profondeur Totale: | | | | | | | | | | | | | | 3,20 | 3,46 |

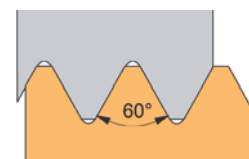
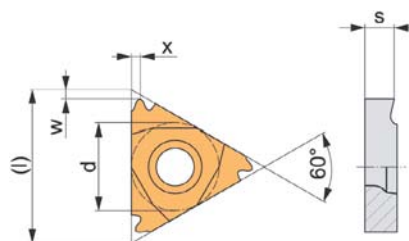
Rosca ISO Métrica Externa External Metric ISO Thread Taraudage ISO métrique externe

| N° Pasadas N° Infeed N° Passades | reduzca la velocidad de corte proporcionalmente al incremento del paso reduce cutting speed proportionally to increasing the thread pitch réglez la vitesse de coupe en proportion à l'augmentation du pas | | | | | | | | | | | | | | | | |
|--|---|--|------|------|--------------------|------|------|------|-------------------|------|------|------|------|------|------|------|------|
| | paso (mm) pitch pas | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,50 | 3,00 | 3,50 | 4,00 | 4,50 | 5,00 | 5,50 | 6,00 | |
| | Avance Radial (mm) | | | | Radial Infeed (mm) | | | | Avance Rayon (mm) | | | | | | | | |
| 1 | | 0,11 | 0,17 | 0,19 | 0,20 | 0,22 | 0,22 | 0,25 | 0,27 | 0,28 | 0,34 | 0,34 | 0,37 | 0,41 | 0,43 | 0,46 | |
| 2 | | 0,09 | 0,15 | 0,16 | 0,17 | 0,21 | 0,21 | 0,24 | 0,25 | 0,26 | 0,31 | 0,32 | 0,34 | 0,39 | 0,40 | 0,43 | |
| 3 | | 0,07 | 0,11 | 0,13 | 0,14 | 0,17 | 0,17 | 0,18 | 0,19 | 0,21 | 0,25 | 0,25 | 0,28 | 0,32 | 0,32 | 0,35 | |
| 4 | | 0,07 | 0,07 | 0,11 | 0,11 | 0,14 | 0,14 | 0,16 | 0,17 | 0,18 | 0,21 | 0,22 | 0,24 | 0,27 | 0,27 | 0,30 | |
| 5 | | 0,34 | 0,48 | 0,08 | 0,10 | 0,12 | 0,12 | 0,14 | 0,15 | 0,16 | 0,18 | 0,19 | 0,22 | 0,24 | 0,24 | 0,27 | |
| 6 | | | | 0,67 | 0,08 | 0,08 | 0,10 | 0,12 | 0,13 | 0,14 | 0,17 | 0,17 | 0,20 | 0,22 | 0,22 | 0,24 | |
| 7 | | | | | 0,80 | 0,94 | 0,10 | 0,11 | 0,12 | 0,13 | 0,15 | 0,16 | 0,18 | 0,20 | 0,20 | 0,22 | |
| 8 | | | | | | | 0,08 | 0,08 | 0,11 | 0,12 | 0,14 | 0,15 | 0,17 | 0,19 | 0,19 | 0,21 | |
| 9 | | | | | | | 1,14 | 1,28 | 0,11 | 0,12 | 0,14 | 0,14 | 0,16 | 0,18 | 0,18 | 0,20 | |
| 10 | | | | | | | | | 0,08 | 0,11 | 0,12 | 0,13 | 0,15 | 0,17 | 0,17 | 0,19 | |
| 11 | | | | | | | | | 1,58 | 0,10 | 0,11 | 0,12 | 0,14 | 0,16 | 0,16 | 0,18 | |
| 12 | | | | | | | | | | 0,08 | 0,08 | 0,12 | 0,13 | 0,15 | 0,15 | 0,16 | |
| 13 | | | | | | | | | | 1,89 | 2,20 | 0,11 | 0,12 | 0,12 | 0,13 | 0,15 | |
| 14 | | | | | | | | | | | | 0,08 | 0,10 | 0,10 | 0,13 | 0,14 | |
| 15 | | | | | | | | | | | | 2,50 | 2,80 | 3,12 | 0,12 | 0,12 | |
| 16 | | | | | | | | | | | | | | | 0,10 | 0,10 | |
| | | Profundidad Total Total Depth Profondeur Totale: | | | | | | | | | | | | | | 3,41 | 3,72 |

Ref. **8610****PLAQUITA INTERCAMBIABLE ROSCADO EXTERIOR TN..ER.M**

TN..ER.M External Threading Indexable Insert

Plaquette taraudage extérieur TN..ER.M



Rosca Externa Perfil Total
Full Profile External Thread
Filetage extérieur profil total

| ISO | P | l mm | d mm | s mm | x mm | w mm | | N° Art. P-620 | € |
|----------------|------|---------|---------|---------|---------|---------|----|------------------|--------------|
| TN-16-ER-050-M | 0,50 | 16 | 9,525 | 3,47 | 0,4 | 0,6 | 10 | 13438 | 19,99 |
| TN-16-ER-075-M | 0,75 | 16 | 9,525 | 3,47 | 0,6 | 0,6 | 10 | 13441 | 19,99 |
| TN-16-ER-100-M | 1,00 | 16 | 9,525 | 3,47 | 0,7 | 0,7 | 10 | 13444 | 19,99 |
| TN-16-ER-125-M | 1,25 | 16 | 9,525 | 3,47 | 0,9 | 0,8 | 10 | 13445 | 19,99 |
| TN-16-ER-150-M | 1,50 | 16 | 9,525 | 3,47 | 1,0 | 0,8 | 10 | 13446 | 19,99 |
| TN-16-ER-175-M | 1,75 | 16 | 9,525 | 3,47 | 1,2 | 0,9 | 10 | 13447 | 19,99 |
| TN-16-ER-200-M | 2,00 | 16 | 9,525 | 3,47 | 1,3 | 1,0 | 10 | 13448 | 19,99 |
| TN-16-ER-250-M | 2,50 | 16 | 9,525 | 3,47 | 1,5 | 1,1 | 10 | 13449 | 19,99 |
| TN-16-ER-300-M | 3,00 | 16 | 9,525 | 3,47 | 1,5 | 1,2 | 10 | 13450 | 19,99 |
| TN-22-ER-350-M | 3,50 | 22 | 12,700 | 4,71 | 2,3 | 1,6 | 10 | 13452 | 33,86 |
| TN-22-ER-400-M | 4,00 | 22 | 12,700 | 4,71 | 2,3 | 1,6 | 10 | 13453 | 33,86 |
| TN-22-ER-450-M | 4,50 | 22 | 12,700 | 4,71 | 2,4 | 1,7 | 10 | 13454 | 33,86 |
| TN-22-ER-500-M | 5,00 | 22 | 12,700 | 4,71 | 2,5 | 1,7 | 10 | 13455 | 33,86 |



Ejemplo Pedido / Order Example / Exemple
commande: Ref. 8610 TN-16-ER-050-M P-620

Porta Plaquetas / Tool Holder / Porte-Plaquettes: **Pag. 515**

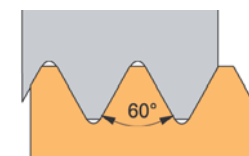
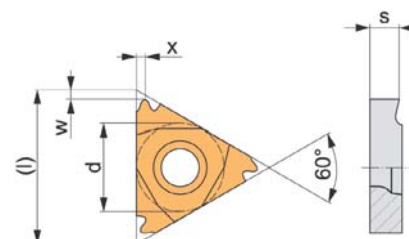
**Set 4 Pcs**

| Cont. | | N° Art. | € |
|---|--|---------|---------------|
| 1 plaqueta por paso - 1 insert per Pitch - 1 plaquette par pas P= 0,5-3 (9pcs) + | | | |
| 1 Porta-Plaquetas - 1 Tool-Holder - 1 porte-plaquettes Exterior - External - Extérieur Ref. 8820 - Art. 13576 - SER-2525-M16 + | | 32649 | 235,70 |
| 1 placa base - 1 Base Plate - 1 Plaque de Base Ref. 8815 - Art. 36144 + | | | |
| Destornillador - Screwdriver - Tournevis - T-15 (1pc) | | | |

Ref. **8615****PLAQUITA INTERCAMBIABLE ROSCADO EXTERIOR TN..ER.M**

TN..ER.M External Threading Indexable Insert

Plaquette taraudage extérieur TN..ER.M



Rosca Externa Perfil Parcial
Partial Profile External Thread
Filetage extérieur profil partiel

| ISO | P | l mm | d mm | s mm | x mm | w mm | | N° Art. P-620 | € |
|---------------|-----------|---------|---------|---------|---------|---------|----|------------------|--------------|
| TN-16-ER-A60 | 0,50-1,50 | 16 | 9,525 | 3,47 | 0,9 | 0,8 | 10 | 13508 | 19,99 |
| TN-16-ER-AG60 | 0,50-3,00 | 16 | 9,525 | 3,47 | 1,7 | 1,2 | 10 | 78788 | 19,99 |
| TN-16-ER-G60 | 1,75-3,00 | 16 | 9,525 | 3,47 | 1,7 | 1,2 | 10 | 13510 | 19,99 |
| TN-22-ER-N60 | 3,50-5,00 | 22 | 12,700 | 4,71 | 2,5 | 1,7 | 10 | 81506 | 33,86 |



Ejemplo Pedido / Order Example / Exemple
commande: Ref. 8615 TN-16-ER-A60 P-620

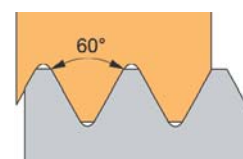
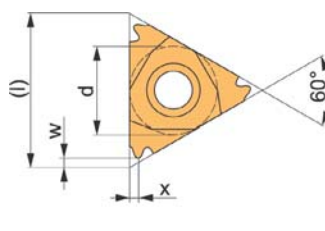
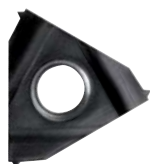
Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 515

Ref. 8620

PLAQUITA INTERCAMBIABLE ROSCADO INTERIOR TN..IR.M

TN..IR.M Internal Threading Indexable Insert

Plaquette taraudage intérieur TN..IR.M



Rosca Interna Perfil Total
Full Profile Internal Thread
Filetage intérieur profil total

| ISO | P | l mm | d mm | s mm | x mm | w mm | | N° Art. P-620 | € |
|----------------|------|---------|---------|---------|---------|---------|----|------------------|-------|
| TN-11-IR-100-M | 1,00 | 11 | 6,350 | 3,00 | 0,7 | 0,7 | 10 | 13480 | 19,99 |
| TN-11-IR-125-M | 1,25 | 11 | 6,350 | 3,00 | 0,9 | 0,8 | 10 | 13481 | 19,99 |
| TN-11-IR-150-M | 1,50 | 11 | 6,350 | 3,00 | 1,0 | 0,8 | 10 | 13484 | 19,99 |
| TN-16-IR-100-M | 1,00 | 16 | 9,525 | 3,47 | 0,7 | 0,8 | 10 | 13486 | 19,99 |
| TN-16-IR-125-M | 1,25 | 16 | 9,525 | 3,47 | 0,9 | 0,8 | 10 | 13487 | 19,99 |
| TN-16-IR-150-M | 1,50 | 16 | 9,525 | 3,47 | 1,0 | 0,8 | 10 | 13492 | 19,99 |
| TN-16-IR-175-M | 1,75 | 16 | 9,525 | 3,47 | 1,2 | 0,9 | 10 | 13493 | 19,99 |
| TN-16-IR-200-M | 2,00 | 16 | 9,525 | 3,47 | 1,3 | 1,0 | 10 | 13495 | 19,99 |
| TN-16-IR-250-M | 2,50 | 16 | 9,525 | 3,47 | 1,5 | 1,1 | 10 | 13496 | 19,99 |
| TN-16-IR-300-M | 3,00 | 16 | 9,525 | 3,47 | 1,5 | 1,2 | 10 | 13498 | 19,99 |



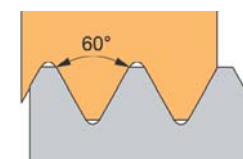
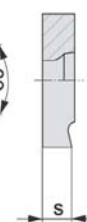
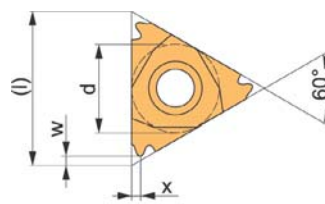
Ejemplo Pedido / Order Example / Exemple commande: **Porta Plaquetas / Tool Holder / Porte-Plaquettes:**
Ref. 8620 TN-11-IR-100-M P-620 **Pag. 515**

Ref. 8625

PLAQUITA INTERCAMBIABLE ROSCADO INTERIOR TN..IR.M

TN..IR.M Internal Threading Indexable Insert

Plaquette taraudage intérieur TN..IR.M



Rosca Interna Perfil Parcial
Partial Profile Internal Thread
Filetage intérieur profil partiel

| ISO | P | l mm | d mm | s mm | x mm | w mm | | N° Art. P-620 | € |
|---------------|-----------|---------|---------|---------|---------|---------|----|------------------|-------|
| TN-11-IR-A60 | 0,50-1,50 | 11 | 6,350 | 3,00 | 0,9 | 0,8 | 10 | 81507 | 19,99 |
| TN-16-IR-A60 | 0,50-1,50 | 16 | 9,525 | 3,47 | 0,9 | 0,8 | 10 | 13511 | 19,99 |
| TN-16-IR-AG60 | 0,50-3,00 | 16 | 9,525 | 3,47 | 1,7 | 1,2 | 10 | 78789 | 19,99 |
| TN-16-IR-G60 | 1,75-3,00 | 16 | 9,525 | 3,47 | 1,7 | 1,2 | 10 | 13513 | 19,99 |

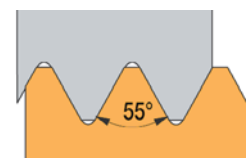
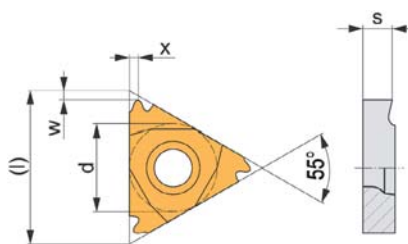


Ejemplo Pedido / Order Example / Exemple commande: **Porta Plaquetas / Tool Holder / Porte-Plaquettes:**
Ref. 8625 TN-16-IR-A60 P-620 **Pag. 515**


Ref. **8612****PLAQUITA INTERCAMBIABLE ROSCADO EXTERIOR WHITWORTH 55°**

55° Whitworth External Threading Indexable Insert

Plaquette taraudage extérieur Whitworth 55°



Rosca Interna Perfil Total
Full Profile Internal Thread
Filetage Intérieur Profil total

| ISO | P (N° Hilos / Threads / Filets) | l mm | d mm | s mm | x mm | w mm |  | N° Art. P-620 | € |
|----------------|---------------------------------|------|-------|------|------|------|---|---------------|--------------|
| TN-16-ER-080-W | 8 | 16 | 9,525 | 3,47 | 1,5 | 1,2 | 10 | 59314 | 19,99 |
| TN-16-ER-100-W | 10 | 16 | 9,525 | 3,47 | 1,5 | 1,1 | 10 | 59311 | 19,99 |
| TN-16-ER-110-W | 11 | 16 | 9,525 | 3,47 | 1,5 | 1,1 | 10 | 59310 | 19,99 |
| TN-16-ER-120-W | 12 | 16 | 9,525 | 3,47 | 1,4 | 1,1 | 10 | 59309 | 19,99 |
| TN-16-ER-140-W | 14 | 16 | 9,525 | 3,47 | 1,2 | 1,0 | 10 | 59308 | 19,99 |
| TN-16-ER-160-W | 16 | 16 | 9,525 | 3,47 | 1,1 | 0,9 | 10 | 59307 | 19,99 |
| TN-16-ER-180-W | 18 | 16 | 9,525 | 3,47 | 1,0 | 0,8 | 10 | 59306 | 19,99 |
| TN-16-ER-200-W | 20 | 16 | 9,525 | 3,47 | 0,9 | 0,8 | 10 | 59305 | 19,99 |



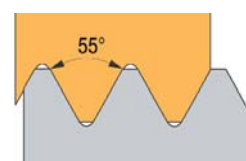
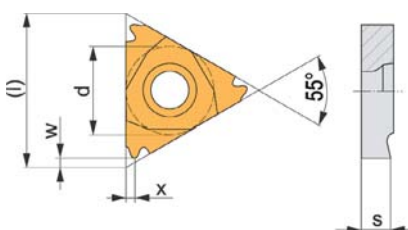
Ejemplo Pedido / Order Example / Exemple commande: Ref.
8612 TN-16-ER-100-W P-620

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 515


Ref. **8622****PLAQUITA INTERCAMBIABLE ROSCADO INTERIOR WHITWORTH 55°**

55° Whitworth Internal Threading Indexable Insert

Plaquette taraudage intérieur Whitworth 55°



Rosca Interna Perfil Total
Full Profile Internal Thread
Filetage Intérieur Profil total

| ISO | P (N° Hilos / Threads / Filets) | l mm | d mm | s mm | x mm | w mm |  | N° Art. P-620 | € |
|----------------|---------------------------------|------|-------|------|------|------|---|---------------|--------------|
| TN-16-IR-080-W | 8 | 16 | 9,525 | 3,47 | 1,5 | 1,2 | 10 | 59321 | 19,99 |
| TN-16-IR-100-W | 10 | 16 | 9,525 | 3,47 | 1,5 | 1,1 | 10 | 59320 | 19,99 |
| TN-16-IR-110-W | 11 | 16 | 9,525 | 3,47 | 1,5 | 1,1 | 10 | 60000 | 19,99 |
| TN-16-IR-120-W | 12 | 16 | 9,525 | 3,47 | 1,4 | 1,1 | 10 | 59319 | 19,99 |
| TN-16-IR-140-W | 14 | 16 | 9,525 | 3,47 | 1,2 | 1,0 | 10 | 59318 | 19,99 |
| TN-16-IR-160-W | 16 | 16 | 9,525 | 3,47 | 1,1 | 0,9 | 10 | 59317 | 19,99 |
| TN-16-IR-180-W | 18 | 16 | 9,525 | 3,47 | 1,0 | 0,8 | 10 | 59316 | 19,99 |
| TN-16-IR-200-W | 20 | 16 | 9,525 | 3,47 | 0,9 | 0,8 | 10 | 59315 | 19,99 |



Ejemplo Pedido / Order Example / Exemple commande:
Ref. 8622 TN-16-IR-100-W P-620

Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 515

CÓDIGOS ISO ELECCIÓN PORTA-PLAQUITAS ROSCADO

Threading Tool-Holder Choice ISO Codes

Codes ISO choix Porte-Plaquettes taraudage

| 1 | | 2 | | 3 | | 4 | | |
|---|--|---|--|--|-----------------------|--|----------|------------------------------|
| Sistema Anclaje Clamping system Type attachment | | Tipo Mecanizado Way of machining Type usinage | | Dirección Corte Direction of cut Direction coupe | | Tipo de Fabricación Type of Fabrication Type fabrication | | |
| C | | E Exterior Extérieur | | R - Dcha./Right/Droit | Interior Intérieur | | - | normal / normal / normal |
| P | | I Interior Intérieur | | | Exterior Extérieur | | S | especial / special / spécial |
| M | | | | L - Izda./Left/Gauche | Interior Intérieur | | | |
| S | | | | | Exterior Extérieur | | | |

1 2 3 - 4 - 5 6 7
S E R - - 2525 M 16

| 5 | | 6 | | 7 | |
|---|------|---|----------------|--|--|
| Dimensiones (mm) Dimensions (mm) Dimensions (mm) | | Largo total Total length Longueur total | | Dimensiones (mm) Dimensions (mm) Dimensions (mm) | |
| Torneado exterior External turning Tournage extérieur | 2525 | 25 x 25 mm | | | |
| Torneado interior Internal turning Tournage intérieur | 1416 | mango / shank / queue ancho mango / shank width largeur queue | 14 mm 16 mm | | |

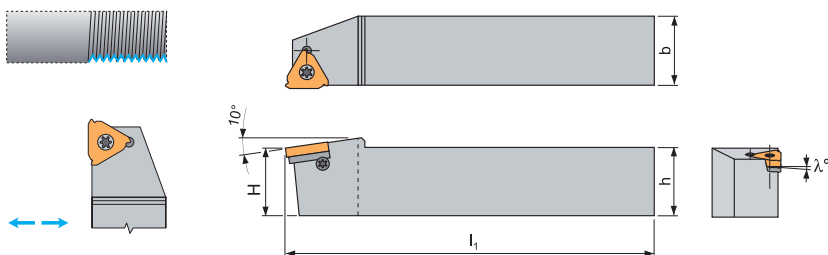
| 6 | | 7 | |
|---|------------|--|----------|
| Largo total Total length Longueur total | | Dimensiones (mm) Dimensions (mm) Dimensions (mm) | |
| | l_1 [mm] | | T |
| | H | d [mm] | |
| | J | 6,350 | 11 |
| | K | 9,525 | 16 |
| | L | 12,700 | 22 |
| | M | | |
| | N | | |
| | P | | |
| | Q | | |
| | R | | |
| | S | | |
| | T | | |
| | U | | |
| | V | | |
| | W | | |
| | X | | |
| | Y | | |



Ref. 8820

PORTA-PLAQUITAS ROSCADO EXTERIOR SER

SER External Threading Tool-Holder
Porte-Plaquettes taraudage extérieur SER



Nota: Grado Inclinación Standard Porta-Plaquetas $\lambda = 1,5^\circ$
Note: Holder Standard Inclination Angle $\lambda = 1,5^\circ$
Note: Degré inclinaison standard Porte-Plaquettes $\lambda = 1,5^\circ$

| ISO | N° Art. | | h=H mm | b mm | l mm | λ° | € | | | | | |
|--------------|---------|----------|--------|------|------|-----------------|--------|--|-----------------------------------|--|---|-------------------------------------|
| SER-2020-K16 | 13573 | TN-16-ER | 20 | 20 | 125 | 1,5 | 202,28 | Ref. 8803 Z-12 Art. 13848 5 | Ref. 8803 | Ref. 8803 ZSY3 Art. 74798 5 | Ref. 8801 ZT-15 Art. 10512 1 | Ref. 8815 Art. 36144 5 |
| SER-2525-M16 | 13576 | | 25 | 25 | 150 | 1,5 | 207,74 | - | - | 3,98 € | 10,74 € | 20,38 € |
| SER-3232-P22 | 13577 | TN-22-ER | 32 | 32 | 170 | 1,5 | 239,53 | Z-13 Art. 13843 5 | ZSP-405 Art. 13844 5 | - | ZT-20 Art. 13845 1 | Art. 32581 5 |

Plaquita / Insert / Plaquette: **Pag. 502, 511**

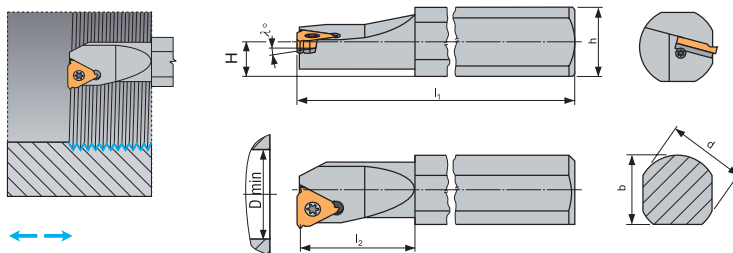
| | |
|--|------------------------|
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |

| | |
|--|--|
| | Destornillador - Screwdriver - Tournevis |
| | Placa Base - Base Plate - Plaque de base |

Ref. 8830

PORTA-PLAQUITAS ROSCADO INTERIOR SIR

SIR Internal Threading Tool-Holder
Porte-Plaquettes taraudage intérieur SIR



| ISO | N° Art. | | d mm | l1 mm | l2 mm | H mm | D min. | h mm | b mm | € | | | | |
|--------------|---------|----------|------|-------|-------|------|--------|------|------|--------|---|--------------------------------|---|------------------|
| SIR-0910-K11 | 13579 | TN-11-IR | 10 | 125 | 16 | 4,5 | 13 | 9 | 14,5 | 210,77 | Ref. 8803 T07 Art. 10846 5 | Ref. 8803 | Ref. 8801 ZT-08 Art. 10506 1 | Ref. 8815 |
| SIR-1516-M16 | 13582 | | 16 | 150 | 25 | 7,5 | 22 | 15 | 14,0 | 230,84 | Z-09 Art. 13847 5 | - | ZT-15 Art. 10512 1 | - |
| SIR-2325-R16 | 13583 | TN-16-IR | 25 | 200 | 35 | 11,5 | 29 | 23,0 | 23,5 | 287,27 | Z-12 Art. 13848 5 | ZSY3 Art. 74798 5 | ZYI3 Art. 22701 5 | 20,38 € |

Plaquita / Insert / Plaquette: **Pag. 503, 512**

| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |
| | Placa Base - Base Plate - Plaque de base |

Set 8799




SETS DE TORNEADO Turning Inserts Sets Jeux de tournage



Set 1



5 Pcs






| Cont. | | N° Art. | € |
|--|---|---------|--|
| Plaquita - Insert - Plaque Ref. 8560 - Art. 26323 TCMT-16T308-E-ZRR C-525 (20pcs) + Porta-Plaquita - Tool-Holder - Porte-Plaquettes Exterior - External - Extérieur Ref. 8703 - Art.18660 STJCR-2020K16 (1pc) Interior - Internal - Intérieur Ref. 8718 - Art. 18789 S25T-STFCR-16 (1pc) + Destornillador - Screwdriver - Tournevis T-15 (1pc) |    | 83386 | € 368,23 Set Price! |

Set 2

New!



7 Pcs






| Cont. | | N° Art. | € |
|--|--|---------|--|
| Plaquita Torneado - Turning Insert - Plaque tournage Ref. 8500 - Art. 26281 (10 pcs) CCMT 09T308-E-ZRR Ref. 8500 - Art. 59270 (10 pcs) CCMT 060204-E-ZMM + Porta-Plaquita - Tool-Holder - Porte-Plaquettes Exterior - External - Extérieur Ref. 8704 - Art. 42945 (1 pc) SCLCR 2020 K09 Interior - Internal - Intérieur Ref. 8751 - Art. 19443 (1 pc) S20S-SCLCR 09 Ref. 8751 - Art. 19435 (1 pc) S10M-SCLCR 06 + Destornillador - Screwdriver - Tournevis T-15 (1pc) - T-07 (1pc) |      | 20098 | € 446,80 Set Price! |

Set 3

New!



7 Pcs

| Cont. | | N° Art. | € |
|--|---|---------|--|
| Plaquita Torneado - Turning Insert - Plaque tournage Ref. 8500 - Art. 26281 (10 pcs) CCMT 09T308-E-ZRR Plaquita Tronzado - Parting Insert - Plaque tronçonnage Ref. 8601 MGMN - Art. 12712 (10 pcs) 3.00-0.40-GC-ZF + Porta-Plaquita - Tool-Holder - Porte-Plaquettes Exterior - External - Extérieur Ref. 8704 - Art. 42945 (1 pc) SCLCR 2020 K09 Interior - Internal - Intérieur Ref. 8751 - Art. 19443 (1 pc) S20S-SCLCR 09 Porta-plaquita Tronzado Parting Tool-Holder - Porte-Plaquettes tronçonnage Ref. 8865 - Art. 12729 (1 pc) XMCGR-2020-K-3.00 + Destornillador - Screwdriver - Tournevis T-15 (1pc) + Allen 4 (1pc) |      | 20099 | € 518,01 Set Price! |

FRESADO

Milling

Fraisage



CLASIFICACIÓN CALIDADES - ELECCIÓN PRINCIPAL FRESADO

Milling Grade Classification - Main Choice

Classement des Qualités - Choix principal fraiseage

| Grupo ISO ISO Group Groupe ISO | Fresado - Milling - Fraisage | | | | Taladrado/Roscado/Tronzado Drilling/Threading/Parting Perçage/Tarudage/Tronçonnage | |
|--|---|-------|-------|---------------------------------------|--|-------|
| | Calidades con Recubrimiento Coated Grades - Qualités avec revêtement | | | Sin Recubrimiento Unc. - Sans rev. | Calidades con Recubrimiento Coated - Avec revêtement | |
| | Metal Duro - Carbide - Carburé | | | MD/HM Carbure | Metal Duro - Carbide - Carburé | |
| | CVD | PVD | | | CVD | PVD |
| P Resistencia al desgaste Wear resistance Résistance à l'usure Tenacidad Toughness Ténacité | P01 | | | | | |
| | P05 | | P-605 | | | |
| | P10 | | P-610 | | | |
| | P15 | | P-615 | | | |
| | P20 | C-526 | | | | |
| | P25 | | | | | P-620 |
| | P30 | | P-620 | | C-540 | |
| | P35 | | P-630 | | | P-625 |
| | P40 | | | P-640 | | |
| | P50 | | | | | |
| M Resistencia al desgaste Wear resistance Résistance à l'usure Tenacidad Toughness Ténacité | M01 | | | | | |
| | M05 | | | | | |
| | M10 | | P-610 | | | |
| | M15 | | P-615 | | P-010 | |
| | M20 | C-526 | | | | P-620 |
| | M25 | | P-625 | | | P-625 |
| | M30 | | P-630 | P-640 | | |
| | M35 | | | | C-540 | |
| | M40 | | | | | |
| | M40 | | | | | |
| K Resistencia al desgaste Wear resistance Résistance à l'usure Tenacidad Toughness Ténacité | K01 | | | | | |
| | K05 | | | | | |
| | K10 | | P-610 | P-615 | | |
| | K15 | | | | P-010 | |
| | K20 | C-526 | | P-630 | | |
| | K25 | | P-620 | P-640 | | P-625 |
| | K30 | | | | | |
| | K35 | | | | C-540 | |
| | K40 | | | | | |
| | K40 | | | | | |
| S Resistencia al desgaste Wear resistance Résistance à l'usure Tenacidad Toughness Ténacité | S01 | | | | | |
| | S05 | | | | | |
| | S10 | | P-610 | P-615 | | |
| | S15 | | | | P-010 | |
| | S20 | | | P-630 | | P-620 |
| | S25 | | | P-640 | | P-625 |
| | S30 | | | | C-540 | |
| | S30 | | | | | |
| N Resistencia al desgaste Wear resistance Résistance à l'usure Tenacidad Toughness Ténacité | N01 | | | | | |
| | N05 | | | | | |
| | N10 | | P-610 | P-615 | | |
| | N15 | | | | P-010 | |
| | N20 | | | P-630 | | |
| | N25 | | | | | P-625 |
| | N30 | | | | | |
| H Resistencia al desgaste Wear resistance Résistance à l'usure Tenacidad Toughness Ténacité | H01 | | | | | |
| | H05 | | P-605 | | | |
| | H10 | | P-610 | P-615 | | |
| | H15 | C-526 | | | P-010 | |
| | H20 | | | P-630 | | |
| | H25 | | | | | P-625 |
| | H30 | | | | | |
| | H30 | | | | | |

ELECCIÓN CONDICIONES CORTE SEGUN CALIDADES FRESADO

Milling Cutting Condition Choice depending on Qualities

Choix de conditions de coupe à cause de qualités fraissage

| Porta-Plaquitas Tool-Holder Porte-Plaquettes | Plaquitas Inserts Plaquettes | Condiciones Corte Cutting Conditions Conditions Coupe | Calidades Qualities Qualités | | | | | | | P | |
|--|------------------------------------|--|------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------|---|--|
| | | | C-526 | P-610 | P-615 | P-625 | P-630 | P-640 | Z-010 | | |
| S90AP-10 S90AP-16 S90XO-06 SAP-16D | APKT XOET APET | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 315 300 280 | | | 230 220 180 | 180 170 150 | 160 150 130 | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | |
| S-45-SN-12 50060 | SEHT WNNMW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 315 300 280 | 250 230 180 | | 230 220 180 | | 160 150 130 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,90 |
| S-45OD06-45 W45SE-12 | ODMT SEKR SEKN | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 315 300 280 | 250 210 200 | | 230 220 180 | | 160 150 130 | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 |
| W90TP-22 | TPKN TPKR | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 315 300 280 | | | 230 220 180 | | 160 150 130 | | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,80-0,95 |
| S90... | SNHQ | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | 280 270 260 | | Vida plaqueta Insert life Vie plaquette | T _{min} 15 K = 1,23 T _{min} 20 K = 1,13 T _{min} 30 K = 1,00 T _{min} 45 K = 0,89 T _{min} 60 K = 0,81 T _{min} 90 K = 0,72 |
| S-45OD06-45 W45SE-12 | RDHT RDHW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | 250 210 200 | | 230 220 180 | | 160 150 130 | | | |
| SRC SLC | RC LC | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | 310 295 280 | | 270 240 200 | | | | |

| Porta-Plaquitas Tool-Holder Porte-Plaquettes | Plaquitas Inserts Plaquettes | Condiciones Corte Cutting Conditions Conditions Coupe | Calidades Qualities Qualités | | | | | | | M | |
|--|------------------------------------|--|------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------|---|--|
| | | | C-526 | P-610 | P-615 | P-625 | P-630 | P-640 | Z-010 | | |
| S90AP-10 S90AP-16 S90XO-06 SAP-16D | APKT XOET APET | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 185 180 165 | | | 170 165 155 | | 150 145 140 | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | |
| S-45-SN-12 50060 | SEHT WNNMW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 185 180 165 | | | 160 150 110 | | 120 110 100 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,90 |
| S-45OD06-45 W45SE-12 | ODMT SEKR SEKN | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 185 180 165 | 160 150 110 | | | | 120 110 100 | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 |
| W90TP-22 | TPKN TPKR | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | 160 150 110 | | 120 110 100 | | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,80-0,95 |
| S90... | SNHQ | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | 165 160 155 | | Vida plaqueta Insert life Vie plaquette | T _{min} 15 K = 1,23 T _{min} 20 K = 1,13 T _{min} 30 K = 1,00 T _{min} 45 K = 0,89 T _{min} 60 K = 0,81 T _{min} 90 K = 0,72 |
| S-45OD06-45 W45SE-12 | RDHT RDHW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | 160 150 110 | | 120 110 100 | | | | |
| SRC SLC | RC LC | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | 185 175 165 | | 155 150 140 | | | | |

| Porta-Plaquitas Tool-Holder Porte-Plaquettes | Plaquitas Inserts Plaquettes | Condiciones Corte Cutting Conditions Conditions Coupe | Calidades Qualities Qualités | | | | | | | K | |
|--|------------------------------------|--|------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------|---|--|
| | | | C-526 | P-610 | P-615 | P-625 | P-630 | P-640 | Z-010 | | |
| S90AP-10 S90AP-16 S90XO-06 SAP-16D | APKT XOET APET | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 480 440 395 | | | 280 230 190 | 230 225 180 | 250 220 170 | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | |
| S-45-SN-12 50060 | SEHT WNNMW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 450 415 380 | 300 250 190 | | 280 230 190 | | 250 220 170 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,90 |
| S-45OD06-45 W45SE-12 | ODMT SEKR SEKN | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 450 415 370 | 300 250 210 | | 280 230 190 | | 250 220 170 | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 |
| W90TP-22 | TPKN TPKR | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,80-0,95 |
| S90... | SNHQ | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | 255 245 | | Vida plaqueta Insert life Vie plaquette | T _{min} 15 K = 1,23 T _{min} 20 K = 1,13 T _{min} 30 K = 1,00 T _{min} 45 K = 0,89 T _{min} 60 K = 0,81 T _{min} 90 K = 0,72 |
| S-45OD06-45 W45SE-12 | RDHT RDHW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | 300 250 210 | | 280 230 190 | | 250 220 170 | | | |
| SRC SLC | RC LC | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | 290 280 265 | | 250 235 220 | | | | |

ELECCIÓN CONDICIONES CORTE SEGUN CALIDADES FRESADO

Milling Cutting Condition Choice depending on Qualities

Choix de conditions de coupe à cause de qualités fraiseage

| Porta-Plaquitas Tool-Holder Porte-Plaquettes | Plaquitas Inserts Plaquettes | Condiciones Corte Cutting Conditions Conditions Coupe | Calidades Qualities Qualités | | | | | | | S | |
|--|------------------------------------|--|------------------------------------|-------|----------|----------------|----------------|----------------|-------|---|--|
| | | | C-526 | P-610 | P-615 | P-625 | P-630 | P-640 | Z-010 | | |
| S90AP-10 S90AP-16 S90XO-06 SAP-16D | APKT XOET APET | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | 50 | | | 45 40 | 75 70 | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | |
| S-45-SN-12 50060 | SEHT WNMW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | 90 50 20 | | 80 40 20 | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,90 |
| S-45OD06-45 W45SE-12 | ODMT SEKR SEKN | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | 50 | | 90 85 | | 80 75 | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 |
| W90TP-22 | TPKN TPKR | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,80-0,95 |
| S90... | SNHQ | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | 80 80 | | Vida plaqueta Insert life Vie plaquette | T _{min} 15 K = 1,23 T _{min} 20 K = 1,13 T _{min} 30 K = 1,00 T _{min} 45 K = 0,89 T _{min} 60 K = 0,81 T _{min} 90 K = 0,72 |
| S-45OD06-45 W45SE-12 | RDHT RDHW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | 90 50 20 | 80 40 20 | | | |
| SRC SLC | RC LC | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | 90 85 | | 50 | | | | |

| Porta-Plaquitas Tool-Holder Porte-Plaquettes | Plaquitas Inserts Plaquettes | Condiciones Corte Cutting Conditions Conditions Coupe | Calidades Qualities Qualités | | | | | | | N | |
|--|------------------------------------|--|------------------------------------|-------|-------------------|-------|-------------------|-------|-------------------|---|--|
| | | | C-526 | P-610 | P-615 | P-625 | P-630 | P-640 | Z-010 | | |
| S90AP-10 S90AP-16 S90XO-06 SAP-16D | APKT XOET APET | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | 900 400 350 | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | |
| S-45-SN-12 50060 | SEHT WNMW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | 900 400 350 | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,90 |
| S-45OD06-45 W45SE-12 | ODMT SEKR SEKN | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 |
| W90TP-22 | TPKN TPKR | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,80-0,95 |
| S90... | SNHQ | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Vida plaqueta Insert life Vie plaquette | T _{min} 15 K = 1,23 T _{min} 20 K = 1,13 T _{min} 30 K = 1,00 T _{min} 45 K = 0,89 T _{min} 60 K = 0,81 T _{min} 90 K = 0,72 |
| S-45OD06-45 W45SE-12 | RDHT RDHW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | | |
| SRC SLC | RC LC | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | 775 735 700 | | 660 625 580 | | | | |

| Porta-Plaquitas Tool-Holder Porte-Plaquettes | Plaquitas Inserts Plaquettes | Condiciones Corte Cutting Conditions Conditions Coupe | Calidades Qualities Qualités | | | | | | | H | |
|--|------------------------------------|--|------------------------------------|----------|----------|----------|----------|-------|-------|---|--|
| | | | C-526 | P-610 | P-615 | P-625 | P-630 | P-640 | Z-010 | | |
| S90AP-10 S90AP-16 S90XO-06 SAP-16D | APKT XOET APET | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | 40 35 | | | 55 55 | | | Factor K- Corrige Vc en función de K Factor- Correct Vc depending on Facteur K- Vc correct à cause de | |
| S-45-SN-12 50060 | SEHT WNMW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 55 50 | | 40 35 | | | | | Forjados/fundidos carcasa Forging/melting w. frame Forgeage/fondu carcasse | K = 0,70-0,90 |
| S-45OD06-45 W45SE-12 | ODMT SEKR SEKN | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | 55 50 | 45 35 | | 60 55 | | | | Maq. en buen estado Good condition mach. Mach. en bon état | K = 1,05-1,20 |
| W90TP-22 | TPKN TPKR | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Maq. en mal estado Bad condition mach. Mach. en mauvais état | K = 0,80-0,95 |
| S90... | SNHQ | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | Vida plaqueta Insert life Vie plaquette | T _{min} 15 K = 1,23 T _{min} 20 K = 1,13 T _{min} 30 K = 1,00 T _{min} 45 K = 0,89 T _{min} 60 K = 0,81 T _{min} 90 K = 0,72 |
| S-45OD06-45 W45SE-12 | RDHT RDHW | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | | | | | | | | |
| SRC SLC | RC LC | Acabado - Finishing - Finition Semidesbaste - Semiroughing - Semiébauche Desbaste - Roughing - Ébauche | | 55 50 | | | | | | | |

CÓDIGOS ISO ELECCIÓN PORTA-PLAQUITAS PLATO FRESADO

Milling SHELL Tool-Holder Choice ISO Codes

Codes ISO choix Porte-Plaquettes PLATEAU fraissage

ISO 7406-88 DIN 8029/1

1

Díámetro filo corte
Cutter diameter
Diamètre filet coupe

2

Tipo de corte, designación y/o tamaño anclaje
Cutter type, designation and/or size of clamping
Type coupe, nom et/ou taille fixation

A ISO 6462/A
DIN 8030/A
CSN 22 2301/A

B ISO 6462/B
DIN 8030/B
CSN 22 2301/B

C ISO 6462/C
DIN 8030/C
CSN 22 2301/C

F ød = 27°
G ød = 32°
H ød = 40°
J ød = 50°
K ød = 60°
M ød = 80°

T

3

Nº fillos trabando
Nº of working edges
Número filets qui travaillent

4

Dirección corte
Direction of cut
Direction coupe

R

L

N

5

Designación anclaje
Clamping designation
Type fixation

C

S

W

F

6

Angulo entrada
Setting angle
Angle entrée

K 90°

K 75°

K 60°

K 45°

K MO ø D [mm]

7

Forma plaqueta
Insert shape
Forme plaquette

S

T

R

C

W

A

8

Angulo incidencia
Clearance angle
Angle incidence

N $\alpha_i = 0^\circ$

C $\alpha_i = 7^\circ$

P $\alpha_i = 11^\circ$

D $\alpha_i = 15^\circ$

E $\alpha_i = 20^\circ$

F $\alpha_i = 25^\circ$

9

Tamaño plaqueta o longitud filo corte
Insert size or cutting edge length
Taille plaquette ou longueur filet coupe

| | S | C | T | W | R | A |
|--------|----|----|----|----|----|-------|
| d [mm] | | | | | | |
| 6,35 | | | | | | 09/11 |
| 7,94 | | | | 05 | | |
| 8,00 | | | | | 08 | |
| 9,525 | 09 | 09 | 16 | 06 | | 12 |
| 10,00 | | | | | 10 | |
| 12,00 | | | | | 12 | |
| 12,70 | 12 | 12 | 22 | 08 | | 15 |
| 15,875 | 15 | | | | | |
| 16,00 | | | | | 16 | |
| 25,00 | | | | | 25 | |
| 25,40 | 25 | | | | | |

10

Angulo incidencia
Clearance angle
Angle incidence

N $\alpha_i = 0^\circ$

P $\alpha_i = 11^\circ$

D $\alpha_i = 15^\circ$

E $\alpha_i = 20^\circ$

F $\alpha_i = 25^\circ$

11

Longitud (ancho) filo corte
Cutting edge length (width)
Longueur arête de coupe

B [mm]

I [mm]

| | | | | | | | | | | |
|------------|----------|-----------|----------|----------|-----------|----------|----------|-----------|----------|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 160 | H | 05 | N | F | 90 | T | P | 16 | P | 22 |
| 250 | C | 16 | R | W | 45 | S | E | 12 | F | |

CÓDIGOS ISO ELECCIÓN PORTA-PLAQUITAS MANGO FRESADO

Milling END Tool-Holder Choice ISO Codes

Codes ISO choix Porte-Plaquettes QUEUE fraisage

ISO 7548-86 DIN 8029/2

1

Diámetro filo corte
Cutter diameter
Diamètre filet coupe

3

Nº filas trabajando
Nº of working edges
Numéro filets qui travaillent

4

Dirección corte
Direction of cut
Direction coupe

R

L

N

5

Designación anclaje
Clamping designation
Type fixation

C

S

W

F

7

Forma Plaquita
Insert Shape
Forme plaquette

S

C

T

W

R

A

9

Tamaño plaquita o longitud filo corte
Insert size or cutting edge length
Taille plaquette ou longueur filet coupe

| d [mm] | S | C | T | W | R | A |
|--------|----|----|----|----|----|-------|
| 6,35 | | | | | | 09/11 |
| 7,94 | | | | 05 | | |
| 8,00 | | | | | 08 | |
| 9,525 | 09 | 09 | 16 | 06 | | 12 |
| 10,00 | | | | | 10 | |
| 12,00 | | | | | 12 | |
| 12,70 | 12 | 12 | 22 | 08 | | 15 |
| 15,875 | 15 | | | | | |
| 16,00 | | | | | 16 | |
| 25,00 | | | | | 25 | |
| 25,40 | 25 | | | | | |

11

Longitud (ancho) filo corte
Cutting edge length (width)
Longueur arête de coupe

8

Angulo Incidencia
Clearance Angle
Angle d'incidence

N $\alpha_1 = 0^\circ$

C $\alpha_1 = 7^\circ$

P $\alpha_1 = 11^\circ$

D $\alpha_1 = 15^\circ$

E $\alpha_1 = 20^\circ$

F $\alpha_1 = 25^\circ$

| | | | | | | | | | | |
|-----------|-----------|----------|----------|------------|-----------|-----------|----------|----------|----------|--------------|
| 1 | 1a | 3 | 4 | 2a | 3a | 4a | 5 | 7 | 8 | 9(11) |
| 63 | J | 4 | R | 150 | H | 50 | S | SA | P | 95 |
| 32 | A | 3 | R | 040 | B | 32 | S | A | D | 12 |

1a

Tipo de corte y ángulo de entrada
Cutter type & setting angle
Type coupe et angle d'entrée

A

N

E

H

J

K

2a

Tipo de corte y ángulo de entrada
Cutter type & setting angle
Type coupe et angle d'entrée

3a

Designación mango
Shank designation
Type fixation

| | |
|---|---|
| A | DIN 1835/1-A |
| B | ISO 3338/B DIN 1835/1-B CSN 22 0412 |
| E | ISO 296 DIN 228/A CSN 22 0420 |
| G | ISO 297 DIN 2080/1 CSN 22 0430 |
| X | CSN 22 0432 |
| H | ISO 7388/1 DIN 6987/1/A CSN 22 0434 |

4a

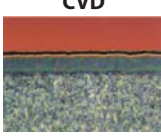
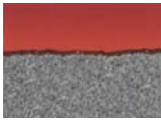

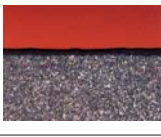





Tamaño mango
Shank size
Type queue

| ø D | ø d |
|-----------------|-----------|
| 08 + 32 | 10 + 32 |
| ø D | ø d |
| 10; 12; 16 | 16 |
| 20 | 20 |
| 25 | 25 |
| 32; 40 | 32 |
| ø D | MORSE No. |
| 10; 12; 16 | 02 |
| 20; 25; 32 | 03 |
| 40 | 04 |
| ø D | 7:24 No. |
| 32; 40 (50; 63) | 40 |
| 50; 63; 80 | 50 |
| ø D | 7:24 No. |
| 32; 40 | 40 |
| 50; 63; 80 | 50 |

GRADOS RECUBRIMIENTO MÉTODOS CVD-PVD FRESADO

Milling CVD-PVD Methods Coating Grades

Degré revêtement méthodes CVD-PVD fraiseage

| Grado Grades Degré | Microestructura Microstructure Microstructure | Grupo Material Pieza Trabajo Workpiece Material Group Groupe materiel piece travail | Aplicación Recomendada Recommended Application Application conseillée | | | | | | | | | | | | |
|--------------------------|---|--|---|---|---|---|---|---|---|---|---|---|---|---|--|
| C-526 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>○</td><td>●</td><td>○</td><td>○</td><td>○</td></tr></table> | P | M | K | S | N | H | ● | ○ | ● | ○ | ○ | ○ | <ul style="list-style-type: none"> - Sustrato de metal duro sin carburos - Capa fina de recubrimiento depositada por metodo CVD - Recomendada para materiales P-K y plaquitas con ángulo posición 90° - Grandes secciones de viruta - Buenas condiciones de corte y elevadas Vc sin refrigeración |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ○ | ● | ○ | ○ | ○ | | | | | | | | | | |
| P-605 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>○</td><td>○</td><td>○</td><td>○</td><td>●</td></tr></table> | P | M | K | S | N | H | ● | ○ | ○ | ○ | ○ | ● | <ul style="list-style-type: none"> - Sustrato de micrograno sin carburos y bajo contenido de cobalto - Recubrimiento nanocapa con contenido Al2 por metodo PVD - Recomendada para condiciones de trabajo con elevada fatiga térmica - Aplicación general - Secciones de viruta corta. Elevadas Vc en condiciones estables |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ○ | ○ | ○ | ○ | ● | | | | | | | | | | |
| P-610 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>○</td><td>●</td><td>●</td><td>○</td><td>●</td><td>●</td></tr></table> | P | M | K | S | N | H | ○ | ● | ● | ○ | ● | ● | <ul style="list-style-type: none"> - Sustrato de micrograno sin carburos y bajo contenido de cobalto - Recubrimiento nanocapa con contenido Al2 por metodo PVD - Recomendada para condiciones de trabajo con elevada fatiga térmica - Aplicación general - Secciones de viruta corta. Elevadas Vc en condiciones estables |
| P | M | K | S | N | H | | | | | | | | | | |
| ○ | ● | ● | ○ | ● | ● | | | | | | | | | | |
| P-615 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>●</td><td>●</td><td>○</td><td>●</td><td>●</td></tr></table> | P | M | K | S | N | H | ● | ● | ● | ○ | ● | ● | <ul style="list-style-type: none"> - Sustrato de ultramicrograno sin carburos - Nuevo recubrimiento de PVD - Alta resistencia a la oxidación - Medias y bajas secciones de viruta - Medias a altas Vc en condiciones de trabajo estables |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ● | ● | ○ | ● | ● | | | | | | | | | | |
| P-620 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>●</td><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> | P | M | K | S | N | H | ● | ● | ○ | ○ | ○ | ○ | <ul style="list-style-type: none"> - Sustrato de micrograno con alto contenido en carburos - Recubrimiento de nanocapa con elevado contenido en Al2 - Recomendada para materiales del grupo P-M - Moderados y elevados avances en condiciones estables |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ● | ○ | ○ | ○ | ○ | | | | | | | | | | |
| P-625 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> | P | M | K | S | N | H | ● | ○ | ○ | ○ | ○ | ○ | <ul style="list-style-type: none"> - Sustrato de micrograno con alto contenido en carburos - Recubrimiento de nanocapa con elevado contenido en Al2 - Recomendada para materiales del grupo P-M - Moderados y elevados avances en condiciones estables |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ○ | ○ | ○ | ○ | ○ | | | | | | | | | | |
| P-630 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> | P | M | K | S | N | H | ● | ○ | ○ | ○ | ○ | ○ | <ul style="list-style-type: none"> - Sustrato de ultramicrograno sin carburos con alto contenido en cobalto - Nuevo recubrimiento de PVD con gran resistencia contra la oxidación - Medias y bajas secciones de viruta - Aplicable en todos grupos de materiales en condiciones desfavorables |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ○ | ○ | ○ | ○ | ○ | | | | | | | | | | |
| P-640 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>●</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> | P | M | K | S | N | H | ● | ○ | ○ | ○ | ○ | ○ | <ul style="list-style-type: none"> - Sustrato de gran tenacidad sin carburos y elevado contenido en cobalto - Nanorecubrimiento por metodo PVD - Recomendada en condiciones de trabajo con elevada fatiga térmica - Velocidades de corte bajas en condiciones inestables |
| P | M | K | S | N | H | | | | | | | | | | |
| ● | ○ | ○ | ○ | ○ | ○ | | | | | | | | | | |
| P-010 |  | <table border="1"><tr><td>P</td><td>M</td><td>K</td><td>S</td><td>N</td><td>H</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> | P | M | K | S | N | H | ○ | ○ | ○ | ○ | ○ | ○ | <ul style="list-style-type: none"> - Sustrato de submicrograno sin carburos y bajo contenido en cobalto - Aplicación general en todos los materiales menos el grupo P - Secciones de viruta corta en condiciones de trabajo estables |
| P | M | K | S | N | H | | | | | | | | | | |
| ○ | ○ | ○ | ○ | ○ | ○ | | | | | | | | | | |

Ref. **8232**

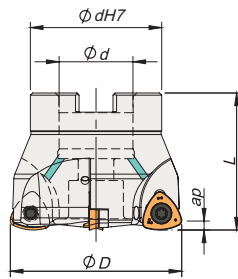
PORTA-PLAQUITAS FRESADO A50060 REFRIGERACIÓN INTERIOR

Internal Cooling A50060 Milling Tool-Holder

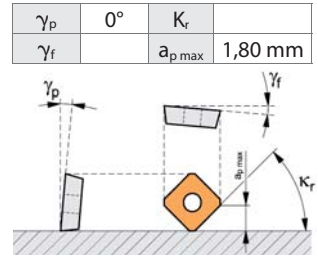
Porte-Plaquettes fraiseage A50060 lubrification interne



ALTO AVANCE
High Feed
Haut Pas



TRABAJO DE INTERPOLACIÓN
Interpolation Work
Travail d'Interpolation



| ISO | D | dH7 | L | Z | N° Art. | € | |
|---------------|----|-----|----|---|---------|--------|--|
| 052-A50060-03 | 52 | 22 | 45 | 3 | 59764 | 463,97 | Ref. 8804 Z-052-80 Art. 59770 8,40 € |
| 063-A50060-04 | 63 | 27 | 50 | 4 | 59765 | 531,14 | |
| 080-A50060-05 | 80 | 27 | 50 | 5 | 59766 | 614,64 | |



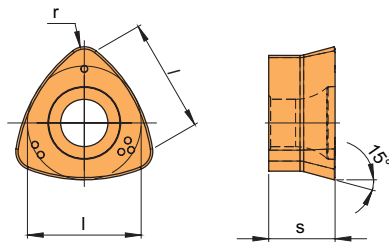
Plaquita / Insert / Paquette: Pag. 549

Tornillo - Screw - Vis

| Tipo Mecanizado | | |
|---------------------------------|--|--|
| Machining Type - Type d'Usinage | | |
| | | |
| | | |
| | | |
| | | |



WNMW



| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones / Dimensions | | |
|-------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|--------------------------|------|---|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | s | r |
| WNMW-1207SP | | | ● | | ● | | | | | 12 | 7,00 | 2 |

Plaquita / Insert / Paquette: Pag. 549

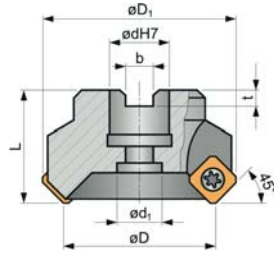
| Geometría / Géométrie | Foto / Picture / Photo | Grupo Materiales / Pieza Trabajo / Workpiece / Material Group / Groupe matériaux / pièce travail | |
|-----------------------|---|---|--|
| WNMW | Filo Corte / Cutting Edge / Arête coupe | Fresado / Milling / Fraisage: P M K S N H Acabado / Finishing / Finition: ● ● ● ○ Desb. Medio / Roug. & Finish. / Semi-Finition: ● ● ● ○ Desb. Grueso / Coarse Rough. / Ébauche: ● ● ● ○ | |
| | | Condiciones Corte / Cutting Conditions / Conditions coupe f_z : 0,30-1,50 mm/z a_p : 1,80 mm | |

Ref. 8230

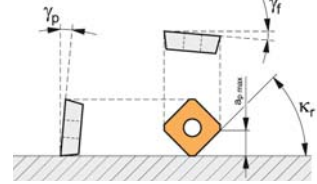
PORTA-PLAQUITAS FRESADO S45SE12F-45° REFRIGERACIÓN INTERIOR

Internal Cooling S45SE12F-45° Milling Tool-Holder

Porte-Plaquettes fraiseage S45SE12F-45° lubrification interne



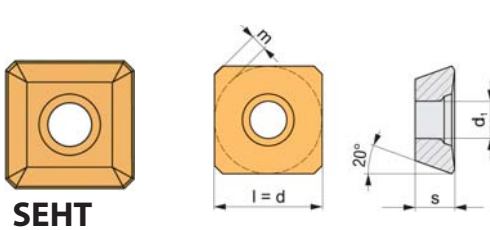
| | | | |
|------------|------|-------------|---------|
| γ_p | +18° | K_r | 45° |
| γ_f | -6° | $a_{p,max}$ | 6,00 mm |



| ISO | D | dH7 | L | D ₁ | Z | N° Art. | € | | | |
|---------------|-----|-----|----|----------------|---|---------|--------|-------------------------------|-------------------------------|--------------------------------|
| 050R-S45SE12F | 50 | 22 | 40 | 62 | 4 | 20566 | 259,04 | Ref. 8804 | Ref. 8804 | Ref. 8801 |
| 063R-S45SE12F | 63 | 22 | 50 | 75 | 5 | 20567 | 319,11 | Z-155 Art. 21009 3,85 € | Z-910 Art. 20998 4,43 € | ZT-20 Art. 13845 10,74 € |
| 080R-S45SE12F | 80 | 27 | 50 | 92 | 6 | 20596 | 451,95 | | | |
| 100R-S45SE12F | 100 | 32 | 50 | 112 | 6 | 20600 | 530,53 | | | |
| 125R-S45SE12F | 125 | 40 | 63 | 132 | 7 | 20607 | 674,93 | | | |
| | | | | | | | | | | |

| Tipo Mecanizado Machining Type - Type d'Usinage | | |
|--|--|--|
| | | |
| | | |
| | | |

Plaquita / Insert / Plaquette: Pag. 546, 547



| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones / Dimensions | | | | |
|------------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------|-------|------|----------------|----------------|
| | C-526 | P-605 | P-610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | m _e |
| SEHT 1204AFSN | ● | | | | | | | | | 12,70 | 12,70 | 4,76 | 5,50 | 1,6 |
| SEHT 1204AFTN | | | | | ● | | | ● | | 12,70 | 12,70 | 4,76 | 5,50 | 1,6 |
| SEHT 1204AFFN-FA | | | ● | | | | | | ● | 12,70 | 12,70 | 4,76 | 5,50 | 1,6 |

Plaquita / Insert / Plaquette: Pag. 546, 547

| | | | |
|---|---|---|--|
| SEHT FA | | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | |
| | Fresado Milling Fraiseage | P M K S N H | Condiciones Corte Cutting Conditions Conditions coupe f_z 0,10-0,30 mm/z a_p 1,00-6,00 mm |
| | Acabado Finishing Finition | ● ● ● ● ● | |
| | Desb. Medio Roug. & Finish. Semi-Finition | ● ● ● ● ● | |
| | Desb. Grueso Coarse Rough. Ebauche | ● ● ● ● ● | |
| Filo Corte Cutting Edge Arête coupe | | | |

| | | | |
|---|---|---|--|
| SEHT | | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | |
| | Fresado Milling Fraiseage | P M K S N H | Condiciones Corte Cutting Conditions Conditions coupe f_z 0,10-0,30 mm/z a_p 1,00-6,00 mm |
| | Acabado Finishing Finition | ● ● ● ● ● | |
| | Desb. Medio Roug. & Finish. Semi-Finition | ● ● ● ● ● | |
| | Desb. Grueso Coarse Rough. Ebauche | ● ● ● ● ● | |
| Filo Corte Cutting Edge Arête coupe | | | |

Ref. 8235

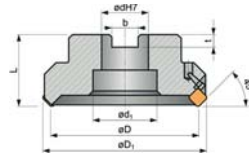
PORTA-PLAQUITAS FRESADO W45SE123F-45°

W45SE123F-45° Milling Tool-Holder

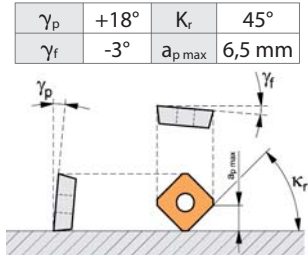
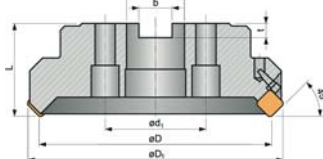
Porte-Plaquettes fraiseage W45SE123F-45°



ø63-125mm



ø 160-250 mm

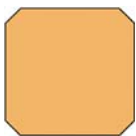
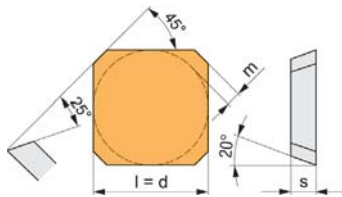


| ISO | D | dH7 | L | D ₁ | Z | N° Art. | € | | | | | | Tipo Mecanizado Machining Type Type d'Usinage |
|-----------------|-----|-----|----|----------------|---|---------|--------|----------------------------|----------------------------|----------------------------|---------------------------|---|---|
| 080R-W45SE1203F | 80 | 27 | 50 | 98 | 6 | 20608 | 474,49 | Ref. 8804 5 | Ref. 8806 5 | Ref. 8809 5 | Ref. 8814 5 | Ref. 8804 Z-912 Art. 20999 3,71 € | |
| 100R-W45SE1203F | 100 | 32 | 50 | 108 | 6 | 20614 | 557,10 | Z-106 Art. 21004 2,45 € | Z-206 Art. 21367 2,75 € | Z-301 Art. 21372 9,83 € | 3x10 Art. 10955 1,28 € | Z-917 Art. 21001 6,90 € | |
| 125R-W45SE1203F | 125 | 40 | 63 | 139 | 7 | 20616 | 708,74 | | | | | - | |
| 160R-W45SE1203F | 160 | 40 | 63 | 174 | 8 | 20617 | 845,56 | | | | | Z-952 Art. 21003 3,71 € | |

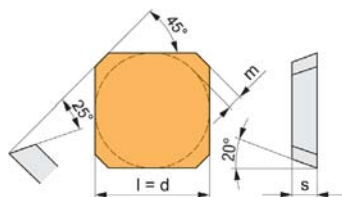
Plaquita / Insert / Plaquette: Pag. 546



SEKR



SEKN



| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Arandela - Clamp - Rondelle |
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Tornillo - Screw - Vis |



| ISO | Calidades Qualities Qualités | | | Dimensiones Dimensions | | | |
|---------------|---------------------------------|-------|-------|---------------------------|-------|------|----------------|
| | C-526 | P-620 | P-640 | l | d | s | m _c |
| SEKR-1203AFSN | ● | ● | ● | 12,70 | 12,70 | 3,18 | 1,6 |
| SEKN-1203AFSN | ● | ● | | 12,70 | 12,70 | 3,18 | 1,6 |

Plaquita / Insert / Plaquette: Pag. 546

| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | SEKR |
|------------------------------------|---|---|------|
| SEKR | Filo Corte Cutting Edge Arête coupe | Fresado Milling Fraisage | |
| | | Acabado Finishing Finition | |
| | | Desb. Medio Roug. & Finish. Semi-Finition | |
| | | Desb. Grueso Coarse Rough. Ébauche | |
| | | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>Segun Dimensiones plaquita According to insert dimensions</p> <p>f_z</p> <p>a_p</p> | |

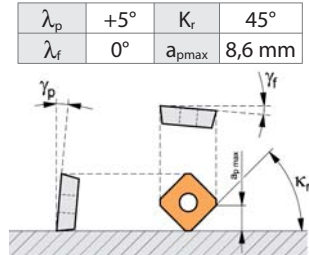
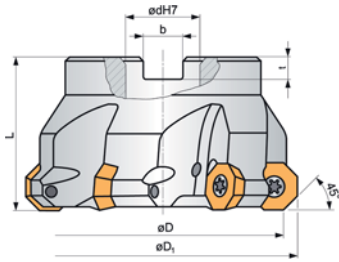
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | SEKN |
|------------------------------------|---|---|------|
| SEKN | Filo Corte Cutting Edge Arête coupe | Fresado Milling Fraisage | |
| | | Acabado Finishing Finition | |
| | | Desb. Medio Roug. & Finish. Semi-Finition | |
| | | Desb. Grueso Coarse Rough. Ébauche | |
| | | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>Segun Dimensiones plaquita According to insert dimensions</p> <p>f_z</p> <p>a_p</p> | |

Ref. 8240

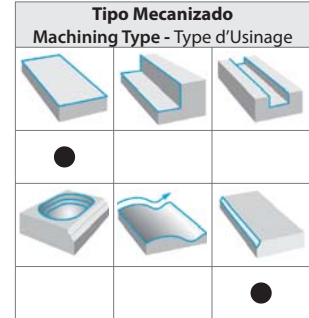
PORTA-PLAQUITAS FRESADO S450D06-45° REFRIGERACIÓN INTERIOR

Internal Cooling S450D06-45° Milling Tool-Holder

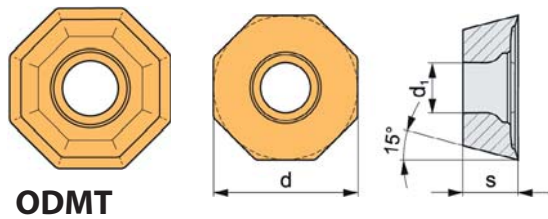
Porte-Plaquettes fraiseage S450D06-45° lubrification interne



| ISO | D | dH7 | L | Z | N° Art. | € | | | |
|--------------|-----|-----|----|---|---------|--------|--------------------------------------|---|---------------------------------------|
| 063R-S450D06 | 63 | 27 | 50 | 5 | 20623 | 288,69 | Ref. 8804 | Ref. 8804 | Ref. 8801 |
| | | | | | | | 5 | Z-912 Art. 20999 3,71 € | 1 |
| 080R-S450D06 | 80 | 32 | 50 | 6 | 20656 | 398,63 | Z-125 Art. 21008 3,85 € | Z-917 Art. 21001 6,90 € | ZT-07 Art. 19569 10,74 € |
| 100R-S450D06 | 100 | 40 | 50 | 7 | 20659 | 511,13 | | 5 | |
| 125R-S450D06 | 125 | 40 | 63 | 8 | 20660 | 877,38 | | 5 | |



Plaquita / Insert / Plaquette: Pag. 544

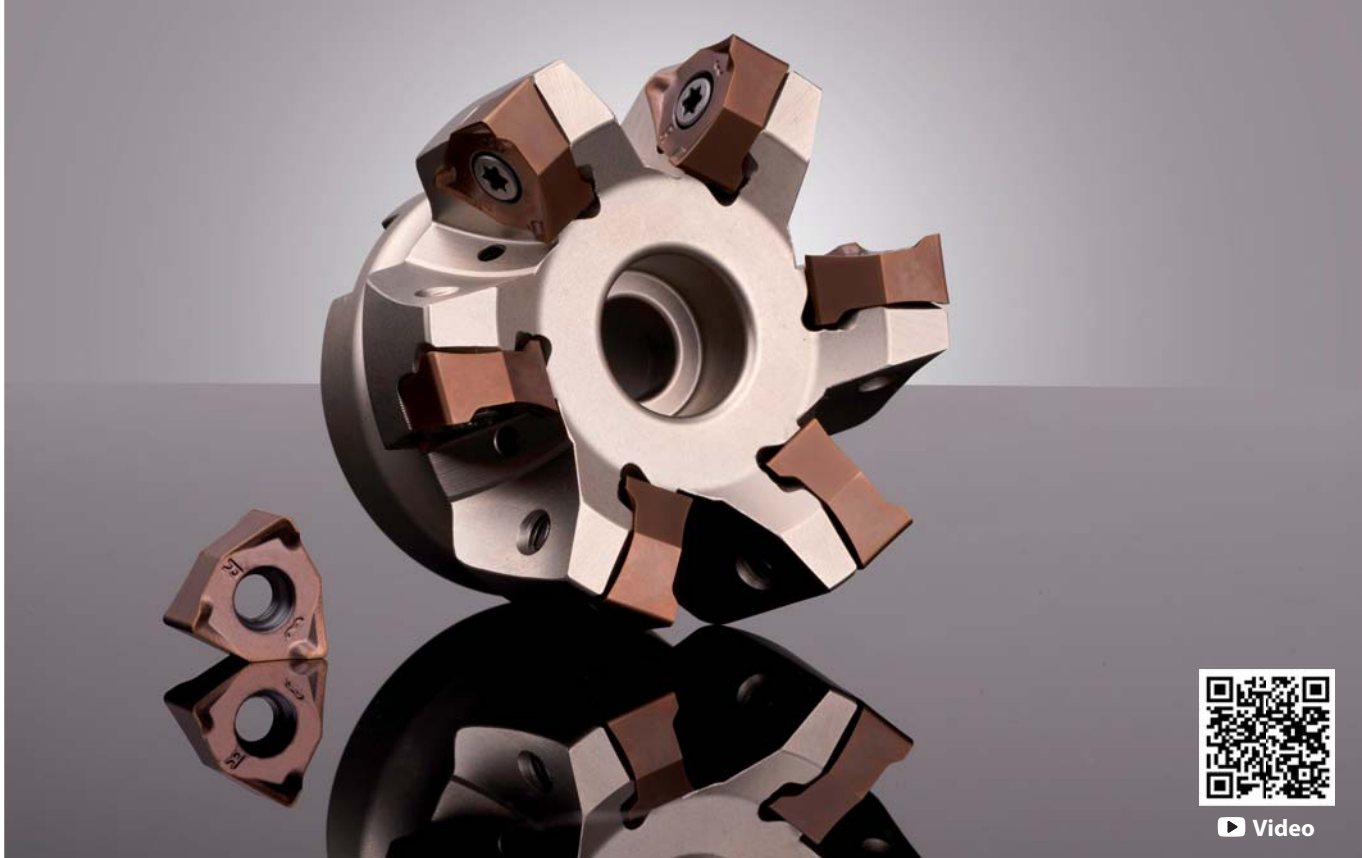


| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones / Dimensions | | |
|--------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|--------------------------|------|----------------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | d | s | d ₁ |
| ODMT 0605ZZN | ● | | | | | | ● | ● | | 15,87 | 5,56 | 5,50 |

Plaquita / Insert / Plaquette: Pag. 544

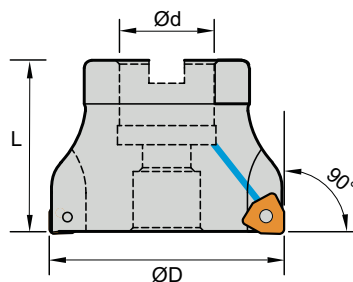
| | | | | |
|---|---|---|--|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraiseage | | P M K S N H |
| | | Acabado Finishing Finition | | ● ● ● ○ ○ |
| | | Desb. Medio Roug. & Finish. Semi-Finition | | ● ● ● ○ ○ |
| Desb. Grueso Coarse Rough. Ebaouche | ● ● ● | | | |
| ODMT | Filo Corte Cutting Edge Arête coupe | | Condiciones Corte Cutting Conditions Conditions coupe f _z 0,15-0,45 mm/z a _p 1,00-8,60 mm | |



Ref. **8241**

PORTA-PLAQUITAS FRESADO ESCUADRA S90XN08 REFRIGERACIÓN INTERIOR
Internal Cooling S90XN08 Square Milling Tool-Holder
Porte-Plaquettes fraisage équerre S90XN08 lubrification interne

New!



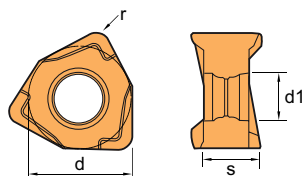
| Tipo Mecanizado Machining Type - Type d'Usinage | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |

| ISO | ØD | Ød | Z | L | N° Art. | € | Screw | | Screwdriver | |
|-----------------|-----|----|----|----|---------|--------|---------------------------------|------|--------------------------------|---|
| | | | | | | | 8804 | 8801 | | |
| 050B5R-S90XN08 | 50 | 22 | 5 | 45 | 17144 | 220,18 | | | | |
| 063B6R-S90XN08 | 63 | 22 | 6 | 45 | 17147 | 261,05 | M4x12,5 Art. 20689 3,32 € | 5 | ZT-15 Art. 10512 10,74 € | 5 |
| 080B7R-S90XN08 | 80 | 27 | 7 | 50 | 17208 | 338,83 | | | | |
| 100B7R-S90XN08 | 100 | 32 | 7 | 52 | 17256 | 434,47 | | | | |
| 125B10R-S90XN08 | 125 | 40 | 10 | 60 | 17267 | 597,06 | | | | |



| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

Plaquita / Insert / Plaque: Pag. 548



XNMX

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones / Dimensions | | | |
|-----------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------|------|-------------------|------|
| | C-526 | P-605 | P-610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | d mm | s mm | d ₁ mm | r mm |
| XNMX-080608-ZMG | | | | | ● | | ● | | | 12,53 | 6,5 | 4,5 | 0,8 |
| XNMX-080608-ZRG | | | | | | | | ● | | 12,53 | 6,5 | 4,5 | 0,8 |

Plaquita / Insert / Plaque: Pag. 548

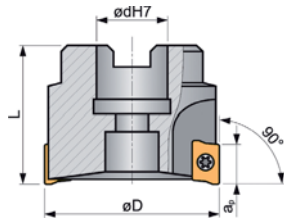
Ref. 8245

PORTA-PLAQUITAS FRESADO ESCUADRA S90AP10D-90°

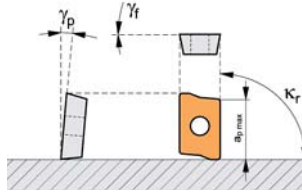
S90AP10D-90° Square Milling Tool-Holder

Porte Plaquettes fraissage équerre S90AP10D-90°

New!



| | | | |
|------------|-----|-------------|------|
| γ_p | +3° | K_r | 90° |
| γ_f | 0° | $a_{p,max}$ | 9 mm |



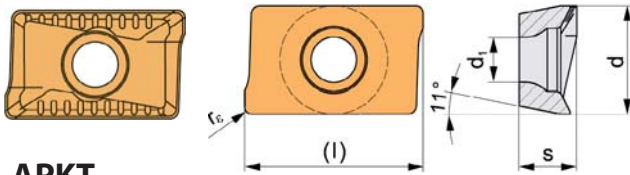
| Tipo Mecanizado Machining Type - Type d'Usage | | |
|--|--|--|
| | | |
| | | |
| | | |

| ISO | D | dH7 | L | Z | N° Art. | € | | | |
|---------------|----|-----|----|---|---------|--------|-------------------------------|-------------------------------|--------------------------------|
| 040R-S90AP10D | 40 | 16 | 40 | 6 | 20662 | 289,98 | Ref. 8816 5 | Ref. 8804 5 | Ref. 8801 1 |
| 050R-S90AP10D | 50 | 22 | 40 | 7 | 20665 | 308,65 | T-07 Art. 10846 3,11 € | Z-105 Art. 20997 2,89 € | ZT-07 Art. 19569 10,74 € |
| 063R-S90AP10D | 63 | 22 | 50 | 9 | 20670 | 383,32 | Z-910 Art. 20998 4,43 € | | |

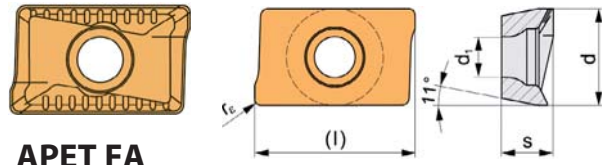


Plaquita / Insert / Plaquette: Pag. 543

| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |



APKT



APET FA
AI

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | | | |
|------------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|-----|------|----------------|----------------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | r _c |
| APKT 1003PDER-M | ● | | | | ● | | ● | ● | | 10 | 6,7 | 3,50 | 2,88 | 0,5 |
| APET 1003PDFR-FA | | | | | | | | | ● | 10 | 6,7 | 3,50 | 2,88 | 0,5 |

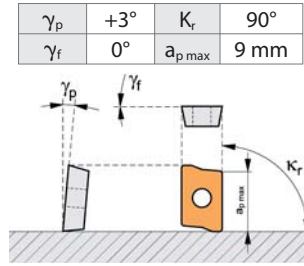
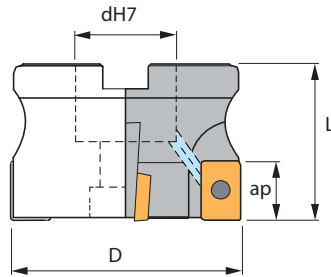
Plaquita / Insert / Plaquette: Pag. 543

| | | | | | | | | | | |
|------------------------------------|--------------------------|---|---|---|---|---|---|---|--|--|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | | | | | | | |
| | | Fresado Milling Fraisage | P | M | K | S | N | H | | |
| | | Acabado Finishing Finition | ● | ● | ● | ○ | | | | |
| | | Desb. Medio Roug. & Finish. Semi-Finition | ● | ● | ● | ○ | | | | |
| | | Desb. Grueso Coarse Rough. Ebauche | ○ | ○ | ○ | | | | | |
| APKT-10. | | Filo Corte Cutting Edge Arête coupe | | | | | | | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,08-0,20 mm/z</p> <p>a_p 1,00-9,00 mm</p> | |

| | | | | | | | | | | |
|------------------------------------|--------------------------|---|---|---|---|---|---|---|--|---|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | | | | | | | |
| | | Fresado Milling Fraisage | P | M | K | S | N | H | | |
| | | Acabado Finishing Finition | | | | | | | | ● |
| | | Desb. Medio Roug. & Finish. Semi-Finition | | | | | | | | ● |
| | | Desb. Grueso Coarse Rough. Ebauche | | | | | | | | ● |
| APET FA | | Filo Corte Cutting Edge Arête coupe | | | | | | | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,07-0,20 mm/z</p> <p>a_p 1,00-9,00 mm</p> | |

Ref. 8247

PORTA-PLAQUITAS FRESADO ESCUADRA S90AP10D-RF-90° REFRIGERACIÓN INTERIOR Internal Cooling S90AP10D-RF-90°-Square Milling Tool-Holder Porte-Plaquettes fraisage équerre S90AP10D-RF-90° lubrification interne

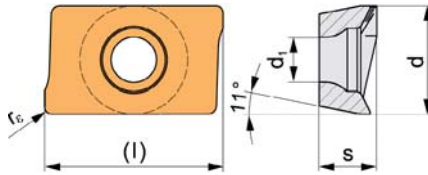
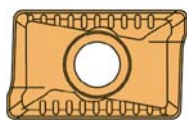


| ISO | D | dH7 | L | Z | N° Art. | € | Tipo Mecanizado Machining Type - Type d'Usage | | |
|------------------|----|-----|----|---|---------|--------|--|------------------------------------|-------------------------------------|
| | | | | | | | Ref. 8816 | Ref. 8804 | Ref. 8801 |
| 040R-S90AP10D-RF | 40 | 16 | 40 | 6 | 80595 | 353,90 | 5 Z-105 Art. 20997 2,89 € | 5 Z-910 Art. 20998 4,43 € | 1 ZT-07 Art. 19569 10,74 € |
| 050R-S90AP10D-RF | 50 | 22 | 40 | 7 | 80596 | 377,06 | 5 T-07 Art. 10846 3,11 € | 5 Z-910 Art. 20998 4,43 € | 1 ZT-07 Art. 19569 10,74 € |
| 063R-S90AP10D-RF | 63 | 22 | 50 | 9 | 80597 | 466,36 | | | |

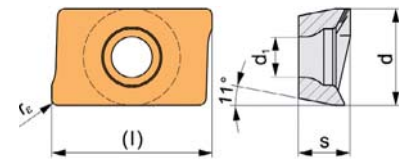
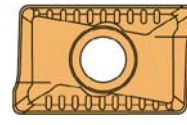
Plaquita / Insert / Plaquette: Pag. 543



- Tornillo - Screw - Vis
- Tornillo - Screw - Vis
- Destornillador - Screwdriver - Tournevis



APKT



APET FA
AI

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | | | |
|------------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|-----|------|----------------|----------------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | r _e |
| APKT 1003PDER-M | ● | | | | ● | | ● | ● | | 10 | 6,7 | 3,50 | 2,88 | 0,5 |
| APET 1003PDRF-FA | | | | | | | | | ● | 10 | 6,7 | 3,50 | 2,88 | 0,5 |

Plaquita / Insert / Plaquette: Pag. 543

| | | | | |
|---|--------------------------|---|-------------|--|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraisage | P M K S N H | |
| | | Acabado Finishing Finition | ● ● ● ● ● | |
| | | Desb. Medio Roug. & Finish. Semi-Finition | ● ● ● ● ● | |
| Filo Corte Cutting Edge Arête coupe | | Desb. Grueso Coarse Rough. Ébauche | | |
| APKT-10.. | | | | Condiciones Corte Cutting Conditions Conditions coupe f _z 0,08-0,20 mm/z a _p 1,00-9,00 mm |

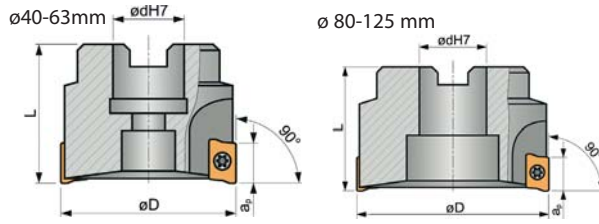
| | | | | |
|---|--------------------------|---|-------------|--|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraisage | P M K S N H | |
| | | Acabado Finishing Finition | ● ● ● ● ● | |
| | | Desb. Medio Roug. & Finish. Semi-Finition | ● ● ● ● ● | |
| Filo Corte Cutting Edge Arête coupe | | Desb. Grueso Coarse Rough. Ébauche | | |
| APET FA | | | | Condiciones Corte Cutting Conditions Conditions coupe f _z 0,07-0,20 mm/z a _p 1,00-9,00 mm |

Ref. 8250

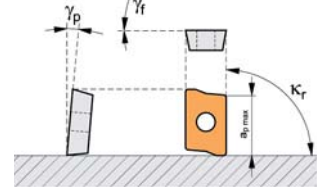
PORTA-PLAQUITAS FRESADO ESCUADRA S90AP16D-90°

S90AP16D-90° Square Milling Tool-Holder

Porte-Plaquettes fraissage équerre S90AP16D-90°



| | | | |
|------------|-----|--------------|----------|
| γ_p | +6° | K_r | 90° |
| γ_f | 0° | $a_{p\ max}$ | 13,50 mm |



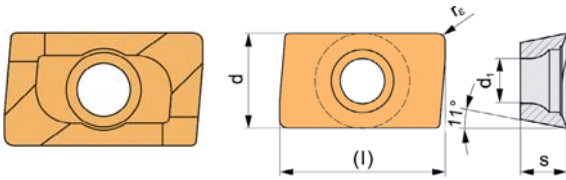
| ISO | D | dH7 | L | Z | N° Art. | € | | | |
|---------------|-----|-----|----|---|---------|--------|------------------------------|-------------------------------|--------------------------------|
| 050R-S90AP16D | 50 | 22 | 40 | 5 | 20671 | 259,04 | Ref. 8816 | Ref. 8804 | Ref. 8801 |
| 063R-S90AP16D | 63 | 27 | 50 | 6 | 20674 | 307,11 | T-15 Art. 10895 3,32 € | Z-910 Art. 20998 4,43 € | ZT-15 Art. 10512 10,74 € |
| 080R-S90AP16D | 80 | 27 | 50 | 7 | 20683 | 398,63 | | | |
| 100R-S90AP16D | 100 | 32 | 50 | 8 | 20692 | 511,13 | | | |
| 125R-S90AP16D | 125 | 40 | 63 | 8 | 20693 | 702,42 | - | - | - |

| Tipo Mecanizado Machining Type - Type d'Usinage | | |
|--|--|--|
| | | |
| | | |
| | | |

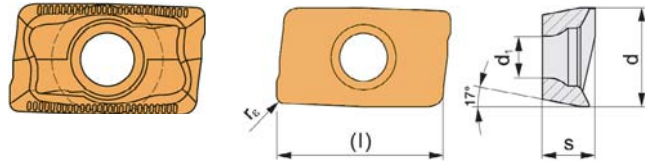
Plaquita / Insert / Plaquette: Pag. 543, 544



| | | | | | |
|--|------------------------|--|------------------------|--|--|
| | Tornillo - Screw - Vis | | Tornillo - Screw - Vis | | Destornillador - Screwdriver - Tournevis |
|--|------------------------|--|------------------------|--|--|



APHT



APKT

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | | | |
|------------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|------|------|----------------|----------------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | r _e |
| APHT 160408FR-FA | | | | | | | | | ● | 16 | 9,45 | 5,35 | 4,5 | 0,8 |
| APKT 1604PDER | ● | | | | ● | | ● | ● | | 16 | 9,45 | 5,35 | 4,6 | 0,8 |

Plaquita / Insert / Plaquette: Pag. 543, 544

| | | | | |
|------------------------------------|---|---|---|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraisage | | P M K S N H |
| | Acabado Finishing Finition | ● ○ | | |
| | Desb. Medio Roug. & Finish. Semi-Finition | ● ○ | | |
| | Desb. Grueso Coarse Rough. Ebauche | ● ○ | | |
| APHT | Filo Corte Cutting Edge Arête coupe | | Condiciones Corte Cutting Conditions Conditions coupe f_z 0,07-0,20 mm/z a_p 1,00-13,50 mm | |

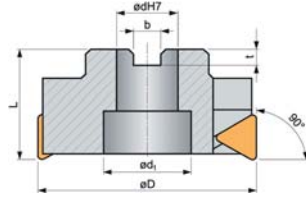
| | | | | |
|------------------------------------|---|---|---|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraisage | | P M K S N H |
| | Acabado Finishing Finition | ● ○ | | |
| | Desb. Medio Roug. & Finish. Semi-Finition | ● ○ | | |
| | Desb. Grueso Coarse Rough. Ebauche | ● ○ | | |
| APKT-PDER | Filo Corte Cutting Edge Arête Coupe | | Condiciones Corte Cutting Conditions Conditions coupe f_z 0,07-0,20 mm/z a_p 1,00-13,50 mm | |

Ref. 8255

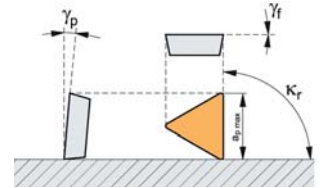
PORTA-PLAQUITAS FRESADO ESCUADRA W90TP16D-90°

W90TP16D-90° Square Milling Tool-Holder

Porte-Plaquettes fraiseage équerre W90TP16D-90°

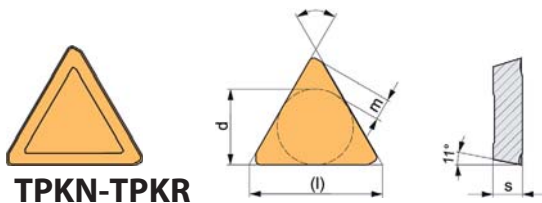


| | | | |
|------------|-----|-------------|-------|
| γ_p | +5° | K_r | 90° |
| γ_f | 0° | $a_{p\max}$ | 13 mm |



| ISO | D | dH7 | L | Z | N° Art. | € | | | | | | Tipo Mecanizado Machining Type Type d'Usinage |
|---------------|-----|-----|----|---|---------|--------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|---|
| 050R-W90TP16D | 50 | 22 | 40 | 4 | 20698 | 235,49 | Ref. 8804 | Ref. 8806 | Ref. 8809 | Ref. 8807 | Ref. 8804 | |
| | | | | | | | Z-116 Art. 21005 2,45 € | | - | - | Z-910 Art. 20998 4,43 € | |
| 063R-W90TP16D | 63 | 27 | 50 | 4 | 20708 | 288,69 | | | | | Z-912 Art. 20999 3,71 € | |
| | | | | | | | | Z-206 Art. 21367 2,75 € | | | Z-916 Art. 21000 3,71 € | |
| 080R-W90TP16D | 80 | 32 | 50 | 5 | 20723 | 398,63 | Z-106 Art. 21004 2,45 € | | Z-316 Art. 21373 9,83 € | Z-416 Art. 21371 1,27 € | Z-920 Art. 21002 12,30 € | |
| 100R-W90TP16D | 100 | 40 | 50 | 6 | 20738 | 511,13 | | | | | | |

Plaquita / Insert / Plaque: Pag. 548



TPKN-TPKR



| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Arandela - Clamp - Rondelle |
| | Placa Base - Base Plate - Plaque de base |
| | Pasador - Pin - Goupille |
| | Tornillo - Screw - Vis |

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | | |
|---------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|------|------|------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | m |
| TPKN 1603PDSR | | | | | ● | | | ● | ● | 16,5 | 9,53 | 3,18 | 2,45 |
| TPKR 1603PDSR | | | | | ● | | | ● | | 16,5 | 9,53 | 3,18 | 2,45 |

Plaquita / Insert / Plaque: Pag. 548

| | | |
|------------------------------------|---|---|
| Geometría Geometry Géométrie | Foto Picture Photo | <p>Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail</p> |
| | | |
| | Filo Corte Cutting Edge Arête coupe | |
| | Desb. Medio Roug. & Finish. Semi-Finition | |
| | Desb. Grueso Coarse Rough. Ébauche | |
| TPKN | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,08-0,20 mm/z</p> <p>a_p 1,00-13,00 mm</p> | |

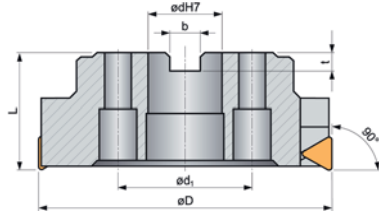
| | | |
|------------------------------------|---|---|
| Geometría Geometry Géométrie | Foto Picture Photo | <p>Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail</p> |
| | | |
| | Filo Corte Cutting Edge Arête coupe | |
| | Desb. Medio Roug. & Finish. Semi-Finition | |
| | Desb. Grueso Coarse Rough. Ébauche | |
| TPKR | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,08-0,20 mm/z</p> <p>a_p 1,00-13,00 mm</p> | |

Ref. 8260

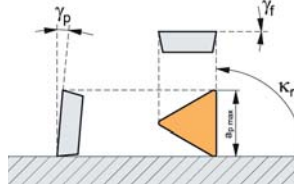
PORTA-PLAQUITAS FRESADO ESCUADRA W90TP22D-90°

W90TP22D-90° Square Milling Tool-Holder

Porte-Plaquettes fraissage équerre W90TP22D-90°



| | | | |
|------------|-----|-------------|-------|
| γ_p | +5° | K_r | 90° |
| γ_f | 0° | $a_{p,max}$ | 18 mm |

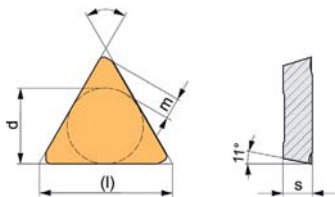


| Tipo Mecanizado Machining Type - Type d'Usinage | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |

| ISO | D | dH7 | L | Z | N° Art. | € | | | | | | | |
|---------------|-----|-----|----|---|---------|----------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|-------------------------------|--|--|
| 160R-W90TP22D | 160 | 40 | 63 | 9 | 20743 | 1.361,88 | Ref. 8804 5 | Ref. 8810 5 | Ref. 8810 5 | Ref. 8811 5 | Ref. 8804 5 | Ref. 8804 5 Z-912 Art. 20999 3,71 € Z-916 Art. 21000 3,71 € | Ref. 8801 1 ZT-20 Art. 13845 10,74 € |
| | | | | | | | Z-077 Art. 21374 4,32 € | Z-434 Art. 21376 9,83 € | Z-436 Art. 21390 9,83 € | Z-942 Art. 21392 35,19 € | Z-116 Art. 21005 2,45 € | | |

Ref. 8260 hasta fin de existencias / while stock lasts / jusqu'à la fin de stock

Plaquita / Insert / Plaque: Pag. 548



| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Brida - Clamp - Pince |
| | Cuña - Wedge - Cale |
| | Tope - Stop |
| | Tornillo - Screw - Vis |
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | | |
|---------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|-------|------|------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | m |
| TPKN 2204PDSR | | | ● | | ● | | | ● | ● | 22 | 12,70 | 4,76 | 3,55 |
| TPKR 2204PDSR | | | | | ● | | | ● | | 22 | 12,70 | 4,76 | 3,55 |

Plaquita / Insert / Plaque: Pag. 548

| | | | | |
|--|--|---|--------------------------------|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | <p>Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail</p> | | |
| | | | Fresado Milling Fraisage | P M K S N H |
| | Acabado Finishing Finition | | ● ○ ● ● ● | |
| | Desb. Medio Roug. & Finish. Semi-Finition | | ● ○ ● ● ● | |
| Desb. Grueso Coarse Rough. Ebauche | ● ○ ● ● ● | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,10-0,30 mm/z</p> <p>a_p 1,00-18,00 mm</p> | | |
| TPKN | <p>Filo Corte Cutting Edge Arête coupe</p> | | | |

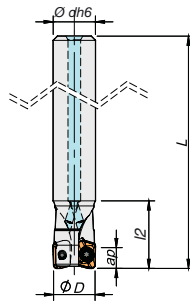
| | | | | |
|--|--|---|--------------------------------|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | <p>Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail</p> | | |
| | | | Fresado Milling Fraisage | P M K S N H |
| | Acabado Finishing Finition | | ● ○ ● ● ● | |
| | Desb. Medio Roug. & Finish. Semi-Finition | | ● ○ ● ● ● | |
| Desb. Grueso Coarse Rough. Ebauche | ● ○ ● ● ● | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,10-0,30 mm/z</p> <p>a_p 1,00-18,00 mm</p> | | |
| TPKR | <p>Filo Corte Cutting Edge Arête coupe</p> | | | |

Ref. **8264**

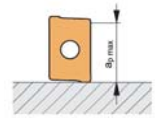
PORTA-PLAQUITAS FRESADO ESCUADRA SAP-06

SAP-06 Square Milling Tool-Holder

Porte-Plaquettes fraiseage équerre SAP-06



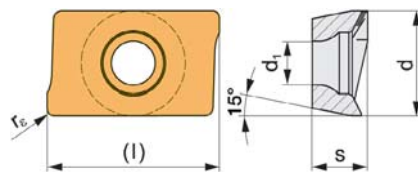
| | | | |
|------------|--|-------------|------|
| γ_p | | K_r | |
| γ_f | | $a_{p,max}$ | 4 mm |



| ISO | dh6 | D | L | I ₂ | Z | N° Art. | € | |
|-----------|-----|----|----|----------------|---|---------|--------|---|
| 10-SAP-06 | 10 | 10 | 55 | 16 | 2 | 19833 | 257,77 | Ref. 8804 P-180300 Art. 30435 10,78 € |
| 12-SAP-06 | 12 | 12 | 80 | 17 | 2 | 19835 | 257,77 | |
| 16-SAP-06 | 16 | 16 | 90 | 20 | 3 | 20028 | 294,57 | P-180400 Art. 30437 10,78 € |

| Tipo Mecanizado | | |
|-------------------------------|---|---|
| Machining Type - Type d'Usage | | |
| | | |
| ● | ● | ● |
| | | |
| ● | | |

Plaquita / Insert / Plaquette: **Pag. 549**



XOET

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones / Dimensions | | | | |
|-------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|--------------------------|------|------|----------------|-----|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | r |
| XOET-060204 | | | | | ● | | | | | 6,96 | 3,98 | 2,30 | 1,92 | 0,4 |
| XOET-060208 | | | | | ● | | | | | 6,96 | 3,98 | 2,30 | 1,92 | 0,8 |

Plaquita / Insert / Plaquette: **Pag. 549**

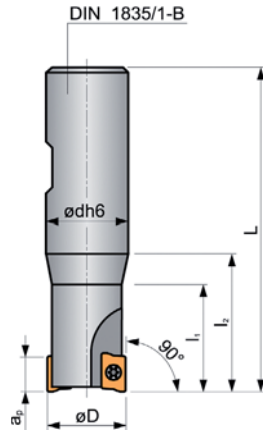
| Geometría / Geometry / Géométrie | Foto / Picture / Photo | Grupo Materiales / Pieza Trabajo / Workpiece / Material Group / Groupe matériaux / pièce travail |
|----------------------------------|---|--|
| XOET | Filo Corte / Cutting Edge / Arête coupe | Fresado / Milling / Fraisage: P M K S N H Acabado / Finishing / Finition: ● ● ● ● ● Desb. Medio / Rough. & Finish. / Semi-Finition: ● ● ● ● ● Desb. Grueso / Coarse Rough. / Ébauche: ● ● ● ● ● |
| | | Condiciones Corte / Cutting Conditions / Conditions coupe f_z : 0,05-0,07 mm/z a_p : 1-4 mm |

Ref. 8265

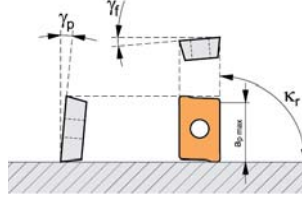
PORTA-PLAQUITAS FRESADO ESCUADRA SAP-10D

SAP-10D Square Milling Tool-Holder

Porte-Plaquettes fraiseage équerre SAP-10D



| | | | |
|------------|--------|-------------|------|
| γ_p | +4-10° | K_r | 90° |
| γ_f | 12° | $a_{p,max}$ | 9 mm |



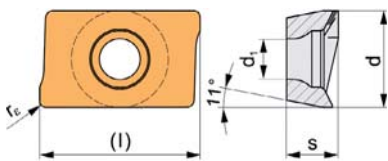
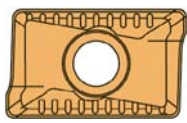
| Tipo Mecanizado Machining Type - Type d'Usinage | | |
|--|--|--|
| | | |
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| | | |

| ISO | dh6 | D | L | l_2 | Z | N° Art. | € | | |
|------------|-----|----|----|-------|---|---------|--------|------------------------|--------------------------|
| 16-SAP-10D | 20 | 16 | 90 | 25 | 2 | 20746 | 153,18 | Ref. 8816 | Ref. 8801 |
| 20-SAP-10D | 20 | 20 | 95 | 30 | 3 | 20750 | 175,42 | T-0 Art. 10846 5 | ZT-07 Art. 19569 1 |
| 25-SAP-10D | 25 | 25 | 95 | 30 | 4 | 20752 | 198,80 | 3,11 € | 10,74 € |

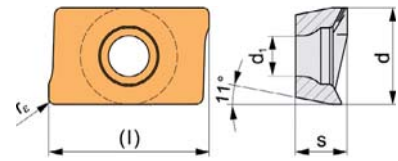
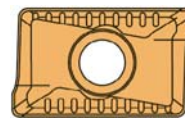


Plaquita / Insert / Plaque: Pag. 543

| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |



APKT



APET FA
AI

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones / Dimensions | | | | |
|-----------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|--------------------------|-----|------|----------------|----------------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | r _c |
| APKT-1003PDER-M | ● | | | | ● | | ● | ● | | 10 | 6,7 | 3,50 | 2,88 | 0,5 |
| APET 1003PDR-FA | | | | | | | | | ● | 10 | 6,7 | 3,50 | 2,88 | 0,5 |

Plaquita / Insert / Plaque: Pag. 543

| | | | | |
|------------------------------------|---|---|---|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraisage | | P M K S N H |
| | | Acabado Finishing Finition | | ● ● ● ● ● ● |
| | | Desb. Medio Roug. & Finish. Semi-Finition | | ● ● ● ● ● ● |
| | | Desb. Grueso Coarse Rough. Ebauche | | ● ● ● ● ● ● |
| APKT-10.. | Filo Corte Cutting Edge Arête coupe | | Condiciones Corte Cutting Conditions Conditions coupe | |
| | | | f_z 0,10-0,25 mm/z | |
| | | | a_p 1,00-9,00 mm | |

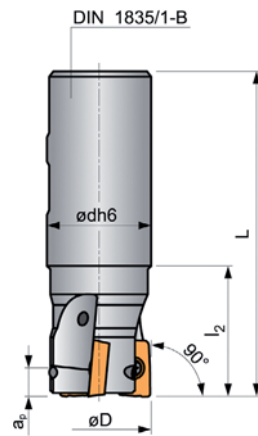
| | | | | |
|------------------------------------|---|---|---|-------------|
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | | |
| | | Fresado Milling Fraisage | | P M K S N H |
| | | Acabado Finishing Finition | | ● ● ● ● ● ● |
| | | Desb. Medio Roug. & Finish. Semi-Finition | | ● ● ● ● ● ● |
| | | Desb. Grueso Coarse Rough. Ebauche | | ● ● ● ● ● ● |
| APET FA | Filo Corte Cutting Edge Arête coupe | | Condiciones Corte Cutting Conditions Conditions coupe | |
| | | | f_z 0,05-0,40 mm/z | |
| | | | a_p 0,80-15,00 mm | |

Ref. **8270**

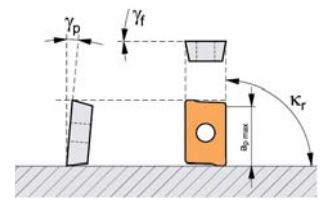
PORTA-PLAQUITAS FRESADO ESCUADRA SAP-16D

SAP-16D Square Milling Tool-Holder

Porte-Plaquettes fraiseage équerre SAP-16D



| | | | |
|------------|-------|-------------|----------|
| γ_p | +0-8° | K_r | 90° |
| γ_f | 0° | $a_{p,max}$ | 13,50 mm |

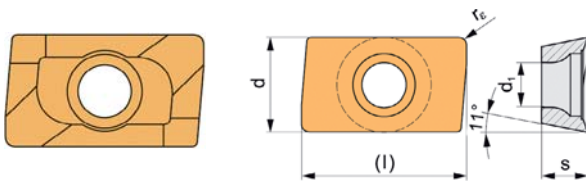


| ISO | dh6 | D | L | I_2 | Z | N° Art. | € | | |
|-------------------|-----|----|-----|-------|---|---------|---------------|--|--|
| 25-SAP-16D | 25 | 25 | 100 | 30 | 2 | 20759 | 198,79 | Ref. 8816 T 15 Art. 35217 3,32 € | Ref. 8801 ZT-15 Art. 10512 10,74 € |
| 32-SAP-16D | 32 | 32 | 110 | 35 | 3 | 20762 | 210,48 | 5 | 1 |
| 40-SAP-16D | 32 | 40 | 110 | 35 | 4 | 20789 | 228,03 | | |

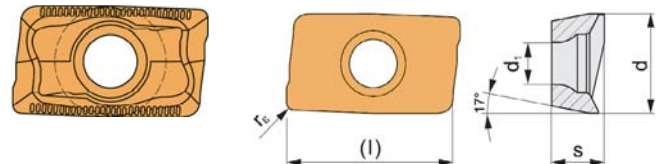
| Tipo Mecanizado Machining Type - Type d'Usage | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |

| | |
|--|---|
| | Tornillo - Screw - Vis |
| | Destornillador Screwdriver - Tournevis |

Plaquita / Insert / Plaque: Pag. 543, 544



APHT



APKT

| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | | | |
|---------------------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|------|------|----------------|----------------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | l | d | s | d ₁ | r _e |
| APHT-160408PDFR-FA | | | | | | | | | ● | 16 | 9,45 | 5,35 | 4,5 | 0,8 |
| APKT-1604PDER | ● | | | | ● | | ● | ● | | 16 | 9,45 | 5,35 | 4,6 | 0,8 |

Plaquita / Insert / Plaque: Pag. 543, 544

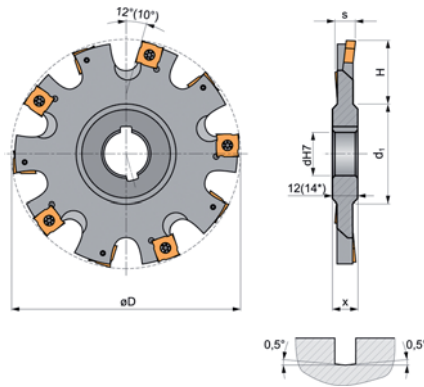
| | | | | |
|-------------|---|--------------------------|---|---|
| APHT | Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | |
| | Fresado Milling Fraisage | | P M K S N H | |
| | Acabado Finishing Finition | | ● | |
| | Desb. Medio Roug. & Finish. Semi-Finition | | ● | |
| | Desb. Grueso Coarse Rough. Ébauche | | ● | |
| | Filo Corte Cutting Edge Arête coupe | | Condiciones Corte Cutting Conditions Conditions coupe | f_z 0,07-0,20 mm/z a_p 1,00-13,50 mm |

| | | | | |
|------------------|---|--------------------------|---|---|
| APKT-PDER | Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | |
| | Fresado Milling Fraisage | | P M K S N H | |
| | Acabado Finishing Finition | | ● ● ● ● ● | |
| | Desb. Medio Roug. & Finish. Semi-Finition | | ● ● ● ● ● | |
| | Desb. Grueso Coarse Rough. Ébauche | | ● ● ● ● ● | |
| | Filo Corte Cutting Edge Arête coupe | | Condiciones Corte Cutting Conditions Conditions coupe | f_z 0,07-0,15 mm/z a_p 1,00-13,50 mm |

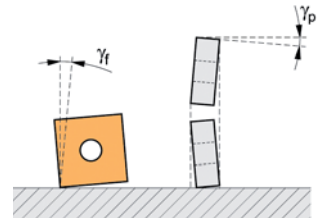
Ref. 8275

PORTA-PLAQUITAS RANURADO S90SN12

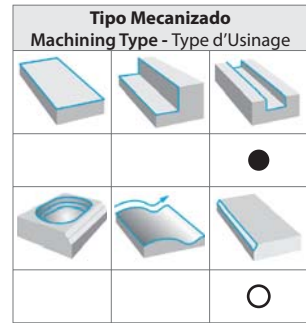
S90SN12 Side & Face Milling Tool-Holder
Porte-Plaquettes rainurado S90SN12



| | | | |
|------------|----------------|-------------|------------|
| γ_p | $-0^\circ 30'$ | K_r | 90° |
| γ_f | $+2^\circ 30'$ | $a_{p\max}$ | H |



| ISO | D | dH7 | H | s | d ₁ | Z | Plaqueta Insert Plaquette | N° Art. | € | | |
|------------|-----|-----|----|----|----------------|----|------------------------------|---------|-----------------|--|---|
| S90-100-06 | 100 | 27 | 25 | 6 | 41 | 10 | SNH.-1203.. | 20840 | 870,94 | Ref. 8804 Z-745 Art. 21315 3,50 € | Ref. 8801 ZT-15 Art. 10512 10,74 € |
| S90-125-06 | 125 | 32 | 40 | 6 | 48 | 12 | SNH.-1203.. | 20869 | 990,94 | | |
| S90-160-06 | 160 | 40 | 44 | 6 | 58 | 16 | SNH.-1203.. | 20873 | 1.181,08 | | |
| S90-100-08 | 100 | 27 | 25 | 8 | 41 | 10 | SNH.-1204.. | 20855 | 870,94 | Z-846 Art. 21364 3,50 € | ZT-15 Art. 10512 10,74 € |
| S90-125-08 | 125 | 32 | 40 | 8 | 48 | 12 | SNH.-1204.. | 20870 | 990,94 | | |
| S90-160-08 | 160 | 40 | 44 | 8 | 58 | 16 | SNH.-1204.. | 20874 | 1.181,08 | | |
| S90-100-10 | 100 | 27 | 25 | 10 | 41 | 10 | SNH.-1205.. | 20858 | 870,94 | Z-845 Art. 21349 3,50 € | ZT-15 Art. 10512 10,74 € |
| S90-125-10 | 125 | 32 | 40 | 10 | 48 | 12 | SNH.-1205.. | 20871 | 990,94 | | |
| S90-160-10 | 160 | 40 | 44 | 10 | 58 | 16 | SNH.-1205.. | 20876 | 1.181,08 | | |
| S90-100-12 | 100 | 27 | 25 | 12 | 41 | 10 | SNH.-1207.. | 20867 | 870,94 | Z-847 Art. 21365 3,93 € | ZT-15 Art. 10512 10,74 € |
| S90-125-12 | 125 | 32 | 40 | 12 | 48 | 12 | SNH.-1207.. | 20872 | 990,94 | | |
| S90-160-12 | 160 | 40 | 44 | 12 | 58 | 16 | SNH.-1207.. | 20877 | 1.181,08 | | |

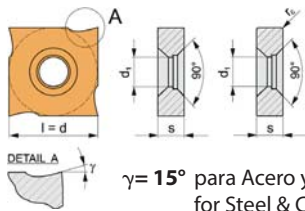


| | |
|--|---|
| | Tornillo - Screw - Vis |
| | Destornillador Screwdriver - Tournevis |

Plaquita / Insert / Plaquette: Plaquette: Pag. 547



SNHQ



$\gamma = 15^\circ$ para Acero y Fundición
for Steel & Cast Iron
Pour acier et fonte

| ISO | Calidades Qualities Qualités | | Dimensiones Dimensions | | |
|---------------|------------------------------------|--|---------------------------|------|----------------|
| | P-640 | | l | s | d ₁ |
| SNHQ 1203AZTN | ● | | 12,70 | 3,20 | 5 |
| SNHQ 1204AZTN | ● | | 12,70 | 4,50 | 5 |
| SNHQ 1205AZTN | ● | | 12,70 | 5,40 | 5 |
| SNHQ 1207AZTN | ● | | 12,70 | 7,00 | 5 |

Plaquita / Insert / Plaquette: Pag. 547

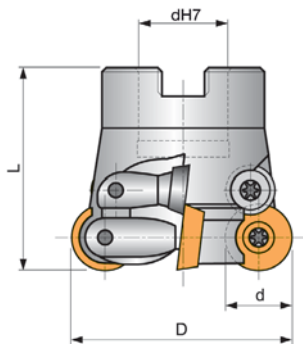
| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail |
|------------------------------------|--------------------------|---|
| SNHQ | | Fresado Milling Fraiseage |
| | | Acabado Finishing Finition |
| | | Desb. Medio Roug. & Finish. Semi-Finition |
| | | Desb. Grueso Coarse Rough. Ebauche |
| | | |
| | | <p>Condiciones Corte Cutting Conditions Conditions coupe</p> <p>f_z 0,20-0,50 mm/z</p> |

Ref. 8280

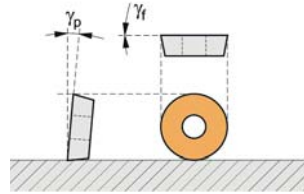
PORTA-PLAQUITAS PERFILADO SCMORD

SCMORD Profile Tool-Holder

Porte-Plaquettes profilage SCMORD



| | | | |
|------------|-----|--------------|---------|
| γ_p | +5° | $a_{p\ max}$ | 2,50 mm |
| γ_f | 0° | | 3,50 mm |

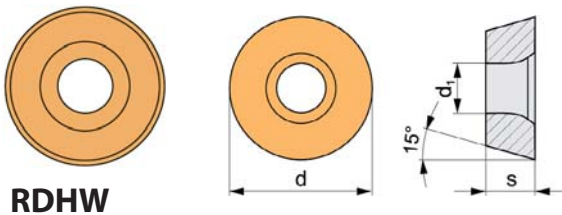


- Tornillo - Screw - Vis
- Arandela - Clamp - Rondelle
- Destornillador - Screwdriver - Tournevis

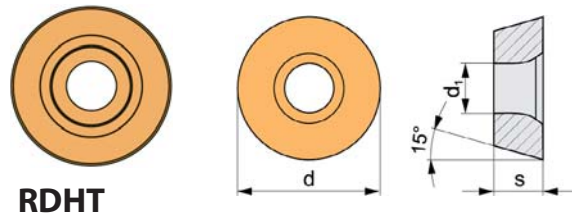
| Tipo Mecanizado Machining Type - Type d'Usage | | |
|--|--|--|
| | | |
| | | |
| | | |

| ISO | D | d | dH7 | L | Z | Plaquita Insert - Plaquette | N° Art. | € | | | |
|--------------|----|----|-----|----|---|--------------------------------|------------|--------|----------------------------|----------------------------|----------------------------|
| 52-SCMORD-12 | 52 | 12 | 22 | 50 | 5 | RD..12T3 | 20883 | 296,50 | Ref. 8804 | Ref. 8806 | Ref. 8801 |
| 66-SCMORD-12 | 66 | 12 | 27 | 50 | 6 | RD..12T3 | 20885 | 382,94 | Z-235 Art. 21011 | Z-209 Art. 21368 | ZT-15 Art. 10512 |
| 80-SCMORD-12 | 80 | 12 | 27 | 50 | 7 | RD..12T3 | 20886 | 542,33 | 3,71 € | 2,75 € | 10,74 € |
| 52-SCMORD-16 | 52 | 16 | 22 | 50 | 4 | RD..1604 | 20887 | 296,50 | Z-245 Art. 21013 | Z-210 Art. 21369 | ZT-20 Art. 13845 |
| 66-SCMORD-16 | 66 | 16 | 27 | 50 | 5 | RD..1604 | 20891 | 382,94 | 3,31 € | 2,75 € | 10,74 € |
| 80-SCMORD-16 | 80 | 16 | 27 | 50 | 6 | RD..1604 | 20892 | 542,33 | | | |

Plaquita / Insert / Plaquette: **Pag. 545**



RDHW



RDHT



| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | |
|--------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|----------------|------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | D | d ₁ | s |
| RDHW 12T3MOT | | | ● | | ● | | | | | 12,00 | 3,90 | 3,97 |
| RDHT 12T3MOT | | | ● | | ● | | | | | 12,00 | 3,90 | 3,97 |
| RDHW 1604MOT | | | ● | | ● | | | | | 16,00 | 5,20 | 4,76 |
| RDHT 1604MOT | | | ● | | ● | | | | | 16,00 | 5,20 | 4,76 |

Plaquita / Insert / Plaquette: **Pag. 545**

Geometría
Geometry
Géométrie

Foto
Picture
Photo

Grupo Materiales
Pieza Trabajo
Workpiece
Material Group
Groupe matériaux
pièce travail

| | | | | | | |
|---|---|---|---|---|---|---|
| Fresado Milling Fraisage | P | M | K | S | N | H |
| Acabado Finishing Finition | ○ | ○ | ○ | ○ | ○ | ○ |
| Desb. Medio Roug. & Finish. Semi-Finition | ○ | ○ | ○ | ○ | ○ | ○ |
| Desb. Grueso Coarse Rough. Ébauche | ○ | ○ | ○ | ○ | ○ | ○ |

RDHT 05
RDHT 07
RDHT 10
RDHT 12
RDHT 16
RDHT 20

Condiciones Corte
Cutting Conditions
Conditions coupe

f_z 0,10-0,27 mm/z

Segun Dimensiones
plaquita
According to insert
dimensions
Suivant dimensions
plaquette

a_p

Geometría
Geometry
Géométrie

Foto
Picture
Photo

Grupo Materiales
Pieza Trabajo
Workpiece
Material Group
Groupe matériaux
pièce travail

| | | | | | | |
|---|---|---|---|---|---|---|
| Fresado Milling Fraisage | P | M | K | S | N | H |
| Acabado Finishing Finition | ○ | ○ | ○ | ○ | ○ | ○ |
| Desb. Medio Roug. & Finish. Semi-Finition | ○ | ○ | ○ | ○ | ○ | ○ |
| Desb. Grueso Coarse Rough. Ébauche | ○ | ○ | ○ | ○ | ○ | ○ |

RDGT 07
RDGT 10
RDGT 12
RDGT 16

Condiciones Corte
Cutting Conditions
Conditions coupe

f_z 0,10-0,27 mm/z

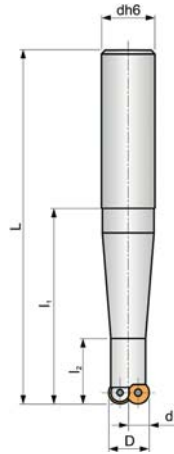
Segun Dimensiones
plaquita
According to insert
dimensions
Suivant dimensions
plaquette

a_p

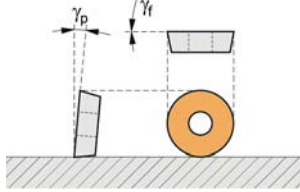
Ref. 8285

PORTA-PLAQUITAS PERFILADO SRD

SRD Profile Tool-Holder
Porte-Plaquettes profilage SRD



| | | | |
|------------|-----|--------------|---------|
| γ_p | +5° | $a_{p\ max}$ | 1,50 mm |
| γ_f | 0° | | 2,50 mm |



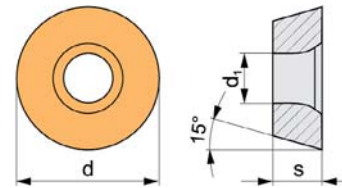
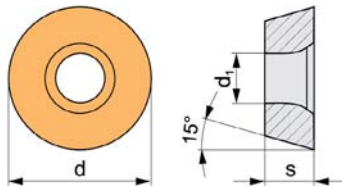
- Tornillo - Screw - Vis
- Arandela - Clamp - Rondelle
- Destornillador - Screwdriver - Tournevis

| Tipo Mecanizado Machining Type - Type d'Usage | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |



| ISO | D | dh6 | L | I_2 | Z | Plaquita Insert - Plaque | N° Art. | € | | | |
|-----------|----|-----|-----|-------|---|-----------------------------|------------|--------|--|--|--------------------------------|
| 15-SRD-07 | 15 | 20 | 100 | 40 | 2 | RD..0702 | 20894 | 214,65 | | | Ref. 8801 |
| 15-SRD-07 | 15 | 20 | 150 | 40 | 2 | RD..0702 | 20896 | 268,00 | | | |
| 20-SRD-10 | 20 | 20 | 100 | 40 | 2 | RD..1003 | 20901 | 214,65 | | | ZT-07 Art. 19569 10,74 € |
| 20-SRD-10 | 20 | 20 | 150 | 40 | 2 | RD..1003 | 20906 | 268,00 | | | |

Plaquita / Insert / Plaque: Pag. 545



| ISO | Calidades / Qualities / Qualités | | | | | | | | | Dimensiones Dimensions | | |
|--------------|----------------------------------|-------|------|-------|-------|-------|-------|-------|-------|---------------------------|-------|------|
| | C-526 | P-605 | P610 | P-615 | P-620 | P-625 | P-630 | P-640 | P-010 | D | d_1 | s |
| RDHW 0702MOT | | | ● | | ● | | | | | 7,00 | 2,80 | 2,38 |
| RDHT 0702MOT | | | ● | | ● | | | | | 7,00 | 3,90 | 2,38 |
| RDHW 1003MOT | | | ● | | ● | | | | | 10,00 | 2,80 | 2,38 |
| RDHT 1003MOT | | | ● | | ● | | | | | 10,00 | 3,90 | 3,18 |

Plaquita / Insert / Plaque: Pag. 545

| | | | | |
|-------------|---|--|--|--|
| RDHW | Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | |
| | | Filo Corte Cutting Edge Arête coupe | Fresado Milling Fraisage | Acabado Finishing Finition |
| | | Desb. Medio Roug. & Finish. Semi-Finition | Desb. Grueso Coarse Rough. Ebauche | Condiciones Corte Cutting Conditions Conditions coupe |
| | f_z | 0,10-0,24 mm/z | Segun Dimensiones plaquita According to insert dimensions Suivant dimensions plaquette | a_p |

| | | | | |
|-------------|---|--|--|--|
| RDHT | Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | |
| | | Filo Corte Cutting Edge Arête Coupe | Fresado Milling Fraisage | Acabado Finishing Finition |
| | | Desb. Medio Roug. & Finish. Semi-Finition | Desb. Grueso Coarse Rough. Ebauche | Condiciones Corte Cutting Conditions Conditions coupe |
| | f_z | 0,10-0,24 mm/z | Segun Dimensiones plaquita According to insert dimensions Suivant dimensions plaquette | a_p |

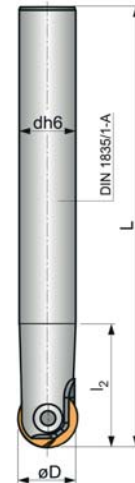
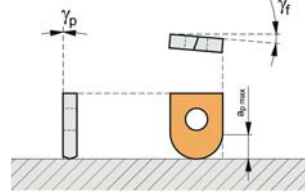
Ref. 8290

PORTA-PLAQUITAS COPIADO SRC

SRC Copy Tool-Holder
Porte-Plaquettes copiage SRC



| | | | |
|------------|--------|--------------|--------|
| γ_p | 0° | $a_{p \max}$ | 2-6 mm |
| γ_f | -7-14° | | |

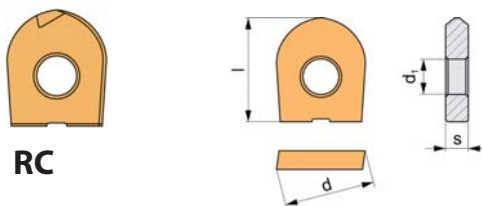


| ISO | D | L | l_2 | dh6 | Plaquita Insert - Plaquette | N° Art. | € | | |
|--------|----|-----|-------|-----|--------------------------------|------------|--------|--------------------------------|--------------------------------|
| SRC-10 | 10 | 105 | 50 | 12 | RC10 | 20910 | 196,45 | Z-359 Art. 21016 13,82 € | ZT-15 Art. 10512 10,74 € |
| SRC-10 | 10 | 150 | 80 | 12 | RC10 | 20911 | 210,48 | | |
| SRC-12 | 12 | 105 | 50 | 16 | RC12 | 20913 | 196,45 | Z-509 Art. 21155 13,82 € | ZT-20 Art. 13845 10,74 € |
| SRC-12 | 12 | 160 | 90 | 16 | RC12 | 20914 | 210,48 | | |
| SRC-16 | 16 | 105 | 50 | 20 | RC16 | 20916 | 196,45 | Z-519 Art. 21156 13,82 € | ZT-30 Art. 21588 22,03 € |
| SRC-16 | 16 | 180 | 100 | 20 | RC16 | 20918 | 210,48 | | |
| SRC-20 | 20 | 125 | 70 | 25 | RC20 | 20919 | 210,48 | Z-529 Art. 21229 13,82 € | ZT-30 Art. 21588 22,03 € |
| SRC-20 | 20 | 200 | 120 | 25 | RC20 | 20920 | 257,27 | | |
| SRC-25 | 25 | 125 | 70 | 32 | RC25 | 20921 | 257,27 | Z-609 Art. 21230 15,95 € | ZT-30 Art. 21588 22,03 € |
| SRC-25 | 25 | 220 | 140 | 32 | RC25 | 20923 | 292,33 | | |

| Tipo Mecanizado Machining Type - Type d'Usage | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |

Plaquita / Insert / Plaquette: Pag. 545

| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |



| ISO | Calidades Qualities Qualités | | Dimensiones Dimensions | | | |
|-------|------------------------------------|-------|---------------------------|-------|-------|------|
| | P-615 | P-640 | D | l | d_1 | s |
| RC-10 | ● | ● | 10,00 | 11,50 | 4,00 | 2,50 |
| RC-12 | ● | ● | 12,00 | 12,00 | 5,00 | 2,50 |
| RC-16 | ● | ● | 16,00 | 14,00 | 5,00 | 3,00 |
| RC-20 | ● | ● | 20,00 | 16,00 | 5,00 | 3,00 |
| RC-25 | ● | ● | 25,00 | 21,50 | 6,00 | 4,00 |

Plaquita / Insert / Plaquette: Pag. 545

| Geometría Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail | Fresado Milling Fraisage | | | | Acabado Finishing Finition | | | | |
|------------------------------------|---|---|---|---|---|---|----------------------------------|---|---|---|---|
| RC | | | P | M | K | S | N | H | ● | ● | |
| | Filo Corte Cutting Edge Arête coupe | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Desb. Medio Roug. & Finish. Semi-Finition | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Desb. Grueso Coarse Rough. Ebauche | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Condiciones Corte Cutting Conditions Conditions coupe | | Segun Dimensiones plaquita According to insert dimensions Suivant dimensions plaquette | | | | | | | | |
| | f_z | | | | | | | | | | |
| | a_p | | | | | | | | | | |

Ref. 8295

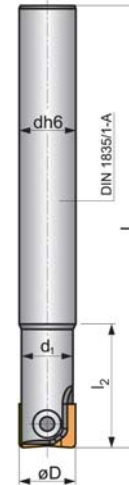
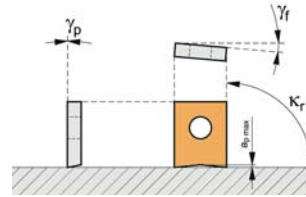
PORTA-PLAQUITAS COPIADO SLC

SLC Copy Tool-Holder

Porte-Plaquettes copiado SLC



| | | | |
|------------|--------|-------------|-----------|
| γ_p | 0° | K_r | 90° |
| γ_f | -7-14° | $a_{p,max}$ | 0,6-1,6mm |



| ISO | D | dh6 | d ₁ | L | l ₂ | Plaqueta Insert - Plaquette | N° Art. | € | | |
|--------|----|-----|----------------|-----|----------------|--------------------------------|------------|--------|---|--|
| SLC-12 | 12 | 12 | 10 | 130 | 30 | LCK12 | 20924 | 242,29 | Ref. 8804 Z-354 Art. 21015 9,33 € | Ref. 8801 ZT-20 Art. 13845 10,74 € |
| SLC-16 | 16 | 16 | 14 | 140 | 35 | LCK16 | 20925 | 254,94 | Z-619 Art. 21295 9,33 € | ZT-20 Art. 13845 10,74 € |
| SLC-20 | 20 | 20 | 18 | 160 | 45 | LCK20 | 20926 | 293,93 | Z-629 Art. 21298 9,33 € | |

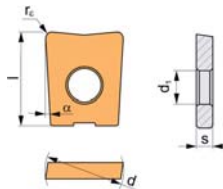
Plaqueta / Insert / Plaquette: **Pag. 544**

| | |
|--|--|
| | Tornillo - Screw - Vis |
| | Destornillador - Screwdriver - Tournevis |

| Tipo Mecanizado Machining Type - Type d'Usinage | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |



LC



| ISO | Calidades Qualities Qualités | Dimensiones Dimensions | | | | |
|---------|------------------------------------|---------------------------|-------|------|----------------|------|
| | | P-615 | d | l | d ₁ | s |
| LC-1210 | ● | 12,00 | 14,00 | 5,00 | 2,50 | 1,00 |
| LC-1610 | ● | 16,00 | 16,00 | 5,00 | 3,00 | 1,00 |
| LC-2010 | ● | 20,00 | 18,00 | 5,00 | 3,00 | 1,00 |

Plaqueta / Insert / Plaquette: **Pag. 544**



| Geometria Geometry Géométrie | Foto Picture Photo | Grupo Materiales Pieza Trabajo Workpiece Material Group Groupe matériaux pièce travail |
|------------------------------------|--|---|
| LC | Filo Corte Cutting Edge Arête coupe | Fresado Milling Fraisage P M K S N H |
| | | Acabado Finishing Finition ● ● ● |
| | | Desb. Medio Rough. & Finish. Semi-Finition ● ● ● |
| | | Desb. Grueso Coarse Rough. Ebauche ○ ○ ○ |
| | | |
| | | Condiciones Corte Cutting Conditions Conditions coupe Segun Dimensiones plaqueta According to insert dimensions Suivant dimensions plaquette |

CÓDIGOS ISO ELECCIÓN PLAQUITAS FRESADO

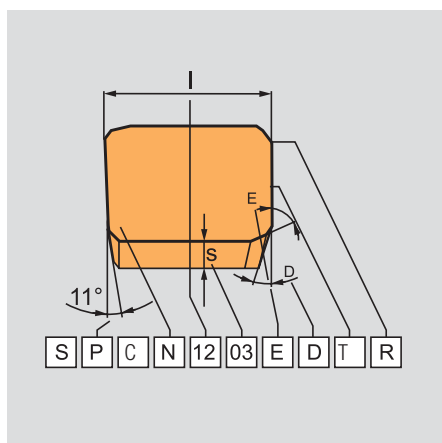
Milling Insert Choice ISO Codes

Codes ISO choix **plaquettes fraiseage**

| 1 | | | |
|---|---|---|---|
| Forma Plaquita / Insert Shape / Forme plaquette | | | |
| H | O | P | R |
| S | T | C | D |
| E | M | V | W |
| L | A | B | K |

| 2 | |
|--|--------------------|
| Angulo Incidencia Clearance Angle / Angle d'incidence | |
| A | B |
| C | D |
| E | F |
| G | N |
| P | O Especial Special |

| 4 | |
|---|--------------------|
| Tipo Plaquita Insert type / Type plaquette | |
| N | R |
| F | A |
| M | G |
| W | T |
| Q | X Especial Special |



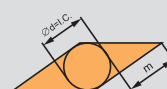
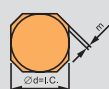
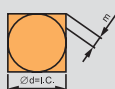
| ISO | 1 | 2 | 3 | 4 |
|-----|---|---|---|---|
| S | P | G | N | |
| S | P | K | N | |

| ANSI | 1 | 2 | 3 | 4 |
|------|---|---|---|---|
| S | P | G | | |
| S | P | K | N | |

3

Tolerancias / Tolerances / Tolérances

| Símbolo Symbol / Symbole | Tolerancias / Tolerances / Tolérances [mm] | | | Tolerancias [Pulg.] / Tolerances [Inch] / Tolérances [Pouc.] | | |
|-----------------------------|--|-------|--------------|--|-------|---------------|
| | m (±) | s (±) | d = I.C. (±) | m (±) | s (±) | d = I.C. (±) |
| A | 0,005 | 0,025 | 0,025 | 0,0002 | 0,001 | 0,0010 |
| F | 0,005 | 0,025 | 0,013 | 0,0002 | 0,001 | 0,0005 |
| C | 0,013 | 0,025 | 0,025 | 0,0005 | 0,001 | 0,0010 |
| H | 0,013 | 0,025 | 0,013 | 0,0005 | 0,001 | 0,0005 |
| E | 0,025 | 0,025 | 0,025 | 0,0010 | 0,001 | 0,0010 |
| G | 0,025 | 0,130 | 0,025 | 0,0010 | 0,005 | 0,0010 |
| J | 0,005 | 0,025 | 0,05 ÷ 0,13 | 0,0002 | 0,001 | 0,002 ÷ 0,005 |
| K | 0,013 | 0,025 | 0,05 ÷ 0,13 | 0,0005 | 0,001 | 0,002 ÷ 0,005 |
| L | 0,025 | 0,025 | 0,05 ÷ 0,13 | 0,0010 | 0,001 | 0,002 ÷ 0,005 |
| M | 0,08 ÷ 0,18 | 0,130 | 0,05 ÷ 0,13 | 0,003 ÷ 0,007 | 0,005 | 0,002 ÷ 0,005 |
| N | 0,08 ÷ 0,18 | 0,025 | 0,05 ÷ 0,13 | 0,003 ÷ 0,007 | 0,001 | 0,002 ÷ 0,005 |
| U | 0,05 ÷ 0,38 | 0,130 | 0,05 ÷ 0,13 | 0,005 ÷ 0,015 | 0,005 | 0,003 ÷ 0,010 |



CÓDIGOS ISO ELECCIÓN PLAQUITAS FRESADO

Milling Insert Choice ISO Codes

Codes ISO choix plaquettes fraiseage

| 5 | | | | | | | |
|--|--------|----|----|----|----|----|----|
| Longitud Filo Corte / Cutting Edge Length / Longueur arête coupe | | | | | | | |
| d = I.C. | R | S | T | C | D | V | W |
| mm | ["] | | | | | | |
| 3,97 | 5/32" | | | 06 | | | |
| 5,00 | - | 05 | | | | | |
| 5,56 | 7/32" | | | 09 | | | 03 |
| 6,00 | - | 06 | | | | | |
| 6,35 | 1/4" | | | 11 | 06 | 07 | 04 |
| 8,00 | - | 08 | | | | | |
| 9,525 | 3/8" | 09 | 09 | 16 | 09 | 11 | 16 |
| 10,0 | - | 10 | | | | | |
| 12,0 | - | 12 | | | | | |
| 12,7 | 1/2" | 12 | 12 | 22 | 12 | 15 | 08 |
| 15,875 | 5/8" | 15 | 15 | 27 | 16 | | |
| 16,0 | - | 16 | | | | | |
| 19,05 | 3/4" | 19 | 19 | 33 | 19 | | |
| 20,0 | - | 20 | | | | | |
| 25,0 | - | 25 | | | | | |
| 25,4 | 1" | 25 | 25 | | 25 | | |
| 31,75 | 1 1/4" | 31 | | | | | |
| 32,0 | - | 32 | | | | | |

| 6 | | |
|---------------------------------|-------|-------|
| Espesor / Thickness / Épaisseur | | |
| | | |
| | | |
| Símbolo / Symbol | s | |
| | [m.m] | ["] |
| 01 | 1,59 | 1/16" |
| T1 | 1,98 | 5/64" |
| 02 | 2,38 | 3/32" |
| 03 | 3,18 | 1/8" |
| T3 | 3,97 | 5/32" |
| 04 | 4,76 | 3/16" |
| 05 | 5,56 | 7/32" |
| 06 | 6,35 | 1/4" |
| 07 | 7,94 | 5/16" |
| 09 | 9,52 | 3/8" |

| 7 | | | |
|--|---|---|--------------------|
| Angulo filo corte Cutting edge angle Angle arête coupe | Angulo incidencia Clearance angle Angle incidence | | |
| | | | |
| χ _r | α' _n | | |
| A | 45° | A | 3° |
| D | 60° | B | 5° |
| E | 75° | C | 7° |
| F | 85° | D | 15° |
| P | 90° | E | 20° |
| Z | Especial / Special | F | 25° |
| | | G | 30° |
| | | N | 0° |
| | | P | 11° |
| | | Z | Especial / Special |
| ZZ - Especial / Special | | | |

| | | | | |
|----|----|----|---|---|
| 5 | 6 | 7 | 8 | 9 |
| 12 | 03 | 08 | | |
| 12 | 03 | ED | S | R |
| 5a | 6a | 7a | 8 | 9 |
| 4 | 2 | 2 | | |
| 4 | 2 | ED | S | R |

ANSI

| 5a | | | 6a | | | 7a | | |
|--|----------|-------|----------------------------------|--------|-------|---|---------------------|--------|
| Círculo inscrito Inscribed circle / Cercle inscrite | | | Espesor Thickness / Épaisseur | | | Radio vértice Nose radius / Rayon pointe | | |
| | | | | | | | | |
| Symbol | d = I.C. | | Symbol | s | | Symbol | r _c | |
| | [m.m] | ["] | | [m.m] | ["] | | [m.m] | ["] |
| 1 | 3,175 | 1/8" | 1 | 1,588 | 1/16" | 0 | 0,050 | 1/512" |
| (1.2) | 3,969 | 5/32" | (1.2) | 1,984 | 5/64" | (0.2) | 0,099 | 1/256" |
| (1.5) | 4,763 | 3/16" | (1.5) | 2,381 | 3/32" | (0.5) | 0,198 | 1/128" |
| (1.8) | 5,556 | 7/32" | (1.8) | 3,175 | 1/8" | 1 | 0,397 | 1/64" |
| 2 | 6,350 | 1/4" | 2 | 3,969 | 5/32" | 2 | 0,794 | 1/32" |
| (2.5) | 7,938 | 5/16" | (2.5) | 4,763 | 3/16" | 3 | 1,191 | 3/64" |
| 3 | 9,525 | 3/8" | 3 | 5,556 | 7/32" | 4 | 1,588 | 1/16" |
| 4 | 12,700 | 1/2" | 4 | 6,350 | 1/4" | 5 | 1,984 | 5/64" |
| 5 | 15,875 | 5/8" | 5 | 7,938 | 5/16" | 6 | 2,381 | 3/32" |
| 6 | 19,050 | 3/4" | 6 | 9,525 | 3/8" | 7 | 2,778 | 7/64" |
| 7 | 22,225 | 7/8" | 7 | 11,113 | 7/16" | 8 | 3,175 | 1/8" |
| 8 | 25,400 | 1" | 8 | 12,700 | 1/2" | 10 | 3,969 | 5/32" |
| 10 | 31,750 | 5/8" | 9 | 14,288 | 9/16" | 14 | 6,350 | 1/4" |
| | | | 10 | 15,875 | 5/8" | x | Otros/Others/Autres | |

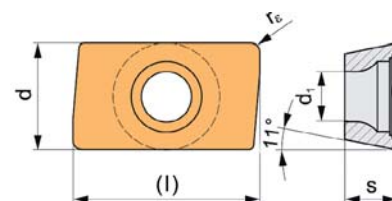
| 8 | | | |
|---|---|--|---|
| Designación Filo Corte / Cutting Edge Condition / Description arête coupe | | | |
| | Filos agudos Sharp edges Arêtes aiguës | | Filos redondeados Rounded edges Arêtes arrondées |
| | Filos con faceta Edges with facet Arêtes avec facette | | Filos redondeados con faceta Rounded edges with facet Arêtes arrondées avec facette |
| | Filos con doble faceta Edges with double facet Arêtes avec double facette | | Filos redondeados con doble faceta Rounded edges with double facet Arêtes arrondées avec double facette |

| 9 | | |
|--|--|----------------|
| Dirección Avance / Feed Direction / Direction avance | | |
| R | | Avance Feed |
| L | | Avance Feed |
| N | | Avance Feed |

Ref. **8633****PLAQUITA INTERCAMBIABLE FRESADO APHT**

APHT Milling Indexable Insert

Plaquette fraissage APHT

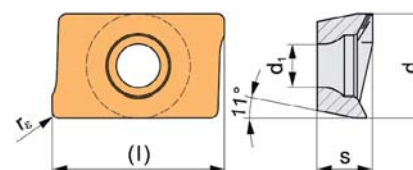


| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-010 | € |
|----------------------------------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | |
| Aluminio - Aluminium - Aluminium | | | | | | | | | | |
| APHT-160408PDFR-FA | 16,00 | 9,45 | 4,76 | 4,50 | 0,80 | 0,07-0,20 | 1,00-13,50 | 10 | 20929 | 22,12 |

Porta Plaquitas / Tool Holder / Porte-Plaquettes: **Pag. 530, 535**Ref. **8636****PLAQUITA INTERCAMBIABLE FRESADO APET 10F**

APET 10F Milling Indexable Insert

Plaquette fraissage APET 10F

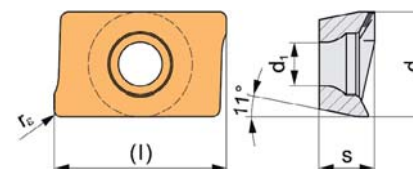


| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-010 | € |
|----------------------------------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | |
| Aluminio - Aluminium - Aluminium | | | | | | | | | | |
| APET-1003PDFR-FA | 10,00 | 6,70 | 3,50 | 2,88 | 0,50 | 0,07-0,20 | 1,00-9,00 | 10 | 20933 | 20,27 |

Porta Plaquitas / Tool Holder / Porte-Plaquettes: **Pag. 529, 534**Ref. **8639****PLAQUITA INTERCAMBIABLE FRESADO APKT 10M**

APKT 10M Milling Indexable Insert

Plaquette fraissage APKT 10M



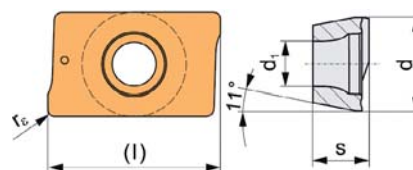
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-620 | N° Art. P-630 | € |
|-----------------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | |
| APKT-1003PDER-M | 10,00 | 6,70 | 3,50 | 2,88 | 0,50 | 0,08-0,20 | 1,00-9,00 | 10 | 20934 | 20935 | 9,94 |

Porta Plaquitas / Tool Holder / Porte-Plaquettes: **Pag. 529, 534**

Ref. 8642

PLAQUITA INTERCAMBIABLE FRESADO APKT 16

APKT 16 Milling Indexable Insert
Plaquette fraiseage APKT 16



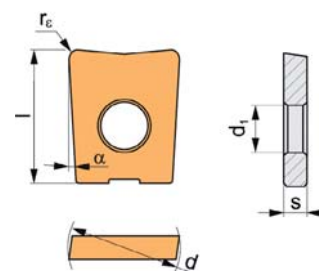
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-620 | N° Art. P-630 | N° Art. P-640 | € |
|---------------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | | | |
| APKT-1604PDER | 16,00 | 9,45 | 5,35 | 4,50 | 0,80 | 0,07-0,20 | 1,00-13,50 | 10 | 35175 | 20938 | 20939 | 13,36 |

Porta Plaquetas / Tool Holder / Porte-Plaquettes: **Pag. 530, 535**

Ref. 8645

PLAQUITA INTERCAMBIABLE FRESADO LC

LC Milling Indexable Insert
Plaquette fraiseage LC



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-615 | € |
|---------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | | | |
| LC-1210 | 14,00 | 12,00 | 2,50 | 5,00 | 1,00 | 0,08-0,25 | 0,10-1,00 | 10 | 20940 | 41,01 |
| LC-1610 | 16,00 | 16,00 | 3,00 | 5,00 | 1,00 | 0,08-0,30 | 0,10-1,00 | 10 | 20941 | 44,55 |
| LC-2010 | 18,00 | 20,00 | 3,00 | 5,00 | 1,00 | 0,08-0,30 | 0,10-1,00 | 10 | 20942 | 51,29 |

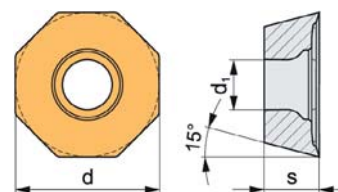


Porta Plaquetas / Tool Holder / Porte-Plaquettes: **Pag. 540**

Ref. 8648

PLAQUITA INTERCAMBIABLE FRESADO ODMT

ODMT Milling Indexable Insert
Plaquette fraiseage ODMT



| ISO | Dimensiones Dimensions | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-526 | N° Art. P-630 | N° Art. P-640 | € |
|--------------|---------------------------|---------|----------------------|---|----------------------|----|------------------|------------------|------------------|-------|
| | d mm | s mm | d ₁ mm | f mm | a _p mm | | | | | |
| ODMT-0605ZZN | 15,87 | 5,56 | 5,50 | 0,15-0,45 | 1,00-8,60 | 10 | 30137 | 20943 | 20944 | 18,53 |

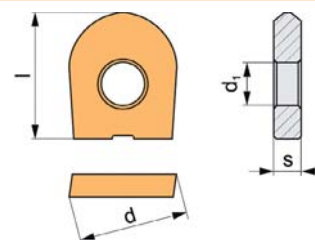


Porta Plaquetas / Tool Holder / Porte-Plaquettes: **Pag. 526**

Ref. **8651**

PLAQUITA INTERCAMBIABLE FRESADO RC

RC Milling Indexable Insert
Plaquette fraiseage RC



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-615 | N° Art. P-640* | € |
|-------|---------------------------|---------|---------|----------------------|---|----------------------|----|------------------|-------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | f mm | a _p mm | 10 | | | |
| RC-10 | 11,50 | 10,00 | 2,50 | 4,00 | 0,10-0,33 | 0,30-2,50 | 10 | 20945 | | 36,55 |
| RC-12 | 12,00 | 12,00 | 2,50 | 5,00 | 0,10-0,35 | 0,40-3,00 | 10 | 20947 | | 39,33 |
| RC-16 | 14,00 | 16,00 | 3,00 | 5,00 | 0,10-0,40 | 0,50-4,00 | 10 | 20949 | | 44,55 |
| RC-20 | 16,00 | 20,00 | 3,00 | 5,00 | 0,10-0,50 | 0,60-5,00 | 10 | 20951 | 20952 | 51,29 |
| RC-25 | 21,50 | 25,00 | 4,00 | 6,00 | 0,10-0,55 | 0,60-6,00 | 10 | 20953 | 20954 | 68,82 |

* Hasta fin de existencias
while stock lasts / jusqu'à la fin de stock

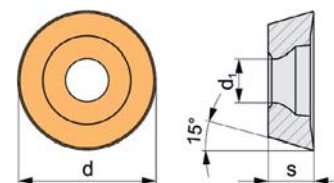
Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 539



Ref. **8654**

PLAQUITA INTERCAMBIABLE FRESADO RDHT

RDHT Milling Indexable Insert
Plaquette fraiseage RDHT



| ISO | Dimensiones Dimensions | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-610* | N° Art. P-620 | € |
|--------------|---------------------------|---------|----------------------|---|----------------------|----|-------------------|------------------|-------|
| | d mm | s mm | d ₁ mm | f mm | a _p mm | 10 | | | |
| RDHT-0702MOT | 7,00 | 2,38 | 2,90 | 0,10-0,18 | 0,50-1,50 | 10 | 29974 | 20955 | 10,62 |
| RDHT-1003MOT | 10,00 | 3,18 | 4,10 | 0,10-0,24 | 0,50-2,50 | 10 | | 20956 | 11,43 |
| RDHT-12T3MOT | 12,00 | 3,97 | 4,10 | 0,10-0,27 | 1,00-2,50 | 10 | | 20957 | 12,88 |
| RDHT-1604MOT | 16,00 | 4,76 | 5,20 | 0,10-0,33 | 1,00-3,50 | 10 | | 20958 | 16,46 |

* Hasta fin de existencias
while stock lasts / jusqu'à la fin de stock

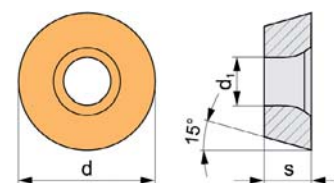
Porta Plaquetas / Tool Holder / Porte-Plaquettes:
Pag. 537, 538



Ref. **8657**

PLAQUITA INTERCAMBIABLE FRESADO RDHW

RDHW Milling Indexable Insert
Plaquette fraiseage RDHW



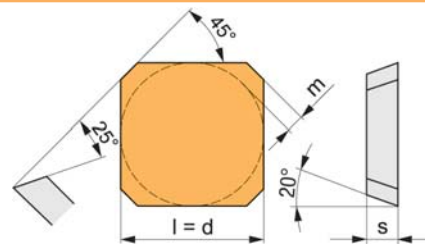
| ISO | Dimensiones Dimensions | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-610 | N° Art. P-620 | € |
|--------------|---------------------------|---------|----------------------|---|----------------------|----|------------------|------------------|-------|
| | d mm | s mm | d ₁ mm | f mm | a _p mm | 10 | | | |
| RDHW-0702MOT | 7,00 | 2,38 | 2,90 | 0,10-0,18 | 0,50-1,50 | 10 | 20959 | 20960 | 10,62 |
| RDHW-1003MOT | 10,00 | 3,18 | 4,10 | 0,10-0,24 | 0,50-2,50 | 10 | 20961 | 20962 | 10,95 |
| RDHW-12T3MOT | 12,00 | 3,97 | 4,10 | 0,10-0,27 | 1,00-2,50 | 10 | 20963 | 20964 | 11,62 |
| RDHW-1604MOT | 16,00 | 4,76 | 5,20 | 0,10-0,33 | 1,00-3,50 | 10 | 20965 | 20966 | 12,66 |

Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 537, 538



Ref. 8660

PLAQUITA INTERCAMBIABLE FRESADO SEKN FSN SEKN FSN Milling Indexable Insert Plaquette fraiseage SEKN FSN



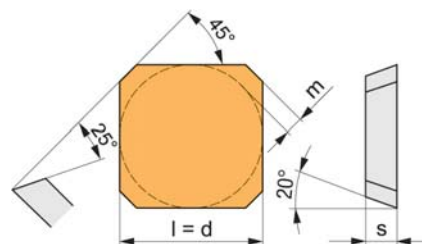
| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-620 | € |
|---------------|---------------------------|---------|---------|---------|---|----------------------|----|------------------|------|
| | l mm | d mm | s mm | m mm | f mm | a _p mm | | | |
| SEKN-1203AFSN | 12,70 | 12,70 | 3,18 | 1,60 | 0,15-0,30 | 1,00-6,50 | 10 | 20968 | 9,53 |



Porta Plaquitas / Tool Holder / Porte-Plaquettes: **Pag. 525**

Ref. 8663

PLAQUITA INTERCAMBIABLE FRESADO SEKR FSN SEKR FSN Milling Indexable Insert Plaquette fraiseage SEKR FSN



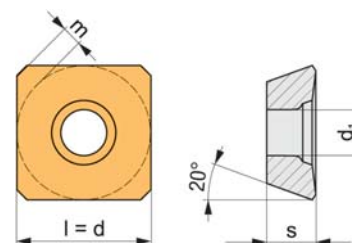
| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-620 | € |
|---------------|---------------------------|---------|---------|---------|---|----------------------|----|------------------|-------|
| | l mm | d mm | s mm | m mm | f mm | a _p mm | | | |
| SEKR-1203AFSN | 12,70 | 12,70 | 3,18 | 1,60 | 0,20-0,30 | 1,00-6,50 | 10 | 20969 | 10,95 |



Porta Plaquitas / Tool Holder / Porte-Plaquettes: **Pag. 525**

Ref. 8666

PLAQUITA INTERCAMBIABLE FRESADO SEHT FSN/FTN SEHT FSN/FTN Milling Indexable Insert Plaquette fraiseage SEHT FSN/FTN



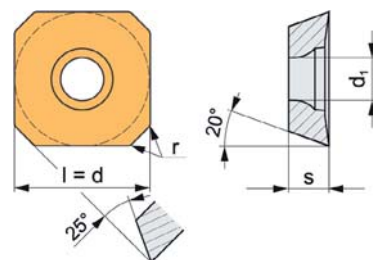
| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-526 | N° Art. P-620 | N° Art. P-640 | € |
|---------------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | m mm | f mm | a _p mm | | | | | |
| SEHT-1204AFSN | 12,70 | 12,70 | 4,76 | 5,50 | 1,60 | 0,10-0,30 | 1,00-6,50 | 10 | 30532 | | 12,68 | |
| SEHT-1204AFTN | 12,70 | 12,70 | 4,76 | 5,50 | 1,60 | 0,10-0,30 | 1,00-6,50 | 10 | | 20971 | 20973 | 12,68 |

Porta Plaquitas / Tool Holder / Porte-Plaquettes: **Pag. 524**

Ref. **8667**

PLAQUITA INTERCAMBIABLE FRESADO SEET PM

SEET PM Milling Indexable Insert
Plaquette fraiseage SEET PM



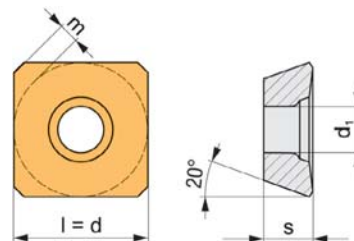
| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. C-526 | N° Art. P-610 | N° Art. P-630 | € |
|---------------|---------------------------|---------|---------|----------------------|---|----------------------|----|------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | f mm | a _p mm | 10 | | | | |
| SEET-12T3M-PM | 13,40 | 13,40 | 3,97 | 4,20 | 0,20-0,35 | 1,00-6,50 | 10 | 29979 | 29980 | 26219 | 16,46 |



Ref. **8669**

PLAQUITA INTERCAMBIABLE FRESADO SEHT FA

SEHT FA Milling Indexable Insert
Plaquette fraiseage SEHT FA



| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-610 | N° Art. P-010 | € |
|---|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | m mm | f mm | a _p mm | 10 | | | |
| Aluminio - Aluminium - Aluminium | | | | | | | | | | | |
| SEHT-1204AFFN-FA | 12,70 | 12,70 | 4,76 | 5,50 | 1,60 | 0,10-0,30 | 0,20-0,45 | 10 | 20974 | 20975 | 18,83 |

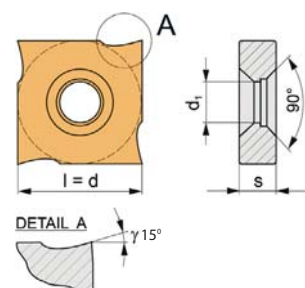


Porta Plaquetas / Tool Holder / Porte-Plaquettes: **Pag. 524**

Ref. **8672**

PLAQUITA INTERCAMBIABLE FRESADO SNHQ

SNHQ Milling Indexable Insert
Plaquette fraiseage SNHQ



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-640 | € |
|----------------|---------------------------|---------|---------|----------------------|---|----|-------|------------------|---|
| | l mm | d mm | s mm | d ₁ mm | f mm | 10 | 10 | | |
| SNHQ-1203-AZTN | 12,70 | 12,70 | 3,20 | 5,00 | 0,20-0,40 | 10 | 38106 | 24,39 | |
| SNHQ-1204-AZTN | 12,70 | 12,70 | 4,50 | 5,00 | 0,20-0,40 | 10 | 38410 | 26,61 | |
| SNHQ-1205-AZTN | 12,70 | 12,70 | 5,40 | 5,00 | 0,20-0,50 | 10 | 38412 | 28,19 | |
| SNHQ-1207-AZTN | 12,70 | 12,70 | 7,00 | 5,00 | 0,20-0,50 | 10 | 38980 | 30,57 | |

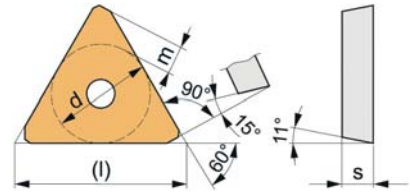


Porta Plaquetas / Tool Holder / Porte-Plaquettes: **Pag. 536**

Ref. 8675

PLAQUITA INTERCAMBIABLE FRESADO TPKN

TPKN Milling Indexable Insert
Plaquette fraiseage TPKN



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions | | | N° Art. P-610 | N° Art. P-620 | N° Art. P-640 | € |
|---------------|---------------------------|---------|---------|---------|---|----------------------|----|------------------|------------------|------------------|-------|
| | l mm | d mm | s mm | m mm | f mm | a _p mm | 10 | | | | |
| TPKN-1603PDSR | 16,50 | 9,52 | 3,18 | 2,45 | 0,08-0,20 | 1,00-13,00 | 10 | | 20984 | 20985 | 11,10 |
| TPKN-2204PDSR | 22,00 | 12,70 | 4,76 | 3,55 | 0,10-0,30 | 1,00-18,00 | 10 | 35176 | 20990 | 20991 | 12,31 |

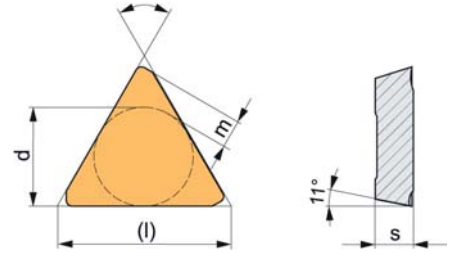


Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 531, 532

Ref. 8678

PLAQUITA INTERCAMBIABLE FRESADO TPKR

TPKR Milling Indexable Insert
Plaquette fraiseage TPKR



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions | | | N° Art. P-620 | N° Art. P-640 | € |
|---------------|---------------------------|---------|---------|---------|---|----------------------|----|------------------|------------------|-------|
| | l mm | d mm | s mm | m mm | f mm | a _p mm | 10 | | | |
| TPKR-1603PDSR | 16,50 | 9,52 | 3,18 | 2,45 | 0,08-0,20 | 1,00-16,00 | 10 | 20993 | | 7,88 |
| TPKR-2204PDSR | 22,00 | 12,70 | 4,76 | 3,55 | 0,10-0,30 | 1,00-22,00 | 10 | 20995 | 20996 | 12,31 |



Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 531, 532

Ref. 8679

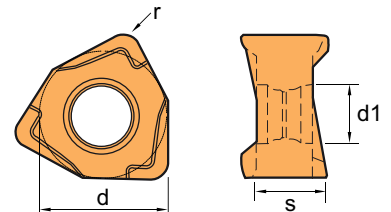
PLACA INTERCAMBIABLE FRESADO XNMX

XNMX Milling Indexable Insert
Plaquette fraiseage XNMX

New!



Video



| ISO | Dimensiones Dimensions | | | | Condiciones Corte Cutting Conditions | | | N° Art. P-620 | N° Art. P-630 | N° Art. P-640 | € |
|-----------------|---------------------------|---------|----------------------|---------|---|----------------------|----|------------------|------------------|------------------|-------|
| | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | 10 | | | | |
| XNMX-080608-ZMG | 12,53 | 6,5 | 4,5 | 0,8 | 0,1-0,3 | 0,3-7,0 | 10 | 30930 | 83759 | | 21,19 |
| XNMX-080608-ZRG | 12,53 | 6,5 | 4,5 | 0,8 | 0,1-0,3 | 0,3-7,0 | 10 | | | 83760 | 21,19 |

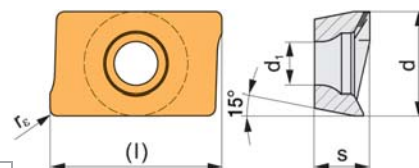


Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 527

Ref. **8680****PLAQUITA INTERCAMBIABLE FRESADO XOET**

XOET Milling Indexable Insert

Plaquette fraiseage XOET

ALTO RENDIMIENTO
High Performance
Haut rendement

| ISO | Dimensiones Dimensions | | | | | Condiciones Corte Cutting Conditions Conditions coupe | | | N° Art. P-720 | € |
|-------------|---------------------------|---------|---------|----------------------|---------|---|----------------------|----|------------------|-------|
| | l mm | d mm | s mm | d ₁ mm | r mm | f mm | a _p mm | 10 | | |
| XOET-060204 | 6,96 | 3,98 | 2,30 | 1,92 | 0,4 | 0,05-0,07 | 1,00-4,00 | 10 | 19646 | 14,82 |
| XOET-060208 | 6,96 | 3,98 | 2,30 | 1,92 | 0,8 | 0,05-0,07 | 1,00-4,00 | 10 | 19647 | 14,82 |

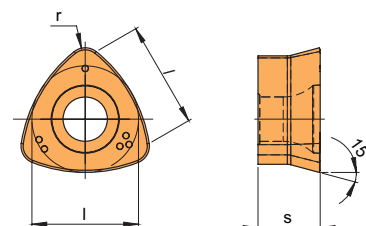


Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 533

Ref. **8690****PLAQUITA INTERCAMBIABLE FRESADO WNMW**

WNMW Milling Indexable Insert

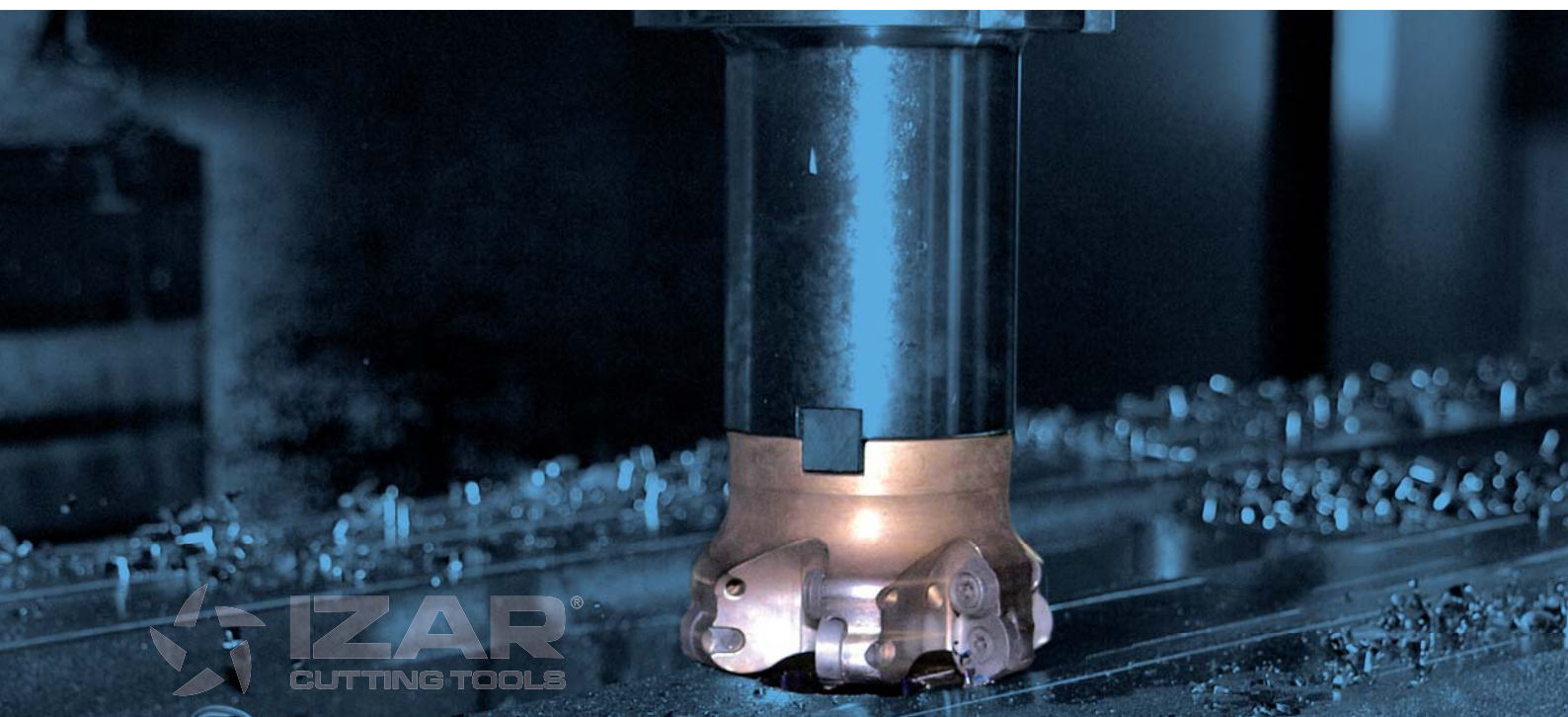
Plaquette fraiseage WNMW



| ISO | Dimensiones Dimensions | | | Condiciones Corte Cutting Conditions Conditions coupe | | N° Art. P-610 | N° Art. P-620 | € |
|-------------|---------------------------|---------|---------|---|----------------------|------------------|------------------|-------|
| | l mm | s mm | r mm | f mm | a _p mm | | | |
| WNMW-1207SP | 12,70 | 7,00 | 2,00 | 0,30-1,50 | 0,50-1,80 | 10 | 59772 59773 | 14,37 |



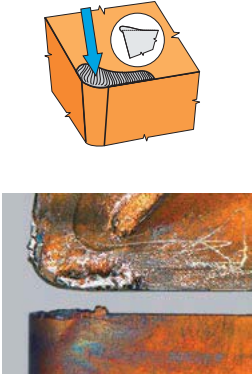
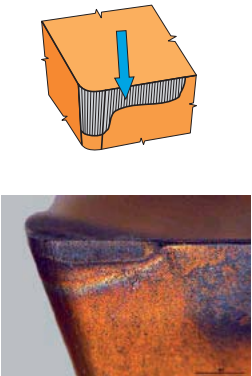
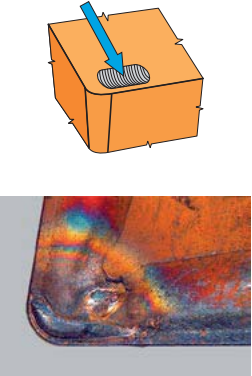
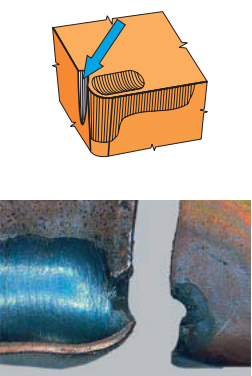
Porta Plaquetas / Tool Holder / Porte-Plaquettes: Pag. 523



PROBLEMAS Y SOLUCIONES PLAQUITAS

INSERT Problems & Solutions

Problèmes et solutions PLAQUETTES

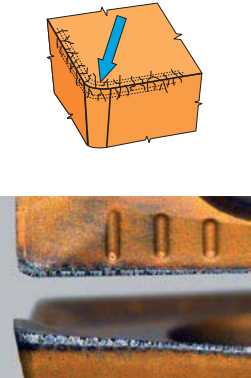
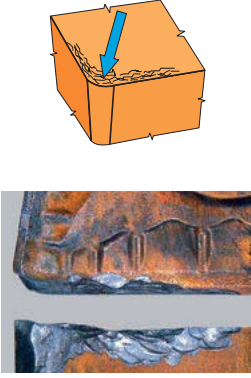
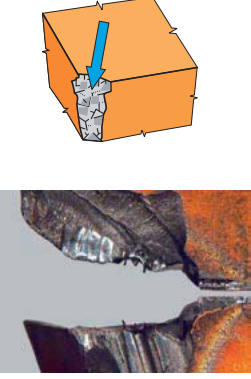
| | | | |
|---|---|--|--|
|  | <p>FILO APORTACIÓN</p> <p>Causas: Adherencia del material trabajado en la arista de corte; su ruptura puede causar el astillado de la arista y, como consecuencia, mal acabado superficial.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Incrementar Vc y avance - Utilizar calidades con recubrimiento - Utilizar una geometría de corte diferente - No utilizar refrigeración | <p>BUILT-UP EDGE</p> <p>Causes: Sticking of machined material on the cutting edge. Its tear-off can cause the brittle crack of the edge, consequently the surface quality gets worse.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Increase cutting speed & feed - Use coated grade - Use different cutting geometry - No coolant | <p>FILET AVEC MATÉRIEL</p> <p>Causas: Matériel usiné reste soudé au filet de coupe, lui créant dommages. Mauvaise finition de surface.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Augmenter vitesse coupe et avance - Appliquer types de matériaux revêtus (spécialement avec PVD) - Employer une différente géométrie de coupe (plus positive et affûtée) - Pas de refroidissement |
|  | <p>DESGASTE INCIDENCIA</p> <p>Causas: Causado por la fricción entre la plaquita y el material a trabajar. No es posible eliminarlo, solamente reducirlo.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad con mayor resistencia al desgaste - Reducir la velocidad de corte - Incrementar el avance - Usar refrigerante o aumentar la presión | <p>FLANK WEAR</p> <p>Causes: One of the main criteria of tool life. It appears due to friction of insert to the machined material. It's not possible to fully eliminate it, just to reduce.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use more wear resistant grade - Reduce cutting speed - Increase feed - Use coolant or increase its intensity | <p>USURE ANGLE D'INCIDENCE</p> <p>Causas: Conséquence de friction entre plaquette et matériel à usiner.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une qualité avec plus haute résistance à l'usure - Employer huile de coupe où augmenter l'intensité - Reduire la vitesse de coupe - Augmenter l'avance si < 0.1 mm/tour (pour qualités CVD) |
|  | <p>CRATERIZACIÓN</p> <p>Causas: Aparece frecuentemente en plaquitas sin rompevirutas.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad con mayor resistencia al desgaste - Utilizar una calidad con recubrimiento - Usar una geometría de corte positiva - Reducir Vc - Usar refrigerante o aumentar su presión | <p>CRATERING</p> <p>Causes: It appears usually on inserts with plain face.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use more wear resistance grade - Use coated grade - Use positive cutting geometry - Reduce cutting speed - Use coolant or increase its intensity | <p>CRATÈRES</p> <p>Causas: Apparaît beaucoup en plaquette sans brisecopeaux.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une qualité avec plus haute résistance à l'usure. - Employer huile de coupe où augmenter l'intensité - Reduire la 1ere vitesse de coupe et/ou avance - Employer une géométrie de coupe différente (plus positive) - Employer une qualité avec revêtement |
|  | <p>DESGASTE ARISTA SECUNDARIA</p> <p>Causas: Aparece frecuentemente en el torneado y limita la vida de la plaquita por oxidación y craterización.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad más resistente al desgaste, con recubrimiento Al₂O₃ - Reducir Vc - Usar refrigerante o elevar su intensidad | <p>OXIDATION GROOVE ON THE MINOR EDGE</p> <p>Causes: The main criterion which limits the tool life, usually appeared at turning. Oxidation and cratering combined.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use more wear-resistant grade, if possible Al₂O₃ coated - Reduce cutting speed - Use coolant or increase its intensity | <p>USURE ARÊTE SECONDAIRE</p> <p>Causas: Apparaît beaucoup sur tournage et limite la vie de la plaquette par oxidation et cratères.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une qualité avec plus haute résistance à l'usure - Employer plaquettes avec Al₂O₃ si les conditions sont convenables - Employer huile de coupe où augmenter l'intensité - Reduire la vitesse de coupe |

PROBLEMAS Y SOLUCIONES PLAQUITAS

INSERT Problems & Solutions

Problèmes et solutions PLAQUETTES

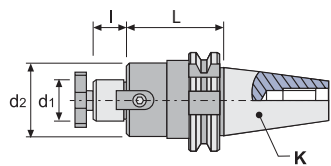
| | | | |
|---|---|--|---|
|  | <p>DEFORMACIÓN PLÁSTICA</p> <p>Causas: Elevada fatiga térmica de la arista de corte por la elevada Vc.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad con mayor resistencia al desgaste - Reducir Vc y avance. - Usar una plaquita con un radio mayor - Usar refrigerante o elevar su intensidad | <p>PLASTIC DEFORMATION</p> <p>Causes: Caused by high thermal stress of the cutting edge (high feed and cutting speed).</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use a more wear-resistant grade - Reduce Vc and feed - Use an insert with bigger nose radius - Use coolant or increase its intensity | <p>DÉFORMATION PLASTIQUE</p> <p>Causes: Trop de pression sur le filet à cause d'une haute vitesse de coupe et avance.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une Qualité plus résistante à l'usure - Reduire la vitesse de coupe et/ou avance - Employer huile de coupe où augmenter l'intensité - Employer une plaquette avec un rayon plus grand |
|  | <p>DESGASTE EN LA ARISTA PRINCIPAL</p> <p>Causas: Rotura creada en el area de contacto entre arista de corte y superficie de la pieza; causada por el endurecimiento de la superficie mecanizada y por rebabas. Suele aparecer en INOX austeníticos AISI-316-304.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad más resistente al desgaste y con recubrimiento Al_2O_3 - Utilizar una herramienta con menor ángulo de posición | <p>NOTCH WEAR</p> <p>Causes: Created in area of contact of the cutting edge with the surface of the work piece. Mainly caused by hardening of the surface layer of work piece and burrs. Usually appears on austenitic stainless steel AISI-316-304.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use more wear resistant grade and Al_2O_3 coated. - Use a smaller setting angle tool | <p>USURE EN ARÊTE PRINCIPALE</p> <p>Causes: Rupture sur la surface de contact entre arête de coupe et surface de la pièce, a cause d'augmenter la dureté de la surface usiner et par bavures. Surtout en INOX austénitiques AISI 316-304.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une qualité plus résistante à l'usure et avec revêtement Al_2O_3 - Employer un outil avec angle d'approximation inférieur |
|  | <p>ASTILLADO DE LA ARISTA DE CORTE</p> <p>Causas: Aparece junto con otro tipo de fallo causado por la baja rigidez entre máquina/herramienta/pieza o por formación de viruta.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Incrementar Vc - Reducir el avance - Fresado convencional - Mejorar evacuación de viruta - Cambiar posición herramienta - Mejorar la estabilidad | <p>CHIPPING OF CUTTING EDGE</p> <p>Causes: It mainly appears with another type of wear, caused by low rigidity of machine-tool-work piece or hard chip forming.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Increase the cutting speed - Reduce the feed rate - Conventional milling - Improve chip evacuation - Change cutter positioning - Improve stability | <p>COPEAUX SUR LES ARÊTES DE COUPE</p> <p>Causes: A cause de la faiblesse de la pièce à usiner sur la machine où à cause d'une énorme formation de copeaux.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Augmenter la vitesse de coupe - Reduire l'avance - Fraisage Conventionnel - Améliorer l'évacuation de copeaux - Changer la position de l'outil - Améliore la stabilité |
|  | <p>ASTILLADO DE LA ARISTA (FUERA DEL CORTE)</p> <p>Causas: Causada por una formación de virutas incorrecta, que dañan la arista.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Variar el avance - Usar una herramienta con un ángulo de aproximación diferente - Usar una geometría de plaquita diferente - Utilizar una calidad más tenaz | <p>CHIPPING OF CUTTING EDGE (OUT OF CUT)</p> <p>Causes: Caused by inconvenient chip forming. The chip damages the edge.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Change feed. - Use a different setting angle tool. - Use different insert geometry - Use tougher grade | <p>COPEAUX DEHORS DES ARÊTES DE COUPE</p> <p>Causes: Formation de copeaux déviés jusqu'aux filets de coupe.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Variar l'avance - Employer un outil avec un angle d'approximation différent - Employer une géométrie de coupe différentes (un autre brise copeaux) |

| | | | |
|---|--|---|--|
|  | <p>FISURAS TÉRMICAS</p> <p>Causas: Causadas por fatiga térmica en la arista de corte por cortes interrumpidos.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar abundante refrigeración o anularla - Reducir la velocidad de corte - Reducir el avance - Usar una calidad más tenaz | <p>COMB CRACKS</p> <p>Causes: High thermal stress of the cutting edge at interrupted cut.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use an abundant flow of coolant or shut off the coolant - Reduce the cutting speed - Reduce the feed rate - Use tougher grade | <p>FISURES THERMIQUES</p> <p>Causes: TROP de fatigue thermique sur l'arête de coupe par coupe interrompue.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer beaucoup de lubrifiant où la fermer - Réduire la vitesse de coupe - Réduire l'avance - Employer le Degré le plus fort - Employer une qualité plus tenace |
|  | <p>FISURAS A LO LARGO DEL FLANCO</p> <p>Causas: Generada por fatiga dinámica en el area posterior de la arista de corte.</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad más tenaz - Cambiar condiciones de corte - Usar plaquitas de fresado con geometría diferente (...T, ...S, ...K, ...P) - Cambiar el avance - Modificar la posición del porta-fresas | <p>CRACKS ALONG THE FLANK</p> <p>Causes: High dynamic stress of the area behind the cutting edge.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use tougher grade - Change the cutting conditions - Use different geometry of milling insert or inserts with different cutting edge condition (...T, ...S, ...K, ...P) - Change the feed - Change the cutter positioning | <p>FISURES AU COURS DU FILET</p> <p>Causes: TROP de stress dynamique de la zone postérieure à l'arête de coupe.</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une qualité plus tenace - Changer les conditions de coupe - Employer un géométrie de coupe différente de la plaquette de fraisage où plaquettes avec différentes conditions du filet de coupe (...T, ...S, ...K, ...P) - Changer l'avance - Changer la position du porte-fraises |
|  | <p>ROTURA DE LA PLAQUITA</p> <p>Causas: Causas variadas dependiendo del material, condiciones de corte, rigidez de la máquina, calidad del metal duro...</p> <p>Soluciones:</p> <ul style="list-style-type: none"> - Usar una calidad más tenaz - Reducir avance y profundidad de corte - Usar plaquitas con mayor radio - Mejorar la rigidez en su conjunto | <p>INSERT FRACTURE</p> <p>Causes: Various causes depending on work piece material, grade, condition and rigidity of machine-tool-work piece, extend and wear type, cutting conditions...</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Use a tougher grade - Reduce feed & cutting depth. - Use a bigger corner radius insert - Improve stability | <p>RUPTURE PLAQUETTE</p> <p>Causes: Variées en fonction du matériel, conditions de coupe, rigidité de la machine, qualité du carbure...</p> <p>Solutions:</p> <ul style="list-style-type: none"> - Employer une qualité plus tenace - Reduire avance et profondeur de coupe - Employer plaquettes avec Rayon plus grand - Augmenter la rigidité de l'ensemble |



Ref. 8200

CONO PORTAPLAQUITAS FRESADO DIN 69871-A-AD DIN 69871-A-AD Milling Tool-Holder Adaptor Adaptateur Porte-Plaquettes fraiseage DIN 69871-A-AD

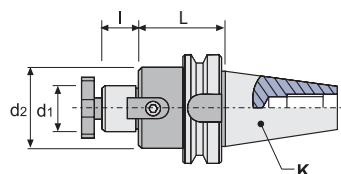


| ISO-K | d ₁ mm | d ₂ mm | L mm | l mm | N° Art. | € |
|-------|----------------------|----------------------|---------|---------|------------|--------|
| 40 | 16 | 38 | 35 | 17 | 59928 | 107,24 |
| 40 | 22 | 48 | 35 | 19 | 59929 | 107,24 |
| 40 | 27 | 58 | 60 | 21 | 59930 | 110,93 |
| 40 | 32 | 63 | 60 | 24 | 59931 | 118,34 |
| 40 | 40 | 73 | 60 | 27 | 59932 | 140,51 |
| 50 | 16 | 38 | 35 | 17 | 59933 | 162,72 |
| 50 | 22 | 48 | 35 | 19 | 59935 | 162,72 |
| 50 | 27 | 58 | 40 | 21 | 59936 | 162,72 |
| 50 | 32 | 78 | 50 | 24 | 59941 | 170,10 |
| 50 | 40 | 88 | 50 | 27 | 59942 | 184,91 |
| 50 | 50 | 90 | 65 | 30 | 59944 | 240,90 |



Ref. 8201

CONO PORTAPLAQUITAS FRESADO JIS B 6339-BT JIS B 6339-BT Milling Tool-Holder Adaptor Adaptateur Porte-Plaquettes fraiseage JIS B 6339-BT



| ISO-K | d ₁ mm | d ₂ mm | L mm | l mm | N° Art. | € |
|-------|----------------------|----------------------|---------|---------|------------|--------|
| 40 | 16 | 38 | 40 | 17 | 59945 | 107,24 |
| 40 | 22 | 48 | 45 | 19 | 59946 | 107,24 |
| 40 | 27 | 58 | 50 | 21 | 59947 | 110,93 |
| 40 | 32 | 63 | 50 | 24 | 59948 | 118,34 |
| 40 | 40 | 73 | 55 | 27 | 59949 | 140,51 |
| 50 | 16 | 38 | 55 | 17 | 59950 | 162,72 |
| 50 | 22 | 48 | 55 | 19 | 59951 | 162,72 |
| 50 | 27 | 58 | 60 | 21 | 59952 | 162,72 |
| 50 | 32 | 78 | 60 | 24 | 59954 | 162,72 |
| 50 | 40 | 88 | 65 | 27 | 59955 | 184,91 |



ACEITES DE CORTE Y REFRIGERANTES

Cutting Oils & Water Soluble Fluids

Huiles de coupe et lubrifiants

ACEITES DE CORTE

Cutting Oils
Huiles de coupe

557

PASTA DE CORTE

Cutting Paste
Pâte de coupe

559

CERA DE CORTE

Cutting Wax
Cire de coupe

560

REFRIGERANTES - TALADRINA

Water Soluble Fluids
Lubrifiants

560



ACEITES DE CORTE Y REFRIGERANTES

Cutting Oils & Water Soluble Fluids

Huiles de coupe et lubrifiants

ACEITES DE CORTE

Aceite de corte de uso general de alta gama, formulado a base de aceites vegetales y libre de cloruros. Para aplicaciones de corte en general (taladrado, roscado, fresado, torneado, etc.)

Cutting Oils

High-end general purpose cutting oil, formulated from vegetable oils and chloride-free. For general cutting applications (drilling, threading, milling, turning, etc.)

Huiles de coupe

Huile de coupe à usage général haut de gamme, formulée à base d'huiles végétales et sans chlorures. Pour des applications de coupe en général (perçage, taraudage, fraisage, tournage, etc.)

REFRIGERANTES - TALADRINA

Aceite emulsionable altamente concentrado libre de cloruros, aminas secundarias y / o nitritos

Water Soluble Fluids

Highly concentrated emulsifiable oil free of chlorides, secondary amines and/or nitrites

Lubrifiants

Huile émulsifiable hautement concentrée, exempte de chlorures, d'amines secondaires et/ou de nitrites



ACEITES DE CORTE - Cutting Oils - Huiles de coupe

UNI
Universal

New!



Viscosidad a 40°C
Viscosity / Viscosité:
37 cSt

No
Soluble

- * Disponible Ficha Técnica
- * Data Sheet available
- * Fiche technique disponible

APLICACIÓN:

Para aplicaciones de uso general y universal (UNI) en todos los metales ferrosos.

APPLICATION:

For general purpose and universal (UNI) applications on all ferrous metals.

APPLICATION:

Pour des applications à usage général et universel (UNI) sur tous les métaux ferreux.



Cont. 250 ml

Nº Art. 53898

€ 8,84

Cont. 500 ml

Nº Art. 53901

€ 11,95

Cont. 1L

Nº Art. 53903

€ 27,34

Cont. 5L

Nº Art. 53904

€ 95,54

Cont. 10L

Nº Art. 53906

€ 175,30

Cont. 25L

Nº Art. 53907

€ 344,37

INOX

Heavy Duty

New!

VISCOSIDAD EXTRA !
Extra Viscosity!
Viscosité supplémentaire !

Viscosidad a 40°C
Viscosity / Viscosité:
173 cSt

No
Soluble

- * Disponible Ficha Técnica
- * Data Sheet available
- * Fiche technique disponible

APLICACIÓN:

Para aplicaciones de mecanizado pesado (Heavy Duty) en todos los metales ferrosos y para un rendimiento mejorado en aceros inoxidable (INOX).

APPLICATION:

For heavy duty machining applications on all ferrous metals and for improved performance on stainless steels (STAINLESS).

APPLICATION:

Pour des applications d'usinage lourd (Heavy Duty) sur tous les métaux ferreux et pour améliorer les performances sur les aciers inoxydables (INOX).



Cont. 250 ml

Nº Art. 53928

€ 13,56

Cont. 500 ml

Nº Art. 53934

€ 24,16

Cont. 1L

Nº Art. 53936

€ 42,44

Cont. 5L

Nº Art. 53937

€ 152,33

Cont. 10L

Nº Art. 53940

€ 290,43

Cont. 25L

Nº Art. 53942

€ 629,28

ALU

New!

Non Ferrous

Viscosidad a 40°C
Viscosity / Viscosité:
4,20 cSt

No Soluble

- * Disponible Ficha Técnica
- * Data Sheet available
- * Fiche technique disponible

APLICACIÓN:

Especial para aplicaciones en todos los metales no ferrosos como aluminio (ALU), cobre, latón, bronce, zinc

APPLICATION:

Specially for applications on all non-ferrous metals such as aluminium (ALU), copper, brass, bronze, zinc, etc.

APPLICATION:

Spécialement indiqué pour les applications sur tous les métaux non ferreux, tels que l'aluminium (ALU), le cuivre, le laiton, le bronze, le zinc, etc.



| | |
|---------|--------|
| Cont. | 250 ml |
| Nº Art. | 53943 |
| € | 12,23 |



| | |
|---------|--------|
| Cont. | 500 ml |
| Nº Art. | 53946 |
| € | 19,96 |



| | |
|---------|-------|
| Cont. | 1L |
| Nº Art. | 53948 |
| € | 33,42 |



| | |
|---------|--------|
| Cont. | 5L |
| Nº Art. | 53949 |
| € | 123,67 |



| | |
|---------|--------|
| Cont. | 25L |
| Nº Art. | 79042 |
| € | 563,29 |

New! AEROSOL - Aerosol - Aérosol



2 Cánulas / 2 Actuators / 2 Canules



Chorro líquido
Liquid jet
Jet liquide



Spray

| | |
|---------|-------|
| Cont. | 400ml |
| Nº Art. | 53900 |
| € | 15,21 |

Para aplicaciones de uso general en todos los metales ferrosos

For general purpose applications on all ferrous metals

Pour des applications à usage général sur tous les métaux ferreux



12 UNI

| | |
|---------|--------|
| Nº Art. | € |
| 53926 | 173,45 |

Box Price!

New! ESPUMA - Foam - Mousse



Fuerte adhesión sin goteos. Lavable con agua

Strong adherence without drips. Washable with water

Forte adhérence sans gouttes. Lavable à l'eau



| | |
|---------|-------|
| Cont. | 400ml |
| Nº Art. | 48302 |
| € | 19,82 |



12 UNI

| | |
|---------|--------|
| Nº Art. | € |
| 48299 | 225,95 |

Box Price!



New! DISPLAYS

9x250ml
UNI

| Nº Art. | € |
|---------|-------|
| 13929 | 75,56 |

Set Price!

UNI
Universal

UNI+INOX+ALU
3+3+3x250ml
MIXTO

| Nº Art. | € |
|---------|-------|
| 13930 | 98,68 |

Set Price!

UNI **INOX** **ALU**
Universal Heavy Duty Non Ferrous

6x400ml
AEROSOL

| Nº Art. | € |
|---------|-------|
| 13912 | 86,73 |

Set Price!

UNI
Universal

New! PASTA DE CORTE - Cutting Paste - Pâte de coupe

Pasta con propiedades lubricantes extremas. La pasta se asienta en las aristas de corte y se licua durante la operación de corte.

Ideal para todas las operaciones como roscado, taladrado y fresado de materiales difíciles de cortar como acero inoxidable, acero Cr-Ni, titanio, acero al manganeso, etc.

Paste with extreme lubricating properties. The paste settles on the cutting edges and liquefies during the cutting operation.

Ideal for all operations such as the threading, drilling and milling of difficult-to-cut materials such as stainless steel, Cr-Ni steel, titanium, manganese steel, etc.

Pâte aux propriétés lubrifiantes extrêmes. La pâte se dépose sur les bords de coupe et se liquéfie pendant l'opération de coupe.

Idéale pour toutes les opérations telles que le taraudage, le perçage et le fraisage de matériaux difficiles à couper comme l'acier inoxydable, l'acier Cr-Ni, le titane, l'acier au manganèse, etc.

| Cont. | 250ml |
|---------|-------|
| Nº Art. | 53954 |
| € | 16,70 |

| Cont. | 750ml |
|---------|-------|
| Nº Art. | 53956 |
| € | 27,81 |

Sumerja la herramienta de corte en la pasta para obtener resultados optimizados

Dip the cutting tool into the paste for optimised results

Trempez l'outil de coupe dans la pâte pour des résultats optimisés



New!

CERA DE CORTE - Cutting Wax - Cire de coupe

Cera en barra de alta gama para refrigerante y lubricación de operaciones de corte en metales no ferrosos como aluminio, cobre, latón, etc. Libre de cloruros, sin humos o vapores nocivos.

Para todas las máquinas de hoja de sierra circular o sierra de cinta sin suministro de refrigerante. También apto para fresado, roscado, escariado, taladrado, torneado, etc.

High-end wax in a bar for the cooling and lubrication of cutting operations on non-ferrous metals such as aluminium, copper, brass, etc. Chloride free, no harmful fumes or vapours.

For all circular or band saw blade machines without coolant supply. Also suitable for milling, threading, reaming, drilling, turning, etc.

Cire en barre haut de gamme pour le refroidissement et la lubrification des opérations de coupe sur les métaux non ferreux tels que l'aluminium, le cuivre, le laiton, etc. Sans chlorures, sans fumées ni vapeurs nocives.

Pour toutes les machines à lame de scie circulaire ou à ruban sans alimentation en réfrigérant. Convient également pour le fraisage, taraudage, alésage, perçage, tournage, etc.



| | |
|---------|-------|
| Cont. | 300ml |
| Nº Art. | 53957 |
| € | 29,08 |



Para aplicar la cera, sostenga brevemente la barra de cera contra la sierra giratoria. Repita cada 10-20 ciclos de aserrado

To apply the wax, briefly hold the wax bar against the rotary saw. Repeat every 10-20 sawing cycles

Pour appliquer la cire, maintenez brièvement la barre de cire contre la scie rotative. Répétez tous les 10 à 20 cycles de sciage



REFRIGERANTES - TALADRINA Water Soluble Fluids - Lubrificants

STD

New!

Standard

Emulsión semisintética, transparente a semitransparente. Muy alta estabilidad ante los microorganismos. Apto para operaciones de rectificado. Concentración del 4-7% en función de la aplicación.

Semi-synthetic emulsion, transparent to semi-transparent. Very high stability to micro-organisms. Suitable for grinding operations. Concentration 4-7% depending on the application.

Émulsion semi-synthétique, transparente à semi-transparente. Très grande stabilité face aux microorganismes. Convient pour les opérations de meulage. Concentration de 4-7 % selon l'application.



| | |
|-------------|---|
| | Índice Refractómetro Refractometer Index Indice de réfractomètre |
| 1,60 | |

- * Disponible Ficha Técnica
- * Data Sheet available
- * Fiche technique disponible

STANDARD

| | |
|---------|-------|
| Cont. | 5L |
| Nº Art. | 53958 |
| € | 91,99 |

TOP

New!

Top Line

Emulsión de color blanco lechoso. Para aplicaciones de alto rendimiento en aceros, materiales no ferrosos y aluminio. Concentración 6-10% en función de la aplicación.

Milky white emulsion. For high performance applications on steels, non-ferrous materials and aluminium. Concentration 6-10% depending on application.

Émulsion blanche laiteuse. Pour des applications de haute performance sur les aciers, les matériaux non ferreux et l'aluminium. Concentration de 6-10 % selon l'application.



| | |
|-------------|---|
| | Índice Refractómetro Refractometer Index Indice de réfractomètre |
| 1,20 | |

- * Disponible Ficha Técnica
- * Data Sheet available
- * Fiche technique disponible

TOP LINE

| | |
|---------|--------|
| Cont. | 5L |
| Nº Art. | 53959 |
| € | 107,95 |



HERRAMIENTA ESPECIAL

Special Tools

Outils spéciaux

BAJO DEMANDA

Upon request

Sur demande



FABRICAMOS HERRAMIENTA ESPECIAL BAJO DEMANDA

Special Tools manufactured upon request

On fabrique des outils spéciaux sur demande



Brocas, Fresas Mango, Fresas Agujero, Fresas Madre...

Drill Bits, End Mills, Shank type and Arbor type Milling Cutters, Hobs...

Forets, Fraises queue cylindrique, Fraises à trou, Fraises mère...

Especialmente:

Specially:

Spécialement:

Fresas madre y de disco con perfil constante:

- Modulares y d. pitch desde mod. 0,25 hasta mod. 25
- Para ejes nervados DIN-5480, DIN-5482...
- Para ejes estriados
- Para ruedas de cadena
- Tallado de coronas
- Poleas dentadas
- * Calidad hasta AA s/ DIN-3968

Form Relieved Single Cutter and Hobs:

- Modular and Diametral Pitch system from 0.25 up to 25 mod.
- For Involute Spline Shaft DIN 5480, DIN 5482...
- For Spline Shaft
- For roller chain sprockets
- Gear milling cutters
- Pulley milling cutters
- * Accuracy up to quality class AA according to DIN-3968

Fraises mère et disque avec profil constant:

- Modulaires et diamétral pitch depuis mod 0.25 jusqu'à mod 25
- Pour arbres nerveux DIN 5480, DIN 5482
- Pour arbres cannelés
- Pour roués à chaîne
- Taillage de couronnes
- Poulies dentées
- * Qualité jusqu'à AA s/DIN 3968

Fresas de disco para tallado de tornillos sin fin y cremalleras.

Single cutters for milled Worm and Racks.

Fraise disque pour taillage de vis et cremillère.

Fresas de forma s/plano ajustadas a las necesidades de cada cliente.

Single cutters with special profile according to customer preferences and drawings.

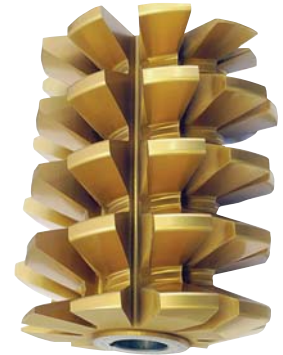
Fraise de forme suivant plan et suivant les besoins de chaque client.



FABRICAMOS HERRAMIENTA ESPECIAL BAJO DEMANDA

Special Tools manufactured upon request

On fabrique des outils spéciaux sur demande



Disponemos de Maquinaria:

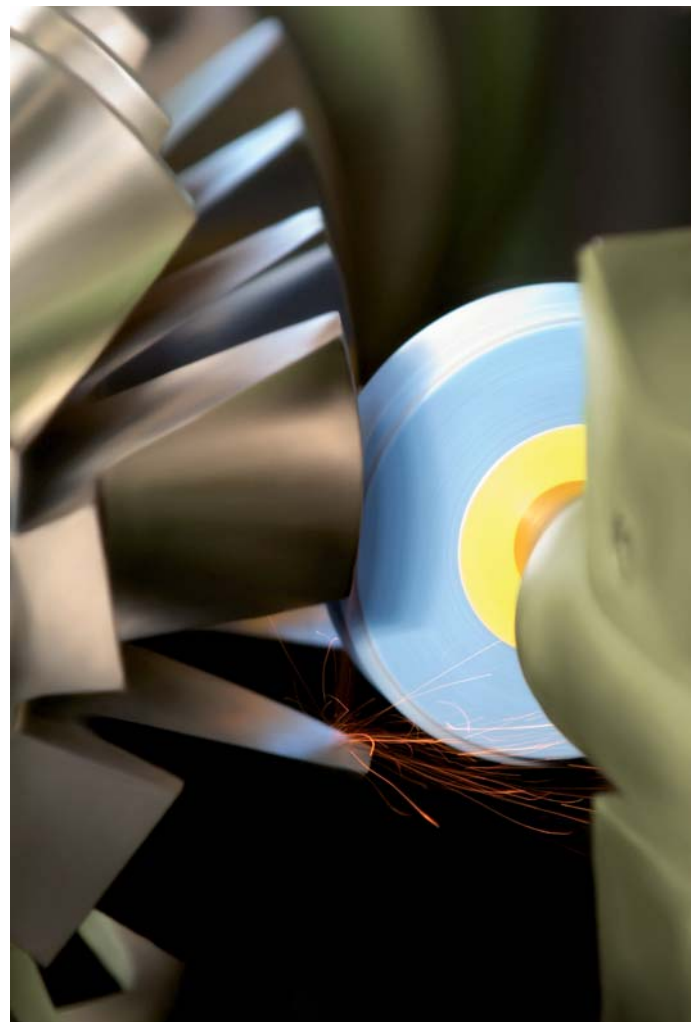
- **Klingelberg, Reishauer** para rectificado de perfiles
- **Klingelberg, Schutte** para afilado pulido
- **Samputensili** para la comprobación de perfiles de fresas madre
- **Schneeberger** de última generación con 5 ejes controlados
- **Danobat**, rectificadoras de última generación
- Otra maquinaria especial

We have special and specific technical machinery such as:

- Profile grinding machines **Klingelberg, Reishauer**
- Sharpening and Polishing machines **Klingelberg, Schütte**
- **Samputensili** machines for checking profiles
- Last generation 5 axes cnc machines **Schneeberger**
- Last generation grinding machines **Danobat**
- Other special machines

On dispose du suivant parc machines:

- **Kingelberg, Reishauer** pour rectifié les profils
- **Kingelberg, Schutte** pour affutage pouli
- **Samputensili** pour verification des profils des fraises mères
- **Schneeberger** de dernière génération avec 5 axes controlés
- **Danobat**, machines pour rectifier de dernière génération
- Autres machines spéciales



FABRICAMOS HERRAMIENTA ESPECIAL BAJO DEMANDA

Special Tools manufactured upon request

On fabrique des outils spéciaux sur demande

Reafilado Resharpening Réaffutage

Servicio de reafilado:

- Fresas madre
- Fresas de agujero
- Brocas cónicas DIN-345, DIN-341
- Fresas frontales Metal Duro, PMX

Ofrecemos todo tipo de recubrimientos

Resharpening service for:

- Hobs
- Arbor type cutters
- Taper shank drill bits DIN 345, DIN 341
- Carbide and PMX end mills,...

We offer all kind of coatings

Service de réaffutage:

- Fraises mère
- Fraises à trou
- Forets coniques DIN-345, DIN-341
- Forets carbure et ASP

On offer tout genre de revêtements

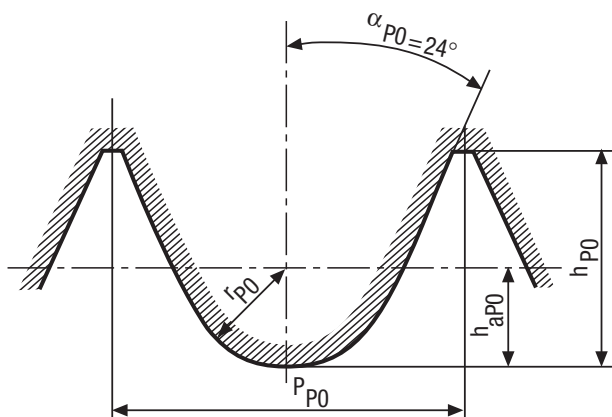
+ INFO  izartool.com

PERFIL REFERENCIA EN FRESAS MADRE PARA CADENAS

Hob Reference Profiles for Roller Chain Sprockets

Profils de référence dans les fraises mère pour chaînes

DIN-8197



Línea de referencia del perfil
Profile line reference
Ligne de référence du profil

P_{PO} Paso del perfil de referencia = 1,005-p cadena
 h_{PO} Altura del diente del perfil de referencia
 h_{aPO} Altura de la cabeza del perfil de referencia = 0,5.d₁
 r_{PO} Radio de la cabeza del diente del perfil de referencia
 α_{PO} Ángulo del perfil de referencia

P_{PO} Reference profile pitch = 1.005 x chain pitch
 h_{PO} Reference profile Tooth height
 h_{aPO} Reference profile addendum height = 0.5.d₁
 r_{PO} Reference profile tooth addendum radius
 α_{PO} Reference profile angle

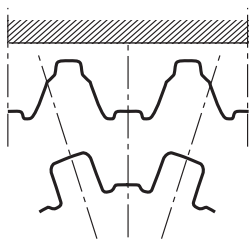
P_{PO} Pas du profil de référence = 1005-p chaîne
 h_{PO} Hauteur du dent du profil de référence
 h_{aPO} Hauteur de la tête du profil de référence = 0,5.d₁
 r_{PO} Rayon de la tête du dent du profil de référence
 α_{PO} Angle du profil de référence

| Perfil de referencia Reference profile Profil de référence | | | | Cadena correspondiente Chain Number Chaîne correspondante | | |
|--|----------|----------|----------|---|-----------------------------|---|
| Perfil núm. Profil nr. Profil num. | r_{PO} | P_{PO} | h_{PO} | Cadena núm. Chain nr. Chaîne num. | Paso Pitch Pas p | Diámetro del rodillo Roller diameter Diam. rouleau d_1 |
| 1 | 1,66 | 5,0250 | 3,0 | 03 B | 5 | 3,2 |
| 2 | 2,07 | 6,0300 | 3,5 | 04 B | 6 | 4 |
| 3 | 2,58 | 8,0400 | 5,0 | 05 B | 8 | 5 |
| 4 | 3,26 | 9,5726 | 5,7 | 06 B | 9,525 | 6,35 |
| 5 | 4,06 | 12,7635 | 7,9 | 08 A | 12,7 | 7,92 |
| | | | | 081 a 084 | | 7,75 |
| | | | | 085 | | 7,77 |
| 6 | 4,36 | 12,7635 | 7,5 | 08 B | 12,7 | 8,51 |
| 7 | 5,2 | 15,9544 | 9,8 | 10 A y 10 B | 15,875 | 10,16 |
| 8 | 6,16 | 19,1453 | 11,9 | 12 A | 19,05 | 11,91 |
| | | | | 12 B | | 12,07 |
| 9 | 8,09 | 25,5270 | 15,9 | 16 A y 16 B | 25,4 | 15,88 |
| 10 | 9,7 | 31,9088 | 19,9 | 20 A y 20 B | 31,75 | 19,05 |
| 11 | 11,31 | 38,2905 | 23,9 | 24 A | 38,1 | 22,23 |
| 12 | 12,92 | 38,2905 | 22,5 | 24 B | | 25,4 |
| 13 | 12,92 | 44,6723 | 27,8 | 28 A | 44,45 | 25,4 |
| 14 | 14,2 | 44,6723 | 27,8 | 28 B | | 27,94 |
| 15 | 14,52 | 51,0540 | 31,8 | 32 A | 50,8 | 28,58 |
| 16 | 14,84 | 51,0540 | 31,8 | 32 B | | 29,21 |
| 17 | 20,14 | 63,8175 | 39,7 | 40 A | 63,5 | 39,68 |
| | | | | 40 B | | 39,37 |
| 18 | 24,16 | 76,5810 | 47,7 | 48 A | 76,2 | 47,63 |
| 19 | 24,48 | 76,5810 | 47,7 | 48 B | | 48,26 |
| 20 | 27,37 | 89,3445 | 55,6 | 56 B | 88,9 | 53,98 |
| 21 | 32,19 | 102,1080 | 63,6 | 64 B | 101,6 | 63,5 |
| 22 | 36,68 | 114,8715 | 71,5 | 72 B | 114,3 | 72,39 |

VARIANTES PERFIL FRESAS MADRE PARA TALLADO DE EJES ESTRIADOS

Spline Shaft Hob Profile Types

Types de profil pour fraises mere à tailler les arbres cannelés

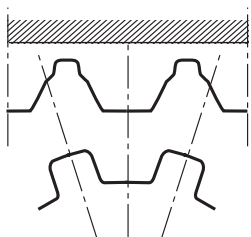


MA

PERFIL CON PROTUBERANCIAS Y CHAFLANES

Profile with lugs and chamfers

Profil avec protubérances et chanfreins



MB

PERFIL CON CHAFLANES Y SIN PROTUBERANCIAS

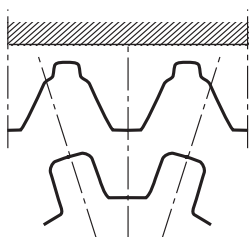
Profile with chamfers and without lugs

Profil avec chanfreins et sans protuberances

Para generar la parte activa del flanco del perfil, en ejes que permitan el redondeo del canto del fondo

For generating profile active flank at shafts which allows generating fillet at bottom

Pour créer la partie active du flanc du profils, sur des arbres qui permettent arrondir l'arête du fond



MC

PERFIL CON CHAFLANES Y SIN PROTUBERANCIAS

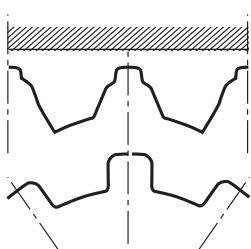
Profile with chamfers and without lugs

Profil avec chanfreins et sans protuberances

Para generar la altura total del flanco del perfil y obtener el fondo redondeado

For generating the total height profile flank and to obtain generated fillet at bottom

Pour créer l'hauteur totalle de l'arête du profil et avec un fond arrondi



MD

PERFIL PARA OBTENER CANTOS VIVOS EN EL FONDO DEL DIENTE

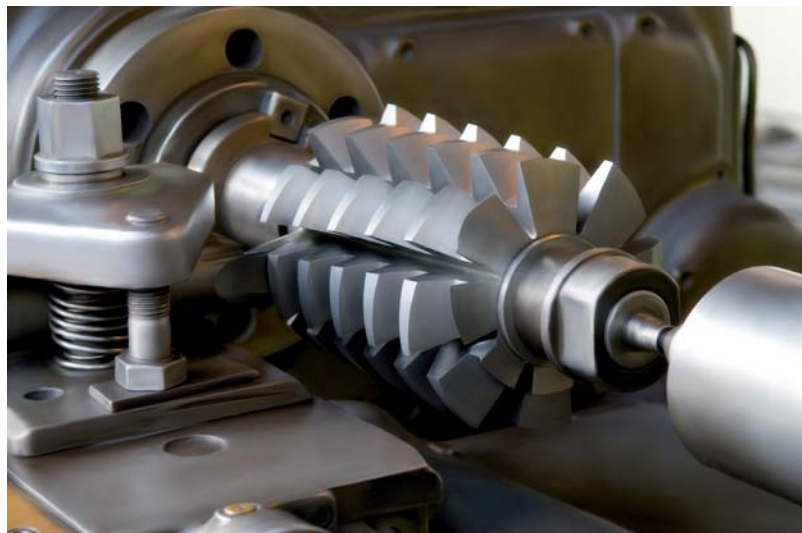
Profile to obtain squared edges at tooth bottom

Profil pour créer des arêtes vives sur le fond du dent

Solamente para fresas madres de posición fija

Only for hobs with fixed position

Seulement pour des fraise mères en position fixe



Las fresas madres para el tallado de ejes estriados se fabrican normalmente en ejecución con PERFIL RECTIFICADO

Spline shaft hobs are usually ground PROFILE MANUFACTURED

Les fraises mere à tailler les arbres cannelés sont fabriquées normalement en execution avec PROFIL RECTIFIÉ

La ejecución terminada a cuchilla solamente puede ser aconsejable en algunos trabajos de desbaste
Insert formed profile is only suitable for some roughing operations

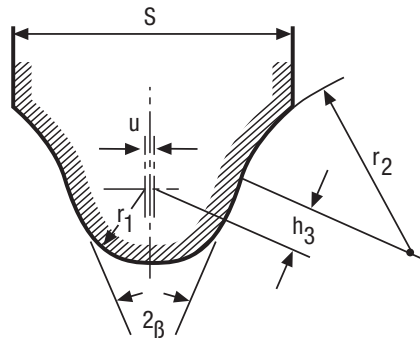
L'exécution terminée à lame seulement peut être recommandée pour des travaux d'ébauche spécifiques

PERFIL REFERENCIA EN FRESAS DISCO PARA CADENAS

Reference Profiles for Roller Chain Sprocket Cutters

Profils de référence sur fraises scies pour roués à chaînes

DIN-8198



Medidas en mm.
Dimensions in mm
Mesures en mm

| Cadena Chain Chaines | | | Perfil Profil Profil | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|---|----------------|----------------------------|----------------|----------------|----------------------------------|----------------|-----------------|----------------------------------|----------------|----------------|----------------------------------|------------------|----------------|----------------------------------|----------------|----------------|----------------------------------|----------------|----------------|----------------------------------|------|----------------|------|--|--|--|
| Paso Pitch Pas | Diám. rodillo Roller diameter Diam. rouleau | | I 2 β = 74° | | | | | II 2 β = 66° | | | | | III 2 β = 56° | | | | | IV 2 β = 47° | | | | | V 2 β = 38° | | | | |
| t | d ₁ | r ₁ | u | h ₃ | r ₂ | S mínima minim minimale | h ₃ | r ₂ | S mínima minim minimale | h ₃ | r ₂ | S mínima minim minimale | h ₃ | r ₂ | S mínima minim minimale | h ₃ | r ₂ | S mínima minim minimale | h ₃ | r ₂ | S mínima minim minimale | | | | | | |
| 6 | 4 | 2,04 | 0,12 | 1,2 | 4,8 | 7,5 | 1,2 | 4,8 | 7,4 | 1,2 | 4,8 | 7,3 | 1,2 | 4,8 | 7,1 | 1,4 | 2 | 7 | | | | | | | | | |
| 6,35 | 3,3 | 1,68 | 0,13 | 1 | 5,1 | 8,5 | 1 | 5,1 | 8,4 | 1 | 5,1 | 8,3 | 1 | 5,1 | 8,2 | 1,2 | 1,7 | 8,1 | | | | | | | | | |
| 8 | 5 | 2,55 | 0,16 | 1,5 | 6,4 | 9,8 | 1,5 | 6,4 | 9,8 | 1,5 | 6,4 | 9,6 | 1,5 | 6,4 | 9,5 | 1,8 | 2,5 | 9,2 | | | | | | | | | |
| 9,525 | 5 | 2,55 | 0,19 | 1,5 | 7,6 | 11,3 | 1,5 | 7,6 | 11,4 | 1,5 | 7,6 | 11,3 | 1,5 | 7,6 | 11,1 | 1,8 | 2,5 | 10,9 | | | | | | | | | |
| | 5,08 | 2,55 | | 1,5 | | 11,3 | 1,5 | | 11,4 | 1,5 | | 11,3 | 1,5 | | 11,1 | 1,8 | 2,5 | 10,9 | | | | | | | | | |
| | 6 | 3,06 | | 1,8 | | 11,7 | 1,8 | | 11,7 | 1,8 | | 11,5 | 1,8 | | 11,3 | 2,2 | 3 | 11 | | | | | | | | | |
| | 6,35 | 3,24 | | 1,9 | | 11,9 | 1,9 | | 11,8 | 1,9 | | 11,6 | 1,9 | | 11,4 | 2,3 | 3,2 | 11 | | | | | | | | | |
| 12,7 | 7,75*) | 4,05 | 0,25 | 2,4 | 10 | 15,6 | 2,4 | 10 | 15,6 | 2,4 | 10 | 15,4 | 2,4 | 10 | 15 | 2,9 | 4 | 14,6 | | | | | | | | | |
| | 7,94 | | | 2,6 | | 15,9 | 2,6 | | 15,7 | 2,6 | | 15,5 | 2,6 | | 15,1 | 3,1 | 4,3 | | | | | | | | | | |
| | 8,51 | | | 4,34 | | 3 | 12,7 | | 19,6 | 3 | | 12,7 | 19,5 | | 3 | 12,7 | 19,2 | | 3 | 12,7 | 18,8 | 3,7 | 5,1 | 18,3 | | | |
| 15,875 | 10,16 | 5,18 | 0,32 | 3 | 12,7 | 19,6 | 3 | 12,7 | 19,5 | 3 | 12,7 | 19,2 | 3 | 12,7 | 18,8 | 3,7 | 5,1 | 18,3 | | | | | | | | | |
| 19,05 | 11,9*) | 6,16 | 0,38 | 3,6 | 15,2 | 23,5 | 3,6 | 15,2 | 23,4 | 3,6 | 15,2 | 23 | 3,6 | 15,2 | 22,6 | 4,3 | 6 | 21,9 | | | | | | | | | |
| 12,07 | 4,8 | | | 24 | | 35,5 | 4,8 | | 24 | 36 | | 4,8 | 24 | | 35,5 | 4,8 | 24 | | 35 | 5,7 | 8 | 34,5 | | | | | |
| 25,4 | 15,88 | 8,1 | 0,51 | 4,8 | 20 | 31,5 | 4,8 | 20 | 31 | 4,8 | 20 | 31 | 4,8 | 20 | 30 | 5,7 | 8 | 29,5 | | | | | | | | | |
| (30) | | | 0,6 | | 24 | 35,5 | | 24 | 36 | | 24 | 35,5 | | 24 | 35 | | | 34,5 | | | | | | | | | |
| 31,75 | 19,05 | 9,7 | 0,64 | 5,7 | 25,5 | 39 | 5,7 | 25,5 | 38,5 | 5,7 | 25,5 | 38 | 5,7 | 25,5 | 37,5 | 6,9 | 9,5 | 36,5 | | | | | | | | | |
| 38,1 | 22,22 | 11,3 | 0,76 | 6,7 | 31 | 46 | 6,7 | 31 | 46 | 6,7 | 31 | 45,5 | 6,7 | 31 | 45 | 8 | 11 | 44 | | | | | | | | | |
| | 25,4 | 13,0 | | 7,6 | | 47,5 | 7,6 | | 47 | 7,6 | | 46,5 | 7,6 | | 45,5 | 9,2 | 13 | 44 | | | | | | | | | |
| 44,45 | 25,4 | 13,0 | 0,89 | 7,6 | 36 | 60 | 7,6 | 36 | 56,5 | 7,6 | 36 | 54,5 | 7,6 | 36 | 53 | 9,2 | 13 | 51,5 | | | | | | | | | |
| | 27,94 | 14,3 | | 8,4 | | 61,5 | 8,4 | | 57,5 | 8,4 | | 55,5 | 8,4 | | 53,5 | 10 | 14 | 52 | | | | | | | | | |
| 50,8 | 28,57*) 29,21 | 14,9 | 1 | 8,8 | 41 | 69 | 8,8 | 41 | 65 | 8,8 | 41 | 62,5 | 8,8 | 41 | 60,5 | 10,5 | 14,5 | 59 | | | | | | | | | |
| 57,15 | 35,71 | 18,3 | 1,2 | 10,7 | 46 | 78,5 | 10,7 | 46 | 74 | 10,7 | 46 | 71 | 10,7 | 46 | 69 | 12,9 | 18 | 67 | | | | | | | | | |
| 63,5 | 39,37*) | 20,2 | 1,3 | 11,8 | 51 | 87,5 | 11,8 | 51 | 82 | 11,8 | 51 | 79 | 11,8 | 51 | 76,5 | 14,2 | 20 | 74 | | | | | | | | | |
| | 39,68 | | | | | | | | | | | | | | | | | | 89 | | | | | | | | |
| 76,2 | 47,62*) | 24,6 | 1,5 | 14,5 | 61 | 105 | 14,5 | 61 | 98,5 | 14,5 | 61 | 95 | 14,5 | 61 | 92 | 17,4 | 24 | 89 | | | | | | | | | |
| | 48,26 | | | | | | | | | | | | | | | | | | | | | | | | | | |

Evítense en lo posible el tamaño entre paréntesis.

*) Para estos diámetros de rodillos sirven los perfiles del diámetro de rodillo inmediato superior de igual paso.

Cadenas, DIN 8180, DIN 8187, DIN 8188 y DIN 73232.

Ruedas de cadena para cadenas de casquillos y de rodillos, DIN 9196.

Try to avoid sizes in brackets

*) For these roller diameters it can be used upper roll diameter profiles with same pitch.

Chains DIN 8180, DIN 8187, DIN 8188, DIN 73232.

Sprocket wheel for roller chains DIN 9196.

Il faut éviter si possible les pas entre parenthèse.

*) Pour ces diamètres de rouleaux on emploie les profils du diamètre de rouleau immédiat avec le même pas.

Chaines, DIN 8180, DIN 8187, DIN 8188 y DIN 73232

Roues de chaînes pour chaînes de culots et rouleaux.

Aplicación

Application

Application

| Perfil Profil Profil | Juego de 5 piezas para v < 12 m/s. 5 pieces set for v < 12m/s. Jeu de 5 pièces pour v < 12 m/s. |
|----------------------------|--|
| I | 6 a 8 |
| II | 9 a 11 |
| III | 12 a 16 |
| IV | 17 a 29 |
| V | Más de 29 / More than 29 / Plus de 29 |

Nuestra fabricación normal se compone de juegos de 5 piezas (recuadro)

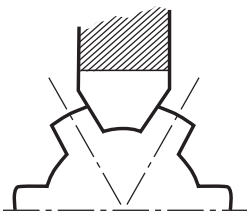
Our standar manufacturing set is 5 pieces (see table)

Notre fabrication normale est compose de 5 pièces (tableau)

VARIANTES PERFIL FRESAS DISCO PARA TALLADO DE EJES ESTRIADOS

Spline Shaft Single Cutter Profile Types

Types de profil pour fraises scies à tailler les arbres cannelés



A

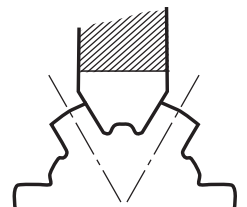
FRESA DE ACABADO

Finishing cutter Fraise finition

Sin chaflanes ni protuberancias

Without chamfers and lugs

Sans chanfreins ni protuberances



B

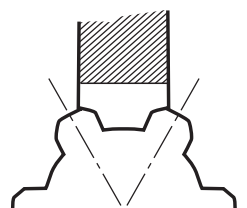
FRESA DE ACABADO O DESBASTE

Roughing or finishing cutter Fraise finition où ébauche

Con protuberancias y sin chaflanes

With lugs and without chamfers

Avec protuberances et sans chanfreins



C

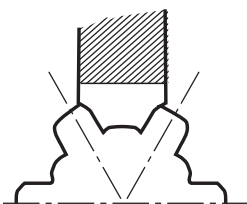
FRESA DE ACABADO

Finishing cutter Fraise finition

Con chaflanes y sin protuberancias

With chamfers and without lugs

Avec chanfreins et sans protuberances



D

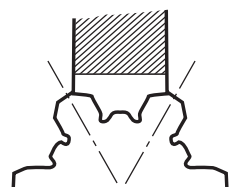
FRESA DE ACABADO O DESBASTE

Roughing or finishing cutter Fraise finition où ébauche

Con chaflanes y protuberancias

With chamfers and lugs

Avec chanfreins et protuberances



E

FRESA ESPECIAL PARA DESBASTE

Special cutter for roughing Fraise spéciale ébauche

Con protuberancia lateral para facilitar el rectificado y chaflanes

With chamfers and side lug to make easier grind operation.

Avec protuberance latérale pour faciliter le rectifié et les chanfreins



Estas fresas se fabrican normalmente en ejecución terminada a cuchilla y bajo demanda, pueden ser suministradas con perfil rectificado

These cutters are usually insert form relieved manufactured and upon request they can be supplied with ground profile

Ces fraises sont fabriquées normalement sur demande et peuvent être livrées avec profil rectifié

Estas fresas pueden ser suministradas en juegos, para fresar simultáneamente varios ejes

These cutters can be supplied in sets for milling several shafts simultaneously

Ces fraises peuvent être livrées en jeux, pour fraiser plusieurs arbres au même temps

El excedente que normalmente damos por flanco, en las fresas para desbaste es de 0,125 mm. (0,250 mm en espesor). Otras creces deben de indicarse expresamente

For standard manufacturing, stock per flank is 0.125 mm for roughing cutters (0.250 mm thick). Other stock values must be indicated with the order

L'excedent qu'on considère arête normalement pour les fraises ébauche est de 0.125 mm (0.25 mm d'épaisseur) D'autres données doivent s'indiquer expressément

BROCAS ESPECIALES

Special Drill Bits

Forets spéciaux

IZAR CUTTING TOOLS S.A.L.

Parque Empresarial Boroa 2B2
48340 AMOREBIETA (Bizkaia) - Spain

Tel. +34 94 630 02 43

Fax +34 94 630 05 42

E-mail ibeobide@izartool.com

izartool.com

Cliente

Customer

Client

Dirección

Address

Adresse

Contacto

Contact

Contact

E-mail

E-mail

E-mail

Fecha

Date

Date

Ciudad

Town

Ville

Teléfono

Phone

Téléphone

Fax

Fax

Fax

DENOMINACIÓN HERRAMIENTA

TOOL DENOMINATION

DÉNOMINATION DE L'OUTIL

Cantidad Requerida

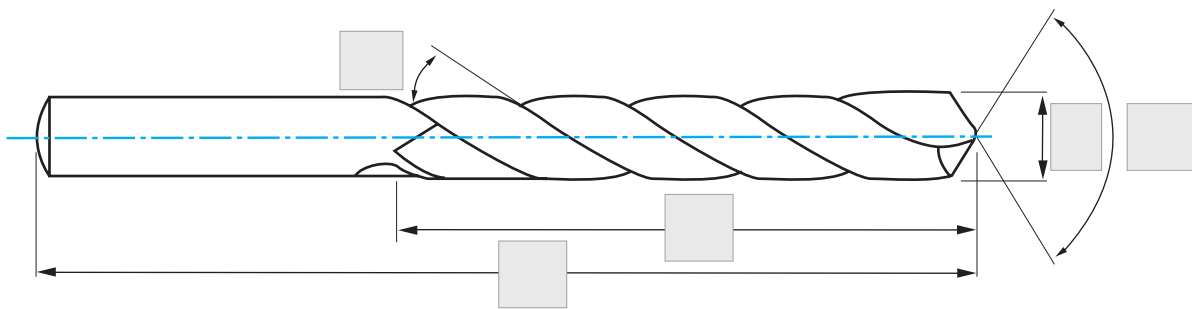
Requested Quantity

Quantité demandée

Similar a Ref. IZAR

Similar to IZAR Ref.

Similaire à ref. IZAR



FORMA DEL MANGO

SHANK TYPE

TYPE DE QUEUE



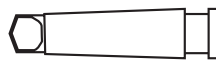
Liso
Flat
Plat

DIN-1809

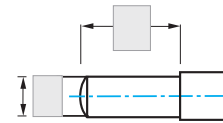


Lengüeta
Tang
Clavette

DIN-228



Cono Morse
Morse Taper
Cône morse



Rebajado
Reduced
Baissé

Otro
Another one
Autres

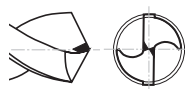
AGUZADO

SPLIT POINT

AFFUTAGE



Sin Aguzar
Without Split Point
Sans affuter



Tipo "A"
"A" Type
Type "A"



Tipo "C"
"C" Type
Type "C"



Tipo "U"
"U" Type
Type "U"

Otro
Another one
Autres

APLICACIÓN

APPLICATION

APPLICATION

Material a Trabajar

Material to Work

Matériel à travailler

Dureza / Resistencia a la Tracción

Hardness / Tensile Strength

Dureté / Resistance à la traction

MATERIAL PIEZA

TOOL MATERIAL

MATÉRIEL DE L'OUTIL

MD Integral
HM
Carbure

MD Plaquita
Carbide Tipped
Pointe carbure

HSSE 5% Co

HSS

Otro
Another one
Autres

ACABADO

FINISH

FINITION

Blanca
Bright Finish
Blanche

Negra
Blue Finish
Noir

Ambar
Gold Finish
Ambre

Otro
Another one
Autres

RECUBRIMIENTO

COATING

REVÊTEMENT

TIALSIN

CROMAX

TIN

Otro
Another one
Autres

FRESAS ESPECIALES

Special End Mills

Fraises spéciales

IZAR CUTTING TOOLS S.A.L.

Parque Empresarial Boroa 2B2
48340 AMOREBIETA (Bizkaia) - Spain
Tel. +34 94 630 02 43
Fax +34 94 630 05 42
E-mail ibeobide@izartool.com
izartool.com

Cliente

Customer
Client

Dirección

Address
Adresse

Contacto

Contact
Contact

E-mail

E-mail
E-mail

Fecha

Date
Date

Ciudad

Town
Ville

Teléfono

Phone
Téléphone

Fax

Fax
Fax

DENOMINACIÓN HERRAMIENTA

TOOL DENOMINATION

DÉNOMINATION DE L'OUTIL

Cantidad Requerida

Requested Quantity

Quantité demandée

Similar a Ref. IZAR

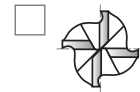
Similar to IZAR Ref.

Similaire à ref. IZAR

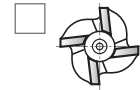
N° Dientes

Tooth N°

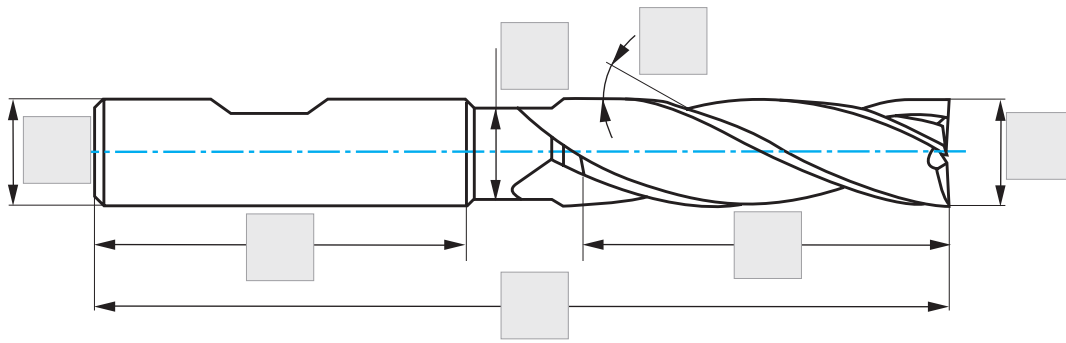
N° de dents



Corte al Centro
Center-Cutting
Coupe au centre



Sin Corte al Centro
Non Center-Cutting
Sans coupe au centre



FORMA DEL MANGO SHANK TYPE TYPE DE QUEUE



DIN 1835 E (PMX-HSSE-HSS)



DIN 1835 B (PMX-HSSE-HSS)



DIN 1835 A (PMX-HSSE-HSS)

DIN 6535 HE (MD-HM-Carbure)

DIN 6535 HB (MD-HM-Carbure)

DIN 6535 HA (MD-HM-Carbure)

Otro
Another one
Autres

GEOMETRÍA DEL PERFIL

PROFILE GEOMETRY

GÉOMÉTRIE DU PROFIL



Acabado N
Finishing N
Finition N



Desbaste Grueso NR
Coarse Roughing NR
Ébauche NR



Desbaste Fino NR-F
Fine Pitch Roughing NR-F
Ébauche Pas Fin NR-F



Desbaste Medio NF
Roughing & Finishing NF
Semi-Ébauche NF

Otro
Another one
Autres

GEOMETRÍA FRONTAL

FRONT GEOMETRY

GÉOMÉTRIE FRONTALE



Recta
Straight
Droite



Chafán
Chamfer
Chanfrein



Radio
Radius
Rayou



Radial
Radial
Fémisphérique

Otro
Another one
Autres

APLICACIÓN APPLICATION APPLICATION

Material a Trabajar

Material to Work

Matériel à travailler

Dureza / Resistencia a la Tracción

Hardness / Tensile Strength

Dureté / Resistance à la traction

MATERIAL PIEZA

TOOL MATERIAL

MATÉRIEL DE L'OUTIL

MD
HM
Carbure

PMX

HSSE 8% Co

HSS

Otro
Another one
Autres

RECUBRIMIENTO

COATING

REVÊTEMENT

Blanca
Bright
Blanche

TIALSIN

TIALN-TOP

CROMAX

Otro
Another one
Autres

REAFILADO Y RECUPERACIÓN HERRAMIENTAS

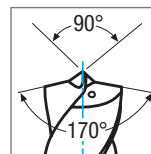
Tool Resharpener & Recovery

Reaffûtage et récupération des outils

BROCAS HSS M. CÓNICO REFRIGERACIÓN INTERIOR PUNTA 170°

170° Point Internal Cooling Taper Shank HSS Drill Bits

Forets HSS queue cône morse réfrigération intérieur pointe 170°



| Ø | Cantidad Mínima Minimum Quantity Quantité minimum |
|-------|---|
| 18,00 | 1 |
| 20,00 | 1 |
| 22,00 | 1 |
| 24,00 | 1 |
| 26,00 | 1 |
| 28,00 | 1 |
| 30,00 | 1 |
| 32,00 | 1 |

BROCAS HSS M. CÓNICO PUNTA 118°

118° Point Taper Shank HSS Drill Bits

Forets HSS queue cône morse pointe 118°



| Ø | Cantidad Mínima Minimum Quantity Quantité minimum |
|-------|---|
| 13,00 | 1 |
| 15,00 | 1 |
| 18,00 | 1 |
| 20,00 | 1 |
| 22,00 | 1 |
| 24,00 | 1 |

| Ø | Cantidad Mínima Minimum Quantity Quantité minimum |
|-------|---|
| 26,00 | 1 |
| 28,00 | 1 |
| 30,00 | 1 |
| 32,00 | 1 |

Ø > 32 bajo demanda / upon request / sur demande

BROCAS MD CON/SIN REFRIGERACIÓN INTERIOR

Solid Carbide Drill Bits with/without Internal Cooling

Forets carbure avec/sans réfrigération intérieur



| Ø | Cantidad Mínima Minimum Quantity Quantité minimum |
|-------|---|
| 6,00 | 10 |
| 8,00 | 10 |
| 10,00 | 10 |
| 12,00 | 10 |
| 14,00 | 10 |
| 16,00 | 5 |
| 18,00 | 5 |
| 20,00 | 5 |

REAFILADO Y RECUPERACIÓN HERRAMIENTAS

Tool Resharpening & Recovery

Reaffûtage et récupération des outils

FRESAS METAL DURO (2-3-4 Z)

Solid Carbide End Mills (2-3-4 Z)

Fraises carbure (2-3-4 Z)



| Ø | Cantidad Mínima Minimum Quantity Quantité minimum |
|-------|---|
| 10,00 | 10 |
| 12,00 | 10 |
| 14,00 | 10 |
| 16,00 | 5 |
| 18,00 | 5 |
| 20,00 | 5 |
| 25,00 | 5 |

FRESAS ESFÉRICAS METAL DURO

Solid Carbide Ball Nose End Mills

Fraises sphériques carbure



| Ø | Cantidad Mínima Minimum Quantity Quantité minimum |
|-------|---|
| 10,00 | 10 |
| 12,00 | 10 |
| 14,00 | 10 |
| 16,00 | 5 |
| 18,00 | 5 |
| 20,00 | 5 |
| 25,00 | 5 |

FRESAS MADRE / AGUJERO BAJO DEMANDA

Gear Hobs / Milling Cutters upon request

Fraises mère / Fraises à tailler sur demande



Suplementos
Extra Charges
Suppléments

Corte Puntas Herramienta por Desgaste
Worn out Tool Point Cutting
Coupe des pointes d'outil pour l'usure

+30%

Cantidad Inferior a la Mínima indicada
Lower Quantity than showed Minimum
Quantité inférieure

+10%

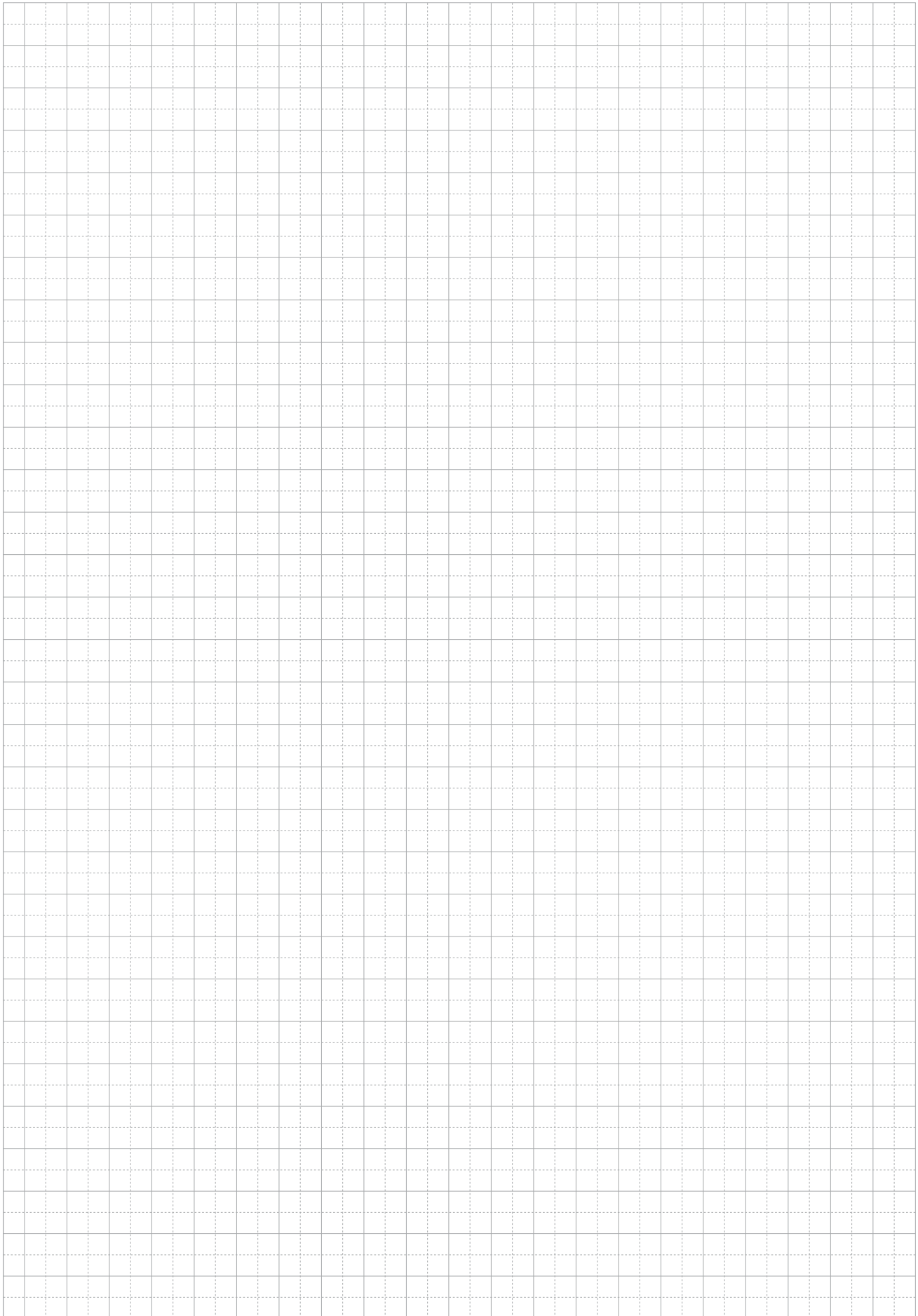
Plazo
Delivery Date
Délai

Días a partir de recibir el material
Days from getting the material
Jours depuis la reception del materiel

10-12

NOTAS
Notes

A large grid of graph paper for taking notes. The grid consists of 20 columns and 40 rows of small squares, with a larger margin at the top for the header.



CONDICIONES GENERALES VENTA

General Selling Conditions

Conditions générales de vente

1. CONDICIONES DE PAGO

Giro a 30 días f.f. NETO.

2. VENCIMIENTOS FIJOS

En caso de fechas fijas de pago que rebasen los plazos estipulados giraremos a la fecha fijada pero inmediata anterior, según corresponda, siendo el plazo máximo en todo caso de 60 días, fecha factura o envío.

3. SEGURO

Las mercancías viajarán por exclusiva cuenta y riesgo del comprador, siendo siempre a cargo del mismo la prima del seguro que se realice, en los casos que el cliente desee asegurarla.

4. RECLAMACIONES

Se atenderán aquellas reclamaciones que se planteen dentro de los 8 días siguientes a la recepción del material no aceptando ninguna devolución sin el previo conocimiento de IZAR Cutting Tools S.A.L.

5. DEVOLUCIONES

Sólo se aceptarán las devoluciones por defecto de fabricación o error atribuible a IZAR. No se aceptarán devoluciones sin previa autorización de IZAR o de nuestro delegado o representante. Las devoluciones serán a portes pagados e irán acompañadas de la factura original. No se admitirán devoluciones procedentes de promociones ni en estuches defectuosos. Toda devolución originará una nota de cargo por el 20 % de su valor en concepto de manipulación e inspección de control de calidad.

6. CONDICIONALIDAD

La aceptación de las mercancías sin el rechazo inmediato por parte del comprador supone la aprobación de estas condiciones generales de venta y su modificación sólo tendrá validez si consta por escrito la conformidad de IZAR.

7. I.V.A.

Los precios están sujetos al Impuesto sobre el Valor Añadido, siendo a cargo del cliente el recargo correspondiente.

8. GARANTÍAS

Todas las herramientas están garantizadas contra cualquier defecto de fabricación y materiales, sin responsabilizarse IZAR de la utilización inadecuada de las mismas. En todo caso, nuestra responsabilidad estará limitada al valor de la herramienta suministrada.

Nos reservamos el derecho de modificar, sin previo aviso, las dimensiones, calidades del acero y en general todas las características técnicas de las herramientas. No será sustituida ninguna herramienta sin el informe previo de nuestro Departamento de Control de Calidad.

9. PORTES

Se suministrarán con franquicia de portes todos aquellos envíos cuyo valor neto de factura supere los 180 € netos por cada envío en territorio peninsular e Islas Baleares; 300 € en Canarias, Ceuta, Melilla, Andorra y Portugal. En cualquier caso IZAR se reserva el derecho de utilizar el medio de envío más económico.

En las capitales donde IZAR tenga establecidos depósitos de distribución, esta cláusula se aplicará para las reexpediciones a otras poblaciones de la provincia.

10. IMPORTE MÍNIMO POR PEDIDO

Queda establecido como pedido mínimo la cantidad de 60 € netos. Los pedidos inferiores se cobrarán al contado o por reembolso.

11. RESERVA DE DOMINIO

Nuestras ventas se consideran siempre bajo la condición de Reserva de dominio según el artículo 1.506 C.C. hasta que se haya hecho efectivo íntegramente el pago de todo lo adeudado.

12. JURISDICCIÓN COMPETENTE

Para cualquier discrepancia acerca de la interpretación de estas condiciones o litigio por razón de incumplimiento por cualquiera de las partes se someten ambas al fuero de los Juzgados y Tribunales de Bilbao, con renuncia al que pudiera corresponderles.

13. SISTEMA DE REDONDEO DEL EURO (2 DECIMALES)

IZAR aplica en sus sistemas informáticos la normativa legal vigente en esta materia.

1. CONDITIONS DE PAIEMENT

Les paiements s'effectuent à 30 jours.

2. ECHEANCES

Quelle que soit la date fixée pour le paiement des factures, celui-ci doit être effectué au maximum 60 jours après l'envoi ou la date de facture.

3. ASSURANCE

Le risque lié à l'envoi des marchandises est assumé exclusivement par l'acheteur, toute latitude lui étant laissée s'il désire les assurer.

4. RECLAMATIONS

Seront prises en compte les réclamations portées à la connaissance d'IZAR Cutting Tools S.A.L. dans un délai de 8 jours suivant la réception des marchandises. Aucun retour ne sera accepté si cette condition préliminaire n'est pas satisfaite.

5. RETOURS

Seront acceptés les retours de marchandises pour défaut de fabrication ou erreur imputable à IZAR. Ne sera accepté aucun retour de marchandises sans accord préalable de notre part ou de notre représentant.

Les retours s'effectueront port payé et seront accompagnés de la facture originale. En aucun cas ne seront acceptés les retours de marchandises liées à des promotions ou en emballages defectueux. Les avoirs seront minorés de 20% de la valeur de la marchandise pour manipulation et inspection du contrôle de qualité.

6. CONDITIONNALITE

L'acceptation des marchandises de la part de l'acheteur implique l'acceptation de ces conditions générales de vente et leur modification ne sera valable qu'après approbation écrite de la part d'IZAR.

7. T.V.A.

Les prix ne sont pas assujettis à la Taxe sur la Valeur Ajoutée.

8. GARANTIES

Tous les outils sont garantis contre les défauts de fabrication, IZAR ne pouvant en aucun cas être rendu responsable en cas d'utilisation inadéquate de ceux-ci. En tout état de cause, notre responsabilité se limitera à la valeur de l'outil fourni.

Nous nous réservons le droit de modifier, sans information préalable, les dimensions, qualités d'acier et en général toutes les caractéristiques techniques des outils. Aucun outil ne sera remplacé sans l'avis préalable de notre département de contrôle de qualité.

9. PORTS

Seront expédiées en franco de port en France Métropolitaine toutes les commandes dont le montant net dépasse ou est égal à 300 €. IZAR se réserve le droit d'utiliser le moyen de transport le plus économique.

10. MONTANT MINIMUM DES COMMANDES

Le montant minimum des commandes est de 60 € nets.

11. RESERVE DE PROPRIETE

IZAR conserve tous les droits de propriété sur ses ventes jusqu'au paiement intégral des sommes dues.

12. JURIDICTION COMPETENTE

Tout litige relatif à l'interprétation de ces conditions ou au manquement de l'une des parties à ses obligations est de la compétence du Tribunal de Commerce de Bilbao.

13. ARRONDI DE L'EURO (2 DECIMALES)

IZAR utilise pour son système informatique la norme légale en vigueur sur ce sujet.

CONDICIONES CORTE BROCAS

Drill Bit Cutting Conditions

Conditions coupe forets

Ref. **8400**



| Material | | Vc (m/min) | Avances f/rev. (mm/rev) - Feed - Pas | | | | | | |
|----------|------|------------|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | | ALTIN | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 14 |
| P | P.1 | 90-110 | 0,090 | 0,140 | 0,200 | 0,240 | 0,290 | 0,300 | 0,340 |
| | P.2 | 40-80 | 0,060 | 0,090 | 0,120 | 0,140 | 0,160 | 0,200 | 0,220 |
| | P.3 | 30-40 | 0,040 | 0,050 | 0,070 | 0,090 | 0,100 | 0,140 | 0,160 |
| | P.4 | 15-30 | 0,035 | 0,050 | 0,060 | 0,062 | 0,070 | 0,075 | 0,080 |
| | P.5 | 40-70 | 0,030 | 0,050 | 0,060 | 0,062 | 0,070 | 0,075 | 0,080 |
| M | | 35-45 | 0,045 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |
| K | K.1 | 40-100 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,320 |
| | K.2 | 40-60 | 0,080 | 0,120 | 0,160 | 0,200 | 0,240 | 0,260 | 0,280 |
| S | | 30-40 | 0,040 | 0,060 | 0,080 | 0,100 | 0,120 | 0,160 | 0,180 |
| N | N.1 | 50-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.2 | 50-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.3 | 80-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.4 | 80-300 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |
| | N.5 | 60-150 | 0,090 | 0,140 | 0,200 | 0,240 | 0,280 | 0,300 | 0,340 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times f$$

Ejemplo Recomendaciones Iniciales.

- Vc: Velocidad de corte (m/min)
- D ø: Diámetro de broca (mm)
- f: Avance por revolución (mm)
- r.p.m.: Revoluciones por minuto
- Vf: Avance (mm/min)
- π: 3,1416 mm

Initial Recommendation Example

- Vc: Cutting Speed (m/min)
- D ø: Diameter of the drills (mm)
- f: Feed per revolution (mm)
- r.p.m.: Revolution per minute
- Vf: Feed (mm/min)
- π: 3,1416 mm

Conditions initiales conseillées

- Vc: Vitesse de coupe (m/min)
- D ø: Diametre foret (mm)
- f: Avance par tour (mm)
- r.p.m.: Tours par minute
- Vf: Avance (mm/min)
- π: 3,1416 mm

1° Determinar el material a trabajar.
Por ejemplo, Acero Inoxidable del tipo P.5. (ver pág. 9)

1° Choose working material.
For example, Stainless Steel of the group P.5 (see page 9)

1° Déterminer le matériel à usiner.
Par exemple acier INOX du groupe P.5 (voir page 9)

2° Determinar un valor intermedio de Vc.
Por ejemplo, 40-70 (55)

2° Please choose a value in the middle for Vc.
For example, 40-70 (55)

2° Déterminer une valeur en moyenne de Vc.
Par exemple, 40-70 (55)

3° Determinar f según diámetro.
Para Ø 8 → f=0,060

3° Choose f according to diameter.
For Ø 8 → f=0,060

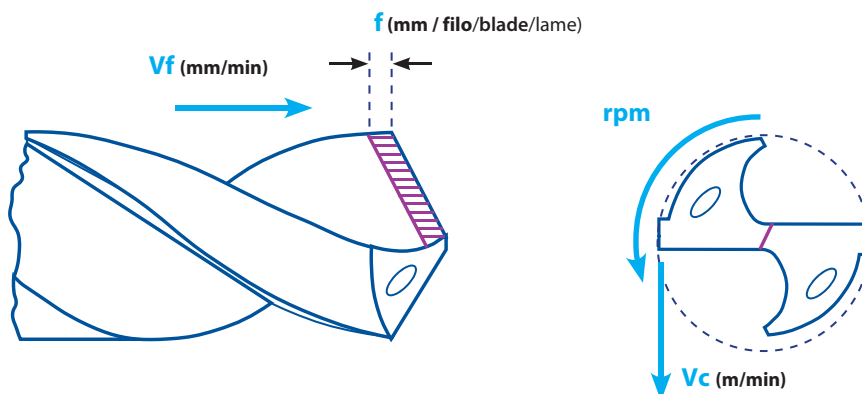
3° Déterminer f selon diamètre.
Pour Ø 8 → f=0,060

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad r.p.m. = \frac{55 \times 1.000}{3,14 \times 8} = 2189,49 \quad Vf = r.p.m. \times f = 2189,49 \times 0,060 = 131,37 \text{ mm/min.}$$

Nota: En las tablas hay dos valores comunes para todas las operaciones: π (3,14) y 1000.

Note: In the tables there are two common values for all operations: π (3,14) & 1000.

Note: Dans les tableaux il y a deux valeurs communes pour toutes les opérations: π (3,14) y 1000

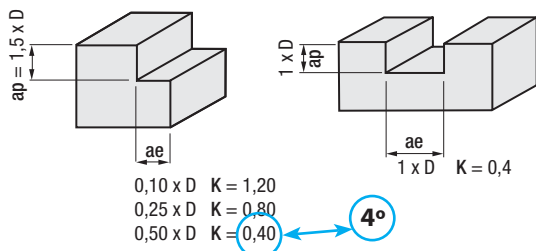


CONDICIONES CORTE FRESAS

End Mill Cutting Conditions

Conditions coupe fraises

Ref. **9406**



| Material | | Vc (m/min) | Avances fz/rev. (mm/z) - Feed - Pas | | | | | | | |
|----------|-------------|------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Grupo | Sub. | CROMAX | Ø 2 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
| P | P.2 | 112-150 | 0,018 | 0,030 | 0,040 | 0,056 | 0,070 | 0,090 | 0,112 | 0,140 |
| | P.3 | 60-130 | 0,015 | 0,027 | 0,036 | 0,050 | 0,056 | 0,070 | 0,084 | 0,105 |
| | P.5 | 100-130 | 0,011 | 0,019 | 0,025 | 0,035 | 0,035 | 0,056 | 0,080 | 0,100 |
| M | | 50-80 | 0,015 | 0,027 | 0,036 | 0,049 | 0,049 | 0,070 | 0,070 | 0,080 |
| K | K.1 | 80-120 | 0,018 | 0,030 | 0,040 | 0,056 | 0,077 | 0,091 | 0,112 | 0,140 |
| | K.2 | 80-100 | 0,018 | 0,030 | 0,040 | 0,056 | 0,077 | 0,091 | 0,112 | 0,140 |
| S | Ti6Al44V | 70-90 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,065 |
| | Inconel 718 | 100-130 | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,065 |
| N | N.1 | 140-350 | 0,020 | 0,039 | 0,051 | 0,070 | 0,084 | 0,105 | 0,112 | 0,175 |
| | N.2 | 140-350 | 0,020 | 0,039 | 0,051 | 0,070 | 0,084 | 0,105 | 0,112 | 0,175 |

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

$$Vf (mm/min.) = r.p.m. \times Z \times fz \times K$$

K = Coeficiente corrección
Correction coefficient
Coefficient correction

Ejemplo Recomendaciones Iniciales.

- Vc: Velocidad de corte (m/min)
- D ø: Diámetro de fresa (mm)
- Z: Número de dientes
- fz: Avance por diente y revolución (mm)
- K: Factor de corrección
- ae: Profundidad de corte axial (mm)
- ap: Profundidad de corte radial (mm)
- r.p.m.: Revoluciones por minuto
- Vf: Avance (mm/min)
- π: 3,1416

Initial Recommendation Example

- Vc: Cutting Speed (m/min)
- D ø: Diameter of the End Mill (mm)
- Z: Number of teeth
- fz: Feed per tooth and Rev (mm)
- K: Correction Coefficient
- ae: Axis cut depth (mm)
- ap: Radial Cutting Depth (mm)
- r.p.m.: Revolution per minute
- Vf: Feed per minute (mm/min)
- π: 3,1416 mm

Conditions initiales conseillées

- Vc: Vitesse de coupe (m/min)
- D ø: Diamètre fraise (mm)
- z: Number of teeth
- fz: Avance par dent et tour (mm)
- K: Coefficient de Correction
- ae: Profondeur coupe axiale
- ap: Profondeur coupe radiale (mm)
- r.p.m.: Tours par minute
- Vf: Avance par minute (mm/min)
- π: 3,1416 mm

- 1° Determinar el material a trabajar.**
Por ejemplo, Acero Inoxidable del tipo P.5. (ver pág. 9)
- 2° Determinar un valor intermedio de Vc.**
Por ejemplo, 100-130 (115)
- 3° Determinar fz según diámetro.**
Para Ø 16 → f=0,080
- 4° Determinar factor K en función de ae.**
Por ejemplo, para ae: 0,5xD → K=0,40

- 1° Choose working material.**
For example, Stainless Steel of the group P.5 (see page 9)
- 2° Please choose a value in the middle for Vc.**
For example, 100-130 (115)
- 3° Choose fz according to diameter.**
For Ø 16 → f=0,080
- 4° Choose K value depending on the ae.**
For example, for ae: 0,5xD → K=0,40

- 1° Déterminer le matériel à usiner.**
Par exemple acier INOX du groupe P.5 (voir page 9)
- 2° Déterminer une valeur en moyenne de Vc.**
Par exemple, 100-130 (115)
- 3° Déterminer fz selon diamètre.**
Pour Ø 16 → f=0,080
- 4° Déterminer le facteur K en fonction de ae.**
Par exemple, pour ae: 0,5xD → K = 0,40

$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi} \quad r.p.m. = \frac{115 \times 1.000}{3,14 \times 16} = 2289,01 \quad Vf = r.p.m. \times Z \times fz \times K = 2289,01 \times 5 \times 0,080 \times 0,40 = 366,24 \text{ mm/min.}$$

Nota: En las tablas hay 2 valores comunes para todas las operaciones: π (3,14) y 1000.

Note: In the tables there are two common values for all operations: π (3,14) & 1000

Note: Dans les tableaux il y a deux valeurs communes pour toutes les opérations: π (3,14) y 1000

Importante: Condiciones de trabajo para prolongar la vida de la herramienta:

- Para series largas, reducir el avance un 50%
- Cuando la fresa taladra, reducir el avance un 50%

Important: Work conditions for a longer life of the End Mill:

- For long length, reduce feed to 50%
- When the end mill is drilling, reduce feed to 50%

Important: Conditions de travail pour augmenter la vie de l'outil:

- Pour séries longues, réduire l'avance un 50%
- Quand la fraise perce, réduire l'avance un 50%

INFORMACIÓN TÉCNICA SOBRE TALADRADO

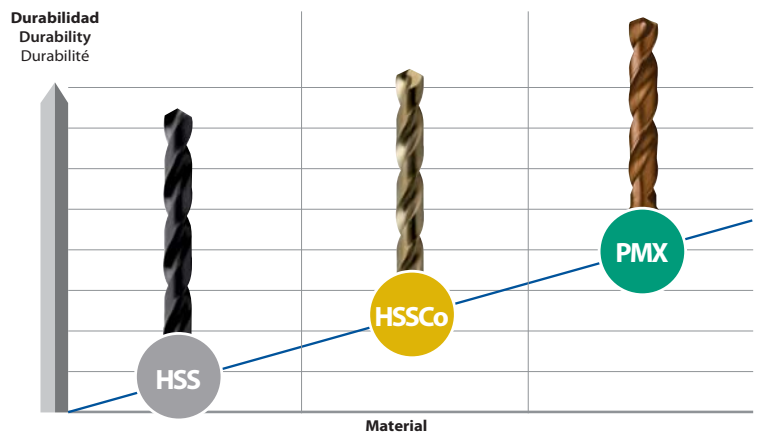
Technical Information for Drilling
Informations techniques sur Perçage

TIPOS DE BROCAS - Drill Bit Types - Types de forets

| Tipo - Type | N | H | W | S Parabólico Parabolic Parabolique | Gran Rigidez Big rigidity Grande rigidité |
|--|--|---|---|---|---|
| Alma Core Noyau | Normal Normal Normal | Pequeña Small Petite | Pequeña Small Petite | Grande o Pequeña Big or Small Gros ou petit | Grande Big Petit |
| Ángulo de Hélice Helix Angle Angle d'hélice | Standard (30°) Standard (30°) Standard (30°) | Pequeño (12-16°) Small (12-16°) Petit (12-16°) | Alto (35°-40°) High (35°-40°) Haut (35°-40°) | Alto (35°-40°) High (35°-40°) Haut (35°-40°) | Medio (20°-35°) Medium (20°-35°) Moyen (20°-35°) |
| Ángulo en la Punta Point Angle Angle de pointe | Standard Standard Standard (118° ó/or/ou 120°) | Standard (118°-120°) ó Grande or Big/ou gros (130°) | Grande (130°) Big (130°) Gros (130°) | Standard (118°-120°) ó Grande or Big/ou gros (130°) | Grande (130°) Big (130°) Gros (130°) |
| Uso Use Usage | Materiales Férricos, Fundición Ferrous materials, Cast Iron Matériaux ferreux, Fonte | Materiales Viruta Corta, Bronce, Latón Short Chipping Materials, Bronze, Brass Matériaux à copeaux courts, bronze, laiton | Materiales Viruta Larga, Aleaciones de Aluminio, Cobre Long Chipping Materials, Aluminum Alloys, Copper Matériaux à copeaux longs, alliages d'aluminium, cuivre | Materiales Viruta Larga, Agujeros profundos Long Chipping Materials, Deep Holes Matériaux à copeaux longs, Troux profonds | Materiales difíciles de mecanizar, Inox, Resistentes al calor, Aceros para muelles Difficult-to-machine Materials, Stainless Steel, Heat-resistant, Spring Steel Matériaux difficiles à usiner, acier inoxydable, résistant à la chaleur, acier à ressort |

MATERIAL DE CORTE-GRADOS DE CALIDAD-ACEROS RÁPIDOS Cutting Material-Quality Grades-HSS

Matériau de coupe-Degrés de qualité-Aciers rapides

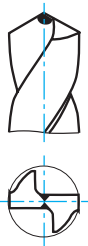


TIPOS DE AFILADOS COMPLEMENTARIOS NORMALIZADOS (Ejecución bajo demanda)

Types of Standardized Complementary Sharpening (Execution on request)

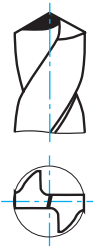
Types d'affûtage complémentaire normalisé (Exécution sur demande)

FORMA Shape Forma **A**



Afilado con espesor de núcleo aguzado Split Point Sharpening Affûtage du point en croix

FORMA Shape Forma **B**



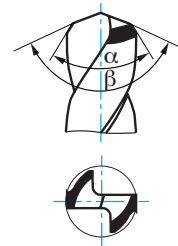
Afilado con espesor de núcleo aguzado y perfil corregido Split Point & Corrected Edge Sharpening Affûtage du point en croix et lèvres corrigées

FORMA Shape Forma **C**



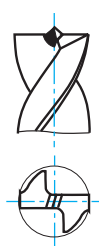
Afilado en cruz Split Point Affûtage en croix

FORMA Shape Forma **D**



Afilado para fundición gris Grey Cast Iron Sharpening Affûtage pour le fonte gris

FORMA Shape Forma **E**



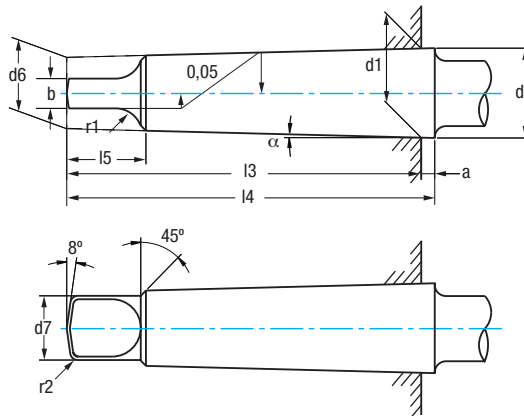
Afilado con punta de centrado Centering Point Sharpening Affûtage avec une pointe de centrage

INFORMACIÓN TÉCNICA SOBRE TALADRADO

Technical Information for Drilling
Informations techniques sur Perçage

DIMENSIONES DE CONO MORSE CON CHAVETA DIN-228

Morse Taper Dimensions with DIN-228 Slot - Dimensions du cône morse avec rainure DIN-228



Dimensiones en mm - Dimensions in mm - Dimensions en mm

| Designación del tamaño Size designation Désignation de la taille | Adelgazamiento Undercutting Amincissant | α | a | b h 13 | d ₁ | d ₂ ≈ | d ₆ ≈ | d ₇ max | l ₃ max | l ₄ max | l ₅ max | r ₁ | r ₂ | |
|--|---|--------------------|------------|-----------|----------------|---------------------|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------|----------------|-----|
| Cono Morse | 0 | 1:19,212 = 0,05205 | 1° 29' 27" | 3 | 3,9 | 9,045 | 9,2 | 6,1 | 6 | 56,5 | 59,5 | 10,5 | 4 | 1 |
| | 1 | 1:20,047 = 0,04988 | 1° 25' 43" | 3,5 | 5,2 | 12,065 | 12,2 | 9 | 8,7 | 62 | 65,5 | 13,5 | 5 | 1,2 |
| Morse Taper | 2 | 1:20,020 = 0,04995 | 1° 25' 50" | 5 | 6,3 | 17,780 | 18 | 14 | 13,5 | 75 | 80 | 16 | 6 | 1,6 |
| | 3 | 1:19,922 = 0,05020 | 1° 26' 16" | 5 | 7,9 | 23,825 | 24,1 | 19,1 | 18,5 | 94 | 99 | 20 | 7 | 2 |
| Cône morse | 4 | 1:19,254 = 0,05194 | 1° 29' 15" | 6,5 | 11,9 | 31,267 | 31,5 | 25,2 | 24,5 | 117,5 | 124 | 24 | 8 | 2,5 |
| | 5 | 1:19,002 = 0,05263 | 1° 30' 26" | 6,5 | 15,9 | 44,399 | 44,7 | 36,5 | 35,7 | 149,5 | 156 | 30 | 10 | 3 |
| | 6 | 1:19,180 = 0,05214 | 1° 29' 36" | 8 | 19 | 63,348 | 63,8 | 52,4 | 51 | 210 | 218 | 44 | 13 | 4 |

NORMAS DE BROCAS - Drill Bit Norms - Normes des forets

DIN-1897

Extra-Corta / Stub / Extra-courte



DIN-338

Corta / Jobber / Courte



DIN-340

Larga / Long / Longue



DIN-1869

Extra Larga / Extra Long / Extra-longue



DIN-345

Corta / Jobber / Courte



DIN-341

Larga / Long / Longue



DIN-1870

Extra Larga / Extra Long / Extra-longue



*

Escoger la longitud de la broca teniendo en cuenta la longitud mínima necesaria para el desahogo de viruta

Choose the length of the drill bit taking into account the minimum length necessary for chip relief

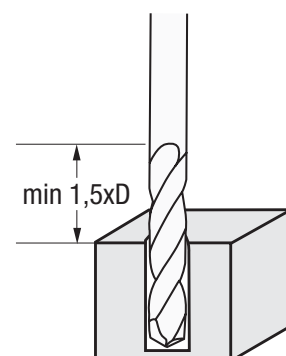
Choisir la longueur du foret en tenant compte de la longueur minimale nécessaire au dégagement des copeaux

*

Desahogo mínimo

Minimum relief

Dégagement minimal



INFORMACIÓN TÉCNICA SOBRE ROSCADO

Technical Information for Threading

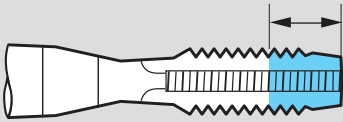
Informations techniques sur filetage

TIPO DE ENTRADA EN MACHOS

Chamfer Type of the Threading Taps - Type d'entrée dans tarauds

Forma A Form

6 - 8 hilos-threads-filets



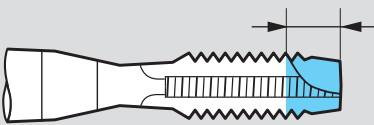
- Chaflán de entrada largo, normalmente para agujeros pasantes y poco profundos
- Bajo demanda

- Long chamfer, usually for shallow through-holes
- Upon demand

- Chanfrein d'entrée long, généralement pour les trous traversants et peu profonds
- Sur demande

Forma B Form

3,5 - 5 hilos-threads-filets



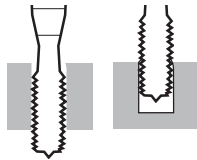
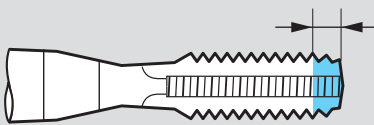
- Entrada de longitud media
- Adecuado para agujeros pasantes
- El más estándar en los machos rectos con entrada GUN

- Medium-length chamfer
- Suitable for through-holes
- Typical for spiral point (GUN) straight taps

- Entrée de longueur moyenne
- Apte pour les trous traversants
- Le plus standard des tarauds droits avec entrée GUN

Forma C Form

2 - 3 hilos-threads-filets



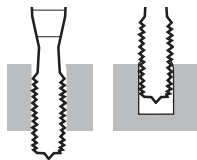
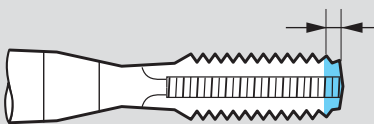
- Entrada corta
- Agujeros pasantes y ciegos
- Estándar en machos helicoidales para agujeros ciegos

- Short-length chamfer
- Through holes and blind holes
- Typical for spiral flute taps of blind holes

- Entrée courte
- Trous traversants et borgnes
- Standard des tarauds hélicoïdaux pour trous borgnes

Forma E Form

1,5 - 2 hilos-threads-filets



- Entrada muy corta
- Agujeros ciegos con poco espacio en el fondo
- Bajo demanda

- Extra short chamfer
- Blind holes with little run-out length
- Upon demand

- Entrée très courte
- Trous borgnes avec peu d'espace dans le fond
- Sur demande

Nota:

Cuanto más larga sea la entrada, la presión en esta es menor, y en general los machos tendrán mayor vida de uso. Asimismo en los machos de entrada larga las virutas son más finas, y en las de entrada corta obtendremos virutas más gruesas

Note:

The pressure is lower on the long-chamfers and generally the long-chamfer taps have a higher tool-life. Normally, the longer the chamfer, the thinner the chips. So we will get thick chips when we use short-chamfer taps

Remarque :

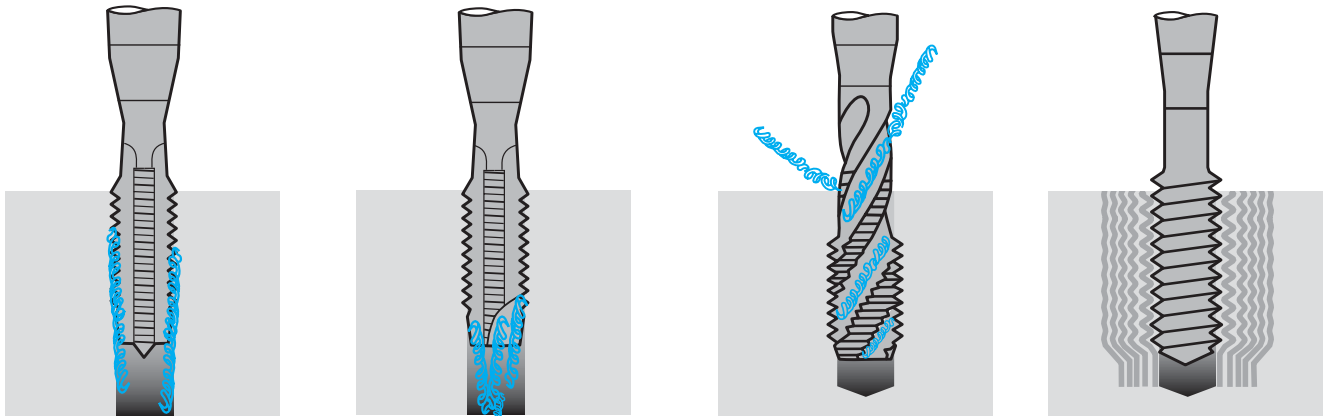
Plus l'entrée est longue, plus la pression dans celle-ci est faible et, en général, les tarauds auront une plus longue durée de vie. De même, dans les tarauds à entrée longue, les copeaux sont plus fins, alors que dans les tarauds à entrée courte, nous obtiendrons des copeaux plus épais

INFORMACIÓN TÉCNICA SOBRE ROSCADO

Technical Information for Threading

Informations techniques sur filetage

TIPOS DE MACHO - Types of Threading Taps - Types de tarauds



- Macho recto
- Straight flute tap
- Taraud droit

- Macho recto con entrada GUN
- Spiral point (GUN) Straight tap
- Taraud droit avec entrée GUN

- Macho helicoidal
- Spiral tap
- Taraud hélicoïdal

- Macho de laminación
- Forming tap
- Taraud à refouler

TIPOS DE MANGO - Shank Types - Types de queue



DIN 376/374:

Machos de máquina con **mango reducido**
Machine taps with **reduced shank**
Tarauds de machine à **queue réduite**



DIN 371:

Machos de máquina con **mango reforzado**
Machine taps with **reinforced shank**
Tarauds de machines à **queue renforcée**





ELABORACIÓN DE LOS FRONTALES DE LOS MACHOS

Manufacturing of the fronts of the taps - Élaboration des faces des tarauds

| Dimensiones Dimensions Dimensions | Norma Norm Norme | Imagen Image Image |
|---|------------------------|--------------------------|
| M2 - M6 | DIN-352 | |
| | DIN-357 | |
| | DIN-371 | |
| | DIN-374 | |
| | DIN-376 | |
| M3 - M10 | DIN-2181 | |
| | DIN-2174 | |
| M7-M10 | DIN-371 | |
| M7-M12 | DIN-374 | |
| M7-M12 | DIN-376 | |
| ≥ M14 | DIN-374 | |
| ≥ M14 | DIN-376 | |
| ≥ M7 | DIN-352 | |
| ≥ M7 | DIN-2181 | |
| ≥ M7 | DIN-351 | |
| ≥ M12 | DIN-2174 | |

ELECCIÓN DE FRESAS SEGÚN APLICACIÓN

Choice of end mills according to application - Choix des fraises en fonction de l'application

| | Tipos Types Type | Características y aplicaciones | Features and applications | Caractéristiques et applications | Icono Icon Icône |
|-----|---|--|---|--|---|
| N |  | <p>Fresa construida para realizar trabajos de acabado.</p> <p>Capacidad para fresados de pequeño y medio arranque de material. Para una gama amplia de materiales. Proporciona muy buenos acabados superficiales.</p> | <p>End mill built to perform finishing work.</p> <p>Capable of small and medium stock removal milling. For a wide range of materials. It provides very good surface finishes.</p> | <p>Fraise conçue pour les travaux de finition.</p> <p>Taux d'enlèvement de matière faible/moyen. Pour une large variété de matériaux. Elle permet d'obtenir de très bonnes finitions de surface.</p> | |
| W |  | <p>Fresa construida para realizar trabajos de acabado.</p> <p>Capacidad para fresados de pequeño y medio arranque de material. Para materiales ligeros y de viruta larga, como aleaciones de aluminio y cobre, y plásticos.</p> | <p>End mill built to perform finishing work.</p> <p>Capable of small and medium stock removal milling. For light and long-chipping materials, such as aluminium and copper alloys and plastics.</p> | <p>Fraise conçue pour les travaux de finition.</p> <p>Taux d'enlèvement de matière faible/moyen. Pour les matériaux à copeaux légers et longs, tels que les alliages d'aluminium et de cuivre, et les matières plastiques.</p> | |
| WRF |  | <p>Fresas construidas con perfil de desbaste con paso fino y capacidad para realizar trabajos de medio y alto arranque de material.</p> <p>Fácil evacuación de la viruta. Para una gama amplia de materiales. En muchos casos las superficies fresadas son de calidad aceptable.</p> | <p>End mills built with roughing profile, with fine pitch and capacity to perform medium and high stock removal jobs</p> <p>Easy chip evacuation. For a wide range of materials. In many cases the milled surfaces are of acceptable quality.</p> | <p>Fraise d'ébauche, à pas fin et taux d'enlèvement de matière moyen/élevé.</p> <p>Évacuation facile des copeaux. Pour une large variété de matériaux. Dans de nombreux cas, les surfaces fraisées sont de qualité acceptable.</p> |  |







INFORMACIÓN TÉCNICA SOBRE FRESADO

Technical Information for Milling

Informations techniques sur fraisage

ELECCIÓN DE FRESAS SEGÚN APLICACIÓN

Choice of end mills according to application - Choix des fraises en fonction de l'application

| | Tipos Types Type | Características y aplicaciones | Features and applications | Caractéristiques et applications | Icono Icon Icône |
|-----|---|---|--|--|---|
| NR |  | <p>Fresas construidas con perfil de desbaste, con paso normal y capacidad para realizar trabajos de medio y alto arranque de material.</p> <p>Para una gama amplia de materiales. En la mayoría de los casos es necesario un acabado adicional.</p> | <p>End mills built with roughing profile, with normal pitch and capacity to perform medium and high stock removal jobs.</p> <p>For a wide range of materials. In most cases, additional finishing is required.</p> | <p>Fraises d'ébauche, à pas normal et taux d'enlèvement de matière moyen/élevé. Pour une large variété de matériaux.</p> <p>Dans la plupart des cas, une finition supplémentaire est nécessaire.</p> |  |
| NRF |  | <p>Fresas construidas con perfil de desbaste, con paso fino y capacidad para realizar trabajos de medio y alto arranque de material.</p> <p>Para una gama amplia de materiales. En muchos casos las superficies fresadas son de calidad aceptable.</p> | <p>End mills built with roughing profile, with fine pitch and capacity to perform medium and high stock removal jobs.</p> <p>For a wide range of materials. In many cases the milled surfaces are of acceptable quality.</p> | <p>Fraise d'ébauche, à pas fin et taux d'enlèvement de matière moyen/élevé. Pour une large variété de matériaux.</p> <p>Dans de nombreux cas, les surfaces fraisées sont de qualité acceptable.</p> |  |
| NF |  | <p>Fresas construidas con perfil de desbaste terminado y capacidad para realizar trabajos de medio y alto arranque de material.</p> <p>Para materiales abrasivos como aleaciones de titanio, aceros inoxidable y en general materiales con alto contenido de cromo y níquel. En muchos casos las superficies fresadas son de calidad aceptable.</p> | <p>End mills built with finished roughing profile and capacity to perform medium and high stock removal jobs.</p> <p>For abrasive materials such as titanium alloys, stainless steels and in general materials with high chromium and nickel content. In many cases the milled surfaces are of acceptable quality.</p> | <p>Fraises d'ébauche, taux d'enlèvement de matière moyen/élevé.</p> <p>Pour les matériaux abrasifs, tels que les alliages de titane, les aciers inoxydables et, en général, les matériaux à forte teneur en chrome et en nickel. Dans de nombreux cas, les surfaces fraisées sont de qualité acceptable.</p> |  |

INFORMACIÓN TÉCNICA SOBRE FRESADO

Technical Information for Milling

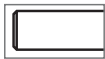
Informations techniques sur fraisage

MANGOS CILÍNDRICOS PARA HERRAMIENTAS DE ACERO RÁPIDO S/DIN-1835 (Otros bajo demanda)

Straight Shanks for HSS Tools according to DIN-1835 (Others upon request)

Queues cylindriques pour outils d'acier rapide selon DIN-1835 (Autres sur demande)

FORMA
Form
Forme

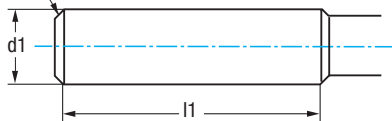


A

(MANGO LISO)
(Plain Shank)
(Queue plane)

| d ₁ | l ₁ | d ₁ | l ₁ |
|----------------|----------------|----------------|----------------|
| h _g | +2 0 | h _g | +2 0 |
| 2 | 28 | 16 | 48 |
| 3 | 28 | 20 | 50 |
| 4 | 28 | 25 | 56 |
| 5 | 28 | 32 | 60 |
| 6 | 36 | 40 | 70 |
| 8 | 36 | 50 | 80 |
| 10 | 40 | 63 | 90 |
| 12 | 45 | | |
| | | | |

Chafilán - Chamfer - Chanfrein



Dimensiones en mm - Dimensions in mm - Dimensions in mm

FORMA
Form
Forme



B

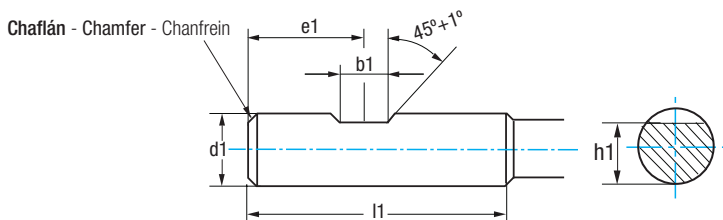
(PLANOS DE ARRASTRE)
(With Drive Flat)
(Avec plans de traction)

| d ₁ | b ₁ | e ₁ | h ₁ | l ₁ | l ₂ |
|----------------|----------------|----------------|-----------------|----------------|----------------|
| h ₆ | +0,05 0 | 0 -1 | h ₁₃ | +2 0 | +1 0 |
| 6 | 4,2 | 18 | 4,8 | 36 | - |
| 8 | 5,5 | 18 | 6,6 | 36 | - |
| 10 | 7 | 20 | 8,4 | 40 | - |
| 12 | 8 | 22,5 | 10,4 | 45 | - |
| 16 | 10 | 24 | 14,2 | 48 | - |
| 20 | 11 | 25 | 18,2 | 50 | - |
| 25 | 12 | 32 | 23 | 56 | 17 |
| 32 | 14 | 36 | 30 | 60 | 19 |
| 40 | 14 | 40 | 38 | 79 | 19 |
| 50 | 18 | 45,6 | 47,8 | 80 | 23 |
| 63 | 18 | 50 | 60,8 | 90 | 23 |

Con un plano de arrastre para d₁ = 6 y 20 mm

With one drive flat for d₁ = 6 and 20 mm

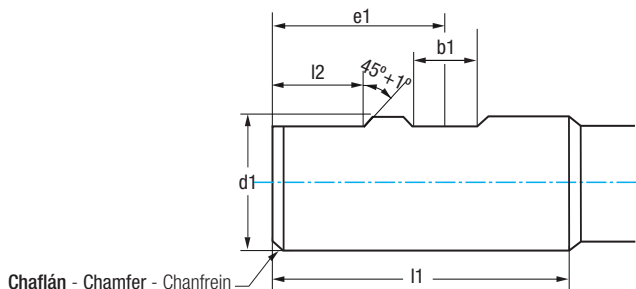
Avec un plan de traction pour d₁ = 6 et 20 mm



Con dos planos de arrastre para d₁ = 25 y 32 mm

With two drive flats for d₁ = 25 and 32 mm

Avec deux plans de traction pour d₁ = 25 et 32 mm



Dimensiones en mm - Dimensions in mm - Dimensions in mm

INFORMACIÓN TÉCNICA SOBRE FRESADO

Technical Information for Milling

Informations techniques sur fraisage

MANGOS CILÍNDRICOS PARA HERRAMIENTAS DE METAL DURO S/DIN-6535 (Otros bajo demanda)

Straight Shanks for Carbure Tools according to DIN-6535 (Others upon request)

Queues cylindriques pour outils de carbure selon DIN-6535 (Autres sur demande)

FORMA
Form
Forme



HA

(MANGO LISO)
(Plain Shank)
(Queue plane)

| d_1 | l_1 +2 0 | d_1 | l_1 +2 0 |
|-------|------------------|-------|------------------|
| h_6 | | h_6 | |
| 2 | 28 | 14 | 45 |
| 3 | 28 | 16 | 48 |
| 4 | 28 | 18 | 48 |
| 5 | 28 | 20 | 50 |
| 6 | 36 | 25 | 56 |
| 8 | 36 | 32 | 60 |
| 10 | 40 | | |
| 12 | 45 | | |

Chafilán - Chamfer - Chanfrein

Sin agujero central
Without center hole
Sans trou central



Dimensiones en mm - Dimensions in mm - Dimensions in mm

FORMA
Form
Forme



HB

(PLANOS DE ARRASTRE)
(With Drive Flat)
(Avec plans de traction)

| d_1 | b_1 +0,05 0 | e_1 0 -1 | h_1 h11 | l_1 +2 0 | l_2 +1 0 |
|-------|---------------------|------------------|--------------|------------------|------------------|
| 6 | 4,2 | 18 | 5,1 | 36 | - |
| 8 | 5,5 | 18 | 6,9 | 36 | - |
| 10 | 7 | 20 | 8,5 | 40 | - |
| 12 | 8 | 22,5 | 10,4 | 45 | - |
| 14 | 8 | 22,5 | 12,7 | 45 | - |
| 16 | 10 | 24 | 14,2 | 48 | - |
| 18 | 10 | 24 | 16,2 | 48 | - |
| 20 | 11 | 25 | 18,2 | 50 | - |
| 25 | 12 | 32 | 23 | 56 | 17 |
| 32 | 14 | 36 | 30 | 60 | 19 |

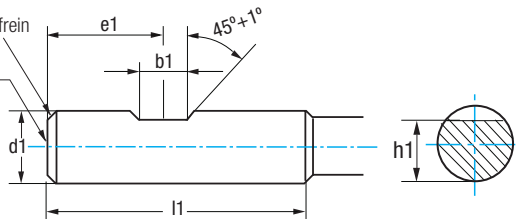
Con un plano de arrastre para $d_1 = 6$ y 20 mm

With one drive flat for $d_1 = 6$ and 20 mm

Avec un plan de traction pour $d_1 = 6$ et 20 mm

Chafilán - Chamfer - Chanfrein

Sin agujero central
Without center hole
Sans trou central

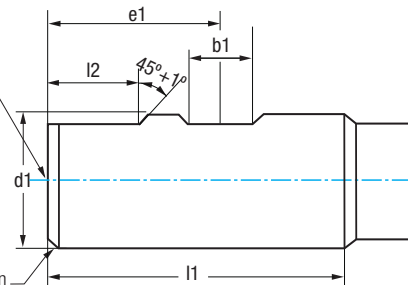


Con dos planos de arrastre para $d_1 = 25$ y 32 mm

With two drive flats for $d_1 = 25$ and 32 mm

Avec deux plans de traction pour $d_1 = 25$ et 32 mm

Sin agujero central
Without center hole
Sans trou central



Chafilán - Chamfer - Chanfrein

Dimensiones en mm - Dimensions in mm - Dimensions in mm

ÍNDICE SÍMBOLOS

Symbol Index

Index de symboles

SÍMBOLOS UTILIZACIÓN HERRAMIENTA - Tool Use Symbols - Symboles usage outils

GENERAL



Herramienta de Mano
Hand Tool
Outil à main



Acero
Steel
Aciers



Plástico
Plastic
Plastique

TALADRADO - Drilling - Perçage



Especial Taladro Batería
Power Tool Special
Spécial perceuse à main

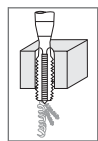


Asiento Allen
Allen Seat
Logement Allen

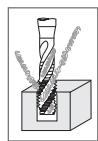


Asiento Cónico
Taper Seat
Logement conique

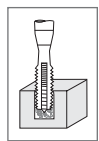
ROSCADO - Threading - Taraudage



Agujero Pasante
Through Hole
Trou débouchant



Agujero Ciego
Blind Hole
Trou borgne



Agujero Ciego
Blind Hole
Trou borgne



Bujía
Spark Plug
Bougie

FRESADO - Milling - Fraisage



Desbaste Fino
Fine Pitch Roughing
Ébauche pas fin



Desbaste Grueso
Coarse Roughing
Ébauche



Desbaste Medio
Roughing & Finishing
Semi-Finition



Ranuras en "T"
T Slots
Rainures en T



Ranuras Woodruff
Woodruff Slots
Rainures Woodruff



Perfiles
Profiles
Profils



Metacrilatos
Methacrylates
Méthacrylates

SÍMBOLOS CARACTERÍSTICAS HERRAMIENTA - Tool Characteristics Symbols - Symboles caractéristiques outils

TALADRADO - Drilling - Perçage



Punta Cónica con Afilado Universal
Universal
Pointe conique universel



Afilado en Cruz Tipo DIN 1412 "C"
Split Point DIN 1412 "C" type
Affûtage en croix type DIN 1412 "C"



Filo Corregido tipo "U"
"U" type
Corrected Edge
Lèvre corrigée type "U"



Punta Contrar Tipo DIN 1412 "E"
Center Point
DIN 1412 "E" type
Pointe à centrer type DIN 1412 "E"



Afilado Tipo DIN 1412 "A"
Split Point DIN 1412 "A" type
Affûtage pointe type DIN 1412 "A"



Relieved Cone Point
Pointe conique universel



Afilado Tipo "Convex"
Split Point "Convex" Type
Affûtage pointe type "Convex"



Punta Metal Duro
Carbide Tipped
Pointe carbure



Ángulo Punta
Point Angle
Angle de pointe



Hélice Izquierda
Left Hand Helix
Hélice à gauche



Ángulo de Hélice
Helix Angle
Angle d'hélice



Afilado Tipo "Convex"
Split Point "Convex" Type
Affûtage pointe type "Convex"



Punta Metal Duro
Carbide Tipped
Pointe carbure



Ángulo Punta
Point Angle
Angle de pointe



Hélice Izquierda
Left Hand Helix
Hélice à gauche



Perfil Parabólico "S"
S Parabolic Profile
Profil parabolique S



Ángulo de Hélice
Helix Angle
Angle d'hélice



3Z sin Corte al Centro
3Z Non-Center-Cutting
3Z sans coupe au centre



Mango Rebajado
Reduced Shank
Queue réduite



Mango Cilíndrico
Straight Shank
Queue cylindrique



Mango Cónico
Morse Taper Shank
Queue conique



Mango 3 Planos
3-Flat Shank
Attachement 3 plans



Ángulo Broca Escalonada
Step Drill Angle
Angle de foret etagé



Conicidad
Taper
Conicité



Pulido Espejo
Mirror Polished
Polyglass

ÍNDICE SÍMBOLOS

Symbol Index

Index de symboles

SÍMBOLOS CARACTERÍSTICAS HERRAMIENTA - Tool Characteristics Symbols - Symboles caractéristiques outils

ESCARIADO-AVELLANADO - Reaming-Countersinking - Alesaje-Fraisage



Ángulo Avellanado
Countersinking Angle
Angle de fraisage



Ángulo Avellanado
Countersinking Angle
Angle de fraisage



Ángulo Avellanado
Countersinking Angle
Angle de fraisage

ROSCADO - Threading - Taraudage



Tipo Entrada Macho
Tap Point Type
Type d'entrée de taraud



Entrada GUN
GUN Chamfer
Entrée GUN



Ranuras Rectas
Straight Slots
Denture droite



Ángulo de Hélice
Helix Angle
Angle d'hélice



Ranuras Exteriores Refrigeración
External Cooling Slots
Rainures extérieurs refroidissement



Rosca Standard
Standard Thread
Filetage standard



Rosca de tubo cilíndrica
Straight Pipe Thread
Filetage tubes cylindriques



Rosca Whitworth cilíndrica
Straight Whitworth Thread
Filetage Whitworth cylíndrica

FRESADO - Milling - Fraisage



Dentado Alterno
Staggered Teeth
Denture alternée



Dentado Recto
Straight Teeth
Denture droite



Chavetero Longitudinal
Keyway
Rainure longitudinale



Chavetero Longitudinal y Transversal
Drive Slot & Keyway
Rainure longitudinale et transversale



Mecanizado piezas 3D
3D
For 3D-printed metal parts
Fabrication additive de métaux 3D



Dentado Fresado
Milled Teeth
Denture fraisée



Dentado Destalonado
Formed Teeth
Denture détalonnée



Engranaje
Gear
Engrenage



Engranajes Cilíndricos
Straight Gears
Engrenages cylíndricos



Engranajes Helicoidales
Helical Gears
Engrenages hélicoïdaux



1Z= 1 Diente
1Z= 1 Flute
1Z= 1 Dent



2Z= 2 Dientes
2Z= 2 Flutes
2Z= 2 Dents



3Z= 3 Dientes
3Z= 3 Flutes
3Z= 3 Dents



4-5 Z= 4-5 Dientes. Corte al Centro
4-5 Z= 4-5 Flutes. Center Cutting
4-5 Z= 4-5 Dents. Coupe au centre



6-8 Z= 6 Dientes. Super-Acabado
6-8 Z= 6 Flutes. Super-Finishing
6-8 Z= 6 Dents. Super-finition



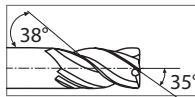
Varios Dientes Sin Corte al Centro
Non-Center-Cutting Several Flutes
Plusieurs dents sans coupe au centre



Desplazamiento desigual
Uneven displacement
Déplacement irrégulier



1 Z= 1 Diente. Fresa Grabado
1 Z= 1 Flute. Engraving End Mill
1 Z= 1 Dent. Fraise gravure



Hélice alterna
Unequal Helix
Hélice alternée



Fresa Frontal Radial
Radial Head End Mill
Fraise frontal hémisphérique



Fresa Frontal Recta
Straight Head End Mill
Fraise frontal droite



Fresa Tórica
Radius End Mill
Fraise torique



DIN Mango Liso MD
HM Plain Shank
6535 HA Queue plane carbure



DIN Mango Weldon MD
HM Weldon Shank
6535 HB Queue Weldon carbure



Fresa Frontal Recta con Chaflán 45°
Straight Head End Mill with 45° Chamfer
Fraise frontal droite avec chamfrein 45°



DIN Mango Liso PMX-HSSE-HSS
PMX-HSSE-HSS Plain Shank
1835 A Queue plane PMX-HSSE-HSS



DIN Mango Weldon PMX-HSSE-HSS
PMX-HSSE-HSS Weldon Shank
1835 B Queue Weldon PMX-HSSE-HSS



Pulido Espejo
Mirror Polished
Polyglass



DIN Mango WHISTLE NOTCH MD
HM WHISTLE NOTCH Shank
6535 HE Queue WHISTLE NOTCH carbure



DIN Mango WHISTLE NOTCH PMX-HSSE-HSS
PMX-HSSE-HSS WHISTLE NOTCH Shank
1835 E Queue WHISTLE NOTCH PMX-HSSE-HSS



Dentado Fino
Fine Teeth
Denture fine



Dentado Grueso
Coarse Teeth
Denture grosse



Fresado trocoidal
Trochoidal milling
Fraisage trocoidal



1/4 radio
1/4 radius
1/4 rayon



Planchas de Aluminio
Aluminium plates
Plaques d'aluminium

ACEROS Y MATERIALES DE FABRICACIÓN

Production Steels & Materials - Aciers et matériels de fabrication

| | |
|---|---|
| Identif. Internacional International Identif. Identif. Internationale | Comp. Química Chemical Comp. Comp. Chimique |
|---|---|

HSS

| | |
|---|----------|
| AISI: M-2* | C |
| DIN: 1.3343* | Cr |
| AFNOR: Z85WDCV* | W |
| EN: HS 6-5-2* | V |
| UNE: F-5603* | Mo |
| *(o similares / or similar / ou similaires) | |

PMX

| | |
|---|---|
| Identif. Internacional International Identif. Identif. Internationale | Comp. Química Chemical Comp. Comp. Chimique |
|---|---|

| | |
|---|--|
| AISI: ASP* | |
| This is a brandname belonging to Erasteel | |
| C: 1,60% / Cr: 4,80% / W: 10,50% | |
| V: 5,00% / Mo: 2,00% / Co: 8,00% | |
| *(ó equivalentes) | |
| *(or equivalents) *(Où Similaires) | |

MD/HM
Carbure
Micrograno+

| | |
|---|---|
| Identif. Internacional International Identif. Identif. Internationale | Comp. Química Chemical Comp. Comp. Chimique |
|---|---|

| | |
|---|------------------------------------|
| Mat: Micrograno + | |
| Comp. | WC 89,3, Co 6%, 0,7 (Nb-Ti-Ta) |
| Grano/Grain/Grain | Muy Fino Very Fine Très fine |
| Dureza/Hardness/Dureté | 1820 HV |
| Resist. Rotura Breaking Resist. Résistance ruptures | 3.600 N/mm2 |

HSSE
5%Co

| | |
|---|----------|
| AISI: M-35 * | C |
| DIN: 1.3243 | Cr |
| AFNOR: Z85WDKCV | W |
| EN: HS 6-5-2-5 | V |
| UNE: F-5613 | Mo |
| | Co |
| *(o similares / or similar / ou similaires) | |

MD/HM
Carbure
Micrograno

| | |
|---|------------------------------------|
| Mat: Micrograno | |
| Comp. | WC 89,3, Co 10%, 0,7 (Nb-Ti-Ta) |
| Grano/Grain/Grain | Muy Fino Very Fine Très fine |
| Dureza/Hardness/Dureté | 1700 HV |
| Resist. Rotura Breaking Resist. Résistance ruptures | 3.800 N/mm2 |

MD/HM
Carbure
Grano UF

| | |
|---|--------------------------------------|
| Mat: Grano UF | |
| Comp. | WC 85,6, Ti/Ta (Ni) C 0,9, Co 12% |
| Grano/Grain/Grain | Ultrafino / Ultrafine / Ultrafin |
| Dureza/Hardness/Dureté | 1750 HV |
| Resist. Rotura Breaking Resist. Résistance ruptures | 4.200 N/mm ² |

HSSE
8%Co

| | |
|---|----------|
| AISI: M-42* | C |
| DIN: 1.3247 | Cr |
| AFNOR: Z110DKCWY | W |
| EN: HS 2-9-1-8 | V |
| UNE: F-5617 | Mo |
| | Co |
| *(o similares / or similar / ou similaires) | |

RECUBRIMIENTOS

Coatings - Revêtements

ALTiN

| | |
|--|-----------|
| Nitruro de Aluminio-Titanio Aluminum-Titanium Nitride Nitrure de Aluminium-Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 3.300±300 |
| Oxidación / Oxidation / Oxidation | 800°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,70 |
| Color / Colour / Couleur: Antracita / Anthracite / Anthracite | |

TiN

| | |
|--|-------|
| Nitruro de Titanio Titanium Nitride Nitrure de Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 2.300 |
| Oxidación / Oxidation / Oxidation | 600°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,30 |
| Color / Colour / Couleur: Oro / Gold / Or | |

CROMAX

| | |
|--|---------|
| Base AlCrN AlCrN Base Base AlCrN | |
| Dureza / Hardness / Dureté HV(0,05) | 3.200 |
| Oxidación / Oxidation / Oxidation | 1.100°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,40 |
| Color / Colour / Couleur: Gris Brillante / Shinning Grey / Gris Clair | |

BORDEAUX

| | |
|---|-------|
| Base TiAlCrN TiAlCrN base Base TiAlCrN | |
| Dureza / Hardness / Dureté HV(0,05) | 2850 |
| Oxidación / Oxidation / Oxidation | 800°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,25 |
| Color / Colour / Couleur: rosado cobrizo / Copper Pink / Rose cuivré | |

CARBEX

| | |
|---|--------------|
| Base Carbono Carbon Base Base Carbone | |
| Dureza / Hardness / Dureté HV(0,05) | 8.000-10.000 |
| Oxidación / Oxidation / Oxidation | 600°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,2 |
| Color / Colour / Couleur: Gris Oscuro / Dark Grey / Gris Foncé | |

IKRA

| | |
|---|----------|
| Base AlTiN AlTiN Base Base AlTiN | |
| Dureza / Hardness / Dureté HV(0,05) | 3500±300 |
| Oxidación / Oxidation / Oxidation | 1000°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,35 |
| Color / Colour / Couleur: Gris / Grey / Gris | |

DIAMAX

| | |
|---|-----------|
| Diamante Nanocrystalino Nanocrystalline Diamond Diamant nanocrystallin | |
| Dureza / Hardness / Dureté HV(0,05) | 7000-9000 |
| Oxidación / Oxidation / Oxidation | 600°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,2-0,3 |
| Color / Colour / Couleur: Negro / Black / Noir | |

HARD

| | |
|--|-----------|
| Hard - TiAlN + WC/C Hard - TiAlN + WC/C Hard - TiAlN + WC/C | |
| Dureza / Hardness / Dureté HV(0,05) | 3.000 |
| Oxidación / Oxidation / Oxidation | 800°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,15-0,20 |
| Color / Colour / Couleur: Gris oscuro / Dark Grey / Gris Foncé | |

TIALCN

| | |
|--|-------|
| Carbonitruro de Titanio-Aluminio Titanium Aluminium Carbonitride Carbo Nitrure d'Aluminium-Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 3200 |
| Oxidación / Oxidation / Oxidation | 900°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,4 |
| Color / Colour / Couleur: Oro rosa / Pink gold / Or rose | |

NITREX

| | |
|--|-----------|
| Nitruro de Aluminio-Titanio Aluminium-Titanium Nitride Nitrure d'Aluminium-Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 3.300±300 |
| Oxidación / Oxidation / Oxidation | 800°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,70 |
| Color / Colour / Couleur: Antracita / Anthracite / Anthracite | |

SUA

| | |
|---|-------------|
| Nitruro de Titanio Silicio Titanium Silicon Nitride Nitrure de Silicium-Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 3500±300 |
| Oxidación / Oxidation / Oxidation | 1000-1100°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,45 |
| Color / Colour / Couleur: Cobre / Copper / Cuivre | |

TiCN

| | |
|---|-----------|
| Carbo-Nitruro de Titanio Titanium Carbo-Nitride Carbonitru de Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 3.500±500 |
| Oxidación / Oxidation / Oxidation | 400°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,20 |
| Color / Colour / Couleur: Gris Azulado-Antracita / Bluish-Anthracite Grey / Gris Bleu Anthracite | |

TIALN-TOP

| | |
|--|-----------|
| Carbo-Nitruro de Aluminio-Titanio Titanium-Aluminium Carbo-Nitride Carbo-Nitrure d'Aluminium-Titanium | |
| Dureza / Hardness / Dureté HV(0,05) | 3.300 |
| Oxidación / Oxidation / Oxidation | 900°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,30-0,35 |
| Color / Colour / Couleur: Violeta-Gris / Violet-Grey / Violet-Gris | |

TIALSiN

| | |
|---|-----------|
| Nitruro de Titanio Titanium Nitride Nitrure de Titanium | |
| Dureza/Hardness/Dureté HV(0,05) | 3.500±500 |
| Oxidación Oxidation / Oxidation | 900°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,45 |
| Adecuado para Uso en Seco Appropriate for Dry Use Parfait usinage sans refroidir | |
| Color / Colour / Couleur: Antracita / Anthracite / Anthracite | |

ZIRKONIO

| | |
|---|-------------|
| Nitruro de Zirconio Zirconium Nitride Nitrure de Zirkonium | |
| Dureza / Hardness / Dureté HV(0,05) | 2.300±200 |
| Oxidación / Oxidation / Oxidation | 660-1.100°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,50 |
| Color / Colour / Couleur: Amarillo pálido / Pale Yellow / Jaune pâle | |

X-AlCr

| | |
|--|---------|
| Base ALCR Multicapa Multi-layered AlCr Base Base AlCr Multicouche | |
| Dureza / Hardness / Dureté HV(0,05) | 3.000 |
| Oxidación / Oxidation / Oxidation | 1.100°C |
| Coefficiente Fricción Rubbing Coefficient/Coefficient Friction | 0,25 |
| Color / Colour / Couleur: Cobre / Copper / Cuivre | |

| Ref. | Pag. | Ref. | Pag. | Ref. | Pag. | Ref. | Pag. | Ref. | Pag. | Ref. | Pag. | Ref. | Pag. |
|------|--------|------|---------|------|---------|------|---------|------|---------|------|------|------|---------|
| 1000 | 78 | 2572 | 182 | 3173 | 208 | 4071 | 144 | 6420 | 375-391 | 8610 | 511 | 9056 | 59 |
| 1007 | 90 | 2573 | 183 | 3174 | 205 | 4072 | 145 | 6430 | 373-391 | 8612 | 513 | 9060 | 162 |
| 1010 | 84-113 | 2574 | 180 | 3175 | 204 | 4074 | 147 | 6439 | 374 | 8615 | 511 | 9075 | 61 |
| 1012 | 89 | 2575 | 181 | 3176 | 202 | 4075 | 141/152 | 6444 | 364 | 8620 | 512 | 9076 | 62 |
| 1013 | 87-113 | 2580 | 184 | 3181 | 286 | 4076 | 146 | 6575 | 179 | 8622 | 513 | 9100 | 66 |
| 1015 | 82-113 | 2610 | 130 | 3184 | 286 | 4077 | 142 | 6600 | 371-390 | 8625 | 512 | 9116 | 115 |
| 1016 | 76-112 | 2630 | 188 | 3185 | 229 | 4078 | 141 | 6604 | 372 | 8633 | 543 | 9196 | 114 |
| 1020 | 80-112 | 2636 | 131 | 3190 | 284 | 4079 | 146 | 6606 | 371 | 8636 | 543 | 9200 | 353 |
| 1021 | 79-112 | 2644 | 133 | 3191 | 282 | 4080 | 410 | 6640 | 362 | 8639 | 543 | 9230 | 343 |
| 1025 | 91 | 2646 | 132 | 3193 | 285 | 4120 | 407 | 6642 | 363 | 8642 | 544 | 9231 | 344 |
| 1027 | 81 | 2660 | 187 | 3194 | 284 | 4130 | 408 | 6644 | 360-389 | 8645 | 544 | 9237 | 348 |
| 1029 | 75 | 2685 | 186 | 3195 | 285 | 4200 | 433 | 6647 | 361-389 | 8648 | 544 | 9238 | 349 |
| 1030 | 101 | 2690 | 187 | 3200 | 215-235 | 4210 | 434 | 6666 | 370 | 8651 | 545 | 9240 | 342 |
| 1036 | 99 | | | 3201 | 225 | 4223 | 422 | 6690 | 362 | 8654 | 545 | 9247 | 351 |
| 1040 | 104 | | | 3202 | 262 | 4224 | 424 | 6692 | 363 | 8657 | 545 | 9248 | 352 |
| 1050 | 97 | 3010 | 247 | 3204 | 256 | 4228 | 425 | 6696 | 360 | 8660 | 546 | 9250 | 343 |
| 1054 | 92 | 3011 | 272 | 3205 | 227 | 4229 | 427 | | | 8663 | 546 | 9251 | 344 |
| 1055 | 93 | 3012 | 266 | 3209 | 260 | 4231 | 428 | 8200 | 554 | 8666 | 546 | 9252 | 345 |
| 1056 | 94 | 3016 | 271 | 3210 | 218 | 4232 | 429 | 8201 | 554 | 8667 | 547 | 9254 | 346 |
| 1101 | 155 | 3017 | 261 | 3212 | 263 | 4235 | 430 | 8230 | 524 | 8669 | 547 | 9255 | 347 |
| 1102 | 155 | 3019 | 272 | 3214 | 252 | 4240 | 435 | 8232 | 523 | 8672 | 547 | 9256 | 347 |
| 1103 | 156 | 3020 | 245 | 3220 | 210 | 4250 | 436 | 8235 | 525 | 8675 | 548 | 9257 | 348 |
| 1104 | 156 | 3021 | 246 | 3224 | 256 | 4252 | 436 | 8240 | 526 | 8678 | 548 | 9258 | 349 |
| 1110 | 116 | 3023 | 249 | 3225 | 198 | 4300 | 411 | 8241 | 527 | 8679 | 548 | 9260 | 342 |
| 1130 | 120 | 3024 | 258 | 3230 | 194 | 4330 | 398 | 8245 | 528 | 8680 | 549 | 9266 | 350 |
| 1140 | 121 | 3025 | 259 | 3234 | 251 | 4340 | 398 | 8247 | 529 | 8690 | 549 | 9267 | 351 |
| 1154 | 119 | 3026 | 270 | 3234 | 251 | 4352 | 411 | 8250 | 530 | 8700 | 487 | 9268 | 352 |
| 1300 | 100 | 3030 | 243 | 3240 | 220 | 4400 | 377 | 8255 | 531 | 8703 | 491 | 9280 | 336 |
| 1301 | 123 | 3031 | 243 | 3243 | 196 | 4401 | 383 | 8260 | 532 | 8704 | 490 | 9281 | 337 |
| 1303 | 123 | 3032 | 265 | 3244 | 257 | 4410 | 382 | 8264 | 533 | 8706 | 485 | 9282 | 338 |
| 1310 | 124 | 3034 | 254 | 3249 | 200 | 4411 | 382 | 8265 | 534 | 8707 | 486 | 9283 | 339 |
| 1320 | 125 | 3036 | 242 | 3250 | 223-236 | 4412 | 385 | 8270 | 535 | 8709 | 489 | 9301 | 63 |
| 1330 | 126 | 3037 | 242 | 3251 | 212 | 4413 | 385 | 8275 | 536 | 8710 | 487 | 9303 | 64 |
| 1405 | 109 | 3040 | 244 | 3252 | 264 | 4414 | 386 | 8280 | 537 | 8715 | 493 | 9310 | 65 |
| 1406 | 110 | 3099 | 229 | 3253 | 197 | 4415 | 386 | 8285 | 538 | 8718 | 498 | 9315 | 127 |
| 1407 | 109 | 3100 | 214-235 | 3254 | 253 | 4416 | 387 | 8290 | 539 | 8724 | 488 | 9401 | 303-356 |
| 1408 | 110 | 3101 | 225 | 3255 | 228 | 4417 | 387 | 8295 | 540 | 8725 | 489 | 9405 | 299 |
| 1409 | 109 | 3102 | 262 | 3259 | 201 | 4417 | 387 | 8400 | 38 | 8726 | 485 | 9406 | 300-356 |
| 1410 | 110-A | 3104 | 250 | 3260 | 211 | 4420 | 380-392 | 8401 | 53 | 8727 | 492 | 9407 | 304 |
| 1456 | 107 | 3105 | 227 | 3261 | 226 | 4421 | 384 | 8403 | 54 | 8728 | 492 | 9410 | 303 |
| 1459 | 108 | 3106 | 268 | 3265 | 199 | 4422 | 381 | 8405 | 40 | 8729 | 491 | 9411 | 324 |
| 1466 | 106 | 3107 | 261 | 3270 | 195 | 4426 | 380 | 8410 | 42 | 8731 | 493 | 9412 | 304 |
| 1470 | 111 | 3109 | 240 | 3272 | 203 | 4430 | 378 | 8411 | 46 | 8732 | 494 | 9413 | 323 |
| 1476 | 111 | 3110 | 217-234 | 3274 | 205 | 4432 | 378 | 8413 | 50 | 8733 | 496 | 9414 | 324 |
| 1602 | 137 | 3112 | 263 | 3275 | 204 | 4439 | 379 | 8414 | 51 | 8751 | 497 | 9415 | 299 |
| 1603 | 138 | 3113 | 239 | 3276 | 202 | 4447 | 368 | 8415 | 44 | 8761 | 497 | 9416 | 319-357 |
| 1604 | 128 | 3114 | 252 | 3300 | 289 | 4470 | 381 | 8416 | 52 | 8765 | 496 | 9417 | 320 |
| 1605 | 128 | 3116 | 268 | 3303 | 291 | 4497 | 368 | 8425 | 453 | 8768 | 498 | 9419 | 322 |
| 1606 | 139 | 3119 | 239 | 3305 | 290 | 4516 | 402 | 8430 | 458 | 8769 | 494 | 9421 | 310-357 |
| 1607 | 135 | 3120 | 210 | 3307 | 291 | 4550 | 403 | 8431 | 457 | 8770 | 488 | 9424 | 310 |
| 1609 | 138 | 3124 | 255 | 3310 | 292 | 4570 | 401 | 8432 | 457 | 8778 | 495 | 9425 | 313 |
| 1610 | 139 | 3125 | 198-232 | 3311 | 292 | 4580 | 401 | 8450 | 453 | 8780 | 495 | 9426 | 313 |
| 1612 | 136 | 3126 | 267 | 3312 | 293 | 4600 | 376-392 | 8460 | 456 | 8790 | 486 | 9427 | 311 |
| 1617 | 134 | 3127 | 255 | 3404 | 237 | 4606 | 376 | 8465 | 455 | 8791 | 490 | 9429 | 311 |
| 1660 | 98 | 3129 | 213 | 3405 | 237 | 4610 | 402 | 8470 | 455 | 8799 | 516 | 9431 | 305-356 |
| 1666 | 96 | 3130 | 194 | 3406 | 238 | 4640 | 366 | 8475 | 456 | 8800 | 495 | 9436 | 306 |
| 1689 | 325 | 3134 | 251 | 3409 | 287 | 4644 | 365-390 | 8500 | 468 | 8820 | 515 | 9437 | 307 |
| 1803 | 154 | 3136 | 267 | 3415 | 556/560 | 4675 | 400 | 8501 | 469 | 8830 | 515 | 9439 | 308 |
| 1810 | 153 | 3140 | 220 | 3500 | 275 | 4680 | 367 | 8510 | 470 | 8850 | 504 | 9441 | 318 |
| 1812 | 153 | 3143 | 196-233 | 3501 | 276 | 4690 | 366 | 8512 | 471 | 8860 | 504 | 9446 | 301 |
| 1819 | 154 | 3144 | 250 | 3502 | 279 | 4692 | 367 | 8515 | 471 | 8865 | 506 | 9447 | 301 |
| | | 3149 | 200-233 | 3504 | 278 | 4696 | 365 | 8520 | 472 | 8870 | 505 | 9450 | 330-358 |
| | | 3150 | 222-236 | 3505 | 278 | 4800 | 395 | 8530 | 473 | 8875 | 505 | 9451 | 332 |
| | | 3151 | 212 | 3506 | 280 | 4802 | 395 | 8535 | 474 | 8900 | 439 | 9452 | 333 |
| 2010 | 175 | 3152 | 264 | 3507 | 279 | 4810 | 399 | 8540 | 474 | 8901 | 439 | 9453 | 327 |
| 2015 | 177 | 3153 | 197-233 | 3509 | 281 | 4834 | 396 | 8550 | 475 | 8904 | 440 | 9454 | 333 |
| 2016 | 177 | 3154 | 253 | 3510 | 277 | 4995 | 230-393 | 8554 | 475 | 8910 | 440 | 9455 | 328 |
| 2017 | 177 | 3155 | 228 | 3519 | 281 | | | 8558 | 476 | 8920 | 441 | 9456 | 321 |
| 2020 | 173 | 3156 | 269 | 3534 | 277 | 5040 | 412 | 8560 | 476 | 8925 | 441 | 9457 | 329 |
| 2026 | 176 | 3157 | 241 | 3536 | 274 | 5050 | 412 | 8570 | 477 | 8930 | 442 | 9459 | 334-358 |
| 2060 | 166 | 3159 | 201-233 | 3540 | 273 | 5080 | 397 | 8571 | 478 | 8940 | 442 | 9460 | 309 |
| 2064 | 168 | 3160 | 211 | 3546 | 280 | 5100 | 413 | 8572 | 478 | 8950 | 443 | 9461 | 302 |
| 2130 | 174 | 3161 | 226 | 3600 | 221 | 5120 | 413 | 8575 | 479 | 8960 | 443 | 9465 | 312 |
| 2160 | 169 | 3162 | 207 | 3900 | 283 | 5206 | 416 | 8576 | 479 | 8970 | 444 | 9470 | 315 |
| 2164 | 170 | 3163 | 208 | 3912 | 283 | 5512 | 414 | 8577 | 480 | 8990 | 445 | 9475 | 316 |
| 2310 | 171 | 3164 | 209 | | | 5522 | 414 | 8578 | 480 | 8991 | 445 | 9575 | 163 |
| 2314 | 172 | 3165 | 199-232 | 4010 | 410 | 5700 | 415 | 8580 | 481 | 8992 | 446 | 9644 | 296 |
| 2316 | 173 | 3166 | 224 | 4040 | 410 | | | 8600 | 500 | | | 9647 | 297 |
| 2510 | 129 | 3167 | 224 | 4060 | 150 | 6000 | 72 | 8601 | 501 | 9010 | 58 | 9674 | 404 |
| 2530 | 185 | 3169 | 213 | 4061 | 151 | 6016 | 70 | 8603 | 502 | 9036 | 67 | 9994 | 160 |
| 2536 | 131 | 3170 | 195 | 4062 | 152 | 6040 | 409 | 8605 | 503 | 9040 | 103 | 9995 | 158 |
| 2544 | 133 | 3171 | 207 | 4067 | 149 | 6080 | 409 | 8606 | 503 | | | | |
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