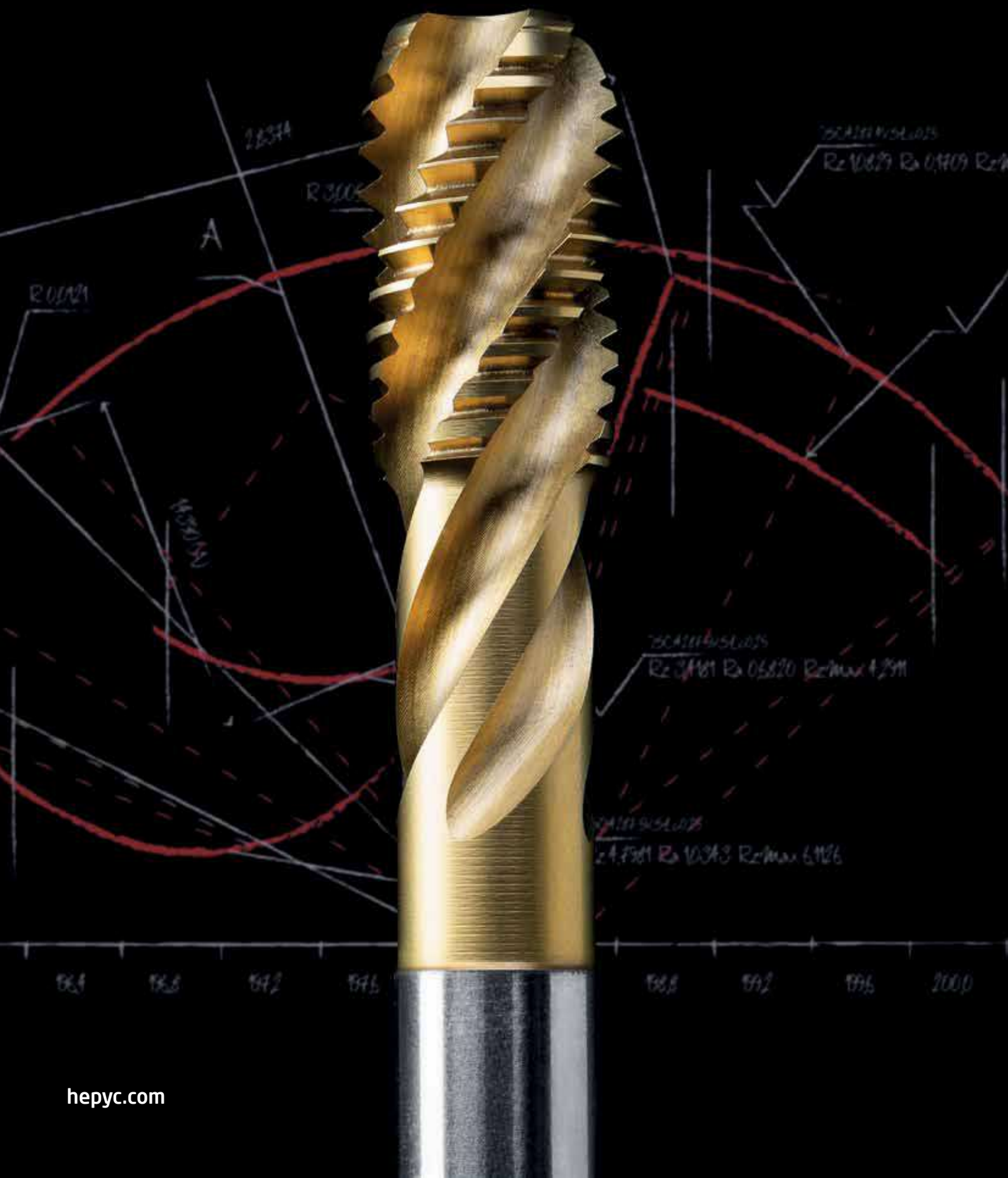
Hepyc CUTTING TOOL EXPERTS

# >2020



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## SERIE / SÉRIE / SERIE

- **Extra Larga** / Extra longue / Extra-long
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- **Convencional** / Normal / Conventional
- **Corrección de labios** / Correction de lèvres / Lip correction
- Split Point
- **Puntos soldadura** / Points de soudure / Welding points
- **Placa de carburo** / Plaquette carbure / Carbide sheet

## ESPIRAL / SPIRALE / SPIRAL

- **Espiral a 8º** / Spirale à 8º / 8º Spiral
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- **Espiral a 30º** / Spirale à 30º / 30º Spiral
- **Espiral a 35º** / Spirale à 35º / 35º Spiral
- **Espiral a 40º** / Spirale à 40º / 40º Spiral
- **Espiral a 45º** / Spirale à 40º / 40º Spiral
- **Espiral S** / Spirale S / S Spiral
- **Giro a izquierdas** / Rotation à gauche / Anti-clockwise rotation

## ASIENTO / VIS / SHOULDERED

- 90º
- 80º

## CENTRADO / CENTRAGE / CENTRED

- 20º
- 60º
- 60º / 120º
- **Radial** / Radial / Radial

## ÁNGULO DE LA PUNTA / ANGLE DE LA POINTE / TIP ANGLE

- **Punta a 90º** / Pointe à 90º / 90º Tip
- **Punta a 118º** / Pointe à 118º / 118º Tip
- **Punta a 135º** / Pointe à 135º / 135º Tip

## MANGO / QUEUE / SHANK

- **Reducido** / Réduite / Small
- **Reforzado** / Renforcée / Reinforced
- **Delgado** / Fine / Thin

## ENTRADA / ENTRÉE / ENTRY

- Form. D — 3,5-5h
- Form. E — 1,5-2h
- Form. A — 6-8h
- Form. B "Gun" — **3,5-5h Entrada corregida** / Entrée corrigée / Corrected entry
- Form. C — 2-3h

## TOLERANCIA / TOLÉRANCE / TOLERANCE

- Tol. 2A — **Tolerancia 2A** / Tolérance 2A / 2A Tolerance
- Tol. 2B — **Tolerancia 2B** / Tolérance 2B / 2B Tolerance
- Tol. 6H — **Tolerancia 6H** / Tolérance 6H / 6H Tolerance
- Tol. 6HX — **Tolerancia 6HX** / Tolérance 6HX / 6HX Tolerance
- Tol. 6H +0,1 — **Tolerancia 6H+0,1** / Tolérance 6H+0,1 / 6H+0,1 Tolerance
- Tol. 6G — **Tolerancia 6G** / Tolérance 6G / 6G Tolerance

## TIPO DE AGUJERO / TYPE DE TROU / TYPE OF HOLE

- **Pasante "gun"** / Débouchant "gun" / "Gun" bushing
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## OTROS / AUTRES / OTHERS

- **Taladro manual** / Perçage manuel / Manual drill
- ALLEN — **Asiento Allen** / Vis Allen / Allen setting
- **Conicidad 2%** / Conicité 2% / 2 % Taper
- K30 — **Micrograno K30** / Micrograin k30 / K30 Micrograin
- ASP 2030 — **Acero ASP** / Acier ASP / ASP Steel
- **Mango Hexagonal** / Queue Hexagonal / Hexagonale shank

## TIPOS DE PUNTA / TYPES DE POINTE / TYPES OF TIPS

- **Radial** / Radiale / Radial
- **Normal** / Normale / Normal

## LABIOS / LÈVRES / LIPS

- **Debaste** / Dégrossissage / Grinding
- **Debaste fino** / Dégrossissage fin / Fine grinding
- **Acabado** / Finition / Finishing

## CORTES / DENTS / CUTS

- 1z — **1 corte** / 1 dent / 1 cut
- 2z — **2 cortes** / 2 dents / 2 cuts
- 3z — **3 cortes** / 3 dents / 3 cuts
- 4z — **4 cortes** / 4 dents / 4 cuts
- z ≥ 4 — **Varios cortes** / Plusieurs dents / Various cuts

## DENTADO / DENTURE / TEETH

- ALU — **Dentado aluminio** / Denture aluminium / Aluminium teeth
- CRUZ — **Dentado cruzado** / Denture croisée / Crossed teeth
- DIAM — **Dentado diamond** / Denture diamond / Diamond teeth

| Materia prima / Matière Première / Raw Material | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Composición / Composition | | | | | |
| Nombre /Nom / Name | | Nr. | HS | C | Cr | Mo | W | V | Co |
| HSS | M2 | 1.3343 | 6-5-2 | 0,9 | 4,2 | 5,0 | 6,4 | 1,8 | - |
| HSSCO/HSSE (5%Co) | M35 | 1.3243 | 6-5-2-5 | 0,93 | 4,2 | 5,0 | 6,4 | 1,8 | 4,8 |
| HSSE (8%Co) | M42 | 1.3247 | 2-9-1-8 | 1,08 | 3,8 | 9,4 | 1,5 | 1,2 | 8,0 |
| HSSE-PM | ASP 2030 | | 6-5-3-8 | 1,28 | 4,2 | 5,0 | 6,4 | 3,1 | 8,5 |
| | ASP 2052 | | 10-2-5-8 | 1,6 | 4,8 | 2,0 | 10,5 | 5,0 | 8,0 |
| | | | | WC | Co | Grain | | | |
| HM | ISO | K20-K40 | | 90 | 10 | 0,5-0,8 | | | |

| Tratamientos y Recubrimientos / Traitements et Revêtements/Traitements and Coating | | | | | |
|---|---|---|---|---|---|
| | Tipo/Type | Temp.Max. | HV | Coef. fricción | |
| VAP | | 300ºC | 800 | 0,7 | Vapotización / Vaporisation / Vaporization |
| TiN | | 500ºC | 2500 | 0,5 | Nitruro de Titanio / Nitrure de Titane / Titanium Nitride |
| TiN+ | Multi | 800ºC | 3500 | 0,3 | TiAlN + TiN |
| TiAlN | Multi | 1000ºC | 3500 | 0,5 | Nitruro de Titanio Aluminio / Nitrure de Titane Aluminium / Titanium Aluminium Nitride |
| TiCN | | 400ºC | 3300 | 0,5 | Carbonitruro de Titanio / Carbonitrure de Titane / Titane Carbonitride |
| TiCN+ | Multi | 400ºC | 3700 | 0,2 | TiN + TiCN |
| AlCrN | Multi | 1000ºC | 3300 | 0,4 | Nitruro de Cromo Aluminio / Nitrute de Crome Aluminium / Cromium Aluminium Nitride |
| AlCr | Multi | 1000ºC | 3300 | 0,4 | Cromo Aluminio / Crome Aluminium / Cromium Aluminium |
| HL | Multi | 800ºC | 3000 | 0,15 | TiAlN + WC/C |

## Materiales ISO / Matériaux ISO / ISO Marterials

| | | Material | Matières | Material | (N/mm2) | HB 30 | HRC | Mat-Nr | DIN | AISI | UNE | Brand name |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P** ACEROS ACIERS STEELS | P.1 | Aceros blandos fácil mecanización | Aciers de décolletage | Free-machining steels | <600 | <175 | | 1.0722 | 10SPb20 | 1108 | 10S20 | |
| | P.2 | Aceros de construcción | Aciers de construction | Construction steels | <800 | <240 | | 1.0503 | C45 | 1045 | F114 | |
| | P.3 | Aceros baja aleación y cementación | Aciers de bas alliage et cementés | Low alloyed and case hardening steels | <1000 | <300 | <30 | 1.7225 | 42CrMo4 | 4140 | F-1252 | |
| | P.4 | Aceros aleados tratados o nitrurados | Aciers alliés traités et nitrurés | Alloyed heat-treatable and nitriding steels | <1200 | <360 | <38 | 1.8159 | 51CrV4 | 6150 | 51CrV4 | |
| | P.5 | Aceros tratados de alta aleación | Aciers traité du haute alliage | High alloyed hardened steels | <1400 | <430 | <44 | 1.8523 | 40CrMoV13-9 | | | |
| **M** ACEROS INOX ACIERS INOX STAINLESS STEEL | M.1 | Ferríticos y martensíticos | Ferritiques et mastensitiques | Ferritics and martensitics | <950 | <285 | | 1.4104 | X14CrMoS17 | 430 F | F-3431 | |
| | M.2 | Austeníticos | Austénitiques | Austenitics | <950 | <285 | | 1.4301 | X5CrNi18-10 | 304 | F-3551 | |
| | M.3 | Austeníticos- ferríticos (Dúplex) | Austénitiques-ferritiques (Dúplex) | Austenitics-ferritics (Dúplex) | <1000 | <300 | | 1.4462 | X2CrNiMoN22-5-3 | 2205 | | |
| | M.4 | Austeníticos- ferríticos resistente a la calor (Super Dúplex) | Austénitiques-ferritiques résistants à la chaleur (Super Dúplex) | Heat resistant austenitics-ferritics (Super Dúplex) | <1200 | <360 | <38 | 1.4410 | X2CrNiMoN25-7-4 | 2507 | | |
| **K** FUNDICIÓN FONTE CAST IRON | K.1 | Fundición gris con grafito laminar (GJL) | Fontes à graphite lamellaire (GJL) | Cast iron with lamellar graphite (GJL) | <450 | <130 | | 0.6010 | EN-GJL-100 | A48-20 B | GG 10 | |
| | K.2 | Fundición gris con grafito vermicular (GJV) | Fontes à graphite vermiculaire (GJV) | Cast iron with vermicular graphite (GJV) | <500 | <150 | | | EN-GJV-400 | | | GGV 400 |
| | K.3 | Fundición gris maleable (GTMW,GJMB) | Fontes à malleábles (GTMW,GJMB) | Malleable cast iron (GTMW,GJMB) | <800 | <240 | | 0.8045 | EN-GJMW-450-7 | MB 450-7 | GTW 45 | |
| | K.4.1 | Fundición gris con grafito nodular (GJS) | Fontes à graphite sphéroïdal (GJS) | Cast iron with nodular graphite (GJS) | <700 | <210 | | 0.7040 | EN-GJS-400-15 | 60-40-18 | GGG 40 | GGG 40 |
| | K.4.2 | Fundición gris tratada con grafito nodular (GJH,GJS-ADI) | Fontes traités à graphite sphéroidal (GJH,GJS-ADI) | Hardened cast iron with nodular graphite (GJS) | <1400 | <430 | <44 | | EN-GJS-1200-2 | | | ADI 1200 |
| **N** METALES NO FERROSOS MÉTAL NON FERREUX NON-FERREOUS METALS | N.1.1 | Aluminio no aleado y aleaciones forjables | Aluminium non allié et alliages corroyés | Aluminium non alloyed and wrought alloys | <500 | <150 | | 3.2315 | AlMgSi1 | | L-3451 | ENAW-6082 |
| | N.1.2 | Fundición de aluminio Si <12% | Fontes d'aluminium à Si<12% | Cast aluminium alloys Si<12% | <350 | <100 | | 3.2581 | G-AlSi12 | A 413.2 | | ENAC-44200 |
| | N.1.3 | Fundición de aluminio Si >12% | Fontes d'aluminium à Si>12% | Cast aluminium alloys Si>12% | <450 | <130 | | | G-AlSi17Cu4Mg | | | ENAC-48100 |
| | N.2.1 | Cobre puro o poco aleado | Cuivre pur et faiblement allié | Pure and low alloyed cooper | <400 | <120 | | 2.0065 | E-Cu58 | | | Cu-ETP |
| | N.2.2 | Aleaciones de cobre de viruta corta | Alliages de cuivre - copeau curt | Cooper alloys - short chipping | <400 | <120 | | 2.0402 | CuZn40Pb2 (Ms58) | C38500 | | Ms58 |
| | N.2.3 | Aleaciones de cobre de viruta larga | Alliages de cuivre - copeau long | Cooper alloys - long chipping | <700 | <210 | | 2.0321 | CuZn37 (Ms63) | C27200 | | Ms63 |
| | N.2.4 | Aleaciones de cobre de alta resistencia | Alliages de cuivre du haute résistance | High strength cooper alloys | <1000 | <300 | | | | | | AMPCO 45 |
| | N.3.1 | Aleaciones de magnesio y zinc | Alliages de magnésium et zinc | Magnesium and zinc alloys | <500 | <150 | | | ZnAl4 (Z400) | AG40A | | ZAMAK |
| | N.4.1 | Termoplásticos | Termoplastiques | Termoplastiques | <50 | | | | | | | PVC |
| | N.4.2 | Duroplásticos | Duroplastiques | Hard plastics | <80 | | | | | | | Baquelita |
| | N.4.3 | Plásticos reforzados con fibras | Plastiques chargées en fibres | Fibre reinforced plastics | <200 | | | GFK | | | | GFK |
| **S** TITANIO Y SUPERALECIONES TITANIUM ET SUPERALLIAGES TITANIUM AND SUPERALLOYS | S.1.1 | Aleaciones de níquel y hierro | Alliages de nickel et fer | Nickel and Iron alloys | <850 | <255 | | 2.4360 | NiCu30Fe | | | Monel 400 |
| | S.1.2 | Aleaciones de níquel y hierro | Alliages de nickel et fer | Nickel and Iron alloys | <1400 | <430 | <44 | 2.4668 | NiCr19FeNbMo | | | Inconel 718 |
| | S.2.1 | Titanio puro | Titane pur | Pure titanium | <700 | <200 | | 3.7025 | Ti99.8 | | | |
| | S.2.2 | Aleaciones de titanio tipo α | Alliages de titane α type | Titanium alloys α type | <900 | <270 | | 3.7165 | Ti-6Al-4V | R56400 | | T-A6V |
| | S.2.3 | Aleaciones de titanio tipo ß | Alliages de titane ß type | Titanium alloys ß type | <1200 | <360 | <38 | | Ti-10V-2Fe-3AL | | | |
| **H** MATERIALES DUROS MATIÉRS DURS HARDENED STEELS | H.1 | Aceros templados <50 HRc | Aciers traités <50 HRc | Hardened steel <50 HRc | | | <50 | | | | | Hardox 500 |
| | H.2 | Aceros templados <55 HRc | Aciers traités <55 HRc | Hardened steel <55 HRc | | | <55 | | | | | Hardox 550 |
| | H.3 | Aceros templados <60 HRc | Aciers traités <60 HRc | Hardened steel <60 HRc | | | <60 | | | | | Hardox 600 |

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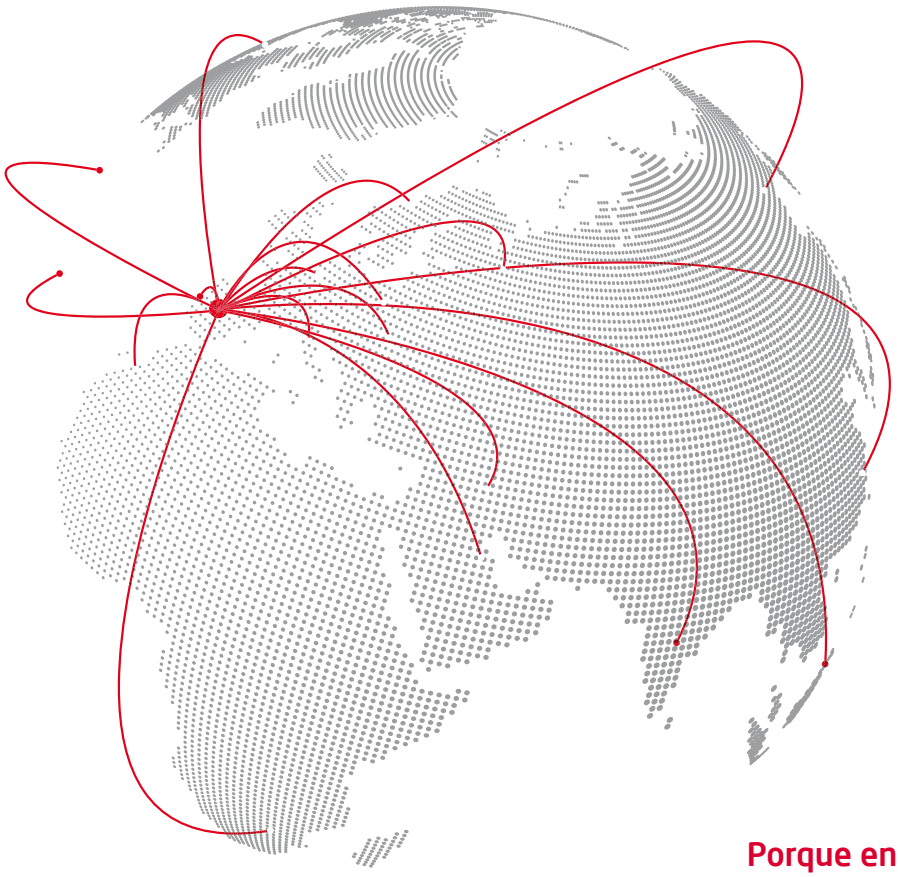
- Totem / Display
- Totem / Display
- Totem / Display

Hepyc CUTTING TOOL EXPERTS

## Porque somos expertos en herramienta de corte desde hace más de 70 años

**Y hoy somos una industria 4.0 con presencia en los sectores más innovadores de la producción gracias a inversiones millonarias, robotización, crecimiento continuado en gama y mercados internacionales.**



## Porque en menos de 24 horas estamos allí

**Hepyc es una empresa orientada al cliente. Con entregas en cualquier parte del mundo en cuestión de horas y un departamento de asistencia exclusivamente orientado a solventar dudas, dar apoyo técnico, formación... a nuestros clientes.**

- Líderes nacionales en herramienta de roscado. Presentes en más de 30 países.
- Hepyc, leaders nationaux en outils de filetage. Présents dans plus de 30 pays.
- Hepyc, national leaders in threading tools. With a presence in over 30 countries.

## Parce que nous sommes experts en outils de coupe depuis plus de 70 ans

Nous sommes aujourd'hui une industrie 4.0 présente sur les secteurs les plus innovants de la production grâce à des investissements qui se chiffrent en millions, la robotisation, l'expansion continue de la gamme et les marchés internationaux.

## Because we have been experts in cutting tools for over 70 years

And right now we are a 4.0 industry with a presence in the most innovative sectors of production thanks to heavy investment, robotization, ongoing product range growth and international markets.

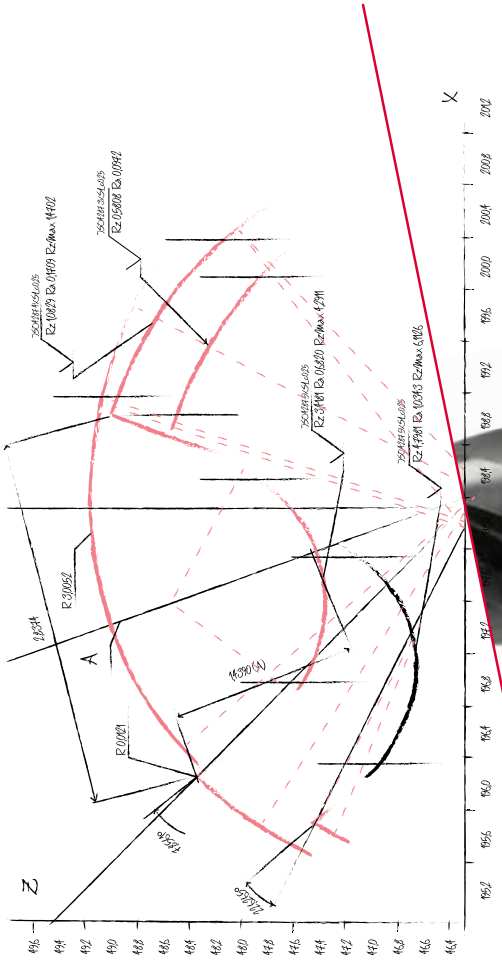
## Parce que nous sommes chez vous en moins de 24 heures

Chez Hepyc, le service du client est notre maître mot. Nous livrons partout dans le monde en quelques heures et nous mettons à votre disposition notre service d'assistance exclusivement conçu pour répondre aux questions de nos clients et leur apporter un support technique et la formation nécessaire.

## Because we arrive in less than 24 hours

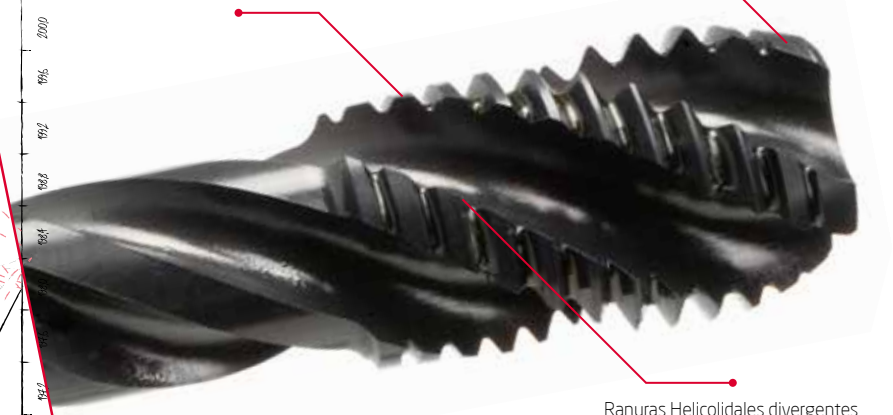
Hepyc is a company geared towards its customers. With deliveries in any part of the world within a matter of hours, and a support department exclusively geared towards dealing with our customers' queries, and providing them with technical support, training, etc.

HUNIX / UNIVERSAL THREADING TAP / by Hepyc



Perfil de Ranura Optimizado
Profil de rainure optimisé
Optimized flute profile

Tecnología Micro-finish
Technologie Micro-finish
Micro-finish technology



Ranuras Helicolidales divergentes
Rainures hélicoïdales divergentes
Divergent spiral flutes

## Simplifica tareas, ahorra problemas

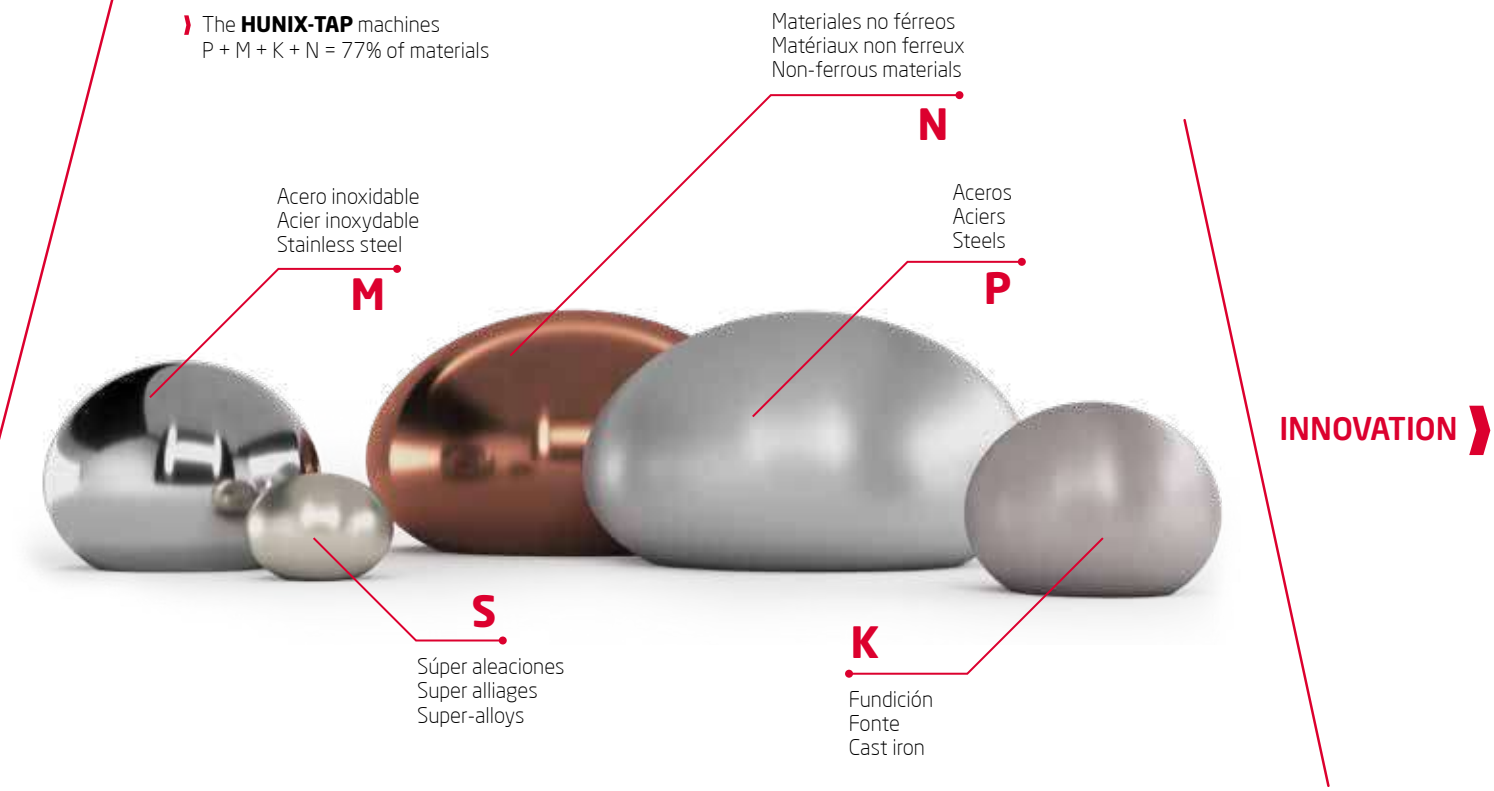
Hunix es la nueva gama de machos de roscar universal de Hepyc. Una innovación, de desarrollo propio, que ha dado como resultado una herramienta capaz de mecanizar por si sola hasta el 77% de los materiales.

¿Imaginas lo que supone para un distribuidor reducir sus referencias aumentando la calidad? ¿Y la optimización del proceso de mecanizado de una industria? Disminución de tiempos, reducción de incidencias, simplificación de stock... ¡menos problemas! ¡más eficiencia! Además, gracias a nuestro exclusivo diseño y fabricación, conseguimos hasta 2 veces más de vida útil y mejora en el mecanizado.

HUNIX / VAP

**VAP** / **Básico para una mejor Lubricación**
**La base d'une meilleure lubrification**
**Basic for better lubrication**

- **HUNIX-TAP** puede mecanizar
  P + M + K + N= 77% de los materiales
- **HUNIX-TAP** peut usiner
  P + M + K + N = 77% des matériaux
- The **HUNIX-TAP** machines
  P + M + K + N = 77% of materials




**INNOVATION**

## Simplifie les tâches, évite les problèmes

Hunix est la nouvelle gamme filetages universels de Hepyc. Une innovation, développée en interne qui a donné naissance à un outil capable d'usiner seul jusqu'à 77% des matériaux.
Pouvez-vous imaginer ce que cela signifie pour un distributeur de réduire ses références en augmentant la qualité ? Et qu'en est-il de l'optimisation du processus d'usinage dans une industrie ? Réduction des temps, réduction des incidents, simplification du stock... moins de problèmes ! plus d'efficacité ! De plus, grâce à notre conception et à notre fabrication exclusives, nous obtenons jusqu'à 2 fois plus de durée de vie utile et d'amélioration de l'usinage.

## Simplify tasks, save on problems

Hunix is the new Hepyc range of universal tap screws. A proprietary innovation that has resulted in a tool capable of machining up to 77% of materials by itself.
Can you imagine what it means for a distributor to reduce his references while increasing quality? And the optimization of the machining process of an industry? Decrease in production times, reduction of incidents, stock simplification... less problems! More efficiency! Moreover, thanks to our exclusive design and manufacturing, we achieve over a useful life over 2 times longer and machining improvements.

HUNIX / TIN+

**TIN+** **Tratamiento Bicapa**
**Traitement à deux couches**
**Two-layer coating**

# Taladrado
# Perçage
# Drilling

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## **Brocas con mango cilíndrico cortas /** Forets à queue cylindrique courtes / Short straight shank drill-bits (DIN 338)


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1101 | HSS | DIN338N | | | 118° 30° | P K N | 31 |
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| 1158 | HSS | DIN338NSP | | | 118° 30° | P K N | 35 |
| 1158/9 | HSS | DIN338NSP | | | 118° 30° | P K N | 36 |
| 1108 | HSS | DIN338NSP | TIN | | 118° 30° | P K N | 37 |
| 1103 | HSS | DIN338H | | | 118° 18° | N | 38 |
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P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
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## Brocas con mango cilíndrico cortas / Forets à queue cylindrique courtes / Short straight shank drill-bits (DIN 338)


| | | | | | | |
|---|---|---|---|---|---|---|
| 1105/9 | HSSCO | DIN 338N | | | | P K N | 40 |
| 1161 | HSSCO | DIN338N | TIALN | | | P K N | 41 |
| 1107 | HSSCO | DIN338N | | | | P K N | 41 |
| 1107/9 | HSSCO | ANSI | | | | P K N | 42 |
| NEW 1187 | HSSCO | DIN338W | | | | P M N S | 43 |
| 1106 | HSSCO | DIN338W | | | | M N S | 44 |
| 1162 | HSSCO | DIN338W | TIALN | | | M N S | 45 |
| 1159 | HSSCO | DIN338S | | | | P N | 46 |
| 1160 | HSSCO | DIN338S | TIALN | | | P N | 47 |
| 1110 | WIDIA | DIN338N | | | | P K N | 48 |


## Brocas con mango cilíndrico largas / Forets à queue cylindrique longues / Long straight shank drill-bits (DIN 340)


| | | | | | | |
|---|---|---|---|---|---|---|
| 1112 | HSS | DIN 340 N | | | | P K N | 49 |
| 1113 | HSSCO | DIN 340 N | | | | P K N | 50 |
| 1114 | HSSCO | DIN 340 S | | | | P N | 51 |
| 1164 | HSSCO | DIN 340 S | TIALN | | | P N | 52 |


## Brocas con mango cilíndrico extra largas / Forets à queue cylindrique extra longues / Extra-long straight shank drill-bits (DIN 1869)


| | | | | | | |
|---|---|---|---|---|---|---|
| 1115 | HSS | DIN 1869 N | | | | P K N | 53 |
| 1165 | HSSCO | DIN 1869 S | | | | P N | 54 |


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**Brocas con mango cilíndrico extra cortas /** Forets à queue cylindrique extra-courtes / Extra-short straight shank drill-bits (DIN 1897)

| | | | | | | |
|---|---|---|---|---|---|---|
| 1116 | HSS | DIN 1897 N | | | | P K N 55 |
| 1117 | HSS | DIN 1897 N | | | | P K N 56 |
| 1118 | HSSCO | DIN 1897 N | | | | P K N 56 |
| 1166 | HSSCO | DIN 1897 S | | | | P N 57 |
| 1167 | HSSCO | DIN 1897 S | TIALN | | | P N 58 |

**Brocas con mango cónico /** Forets à queue conique / Taper straight shank drill-bits

| | | | | | | |
|---|---|---|---|---|---|---|
| 1121 | HSS | DIN 345 N | | | | P K N 59 |
| 1121/9 | HSS | DIN 345 N | | | | P K N 61 |
| 1123 | WIDIA | DIN 345 N | | | | P K 62 |
| 1122 | HSSCO | DIN 345 N | | | | P K N 63 |
| 1181 | HSSCO | | | | | P S H 64 |
| 1125 | HSS | DIN 341 N | | | | P K N 65 |
| 1126 | HSS | DIN 1870 N | | | | P K N 66 |
| 1139 | HSS | DIN 343 | | | | P K N 67 |

**Brocas bidiametrales /** Forets biétagés / Two-diameter drill-bits

| | | | | | | |
|---|---|---|---|---|---|---|
| 1127 | HSS | DIN 8376 | | | | P K N 68 |
| 1128 | HSS | DIN 8374 | | | | P K N 68 |
| 1129 | HSS | DIN 8377 | | | | P K N 69 |
| 1130 | HSS | DIN 8375 | | | | P K N 69 |




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## **Brocas bidiametrales /** Forets biétagés / Two-diameter drill-bits

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1152 | HSS | DIN 8378 | | | P K N | 70 |
| | 1153 | HSS | DIN 8379 | | | P K N | 70 |
| NEW | 1191 | HSSCO | | | | P M K N S | 71 |
| NEW | 1192 | HSSCO | | | | P M K N S | 71 |

## **Brocas de centrar /** Forets à centrer / Centre drill-bits

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1132 | HSS | DIN 333 A | | | P K N | 72 |
| NEW | 1188 | HSS | DIN 333 A | TIN | | P K N | 72 |
| NEW | 1193 | HM-MD | DIN 333 A | | | P M K N S H | 73 |
| | 1133 | HSS | DIN 333 A | | | P K N | 73 |
| | 1135 | HSS | DIN 333 R | | | P K N | 74 |
| | 1137 | HSS | DIN 333 B | | | P K N | 74 |
| | 1138 | HSSCO | | | | P M K N S | 75 |
| | 1155 | HSSCO | | | | P M K N S | 75 |
| NEW | 1189 | HSSCO | | TIN | | P M K N S | 76 |
| NEW | 1190 | HSSCO | | TIN | | P M K N S | 76 |
| | 1179 | HM-MD | | | | P M K N S | 77 |
| | 1180 | HM-MD | | | | P M K N S | 77 |
| NEW | 1185 | HM-MD | | TIALN | | P M K N S | 78 |
| NEW | 1186 | HM-MD | | TIALN | | P M K N S | 78 |

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|---|---|---|---|---|---|---|---|---|
| | 1119 | HSSCO | DIN 1897N | | | | P | 79 |
| NEW | 1194 | HSSCO | DIN 1897N | TIALN | | | P | 79 |

**Brocas fresa /** Forets fraiseur / Mill drills

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 5114 | HSS | | | | | P N | 80 |
| | 5115 | HSS | | TIN | | | P N | 80 |

**Accesorios /** Accessoires / Accessories

| | | | | | |
|---|---|---|---|---|---|
| 6110 | **Espiga /** Queue à tenon / Bit shank | | | | 81 |
| 6111 | **Casquillo DIN 2185 /** Douille de réduction / Drill sleeve | | | | 81 |
| 6114 | **Contrapunto /** Contrepointe / Fixed centre | | | | 81 |
| 6112 | **Alargadera /** Adaptateur / Extension piece | | | | 82 |
| 6113 | **Expulsor /** Éjecteur / Ejector | | | | 82 |
| 6115 | **Punto giratorio /** Pointe tournante / Revolving lathe centre | | | | 83 |
| 6101 | HP1 | | | | 83 |
| 6120 | HP1-CM | | | | 83 |
| 6102 | HP2 | | | | 84 |
| 6103 | HP3 | | | | 84 |
| 6122 | Afilador de Brocas / Affûteuses forets / Twist Drill Sharpener | | | | 85 |
| 6123 | Porta / Mandrins / Chuck | | | | 85 |
| 6124 | Muela / Meule / Wheel | | | | 85 |




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| | | | |
|---|---|---|---|
| **Estuches /** Coffrets / Sets | | | 86 |
| **Expositores /** Presentoirs / Displays | | | 90 |

# FORMULARIO BROCAS ESPECIALES
# FICHE TECHNIQUE FORETS SPECIAUX / TECHNICAL ENQUIRY FOR SPECIAL DRILL BITS

Fecha / Date: .....

Empresa / Entreprise / Company: ..... Contacto / Contact: .....

Dirección / Adresse / Adress: ..... Población / Ville / Town: .....

Tel / Fax: ..... E-mail: .....

.....

TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK

Material / Matière / Material ..... Norma / Norme / Norm: .....

Dureza / Dureté / Hardness ..... HB ..... HRc Resistencia / Résistance / Resistance ..... N/mm$^2$

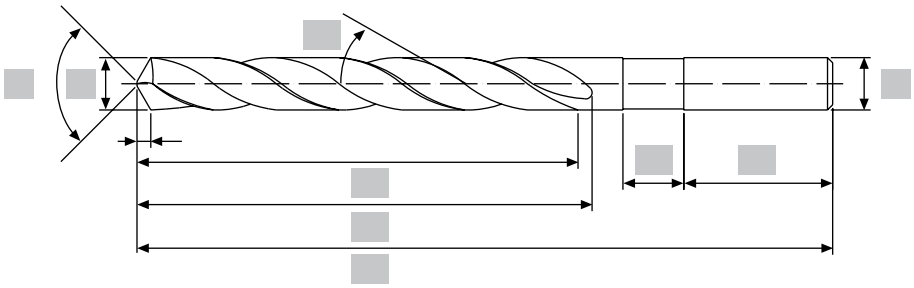
Tipo viruta: ☐ Corta ☐ Larga ☐ Polvo
Type copeau Courte Longue Poussière
Shaving Short Long Powder

Máquina / Machine ..... Refrigerante / Réfrigérant / Coolant .....

Posición / Position ☐ Horizontal ☐ Vertical ☐ V. Corte / V. Coupe / Cutting Speed ☐ V. avance / Avance / Feed

HERRAMIENTA / OUTIL / TOOL

Descripción / Description ..... Cantidad / Quantité / Quantity .....



Mango: ☐ Cilíndrico ☐ Weldon ☐ Cónico ☐ Rebajado
Queue: Cylindrique Weldon Conique Réduite
Shank: Straight Weldon Taper Reduced

Afilado: ☐ Convencional ☐ Corrección de labios ☐ Split Point ☐ Puntos soldadura ☐ Placa carburo
Affûtage: Normal Correction de lèvres Affûtage en croix Points de soudure plaquette carbure
Sharpened: Convencional Lip correction Split Point Welding points Carbide sheet

Material / Matière / Material: ☐ HSS ☐ HSSE ☐ HM ☐ HSS-HM

Superficie / Surface: ☐ Brillante / Brillant / Brilliant ☐ Negra / Noire / Black ☐ Recubrimiento / Revêtement / Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....

.....

.....

.....

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Tel. (+34) 93 387 32 99 - Fax.(+ 34) 93 383 33 08 - especiales@hepycrf.com

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| Ref./ Réf. / Ref. | 1175 | 1176 | 1177 | 1178 | 1184 | 1182 | 1120 | 1109 |
|---|---|---|---|---|---|---|---|---|
| Prof./ Prof./Depth | 3xd | 3xd | 5xd | 8xd | 12xd | 1Xd | 2xd | 4xd |
| Punta/Poin/Point | 140° | 140° | 140° | 140° | 140° | 120° | 118° | 118° |
| Refrig./Réfrig./Cooling | No | Si | Si | Si | Si | No | No | No |
| Mat. | HM | HM | HM | HM | HM | HM | HM | HM |
| Rec./Rev./Coat. | TIALN | TIALN | TIALN | TIALN | TIALN | TIN | | |
| DIN | 6537 | 6537 | 6537 | 6537 | - | - | 6539 | 338 |
| Gama/Gamme/Range | 3-20 | 3-20 | 3-20 | 3-16 | 3-16 | M3-M12 | 2-13 | 2-10,20 |
| Pag. | 24 | 25 | 26 | 27 | 27 | 28 | 29 | 30 |

| Mat. | | Avance/Feed (mm/rpm) Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Vc (m/min) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.1 | <600 | 0,10-0,14 | 0,20-0,28 | 0,30-0,45 | 0,38-0,55 | 0,48-0,68 | o 80-110 | o 90-120 | o 90-120 | o 90-120 | o 70-90 | | ● 40-70 | ● 40-70 |
| P.2 | <800 | 0,08-0,12 | 0,16-0,24 | 0,25-0,38 | 0,32-0,48 | 0,40-0,60 | ● 40-80 | ● 50-90 | ● 50-90 | ● 50-90 | ● 40-80 | | ● 30-60 | ● 30-60 |
| P.3 | <1000 | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | ● 35-75 | ● 40-85 | ● 40-85 | ● 40-85 | ● 35-55 | | ● 25-50 | ● 25-50 |
| P.4 | <1200 | 0,04-0,08 | 0,08-0,16 | 0,12-0,26 | 0,15-0,32 | 0,18-0,40 | ● 30-50 | ● 35-55 | ● 35-55 | ● 35-55 | ● 30-50 | | ● 20-40 | ● 20-40 |
| P.5 | <1400 | 0,03-0,06 | 0,06-0,12 | 0,08-0,20 | 0,10-0,25 | 0,12-0,30 | ● 25-40 | ● 30-45 | ● 30-45 | ● 30-45 | ● 25-40 | | o 15-25 | o 15-25 |
| M.1 | <950 | 0,04-0,08 | 0,08-0,16 | 0,12-0,26 | 0,15-0,32 | 0,18-0,40 | ● 35-75 | ● 40-85 | ● 40-85 | ● 40-85 | ● 35-55 | | o 20-25 | o 20-25 |
| M.2 | | 0,04-0,08 | 0,08-0,16 | 0,12-0,26 | 0,15-0,32 | 0,18-0,40 | ● 35-75 | ● 40-85 | ● 40-85 | ● 40-85 | ● 35-55 | | o 20-25 | o 20-25 |
| M.3 | <1200 | 0,03-0,06 | 0,06-0,12 | 0,08-0,20 | 0,10-0,25 | 0,12-0,30 | | o 35-55 | o 35-55 | o 35-55 | | | | |
| M.4 | | 0,03-0,06 | 0,06-0,12 | 0,08-0,20 | 0,10-0,25 | 0,12-0,30 | | o 30-45 | o 30-45 | o 30-45 | | | | |
| K.1 | <500 | 0,08-0,12 | 0,16-0,24 | 0,25-0,38 | 0,32-0,48 | 0,40-0,60 | ● 100-130 | ● 120-150 | ● 120-150 | ● 120-150 | ● 90-120 | | ● 50-70 | ● 50-70 |
| K.2 | | 0,08-0,12 | 0,16-0,24 | 0,25-0,38 | 0,32-0,48 | 0,40-0,60 | o 60-80 | o 70-90 | o 70-90 | o 70-90 | o 60-80 | | | |
| K.3 | <800 | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | ● 80-110 | ● 90-120 | ● 90-120 | ● 90-120 | ● 70-90 | | ● 40-50 | ● 40-50 |
| K.4.1 | | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | o 70-90 | o 80-110 | o 80-110 | o 80-110 | o 60-80 | | | |
| K.4.2 | <1400 | 0,03-0,06 | 0,06-0,12 | 0,08-0,20 | 0,10-0,25 | 0,12-0,30 | ● 40-60 | ● 50-70 | ● 50-70 | ● 50-70 | ● 30-50 | | | |
| N.1.1 | Al | 0,08-0,12 | 0,16-0,24 | 0,25-0,38 | 0,32-0,48 | 0,40-0,60 | | | | | | | ● 100-140 | ● 100-140 |
| N.1.2 | | 0,08-0,12 | 0,16-0,24 | 0,25-0,38 | 0,32-0,48 | 0,40-0,60 | | | | | | | ● 70-100 | ● 70-100 |
| N.1.3 | | 0,08-0,12 | 0,16-0,24 | 0,25-0,38 | 0,32-0,48 | 0,40-0,60 | | | | | | | ● 60-80 | ● 60-80 |
| N.2.1 | Cu | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | | | | | | | ● 40-70 | ● 40-70 |
| N.2.2 | | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | | | | | | | ● 40-70 | ● 40-70 |
| N.2.3 | | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | | | | | | | ● 30-60 | ● 30-60 |
| N.2.4 | | 0,04-0,08 | 0,08-0,16 | 0,12-0,26 | 0,15-0,32 | 0,18-0,40 | | | | | | | ● 25-50 | ● 25-50 |
| N.3.1 | Mg/Zn | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | | | | | | | ● 30-60 | ● 30-60 |
| N.4.1 | Plastic | 0,06-0,10 | 0,12-0,20 | 0,20-0,32 | 0,25-0,40 | 0,30-0,50 | | | | | | | ● 40-70 | ● 40-70 |
| N.4.2 | | | | | | | | | | | | | | |
| N.4.3 | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,03-0-05 | 0,05-0,08 | 0,08-0,12 | 0,12-0,16 | 0,16-0,20 | o 20-25 | ● 25-30 | ● 25-30 | ● 25-30 | ● 20-25 | | o 10-15 | o 10-15 |
| S.1.2 | | 0,03-0-05 | 0,05-0,08 | 0,08-0,12 | 0,12-0,16 | 0,16-0,20 | | o 20-25 | o 20-25 | o 20-25 | o 15-20 | | | |
| S.2.1 | Ti | 0,04-0,08 | 0,08-0,16 | 0,12-0,26 | 0,15-0,32 | 0,18-0,40 | ● 35-75 | ● 40-85 | ● 40-85 | ● 40-85 | | | o 15-25 | o 15-25 |
| S.2.2 | | 0,03-0-05 | 0,05-0,08 | 0,08-0,12 | 0,12-0,16 | 0,16-0,20 | o 25-35 | ● 30-40 | ● 30-40 | ● 30-40 | | | o 10-15 | o 10-15 |
| S.2.3 | | 0,03-0-05 | 0,05-0,08 | 0,08-0,12 | 0,12-0,16 | 0,16-0,20 | o 20-25 | ● 25-30 | ● 25-30 | ● 25-30 | | | | |
| H.1 | 50 HRC | 0,03-0,06 | 0,06-0,12 | 0,08-0,20 | 0,10-0,25 | 0,12-0,30 | o 25-35 | ● 30-40 | ● 30-40 | ● 30-40 | | ● 25-30 | | |
| H.2 | 55 HRC | 0,01-0,04 | 0,04-0,08 | 0,06-0,10 | 0,08-0,12 | 0,10-0,18 | o 15-25 | ● 20-35 | ● 20-35 | ● 20-35 | | ● 15-25 | | |
| H.3 | 60 HRC | 0,01-0,04 | 0,04-0,08 | 0,06-0,10 | 0,08-0,12 | 0,10-0,18 | | o 15-25 | o 15-25 | o 15-25 | | ● 10-15 | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros Aciers Steels | M | Aceros Inox Aciers Inox Stainless Steels | K | Fundicion Fonte Cast Iron | N | Metales no ferrosos Métal non Ferraux Non Ferrous metals | S | Titanio y Superaleaciones Titanium et Superalliages Titanium and Superalloys | H | Materiales Duros Materiels Durs Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| Ref./ Réf. / Ref. | 1101 | 1101/1 | 1104 | 1104/9 | 1501 | 1158 | 1158/9 | 1108 | 1103 | 1105 | 1105/9 | 1161 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DIN | 338 | 338 | 338 | ANSI | 338 | 338 | 338 | 338 | 338 | 338 | 338 | 338 |
| Punta/Poin/Point | 118° | 118° | 118° | 118° | 118° | 118° | 118° | 118° | 118° | 135° | 135° | 135° |
| Ejec./Exéc./Exec. | N | N | N | N | N | NSP | NSP | NSP | N | NSP | NSP | NSP |
| Hel./Hél./Spiral | 30° | 30°-LH | 30° | 30° | 30° | 30° | 30° | 30° | 18° | 30° | 30° | 30° |
| Mat. | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSSCO | HSSCO | HSSCO |
| Rec./Rev./Coat. | | | | | | | | TIN | | | | TIALN |
| Prof./ Prof./Depth | 5xD | 5xD | 3xD | 3xD | 5xD | 5xD | 5xD | 5xD | 5xD | 5xD | 5xD | 5xD |
| Gama/Gamme/Range | 0,20-20 | 2-12 | 10-30 | 17/32-1"1/8 | 3-10 | 1-20 | 1/16-1/2 | 1-13 | 1-13 | 0,50-20 | 1/16-1/2 | 2-13 |
| Pag. | 31 | 33 | 33 | 34 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

| Mat. | | Avance/Feed (mm/rpm) Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Vc (m/min) 1101 | 1101/1 | 1104 | 1104/9 | 1501 | 1158 | 1158/9 | 1108 | 1103 | 1105 | 1105/9 | 1161 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.1 | <600 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 35-45 | | o 25-35 | o 25-35 | o 35-50 |
| P.2 | <800 | 0,02-0,06 | 0,08-0,12 | 0,12-0,30 | 0,18-0,40 | 0,22-0,46 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 20-40 | | ● 15-30 | ● 15-30 | ● 25-45 |
| P.3 | <1000 | 0,02-0,03 | 0,05-0,07 | 0,12-0,18 | 0,18-0,24 | 0,22-0,28 | | | | | | | | ● 15-30 | | ● 12-20 | ● 12-20 | ● 18-30 |
| P.4 | <1200 | 0,01-0,04 | 0,04-0,09 | 0,09-0,18 | 0,12-0,28 | 0,14-0,33 | | | | | | | | | | ● 6-16 | ● 6-16 | ● 10-25 |
| P.5 | <1400 | 0,01-0,04 | 0,04-0,09 | 0,09-0,18 | 0,12-0,28 | 0,14-0,33 | | | | | | | | | | | | |
| M.1 | <950 | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | | | | o 10-14 | o 10-14 | o 15-20 |
| M.2 | <950 | 0,01-0,03 | 0,05-0,07 | 0,14-0,18 | 0,20-0,24 | 0,22-0,28 | | | | | | | | | | o 8-12 | o 8-12 | o 12-18 |
| M.3 | <1200 | | | | | | | | | | | | | | | | | |
| M.4 | <1200 | | | | | | | | | | | | | | | | | |
| K.1 | <500 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 35-40 | | ● 25-30 | ● 25-30 | ● 38-45 |
| K.2 | <500 | | | | | | | | | | | | | | | | | |
| K.3 | <800 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | | | | | | | | | | | | |
| K.4.1 | <800 | 0,04-0,06 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 12-16 | ● 12-16 | ● 12-16 | ● 12-16 | ● 12-16 | ● 12-16 | ● 12-16 | ● 15-20 | | ● 12-16 | ● 12-16 | ● 18-25 |
| K.4.2 | <1400 | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | | | | | | |
| N.1.1 | Al | 0,03-0,05 | 0,08-0,12 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | | o 75-90 | | | | |
| N.1.2 | Al | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 65-75 | | o 50-60 | o 50-60 | o 70-80 |
| N.1.3 | Al | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | | | | | | |
| N.2.1 | Cu | 0,03-0,05 | 0,08-0,10 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | | | ● 40-60 | | | |
| N.2.2 | Cu | 0,03-0,05 | 0,08-0,10 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | | | o 25-60 | | | |
| N.2.3 | Cu | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 30-60 | ● 30-60 | ● 30-60 | ● 30-60 | ● 30-60 | ● 30-60 | ● 30-60 | ● 40-70 | | ● 30-60 | ● 30-60 | ● 45-80 |
| N.2.4 | Cu | | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | | | | | | |
| N.4.1 | Plastic | 0,03-0,04 | 0,06-0,07 | 0,12-0,13 | 0,16-0,17 | 0,25-0,26 | o 20-25 | o 20-25 | o 20-25 | o 30-35 | | o 20-25 | o 20-25 | o 20-25 | | o 20-25 | o 20-25 | o 30-35 |
| N.4.2 | Plastic | 0,03-0,04 | 0,06-0,07 | 0,12-0,13 | 0,16-0,17 | 0,25-0,26 | | | | | | | | | | | | |
| N.4.3 | Plastic | | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | | | | | |
| S.1.2 | Ni | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | | | | | |
| S.2.1 | Ti | 0,01-0,03 | 0,04-0,06 | 0,08-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | | | | | |
| S.2.2 | Ti | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | | | | | |
| S.2.3 | Ti | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | | | | | |
| H.1 | 50 HRC | 0,02-0,03 | 0,05-0,07 | 0,09-0,13 | 0,14-0,18 | 0,18-0,22 | | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



P Aceros / Aciers / Steels

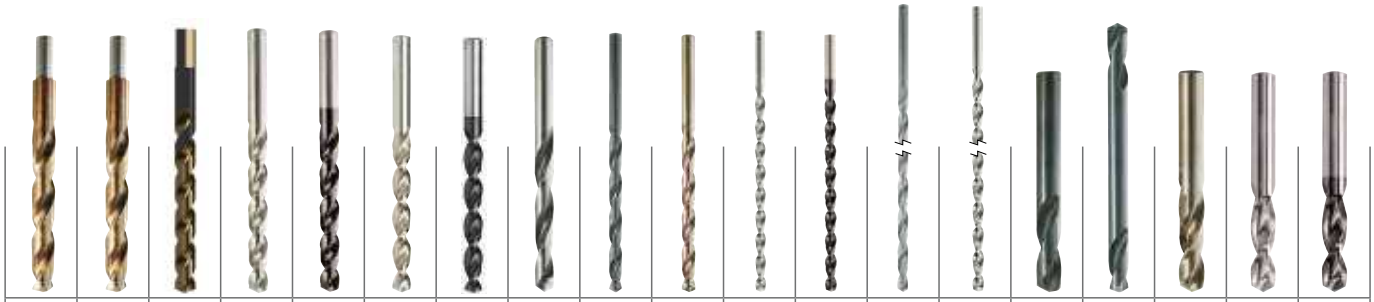
M Aceros Inox / Aciers Inox / Stainless Steels

K Fundicion / Fonte / Cast Iron

N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals

S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys

H Materiales Duros / Materiels Durs / Hard materials



| 1107 | 1107/9 | 1187 | 1106 | 1162 | 1159 | 1160 | 1110 | 1112 | 1113 | 1114 | 1164 | 1115 | 1165 | 1116 | 1117 | 1118 | 1166 | 1167 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | ANSI | 338 | 338 | 338 | 338 | 338 | 338 | 340 | 340 | 340 | 340 | 1869 | 1869 | 1897 | | 1897 | 1897 | 1897 |
| 135° | 135° | 135° | 135° | 135° | 135° | 135° | 118° | 118° | 135° | 135° | 135° | 118° | 135° | 118° | 118° | 135° | 135° | 135° |
| NSP | NSP | W | W | W | TS | TS | N | N | NSP | TS | TS | N | TS | N | N | NSP | TS | TS |
| 30° | 30° | 35° | 35° | 35° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° |
| HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSS WIDIA | HSS | HSSCO | HSSCO | HSSCO | HSS | HSSCO | HSS | HSS | HSSCO | HSSCO | HSSCO |
| | | | | TIALN | | TIALN | | | | | TIALN | | | | | | | TIALN |
| 5xD | 3xD | 5xD | 5xD | 5xD | 5xD | 5xD | 5xD | 10xD | 10xD | 10xD | 10xD | 15-30xD | 15-30xD | 3xD | 3xD | 3xD | 3xD | 3xD |
| 10-20 | 17/32-13/16 | 1-13 | 1-13 | 1-13 | 2-13 | 2-13 | 1,50-20 | 1-20 | 2-13 | 2-13 | 2-13 | 2-13 | 2-12 | 1-20 | 2-8 | 2-13 | 2-16 | 2-16 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 56 | 57 | 58 |
| Vc (m/min) | | | | | | | | | | | | | | | | | | |
| o 25-35 | o 25-35 | ● 35-40 | | | | | | ● 25-35 | o 25-35 | | | ● 25-35 | | ● 25-35 | ● 25-35 | o 25-35 | | |
| ● 15-30 | ● 15-30 | ● 30-35 | | | ● 15-30 | ● 25-45 | ● 25-45 | ● 15-30 | ● 15-30 | ● 15-30 | ● 25-45 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 25-45 |
| ● 12-20 | ● 12-20 | | | | ● 12-20 | ● 18-30 | ● 18-30 | | ● 12-20 | ● 12-20 | ● 18-30 | | ● 12-20 | | | ● 12-20 | ● 12-20 | ● 18-30 |
| ● 6-16 | ● 6-16 | | | | ● 6-16 | ● 10-25 | ● 10-25 | | ● 6-16 | ● 6-16 | ● 10-25 | | | | | ● 6-16 | ● 6-16 | ● 10-25 |
| | | | | | | | o 6-9 | | | | | | | | | | | |
| o 10-14 | o 10-14 | ● 10-14 | ● 10-14 | ● 15-20 | o 10-14 | o 15-20 | | | o 10-14 | o 10-14 | o 15-20 | | o 10-14 | | | o 10-14 | o 10-14 | o 15-20 |
| o 8-12 | o 8-12 | ● 8-12 | ● 8-12 | ● 12-18 | o 8-12 | o 12-18 | | | o 8-12 | o 8-12 | o 12-18 | | o 8-12 | | | o 8-12 | o 8-12 | o 12-18 |
| | | | | | | | | | | | | | | | | | | |
| ● 25-30 | ● 25-30 | | | | | | | ● 25-30 | ● 25-30 | | | ● 25-30 | | ● 25-30 | ● 25-30 | ● 25-30 | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | ● 30-40 | | | | | | | | | | | |
| ● 12-16 | ● 12-16 | | | | | | | ● 12-16 | ● 12-16 | | | ● 12-16 | | ● 12-16 | ● 12-16 | ● 12-16 | | |
| | | | | | | | ● 15-20 | | | | | | | | | | | |
| | | o 60-80 | o 60-80 | o 85-100 | o 60-80 | o 85-100 | | | | o 60-80 | o 85-100 | | o 60-80 | | | | o 60-80 | o 85-100 |
| o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 75-90 | o 50-60 | o 75-90 | | o 50-60 | o 50-60 | o 50-60 | o 75-90 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 50-60 | o 75-90 |
| | | 30-40 | 30-40 | 45-60 | ● 30-40 | ● 45-60 | | | | ● 30-40 | ● 45-60 | | ● 30-40 | | | | ● 30-40 | ● 45-60 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| ● 30-60 | ● 30-60 | o 50-70 | o 50-70 | | | | | ● 30-60 | ● 30-60 | | | ● 30-60 | | ● 30-60 | ● 30-60 | ● 30-60 | | |
| | | | | | | | | | | | | | | | | | | |
| | | o 50-70 | o 50-70 | o 75-95 | ● 50-70 | ● 70-90 | | | | ● 50-70 | ● 70-90 | | ● 50-70 | | | | ● 50-70 | ● 70-90 |
| o 20-25 | o 20-25 | | | | | | o 30-35 | o 20-25 | o 20-25 | | | o 20-25 | | o 20-25 | o 20-25 | o 20-25 | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | ● 8-10 | ● 8-10 | ● 12-15 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | 1121 | 1121/9 | 1122 | 1123 | 1181 | 1125 | 1126 | 1139 |
|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | 1121 | 1121/9 | 1122 | 1123 | 1181 | 1125 | 1126 | 1139 |
| DIN | 345 | 345 | 345 | 345 | | 341 | 1870 | 343 |
| Punta/Poin/Point | 118° | 118° | 135° | 118° | 128° | 118° | 118° | 120° |
| Ejec./Exéc./Exec. | N | N | NSP | N | N | N | N | N |
| Hel./Hél./Spiral | 30° | 30° | 30° | 30° | 15° | 30° | 30° | 30° |
| Mat. | HSS | HSS | HSSCO | HSS WIDIA | HSSCO | HSS | HSS | HSS |
| Rec./Rev./Coat. | | | | | | | | |
| Prof./ Prof./Depth | 5xD | 5xD | 5xD | 5xD | 3xD | 8xD | 10-15xD | 5xD |
| Gama/Gamme/Range | 5-80 | 1/2-2" | 10-40 | 10-30 | 10-50 | 5-40 | 8-50 | 10-40 |
| Pag. | 59 | 61 | 62 | 63 | 64 | 65 | 66 | 67 |

| Mat. | | Avance/Feed (mm/rpm) Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Vc (m/min) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.1 | <600 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 25-35 | ● 25-35 | ● 25-35 | | | ● 25-35 | ● 25-35 | ● 25-35 |
| P.2 | <800 | 0,02-0,06 | 0,08-0,12 | 0,12-0,30 | 0,18-0,40 | 0,22-0,46 | ● 15-30 | ● 15-30 | ● 15-30 | ● 25-45 | | ● 15-30 | ● 15-30 | ● 15-30 |
| P.3 | <1000 | 0,02-0,03 | 0,05-0,07 | 0,12-0,18 | 0,18-0,24 | 0,22-0,28 | | | o 12-20 | o 18-30 | | | | |
| P.4 | <1200 | 0,01-0,04 | 0,04-0,09 | 0,09-0,18 | 0,12-0,28 | 0,14-0,33 | | | o 6-16 | o 10-25 | o 8-10 | | | |
| P.5 | <1400 | 0,01-0,04 | 0,04-0,09 | 0,09-0,18 | 0,12-0,28 | 0,14-0,33 | | | | o 6-9 | o 6-8 | | | |
| M.1 | <950 | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | o 8-12 | | | | | o 8-12 |
| M.2 | | 0,01-0,03 | 0,05-0,07 | 0,14-0,18 | 0,20-0,24 | 0,22-0,28 | | | o 10-14 | | | | | o 10-14 |
| M.3 | <1200 | | | | | | | | | | | | | |
| M.4 | | | | | | | | | | | | | | |
| K.1 | <500 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 25-30 | ● 25-30 | ● 25-30 | | | ● 25-30 | ● 25-30 | ● 25-30 |
| K.2 | | | | | | | | | | | | | | |
| K.3 | <800 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | | | | o 30-40 | | | | |
| K.4.1 | | 0,04-0,06 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 12-16 | ● 12-16 | ● 12-16 | | | ● 12-16 | ● 12-16 | ● 12-16 |
| K.4.2 | <1400 | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | o 15-20 | | | | |
| N.1.1 | Al | 0,03-0,05 | 0,08-0,12 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | | |
| N.1.2 | | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | o 50-60 | o 50-60 | o 50-60 | | | o 50-60 | o 50-60 | o 50-60 |
| N.1.3 | | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | | |
| N.2.1 | Cu | 0,03-0,05 | 0,08-0,10 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | | |
| N.2.2 | | 0,03-0,05 | 0,08-0,10 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | | |
| N.2.3 | | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 30-60 | ● 30-60 | ● 30-60 | | | ● 30-60 | ● 30-60 | ● 30-60 |
| N.2.4 | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | | |
| N.4.1 | Plastic | 0,03-0,04 | 0,06-0,07 | 0,12-0,13 | 0,16-0,17 | 0,25-0,26 | o 20-25 | o 20-25 | o 20-25 | o 30-35 | | o 20-25 | o 20-25 | o 20-25 |
| N.4.2 | | 0,03-0,04 | 0,06-0,07 | 0,12-0,13 | 0,16-0,17 | 0,25-0,26 | | | o 15-20 | | | | | |
| N.4.3 | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | o 5-7 | | | |
| S.1.2 | | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | o 4-6 | | | |
| S.2.1 | Ti | 0,01-0,03 | 0,04-0,06 | 0,08-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | |
| S.2.2 | | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | |
| S.2.3 | | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | | |
| H.1 | 50 HRC | 0,02-0,03 | 0,05-0,07 | 0,09-0,13 | 0,14-0,18 | 0,18-0,22 | | | | | o 4-6 | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | |

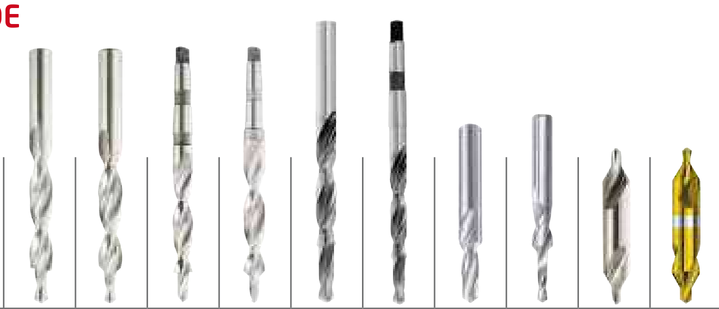
● Optima / Optimun ○ Alternativo / Alternative

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

Hepyc | CUTTING TOOL EXPERTS

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

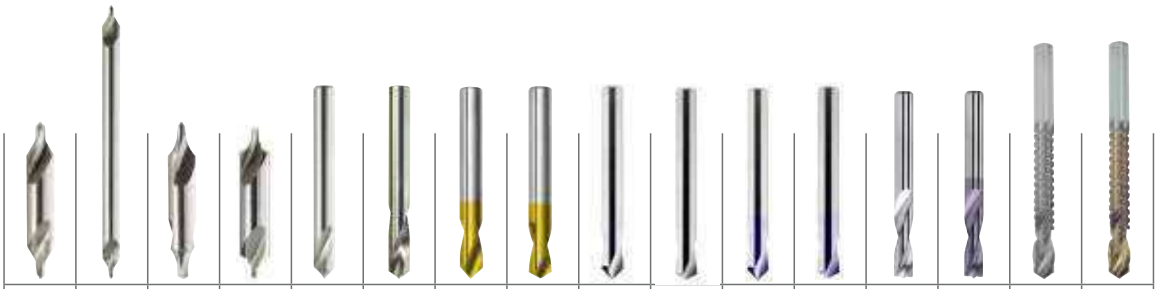


| Ref./ Réf. / Ref. | 1127 | 1128 | 1129 | 1130 | 1152 | 1153 | 1191 | 1192 | 1132 | 1188 |
|---|---|---|---|---|---|---|---|---|---|---|
| DIN | 8376 | 8374 | 8377 | 8375 | 8378 | 8379 | | | 333 | 333 |
| Punta/Poin/Point | 180º | 90º | 180º | 90º | 90º | 90º | 90º | 90º | 60º | 60º |
| Ejec./Exéc./Exec. | | | | | | | | | A | A |
| Hel./Hél./Spiral | | | | | | | | | | |
| Mat. | HSS | HSS | HSS | HSS | HSS | HSS | HSSCo | HSSCo | HSS | HSS |
| Rec./Rev./Coat. | | | | | | | | | | TiN |
| Prof./ Prof./Depth | | | | | | | | | | |
| Gama/Gamme/Range | M3-M10 | M3-M10 | M8-M20 | M5-M10 | M3-M12 | M8-M20 | M3-M12 | M4-M10 | 1-12,5 | 1-12 |
| Pag. | 68 | 68 | 69 | 69 | 70 | 70 | 71 | 71 | 72 | 72 |

| Avance/Feed (mm/rpm) HSS/HSSCo - HM=x2 | | | | | | | Vc (m/min) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mat. | | Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | 1127 | 1128 | 1129 | 1130 | 1152 | 1153 | 1191 | 1192 | 1132 | 1188 |
| P.1 | <600 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 35-40 |
| P.2 | <800 | 0,02-0,06 | 0,08-0,12 | 0,12-0,30 | 0,18-0,40 | 0,22-0,46 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 20-25 | ● 20-25 | ● 20-25 | ● 30-35 |
| P.3 | <1000 | 0,02-0,03 | 0,05-0,07 | 0,12-0,18 | 0,18-0,24 | 0,22-0,28 | ● 8-10 | ● 8-10 | ● 8-10 | ● 8-10 | ● 8-10 | ● 8-10 | ● 12-18 | ● 12-18 | ● 8-12 | ● 12-16 |
| P.4 | <1200 | 0,01-0,04 | 0,04-0,09 | 0,09-0,18 | 0,12-0,28 | 0,14-0,33 | | | | | | | ○ 4-8 | ○ 4-8 | | |
| P.5 | <1400 | 0,01-0,04 | 0,04-0,09 | 0,09-0,18 | 0,12-0,28 | 0,14-0,33 | | | | | | | | | | |
| M.1 | <950 | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | ● 4-10 | ● 4-10 | | |
| M.2 | | 0,01-0,03 | 0,05-0,07 | 0,14-0,18 | 0,20-0,24 | 0,22-0,28 | | | | | | | ● 4-10 | ● 4-10 | | |
| M.3 | <1200 | 0,03-0,04 | 0,04-0,06 | 0,08-0,10 | 0,12-0,14 | 0,16-0,18 | | | | | | | | | | |
| M.4 | | 0,02-0,03 | 0,03-0,05 | 0,06-0,08 | 0,10-0,12 | 0,14-0,16 | | | | | | | | | | |
| K.1 | <500 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 20-25 | ● 20-25 | ● 20-25 | ● 30-35 |
| K.2 | | | | | | | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | | | ● 20-25 | ● 30-35 |
| K.3 | <800 | 0,04-0,06 | 0,08-0,12 | 0,20-0,30 | 0,30-0,40 | 0,35-0,46 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ○ 10-15 | ○ 10-15 | ● 15-20 | ● 20-30 |
| K.4.1 | | 0,04-0,06 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ○ 10-15 | ○ 10-15 | ● 15-20 | ● 20-30 |
| K.4.2 | <1400 | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ○ 14-18 | ○ 14-18 | ○ 14-18 | ○ 14-18 | ○ 14-18 | ○ 14-18 | | | | |
| N.1.1 | Al | 0,03-0,05 | 0,08-0,12 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | ● 50-80 | ● 50-80 | | |
| N.1.2 | | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | ● 30-50 | ● 30-50 | | |
| N.1.3 | | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 15-30 | ● 15-30 | ● 15-20 | ● 20-30 |
| N.2.1 | Cu | 0,03-0,05 | 0,08-0,10 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | | | | | | | ● 25-35 | ● 25-35 | | |
| N.2.2 | | 0,03-0,05 | 0,08-0,10 | 0,18-0,24 | 0,25-0,32 | 0,30-0,37 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 40-60 | ● 40-60 | ● 25-30 | ● 35-40 |
| N.2.3 | | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-50 | ● 30-50 | | |
| N.2.4 | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | 0,02-0,04 | 0,05-0,09 | 0,18-0,21 | 0,20-0,28 | 0,25-0,33 | | | | | | | ● 60-90 | ● 60-90 | | |
| N.4.1 | Plastic | 0,03-0,04 | 0,06-0,07 | 0,12-0,13 | 0,16-0,17 | 0,25-0,26 | ○ 15-20 | ○ 15-20 | ○ 15-20 | ○ 15-20 | ○ 15-20 | ○ 20-25 | ● 35-70 | ● 35-70 | ○ 10-15 | ○ 10-15 |
| N.4.2 | | 0,03-0,04 | 0,06-0,07 | 0,12-0,13 | 0,16-0,17 | 0,25-0,26 | | | | | | | ● 12-24 | ● 12-24 | | |
| N.4.3 | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | ○ 4-6 | ○ 4-6 | | |
| S.1.2 | | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | ○ 2-5 | ○ 2-5 | | |
| S.2.1 | Ti | 0,01-0,03 | 0,04-0,06 | 0,08-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | ● 6-10 | ● 6-10 | | |
| S.2.2 | | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | ○ 4-6 | ○ 4-6 | | |
| S.2.3 | | 0,01-0,03 | 0,03-0,05 | 0,06-0,10 | 0,10-0,14 | 0,16-0,20 | | | | | | | ○ 2-5 | ○ 2-5 | | |
| H.1 | 50 HRC | 0,02-0,03 | 0,05-0,07 | 0,09-0,13 | 0,14-0,18 | 0,18-0,22 | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

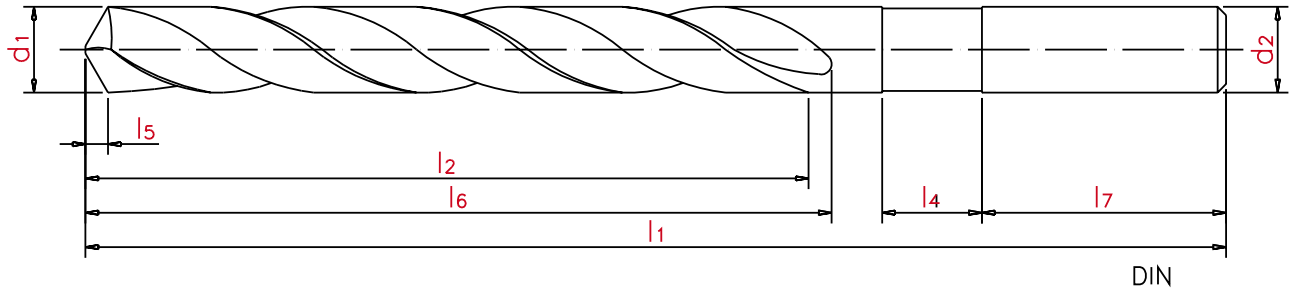
| | | | | | |
|---|---|---|---|---|---|
| **P** | Aceros<br>Aciers<br>Steels | **M** | Aceros Inox<br>Aciers Inox<br>Stainless Steels | **K** | Fundicion<br>Fonte<br>Cast Iron |
| **N** | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | **S** | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | **H** | Materiales Duros<br>Materiels Durs<br>Hard materials |



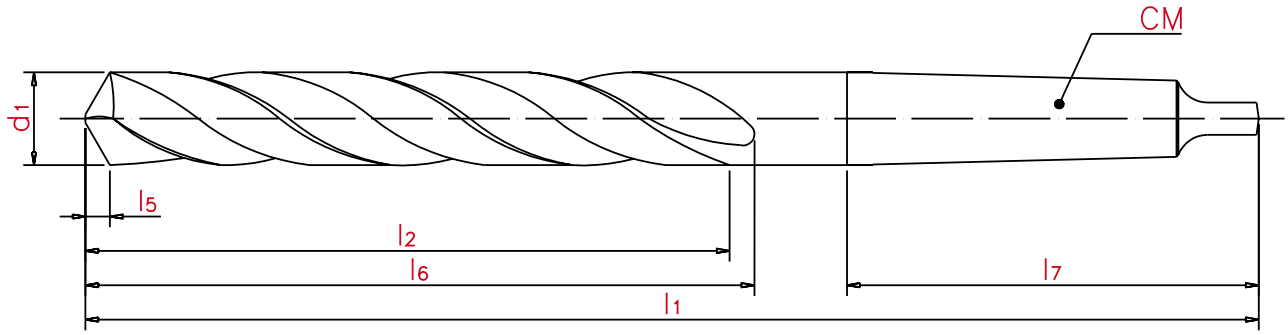
| 1193 | 1133 | 1135 | 1137 | 1138 | 1155 | 1189 | 1190 | 1179 | 1180 | 1185 | 1186 | 1119 | 1194 | 5114 | 5115 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 333 | 333 | 333 | 333 | CNC | CNC | CNC | CNC | CNC | CNC | CNC | CNC | 1897 | 1897 | | |
| 60° | 60° | Radial | 60° | 90° | 120° | 90° | 120° | 90° | 120° | 90° | 120° | 118° | 118° | 118° | 118° |
| A | A | R | B | | | | | | | | | | | | |
| | | | | | | | | | | | | 30° | 30° | | |
| HM | HSS | HSS | HSS | HSSCo | HSSCo | HSSCo | HSSCo | HM | HM | HM | HM | HSSCo | HSSCo | HSS | HSS |
| | | | | | | TiN | TiN | | | TiAlN | TiAlN | | TiAlN | | TiN |
| | | | | | | | | | | | | | | | |
| 1-6,30 | 1-5 | 1-12,5 | 1-6,30 | 3-20 | 3-20 | 3-20 | 3-20 | 6-12 | 6-12 | 6-12 | 6-12 | 6-10 | 6-10 | 6-8 | 6-8 |
| 73 | 73 | 74 | 74 | 75 | 75 | 76 | 76 | 77 | 77 | 78 | 78 | 79 | 79 | 80 | 80 |
| Vc (m/min) | | | | | | | | | | | | | | | |
| o 55-60 | ● 20-30 | ● 20-30 | ● 20-30 | ● 20-30 | ● 20-30 | ● 35-40 | ● 35-40 | ● 60-80 | ● 60-80 | ● 80-100 | ● 80-100 | o 25-30 | o 35-40 | ● 20-25 | ● 25-35 |
| o 45-60 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 30-35 | ● 30-35 | ● 55-70 | ● 55-70 | ● 70-90 | ● 70-90 | o 20-25 | o 30-35 | ● 10-15 | ● 15-20 |
| ● 40-55 | ● 8-12 | ● 8-12 | ● 8-12 | ● 8-12 | ● 8-12 | ● 12-16 | ● 12-16 | ● 40-55 | ● 40-55 | ● 55-75 | ● 55-75 | ● 12-18 | ● 16-20 | | |
| ● 25-30 | | | | ● 6-10 | ● 6-10 | ● 10-14 | ● 10-14 | ● 35-45 | ● 35-45 | ● 50-60 | ● 50-60 | ● 6-10 | ● 8-14 | | |
| ● 20-25 | | | | | | | | | | | | | | | |
| ● 40-55 | | | | ● 8-12 | ● 8-12 | ● 12-16 | ● 12-16 | ● 20-30 | ● 20-30 | ● 25-35 | ● 25-35 | | | | |
| ● 40-55 | | | | ● 6-10 | ● 6-10 | ● 10-14 | ● 10-14 | ● 15-20 | ● 15-20 | ● 20-25 | ● 20-25 | | | | |
| ● 25-30 | | | | | | | | | | | | | | | |
| ● 25-30 | | | | | | | | | | | | | | | |
| ● 40-55 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 30-35 | ● 30-35 | ● 60-80 | ● 60-80 | ● 80-100 | ● 80-100 | | | | |
| ● 40-55 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 30-35 | ● 30-35 | ● 60-80 | ● 60-80 | ● 80-100 | ● 80-100 | | | | |
| ● 35-45 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 20-25 | ● 20-25 | ● 40-60 | ● 40-60 | ● 55-80 | ● 55-80 | | | | |
| ● 35-45 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 20-25 | ● 20-25 | ● 40-60 | ● 40-60 | ● 55-80 | ● 55-80 | | | | |
| ● 20-25 | | | | | | | | | | | | | | | |
| ● 110-130 | | | | | | | | ● 120-160 | ● 120-160 | ● 160-200 | ● 160-200 | | | | |
| ● 100-110 | | | | | | | | ● 100-130 | ● 100-130 | ● 140-180 | ● 140-180 | | | | |
| ● 80-100 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | ● 20-25 | ● 20-25 | ● 70-90 | ● 70-90 | ● 100-120 | ● 100-120 | | | ● 15-20 | ● 20-25 |
| o 40-55 | | | | | | | | o 60-80 | o 60-80 | o 80-100 | o 80-100 | | | | |
| ● 55-65 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 35-40 | ● 35-40 | ● 100-120 | ● 100-120 | ● 140-160 | ● 140-160 | | | | |
| ● 45-55 | | | | | | | | ● 80-100 | ● 80-100 | ● 110-140 | ● 110-140 | | | | |
| o 25-30 | | | | | | | | | | | | | | | |
| ● 100-110 | | | | | | | | | | | | | | | |
| ● 150-200 | o 10-15 | o 10-15 | o 10-15 | ● 25-30 | ● 25-30 | ● 35-40 | ● 35-40 | o 50-70 | o 50-70 | o 50-70 | o 50-70 | | | ● 25-30 | ● 35-40 |
| ● 70-100 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ● 20-30 | | | | | | | | o 10-20 | o 10-20 | o 15-20 | o 15-20 | | | | |
| | | | | | | | | o 8-12 | o 8-12 | o 12-16 | o 12-16 | | | | |
| ● 25-30 | | | | ● 10-12 | ● 10-12 | ● 12-16 | ● 12-16 | ● 20-30 | ● 20-30 | ● 25-35 | ● 25-35 | | | | |
| o 25-25 | | | | | | | | | | | | | | | |
| o 15-20 | | | | | | | | | | | | | | | |
| ● 15-20 | | | | | | | | | | | | | | | |
| ● 10-15 | | | | | | | | | | | | | | | |
| o 4-6 | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

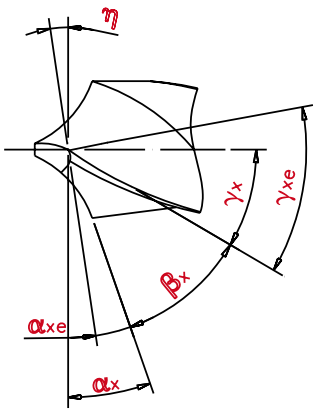
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |


d1
d2
l5
l2
l6
l4
l7
l1

DIN


CM
d1
l5
l2
l6
l7
l1

DIN 345


η
γx
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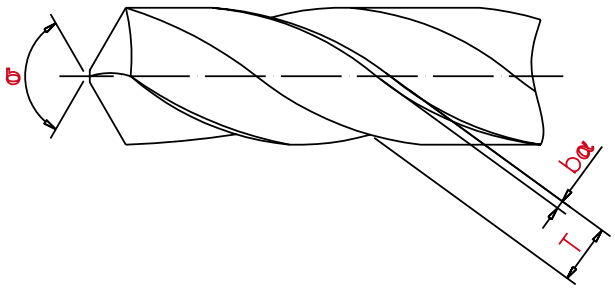
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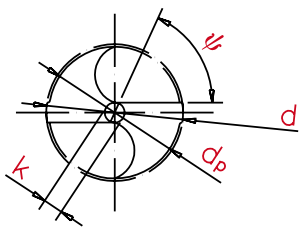
ψ
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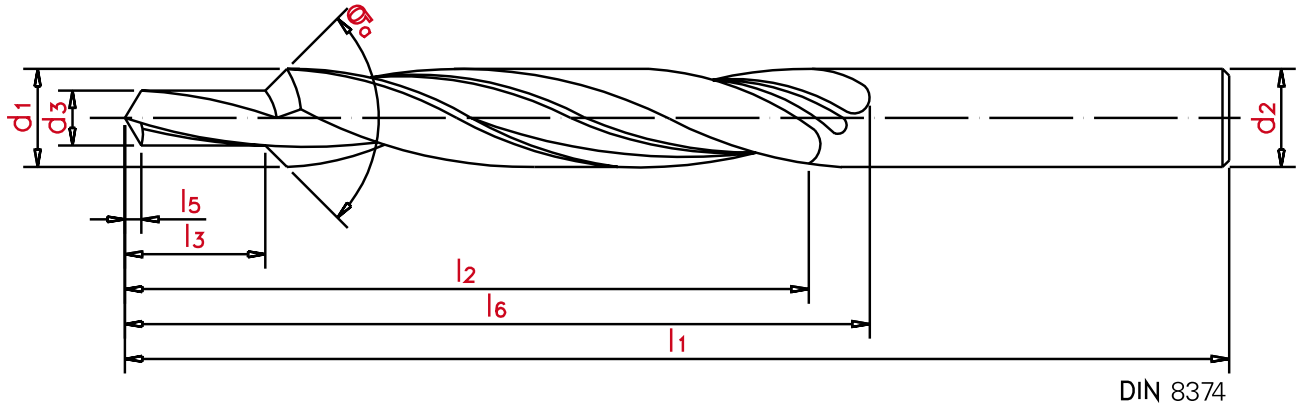
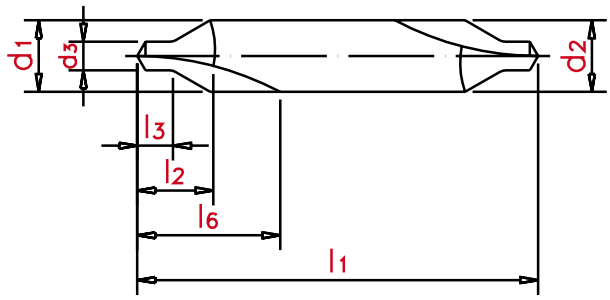
dp
K




DIN 8374




DIN 333–A

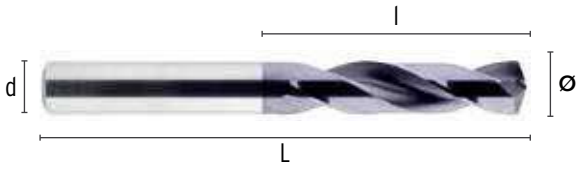
| | |
|---|---|
| **l1** | **Longitud total** / Longueur totale / Total length |
| **l2** | **Longitud de corte** / Longueur de coupe / Length of cut |
| **l3** | **Longitud de corte del diámetro menor** / Longueur de coupe du plus petit diamètre / Length of cut of the smaller diametre |
| **l7** | **Longitud del mango-del cono** / Longueur de la queue du cône / Length of cone shank |
| **l5** | **Longitud de punta** / Longueur de pointe / Length of tip |
| **l6** | **Longitud de ranura** / Longueur de rainure / Length of groove |
| **l4** | **Diámetro de broca** / Diamètre de foret / Drill-bit diametre |
| **d1** | **Longitud de sangrado** / Longueur d'indentation / Bled length |
| **d3** | **Diámetro inicial** / Diamètre initial / Initial diametre |
| **d2** | **Diámetro de mango** / Diamètre de queue / Shank diametre |
| **CM** | **Tamaño del cono morse** / Taille du cône morse / Morse taper size |
| **dp** | **Diámetro posterior** / Diamètre postérieur / Rear diametre |
| **bα** | **Ancho de fase** / Largeur de phase / Phase width |
| **T** | **Ancho de alma** / Largeur d'âme / Core width |
| **k** | **Espesor del núcleo** / Épaisseur du noyau / Thickness of nucleus |
| **σ** | **Ángulo de la punta** / Angle de la pointe / Tip angle |
| **σa** | **Ángulo de avellanado** / Angle de chanfreinage / Countersink angle |
| **ψ** | **Ángulo de corte transversal** / Angle de coupe transversale / Transversal cut angle |
| **γxe** | **Ángulo de corte lateral efectivo** / Angle de coupe latérale effectif / Effective lateral cut angle |
| **γx** | **Ángulo de corte lateral** / Angle de coupe latérale / Lateral cut angle |
| **αxe** | **Ángulo de incidencia lateral efectivo** / Angle d'incidence latérale effectif / Effective lateral angle of incidence |
| **αx** | **Ángulo de incidencia lateral** / Angle d'incidence latérale / Lateral angle of incidence |
| **βx** | **Ángulo ortogonal de la herramienta** / Angle orthogonal de l'outil / Orthogonal angle of the tool |
| **η** | **Ángulo del sentido efectivo del corte** / Angle du sens effectif de la coupe / Effective direction of cut angle |

# 1175 HM-MD DIN 6537 S

3XD | 140° | 30° | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | | ● | ● | ● | | | | | ○ | ● | ○ | ○ | |
| 40-110 | 35-75 | 30-50 | 25-40 | 35-75 | | 60-100 | 70-110 | 40-60 | | | | | 20-25 | 20-75 | 25-35 | 15-25 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,10 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,20 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,30 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,40 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,50 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,60 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,70 | 6,00 | *34,00* | 62,00 | 20,00 | 1 |
| 3,80 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 3,90 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,00 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,10 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,20 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,30 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,40 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,50 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,60 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,70 | 6,00 | *34,00* | 66,00 | 24,00 | 1 |
| 4,80 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 4,90 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,00 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,10 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,20 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,30 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,40 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,50 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,60 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,70 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,80 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 5,90 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 6,00 | 6,00 | *34,00* | 66,00 | 28,00 | 1 |
| 6,10 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,20 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,30 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,40 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,50 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,60 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,70 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,80 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 6,90 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 7,00 | 8,00 | *46,13* | 79,00 | 34,00 | 1 |
| 7,10 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,20 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,30 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,40 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,50 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,60 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,70 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,80 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 7,90 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 8,00 | 8,00 | *46,13* | 79,00 | 41,00 | 1 |
| 8,10 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,20 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,30 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,40 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,50 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,60 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,70 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,80 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 8,90 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,00 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,10 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,20 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,30 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,40 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,50 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,60 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,70 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,80 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 9,90 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 10,00 | 10,00 | *61,44* | 89,00 | 47,00 | 1 |
| 10,10 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,20 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,30 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,40 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,50 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,60 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,70 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,80 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 10,90 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 11,00 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 11,50 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 11,80 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 12,00 | 12,00 | *92,69* | 102,00 | 55,00 | 1 |
| 12,50 | 14,00 | *122,81* | 107,00 | 60,00 | 1 |
| 12,80 | 14,00 | *122,81* | 107,00 | 60,00 | 1 |
| 13,00 | 14,00 | *122,81* | 107,00 | 60,00 | 1 |
| 13,50 | 14,00 | *122,81* | 107,00 | 60,00 | 1 |
| 13,80 | 14,00 | *122,81* | 107,00 | 60,00 | 1 |
| 14,00 | 14,00 | *122,81* | 107,00 | 60,00 | 1 |
| 14,50 | 16,00 | *155,19* | 115,00 | 65,00 | 1 |
| 14,80 | 16,00 | *155,19* | 115,00 | 65,00 | 1 |
| 15,00 | 16,00 | *155,19* | 115,00 | 65,00 | 1 |
| 15,80 | 16,00 | *155,19* | 115,00 | 65,00 | 1 |
| 16,00 | 16,00 | *155,19* | 115,00 | 65,00 | 1 |
| 16,50 | 18,00 | *212,63* | 123,00 | 73,00 | 1 |
| 17,00 | 18,00 | *212,63* | 123,00 | 73,00 | 1 |
| 17,50 | 18,00 | *212,63* | 123,00 | 73,00 | 1 |
| 18,00 | 18,00 | *212,63* | 123,00 | 73,00 | 1 |
| 18,50 | 20,00 | *270,06* | 131,00 | 79,00 | 1 |
| 19,00 | 20,00 | *270,06* | 131,00 | 79,00 | 1 |
| 19,50 | 20,00 | *270,06* | 131,00 | 79,00 | 1 |
| 20,00 | 20,00 | *270,06* | 131,00 | 79,00 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 1176 HM-MD DIN 6537 S

3XD | 140° | 30° | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ○ | ● | ● | ● | | | | | ● | ● | ● | ● | ○ |
| 50-120 | 40-85 | 35-55 | 30-45 | 40-85 | 30-55 | 70-150 | 80-120 | 50-70 | | | | | 25-30 | 25-40 | 30-40 | 20-35 | 15-25 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,10 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,20 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,30 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,40 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,50 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,60 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,70 | 6,00 | *54,25* | 62,00 | 20,00 | 1 |
| 3,80 | 6,00 | *54,25* | 66,00 | 24,00 | 1 |
| 3,90 | 6,00 | *54,25* | 66,00 | 24,00 | 1 |
| 4,00 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,10 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,20 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,30 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,40 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,50 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,60 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,70 | 6,00 | *58,63* | 66,00 | 24,00 | 1 |
| 4,80 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 4,90 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,00 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,10 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,20 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,30 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,40 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,50 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,60 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,70 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,80 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 5,90 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 6,00 | 6,00 | *58,63* | 66,00 | 28,00 | 1 |
| 6,10 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,20 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,30 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,40 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,50 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,60 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,70 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,80 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 6,90 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 7,00 | 8,00 | *70,50* | 79,00 | 34,00 | 1 |
| 7,10 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,20 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,30 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,40 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,50 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,60 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,70 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,80 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 7,90 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 8,00 | 8,00 | *70,50* | 79,00 | 41,00 | 1 |
| 8,10 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,20 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,30 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,40 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,50 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,60 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,70 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,80 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 8,90 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,00 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,10 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,20 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,30 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,40 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,50 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,60 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,70 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,80 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 9,90 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 10,00 | 10,00 | *88,44* | 89,00 | 47,00 | 1 |
| 10,10 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,20 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,30 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,40 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,50 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,60 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,70 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,80 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 10,90 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 11,00 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 11,50 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 11,80 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 12,00 | 12,00 | *125,00* | 102,00 | 55,00 | 1 |
| 12,50 | 14,00 | *158,56* | 107,00 | 60,00 | 1 |
| 12,80 | 14,00 | *158,56* | 107,00 | 60,00 | 1 |
| 13,00 | 14,00 | *158,56* | 107,00 | 60,00 | 1 |
| 13,50 | 14,00 | *158,56* | 107,00 | 60,00 | 1 |
| 14,00 | 14,00 | *158,56* | 107,00 | 60,00 | 1 |
| 14,50 | 16,00 | *197,19* | 115,00 | 65,00 | 1 |
| 15,00 | 16,00 | *197,19* | 115,00 | 65,00 | 1 |
| 16,00 | 16,00 | *197,19* | 115,00 | 65,00 | 1 |
| 16,50 | 18,00 | *314,56* | 123,00 | 73,00 | 1 |
| 17,00 | 18,00 | *314,56* | 123,00 | 73,00 | 1 |
| 17,50 | 18,00 | *314,56* | 123,00 | 73,00 | 1 |
| 18,00 | 18,00 | *314,56* | 123,00 | 73,00 | 1 |
| 18,50 | 20,00 | *341,56* | 131,00 | 79,00 | 1 |
| 19,00 | 20,00 | *341,56* | 131,00 | 79,00 | 1 |
| 19,50 | 20,00 | *341,56* | 131,00 | 79,00 | 1 |
| 20,00 | 20,00 | *341,56* | 131,00 | 79,00 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 1177 HM-MD DIN 6537 L

5XD | 140° | 30° | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ○ | ● | ● | ● | | | | | ● | ● | ● | ● | ○ |
| 50-120 | 40-85 | 35-55 | 30-45 | 40-85 | 30-55 | 70-150 | 80-120 | 50-70 | | | | | 25-30 | 25-40 | 30-40 | 20-35 | 15-25 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,10 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,20 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,30 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,40 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,50 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,60 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,70 | 6,00 | *62,44* | 66,00 | 28,00 | 1 |
| 3,80 | 6,00 | *62,44* | 74,00 | 36,00 | 1 |
| 3,90 | 6,00 | *62,44* | 74,00 | 36,00 | 1 |
| 4,00 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,10 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,20 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,30 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,40 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,50 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,60 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,70 | 6,00 | *66,38* | 74,00 | 36,00 | 1 |
| 4,80 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 4,90 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,00 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,10 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,20 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,30 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,40 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,50 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,60 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,70 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,80 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 5,90 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 6,00 | 6,00 | *66,38* | 82,00 | 44,00 | 1 |
| 6,10 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,20 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,30 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,40 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,50 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,60 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,70 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,80 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 6,90 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,00 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,10 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,20 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,30 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,40 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,50 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,60 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,70 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,80 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 7,90 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 8,00 | 8,00 | *74,19* | 91,00 | 53,00 | 1 |
| 8,10 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 8,20 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,30 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,40 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,50 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,60 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,70 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,80 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 8,90 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,00 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,10 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,20 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,30 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,40 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,50 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,60 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,70 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,80 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 9,90 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 10,00 | 10,00 | *93,06* | 103,00 | 61,00 | 1 |
| 10,10 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,20 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,30 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,40 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,50 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,60 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,70 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,80 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 10,90 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 11,00 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 11,50 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 11,80 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 12,00 | 12,00 | *131,81* | 118,00 | 71,00 | 1 |
| 12,50 | 14,00 | *176,13* | 124,00 | 77,00 | 1 |
| 12,80 | 14,00 | *176,13* | 124,00 | 77,00 | 1 |
| 13,00 | 14,00 | *176,13* | 124,00 | 77,00 | 1 |
| 13,50 | 14,00 | *176,13* | 124,00 | 77,00 | 1 |
| 13,80 | 14,00 | *176,13* | 124,00 | 77,00 | 1 |
| 14,00 | 14,00 | *176,13* | 124,00 | 77,00 | 1 |
| 14,50 | 16,00 | *219,06* | 133,00 | 83,00 | 1 |
| 14,80 | 16,00 | *219,06* | 133,00 | 83,00 | 1 |
| 15,00 | 16,00 | *219,06* | 133,00 | 83,00 | 1 |
| 15,80 | 16,00 | *219,06* | 133,00 | 83,00 | 1 |
| 16,00 | 16,00 | *219,06* | 133,00 | 83,00 | 1 |
| 16,50 | 18,00 | *349,31* | 143,00 | 93,00 | 1 |
| 17,00 | 18,00 | *349,31* | 143,00 | 93,00 | 1 |
| 17,50 | 18,00 | *349,31* | 143,00 | 93,00 | 1 |
| 18,00 | 18,00 | *349,31* | 143,00 | 93,00 | 1 |
| 18,50 | 20,00 | *379,88* | 153,00 | 101,00 | 1 |
| 19,00 | 20,00 | *379,88* | 153,00 | 101,00 | 1 |
| 19,50 | 20,00 | *379,88* | 153,00 | 101,00 | 1 |
| 20,00 | 20,00 | *379,88* | 153,00 | 101,00 | 1 |



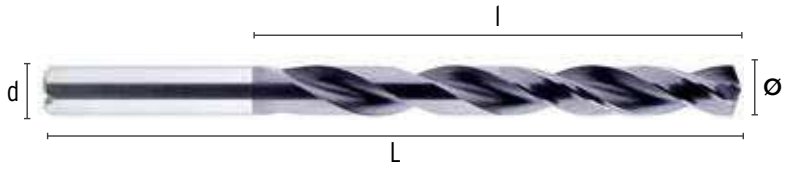
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 1178 HM-MD DIN 6537 EL

8XD | 140º | 30º | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ○ | ● | ● | ● | | | | | ● | ● | ● | ● | ○ |
| 50-120 | 40-85 | 35-55 | 30-45 | 40-85 | 30-55 | 70-150 | 80-120 | 50-70 | | | | | 25-30 | 25-40 | 30-40 | 20-35 | 15-25 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6 | *148,38* | 70 | 30 | 1 |
| 3,30 | 6 | *148,38* | 70 | 30 | 1 |
| 3,50 | 6 | *148,38* | 70 | 30 | 1 |
| 3,70 | 6 | *148,38* | 70 | 30 | 1 |
| 4,00 | 6 | *148,38* | 75 | 37 | 1 |
| 4,20 | 6 | *148,38* | 75 | 37 | 1 |
| 4,50 | 6 | *148,38* | 75 | 37 | 1 |
| 4,70 | 6 | *148,38* | 75 | 37 | 1 |
| 5,00 | 6 | *148,38* | 90 | 50 | 1 |
| 5,50 | 6 | *148,38* | 90 | 50 | 1 |
| 6,00 | 6 | *148,38* | 90 | 50 | 1 |
| 6,50 | 8 | *172,44* | 106 | 66 | 1 |
| 6,80 | 8 | *172,44* | 106 | 66 | 1 |
| 7,00 | 8 | *172,44* | 106 | 66 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 7,50 | 8 | *172,44* | 106 | 66 | 1 |
| 8,00 | 8 | *172,44* | 106 | 66 | 1 |
| 8,50 | 10 | *207,75* | 131 | 87 | 1 |
| 9,00 | 10 | *207,75* | 131 | 87 | 1 |
| 9,50 | 10 | *207,75* | 131 | 87 | 1 |
| 10,00 | 10 | *207,75* | 131 | 87 | 1 |
| 10,20 | 12 | *283,75* | 155 | 106 | 1 |
| 10,50 | 12 | *283,75* | 155 | 106 | 1 |
| 11,00 | 12 | *283,75* | 155 | 106 | 1 |
| 12,00 | 12 | *283,75* | 155 | 106 | 1 |
| 13,00 | 14 | *403,94* | 182 | 133 | 1 |
| 14,00 | 14 | *403,94* | 182 | 133 | 1 |
| 15,00 | 16 | *503,50* | 204 | 152 | 1 |
| 16,00 | 16 | *503,50* | 204 | 152 | 1 |

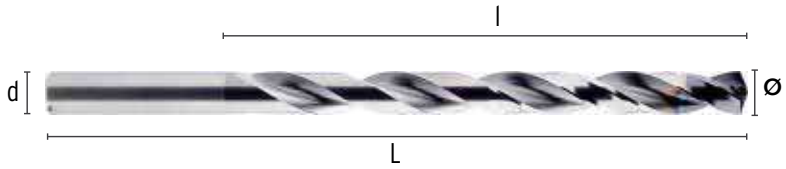
## 1184 HM-MD

12XD | 140º | 30º | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | | ● | ● | ● | | | | | ● | | | | |
| 40-90 | 35-55 | 30-50 | 25-40 | 35-55 | | 60-120 | 60-90 | 30-50 | | | | | 15-25 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6 | *199,31* | 90 | 50 | 1 |
| 3,30 | 6 | *199,31* | 90 | 50 | 1 |
| 3,50 | 6 | *199,31* | 90 | 50 | 1 |
| 3,70 | 6 | *199,31* | 90 | 50 | 1 |
| 4,00 | 6 | *199,31* | 102 | 64 | 1 |
| 4,20 | 6 | *199,31* | 102 | 64 | 1 |
| 4,50 | 6 | *199,31* | 102 | 64 | 1 |
| 4,70 | 6 | *199,31* | 102 | 64 | 1 |
| 5,00 | 6 | *199,31* | 116 | 78 | 1 |
| 5,50 | 6 | *199,31* | 116 | 78 | 1 |
| 6,00 | 6 | *199,31* | 116 | 78 | 1 |
| 6,50 | 8 | *245,69* | 146 | 108 | 1 |
| 6,80 | 8 | *245,69* | 146 | 108 | 1 |
| 7,00 | 8 | *245,69* | 146 | 108 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 7,50 | 8 | *245,69* | 146 | 108 | 1 |
| 8,00 | 8 | *245,69* | 146 | 108 | 1 |
| 8,50 | 10 | *309,75* | 162 | 120 | 1 |
| 9,00 | 10 | *309,75* | 162 | 120 | 1 |
| 9,50 | 10 | *309,75* | 162 | 120 | 1 |
| 10,00 | 10 | *309,75* | 162 | 120 | 1 |
| 10,20 | 12 | *411,00* | 204 | 156 | 1 |
| 10,50 | 12 | *411,00* | 204 | 156 | 1 |
| 11,00 | 12 | *411,00* | 204 | 156 | 1 |
| 12,00 | 12 | *411,00* | 204 | 156 | 1 |
| 13,00 | 14 | *509,19* | 230 | 182 | 1 |
| 14,00 | 14 | *509,19* | 230 | 182 | 1 |
| 15,00 | 16 | *720,56* | 260 | 208 | 1 |
| 16,00 | 16 | *720,56* | 260 | 208 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1182 HM-MD

1XD | 120° | 0° | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | | | | | | ● 25-30 | ● 15-25 | ● 10-15 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

**Sacar Machos rotos** / Enlever Taraud cassés / ***Remove Broken Taps***

| ø mm | M | € | L mm | l mm | d mm |
|---|---|---|---|---|---|
| 2,5 | M3 | *82,38* | 38 | 10 | 3 |
| 3,3 | M4 | *113,31* | 46 | 14 | 4 |
| 4,2 | M5 | *127,53* | 50 | 19 | 5 |
| 5 | M6 | *141,62* | 50 | 23 | 6 |

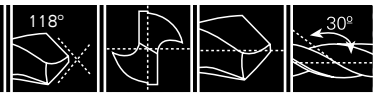
| ø mm | M | € | L mm | l mm | d mm |
|---|---|---|---|---|---|
| 6,8 | M8 | *155,84* | 60 | 23 | 8 |
| 8,5 | M10 | *198,28* | 80 | 25 | 10 |
| 10,2 | M12 | *295,36* | 80 | 35 | 12 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

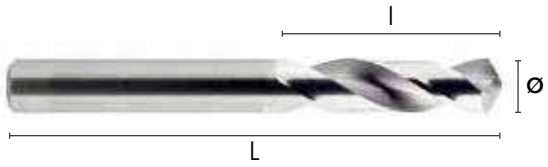
# 1120 HM-MD DIN 6539 N

2XD




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | | ● | ● | | ● | ● | ● | ● | ○ | ○ | | | |
| 30-70 | 25-50 | 20-40 | 15-25 | 20-25 | | 50-70 | 40-50 | | 60-140 | 25-70 | 30-60 | 40-70 | 10-15 | 10-25 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



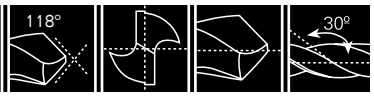

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *6,88* | 38 | 12 | 1 |
| 2,10 | *7,50* | 38 | 12 | 1 |
| 2,20 | *7,50* | 40 | 13 | 1 |
| 2,30 | *7,50* | 40 | 13 | 1 |
| 2,40 | *7,50* | 43 | 14 | 1 |
| 2,50 | *7,50* | 43 | 14 | 1 |
| 2,60 | *7,50* | 43 | 14 | 1 |
| 2,70 | *10,07* | 46 | 16 | 1 |
| 2,80 | *10,26* | 46 | 16 | 1 |
| 2,90 | *10,26* | 46 | 16 | 1 |
| 3,00 | *10,07* | 46 | 16 | 1 |
| 3,10 | *10,26* | 49 | 18 | 1 |
| 3,20 | *10,26* | 49 | 18 | 1 |
| 3,30 | *10,26* | 49 | 18 | 1 |
| 3,40 | *11,46* | 52 | 20 | 1 |
| 3,50 | *11,46* | 52 | 20 | 1 |
| 3,60 | *12,65* | 52 | 20 | 1 |
| 3,70 | *12,65* | 52 | 20 | 1 |
| 3,80 | *13,18* | 52 | 20 | 1 |
| 3,90 | *13,18* | 55 | 22 | 1 |
| 4,00 | *13,18* | 55 | 22 | 1 |
| 4,10 | *14,36* | 55 | 22 | 1 |
| 4,20 | *14,36* | 55 | 22 | 1 |
| 4,30 | *15,08* | 58 | 24 | 1 |
| 4,40 | *15,08* | 58 | 24 | 1 |
| 4,50 | *15,08* | 58 | 24 | 1 |
| 4,60 | *15,08* | 58 | 24 | 1 |
| 4,70 | *16,03* | 58 | 24 | 1 |
| 4,80 | *16,03* | 62 | 26 | 1 |
| 4,90 | *16,03* | 62 | 26 | 1 |
| 5,00 | *16,03* | 62 | 26 | 1 |
| 5,10 | *21,28* | 62 | 26 | 1 |
| 5,20 | *21,28* | 62 | 26 | 1 |
| 5,30 | *23,25* | 62 | 26 | 1 |
| 5,40 | *23,25* | 66 | 28 | 1 |
| 5,50 | *21,28* | 66 | 28 | 1 |
| 5,60 | *24,58* | 66 | 28 | 1 |
| 5,70 | *24,58* | 66 | 28 | 1 |
| 5,80 | *22,33* | 66 | 28 | 1 |
| 5,90 | *24,58* | 66 | 28 | 1 |
| 6,00 | *22,33* | 66 | 28 | 1 |
| 6,10 | *27,45* | 70 | 31 | 1 |
| 6,20 | *27,45* | 70 | 31 | 1 |
| 6,30 | *27,45* | 70 | 31 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,40 | *27,45* | 70 | 31 | 1 |
| 6,50 | *27,45* | 70 | 31 | 1 |
| 6,60 | *33,22* | 70 | 31 | 1 |
| 6,70 | *33,22* | 70 | 31 | 1 |
| 6,80 | *33,22* | 74 | 34 | 1 |
| 6,90 | *33,22* | 74 | 34 | 1 |
| 7,00 | *32,08* | 74 | 34 | 1 |
| 7,10 | *39,04* | 74 | 34 | 1 |
| 7,20 | *39,04* | 74 | 34 | 1 |
| 7,30 | *39,04* | 74 | 34 | 1 |
| 7,40 | *39,04* | 74 | 34 | 1 |
| 7,50 | *39,04* | 74 | 34 | 1 |
| 7,60 | *47,83* | 79 | 37 | 1 |
| 7,70 | *47,83* | 79 | 37 | 1 |
| 7,80 | *47,83* | 79 | 37 | 1 |
| 7,90 | *47,83* | 79 | 37 | 1 |
| 8,00 | *43,48* | 79 | 37 | 1 |
| 8,10 | *54,98* | 79 | 37 | 1 |
| 8,20 | *54,98* | 79 | 37 | 1 |
| 8,30 | *54,98* | 79 | 37 | 1 |
| 8,40 | *54,98* | 79 | 37 | 1 |
| 8,50 | *54,98* | 79 | 37 | 1 |
| 8,60 | *58,37* | 84 | 40 | 1 |
| 8,70 | *58,37* | 84 | 40 | 1 |
| 8,80 | *58,37* | 84 | 40 | 1 |
| 8,90 | *58,37* | 84 | 40 | 1 |
| 9,00 | *56,23* | 84 | 40 | 1 |
| 9,10 | *56,23* | 84 | 40 | 1 |
| 9,20 | *57,90* | 84 | 40 | 1 |
| 9,30 | *57,90* | 84 | 40 | 1 |
| 9,40 | *57,90* | 84 | 40 | 1 |
| 9,50 | *61,90* | 84 | 40 | 1 |
| 9,60 | *61,90* | 89 | 43 | 1 |
| 9,70 | *61,90* | 89 | 43 | 1 |
| 9,80 | *61,90* | 89 | 43 | 1 |
| 9,90 | *61,90* | 89 | 43 | 1 |
| 10,00 | *78,08* | 89 | 43 | 1 |
| 10,20 | *79,61* | 89 | 43 | 1 |
| 10,50 | *94,07* | 89 | 43 | 1 |
| 11,00 | *100,65* | 95 | 47 | 1 |
| 11,50 | *107,25* | 95 | 47 | 1 |
| 12,00 | *107,25* | 102 | 51 | 1 |
| 13,00 | *160,70* | 102 | 51 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

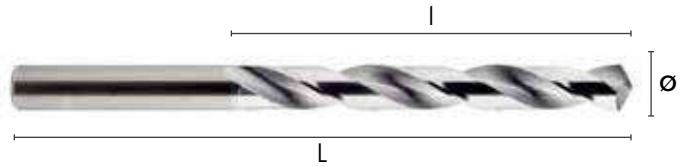
# 1109 HM-MD DIN 338 N

4XD




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-70 | ● 25-50 | ● 20-40 | ● 15-25 | ● 20-25 | | ● 50-70 | ● 40-50 | | ● 60-140 | ● 25-70 | ● 30-60 | ● 40-70 | ○ 10-15 | ○ 10-25 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



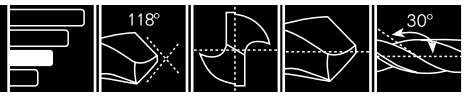

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *9,26* | 49 | 24 | 1 |
| 2,10 | *10,93* | 49 | 24 | 1 |
| 2,20 | *11,50* | 53 | 27 | 1 |
| 2,30 | *11,50* | 53 | 27 | 1 |
| 2,40 | *11,50* | 57 | 30 | 1 |
| 2,50 | *11,50* | 57 | 30 | 1 |
| 2,60 | *13,65* | 57 | 30 | 1 |
| 2,70 | *14,03* | 61 | 33 | 1 |
| 2,80 | *14,03* | 61 | 33 | 1 |
| 2,90 | *14,03* | 61 | 33 | 1 |
| 3,00 | *14,03* | 61 | 33 | 1 |
| 3,10 | *14,32* | 65 | 36 | 1 |
| 3,20 | *14,89* | 65 | 36 | 1 |
| 3,30 | *14,98* | 65 | 36 | 1 |
| 3,40 | *16,71* | 70 | 39 | 1 |
| 3,50 | *16,13* | 70 | 39 | 1 |
| 3,60 | *17,33* | 70 | 39 | 1 |
| 3,70 | *17,33* | 70 | 39 | 1 |
| 3,80 | *17,51* | 75 | 43 | 1 |
| 3,90 | *18,19* | 75 | 43 | 1 |
| 4,00 | *18,38* | 75 | 43 | 1 |
| 4,10 | *23,10* | 75 | 43 | 1 |
| 4,20 | *23,10* | 75 | 43 | 1 |
| 4,30 | *23,10* | 80 | 47 | 1 |
| 4,40 | *23,10* | 80 | 47 | 1 |
| 4,50 | *23,05* | 80 | 47 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 4,60 | *27,11* | 80 | 47 | 1 |
| 4,70 | *27,11* | 80 | 47 | 1 |
| 4,80 | *27,11* | 86 | 52 | 1 |
| 4,90 | *27,11* | 86 | 52 | 1 |
| 5,00 | *27,11* | 86 | 52 | 1 |
| 5,10 | *33,26* | 86 | 52 | 1 |
| 5,20 | *33,26* | 86 | 52 | 1 |
| 5,30 | *33,26* | 86 | 52 | 1 |
| 5,40 | *33,26* | 93 | 57 | 1 |
| 5,50 | *33,26* | 93 | 57 | 1 |
| 5,60 | *35,75* | 93 | 57 | 1 |
| 5,70 | *35,75* | 93 | 57 | 1 |
| 5,80 | *35,75* | 93 | 57 | 1 |
| 5,90 | *35,75* | 93 | 57 | 1 |
| 6,00 | *35,75* | 93 | 57 | 1 |
| 6,10 | *45,00* | 101 | 63 | 1 |
| 6,20 | *45,00* | 101 | 63 | 1 |
| 6,30 | *45,00* | 101 | 63 | 1 |
| 6,40 | *45,00* | 101 | 63 | 1 |
| 6,50 | *45,00* | 101 | 63 | 1 |
| 6,80 | *55,99* | 109 | 69 | 1 |
| 7,00 | *55,99* | 109 | 69 | 1 |
| 8,00 | *77,23* | 117 | 75 | 1 |
| 8,50 | *88,63* | 117 | 75 | 1 |
| 10,00 | *143,27* | 113 | 87 | 1 |
| 10,20 | *143,27* | 113 | 87 | 1 |



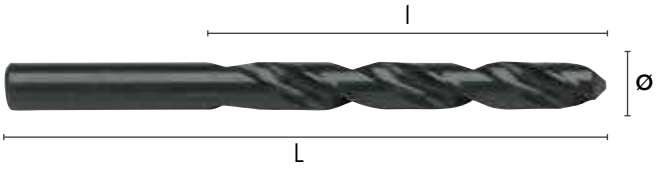
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1101 HSS DIN 338 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 0,20 | *2,54* | 19 | 2,50 | 10 |
| 0,25 | *2,54* | 19 | 3 | 10 |
| 0,30 | *2,54* | 19 | 3 | 10 |
| 0,35 | *2,54* | 19 | 3 | 10 |
| 0,40 | *2,54* | 20 | 5 | 10 |
| 0,45 | *2,54* | 22 | 6 | 10 |
| 0,50 | *1,88* | 22 | 6 | 10 |
| 0,55 | *1,91* | 24 | 7 | 10 |
| 0,60 | *1,91* | 24 | 7 | 10 |
| 0,65 | *1,91* | 26 | 8 | 10 |
| 0,70 | *1,91* | 28 | 9 | 10 |
| 0,75 | *1,80* | 28 | 9 | 10 |
| 0,80 | *1,80* | 30 | 10 | 10 |
| 0,85 | *1,80* | 30 | 10 | 10 |
| 0,90 | *1,80* | 32 | 11 | 10 |
| 0,95 | *1,80* | 32 | 11 | 10 |
| 1,00 | *1,08* | 34 | 12 | 10 |
| 1,05 | *1,35* | 34 | 12 | 10 |
| 1,10 | *1,23* | 36 | 14 | 10 |
| 1,15 | *1,23* | 36 | 14 | 10 |
| 1,20 | *1,23* | 38 | 16 | 10 |
| 1,25 | *1,00* | 38 | 16 | 10 |
| 1,30 | *1,12* | 38 | 16 | 10 |
| 1,35 | *1,23* | 40 | 18 | 10 |
| 1,40 | *1,12* | 40 | 18 | 10 |
| 1,45 | *1,17* | 40 | 18 | 10 |
| 1,50 | *0,91* | 40 | 18 | 10 |
| 1,55 | *1,17* | 43 | 20 | 10 |
| 1,60 | *1,08* | 43 | 20 | 10 |
| 1,65 | *1,17* | 43 | 20 | 10 |
| 1,70 | *1,08* | 43 | 20 | 10 |
| 1,75 | *1,00* | 46 | 22 | 10 |
| 1,80 | *1,08* | 46 | 22 | 10 |
| 1,85 | *1,08* | 46 | 22 | 10 |
| 1,90 | *1,08* | 46 | 22 | 10 |
| 1,95 | *1,17* | 49 | 24 | 10 |
| 2,00 | *0,89* | 49 | 24 | 10 |
| 2,05 | *1,17* | 49 | 24 | 10 |
| 2,10 | *1,08* | 49 | 24 | 10 |
| 2,15 | *1,17* | 53 | 27 | 10 |
| 2,20 | *1,08* | 53 | 27 | 10 |
| 2,25 | *0,98* | 53 | 27 | 10 |
| 2,30 | *1,08* | 53 | 27 | 10 |
| 2,35 | *1,08* | 53 | 27 | 10 |
| 2,40 | *1,08* | 57 | 30 | 10 |
| 2,45 | *1,17* | 57 | 30 | 10 |
| 2,50 | *0,89* | 57 | 30 | 10 |
| 2,55 | *1,23* | 57 | 30 | 10 |
| 2,60 | *1,12* | 57 | 30 | 10 |
| 2,65 | *1,12* | 57 | 30 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,70 | *1,12* | 61 | 33 | 10 |
| 2,75 | *1,00* | 61 | 33 | 10 |
| 2,80 | *1,12* | 61 | 33 | 10 |
| 2,85 | *1,23* | 61 | 33 | 10 |
| 2,90 | *1,12* | 61 | 33 | 10 |
| 2,95 | *1,23* | 61 | 33 | 10 |
| 3,00 | *0,78* | 61 | 33 | 10 |
| 3,05 | *1,30* | 65 | 36 | 10 |
| 3,10 | *1,11* | 65 | 36 | 10 |
| 3,15 | *1,30* | 65 | 36 | 10 |
| 3,20 | *1,11* | 65 | 36 | 10 |
| 3,25 | *0,98* | 65 | 36 | 10 |
| 3,30 | *1,18* | 65 | 36 | 10 |
| 3,35 | *1,30* | 70 | 39 | 10 |
| 3,40 | *1,18* | 70 | 39 | 10 |
| 3,45 | *1,30* | 70 | 39 | 10 |
| 3,50 | *0,98* | 70 | 39 | 10 |
| 3,55 | *1,45* | 70 | 39 | 10 |
| 3,60 | *1,30* | 70 | 39 | 10 |
| 3,65 | *1,45* | 70 | 39 | 10 |
| 3,70 | *1,30* | 70 | 39 | 10 |
| 3,75 | *1,19* | 70 | 39 | 10 |
| 3,80 | *1,30* | 75 | 43 | 10 |
| 3,90 | *1,30* | 75 | 43 | 10 |
| 3,95 | *1,44* | 75 | 43 | 10 |
| 4,00 | *1,01* | 75 | 43 | 10 |
| 4,05 | *1,55* | 75 | 43 | 10 |
| 4,10 | *1,41* | 75 | 43 | 10 |
| 4,15 | *1,55* | 75 | 43 | 10 |
| 4,20 | *1,41* | 75 | 43 | 10 |
| 4,25 | *1,30* | 75 | 43 | 10 |
| 4,30 | *1,54* | 80 | 47 | 10 |
| 4,40 | *1,54* | 80 | 47 | 10 |
| 4,50 | *1,30* | 80 | 47 | 10 |
| 4,55 | *1,91* | 80 | 47 | 10 |
| 4,60 | *1,74* | 80 | 47 | 10 |
| 4,65 | *1,91* | 80 | 47 | 10 |
| 4,70 | *1,74* | 80 | 47 | 10 |
| 4,75 | *1,60* | 80 | 47 | 10 |
| 4,80 | *1,74* | 86 | 52 | 10 |
| 4,90 | *1,74* | 86 | 52 | 10 |
| 5,00 | *1,28* | 86 | 52 | 10 |
| 5,10 | *1,93* | 86 | 52 | 10 |
| 5,20 | *2,13* | 86 | 52 | 10 |
| 5,25 | *1,63* | 86 | 52 | 10 |
| 5,30 | *1,93* | 86 | 52 | 10 |
| 5,40 | *1,93* | 93 | 57 | 10 |
| 5,50 | *1,63* | 93 | 57 | 10 |
| 5,60 | *2,23* | 93 | 57 | 10 |
| 5,70 | *2,23* | 93 | 57 | 10 |

# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

**(continúa Ref.11010 / suite Réf.11010 / Ref.11010 cont'd)**

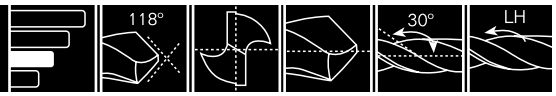
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,75 | *2,03* | 93 | 57 | 10 |
| 5,80 | *2,23* | 93 | 57 | 10 |
| 5,85 | *2,44* | 93 | 57 | 10 |
| 5,90 | *2,23* | 93 | 57 | 10 |
| 6,00 | *1,72* | 93 | 57 | 10 |
| 6,10 | *2,61* | 101 | 63 | 10 |
| 6,20 | *2,61* | 101 | 63 | 10 |
| 6,25 | *2,40* | 101 | 63 | 10 |
| 6,30 | *2,61* | 101 | 63 | 10 |
| 6,35 | *2,88* | 101 | 63 | 10 |
| 6,40 | *2,61* | 101 | 63 | 10 |
| 6,50 | *2,21* | 101 | 63 | 10 |
| 6,60 | *3,02* | 101 | 63 | 10 |
| 6,70 | *3,02* | 101 | 63 | 10 |
| 6,75 | *2,77* | 109 | 69 | 10 |
| 6,80 | *3,02* | 109 | 69 | 10 |
| 6,90 | *3,02* | 109 | 69 | 10 |
| 6,95 | *3,34* | 109 | 69 | 10 |
| 7,00 | *2,54* | 109 | 69 | 10 |
| 7,10 | *3,43* | 109 | 69 | 10 |
| 7,20 | *3,43* | 109 | 69 | 10 |
| 7,25 | *3,16* | 109 | 69 | 10 |
| 7,30 | *3,43* | 109 | 69 | 10 |
| 7,35 | *3,76* | 109 | 69 | 10 |
| 7,40 | *3,43* | 109 | 69 | 10 |
| 7,50 | *2,86* | 109 | 69 | 10 |
| 7,60 | *3,75* | 117 | 75 | 10 |
| 7,65 | *4,13* | 117 | 75 | 10 |
| 7,70 | *3,75* | 117 | 75 | 10 |
| 7,75 | *3,44* | 117 | 75 | 10 |
| 7,80 | *3,75* | 117 | 75 | 10 |
| 7,90 | *3,75* | 117 | 75 | 10 |
| 7,95 | *4,13* | 117 | 75 | 10 |
| 8,00 | *2,99* | 117 | 75 | 10 |
| 8,10 | *4,47* | 117 | 75 | 10 |
| 8,15 | *4,92* | 117 | 75 | 10 |
| 8,20 | *4,47* | 117 | 75 | 10 |
| 8,25 | *4,12* | 117 | 75 | 10 |
| 8,30 | *4,47* | 117 | 75 | 10 |
| 8,40 | *4,47* | 117 | 75 | 10 |
| 8,45 | *4,92* | 117 | 75 | 10 |
| 8,50 | *3,75* | 117 | 75 | 10 |
| 8,60 | *4,89* | 125 | 81 | 10 |
| 8,65 | *5,38* | 125 | 81 | 10 |
| 8,70 | *4,89* | 125 | 81 | 10 |
| 8,75 | *4,47* | 125 | 81 | 10 |
| 8,80 | *4,89* | 125 | 81 | 10 |
| 8,90 | *5,38* | 125 | 81 | 10 |
| 8,95 | *5,38* | 125 | 81 | 10 |
| 9,00 | *4,11* | 125 | 81 | 10 |
| 9,05 | *5,82* | 125 | 81 | 10 |
| 9,10 | *5,49* | 125 | 81 | 10 |
| 9,20 | *5,49* | 125 | 81 | 10 |
| 9,25 | *5,49* | 125 | 81 | 10 |
| 9,30 | *5,49* | 125 | 81 | 10 |
| 9,35 | *6,07* | 125 | 81 | 10 |
| 9,40 | *5,49* | 125 | 81 | 10 |
| 9,45 | *6,07* | 125 | 81 | 10 |
| 9,50 | *4,61* | 125 | 81 | 10 |
| 9,60 | *6,15* | 133 | 87 | 10 |
| 9,70 | *6,15* | 133 | 87 | 10 |
| 9,75 | *5,63* | 133 | 87 | 10 |
| 9,80 | *6,15* | 133 | 87 | 10 |
| 9,90 | *6,15* | 133 | 87 | 10 |
| 10,00 | *4,69* | 133 | 87 | 5 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,10 | *6,92* | 133 | 87 | 5 |
| 10,20 | *6,92* | 133 | 87 | 5 |
| 10,25 | *6,37* | 133 | 87 | 5 |
| 10,30 | *6,92* | 133 | 87 | 5 |
| 10,40 | *6,92* | 133 | 87 | 5 |
| 10,50 | *5,79* | 133 | 87 | 5 |
| 10,60 | *7,73* | 133 | 87 | 5 |
| 10,70 | *7,73* | 142 | 94 | 5 |
| 10,75 | *7,09* | 142 | 94 | 5 |
| 10,80 | *7,73* | 142 | 94 | 5 |
| 10,90 | *7,73* | 142 | 94 | 5 |
| 11,00 | *6,43* | 142 | 94 | 5 |
| 11,10 | *8,59* | 142 | 94 | 5 |
| 11,20 | *8,59* | 142 | 94 | 5 |
| 11,25 | *7,89* | 142 | 94 | 5 |
| 11,30 | *8,59* | 142 | 94 | 5 |
| 11,40 | *8,59* | 142 | 94 | 5 |
| 11,50 | *7,13* | 142 | 94 | 5 |
| 11,60 | *9,04* | 142 | 94 | 5 |
| 11,70 | *9,04* | 142 | 94 | 5 |
| 11,75 | *8,30* | 142 | 94 | 5 |
| 11,80 | *9,04* | 142 | 94 | 5 |
| 11,90 | *9,04* | 151 | 101 | 5 |
| 12,00 | *7,56* | 151 | 101 | 5 |
| 12,10 | *10,19* | 151 | 101 | 5 |
| 12,20 | *10,19* | 151 | 101 | 5 |
| 12,25 | *9,32* | 151 | 101 | 5 |
| 12,30 | *10,19* | 151 | 101 | 5 |
| 12,40 | *10,19* | 151 | 101 | 5 |
| 12,50 | *8,46* | 151 | 101 | 5 |
| 12,60 | *11,12* | 151 | 101 | 5 |
| 12,70 | *11,12* | 151 | 101 | 5 |
| 12,75 | *10,19* | 151 | 101 | 5 |
| 12,80 | *11,12* | 151 | 101 | 5 |
| 12,90 | *11,12* | 151 | 101 | 5 |
| 13,00 | *9,30* | 151 | 101 | 5 |
| 13,25 | *12,97* | 160 | 108 | 4 |
| 13,50 | *11,80* | 160 | 108 | 4 |
| 13,75 | *14,04* | 160 | 108 | 4 |
| 14,00 | *12,76* | 160 | 108 | 4 |
| 14,25 | *16,00* | 169 | 114 | 4 |
| 14,50 | *14,55* | 169 | 114 | 4 |
| 14,75 | *18,30* | 169 | 114 | 4 |
| 15,00 | *16,63* | 169 | 114 | 4 |
| 15,25 | *22,06* | 178 | 120 | 1 |
| 15,50 | *20,07* | 178 | 120 | 1 |
| 15,75 | *22,06* | 178 | 120 | 1 |
| 16,00 | *20,07* | 178 | 120 | 1 |
| 16,25 | *28,53* | 184 | 125 | 1 |
| 16,50 | *25,91* | 184 | 125 | 1 |
| 16,75 | *28,53* | 184 | 125 | 1 |
| 17,00 | *25,91* | 184 | 125 | 1 |
| 17,25 | *31,74* | 191 | 130 | 1 |
| 17,50 | *28,86* | 191 | 130 | 1 |
| 17,75 | *31,74* | 191 | 130 | 1 |
| 18,00 | *28,86* | 191 | 130 | 1 |
| 18,25 | *35,42* | 198 | 135 | 1 |
| 18,50 | *32,20* | 198 | 135 | 1 |
| 18,75 | *35,42* | 198 | 135 | 1 |
| 19,00 | *32,20* | 198 | 135 | 1 |
| 19,25 | *42,46* | 205 | 140 | 1 |
| 19,50 | *38,61* | 205 | 140 | 1 |
| 19,75 | *42,45* | 205 | 140 | 1 |
| 20,00 | *38,61* | 205 | 140 | 1 |



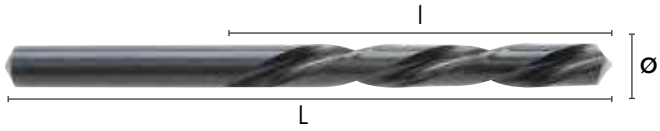
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1101/1 HSS DIN 338 N Izquierda / A gauche / Left hand




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

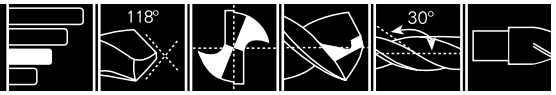
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *4,31* | 49 | 24 | 10 |
| 2,25 | *4,76* | 53 | 27 | 10 |
| 2,50 | *4,31* | 57 | 30 | 10 |
| 2,75 | *4,92* | 61 | 33 | 10 |
| 3,00 | *3,84* | 61 | 33 | 10 |
| 3,25 | *4,80* | 65 | 36 | 10 |
| 3,50 | *4,80* | 70 | 39 | 10 |
| 3,75 | *5,92* | 70 | 39 | 10 |
| 4,00 | *4,95* | 75 | 43 | 10 |
| 4,50 | *6,30* | 80 | 47 | 10 |
| 5,00 | *6,26* | 86 | 52 | 10 |
| 5,25 | *7,97* | 86 | 52 | 10 |
| 5,50 | *7,97* | 93 | 57 | 10 |

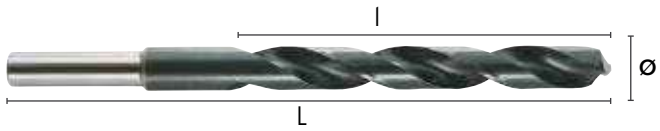
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,00 | *8,45* | 93 | 57 | 10 |
| 6,50 | *10,73* | 101 | 63 | 10 |
| 7,00 | *12,41* | 109 | 69 | 10 |
| 7,50 | *14,12* | 109 | 69 | 10 |
| 8,00 | *14,65* | 117 | 75 | 10 |
| 8,50 | *18,45* | 117 | 75 | 10 |
| 9,00 | *20,06* | 125 | 81 | 10 |
| 9,50 | *22,51* | 125 | 81 | 10 |
| 10,00 | *23,01* | 133 | 87 | 5 |
| 10,50 | *28,91* | 133 | 87 | 5 |
| 11,00 | *32,16* | 142 | 94 | 5 |
| 11,50 | *35,65* | 142 | 94 | 5 |
| 12,00 | *37,08* | 151 | 101 | 5 |

## 1104 HSS DIN 338 N MR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 8 | *7,99* | 133 | 87 | 1 |
| 10,50 | 8 | *9,18* | 133 | 87 | 1 |
| 11,00 | 8 | *9,18* | 142 | 94 | 1 |
| 11,50 | 8 | *10,26* | 142 | 94 | 1 |
| 12,00 | 8 | *10,26* | 151 | 101 | 1 |
| 12,50 | 8 | *11,32* | 151 | 101 | 1 |
| 13,00 | 10 | *12,48* | 151 | 101 | 1 |
| 13,25 | 10 | *15,91* | 160 | 108 | 1 |
| 13,50 | 10 | *15,91* | 160 | 108 | 1 |
| 13,75 | 10 | *17,29* | 160 | 108 | 1 |
| 14,00 | 10 | *15,91* | 160 | 108 | 1 |
| 14,25 | 10 | *19,94* | 169 | 114 | 1 |
| 14,40 | 10 | *19,65* | 169 | 114 | 1 |
| 14,50 | 10 | *19,58* | 169 | 114 | 1 |
| 14,75 | 10 | *28,07* | 169 | 114 | 1 |
| 15,00 | 10 | *19,58* | 169 | 114 | 1 |
| 15,25 | 10 | *25,95* | 178 | 120 | 1 |
| 15,50 | 10 | *23,18* | 178 | 120 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 15,75 | 10 | *25,49* | 178 | 120 | 1 |
| 16,00 | 12 | *23,18* | 178 | 120 | 1 |
| 16,25 | 12 | *33,00* | 184 | 125 | 1 |
| 16,40 | 12 | *29,88* | 184 | 125 | 1 |
| 16,50 | 12 | *29,06* | 184 | 125 | 1 |
| 16,75 | 12 | *32,00* | 184 | 125 | 1 |
| 17,00 | 12 | *29,06* | 184 | 125 | 1 |
| 17,25 | 12 | *35,60* | 191 | 130 | 1 |
| 17,50 | 12 | *32,15* | 191 | 130 | 1 |
| 17,75 | 12 | *35,35* | 191 | 130 | 1 |
| 18,00 | 12 | *32,15* | 191 | 130 | 1 |
| 18,25 | 12 | *39,44* | 198 | 135 | 1 |
| 18,50 | 12 | *36,10* | 198 | 135 | 1 |
| 18,60 | 12 | *39,14* | 198 | 135 | 1 |
| 18,75 | 12 | *39,68* | 198 | 135 | 1 |
| 19,00 | 12 | *36,10* | 198 | 135 | 1 |
| 19,25 | 12 | *47,59* | 205 | 140 | 1 |
| 19,50 | 12 | *42,58* | 205 | 140 | 1 |

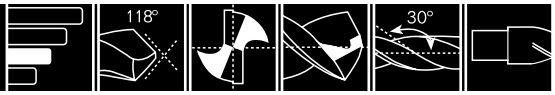
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 19,75 | 12 | *46,80* | 205 | 149 | 1 |
| 20,00 | 13 | *42,58* | 205 | 140 | 1 |
| 20,50 | 13 | *49,56* | 212 | 145 | 1 |
| 20,60 | 13 | *40,80* | 212 | 145 | 1 |
| 21,00 | 13 | *49,56* | 212 | 145 | 1 |
| 21,50 | 13 | *53,99* | 219 | 150 | 1 |
| 22,00 | 13 | *53,99* | 219 | 150 | 1 |
| 22,50 | 13 | *57,09* | 226 | 155 | 1 |
| 22,60 | 13 | *51,64* | 226 | 155 | 1 |
| 23,00 | 13 | *57,09* | 226 | 155 | 1 |
| 23,50 | 13 | *63,56* | 226 | 155 | 1 |
| 24,00 | 13 | *63,56* | 233 | 160 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 24,50 | 13 | *64,45* | 233 | 160 | 1 |
| 25,00 | 13 | *64,45* | 233 | 160 | 1 |
| 25,50 | 13 | *83,69* | 240 | 165 | 1 |
| 26,00 | 13 | *83,69* | 240 | 165 | 1 |
| 26,50 | 13 | *90,35* | 240 | 165 | 1 |
| 27,00 | 13 | *90,35* | 247 | 170 | 1 |
| 27,50 | 13 | *91,71* | 247 | 170 | 1 |
| 28,00 | 13 | *91,71* | 247 | 170 | 1 |
| 28,50 | 13 | *113,99* | 254 | 175 | 1 |
| 29,00 | 13 | *113,99* | 254 | 175 | 1 |
| 29,50 | 13 | *118,94* | 254 | 175 | 1 |
| 30,00 | 13 | *118,94* | 254 | 175 | 1 |

## 1104/9 HSS ANSI




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 17/32" | 1/2" | *15,91* | 152 | 76 | 1 |
| 9/16" | 1/2" | *15,91* | 152 | 76 | 1 |
| 19/32" | 1/2" | *19,58* | 152 | 76 | 1 |
| 5/8" | 1/2" | *23,18* | 152 | 76 | 1 |
| 21/32" | 1/2" | *29,06* | 152 | 76 | 1 |
| 11/16" | 1/2" | *32,15* | 152 | 76 | 1 |
| 23/32" | 1/2" | *32,15* | 152 | 76 | 1 |
| 3/4" | 1/2" | *36,10* | 152 | 76 | 1 |
| 25/32" | 1/2" | *42,58* | 152 | 76 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 13/16" | 1/2" | *40,80* | 152 | 76 | 1 |
| 27/32" | 1/2" | *49,56* | 152 | 76 | 1 |
| 7/8" | 1/2" | *54,00* | 152 | 76 | 1 |
| 29/32" | 1/2" | *57,09* | 152 | 76 | 1 |
| 15/16" | 1/2" | *63,56* | 152 | 76 | 1 |
| 31/32" | 1/2" | *64,45* | 152 | 76 | 1 |
| 1" | 1/2" | *64,45* | 152 | 76 | 1 |
| 1-1/16" | 1/2" | *90,35* | 152 | 76 | 1 |
| 1-1/8" | 1/2" | *113,99* | 152 | 76 | 1 |

## 1501 HSS Hex.

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

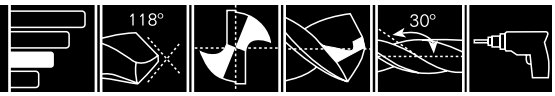
| Ø mm | L mm | l mm | € | |
|---|---|---|---|---|
| 3,00 | 61 | 33 | *3,51* | 1 |
| 4,00 | 75 | 43 | *3,86* | 1 |
| 5,00 | 86 | 52 | *4,03* | 1 |
| 6,00 | 93 | 57 | *4,34* | 1 |

| Ø mm | L mm | l mm | € | |
|---|---|---|---|---|
| 7,00 | 109 | 69 | *4,47* | 1 |
| 8,00 | 117 | 75 | *4,72* | 1 |
| 9,00 | 125 | 81 | *4,78* | 1 |
| 10,00 | 133 | 87 | *6,02* | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1158 HSS DIN 338 NSP




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *1,18* | 34 | 12 | 10 |
| 1,10 | *1,47* | 36 | 14 | 10 |
| 1,20 | *1,47* | 38 | 16 | 10 |
| 1,30 | *1,30* | 38 | 16 | 10 |
| 1,40 | *1,30* | 40 | 18 | 10 |
| 1,50 | *1,02* | 40 | 18 | 10 |
| 1,60 | *1,25* | 43 | 20 | 10 |
| 1,70 | *1,25* | 43 | 20 | 10 |
| 1,80 | *1,11* | 46 | 22 | 10 |
| 1,90 | *1,11* | 46 | 22 | 10 |
| 2,00 | *0,97* | 49 | 24 | 10 |
| 2,10 | *1,08* | 49 | 24 | 10 |
| 2,20 | *1,08* | 53 | 27 | 10 |
| 2,25 | *1,08* | 53 | 27 | 10 |
| 2,30 | *1,29* | 53 | 27 | 10 |
| 2,40 | *1,29* | 57 | 30 | 10 |
| 2,50 | *0,97* | 57 | 30 | 10 |
| 2,60 | *1,30* | 57 | 30 | 10 |
| 2,70 | *1,30* | 61 | 33 | 10 |
| 2,75 | *1,11* | 61 | 33 | 10 |
| 2,80 | *1,30* | 61 | 33 | 10 |
| 2,90 | *1,30* | 61 | 33 | 10 |
| 3,00 | *0,88* | 61 | 33 | 10 |
| 3,10 | *1,11* | 65 | 36 | 10 |
| 3,20 | *1,11* | 65 | 36 | 10 |
| 3,25 | *1,08* | 65 | 36 | 10 |
| 3,30 | *1,11* | 65 | 36 | 10 |
| 3,40 | *1,42* | 70 | 39 | 10 |
| 3,50 | *1,08* | 70 | 39 | 10 |
| 3,60 | *1,48* | 70 | 39 | 10 |
| 3,70 | *1,48* | 70 | 39 | 10 |
| 3,75 | *1,32* | 70 | 39 | 10 |
| 3,80 | *1,56* | 75 | 43 | 10 |
| 3,90 | *1,56* | 75 | 43 | 10 |
| 4,00 | *1,11* | 75 | 43 | 10 |
| 4,10 | *1,37* | 75 | 43 | 10 |
| 4,20 | *1,37* | 75 | 43 | 10 |
| 4,25 | *1,41* | 75 | 43 | 10 |
| 4,30 | *1,84* | 80 | 47 | 10 |
| 4,40 | *1,84* | 80 | 47 | 10 |
| 4,50 | *1,41* | 80 | 47 | 10 |
| 4,60 | *1,88* | 80 | 47 | 10 |
| 4,70 | *1,88* | 80 | 47 | 10 |
| 4,75 | *1,76* | 80 | 47 | 10 |
| 4,80 | *2,04* | 86 | 52 | 10 |
| 4,90 | *2,01* | 86 | 52 | 10 |
| 5,00 | *1,41* | 86 | 52 | 10 |
| 5,10 | *2,05* | 86 | 52 | 10 |
| 5,20 | *2,05* | 86 | 52 | 10 |
| 5,25 | *1,79* | 86 | 52 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,30 | *2,58* | 86 | 52 | 10 |
| 5,40 | *2,58* | 93 | 57 | 10 |
| 5,50 | *1,79* | 93 | 57 | 10 |
| 5,60 | *2,71* | 93 | 57 | 10 |
| 5,70 | *2,71* | 93 | 57 | 10 |
| 5,75 | *2,25* | 93 | 57 | 10 |
| 5,80 | *2,58* | 93 | 57 | 10 |
| 5,90 | *2,58* | 93 | 57 | 10 |
| 6,00 | *1,91* | 93 | 57 | 10 |
| 6,10 | *2,96* | 101 | 63 | 10 |
| 6,20 | *2,96* | 101 | 63 | 10 |
| 6,25 | *2,67* | 101 | 63 | 10 |
| 6,30 | *3,13* | 101 | 63 | 10 |
| 6,40 | *3,18* | 101 | 63 | 10 |
| 6,50 | *2,42* | 101 | 63 | 10 |
| 6,60 | *3,91* | 101 | 63 | 10 |
| 6,70 | *3,91* | 101 | 63 | 10 |
| 6,75 | *3,06* | 109 | 69 | 10 |
| 6,80 | *2,95* | 109 | 69 | 10 |
| 6,90 | *4,32* | 109 | 69 | 10 |
| 7,00 | *2,80* | 109 | 69 | 10 |
| 7,10 | *4,59* | 109 | 69 | 10 |
| 7,20 | *4,59* | 109 | 69 | 10 |
| 7,25 | *3,50* | 109 | 69 | 10 |
| 7,30 | *4,59* | 109 | 69 | 10 |
| 7,40 | *4,59* | 109 | 69 | 10 |
| 7,50 | *3,18* | 109 | 69 | 10 |
| 7,60 | *5,39* | 117 | 75 | 10 |
| 7,70 | *5,39* | 117 | 75 | 10 |
| 7,75 | *3,82* | 117 | 75 | 10 |
| 7,80 | *5,46* | 117 | 75 | 10 |
| 7,90 | *5,46* | 117 | 75 | 10 |
| 8,00 | *3,29* | 117 | 75 | 10 |
| 8,10 | *5,54* | 117 | 75 | 10 |
| 8,20 | *5,54* | 117 | 75 | 10 |
| 8,25 | *4,55* | 117 | 75 | 10 |
| 8,30 | *5,81* | 117 | 75 | 10 |
| 8,40 | *5,81* | 117 | 75 | 10 |
| 8,50 | *4,16* | 117 | 75 | 10 |
| 8,60 | *7,30* | 125 | 81 | 10 |
| 8,70 | *7,30* | 125 | 81 | 10 |
| 8,75 | *4,95* | 125 | 81 | 10 |
| 8,80 | *7,34* | 125 | 81 | 10 |
| 8,90 | *7,34* | 125 | 81 | 10 |
| 9,00 | *4,54* | 125 | 81 | 10 |
| 9,10 | *7,36* | 125 | 81 | 10 |
| 9,20 | *7,36* | 125 | 81 | 10 |
| 9,25 | *6,08* | 125 | 81 | 10 |
| 9,30 | *6,86* | 125 | 81 | 10 |
| 9,40 | *6,86* | 125 | 81 | 10 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

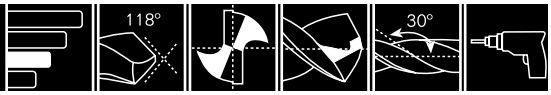
# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

**(continúa Ref.1158 / suite Réf.1158 / Ref.1158 cont'd)**

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 9,50 | *5,08* | 125 | 81 | 10 |
| 9,60 | *8,78* | 133 | 87 | 10 |
| 9,70 | *8,78* | 133 | 87 | 10 |
| 9,75 | *6,22* | 133 | 87 | 10 |
| 9,80 | *8,65* | 133 | 87 | 10 |
| 9,90 | *8,65* | 133 | 87 | 10 |
| 10,00 | *5,17* | 133 | 87 | 5 |
| 10,50 | *6,39* | 133 | 87 | 5 |
| 11,00 | *7,11* | 142 | 94 | 5 |
| 11,50 | *7,89* | 142 | 94 | 5 |
| 12,00 | *8,35* | 151 | 101 | 5 |
| 12,50 | *9,36* | 151 | 101 | 5 |
| 13,00 | *10,24* | 151 | 101 | 5 |
| 13,50 | *12,96* | 151 | 101 | 4 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 14,00 | *14,04* | 169 | 108 | 4 |
| 14,50 | *16,00* | 169 | 114 | 4 |
| 15,00 | *18,28* | 169 | 114 | 4 |
| 15,50 | *22,05* | 178 | 120 | 1 |
| 16,00 | *22,05* | 178 | 120 | 1 |
| 16,50 | *28,48* | 184 | 125 | 1 |
| 17,00 | *28,48* | 184 | 125 | 1 |
| 17,50 | *31,73* | 191 | 130 | 1 |
| 18,00 | *31,73* | 191 | 130 | 1 |
| 18,50 | *35,41* | 198 | 125 | 1 |
| 19,00 | *35,41* | 198 | 125 | 1 |
| 19,50 | *42,43* | 205 | 140 | 1 |
| 20,00 | *42,43* | 205 | 140 | 1 |

## 1158/9 HSS DIN 338 NSP




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

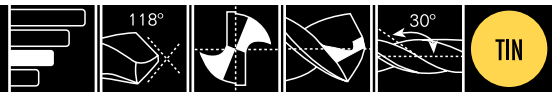
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1/16" | *1,02* | 43 | 20 | 10 |
| 5/64" | *0,97* | 49 | 24 | 10 |
| 3/32" | *0,97* | 57 | 30 | 10 |
| 7/64" | *1,11* | 61 | 33 | 10 |
| 1/8" | *0,88* | 65 | 36 | 10 |
| 9/64" | *1,08* | 70 | 39 | 10 |
| 5/32" | *1,11* | 75 | 43 | 10 |
| 11/64" | *1,41* | 80 | 47 | 10 |
| 3/16" | *1,41* | 86 | 52 | 10 |
| 13/64" | *1,41* | 86 | 52 | 10 |
| 7/32" | *1,79* | 93 | 57 | 10 |
| 15/64" | *1,91* | 93 | 57 | 10 |
| 1/4" | *2,42* | 101 | 63 | 10 |
| 17/64" | *2,80* | 109 | 69 | 10 |
| 9/32" | *2,80* | 109 | 69 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 19/64" | *3,18* | 117 | 75 | 10 |
| 5/16" | *3,29* | 117 | 75 | 10 |
| 21/64" | *4,16* | 117 | 75 | 10 |
| 11/32" | *4,54* | 125 | 81 | 10 |
| 23/64" | *4,54* | 125 | 81 | 10 |
| 3/8" | *5,08* | 133 | 87 | 10 |
| 25/64" | *5,17* | 133 | 87 | 10 |
| 13/32" | *6,39* | 133 | 87 | 5 |
| 27/64" | *6,71* | 142 | 94 | 5 |
| 7/16" | *7,11* | 142 | 94 | 5 |
| 29/64" | *7,89* | 142 | 94 | 5 |
| 15/32" | *8,35* | 151 | 101 | 5 |
| 31/64" | *9,36* | 151 | 101 | 5 |
| 1/2" | *10,24* | 151 | 101 | 5 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1108 HSS DIN 338 NSP




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-45 | ● 15-30 | | | | | ● 35-40 | ● 15-20 | | ○ 65-90 | ● 40-70 | ○ 65-90 | ○ 25-35 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *2,40* | 34 | 12 | 10 |
| 1,10 | *2,14* | 36 | 14 | 10 |
| 1,20 | *2,14* | 38 | 16 | 10 |
| 1,30 | *2,14* | 38 | 16 | 10 |
| 1,40 | *2,14* | 40 | 18 | 10 |
| 1,50 | *1,86* | 40 | 18 | 10 |
| 1,60 | *2,14* | 43 | 20 | 10 |
| 1,70 | *2,14* | 43 | 20 | 10 |
| 1,80 | *2,14* | 46 | 22 | 10 |
| 1,90 | *2,14* | 46 | 22 | 10 |
| 2,00 | *1,86* | 49 | 24 | 10 |
| 2,10 | *2,14* | 49 | 24 | 10 |
| 2,20 | *2,14* | 53 | 27 | 10 |
| 2,25 | *2,14* | 53 | 27 | 10 |
| 2,30 | *2,14* | 53 | 27 | 10 |
| 2,40 | *2,14* | 57 | 30 | 10 |
| 2,50 | *1,86* | 57 | 30 | 10 |
| 2,60 | *2,14* | 57 | 30 | 10 |
| 2,70 | *2,14* | 61 | 33 | 10 |
| 2,75 | *1,86* | 61 | 33 | 10 |
| 2,80 | *2,14* | 61 | 33 | 10 |
| 2,90 | *2,14* | 61 | 33 | 10 |
| 3,00 | *2,03* | 61 | 33 | 10 |
| 3,10 | *2,39* | 65 | 36 | 10 |
| 3,20 | *2,39* | 65 | 36 | 10 |
| 3,25 | *2,07* | 65 | 36 | 10 |
| 3,30 | *2,39* | 65 | 36 | 10 |
| 3,40 | *2,39* | 70 | 39 | 10 |
| 3,50 | *2,25* | 70 | 39 | 10 |
| 3,60 | *2,64* | 70 | 39 | 10 |
| 3,70 | *2,64* | 70 | 39 | 10 |
| 3,75 | *2,33* | 70 | 39 | 10 |
| 3,80 | *2,64* | 75 | 43 | 10 |
| 3,90 | *2,64* | 75 | 43 | 10 |
| 4,00 | *2,54* | 75 | 43 | 10 |
| 4,10 | *3,18* | 75 | 43 | 10 |
| 4,20 | *3,18* | 75 | 43 | 10 |
| 4,25 | *2,77* | 75 | 43 | 10 |
| 4,30 | *2,77* | 80 | 47 | 10 |
| 4,40 | *2,77* | 80 | 47 | 10 |
| 4,50 | *2,77* | 80 | 47 | 10 |
| 4,60 | *2,77* | 80 | 47 | 10 |
| 4,70 | *2,77* | 80 | 47 | 10 |
| 4,75 | *2,99* | 80 | 47 | 10 |
| 4,80 | *2,99* | 86 | 52 | 10 |
| 4,90 | *3,00* | 86 | 52 | 10 |
| 5,00 | *2,86* | 86 | 52 | 10 |
| 5,10 | *3,43* | 86 | 52 | 10 |
| 5,20 | *3,43* | 86 | 52 | 10 |
| 5,25 | *3,43* | 86 | 52 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,30 | *3,43* | 86 | 52 | 10 |
| 5,40 | *3,43* | 93 | 57 | 10 |
| 5,50 | *3,43* | 93 | 57 | 10 |
| 5,60 | *3,79* | 93 | 57 | 10 |
| 5,70 | *3,79* | 93 | 57 | 10 |
| 5,75 | *3,79* | 93 | 57 | 10 |
| 5,80 | *3,79* | 93 | 57 | 10 |
| 5,90 | *3,79* | 93 | 57 | 10 |
| 6,00 | *3,79* | 93 | 57 | 10 |
| 6,10 | *4,66* | 101 | 63 | 10 |
| 6,20 | *4,66* | 101 | 63 | 10 |
| 6,25 | *4,66* | 101 | 63 | 10 |
| 6,30 | *4,66* | 101 | 63 | 10 |
| 6,40 | *4,66* | 101 | 63 | 10 |
| 6,50 | *4,66* | 101 | 63 | 10 |
| 6,60 | *5,39* | 101 | 63 | 10 |
| 6,70 | *5,39* | 101 | 63 | 10 |
| 6,75 | *5,41* | 109 | 69 | 10 |
| 6,80 | *6,23* | 109 | 69 | 10 |
| 6,90 | *6,23* | 109 | 69 | 10 |
| 7,00 | *6,23* | 109 | 69 | 10 |
| 7,10 | *6,23* | 109 | 69 | 10 |
| 7,20 | *6,23* | 109 | 69 | 10 |
| 7,25 | *6,75* | 109 | 69 | 10 |
| 7,30 | *6,75* | 109 | 69 | 10 |
| 7,40 | *6,75* | 109 | 69 | 10 |
| 7,50 | *6,75* | 109 | 69 | 10 |
| 7,60 | *7,05* | 117 | 75 | 10 |
| 7,70 | *7,05* | 117 | 75 | 10 |
| 7,75 | *7,05* | 117 | 75 | 10 |
| 7,80 | *7,11* | 117 | 75 | 10 |
| 7,90 | *7,11* | 117 | 75 | 10 |
| 8,00 | *7,11* | 117 | 75 | 10 |
| 8,10 | *8,22* | 117 | 75 | 10 |
| 8,20 | *8,22* | 117 | 75 | 10 |
| 8,25 | *8,22* | 117 | 75 | 10 |
| 8,30 | *8,22* | 117 | 75 | 10 |
| 8,40 | *8,22* | 117 | 75 | 10 |
| 8,50 | *8,22* | 117 | 75 | 10 |
| 8,60 | *8,96* | 125 | 81 | 10 |
| 8,70 | *8,96* | 125 | 81 | 10 |
| 8,75 | *8,97* | 125 | 81 | 10 |
| 8,80 | *8,96* | 125 | 81 | 10 |
| 8,90 | *8,96* | 125 | 81 | 10 |
| 9,00 | *8,97* | 125 | 81 | 10 |
| 9,10 | *10,12* | 125 | 81 | 10 |
| 9,20 | *10,12* | 125 | 81 | 10 |
| 9,25 | *10,11* | 125 | 81 | 10 |
| 9,30 | *10,12* | 125 | 81 | 10 |
| 9,40 | *10,12* | 125 | 81 | 10 |

**(continúa Ref.1108 / suite Réf.1108 / Ref.1108 cont'd)**

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

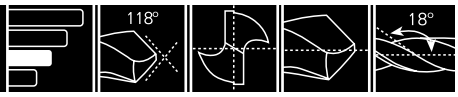
# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

**(continúa Ref.1108 / suite Réf.1108 / Ref.1108 cont'd)**

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 9,50 | *10,11* | 125 | 81 | 10 |
| 9,60 | *11,26* | 133 | 87 | 10 |
| 9,75 | *11,26* | 133 | 87 | 10 |
| 9,80 | *11,26* | 133 | 87 | 10 |
| 9,90 | *11,26* | 133 | 87 | 10 |
| 10,00 | *11,26* | 133 | 87 | 5 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,50 | *13,01* | 133 | 87 | 5 |
| 11,00 | *14,55* | 142 | 94 | 5 |
| 11,50 | *16,15* | 142 | 94 | 5 |
| 12,00 | *18,55* | 151 | 101 | 5 |
| 12,50 | *19,60* | 151 | 101 | 5 |
| 13,00 | *21,40* | 151 | 101 | 5 |

## 1103 HSS DIN 338 H




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● 25-60 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *3,83* | 34 | 12 | 1 |
| 1,25 | *4,32* | 38 | 16 | 1 |
| 1,50 | *3,75* | 40 | 18 | 1 |
| 1,75 | *4,21* | 46 | 22 | 1 |
| 2,00 | *3,43* | 49 | 24 | 1 |
| 2,25 | *4,02* | 53 | 27 | 1 |
| 2,50 | *3,50* | 57 | 30 | 1 |
| 2,75 | *4,70* | 61 | 33 | 1 |
| 3,00 | *3,83* | 61 | 33 | 1 |
| 3,25 | *4,70* | 65 | 36 | 1 |
| 3,50 | *4,13* | 70 | 39 | 1 |
| 3,75 | *6,09* | 70 | 39 | 1 |
| 4,00 | *4,43* | 75 | 43 | 1 |
| 4,25 | *6,63* | 75 | 43 | 1 |
| 4,50 | *5,46* | 80 | 47 | 1 |
| 4,75 | *7,48* | 80 | 47 | 1 |
| 5,00 | *5,94* | 86 | 52 | 1 |
| 5,25 | *8,95* | 86 | 52 | 1 |
| 5,50 | *7,19* | 93 | 57 | 1 |
| 5,75 | *10,94* | 93 | 57 | 1 |
| 6,00 | *7,79* | 93 | 57 | 1 |
| 6,25 | *10,94* | 101 | 63 | 1 |

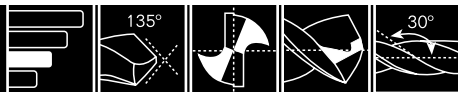
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,50 | *8,68* | 101 | 63 | 1 |
| 6,75 | *13,18* | 109 | 69 | 1 |
| 7,00 | *9,17* | 109 | 69 | 1 |
| 7,25 | *17,40* | 109 | 69 | 1 |
| 7,50 | *10,78* | 109 | 69 | 1 |
| 7,75 | *20,13* | 117 | 75 | 1 |
| 8,00 | *11,49* | 117 | 75 | 1 |
| 8,25 | *21,50* | 117 | 75 | 1 |
| 8,50 | *13,31* | 117 | 75 | 1 |
| 8,75 | *22,51* | 125 | 81 | 1 |
| 9,00 | *13,98* | 125 | 81 | 1 |
| 9,25 | *29,01* | 125 | 81 | 1 |
| 9,50 | *16,36* | 125 | 81 | 1 |
| 9,75 | *32,10* | 133 | 87 | 1 |
| 10,00 | *17,09* | 133 | 87 | 1 |
| 10,50 | *20,48* | 133 | 87 | 1 |
| 11,00 | *22,87* | 142 | 94 | 1 |
| 11,50 | *27,65* | 142 | 94 | 1 |
| 12,00 | *29,81* | 151 | 101 | 1 |
| 12,50 | *33,79* | 151 | 101 | 1 |
| 13,00 | *36,17* | 151 | 101 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

Hepyc CUTTING TOOL EXPERTS

# 1105 HSSCO DIN 338 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | ● 12-20 | ● 6-16 | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 0,50 | *2,80* | 22 | 6 | 10 |
| 0,60 | *2,27* | 24 | 7 | 10 |
| 0,70 | *2,21* | 28 | 9 | 10 |
| 0,75 | *2,21* | 28 | 9 | 10 |
| 0,80 | *2,00* | 30 | 10 | 10 |
| 0,90 | *2,00* | 32 | 11 | 10 |
| 1,00 | *1,75* | 34 | 12 | 10 |
| 1,10 | *1,52* | 36 | 14 | 10 |
| 1,20 | *1,69* | 38 | 16 | 10 |
| 1,25 | *2,00* | 38 | 16 | 10 |
| 1,30 | *1,60* | 38 | 16 | 10 |
| 1,40 | *1,51* | 40 | 18 | 10 |
| 1,50 | *1,60* | 40 | 18 | 10 |
| 1,60 | *1,67* | 43 | 20 | 10 |
| 1,70 | *1,54* | 43 | 20 | 10 |
| 1,75 | *2,25* | 46 | 22 | 10 |
| 1,80 | *1,54* | 46 | 22 | 10 |
| 1,90 | *1,59* | 46 | 22 | 10 |
| 2,00 | *1,64* | 49 | 24 | 10 |
| 2,10 | *1,79* | 49 | 24 | 10 |
| 2,20 | *1,79* | 53 | 27 | 10 |
| 2,25 | *2,59* | 53 | 27 | 10 |
| 2,30 | *1,79* | 53 | 27 | 10 |
| 2,40 | *1,80* | 57 | 30 | 10 |
| 2,50 | *1,75* | 57 | 30 | 10 |
| 2,60 | *1,88* | 57 | 30 | 10 |
| 2,70 | *1,88* | 61 | 33 | 10 |
| 2,75 | *1,93* | 61 | 33 | 10 |
| 2,80 | *1,90* | 61 | 33 | 10 |
| 2,90 | *1,93* | 61 | 33 | 10 |
| 3,00 | *1,46* | 61 | 33 | 10 |
| 3,10 | *1,93* | 65 | 36 | 10 |
| 3,20 | *1,93* | 65 | 36 | 10 |
| 3,25 | *1,95* | 65 | 36 | 10 |
| 3,30 | *2,04* | 65 | 36 | 10 |
| 3,40 | *2,07* | 70 | 39 | 10 |
| 3,50 | *1,93* | 70 | 39 | 10 |
| 3,60 | *2,12* | 70 | 39 | 10 |
| 3,70 | *2,14* | 70 | 39 | 10 |
| 3,75 | *2,32* | 70 | 39 | 10 |
| 3,80 | *2,16* | 75 | 43 | 10 |
| 3,90 | *2,22* | 75 | 43 | 10 |
| 4,00 | *1,90* | 75 | 43 | 10 |
| 4,10 | *2,25* | 75 | 43 | 10 |
| 4,20 | *2,27* | 75 | 43 | 10 |
| 4,25 | *2,22* | 75 | 43 | 10 |
| 4,30 | *2,42* | 80 | 47 | 10 |
| 4,40 | *2,48* | 80 | 47 | 10 |
| 4,50 | *2,32* | 80 | 47 | 10 |
| 4,60 | *2,54* | 80 | 47 | 10 |
| 4,70 | *2,59* | 80 | 47 | 10 |
| 4,75 | *2,58* | 80 | 47 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 4,80 | *2,67* | 86 | 52 | 10 |
| 4,90 | *2,69* | 86 | 52 | 10 |
| 5,00 | *2,22* | 86 | 52 | 10 |
| 5,10 | *2,72* | 86 | 52 | 10 |
| 5,20 | *2,73* | 86 | 52 | 10 |
| 5,25 | *2,78* | 86 | 52 | 10 |
| 5,30 | *2,78* | 86 | 52 | 10 |
| 5,40 | *3,21* | 93 | 57 | 10 |
| 5,50 | *3,51* | 93 | 57 | 10 |
| 5,60 | *3,51* | 93 | 57 | 10 |
| 5,70 | *3,51* | 93 | 57 | 10 |
| 5,75 | *3,51* | 93 | 57 | 10 |
| 5,80 | *3,51* | 93 | 57 | 10 |
| 5,90 | *3,51* | 93 | 57 | 10 |
| 6,00 | *3,00* | 93 | 57 | 10 |
| 6,10 | *3,90* | 101 | 63 | 10 |
| 6,20 | *3,93* | 101 | 63 | 10 |
| 6,25 | *3,93* | 101 | 63 | 10 |
| 6,30 | *3,93* | 101 | 63 | 10 |
| 6,40 | *4,23* | 101 | 63 | 10 |
| 6,50 | *3,90* | 101 | 63 | 10 |
| 6,60 | *4,23* | 101 | 63 | 10 |
| 6,70 | *4,23* | 101 | 63 | 10 |
| 6,75 | *4,55* | 109 | 69 | 10 |
| 6,80 | *4,55* | 109 | 69 | 10 |
| 6,90 | *4,55* | 109 | 69 | 10 |
| 7,00 | *4,11* | 109 | 69 | 10 |
| 7,10 | *5,55* | 109 | 69 | 10 |
| 7,20 | *5,55* | 109 | 69 | 10 |
| 7,25 | *5,55* | 109 | 69 | 10 |
| 7,30 | *5,55* | 109 | 69 | 10 |
| 7,40 | *5,55* | 109 | 69 | 10 |
| 7,50 | *4,37* | 109 | 69 | 10 |
| 7,60 | *6,73* | 117 | 75 | 10 |
| 7,70 | *6,73* | 117 | 75 | 10 |
| 7,75 | *6,73* | 117 | 75 | 10 |
| 7,80 | *6,73* | 117 | 75 | 10 |
| 7,90 | *6,73* | 117 | 75 | 10 |
| 8,00 | *5,46* | 117 | 75 | 10 |
| 8,10 | *6,73* | 117 | 75 | 10 |
| 8,20 | *6,73* | 117 | 75 | 10 |
| 8,25 | *6,45* | 117 | 75 | 10 |
| 8,30 | *6,73* | 117 | 75 | 10 |
| 8,40 | *6,73* | 117 | 75 | 10 |
| 8,50 | *5,36* | 117 | 75 | 10 |
| 8,60 | *7,89* | 125 | 81 | 10 |
| 8,70 | *7,89* | 125 | 81 | 10 |
| 8,75 | *8,20* | 125 | 81 | 10 |
| 8,80 | *8,20* | 125 | 81 | 10 |
| 8,90 | *8,20* | 125 | 81 | 10 |
| 9,00 | *6,78* | 125 | 81 | 10 |
| 9,10 | *8,78* | 125 | 81 | 10 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

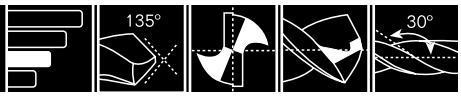
# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

**(continúa Ref.1105 / suite Réf.1105 / Ref.1105 cont'd)**

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 9,20 | *8,78* | 125 | 81 | 10 |
| 9,25 | *9,05* | 125 | 81 | 10 |
| 9,30 | *9,67* | 125 | 81 | 10 |
| 9,40 | *9,67* | 125 | 81 | 10 |
| 9,50 | *8,56* | 125 | 81 | 10 |
| 9,60 | *10,83* | 133 | 87 | 10 |
| 9,70 | *11,09* | 133 | 87 | 10 |
| 9,75 | *10,68* | 133 | 87 | 10 |
| 9,80 | *11,10* | 133 | 87 | 10 |
| 9,90 | *11,10* | 133 | 87 | 10 |
| 10,00 | *8,56* | 133 | 87 | 5 |
| 10,10 | *14,04* | 133 | 87 | 5 |
| 10,20 | *14,04* | 133 | 87 | 5 |
| 10,25 | *14,04* | 133 | 87 | 5 |
| 10,30 | *14,04* | 133 | 87 | 5 |
| 10,40 | *14,04* | 133 | 87 | 5 |
| 10,50 | *11,41* | 133 | 87 | 5 |
| 10,60 | *16,33* | 133 | 87 | 5 |
| 10,70 | *16,33* | 142 | 94 | 5 |
| 10,75 | *16,33* | 142 | 94 | 5 |
| 10,80 | *16,33* | 142 | 94 | 5 |
| 10,90 | *16,33* | 142 | 94 | 5 |
| 11,00 | *12,56* | 142 | 94 | 5 |
| 11,10 | *19,14* | 142 | 94 | 5 |
| 11,20 | *19,14* | 142 | 94 | 5 |
| 11,25 | *19,14* | 142 | 94 | 5 |
| 11,30 | *19,14* | 142 | 94 | 5 |
| 11,40 | *19,14* | 142 | 94 | 5 |
| 11,50 | *16,10* | 142 | 94 | 5 |
| 11,60 | *20,58* | 142 | 94 | 5 |
| 11,70 | *20,58* | 142 | 94 | 5 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 11,75 | *20,58* | 142 | 94 | 5 |
| 11,80 | *20,58* | 142 | 94 | 5 |
| 11,90 | *20,58* | 151 | 101 | 5 |
| 12,00 | *15,77* | 151 | 101 | 5 |
| 12,10 | *24,57* | 151 | 101 | 5 |
| 12,20 | *24,57* | 151 | 101 | 5 |
| 12,25 | *24,57* | 151 | 101 | 5 |
| 12,30 | *24,57* | 151 | 101 | 5 |
| 12,40 | *24,57* | 151 | 101 | 5 |
| 12,50 | *21,63* | 151 | 101 | 5 |
| 12,60 | *25,65* | 151 | 101 | 5 |
| 12,70 | *25,65* | 151 | 101 | 5 |
| 12,75 | *25,65* | 151 | 101 | 5 |
| 12,80 | *25,65* | 151 | 101 | 5 |
| 12,90 | *25,65* | 151 | 101 | 5 |
| 13,00 | *21,92* | 151 | 101 | 5 |
| 13,50 | *24,17* | 160 | 108 | 4 |
| 14,00 | *23,89* | 160 | 108 | 4 |
| 14,50 | *33,85* | 169 | 114 | 4 |
| 15,00 | *34,41* | 169 | 114 | 4 |
| 15,50 | *39,76* | 178 | 120 | 1 |
| 16,00 | *41,25* | 178 | 120 | 1 |
| 16,50 | *47,19* | 184 | 125 | 1 |
| 17,00 | *47,19* | 184 | 125 | 1 |
| 17,50 | *52,23* | 191 | 130 | 1 |
| 18,00 | *56,93* | 191 | 130 | 1 |
| 18,50 | *62,84* | 198 | 125 | 1 |
| 19,00 | *62,84* | 198 | 125 | 1 |
| 19,50 | *69,69* | 205 | 140 | 1 |
| 20,00 | *80,52* | 205 | 140 | 1 |

## 1105/9 HSSCO DIN 338 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | ● 12-20 | ● 6-16 | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

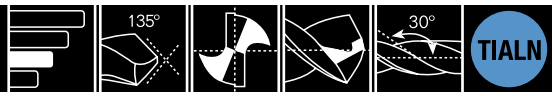
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1/16" | *1,59* | 43 | 20 | 10 |
| 5/64" | *1,64* | 49 | 24 | 10 |
| 3/32" | *1,75* | 57 | 30 | 10 |
| 7/64" | *1,93* | 61 | 33 | 10 |
| 1/8" | *1,46* | 65 | 36 | 10 |
| 9/64" | *1,93* | 70 | 39 | 10 |
| 5/32" | *1,90* | 75 | 43 | 10 |
| 11/64" | *2,32* | 80 | 47 | 10 |
| 3/16" | *2,32* | 86 | 52 | 10 |
| 13/64" | *2,22* | 86 | 52 | 10 |
| 7/32" | *3,51* | 93 | 57 | 10 |
| 15/64" | *3,00* | 93 | 57 | 10 |
| 1/4" | *3,90* | 101 | 63 | 10 |
| 17/64" | *4,55* | 109 | 69 | 10 |
| 9/32" | *4,11* | 109 | 69 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 19/64" | *4,37* | 117 | 75 | 10 |
| 5/16" | *5,46* | 117 | 75 | 10 |
| 21/64" | *5,36* | 117 | 75 | 10 |
| 11/32" | *8,20* | 125 | 81 | 10 |
| 23/64" | *6,78* | 125 | 81 | 10 |
| 3/8" | *8,56* | 133 | 87 | 10 |
| 25/64" | *8,56* | 133 | 87 | 10 |
| 13/32" | *11,41* | 133 | 87 | 5 |
| 27/64" | *16,33* | 142 | 94 | 5 |
| 7/16" | *12,56* | 142 | 94 | 5 |
| 29/64" | *16,10* | 142 | 94 | 5 |
| 15/32" | *15,77* | 151 | 101 | 5 |
| 31/64" | *21,63* | 151 | 101 | 5 |
| 1/2" | *21,92* | 151 | 101 | 5 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1161 HSSCO DIN 338 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-50 | ● 18-30 | ● 10-25 | | ○ 12-20 | | ● 38-45 | ● 18-25 | | ○ 70-80 | ● 45-80 | | ○ 30-35 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

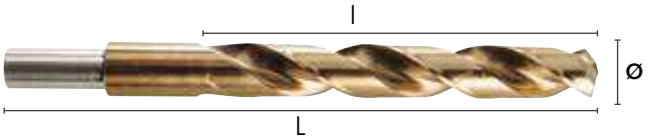
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *3,48* | 49 | 24 | 1 |
| 2,50 | *3,48* | 57 | 30 | 1 |
| 3,00 | *3,44* | 61 | 33 | 1 |
| 3,10 | *4,33* | 65 | 36 | 1 |
| 3,25 | *4,33* | 65 | 36 | 1 |
| 3,30 | *4,33* | 65 | 36 | 1 |
| 3,40 | *4,51* | 70 | 39 | 1 |
| 3,50 | *4,32* | 70 | 39 | 1 |
| 4,00 | *4,46* | 75 | 43 | 1 |
| 4,10 | *4,69* | 75 | 43 | 1 |
| 4,20 | *4,69* | 75 | 43 | 1 |
| 4,25 | *4,69* | 75 | 43 | 1 |
| 4,30 | *4,73* | 80 | 47 | 1 |
| 4,50 | *4,75* | 80 | 47 | 1 |
| 5,00 | *4,83* | 86 | 52 | 1 |
| 5,10 | *5,19* | 86 | 52 | 1 |
| 5,25 | *5,24* | 86 | 52 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,50 | *5,47* | 93 | 57 | 1 |
| 6,00 | *5,68* | 93 | 57 | 1 |
| 6,50 | *10,45* | 101 | 63 | 1 |
| 7,00 | *11,07* | 109 | 69 | 1 |
| 7,50 | *11,34* | 109 | 69 | 1 |
| 8,00 | *12,09* | 117 | 75 | 1 |
| 8,50 | *13,47* | 117 | 75 | 1 |
| 9,00 | *14,94* | 125 | 81 | 1 |
| 9,50 | *15,19* | 125 | 81 | 1 |
| 10,00 | *15,94* | 133 | 87 | 1 |
| 10,50 | *27,46* | 133 | 87 | 1 |
| 11,00 | *28,61* | 142 | 94 | 1 |
| 11,50 | *30,37* | 142 | 94 | 1 |
| 12,00 | *31,39* | 151 | 101 | 1 |
| 12,50 | *38,81* | 151 | 101 | 1 |
| 13,00 | *39,45* | 151 | 101 | 1 |

## 1107 HSSCO DIN 338 MR

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | ● 12-20 | ● 6-16 | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

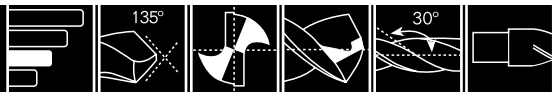



| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 8 | *10,17* | 133 | 87 | 1 |
| 10,50 | 8 | *13,61* | 133 | 87 | 1 |
| 11,00 | 8 | *14,67* | 142 | 94 | 1 |
| 11,50 | 8 | *18,01* | 142 | 94 | 1 |
| 12,00 | 8 | *19,09* | 151 | 101 | 1 |
| 12,50 | 8 | *23,17* | 151 | 101 | 1 |
| 13,00 | 10 | *23,49* | 151 | 101 | 1 |
| 13,50 | 10 | *25,59* | 160 | 108 | 1 |
| 14,00 | 10 | *25,33* | 160 | 108 | 1 |
| 14,50 | 10 | *34,69* | 169 | 114 | 1 |
| 15,00 | 10 | *35,18* | 169 | 114 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 15,50 | 10 | *40,19* | 178 | 120 | 1 |
| 16,00 | 12 | *41,62* | 178 | 120 | 1 |
| 16,50 | 12 | *47,18* | 184 | 125 | 1 |
| 17,00 | 12 | *47,18* | 184 | 125 | 1 |
| 17,50 | 12 | *51,91* | 191 | 130 | 1 |
| 18,00 | 12 | *56,31* | 191 | 130 | 1 |
| 18,50 | 12 | *61,90* | 191 | 130 | 1 |
| 19,00 | 12 | *61,90* | 191 | 130 | 1 |
| 19,50 | 12 | *68,31* | 191 | 130 | 1 |
| 20,00 | 12 | *78,47* | 191 | 130 | 1 |

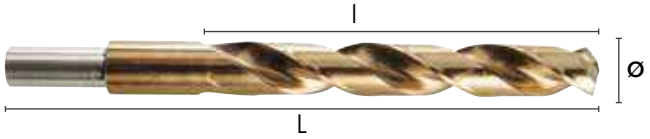
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1107/9 HSSCO ANSI




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | ● 12-20 | ● 6-16 | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 17/32" | 1/2" | *25,59* | 152 | 76 | 1 |
| 9/16" | 1/2" | *25,33* | 152 | 76 | 1 |
| 19/32" | 1/2" | *35,18* | 152 | 76 | 1 |
| 5/8" | 1/2" | *41,62* | 152 | 76 | 1 |
| 21/32" | 1/2" | *47,18* | 152 | 76 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 11/16" | 1/2" | *51,91* | 152 | 76 | 1 |
| 23/32" | 1/2" | *56,41* | 152 | 76 | 1 |
| 3/4" | 1/2" | *61,90* | 152 | 76 | 1 |
| 25/32" | 1/2" | *68,31* | 152 | 76 | 1 |
| 13/16" | 1/2" | *78,47* | 152 | 76 | 1 |



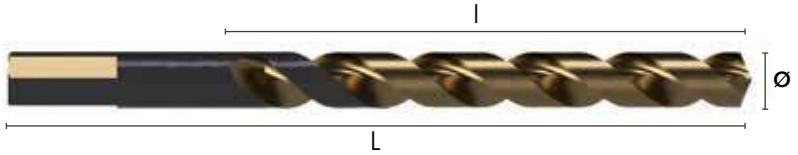
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1187 HSSCO DIN 338W

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | | | | ● 8-14 | | | | | ○ 30-80 | ○ 50-70 | ○ 50-70 | | | ● 8-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

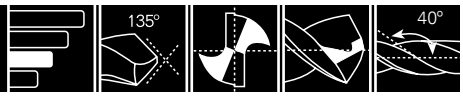



| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *2,89* | 34 | 12 | 10 |
| 1,25 | *3,45* | 38 | 16 | 10 |
| 1,50 | *2,75* | 40 | 18 | 10 |
| 1.75 | *3,45* | 46 | 22 | 10 |
| 2,00 | *2,75* | 49 | 24 | 10 |
| 2,25 | *3,05* | 53 | 27 | 10 |
| 2,50 | *2,51* | 57 | 30 | 10 |
| 2,75 | *3,05* | 61 | 33 | 10 |
| 3,00 | *2,45* | 61 | 33 | 10 |
| 3,20 | *3,01* | 65 | 36 | 10 |
| 3,25 | *3,01* | 65 | 36 | 10 |
| 3,30 | *3,01* | 65 | 36 | 10 |
| 3,50 | *2,96* | 70 | 39 | 10 |
| 3,75 | *3,57* | 70 | 39 | 10 |
| 4,00 | *3,22* | 75 | 43 | 10 |
| 4,20 | *3,57* | 75 | 43 | 10 |
| 4,25 | *3,57* | 75 | 43 | 10 |
| 4,50 | *3,57* | 80 | 47 | 10 |
| 4,75 | *3,99* | 80 | 47 | 10 |
| 5,00 | *3,83* | 86 | 52 | 10 |
| 5,20 | *4,75* | 86 | 52 | 10 |
| 5,25 | *4,48* | 86 | 52 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,50 | *4,85* | 93 | 57 | 10 |
| 5,75 | *5,42* | 93 | 57 | 10 |
| 6,00 | *5,16* | 93 | 57 | 10 |
| 6,25 | *5,93* | 101 | 63 | 10 |
| 6,50 | *6,04* | 101 | 63 | 10 |
| 6,75 | *7,07* | 109 | 69 | 10 |
| 6,80 | *7,05* | 109 | 69 | 10 |
| 7,00 | *6,58* | 109 | 69 | 10 |
| 7,50 | *7,00* | 109 | 69 | 10 |
| 8,00 | *8,19* | 117 | 75 | 10 |
| 8,50 | *8,55* | 117 | 75 | 10 |
| 8,75 | *13,13* | 125 | 81 | 10 |
| 9,00 | *10,89* | 125 | 81 | 10 |
| 9,50 | *11,26* | 125 | 81 | 10 |
| 10,00 | *12,43* | 133 | 87 | 5 |
| 10,20 | *16,76* | 133 | 87 | 5 |
| 10,50 | *16,76* | 133 | 87 | 5 |
| 11,00 | *18,51* | 142 | 94 | 5 |
| 11,50 | *21,29* | 142 | 94 | 5 |
| 12,00 | *22,83* | 151 | 101 | 5 |
| 12,50 | *25,41* | 151 | 101 | 5 |
| 13,00 | *25,79* | 151 | 101 | 5 |

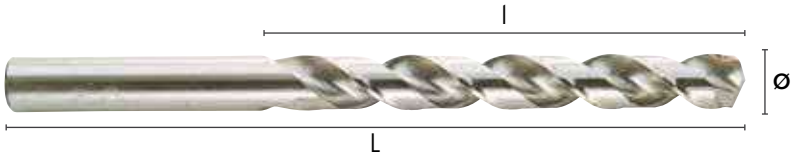
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1106 HSSCO DIN 338 W




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | ● 8-14 | | | | | ○ 30-80 | ○ 50-70 | ○ 50-70 | | | ● 8-10 | | | |

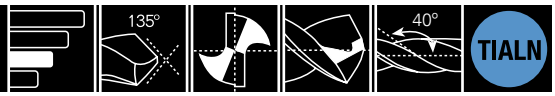
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *2,95* | 34 | 12 | 10 |
| 1,25 | *3,49* | 38 | 16 | 10 |
| 1,50 | *2,81* | 40 | 18 | 10 |
| 2,00 | *2,81* | 49 | 24 | 10 |
| 2,25 | *3,40* | 53 | 27 | 10 |
| 2,50 | *2,80* | 57 | 30 | 10 |
| 2,75 | *4,35* | 61 | 33 | 10 |
| 3,00 | *3,11* | 61 | 33 | 10 |
| 3,10 | *3,38* | 65 | 36 | 10 |
| 3,20 | *3,38* | 65 | 36 | 10 |
| 3,25 | *3,44* | 65 | 36 | 10 |
| 3,30 | *4,31* | 65 | 36 | 10 |
| 3,50 | *3,38* | 70 | 39 | 10 |
| 3,75 | *3,99* | 70 | 39 | 10 |
| 4,00 | *3,83* | 75 | 43 | 10 |
| 4,10 | *4,78* | 75 | 43 | 10 |
| 4,20 | *4,78* | 75 | 43 | 10 |
| 4,25 | *4,44* | 75 | 43 | 10 |
| 4,50 | *4,44* | 80 | 47 | 10 |
| 4,75 | *4,41* | 80 | 47 | 10 |
| 5,00 | *4,67* | 86 | 52 | 10 |
| 5,10 | *5,94* | 86 | 52 | 10 |
| 5,20 | *5,31* | 86 | 52 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,25 | *5,81* | 86 | 52 | 10 |
| 5,50 | *5,68* | 93 | 57 | 10 |
| 5,75 | *6,43* | 93 | 57 | 10 |
| 6,00 | *6,31* | 93 | 57 | 10 |
| 6,25 | *6,63* | 101 | 63 | 10 |
| 6,50 | *7,51* | 101 | 63 | 10 |
| 6,75 | *7,91* | 109 | 69 | 10 |
| 7,00 | *8,73* | 109 | 69 | 10 |
| 7,25 | *10,08* | 109 | 69 | 10 |
| 7,50 | *9,94* | 109 | 69 | 10 |
| 8,00 | *10,78* | 117 | 75 | 10 |
| 8,25 | *11,64* | 117 | 75 | 10 |
| 8,50 | *12,99* | 117 | 75 | 10 |
| 9,00 | *14,09* | 125 | 81 | 10 |
| 9,50 | *15,95* | 125 | 81 | 10 |
| 10,00 | *17,54* | 133 | 87 | 5 |
| 10,25 | *24,44* | 133 | 87 | 5 |
| 10,50 | *20,76* | 133 | 87 | 5 |
| 11,00 | *22,14* | 142 | 94 | 5 |
| 11,50 | *25,97* | 142 | 94 | 5 |
| 12,00 | *25,97* | 151 | 101 | 5 |
| 12,50 | *32,57* | 151 | 101 | 5 |
| 13,00 | *32,57* | 151 | 101 | 5 |

# 1162 HSSCO DIN 338 W



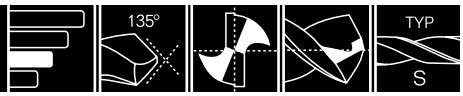

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | ● 12-20 | | | | | ○ 45-100 | | ○ 75-95 | | | ● 12-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *5,61* | 34 | 12 | 1 |
| 1,25 | *6,65* | 38 | 16 | 1 |
| 1,50 | *5,34* | 40 | 18 | 1 |
| 2,00 | *5,34* | 49 | 24 | 1 |
| 2,25 | *6,47* | 53 | 27 | 1 |
| 2,50 | *5,32* | 57 | 30 | 1 |
| 2,75 | *8,28* | 61 | 33 | 1 |
| 3,00 | *5,93* | 61 | 33 | 1 |
| 3,10 | *6,44* | 65 | 36 | 1 |
| 3,20 | *6,44* | 65 | 36 | 1 |
| 3,25 | *6,55* | 65 | 36 | 1 |
| 3,30 | *8,17* | 65 | 36 | 1 |
| 3,50 | *6,45* | 70 | 39 | 1 |
| 3,75 | *7,61* | 70 | 39 | 1 |
| 4,00 | *7,30* | 75 | 43 | 1 |
| 4,10 | *9,07* | 75 | 43 | 1 |
| 4,20 | *9,07* | 75 | 43 | 1 |
| 4,25 | *8,47* | 75 | 43 | 1 |
| 4,50 | *8,47* | 80 | 47 | 1 |
| 4,75 | *8,39* | 80 | 47 | 1 |
| 5,00 | *8,89* | 86 | 52 | 1 |
| 5,10 | *11,31* | 86 | 52 | 1 |
| 5,20 | *10,11* | 86 | 52 | 1 |

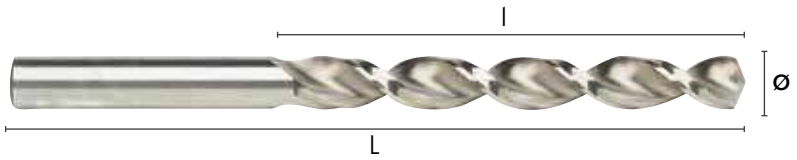
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,25 | *11,07* | 86 | 52 | 1 |
| 5,50 | *10,83* | 93 | 57 | 1 |
| 5,75 | *12,24* | 93 | 57 | 1 |
| 6,00 | *12,02* | 93 | 57 | 1 |
| 6,25 | *12,60* | 101 | 63 | 1 |
| 6,50 | *14,32* | 101 | 63 | 1 |
| 6,75 | *15,04* | 109 | 69 | 1 |
| 7,00 | *16,61* | 109 | 69 | 1 |
| 7,25 | *19,19* | 109 | 69 | 1 |
| 7,50 | *18,94* | 109 | 69 | 1 |
| 8,00 | *20,55* | 117 | 75 | 1 |
| 8,25 | *22,18* | 117 | 75 | 1 |
| 8,50 | *24,75* | 117 | 75 | 1 |
| 9,00 | *26,84* | 125 | 81 | 1 |
| 9,50 | *30,38* | 125 | 81 | 1 |
| 10,00 | *33,38* | 133 | 87 | 1 |
| 10,25 | *46,54* | 133 | 87 | 1 |
| 10,50 | *39,53* | 133 | 87 | 1 |
| 11,00 | *42,18* | 142 | 94 | 1 |
| 11,50 | *49,46* | 142 | 94 | 1 |
| 12,00 | *49,46* | 151 | 101 | 1 |
| 12,50 | *62,01* | 151 | 101 | 1 |
| 13,00 | *62,01* | 151 | 101 | 1 |

## 1159 HSSCO DIN 338 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-20 | ● 6-16 | | ○ 8-14 | | | | | ● 30-80 | | ● 50-70 | | | | | | |

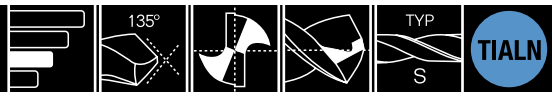
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *3,76* | 49 | 24 | 10 |
| 2,10 | *3,61* | 49 | 24 | 10 |
| 2,20 | *3,61* | 53 | 27 | 10 |
| 2,30 | *3,61* | 53 | 27 | 10 |
| 2,40 | *3,61* | 57 | 30 | 10 |
| 2,50 | *3,76* | 57 | 30 | 10 |
| 2,60 | *3,89* | 57 | 30 | 10 |
| 2,70 | *3,89* | 61 | 33 | 10 |
| 2,80 | *4,11* | 61 | 33 | 10 |
| 2,90 | *4,11* | 61 | 33 | 10 |
| 3,00 | *4,11* | 61 | 33 | 10 |
| 3,10 | *4,19* | 65 | 36 | 10 |
| 3,20 | *4,19* | 65 | 36 | 10 |
| 3,30 | *4,19* | 65 | 36 | 10 |
| 3,40 | *4,19* | 70 | 39 | 10 |
| 3,50 | *4,68* | 70 | 39 | 10 |
| 3,60 | *4,58* | 70 | 39 | 10 |
| 3,70 | *4,58* | 70 | 39 | 10 |
| 3,80 | *5,29* | 75 | 43 | 10 |
| 3,90 | *5,29* | 75 | 43 | 10 |
| 4,00 | *5,12* | 75 | 43 | 10 |
| 4,10 | *5,29* | 75 | 43 | 10 |
| 4,20 | *5,29* | 75 | 43 | 10 |
| 4,30 | *5,41* | 80 | 47 | 10 |
| 4,40 | *5,41* | 80 | 47 | 10 |
| 4,50 | *5,46* | 80 | 47 | 10 |
| 4,60 | *5,83* | 80 | 47 | 10 |
| 4,70 | *5,83* | 80 | 47 | 10 |
| 4,80 | *6,01* | 86 | 52 | 10 |
| 4,90 | *6,01* | 86 | 52 | 10 |
| 5,00 | *5,78* | 86 | 52 | 10 |
| 5,10 | *6,53* | 86 | 52 | 10 |
| 5,20 | *6,83* | 86 | 52 | 10 |
| 5,30 | *6,83* | 86 | 52 | 10 |
| 5,40 | *6,83* | 93 | 57 | 10 |
| 5,50 | *7,74* | 93 | 57 | 10 |
| 5,60 | *8,17* | 93 | 57 | 10 |
| 5,70 | *9,10* | 93 | 57 | 10 |
| 5,80 | *8,17* | 93 | 57 | 10 |
| 5,90 | *8,17* | 93 | 57 | 10 |

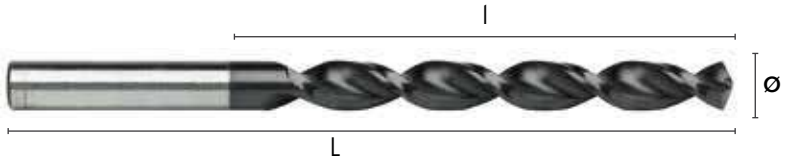
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,00 | *8,15* | 93 | 57 | 10 |
| 6,10 | *9,05* | 101 | 63 | 10 |
| 6,20 | *9,05* | 101 | 63 | 10 |
| 6,30 | *9,10* | 101 | 63 | 10 |
| 6,40 | *9,10* | 101 | 63 | 10 |
| 6,50 | *9,10* | 101 | 63 | 10 |
| 6,60 | *10,42* | 101 | 63 | 10 |
| 6,70 | *10,42* | 101 | 63 | 10 |
| 6,80 | *10,42* | 109 | 69 | 10 |
| 6,90 | *10,42* | 109 | 69 | 10 |
| 7,00 | *10,42* | 109 | 69 | 10 |
| 7,10 | *12,63* | 109 | 69 | 10 |
| 7,20 | *12,63* | 109 | 69 | 10 |
| 7,30 | *12,63* | 109 | 69 | 10 |
| 7,40 | *12,63* | 109 | 69 | 10 |
| 7,50 | *11,29* | 109 | 69 | 10 |
| 7,60 | *17,24* | 117 | 75 | 10 |
| 7,70 | *17,24* | 117 | 75 | 10 |
| 7,80 | *17,24* | 117 | 75 | 10 |
| 7,90 | *17,24* | 117 | 75 | 10 |
| 8,00 | *13,31* | 117 | 75 | 10 |
| 8,10 | *17,24* | 117 | 75 | 10 |
| 8,20 | *15,09* | 117 | 75 | 10 |
| 8,30 | *16,21* | 117 | 75 | 10 |
| 8,40 | *16,21* | 117 | 75 | 10 |
| 8,50 | *14,66* | 117 | 75 | 10 |
| 8,60 | *18,59* | 125 | 81 | 10 |
| 8,70 | *18,59* | 125 | 81 | 10 |
| 8,80 | *18,59* | 125 | 81 | 10 |
| 8,90 | *18,59* | 125 | 81 | 10 |
| 9,00 | *17,24* | 125 | 81 | 10 |
| 9,50 | *18,57* | 125 | 81 | 10 |
| 9,80 | *23,30* | 133 | 87 | 10 |
| 10,00 | *21,18* | 133 | 87 | 5 |
| 10,50 | *26,06* | 133 | 87 | 5 |
| 11,00 | *32,26* | 142 | 94 | 5 |
| 11,50 | *39,13* | 142 | 94 | 5 |
| 12,00 | *40,37* | 151 | 101 | 5 |
| 12,50 | *44,05* | 151 | 101 | 5 |
| 13,00 | *44,05* | 151 | 101 | 5 |

# 1160 HSSCO DIN 338 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 18-30 | ● 10-25 | | ○ 12-20 | | | | | ● 45-100 | | ● 70-90 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | 5,27 | 49 | 24 | 1 |
| 2,10 | 5,07 | 49 | 24 | 1 |
| 2,20 | 5,07 | 53 | 27 | 1 |
| 2,30 | 5,07 | 53 | 27 | 1 |
| 2,40 | 5,07 | 57 | 30 | 1 |
| 2,50 | 5,27 | 57 | 30 | 1 |
| 2,60 | 5,43 | 57 | 30 | 1 |
| 2,70 | 5,43 | 61 | 33 | 1 |
| 2,80 | 5,75 | 61 | 33 | 1 |
| 2,90 | 5,75 | 61 | 33 | 1 |
| 3,00 | 5,75 | 61 | 33 | 1 |
| 3,10 | 5,88 | 65 | 36 | 1 |
| 3,20 | 5,88 | 65 | 36 | 1 |
| 3,30 | 5,88 | 65 | 36 | 1 |
| 3,40 | 5,88 | 70 | 39 | 1 |
| 3,50 | 6,54 | 70 | 39 | 1 |
| 3,60 | 6,42 | 70 | 39 | 1 |
| 3,70 | 6,42 | 70 | 39 | 1 |
| 3,80 | 7,41 | 75 | 43 | 1 |
| 3,90 | 7,41 | 75 | 43 | 1 |
| 4,00 | 7,16 | 75 | 43 | 1 |
| 4,10 | 7,41 | 75 | 43 | 1 |
| 4,20 | 7,41 | 75 | 43 | 1 |
| 4,30 | 7,57 | 80 | 47 | 1 |
| 4,40 | 7,66 | 80 | 47 | 1 |
| 4,50 | 7,66 | 80 | 47 | 1 |
| 4,60 | 8,16 | 80 | 47 | 1 |
| 4,70 | 8,16 | 80 | 47 | 1 |
| 4,80 | 8,42 | 86 | 52 | 1 |
| 4,90 | 8,42 | 86 | 52 | 1 |
| 5,00 | 8,08 | 86 | 52 | 1 |
| 5,10 | 9,14 | 86 | 52 | 1 |
| 5,20 | 9,58 | 86 | 52 | 1 |
| 5,30 | 9,58 | 86 | 52 | 1 |
| 5,40 | 9,58 | 93 | 57 | 1 |
| 5,50 | 10,84 | 93 | 57 | 1 |
| 5,60 | 11,46 | 93 | 57 | 1 |
| 5,70 | 12,73 | 93 | 57 | 1 |
| 5,80 | 11,46 | 93 | 57 | 1 |
| 5,90 | 11,46 | 93 | 57 | 1 |

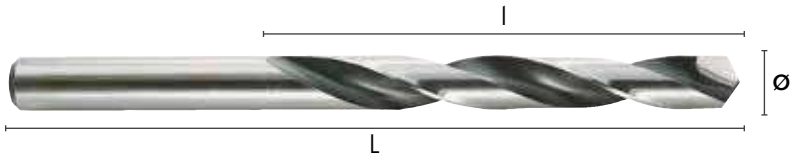
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,00 | 11,41 | 93 | 57 | 1 |
| 6,10 | 12,66 | 101 | 63 | 1 |
| 6,20 | 12,66 | 101 | 63 | 1 |
| 6,30 | 12,73 | 101 | 63 | 1 |
| 6,40 | 12,73 | 101 | 63 | 1 |
| 6,50 | 12,73 | 101 | 63 | 1 |
| 6,60 | 14,59 | 101 | 63 | 1 |
| 6,70 | 14,59 | 101 | 63 | 1 |
| 6,80 | 14,59 | 109 | 69 | 1 |
| 6,90 | 14,59 | 109 | 69 | 1 |
| 7,00 | 14,30 | 109 | 69 | 1 |
| 7,10 | 17,68 | 109 | 69 | 1 |
| 7,20 | 17,68 | 109 | 69 | 1 |
| 7,30 | 17,68 | 109 | 69 | 1 |
| 7,40 | 17,68 | 109 | 69 | 1 |
| 7,50 | 15,80 | 109 | 69 | 1 |
| 7,60 | 24,15 | 117 | 75 | 1 |
| 7,70 | 24,15 | 117 | 75 | 1 |
| 7,80 | 24,15 | 117 | 75 | 1 |
| 7,90 | 24,15 | 117 | 75 | 1 |
| 8,00 | 18,64 | 117 | 75 | 1 |
| 8,10 | 24,15 | 117 | 75 | 1 |
| 8,20 | 21,12 | 117 | 75 | 1 |
| 8,30 | 24,15 | 117 | 75 | 1 |
| 8,40 | 24,15 | 117 | 75 | 1 |
| 8,50 | 20,51 | 117 | 75 | 1 |
| 8,60 | 26,04 | 125 | 81 | 1 |
| 8,70 | 26,04 | 125 | 81 | 1 |
| 8,80 | 26,04 | 125 | 81 | 1 |
| 8,90 | 26,04 | 125 | 81 | 1 |
| 9,00 | 24,15 | 125 | 81 | 1 |
| 9,50 | 26,00 | 125 | 81 | 1 |
| 9,80 | 32,63 | 133 | 87 | 1 |
| 10,00 | 29,64 | 133 | 87 | 1 |
| 10,50 | 36,49 | 133 | 87 | 1 |
| 11,00 | 45,15 | 142 | 94 | 1 |
| 11,50 | 54,79 | 142 | 94 | 1 |
| 12,00 | 56,50 | 151 | 101 | 1 |
| 12,50 | 58,55 | 151 | 101 | 1 |
| 13,00 | 61,68 | 151 | 101 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1110 HSS DIN 338 N - WIDIA

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 18-30 | ● 10-25 | ○ 6-9 | | | | ● 30-40 | ● 15-20 | | | | ○ 30-35 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



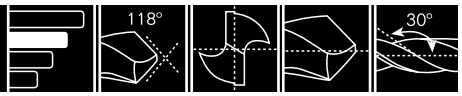

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,50 | *27,05* | 40 | 18 | 1 |
| 2,00 | *20,55* | 49 | 24 | 1 |
| 2,50 | *20,55* | 57 | 30 | 1 |
| 3,00 | *20,55* | 61 | 33 | 1 |
| 3,50 | *20,55* | 70 | 39 | 1 |
| 4,00 | *20,55* | 75 | 43 | 1 |
| 4,50 | *21,01* | 80 | 47 | 1 |
| 5,00 | *21,01* | 86 | 52 | 1 |
| 5,50 | *22,22* | 93 | 57 | 1 |
| 6,00 | *23,30* | 93 | 57 | 1 |
| 6,50 | *27,65* | 101 | 63 | 1 |
| 7,00 | *27,65* | 109 | 69 | 1 |
| 7,50 | *28,75* | 109 | 69 | 1 |
| 8,00 | *28,75* | 117 | 75 | 1 |
| 8,50 | *31,46* | 117 | 75 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 9,00 | *31,46* | 125 | 81 | 1 |
| 9,50 | *34,39* | 125 | 81 | 1 |
| 10,00 | *34,39* | 133 | 87 | 1 |
| 10,50 | *44,32* | 133 | 87 | 1 |
| 11,00 | *44,32* | 142 | 97 | 1 |
| 12,00 | *51,00* | 151 | 101 | 1 |
| 13,00 | *60,93* | 151 | 101 | 1 |
| 14,00 | *71,00* | 160 | 108 | 1 |
| 15,00 | *80,86* | 169 | 114 | 1 |
| 16,00 | *93,10* | 178 | 120 | 1 |
| 17,00 | *101,93* | 184 | 125 | 1 |
| 18,00 | *109,75* | 191 | 130 | 1 |
| 19,00 | *136,30* | 198 | 135 | 1 |
| 20,00 | *155,16* | 205 | 140 | 1 |



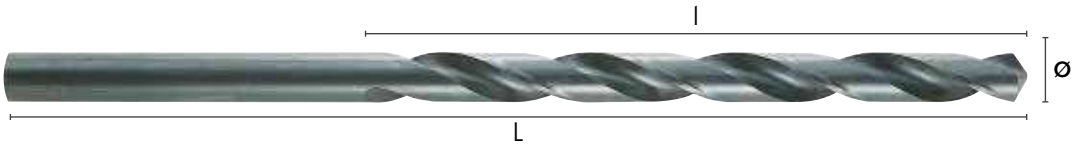
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1112 HSS DIN 340 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *3,23* | 56 | 33 | 10 |
| 1,10 | *3,91* | 60 | 37 | 10 |
| 1,20 | *3,91* | 65 | 41 | 10 |
| 1,25 | *3,55* | 65 | 41 | 10 |
| 1,30 | *3,91* | 65 | 41 | 10 |
| 1,40 | *3,91* | 70 | 45 | 10 |
| 1,50 | *3,23* | 70 | 45 | 10 |
| 1,60 | *3,32* | 76 | 50 | 10 |
| 1,70 | *3,03* | 76 | 50 | 10 |
| 1,75 | *3,03* | 80 | 53 | 10 |
| 1,80 | *3,32* | 80 | 53 | 10 |
| 1,90 | *3,32* | 80 | 53 | 10 |
| 2,00 | *2,77* | 85 | 56 | 10 |
| 2,10 | *3,32* | 85 | 56 | 10 |
| 2,20 | *3,32* | 85 | 56 | 10 |
| 2,25 | *3,03* | 90 | 59 | 10 |
| 2,30 | *3,32* | 90 | 59 | 10 |
| 2,40 | *3,32* | 95 | 62 | 10 |
| 2,50 | *2,77* | 95 | 62 | 10 |
| 2,60 | *3,32* | 100 | 66 | 10 |
| 2,70 | *3,32* | 100 | 66 | 10 |
| 2,75 | *3,03* | 100 | 66 | 10 |
| 2,80 | *3,32* | 100 | 66 | 10 |
| 2,90 | *3,32* | 100 | 66 | 10 |
| 3,00 | *2,51* | 100 | 66 | 10 |
| 3,10 | *3,96* | 106 | 69 | 10 |
| 3,20 | *3,96* | 106 | 69 | 10 |
| 3,25 | *3,60* | 106 | 69 | 10 |
| 3,30 | *3,96* | 106 | 69 | 10 |
| 3,40 | *3,96* | 112 | 73 | 10 |
| 3,50 | *3,27* | 112 | 73 | 10 |
| 3,60 | *3,96* | 112 | 73 | 10 |
| 3,70 | *3,96* | 112 | 73 | 10 |
| 3,75 | *3,60* | 112 | 73 | 10 |
| 3,80 | *3,96* | 119 | 78 | 10 |
| 3,90 | *3,96* | 119 | 78 | 10 |
| 4,00 | *3,06* | 119 | 78 | 10 |
| 4,10 | *5,06* | 119 | 78 | 10 |
| 4,20 | *5,06* | 119 | 78 | 10 |
| 4,25 | *4,61* | 119 | 78 | 10 |
| 4,30 | *5,06* | 126 | 82 | 10 |
| 4,40 | *5,06* | 126 | 82 | 10 |
| 4,50 | *4,26* | 126 | 82 | 10 |
| 4,60 | *5,06* | 126 | 82 | 10 |
| 4,70 | *5,06* | 126 | 82 | 10 |
| 4,75 | *4,61* | 126 | 82 | 10 |
| 4,80 | *5,06* | 132 | 87 | 10 |
| 4,90 | *5,06* | 132 | 87 | 10 |
| 5,00 | *3,94* | 132 | 87 | 10 |
| 5,10 | *6,03* | 132 | 87 | 10 |
| 5,20 | *6,03* | 132 | 87 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,25 | *5,48* | 132 | 87 | 10 |
| 5,30 | *6,03* | 132 | 87 | 10 |
| 5,40 | *6,03* | 139 | 91 | 10 |
| 5,50 | *4,95* | 139 | 91 | 10 |
| 5,60 | *6,03* | 139 | 91 | 10 |
| 5,70 | *6,03* | 139 | 91 | 10 |
| 5,75 | *5,48* | 139 | 91 | 10 |
| 5,80 | *6,03* | 139 | 91 | 10 |
| 5,90 | *6,03* | 139 | 91 | 10 |
| 6,00 | *4,85* | 139 | 91 | 10 |
| 6,10 | *7,65* | 148 | 97 | 10 |
| 6,20 | *7,65* | 148 | 97 | 10 |
| 6,25 | *6,95* | 148 | 97 | 10 |
| 6,30 | *7,65* | 148 | 97 | 10 |
| 6,40 | *8,34* | 148 | 97 | 10 |
| 6,50 | *6,33* | 148 | 97 | 10 |
| 6,60 | *7,65* | 148 | 97 | 10 |
| 6,70 | *7,65* | 148 | 97 | 10 |
| 6,75 | *6,95* | 156 | 102 | 10 |
| 6,80 | *8,84* | 156 | 102 | 10 |
| 6,90 | *8,84* | 156 | 102 | 10 |
| 7,00 | *6,33* | 156 | 102 | 10 |
| 7,10 | *9,35* | 156 | 102 | 10 |
| 7,20 | *9,35* | 156 | 102 | 10 |
| 7,25 | *8,52* | 156 | 102 | 10 |
| 7,30 | *9,35* | 156 | 102 | 10 |
| 7,40 | *9,35* | 156 | 102 | 10 |
| 7,50 | *7,73* | 156 | 102 | 10 |
| 7,60 | *9,35* | 165 | 109 | 10 |
| 7,70 | *9,35* | 165 | 109 | 10 |
| 7,75 | *8,52* | 165 | 109 | 10 |
| 7,80 | *9,35* | 165 | 109 | 10 |
| 7,90 | *9,35* | 165 | 109 | 10 |
| 8,00 | *7,73* | 165 | 109 | 10 |
| 8,10 | *11,53* | 165 | 109 | 10 |
| 8,20 | *11,53* | 165 | 109 | 10 |
| 8,25 | *10,48* | 165 | 109 | 10 |
| 8,30 | *11,53* | 165 | 109 | 10 |
| 8,40 | *11,53* | 165 | 109 | 10 |
| 8,50 | *9,51* | 165 | 109 | 10 |
| 8,75 | *10,48* | 175 | 115 | 10 |
| 8,80 | *11,53* | 175 | 115 | 10 |
| 8,90 | *12,02* | 175 | 115 | 10 |
| 9,00 | *9,51* | 175 | 115 | 10 |
| 9,25 | *12,18* | 175 | 115 | 10 |
| 9,30 | *13,43* | 175 | 115 | 10 |
| 9,40 | *13,43* | 175 | 115 | 10 |
| 9,50 | *11,11* | 175 | 115 | 10 |
| 9,70 | *13,43* | 184 | 121 | 10 |
| 9,75 | *12,18* | 184 | 121 | 10 |
| 9,90 | *13,43* | 184 | 121 | 10 |

**(continúa Ref.1112 / suite Réf.1112 / Ref.1112 cont'd)**

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

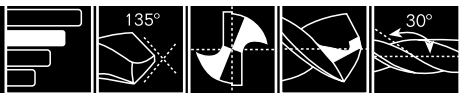
# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

**(continúa Ref.1112 / suite Réf.1112 / Ref.1112 cont'd)**

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,00 | *11,11* | 184 | 121 | 5 |
| 10,25 | *16,66* | 184 | 121 | 5 |
| 10,30 | *23,71* | 184 | 121 | 5 |
| 10,40 | *18,34* | 184 | 121 | 5 |
| 10,50 | *15,17* | 184 | 121 | 5 |
| 10,75 | *16,66* | 195 | 128 | 5 |
| 11,00 | *15,17* | 195 | 128 | 5 |
| 11,10 | *21,74* | 195 | 128 | 5 |
| 11,20 | *21,74* | 195 | 128 | 5 |
| 11,25 | *19,77* | 195 | 128 | 5 |
| 11,50 | *17,98* | 195 | 128 | 5 |
| 11,75 | *19,77* | 195 | 128 | 5 |
| 12,00 | *17,98* | 205 | 134 | 5 |
| 12,25 | *23,78* | 205 | 134 | 5 |
| 12,50 | *21,61* | 205 | 134 | 5 |
| 12,75 | *23,78* | 205 | 134 | 5 |
| 13,00 | *21,61* | 205 | 134 | 5 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 13,25 | *29,70* | 214 | 140 | 1 |
| 13,50 | *27,00* | 214 | 140 | 1 |
| 13,75 | *29,70* | 214 | 140 | 1 |
| 14,00 | *27,00* | 214 | 140 | 1 |
| 14,50 | *30,08* | 220 | 144 | 1 |
| 15,00 | *30,08* | 220 | 144 | 1 |
| 15,50 | *32,87* | 227 | 149 | 1 |
| 16,00 | *32,87* | 227 | 149 | 1 |
| 16,50 | *45,11* | 235 | 154 | 1 |
| 17,00 | *45,11* | 235 | 154 | 1 |
| 17,50 | *49,77* | 241 | 158 | 1 |
| 18,00 | *49,77* | 241 | 158 | 1 |
| 18,50 | *56,68* | 247 | 162 | 1 |
| 19,00 | *56,68* | 247 | 162 | 1 |
| 19,50 | *61,26* | 254 | 166 | 1 |
| 20,00 | *61,26* | 254 | 166 | 1 |

## 1113 HSSCO DIN 340 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | ● 12-20 | ● 6-16 | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *6,58* | 85 | 56 | 10 |
| 2,50 | *6,58* | 95 | 62 | 10 |
| 3,00 | *6,58* | 100 | 66 | 10 |
| 3,25 | *11,47* | 106 | 69 | 10 |
| 3,50 | *7,81* | 112 | 73 | 10 |
| 3,75 | *7,81* | 112 | 73 | 10 |
| 4,00 | *7,81* | 119 | 78 | 10 |
| 4,25 | *9,07* | 119 | 78 | 10 |
| 4,50 | *10,01* | 126 | 82 | 10 |
| 4,75 | *12,43* | 126 | 82 | 10 |
| 5,00 | *10,01* | 132 | 87 | 10 |
| 5,25 | *21,81* | 132 | 87 | 10 |
| 5,50 | *10,96* | 139 | 91 | 10 |
| 5,75 | *14,82* | 139 | 91 | 10 |
| 6,00 | *10,96* | 139 | 91 | 10 |

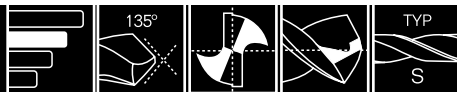
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,50 | *13,91* | 148 | 97 | 10 |
| 7,00 | *15,12* | 156 | 102 | 10 |
| 7,50 | *18,51* | 156 | 102 | 10 |
| 8,00 | *17,00* | 165 | 109 | 10 |
| 8,50 | *21,01* | 165 | 109 | 10 |
| 9,00 | *21,01* | 175 | 115 | 10 |
| 9,50 | *24,45* | 175 | 115 | 10 |
| 10,00 | *32,95* | 184 | 121 | 5 |
| 10,50 | *41,48* | 184 | 121 | 5 |
| 11,00 | *43,05* | 195 | 128 | 5 |
| 11,50 | *55,83* | 195 | 128 | 5 |
| 12,00 | *46,25* | 205 | 134 | 5 |
| 12,50 | *59,01* | 205 | 134 | 5 |
| 13,00 | *59,01* | 204 | 134 | 5 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

Hepyc CUTTING TOOL EXPERTS

# 1114 HSSCO DIN 340 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-20 | ● 6-16 | | ○ 8-14 | | | | | ● 30-80 | | ● 50-70 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

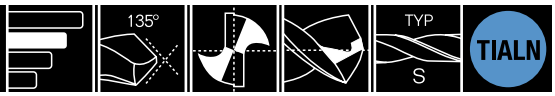
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *9,10* | 85 | 56 | 1 |
| 2,10 | *8,45* | 85 | 56 | 1 |
| 2,30 | *8,78* | 90 | 59 | 1 |
| 2,50 | *9,10* | 95 | 62 | 1 |
| 2,70 | *9,26* | 100 | 66 | 1 |
| 3,00 | *9,44* | 100 | 66 | 1 |
| 3,10 | *10,84* | 106 | 69 | 1 |
| 3,20 | *10,84* | 106 | 69 | 1 |
| 3,30 | *10,84* | 106 | 69 | 1 |
| 3,50 | *10,50* | 112 | 73 | 1 |
| 3,60 | *11,45* | 112 | 73 | 1 |
| 3,70 | *11,72* | 112 | 73 | 1 |
| 4,00 | *10,42* | 119 | 78 | 1 |
| 4,10 | *13,47* | 119 | 78 | 1 |
| 4,20 | *13,47* | 119 | 78 | 1 |
| 4,30 | *15,14* | 126 | 82 | 1 |
| 4,50 | *12,06* | 126 | 82 | 1 |
| 4,70 | *14,98* | 126 | 82 | 1 |
| 4,80 | *15,67* | 132 | 87 | 1 |
| 5,00 | *12,97* | 132 | 87 | 1 |
| 5,10 | *16,29* | 132 | 87 | 1 |
| 5,20 | *16,26* | 132 | 87 | 1 |
| 5,50 | *15,03* | 139 | 91 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,60 | *19,28* | 139 | 91 | 1 |
| 5,80 | *19,75* | 139 | 91 | 1 |
| 6,00 | *15,99* | 139 | 91 | 1 |
| 6,20 | *24,44* | 148 | 97 | 1 |
| 6,50 | *19,83* | 148 | 97 | 1 |
| 6,80 | *31,10* | 156 | 102 | 1 |
| 7,00 | *24,49* | 156 | 102 | 1 |
| 7,20 | *30,66* | 156 | 102 | 1 |
| 7,50 | *28,16* | 156 | 102 | 1 |
| 8,00 | *28,16* | 165 | 109 | 1 |
| 8,20 | *33,33* | 165 | 109 | 1 |
| 8,50 | *32,79* | 165 | 109 | 1 |
| 8,80 | *35,55* | 175 | 115 | 1 |
| 9,00 | *34,18* | 175 | 115 | 1 |
| 9,50 | *44,75* | 175 | 115 | 1 |
| 9,80 | *61,32* | 184 | 121 | 1 |
| 10,00 | *45,73* | 184 | 121 | 1 |
| 10,50 | *71,12* | 184 | 121 | 1 |
| 11,00 | *53,54* | 195 | 128 | 1 |
| 11,50 | *99,39* | 195 | 128 | 1 |
| 12,00 | *73,85* | 195 | 128 | 1 |
| 13,00 | *92,01* | 195 | 128 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

## 1164 HSSCO DIN 340 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 18-30 | ● 10-25 | | ○ 12-20 | | | | | ● 45-100 | | ● 70-90 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

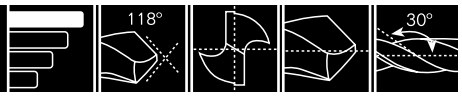
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *11,74* | 85 | 56 | 1 |
| 2,10 | *10,89* | 85 | 56 | 1 |
| 2,30 | *11,31* | 90 | 59 | 1 |
| 2,50 | *11,74* | 95 | 62 | 1 |
| 2,70 | *11,93* | 100 | 66 | 1 |
| 3,00 | *12,14* | 100 | 66 | 1 |
| 3,10 | *13,96* | 106 | 69 | 1 |
| 3,20 | *13,96* | 106 | 69 | 1 |
| 3,30 | *13,96* | 106 | 69 | 1 |
| 3,50 | *13,53* | 112 | 73 | 1 |
| 3,60 | *14,74* | 112 | 73 | 1 |
| 3,70 | *15,09* | 112 | 73 | 1 |
| 4,00 | *13,41* | 119 | 78 | 1 |
| 4,10 | *17,37* | 119 | 78 | 1 |
| 4,20 | *17,37* | 119 | 78 | 1 |
| 4,30 | *19,50* | 126 | 82 | 1 |
| 4,50 | *15,54* | 126 | 82 | 1 |
| 4,70 | *19,30* | 126 | 82 | 1 |
| 4,80 | *20,19* | 132 | 87 | 1 |
| 5,00 | *16,69* | 132 | 87 | 1 |
| 5,10 | *20,97* | 132 | 87 | 1 |
| 5,20 | *20,94* | 132 | 87 | 1 |
| 5,50 | *19,35* | 139 | 91 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,60 | *24,86* | 139 | 91 | 1 |
| 5,80 | *25,43* | 139 | 91 | 1 |
| 6,00 | *20,60* | 139 | 91 | 1 |
| 6,20 | *31,48* | 148 | 97 | 1 |
| 6,50 | *25,54* | 148 | 97 | 1 |
| 6,80 | *40,07* | 156 | 102 | 1 |
| 7,00 | *31,53* | 156 | 102 | 1 |
| 7,20 | *39,49* | 156 | 102 | 1 |
| 7,50 | *36,27* | 156 | 102 | 1 |
| 8,00 | *36,27* | 165 | 109 | 1 |
| 8,20 | *42,93* | 165 | 109 | 1 |
| 8,50 | *42,22* | 165 | 109 | 1 |
| 8,80 | *45,80* | 175 | 115 | 1 |
| 9,00 | *44,01* | 175 | 115 | 1 |
| 9,50 | *57,65* | 175 | 115 | 1 |
| 9,80 | *78,98* | 184 | 121 | 1 |
| 10,00 | *58,90* | 184 | 121 | 1 |
| 10,50 | *91,60* | 184 | 121 | 1 |
| 11,00 | *68,96* | 195 | 128 | 1 |
| 11,50 | *128,03* | 195 | 128 | 1 |
| 12,00 | *95,12* | 195 | 128 | 1 |
| 13,00 | *118,51* | 195 | 128 | 1 |



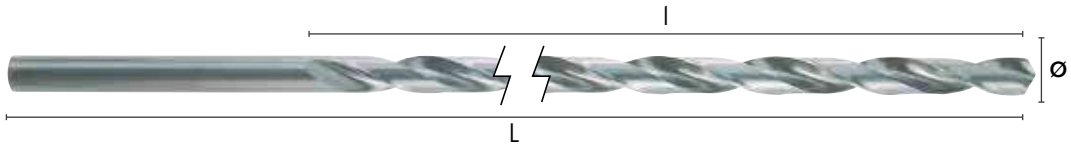
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1115 HSS DIN 1869 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

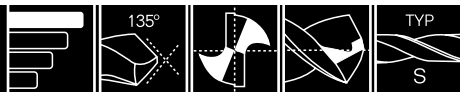
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *12,02* | 125 | 85 | 1 |
| 2,50 | *12,56* | 140 | 95 | 1 |
| 3,00 | *12,98* | 150 | 100 | 1 |
| 3,00 | *13,88* | 190 | 130 | 1 |
| 3,50 | *14,65* | 165 | 115 | 1 |
| 3,50 | *16,88* | 210 | 145 | 1 |
| 3,50 | *24,17* | 265 | 180 | 1 |
| 4,00 | *14,65* | 175 | 120 | 1 |
| 4,00 | *17,29* | 220 | 150 | 1 |
| 4,00 | *24,63* | 280 | 190 | 1 |
| 4,50 | *16,23* | 185 | 125 | 1 |
| 4,50 | *20,29* | 235 | 160 | 1 |
| 4,50 | *29,02* | 295 | 200 | 1 |
| 5,00 | *17,17* | 195 | 135 | 1 |
| 5,00 | *21,80* | 245 | 170 | 1 |
| 5,00 | *26,82* | 315 | 210 | 1 |
| 5,50 | *20,34* | 205 | 140 | 1 |
| 5,50 | *29,02* | 260 | 180 | 1 |
| 5,50 | *33,53* | 330 | 235 | 1 |
| 6,00 | *20,34* | 205 | 140 | 1 |
| 6,00 | *29,02* | 260 | 180 | 1 |
| 6,00 | *33,53* | 330 | 225 | 1 |
| 6,50 | *24,17* | 215 | 150 | 1 |
| 6,50 | *31,23* | 275 | 190 | 1 |
| 6,50 | *38,92* | 350 | 235 | 1 |
| 7,00 | *25,62* | 225 | 155 | 1 |
| 7,00 | *35,67* | 290 | 210 | 1 |
| 7,00 | *48,20* | 370 | 250 | 1 |
| 7,50 | *28,85* | 225 | 155 | 1 |
| 7,50 | *38,42* | 290 | 200 | 1 |
| 7,50 | *56,00* | 370 | 250 | 1 |
| 8,00 | *31,88* | 240 | 165 | 1 |

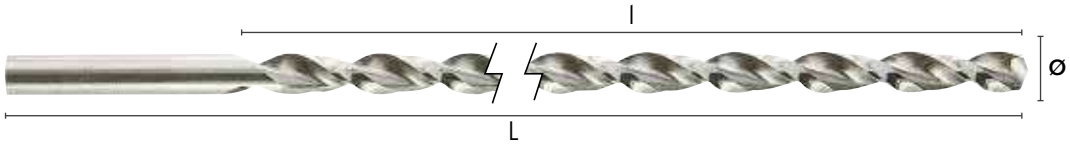
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 8,00 | *44,13* | 305 | 210 | 1 |
| 8,00 | *57,47* | 390 | 265 | 1 |
| 8,50 | *43,37* | 240 | 165 | 1 |
| 8,50 | *59,10* | 305 | 210 | 1 |
| 8,50 | *81,28* | 390 | 265 | 1 |
| 9,00 | *41,36* | 250 | 175 | 1 |
| 9,00 | *54,61* | 320 | 220 | 1 |
| 9,00 | *80,17* | 410 | 280 | 1 |
| 9,50 | *48,69* | 250 | 175 | 1 |
| 9,50 | *66,93* | 320 | 220 | 1 |
| 9,50 | *90,16* | 410 | 280 | 1 |
| 10,00 | *48,06* | 265 | 185 | 1 |
| 10,00 | *62,86* | 340 | 235 | 1 |
| 10,00 | *87,35* | 430 | 295 | 1 |
| 10,50 | *91,59* | 265 | 145 | 1 |
| 10,50 | *99,26* | 340 | 250 | 1 |
| 10,50 | *105,57* | 430 | 295 | 1 |
| 11,00 | *60,85* | 280 | 195 | 1 |
| 11,00 | *89,12* | 365 | 250 | 1 |
| 11,00 | *104,34* | 455 | 310 | 1 |
| 11,50 | *85,29* | 280 | 195 | 1 |
| 11,50 | *114,50* | 365 | 250 | 1 |
| 11,50 | *118,30* | 455 | 310 | 1 |
| 12,00 | *80,35* | 295 | 205 | 1 |
| 12,00 | *100,55* | 375 | 260 | 1 |
| 12,00 | *122,83* | 480 | 315 | 1 |
| 12,50 | *99,26* | 295 | 205 | 1 |
| 12,50 | *111,15* | 375 | 260 | 1 |
| 12,50 | *134,93* | 480 | 315 | 1 |
| 13,00 | *99,26* | 295 | 205 | 1 |
| 13,00 | *114,52* | 375 | 260 | 1 |
| 13,00 | *136,21* | 480 | 315 | 1 |

# 1165 HSSCO DIN 1869 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-20 | | | ○ 8-14 | | | | | ● 30-80 | | ● 50-70 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



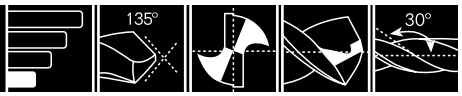

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *18,07* | 125 | 85 | 1 |
| 2,50 | *19,71* | 140 | 95 | 1 |
| 3,00 | *19,71* | 150 | 100 | 1 |
| 3,00 | *23,01* | 190 | 130 | 1 |
| 3,00 | *36,15* | 240 | 160 | 1 |
| 3,50 | *21,36* | 165 | 115 | 1 |
| 3,50 | *24,64* | 210 | 145 | 1 |
| 3,50 | *32,87* | 265 | 180 | 1 |
| 4,00 | *23,01* | 175 | 120 | 1 |
| 4,00 | *27,94* | 220 | 150 | 1 |
| 4,00 | *32,87* | 180 | 190 | 1 |
| 4,50 | *24,64* | 185 | 125 | 1 |
| 4,50 | *31,23* | 235 | 160 | 1 |
| 4,50 | *36,15* | 295 | 200 | 1 |
| 5,00 | *26,29* | 195 | 135 | 1 |
| 5,00 | *32,87* | 245 | 170 | 1 |
| 5,00 | *39,44* | 315 | 210 | 1 |
| 5,50 | *29,58* | 205 | 140 | 1 |
| 5,50 | *37,78* | 260 | 180 | 1 |
| 5,50 | *44,37* | 330 | 225 | 1 |
| 6,00 | *27,94* | 205 | 140 | 1 |
| 6,00 | *34,51* | 260 | 180 | 1 |
| 6,00 | *42,74* | 330 | 225 | 1 |
| 6,50 | *31,23* | 215 | 150 | 1 |
| 6,50 | *39,44* | 275 | 190 | 1 |
| 6,50 | *52,57* | 350 | 235 | 1 |
| 7,00 | *36,15* | 225 | 155 | 1 |
| 7,00 | *42,74* | 290 | 200 | 1 |
| 7,00 | *57,52* | 370 | 250 | 1 |
| 7,50 | *39,44* | 225 | 155 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 7,50 | *47,65* | 290 | 200 | 1 |
| 7,50 | *62,44* | 370 | 250 | 1 |
| 8,00 | *44,37* | 240 | 165 | 1 |
| 8,00 | *52,57* | 305 | 210 | 1 |
| 8,00 | *75,60* | 390 | 265 | 1 |
| 8,50 | *46,01* | 240 | 165 | 1 |
| 8,50 | *55,86* | 305 | 210 | 1 |
| 8,50 | *78,88* | 390 | 265 | 1 |
| 9,00 | *54,22* | 250 | 175 | 1 |
| 9,00 | *65,73* | 320 | 220 | 1 |
| 9,00 | *92,03* | 410 | 280 | 1 |
| 9,50 | *55,86* | 250 | 175 | 1 |
| 9,50 | *65,73* | 320 | 220 | 1 |
| 9,50 | *96,96* | 410 | 280 | 1 |
| 10,00 | *62,44* | 265 | 185 | 1 |
| 10,00 | *87,09* | 340 | 235 | 1 |
| 10,00 | *106,80* | 430 | 295 | 1 |
| 10,50 | *65,73* | 265 | 185 | 1 |
| 10,50 | *92,03* | 340 | 235 | 1 |
| 10,50 | *110,10* | 430 | 295 | 1 |
| 11,00 | *72,29* | 280 | 195 | 1 |
| 11,00 | *100,23* | 365 | 250 | 1 |
| 11,00 | *123,24* | 455 | 310 | 1 |
| 11,50 | *82,16* | 280 | 195 | 1 |
| 11,50 | *113,38* | 365 | 250 | 1 |
| 11,50 | *138,03* | 455 | 310 | 1 |
| 12,00 | *90,37* | 275 | 205 | 1 |
| 12,00 | *123,24* | 375 | 260 | 1 |
| 12,00 | *152,82* | 480 | 330 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1116 HSS DIN 1897 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

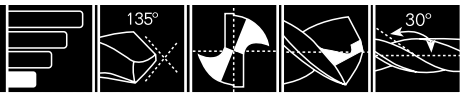
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *1,23* | 26 | 6 | 10 |
| 1,10 | *2,72* | 28 | 7 | 10 |
| 1,20 | *3,14* | 30 | 8 | 10 |
| 1,25 | *1,11* | 30 | 8 | 10 |
| 1,30 | *3,61* | 30 | 8 | 10 |
| 1,40 | *4,14* | 32 | 9 | 10 |
| 1,50 | *1,08* | 32 | 9 | 10 |
| 1,60 | *2,46* | 34 | 10 | 10 |
| 1,70 | *2,85* | 34 | 10 | 10 |
| 1,75 | *1,08* | 36 | 11 | 10 |
| 1,80 | *2,85* | 36 | 11 | 10 |
| 1,90 | *2,85* | 36 | 11 | 10 |
| 2,00 | *1,08* | 38 | 12 | 10 |
| 2,10 | *1,32* | 38 | 12 | 10 |
| 2,20 | *1,32* | 40 | 13 | 10 |
| 2,25 | *1,08* | 40 | 13 | 10 |
| 2,30 | *1,32* | 40 | 13 | 10 |
| 2,40 | *1,32* | 43 | 14 | 10 |
| 2,50 | *1,08* | 43 | 14 | 10 |
| 2,60 | *1,79* | 43 | 14 | 10 |
| 2,70 | *1,23* | 46 | 16 | 10 |
| 2,75 | *1,12* | 46 | 16 | 10 |
| 2,80 | *1,35* | 46 | 16 | 10 |
| 2,90 | *1,35* | 46 | 16 | 10 |
| 3,00 | *1,12* | 46 | 16 | 10 |
| 3,10 | *1,46* | 49 | 18 | 10 |
| 3,20 | *1,46* | 49 | 18 | 10 |
| 3,25 | *1,22* | 49 | 18 | 10 |
| 3,30 | *1,39* | 49 | 18 | 10 |
| 3,40 | *1,46* | 52 | 20 | 10 |
| 3,50 | *1,22* | 52 | 20 | 10 |
| 3,60 | *1,62* | 52 | 20 | 10 |
| 3,70 | *1,62* | 52 | 20 | 10 |
| 3,75 | *1,31* | 52 | 20 | 10 |
| 3,80 | *1,62* | 55 | 22 | 10 |
| 3,90 | *1,62* | 55 | 22 | 10 |
| 4,00 | *1,31* | 55 | 22 | 10 |
| 4,10 | *1,90* | 55 | 22 | 10 |
| 4,20 | *1,90* | 55 | 22 | 10 |
| 4,25 | *1,59* | 55 | 22 | 10 |
| 4,30 | *1,90* | 58 | 24 | 10 |
| 4,40 | *1,90* | 58 | 24 | 10 |
| 4,50 | *1,59* | 58 | 24 | 10 |
| 4,60 | *2,16* | 58 | 24 | 10 |
| 4,70 | *2,16* | 58 | 24 | 10 |
| 4,75 | *1,77* | 58 | 24 | 10 |
| 4,80 | *2,16* | 62 | 26 | 10 |
| 4,90 | *2,16* | 62 | 26 | 10 |
| 5,00 | *1,77* | 62 | 26 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,10 | *2,38* | 62 | 26 | 10 |
| 5,20 | *2,38* | 62 | 26 | 10 |
| 5,25 | *1,95* | 62 | 26 | 10 |
| 5,30 | *2,39* | 62 | 26 | 10 |
| 5,40 | *2,39* | 66 | 28 | 10 |
| 5,50 | *1,95* | 66 | 28 | 10 |
| 5,60 | *2,58* | 66 | 28 | 10 |
| 5,70 | *3,87* | 66 | 28 | 10 |
| 5,75 | *2,24* | 66 | 28 | 10 |
| 5,80 | *2,58* | 66 | 28 | 10 |
| 5,90 | *2,72* | 66 | 28 | 10 |
| 6,00 | *2,24* | 66 | 28 | 10 |
| 6,10 | *3,22* | 70 | 31 | 10 |
| 6,20 | *3,22* | 70 | 31 | 10 |
| 6,25 | *2,67* | 70 | 31 | 10 |
| 6,30 | *3,22* | 70 | 31 | 10 |
| 6,40 | *3,22* | 70 | 31 | 10 |
| 6,50 | *2,67* | 70 | 31 | 10 |
| 6,60 | *3,74* | 70 | 31 | 10 |
| 6,70 | *3,74* | 70 | 31 | 10 |
| 6,75 | *3,08* | 74 | 34 | 10 |
| 6,80 | *3,74* | 74 | 34 | 10 |
| 6,90 | *3,74* | 74 | 34 | 10 |
| 7,00 | *3,08* | 74 | 34 | 10 |
| 7,25 | *3,49* | 74 | 34 | 10 |
| 7,50 | *3,49* | 74 | 34 | 10 |
| 7,75 | *3,83* | 79 | 37 | 10 |
| 8,00 | *3,83* | 79 | 37 | 10 |
| 8,25 | *4,58* | 79 | 37 | 10 |
| 8,50 | *4,58* | 79 | 37 | 10 |
| 8,75 | *5,06* | 84 | 40 | 10 |
| 9,00 | *5,00* | 84 | 40 | 10 |
| 9,25 | *5,32* | 84 | 40 | 10 |
| 9,50 | *5,59* | 84 | 40 | 10 |
| 9,75 | *6,25* | 89 | 43 | 10 |
| 10,00 | *6,25* | 89 | 43 | 5 |
| 10,50 | *7,02* | 89 | 43 | 5 |
| 11,00 | *7,84* | 95 | 47 | 5 |
| 11,50 | *8,72* | 95 | 47 | 5 |
| 12,00 | *9,19* | 102 | 51 | 5 |
| 13,00 | *11,31* | 102 | 51 | 5 |
| 14,00 | *15,57* | 107 | 54 | 4 |
| 15,00 | *20,28* | 111 | 56 | 4 |
| 16,00 | *24,44* | 115 | 58 | 1 |
| 17,00 | *28,73* | 119 | 60 | 1 |
| 18,00 | *32,00* | 123 | 62 | 1 |
| 19,00 | *35,67* | 127 | 64 | 1 |
| 20,00 | *42,77* | 131 | 66 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# BROCAS CON MANGO CILÍNDRICO
# FORETS À QUEUE CYLINDRIQUE / STRAIGHT SHANK DRILL-BITS

## 1117 HSS DIN 1897 N



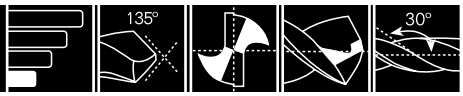

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | ● | ● | | ○ | ● | | ○ | | | | | |
| 15-35 | | | | | | 25-30 | 12-16 | | 50-60 | 30-60 | | 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *2,35* | 38 | 9 | 10 |
| 2,25 | *2,35* | 40 | 9 | 10 |
| 2,50 | *2,35* | 43 | 10 | 10 |
| 2,75 | *2,35* | 46 | 10 | 10 |
| 3,00 | *2,04* | 46 | 10 | 10 |
| 3,25 | *2,04* | 49 | 10 | 10 |
| 3,30 | *2,04* | 49 | 10 | 10 |
| 3,50 | *2,27* | 52 | 13 | 10 |
| 3,75 | *2,60* | 52 | 13 | 10 |
| 4,00 | *2,34* | 55 | 13 | 10 |
| 4,10 | *2,52* | 55 | 13 | 10 |
| 4,20 | *2,52* | 55 | 13 | 10 |

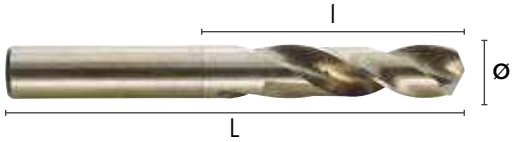
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 4,25 | *2,52* | 55 | 13 | 10 |
| 4,50 | *2,60* | 58 | 13 | 10 |
| 4,75 | *4,21* | 58 | 13 | 10 |
| 4,80 | *2,87* | 58 | 13 | 10 |
| 5,00 | *2,98* | 62 | 13 | 10 |
| 5,25 | *4,21* | 62 | 13 | 10 |
| 5,50 | *3,59* | 66 | 16 | 10 |
| 5,75 | *4,97* | 66 | 16 | 10 |
| 6,00 | *4,02* | 66 | 16 | 10 |
| 7,00 | *5,31* | 74 | 19 | 10 |
| 8,00 | *6,51* | 79 | 19 | 10 |

## 1118 HSSCO DIN 1897 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | | ○ | | ● | ● | | ○ | ● | | ○ | | | | | |
| 15-35 | 12-20 | 6-16 | | 8-14 | | 25-30 | 12-16 | | 50-60 | 30-60 | | 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



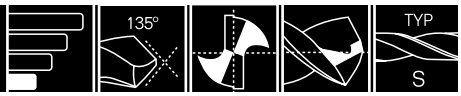

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *1,42* | 38 | 12 | 10 |
| 2,20 | *2,48* | 40 | 13 | 10 |
| 2,25 | *1,94* | 40 | 13 | 10 |
| 2,50 | *2,03* | 43 | 14 | 10 |
| 2,70 | *3,42* | 46 | 16 | 10 |
| 2,75 | *2,14* | 46 | 16 | 10 |
| 3,00 | *2,14* | 46 | 16 | 10 |
| 3,20 | *2,71* | 49 | 18 | 10 |
| 3,25 | *2,10* | 49 | 18 | 10 |
| 3,30 | *2,80* | 49 | 18 | 10 |
| 3,50 | *2,27* | 52 | 20 | 10 |
| 3,75 | *2,38* | 52 | 20 | 10 |
| 4,00 | *2,50* | 55 | 22 | 10 |
| 4,10 | *4,56* | 55 | 22 | 10 |
| 4,20 | *3,45* | 55 | 22 | 10 |
| 4,25 | *2,71* | 55 | 22 | 10 |
| 4,50 | *2,88* | 58 | 24 | 10 |
| 4,75 | *2,98* | 58 | 24 | 10 |
| 4,90 | *3,61* | 62 | 26 | 10 |
| 5,00 | *3,22* | 62 | 26 | 10 |
| 5,10 | *4,03* | 62 | 26 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,20 | *3,92* | 62 | 26 | 10 |
| 5,25 | *3,07* | 62 | 26 | 10 |
| 5,50 | *3,36* | 66 | 28 | 10 |
| 5,75 | *3,48* | 66 | 28 | 10 |
| 6,00 | *3,62* | 66 | 28 | 10 |
| 6,50 | *4,14* | 70 | 31 | 10 |
| 6,75 | *7,07* | 74 | 34 | 10 |
| 7,00 | *4,64* | 74 | 34 | 10 |
| 7,50 | *5,89* | 74 | 34 | 10 |
| 8,00 | *6,54* | 79 | 37 | 10 |
| 8,25 | *8,33* | 79 | 37 | 10 |
| 8,50 | *7,07* | 79 | 37 | 10 |
| 9,00 | *7,84* | 84 | 40 | 10 |
| 9,50 | *8,46* | 84 | 40 | 10 |
| 10,00 | *9,39* | 89 | 43 | 5 |
| 10,50 | *14,12* | 89 | 43 | 5 |
| 11,00 | *13,04* | 95 | 47 | 5 |
| 11,50 | *14,63* | 95 | 47 | 5 |
| 12,00 | *17,96* | 102 | 51 | 5 |
| 12,50 | *18,84* | 102 | 51 | 5 |
| 13,00 | *24,62* | 102 | 51 | 5 |



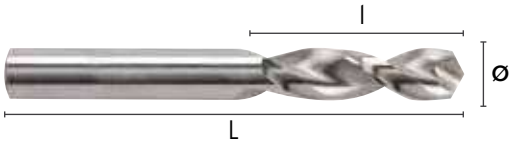
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1166 HSSCO DIN 1897 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-20 | ● 6-16 | | | | | | | ● 30-80 | | ● 50-70 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

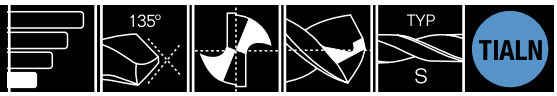



| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *4,15* | 38 | 12 | 10 |
| 2,50 | *3,74* | 43 | 14 | 10 |
| 2,80 | *3,76* | 46 | 16 | 10 |
| 3,00 | *3,60* | 46 | 16 | 10 |
| 3,10 | *4,00* | 49 | 18 | 10 |
| 3,20 | *4,00* | 49 | 18 | 10 |
| 3,30 | *4,00* | 49 | 18 | 10 |
| 3,40 | *4,00* | 52 | 20 | 10 |
| 3,50 | *4,00* | 52 | 20 | 10 |
| 3,60 | *4,87* | 52 | 20 | 10 |
| 3,70 | *4,87* | 52 | 20 | 10 |
| 3,80 | *5,07* | 55 | 22 | 10 |
| 3,90 | *4,87* | 55 | 22 | 10 |
| 4,00 | *4,43* | 55 | 22 | 10 |
| 4,10 | *5,27* | 55 | 22 | 10 |
| 4,20 | *5,27* | 55 | 22 | 10 |
| 4,30 | *6,07* | 58 | 24 | 10 |
| 4,40 | *6,07* | 58 | 24 | 10 |
| 4,50 | *5,27* | 58 | 24 | 10 |
| 4,60 | *6,31* | 58 | 24 | 10 |
| 4,70 | *6,33* | 58 | 24 | 10 |
| 4,80 | *6,33* | 62 | 26 | 10 |
| 4,90 | *6,31* | 62 | 26 | 10 |
| 5,00 | *5,87* | 62 | 26 | 10 |
| 5,10 | *7,18* | 62 | 26 | 10 |
| 5,20 | *7,18* | 62 | 26 | 10 |
| 5,30 | *7,18* | 62 | 26 | 10 |
| 5,40 | *7,17* | 66 | 28 | 10 |
| 5,50 | *6,55* | 66 | 28 | 10 |
| 5,60 | *7,56* | 66 | 28 | 10 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,70 | *7,87* | 66 | 28 | 10 |
| 5,80 | *7,56* | 66 | 28 | 10 |
| 5,90 | *7,56* | 66 | 28 | 10 |
| 6,00 | *7,46* | 66 | 28 | 10 |
| 6,10 | *9,59* | 66 | 28 | 10 |
| 6,20 | *9,56* | 70 | 31 | 10 |
| 6,50 | *8,92* | 70 | 31 | 10 |
| 6,80 | *12,43* | 70 | 31 | 10 |
| 7,00 | *10,22* | 74 | 34 | 10 |
| 7,20 | *12,96* | 74 | 34 | 10 |
| 7,50 | *13,19* | 74 | 34 | 10 |
| 7,80 | *13,19* | 74 | 34 | 10 |
| 8,00 | *12,85* | 79 | 37 | 10 |
| 8,20 | *11,35* | 79 | 37 | 10 |
| 8,50 | *15,24* | 79 | 37 | 10 |
| 8,80 | *22,30* | 79 | 37 | 10 |
| 9,00 | *16,62* | 84 | 40 | 10 |
| 9,20 | *18,73* | 84 | 40 | 10 |
| 9,50 | *18,73* | 84 | 40 | 10 |
| 9,80 | *20,81* | 84 | 40 | 10 |
| 10,00 | *20,81* | 89 | 43 | 10 |
| 10,50 | *22,63* | 89 | 43 | 5 |
| 11,00 | *25,94* | 89 | 43 | 5 |
| 11,50 | *28,81* | 95 | 47 | 5 |
| 12,00 | *30,36* | 95 | 47 | 5 |
| 13,00 | *37,40* | 102 | 51 | 5 |
| 14,00 | *48,20* | 102 | 51 | 5 |
| 15,00 | *53,37* | 107 | 54 | 4 |
| 16,00 | *61,97* | 111 | 56 | 4 |

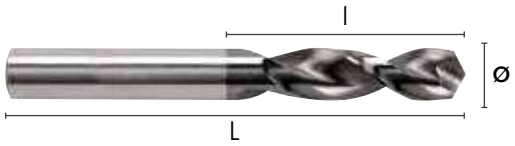
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1167 HSSCO DIN 1897 S




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 18-30 | ● 10-25 | | ○ 12-20 | | | | | ● 45-100 | | ● 70-90 | | | | | | |

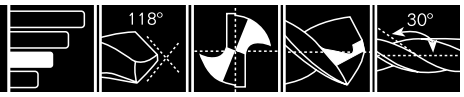
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 2,00 | *5,82* | 38 | 12 | 1 |
| 2,50 | *5,26* | 43 | 14 | 1 |
| 2,80 | *5,26* | 46 | 16 | 1 |
| 3,00 | *5,04* | 46 | 16 | 1 |
| 3,10 | *5,60* | 49 | 18 | 1 |
| 3,20 | *5,60* | 49 | 18 | 1 |
| 3,30 | *5,60* | 49 | 18 | 1 |
| 3,40 | *5,60* | 52 | 20 | 1 |
| 3,50 | *5,60* | 52 | 20 | 1 |
| 3,60 | *6,83* | 52 | 20 | 1 |
| 3,70 | *6,83* | 52 | 20 | 1 |
| 3,80 | *7,10* | 55 | 22 | 1 |
| 3,90 | *6,83* | 55 | 22 | 1 |
| 4,00 | *6,22* | 55 | 22 | 1 |
| 4,10 | *7,36* | 55 | 22 | 1 |
| 4,20 | *7,36* | 55 | 22 | 1 |
| 4,30 | *8,50* | 58 | 24 | 1 |
| 4,40 | *8,50* | 58 | 24 | 1 |
| 4,50 | *7,36* | 58 | 24 | 1 |
| 4,60 | *8,86* | 58 | 24 | 1 |
| 4,70 | *8,87* | 58 | 24 | 1 |
| 4,80 | *8,87* | 62 | 26 | 1 |
| 4,90 | *8,86* | 62 | 26 | 1 |
| 5,00 | *8,24* | 62 | 26 | 1 |
| 5,10 | *10,03* | 62 | 26 | 1 |
| 5,20 | *10,03* | 62 | 26 | 1 |
| 5,30 | *10,03* | 62 | 26 | 1 |
| 5,40 | *10,03* | 66 | 28 | 1 |
| 5,50 | *9,17* | 66 | 28 | 1 |
| 5,60 | *10,59* | 66 | 28 | 1 |

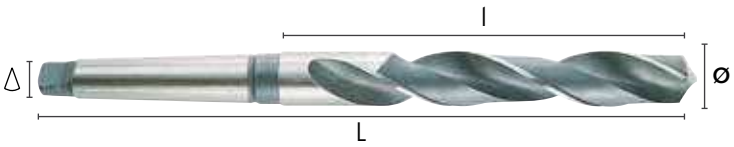
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 5,70 | *11,01* | 66 | 28 | 1 |
| 5,80 | *10,59* | 66 | 28 | 1 |
| 5,90 | *10,59* | 66 | 28 | 1 |
| 6,00 | *10,44* | 66 | 28 | 1 |
| 6,10 | *13,41* | 70 | 31 | 1 |
| 6,20 | *13,40* | 70 | 31 | 1 |
| 6,50 | *12,46* | 70 | 31 | 1 |
| 6,80 | *17,40* | 74 | 34 | 1 |
| 7,00 | *14,32* | 74 | 34 | 1 |
| 7,20 | *18,16* | 74 | 34 | 1 |
| 7,50 | *18,47* | 74 | 34 | 1 |
| 7,80 | *18,48* | 79 | 37 | 1 |
| 8,00 | *17,99* | 79 | 37 | 1 |
| 8,20 | *15,90* | 79 | 37 | 1 |
| 8,50 | *21,33* | 79 | 37 | 1 |
| 8,80 | *31,21* | 84 | 40 | 1 |
| 9,00 | *23,27* | 84 | 40 | 1 |
| 9,20 | *26,22* | 84 | 40 | 1 |
| 9,50 | *26,22* | 84 | 40 | 1 |
| 9,80 | *29,13* | 89 | 43 | 1 |
| 10,00 | *29,13* | 89 | 43 | 1 |
| 10,50 | *31,68* | 89 | 43 | 1 |
| 11,00 | *36,32* | 95 | 47 | 1 |
| 11,50 | *40,33* | 95 | 47 | 1 |
| 12,00 | *42,53* | 102 | 51 | 1 |
| 13,00 | *52,36* | 102 | 51 | 1 |
| 14,00 | *67,47* | 107 | 54 | 1 |
| 15,00 | *74,70* | 111 | 56 | 1 |
| 16,00 | *86,77* | 115 | 58 | 1 |

# 1121 HSS DIN 345 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 5,00 | *18,12* | 133 | 52 | 1 |
| 1 | 5,25 | *20,87* | 133 | 52 | 1 |
| 1 | 5,50 | *18,12* | 138 | 57 | 1 |
| 1 | 5,75 | *20,87* | 138 | 57 | 1 |
| 1 | 6,00 | *18,12* | 138 | 57 | 1 |
| 1 | 6,25 | *23,77* | 144 | 63 | 1 |
| 1 | 6,50 | *20,64* | 144 | 63 | 1 |
| 1 | 6,75 | *23,77* | 150 | 69 | 1 |
| 1 | 7,00 | *20,64* | 150 | 69 | 1 |
| 1 | 7,25 | *25,52* | 150 | 69 | 1 |
| 1 | 7,50 | *22,20* | 150 | 69 | 1 |
| 1 | 7,75 | *25,52* | 156 | 75 | 1 |
| 1 | 8,00 | *22,20* | 156 | 75 | 1 |
| 1 | 8,25 | *29,95* | 156 | 75 | 1 |
| 1 | 8,50 | *20,03* | 156 | 75 | 1 |
| 1 | 8,75 | *29,95* | 162 | 81 | 1 |
| 1 | 9,00 | *20,03* | 162 | 81 | 1 |
| 1 | 9,25 | *30,94* | 162 | 81 | 1 |
| 1 | 9,50 | *19,78* | 162 | 81 | 1 |
| 1 | 9,75 | *30,94* | 168 | 87 | 1 |
| 1 | 10,00 | *19,78* | 168 | 87 | 1 |
| 1 | 10,25 | *31,58* | 168 | 87 | 1 |
| 1 | 10,50 | *21,12* | 168 | 87 | 1 |
| 1 | 10,75 | *31,58* | 175 | 94 | 1 |
| 1 | 11,00 | *21,12* | 175 | 94 | 1 |
| 1 | 11,25 | *33,26* | 175 | 94 | 1 |
| 1 | 11,50 | *22,26* | 175 | 94 | 1 |
| 1 | 11,75 | *33,26* | 175 | 94 | 1 |
| 1 | 12,00 | *22,26* | 182 | 101 | 1 |
| 1 | 12,25 | *37,05* | 182 | 101 | 1 |
| 1 | 12,50 | *24,77* | 182 | 101 | 1 |
| 1 | 12,75 | *37,05* | 182 | 101 | 1 |
| 1 | 13,00 | *24,77* | 182 | 101 | 1 |
| 1 | 13,25 | *40,73* | 189 | 108 | 1 |
| 1 | 13,50 | *27,24* | 189 | 108 | 1 |
| 1 | 13,75 | *40,73* | 189 | 108 | 1 |
| 1 | 14,00 | *27,24* | 189 | 108 | 1 |
| 2 | 14,25 | *44,07* | 212 | 114 | 1 |
| 2 | 14,50 | *29,49* | 212 | 114 | 1 |
| 2 | 14,75 | *44,07* | 212 | 114 | 1 |
| 2 | 15,00 | *29,49* | 212 | 114 | 1 |
| 2 | 15,25 | *45,66* | 218 | 120 | 1 |
| 2 | 15,50 | *30,51* | 218 | 120 | 1 |
| 2 | 15,75 | *45,66* | 218 | 120 | 1 |
| 2 | 16,00 | *30,51* | 218 | 120 | 1 |
| 2 | 16,25 | *51,61* | 223 | 125 | 1 |
| 2 | 16,50 | *34,52* | 223 | 125 | 1 |
| 2 | 16,75 | *51,61* | 223 | 125 | 1 |
| 2 | 17,00 | *34,52* | 223 | 125 | 1 |
| 2 | 17,25 | *57,14* | 228 | 130 | 1 |
| 2 | 17,50 | *38,20* | 228 | 130 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 17,75 | *57,14* | 228 | 130 | 1 |
| 2 | 18,00 | *38,20* | 228 | 130 | 1 |
| 2 | 18,25 | *62,87* | 233 | 135 | 1 |
| 2 | 18,50 | *42,05* | 233 | 135 | 1 |
| 2 | 18,75 | *62,87* | 233 | 135 | 1 |
| 2 | 19,00 | *42,05* | 233 | 135 | 1 |
| 2 | 19,25 | *68,45* | 238 | 140 | 1 |
| 2 | 19,50 | *45,76* | 238 | 140 | 1 |
| 2 | 19,75 | *68,45* | 238 | 140 | 1 |
| 2 | 20,00 | *45,76* | 238 | 140 | 1 |
| 2 | 20,25 | *70,94* | 243 | 145 | 1 |
| 2 | 20,50 | *49,46* | 243 | 145 | 1 |
| 2 | 20,75 | *70,94* | 243 | 145 | 1 |
| 2 | 21,00 | *49,46* | 243 | 145 | 1 |
| 2 | 21,25 | *78,24* | 248 | 150 | 1 |
| 2 | 21,50 | *54,60* | 248 | 150 | 1 |
| 2 | 21,75 | *78,24* | 248 | 150 | 1 |
| 2 | 22,00 | *54,60* | 248 | 150 | 1 |
| 2 | 22,25 | *86,64* | 248 | 150 | 1 |
| 2 | 22,50 | *59,73* | 253 | 155 | 1 |
| 2 | 22,75 | *85,64* | 253 | 155 | 1 |
| 2 | 23,00 | *59,73* | 253 | 155 | 1 |
| 3 | 23,25 | *94,45* | 276 | 155 | 1 |
| 3 | 23,50 | *65,92* | 276 | 155 | 1 |
| 3 | 23,75 | *94,45* | 281 | 160 | 1 |
| 3 | 24,00 | *65,92* | 281 | 160 | 1 |
| 3 | 24,25 | *103,03* | 281 | 160 | 1 |
| 3 | 24,50 | *71,86* | 281 | 160 | 1 |
| 3 | 24,75 | *103,03* | 281 | 160 | 1 |
| 3 | 25,00 | *71,86* | 281 | 160 | 1 |
| 3 | 25,25 | *112,09* | 286 | 165 | 1 |
| 3 | 25,50 | *78,20* | 286 | 165 | 1 |
| 3 | 25,75 | *112,09* | 286 | 165 | 1 |
| 3 | 26,00 | *78,20* | 286 | 165 | 1 |
| 3 | 26,25 | *121,39* | 286 | 165 | 1 |
| 3 | 26,50 | *84,68* | 286 | 165 | 1 |
| 3 | 26,75 | *121,39* | 291 | 170 | 1 |
| 3 | 27,00 | *86,94* | 291 | 170 | 1 |
| 3 | 27,25 | *129,92* | 291 | 170 | 1 |
| 3 | 27,50 | *90,67* | 291 | 170 | 1 |
| 3 | 27,75 | *129,92* | 291 | 170 | 1 |
| 3 | 28,00 | *90,67* | 291 | 170 | 1 |
| 3 | 28,25 | *139,35* | 296 | 175 | 1 |
| 3 | 28,50 | *97,21* | 296 | 175 | 1 |
| 3 | 28,75 | *139,35* | 296 | 175 | 1 |
| 3 | 29,00 | *97,21* | 296 | 175 | 1 |
| 3 | 29,25 | *153,22* | 296 | 175 | 1 |
| 3 | 29,50 | *106,73* | 296 | 175 | 1 |
| 3 | 29,75 | *153,22* | 296 | 175 | 1 |
| 3 | 30,00 | *106,89* | 296 | 175 | 1 |
| 3 | 30,25 | *170,49* | 301 | 180 | 1 |

**(continúa Ref.1121 / suite Réf.1121 / Ref.1121 cont'd)**

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# BROCAS CON MANGO CÓNICO
# FORETS À QUEUE CONIQUE / TAPER SHANK DRILL-BITS

**(continúa Ref.1121 / suite Réf.1121 / Ref.1121 cont'd)**

| △ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3 | 30,50 | *148,26* | 301 | 180 | 1 |
| 3 | 30,75 | *170,49* | 301 | 180 | 1 |
| 3 | 31,00 | *118,97* | 301 | 180 | 1 |
| 3 | 31,25 | *180,57* | 301 | 180 | 1 |
| 3 | 31,50 | *148,34* | 301 | 180 | 1 |
| 3 | 31,75 | *180,57* | 306 | 185 | 1 |
| 4 | 32,00 | *125,97* | 334 | 185 | 1 |
| 4 | 32,50 | *179,30* | 334 | 185 | 1 |
| 4 | 33,00 | *143,86* | 334 | 185 | 1 |
| 4 | 33,50 | *194,96* | 334 | 185 | 1 |
| 4 | 34,00 | *156,47* | 339 | 190 | 1 |
| 4 | 34,50 | *213,08* | 339 | 190 | 1 |
| 4 | 35,00 | *171,00* | 339 | 190 | 1 |
| 4 | 35,50 | *228,65* | 339 | 190 | 1 |
| 4 | 36,00 | *183,41* | 344 | 195 | 1 |
| 4 | 36,50 | *241,02* | 344 | 195 | 1 |
| 4 | 37,00 | *193,37* | 344 | 195 | 1 |
| 4 | 37,50 | *253,52* | 344 | 195 | 1 |
| 4 | 38,00 | *203,44* | 349 | 200 | 1 |
| 4 | 38,50 | *270,33* | 349 | 200 | 1 |
| 4 | 39,00 | *216,93* | 349 | 200 | 1 |
| 4 | 39,50 | *285,48* | 349 | 200 | 1 |
| 4 | 40,00 | *229,06* | 349 | 200 | 1 |
| 4 | 40,50 | *300,14* | 354 | 205 | 1 |
| 4 | 41,00 | *240,83* | 354 | 205 | 1 |
| 4 | 41,50 | *318,53* | 354 | 205 | 1 |
| 4 | 42,00 | *255,55* | 354 | 205 | 1 |
| 4 | 42,50 | *334,05* | 354 | 205 | 1 |
| 4 | 43,00 | *268,04* | 359 | 210 | 1 |
| 4 | 43,50 | *349,77* | 359 | 210 | 1 |
| 4 | 44,00 | *280,61* | 359 | 210 | 1 |
| 4 | 44,50 | *365,17* | 359 | 210 | 1 |
| 4 | 45,00 | *291,43* | 359 | 210 | 1 |
| 4 | 45,50 | *380,61* | 364 | 215 | 1 |
| 4 | 46,00 | *305,36* | 364 | 215 | 1 |
| 4 | 46,50 | *396,10* | 364 | 215 | 1 |
| 4 | 47,00 | *317,84* | 364 | 215 | 1 |
| 4 | 47,50 | *409,42* | 364 | 215 | 1 |
| 4 | 48,00 | *328,50* | 369 | 220 | 1 |
| 4 | 48,50 | *425,13* | 369 | 220 | 1 |
| 4 | 49,00 | *341,11* | 369 | 220 | 1 |
| 4 | 49,50 | *440,61* | 369 | 220 | 1 |

| △ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4 | 50,00 | *344,06* | 369 | 220 | 1 |
| 5 | 51,00 | *447,16* | 412 | 225 | 1 |
| 5 | 52,00 | *474,66* | 412 | 225 | 1 |
| 5 | 53,00 | *514,19* | 412 | 225 | 1 |
| 5 | 54,00 | *528,16* | 417 | 230 | 1 |
| 5 | 55,00 | *529,34* | 417 | 230 | 1 |
| 5 | 56,00 | *623,74* | 417 | 230 | 1 |
| 5 | 57,00 | *665,87* | 422 | 235 | 1 |
| 5 | 58,00 | *665,87* | 422 | 235 | 1 |
| 5 | 59,00 | *681,05* | 422 | 235 | 1 |
| 5 | 60,00 | *655,19* | 422 | 235 | 1 |
| 5 | 61,00 | *729,87* | 427 | 240 | 1 |
| 5 | 62,00 | *746,89* | 427 | 240 | 1 |
| 5 | 63,00 | *802,44* | 427 | 240 | 1 |
| 5 | 64,00 | *836,14* | 432 | 245 | 1 |
| 5 | 65,00 | *799,89* | 432 | 245 | 1 |
| 5 | 66,00 | *911,49* | 432 | 245 | 1 |
| 5 | 67,00 | *938,47* | 432 | 245 | 1 |
| 5 | 68,00 | *967,40* | 437 | 250 | 1 |
| 5 | 69,00 | *992,52* | 437 | 250 | 1 |
| 5 | 70,00 | *1.023,37* | 437 | 250 | 1 |
| 5 | 71,00 | *970,28* | 437 | 250 | 1 |
| 5 | 72,00 | *1.120,29* | 442 | 255 | 1 |
| 5 | 73,00 | *1.143,46* | 442 | 255 | 1 |
| 5 | 74,00 | *1.173,40* | 442 | 255 | 1 |
| 5 | 75,00 | *1.207,72* | 442 | 255 | 1 |
| 5 | 76,00 | *1.137,63* | 447 | 260 | 1 |
| 6 | 77,00 | *1.339,58* | 514 | 260 | 1 |
| 6 | 78,00 | *1.437,56* | 514 | 260 | 1 |
| 6 | 79,00 | *1.465,62* | 514 | 260 | 1 |
| 6 | 80,00 | *1.495,14* | 514 | 260 | 1 |

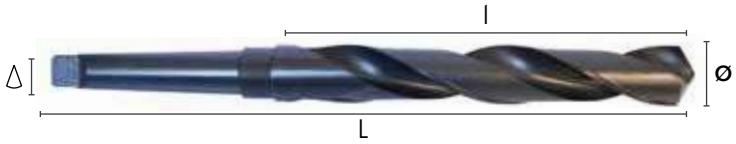


P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 1121/9 HSS DIN 345 N

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



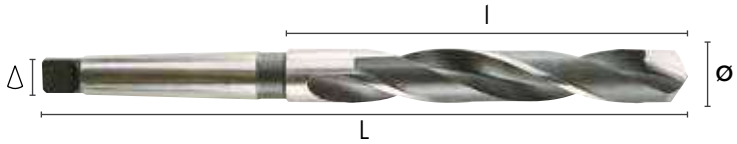

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1/2" | *24,77* | 182 | 101 | 1 |
| 33/64" | *24,77* | 182 | 101 | 1 |
| 17/32" | *27,24* | 189 | 108 | 1 |
| 35/64" | *27,24* | 189 | 108 | 1 |
| 9/16" | *29,49* | 212 | 114 | 1 |
| 37/64" | *44,07* | 212 | 114 | 1 |
| 19/32" | *29,49* | 218 | 120 | 1 |
| 39/64" | *30,51* | 218 | 120 | 1 |
| 5/8" | *30,51* | 218 | 120 | 1 |
| 41/64" | *51,61* | 223 | 125 | 1 |
| 21/32" | *34,52* | 223 | 125 | 1 |
| 43/64" | *34,52* | 223 | 125 | 1 |
| 11/16" | *38,20* | 228 | 130 | 1 |
| 45/64" | *38,20* | 228 | 130 | 1 |
| 23/32" | *62,87* | 233 | 135 | 1 |
| 47/64" | *42,05* | 233 | 135 | 1 |
| 3/4" | *42,05* | 238 | 140 | 1 |
| 49/64" | *45,76* | 238 | 140 | 1 |
| 25/32" | *68,45* | 238 | 140 | 1 |
| 51/64" | *45,76* | 243 | 145 | 1 |
| 13/16" | *49,46* | 243 | 145 | 1 |
| 53/64" | *49,46* | 243 | 145 | 1 |
| 27/32" | *54,60* | 248 | 150 | 1 |
| 55/64" | *78,24* | 248 | 150 | 1 |
| 7/8" | *54,60* | 248 | 150 | 1 |
| 57/64" | *59,73* | 253 | 155 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 29/32" | *59,73* | 253 | 155 | 1 |
| 59/64" | *65,92* | 276 | 155 | 1 |
| 15/16" | *129,92* | 281 | 160 | 1 |
| 61/64" | *65,92* | 281 | 160 | 1 |
| 31/32" | *54,60* | 281 | 160 | 1 |
| 63/64" | *71,86* | 286 | 160 | 1 |
| 1" | *79,40* | 290 | 170 | 1 |
| 1-1/16" | *86,94* | 291 | 170 | 1 |
| 1-1/8" | *97,21* | 296 | 175 | 1 |
| 1-5/32" | *97,21* | 296 | 175 | 1 |
| 1-3/16" | *106,89* | 301 | 180 | 1 |
| 1-7/32" | *118,97* | 301 | 180 | 1 |
| 1-1/4" | *180,57* | 306 | 185 | 1 |
| 1-9/32" | *179,30* | 334 | 185 | 1 |
| 1-5/16" | *143,86* | 334 | 185 | 1 |
| 1-11/32" | *156,47* | 339 | 190 | 1 |
| 1-3/8" | *171,00* | 339 | 190 | 1 |
| 1-13/32" | *183,41* | 344 | 195 | 1 |
| 1-7/16" | *241,02* | 344 | 195 | 1 |
| 1-1/2" | *203,44* | 349 | 200 | 1 |
| 1-9/16" | *229,06* | 349 | 200 | 1 |
| 1-5/8" | *240,83* | 354 | 205 | 1 |
| 1-11/16" | *268,04* | 359 | 210 | 1 |
| 1-3/4" | *280,61* | 359 | 210 | 1 |
| 2" | *344,06* | 374 | 225 | 1 |

# 1123 HSS DIN 345 N - WIDIA

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 18-30 | ● 10-25 | ○ 6-9 | | | | ● 30-40 | ● 15-20 | | | | ○ 30-35 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



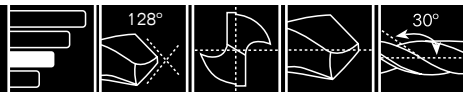

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 10,00 | *80,28* | 168 | 87 | 1 |
| 1 | 11,00 | *86,84* | 175 | 94 | 1 |
| 1 | 12,00 | *91,11* | 182 | 101 | 1 |
| 1 | 13,00 | *103,55* | 182 | 101 | 1 |
| 1 | 14,00 | *112,57* | 189 | 108 | 1 |
| 1 | 14,50 | *127,18* | 212 | 114 | 1 |
| 2 | 15,00 | *127,18* | 212 | 114 | 1 |
| 2 | 15,50 | *135,85* | 218 | 120 | 1 |
| 2 | 16,00 | *135,85* | 218 | 120 | 1 |
| 2 | 16,50 | *144,10* | 223 | 125 | 1 |
| 2 | 17,00 | *144,10* | 223 | 125 | 1 |
| 2 | 17,50 | *155,51* | 228 | 130 | 1 |
| 2 | 18,00 | *155,51* | 228 | 130 | 1 |
| 2 | 18,50 | *182,03* | 233 | 135 | 1 |
| 2 | 19,00 | *182,03* | 233 | 135 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 19,50 | *204,58* | 238 | 140 | 1 |
| 2 | 20,00 | *204,04* | 238 | 140 | 1 |
| 2 | 20,50 | *207,56* | 243 | 145 | 1 |
| 2 | 21,00 | *207,56* | 243 | 145 | 1 |
| 2 | 21,50 | *226,58* | 248 | 150 | 1 |
| 2 | 22,00 | *226,58* | 248 | 150 | 1 |
| 2 | 22,50 | *246,35* | 253 | 155 | 1 |
| 2 | 23,00 | *246,35* | 253 | 155 | 1 |
| 3 | 24,00 | *270,73* | 281 | 160 | 1 |
| 3 | 25,00 | *277,19* | 281 | 160 | 1 |
| 3 | 26,00 | *311,61* | 286 | 165 | 1 |
| 3 | 27,00 | *332,27* | 291 | 170 | 1 |
| 3 | 28,00 | *367,95* | 291 | 170 | 1 |
| 3 | 29,00 | *391,69* | 296 | 175 | 1 |
| 3 | 30,00 | *416,76* | 296 | 175 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1122 HSSCO DIN 345 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | ● 12-20 | ● 6-16 | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ● 15-25 | | | | | |

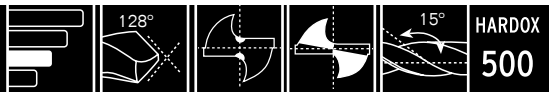
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 10,00 | *66,73* | 168 | 87 | 1 |
| 1 | 10,50 | *69,54* | 168 | 87 | 1 |
| 1 | 11,00 | *66,68* | 175 | 94 | 1 |
| 1 | 11,50 | *69,54* | 175 | 94 | 1 |
| 1 | 12,00 | *71,32* | 182 | 101 | 1 |
| 1 | 12,50 | *75,47* | 182 | 101 | 1 |
| 1 | 13,00 | *73,24* | 182 | 101 | 1 |
| 1 | 13,50 | *95,72* | 189 | 108 | 1 |
| 1 | 14,00 | *93,89* | 189 | 108 | 1 |
| 2 | 14,50 | *104,20* | 212 | 114 | 1 |
| 2 | 15,00 | *95,72* | 212 | 114 | 1 |
| 2 | 15,50 | *106,05* | 218 | 120 | 1 |
| 2 | 16,00 | *102,33* | 218 | 120 | 1 |
| 2 | 16,50 | *106,98* | 223 | 125 | 1 |
| 2 | 17,00 | *106,05* | 223 | 125 | 1 |
| 2 | 17,50 | *112,68* | 228 | 130 | 1 |
| 2 | 18,00 | *110,79* | 228 | 130 | 1 |
| 2 | 18,50 | *121,09* | 233 | 135 | 1 |
| 2 | 19,00 | *118,30* | 233 | 135 | 1 |
| 2 | 19,50 | *136,16* | 238 | 140 | 1 |
| 2 | 20,00 | *132,36* | 238 | 140 | 1 |
| 2 | 20,50 | *152,09* | 243 | 145 | 1 |
| 2 | 21,00 | *153,95* | 243 | 145 | 1 |
| 2 | 21,50 | *173,73* | 248 | 150 | 1 |
| 2 | 22,00 | *156,68* | 248 | 150 | 1 |
| 2 | 22,50 | *193,39* | 253 | 155 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 23,00 | *182,22* | 253 | 155 | 1 |
| 3 | 23,50 | *193,39* | 276 | 155 | 1 |
| 3 | 24,00 | *195,26* | 281 | 160 | 1 |
| 3 | 24,50 | *208,45* | 281 | 160 | 1 |
| 3 | 25,00 | *206,25* | 281 | 160 | 1 |
| 3 | 25,50 | *255,45* | 286 | 165 | 1 |
| 3 | 26,00 | *242,07* | 286 | 165 | 1 |
| 3 | 26,50 | *268,50* | 286 | 165 | 1 |
| 3 | 27,00 | *268,50* | 291 | 170 | 1 |
| 3 | 27,50 | *321,07* | 291 | 170 | 1 |
| 3 | 28,00 | *297,05* | 291 | 170 | 1 |
| 3 | 28,50 | *328,61* | 296 | 175 | 1 |
| 3 | 29,00 | *303,66* | 296 | 175 | 1 |
| 3 | 29,50 | *336,14* | 296 | 175 | 1 |
| 3 | 30,00 | *310,10* | 296 | 175 | 1 |
| 3 | 31,00 | *310,09* | 301 | 180 | 1 |
| 4 | 32,00 | *355,34* | 334 | 185 | 1 |
| 4 | 33,00 | *405,85* | 334 | 185 | 1 |
| 4 | 34,00 | *482,25* | 339 | 190 | 1 |
| 4 | 35,00 | *482,25* | 339 | 190 | 1 |
| 4 | 36,00 | *517,45* | 344 | 195 | 1 |
| 4 | 37,00 | *534,81* | 344 | 195 | 1 |
| 4 | 38,00 | *595,70* | 349 | 200 | 1 |
| 4 | 39,00 | *611,84* | 349 | 200 | 1 |
| 4 | 40,00 | *646,16* | 349 | 200 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1181 HSSCO (8%)




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | ● 8-10 | ● 6-8 | | | | | | | | | | ● 4-7 | | ● 4-6 | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

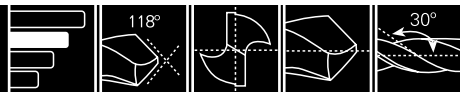
| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 10 | *55,94* | 190 | 90 | 1 |
| 2 | 11 | *55,94* | 190 | 90 | 1 |
| 2 | 12 | *61,27* | 190 | 90 | 1 |
| 2 | 13 | *61,27* | 190 | 90 | 1 |
| 2 | 14 | *65,23* | 190 | 90 | 1 |
| 2 | 15 | *66,51* | 190 | 90 | 1 |
| 2 | 16 | *79,13* | 190 | 90 | 1 |
| 2 | 17 | *84,36* | 190 | 90 | 1 |
| 2 | 18 | *85,63* | 190 | 90 | 1 |
| 3 | 19 | *97,29* | 225 | 105 | 1 |
| 3 | 20 | *103,44* | 225 | 105 | 1 |
| 3 | 21 | *112,64* | 225 | 105 | 1 |
| 3 | 22 | *129,50* | 225 | 105 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3 | 24 | *139,50* | 225 | 105 | 1 |
| 3 | 25 | *165,31* | 225 | 105 | 1 |
| 3 | 26 | *195,89* | 225 | 105 | 1 |
| 4 | 27 | *210,66* | 265 | 120 | 1 |
| 4 | 28 | *218,75* | 265 | 120 | 1 |
| 4 | 30 | *243,32* | 265 | 120 | 1 |
| 4 | 32 | *283,19* | 265 | 120 | 1 |
| 4 | 35 | *353,83* | 265 | 120 | 1 |
| 4 | 36 | *372,14* | 265 | 120 | 1 |
| 4 | 40 | *467,84* | 265 | 120 | 1 |
| 4 | 45 | *636,27* | 265 | 120 | 1 |
| 5 | 50 | *747,47* | 340 | 150 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 1125 HSS DIN 341 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

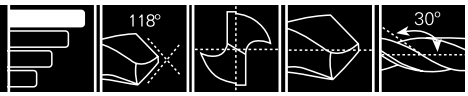
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | *5,00 | *25,25* | 155 | 74 | 1 |
| 1 | *5,50 | *34,14* | 161 | 80 | 1 |
| 1 | *6,00 | *26,94* | 161 | 80 | 1 |
| 1 | *6,50 | *28,40* | 167 | 86 | 1 |
| 1 | *7,00 | *30,02* | 174 | 93 | 1 |
| 1 | *7,50 | *31,33* | 174 | 93 | 1 |
| 1 | 8,00 | *31,62* | 181 | 100 | 1 |
| 1 | 8,50 | *31,62* | 181 | 100 | 1 |
| 1 | 9,00 | *34,62* | 188 | 107 | 1 |
| 1 | 9,50 | *38,61* | 188 | 107 | 1 |
| 1 | 10,00 | *37,49* | 197 | 116 | 1 |
| 1 | 10,50 | *37,71* | 197 | 116 | 1 |
| 1 | 11,00 | *36,83* | 206 | 125 | 1 |
| 1 | 11,50 | *36,83* | 206 | 125 | 1 |
| 1 | 12,00 | *39,21* | 215 | 134 | 1 |
| 1 | 12,50 | *40,73* | 215 | 134 | 1 |
| 1 | 13,00 | *40,73* | 215 | 134 | 1 |
| 1 | 13,50 | *42,59* | 223 | 142 | 1 |
| 1 | 14,00 | *46,25* | 223 | 142 | 1 |
| 1 | 14,50 | *58,20* | 245 | 147 | 1 |
| 2 | 15,00 | *58,20* | 245 | 147 | 1 |
| 2 | 15,50 | *59,52* | 251 | 153 | 1 |
| 2 | 16,00 | *60,49* | 251 | 153 | 1 |
| 2 | 16,50 | *63,92* | 257 | 159 | 1 |
| 2 | 17,00 | *64,26* | 257 | 159 | 1 |
| 2 | 17,50 | *62,72* | 263 | 165 | 1 |
| 2 | 18,00 | *69,70* | 263 | 165 | 1 |
| 2 | 18,50 | *71,61* | 269 | 171 | 1 |
| 2 | 19,00 | *73,88* | 269 | 171 | 1 |
| 2 | 19,50 | *77,56* | 275 | 177 | 1 |
| 2 | 20,00 | *78,51* | 275 | 177 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 20,50 | *90,00* | 282 | 184 | 1 |
| 2 | 21,00 | *87,24* | 282 | 184 | 1 |
| 2 | 21,50 | *106,20* | 289 | 191 | 1 |
| 2 | 22,00 | *101,36* | 289 | 191 | 1 |
| 2 | 22,50 | *110,47* | 296 | 198 | 1 |
| 2 | 23,00 | *105,29* | 296 | 198 | 1 |
| 3 | 23,50 | *131,00* | 319 | 198 | 1 |
| 3 | 24,00 | *129,02* | 327 | 206 | 1 |
| 3 | 24,50 | *137,01* | 327 | 206 | 1 |
| 3 | 25,00 | *131,31* | 327 | 206 | 1 |
| 3 | 25,50 | *155,70* | 335 | 214 | 1 |
| 3 | 26,00 | *146,94* | 335 | 214 | 1 |
| 3 | 26,50 | *160,60* | 335 | 214 | 1 |
| 3 | 27,00 | *156,36* | 343 | 222 | 1 |
| 3 | 27,50 | *189,18* | 343 | 222 | 1 |
| 3 | 28,00 | *171,77* | 343 | 222 | 1 |
| 3 | 28,50 | *224,72* | 351 | 230 | 1 |
| 3 | 29,00 | *183,47* | 351 | 230 | 1 |
| 3 | 29,50 | *224,72* | 351 | 230 | 1 |
| 3 | 30,00 | *206,76* | 351 | 230 | 1 |
| 3 | 31,00 | *237,05* | 360 | 239 | 1 |
| 4 | 32,00 | *245,77* | 397 | 248 | 1 |
| 4 | 33,00 | *274,94* | 397 | 248 | 1 |
| 4 | 34,00 | *320,09* | 406 | 257 | 1 |
| 4 | 35,00 | *316,93* | 406 | 257 | 1 |
| 4 | 36,00 | *367,11* | 416 | 267 | 1 |
| 4 | 37,00 | *381,42* | 416 | 267 | 1 |
| 4 | 38,00 | *408,53* | 426 | 277 | 1 |
| 4 | 39,00 | *414,89* | 426 | 277 | 1 |
| 4 | 40,00 | *448,72* | 426 | 277 | 1 |

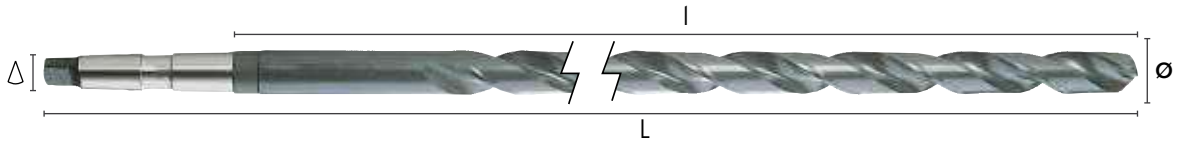
***(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)**

## 1126 HSS DIN 1870 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 8,00 | *79,35* | 265 | 165 | 1 |
| 1 | 8,00 | *98,91* | 330 | 210 | 1 |
| 1 | 8,50 | *87,10* | 265 | 165 | 1 |
| 1 | 8,50 | *101,08* | 330 | 210 | 1 |
| 1 | 9,00 | *89,68* | 275 | 175 | 1 |
| 1 | 9,00 | *114,03* | 345 | 220 | 1 |
| 1 | 9,50 | *96,00* | 275 | 175 | 1 |
| 1 | 9,50 | *115,22* | 345 | 220 | 1 |
| 1 | 10,00 | *98,63* | 285 | 185 | 1 |
| 1 | 10,00 | *121,61* | 360 | 235 | 1 |
| 1 | 10,50 | *104,73* | 285 | 185 | 1 |
| 1 | 10,50 | *125,36* | 360 | 235 | 1 |
| 1 | 11,00 | *109,32* | 300 | 195 | 1 |
| 1 | 11,00 | *149,49* | 375 | 250 | 1 |
| 1 | 11,50 | *119,71* | 300 | 195 | 1 |
| 1 | 11,50 | *149,49* | 375 | 250 | 1 |
| 1 | 12,00 | *122,50* | 310 | 205 | 1 |
| 1 | 12,00 | *152,65* | 395 | 260 | 1 |
| 1 | 12,50 | *130,38* | 310 | 205 | 1 |
| 1 | 12,50 | *170,39* | 395 | 260 | 1 |
| 1 | 13,00 | *130,38* | 310 | 205 | 1 |
| 1 | 13,00 | *170,39* | 395 | 260 | 1 |
| 1 | 13,50 | *142,76* | 325 | 220 | 1 |
| 1 | 13,50 | *174,98* | 410 | 275 | 1 |
| 1 | 14,00 | *142,76* | 325 | 220 | 1 |
| 1 | 14,00 | *174,98* | 410 | 275 | 1 |
| 2 | 14,50 | *156,37* | 340 | 220 | 1 |
| 2 | 14,50 | *190,58* | 425 | 275 | 1 |
| 2 | 15,00 | *156,37* | 340 | 220 | 1 |
| 2 | 15,00 | *190,58* | 425 | 275 | 1 |
| 2 | 15,50 | *175,30* | 355 | 230 | 1 |
| 2 | 15,50 | *210,22* | 445 | 295 | 1 |
| 2 | 16,00 | *175,30* | 355 | 230 | 1 |
| 2 | 16,00 | *210,22* | 445 | 295 | 1 |
| 2 | 16,50 | *188,91* | 355 | 230 | 1 |
| 2 | 16,50 | *227,14* | 445 | 295 | 1 |
| 2 | 17,00 | *188,91* | 355 | 230 | 1 |
| 2 | 17,00 | *227,14* | 445 | 295 | 1 |
| 2 | 17,50 | *207,86* | 370 | 245 | 1 |
| 2 | 17,50 | *250,12* | 465 | 310 | 1 |
| 2 | 18,00 | *207,86* | 370 | 245 | 1 |
| 2 | 18,00 | *250,12* | 465 | 310 | 1 |
| 2 | 18,50 | *225,34* | 370 | 245 | 1 |
| 2 | 18,50 | *270,28* | 465 | 310 | 1 |
| 2 | 19,00 | *225,34* | 370 | 245 | 1 |
| 2 | 19,00 | *270,28* | 465 | 310 | 1 |
| 2 | 19,50 | *240,65* | 385 | 260 | 1 |
| 2 | 19,50 | *292,51* | 490 | 325 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 20,00 | *240,65* | 385 | 260 | 1 |
| 2 | 20,00 | *292,51* | 490 | 325 | 1 |
| 2 | 20,50 | *272,56* | 385 | 260 | 1 |
| 2 | 20,50 | *327,30* | 490 | 325 | 1 |
| 2 | 21,00 | *272,56* | 385 | 260 | 1 |
| 2 | 21,00 | *327,30* | 490 | 325 | 1 |
| 2 | 21,50 | *290,65* | 405 | 270 | 1 |
| 2 | 21,50 | *351,28* | 515 | 345 | 1 |
| 2 | 22,00 | *290,65* | 405 | 270 | 1 |
| 2 | 22,00 | *351,28* | 515 | 345 | 1 |
| 2 | 22,50 | *331,25* | 405 | 270 | 1 |
| 2 | 22,50 | *396,51* | 515 | 345 | 1 |
| 2 | 23,00 | *331,25* | 405 | 270 | 1 |
| 2 | 23,00 | *396,51* | 515 | 345 | 1 |
| 3 | 23,50 | *363,95* | 425 | 270 | 1 |
| 3 | 23,50 | *441,29* | 535 | 345 | 1 |
| 3 | 24,00 | *363,95* | 440 | 290 | 1 |
| 3 | 24,00 | *441,29* | 555 | 365 | 1 |
| 3 | 24,50 | *377,18* | 440 | 290 | 1 |
| 3 | 24,50 | *465,09* | 555 | 365 | 1 |
| 3 | 25,00 | *377,18* | 440 | 290 | 1 |
| 3 | 25,00 | *465,09* | 555 | 365 | 1 |
| 3 | 25,50 | *389,85* | 440 | 290 | 1 |
| 3 | 25,50 | *513,75* | 555 | 365 | 1 |
| 3 | 26,00 | *389,85* | 440 | 290 | 1 |
| 3 | 26,00 | *513,75* | 555 | 365 | 1 |
| 3 | 26,50 | *399,22* | 440 | 290 | 1 |
| 3 | 26,50 | *530,09* | 555 | 365 | 1 |
| 3 | 27,00 | *399,22* | 460 | 305 | 1 |
| 3 | 27,00 | *530,09* | 580 | 385 | 1 |
| 3 | 27,50 | *425,90* | 460 | 305 | 1 |
| 3 | 27,50 | *573,46* | 580 | 385 | 1 |
| 3 | 28,00 | *425,90* | 460 | 305 | 1 |
| 3 | 28,00 | *573,46* | 580 | 385 | 1 |
| 3 | 28,50 | *441,29* | 460 | 305 | 1 |
| 3 | 28,50 | *632,74* | 580 | 385 | 1 |
| 3 | 29,00 | *441,29* | 460 | 305 | 1 |
| 3 | 29,00 | *632,74* | 580 | 385 | 1 |
| 3 | 29,50 | *456,89* | 460 | 305 | 1 |
| 3 | 29,50 | *637,95* | 580 | 385 | 1 |
| 3 | 30,00 | *456,89* | 460 | 305 | 1 |
| 3 | 30,00 | *637,95* | 580 | 385 | 1 |
| 3 | 31,00 | *512,15* | 480 | 320 | 1 |
| 3 | 31,00 | *680,17* | 610 | 410 | 1 |
| 4 | 32,00 | *535,50* | 505 | 320 | 1 |
| 4 | 32,00 | *713,62* | 635 | 410 | 1 |
| 4 | 33,00 | *583,51* | 505 | 320 | 1 |
| 4 | 33,00 | *790,04* | 635 | 410 | 1 |

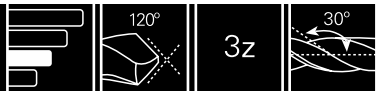
**(continúa Ref.1126 / suite Réf.1126 / Ref.1126 cont'd)**

**(continúa Ref.1126 / suite Réf.1126 / Ref.1126 cont'd)**

| △ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4 | 34,00 | *632,71* | 530 | 340 | 1 |
| 4 | 34,00 | *820,45* | 665 | 430 | 1 |
| 4 | 35,00 | *651,67* | 530 | 340 | 1 |
| 4 | 35,00 | *890,82* | 665 | 430 | 1 |
| 4 | 36,00 | *703,07* | 530 | 340 | 1 |
| 4 | 36,00 | *935,43* | 665 | 430 | 1 |
| 4 | 37,00 | *720,81* | 530 | 340 | 1 |
| 4 | 37,00 | *1.039,38* | 665 | 430 | 1 |
| 4 | 38,00 | *786,32* | 555 | 360 | 1 |
| 4 | 38,00 | *1.100,63* | 695 | 460 | 1 |
| 4 | 39,00 | *819,51* | 555 | 360 | 1 |
| 4 | 39,00 | *1.153,14* | 695 | 460 | 1 |

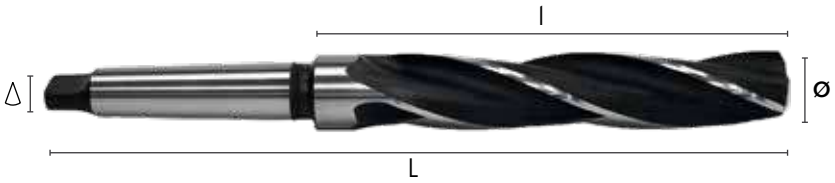
| △ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4 | 40,00 | *863,91* | 555 | 360 | 1 |
| 4 | 40,00 | *1.099,93* | 695 | 460 | 1 |
| 4 | 41,00 | *1.250,21* | 695 | 460 | 1 |
| 4 | 42,00 | *1.334,84* | 695 | 460 | 1 |
| 4 | 43,00 | *1.362,03* | 735 | 490 | 1 |
| 4 | 44,00 | *1.409,90* | 735 | 490 | 1 |
| 4 | 45,00 | *1.475,57* | 735 | 490 | 1 |
| 4 | 46,00 | *1.541,53* | 735 | 490 | 1 |
| 4 | 47,00 | *1.617,20* | 735 | 490 | 1 |
| 4 | 48,00 | *1.711,25* | 765 | 510 | 1 |
| 4 | 49,00 | *1.776,41* | 765 | 510 | 1 |
| 4 | 50,00 | *1.822,81* | 765 | 510 | 1 |

## 1139 HSS DIN 343




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | ○ 8-14 | | ● 25-30 | ● 12-16 | | ○ 50-60 | ● 30-60 | | ○ 20-25 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



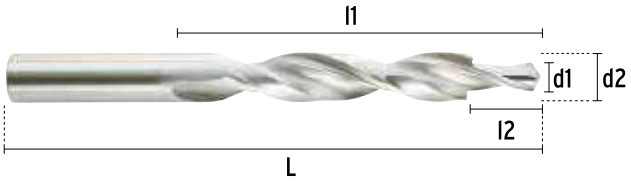

| △ | Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 10,00 | 7,00 | *71,77* | 168 | 87 | 1 |
| 1 | 11,00 | 7,70 | *74,33* | 175 | 94 | 1 |
| 1 | 12,00 | 8,40 | *76,92* | 182 | 101 | 1 |
| 1 | 13,00 | 9,10 | *80,39* | 182 | 101 | 1 |
| 1 | 14,00 | 9,80 | *85,07* | 189 | 108 | 1 |
| 2 | 15,00 | 10,50 | *91,49* | 212 | 114 | 1 |
| 2 | 16,00 | 11,20 | *97,40* | 218 | 120 | 1 |
| 2 | 17,00 | 11,90 | *106,51* | 223 | 125 | 1 |
| 2 | 18,00 | 12,60 | *115,42* | 228 | 130 | 1 |
| 2 | 19,00 | 13,30 | *137,83* | 233 | 135 | 1 |
| 2 | 20,00 | 14,00 | *139,24* | 238 | 140 | 1 |
| 2 | 21,00 | 15,00 | *149,48* | 243 | 145 | 1 |
| 2 | 22,00 | 15,50 | *163,57* | 248 | 150 | 1 |

| △ | Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2 | 23,00 | 16,00 | *175,25* | 253 | 155 | 1 |
| 3 | 24,00 | 17,00 | *188,60* | 281 | 160 | 1 |
| 3 | 25,00 | 17,50 | *201,94* | 281 | 160 | 1 |
| 3 | 26,00 | 18,00 | *222,97* | 286 | 165 | 1 |
| 3 | 27,00 | 19,00 | *240,28* | 291 | 170 | 1 |
| 3 | 28,00 | 19,50 | *260,48* | 291 | 170 | 1 |
| 3 | 30,00 | 21,00 | *302,16* | 296 | 175 | 1 |
| 4 | 32,00 | 22,00 | *340,64* | 334 | 185 | 1 |
| 4 | 34,00 | 24,00 | *377,69* | 339 | 190 | 1 |
| 4 | 35,00 | 25,00 | *409,69* | 339 | 190 | 1 |
| 4 | 36,00 | 25,50 | *417,29* | 344 | 195 | 1 |
| 4 | 38,00 | 26,50 | *476,51* | 349 | 200 | 1 |
| 4 | 40,00 | 28,00 | *524,20* | 349 | 210 | 1 |

## 1127 HSS DIN 8376

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | ● 8-10 | | | | | ● 30-35 | ● 25-30 | ○ 14-18 | ● 20-25 | ● 30-35 | | ○ 15-20 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



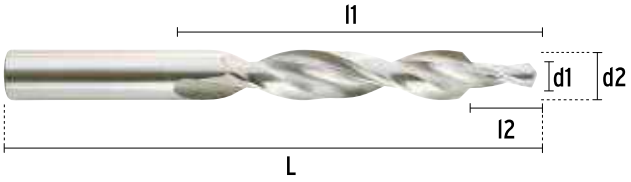

| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-3 | 3,40 | 6,00 | *62,69* | 93 | 57 | 9 | 1 |
| M-4 | 4,50 | 8,00 | *65,73* | 117 | 75 | 11 | 1 |
| M-5 | 5,50 | 10,00 | *78,14* | 133 | 87 | 13 | 1 |

| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-6 | 6,60 | 11,00 | *88,29* | 142 | 94 | 15 | 1 |
| M-8 | 9,00 | 15,00 | *108,48* | 169 | 114 | 19 | 1 |
| M-10 | 11,00 | 18,00 | *215,60* | 191 | 130 | 23 | 1 |

## 1128 HSS DIN 8374

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | ● 8-10 | | | | | ● 30-35 | ● 25-30 | ○ 14-18 | ● 20-25 | ● 30-35 | | ○ 15-20 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-3 | 3,20 | 6,00 | *73,15* | 93 | 57 | 9 | 1 |
| M-4 | 4,30 | 8,00 | *76,70* | 117 | 75 | 11 | 1 |
| M-5 | 5,30 | 10,00 | *91,18* | 133 | 87 | 13 | 1 |

| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-6 | 6,40 | 11,50 | *104,13* | 142 | 94 | 15 | 1 |
| M-8 | 8,40 | 15,00 | *142,45* | 169 | 114 | 19 | 1 |
| M-10 | 10,50 | 19,00 | *219,99* | 198 | 130 | 23 | 1 |

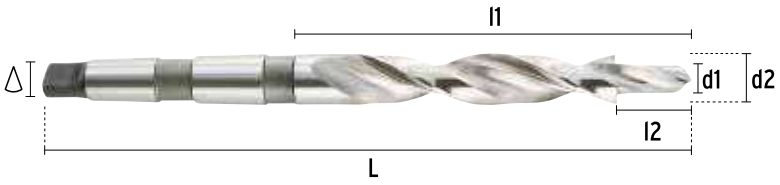


P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1129 HSS DIN 8377

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | ● 8-10 | | | | | ● 30-35 | ● 25-30 | ○ 14-18 | ● 20-25 | ● 30-35 | | ○ 15-20 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



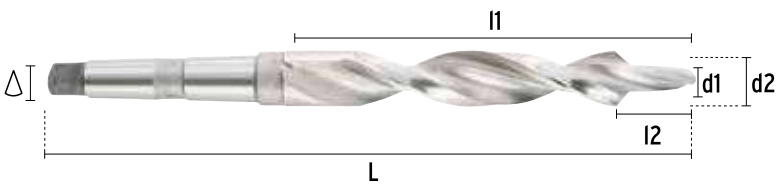

| | M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|---|
| 2 | M-8 | 9,00 | 15,00 | *162,26* | 212 | 114 | 19 | 1 |
| 2 | M-10 | 11,00 | 18,00 | *182,89* | 228 | 130 | 23 | 1 |
| 2 | M-12 | 14,00 | 20,00 | *204,60* | 238 | 140 | 27 | 1 |
| 3 | M-14 | 16,00 | 24,00 | *290,15* | 281 | 160 | 31 | 1 |

| | M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|---|
| 3 | M-16 | 18,00 | *26,00* | *413,71* | 286 | 165 | 35 | 1 |
| 3 | M-18 | 20,00 | *30,00* | *462,63* | 296 | 175 | 39 | 1 |
| 4 | M-20 | 22,00 | *33,00* | *521,76* | 334 | 185 | 43 | 1 |

## 1130 HSS DIN 8375

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | ● 8-10 | | | | | ● 30-35 | ● 25-30 | ○ 14-18 | ● 20-25 | ● 30-35 | | ○ 15-20 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| | M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|---|
| 1 | M-5 | 5,50 | 11,00 | *156,93* | 175 | 94 | 13 | 1 |
| 1 | M-6 | 6,60 | 13,00 | *160,13* | 182 | 101 | 15 | 1 |

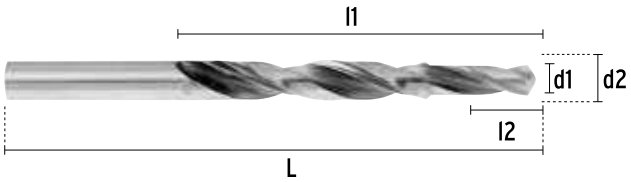
| | M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|---|
| 2 | M-8 | 9,00 | 17,20 | *190,82* | 228 | 130 | 19 | 1 |
| 2 | M-10 | 11,00 | 21,50 | *225,92* | 248 | 150 | 23 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1152 HSS DIN 8378

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | ● 8-10 | | | | | ● 30-35 | ● 25-30 | ○ 14-18 | ● 20-25 | ● 30-35 | | ○ 15-20 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



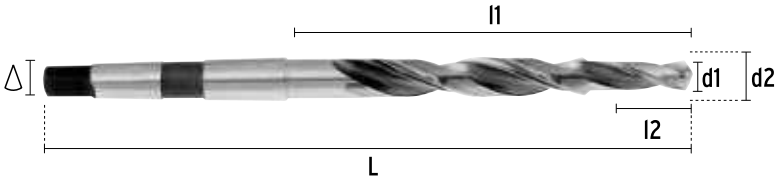

| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-3 | 2,50 | 3,40 | *56,19* | 70 | 39 | 8,80 | 1 |
| M-4 | 3,30 | 4,50 | *60,44* | 80 | 47 | 11,40 | 1 |
| M-5 | 4,20 | 5,50 | *65,10* | 93 | 57 | 13,60 | 1 |
| M-6 | 5,00 | 6,60 | *74,06* | 101 | 63 | 16,50 | 1 |

| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-8 | 6,80 | 9,00 | *88,23* | 125 | 81 | 21,00 | 1 |
| M-10 | 8,50 | 11,00 | *102,93* | 142 | 94 | 25,50 | 1 |
| M-12 | 10,20 | 13,50 | *128,16* | 160 | 108 | 30,00 | 1 |

## 1153 HSS DIN 8379

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | ● 8-10 | | | | | ● 30-35 | ● 25-30 | ○ 14-18 | ● 20-25 | ● 30-35 | | ○ 15-20 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



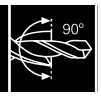

| | M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|---|
| 1 | M-8 | 6,80 | 9,00 | *143,82* | 162 | 81 | 21,00 | 1 |
| 1 | M-10 | 8,50 | 11,00 | *156,71* | 175 | 94 | 25,50 | 1 |
| 1 | M-12 | 10,20 | 13,50 | *185,12* | 189 | 108 | 30,00 | 1 |
| 2 | M-14 | 12,00 | 15,50 | *197,53* | 218 | 120 | 34,50 | 1 |

| | M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|---|
| 2 | M-16 | 14,00 | 17,50 | *213,18* | 228 | 130 | 38,50 | 1 |
| 2 | M-18 | 15,50 | 20,00 | *238,40* | 238 | 140 | 43,50 | 1 |
| 2 | M-20 | 17,50 | 22,00 | *288,29* | 248 | 150 | 47,50 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

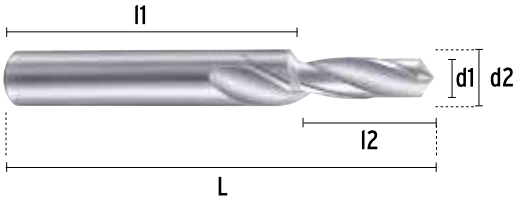
## 1191 HSSCO




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | ● | ○ | | ● | ● | ● | ● | ○ | ● | | | |
| 20-30 | 12-18 | 4-8 | | 4-10 | | 20-25 | 10-15 | | 15-80 | 25-60 | 60-90 | 12-70 | 2-6 | 2-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

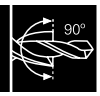
NEW




| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-3 | 2,50 | 3,40 | *37,45* | 52 | 20 | 8 | 1 |
| M-4 | 3,30 | 4,50 | *39,62* | 58 | 24 | 11 | 1 |
| M-5 | 4,20 | 5,50 | *41,37* | 66 | 28 | 13 | 1 |
| M-6 | 5,00 | 6,60 | *45,28* | 70 | 31 | 16 | 1 |

| M | d1 mm | d2 mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|---|
| M-8 | 6,80 | 9,00 | *60,95* | 84 | 40 | 20 | 1 |
| M-10 | 8,50 | 11,00 | *81,85* | 95 | 47 | 24 | 1 |
| M-12 | 10,20 | 14,00 | *111,47* | 107 | 54 | 29 | 1 |

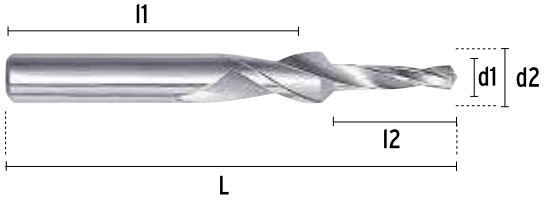
## 1192 HSSCO




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | ● | ○ | | ● | ● | ● | ● | ○ | ● | | | |
| 20-30 | 12-18 | 4-8 | | 4-10 | | 20-25 | 10-15 | | 15-80 | 25-60 | 60-90 | 12-70 | 2-6 | 2-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

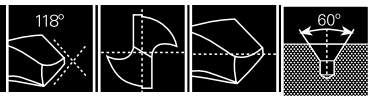



| M | d1 mm | d2 mm | € | L mm | l2 mm | |
|---|---|---|---|---|---|---|
| M-4 | 4,30 | 8,60 | *99,27* | 110 | 30 | 1 |
| M-4 | 5,30 | 10,40 | *104,50* | 110 | 30 | 1 |
| M-6 | 6,40 | 12,40 | *111,47* | 110 | 30 | 1 |

| M | d1 mm | d2 mm | € | L mm | l2 mm | |
|---|---|---|---|---|---|---|
| M-8 | 8,40 | 16,40 | *148,03* | 110 | 30 | 1 |
| M-10 | 10,50 | 20,40 | *179,38* | 110 | 30 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 1132 HSS DIN 333 A



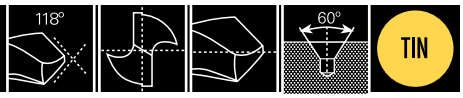

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 8-12 | | | | | ● 20-25 | ○ 15-20 | | ● 15-20 | ● 25-30 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | *3,15* | *6,07* | 31,50 | 1,60 | 1 |
| 1,25 | *3,15* | *6,07* | 33,50 | 1,90 | 1 |
| 1,25 | *4,00* | *6,70* | 35,50 | 1,90 | 1 |
| 1,60 | *4,00* | *6,07* | 37,50 | 2,40 | 1 |
| 1,60 | *5,00* | *7,14* | 40,00 | 2,40 | 1 |
| 2,00 | *5,00* | *6,54* | 42,00 | 2,90 | 1 |
| 2,00 | *6,30* | *7,59* | 45,00 | 2,90 | 1 |
| 2,50 | *6,30* | *7,26* | 47,00 | 3,60 | 1 |
| 2,50 | *8,00* | *8,49* | 50,00 | 3,60 | 1 |
| 3,15 | *8,00* | *8,00* | 52,00 | 4,40 | 1 |

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,15 | 10,00 | *9,40* | 56,00 | 4,40 | 1 |
| 4,00 | 10,00 | *10,91* | 59,00 | 5,60 | 1 |
| 4,00 | 12,50 | *12,88* | 63,00 | 5,60 | 1 |
| 5,00 | 12,50 | *18,28* | 66,00 | 6,90 | 1 |
| 5,00 | 16,00 | *31,12* | 71,00 | 6,90 | 1 |
| 6,30 | *16,00* | *26,11* | 74,00 | 8,60 | 1 |
| 6,30 | *20,00* | *40,17* | 80,00 | 8,60 | 1 |
| 10,00 | *25,00* | *78,73* | 100,00 | 31,50 | 1 |
| 12,50 | *31,50* | *187,87* | 125,00 | 33,50 | 1 |

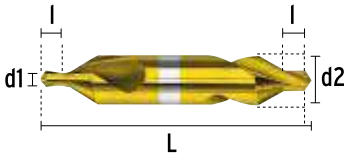
## 1188 HSS DIN 333 A




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | ● 12-16 | | | | | ● 30-35 | ○ 20-30 | | ● 20-30 | ● 35-40 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW



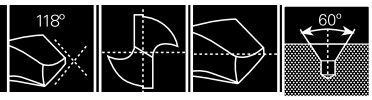

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | 3,15 | *11,57* | 31,50 | 1,60 | 1 |
| 1,25 | 3,15 | *11,57* | 33,50 | 1,90 | 1 |
| 1,60 | 4,00 | *12,10* | 37,50 | 2,40 | 1 |
| 2,00 | 5,00 | *13,25* | 42,00 | 2,90 | 1 |
| 2,50 | 6,30 | *14,42* | 47,00 | 3,60 | 1 |
| 3,15 | 8,00 | *15,10* | 52,00 | 4,40 | 1 |

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4,00 | 10,00 | *21,00* | 59,00 | 5,60 | 1 |
| 5,00 | 12,50 | *26,88* | 66,00 | 6,90 | 1 |
| 6,30 | 16,00 | *28,73* | 74,00 | 8,60 | 1 |
| 10,00 | 25,00 | *86,76* | 100,00 | 31,50 | 1 |
| 12,00 | 31,50 | *206,66* | 125,00 | 33,50 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1193 HM-MD DIN 333 A




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ○ 45-65 | ● 40-55 | ● 25-30 | ● 20-25 | ● 40-55 | ● 25-30 | ● 40-55 | ● 35-45 | ● 20-25 | ● 80-130 | ● 25-65 | ● 100-110 | ● 70-200 | ● 20-30 | ● 15-30 | ● 15-20 | ● 10-15 | ○ 4-6 |

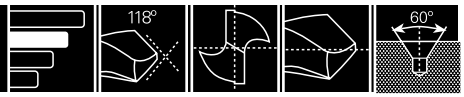
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | 3,15 | *56,38* | 31,50 | 1,60 | 1 |
| 1,25 | 3,15 | *56,38* | 33,50 | 1,90 | 1 |
| 1,60 | 4,00 | *58,00* | 37,50 | 2,40 | 1 |
| 2,00 | 5,00 | *72,49* | 42,00 | 2,90 | 1 |
| 2,50 | 6,30 | *86,19* | 47,00 | 3,60 | 1 |

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,15 | 8,00 | *104,71* | 52,00 | 4,40 | 1 |
| 4,00 | 10,00 | *139,35* | 59,00 | 5,60 | 1 |
| 5,00 | 12,50 | *235,21* | 66,00 | 6,90 | 1 |
| 6,30 | 16,00 | *372,14* | 74,00 | 8,60 | 1 |

## 1133 HSS DIN 333 A




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 8-12 | | | | | ● 20-25 | ○ 15-20 | | ● 15-20 | ● 25-30 | | ○ 10-15 | | | | | |

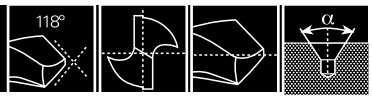
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | 4,00 | *18,92* | 60,00 | 1,30 | 1 |
| 1,50 | 5,00 | *19,26* | 60,00 | 2,00 | 1 |
| 2,00 | 6,00 | *20,08* | 80,00 | 2,50 | 1 |
| 2,50 | 8,00 | *24,39* | 80,00 | 3,10 | 1 |
| 3,00 | 8,00 | *24,39* | 80,00 | 3,90 | 1 |
| 1,00 | 4,00 | *47,22* | 120,00 | 1,30 | 1 |
| 1,50 | 5,00 | *44,88* | 120,00 | 2,00 | 1 |

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2,00 | 6,00 | *44,88* | 120,00 | 2,50 | 1 |
| 2,50 | 8,00 | *51,96* | 120,00 | 3,10 | 1 |
| 3,00 | 8,00 | *51,96* | 120,00 | 3,90 | 1 |
| 3,00 | 10,00 | *59,01* | 120,00 | 3,90 | 1 |
| 4,00 | 10,00 | *59,01* | 120,00 | 5,00 | 1 |
| 4,00 | 12,00 | *70,42* | 120,00 | 5,00 | 1 |
| 5,00 | 14,00 | *84,58* | 120,00 | 6,30 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1135 HSS DIN 333 R



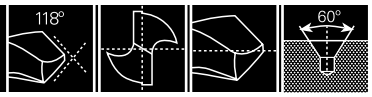

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 8-12 | | | | | ● 20-25 | ○ 15-20 | | ● 15-20 | ● 25-30 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | 3,15 | *6,67* | 31,50 | 3,00 | 1 |
| 1,25 | 3,15 | *6,67* | 33,50 | 3,35 | 1 |
| 1,25 | 4,00 | *6,67* | 35,50 | 3,75 | 1 |
| 1,60 | 4,00 | *6,67* | 35,50 | 4,25 | 1 |
| 1,60 | 5,00 | *7,22* | 40,00 | 4,75 | 1 |
| 2,00 | 5,00 | *7,22* | 40,00 | 5,30 | 1 |
| 2,00 | 6,30 | *8,02* | 45,00 | 6,00 | 1 |
| 2,50 | 6,30 | *8,00* | 45,00 | 6,70 | 1 |
| 2,50 | 8,00 | *8,83* | 50,00 | 7,50 | 1 |
| 3,15 | 8,00 | *8,83* | 50,00 | 8,50 | 1 |

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,15 | 10,00 | *11,50* | 56,00 | 9,50 | 1 |
| 4,00 | 10,00 | *11,50* | 56,00 | 10,60 | 1 |
| 4,00 | 12,50 | *19,20* | 63,00 | 11,80 | 1 |
| 5,00 | 12,50 | *19,23* | 63,00 | 13,20 | 1 |
| 5,00 | 16,00 | *27,32* | 71,00 | 15,00 | 1 |
| 6,30 | 16,00 | *27,51* | 71,00 | 17,00 | 1 |
| 6,30 | 20,00 | *49,01* | 80,00 | 19,00 | 1 |
| 8,00 | 20,00 | *51,53* | 80,00 | 21,20 | 1 |
| 10,00 | 25,00 | *82,81* | 100,00 | 31,50 | 1 |
| 12,50 | 31,50 | *197,58* | 125,00 | 33,50 | 1 |

## 1137 HSS DIN 333 B




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 8-12 | | | | | ● 20-25 | ● 15-20 | | ● 15-20 | ● 25-30 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | 4,00 | 11,01 | 35,50 | 1,60 | 1 |
| 1,25 | 5,00 | 11,01 | 40,00 | 1,90 | 1 |
| 1,60 | 6,30 | 11,01 | 45,00 | 2,40 | 1 |
| 2,00 | 8,00 | 11,01 | 50,00 | 2,90 | 1 |
| 2,50 | 10,00 | 12,64 | 56,00 | 3,60 | 1 |

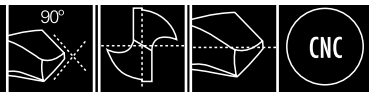
| d1 mm | d2 mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,15 | 11,20 | *14,49* | 60,00 | 4,40 | 1 |
| 4,00 | 14,00 | *22,27* | 67,00 | 5,60 | 1 |
| 5,00 | 18,00 | *31,05* | 75,00 | 6,90 | 1 |
| 6,30 | 20,00 | *45,32* | 80,00 | 8,60 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# BROCAS BIDIAMETRALES Y DE CENTRAR
# FORETS BIÉTAGÉS ET À CENTRER / TWO-DIAMETER AND CENTRE DRILL-BITS

## 1138 HSSCO



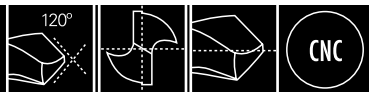

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 8-12 | ● 6-10 | | ● 6-12 | | ● 20-25 | ● 15-20 | | ● 15-20 | ● 25-30 | | ● 25-30 | | ● 10-12 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 3,00 | *22,31* | 50,00 | 10,00 | 1 |
| 4,00 | *22,31* | 52,00 | 12,00 | 1 |
| 5,00 | *25,15* | 60,00 | 15,00 | 1 |
| 6,00 | *25,15* | 66,00 | 20,00 | 1 |
| 8,00 | *28,42* | 79,00 | 25,00 | 1 |

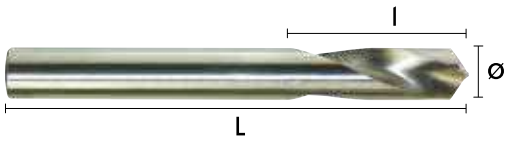
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,00 | *28,42* | 89,00 | 25,00 | 1 |
| 12,00 | *39,30* | 102,00 | 30,00 | 1 |
| 16,00 | *54,20* | 115,00 | 35,00 | 1 |
| 20,00 | *106,64* | 131,00 | 40,00 | 1 |

## 1155 HSSCO




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 8-12 | ● 6-10 | | ● 6-12 | | ● 20-25 | ● 15-20 | | ● 15-20 | ● 25-30 | | ● 25-30 | | ● 10-12 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



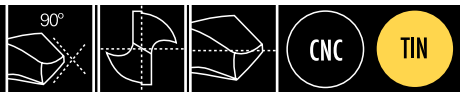

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 3,00 | *22,31* | 46 | 12 | 1 |
| 4,00 | *22,31* | 55 | 12 | 1 |
| 5,00 | *25,15* | 62 | 14 | 1 |
| 6,00 | *25,15* | 66 | 16 | 1 |
| 8,00 | *28,42* | 79 | 21 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,00 | *28,42* | 89 | 25 | 1 |
| 12,00 | *39,30* | 102 | 30 | 1 |
| 16,00 | *54,20* | 115 | 38 | 1 |
| 20,00 | *106,64* | 131 | 45 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# BROCAS BIDIAMETRALES Y DE CENTRAR
# FORETS BIÉTAGÉS ET À CENTRER / TWO-DIAMETER AND CENTRE DRILL-BITS

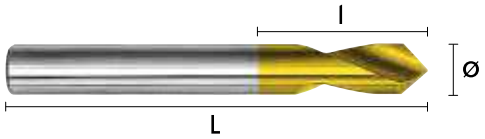
## 1189 HSSCO




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 12-16 | ● 10-14 | | ● 6-12 | | ● 30-35 | ● 20-25 | | ● 20-25 | ● 35-40 | | ● 35-40 | | ● 12-16 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

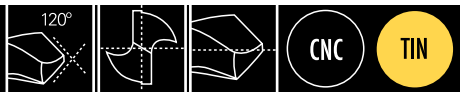
NEW




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 3,00 | *29,00* | 50 | 10 | 1 |
| 4,00 | *29,00* | 52 | 12 | 1 |
| 5,00 | *32,70* | 60 | 15 | 1 |
| 6,00 | *32,70* | 66 | 20 | 1 |
| 8,00 | *36,95* | 79 | 25 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,00 | *36,95* | 89 | 25 | 1 |
| 12,00 | *51,09* | 102 | 30 | 1 |
| 16,00 | *70,46* | 115 | 35 | 1 |
| 20,00 | *138,63* | 131 | 40 | 1 |

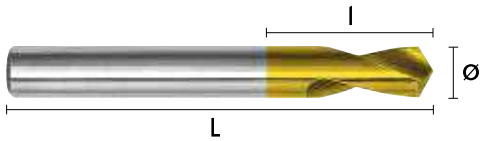
## 1190 HSSCO




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ● 12-16 | ● 10-14 | | ● 6-12 | | ● 30-35 | ● 20-25 | | ● 20-25 | ● 35-40 | | ● 35-40 | | ● 12-16 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 3,00 | *29,00* | 46 | 12 | 1 |
| 4,00 | *29,00* | 55 | 12 | 1 |
| 5,00 | *32,70* | 62 | 14 | 1 |
| 6,00 | *32,70* | 66 | 16 | 1 |
| 8,00 | *36,95* | 79 | 21 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 10,00 | *36,95* | 89 | 25 | 1 |
| 12,00 | *51,09* | 102 | 30 | 1 |
| 16,00 | *70,46* | 115 | 38 | 1 |
| 20,00 | *138,63* | 131 | 45 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 1179 HM-MD

1XD | 90° | 30° | DIN 6535 HA | CNC

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-80 | ● 40-55 | ● 35-45 | | ● 15-30 | | ● 60-80 | ● 40-60 | | ● 70-160 | ● 60-120 | | ○ 50-70 | ○ 8-20 | ● 20-30 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,00 | 6 | *24,63* | 65 | 15 | 1 |
| 8,00 | 8 | *42,42* | 80 | 20 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *61,17* | 90 | 25 | 1 |
| 12,00 | 12 | *85,83* | 100 | 30 | 1 |

## 1180 HM-MD

1XD | 120° | 30° | DIN 6535 HA | CNC

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-80 | ● 40-55 | ● 35-45 | | ● 15-30 | | ● 60-80 | ● 40-60 | | ● 70-160 | ● 60-120 | | ○ 50-70 | ○ 8-20 | ● 20-30 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,00 | 6 | *24,63* | 65 | 15 | 1 |
| 8,00 | 8 | *42,42* | 80 | 20 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *61,17* | 90 | 25 | 1 |
| 12,00 | 12 | *85,83* | 100 | 30 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

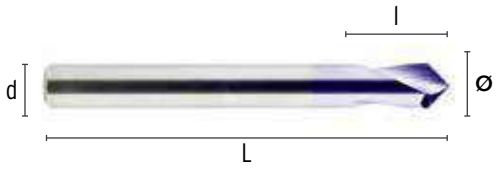
## 1185 HM-MD

1XD | 90° | 30° | DIN 6535 HA | CNC | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 70-100 | ● 55-75 | ● 50-60 | | ● 20-35 | | ● 80-100 | ● 55-80 | | ● 100-200 | ● 80-160 | | ○ 50-70 | ○ 12-20 | ● 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,00 | 6 | *32,02* | 65 | 15 | 1 |
| 8,00 | 8 | *55,15* | 80 | 20 | 1 |

| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *79,52* | 90 | 25 | 1 |
| 12,00 | 12 | *111,58* | 100 | 30 | 1 |

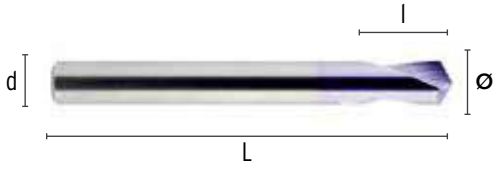
## 1186 HM-MD

1XD | 120° | 30° | DIN 6535 HA | CNC | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 70-100 | ● 55-75 | ● 50-60 | | ● 20-35 | | ● 80-100 | ● 55-80 | | ● 100-200 | ● 80-160 | | ○ 50-70 | ○ 12-20 | ● 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

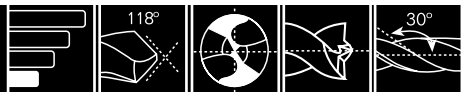
NEW




| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,00 | 6 | *32,02* | 65 | 15 | 1 |
| 8,00 | 8 | *55,15* | 80 | 20 | 1 |

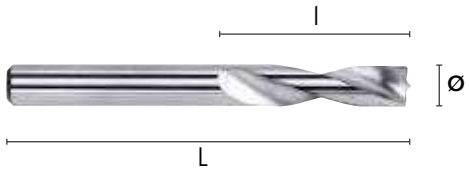
| ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *79,52* | 90 | 25 | 1 |
| 12,00 | 12 | *111,58* | 100 | 30 | 1 |

## 1119 HSSCO DIN 1897 N Soldadura / Soudure / Welding




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ○ 20-30 | ● 12-18 | ● 6-10 | | | | | | | | | | | | | | | |

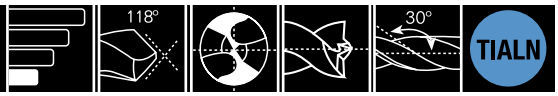
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,00 | *12,85* | 66 | 28 | 1 |
| 7,00 | *14,16* | 74 | 34 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 8,00 | *15,52* | 79 | 37 | 1 |
| 10,00 | *17,56* | 89 | 43 | 1 |

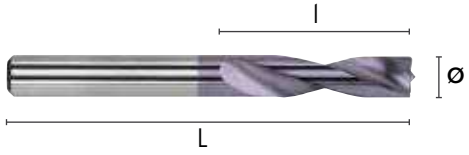
## 1194 HSSCO DIN 1897N Soldadura / Soudure / Welding




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ○ 30-40 | ● 16-20 | ● 8-14 | | | | | | | | | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

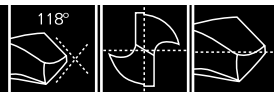



| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 6,00 | *22,49* | 66 | 28 | 1 |
| 7,00 | *24,79* | 74 | 34 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 8,00 | *27,16* | 79 | 37 | 1 |
| 10,00 | *30,72* | 89 | 43 | 1 |

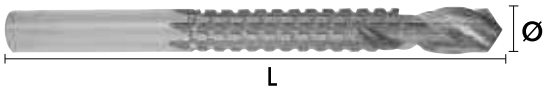
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5114 HSS



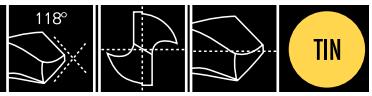

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | | | | | | ● 15-20 | ● 25-30 | | ● 25-30 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | Z | |
|---|---|---|---|---|
| 6,00 | *16,70* | 90 | 5 | 1 |
| 8,00 | *22,84* | 90 | 7 | 1 |

## 5115 HSS




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-35 | | | | | | | | | ● 20-25 | ● 35-40 | | ● 35-40 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | Z | |
|---|---|---|---|---|
| 6,00 | *30,32* | 90 | 5 | 1 |
| 8,00 | *39,65* | 90 | 7 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 6110 Espiga / Queue à tenon / Bit shank

| | DIN 228 | € | L mm | gr | |
|---|---|---|---|---|---|
| 1 | B-12 | *9,89* | 89 | 65 | 1 |
| 1 | B-16 | *9,89* | 99 | 80 | 1 |
| 1 | B-18 | *9,89* | 107 | 110 | 1 |
| >2 | B-12 | *11,98* | 106 | 140 | 1 |
| 2 | B-16 | *11,98* | 112 | 160 | 1 |
| 2 | B-18 | *11,98* | 119 | 185 | 1 |

| | DIN 228 | € | L mm | gr | |
|---|---|---|---|---|---|
| >3 | B-16 | *14,62* | 134 | 305 | 1 |
| 3 | B-18 | *14,62* | 140 | 330 | 1 |
| >4 | B-16 | *20,94* | 156 | 120 | 1 |
| 4 | B-18 | *22,58* | 165 | 640 | 1 |
| >5 | B-16 | *89,16* | 221 | 1.570 | 1 |
| 5 | B-18 | *89,16* | 221 | 1.590 | 1 |

## 6111 Casquillo DIN 2185 / Douille de réduction / Drill sleeve

| | € | L mm | gr | |
|---|---|---|---|---|
| 2 x 1 | *24,11* | 92 | 90 | 1 |
| 3 x 1 | *29,77* | 99 | 200 | 1 |
| 3 x 2 | *29,77* | 112 | 180 | 1 |
| 4 x 1 | *41,64* | 124 | 510 | 1 |
| 4 x 2 | *39,14* | 124 | 420 | 1 |
| 4 x 3 | *39,14* | 140 | 370 | 1 |
| 5 x 1 | *69,06* | 180 | 1.550 | 1 |

| | € | L mm | gr | |
|---|---|---|---|---|
| 5 x 2 | *65,45* | 156 | 1.200 | 1 |
| 5 x 3 | *65,45* | 156 | 1.150 | 1 |
| 5 x 4 | *76,39* | 171 | 1.023 | 1 |
| 6 x 3 | *127,12* | 230 | 3.800 | 1 |
| 6 x 4 | *144,23* | 230 | 3.390 | 1 |
| 6 x 5 | *144,23* | 230 | 2.700 | 1 |

## 6114 Contrapunto / Contrepointe / Fixed centre

| | HSS € | HM € | |
|---|---|---|---|
| 1 | *14,94* | - | 1 |
| 2 | *19,90* | - | 1 |
| 3 | *30,91* | *74,68* | 1 |

| | HSS € | HM € | |
|---|---|---|---|
| 4 | *48,31* | *91,06* | 1 |
| 5 | *68,23* | *178,02* | 1 |
| 6 | *263,10* | - | 1 |

## 6112 **Alargadera /** Adaptateur / Extension piece

| Ext. | Int. | € | L mm | |
|---|---|---|---|---|
| 1 | 1 | *30,39* | 145 | 1 |
| 1 | 2 | *47,06* | 160 | 1 |
| 2 | 1 | *30,39* | 160 | 1 |
| 2 | 2 | *44,17* | 175 | 1 |
| 2 | 3 | *63,97* | 196 | 1 |
| 3 | 1 | *44,17* | 175 | 1 |
| 3 | 2 | *45,61* | 194 | 1 |
| 3 | 3 | *66,89* | 215 | 1 |
| 3 | 4 | *107,89* | 240 | 1 |
| 4 | 1 | *63,97* | 200 | 1 |

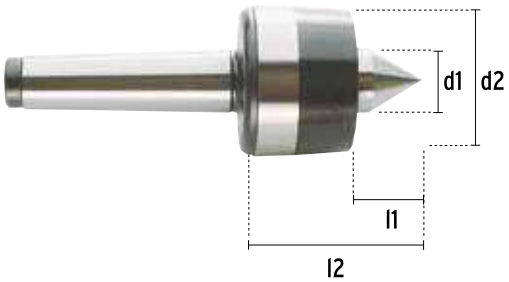
| Ext. | Int. | € | L mm | |
|---|---|---|---|---|
| 4 | 2 | *62,52* | 215 | 1 |
| 4 | 3 | *65,43* | 240 | 1 |
| 4 | 4 | *107,89* | 265 | 1 |
| 4 | 5 | *181,08* | 300 | 1 |
| 5 | 1 | *123,33* | 232 | 1 |
| 5 | 2 | *114,67* | 247 | 1 |
| 5 | 3 | *121,09* | 268 | 1 |
| 5 | 4 | *136,88* | 300 | 1 |
| 5 | 5 | *226,46* | 335 | 1 |

## 6113 **Expulsor /** Éjecteur / Ejector

| | € | gr | |
|---|---|---|---|
| 1 - 2 | *12,88* | 50 | 1 |
| 2 - 3 | *15,24* | 80 | 1 |
| 3 - 4 | *20,10* | 160 | 1 |

| | € | gr | |
|---|---|---|---|
| 4 - 5 | *27,31* | 350 | 1 |
| 5 - 6 | *44,39* | 690 | 1 |

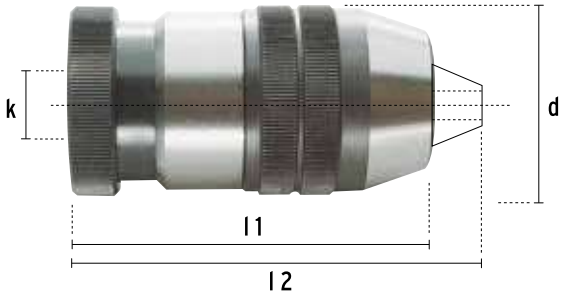
## 6115 **Punto giratorio /** Pointe tournante / Revolving lathe centre




| | d1 mm | d2 mm | l1 mm | l2 mm | Kg | € | |
|---|---|---|---|---|---|---|---|
| 1 | 12 | 32 | 18 | 42 | 180 | *143,25* | 1 |
| 2 | 16 | 40 | 23 | 46 | 400 | *159,79* | 1 |
| 3 | 24 | 45 | 27 | 53 | 600 | *214,81* | 1 |
| 4 | 24 | 59 | 36 | 65 | 1200 | *254,58* | 1 |
| 5 | 38 | 79 | 41 | 77 | 1500 | *367,94* | 1 |

## 6101 HP1

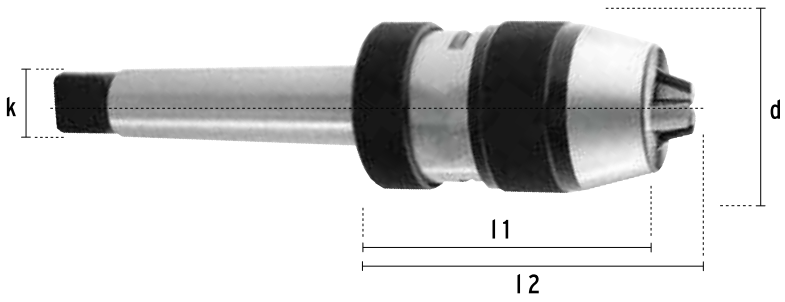
- **Componentes totalmente templados y rectificados.**
  **Composants entièrement trempés et rectifiés.**
  **Fully tempered and rectified components.**
- **Uso en taladros de precisión estacionarios, fresadoras.**
  **Pour perçages de précision stationnaires, fraiseuses.**
  **For use with stationary precision drills, milling machines.**
- **Excentricidad máxima 0,04 mm.**
  **Excentricité maximum de 0,04 mm.**
  **Maximum eccentricity 0.04 mm.**




| Ø mm | d mm | k | Int. | € | l1 mm | l2 mm | | Husillo Arbre Spindle € | Juego de garras Jeux de griffes Set of claws € |
|---|---|---|---|---|---|---|---|---|---|
| 0,00 - 10,00 | 41 | B16 | 1/2" - 20H | *171,74* | 81 | 89 | 1 | *29,38* | *39,85* |
| 1,00 - 13,00 | 46 | B16 | 1/2" - 20H | *188,56* | 88 | 89 | 1 | *31,55* | *42,76* |
| 3,00 - 16,00 | 55 | B16,B18 | - | *213,00* | 95 | 107 | 1 | *31,55* | *44,19* |

## 6120 HP1-CM

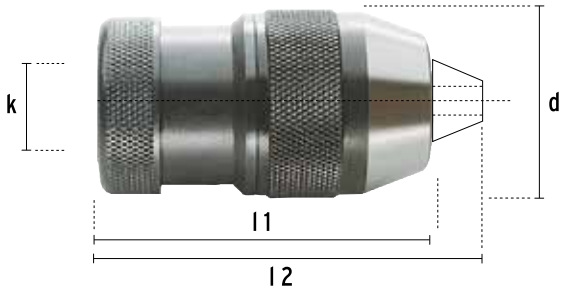
- **Portabrocas automático alta precisión con espiga integrada (Cono Morse)**
  **Mandrin automatique de haute précision avec queue à tenon integrée (Cone Morse)**
  **High precision automatic drill chuck with bit shank (Taper Shank)**




| Ø mm | d mm | k | € | l1 mm | l2 mm | | Husillo Arbre Spindle € | Juego de garras Jeux de griffes Set of claws € |
|---|---|---|---|---|---|---|---|---|
| 0,00 - 10,00 | 43 | CM2 | *372,20* | 73 | 82 | 1 | *29,38* | *39,85* |
| 1,00 - 13,00 | 48 | CM2, CM3, CM4 | *404,10* | 80 | 92 | 1 | *31,55* | *42,76* |
| 3,00 - 16,00 | 54 | CM2, CM3, CM4 | *482,75* | 85 | 96 | 1 | *31,55* | *44,19* |

## 6102 HP2

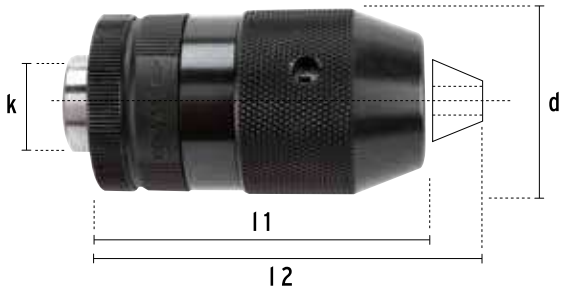
> **Componentes parcialmente templados y rectificados.**
Composants partiellement trempés et rectifiés.
Partially tempered and rectified components.
> **Uso industrial para taladros fijos y portátiles.**
Usage industriel pour perceuses fixes et portables.
For industrial use with fixed and portable drills.
> **Excentricidad máxima 0,20 mm.**
Excentricité maximum de 0,20 mm.
Maximum eccentricity 0.20 mm.




| Ø mm | d mm | △ | k Int. | € | l1 mm | l2 mm | ▭ | **Husillo** Arbre Spindle € | **Juego de garras** Jeux de griffes Set of claws € |
|---|---|---|---|---|---|---|---|---|---|
| 0,00 - 10,00 | 39 | B12 | 1/2" - 20H 3/8" - 24H | *94,06* | 73 | 80 | 1 | *19,85* | *39,66* |
| 2,00 - 13,00 | 46 | B16 | 1/2" - 20H 3/8" - 24H | *118,22* | 87 | 95 | 1 | *22,90* | *42,86* |
| 3,00 - 16,00 | 51 | B16,B18 | 5/8" - 16H 1/2" - 20H | *157,04* | 102 | 115 | 1 | *22,90* | *42,86* |
| 5,00 - 20,00 | 56 | B18 | - | *207,03* | 95 | 110 | 1 | *28,04* | *50,41* |

## 6103 HP3

> **Uso industrial para taladros fijos y portátiles.**
Usage industriel pour perceuses fixes et portables.
For industrial use with fixed and portable drills.
> **Excentricidad no garantizada.**
Excentricité non garantie.
Maximum not guaranteed.




| Ø mm | d mm | △ | k Int. | € | l1 mm | l2 mm | ▭ |
|---|---|---|---|---|---|---|---|
| 1,00 - 10,00 | 35 | B12* | 1/2" - 20H, 3/8" - 24H* | *63,27* | 65 | 72 | 1 |
| 1,50 - 13,00 | 40 | B16 | 1/2" - 20H | *72,60* | 83 | 91 | 1 |
| 3,00 - 16,00 | 53 | B16,B18 | 1/2" - 20H, 5/8" - 24H* | *95,89* | 96 | 109 | 1 |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)

## 6122 **Afilador de Brocas** / Affûteuses forets / Twist Drill Sharpener

- **Para Brocas HSS, HSSE, HSS+TIN, HM**
  **Pour Forets HSS, HSSE. HSS+TIN, HM**
  **For Drill-bits HSS. HSSE, HS+TIN, HM**
- **Para ángulo normal afilado en cruz**
  **Pour angle normal et affûtage en croix**
  **For normal angle and Splint point**
- **Ángulo de punta de 118º**
  **Angle de la point e 118º**
  **Point angle of 118º**

| Ø mm | € | |
|---|---|---|
| 3 a 13 | *159,34* | 1 |

## 6123 **Porta** / Mandrins / Chuck

| € | |
|---|---|
| *9,65* | 1 |

## 6124 **Muela** / Meule / Wheel

| € | |
|---|---|
| *20,48* | 1 |

## 1171 Ø 1 a 10 X 0,5 mm

| Ø mm | X mm | | DIN |
|---|---|---|---|
| 1 a 10 | 0,50 | 19 | 338 |

>HSS (1101)

>SPEED PLUS (1158)

>HSS CO (1105)

>HSS CO INOX (1106)

>HSS TIN (1108)

| REF. | € |
|---|---|
| HSS | *46,83* |
| SPEED PLUS | *51,35* |
| HSS CO | *77,16* |
| HSS CO INOX | *158,38* |
| HSS TIN | *95,71* |
| VACIO/VIDE/EMPTY | *12,40* |

## 1172 Ø 1 a 13 X 0,5 mm

| Ø mm | X mm | | DIN |
|---|---|---|---|
| 1 a 13 | 0,50 | 25 | 338 |

>HSS (1101)

>SPEED PLUS (1158)

>HSS CO (1105)

>HSS CO INOX (1106)

>HSS TIN (1108)

| REF. | € |
|---|---|
| HSS | *91,62* |
| SPEED PLUS | *100,80* |
| HSS CO | *176,68* |
| HSS CO INOX | *318,43* |
| HSS TIN | *199,10* |
| VACIO/VIDE/EMPTY | *16,54* |

## 1143 Ø 1 a 10 X 0,25 mm

| Ø mm | X mm | | DIN |
|---|---|---|---|
| 1 a 10 | 0,25 | 37 | 338 |

>HSS (1101)

>HSS CO (1105)

| REF. | € |
|---|---|
| HSS | *128,75* |
| HSS CO | *190,05* |
| VACIO/VIDE/EMPTY | *41,91* |

## 1144 Ø 6 a 10 X 0,10 mm

| Ø mm | X mm | | DIN |
|---|---|---|---|
| 6 a 10 | 0,10 | 41 | 338 |

>HSS
(1101)

>HSS CO
(1105)

| REF. | € |
|---|---|
| HSS | *241,98* |
| HSS CO | *346,46* |
| VACIO/VIDE/EMPTY | *72,53* |

## 1145 Ø 1 a 13 X 0,25 mm

| Ø mm | X mm | | DIN |
|---|---|---|---|
| 1 a 13 | 0,25 | 49 | 338 |

>HSS
(1101)

>HSS CO
(1105)

| REF. | € |
|---|---|
| HSS | *224,07* |
| HSS CO | *415,61* |
| VACIO/VIDE/EMPTY | *43,52* |

## 1146 Ø 1 a 6 X 0,10 mm

| Ø mm | X mm | | DIN |
|---|---|---|---|
| 1 a 6 | 0,10 | 51 | 338 |

>HSS
(1101)

>HSS CO
(1105)

| REF. | € |
|---|---|
| HSS | *98,36* |
| HSS CO | *139,66* |
| VACIO/VIDE/EMPTY | *29,01* |

## 1173 › 1/16" a 3/8" x 1/64"

21 | DIN 338

›HSS
(1158/9)

›HSS CO
(1105/9)

| REF. | € |
|---|---|
| SPEED PLUS | *74,95* |
| HSS CO | *103,12* |

## 1174 › 1/16" a 1/2" x 1/64"

29 | DIN 338

›SPEED PLUS
(1158/9)

›HSS CO
(1105/9)

| REF. | € |
|---|---|
| SPEED PLUS | *136,17* |
| HSS CO | *227,39* |

## 1150 Ø 1 a 10 X 0,5 mm

| Ø mm | X mm | DIN |
|---|---|---|
| 1 a 10 | 0,50 | 338 |

>HSS (1101) | >HSS NSP (1158) | >HSS CO (1105) | >HSS TIN (1108)

| REF. | € |
|---|---|
| HSS | *542,13* |
| HSS NSP | *581,77* |
| HSS CO | *473,88* |
| HSS TIN | *604,95* |
| VACIO/VIDE/EMPTY | *72,53* |

| Ø mm | HSS | HSS NSP | HSS CO | HSS TIN |
|---|---|---|---|---|
| 1,00 | 20 | 20 | 10 | 10 |
| 1,50 | 10 | 10 | 5 | 5 |
| 2,00 | 20 | 20 | 10 | 10 |
| 2,50 | 10 | 10 | 5 | 5 |
| 3,00 | 20 | 20 | 10 | 10 |
| 3,50 | 10 | 10 | 5 | 5 |
| 4,00 | 20 | 20 | 10 | 10 |
| 4,50 | 10 | 10 | 5 | 5 |
| 5,00 | 20 | 20 | 10 | 10 |
| 5,50 | 10 | 10 | 5 | 5 |

| Ø mm | HSS | HSS NSP | HSS CO | HSS TIN |
|---|---|---|---|---|
| 6,00 | 20 | 20 | 10 | 10 |
| 6,50 | 10 | 10 | 5 | 5 |
| 7,00 | 10 | 10 | 5 | 5 |
| 7,50 | 10 | 10 | 5 | 5 |
| 8,00 | 10 | 10 | 5 | 5 |
| 8,50 | 10 | 10 | 5 | 5 |
| 9,00 | 10 | 10 | 5 | 5 |
| 9,50 | 10 | 10 | 5 | 5 |
| 10,00 | 10 | 10 | 5 | 5 |
| TOTAL | 250 | 250 | 125 | 125 |

## 1183 Ø 1 a 13 X 0,5 mm

| Ø mm | X mm | DIN |
|---|---|---|
| 1 a 10 | 0,50 | 338 |

>HSS (1101) | >HSS NSP (1158) | >HSS CO (1105) | >HSS TIN (1108)

| REF. | € |
|---|---|
| HSS | *838,02* |
| HSS NSP | *900,99* |
| HSS CO | *1.043,37* |
| HSS TIN | *1.193,83* |
| VACIO/VIDE/EMPTY | *145,07* |

| Ø mm | HSS | HSS NSP | HSS CO | HSS TIN |
|---|---|---|---|---|
| 1,00 | 20 | 20 | 10 | 10 |
| 1,50 | 10 | 10 | 5 | 5 |
| 2,00 | 20 | 20 | 10 | 10 |
| 2,50 | 10 | 10 | 5 | 5 |
| 3,00 | 20 | 20 | 10 | 10 |
| 3,50 | 10 | 10 | 5 | 5 |
| 4,00 | 20 | 20 | 10 | 10 |
| 4,50 | 10 | 10 | 5 | 5 |
| 5,00 | 20 | 20 | 10 | 10 |
| 5,50 | 10 | 10 | 5 | 5 |
| 6,00 | 20 | 20 | 10 | 10 |
| 6,50 | 10 | 10 | 5 | 5 |
| 7,00 | 10 | 10 | 5 | 5 |

| Ø mm | HSS | HSS NSP | HSS CO | HSS TIN |
|---|---|---|---|---|
| 7,50 | 10 | 10 | 5 | 5 |
| 8,00 | 10 | 10 | 5 | 5 |
| 8,50 | 10 | 10 | 5 | 5 |
| 9,00 | 10 | 10 | 5 | 5 |
| 9,50 | 10 | 10 | 5 | 5 |
| 10,00 | 10 | 10 | 5 | 5 |
| 10,50 | 5 | 5 | 5 | 5 |
| 11,00 | 5 | 5 | 5 | 5 |
| 11,50 | 5 | 5 | 5 | 5 |
| 12,00 | 5 | 5 | 5 | 5 |
| 12,50 | 5 | 5 | 5 | 5 |
| 13,00 | 5 | 5 | 5 | 5 |
| TOTAL | 280 | 280 | 155 | 155 |

# 8201 Ø 1 a 13 mm

>HSS DIN 338 N
(1101)

>HSS DIN 338 NSP
(1158)

>HSSCO DIN 338 N
(1105)

>HSSCO DIN 338 W
(1106)

>HSSTIN DIN 338 N
(1108)

| Ø mm | HSS DIN 338 N | HSS DIN 338 NSP | HSSCO DIN 338 N | HSSCO DIN 338 W | HSSTIN DIN 338 N |
|---|---|---|---|---|---|
| 1,00 | 20 | 20 | 20 | - | 20 |
| 1,50 | 20 | 20 | 10 | - | 10 |
| 2,00 | 50 | 50 | 20 | - | 20 |
| 2,25 | 20 | 20 | 20 | - | 10 |
| 2,50 | 40 | 40 | 20 | - | 10 |
| 3,00 | 50 | 50 | 20 | - | 20 |
| 3,25 | 30 | 30 | 20 | 10 | 10 |
| 3,50 | 40 | 40 | 20 | 10 | 20 |
| 4,00 | 50 | 50 | 30 | 10 | 30 |
| 4,25 | 30 | 30 | 20 | 10 | 10 |
| 4,50 | 40 | 40 | 20 | 10 | 10 |
| 5,00 | 50 | 50 | 30 | 10 | 30 |
| 5,25 | 20 | 20 | 10 | 10 | 10 |
| 5,50 | 30 | 30 | 20 | 10 | 20 |
| 6,00 | 50 | 50 | 30 | 10 | 20 |

| Ø mm | HSS DIN 338 N | HSS DIN 338 NSP | HSSCO DIN 338 N | HSSCO DIN 338 W | HSSTIN DIN 338 N |
|---|---|---|---|---|---|
| 6,50 | 20 | 20 | 10 | 10 | 10 |
| 7,00 | 20 | 20 | 10 | 10 | 10 |
| 7,50 | 10 | 10 | 10 | 10 | 10 |
| 8,00 | 40 | 40 | 20 | 10 | 10 |
| 8,50 | 20 | 20 | 10 | 10 | 10 |
| 9,00 | 20 | 20 | 10 | 10 | 10 |
| 9,50 | 10 | 10 | 10 | 10 | 10 |
| 10,00 | 20 | 20 | 10 | 10 | 10 |
| 10,50 | 5 | 5 | 5 | 5 | 5 |
| 11,00 | 5 | 5 | 5 | 5 | 5 |
| 11,50 | 5 | 5 | 5 | 5 | 5 |
| 12,00 | 10 | 10 | 5 | 5 | 5 |
| 12,50 | 5 | 5 | 5 | 5 | 5 |
| 13,00 | 5 | 5 | 5 | 5 | 5 |
| TOTAL | 735 | 735 | 430 | 200 | 360 |
| € | *1.432,31* | *1.565,60* | *1.702,26* | *2.226,32* | *1.795,55* |

# 8201/9 1/16" a 1/2" x 1/64"

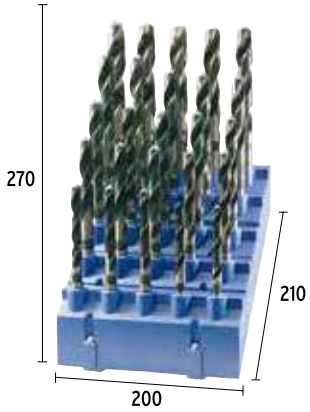
>HSS DIN 338 NSP
(1158/9)

>HSSCO DIN 338 N
(1105/9)

| Ø mm | HSS DIN 338 NSP | HSSCO DIN 338 N |
|---|---|---|
| 1/16" | 20 | 20 |
| 5/64" | 20 | 10 |
| 3/32" | 50 | 20 |
| 7/64" | 20 | 20 |
| 1/8" | 40 | 20 |
| 9/64" | 50 | 20 |
| 5/32" | 30 | 20 |
| 11/64" | 40 | 20 |
| 3/16" | 50 | 30 |
| 13/64" | 30 | 20 |
| 7/32" | 40 | 20 |
| 15/64" | 50 | 30 |
| 1/4" | 20 | 10 |
| 17/64" | 30 | 20 |
| 9/32" | 50 | 30 |

| Ø mm | HSS DIN 338 NSP | HSSCO DIN 338 N |
|---|---|---|
| 19/64" | 20 | 10 |
| 5/16" | 20 | 10 |
| 21/64" | 10 | 10 |
| 11/32" | 40 | 20 |
| 23/64" | 20 | 10 |
| 3/8" | 20 | 10 |
| 25/64" | 10 | 10 |
| 13/32" | 20 | 10 |
| 27/64" | 5 | 5 |
| 7/16" | 5 | 5 |
| 29/64" | 5 | 5 |
| 15/32" | 10 | 5 |
| 31/64" | 5 | 5 |
| 1/2" | 5 | 5 |
| TOTAL | 735 | 430 |
| € | *1.855,61* | *1.991,75* |

## 8203 Ø 14 a 30 mm (Ref. 1121)




| Ø mm | |
|---|---|
| 14,00 | 1 |
| 14,50 | 1 |
| 15,00 | 1 |
| 15,50 | 1 |
| 16,00 | 1 |
| 16,50 | 1 |
| 17,00 | 1 |
| 17,50 | 1 |
| 18,00 | 1 |

| Ø mm | |
|---|---|
| 18,50 | 1 |
| 19,00 | 1 |
| 19,50 | 1 |
| 20,00 | 1 |
| 20,50 | 1 |
| 21,00 | 1 |
| 21,50 | 1 |
| 22,00 | 1 |
| 22,50 | 1 |

| Ø mm | |
|---|---|
| 23,00 | 1 |
| 24,00 | 1 |
| 25,00 | 1 |
| 26,00 | 1 |
| 27,00 | 1 |
| 28,00 | 1 |
| 30,00 | 1 |
| | |
| TOTAL | 25 |
| € | *1296,38* |

## 8207 Ø 1 a 16 mm

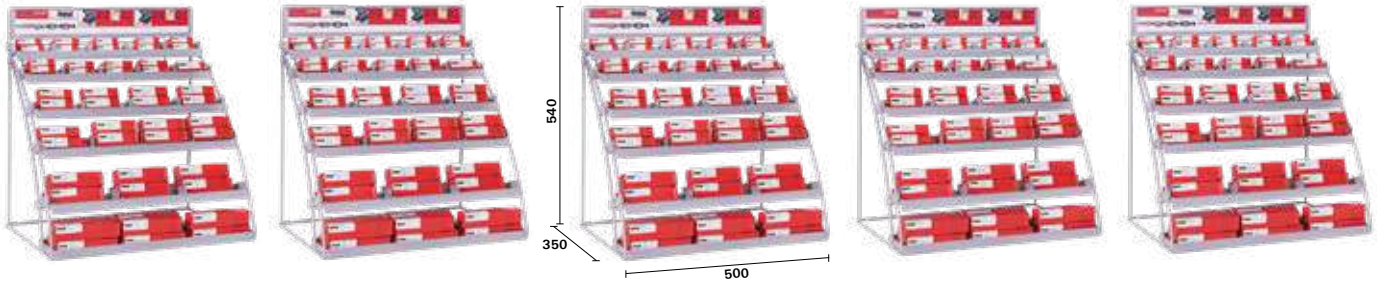
›HSS DIN 338 N (1101)

›HSS DIN 338 NSP (1158)

›HSSCO DIN 338 N (1105)

›HSSCO DIN 338 W (1187)

›HSSTIN DIN 338 N (1108)




| Ø mm | HSS DIN 338 N | HSS DIN 338 NSP | HSSCO DIN 338 N | HSSCO DIN 338 W | HSSTIN DIN 338 N |
|---|---|---|---|---|---|
| 1,00 | 40 | 40 | 40 | 40 | 40 |
| 1,50 | 20 | 20 | 20 | 20 | 20 |
| 2,00 | 40 | 40 | 40 | 40 | 40 |
| 2,25 | 40 | 40 | 40 | 40 | 40 |
| 2,50 | 40 | 40 | 40 | 40 | 40 |
| 3,00 | 60 | 60 | 60 | 60 | 60 |
| 3,25 | 40 | 40 | 40 | 40 | 40 |
| 3,50 | 40 | 40 | 40 | 40 | 40 |
| 4,00 | 60 | 60 | 60 | 60 | 60 |
| 4,25 | 40 | 40 | 40 | 40 | 40 |
| 4,50 | 40 | 40 | 40 | 40 | 40 |
| 5,00 | 60 | 60 | 60 | 60 | 60 |
| 5,50 | 40 | 40 | 40 | 40 | 40 |
| 6,00 | 60 | 60 | 60 | 60 | 60 |

| Ø mm | HSS DIN 338 N | HSS DIN 338 NSP | HSSCO DIN 338 N | HSSCO DIN 338 W | HSSTIN DIN 338 N |
|---|---|---|---|---|---|
| 6,50 | 20 | 20 | 20 | 20 | 20 |
| 7,00 | 20 | 20 | 20 | 20 | 20 |
| 7,50 | 20 | 20 | 20 | 20 | 20 |
| 8,00 | 30 | 30 | 30 | 30 | 30 |
| 8,50 | 20 | 20 | 20 | 20 | 20 |
| 9,00 | 20 | 20 | 20 | 20 | 20 |
| 10,00 | 20 | 20 | 20 | 20 | 20 |
| 11,00 | 10 | 10 | 10 | 10 | 10 |
| 12,00 | 10 | 10 | 10 | 10 | 10 |
| 13,00 | 5 | 5 | 5 | 5 | 5 |
| TOTAL | 795 | 795 | 795 | 795 | 795 |
| € | *1.396,74* | *1.526,75* | *2.551,23* | *3.918,85* | *3.145,28* |

# Roscado
# Taraudage
# Threading

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## **Machos de máquina /** Tarauds machine / Machine taps (M-MF)

### **Entrada recta (Agujeros Ciegos y pasantes) /** Entrée droite (trous borgnes et débouchants) / Straight flute (through and blind holes)


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2102 | HSSE | DIN 371 | | | P | 136 |
| | 2101 | HSSE | DIN 376/374 | | | P | 137 |
| | 2102/5 | HSSE | DIN 371 | | | P | 139 |
| | 2101/5 | HSSE | DIN 376/374 | | | P | 139 |
| | 2114 | HSSE | DIN 371 | | | P | 140 |
| | 2113 | HSSE | DIN 376/374 | | | P | 140 |
| | 2190 | HSSE | DIN 371 | | | N | 141 |
| | 2191 | HSSE | DIN 376 | | | N | 141 |
| | 2180 | HSSE-PM | DIN 371 | TICN+ | | K | 142 |
| | 2179 | HSSE-PM | DIN 376 | TICN+ | | K | 142 |
| NEW | 2274 | HM | DIN 371 | TICN | | H | 143 |
| NEW | 2275 | HM | DIN 376 | TICN | | H | 143 |


### **Entrada Corregida (Agujeros pasantes) /** Entrée corrigée (Trous débouchants) / Spiral point (through holes)


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2104 | HSSE | DIN 371 | | | P N | 144 |
| | 2103 | HSSE | DIN 376/374 | | | P N | 144 |
| | 2104/5 | HSS | DIN 371 | | | P N | 146 |
| | 2103/5 | HSS | DIN 376/374 | | | P N | 146 |
| | 2111 | HSSE | DIN 371-L | | | P N | 147 |
| NEW | 2272 | HSS | DIN 376-L | | | P N | 147 |
| | 2110 | HSSE | DIN 371 | | | P N | 148 |




P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2109 | HSSE | DIN 376 | | | M DIN 13 · Form. B "Gun" · Tol. 6H +0,1 · 3XD · D | P N | 148 |
| | 2168 | HSSE | DIN 371 | | | M DIN 13 · Form. B "Gun" · Tol. 6G · 3XD · R | P N | 149 |
| | 2169 | HSSE | DIN 376 | | | M DIN 13 · Form. B "Gun" · Tol. 6G · 3XD · D | P N | 149 |
| NEW | 2250 | HSSE | DIN 371 | VAP | | M DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · R · MF | P M N | 150 |
| NEW | 2251 | HSSE | DIN 376/374 | VAP | | M-MF DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · D · MF | P M N | 150 |
| NEW | 2116 | HSSE | DIN 371 | TIN+ | | M DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · R · MF | P M K N | 151 |
| NEW | 2115 | HSSE | DIN 376 | TIN+ | | M-MF DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · D · MF | P M K N | 151 |
| | 2126 | HSSE-PM | DIN 371 | TICN+ | | M DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · R · MF | P K | 152 |
| | 2125 | HSSE-PM | DIN 376/374 | TICN+ | | M-MF DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · D · MF | P K | 152 |
| | 2176 | HSSE-PM | DIN 371 | TICN+ | | M DIN 13 · Form. B "Gun" · Tol. 6HX · 3XD · R · MF | P K | 153 |
| | 2175 | HSSE-PM | DIN 376 | TICN+ | | M DIN 13 · Form. B "Gun" · Tol. 6HX · 3XD · D · MF | P K | 153 |
| | 2122 | HSSE | DIN 371 | VAP | | M DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · R · MF | P M | 154 |
| | 2121 | HSSE | DIN 376/374 | VAP | | M-MF DIN 13 · Form. B "Gun" · Tol. 6H · 3XD · D · MF | P M | 154 |
| | 2133 | HSSE | DIN 371 | | | M DIN 13 · B-AZ · Tol. 6H · 3XD · R | N | 155 |
| | 2132 | HSSE | DIN 376 | | | M DIN 13 · B-AZ · Tol. 6H · 3XD · D | N | 155 |
| | 2254 | HSSE-PM | DIN 371 MULTI | HL | | M DIN 13 · Form. B "Gun" · Tol. 6HX · 3XD · R · MF | P M K N S | 156 |
| | 2255 | HSSE-PM | DIN 371 MULTI | HL | | M DIN 13 · Form. B "Gun" · Tol. 6HX · 3XD · D · MF | P M K N S | 156 |
| | 2258 | HSSE-PM | DIN 371 SYNCHRO | HL | | M DIN 13 · Form. B "Gun" · Tol. 6HX · CNC · 3XD · R · MF | P M K N S | 157 |
| | 2259 | HSSE-PM | DIN 371 SYNCHRO | HL | | M DIN 13 · Form. B "Gun" · Tol. 6HX · CNC · 3XD · D · MF | P M K N S | 157 |


P Aceros / Aciers / Steels

M Aceros Inox / Aciers Inox / Stainless Steels

K Fundicion / Fonte / Cast Iron

N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals

S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys

H Materiales Duros / Materiels Durs / Hard materials

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Hepyc CUTTING TOOL EXPERTS

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**Forma Helicoidal (Agujeros ciegos) /** Forme helicoïdale (Trous borgnes)/ Spiral fluted (Blind holes)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2106 | HSSE | DIN 371 | | | M-MF DIN 13 · Form. C · Tol. 6H · 35° · 3XD · R | P N | 158 |
| 2105 | HSSE | DIN 376/374 | | | M-MF DIN 13 · Form. C · Tol. 6H · 35° · 3XD · D | P N | 158 |
| 2106/5 | HSSE | DIN 371 | | | M-MF DIN 13 · Form. C · Tol. 6H · 35° LH · 3XD · R | P N | 160 |
| 2105/5 | HSSE | DIN 376/374 | | | M-MF DIN 13 · Form. C · Tol. 6H · 35° LH · 3XD · D | P N | 160 |
| NEW 2112 | HSSE | DIN 371-L | | | M DIN 13 · Form. C · Tol. 6H · 35° · 3XD · R | P N | 161 |
| 2273 | HSSE | DIN 376-L | |  | M DIN 13 · Form. C · Tol. 6H · 35° · 3XD · D | P N | 161 |
| 2166 | HSSE | DIN 371 | | | M DIN 13 · Form. C · Tol. 6H +0,1 · 35° · 3XD · R | P N | 162 |
| 2165 | HSSE | DIN 376 | | | M DIN 13 · Form. C · Tol. 6H +0,1 · 35° · 3XD · D | P N | 162 |
| 2170 | HSSE | DIN 371 | | | M DIN 13 · Form. C · Tol. 6G · 35° · 3XD · R | P N | 163 |
| 2208 | HSSE | DIN 376 | | | M DIN 13 · Form. C · Tol. 6G · 35° · 3XD · D | P N | 163 |
| 2108 | HSSE | DIN 371 | | | M DIN 13 · Form. C · Tol. 6H · 15° · 3XD · R | P N | 164 |
| 2107 | HSSE | DIN 376/374 | | | M DIN 13 · Form. C · Tol. 6H · 15° · 3XD · D | P N | 164 |
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| NEW 2117 | HSSE | DIN 376/374 | TIN+ | | M-MF DIN 13 · Form. C · Tol. 6H · 35° · 3XD · D · MF | P M K N | 166 |
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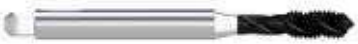
| 2260 | HSSE-PM | DIN 371 SYNCHRO | HL |  | M DIN 13 · CNC · Form. C · Tol. 6HX · 45° · 3XD · R · MF | P M K N S | 172 |
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| NEW | 2280 | HSSE | DIN 371 | TIN+ | | UNF · Form. B "Gun" · Tol. 2B · 3XD · R · MF | P M K N | 195 |
| NEW | 2281 | HSSE | DIN 374 | TIN+ | | UNF · Form. B "Gun" · Tol. 2B · 3XD · D · MF | P M K N | 195 |
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| | 2136/5 | HSSE | DIN 371 | | | BSW BS 84 · Form. C · LH · 1,5XD · R | P | 201 |
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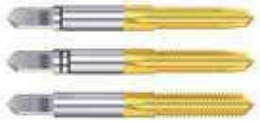
| 2302 | HSS | DIN 352 | TIN |  | M DIN 13 · Tol. 6HX | P N | 217 |
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M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

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## **Accesorios /** Accessoires / Accessories


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## ¿Por qué conformarse con menos?

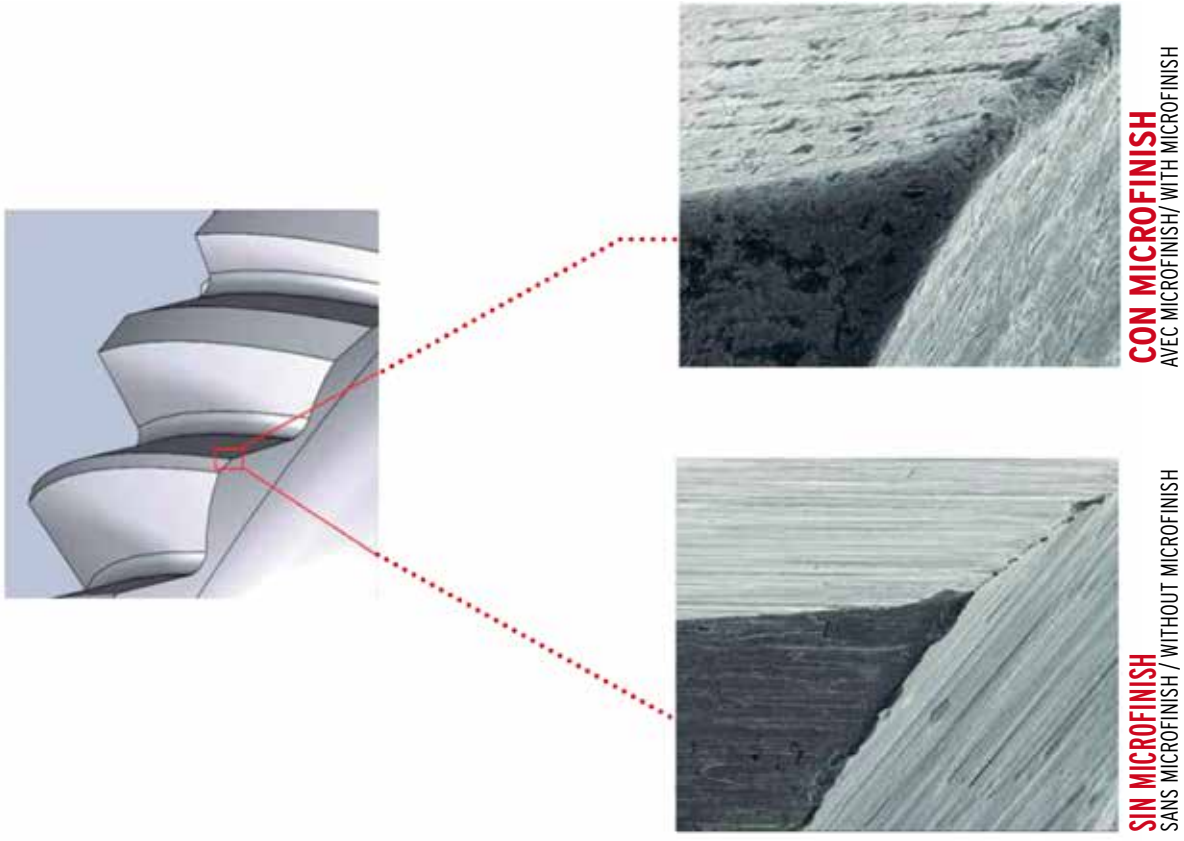
• La tecnología MICROFINISH consiste en que una vez el macho de roscar es rectificado, se limpia de rebabas y se redondean las aristas de corte.
• Se logra un mayor control y estabilidad del desgaste de la herramienta.
• Ello se traduce en un notable incremento de su rendimiento.
• Y en la mejora de los acabados de la rosca.

## Pourquoi se satisfaire de peu?

• La technologie MICROFINISH agit après le surfaçage du taraud, qui est nettoyé des bavures et dont les arêtes de coupe sont arrondies.
• L'usure de l'outil est alors mieux contrôlée et plus stable.
• Cela se traduit par une augmentation significative de son rendement.
• Et une amélioration des finitions du filetage.

## Why settle for less?

• With MICROFINISH technology once the thread of the tap is rectified, it is cleaned from burrs and the cutting edges are rounded.
• Greater control and stability of wear on the tool is achieved.
• This translates into a notable increase in performance.
• And improves the finishes of the thread.



**CON MICROFINISH**
AVEC MICROFINISH/ WITH MICROFINISH

**SIN MICROFINISH**
SANS MICROFINISH / WITHOUT MICROFINISH

## 1. UNA ROSCA CON CALIDAD SUPERFICIAL SUPERIOR

Las roscas obtenidas tienen una calidad superficial superior, gracias a dos efectos:

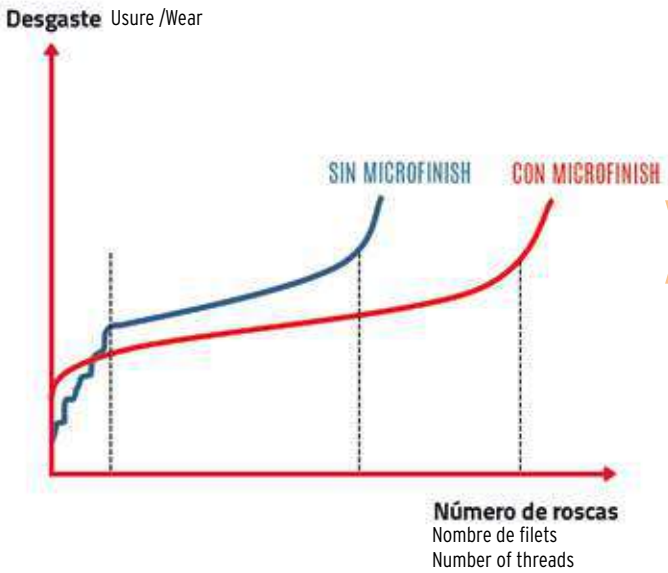
• La geometría redondeada de forma constante a lo largo de todo el filo de corte del macho, permite un corte continuo y homogéneo de la rosca de la pieza.

• La menor rugosidad superficial de la rosca del macho reduce la fricción durante el roscado para obtener a su vez, una rosca con mejor calidad superficial.

## 2. MAYOR VIDA ÚTIL DE LA HERRAMIENTA

• Gracias a su nuevo acabado redondeado y a que el filo de corte se va desgastando de manera más controlada y constante, se evita el salto de partículas de cualquier forma y tamaño.

• Ello impide que se produzcan roturas prematuras con el uso.




## 1. UN FILET D'UNE QUALITÉ DE SURFACE SUPÉRIEURE

Les filets obtenus présentent une qualité de surface supérieure, grâce à deux effets :

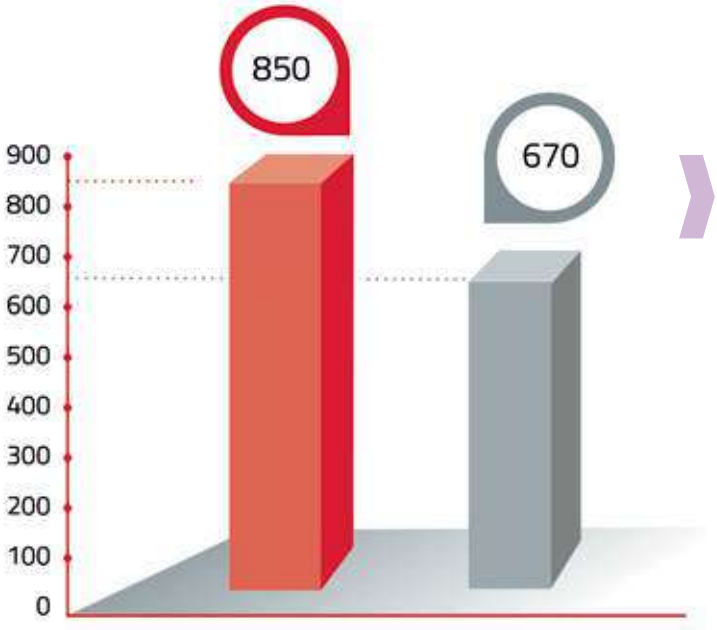
• La géométrie arrondie de manière constante tout au long du fil de coupe du taraud apporte une coupe continue et homogène sur le filetage de la pièce.

• La plus faible rugosité de surface du taraud réduit la friction lors du taraudage, permettant ainsi d'obtenir un filet de meilleure qualité de surface.

## 2. UNE DURÉE DE VIE UTILE DE L'OUTIL PROLONGÉE

• Grâce à sa nouvelle finition arrondie et grâce à un fil de coupe qui s'use de manière mieux contrôlée et plus homogène, le décrochement de particules de toute forme et dimension est évité.

• Cela évite les ruptures prématurées à l'usage.




**Rosca**/Filet/Thread: M6 6H
**Material**/Matériau/Material: F114 (C45)
**Profundidad**/Profondeur/Depth: 12mm
**Velocidad**/Vitesse/Speed: 10 m/min

## 1. A THREAD WITH HIGHER SERVICE QUALITY

The threads obtained have a higher service quality, thanks to two effects:

• The constant rounded geometry over the entire cutting edge of the tap enables continuous and even cutting of the part's thread.

• The lower surface roughness of the thread on the tap reduces friction during threading, which obtains a thread with a higher surface quality.

## 2. LONGER SERVICE LIFE OF THE TOOL

• Thanks to its new rounded finish and that the cutting-edge is worn in a controlled and constant manner, the release of particles of any shape and size is avoided.

• This avoids premature breakage with use.

# FORMULARIO MACHOS ESPECIALES
# FICHE TECHNIQUE TARAUDS SPECIAUX / TECHNICAL ENQUIRY FOR SPECIAL TAPS

Fecha / Date: .....

Empresa / Entreprise / Company: ..... Contacto / Contact: .....

Dirección / Adresse / Adress: ..... Población / Ville / Town: .....

Tel / Fax: ..... E-mail: .....

.....

TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK

Material / Matière / Material ..... Norma / Norme / Norm: .....

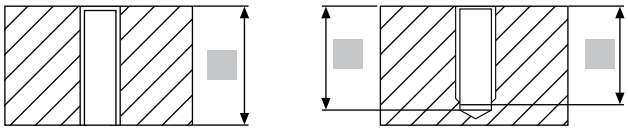
Dureza / Dureté / Hardness ..... HB ..... HRc Resistencia / Résistance / Resistance ..... N/mm$^2$

Tipo viruta: ☐ Corta ☐ Larga ☐ Polvo
Type copeau: Courte Longue Poussière
Shaving: Short Long Powder

Máquina / Machine ..... Refrigerante / Réfrigérant / Coolant .....

Posición / Position: ☐ Horizontal ☐ Vertical ☐ V. Corte / V. Coupe / Cutting Speed ☐ V. avance / Avance / Feed

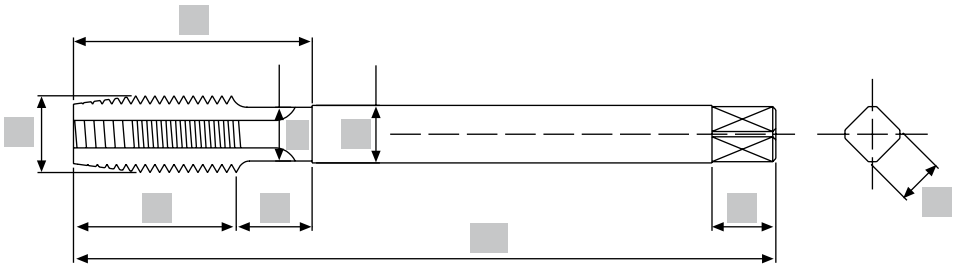
Agujero / Trou / Hole:



HERRAMIENTA / OUTIL / TOOL

Descripción / Description ..... Tolerancia / Tolérance / Tolerance .....

Cantidad / Quantité / Quantity ..... Número ranuras / Rainures / Grooves .....



Mango: ☐ Cilíndrico ☐ Weldon ☐ Cónico ☐ Rebajado
Queue: Cylindrique Weldon Conique Réduite
Shank: Straight Weldon Taper Reduced

Entrada: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ Otra
Entrée: A B C D E Autres
Entry: A B C D E Others

Material / Matière / Material: ☐ HSS ☐ HSSE ☐ HM ☐ HSS-HM

Superficie / Surface: ☐ Brillante / Brillant / Brilliant ☐ Recubrimiento / Revêtement / Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....

.....

.....

.....

Servicio de Herramienta Especial - Service Outils Spéciaux - Special Tools Service
Tel. (+34) 93 387 32 99 - Fax.(+ 34) 93 383 33 08 - especiales@hepycrf.com

# FORMULARIO COJINETES ESPECIALES
# FICHE TECHNIQUE FILIERES SPECIAUX / TECHNICAL ENQUIRY FOR SPECIAL DIES

Fecha / Date: .....

Empresa / Entreprise / Company: ..... Contacto / Contact: .....

Dirección / Adresse / Adress: ..... Población / Ville / Town: .....

Tel / Fax: ..... E-mail: .....

.....

TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK

Material / Matière / Material ..... Norma / Norme / Norm: .....

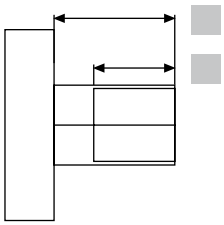
Dureza / Dureté / Hardness ..... HB ..... HRc Resistencia / Résistance / Resistance ..... N/mm$^2$

Tipo viruta: ☐ Corta ☐ Larga ☐ Polvo
Type copeau Courte Longue Poussière
Shaving Short Long Powder

Máquina / Machine ..... Refrigerante / Réfrigérant / Coolant .....

Posición / Position: ☐ Horizontal ☐ Vertical ☐ V. Corte ☐ V. avance
V. Coupe Avance
Cutting Speed Feed

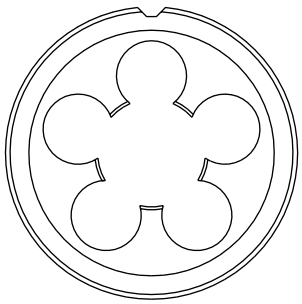
Eje / Axe / Axis:

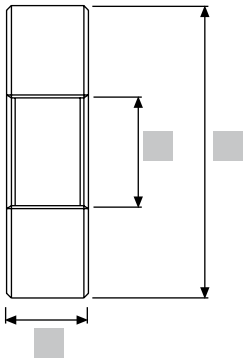


HERRAMIENTA / OUTIL / TOOL

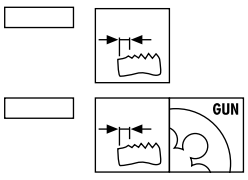
Descripción / Description ..... Tolerancia / Tolérance / Tolerance .....

Cantidad / Quantité / Quantity ..... Número ranuras / Rainures / Grooves .....





Entrada / Entrée / Entry




Material / Matière / Material: ☐ HSS ☐ HSSE ☐ HM ☐ HSS-HM

Superficie / Surface: ☐ Brillante ☐ Recubrimiento
Brillant Revêtement
Brilliant Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....

.....

.....

.....

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# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 2102 | 2101 | 2102/5 | 2101/5 | 2114 | 2113 | 2190 | 2191 | 2180 | 2179 | 2274 | 2275 | 2148 | 2147 | 2147/5 | 2154 | 2153 | 2153/5 | 2189 |
| Rosca/ Filetage/Thread | | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | UNC | UNC | UNC | UNF | UNF | UNF | UN |
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| Form. | | C(2-3) | C(2-3) | C(2-3) | C(2-3) | A(6-8) | A(6-8) | E(1,5-2) | E(1,2-2) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) |
| Ejec./Exéc./Exec. | | | | LH | LH | | | | | | | | | | | LH | | | LH | |
| Tol. | | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6HX | 6HX | 6HX | 6HX | 6H | 6H | 6H | 6H | 6H | 6H | 6H |
| Mat. | | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HM | HM | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE |
| Rec./Rev./Coat. | | | | | | | | | | TICN+ | TICN+ | TICN | TICN | | | | | | | |
| Prof./ Depth | | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD |
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| Mat. | | Vc (m/min) | | | | | | | | | | | | | | | | | | |
| P.1 | <600 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | | | | | | | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 |
| P.2 | <800 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | | | | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 |
| P.3 | <1000 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | | | | | | | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 |
| P.4 | <1200 | | | | | | | | | | | | | | | | | | | |
| P.5 | <1400 | | | | | | | | | | | | | | | | | | | |
| M.1 | <950 | | | | | | | | | | | | | | | | | | | |
| M.2 | | | | | | | | | | | | | | | | | | | | |
| M.3 | <1200 | | | | | | | | | | | | | | | | | | | |
| M.4 | | | | | | | | | | | | | | | | | | | | |
| K.1 | <500 | | | | | | | | | ● 15-30 | ● 15-30 | | | | | | | | | |
| K.2 | | | | | | | | | | | | | | | | | | | | |
| K.3 | <800 | | | | | | | | | ● 10-20 | ● 10-20 | | | | | | | | | |
| K.4.1 | | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | | | | | | | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 |
| K.4.2 | <1400 | | | | | | | | | | | | | | | | | | | |
| N.1.1 | Al | | | | | | | | | | | | | | | | | | | |
| N.1.2 | | | | | | | | | | | | | | | | | | | | |
| N.1.3 | | | | | | | | | | | | | | | | | | | | |
| N.2.1 | Cu | | | | | | | | | | | | | | | | | | | |
| N.2.2 | | | | | | | | ● 25-35 | ● 25-35 | o 35-50 | o 35-50 | | | | | | | | | |
| N.2.3 | | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | | | | | | | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 |
| N.2.4 | | | | | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | | | | | | | | | | | | | | | | | | |
| N.4.1 | Plastic | | | | | | | | | | | | | | | | | | | |
| N.4.2 | | | | | | | | | | | | | | | | | | | | |
| N.4.3 | | | | | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | | | | | | | | | | | | | | | | | | | |
| S.1.2 | | | | | | | | | | | | | | | | | | | | |
| S.2.1 | Ti | | | | | | | | | | | | | | | | | | | |
| S.2.2 | | | | | | | | | | | | | | | | | | | | |
| S.2.3 | | | | | | | | | | | | | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | | | | ● 3-6 | ● 3-6 | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | ● 2-5 | ● 2-5 | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | ● 1-4 | ● 1-4 | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

| 2160 | 2136 | 2135 | 2136/5 | 2135/5 | 2141 | 2142 | 2144 | 2144/5 | 2192 | 2206 | 2159 | 2164 | 2212 | 2212/5 | 2163 | 2242 | 2199 | 2134 | 1504 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNEF | BSW | BSW | BSW | BSW | BSF | BSF | G | G | G | G | GT | NPT | TR | TR | PG | VG | M | M | M-MF |
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| C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | E(1,2-2) | E(1,2-2) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | A(6-8) | A(6-8) | D(3,5-5) |
| | | | LH | LH | | | | LH | | | | | | LH | | | | | |
| 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H |
| HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSS |
| | | | | | | | | | | | | | | | | | | | |
| 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD | 1,5xD |
| 1/4-1" | 3/32-3/8 | 1/8-2"1/2 | 1/8-3/16 | 1/4-1" | 3/16-3/8 | 7/16-1" | 1/8-2" | 1/8-1" | 1/8-1" | 1/8-1" | 1/8-1" | 1/16-2" | 10-32 | 10-32 | 7-48 | 5-8 | 3-24 | 3-24 | 3-10 |
| 199 | 200 | 200 | 201 | 201 | 204 | 204 | 205 | 205 | 206 | 206 | 210 | 210 | 211 | 211 | 212 | 212 | 177 | 177 | 178 |
| Vc (m/min) | | | | | | | | | | | | | | | | | | | |
| o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | | | o 10-15 | o 10-15 | o 3-8 | o 3-8 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 10-20 |
| ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | ● 7-14 | ● 7-14 | ● 2-6 | ● 2-6 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 5-15 |
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| o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | | | o 7-15 | o 7-15 | ● 2-6 | ● 2-6 | o 10-20 | o 10-20 | o 10-20 | o 10-20 | |
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● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

Hepyc CUTTING TOOL EXPERTS

r.p.m.= Vc x 1.000 / πxØ

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 2104 | 2103 | 2104/5 | 2103/5 | 2111 | 2272 | 2110 | 2109 | 2168 | 2169 | 2250 | 2251 | 2116 | 2115 | 2126 | 2125 | 2176 | 2175 | 2122 | 2121 | 2133 | 2132 |
| Rosca/ Filetage/Thread | | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF |
| DIN | | 371 | 374 376 | 371 | 374 376 | 371-EL | 376-EL | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 |
| Form. | | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5)-AZ | B(3,5-5)-AZ |
| Ejec./Exéc./Exec. | | | | LH | LH | | | | | | | | | | | | | | | | | | |
| Tol. | | 6H | 6H | 6H | 6H | 6H | 6H | 6H+01 | 6H+0,1 | 6G | 6G | 6H | 6H | 6H | 6H | 6H | 6H | 6HX | 6HX | 6H | 6H | 6H | 6H |
| Mat. | | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE | HSSE | HSSE | HSSE |
| Rec./Rev./Coat. | | | | | | | | | | | | VAP | VAP | TIN+ | TIN+ | TICN+ | TICN+ | TICN+ | TICN+ | VAP | VAP | | |
| Prof./ Depth | | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 2xD | 2xD | 3xD | 3xD | 3xD | 3xD |
| Gama/Gamme/Range | | 2-10 | 3-52 | 3-10 | 20-24 | 3-12 | 8-16 | 3-10 | 8-16 | 3-10 | 8-20 | 2-10 | 3-24 | 2-10 | 3-24 | 3-10 | 8-24 | 3-10 | 8-20 | 3-10 | 8-24 | 3-10 | 4-16 |
| Pag. | | 144 | 144 | 146 | 146 | 147 | 147 | 148 | 148 | 149 | 149 | 150 | 150 | 151 | 151 | 152 | 152 | 153 | 153 | 154 | 154 | 155 | 155 |
| **Mat.** | | **Vc (m/min)** | | | | | | | | | | | | | | | | | | | | | |
| P.1 | <600 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | ● 15-25 | ● 15-25 | ● 20-30 | ● 20-30 | | | | | ● 15-25 | ● 15-25 | | |
| P.2 | <800 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | | | | | o 10-20 | o 10-20 | | |
| P.3 | <1000 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | ● 12-18 | ● 12-18 | ● 10-15 | ● 10-15 | | | | | | |
| P.4 | <1200 | | | | | | | | | | | | | ● 8-12 | ● 8-12 | ● 6-10 | ● 6-10 | o 6-10 | o 6-10 | | | | |
| P.5 | <1400 | | | | | | | | | | | | | | | o 4-6 | o 4-6 | ● 4-6 | ● 4-6 | | | | |
| M.1 | <950 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | ● 7-10 | ● 7-10 | ● 9-12 | ● 9-12 | | | | | ● 7-10 | ● 7-10 | | |
| M.2 | <950 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | ● 5-8 | ● 5-8 | ● 6-10 | ● 6-10 | | | | | ● 5-8 | ● 5-8 | | |
| M.3 | <1200 | | | | | | | | | | | o 5-8 | o 5-8 | o 6-10 | o 6-10 | ● 6-12 | ● 6-12 | | | | | | |
| M.4 | <1200 | | | | | | | | | | | | | | | | | o 4-6 | o 4-6 | | | | |
| K.1 | <500 | | | | | | | | | | | | | ● 10-15 | ● 10-15 | | | | | | | | |
| K.2 | <500 | | | | | | | | | | | | | ● 10-15 | ● 10-15 | | | | | | | | |
| K.3 | <800 | | | | | | | | | | | | | ● 15-20 | ● 15-20 | | | | | | | | |
| K.4.1 | <800 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | ● 15-20 | ● 15-20 | | | | | | | | |
| K.4.2 | <1400 | | | | | | | | | | | | | | | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | |
| N.1.1 | Al | | | | | | | | | | | | | ● 15-25 | ● 15-25 | | | | | | | ● 10-20 | ● 10-20 |
| N.1.2 | Al | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | ● 15-25 | ● 15-25 | | | | | | | o 10-15 | o 10-15 |
| N.1.3 | Al | | | | | | | | | | | | | ● 15-25 | ● 15-25 | | | | | | | | |
| N.2.1 | Cu | | | | | | | | | | | | | ● 15-25 | ● 15-25 | | | | | | | o 6-8 | o 6-8 |
| N.2.2 | Cu | | | | | | | | | | | | | | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | | | | |
| N.2.3 | Cu | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | | | | | | | | |
| N.2.4 | Cu | | | | | | | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | | | | | | | | | | | | | | | | | | | | o 10-20 | o 10-20 |
| N.4.1 | Plastic | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 12-18 | o 12-18 | | | | | | | o 10-15 | o 10-15 |
| N.4.2 | Plastic | | | | | | | | | | | | | | | o 10-15 | o 10-15 | o 10-15 | o 10-15 | | | | |
| N.4.3 | Plastic | | | | | | | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | | | | | | | | | | | | | | | | | | | | | | |
| S.1.2 | Ni | | | | | | | | | | | | | | | | | | | | | | |
| S.2.1 | Ti | | | | | | | | | | | | | | | | | | | o 10-15 | o 10-15 | | |
| S.2.2 | Ti | | | | | | | | | | | | | | | o 6-8 | o 6-8 | o 6-8 | o 6-8 | | | | |
| S.2.3 | Ti | | | | | | | | | | | | | | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | | | | |
| H.1 | 50 HRC | | | | | | | | | | | | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



P Aceros / Aciers / Steels

M Aceros Inox / Aciers Inox / Stainless Steels

K Fundicion / Fonte / Cast Iron

N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals

S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys

H Materiales Duros / Materiels Durs / Hard materials

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-MF | M-MF | M-MF | M-MF | UNC | UNC | UNC | UNC | UNC | UNC | UNF | UNF | UNF | UNF | UNF | UNF | BSW | BSW | G | G | G | M-MF | M-MF | M-MF | M-MF |
| 371 | 374<br>376 | 371 | 374<br>376 | 371 | 376 | 371 | 376 | 371 | 376 | 371 | 374 | 371 | 374 | 371 | 374 | 371 | 376 | 5156 | 5156 | 5156 | ISO 529 | JIS B4430 | JIS B4430 | JIS B4430 |
| B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) | B(3,5-5) |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| 6HX | 6HX | 6HX | 6HX | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | Med | Med | Med | Med | Med | 6H | 6H | 6H | 6H |
| HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSS | HSSE | HSSE | HSSE |
| HL | HL | HL | HL | | | VAP | VAP | TIN+ | TIN+ | | | VAP | VAP | TIN+ | TIN+ | | | | VAP | TIN+ | | | VAP | TIN |
| 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD | 3xD |
| 3-10 | 12-16 | 3-10 | 12-16 | N.4-3/8 | 1/4-<br>1"1/4 | N.4-3/8 | 7/16-1" | N.4-3/8 | 7/16-1" | N.4-3/8 | 1/4-1" | N.4-3/8 | 7/16-1" | N.4-3/8 | 7/16-1" | 1/8-3/8 | 1/4-1" | 1/8-<br>1"1/2 | 1/8-1" | 1/8-1" | 3-30 | 3-20 | 3-20 | 3-20 |
| 156 | 156 | 157 | 157 | 185 | 185 | 186 | 186 | 187 | 187 | 193 | 193 | 194 | 194 | 195 | 195 | 202 | 202 | 207 | 207 | 208 | 183 | 180 | 180 | 182 |
| Vc (m/min) | | | | | | | | | | | | | | | | | | | | | | | | |
| ● 20-40 | ● 20-40 | ● 20-50 | ● 20-50 | ○ 15-25 | ○ 15-25 | ● 15-25 | ● 15-25 | ● 20-30 | ● 20-30 | ○ 15-25 | ○ 15-25 | ● 15-25 | ● 15-25 | ● 20-30 | ● 20-30 | ○ 15-25 | ○ 15-25 | ○ 15-25 | ● 15-25 | ● 20-30 | ○ 10-20 | ○ 15-25 | ○ 15-25 | ○ 20-30 |
| ● 20-40 | ● 20-40 | ● 20-50 | ● 20-50 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 5-15 | ● 10-20 | ● 10-20 | ● 15-25 |
| ● 15-30 | ● 15-30 | ● 15-40 | ● 15-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 12-18 | ● 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 12-18 | ● 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 12-18 | | ○ 10-15 | ○ 10-15 | ○ 12-18 |
| ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | | ○ 8-12 | ○ 8-12 | | | | | ○ 8-12 | ○ 8-12 | | | | | ○ 8-12 | | | | |
| ● 5-10 | ● 5-10 | ● 5-10 | ● 5-10 | | | | | | | | | | | | | | | | | | | | | |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | ○ 7-10 | ○ 7-10 | ● 7-10 | ● 7-10 | ● 9-12 | ● 9-12 | ○ 7-10 | ○ 7-10 | ● 7-10 | ● 7-10 | ● 9-12 | ● 9-12 | ○ 7-10 | ○ 7-10 | ○ 7-10 | ● 7-10 | ● 9-12 | | ○ 7-10 | ○ 7-10 | ○ 9-12 |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | ○ 5-8 | ○ 5-8 | ● 5-8 | ● 5-8 | ● 6-10 | ● 6-10 | ○ 5-8 | ○ 5-8 | ● 5-8 | ● 5-8 | ● 6-10 | ● 6-10 | ○ 5-8 | ○ 5-8 | ○ 5-8 | ● 5-8 | ● 6-10 | | ○ 5-8 | ○ 5-8 | ○ 6-10 |
| ● 5-10 | ● 5-10 | ● 5-10 | ● 5-10 | | | ○ 5-8 | ○ 5-8 | ○ 6-10 | ○ 6-10 | | | ○ 5-8 | ○ 5-8 | ○ 6-10 | ○ 6-10 | | | | ○ 5-8 | ○ 6-10 | | | | |
| ● 5-10 | ● 5-10 | ● 5-10 | ● 5-10 | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | ● 10-15 | ● 10-15 | | | | | ● 10-15 | ● 10-15 | | | | | ● 10-15 | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | ● 10-15 | ● 10-15 | | | | | ● 10-15 | ● 10-15 | | | | | ● 10-15 | | | | |
| ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | | ● 15-20 | ● 15-20 | | | | | ● 15-20 | ● 15-20 | | | | | ● 15-20 | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-20 | ● 15-20 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-20 | ● 15-20 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-20 | ○ 5-15 | ○ 10-15 | ○ 10-15 | ○ 15-20 |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-25 | ● 15-25 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-25 | ● 15-25 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-25 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 15-20 |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 5-15 | ● 10-20 | ● 10-20 | ● 15-25 |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 | ○ 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 | ○ 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | |
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| ● 2-8 | ● 2-8 | ● 2-8 | ● 2-8 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-15 | ● 10-15 | ● 10-15 | ● 10-15 | | | | | | | | | | | | | | | | | | | | | |
| ● 2-8 | ● 2-8 | ● 2-8 | ● 2-8 | | | | | | | | | | | | | | | | | | | | | |
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● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

Hepyc CUTTING TOOL EXPERTS

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

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 2106 | 2105 | 2106/5 | 2105/5 | 2112 | 2273 | 2166 | 2165 | 2170 | 2208 | 2108 | 2107 | 2252 | 2253 | 2118 | 2117 | 2124 | 2123 | 2178 | 2177 | 2120 | 2119 | 2182 | 2181 |
| Rosca/ Filetage/Thread | | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF |
| DIN | | 371 | 374 376 | 371 | 374 376 | 371-EL | 376-EL | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 |
| Form. | | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) |
| Ejec./Exéc./Exec. | | R35° | R35° | L35°-LH | L35°-LH | R35° | R35° | R35° | R35° | R35° | R35° | R15° | R15° | R35° | R35° | R35° | R35° | R35° | R35° | R15° | R15° | R35° | R35° | R45° | R45° |
| Tol. | | 6H | 6H | 6H | 6H | 6H | 6H | 6H+01 | 6H+0,1 | 6G | 6G | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6H | 6HX | 6HX | 6H | 6H | 6H | 6H |
| Mat. | | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE | HSSE | HSSE | HSSE |
| Rec./Rev./Coat. | | | | | | | | | | | | | | VAP | VAP | TIN+ | TIN+ | TICN+ | TICN+ | TICN+ | TICN+ | VAP | VAP | | |
| Prof./ Depth | | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 1,5xD | 1,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD |
| Gama/Gamme/Range | | M2-M10 | M3-M52 | M3-M10 | M10-M24 | M3-M12 | M8-M16 | M3-M10 | M8-M16 | M3-M10 | M8-M20 | M2-M10 | M4-M36 | M2-M10 | M3-M24 | M2-M10 | M3-M24 | M3-M10 | M8-M24 | M3-M10 | M8-M20 | M3-M10 | M8-M24 | M3-M10 | M6-M16 |
| Pag. | | 158 | 158 | 160 | 160 | 161 | 161 | 162 | 162 | 163 | 163 | 164 | 164 | 165 | 165 | 166 | 166 | 167 | 167 | 168 | 168 | 169 | 169 | 170 | 170 |
| **Mat.** | | Vc (m/min) | | | | | | | | | | | | | | | | | | | | | | | |
| P.1 | <600 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | o 15-25 | ● 15-25 | ● 15-25 | ● 20-30 | ● 20-30 | | | | | ● 15-25 | ● 15-25 | | |
| P.2 | <800 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | | | | | o 10-20 | o 10-20 | | |
| P.3 | <1000 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | ● 12-18 | ● 12-18 | ● 10-15 | ● 10-15 | | | | | | |
| P.4 | <1200 | | | | | | | | | | | | | | | ● 8-12 | ● 8-12 | ● 6-10 | ● 6-10 | o 6-10 | o 6-10 | | | | |
| P.5 | <1400 | | | | | | | | | | | | | | | | | o 4-6 | o 4-6 | ● 4-6 | ● 4-6 | | | | |
| M.1 | <950 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | o 7-10 | ● 7-10 | ● 7-10 | ● 9-12 | ● 9-12 | | | | | ● 7-10 | ● 7-10 | | |
| M.2 | <950 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | o 5-8 | ● 5-8 | ● 5-8 | ● 6-10 | ● 6-10 | | | | | ● 5-8 | ● 5-8 | | |
| M.3 | <1200 | | | | | | | | | | | | | o 5-8 | o 5-8 | o 6-10 | o 6-10 | ● 6-12 | ● 6-12 | | | | | | |
| M.4 | <1200 | | | | | | | | | | | | | | | | | | | o 4-6 | o 4-6 | | | | |
| K.1 | <500 | | | | | | | | | | | | | | | | | | | | | | | | |
| K.2 | <500 | | | | | | | | | | | | | | | | | | | | | | | | |
| K.3 | <800 | | | | | | | | | | | | | | | ● 15-20 | ● 15-20 | | | | | | | | |
| K.4.1 | <800 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | ● 15-20 | ● 15-20 | | | | | | | | |
| K.4.2 | <1400 | | | | | | | | | | | | | | | | | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | |
| N.1.1 | Al | | | | | | | | | | | | | | | | | | | | | | | ● 10-20 | ● 10-20 |
| N.1.2 | Al | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | | | | | | | | | | | o 10-15 | o 10-15 |
| N.1.3 | Al | | | | | | | | | | | | | | | | | | | | | | | | |
| N.2.1 | Cu | | | | | | | | | | | | | | | ● 15-25 | ● 15-25 | | | | | | | o 6-8 | o 6-8 |
| N.2.2 | Cu | | | | | | | | | | | | | | | | | | | | | | | | |
| N.2.3 | Cu | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | | | | | | | | |
| N.2.4 | Cu | | | | | | | | | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | | | | | | | | | | | | | | | | | | | | | | o 10-20 | o 10-20 |
| N.4.1 | Plastic | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 10-15 | o 12-18 | o 12-18 | | | | | | | o 10-15 | o 10-15 |
| N.4.2 | Plastic | | | | | | | | | | | | | | | | | o 10-15 | o 10-15 | o 10-15 | o 10-15 | | | | |
| N.4.3 | Plastic | | | | | | | | | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | | | | | | | | | | | | | | | | | | | | | | | | |
| S.1.2 | Ni | | | | | | | | | | | | | | | | | | | | | | | | |
| S.2.1 | Ti | | | | | | | | | | | | | | | | | | | | | o 10-15 | o 10-15 | | |
| S.2.2 | Ti | | | | | | | | | | | | | | | | | o 6-8 | o 6-8 | o 6-8 | o 6-8 | | | | |
| S.2.3 | Ti | | | | | | | | | | | | | | | | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | | | | |
| H.1 | 50 HRC | | | | | | | | | | | | | | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

| 2256 | 2257 | 2260 | 2261 | 2152 | 2151 | 2264 | 2265 | 2236 | 2237 | 2158 | 2157 | 2278 | 2279 | 2282 | 2283 | 2140 | 2139 | 2146 | 2285 | 2287 | 2806 | 2249 | 2267 | 2269 | 2271 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-MF | M-MF | M-MF | M-MF | UNC | UNC | UNC | UNC | UNC | UNC | UNF | UNF | UNF | UNF | UNF | UNF | BSW | BSW | G | G | G | M-MF | M-MF | M-MF | M-MF | M-MF |
| 371 | 374 376 | 371 | 374 376 | 371 | 376 | 371 | 376 | 371 | 376 | 371 | 374 | 371 | 374 | 371 | 374 | 371 | 376 | 5156 | 5156 | 5156 | | ISO 529 | JIS B4430 | JIS B4430 | JIS B4430 |
| C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | D(3,5-5) | C(2-3) | C(2-3) | C(2-3) | C(2-3) |
| R45° | R45° | R45° | R45° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R35° | R25° | R35° | R35° | R35° | R35° |
| 6HX | 6HX | 6HX | 6HX | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | Med | Med | Med | Med | Med | 6H | 6H | 6H | 6H | 6H |
| HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSS | HSSE | HSSE | HSSE |
| HL | HL | HL | HL | | | VAP | VAP | TIN+ | TIN+ | | | VAP | VAP | TIN+ | TIN+ | | | | VAP | TIN+ | | | | VAP | TIN |
| 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD | 1,5xD | 2,5xD | 2,5xD | 2,5xD | 2,5xD |
| M3-M10 | M12-M16 | M3-M10 | M12-M16 | N.4-3/8 | 1/4-1"1/4 | N.4-3/8 | 7/16-1" | N.4-3/8 | 7/16-1" | N.4-3/8 | 1/4-1" | N.4-3/8 | 7/16-1" | N.4-3/8 | 7/16-1" | 1/8-3/8 | 3/16-1" | 1/8-1"1/2 | 1/8-1" | 1/8-1" | | | | | |
| 171 | 171 | 172 | 172 | 188 | 188 | 189 | 189 | 190 | 190 | 196 | 196 | 197 | 197 | 198 | 198 | 203 | 203 | 208 | 209 | 209 | 178 | 179 | 180 | 181 | 182 |
| Vc (m/min) | | | | | | | | | | | | | | | | | | | | | | | | | |
| ● 20-40 | ● 20-40 | ● 20-50 | ● 20-50 | ○ 15-25 | ○ 15-25 | ● 15-25 | ● 15-25 | ● 20-30 | ● 20-30 | ○ 15-25 | ○ 15-25 | ● 15-25 | ● 15-25 | ● 20-30 | ● 20-30 | ○ 15-25 | ○ 15-25 | ○ 15-25 | ● 15-25 | ● 20-30 | ○ 15-25 | ○ 10-20 | ○ 15-25 | ○ 15-25 | ○ 20-30 |
| ● 20-40 | ● 20-40 | ● 20-50 | ● 20-50 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 10-20 | ● 5-15 | ● 10-20 | ● 10-20 | ● 15-25 |
| ● 15-30 | ● 15-30 | ● 15-40 | ● 15-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 12-18 | ● 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 12-18 | ● 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 12-18 | | | ○ 10-15 | ○ 10-15 | ○ 12-18 |
| ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | | ● 8-12 | ● 8-12 | | | | | ● 8-12 | ● 8-12 | | | | | ● 8-12 | | | | | |
| ● 5-10 | ● 5-10 | ● 5-10 | ● 5-10 | | | | | | | | | | | | | | | | | | | | | | |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | ○ 7-10 | ○ 7-10 | ● 7-10 | ● 7-10 | ● 9-12 | ● 9-12 | ○ 7-10 | ○ 7-10 | ● 7-10 | ● 7-10 | ● 9-12 | ● 9-12 | ○ 7-10 | ○ 7-10 | ○ 7-10 | ● 7-10 | ● 9-12 | | | ○ 7-10 | ○ 7-10 | ○ 9-12 |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | ○ 5-8 | ○ 5-8 | ● 5-8 | ● 5-8 | ● 6-10 | ● 6-10 | ○ 5-8 | ○ 5-8 | ● 5-8 | ● 5-8 | ● 6-10 | ● 6-10 | ○ 5-8 | ○ 5-8 | ○ 5-8 | ● 5-8 | ● 6-10 | | | ○ 5-8 | ○ 5-8 | ○ 6-10 |
| ● 5-10 | ● 5-10 | ● 5-10 | ● 5-10 | | | ○ 5-8 | ○ 5-8 | ○ 6-10 | ○ 6-10 | | | ○ 5-8 | ○ 5-8 | ○ 6-10 | ○ 6-10 | | | | ○ 5-8 | ○ 6-10 | | | | | |
| ● 5-10 | ● 5-10 | ● 5-10 | ● 5-10 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | | | | | ● 15-20 | ● 15-20 | | | | | ● 15-20 | ● 15-20 | | | | | ● 15-20 | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-20 | ● 15-20 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-20 | ● 15-20 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ● 15-20 | 10-15 | 5-15 | 10-15 | 10-15 | 15-20 |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ○ 10-15 | ○ 10-15 | | | | | ○ 10-15 | ○ 10-15 | | | | | ○ 10-15 | ○ 10-15 | ○ 10-15 | | | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 15-20 |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | ● 15-25 | | | | | ● 15-25 | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 15-25 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 15-25 | ● 10-20 | ● 5-15 | ● 10-20 | ● 10-20 | ● 15-25 |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
| ● 5-15 | ● 5-15 | ● 5-15 | ● 5-15 | | | | | | | | | | | | | | | | | | | | | | |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 | ○ 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 | ○ 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 10-15 | ○ 12-18 |
| ● 10-30 | ● 10-30 | ● 10-40 | ● 10-40 | | | | | | | | | | | | | | | | | | | | | | |
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| ● 2-8 | ● 2-8 | ● 2-8 | ● 2-8 | | | | | | | | | | | | | | | | | | | | | | |
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| ● 10-15 | ● 10-15 | ● 10-15 | ● 10-15 | | | | | | | | | | | | | | | | | | | | | | |
| ● 2-8 | ● 2-8 | ● 2-8 | ● 2-8 | | | | | | | | | | | | | | | | | | | | | | |
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● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 2188 | 2187 | 2214 | 2213 | 2216 | 2215 | 2218 | 2217 |
| Rosca/ Filetage/Thread | | M | M | M | M | M | M | M | M |
| DIN | | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 | 371 | 374 376 |
| Form. | | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) | C(2-3) |
| Ejec./Exéc./Exec. | | A>12% | A>12% | A>12% | A>12% | A>12% | A>12% | A>12% | A>12% |
| Tol. | | 6HX | 6HX | 6HX | 6HX | 6GX | 6GX | 6GX | 6GX |
| Mat. | | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| Rec./Rev./Coat. | | TIN | TIN | TIN | TIN | TIN | TIN | TIN | TIN |
| Prof./ Depth | | 1,5xD | 1,5xD | 3xD | 3xD | 1,5xD | 1,5xD | 3xD | 3xD |
| Gama/Gamme/Range | | M3-M10 | M12-M16 | M3-M10 | M8-M16 | M3-M10 | M12 | M3-M10 | M12 |
| Pag. | | 173 | 173 | 174 | 174 | 175 | 175 | 176 | 176 |
| **Mat.** | | Vc (m/min) | | | | | | | |
| P.1 | <600 | ● 25-45 | ● 25-45 | ● 25-45 | ● 25-45 | ● 25-45 | ● 25-45 | ● 25-45 | ● 25-45 |
| P.2 | <800 | ● 15-40 | ● 15-40 | ● 15-40 | ● 15-40 | ● 15-40 | ● 15-40 | ● 15-40 | ● 15-40 |
| P.3 | <1000 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 |
| P.4 | <1200 | | | | | | | | |
| P.5 | <1400 | | | | | | | | |
| M.1 | <950 | ● 10-25 | ● 10-25 | ● 10-25 | ● 10-25 | ● 10-25 | ● 10-25 | ● 10-25 | ● 10-25 |
| M.2 | <950 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 | ● 10-20 |
| M.3 | <1200 | | | | | | | | |
| M.4 | <1200 | | | | | | | | |
| K.1 | <500 | | | | | | | | |
| K.2 | <500 | | | | | | | | |
| K.3 | <800 | | | | | | | | |
| K.4.1 | <800 | | | | | | | | |
| K.4.2 | <1400 | | | | | | | | |
| N.1.1 | Al | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 |
| N.1.2 | Al | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 |
| N.1.3 | Al | | | | | | | | |
| N.2.1 | Cu | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 |
| N.2.2 | Cu | | | | | | | | |
| N.2.3 | Cu | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 |
| N.2.4 | Cu | | | | | | | | |
| N.3.1 | Mg/Zn | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 | ● 20-40 |
| N.4.1 | Plastic | | | | | | | | |
| N.4.2 | Plastic | | | | | | | | |
| N.4.3 | Plastic | | | | | | | | |
| S.1.1 | Ni | | | | | | | | |
| S.1.2 | Ni | | | | | | | | |
| S.2.1 | Ti | ○ 10-20 | ○ 10-20 | ○ 10-20 | ○ 10-20 | ○ 10-20 | ○ 10-20 | ○ 10-20 | ○ 10-20 |
| S.2.2 | Ti | | | | | | | | |
| S.2.3 | Ti | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

Hepyc CUTTING TOOL EXPERTS

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

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 2301 | 2301/5 | 2302 | 2314 | 2303 | 2324 | 2304 | 2304/5 | 2305 | 2306 | 2306/5 | 2316 | 2317 |
| Rosca/ Filetage/Thread | | M-MF | M | M | M | M | M | BSW | BSW | BSF | G | G | G | G |
| DIN | | 352-2181 | 352 | 352 | 352 | 352 | 352 | 352 | 352 | 2181 | 5157 | 5157 | 5157 | 5157 |
| Form. | | | | | | | | | | | | | E(1,5-2) | E(1,5-2) |
| Ejec./Exéc./Exec. | | | LH | | | | | | LH | | | LH | | |
| Tol. | | 6H | 6H | 6H | 6HX | 6HX | 6HX | Med | Med | Med | Med | Med | Med | +0,1 |
| Mat. | | HSS | HSS | HSS | HSSE | HSSE | HSSE-PM | HSS | HSS | HSS | HSS | HSS | HSS | HSS |
| Rec./Rev./Coat. | | | | TiN | | VAP | TICN | | | | | | | |
| Prof./ Depth | | | | | | | | | | | | | | |
| Gama/Gamme/Range | | M1-M64 | M3-M30 | M3-M20 | M3-M16 | M3-M20 | M4-M16 | 3/32-3" | 1/8-1" | 3/16-1"1/2 | 1/8-3" | 1/8-1" | 1/8-1" | 1/8-1" |
| Pag. | | 213 | 215 | 217 | 216 | 216 | 217 | 218 | 219 | 219 | 220 | 220 | 221 | 221 |
| Mat. | | Vc (m/min) | | | | | | | | | | | | |
| P.1 | <600 | ● | ● | ● | o | o | | ● | ● | ● | ● | ● | | |
| P.2 | <800 | ● | ● | ● | ● | ● | o | ● | ● | ● | ● | ● | | |
| P.3 | <1000 | | | o | ● | ● | ● | | | | | | | |
| P.4 | <1200 | | | | o | o | ● | | | | | | | |
| P.5 | <1400 | | | | | | ● | | | | | | | |
| M.1 | <950 | | | | o | ● | | | | | | | | |
| M.2 | | | | | o | ● | | | | | | | | |
| M.3 | <1200 | | | | | | o | | | | | | | |
| M.4 | | | | | | | o | | | | | | | |
| K.1 | <500 | | | | | | | | | | | | | |
| K.2 | | | | | | | | | | | | | | |
| K.3 | <800 | | | | | | | | | | | | | |
| K.4.1 | | | | | | | | | | | | | | |
| K.4.2 | <1400 | | | | | | o | | | | | | | |
| N.1.1 | Al | | | | | | | | | | | | | |
| N.1.2 | | o | o | o | | | | o | o | o | o | o | | |
| N.1.3 | | ● | ● | ● | | | | ● | ● | ● | ● | ● | | |
| N.2.1 | Cu | | | | | | | | | | | | | |
| N.2.2 | | | | | | | | | | | | | ● | ● |
| N.2.3 | | ● | ● | ● | o | o | o | ● | ● | ● | ● | ● | | |
| N.2.4 | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | | | | | | | | | | | | |
| N.4.1 | Plastic | | | | | | | | | | | | | |
| N.4.2 | | | | | | | | | | | | | | |
| N.4.3 | | | | | | | | | | | | | | |
| S.1.1 | Ni | | | | | | | | | | | | | |
| S.1.2 | | | | | | | | | | | | | | |
| S.2.1 | Ti | | | | | ● | | | | | | | | |
| S.2.2 | | | | | | | | | | | | | | |
| S.2.3 | | | | | | | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

| 2307 | 2307/5 | 2308 | 2308/5 | 2315 | 2309 | 2310 | 2312 | 2313 | 2321 | 2322 | 2323 | 2701 | 2702 | 2703 | 2704 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | UNC | UNF | UNF | UN | Rc | UNEF | Pg | NPT | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF | M-MF |
| 352 | 352 | 2181 | 2181 | 2181 | 5157 | 2181 | 40432 | 2181 | 352-2181 | 352-2181 | 352-2181 | ISO 529 | ISO 529 | ISO 529 | ISO 529 |
| | | | | | | | | | No Prog | No Prog | No Prog | D(3-5) | D(3-5) | D(3-5) | D(3-5) |
| | LH | | LH | | | | | | | | | | | | |
| 2B | 2B | 2B | 2B | 2B | | 2B | | | 6H | 6H | 6H | 4H | 4H | 4H | 4H |
| HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS |
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| N.4-2" | 1/4-1" | N.4-1"1/2 | 1/4-1" | 1"1/8-2" | 1/8-1" | 1/4-1" | 7-48 | 1/16-2" | M2-M42 | N.4-2" | N.4-1"1/2 | M2-M24 | N.2-1" | N.4-1" | |
| 222 | 223 | 223 | 224 | 224 | 225 | 225 | 226 | 226 | 227 | 228 | 228 | 242 | 243 | 243 | 244 |
| Vc (m/min) | | | | | | | | | | | | | | | |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
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| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
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● Optima / Optimun ○ Alternativo / Alternative

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|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 2501 | 2501/5 | 2514 | 2512 | 2502 | 2502/5 | 2503 | 2504 | 2504/5 | 2522 | 2521 |
| Rosca/ Filetage/Thread | | M-MF | M | M | M | BSW | BSW | BSF | G | G | G | G |
| DIN | | 22568 | 22568 | 22568 | 22568 | 22568 | 22568 | 22568 | 24231 | 24231 | 24231 | 24231 |
| Form. | | | | | | | | | | | | |
| Ejec./Exéc./Exec. | | | LH | | | | LH | | | LH | | |
| Tol. | | 6g | 6g | 6g | 6g | Med | Med | Med | Med | Med | Med | -0,1 |
| Mat. | | HSS | HSS | HSSE | HSSE | HSS | HSS | HSS | HSS | HSS | HSS | HSS |
| Rec./Rev./Coat. | | | | NIT | VAP | | | | | | | |
| Prof./ Depth | | | | | | | | | | | | |
| Gama/Gamme/Range | | M1-M64 | M3-M30 | M3-M16 | M3-M20 | 3/32-2" | 1/8-1" | 3/16-1" | 1/8-2" | 1/8-1" | 1/8-1" | 1/8-1" |
| Pag. | | 229 | 231 | 232 | 232 | 233 | 233 | 234 | 234 | 235 | 236 | 236 |
| Mat. | | Vc (m/min) | | | | | | | | | | |
| P.1 | <600 | • | • | o | o | • | • | • | • | • | | |
| P.2 | <800 | • | • | • | • | • | • | • | • | • | | |
| P.3 | <1000 | | | • | • | | | | | | | |
| P.4 | <1200 | | | o | o | | | | | | | |
| P.5 | <1400 | | | | | | | | | | | |
| M.1 | <950 | | | o | • | | | | | | | |
| M.2 | | | | o | • | | | | | | | |
| M.3 | <1200 | | | | | | | | | | | |
| M.4 | | | | | | | | | | | | |
| K.1 | <500 | | | | | | | | | | | |
| K.2 | | | | | | | | | | | | |
| K.3 | <800 | | | | | | | | | | | |
| K.4.1 | | | | | | | | | | | | |
| K.4.2 | <1400 | | | | | | o | | | | | |
| N.1.1 | Al | | | | | | | | | | | |
| N.1.2 | | o | o | | | o | o | o | o | o | | |
| N.1.3 | | • | • | | | • | • | • | • | • | | |
| N.2.1 | Cu | | | | | | | | | | | |
| N.2.2 | | | | | | | | | | | • | • |
| N.2.3 | | • | • | o | o | • | • | • | • | • | | |
| N.2.4 | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | | | | | | | | | | |
| N.4.1 | Plastic | | | | | | | | | | | |
| N.4.2 | | | | | | | | | | | | |
| N.4.3 | | | | | | | | | | | | |
| S.1.1 | Ni | | | | | | | | | | | |
| S.1.2 | | | | | | | | | | | | |
| S.2.1 | Ti | | | | | | | | | | | |
| S.2.2 | | | | | • | | | | | | | |
| S.2.3 | | | | | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



P Aceros / Aciers / Steels

M Aceros Inox / Aciers Inox / Stainless Steels

K Fundicion / Fonte / Cast Iron

N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals

S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys

H Materiales Duros / Materiels Durs / Hard materials

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2505 | 2505/5 | 2506 | 2506/5 | 2520 | 2507 | 2508 | 2510 | 2509 |
| UNC | UNC | UNF | UNF | UN | R | UNEF | Pg | NPT |
| 22568 | 22568 | 22568 | 22568 | 22568 | 24231 | 22568 | 40434 | 24230 |
| | | | | | | | | |
| | LH | | LH | | | | | |
| 2A | 2A | 2A | 2A | 2A | | 2A | | |
| HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS |
| | | | | | | | | |
| | | | | | | | | |
| N.4-2" | 1/4-1" | N.4-1"1/2 | 1/4-1" | 1"1/8-2" | 1/8-1" | 1/4-1" | 7-48 | 1/16-2" |
| 237 | 237 | 238 | 238 | 240 | 239 | 239 | 240 | 241 |
| | | | | | | | | |
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● Optima / Optimun ○ Alternativo / Alternative

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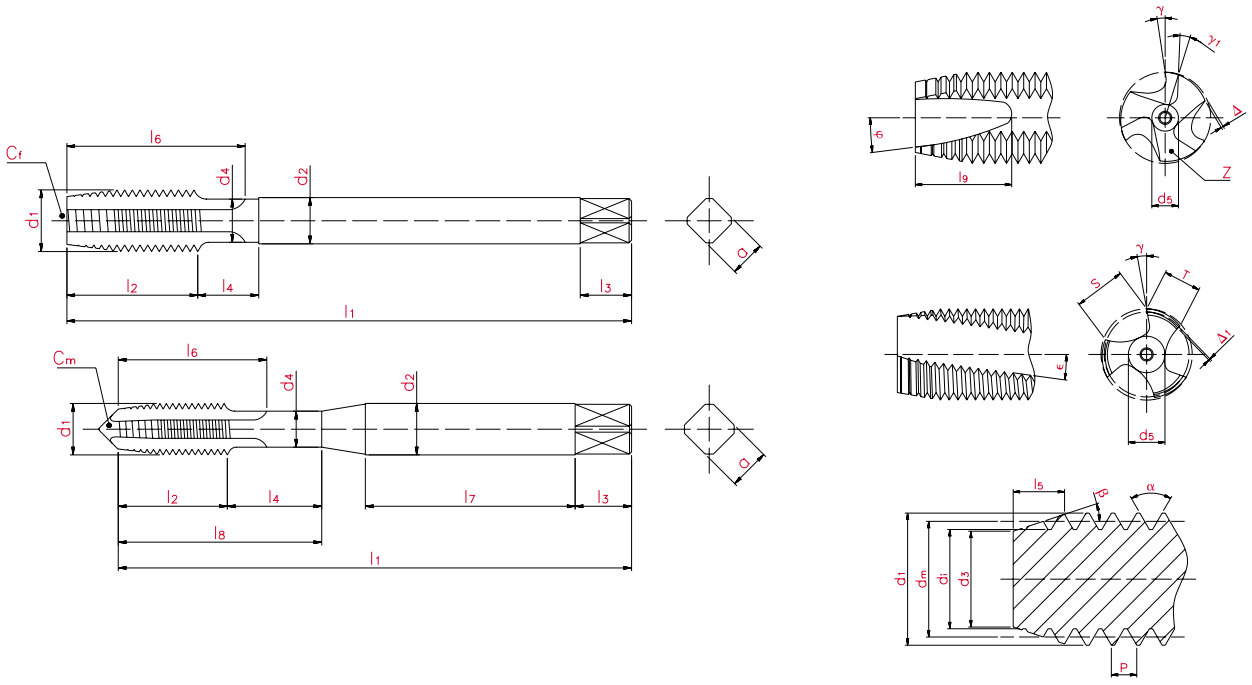
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TERMINOLOGÍA
# TERMINOLOGIE / TERMINOLOGY

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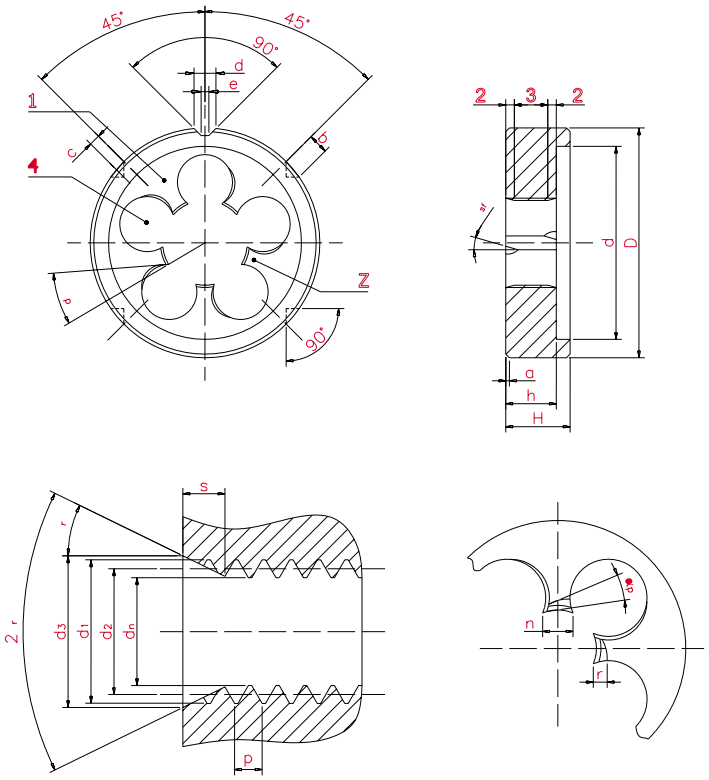
|---|---|
| **l1** | **Longitud total** / Longueur totale / Total length |
| **l2** | **Longitud de rosca** / Longueur de filetage / Thread length |
| **l7** | **Longitud de mango** / Longueur de queue / Shank length |
| **l3** | **Longitud de cuadro** / Longueur du carré / Square length |
| **l4** | **Longitud de sangrado** / Longueur d'indentation / Neck length |
| **l5** | **Longitud de entrada** / Longueur d'entrée / Chamfer length |
| **l6** | **Longitud de ranura** / Longueur de rainure / Flute Length |
| **l8** | **Longitud útil de corte** / Longueur utile de coupe / Useful length of cut |
| **l9** | **Longitud de la entrada en hélice** / Longueur de l'entrée en hélice / Spiral point length |
| **d1** | **Diámetro exterior** / Diamètre extérieur / External diameter |
| **d2** | **Diámetro de mango** / Diamètre de queue / Shank diameter |
| **d3** | **Diámetro de entrada** / Diamètre d'entrée / Chamfer diameter |
| **d4** | **Diámetro de sangrado** / Diamètre d'indentation / Neck diameter |
| **d5** | **Diámetro del alma** / Diamètre de l'âme / Core diameter |
| **dm** | **Diámetro medio** / Diamètre moyen / Pitch diameter |
| **di** | **Diámetro interno** / Diamètre interne / Internal diameter |
| **a** | **Cuadradillo** / Carré / Square |
| **Cm** | **Punto macho** / Pointe mâle / Male point |
| **Cf** | **Punto hembra** / Pointe femelle / Female point |
| **P** | **Paso de la rosca** / Pas de filetage / Pitch of thread |
| **S** | **Ancho de la ranura** / Largeur de la rainure / Flute width |
| **T** | **Ancho del diente** / Largeur de la dent / Width of land |
| **Z** | **Número de ranuras** / Nombre de rainures / Number of flutes |
| $\alpha$ | **Ángulo de flancos** / Angle de flancs / Angle of thread |
| $\beta$ | **Ángulo de la entrada** / Angle de l'entrée / Chamfer angle |
| $\gamma$ | **Ángulo de corte** / Angle de coupe / Rake angle |
| $\gamma_1$ | **Ángulo de corte de la entrada corregida** / Angle de coupe de l'entrée corrigée / Spiral point rake angle |
| $\varphi$ | **Ángulo de la entrada corregida** / Angle de l'entrée corrigée / Spiral point angle |
| $\varepsilon$ | **Ángulo de la ranura** / Angle de la rainure / Flute angle |
| $\Delta$ | **Ángulo de destalonado de la entrada** / Angle de détalonnage de l'entrée / Chamfer relief angle |
| $\Delta_1$ | **Ángulo de destalonado de flancos** / Angle de détalonnage des flancs / Flank relief angle |

# TERMINOLOGÍA
# TERMINOLOGIE / TERMINOLOGY




| | |
|---|---|
| **1** | **Cuerpo del cojinete** / Corps de la filière / Die body |
| **2** | **Parte cortante - Entrada cónica** / Partie coupante - Entrée conique / Cutting part - Conical entry |
| **3** | **Hilos enteros** / Fils entiers / Entire threads |
| **4** | **Alojamiento para viruta** / Logement pour copeau / Void for shavings |
| **d1** | **Diámetro nominal de rosca** / Diamètre nominal de filetage / Nominal diameter of thread |
| **d2** | **Diámetro de flancos** / Diamètre de flancs / Flank Diameter |
| **dn** | **Diámetro de núcleo** / Diamètre du noyau / Nucleus diameter |
| **d3** | **Diámetro de la entrada cónica** / Diamètre de l'entrée conique / Diameter of conical chamfer |
| **P** | **Paso de la rosca** / Pas de filetage / Thread pitch |
| **D** | **Diámetro exterior del cojinete** / Diamètre extérieur de la filière / Exterior diameter of die |
| **d** | **Diámetro de la parte rebajada** / Diamètre de la partie chanfreinée / Diameter of the reduced part |
| **H** | **Diámetro de sangrado** / Diamètre d'indentation / Bled diameter |
| **h** | **Ancho del cojinete** / Largeur de la filière / Die width |
| **Z** | **Ancho útil del cojinete** / Largeur utile de la filière / Useful width of the die |
| **n** | **Número de dientes** / Nombre de dents / Number of teeth |
| **r** | **Ancho del diente** / Largeur de la dent / Tooth width |
| **s** | **Destalonado de la entrada cónica** / Détalonnage de l'entrée conique / Conical chamfer relief |
| **a** | **Longitud de la entrada cónica** / Longueur de l'entrée conique / Conical chamfer length |
| **b** | **Chaflán** / Chanfrein / Bevel |
| **c** | **Diámetro del agujero de fijación** / Diamètre du trou de fixation / Mounting hole diameter |
| **d** | **Desplazamiento del agujero de fijación** / Déplacement du trou de fixation / Mounting hole displacement |
| **e** | **Ancho de preranura** / Largeur de pré-rainure / Pre-groove width |
| **$\gamma$p** | **Ángulo de la ranura** / Angle de la rainure / Groove angle |
| **$\chi$r** | **Ángulo de desprendimiento (de corte)** / Angle de dégagement (de coupe) / Rake angle (of cut) |
| **2$\chi$r** | **Ángulo de la entrada cónica** / Angle de l'entrée conique / Conical chamfer angle |
| **$\alpha$p** | **Ángulo de destalonado de la entrada cónica** / Angle de détalonnage de l'entrée conique / Conical chamfer relief angle |
| **$\gamma$sf** | **Ángulo de la entrada en hélice (rompevirutas)** / Longueur de l'entrée en hélice (brise-copeaux) / Blade chamfer angle (chip cap) |

# TABLAS DE ROSCAS Y PASOS
# GRILLES DES FILETAGES ET DES PAS / TABLE OF THREADS AND PITCHES

> **Roscas más usuales en pulgadas.**
> **Filetages les plus courants en pouces.**
> **Most common threads in inches.**

| Ø | W 55º | BSF 55º | GAS 55º | BSB BRASS 55º | UNC 60º | UNF 60º | UNEF NEF 60º | NPS NPT API 60º | UN 60º | | | | | | UNS 60º | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nº 0 | - | - | - | - | - | 80 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 1 | - | - | - | - | 64 | 72 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 2 | - | - | - | - | 56 | 64 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 3 | - | - | - | - | 48 | 56 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 4 | - | - | - | - | 40 | 48 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 5 | - | - | - | - | 40 | 44 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 6 | - | - | - | - | 32 | 40 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 8 | - | - | - | - | 32 | 36 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nº 10 | - | - | - | - | 24 | 32 | - | - | - | - | - | - | - | - | 28 | 36 | 40 | 48 | 56 | - |
| Nº 12 | - | - | - | - | 24 | 28 | 32 | - | - | - | - | - | - | - | 36 | 40 | 48 | 56 | - | - |
| 1/16 | 60 | - | - | - | - | - | - | 27 | - | - | - | - | - | - | - | - | - | - | - | - |
| 3/32 | 48 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1/8 | 40 | - | 28 | - | - | - | - | 27 | - | - | - | - | - | - | - | - | - | - | - | - |
| 5/32 | 32 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3/16 | 24 | 32 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 7/32 | 24 | 28 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1/4 | 20 | 26 | 19 | 26 | 20 | 28 | 32 | 18 | - | - | - | - | - | - | 24 | 27 | 26 | 40 | 48 | 56 |
| 9/32 | 20 | 26 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5/16 | 18 | 22 | - | 26 | 18 | 24 | 32 | - | 20 | 28 | - | - | - | - | 27 | 36 | 40 | 48 | - | - |
| 3/8 | 16 | 20 | 19 | 26 | 16 | 24 | 32 | 18 | 20 | 28 | - | - | - | - | 18 | 27 | 36 | 40 | - | - |
| 7/16 | 14 | 18 | - | 26 | 14 | 20 | 28 | - | 16 | 32 | - | - | - | - | 18 | 24 | 27 | - | - | - |
| 1/2 | 12 | 16 | 14 | 26 | 13 | 20 | 28 | 14 | 16 | 32 | - | - | - | - | 12 | 14 | 18 | 24 | 27 | - |
| 9/16 | 12 | 16 | - | 26 | 12 | 18 | 24 | - | 16 | 20 | 28 | 32 | - | - | 14 | 27 | - | - | - | - |
| 5/8 | 11 | 14 | 14 | 26 | 11 | 18 | 24 | 14 | 12 | 16 | 20 | 28 | 32 | - | 14 | 27 | - | - | - | - |
| 11/16 | 11 | 14 | - | - | - | - | 24 | - | 12 | 16 | 20 | 28 | 32 | - | - | - | - | - | - | - |
| 3/4 | 10 | 12 | 14 | 26 | 10 | 16 | 20 | 14 | 12 | 28 | 32 | - | - | - | 14 | 18 | 24 | 27 | - | - |
| 13/16 | 10 | 12 | - | - | - | - | 20 | - | 12 | 16 | 28 | 32 | - | - | - | - | - | - | - | - |
| 7/8 | 9 | 11 | 14 | 26 | 9 | 14 | 20 | - | 12 | 16 | 28 | 32 | - | - | 10 | 18 | 24 | 27 | - | - |
| 15/16 | - | - | - | - | - | - | 20 | - | 16 | 28 | 32 | - | - | - | - | - | - | - | - | - |
| 1" | 8 | 10 | 11 | 26 | 8 | 12 | 20 | 11,5 | 16 | 28 | 16 | - | 28 | - | 10 | 14 | 18 | 24 | 27 | - |
| 1"1/16 | - | - | - | - | - | - | 18 | - | 8 | 16 | 20 | 28 | - | - | - | - | - | - | - | - |
| 1"1/8 | 7 | 9 | 11 | 26 | 7 | 12 | 18 | - | 8 | 16 | 20 | 28 | - | - | 10 | 14 | 24 | - | - | - |
| 1"3/16 | - | - | - | - | - | - | 18 | - | 8 | 16 | 20 | 28 | - | - | - | - | - | - | - | - |
| 1"1/4 | 7 | 9 | 11 | 26 | 7 | 12 | 18 | 11,5 | 8 | 16 | 20 | 28 | - | - | 10 | 14 | 24 | - | - | - |
| 1"5/16 | - | - | - | - | - | - | 18 | - | 8 | 16 | 20 | 28 | - | - | - | - | - | - | - | - |
| 1"3/8 | 6 | 8 | 11 | 26 | 6 | 12 | 18 | - | 6 | 8 | 12 | 16 | 20 | 28 | 10 | 14 | 24 | - | - | - |
| 1"7/16 | - | - | - | - | - | - | 18 | - | 8 | 16 | 20 | 28 | - | - | - | - | - | - | - | - |
| 1"1/2 | 6 | 8 | 11 | 26 | 6 | 12 | 18 | 11,5 | 6 | 8 | 16 | 20 | - | - | 10 | 14 | 24 | - | - | - |
| 1"9/16 | - | - | - | - | - | - | 18 | - | 6 | 8 | 12 | 16 | 20 | - | - | - | - | - | - | - |
| 1"5/8 | 5 | 8 | 11 | 26 | - | - | 18 | - | 6 | 8 | 12 | 16 | 20 | - | 10 | 14 | 24 | - | - | - |
| 1"11/16 | - | - | - | - | - | - | 18 | - | 6 | 8 | 12 | 16 | 20 | - | - | - | - | - | - | - |
| 1"3/4 | 5 | 7 | 11 | 26 | 5 | - | - | - | 6 | 8 | 12 | 16 | 20 | - | 10 | 14 | 24 | - | - | - |
| 1"13/16 | - | - | - | - | - | - | - | - | 6 | 8 | 12 | 16 | 20 | - | - | - | - | - | - | - |
| 1"7/8 | 4,5 | - | - | 26 | - | - | - | - | 6 | 8 | 12 | 16 | 20 | - | 10 | 14 | 24 | - | - | - |
| 1"15/16 | - | - | - | - | - | - | - | - | 6 | 8 | 12 | 16 | 20 | - | - | - | - | - | - | - |
| 2" | 4,5 | 7 | 11 | 26 | 4,5 | - | - | 11,5 | 6 | 8 | 12 | 16 | 20 | - | 10 | 14 | 24 | - | - | - |

# TABLAS DE ROSCAS Y PASOS
# GRILLES DES FILETAGES ET DES PAS / TABLE OF THREADS AND PITCHES

**> Equivalencias en mm de los diámetros de las siguientes roscas.**
**Équivalences en mm des diamètres des filetages suivants.**
**Equivalents in mm of the diameters of the following threads.**

| BSW/BSF | | | UNC/UNF | | | BSP (GAS) | | | NSP/NPT | | | PG | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/32 | = | 2,381mm | 5/8 | = | 15,875 mm | G1/8 | = | 9,728 mm | G1”3/8 | = | 44,323 mm | 1/8 | = | 10,287 mm | PG7 | = | 12,50 mm |
| 1/8 | = | 3,175 mm | 3/4 | = | 19,050 mm | G1/4 | = | 13,157 mm | G1”1/2 | = | 47,803 mm | 1/4 | = | 13,716 mm | PG9 | = | 15,20 mm |
| 5/32 | = | 3,969 mm | 7/8 | = | 22,225 mm | G3/8 | = | 16,662 mm | G1”5/8 | = | 51,988 mm | 3/8 | = | 17,145 mm | PG11 | = | 18,60 mm |
| 3/16 | = | 4,762 mm | 1” | = | 25,400 mm | G1/2 | = | 20,955 mm | G1”3/4 | = | 53,746 mm | 1/2 | = | 21,336 mm | PG13,5 | = | 20,40 mm |
| 7/32 | = | 5,556 mm | 1”1/8 | = | 28,575 mm | G5/8 | = | 22,911 mm | G2” | = | 59,614 mm | 3/4 | = | 26,670 mm | PG16 | = | 22,50 mm |
| 1/4 | = | 6,350 mm | 1”1/4 | = | 31,750 mm | G3/4 | = | 26,441 mm | G2”1/4 | = | 65,710 mm | 1” | = | 33,401 mm | PG21 | = | 28,30 mm |
| 9/32 | = | 7,144 mm | 1”3/8 | = | 34,925 mm | G7/8 | = | 30,201 mm | G2”3/8 | = | 69,390 mm | 1”1/4 | = | 42,164 mm | PG29 | = | 37,00 mm |
| 5/16 | = | 7,938 mm | 1”1/2 | = | 38,100 mm | G1” | = | 33,249 mm | G2”1/2 | = | 75,184 mm | 1”1/2 | = | 48,260 mm | PG36 | = | 47,00 mm |
| 3/8 | = | 9,525 mm | 1”5/8 | = | 41,275 mm | G1”1/8 | = | 37,897 mm | G2”3/4 | = | 81,534 mm | 2” | = | 60,325 mm | PG42 | = | 54,00 mm |
| 7/16 | = | 11,112 mm | 1”3/4 | = | 44,450 mm | G1”1/4 | = | 41,910 mm | G3” | = | 87,844 mm | 2”1/2 | = | 73,025 mm | PG48 | = | 59,30 mm |
| 1/2 | = | 12,700 mm | 1”7/8 | = | 47,625 mm | | | | | | | 3” | = | 88,900 mm | | | |
| 9/16 | = | 14,288 mm | 2” | = | 50,800 mm | | | | | | | | | | | | |

**> Equivalencia del paso en hilos por pulgada a mm.**
**Équivalence du pas en fils par pouce en mm.**
**Equivalents of pitch in threads per inch to mm.**

| **PASO h/1”** PAS h/1” PITCH h/1” | **EQUIV. mm** ÉQUIV. mm EQUIV. mm | **PASO h/1”** PAS h/1” PITCH h/1” | **EQUIV. mm** ÉQUIV. mm EQUIV. mm | **PASO h/1”** PAS h/1” PITCH h/1” | **EQUIV. mm** ÉQUIV. mm EQUIV. mm | **PASO h/1”** PAS h/1” PITCH h/1” | **EQUIV. mm** ÉQUIV. mm EQUIV. mm | **PASO h/1”** PAS h/1” PITCH h/1” | **EQUIV. mm** ÉQUIV. mm EQUIV. mm |
|---|---|---|---|---|---|---|---|---|---|
| 80 | 0,317 | 44 | 0,577 | 26 | 0,976 | 16 | 1,587 | 9 | 2,822 |
| 72 | 0,352 | 40 | 0,636 | 24 | 1,058 | 14 | 1,814 | 8 | 3,174 |
| 64 | 0,396 | 36 | 0,705 | 22 | 1,154 | 13 | 1,953 | 7 | 3,628 |
| 60 | 0,423 | 32 | 0,793 | 20 | 1,270 | 12 | 2,116 | 6 | 4,233 |
| 56 | 0,453 | 28 | 0,907 | 19 | 1,336 | 11,5 | 2,208 | 5 | 5,080 |
| 48 | 0,523 | 27 | 0,940 | 18 | 1,411 | 11 | 2,309 | 4,5 | 5,644 |

**> Equivalencia de las roscas PG a MF.**
**Équivalence du pas PG à MF.**
**Equivalents of threads PG to MF.**

| PG | MF | PG | MF |
|---|---|---|---|
| 7 x 20 h. | 12 x 1,50 | 21 x 16 h. | 32 x 1,50 |
| 9 x 18 h. | 16 x 1,50 | 29 x 16 h. | 40 x 1,50 |
| 11 x 18 h. | 20 x 1,50 | 36 x 16 h. | 50 x 1,50 |
| 13,5 x 18 h. | 20 x 1,50 | 48 x 16 h. | 63 x 1,50 |
| 16 x 18 h. | 25 x 1,50 | | |

# DIÁMETROS PREVIOS AL ROSCADO
# DIAMÈTRES PRÉALABLES AU FILETAGE / DIAMETERS BEFORE THREAD

| M | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 1 x 0,25 | 0,75 |
| M | 1,1 x 0,25 | 0,85 |
| M | 1,2 x 0,25 | 0,95 |
| M | 1,4 x 0,3 | 1,10 |
| M | 1,6 x 0,35 | 1,25 |
| M | 1,7 x 0,35 | 1,30 |
| M | 1,8 x 0,35 | 1,45 |
| M | 2 x 0,4 | 1,60 |
| M | 2,2 x 0,45 | 1,75 |
| M | 2,3 x 0,4 | 1,90 |
| M | 2,5 x 0,45 | 2,05 |
| M | 2,6 x 0,45 | 2,10 |
| M | 3 x 0,5 | 2,50 |
| M | 3,5 x 0,6 | 2,90 |
| M | 4 x 0,7 | 3,30 |
| M | 4,5 x 0,75 | 3,70 |
| M | 5 x 0,8 | 4,20 |
| M | 6 x 1 | 5,00 |
| M | 7 x 1 | 6,00 |
| M | 8 x 1,25 | 6,80 |
| M | 9 x 1,25 | 7,80 |
| M | 10 x 1,5 | 8,50 |
| M | 11 x 1,5 | 9,50 |
| M | 12 x 1,75 | 10,20 |
| M | 14 x 2 | 12,00 |
| M | 16 x 2 | 14,00 |
| M | 18 x 2,5 | 15,50 |
| M | 20 x 2,5 | 17,50 |
| M | 22 x 2,5 | 19,50 |
| M | 24 x 3 | 21,00 |
| M | 27 x 3 | 24,00 |
| M | 30 x 3,5 | 26,50 |
| M | 33 x 3,5 | 29,50 |
| M | 36 x 4 | 32,00 |
| M | 39 x 4 | 35,00 |
| M | 42 x 4,5 | 37,50 |
| M | 45 x 4,5 | 40,50 |
| M | 48 x 5 | 43,00 |
| M | 52 x 5 | 47,00 |
| M | 56 x 5,5 | 50,50 |
| M | 60 x 5,5 | 54,50 |
| M | 64 x 6 | 58,00 |
| M | 68 x 6 | 62,00 |

| M | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 3 x 0,6 | 2,40 |
| M | 3,5 x 0,75 | 2,75 |
| M | 4 x 0,75 | 3,25 |
| M | 4 x 0,8 | 3,20 |
| M | 5 x 0,9 | 4,10 |
| M | 5 x 1 | 4,00 |
| M | 5,5 x 0,9 | 4,60 |
| M | 6 x 1,25 | 4,75 |
| M | 8 x 1,5 | 6,50 |
| M | 13 x 1,75 | 11,25 |
| M | 15 x 2 | 13,00 |

| MF | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 1 x 0,2 | 0,80 |
| M | 1,1 x 0,2 | 0,90 |
| M | 1,2 x 0,2 | 1,00 |
| M | 1,4 x 0,2 | 1,20 |
| M | 1,6 x 0,2 | 1,40 |
| M | 1,7 x 0,2 | 1,50 |
| M | 1,8 x 0,2 | 1,60 |
| M | 2 x 0,25 | 1,75 |
| M | 2,2 x 0,25 | 1,95 |
| M | 2,3 x 0,25 | 2,05 |
| M | 2,5 x 0,35 | 2,15 |
| M | 2,6 x 0,35 | 2,25 |
| M | 3 x 0,35 | 2,65 |
| M | 3,5 x 0,35 | 3,15 |
| M | 4 x 0,35 | 3,65 |
| M | 4 x 0,5 | 3,50 |
| M | 4,5 x 0,5 | 4,00 |
| M | 5 x 0,5 | 4,50 |
| M | 5,5 x 0,5 | 5,00 |
| M | 6 x 0,5 | 5,50 |
| M | 6 x 0,75 | 5,20 |
| M | 7 x 0,5 | 6,50 |
| M | 7 x 0,75 | 6,20 |
| M | 8 x 0,5 | 7,50 |
| M | 8 x 0,75 | 7,20 |
| M | 8 x 1 | 7,00 |
| M | 9 x 0,75 | 8,20 |
| M | 9 x 1 | 8,00 |
| M | 10 x 0,5 | 9,50 |
| M | 10 x 0,75 | 9,20 |
| M | 10 x 1 | 9,00 |
| M | 10 x 1,25 | 8,80 |
| M | 11 x 0,75 | 10,20 |
| M | 11 x 1 | 10,00 |
| M | 11 x 1,25 | 9,75 |
| M | 12 x 0,75 | 11,25 |
| M | 12 x 1 | 11,00 |
| M | 12 x 1,25 | 10,80 |
| M | 12 x 1,5 | 10,50 |
| M | 13 x 0,75 | 12,25 |
| M | 13 x 1 | 12,00 |
| M | 13 x 1,25 | 11,75 |
| M | 13 x 1,5 | 11,50 |
| M | 14 x 0,75 | 13,25 |
| M | 14 x 1 | 13,00 |
| M | 14 x 1,25 | 12,80 |
| M | 14 x 1,5 | 12,50 |
| M | 15 x 1 | 14,00 |
| M | 15 x 1,25 | 13,75 |
| M | 15 x 1,5 | 13,50 |
| M | 16 x 1 | 15,00 |
| M | 16 x 1,25 | 14,75 |
| M | 16 x 1,5 | 14,50 |
| M | 17 x 1 | 16,00 |
| M | 17 x 1,25 | 15,75 |
| M | 17 x 1,5 | 15,50 |
| M | 18 x 1 | 17,00 |
| M | 18 x 1,25 | 16,75 |
| M | 18 x 1,5 | 16,50 |

| MF | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 18 x 2 | 16,00 |
| M | 19 x 1 | 18,00 |
| M | 19 x 1,25 | 17,75 |
| M | 19 x 1,5 | 17,50 |
| M | 20 x 1 | 19,00 |
| M | 20 x 1,25 | 18,75 |
| M | 20 x 1,5 | 18,50 |
| M | 20 x 2 | 18,00 |
| M | 21 x 1 | 20,00 |
| M | 21 x 1,25 | 19,75 |
| M | 21 x 1,5 | 19,50 |
| M | 22 x 1 | 21,00 |
| M | 22 x 1,25 | 20,75 |
| M | 22 x 1,5 | 20,50 |
| M | 22 x 2 | 20,00 |
| M | 23 x 1 | 22,00 |
| M | 23 x 1,5 | 21,50 |
| M | 24 x 1 | 23,00 |
| M | 24 x 1,25 | 22,75 |
| M | 24 x 1,5 | 22,50 |
| M | 24 x 2 | 22,00 |
| M | 25 x 1 | 24,00 |
| M | 25 x 1,25 | 23,75 |
| M | 25 x 1,5 | 23,50 |
| M | 25 x 2 | 23,00 |
| M | 26 x 1 | 25,00 |
| M | 26 x 1,5 | 24,50 |
| M | 26 x 2 | 24,00 |
| M | 27 x 1 | 26,00 |
| M | 27 x 1,5 | 25,50 |
| M | 27 x 2 | 25,00 |
| M | 28 x 1 | 27,00 |
| M | 28 x 1,5 | 26,50 |
| M | 28 x 2 | 26,00 |
| M | 30 x 1 | 29,00 |
| M | 30 x 1,5 | 28,50 |
| M | 30 x 2 | 28,00 |
| M | 30 x 3 | 27,00 |
| M | 32 x 1 | 31,00 |
| M | 32 x 1,5 | 30,50 |
| M | 32 x 2 | 30,00 |
| M | 33 x 1 | 32,00 |
| M | 33 x 1,5 | 31,50 |
| M | 33 x 2 | 31,00 |
| M | 33 x 3 | 30,00 |
| M | 34 x 1,5 | 32,50 |
| M | 34 x 2 | 32,00 |
| M | 35 x 1,5 | 33,50 |
| M | 36 x 1,5 | 34,50 |
| M | 36 x 2 | 34,00 |
| M | 36 x 3 | 33,00 |
| M | 38 x 1,5 | 36,50 |
| M | 38 x 2 | 36,00 |
| M | 39 x 1,5 | 37,50 |
| M | 39 x 2 | 37,00 |
| M | 39 x 3 | 36,00 |
| M | 40 x 1,5 | 38,50 |
| M | 40 x 2 | 38,00 |
| M | 40 x 3 | 37,00 |

| MF | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 42 x 1,5 | 40,50 |
| M | 42 x 2 | 40,00 |
| M | 42 x 3 | 39,00 |
| M | 44 x 1,5 | 42,50 |
| M | 45 x 1,5 | 43,50 |
| M | 45 x 2 | 43,00 |
| M | 45 x 3 | 42,00 |
| M | 45 x 4 | 41,00 |
| M | 48 x 1,5 | 46,50 |
| M | 48 x 2 | 46,00 |
| M | 48 x 3 | 45,00 |
| M | 48 x 4 | 44,00 |
| M | 50 x 1,5 | 48,50 |
| M | 50 x 2 | 48,00 |
| M | 50 x 3 | 47,00 |
| M | 52 x 1,5 | 50,50 |
| M | 52 x 2 | 50,00 |
| M | 52 x 3 | 49,00 |
| M | 52 x 4 | 48,00 |
| M | 56 x 1,5 | 54,50 |
| M | 56 x 2 | 54,00 |
| M | 56 x 3 | 53,00 |
| M | 56 x 4 | 52,00 |
| M | 60 x 1,5 | 58,50 |
| M | 60 x 2 | 58,00 |
| M | 60 x 3 | 57,00 |
| M | 60 x 4 | 56,00 |
| M | 63 x 1,5 | 61,50 |

| BSW | d1 (") - p (tpi) | ⌀a |
|---|---|---|
| W | 1/16 - 60 | 1,15 |
| W | 3/32 - 48 | 1,80 |
| W | 1/8 - 40 | 2,50 |
| W | 5/32 - 32 | 3,10 |
| W | 3/16 - 24 | 3,60 |
| W | 7/32 - 24 | 4,40 |
| W | 1/4 - 20 | 5,10 |
| W | 9/32 - 20 | 5,90 |
| W | 5/16 - 18 | 6,50 |
| W | 3/8 - 16 | 7,90 |
| W | 7/16 - 14 | 9,30 |
| W | 1/2 - 12 | 10,50 |
| W | 9/16 - 12 | 12,00 |
| W | 5/8 - 11 | 13,50 |
| W | 11/16 - 11 | 15,00 |
| W | 3/4 - 10 | 16,50 |
| W | 13/16 - 10 | 18,00 |
| W | 7/8 - 9 | 19,25 |
| W | 1" - 8 | 22,00 |
| W | 1"1/8 - 7 | 24,75 |
| W | 1"1/4 - 7 | 27,75 |
| W | 1"3/8 - 6 | 30,50 |
| W | 1"1/2 - 6 | 33,50 |
| W | 1"5/8 - 5 | 35,50 |
| W | 1"3/4 - 5 | 39,00 |
| W | 1"7/8 - 4,5 | 41,50 |

# DIÁMETROS PREVIOS AL ROSCADO
# DIAMÈTRES PRÉALABLES AU FILETAGE / DIAMETERS BEFORE THREAD

**BSW**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| W | 2" | - | 4,5 | 44,50 |
| W | 2"1/4 | - | 4 | 50,00 |
| W | 2"1/2 | - | 4 | 56,50 |
| W | 2"3/4 | - | 3,5 | 62,00 |
| W | 3" | - | 3,5 | 68,50 |

**UNC**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| UNC | 1"3/4 | - | 5 | 39,50 |
| UNC | 2" | - | 4,5 | 45,00 |
| UNC | 2"1/4 | - | 4,5 | 51,50 |
| UNC | 2"1/2 | - | 4 | 57,25 |
| UNC | 2"3/4 | - | 4 | 63,50 |
| UNC | 3" | - | 4 | 70,00 |

**UNEF**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| UNEF | 1"7/16 | - | 18 | 35,10 |
| UNEF | 1"1/2 | - | 18 | 36,70 |
| UNEF | 1"9/16 | - | 18 | 38,30 |
| UNEF | 1"5/8 | - | 18 | 39,90 |

**BSF**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| BSF | 3/16 | - | 32 | 4,00 |
| BSF | 7/32 | - | 28 | 4,50 |
| BSF | 1/4 | - | 26 | 5,20 |
| BSF | 9/32 | - | 26 | 6,00 |
| BSF | 5/16 | - | 22 | 6,60 |
| BSF | 3/8 | - | 20 | 8,10 |
| BSF | 7/16 | - | 18 | 9,50 |
| BSF | 1/2 | - | 16 | 11,00 |
| BSF | 9/16 | - | 16 | 12,50 |
| BSF | 5/8 | - | 14 | 14,00 |
| BSF | 11/16 | - | 14 | 15,60 |
| BSF | 3/4 | - | 12 | 16,50 |
| BSF | 13/16 | - | 12 | 18,25 |
| BSF | 7/8 | - | 11 | 19,50 |
| BSF | 1" | - | 10 | 22,50 |
| BSF | 1"1/8 | - | 9 | 25,50 |
| BSF | 1"1/4 | - | 9 | 28,75 |
| BSF | 1"3/8 | - | 8 | 31,50 |
| BSF | 1"1/2 | - | 8 | 34,50 |
| BSF | 1"5/8 | - | 8 | 37,50 |
| BSF | 1"3/4 | - | 7 | 40,50 |
| BSF | 2" | - | 7 | 46,50 |

**UNF**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| UNF | N.0 | - | 80 | 1,30 |
| UNF | N.1 | - | 72 | 1,60 |
| UNF | N.2 | - | 64 | 1,90 |
| UNF | N.3 | - | 56 | 2,10 |
| UNF | N.4 | - | 48 | 2,40 |
| UNF | N.5 | - | 44 | 2,70 |
| UNF | N.6 | - | 40 | 3,00 |
| UNF | N.8 | - | 36 | 3,50 |
| UNF | N.10 | - | 32 | 4,10 |
| UNF | N.12 | - | 28 | 4,70 |
| UNF | 1/4 | - | 28 | 5,50 |
| UNF | 5/16 | - | 24 | 6,90 |
| UNF | 3/8 | - | 24 | 8,50 |
| UNF | 7/16 | - | 20 | 9,90 |
| UNF | 1/2 | - | 20 | 11,50 |
| UNF | 9/16 | - | 18 | 12,90 |
| UNF | 5/8 | - | 18 | 14,50 |
| UNF | 3/4 | - | 16 | 17,50 |
| UNF | 7/8 | - | 14 | 20,40 |
| UNF | 1" | - | 12 | 23,25 |
| UNF | 1"1/8 | - | 12 | 26,50 |
| UNF | 1"1/4 | - | 12 | 29,50 |
| UNF | 1"3/8 | - | 12 | 32,75 |
| UNF | 1"1/2 | - | 12 | 36,00 |

**G (BSP)**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| G1/16 | | - | 28 | 6,80 |
| G1/8 | | - | 28 | 8,80 |
| G1/4 | | - | 19 | 11,80 |
| G3/8 | | - | 19 | 15,25 |
| G1/2 | | - | 14 | 19,00 |
| G5/8 | | - | 14 | 21,00 |
| G3/4 | | - | 14 | 24,50 |
| G7/8 | | - | 14 | 28,25 |
| G1" | | - | 11 | 30,75 |
| G1"1/8 | | - | 11 | 35,30 |
| G1"1/4 | | - | 11 | 39,25 |
| G1"3/8 | | - | 11 | 41,90 |
| G1"1/2 | | - | 11 | 45,25 |
| G1"3/4 | | - | 11 | 51,30 |
| G2" | | - | 11 | 57,00 |
| G2"1/4 | | - | 11 | 63,10 |
| G2"1/2 | | - | 11 | 72,60 |
| G2"3/4 | | - | 11 | 79,10 |
| G3" | | - | 11 | 85,50 |
| G3"1/4 | | - | 11 | 91,50 |
| G3"1/2 | | - | 11 | 97,70 |
| G3"3/4 | | - | 11 | 104,00 |
| G4" | | - | 11 | 110,50 |

**UNC**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| UNC | N.1 | - | 64 | 1,50 |
| UNC | N.2 | - | 56 | 1,80 |
| UNC | N.3 | - | 48 | 2,10 |
| UNC | N.4 | - | 40 | 2,30 |
| UNC | N.5 | - | 40 | 2,60 |
| UNC | N.6 | - | 32 | 2,85 |
| UNC | N.8 | - | 32 | 3,50 |
| UNC | N.10 | - | 24 | 3,90 |
| UNC | N.12 | - | 24 | 4,50 |
| UNC | 1/4 | - | 20 | 5,20 |
| UNC | 5/16 | - | 18 | 6,60 |
| UNC | 3/8 | - | 16 | 8,00 |
| UNC | 7/16 | - | 14 | 9,40 |
| UNC | 1/2 | - | 13 | 10,75 |
| UNC | 9/16 | - | 12 | 12,20 |
| UNC | 5/8 | - | 11 | 13,50 |
| UNC | 3/4 | - | 10 | 16,50 |
| UNC | 7/8 | - | 9 | 19,50 |
| UNC | 1" | - | 8 | 22,25 |
| UNC | 1"1/8 | - | 7 | 25,00 |
| UNC | 1"1/4 | - | 7 | 28,25 |
| UNC | 1"3/8 | - | 6 | 30,75 |
| UNC | 1"1/2 | - | 6 | 34,00 |

**UNEF**

| d1 (") - p (tpi) | | | | ⌀a |
|---|---|---|---|---|
| UNEF | N.12 | - | 32 | 4,70 |
| UNEF | 1/4 | - | 32 | 5,55 |
| UNEF | 5/16 | - | 32 | 7,15 |
| UNEF | 3/8 | - | 32 | 8,70 |
| UNEF | 7/16 | - | 28 | 10,20 |
| UNEF | 1/2 | - | 28 | 11,80 |
| UNEF | 9/16 | - | 24 | 13,20 |
| UNEF | 5/8 | - | 24 | 14,80 |
| UNEF | 11/16 | - | 24 | 16,40 |
| UNEF | 3/4 | - | 20 | 17,80 |
| UNEF | 13/16 | - | 20 | 19,40 |
| UNEF | 7/8 | - | 20 | 20,95 |
| UNEF | 15/16 | - | 20 | 22,50 |
| UNEF | 1" | - | 20 | 24,10 |
| UNEF | 1"1/16 | - | 18 | 25,60 |
| UNEF | 1"1/8 | - | 18 | 27,15 |
| UNEF | 1"3/16 | - | 18 | 28,75 |
| UNEF | 1"1/4 | - | 18 | 30,35 |
| UNEF | 1"5/16 | - | 18 | 31,90 |
| UNEF | 1"3/8 | - | 18 | 33,60 |

**BA**

| d1 (") - p (tpi) | | | | |
|---|---|---|---|---|
| BA 7 | 2,5 | - | 0,48 | 2,00 |
| BA 8 | 2,2 | - | 0,43 | 1,80 |
| BA 9 | 1,9 | - | 0,39 | 1,50 |
| BA 10 | 1,7 | - | 0,35 | 1,30 |
| BA 11 | 1,5 | - | 0,31 | 1,20 |
| BA 12 | 1,3 | - | 0,28 | 1,00 |
| BA 13 | 1,2 | - | 0,25 | 0,95 |
| BA 14 | 1 | - | 0,23 | 0,75 |

**PG**

| d1 (") - p (tpi) | | | | |
|---|---|---|---|---|
| Pg 7 | 12,5 | - | 20 | 11,40 |
| Pg 9 | 15,2 | - | 18 | 14,00 |
| Pg 11 | 18,6 | - | 18 | 17,25 |
| Pg 13,5 | 20,4 | - | 18 | 19,00 |
| Pg 16 | 22,5 | - | 18 | 21,25 |
| Pg 21 | 28,3 | - | 16 | 26,75 |
| Pg 29 | 37,0 | - | 16 | 35,50 |
| Pg 36 | 47,0 | - | 16 | 45,50 |
| Pg 42 | 54,0 | - | 16 | 52,50 |
| Pg 48 | 59,3 | - | 16 | 58,00 |

# DIÁMETROS PREVIOS AL ROSCADO
# DIAMÈTRES PRÉALABLES AU FILETAGE / DIAMETERS BEFORE THREAD

**BA**

| d1 (") - p (tpi) | ⌀a |
|---|---|
| Rp1/16 - 28 | 6,60 |
| Rp1/8 - 28 | 8,60 |
| Rp1/4 - 19 | 11,50 |
| Rp3/8 - 19 | 15,00 |
| Rp1/2 - 14 | 18,50 |
| Rp3/4 - 14 | 24,00 |
| Rp1" - 11 | 30,25 |
| Rp1"1/4 - 11 | 39,00 |
| Rp1"1/2 - 11 | 45,00 |
| Rp2" - 11 | 56,50 |
| Rp2"1/2 - 11 | 72,25 |
| Rp3" - 11 | 85,00 |

**NPSM**

| d1 (") - p (tpi) | ⌀a |
|---|---|
| NPSM 1/8 - 27 | 9,10 |
| NPSM 1/4 - 18 | 12,00 |
| NPSM 3/8 - 18 | 15,50 |
| NPSM 1/2 - 14 | 19,00 |
| NPSM 3/4 - 14 | 24,50 |
| NPSM 1" - 11,5 | 30,50 |
| NPSM 1"1/4 - 11,5 | 39,25 |
| NPSM 1"1/2 - 11,5 | 45,50 |
| NPSM 2" - 11,5 | 57,50 |
| NPSM 2"1/2 - 8 | 69,00 |
| NPSM 3" - 8 | 85,00 |

**M (Laminación** Laminage/Lamination)

| d1 - p (mm) | ○a ± 0,02 |
|---|---|
| M 3 x 0,5 | 2,76 |
| M 4 x 0,7 | 3,67 |
| M 5 x 0,8 | 4,62 |
| M 6 x 1 | 5,52 |
| M 8 x 1,25 | 7,40 |
| M 10 x 1,5 | 9,28 |
| M 12 x 1,75 | 11,16 |
| M 14 x 2 | 13,04 |
| M 16 x 2 | 15,03 |

**Rp**

| d1 (") - p (tpi) | ⌀a |
|---|---|
| BA 0 6 - 1 | 5,10 |
| BA 1 5,3 - 0,9 | 4,50 |
| BA 2 4,7 - 0,81 | 4,00 |
| BA 3 4,1 - 0,73 | 3,40 |
| BA 4 3,6 - 0,66 | 3,00 |
| BA 5 3,2 - 0,59 | 2,60 |
| BA 6 2,8 - 0,53 | 2,30 |

**NPT**

| d1 (") - p (tpi) | L min | ⌀a | ⌀b | ⌀c |
|---|---|---|---|---|
| NPT 1/16 - 27 | 12,00 | 6,20 | 6,00 | 6,39 |
| NPT 1/8 - 27 | 12,00 | 8,50 | 8,30 | 8,74 |
| NPT 1/4 - 18 | 17,50 | 11,00 | 10,70 | 11,36 |
| NPT 3/8 - 18 | 17,60 | 14,50 | 14,20 | 14,80 |
| NPT 1/2 - 14 | 22,80 | 17,80 | 17,40 | 18,32 |
| NPT 3/4 - 14 | 23,00 | 23,00 | 22,50 | 23,67 |
| NPT 1" - 11,5 | 27,40 | 29,00 | 28,50 | 29,69 |
| NPT 1"1/4 - 11,5 | 28,00 | 37,50 | 37,00 | 38,45 |
| NPT 1"1/2 - 11,5 | 28,40 | 44,00 | 43,50 | 44,52 |
| NPT 2" - 11,5 | 28,00 | 56,00 | 55,50 | 56,56 |
| NPT 2"1/2 - 8 | 40,80 | 66,50 | 66,00 | 67,62 |
| NPT 3" - 8 | 43,00 | 82,50 | 82,00 | 83,53 |

**NPTF**

| d1 (") - p (tpi) | L min | ⌀a | ⌀b | ⌀c |
|---|---|---|---|---|
| NPTF 1/16 - 27 | 12,00 | 6,20 | 6,00 | 6,41 |
| NPTF 1/8 - 27 | 12,00 | 8,50 | 8,30 | 8,76 |
| NPTF 1/4 - 18 | 17,50 | 11,00 | 10,70 | 11,40 |
| NPTF 3/8 - 18 | 17,60 | 14,50 | 14,20 | 14,84 |
| NPTF 1/2 - 14 | 22,80 | 17,80 | 17,40 | 18,33 |
| NPTF 3/4 - 14 | 23,00 | 23,00 | 22,50 | 23,68 |
| NPTF 1" - 11,5 | 27,40 | 29,00 | 28,50 | 29,72 |
| NPTF 1"1/4 - 11,5 | 28,00 | 37,50 | 37,00 | 38,48 |
| NPTF 1"1/2 - 11,5 | 28,40 | 44,00 | 43,50 | 44,55 |
| NPTF 2" - 11,5 | 28,00 | 56,00 | 55,50 | 56,59 |
| NPTF 2"1/2 - 8 | 40,80 | 66,50 | 66,00 | 67,67 |
| NPTF 3" - 8 | 43,00 | 82,50 | 82,00 | 83,58 |

**RC**

| d1 (") - p (tpi) | L min | ⌀a | ⌀b | ⌀c |
|---|---|---|---|---|
| Rc 1/16 - 28 | 10,10 | 6,30 | 6,00 | 6,50 |
| Rc 1/8 - 28 | 10,10 | 8,30 | 8,00 | 8,50 |
| Rc 1/4 - 19 | 15,00 | 11,00 | 10,70 | 11,35 |
| Rc 3/8 - 19 | 15,40 | 14,50 | 14,15 | 14,85 |
| Rc 1/2 - 14 | 20,50 | 18,10 | 17,60 | 18,50 |
| Rc 3/4 - 14 | 21,80 | 23,50 | 23,00 | 24,00 |
| Rc 1" - 11 | 26,00 | 29,60 | 29,00 | 30,20 |
| Rc 1"1/4 - 11 | 28,30 | 38,10 | 37,50 | 38,80 |
| Rc 1"1/2 - 11 | 28,30 | 44,00 | 43,35 | 44,70 |
| Rc 2" - 11 | 32,70 | 55,60 | 54,90 | 56,50 |

**RC**

| d1 (") - p (tpi) | ⌀a |
|---|---|
| UN 1"1/8 - 8 | 25,40 |
| UN 1"1/4 - 8 | 28,50 |
| UN 1"3/8 - 8 | 31,75 |
| UN 1"1/2 - 8 | 35,00 |
| UN 1"5/8 - 8 | 38,10 |
| UN 1"3/4 - 8 | 41,25 |
| UN 2" - 8 | 47,63 |
| UN 2"1/4 - 8 | 54,00 |
| UN 2"1/2 - 8 | 60,35 |
| UN 2"3/4 8 | 66,70 |
| UN 3" - 8 | 73,05 |

# EJES PREVIOS AL ROSCADO
# AXES PRÉALABLES AU FILETAGE / SHAFTS BEFORE THREAD

| M | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 1 x 0,25 | 0,97 |
| M | 1,1 x 0,25 | 1,07 |
| M | 1,2 x 0,25 | 1,17 |
| M | 1,4 x 0,3 | 1,36 |
| M | 1,6 x 0,35 | 1,54 |
| M | 1,7 x 0,35 | 1,64 |
| M | 1,8 x 0,35 | 1,74 |
| M | 2 x 0,4 | 1,93 |
| M | 2,2 x 0,45 | 2,13 |
| M | 2,3 x 0,4 | 2,23 |
| M | 2,5 x 0,45 | 2,43 |
| M | 2,6 x 0,45 | 2,53 |
| M | 3 x 0,5 | 2,92 |
| M | 3,5 x 0,6 | 3,41 |
| M | 4 x 0,7 | 3,91 |
| M | 4,5 x 0,75 | 4,41 |
| M | 5 x 0,8 | 4,90 |
| M | 6 x 1 | 5,88 |
| M | 7 x 1 | 6,88 |
| M | 8 x 1,25 | 7,87 |
| M | 9 x 1,25 | 8,87 |
| M | 10 x 1,5 | 9,85 |
| M | 11 x 1,5 | 10,85 |
| M | 12 x 1,75 | 11,83 |
| M | 14 x 2 | 13,82 |
| M | 16 x 2 | 15,82 |
| M | 18 x 2,5 | 17,79 |
| M | 20 x 2,5 | 19,79 |
| M | 22 x 2,5 | 21,79 |
| M | 24 x 3 | 23,77 |
| M | 27 x 3 | 26,77 |
| M | 30 x 3,5 | 29,73 |
| M | 33 x 3,5 | 32,73 |
| M | 36 x 4 | 35,70 |
| M | 39 x 4 | 38,70 |
| M | 42 x 4,5 | 41,69 |
| M | 45 x 4,5 | 44,69 |
| M | 48 x 5 | 47,66 |
| M | 52 x 5 | 51,66 |
| M | 56 x 5,5 | 55,65 |
| M | 60 x 5,5 | 59,65 |
| M | 64 x 6 | 63,62 |
| M | 68 x 6 | 67,62 |

| M | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 3 x 0,6 | 2,40 |
| M | 3,5 x 0,75 | 2,75 |
| M | 4 x 0,75 | 3,25 |
| M | 4 x 0,8 | 3,20 |
| M | 5 x 0,9 | 4,10 |
| M | 5 x 1 | 4,00 |
| M | 5,5 x 0,9 | 4,60 |
| M | 6 x 1,25 | 4,75 |
| M | 8 x 1,5 | 6,50 |
| M | 13 x 1,75 | 11,25 |
| M | 15 x 2 | 13,00 |

| MF | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 2 x 0,25 | 1,97 |
| M | 2,2 x 0,25 | 2,17 |
| M | 2,3 x 0,25 | 2,27 |
| M | 2,5 x 0,35 | 2,44 |
| M | 2,6 x 0,35 | 2,54 |
| M | 3 x 0,35 | 2,94 |
| M | 3,5 x 0,35 | 3,44 |
| M | 4 x 0,35 | 3,94 |
| M | 4 x 0,5 | 3,93 |
| M | 4,5 x 0,5 | 4,42 |
| M | 5 x 0,5 | 4,93 |
| M | 5,5 x 0,5 | 5,42 |
| M | 6 x 0,5 | 5,93 |
| M | 6 x 0,75 | 5,90 |
| M | 7 x 0,5 | 6,92 |
| M | 7 x 0,75 | 6,90 |
| M | 8 x 0,5 | 7,93 |
| M | 8 x 0,75 | 7,90 |
| M | 8 x 1 | 7,88 |
| M | 9 x 0,75 | 8,90 |
| M | 9 x 1 | 8,88 |
| M | 10 x 0,5 | 9,93 |
| M | 10 x 0,75 | 9,90 |
| M | 10 x 1 | 9,88 |
| M | 10 x 1,25 | 9,86 |
| M | 11 x 0,75 | 10,90 |
| M | 11 x 1 | 10,88 |
| M | 11 x 1,25 | 10,87 |
| M | 12 x 0,75 | 11,90 |
| M | 12 x 1 | 11,88 |
| M | 12 x 1,25 | 11,86 |
| M | 12 x 1,5 | 11,85 |
| M | 13 x 0,75 | 12,90 |
| M | 13 x 1 | 12,88 |
| M | 13 x 1,25 | 12,87 |
| M | 13 x 1,5 | 12,85 |
| M | 14 x 0,75 | 13,90 |
| M | 14 x 1 | 13,88 |
| M | 14 x 1,25 | 13,86 |
| M | 14 x 1,5 | 13,85 |
| M | 15 x 1 | 14,88 |
| M | 15 x 1,25 | 14,87 |
| M | 15 x 1,5 | 14,85 |
| M | 16 x 1 | 15,88 |
| M | 16 x 1,25 | 15,87 |
| M | 16 x 1,5 | 15,85 |
| M | 17 x 1,25 | 16,87 |
| M | 17 x 1,5 | 16,85 |
| M | 18 x 1 | 17,88 |
| M | 18 x 1,25 | 17,85 |
| M | 18 x 1,5 | 17,85 |
| M | 18 x 2 | 17,82 |
| M | 19 x 1 | 18,88 |
| M | 19 x 1,25 | 18,87 |
| M | 19 x 1,5 | 18,85 |
| M | 20 x 1 | 19,88 |
| M | 20 x 1,25 | 19,87 |
| M | 20 x 1,5 | 19,85 |
| M | 20 x 2 | 19,82 |

| MF | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 21 x 1 | 20,88 |
| M | 21 x 1,25 | 20,87 |
| M | 21 x 1,5 | 20,85 |
| M | 22 x 1 | 21,88 |
| M | 22 x 1,25 | 21,87 |
| M | 22 x 1,5 | 21,85 |
| M | 22 x 2 | 21,82 |
| M | 23 x 1 | 22,88 |
| M | 23 x 1,5 | 22,85 |
| M | 24 x 1 | 23,88 |
| M | 24 x 1,25 | 23,87 |
| M | 24 x 1,5 | 23,85 |
| M | 24 x 2 | 23,82 |
| M | 25 x 1 | 24,88 |
| M | 25 x 1,25 | 24,87 |
| M | 25 x 1,5 | 24,85 |
| M | 25 x 2 | 24,82 |
| M | 26 x 1 | 25,88 |
| M | 26 x 1,5 | 25,85 |
| M | 26 x 2 | 25,82 |
| M | 27 x 1 | 26,88 |
| M | 27 x 1,5 | 26,85 |
| M | 27 x 2 | 26,82 |
| M | 28 x 1 | 27,88 |
| M | 28 x 1,5 | 27,85 |
| M | 28 x 2 | 27,82 |
| M | 30 x 1 | 29,88 |
| M | 30 x 1,5 | 29,85 |
| M | 30 x 2 | 29,82 |
| M | 30 x 3 | 29,76 |
| M | 32 x 1 | 31,88 |
| M | 32 x 1,5 | 31,85 |
| M | 32 x 2 | 31,82 |
| M | 33 x 1 | 32,88 |
| M | 33 x 1,5 | 32,85 |
| M | 33 x 2 | 32,82 |
| M | 33 x 3 | 32,76 |
| M | 34 x 1,5 | 33,85 |
| M | 34 x 2 | 33,82 |
| M | 35 x 1,5 | 34,85 |
| M | 36 x 1,5 | 35,85 |
| M | 36 x 2 | 35,82 |
| M | 36 x 3 | 35,76 |
| M | 38 x 1,5 | 37,85 |
| M | 38 x 2 | 37,82 |
| M | 39 x 1,5 | 38,85 |
| M | 39 x 2 | 38,82 |
| M | 39 x 3 | 38,76 |
| M | 40 x 1,5 | 39,85 |
| M | 40 x 2 | 39,82 |
| M | 40 x 3 | 39,76 |
| M | 42 x 1,5 | 41,85 |
| M | 42 x 2 | 41,82 |
| M | 42 x 3 | 41,76 |
| M | 44 x 1,5 | 43,75 |
| M | 45 x 1,5 | 44,85 |
| M | 45 x 2 | 44,82 |
| M | 45 x 3 | 44,76 |
| M | 45 x 4 | 44,70 |

| MF | d1 x p (mm) | ⌀a |
|---|---|---|
| M | 48 x 1,5 | 47,85 |
| M | 48 x 2 | 47,82 |
| M | 48 x 3 | 47,76 |
| M | 48 x 4 | 47,70 |
| M | 50 x 1,5 | 49,85 |
| M | 50 x 2 | 49,82 |
| M | 50 x 3 | 49,76 |
| M | 52 x 1,5 | 51,85 |
| M | 52 x 2 | 51,82 |
| M | 52 x 3 | 51,76 |
| M | 52 x 4 | 51,70 |
| M | 56 x 1,5 | 55,85 |
| M | 56 x 2 | 55,82 |
| M | 56 x 3 | 55,76 |
| M | 56 x 4 | 55,70 |
| M | 60 x 1,5 | 59,75 |
| M | 60 x 2 | 59,82 |
| M | 60 x 3 | 59,76 |
| M | 60 x 4 | 59,70 |
| M | 63 x 1,5 | 62,85 |

| BSW | d1 (") - p (tpi) | ⌀a |
|---|---|---|
| W | 1/16 - 60 | 1,49 |
| W | 3/32 - 48 | 2,28 |
| W | 1/8 - 40 | 3,06 |
| W | 5/32 - 32 | 3,85 |
| W | 3/16 - 24 | 4,63 |
| W | 7/32 - 24 | 5,42 |
| W | 1/4 - 20 | 6,18 |
| W | 5/16 - 18 | 7,78 |
| W | 3/8 - 16 | 9,35 |
| W | 7/16 - 14 | 10,90 |
| W | 1/2 - 12 | 12,47 |
| W | 9/16 - 12 | 13,92 |
| W | 5/8 - 11 | 15,66 |
| W | 11/16 - 11 | 17,20 |
| W | 3/4 - 10 | 18,80 |
| W | 7/8 - 9 | 21,92 |
| W | 1" - 8 | 25,11 |
| W | 1"1/8 - 7 | 28,28 |
| W | 1"1/4 - 7 | 31,45 |
| W | 1"3/8 - 6 | 34,57 |
| W | 1"1/2 - 6 | 37,76 |
| W | 1"5/8 - 5 | 40,91 |
| W | 1"3/4 - 5 | 44,05 |
| W | 1"7/8 - 4,5 | 47,27 |
| W | 2" - 4,5 | 50,38 |
| W | 2"1/4 - 4 | 56,90 |
| W | 2"1/2 - 4 | 63,20 |
| W | 2"3/4 - 3,5 | 69,60 |
| W | 3" - 3,5 | 76,20 |

# EJES PREVIOS AL ROSCADO
# AXES PRÉALABLES AU FILETAGE / SHAFTS BEFORE THREAD



## UNC

| d1 (") - p (tpi) | ⌀a |
|---|---|
| UNC N.1- 64 | 1,79 |
| UNC N.2- 56 | 2,12 |
| UNC N.3- 48 | 2,44 |
| UNC N.4- 40 | 2,76 |
| UNC N.5- 40 | 3,09 |
| UNC N.6- 32 | 3,41 |
| UNC N.8- 32 | 4,07 |
| UNC N.10- 24 | 4,71 |
| UNC N.12- 24 | 5,37 |
| UNC 1/4- 20 | 6,22 |
| UNC 5/16- 18 | 7,8 |
| UNC 3/8- 16 | 9,37 |
| UNC 7/16- 14 | 10,95 |
| UNC 1/2- 13 | 12,52 |
| UNC 9/16- 12 | 14,10 |
| UNC 5/8- 11 | 15,68 |
| UNC 3/4- 10 | 18,84 |
| UNC 7/8- 9 | 22,00 |
| UNC 1"- 8 | 25,16 |
| UNC 1"1/8- 7 | 28,31 |
| UNC 1"1/4- 7 | 31,49 |
| UNC 1"3/8- 6 | 34,63 |
| UNC 1"1/2- 6 | 37,81 |
| UNC 1"3/4- 5 | 44,12 |
| UNC 2"- 4,5 | 50,45 |
| UNC 2"1/4- 4,5 | 56,80 |
| UNC 2"1/2- 4 | 63,10 |
| UNC 2"3/4- 4 | 69,45 |
| UNC 3"- 4 | 75,80 |

## UNF

| d1 (") - p (tpi) | ⌀a |
|---|---|
| UNF N.0- 80 | 1,47 |
| UNF N.1- 72 | 1,79 |
| UNF N.2- 64 | 2,12 |
| UNF N.3- 56 | 2,44 |
| UNF N.4- 48 | 2,77 |
| UNF N.5- 44 | 3,10 |
| UNF N.6- 40 | 3,42 |
| UNF N.8- 36 | 4,08 |
| UNF N.10- 32 | 4,73 |
| UNF N.12- 28 | 5,38 |
| UNF 1/4- 28 | 6,24 |
| UNF 5/16- 24 | 7,82 |
| UNF 3/8- 24 | 9,41 |
| UNF 7/16- 20 | 10,98 |
| UNF 1/2- 20 | 12,56 |
| UNF 9/16- 18 | 14,14 |
| UNF 5/8- 18 | 15,73 |
| UNF 3/4- 16 | 18,89 |
| UNF 7/8- 14 | 22,05 |
| UNF 1"- 12 | 25,21 |
| UNF 1"1/8- 12 | 28,38 |
| UNF 1"1/4- 12 | 31,56 |
| UNF 1"3/8- 12 | 34,73 |
| UNF 1"1/2- 12 | 37,91 |

## UNEF

| d1 (") - p (tpi) | ⌀a |
|---|---|
| UNEF N.12- 32 | 5,39 |
| UNEF 1/4- 32 | 6,25 |
| UNEF 5/16- 32 | 7,84 |
| UNEF 3/8- 32 | 9,42 |
| UNEF 7/16- 28 | 11,00 |
| UNEF 1/2- 28 | 12,59 |
| UNEF 9/16- 24 | 14,18 |
| UNEF 5/8- 24 | 15,75 |
| UNEF 3/4- 20 | 18,91 |
| UNEF 7/8- 20 | 22,09 |
| UNEF 1"- 20 | 25,26 |
| UNEF 1"1/8- 18 | 28,40 |
| UNEF 1"1/4- 18 | 31,59 |
| UNEF 1"3/8- 18 | 34,76 |
| UNEF 1"1/2- 18 | 37,94 |

## G (BSP)

| d1 (") - p (tpi) | ⌀a |
|---|---|
| G 1/16- 28 | 7,61 |
| G 1/8- 28 | 9,62 |
| G 1/4- 19 | 13,03 |
| G 3/8- 19 | 16,53 |
| G 1/2- 14 | 20,81 |
| G 5/8- 14 | 22,77 |
| G 3/4- 14 | 26,30 |
| G 7/8- 14 | 30,06 |
| G 1"- 11 | 33,07 |
| G 1"1/8- 11 | 37,71 |
| G 1"1/4- 11 | 41,73 |
| G 1"3/8- 11 | 44,14 |
| G 1"1/2- 11 | 47,62 |
| G 1"3/4- 11 | 53,56 |
| G 2"- 11 | 59,43 |
| G 2"1/4- 11 | 65,49 |
| G 2"1/2- 11 | 74,94 |
| G 2"3/4- 11 | 81,27 |
| G 3"- 11 | 87,57 |
| G 3"1/4- 11 | 93,68 |
| G 3"1/2- 11 | 100,01 |
| G 3"3/4- 11 | 106,35 |
| G 4"- 11 | 112,68 |

## BA

| d1 (") - p (tpi) | ⌀a |
|---|---|
| BA 0 6-1 | 5,93 |
| BA 1 5,3- 0,9 | 5,23 |
| BA 2 4,7- 0,81 | 4,64 |
| BA 3 4,1- 0,73 | 4,04 |
| BA 4 3,6- 0,66 | 3,55 |
| BA 5 3,2- 0,59 | 3,15 |
| BA 6 2,8- 0,53 | 2,76 |
| BA 7 2,5- 0,48 | 2,46 |
| BA 8 2,2- 0,43 | 2,16 |

## PG

| d1 (") - p (tpi) | ⌀a |
|---|---|
| Pg 7 12,5- 20 | 12,40 |
| Pg 9 15,2- 18 | 15,10 |
| Pg 11 18,6- 18 | 18,50 |
| Pg 13,5 20,4- 18 | 20,30 |
| Pg 16 22,5- 18 | 22,40 |
| Pg 21 28,3- 16 | 28,15 |
| Pg 29 37,0- 16 | 36,85 |
| Pg 36 47,0- 16 | 46,85 |
| Pg 42 54,0- 16 | 53,85 |
| Pg 48 59,3- 16 | 59,15 |

## NPSM

| d1 (") - p (tpi) | ⌀a |
|---|---|
| NPSM 1/8- 27 | 4,99 |
| NPSM 1/4- 18 | 13,24 |
| NPSM 3/8- 18 | 16,70 |
| NPSM 1/2- 14 | 20,77 |
| NPSM 3/4- 14 | 26,13 |
| NPSM 1"- 11,5 | 32,68 |
| NPSM 1"1/4- 11,5 | 41,45 |
| NPSM 1"1/2- 11,5 | 47,52 |
| NPSM 2" - 11,5 | 59,56 |

## NPT

| d1 (") - p (tpi) | L min | ⌀a |
|---|---|---|
| NPT 1/16- 27 | 8,40 | 7,58 |
| NPT 1/8- 27 | 8,50 | 9,93 |
| NPT 1/4- 18 | 12,70 | 13,18 |
| NPT 3/8- 18 | 12,90 | 16,60 |
| NPT 1/2- 14 | 16,80 | 20,63 |
| NPT 3/4- 14 | 17,10 | 25,95 |
| NPT 1"- 11,5 | 21,30 | 32,51 |
| NPT 1"1/4- 11,5 | 21,90 | 41,23 |
| NPT 1"1/2- 11,5 | 22,30 | 47,30 |
| NPT 2" - 11,5 | 23,10 | 59,31 |

## NPTF

| d1 (") - p (tpi) | L min | ⌀a |
|---|---|---|
| NPTF 1/16- 27 | 8,40 | 7,58 |
| NPTF 1/8- 27 | 8,50 | 9,93 |
| NPTF 1/4- 18 | 12,70 | 13,18 |
| NPTF 3/8- 18 | 12,90 | 16,60 |
| NPTF 1/2- 14 | 16,80 | 20,63 |
| NPTF 3/4- 14 | 17,10 | 25,95 |
| NPTF 1"- 11,5 | 21,30 | 32,51 |
| NPTF 1"1/4- 11,5 | 21,90 | 41,23 |
| NPTF 1"1/2- 11,5 | 22,30 | 47,30 |
| NPTF 2" - 11,5 | 23,10 | 59,31 |

## R

| d1 (") - p (tpi) | L min | ⌀a |
|---|---|---|
| R 1/8- 28 | 8,20 | 9,48 |
| R 1/4- 19 | 12,10 | 12,78 |
| R 3/8- 19 | 12,50 | 16,26 |
| R 1/2- 14 | 16,40 | 20,44 |
| R 3/4- 14 | 17,70 | 25,85 |
| R 1"- 11 | 20,90 | 32,60 |
| R 1"1/4- 11 | 23,20 | 41,12 |
| R 1"1/2- 11 | 23,20 | 47,01 |
| R 2" - 11 | 27,50 | 58,62 |

## BSF

| d1 (") - p (tpi) | ⌀a |
|---|---|
| BSF 3/16 - 32 | 4,67 |
| BSF 7/32 - 28 | 5,47 |
| BSF 1/4 - 26 | 6,25 |
| BSF 5/16 - 22 | 7,82 |
| BSF 3/8 - 20 | 9,39 |
| BSF 7/16 - 18 | 10,97 |
| BSF 1/2 - 16 | 12,54 |
| BSF 9/16 - 16 | 14,12 |
| BSF 5/8 - 14 | 15,71 |
| BSF 11/16 - 14 | 17,30 |
| BSF 3/4 - 12 | 18,85 |
| BSF 7/8 - 11 | 22,02 |
| BSF 1" - 10 | 25,17 |
| BSF 1"1/8 - 9 | 24,40 |
| BSF 1"1/4 - 9 | 31,60 |
| BSF 1"3/8 - 8 | 34,70 |
| BSF 1"1/2 - 8 | 37,90 |
| BSF 1"5/8 - 8 | 41,10 |
| BSF 1"3/4 - 7 | 44,20 |
| BSF 2" - 7 | 50,60 |

# TABLA DE CONVERSIÓN DE PULGADAS A MILÍMETROS

**Calculado: 1 pulgada = 25,4 mm. (exactos), ver DIN 4890 (edición 2/75)**

Milímetros

| Parte de pulgadas | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 25,400 0 | 50,800 0 | 76,200 0 | 101,600 0 | 127,000 0 | 152,400 0 | 177,800 0 | 228,600 0 | 254,000 0 | 279,400 0 | 203,200 0 |
| 1/64 | 0,015 625 | 0,396 9 | 25,796 9 | 51,196 9 | 76,596 9 | 101,996 9 | 127,396 9 | 152,796 9 | 178,196 9 | 228,996 9 | 254,396 9 | 279,796 9 | 203,596 9 |
| 1/32 | 0,031 25 | 0,793 8 | 26,193 8 | 51,593 8 | 76,993 8 | 102,393 8 | 127,793 8 | 153,193 8 | 178,593 8 | 229,393 8 | 254,793 8 | 280,193 8 | 203,393 8 |
| 3/64 | 0,046 875 | 1,190 6 | 26,590 6 | 51,990 6 | 77,390 6 | 102,790 6 | 128,190 6 | 153,590 6 | 178,990 6 | 229,790 6 | 255,190 6 | 280,590 6 | 204,390 6 |
| 1/16 | 0,062 5 | 1,587 5 | 26,987 5 | 52,387 5 | 77,787 5 | 103,187 5 | 128,587 5 | 153,987 5 | 179,387 5 | 260,187 5 | 255,587 5 | 280,987 5 | 204,787 5 |
| 5/64 | 0,078 125 | 1,984 4 | 27,384 4 | 52,784 4 | 78,181 4 | 103,584 4 | 128,984 4 | 154,384 4 | 179,784 4 | 230,584 4 | 255,984 4 | 281,384 4 | 205,180 4 |
| 3/32 | 0,093 75 | 2,381 2 | 27,781 2 | 53,181 2 | 78,581 2 | 103,981 2 | 129,381 2 | 154,781 2 | 180,181 2 | 230,981 2 | 256,381 2 | 281,781 2 | 205,581 2 |
| 7/64 | 0,109 375 | 2,778 1 | 28,178 1 | 53,578 1 | 78,978 1 | 104,378 1 | 129,778 1 | 155,178 1 | 180,578 1 | 231,378 1 | 256,778 1 | 282,178 1 | 205,578 1 |
| 1/8 | 0,125 | 3,175 0 | 28,575 0 | 53,975 0 | 79,375 2 | 104,775 0 | 130,175 0 | 155,575 0 | 150,975 0 | 231,775 0 | 257,175 0 | 282,575 0 | 206,375 0 |
| 9/64 | 0,140 625 | 3,571 9 | 28,971 9 | 54,361 9 | 79,771 9 | 105,171 9 | 130,571 9 | 155,971 9 | 181,371 9 | 232,171 9 | 257,571 9 | 282,971 9 | 206,771 9 |
| 5/32 | 0,156 25 | 3,968 8 | 29,368 8 | 54,768 8 | 80,186 8 | 105,568 8 | 130,968 8 | 156,368 8 | 181,768 8 | 232,568 8 | 257,968 8 | 283,368 8 | 207,168 8 |
| 11/64 | 0,171 875 | 4,365 6 | 29,765 6 | 55,165 6 | 80,565 6 | 105,965 6 | 131,365 6 | 156,765 6 | 182,165 6 | 232,965 6 | 258,365 6 | 283,765 6 | 207,565 6 |
| 3/16 | 0,187 5 | 4,762 5 | 30,162 5 | 55,562 5 | 80,962 5 | 106,362 5 | 131,762 5 | 157,162 5 | 182,562 5 | 233,362 5 | 258,762 5 | 284,162 5 | 207,962 5 |
| 13/64 | 0,203 125 | 5,159 4 | 30,559 4 | 55,959 4 | 81,359 4 | 106,759 4 | 132,159 4 | 157,559 4 | 182,959 4 | 233,759 4 | 259,159 4 | 284,559 4 | 208,359 4 |
| 7/32 | 0,218 75 | 5,556 2 | 30,956 2 | 56,356 2 | 81,756 2 | 107,156 2 | 132,556 2 | 157,956 2 | 183,353 2 | 234,156 2 | 259,556 2 | 284,956 2 | 208,756 2 |
| 15/64 | 0,234 375 | 5,953 1 | 31,353 1 | 56,753 1 | 82,153 1 | 107,553 1 | 132,953 1 | 158,353 1 | 183,753 1 | 234,553 1 | 259,953 1 | 285,353 1 | 209,153 1 |
| 1/4 | 0,25 | 6,350 0 | 31,750 0 | 56,150 0 | 82,550 0 | 107,950 0 | 133,350 0 | 158,750 0 | 184,150 0 | 234,950 0 | 260,350 0 | 285,750 0 | 209,550 0 |
| 17/64 | 0,265 625 | 6,746 9 | 32,146 9 | 57,546 9 | 82,946 9 | 108,346 9 | 133,746 9 | 159,146 9 | 184,546 9 | 235,346 9 | 260,746 9 | 286,146 9 | 209,946 9 |
| 9/32 | 0,281 25 | 7,143 8 | 32,543 8 | 57,943 8 | 83,343 8 | 108,743 8 | 134,143 8 | 159,543 8 | 184,943 8 | 235,743 8 | 261,143 8 | 286,543 8 | 210,343 8 |
| 19/64 | 0,296 875 | 7,540 6 | 32,940 6 | 58,340 6 | 83,740 6 | 109,140 6 | 134,540 6 | 159,940 6 | 185,340 6 | 236,140 6 | 261,540 6 | 286,940 6 | 210,740 6 |
| 5/16 | 0,312 5 | 7,937 5 | 33,337 5 | 58,737 5 | 84,137 5 | 109,537 5 | 134,937 5 | 160,337 5 | 185,737 5 | 236,537 5 | 261,937 5 | 287,337 5 | 211,137 5 |
| 21/64 | 0,328 125 | 8,334 4 | 33,734 4 | 59,134 4 | 84,534 4 | 109,934 4 | 135,334 4 | 160,734 4 | 186,134 4 | 236,934 4 | 262,334 4 | 287,734 4 | 211,534 4 |
| 11/32 | 0,343 75 | 8,731 2 | 34,131 2 | 59,531 2 | 84,931 2 | 110,331 2 | 135,731 2 | 161,131 2 | 186,531 2 | 237,331 2 | 262,731 2 | 288,131 2 | 211,931 2 |
| 23/64 | 0,359 375 | 9,128 1 | 34,528 1 | 59,928 1 | 85,328 1 | 110,728 1 | 136,128 1 | 161,528 1 | 186,928 1 | 237,728 1 | 263,128 1 | 288,528 1 | 212,328 1 |
| 3/8 | 0,375 | 9,525 0 | 34,925 0 | 60,325 0 | 85,725 0 | 111,125 0 | 136,525 0 | 161,925 0 | 187,625 0 | 238,125 0 | 263,525 0 | 288,925 0 | 212,725 0 |
| 25/64 | 0,390 625 | 9,921 9 | 35,321 9 | 60,721 9 | 86,121 9 | 111,521 9 | 136,921 9 | 162,321 9 | 187,721 9 | 238,521 9 | 263,921 9 | 289,321 9 | 213,121 9 |
| 13/32 | 0,406 25 | 10,318 8 | 35,718 8 | 61,118 8 | 86,518 8 | 111,918 8 | 137,318 8 | 162,718 8 | 188,118 8 | 238,918 8 | 264,318 8 | 289,718 8 | 213,518 8 |
| 27/64 | 0,421 875 | 10,715 6 | 36,115 6 | 61,515 6 | 86,915 6 | 112,315 6 | 137,715 6 | 163,115 6 | 188,515 6 | 239,315 6 | 264,715 6 | 290,115 6 | 213,915 6 |
| 7/16 | 0,437 5 | 11,112 5 | 36,512 5 | 61,912 5 | 87,312 5 | 112,712 5 | 138,112 5 | 163,512 5 | 188,912 5 | 239,712 5 | 265,112 5 | 290,512 5 | 214,312 5 |
| 29/64 | 0,453 125 | 11,509 4 | 36,909 4 | 62,309 4 | 87,709 4 | 113,109 4 | 138,509 4 | 163,909 4 | 189,309 4 | 240,109 4 | 265,509 4 | 290,909 4 | 214,709 4 |
| 15/32 | 0,468 75 | 11,906 2 | 37,306 2 | 62,706 2 | 88,106 2 | 113,506 2 | 138,906 2 | 164,306 2 | 189,706 2 | 240,506 2 | 265,906 2 | 291,306 2 | 215,106 2 |
| 31/64 | 0,484 375 | 12,303 1 | 37,703 1 | 63,103 1 | 88,503 1 | 113,903 1 | 139,303 1 | 164,703 1 | 190,103 1 | 240,903 1 | 266,303 1 | 291,703 1 | 215,503 1 |
| 1/2 | 0,5 | 12,700 0 | 38,100 0 | 63,500 0 | 88,900 0 | 114,300 0 | 139,700 0 | 165,100 0 | 190,500 0 | 241,300 0 | 266,700 0 | 292,100 0 | 215,900 0 |
| 33/64 | 0,515 625 | 13,096 9 | 38,496 9 | 63,896 9 | 89,296 9 | 114,696 9 | 140,096 9 | 165,496 9 | 190,896 9 | 241,696 9 | 267,096 9 | 292,496 9 | 216,296 9 |
| 17/32 | 0,531 25 | 13,493 8 | 38,893 8 | 64,293 8 | 89,693 8 | 115,093 8 | 140,493 8 | 165,893 8 | 191,293 8 | 242,093 8 | 267,493 8 | 292,893 8 | 216,693 8 |
| 35/64 | 0,546 875 | 13,890 6 | 39,290 6 | 64,690 6 | 90,090 6 | 115,490 6 | 140,890 6 | 166,290 6 | 191,690 6 | 242,490 6 | 267,890 6 | 293,290 6 | 217,090 6 |
| 9/16 | 0,562 5 | 14,287 5 | 39,687 5 | 65,087 5 | 90,487 5 | 115,887 5 | 141,287 5 | 166,687 5 | 192,087 5 | 242,887 5 | 268,287 5 | 293,687 5 | 217,487 5 |
| 37/64 | 0,578 125 | 14,684 4 | 40,084 4 | 65,484 4 | 90,884 4 | 116,284 4 | 141,684 4 | 167,084 4 | 192,484 4 | 243,284 4 | 268,684 4 | 294,084 4 | 217,884 4 |
| 19/32 | 0,593 75 | 15,081 2 | 40,481 2 | 65,8812 | 91,281 2 | 116,681 2 | 142,081 2 | 167,481 2 | 192,881 2 | 243,681 2 | 269,081 2 | 294,481 2 | 218,281 2 |
| 39/64 | 0,609 375 | 15,478 1 | 40,878 1 | 66,278 1 | 91,678 1 | 117,078 1 | 142,478 1 | 167,878 1 | 193,278 1 | 244,078 1 | 269,478 1 | 294,878 1 | 218,678 1 |
| 5/8 | 0,625 | 15,875 0 | 41,275 0 | 66,675 0 | 92,075 0 | 117,475 0 | 142,875 0 | 168,275 0 | 193,675 0 | 244,475 0 | 269,875 0 | 295,275 0 | 219,075 0 |
| 41/64 | 0,640 625 | 16,271 9 | 41,761 9 | 67,071 9 | 92,471 9 | 117,871 9 | 143,271 9 | 168,671 9 | 194,071 9 | 244,871 9 | 270,271 9 | 295,671 9 | 219,471 9 |
| 21/32 | 0,656 25 | 16,668 9 | 42,068 8 | 67,468 8 | 92,868 8 | 118,268 8 | 143,668 8 | 169,068 8 | 194,468 8 | 245,268 8 | 270,668 8 | 296,068 8 | 219,868 8 |
| 43/64 | 0,671 875 | 15,065 6 | 42,465 6 | 67,865 6 | 93,265 6 | 118,665 6 | 144,065 6 | 169,465 6 | 194,865 6 | 245,665 6 | 271,065 6 | 296,465 6 | 220,265 6 |
| 11/16 | 0,687 5 | 17,462 5 | 42,862 5 | 68,262 5 | 93,662 5 | 119,062 5 | 144,462 5 | 169,862 5 | 195,262 5 | 246,062 5 | 271,462 5 | 296,862 5 | 220,662 5 |
| 45/64 | 0,703 125 | 15,859 4 | 43,259 4 | 68,659 4 | 94,059 4 | 119,459 4 | 144,859 4 | 170,259 4 | 195,659 4 | 246,459 4 | 271,859 4 | 297,259 4 | 221,059 4 |
| 23/32 | 0,718 75 | 18,256 2 | 43,656 2 | 69,056 2 | 94,456 2 | 119,856 2 | 145,256 2 | 170,652 2 | 196,056 2 | 246,856 2 | 272,256 2 | 297,656 2 | 221,456 2 |
| 47/64 | 0,734 375 | 18,653 1 | 44,053 1 | 69,4531 | 94,853 1 | 120,253 1 | 145,653 1 | 171,053 1 | 196,453 1 | 247,253 1 | 272,653 1 | 298,053 1 | 221,853 1 |
| 3/4 | 0,75 | 19,050 0 | 44,450 0 | 69,850 0 | 95,250 0 | 120,650 0 | 146,050 0 | 171,450 0 | 196,850 0 | 247,650 0 | 273,050 0 | 298,450 0 | 222,250 0 |
| 49/64 | 0,765 625 | 19,446 9 | 44,846 9 | 70,246 9 | 95,646 9 | 121,046 9 | 146,446 9 | 171,846 9 | 197,246 9 | 248,046 9 | 273,466 9 | 298,846 9 | 222,646 9 |
| 25/32 | 0,781 25 | 19,843 8 | 45,243 8 | 70,643 8 | 96,043 8 | 121,443 8 | 146,843 8 | 172,243 8 | 197,643 8 | 248,443 8 | 273,843 8 | 299,243 8 | 223,043 8 |
| 51/64 | 0,796 875 | 20,240 6 | 45,640 6 | 71,040 6 | 96,440 6 | 121,840 6 | 147,240 6 | 172,640 6 | 198,040 6 | 248,340 6 | 274,240 6 | 299,640 6 | 223,440 6 |
| 13/16 | 0,812 5 | 20,637 5 | 46,037 5 | 71,437 5 | 96,837 5 | 122,237 5 | 147,637 5 | 173,077 5 | 198,437 5 | 249,237 5 | 274,637 5 | 300,037 5 | 223,837 5 |
| 53/64 | 0,828 125 | 21,034 4 | 46,434 4 | 71,834 4 | 97,234 4 | 122,634 4 | 148,034 4 | 173,434 4 | 198,834 4 | 249,634 4 | 275,034 4 | 300,434 4 | 224,234 4 |
| 0/32 | 0,843 75 | 21,431 2 | 46,831 2 | 72,231 2 | 97,631 2 | 123,031 2 | 148,431 2 | 173,831 2 | 199,231 2 | 250,031 2 | 275,431 2 | 300,831 2 | 224,631 2 |
| 55/64 | 0,859 375 | 21,828 1 | 47,228 1 | 72,628 1 | 98,028 1 | 123,428 1 | 148,828 1 | 174,228 1 | 199,628 1 | 250,428 1 | 275,828 1 | 301,228 1 | 225,028 1 |
| 7/8 | 0,875 | 22,225 0 | 47,625 0 | 73,025 0 | 98,425 0 | 123,825 0 | 149,225 0 | 174,625 2 | 200,025 0 | 250,825 0 | 276,225 0 | 301,625 0 | 225,425 0 |
| 57/64 | 0,890 625 | 22,621 9 | 48,021 9 | 73,421 9 | 98,821 9 | 124,221 9 | 149,621 9 | 175,021 9 | 200,421 9 | 251,221 9 | 276,621 9 | 302,021 9 | 225,821 9 |
| 29/32 | 0,906 25 | 23,018 8 | 48,418 8 | 73,818 8 | 99,218 8 | 124,618 8 | 150,018 8 | 175,418 8 | 200,818 8 | 251,618 8 | 277,018 8 | 302,418 8 | 226,218 8 |
| 59/64 | 0,921 875 | 23,415 6 | 48,815 6 | 74,215 6 | 99,615 6 | 125,015 6 | 150,415 6 | 175,815 6 | 201,215 6 | 252,015 6 | 277,415 6 | 302,815 6 | 226,615 6 |
| 15/16 | 0,937 5 | 23,812 5 | 49,212 5 | 74,612 5 | 100,012 5 | 125,412 5 | 150,812 5 | 176,212 5 | 201,612 5 | 252,412 5 | 277,812 5 | 303,212 5 | 227,012 5 |
| 61/64 | 0,953 125 | 24,209 4 | 49,609 4 | 75,009 4 | 100,409 4 | 125,809 4 | 151,209 4 | 176,609 4 | 202,009 4 | 252,809 4 | 278,209 4 | 303,609 4 | 227,409 4 |
| 31/32 | 0,968 75 | 24,606 2 | 50,006 2 | 75,406 2 | 100,806 2 | 126,206 2 | 151,606 2 | 177,006 2 | 202,406 2 | 253,206 2 | 278,606 2 | 304,006 2 | 227,806 2 |
| 63/64 | 0,984 375 | 25,003 1 | 50,403 1 | 75,803 1 | 101,203 1 | 126,603 1 | 152,003 1 | 177,403 1 | 202,803 1 | 253,603 1 | 279,003 1 | 304,403 1 | 228,203 1 |

**12" = 304,800 0**

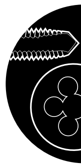
**Ejemplo: 2"1/8 = 53,975**

Milímetros

| Parte de pulgadas | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 25,400 0 | | 76,200 0 | 101,600 0 | 127,000 0 | 152,400 0 | 177,800 0 | 203,200 0 | 228,600 0 | 254,000 0 | 279,400 0 |
| 1/64 | 0,015 625 | 0,396 9 | 25,796 9 | | 76,596 9 | 101,996 9 | 127,396 9 | 152,796 9 | 178,196 9 | 203,596 9 | 228,996 9 | 254,396 9 | 279,796 9 |
| 1/32 | 0,031 25 | 0,793 8 | 26,193 8 | | 76,993 8 | 102,393 8 | 127,793 8 | 153,193 8 | 178,593 8 | 203,393 8 | 229,393 8 | 254,7938 | 280,193 8 |
| 3/64 | 0,046 875 | 1,190 6 | 26,590 6 | | 77,390 6 | 102,790 6 | 128,190 6 | 153,590 6 | 178,990 6 | 204,390 6 | 229,790 6 | 255,190 6 | 280,590 6 |
| 1/16 | 0,062 5 | 1,587 5 | 26,987 5 | | 77,787 5 | 103,187 5 | 128,587 5 | 153,987 5 | 179,387 5 | 204,787 5 | 230,187 5 | 255,587 5 | 280,987 5 |
| 5/64 | 0,078 125 | 1,984 4 | 27,384 4 | | 78,181 4 | 103,584 4 | 128,984 4 | 154,384 4 | 179,784 4 | 205,184 4 | 230,584 4 | 255,984 4 | 281,384 4 |
| 3/32 | 0,093 75 | 2,381 2 | 27,781 2 | | 78,581 2 | 103,981 2 | 129,381 2 | 154,781 2 | 180,181 2 | 205,581 2 | 230,981 2 | 256,381 2 | 281,781 2 |
| 7/64 | 0,109 375 | 2,778 1 | 28,178 1 | | 78,978 1 | 104,378 1 | 129,778 1 | 155,178 1 | 180,578 1 | 205,978 1 | 231,378 1 | 256,778 1 | 282,178 1 |
| 1/8 | | | | 53,975 0 | 79,375 0 | 104,775 0 | 130,175 0 | 155,575 0 | 180,975 0 | 206,375 0 | 231,775 0 | 257,175 0 | 282,575 0 |
| 9/64 | 0,140 625 | 3,571 9 | 28,971 9 | 54,371 9 | 79,771 9 | 105,171 9 | 130,571 9 | 155,971 9 | 181,371 9 | 206,371 9 | 232,171 9 | 257,571 9 | 282,971 9 |
| 5/32 | 0,156 25 | 3,968 8 | 29,368 8 | 54,768 8 | 80,168 8 | 105,568 8 | 130,968 8 | 156,368 8 | 181,768 8 | 207,168 8 | 232,568 8 | 257,968 8 | 283,368 8 |
| 11/64 | 0,171 875 | 4,365 6 | 29,765 6 | 55,165 6 | 80,565 6 | 105,965 6 | 131,365 6 | 156,765 6 | 182,165 6 | 207,165 6 | 232,965 6 | 258,365 6 | 283,765 6 |

# TABLA DE DATOS TÉCNICOS PARA LA INSTALACIÓN DE INSERTOS ROSCADOS
# INFORMATION TECHNIQUE POUR L' INSTALLATION DE FILETS RAPPORTES
# TECHNICAL DATA SHEET FOR THE INSTALLATION OF WIRE THREAD INSERTS

| | | | Taladro | | | | | | Rosca | | | | | | | | Inserto | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rosca | D | p | Diam. (Dt) | Longitud mínima (Lt) mm | | | | | "Diam.ext. (Dr ext) min." | "Diam.int (Dr int) min." | "Diam.int. (Dr int) max." | Longitud mínima (Lr) mm | | | | | "Diam.ext. (d1) min." | "Diam.ext. (d1) max." | Longitud (W) nº de hilos (min-max) | | | | |
| | | | mm | 1xd | 1,5xd | 2xd | 2,5xd | 3xd | mm | mm | mm | 1xd | 1,5xd | 2xd | 2,5xd | 3xd | mm | mm | 1xd | 1,5xd | 2xd | 2,5xd | 3xd |
| M | 2 | 0,40 | 2,10 | 3,80 | 4,80 | 5,80 | 6,80 | 7,80 | 2,52 | 2,09 | 2,18 | 2,00 | 3,00 | 4,00 | 5,00 | 6,00 | 2,60 | 2,80 | 3,0 - 3,3 | 5,2 - 5,7 | 7,4 - 8,1 | 9,6 - 10,5 | 11,8 - 13,0 |
| M | 2,5 | 0,45 | 2,60 | 4,52 | 5,77 | 7,02 | 8,27 | 9,52 | 3,08 | 2,60 | 2,70 | 2,50 | 3,75 | 5,00 | 6,25 | 7,50 | 3,20 | 3,70 | 3,1 - 3,8 | 5,2 - 6,5 | 7,4 - 9,2 | 9,5 - 11,9 | 11,7 - 14,6 |
| M | 3 | 0,50 | 3,20 | 5,25 | 6,75 | 8,25 | 9,75 | 11,25 | 3,65 | 3,11 | 3,22 | 3,00 | 4,50 | 6,00 | 7,50 | 9,00 | 3,80 | 4,35 | 3,4 - 4.3 | 5,8 - 7,2 | 8,2 - 10,1 | 10,5 - 12,8 | 12,9 - 16,0 |
| M | 3,5 | 0,60 | 3,70 | 6,20 | 7,95 | 9,70 | 11,45 | 13,20 | 4,28 | 3,63 | 3,76 | 3,50 | 5,25 | 7,00 | 8,75 | 10,50 | 4,55 | 4,75 | 3,4 - 4,3 | 5,8 - 7,2 | 8,2 - 10,1 | 10,5 - 12,8 | 12,9 - 16,0 |
| M | 4 | 0,70 | 4,20 | 7,15 | 9,15 | 11,15 | 13,15 | 15,15 | 4,91 | 4,15 | 4,29 | 4,00 | 6,00 | 8,00 | 10,00 | 12,00 | 5,05 | 5,60 | 3,4 - 4,0 | 5,7 - 6,8 | 8,1 - 9,6 | 10,5 - 12,3 | 12,8 - 15,1 |
| M | 5 | 0,80 | 5,20 | 8,60 | 11,10 | 13,60 | 16,10 | 18,60 | 6,04 | 5,17 | 5,33 | 5,00 | 7,50 | 10,00 | 12,50 | 15,00 | 6,25 | 6,80 | 3,9 - 4,5 | 6,5 - 7,6 | 9,2 - 10,6 | 11,8 - 13,7 | 14,4 - 16,7 |
| M | 6 | 1,00 | 6,30 | 10,50 | 13,50 | 16,50 | 19,50 | 22,50 | 7,30 | 6,22 | 6,41 | 6,00 | 9,00 | 12,00 | 15,00 | 18,00 | 7,40 | 7,95 | 3,8 - 4,3 | 6,4 - 7,2 | 9,1 - 10,1 | 11,7 - 13,1 | 14,3 - 16,0 |
| M | 7 | 1,00 | 7,30 | 11,50 | 15,00 | 18,50 | 22,00 | 25,50 | 8,30 | 7,22 | 7,41 | 7,00 | 10,50 | 14,00 | 17,50 | 21,00 | 8,65 | 9,20 | 4,6 - 5,3 | 7,7 - 8,7 | 10,7 - 12,1 | 13,7 - 15,6 | 16,7 - 19,0 |
| M | 8 | 1,25 | 8,30 | 13,62 | 17,62 | 21,62 | 25,62 | 29,62 | 9,62 | 8,27 | 8,48 | 8,00 | 12,00 | 16,00 | 20,00 | 24,00 | 9,80 | 10,35 | 4,2 - 4,8 | 7,1 - 7,8 | 9,9 - 10,9 | 12,8 - 14,1 | 15,6 - 17,2 |
| M | 8 | 1,00 | 8,30 | 12,50 | 16,50 | 20,50 | 24,50 | 28,50 | 9,30 | 8,22 | 8,41 | 8,00 | 12,00 | 16,00 | 20,00 | 24,00 | 9,70 | 10,25 | 5,6 - 6,1 | 9,1 - 10,1 | 12,5 - 13,8 | 16,0 - 17,7 | 19,5 - 21,5 |
| M | 9 | 1,25 | 9,30 | 14,62 | 19,12 | 23,62 | 28,13 | 32,62 | 10,62 | 9,27 | 9,48 | 9,00 | 13,50 | 18,00 | 22,50 | 27,00 | 10,85 | 11,10 | 5,1 - 5,5 | 8,4 - 9,0 | 11,7 - 12,5 | 15,0 - 16,1 | 18,3 - 19,6 |
| M | 10 | 1,50 | 10,40 | 16,75 | 21,75 | 26,75 | 31,75 | 36,75 | 11,95 | 10,32 | 10,56 | 10,00 | 15,00 | 20,00 | 25,00 | 30,00 | 11,95 | 12,50 | 4,6 - 5,3 | 7,7 - 8,2 | 10,8 - 11,5 | 13,8 - 14,7 | 16,9 - 18,0 |
| M | 10 | 1,25 | 10,30 | 15,62 | 20,62 | 25,62 | 30,62 | 35,62 | 11,62 | 10,27 | 10,48 | 10,00 | 15,00 | 20,00 | 25,00 | 30,00 | 12,10 | 12,65 | 5,6 - 6,1 | 9,2 - 10,0 | 12,7 - 13,8 | 16,3 - 17,7 | 19,8 - 21,5 |
| M | 10 | 1,00 | 10,30 | 14,50 | 19,50 | 24,50 | 29,50 | 34,50 | 11,30 | 10,22 | 10,41 | 10,00 | 15,00 | 20,00 | 25,00 | 30,00 | 12,10 | 12,50 | 7,3 - 8,1 | 11,7 - 12,9 | 16,1 - 17,8 | 20,5 - 22,6 | 24,9 - 27,5 |
| M | 11 | 1,50 | 11,40 | 17,75 | 23,25 | 28,75 | 34,25 | 39,75 | 12,95 | 11,33 | 11,56 | 11,00 | 16,50 | 22,00 | 27,50 | 33,00 | 13,10 | 13,50 | 5,2 - 5,6 | 8,6 - 9,2 | 12,0 - 12,8 | 15,4 - 16,4 | 18,7 - 20,0 |
| M | 12 | 1,75 | 12,40 | 19,87 | 25,87 | 31,87 | 37,87 | 43,87 | 14,27 | 12,38 | 12,64 | 12,00 | 18,00 | 24,00 | 30,00 | 36,00 | 14,30 | 15,00 | 4,8 - 5,2 | 7,9 - 8,5 | 11,1 - 11,9 | 14,2 - 15,2 | 17,3 - 18,6 |
| M | 12 | 1,50 | 12,40 | 18,75 | 24,75 | 30,75 | 36,75 | 42,75 | 14,10 | 12,32 | 12,56 | 12,00 | 18,00 | 24,00 | 30,00 | 36,00 | 14,25 | 14,95 | 5,6 - 6,1 | 9,2 - 10,0 | 12,7 - 13,8 | 16,2 - 17,7 | 19,8 - 21,5 |
| M | 12 | 1,25 | 12,30 | 17,62 | 23,62 | 29,62 | 35,62 | 41,62 | 13,62 | 12,27 | 12,48 | 12,00 | 18,00 | 24,00 | 30,00 | 36,00 | 14,30 | 15,00 | 7,0 - 7,9 | 11,2 - 12,5 | 15,5 - 17,2 | 19,7 - 21,8 | 23,9 - 26,5 |
| M | 12 | 1,00 | 12,30 | 16,50 | 22,50 | 28,50 | 34,50 | 40,50 | 13,30 | 12,22 | 12,41 | 12,00 | 18,00 | 24,00 | 30,00 | 36,00 | 14,40 | 14,80 | 9,3 - 10,3 | 14,7 - 16,1 | 20,0 - 21,9 | 25,4 - 27,8 | 30,8 - 33,6 |
| M | 14 | 2,00 | 14,50 | 23,00 | 30,00 | 37,00 | 44,00 | 51,00 | 16,60 | 14,43 | 14,73 | 14,00 | 21,00 | 28,00 | 35,00 | 42,00 | 16,65 | 17,35 | 5,0 - 5,5 | 8,2 - 8,9 | 11,4 - 12,3 | 14,6 - 15,8 | 17,9 - 19,2 |
| M | 14 | 1,50 | 14,50 | 20,75 | 27,75 | 34,75 | 41,75 | 48,75 | 15,95 | 14,35 | 14,56 | 14,00 | 21,00 | 28,00 | 35,00 | 42,00 | 15,96 | 16,64 | 6,9 - 7,7 | 11,1 - 12,2 | 15,3 - 16,7 | 19,4 - 21,2 | 23,6 - 25,7 |
| M | 14 | 1,25 | 14,40 | 19,62 | 26,62 | 33,62 | 40,62 | 47,62 | 15,62 | 14,27 | 14,48 | 14,00 | 21,00 | 28,00 | 35,00 | 42,00 | 15,74 | 16,00 | 8,6 - 9,5 | 13,6 - 14,9 | 18,6 - 20,4 | 23,6 - 25,8 | 28,6 - 31,2 |
| M | 14 | 1,00 | 14,40 | 18,50 | 25,50 | 32,50 | 39,50 | 46,50 | 15,30 | 14,22 | 14,41 | 14,00 | 21,00 | 28,00 | 35,00 | 42,00 | 15,35 | 15,65 | 11,1 - 12,2 | 17,4 - 18,9 | 23,7 - 25,7 | 30,0 - 32,5 | 36,2 - 39,3 |
| M | 16 | 2,00 | 16,50 | 25,00 | 33,00 | 41,00 | 49,00 | 57,00 | 18,60 | 16,43 | 16,73 | 16,00 | 24,00 | 32,00 | 40,00 | 48,00 | 18,90 | 19,60 | 5,9 - 6,5 | 9,5 - 10,2 | 13,2 - 14,2 | 16,9 - 18,1 | 20,5 - 22,0 |
| M | 16 | 1,50 | 16,50 | 22,75 | 30,75 | 38,75 | 46,75 | 54,75 | 17,95 | 16,32 | 16,56 | 16,00 | 24,00 | 32,00 | 40,00 | 48,00 | 18,10 | 18,40 | 8,0 - 8,9 | 12,8 - 13,9 | 17,5 - 19,2 | 22,3 - 24,3 | 27,0 - 29,4 |
| M | 18 | 2,50 | 18,50 | 29,25 | 38,25 | 47,25 | 56,25 | 65,25 | 21,25 | 18,54 | 18,90 | 18,00 | 27,00 | 36,00 | 45,00 | 54,00 | 21,30 | 22,00 | 5,1 - 5,7 | 8,5 - 9,2 | 11,8 - 12,7 | 15,2 - 16,3 | 18,5 - 19,8 |
| M | 18 | 2,00 | 18,50 | 27,00 | 36,00 | 45,00 | 54,00 | 63,00 | 20,60 | 18,43 | 18,73 | 18,00 | 27,00 | 36,00 | 45,00 | 54,00 | 20,80 | 21,45 | 6,6 - 7,3 | 10,8 - 11,7 | 15,0 - 16,0 | 19,1 - 20,4 | 23,1 - 24,7 |
| M | 18 | 1,50 | 18,50 | 24,75 | 33,75 | 42,75 | 51,75 | 60,75 | 19,95 | 18,32 | 18,56 | 18,00 | 27,00 | 36,00 | 45,00 | 54,00 | 20,15 | 20,80 | 9,2 - 10,3 | 14,5 - 16,1 | 20,0 - 21,9 | 25,4 - 27,8 | 30,6 - 33,6 |
| M | 20 | 2,50 | 20,50 | 31,25 | 41,25 | 51,25 | 61,25 | 71,25 | 23,25 | 20,54 | 20,90 | 20,00 | 30,00 | 40,00 | 50,00 | 60,00 | 23,55 | 24,40 | 5,8 - 6,5 | 9,5 - 10,4 | 13,2 - 14,4 | 16,8 - 18,3 | 20,5 - 22,2 |
| M | 20 | 2,00 | 20,50 | 29,00 | 39,00 | 49,00 | 59,00 | 69,00 | 22,60 | 20,43 | 20,73 | 20,00 | 30,00 | 40,00 | 50,00 | 60,00 | 22,80 | 23,45 | 7,5 - 8,3 | 12,0 - 13,1 | 16,5 - 18,0 | 21,2 - 22,8 | 25,7 - 27,7 |
| M | 20 | 1,50 | 20,50 | 26,75 | 36,75 | 46,75 | 56,75 | 66,75 | 21,95 | 20,32 | 20,56 | 20,00 | 30,00 | 40,00 | 50,00 | 60,00 | 22,20 | 22,80 | 10,4 - 11,6 | 16,3 - 18,1 | 22,3 - 24,6 | 28,2 - 31,1 | 34,2 - 37,6 |
| M | 22 | 2,50 | 22,50 | 33,25 | 44,25 | 55,25 | 66,25 | 77,25 | 25,25 | 22,54 | 22,90 | 22,00 | 33,00 | 44,00 | 55,00 | 66,00 | 25,90 | 26,90 | 6,4 - 7,3 | 10,4 - 11,6 | 14,4 - 16,0 | 18,4 - 20,3 | 22,4 - 24,7 |
| M | 22 | 2,00 | 22,50 | 31,00 | 42,00 | 53,00 | 64,00 | 75,00 | 24,60 | 22,43 | 22,73 | 22,00 | 33,00 | 44,00 | 55,00 | 66,00 | 24,85 | 26,80 | 8,4 - 9,3 | 13,3 - 14,6 | 18,3 - 20,0 | 23,3 - 25,3 | 28,3 - 30,6 |
| M | 22 | 1,50 | 22,50 | 28,75 | 39,75 | 50,75 | 61,75 | 72,75 | 23,95 | 22,32 | 22,56 | 22,00 | 33,00 | 44,00 | 55,00 | 66,00 | 24,20 | 26,80 | 11,5 - 12,9 | 18,0 - 20,1 | 24,3 - 27,2 | 31,0 - 34,4 | 37,5 - 41,5 |
| M | 24 | 3,00 | 24,75 | 37,50 | 49,50 | 61,50 | 73,50 | 85,50 | 27,90 | 24,65 | 25,05 | 24,00 | 36,00 | 48,00 | 60,00 | 72,00 | 27,43 | 29,00 | 5,8 - 6,5 | 9,6 - 10,4 | 13,3 - 14,4 | 17,0 - 18,3 | 20,8 - 22,2 |
| M | 24 | 2,00 | 24,50 | 33,00 | 45,00 | 57,00 | 69,00 | 81,00 | 26,60 | 24,43 | 24,73 | 24,00 | 36,00 | 48,00 | 60,00 | 72,00 | 28,60 | 29,10 | 9,1 - 10,3 | 14,5 - 16,1 | 19,8 - 21,9 | 25,2 - 27,8 | 30,5 - 33,6 |
| M | 24 | 1,50 | 24,50 | 30,75 | 42,75 | 54,75 | 66,75 | 78,75 | 26,02 | 24,33 | 24,56 | 24,00 | 36,00 | 48,00 | 60,00 | 72,00 | 26,20 | 26,80 | 12,9 - 14,2 | 20,1 - 22,0 | 27,3 - 29,9 | 34,5 - 37,7 | 41,7 - 45,5 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| UNC | N.2 | 56 | 2,30 | 4,22 | 5,31 | 6,40 | 7,50 | 8,58 | 2,84 | 2,28 | 2,44 | 2,18 | 3,27 | 4,36 | 5,46 | 6,55 | 2,79 | 3,02 | 2,7 - 3,2 | 4,7 - 5,5 | 6,8 - 7,9 | 8,9 - 10,2 | 11,0 - 12,6 |
| UNC | N.4 | 40 | 3,00 | 5,69 | 7,11 | 8,53 | 9,95 | 11,38 | 3,67 | 3,00 | 3,15 | 2,84 | 4,26 | 5,68 | 7,11 | 8,53 | 3,65 | 4,03 | 2,3 - 3,2 | 4,2 - 5,1 | 6,1 - 7,2 | 8,0 - 9,3 | 9,8 - 11,5 |
| UNC | N.5 | 40 | 3,40 | 6,02 | 7,62 | 9,19 | 10,79 | 12,37 | 4,00 | 3,33 | 3,48 | 3,17 | 4,74 | 6,35 | 7,92 | 9,52 | 4,01 | 4,04 | 2,8 - 3,4 | 4,9 - 5,8 | 7,1 - 8,2 | 9,2 - 10,6 | 11,4 - 13,1 |
| UNC | N.6 | 32 | 3,70 | 7,09 | 8,84 | 10,60 | 12,34 | 14,10 | 4,54 | 3,68 | 3,89 | 3,50 | 5,25 | 7,00 | 8,76 | 10,50 | 4,52 | 4,90 | 2,3 - 2,9 | 4,2 - 4,9 | 6,1 - 7,1 | 8,1 - 9,2 | 10,0 - 11,3 |
| UNC | N.8 | 32 | 4,50 | 7,75 | 9,83 | 11,91 | 14,00 | 16,07 | 5,11 | 4,34 | 4,52 | 4,16 | 6,24 | 8,33 | 10,41 | 12,50 | 5,20 | 5,58 | 3,1 - 3,6 | 5,4 - 6,2 | 7,7 - 8,7 | 10,0 - 11,3 | 12,3 - 13,8 |
| UNC | N.10 | 24 | 5,20 | 9,57 | 11,99 | 14,40 | 16,81 | 19,22 | 6,20 | 5,06 | 5,28 | 4,82 | 7,24 | 9,65 | 12,06 | 14,47 | 6,19 | 6,58 | 2,5 - 2,9 | 4,5 - 5,1 | 6,6 - 7,3 | 8,6 - 9,5 | 10,6 - 11,7 |
| UNC | N.12 | 24 | 5,80 | 10,26 | 13,00 | 15,74 | 18,46 | 21,23 | 6,86 | 5,72 | 5,92 | 5,48 | 8,22 | 10,97 | 13,70 | 16,45 | 6,85 | 7,23 | 3,1 - 3,6 | 5,5 - 6,1 | 7,8 - 8,4 | 10,2 - 11,1 | 12,5 - 13,6 |
| UNC | 1/4 | 20 | 6,70 | 12,06 | 15,24 | 18,41 | 21,59 | 24,76 | 8,00 | 6,62 | 6,86 | 6,35 | 9,52 | 12,70 | 15,87 | 19,05 | 7,87 | 8,38 | 3,0 - 3,3 | 5,2 - 5,7 | 7,5 - 8,1 | 9,8 - 10,5 | 12,0 - 13,0 |
| UNC | 5/16 | 18 | 8,30 | 14,27 | 18,26 | 22,22 | 26,18 | 30,15 | 9,77 | 8,24 | 8,49 | 7,92 | 11,91 | 15,87 | 19,84 | 23,79 | 9,65 | 10,16 | 3,6 - 4,1 | 6,2 - 6,8 | 8,8 - 9,6 | 11,4 - 12,3 | 14,0 - 15,1 |
| UNC | 3/8 | 16 | 9,90 | 16,66 | 21,43 | 26,18 | 30,96 | 35,71 | 11,59 | 9,89 | 10,12 | 9,52 | 14,27 | 19,05 | 23,80 | 28,57 | 11,48 | 11,99 | 4,0 - 4,5 | 6,7 - 7,3 | 9,5 - 10,2 | 12,3 - 13,2 | 15,1 - 16,1 |
| UNC | 7/16 | 14 | 11,60 | 19,27 | 24,84 | 30,38 | 35,94 | 41,50 | 13,47 | 11,51 | 11,78 | 11,10 | 16,66 | 22,22 | 27,80 | 33,32 | 13,36 | 14,00 | 4,0 - 4,6 | 6,9 - 7,5 | 9,7 - 10,5 | 12,5 - 13,5 | 15,4 - 16,4 |
| UNC | 1/2 | 13 | 13,00 | 21,49 | 27,83 | 34,18 | 40,54 | 46,89 | 15,23 | 13,12 | 13,40 | 12,70 | 19,05 | 25,40 | 31,75 | 38,10 | 15,16 | 15,80 | 4,4 - 4,9 | 7,4 - 8,1 | 10,5 - 11,2 | 13,5 - 14,4 | 16,5 - 17,6 |
| UNC | 9/16 | 12 | 14,75 | 23,80 | 30,96 | 38,10 | 45,23 | 52,37 | 17,04 | 14,75 | 15,03 | 14,27 | 21,43 | 28,57 | 35,70 | 42,84 | 17,75 | 17,63 | 4,7 - 5,1 | 7,8 - 8,5 | 11,0 - 11,8 | 14,1 - 15,1 | 17,3 - 18,4 |
| UNC | 5/8 | 11 | 16,50 | 26,26 | 34,21 | 42,14 | 50,09 | 58,01 | 18,87 | 16,38 | 16,68 | 15,87 | 23,80 | 31,75 | 39,67 | 47,62 | 18,84 | 19,48 | 4,8 - 5,3 | 8,0 - 8,6 | 11,2 - 12,0 | 14,4 - 15,3 | 17,6 - 18,7 |
| UNC | 3/4 | 10 | 19,75 | 30,48 | 40,00 | 49,53 | 59,05 | 68,58 | 22,35 | 19,60 | 19,91 | 19,05 | 28,57 | 38,10 | 47,62 | 57,15 | 22,37 | 23,01 | 5,4 - 6,0 | 8,9 - 9,6 | 12,5 - 13,2 | 16,0 - 16,9 | 19,5 - 20,6 |
| UNC | 7/8 | 9 | 23,00 | 34,92 | 46,02 | 54,33 | 68,24 | 79,37 | 25,89 | 22,84 | 23,18 | 22,22 | 33,32 | 44,45 | 55,55 | 66,67 | 25,95 | 26,72 | 5,8 - 6,3 | 9,5 - 10,1 | 13,2 - 14,0 | 16,9 - 17,9 | 20,6 - 21,8 |
| UNC | 1 | 8 | 26,00 | 39,70 | 52,37 | 65,07 | 77,77 | 90,47 | 29,52 | 26,09 | 26,47 | 25,40 | 38,10 | 50,80 | 63,50 | 76,20 | 29,61 | 30,38 | 5,9 - 6,4 | 9,7 - 10,3 | 13,5 - 14,3 | 17,2 - 18,2 | 21,0 - 22,1 |
| UNC | 1"1/8 | 7 | 29,50 | 44,91 | 59,18 | 73,48 | 87,75 | 102,05 | 33,29 | 29,36 | 29,74 | 28,57 | 42,85 | 57,15 | 71,50 | 85,72 | 33,40 | 34,42 | 5,8 - 6,3 | 9,5 - 10,2 | 13,2 - 14,1 | 16,9 - 18,0 | 20,6 - 21,9 |
| UNC | 1"1/4 | 7 | 33,00 | 48,08 | 63,95 | 79,83 | 95,70 | 111,58 | 36,46 | 32,54 | 32,92 | 31,75 | 47,62 | 63,50 | 79,37 | 95,25 | 36,65 | 37,67 | 6,6 - 7,2 | 10,8 - 11,5 | 14,9 - 15,9 | 19,1 - 20,2 | 23,2 - 24,5 |
| UNC | 1"3/8 | 6 | 36,00 | 53,97 | 71,42 | 88,90 | 106,34 | 123,82 | 40,42 | 35,84 | 36,35 | 34,92 | 52,37 | 69,85 | 87,30 | 104,77 | 40,59 | 41,73 | 6,1 - 6,6 | 10,0 - 10,7 | 13,9 - 14,7 | 17,7 - 18,8 | 21,6 - 22,8 |
| UNC | 1"1/2 | 6 | 39,00 | 57,15 | 76,20 | 95,25 | 114,30 | 133,35 | 43,60 | 39,02 | 39,53 | 38,10 | 57,15 | 76,20 | 95,25 | 114,30 | 43,86 | 45,00 | 6,8 - 7,4 | 11,0 - 11,8 | 15,3 - 16,2 | 19,5 - 20,7 | 23,8 - 25,1 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| UNF | N.4 | 48 | 3,00 | 5,23 | 6,65 | 8,07 | 9,50 | 10,92 | 3,53 | 2,97 | 3,12 | 2,84 | 4,26 | 5,69 | 7,11 | 8,53 | 3,73 | 4,11 | 3,1 - 3,8 | 5,3 - 6,5 | 7,5 - 9,1 | 9,7 - 11,7 | 12,0 - 14,3 |
| UNF | N.6 | 40 | 3,70 | 6,35 | 9,85 | 11,60 | 12,20 | 13,36 | 4,33 | 3,66 | 3,81 | 3,50 | 5,26 | 7,00 | 8,76 | 10,51 | 4,39 | 4,90 | 3,1 - 3,8 | 5,4 - 6,4 | 7,7 - 9,1 | 10,0 - 11,7 | 12,3 - 14,3 |
| UNF | N.8 | 36 | 4,40 | 7,34 | 9,42 | 11,50 | 13,58 | 15,67 | 5,08 | 4,32 | 4,47 | 4,16 | 6,25 | 8,33 | 10,41 | 12,50 | 5,18 | 5,69 | 3,5 - 4,2 | 6,0 - 7,0 | 8,5 - 9,8 | 11,0 - 12,6 | 13,5 - 15,4 |
| UNF | N.10 | 32 | 5,10 | 8,40 | 10,82 | 13,23 | 15,65 | 18,06 | 5,86 | 5,00 | 5,18 | 4,82 | 7,24 | 9,65 | 12,06 | 14,48 | 5,99 | 6,50 | 3,7 - 4,4 | 6,3 - 7,3 | 8,9 - 10,2 | 11,5 - 13,1 | 14,3 - 16,0 |
| UNF | 1/4 | 28 | 6,60 | 10,44 | 13,61 | 16,79 | 19,96 | 23,14 | 7,53 | 6,55 | 6,72 | 6,35 | 9,52 | 12,70 | 15,87 | 19,05 | 7,77 | 8,28 | 4,6 - 5,3 | 7,6 - 8,6 | 10,7 - 12,0 | 13,7 - 15,3 | 16,8 - 18,7 |
| UNF | 5/16 | 24 | 8,20 | 12,70 | 16,66 | 20,62 | 24,61 | 28,57 | 9,31 | 8,17 | 8,35 | 7,92 | 11,91 | 15,87 | 19,84 | 23,80 | 9,65 | 10,16 | 5,0 - 5,7 | 8,4 - 9,3 | 11,6 - 12,9 | 14,9 - 16,5 | 18,2 - 20,1 |
| UNF | 3/8 | 24 | 9,80 | 14,27 | 19,05 | 23,80 | 28,57 | 33,32 | 10,90 | 9,75 | 9,93 | 9,52 | 14,27 | 19,05 | 23,80 | 28,57 | 11,38 | 11,89 | 6,4 - 7,2 | 10,4 - 11,5 | 14,4 - 15,9 | 18,4 - 20,2 | 22,4 - 24,6 |
| UNF | 7/16 | 20 | 11,50 | 16,81 | 22,38 | 27,94 | 33,50 | 39,04 | 12,76 | 11,39 | 11,59 | 11,10 | 16,66 | 22,22 | 27,79 | 33,32 | 13,31 | 13,94 | 6,2 - 7,0 | 10,1 - 11,2 | 13,9 - 15,4 | 17,8 - 19,6 | 21,6 - 23,8 |
| UNF | 1/2 | 20 | 13,00 | 18,41 | 24,76 | 31,11 | 37,46 | 43,81 | 14,35 | 12,97 | 13,16 | 12,70 | 19,10 | 25,40 | 31,75 | 38,10 | 15,03 | 15,67 | 7,3 - 8,2 | 11,8 - 13,0 | 16,2 - 17,9 | 20,7 - 22,7 | 25,1 - 27,6 |
| UNF | 9/16 | 18 | 14,50 | 20,62 | 27,79 | 34,92 | 42,06 | 49,20 | 16,12 | 14,59 | 14,79 | 14,27 | 21,43 | 28,57 | 35,71 | 42,85 | 16,91 | 17,55 | 7,5 - 8,4 | 12,1 - 13,4 | 16,7 - 18,3 | 21,2 - 23,2 | 25,8 - 28,2 |
| UNF | 5/8 | 18 | 16,25 | 22,22 | 30,15 | 38,10 | 46,02 | 53,98 | 17,70 | 16,18 | 16,38 | 15,87 | 23,80 | 31,75 | 39,67 | 47,62 | 18,62 | 19,25 | 8,6 - 9,5 | 13,7 - 15,0 | 18,8 - 20,6 | 23,9 - 26,1 | 29,0 - 31,6 |
| UNF | 3/4 | 16 | 19,50 | 26,18 | 35,71 | 45,23 | 54,76 | 64,28 | 21,11 | 19,39 | 19,60 | 19,05 | 28,57 | 38,10 | 47,62 | 57,15 | 22,25 | 22,88 | 9,2 - 10,2 | 14,6 - 16,0 | 20,0 - 21,6 | 25,4 - 27,7 | 30,8 - 33,5 |
| UNF | 7/8 | 14 | 22,50 | 30,38 | 41,50 | 52,60 | 63,72 | 74,83 | 24,58 | 22,62 | 22,84 | 22,22 | 33,32 | 44,45 | 55,55 | 66,67 | 25,93 | 26,70 | 9,5 - 10,4 | 15,0 - 16,4 | 20,5 - 22,3 | 26,1 - 28,3 | 31,5 - 34,3 |
| UNF | 1 | 12 | 26,00 | 34,92 | 47,62 | 60,32 | 73,02 | 85,72 | 28,15 | 25,86 | 26,11 | 25,40 | 38,10 | 50,80 | 63,50 | 76,20 | 29,69 | 30,45 | 9,3 - 10,2 | 14,7 - 16,1 | 20,2 - 21,9 | 25,6 - 27,8 | 31,00 - 33,6 |
| UNF | 1"1/8 | 12 | 29,00 | 38,10 | 52,37 | 66,67 | 80,95 | 95,25 | 31,33 | 29,03 | 29,29 | 28,57 | 42,85 | 57,15 | 71,42 | 85,72 | 33,12 | 33,88 | 10,7 - 11,6 | 16,8 - 18,3 | 22,9 - 24,9 | 29,1 - 31,5 | 35,2 - 38,1 |
| UNF | 1"1/4 | 12 | 32,50 | 41,27 | 57,15 | 73,02 | 88,90 | 104,77 | 34,50 | 32,21 | 32,46 | 31,75 | 47,62 | 63,50 | 79,37 | 95,25 | 36,55 | 37,31 | 12,1 - 13,2 | 18,9 - 20,5 | 25,7 - 27,9 | 32,6 - 35,2 | 39,4 - 42,6 |
| UNF | 1"3/8 | 12 | 35,50 | 44,45 | 61,90 | 79,37 | 96,82 | 114,30 | 37,68 | 35,38 | 35,63 | 34,80 | 52,37 | 69,85 | 87,30 | 104,77 | 40,00 | 40,90 | 13,4 - 14,7 | 20,9 - 22,8 | 28,4 - 30,9 | 35,9 - 38,9 | 43,4 - 46,9 |
| UNF | 1"1/2 | 12 | 38,50 | 47,62 | 66,67 | 85,72 | 104,77 | 123,82 | 40,85 | 38,56 | 38,81 | 38,10 | 57,15 | 76,20 | 95,25 | 114,30 | 43,43 | 44,32 | 14,8 - 16,00 | 23,0 - 25,0 | 31,2 - 33,8 | 39,4 - 42,7 | 47,6 - 51,5 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| BSW | 1/8 | 40 | 3,40 | 6,10 | 7,59 | 9,19 | 10,79 | 12,37 | 3,93 | 3,28 | 3,43 | 3,17 | 4,75 | 6,35 | 7,92 | 9,52 | 3,98 | 4,37 | 2,9 - 3,6 | 5,0 - 5,9 | 7,2 - 8,5 | 9,3 - 10,9 | 11,5 - 13,5 |
| BSW | 3/16 | 24 | 5,00 | 9,52 | 11,89 | 14,27 | 16,66 | 19,05 | 6,01 | 4,98 | 5,13 | 4,75 | 7,14 | 9,52 | 11,90 | 14,27 | 6,09 | 6,47 | 2,5 - 3,0 | 4,5 - 5,2 | 6,5 - 7,5 | 8,6 - 9,8 | 10,6 - 11,9 |
| BSW | 1/4 | 20 | 6,70 | 12,06 | 15,24 | 18,41 | 21,59 | 24,76 | 7,84 | 6,63 | 6,78 | 6,35 | 9,52 | 12,70 | 15,87 | 19,05 | 7,97 | 8,38 | 3,0 - 3,5 | 5,3 - 6,0 | 7,6 - 8,6 | 9,8 - 11,1 | 12,1 - 13,6 |
| BSW | 5/16 | 18 | 8,30 | 15,20 | 19,20 | 23,20 | 27,10 | 30,14 | 9,59 | 8,33 | 8,48 | 7,92 | 11,91 | 15,87 | 19,84 | 23,80 | 9,78 | 10,16 | 3,7 - 4,2 | 6,3 - 7,0 | 8,9 - 9,9 | 11,5 - 12,7 | 14,1 15,6 |
| BSW | 3/8 | 16 | 9,90 | 16,66 | 21,44 | 26,18 | 30,96 | 35,71 | 11,39 | 9,91 | 10,11 | 9,52 | 14,27 | 19,05 | 23,80 | 28,57 | 11,60 | 11,99 | 4,0 - 4,6 | 6,8 - 7,5 | 9,6 - 10,6 | 12,4 - 13,6 | 15,2 - 16,6 |
| BSW | 7/16 | 14 | 11,60 | 19,28 | 24,84 | 30,38 | 35,94 | 41,50 | 13,24 | 11,51 | 11,76 | 11,10 | 16,70 | 22,20 | 27,76 | 33,30 | 13,51 | 14,02 | 4,1 - 4,7 | 7,0 - 7,7 | 9,8 - 10,8 | 12,7 - 13,9 | 15,5 - 17,00 |
| BSW | 1/2 | 12 | 13,00 | 22,22 | 28,57 | 34,92 | 41,27 | 47,62 | 15,17 | 13,08 | 13,34 | 12,70 | 19,05 | 25,40 | 31,75 | 38,10 | 15,49 | 16,00 | 4,0 - 4,6 | 6,9 - 7,5 | 9,7 - 10,6 | 12,5 - 13,7 | 15,3 - 16,7 |
| BSW | 9/16 | 12 | 14,75 | 23,80 | 30,96 | 38,10 | 45,23 | 52,37 | 16,76 | 14,68 | 14,94 | 14,27 | 21,43 | 28,57 | 35,71 | 42,85 | 17,14 | 17,65 | 4,8 - 5,3 | 7,9 - 8,7 | 11,1 - 12,1 | 14,3 - 15,5 | 17,5 - 18,9 |
| BSW | 5/8 | 11 | 16,50 | 26,26 | 34,21 | 42,13 | 50,08 | 56,74 | 18,57 | 16,59 | 16,84 | 15,87 | 23,80 | 31,75 | 39,37 | 47,62 | 18,97 | 19,48 | 4,9 - 5,5 | 8,1 - 8,8 | 11,4 - 12,3 | 14,6 - 15,8 | 17,8 - 19,3 |
| BSW | 3/4 | 10 | 19,75 | 30,48 | 40,00 | 49,53 | 59,05 | 68,58 | 22,02 | 19,84 | 20,09 | 19,05 | 28,57 | 38,10 | 47,62 | 57,15 | 22,50 | 23,00 | 5,5 - 6,1 | 9,1 - 9,8 | 12,6 - 13,6 | 16,2 - 17,4 | 19,7 - 21,2 |
| BSW | 7/8 | 9 | 23,00 | 34,92 | 46,02 | 57,15 | 68,25 | 79,37 | 25,52 | 23,01 | 23,27 | 22,22 | 33,32 | 44,45 | 55,55 | 66,67 | 26,08 | 26,72 | 5,9 - 6,5 | 9,6 - 10,3 | 13,3 - 14,4 | 17,0 - 18,3 | 20,8 - 22,3 |
| BSW | 1" | 8 | 26,00 | 39,70 | 52,37 | 65,07 | 77,77 | 90,47 | 29,10 | 26,19 | 26,52 | 25,40 | 38,10 | 50,80 | 63,50 | 76,20 | 29,77 | 30,40 | 6,0 - 6,6 | 9,8 - 10,5 | 13,6 - 14,6 | 17,4 - 18,7 | 21,1 - 22,7 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| G | 1/8 | 28 | 9,90 | 7,29 | 8,86 | 10,46 | 12,03 | 13,64 | 10,82 | 9,91 | 10,16 | 3,17 | 4,75 | 6,35 | 7,92 | 9,53 | 11,53 | 12,03 | 1,6 - 2,0 | 3,1 - 3,7 | 4,6 - 5,4 | 6,3 - 7,1 | |
| G | 1/4 | 19 | 13,50 | 12,39 | 15,57 | 18,74 | 21,92 | 25,10 | 14,74 | 13,46 | 13,72 | 6,35 | 9,52 | 12,70 | 15,87 | 19,05 | 15,72 | 16,23 | 2,7 - 3,2 | 4,8 - 5,6 | 7,0 - 7,9 | 9,1 - 10,2 | |
| G | 3/8 | 19 | 17,00 | 15,57 | 20,32 | 25,09 | 29,84 | 34,62 | 18,25 | 17,02 | 17,27 | 9,52 | 14,27 | 19,05 | 23,80 | 28,57 | 19,50 | 20,01 | 4,9 - 5,7 | 8,1 - 9,1 | 11,3 - 12,7 | 14,5 - 16,2 | |
| G | 1/2 | 14 | 21,50 | 20,82 | 27,17 | 33,52 | 39,87 | 46,22 | 23,09 | 21,34 | 21,59 | 12,70 | 19,05 | 25,40 | 31,75 | 38,10 | 24,69 | 25,20 | 4,8 - 5,5 | 8,0 - 9,0 | 11,1 - 12,4 | 14,3 - 15,9 | |



# 2102 HSSE DIN 371

M-MF DIN 13 | Form. C | Tol. 6H | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M1,0** | **0,25** | *51,15* | **40** | **6** | **2,10** | **2,5** |
| **M1,1** | **0,25** | *51,15* | **40** | **6** | **2,10** | **2,5** |
| **M1,2** | **0,25** | *36,59* | **40** | **6** | **2,10** | **2,5** |
| **M1,4** | **0,30** | *36,59* | **40** | **7** | **2,10** | **2,5** |
| **M1,6** | **0,35** | *35,94* | **40** | **8** | **2,10** | **2,5** |
| **M1,7** | **0,35** | *32,84* | **40** | **8** | **2,10** | **2,5** |
| **M1,8** | **0,35** | *33,75* | **40** | **8** | **2,10** | **2,5** |
| **M2,0** | **0,40** | *15,70* | **45** | **10** | **2,10** | **2,8** |
| **M2,2** | **0,45** | *16,23* | **45** | **10** | **2,10** | **2,8** |
| **M2,3** | **0,40** | *16,23* | **45** | **10** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *15,70* | **50** | **9** | **2,10** | **2,8** |
| **M2,6** | **0,45** | *15,70* | **50** | **9** | **2,10** | **2,8** |
| M3,0 | 0,35 | *23,85* | 56 | 11 | 2,70 | 3,5 |
| **M3,0** | **0,50** | *10,78* | **56** | **11** | **2,70** | **3,5** |
| *M3,0 | 0,60 | *18,07* | 56 | 11 | 2,70 | 3,5 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,5** | **0,60** | *14,25* | **56** | **12** | **3,00** | **4,0** |
| *M3,5 | 0,75 | *20,60* | 56 | 11 | 3,00 | 4,0 |
| M4,0 | 0,50 | *22,51* | 63 | 13 | 3,40 | 4,5 |
| **M4,0** | **0,70** | *11,03* | **63** | **13** | **3,40** | **4,5** |
| **M4,5** | **0,75** | *19,65* | **70** | **14** | **4,90** | **6,0** |
| M5,0 | 0,50 | *23,14* | 70 | 14 | 4,90 | 6,0 |
| *M5,0 | 0,75 | *23,63* | 70 | 16 | 4,90 | 6,0 |
| **M5,0** | **0,80** | *11,06* | **70** | **16** | **4,90** | **6,0** |
| M6,0 | 0,75 | *19,85* | 80 | 14 | 4,90 | 6,0 |
| **M6,0** | **1,00** | *12,56* | **80** | **19** | **4,90** | **6,0** |
| **M7,0** | **1,00** | *15,19* | **80** | **18** | **5,50** | **7,0** |
| M8,0 | 0,75 | *23,20* | 80 | 18 | 6,20 | 8,0 |
| **M8,0** | **1,25** | *14,12* | **90** | **22** | **6,20** | **8,0** |
| **M9,0** | **1,25** | *22,94* | **90** | **22** | **7,00** | **9,0** |
| **M10,0** | **1,50** | *15,83* | **100** | **24** | **8,00** | **10,0** |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)



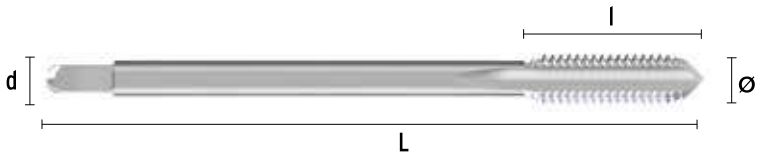
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 2101 HSSE DIN 376/374

M-MF DIN 13 | Form. C | Tol. 6H | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *10,58* | **56** | **11** | **2,00** | **2,2** |
| *M3,5 | 0,60 | *14,25* | 56 | 13 | 2,10 | 2,8 |
| **M4,0** | **0,70** | *11,03* | **63** | **13** | **2,10** | **2,8** |
| **M5,0** | **0,80** | *11,06* | **70** | **16** | **2,70** | **3,5** |
| *M6,0 | 0,50 | *27,77* | 80 | 18 | 3,40 | 4,5 |
| *M6,0 | 0,75 | *18,27* | 80 | 14 | 3,40 | 4,5 |
| **M6,0** | **1,00** | *12,56* | **80** | **19** | **3,40** | **4,5** |
| *M7,0 | 0,50 | *31,61* | 80 | 19 | 4,30 | 5,5 |
| *M7,0 | 0,75 | *24,38* | 80 | 14 | 4,30 | 5,5 |
| *M7,0 | 1,00 | *15,19* | 80 | 19 | 4,30 | 5,5 |
| *M8,0 | 0,50 | *30,44* | 80 | 19 | 4,90 | 6,0 |
| *M8,0 | 0,75 | *22,24* | 80 | 19 | 4,90 | 6,0 |
| M8,0 | 1,00 | *18,01* | 90 | 20 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *14,12* | **90** | **22** | **4,90** | **6,0** |
| *M9,0 | 0,75 | *32,99* | 90 | 22 | 5,50 | 7,0 |
| M9,0 | 1,00 | *27,47* | 90 | 20 | 5,50 | 7,0 |
| *M9,0 | 1,25 | *22,94* | 90 | 20 | 5,50 | 7,0 |
| *M10,0 | 0,50 | *87,43* | 90 | 18 | 5,50 | 7,0 |
| M10,0 | 0,75 | *35,57* | 90 | 18 | 5,50 | 7,0 |
| M10,0 | 1,00 | *20,00* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | *22,88* | 100 | 20 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *15,83* | **100** | **24** | **5,50** | **7,0** |
| M11,0 | 1,00 | *35,13* | 90 | 20 | 6,20 | 8,0 |
| *M11,0 | 1,25 | *35,13* | 90 | 22 | 6,20 | 8,0 |
| M11,0 | 1,50 | *28,88* | 100 | 24 | 6,20 | 8,0 |
| *M12,0 | 0,75 | *54,88* | 100 | 22 | 7,00 | 9,0 |
| M12,0 | 1,00 | *27,32* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,25 | *27,63* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,50 | *24,71* | 100 | 22 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *20,39* | **110** | **29** | **7,00** | **9,0** |
| *M13,0 | 0,75 | *93,91* | 100 | 22 | 9,00 | 11,0 |
| *M13,0 | 1,00 | *50,74* | 100 | 22 | 9,00 | 11,0 |
| *M13,0 | 1,25 | *50,74* | 100 | 22 | 9,00 | 11,0 |
| *M13,0 | 1,50 | *50,74* | 100 | 22 | 9,00 | 11,0 |
| *M13,0 | 1,75 | *50,74* | 110 | 27 | 9,00 | 11,0 |
| *M14,0 | 0,75 | *93,91* | 100 | 22 | 9,00 | 11,0 |
| M14,0 | 1,00 | *43,92* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,25 | *36,11* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,50 | *28,48* | 100 | 20 | 9,00 | 11,0 |
| **M14,0** | **2,00** | *28,25* | **110** | **30** | **9,00** | **11,0** |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M15,0 | 1,00 | *56,56* | 100 | 20 | 9,00 | 12,0 |
| *M15,0 | 1,25 | *61,78* | 100 | 22 | 9,00 | 12,0 |
| *M15,0 | 1,50 | *50,22* | 100 | 22 | 9,00 | 12,0 |
| *M15,0 | 2,00 | *61,45* | 110 | 30 | 9,00 | 12,0 |
| M16,0 | 1,00 | *53,30* | 100 | 20 | 9,00 | 12,0 |
| *M16,0 | 1,25 | *58,14* | 100 | 22 | 9,00 | 12,0 |
| M16,0 | 1,50 | *32,52* | 100 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *33,21* | **110** | **30** | **9,00** | **12,0** |
| *M17,0 | 1,00 | *106,02* | 100 | 20 | 9,00 | 12,0 |
| *M17,0 | 1,25 | *106,02* | 100 | 22 | 9,00 | 12,0 |
| *M17,0 | 1,50 | *106,02* | 100 | 22 | 9,00 | 12,0 |
| M18,0 | 1,00 | *59,68* | 110 | 24 | 11,00 | 14,0 |
| *M18,0 | 1,25 | *75,44* | 110 | 25 | 11,00 | 14,0 |
| M18,0 | 1,50 | *46,61* | 110 | 25 | 11,00 | 14,0 |
| M18,0 | 2,00 | *67,04* | 125 | 34 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *47,87* | **125** | **34** | **11,00** | **14,0** |
| *M19,0 | 1,00 | *139,29* | 110 | 25 | 11,00 | 14,0 |
| *M19,0 | 1,25 | *139,21* | 110 | 25 | 11,00 | 14,0 |
| *M19,0 | 1,50 | *139,28* | 110 | 25 | 11,00 | 14,0 |
| M20,0 | 1,00 | *78,79* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 1,25 | *139,29* | 125 | 25 | 12,00 | 16,0 |
| M20,0 | 1,50 | *52,78* | 125 | 25 | 12,00 | 16,0 |
| M20,0 | 2,00 | *69,16* | 140 | 27 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *50,87* | **140** | **34** | **12,00** | **16,0** |
| *M21,0 | 1,00 | *202,22* | 125 | 25 | 12,00 | 16,0 |
| *M21,0 | 1,25 | *202,22* | 125 | 25 | 12,00 | 16,0 |
| *M21,0 | 1,50 | *148,45* | 125 | 25 | 12,00 | 16,0 |
| M22,0 | 1,00 | *88,34* | 125 | 24 | 14,50 | 18,0 |
| *M22,0 | 1,25 | *139,29* | 125 | 25 | 14,50 | 18,0 |
| M22,0 | 1,50 | *63,53* | 125 | 24 | 14,50 | 18,0 |
| M22,0 | 2,00 | *88,34* | 140 | 27 | 14,50 | 18,0 |
| **M22,0** | **2,50** | *64,49* | **140** | **34** | **14,50** | **18,0** |
| *M23,0 | 1,00 | *202,13* | 125 | 25 | 14,50 | 18,0 |
| *M23,0 | 1,50 | *96,31* | 125 | 25 | 14,50 | 18,0 |
| M24,0 | 1,00 | *202,22* | 140 | 27 | 14,50 | 18,0 |
| *M24,0 | 1,25 | *78,12* | 140 | 28 | 14,50 | 18,0 |
| M24,0 | 1,50 | *98,76* | 140 | 27 | 14,50 | 18,0 |
| M24,0 | 2,00 | *77,24* | 140 | 27 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *261,59* | **160** | **38** | **14,50** | **18,0** |
| M25,0 | 1,00 | *121,57* | 140 | 28 | 14,50 | 18,0 |

(**continúa Ref.2101** / suite Réf.2101 / Ref.2101 cont'd)

# MACHOS DE MÁQUINA
# TARAUDS MACHINE / MACHINE TAPS

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M25,0 | 1,50 | *261,59* | 140 | 27 | 14,50 | 18,0 |
| *M25,0 | 2,00 | *261,59* | 140 | 28 | 14,50 | 18,0 |
| *M26,0 | 1,00 | *27,32* | 140 | 28 | 14,50 | 18,0 |
| *M26,0 | 1,0 | *105,36* | 140 | 27 | 14,50 | 18,0 |
| *M26,0 | 2,00 | *261,59* | 140 | 28 | 14,50 | 18,0 |
| *M27,0 | 1,00 | *132,32* | 140 | 27 | 16,00 | 20,0 |
| M27,0 | 1,50 | *115,06* | 140 | 27 | 16,00 | 20,0 |
| M27,0 | 2,00 | *137,70* | 140 | 27 | 16,00 | 20,0 |
| **M27,0** | **3,00** | *96,40* | **160** | **38** | **16,00** | **20,0** |
| *M28,0 | 1,00 | *261,59* | 140 | 28 | 16,00 | 20,0 |
| M28,0 | 1,50 | *115,06* | 140 | 27 | 16,00 | 20,0 |
| M28,0 | 2,00 | *261,59* | 140 | 27 | 16,00 | 20,0 |
| *M30,0 | 1,00 | *147,18* | 150 | 27 | 18,00 | 22,0 |
| M30,0 | 1,50 | *119,93* | 150 | 27 | 18,00 | 22,0 |
| M30,0 | 2,00 | *148,45* | 150 | 27 | 18,00 | 22,0 |
| *M30,0 | 3,00 | *163,23* | 180 | 45 | 18,00 | 22,0 |
| **M30,0** | **3,50** | *123,54* | **180** | **40** | **18,00** | **22,0** |
| *M32,0 | 1,00 | *321,09* | 150 | 28 | 18,00 | 22,0 |
| M32,0 | 1,50 | *151,71* | 150 | 27 | 18,00 | 22,0 |
| *M32,0 | 2,00 | *321,23* | 150 | 27 | 18,00 | 22,0 |
| *M33,0 | 1,00 | *321,23* | 160 | 30 | 20,00 | 25,0 |
| M33,0 | 1,50 | *166,26* | 160 | 30 | 20,00 | 25,0 |
| M33,0 | 2,00 | *280,18* | 160 | 30 | 20,00 | 25,0 |
| *M33,0 | 3,00 | *308,06* | 180 | 50 | 20,00 | 25,0 |
| **M33,0** | **3,50** | *148,45* | **180** | **45** | **20,00** | **25,0** |
| *M34,0 | 1,50 | *195,37* | 170 | 30 | 22,00 | 28,0 |
| *M34,0 | 2,00 | *352,58* | 170 | 30 | 22,00 | 28,0 |
| M35,0 | 1,50 | *194,85* | 170 | 30 | 22,00 | 28,0 |
| M36,0 | 1,50 | *190,03* | 170 | 30 | 22,00 | 28,0 |
| M36,0 | 2,00 | *256,67* | 170 | 30 | 22,00 | 28,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M36,0 | 3,00 | *294,45* | 200 | 50 | 22,00 | 28,0 |
| **M36,0** | **4,00** | *189,74* | **200** | **50** | **22,00** | **28,0** |
| M38,0 | 1,50 | *202,59* | 170 | 30 | 22,00 | 28,0 |
| *M38,0 | 2,00 | *415,25* | 170 | 30 | 22,00 | 28,0 |
| M39,0 | 1,50 | *307,02* | 170 | 30 | 24,00 | 32,0 |
| M39,0 | 2,00 | *307,02* | 170 | 30 | 24,00 | 32,0 |
| M39,0 | 3,00 | *415,72* | 200 | 50 | 24,00 | 32,0 |
| **M39,0** | **4,00** | *242,25* | **200** | **55** | **24,00** | **32,0** |
| M40,0 | 1,50 | *265,01* | 170 | 30 | 24,00 | 32,0 |
| M40,0 | 2,00 | *307,84* | 170 | 30 | 24,00 | 32,0 |
| *M40,0 | 3,00 | *307,84* | 200 | 60 | 24,00 | 32,0 |
| M42,0 | 1,50 | *268,99* | 170 | 30 | 24,00 | 32,0 |
| M42,0 | 2,00 | *352,14* | 170 | 30 | 24,00 | 32,0 |
| M42,0 | 3,00 | *352,14* | 200 | 50 | 24,00 | 32,0 |
| **M42,0** | **4,50** | *311,41* | **200** | **60** | **24,00** | **32,0** |
| M45,0 | 1,50 | *333,03* | 180 | 30 | 29,00 | 36,0 |
| M45,0 | 2,00 | *422,80* | 180 | 30 | 29,00 | 36,0 |
| M45,0 | 3,00 | *422,80* | 200 | 50 | 29,00 | 36,0 |
| **M45,0** | **4,50** | *340,28* | **220** | **60** | **29,00** | **36,0** |
| M48,0 | 1,50 | *340,28* | 190 | 30 | 29,00 | 36,0 |
| M48,0 | 2,00 | *512,42* | 190 | 30 | 29,00 | 36,0 |
| M48,0 | 3,00 | *512,39* | 225 | 50 | 29,00 | 36,0 |
| **M48,0** | **5,00** | *418,40* | **250** | **65** | **29,00** | **36,0** |
| M50,0 | 1,50 | *397,93* | 190 | 30 | 29,00 | 36,0 |
| M52,0 | 1,50 | *402,83* | 190 | 32 | 32,00 | 40,0 |
| M52,0 | 2,00 | *615,47* | 190 | 32 | 32,00 | 40,0 |
| *M52,0 | 3,00 | *631,93* | 225 | 50 | 32,00 | 40,0 |
| **M52,0** | **5,00** | *428,52* | **250** | **65** | **32,00** | **40,0** |
| ***M63,0** | **1,50** | *923,24* | **275** | **40** | **32,00** | **40,0** |

***(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)**

## 2102/5 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H | LH | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *21,57* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *22,02* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *22,12* | 70 | 14 | 4,90 | 6,0 |

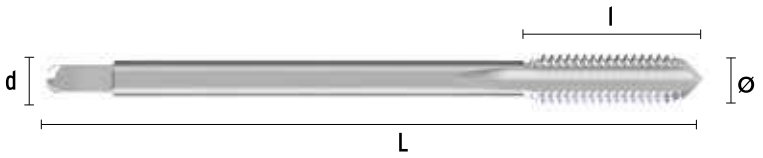
| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *25,10* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *28,26* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *31,65* | 100 | 20 | 8,00 | 10,0 |

## 2101/5 HSSE DIN 376/374

M-MF DIN 13 | Form. C | Tol. 6H | LH | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *M5,0 | 0,80 | *22,12* | 70 | 14 | 2,70 | 3,5 |
| *M6,0 | 1,00 | *25,10* | 80 | 18 | 3,40 | 4,5 |
| *M7,0 | 1,00 | *30,39* | 80 | 18 | 4,30 | 5,5 |
| *M8,0 | 1,00 | *36,02* | 90 | 20 | 4,90 | 6,0 |
| *M8,0 | 1,25 | *28,26* | 90 | 20 | 4,90 | 6,0 |
| *M9,0 | 1,25 | *45,90* | 90 | 20 | 5,50 | 7,0 |
| *M10,0 | 1,00 | *39,96* | 90 | 20 | 5,50 | 7,0 |
| *M10,0 | 1,25 | *31,65* | 90 | 20 | 5,50 | 7,0 |
| *M10,0 | 1,50 | *31,65* | 100 | 20 | 5,50 | 7,0 |
| *M12,0 | 1,25 | *55,23* | 100 | 20 | 7,00 | 9,0 |
| *M12,0 | 1,50 | *49,40* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,75 | *40,80* | 110 | 24 | 7,00 | 9,0 |
| *M14,0 | 1,50 | *56,95* | 100 | 20 | 9,00 | 11,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 2,00 | *56,49* | 110 | 25 | 9,00 | 11,0 |
| *M16,0 | 1,50 | *65,02* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 2,00 | *66,40* | 110 | 32 | 9,00 | 12,0 |
| *M18,0 | 1,50 | *93,22* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 2,50 | *100,36* | 125 | 32 | 11,00 | 14,0 |
| *M20,0 | 1,50 | *105,56* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 2,50 | *106,59* | 140 | 32 | 12,00 | 16,0 |
| *M22,0 | 1,50 | *127,07* | 125 | 24 | 14,50 | 18,0 |
| M22,0 | 2,50 | *129,01* | 140 | 32 | 14,50 | 18,0 |
| *M24,0 | 1,50 | *156,26* | 140 | 27 | 14,50 | 18,0 |
| M24,0 | 3,00 | *154,49* | 160 | 38 | 14,50 | 18,0 |
| *M27,0 | 3,00 | *192,78* | 160 | 38 | 16,00 | 20,0 |
| *M30,0 | 3,50 | *247,05* | 180 | 40 | 18,00 | 22,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

P Aceros Aciers Steels | M Aceros Inox Aciers Inox Stainless Steels | K Fundicion Fonte Cast Iron | N Metales no ferrosos Métal non Ferraux Non Ferrous metals | S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys | H Materiales Duros Materiels Durs Hard materials

## 2114 HSSE DIN 371

M-MF DIN 13 | Form. A | Tol. 6H | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| *M2,0 | 0,40 | *16,65* | 45 | 8 | 2,10 | 2,8 |
| *M2,2 | 0,45 | *18,03* | 45 | 9 | 2,10 | 2,8 |
| *M2,3 | 0,40 | *17,17* | 45 | 9 | 2,10 | 2,8 |
| *M2,5 | 0,45 | *16,65* | 50 | 9 | 2,10 | 2,8 |
| *M2,6 | 0,45 | *16,65* | 50 | 9 | 2,10 | 2,8 |
| M3,0 | 0,50 | *11,87* | 56 | 11 | 2,70 | 3,5 |
| *M3,5 | 0,60 | *15,12* | 56 | 12 | 3,00 | 4,0 |
| M4,0 | 0,70 | *12,11* | 63 | 13 | 3,40 | 4,5 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M4,5 | 0,75 | *20,82* | 70 | 14 | 4,90 | 6,0 |
| M5,0 | 0,80 | *12,17* | 70 | 16 | 4,90 | 6,0 |
| M6,0 | 1,00 | *13,81* | 80 | 19 | 4,90 | 6,0 |
| M7,0 | 1,00 | *15,79* | 80 | 16 | 5,50 | 7,0 |
| M8,0 | 1,25 | *15,53* | 90 | 19 | 6,20 | 8,0 |
| *M9,0 | 1,25 | *24,33* | 90 | 19 | 7,00 | 9,0 |
| M10,0 | 1,50 | *17,39* | 100 | 22 | 8,00 | 10,0 |

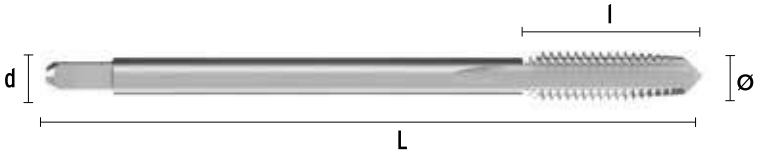
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2113 HSSE DIN 376/374

M-MF DIN 13 | Form. A | Tol. 6H | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| *M3,0 | 0,50 | *11,87* | 56 | 11 | 2,00 | 2,2 |
| *M3,5 | 0,60 | *15,12* | 56 | 13 | 2,10 | 2,8 |
| M4,0 | 0,70 | *12,11* | 63 | 13 | 2,10 | 2,8 |
| M5,0 | 0,80 | *12,17* | 70 | 16 | 2,70 | 3,5 |
| M6,0 | 1,00 | *13,81* | 80 | 19 | 3,40 | 4,5 |
| *M7,0 | 1,00 | *15,79* | 80 | 19 | 4,30 | 5,5 |
| M8,0 | 1,25 | *15,53* | 90 | 22 | 4,90 | 6,0 |
| *M9,0 | 1,25 | *24,33* | 90 | 22 | 5,50 | 7,0 |
| M10,0 | 1,50 | *17,39* | 100 | 24 | 5,50 | 7,0 |
| *M11,0 | 1,50 | *30,64* | 100 | 24 | 6,20 | 8,0 |
| M12,0 | 1,75 | *22,45* | 110 | 29 | 7,00 | 9,0 |
| *M13,0 | 1,75 | *53,77* | 110 | 29 | 9,00 | 11,0 |
| M14,0 | 2,00 | *29,36* | 110 | 30 | 9,00 | 11,0 |
| *M15,0 | 2,00 | *65,11* | 110 | 30 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *34,49* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | *53,17* | 125 | 34 | 11,00 | 14,0 |
| M20,0 | 2,50 | *56,48* | 140 | 34 | 12,00 | 16,0 |
| M22,0 | 2,50 | *68,33* | 140 | 34 | 14,50 | 18,0 |
| M24,0 | 3,00 | *81,85* | 160 | 38 | 14,50 | 18,0 |
| *M27,0 | 3,00 | *102,13* | 160 | 38 | 16,00 | 20,0 |
| *M30,0 | 3,50 | *130,89* | 180 | 45 | 18,00 | 22,0 |
| *M33,0 | 3,50 | *157,29* | 180 | 50 | 20,00 | 25,0 |
| *M36,0 | 4,00 | *201,05* | 200 | 56 | 22,00 | 28,0 |
| *M39,0 | 4,00 | *256,66* | 200 | 60 | 24,00 | 32,0 |
| *M42,0 | 4,50 | *329,96* | 200 | 60 | 24,00 | 32,0 |
| *M45,0 | 4,50 | *360,53* | 220 | 65 | 29,00 | 36,0 |
| *M48,0 | 5,00 | *443,32* | 250 | 70 | 29,00 | 36,0 |
| *M52,0 | 5,00 | *454,01* | 250 | 70 | 32,00 | 40,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2190 HSSE DIN 371

M DIN 13 | Form. E | Tol. 6H | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● 25-35 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *12,05* | 56 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | *12,31* | 63 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | *12,35* | 70 | 16 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *14,05* | 80 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | *18,02* | 90 | 22 | 6,20 | 8,0 |
| M10,0 | 1,50 | *23,25* | 100 | 24 | 8,00 | 10,0 |

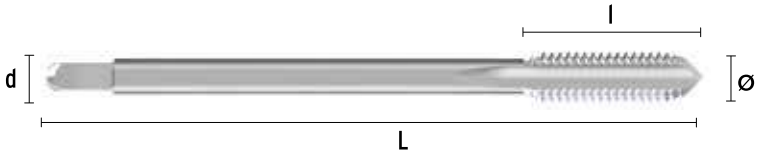
## 2191 HSSE DIN 376

M DIN 13 | Form. E | Tol. 6H | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● 25-35 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *14,05* | 80 | 19 | 3,40 | 4,5 |
| M8,0 | 1,25 | *18,02* | 90 | 22 | 4,90 | 6,0 |
| M10,0 | 1,50 | *23,25* | 100 | 24 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *30,96* | 110 | 29 | 7,00 | 9,0 |
| M14,0 | 2,00 | *36,41* | 110 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | *43,68* | 110 | 32 | 9,00 | 12,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2180 HSSE-PM DIN 371

M DIN 13 | Form. C | Tol. 6HX | 1,5XD | R | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | ● 15-30 | ● 10-20 | | | ○ 35-50 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *21,65* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *22,10* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *22,10* | 70 | 14 | 4,90 | 6,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *23,43* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *27,92* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *33,78* | 100 | 20 | 8,00 | 10,0 |

## 2179 HSSE-PM DIN 376

M DIN 13 | Form. C | Tol. 6HX | 1,5XD | D | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | ● 15-30 | ● 10-20 | | | ○ 35-50 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *27,92* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *33,78* | 100 | 20 | 5,50 | 7,0 |
| M12,0 | 1,75 | *42,54* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 2,00 | *54,22* | 110 | 25 | 9,00 | 11,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *62,53* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | *104,96* | 125 | 32 | 11,00 | 14,0 |
| M20,0 | 2,50 | *118,60* | 140 | 32 | 12,00 | 16,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2274 HM DIN 371

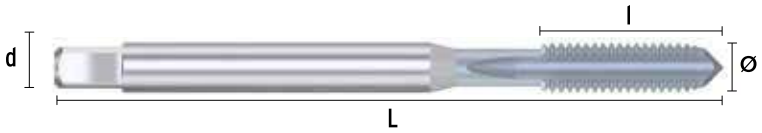
M DIN 13 | Form. D | Tol. 6HX | 1,5XD | R | TICN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | | | | | | ● 3-6 | ● 2-5 | ● 1-4 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *90,08* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *92,96* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *95,74* | 70 | 14 | 4,90 | 6,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *106,98* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *129,50* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *224,70* | 100 | 20 | 8,00 | 10,0 |

## 2275 HM DIN 376

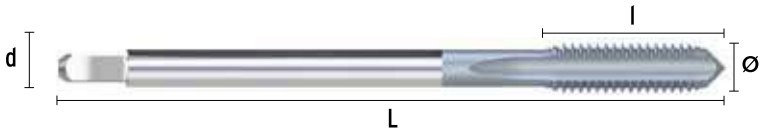
M DIN 13 | Form. D | Tol. 6HX | 1,5XD | D | TICN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | | | | | | ● 3-6 | ● 2-5 | ● 1-4 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *382,19* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 2,00 | *382,19* | 110 | 25 | 9,00 | 11,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *464,75* | 110 | 32 | 9,00 | 12,0 |

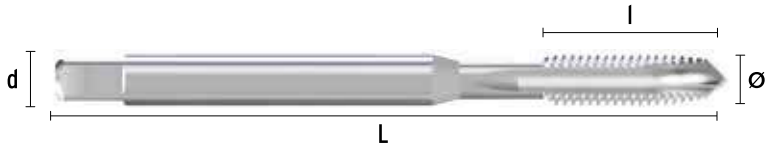
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2104 HSSE DIN 371

M-MF DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | *17,16* | **45** | **10** | **2,10** | **2,8** |
| **M2,2** | **0,45** | *17,16* | **45** | **10** | **2,10** | **2,8** |
| **M2,3** | **0,45** | *17,16* | **45** | **10** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *17,07* | **50** | **9** | **2,10** | **2,8** |
| **M2,6** | **0,45** | *17,07* | **50** | **9** | **2,10** | **2,8** |
| M3,0 | 0,35 | *17,07* | 56 | 10 | 2,70 | 3,5 |
| **M3,0** | **0,50** | *12,16* | **56** | **11** | **2,70** | **3,5** |
| *M3,0 | 0,60 | *20,18* | 56 | 10 | 2,70 | 3,5 |
| M3,5 | 0,35 | *20,18* | 56 | 10 | 3,00 | 4,0 |
| **M3,5** | **0,60** | *15,57* | **56** | **12** | **3,00** | **4,0** |
| M4,0 | 0,50 | *24,77* | 63 | 12 | 3,00 | 4,0 |
| **M4,0** | **0,70** | *12,43* | **63** | **13** | **3,40** | **4,5** |

| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| *M4,0 | 0,75 | *17,76* | 63 | 13 | 3,40 | 4,5 |
| **M4,5** | **0,75** | *21,80* | **70** | **14** | **4,90** | **6,0** |
| M5,0 | 0,50 | *25,46* | 70 | 14 | 4,90 | 6,0 |
| **M5,0** | **0,80** | *12,45* | **70** | **16** | **4,90** | **6,0** |
| M6,0 | 0,75 | *23,65* | 80 | 14 | 4,90 | 6,0 |
| **M6,0** | **1,00** | *13,66* | **80** | **19** | **4,90** | **6,0** |
| **M7,0** | **1,00** | *17,87* | **80** | **18** | **5,50** | **7,0** |
| M8,0 | 0,75 | *25,80* | 80 | 18 | 6,20 | 8,0 |
| **M8,0** | **1,25** | *15,07* | **90** | **22** | **6,20** | **8,0** |
| **M9,0** | **1,25** | *23,39* | **90** | **18** | **7,00** | **9,0** |
| **M10,0** | **1,50** | *18,49* | **100** | **24** | **8,00** | **10,0** |

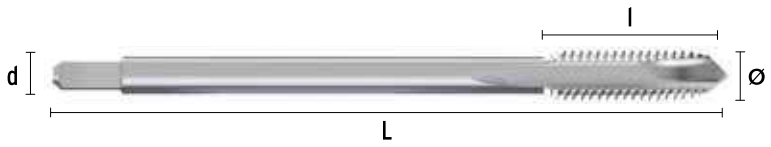
***(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)**

## 2103 HSSE DIN 376/374

M-MF DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *12,16* | **56** | **11** | **2,70** | **3,5** |
| ***M3,5** | **0,60** | *15,58* | **56** | **13** | **3,00** | **4,0** |
| **M4,0** | **0,70** | *12,43* | **63** | **13** | **2,10** | **2,8** |
| ***M4,5** | **0,75** | *21,80* | **70** | **16** | **2,70** | **3,5** |
| **M5,0** | **0,80** | *12,45* | **70** | **16** | **2,70** | **3,5** |
| *M6,0 | 0,75 | *20,70* | 80 | 18 | 3,40 | 4,5 |
| **M6,0** | **1,00** | *13,66* | **80** | **19** | **3,40** | **4,5** |
| *M7,0 | 0,75 | *27,02* | 80 | 18 | 4,30 | 5,5 |
| ***M7,0** | **1,00** | *17,87* | **80** | **18** | **4,30** | **5,5** |
| *M8,0 | 0,75 | *25,56* | 90 | 20 | 4,30 | 5,5 |
| M8,0 | 1,00 | *19,80* | 90 | 20 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *15,07* | **90** | **22** | **4,90** | **6,0** |
| M9,0 | 1,00 | *30,21* | 90 | 20 | 5,50 | 7,0 |
| *M9,0 | 1,25 | *23,39* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 0,75 | *36,31* | 90 | 18 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M10,0 | 1,00 | *22,06* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | *26,28* | 100 | 20 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *18,49* | **100** | **24** | **5,50** | **7,0** |
| M11,0 | 1,00 | *38,67* | 90 | 20 | 6,20 | 8,0 |
| *M11,0 | 1,25 | *38,67* | 100 | 22 | 6,20 | 8,0 |
| **M11,0** | **1,50** | *31,76* | **100** | **22** | **6,20** | **8,0** |
| M12,0 | 1,00 | *30,06* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,25 | *30,39* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,50 | *27,14* | 100 | 20 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *23,60* | **110** | **29** | **7,00** | **9,0** |
| *M13,0 | 1,00 | *55,81* | 100 | 22 | 9,00 | 11,0 |
| *M13,0 | 1,25 | *55,77* | 100 | 22 | 9,00 | 11,0 |
| *M13,0 | 1,50 | *55,77* | 100 | 22 | 9,00 | 11,0 |
| ***M13,0** | **1,75** | *55,81* | **110** | **27** | **9,00** | **11,0** |
| M14,0 | 1,00 | *48,31* | 100 | 20 | 9,00 | 11,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# MACHOS DE MÁQUINA
# TARAUDS MACHINE / MACHINE TAPS

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 1,25 | *39,42* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,50 | *31,35* | 100 | 20 | 9,00 | 11,0 |
| **M14,0** | **2,00** | *31,08* | **110** | **30** | **9,00** | **11,0** |
| M15,0 | 1,00 | *62,08* | 100 | 20 | 9,00 | 12,0 |
| *M15,0 | 1,25 | *67,98* | 100 | 22 | 9,00 | 12,0 |
| *M15,0 | 1,50 | *55,22* | 100 | 22 | 9,00 | 12,0 |
| ***M15,0** | **2,00** | *67,60* | **110** | **30** | **9,00** | **12,0** |
| M16,0 | 1,00 | *58,61* | 100 | 20 | 9,00 | 12,0 |
| *M16,0 | 1,25 | *64,97* | 100 | 22 | 9,00 | 12,0 |
| M16,0 | 1,50 | *39,07* | 100 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *38,18* | **110** | **30** | **9,00** | **12,0** |
| M18,0 | 1,00 | *65,61* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 1,50 | *51,27* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 2,00 | *73,77* | 125 | 27 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *51,88* | **125** | **34** | **11,00** | **14,0** |
| M20,0 | 1,00 | *86,69* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 1,50 | *58,03* | 125 | 25 | 12,00 | 16,0 |
| M20,0 | 2,00 | *76,06* | 140 | 27 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *55,97* | **140** | **34** | **12,00** | **16,0** |
| M22,0 | 1,00 | *97,17* | 125 | 25 | 14,50 | 18,0 |
| M22,0 | 1,50 | *69,87* | 125 | 25 | 14,50 | 18,0 |
| M22,0 | 2,00 | *97,17* | 140 | 27 | 14,50 | 18,0 |
| M22,0 | 2,50 | *70,94* | 140 | 34 | 14,50 | 18,0 |
| M24,0 | 1,00 | *121,05* | 140 | 28 | 14,50 | 18,0 |
| M24,0 | 1,50 | *85,89* | 140 | 27 | 14,50 | 18,0 |
| M24,0 | 2,00 | *108,63* | 140 | 27 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *84,48* | **160** | **38** | **14,50** | **18,0** |
| M25,0 | 1,50 | *133,47* | 140 | 27 | 14,50 | 18,0 |
| *M25,0 | 2,00 | *287,75* | 140 | 28 | 14,50 | 18,0 |
| M26,0 | 1,50 | *110,47* | 140 | 27 | 14,50 | 18,0 |
| *M26,0 | 2,00 | *287,75* | 140 | 28 | 14,50 | 18,0 |
| M27,0 | 1,50 | *126,27* | 140 | 27 | 16,00 | 20,0 |
| M27,0 | 2,00 | *150,57* | 140 | 27 | 16,00 | 20,0 |
| **M27,0** | **3,00** | *105,68* | **160** | **38** | **16,00** | **20,0** |
| M28,0 | 1,50 | *126,27* | 140 | 27 | 16,00 | 20,0 |
| M28,0 | 2,00 | *287,75* | 140 | 27 | 16,00 | 20,0 |
| *M30,0 | 1,00 | *179,62* | 150 | 28 | 18,00 | 22,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M30,0 | 1,50 | *131,95* | 150 | 27 | 18,00 | 22,0 |
| M30,0 | 2,00 | *163,29* | 150 | 27 | 18,00 | 22,0 |
| **M30,0** | **3,50** | *135,80* | **180** | **40** | **18,00** | **22,0** |
| M32,0 | 1,50 | *166,80* | 150 | 27 | 18,00 | 22,0 |
| *M32,0 | 2,00 | *353,37* | 150 | 28 | 18,00 | 22,0 |
| M33,0 | 1,50 | *180,51* | 160 | 30 | 20,00 | 25,0 |
| M33,0 | 2,00 | *308,15* | 160 | 30 | 20,00 | 25,0 |
| **M33,0** | **3,50** | *170,82* | **180** | **45** | **20,00** | **25,0** |
| *M34,0 | 1,50 | *209,03* | 170 | 30 | 22,00 | 28,0 |
| M35,0 | 1,50 | *220,87* | 170 | 30 | 22,00 | 28,0 |
| M36,0 | 1,50 | *209,03* | 170 | 30 | 22,00 | 28,0 |
| M36,0 | 2,00 | *282,33* | 170 | 30 | 22,00 | 28,0 |
| M36,0 | 3,00 | *323,89* | 200 | 50 | 22,00 | 28,0 |
| **M36,0** | **4,00** | *208,70* | **200** | **50** | **22,00** | **28,0** |
| M38,0 | 1,50 | *228,23* | 170 | 30 | 22,00 | 28,0 |
| M38,0 | 2,00 | *456,80* | 170 | 30 | 22,00 | 28,0 |
| M39,0 | 1,50 | *407,43* | 170 | 30 | 24,00 | 32,0 |
| M39,0 | 2,00 | *412,14* | 170 | 30 | 24,00 | 32,0 |
| M39,0 | 3,00 | *549,48* | 170 | 30 | 24,00 | 32,0 |
| **M39,0** | **4,00** | *266,49* | **200** | **55** | **24,00** | **32,0** |
| M40,0 | 1,50 | *291,55* | 170 | 30 | 24,00 | 32,0 |
| M40,0 | 2,00 | *310,50* | 170 | 30 | 24,00 | 32,0 |
| *M40,0 | 3,00 | *360,09* | 200 | 60 | 24,00 | 32,0 |
| M42,0 | 1,50 | *296,37* | 170 | 30 | 24,00 | 32,0 |
| M42,0 | 2,00 | *442,34* | 170 | 30 | 24,00 | 32,0 |
| M42,0 | 3,00 | *442,34* | 170 | 30 | 24,00 | 32,0 |
| **M42,0** | **4,50** | *342,60* | **200** | **60** | **24,00** | **32,0** |
| M45,0 | 1,50 | *362,90* | 180 | 30 | 29,00 | 36,0 |
| M45,0 | 2,00 | *442,34* | 180 | 30 | 29,00 | 36,0 |
| M45,0 | 3,00 | *411,75* | 200 | 50 | 29,00 | 36,0 |
| **M45,0** | **4,50** | *374,26* | **220** | **60** | **29,00** | **36,0** |
| M48,0 | 1,50 | *490,50* | 190 | 30 | 29,00 | 36,0 |
| M48,0 | 2,00 | *494,45* | 190 | 30 | 29,00 | 36,0 |
| M48,0 | 3,00 | *470,93* | 225 | 50 | 29,00 | 36,0 |
| **M48,0** | **5,00** | *460,22* | **250** | **65** | **29,00** | **36,0** |
| M50,0 | 1,50 | *442,31* | 190 | 30 | 29,00 | 36,0 |
| **M52,0** | **5,00** | *471,12* | **250** | **65** | **32,00** | **40,0** |

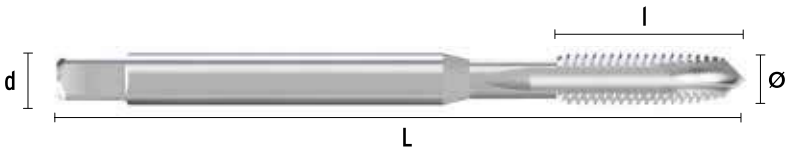
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2104/5 HSS DIN 371

M-MF DIN 13 | Form. B "Gun" | LH | Tol. 6H | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *23,50* | 56 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | *23,76* | 63 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | *25,05* | 70 | 16 | 4,90 | 6,0 |

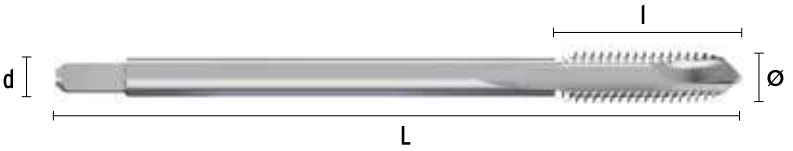
| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *25,05* | 80 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | *29,26* | 90 | 22 | 6,20 | 8,0 |
| M10,0 | 1,50 | *37,48* | 100 | 24 | 8,00 | 10,0 |

## 2103/5 HSS DIN 376/374

M-MF DIN 13 | Form. "Gun" B | LH | Tol. 6H | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *52,95* | 110 | 29 | 7,00 | 9,0 |
| M16,0 | 2,00 | *77,48* | 110 | 30 | 9,00 | 12,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M20,0 | 2,50 | *112,73* | 140 | 34 | 12,00 | 16,0 |
| M24,0 | 3,00 | *148,80* | 160 | 38 | 14,50 | 18,0 |



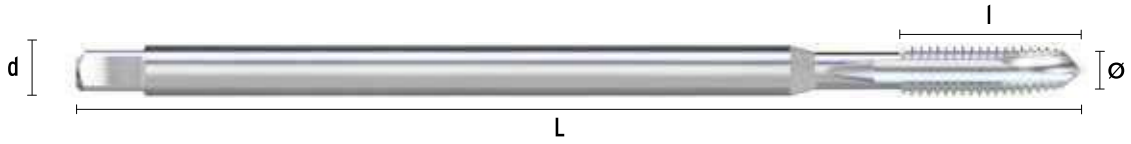
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2111 HSSE DIN 371

M | DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *27,97* | 100 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *27,97* | 125 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *31,59* | 140 | 14 | 4,90 | 6,0 |
| M6,0 | 1,00 | *31,59* | 160 | 18 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *M8,0 | 1,25 | *41,71* | 150 | 22 | 6,20 | 8,0 |
| *M10,0 | 1,50 | *50,62* | 150 | 24 | 8,00 | 10,0 |
| *M12,0 | 1,75 | *56,89* | 150 | 29 | 9,00 | 12,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

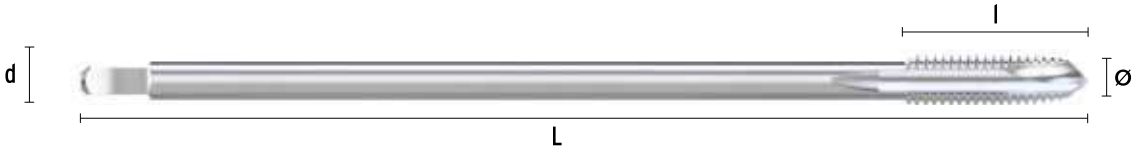
## 2272 HSS DIN 376

M | DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *49,73* | 180 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *61,03* | 200 | 20 | 5,50 | 7,0 |

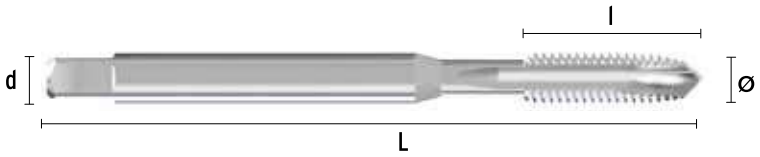
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *78,35* | 220 | 24 | 7,00 | 9,0 |
| M16,0 | 2,00 | *114,73* | 220 | 32 | 9,00 | 12,0 |

## 2110 HSSE DIN 371

M DIN 13 | Form. B "Gun" | Tol. 6H +0,1 | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *19,33* | 56 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | *19,74* | 63 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | *19,79* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *22,49* | 80 | 16 | 4,90 | 6,0 |
| M8,0 | 1,25 | *25,32* | 90 | 18 | 6,20 | 8,0 |
| M10,0 | 1,50 | *31,88* | 100 | 22 | 8,00 | 10,0 |

## 2109 HSSE DIN 376

M DIN 13 | Form. B "Gun" | Tol. 6H +0,1 | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *25,32* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *31,88* | 100 | 22 | 5,50 | 7,0 |
| M12,0 | 1,75 | *40,71* | 110 | 27 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 2,00 | *51,10* | 110 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | *61,83* | 110 | 30 | 9,00 | 12,0 |



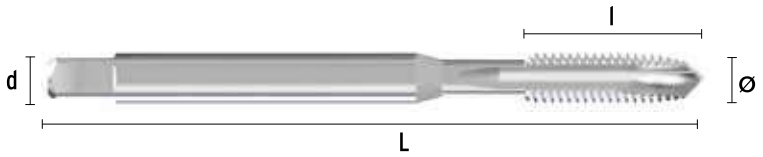
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2168 HSSE DIN 371

M DIN 13 | Form. B "Gun" | Tol. 6G | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *19,11* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *19,11* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *19,11* | 70 | 14 | 4,90 | 6,0 |

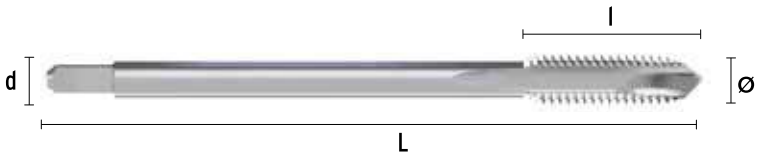
| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *19,27* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *23,12* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *27,17* | 100 | 20 | 8,00 | 10,0 |

## 2169 HSSE DIN 376

M DIN 13 | Form. B "Gun" | Tol. 6G | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *23,12* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *27,17* | 100 | 20 | 5,50 | 7,0 |
| M12,0 | 1,75 | *33,96* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 2,00 | *42,59* | 110 | 25 | 9,00 | 11,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *51,52* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | *70,77* | 125 | 32 | 11,00 | 14,0 |
| M20,0 | 2,50 | *73,98* | 140 | 32 | 12,00 | 16,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2250 HSSE DIN 371

M DIN13 | Form. B "Gun" | Tol. 6H | 3XD | R | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | *25,70* | **45** | **10** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *25,70* | **50** | **9** | **2,10** | **2,8** |
| **M3,0** | **0,50** | *13,41* | **56** | **11** | **2,70** | **3,5** |
| **M3,5** | **0,60** | *17,74* | **56** | **12** | **3,00** | **4,0** |
| **M4,0** | **0,70** | *13,60* | **63** | **13** | **3,40** | **4,5** |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M5,0** | **0,80** | *14,33* | **70** | **16** | **4,90** | **6,0** |
| **M6,0** | **1,00** | *14,33* | **80** | **19** | **4,90** | **6,0** |
| **M8,0** | **1,25** | *16,72* | **90** | **22** | **6,20** | **8,0** |
| **M10,0** | **1,50** | *21,39* | **100** | **24** | **8,00** | **10,0** |

## 2251 HSSE DIN 376/374

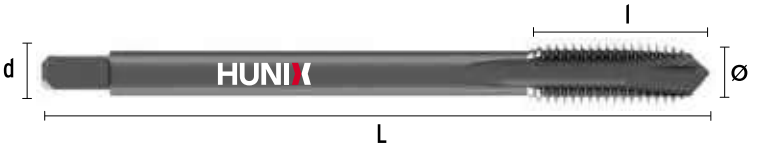
M-MF DIN13 | Form. B "Gun" | Tol. 6H | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *16,13* | **56** | **11** | **2,70** | **3,5** |
| **M4,0** | **0,70** | *17,21* | **63** | **13** | **2,10** | **2,8** |
| **M5,0** | **0,80** | *18,19* | **70** | **16** | **2,70** | **3,5** |
| **M6,0** | **1,00** | *18,19* | **80** | **19** | **3,40** | **4,5** |
| M8,0 | 1,00 | *27,48* | 90 | 20 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *21,17* | **90** | **22** | **4,90** | **6,0** |
| M10,0 | 1,00 | *30,99* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | *36,20* | 100 | 20 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *23,55* | **100** | **24** | **5,50** | **7,0** |
| M12,0 | 1,00 | *40,08* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,25 | *43,39* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,50 | *40,08* | 100 | 20 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *30,34* | **110** | **29** | **7,00** | **9,0** |
| M14,0 | 1,00 | *54,71* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,25 | *50,18* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,50 | *54,71* | 100 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M14,0** | **2,00** | *45,54* | **110** | **30** | **9,00** | **11,0** |
| M16,0 | 1,00 | *63,43* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 1,50 | *56,17* | 100 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *48,78* | **110** | **30** | **9,00** | **12,0** |
| M18,0 | 1,00 | *87,16* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 1,50 | *66,99* | 110 | 24 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *66,99* | **125** | **34** | **11,00** | **14,0** |
| M20,0 | 1,00 | *85,18* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 1,50 | *78,06* | 125 | 25 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *70,95* | **140** | **34** | **12,00** | **16,0** |
| M22,0 | 1,00 | *121,30* | 125 | 25 | 14,50 | 18,0 |
| M22,0 | 1,50 | *101,14* | 125 | 25 | 14,50 | 18,0 |
| **M22,0** | **2,50** | *101,14* | **140** | **34** | **14,50** | **18,0** |
| M24,0 | 1,50 | *103,04* | 140 | 27 | 14,50 | 18,0 |
| M24,0 | 2,00 | *112,41* | 140 | 27 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *93,67* | **160** | **38** | **14,50** | **18,0** |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2116 HSSE DIN 371

M DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | R | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | *26,63* | **45** | **10** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *26,63* | **50** | **9** | **2,10** | **2,8** |
| **M3,0** | **0,50** | *18,67* | **56** | **11** | **2,70** | **3,5** |
| **M3,5** | **0,60** | *21,98* | **56** | **12** | **3,00** | **4,0** |
| **M4,0** | **0,70** | *18,83* | **63** | **13** | **3,40** | **4,5** |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M5,0** | **0,80** | *20,59* | **70** | **16** | **4,90** | **6,0** |
| **M6,0** | **1,00** | *21,34* | **80** | **19** | **4,90** | **6,0** |
| **M8,0** | **1,25** | *25,55* | **90** | **22** | **6,20** | **8,0** |
| **M10,0** | **1,50** | *33,60* | **100** | **24** | **8,00** | **10,0** |

## 2115 HSSE DIN 376/374

M-MF DIN13 | Form. B "Gun" | Tol. 6H | 3XD | D | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *20,60* | **56** | **11** | **2,70** | **3,5** |
| **M4,0** | **0,70** | *22,19* | **63** | **13** | **2,10** | **2,8** |
| **M5,0** | **0,80** | *24,06* | **70** | **16** | **2,70** | **3,5** |
| **M6,0** | **1,00** | *24,86* | **80** | **19** | **3,40** | **4,5** |
| M8,0 | 1,00 | *38,24* | 90 | 20 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *29,71* | **90** | **22** | **4,90** | **6,0** |
| M10,0 | 1,00 | *45,07* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | *49,23* | 100 | 20 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *37,60* | **100** | **24** | **5,50** | **7,0** |
| M12,0 | 1,00 | *56,06* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,25 | *62,09* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,50 | *53,77* | 100 | 20 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *46,62* | **110** | **29** | **7,00** | **9,0** |
| M14,0 | 1,00 | *73,93* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,25 | *68,91* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 1,50 | *71,26* | 100 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M14,0** | **2,00** | *61,50* | **110** | **30** | **9,00** | **11,0** |
| M16,0 | 1,00 | *85,72* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 1,50 | *74,57* | 100 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *66,62* | **110** | **30** | **9,00** | **12,0** |
| M18,0 | 1,00 | *106,10* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 1,50 | *94,68* | 110 | 24 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *90,46* | **125** | **34** | **11,00** | **14,0** |
| M20,0 | 1,00 | *100,66* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 1,50 | *106,62* | 125 | 25 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *99,05* | **140** | **34** | **12,00** | **16,0** |
| M22,0 | 1,00 | *136,61* | 125 | 25 | 14,50 | 18,0 |
| M22,0 | 1,50 | *133,40* | 125 | 25 | 14,50 | 18,0 |
| **M22,0** | **2,50** | *133,45* | **140** | **34** | **14,50** | **18,0** |
| M24,0 | 1,50 | *145,19* | 140 | 27 | 14,50 | 18,0 |
| M24,0 | 2,00 | *159,32* | 140 | 27 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *136,55* | **160** | **38** | **14,50** | **18,0** |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2126 HSSE-PM DIN 371

M DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | R | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | ● 10-15 | ● 6-10 | ○ 4-6 | | ● 6-12 | | | ● 10-20 | | ○ 4-6 | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *21,31* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *21,62* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *23,36* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *24,09* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *28,91* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *37,91* | 100 | 20 | 8,00 | 10,0 |

## 2125 HSSE-PM DIN 376/374

M-MF DIN13 | Form. B "Gun" | Tol. 6H | 3XD | D | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | ● 10-15 | ● 6-10 | ○ 4-6 | | ● 6-12 | | | ● 10-20 | | ○ 4-6 | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,00 | *44,89* | 90 | 20 | 4,90 | 6,0 |
| M8,0 | 1,25 | *33,18* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,00 | *47,21* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | *63,30* | 100 | 20 | 5,50 | 7,0 |
| M10,0 | 1,50 | *41,74* | 100 | 20 | 5,50 | 7,0 |
| M12,0 | 1,00 | *60,98* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,25 | *65,14* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,50 | *60,98* | 110 | 20 | 7,00 | 9,0 |
| M12,0 | 1,75 | *52,73* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 1,25 | *76,73* | 100 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 1,50 | *81,10* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 2,00 | *69,75* | 110 | 25 | 9,00 | 11,0 |
| M16,0 | 1,50 | *84,65* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 2,00 | *75,62* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 1,50 | *102,84* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 2,50 | *102,79* | 125 | 32 | 11,00 | 14,0 |
| M20,0 | 1,50 | *123,42* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 2,50 | *112,19* | 140 | 32 | 12,00 | 16,0 |
| M22,0 | 2,50 | *151,86* | 140 | 32 | 14,50 | 18,0 |
| M24,0 | 3,00 | *154,09* | 160 | 38 | 14,50 | 18,0 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2176 HSSE-PM DIN 371

M DIN 13 | Form. B "Gun" | Tol. 6HX | 3XD | R | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | ○ 6-10 | ● 4-6 | | ○ 4-6 | | | ● 10-20 | | ○ 4-6 | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *27,07* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *27,50* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *29,56* | 70 | 14 | 4,90 | 6,0 |

| ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *31,47* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *36,71* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *45,85* | 100 | 20 | 8,00 | 10,0 |

## 2175 HSSE-PM DIN 376

M DIN 13 | Form. B "Gun" | Tol. 6HX | 3XD | D | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | ○ 6-10 | ● 4-6 | | ○ 4-6 | | | ● 10-20 | | ○ 4-6 | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *45,85* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *59,93* | 100 | 20 | 5,50 | 7,0 |
| M12,0 | 1,75 | *68,74* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 2,00 | *95,69* | 110 | 25 | 9,00 | 11,0 |

| ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *101,10* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | *147,86* | 125 | 32 | 11,00 | 14,0 |
| M20,0 | 2,50 | *145,98* | 140 | 32 | 12,00 | 16,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2122 HSSE DIN 371

M DIN 13 | Form. B "Gun" | Tol. 6H | 3XD | R | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | ● 5-10 | | | | | | | | | | ○ 10-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *18,37* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *18,37* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *18,37* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *20,18* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *22,97* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *26,96* | 100 | 20 | 8,00 | 10,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock
*Para mismo rendimiento / Pour le même rendement / For the same performance **Ref. 2250**
*Para mayor rendimiento / Pour plus rendement / For higher performance **Ref. 2116**

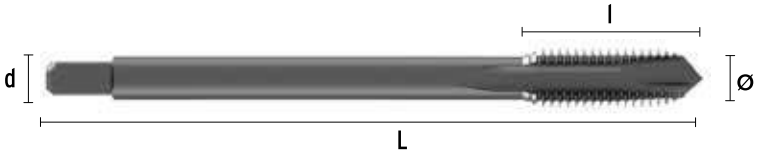
## 2121 HSSE DIN 376/374

M-MF DIN13 | Form. B "Gun" | Tol. 6H | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | ● 5-10 | | | | | | | | | | ○ 10-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,00 | *27,81* | 90 | 20 | 4,90 | 6,0 |
| M8,0 | 1,25 | *22,97* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,00 | *30,59* | 90 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | *34,89* | 100 | 20 | 5,50 | 7,0 |
| M10,0 | 1,50 | *26,96* | 100 | 20 | 5,50 | 7,0 |
| M12,0 | 1,00 | *41,73* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,25 | *42,05* | 100 | 20 | 7,00 | 9,0 |
| M12,0 | 1,50 | *42,39* | 110 | 20 | 7,00 | 9,0 |
| M12,0 | 1,75 | *35,14* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 1,25 | *56,76* | 100 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 1,50 | *45,04* | 100 | 20 | 9,00 | 11,0 |
| M14,0 | 2,00 | *44,76* | 110 | 25 | 9,00 | 11,0 |
| M16,0 | 1,50 | *53,59* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 2,00 | *52,67* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 1,50 | *73,83* | 110 | 24 | 11,00 | 14,0 |
| M18,0 | 2,50 | *74,72* | 125 | 32 | 11,00 | 14,0 |
| M20,0 | 1,50 | *111,09* | 125 | 24 | 12,00 | 16,0 |
| M20,0 | 2,50 | *80,59* | 140 | 32 | 12,00 | 16,0 |
| M22,0 | 2,50 | *87,03* | 140 | 32 | 14,50 | 18,0 |
| M24,0 | 3,00 | *94,00* | 160 | 38 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock
*Para mismo rendimiento / Pour le même rendement / For the same performance **Ref. 2251**
*Para mayor rendimiento / Pour plus rendement / For higher performance **Ref. 2115**



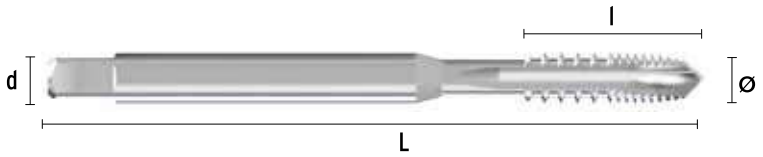
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2133 HSSE DIN 371

M DIN 13 | B-AZ | Tol. 6H | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 10-20 | ○ 6-8 | ○ 10-20 | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *19,99* | 56 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | *19,99* | 63 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | *19,99* | 70 | 16 | 4,90 | 6,0 |

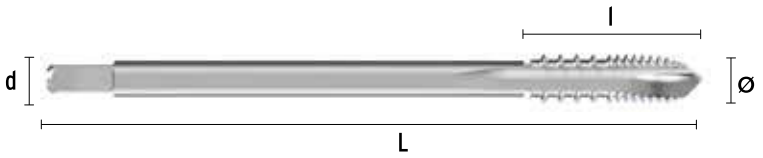
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *21,05* | 80 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | *25,18* | 90 | 22 | 6,20 | 8,0 |
| M10,0 | 1,50 | *29,66* | 100 | 24 | 8,00 | 10,0 |

## 2132 HSSE DIN 376

M DIN 13 | B-AZ | Tol. 6H | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 10-20 | ○ 6-8 | ○ 10-20 | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M4,0 | 0,70 | *19,99* | 63 | 13 | 2,10 | 2,8 |
| M5,0 | 0,80 | *19,99* | 70 | 16 | 2,70 | 3,5 |
| M6,0 | 1,00 | *21,05* | 80 | 19 | 3,40 | 4,5 |
| M8,0 | 1,25 | *25,18* | 90 | 22 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M10,0 | 1,50 | *29,66* | 100 | 24 | 5,50 | 7,0 |
| M12,0 | 1,75 | *37,43* | 110 | 29 | 7,00 | 9,0 |
| M14,0 | 2,00 | *46,61* | 110 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | *61,80* | 110 | 32 | 9,00 | 12,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2254 HSSE-PM DIN 371 MULTI

M DIN 13 | Form. B "Gun" | Tol. 6HX | 3XD | R | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-40 | ● 15-30 | ● 10-20 | ● 5-10 | ● 5-15 | ● 5-10 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 2-8 | ● 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *26,30* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *29,18* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *30,48* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *31,78* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *38,40* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *50,54* | 100 | 15 | 8,00 | 10,0 |

## 2255 HSSE-PM DIN 376 MULTI

M DIN 13 | Form. B "Gun" | Tol. 6HX | 3XD | D | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-40 | ● 15-30 | ● 10-20 | ● 5-10 | ● 5-15 | ● 5-10 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 2-8 | ● 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *75,22* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *101,66* | 110 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *106,99* | 110 | 20 | 9,00 | 12,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2258 HSSE-PM DIN 371 SYNCHRO

M DIN 13 | Form. B "Gun" | Tol. 6HX | CNC | 3XD | R | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-50 | ● 15-40 | ● 10-20 | ● 5-10 | ● 5-15 | ● 5-10 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 2-8 | ● 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *26,30* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *29,18* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *30,48* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *31,78* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *38,40* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *50,54* | 100 | 15 | 8,00 | 10,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2259 HSSE-PM DIN 376 SYNCHRO

M DIN 13 | Form. B "Gun" | Tol. 6HX | CNC | 3XD | D | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-50 | ● 15-40 | ● 10-20 | ● 5-10 | ● 5-15 | ● 5-10 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 2-8 | ● 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *75,22* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *101,66* | 110 | 20 | 9,00 | 11,00 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *106,99* | 110 | 20 | 9,00 | 12,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2106 HSSE DIN 371

M-MF DIN 13 | Form. C | Tol. 6H | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | *33,74* | **45** | **5** | **2,10** | **2,8** |
| **M2,2** | **0,45** | *33,74* | **45** | **10** | **2,10** | **2,8** |
| **M2,3** | **0,40** | *33,74* | **45** | **10** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *33,74* | **50** | **5** | **2,10** | **2,8** |
| **M2,6** | **0,45** | *33,74* | **50** | **5** | **2,10** | **2,8** |
| M3,0 | 0,35 | *33,74* | 56 | 5 | 2,70 | 3,5 |
| **M3,0** | **0,50** | *14,99* | **56** | **6** | **2,70** | **3,5** |
| M3,5 | 0,35 | *33,74* | 56 | 5 | 3,00 | 4,0 |
| **M3,5** | **0,60** | *18,50* | **56** | **6** | **3,00** | **4,0** |
| M4,0 | 0,50 | *24,78* | 63 | 7 | 3,40 | 4,5 |
| **M4,0** | **0,70** | *14,99* | **63** | **7** | **3,40** | **4,5** |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M4,5** | **0,75** | *25,54* | **70** | **7** | **4,90** | **6,0** |
| M5,0 | 0,50 | *34,75* | 70 | 8 | 4,90 | 6,0 |
| **M5,0** | **0,80** | *14,49* | **70** | **8** | **4,90** | **6,0** |
| M6,0 | 0,75 | *24,40* | 80 | 10 | 4,90 | 6,0 |
| **M6,0** | **1,00** | *15,89* | **80** | **10** | **4,90** | **6,0** |
| **M7,0** | **1,00** | *19,45* | **80** | **10** | **5,50** | **7,0** |
| M8,0 | 0,75 | *28,21* | 80 | 10 | 6,20 | 8,0 |
| **M8,0** | **1,25** | *18,94* | **90** | **14** | **6,20** | **8,0** |
| **M9,0** | **1,25** | *32,89* | **90** | **13** | **7,00** | **9,0** |
| **M10,0** | **1,50** | *22,03* | **100** | **16** | **8,00** | **10,0** |

## 2105 HSSE DIN 376/374

M-MF DIN13 | Form. C | Tol. 6H | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *14,99* | **56** | **5** | **2,00** | **2,2** |
| **M4,0** | **0,70** | *14,99* | **63** | **7** | **2,10** | **2,8** |
| **M5,0** | **0,80** | *14,49* | **70** | **8** | **2,70** | **3,5** |
| **M6,0** | **1,00** | *15,89* | **80** | **10** | **3,40** | **4,5** |
| ***M7,0** | **1,00** | *19,45* | **80** | **10** | **4,30** | **5,5** |
| M8,0 | 1,00 | *23,44* | 90 | 10 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *18,94* | **90** | **14** | **4,90** | **6,0** |
| M9,0 | 1,00 | *30,20* | 90 | 10 | 5,50 | 7,0 |
| ***M9,0** | **1,25** | *28,77* | **90** | **13** | **5,50** | **7,0** |
| M10,0 | 0,75 | *42,65* | 90 | 10 | 5,50 | 7,0 |
| M10,0 | 1,00 | *27,67* | 90 | 10 | 5,50 | 7,0 |
| M10,0 | 1,25 | *30,08* | 100 | 15 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *22,03* | **100** | **16** | **5,50** | **7,0** |
| M11,0 | 1,00 | *88,10* | 90 | 10 | 6,20 | 8,0 |
| *M11,0 | 1,25 | *78,58* | 100 | 15 | 6,20 | 8,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M11,0** | **1,50** | *64,19* | **100** | **15** | **6,20** | **8,0** |
| M12,0 | 1,00 | *35,58* | 100 | 10 | 7,00 | 9,0 |
| M12,0 | 1,25 | *34,03* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,50 | *32,77* | 100 | 15 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *29,42* | **110** | **18** | **7,00** | **9,0** |
| M14,0 | 1,00 | *57,46* | 100 | 10 | 9,00 | 11,0 |
| M14,0 | 1,25 | *49,07* | 100 | 15 | 9,00 | 11,0 |
| M14,0 | 1,50 | *36,95* | 100 | 15 | 9,00 | 11,0 |
| **M14,0** | **2,00** | *37,77* | **110** | **20** | **9,00** | **11,0** |
| M15,0 | 1,00 | *75,25* | 100 | 10 | 9,00 | 12,0 |
| *M15,0 | 1,50 | *55,21* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 1,00 | *120,33* | 100 | 10 | 9,00 | 12,0 |
| *M16,0 | 1,25 | *99,87* | 100 | 20 | 9,00 | 12,0 |
| M16,0 | 1,50 | *48,22* | 100 | 15 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *45,61* | **110** | **20** | **9,00** | **12,0** |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# MACHOS DE MÁQUINA
# TARAUDS MACHINE / MACHINE TAPS

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M18,0 | 1,00 | *95,80* | 110 | 13 | 11,00 | 14,0 |
| M18,0 | 1,50 | *61,04* | 110 | 20 | 11,00 | 14,0 |
| M18,0 | 2,00 | *115,03* | 125 | 20 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *61,33* | **125** | **25** | **11,00** | **14,0** |
| M20,0 | 1,00 | *93,65* | 125 | 13 | 12,00 | 16,0 |
| M20,0 | 1,50 | *69,75* | 125 | 20 | 12,00 | 16,0 |
| M20,0 | 2,00 | *109,30* | 140 | 20 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *65,34* | **140** | **25** | **12,00** | **16,0** |
| M22,0 | 1,00 | *92,25* | 125 | 13 | 14,50 | 18,0 |
| M22,0 | 1,50 | *75,27* | 125 | 17 | 14,50 | 18,0 |
| M22,0 | 2,00 | *103,50* | 140 | 20 | 14,50 | 18,0 |
| **M22,0** | **2,50** | *80,58* | **140** | **27** | **14,50** | **18,0** |
| M24,0 | 1,00 | *123,70* | 140 | 13 | 14,50 | 18,0 |
| M24,0 | 1,50 | *102,28* | 140 | 20 | 14,50 | 18,0 |
| M24,0 | 2,00 | *123,70* | 140 | 20 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *98,37* | **160** | **30** | **14,50** | **18,0** |
| M25,0 | 1,50 | *164,90* | 140 | 20 | 14,50 | 18,0 |
| M26,0 | 1,50 | *110,44* | 140 | 20 | 14,50 | 18,0 |
| M27,0 | 1,50 | *126,22* | 140 | 20 | 16,00 | 20,0 |
| M27,0 | 2,00 | *165,60* | 140 | 20 | 16,00 | 20,0 |
| **M27,0** | **3,00** | *120,49* | **160** | **30** | **16,00** | **20,0** |
| M28,0 | 1,50 | *126,22* | 140 | 20 | 16,00 | 20,0 |
| M28,0 | 2,00 | *206,90* | 140 | 20 | 16,00 | 20,0 |
| M30,0 | 1,50 | *157,27* | 150 | 22 | 18,00 | 22,0 |
| M30,0 | 2,00 | *332,26* | 150 | 22 | 18,00 | 22,0 |
| **M30,0** | **3,50** | *154,38* | **180** | **35** | **18,00** | **22,0** |
| M32,0 | 1,50 | *194,08* | 150 | 22 | 18,00 | 22,0 |
| M33,0 | 1,50 | *238,00* | 160 | 22 | 20,00 | 25,0 |
| M33,0 | 2,00 | *261,70* | 160 | 24 | 20,00 | 25,0 |
| **M33,0** | **3,50** | *185,49* | **180** | **35** | **20,00** | **25,0** |
| M35,0 | 1,50 | *265,50* | 170 | 22 | 22,00 | 28,0 |
| M36,0 | 1,50 | *323,55* | 170 | 22 | 22,00 | 28,0 |
| M36,0 | 2,00 | *420,50* | 170 | 24 | 22,00 | 28,0 |
| M36,0 | 3,00 | *328,00* | 200 | 30 | 22,00 | 28,0 |
| **M36,0** | **4,00** | *250,31* | **200** | **40** | **22,00** | **28,0** |
| M38,00 | 1,50 | *388,10* | 170 | 24 | 22,00 | 28,0 |
| M39,00 | 1,50 | *312,75* | 170 | 25 | 24,00 | 32,0 |
| M39,00 | 2,00 | *312,75* | 170 | 25 | 24,00 | 32,0 |
| M39,00 | 3,00 | *511,70* | 200 | 30 | 24,00 | 32,0 |
| **M39,00** | **4,00** | *528,75* | **200** | **40** | **24,00** | **32,0** |
| M40,00 | 1,50 | *426,85* | 170 | 25 | 24,00 | 32,0 |
| M40,00 | 2,00 | *346,50* | 170 | 25 | 24,00 | 32,0 |
| M42,00 | 1,50 | *459,00* | 170 | 25 | 24,00 | 32,0 |
| M42,00 | 2,00 | *387,00* | 170 | 25 | 24,00 | 32,0 |
| M42,00 | 3,00 | *387,00* | 200 | 30 | 24,00 | 32,0 |
| **M42,00** | **4,50** | *386,20* | **200** | **45** | **24,00** | **32,0** |
| M45,00 | 1,50 | *452,25* | 180 | 27 | 29,00 | 36,0 |
| M45,00 | 2,00 | *452,25* | 180 | 27 | 29,00 | 36,0 |
| M45,00 | 3,00 | *540,00* | 200 | 30 | 29,00 | 36,0 |
| **M45,00** | **4,50** | *708,75* | **220** | **45** | **29,00** | **36,0** |
| M48,00 | 1,50 | *540,00* | 190 | 27 | 29,00 | 36,0 |
| M48,00 | 2,00 | *540,00* | 190 | 27 | 29,00 | 36,0 |
| M48,00 | 3,00 | *540,00* | 225 | 33 | 29,00 | 36,0 |
| **M48,00** | **5,00** | *776,25* | **250** | **50** | **29,00** | **36,0** |
| M50,00 | 1,50 | *630,00* | 190 | 27 | 29,00 | 36,0 |
| **M52,00** | **5,00** | *922,50* | **250** | **50** | **32,00** | **40,0** |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2106/5 HSS DIN 371

M DIN 13 | Form. C | Tol. 6H | 35° | LH | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *25,05* | 56 | 6 | 2,70 | 3,5 |
| M4,0 | 0,70 | *25,36* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *26,77* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *26,77* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *31,23* | 90 | 14 | 6,20 | 8,0 |
| M10,0 | 1,50 | *39,95* | 100 | 16 | 8,00 | 10,0 |

## 2105/5 HSS DIN 376/374

M DIN13 | Form. C | Tol. 6H | 35° | LH | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *58,82* | 110 | 18 | 7,00 | 9,0 |
| M16,0 | 2,00 | *86,03* | 110 | 20 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M20,0 | 2,50 | *125,04* | 140 | 25 | 12,00 | 16,0 |
| M24,0 | 1,50 | *165,18* | 140 | 20 | 14,50 | 18,0 |



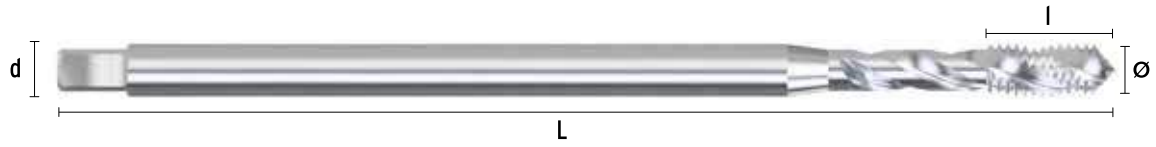
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2112 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *33,04* | 100 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *33,04* | 125 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *38,10* | 140 | 8 | 4,90 | 6,0 |
| M6,0 | 1,00 | *38,10* | 160 | 10 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *M8,0 | 1,25 | *48,24* | 150 | 14 | 6,20 | 8,0 |
| *M10,0 | 1,50 | *58,35* | 150 | 16 | 8,00 | 10,0 |
| *M12,0 | 1,75 | *60,72* | 150 | 18 | 9,00 | 12,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

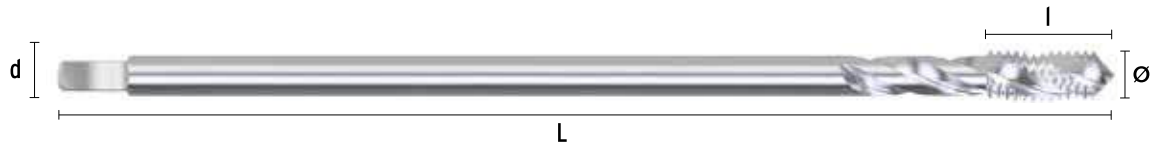
## 2273 HSSE DIN 376

M DIN 13 | Form. C | Tol. 6H | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *54,80* | 180 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *67,09* | 200 | 20 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *86,27* | 220 | 24 | 7,00 | 9,0 |
| M16,0 | 2,00 | *126,22* | 220 | 32 | 9,00 | 12,0 |

## 2166 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H +0,1 | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *24,21* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *24,21* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *23,37* | 70 | 8 | 4,90 | 6,0 |

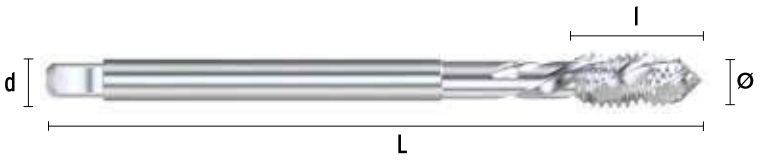
| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *25,63* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *30,59* | 90 | 13 | 4,90 | 6,0 |
| M10,0 | 1,50 | *36,27* | 110 | 15 | 8,00 | 10,0 |

## 2165 HSSE DIN 376

M DIN 13 | Form. C | Tol. 6H +0,1 | 35° | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *30,59* | 90 | 15 | 4,90 | 6,0 |
| M10,0 | 1,50 | *36,27* | 100 | 17 | 5,50 | 7,0 |
| M12,0 | 1,75 | *40,71* | 110 | 18 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 2,00 | *58,28* | 110 | 20 | 9,00 | 11,0 |
| M16,0 | 2,00 | *70,36* | 110 | 20 | 9,00 | 12,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2170 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6G | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *21,05* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *21,05* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *20,30* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *22,27* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *26,59* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *31,51* | 110 | 15 | 8,00 | 10,0 |

## 2208 HSSE DIN 376

M DIN 13 | Form. C | Tol. 6G | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *26,59* | 90 | 15 | 4,90 | 6,0 |
| M10,0 | 1,50 | *31,51* | 100 | 17 | 5,50 | 7,0 |
| M12,0 | 1,75 | *42,05* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *48,57* | 110 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *58,65* | 110 | 20 | 9,00 | 12,0 |
| M18,0 | 2,50 | *79,91* | 125 | 25 | 11,00 | 14,0 |
| M20,0 | 2,50 | *84,06* | 140 | 25 | 12,00 | 16,0 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2108 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H | 15° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *M2,0 | 0,40 | *18,96* | 45 | 8 | 2,10 | 2,8 |
| M3,0 | 0,50 | *15,91* | 56 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | *15,27* | 63 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | *14,72* | 70 | 16 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *16,14* | 80 | 19 | 4,90 | 6,0 |
| M7,0 | 1,00 | *19,57* | 80 | 19 | 5,50 | 7,0 |
| M8,0 | 1,25 | *19,28* | 90 | 22 | 6,20 | 8,0 |
| M10,0 | 1,50 | *22,84* | 100 | 24 | 8,00 | 10,0 |

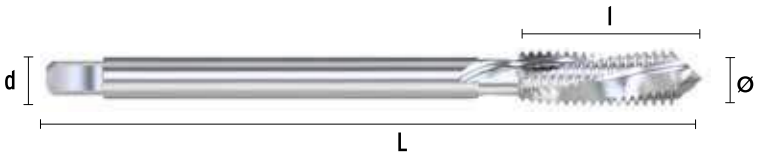
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2107 HSSE DIN 376/374

M DIN 13 | Form. C | Tol. 6H | 15° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M4,0 | 0,70 | *15,13* | 63 | 13 | 2,10 | 2,8 |
| M5,0 | 0,80 | *14,62* | 70 | 16 | 2,70 | 3,5 |
| M6,0 | 1,00 | *16,14* | 80 | 19 | 3,40 | 4,5 |
| M7,0 | 1,00 | *19,57* | 80 | 19 | 4,30 | 5,5 |
| M8,0 | 1,25 | *19,28* | 90 | 22 | 4,90 | 6,0 |
| M10,0 | 1,50 | *22,84* | 100 | 24 | 5,50 | 7,0 |
| M12,0 | 1,75 | *30,50* | 110 | 29 | 7,00 | 9,0 |
| M14,0 | 2,00 | *36,27* | 110 | 30 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *43,82* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | *58,95* | 125 | 34 | 11,00 | 14,0 |
| M20,0 | 2,50 | *62,80* | 140 | 34 | 12,00 | 16,0 |
| M22,0 | 2,50 | *77,45* | 140 | 34 | 14,50 | 18,0 |
| M24,0 | 3,00 | *94,10* | 160 | 38 | 14,50 | 18,0 |
| *M27,0 | 3,00 | *115,83* | 160 | 38 | 16,00 | 20,0 |
| *M30,0 | 3,50 | *148,40* | 180 | 45 | 18,00 | 22,0 |
| *M36,0 | 4,00 | *239,30* | 200 | 56 | 22,00 | 28,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2252 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H | 35° | 3XD | R | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | *29,21* | **45** | **5** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *29,21* | **50** | **5** | **2,10** | **2,8** |
| **M3,0** | **0,50** | *16,21* | **56** | **6** | **2,70** | **3,5** |
| **M3,5** | **0,60** | *19,44* | **56** | **6** | **3,00** | **4,0** |
| **M4,0** | **0,70** | *16,48* | **63** | **7** | **3,40** | **4,5** |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M5,0** | **0,80** | *17,41* | **70** | **8** | **4,90** | **6,0** |
| **M6,0** | **1,00** | *17,41* | **80** | **10** | **4,90** | **6,0** |
| **M8,0** | **1,25** | *20,24* | **90** | **14** | **6,20** | **8,0** |
| **M10,0** | **1,50** | *25,90* | **100** | **16** | **8,00** | **10,0** |

## 2253 HSSE DIN 376/374

M-MF DIN13 | Form. C | Tol. 6H | 35° | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *18,59* | **56** | **5** | **2,00** | **2,2** |
| **M4,0** | **0,70** | *18,99* | **63** | **7** | **2,10** | **2,8** |
| **M5,0** | **0,80** | *19,97* | **70** | **8** | **2,70** | **3,5** |
| **M6,0** | **1,00** | *19,97* | **80** | **10** | **3,40** | **4,5** |
| M8,0 | 1,00 | *30,26* | 90 | 10 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *23,27* | **90** | **14** | **4,90** | **6,0** |
| M10,0 | 1,00 | *34,22* | 90 | 10 | 5,50 | 7,0 |
| M10,0 | 1,25 | *39,88* | 100 | 15 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *28,53* | **100** | **16** | **5,50** | **7,0** |
| M12,0 | 1,00 | *44,04* | 100 | 10 | 7,00 | 9,0 |
| M12,0 | 1,25 | *47,80* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,50 | *44,04* | 100 | 15 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *36,73* | **110** | **18** | **7,00** | **9,0** |
| M14,0 | 1,00 | *60,13* | 100 | 10 | 9,00 | 11,0 |
| M14,0 | 1,25 | *55,19* | 100 | 15 | 9,00 | 11,0 |
| M14,0 | 1,50 | *60,13* | 100 | 15 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M14,0** | **2,00** | *50,18* | **110** | **20** | **9,00** | **11,0** |
| M16,0 | 1,00 | *69,70* | 100 | 10 | 9,00 | 12,0 |
| M16,0 | 1,50 | *61,70* | 100 | 15 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *53,66* | **110** | **20** | **9,00** | **12,0** |
| M18,0 | 1,00 | *95,80* | 110 | 13 | 11,00 | 14,0 |
| M18,0 | 1,50 | *73,70* | 110 | 20 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *73,70* | **125** | **25** | **11,00** | **14,0** |
| M20,0 | 1,00 | *93,67* | 125 | 13 | 12,00 | 16,0 |
| M20,0 | 1,50 | *85,83* | 125 | 20 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *78,06* | **140** | **25** | **12,00** | **16,0** |
| M22,0 | 1,00 | *157,00* | 125 | 13 | 14,50 | 18,0 |
| M22,0 | 1,50 | *111,21* | 125 | 17 | 14,50 | 18,0 |
| **M22,0** | **2,50** | *111,21* | **140** | **27** | **14,50** | **18,0** |
| M24,0 | 1,50 | *113,39* | 140 | 20 | 14,50 | 18,0 |
| M24,0 | 2,00 | *123,68* | 140 | 20 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *103,04* | **160** | **30** | **14,50** | **18,0** |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2118 HSSE DIN 371

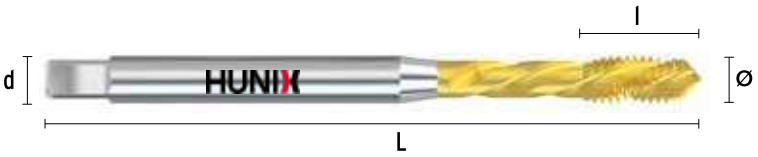
M DIN 13 | Form. C | Tol. 6H | 35° | 3XD | R | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | *31,41* | **45** | **5** | **2,10** | **2,8** |
| **M2,5** | **0,45** | *31,41* | **50** | **5** | **2,10** | **2,8** |
| **M3,0** | **0,50** | *19,52* | **56** | **6** | **2,70** | **3,5** |
| **M3,5** | **0,60** | *24,80* | **56** | **6** | **3,00** | **4,0** |
| **M4,0** | **0,70** | *19,68* | **63** | **7** | **3,40** | **4,5** |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M5,0** | **0,80** | *21,44* | **70** | **8** | **4,90** | **6,0** |
| **M6,0** | **1,00** | *22,19* | **80** | **10** | **4,90** | **6,0** |
| **M8,0** | **1,25** | *26,67* | **90** | **14** | **6,20** | **8,0** |
| **M10,0** | **1,50** | *35,04* | **100** | **16** | **8,00** | **10,0** |

## 2117 HSSE DIN 376/374

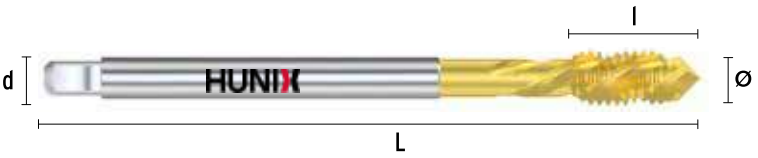
M-MF DIN 13 | Form. C | Tol. 6H | 35° | 3XD | D | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | *21,03* | **56** | **5** | **2,00** | **2,2** |
| **M4,0** | **0,70** | *24,11* | **63** | **7** | **2,10** | **2,8** |
| **M5,0** | **0,80** | *26,08* | **70** | **8** | **2,70** | **3,5** |
| **M6,0** | **1,00** | *26,88* | **80** | **10** | **3,40** | **4,5** |
| M8,0 | 1,00 | *41,50* | 90 | 10 | 4,90 | 6,0 |
| **M8,0** | **1,25** | *32,11* | **90** | **14** | **4,90** | **6,0** |
| M10,0 | 1,00 | *48,65* | 90 | 10 | 5,50 | 7,0 |
| M10,0 | 1,25 | *53,23* | 100 | 15 | 5,50 | 7,0 |
| **M10,0** | **1,50** | *40,54* | **100** | **16** | **5,50** | **7,0** |
| M12,0 | 1,00 | *60,49* | 100 | 10 | 7,00 | 9,0 |
| M12,0 | 1,25 | *67,31* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,50 | *57,98* | 100 | 15 | 7,00 | 9,0 |
| **M12,0** | **1,75** | *50,14* | **110** | **18** | **7,00** | **9,0** |
| M14,0 | 1,00 | *80,17* | 100 | 10 | 9,00 | 11,0 |
| M14,0 | 1,25 | *74,51* | 100 | 15 | 9,00 | 11,0 |
| M14,0 | 1,50 | *77,07* | 100 | 15 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| **M14,0** | **2,00** | *66,30* | **110** | **20** | **9,00** | **11,0** |
| M16,0 | 1,00 | *92,76* | 100 | 10 | 9,00 | 12,0 |
| M16,0 | 1,50 | *80,49* | 100 | 15 | 9,00 | 12,0 |
| **M16,0** | **2,00** | *71,85* | **110** | **20** | **9,00** | **12,0** |
| M18,0 | 1,00 | *110,61* | 110 | 13 | 11,00 | 14,0 |
| M18,0 | 1,50 | *101,88* | 110 | 20 | 11,00 | 14,0 |
| **M18,0** | **2,50** | *97,61* | **125** | **25** | **11,00** | **14,0** |
| M20,0 | 1,00 | *108,61* | 125 | 13 | 12,00 | 16,0 |
| M20,0 | 1,50 | *114,95* | 125 | 20 | 12,00 | 16,0 |
| **M20,0** | **2,50** | *106,62* | **140** | **25** | **12,00** | **16,0** |
| M22,0 | 1,00 | *148,01* | 125 | 13 | 14,50 | 18,0 |
| M22,0 | 1,50 | *144,17* | 125 | 17 | 14,50 | 18,0 |
| **M22,0** | **2,50** | *144,12* | **140** | **27** | **14,50** | **18,0** |
| M24,0 | 1,50 | *156,12* | 140 | 20 | 14,50 | 18,0 |
| M24,0 | 2,00 | *181,30* | 140 | 20 | 14,50 | 18,0 |
| **M24,0** | **3,00** | *146,52* | **160** | **30** | **14,50** | **18,0** |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2124 HSSE-PM DIN 371

M DIN 13 | Form. C | Tol. 6H | 35° | 3XD | R | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | ● 10-15 | ● 6-10 | ○ 4-6 | | ● 6-12 | | | ● 10-20 | | | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *23,12* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *23,48* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *25,31* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *26,11* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *33,61* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *40,75* | 100 | 15 | 8,00 | 10,0 |

## 2123 HSSE-PM DIN 376/374

M-MF DIN 13 | Form. C | Tol. 6H | 35° | 3XD | D | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | ● 10-15 | ● 6-10 | ○ 4-6 | | ● 6-12 | | | ● 10-20 | | | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,00 | *44,37* | 90 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *34,87* | 90 | 15 | 4,90 | 6,0 |
| M10,0 | 1,00 | *51,09* | 90 | 10 | 5,50 | 7,0 |
| M10,0 | 1,25 | *58,75* | 100 | 15 | 5,50 | 7,0 |
| M10,0 | 1,50 | *44,84* | 100 | 17 | 5,50 | 7,0 |
| M12,0 | 1,00 | *76,14* | 100 | 10 | 7,00 | 9,0 |
| M12,0 | 1,25 | *68,03* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,50 | *65,99* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,75 | *56,89* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 1,25 | *164,57* | 100 | 15 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 1,50 | *87,80* | 100 | 15 | 9,00 | 11,0 |
| M14,0 | 2,00 | *75,48* | 110 | 20 | 9,00 | 11,0 |
| M16,0 | 1,50 | *91,65* | 100 | 15 | 9,00 | 12,0 |
| M16,0 | 2,00 | *81,71* | 110 | 20 | 9,00 | 12,0 |
| M18,0 | 1,50 | *111,06* | 110 | 17 | 11,00 | 14,0 |
| M18,0 | 2,50 | *111,79* | 125 | 25 | 11,00 | 14,0 |
| M20,0 | 1,50 | *130,59* | 125 | 17 | 12,00 | 16,0 |
| M20,0 | 2,50 | *120,98* | 140 | 25 | 12,00 | 16,0 |
| M22,0 | 2,50 | *164,38* | 140 | 25 | 14,50 | 18,0 |
| M24,0 | 3,00 | *178,41* | 160 | 30 | 14,50 | 18,0 |

## 2178 HSSE-PM DIN 371

M DIN 13 | Form. C | Tol. 6HX | 15º | 3XD | R | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | ○ 6-10 | ● 4-6 | | ○ 4-6 | | | ● 10-20 | | | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *35,04* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *25,85* | 63 | 12 | 3,40 | 4,5 |
| M5,0 | 0,80 | *27,50* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *29,42* | 80 | 18 | 4,90 | 6,0 |
| M8,0 | 1,25 | *33,61* | 90 | 20 | 6,20 | 8,0 |
| M10,0 | 1,50 | *44,04* | 100 | 20 | 8,00 | 10,0 |

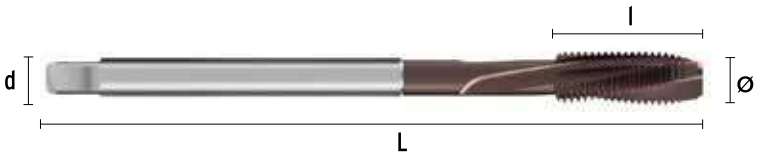
## 2177 HSSE-PM DIN 376

M DIN 13 | Form. C | Tol. 6HX | 15º | 3XD | D | TICN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | ○ 6-10 | ● 4-6 | | ○ 4-6 | | | ● 10-20 | | | | ○ 10-15 | | ○ 4-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *50,10* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *51,63* | 100 | 20 | 5,50 | 7,0 |
| M12,0 | 1,75 | *61,38* | 110 | 24 | 7,00 | 9,0 |
| M14,0 | 2,00 | *85,19* | 110 | 25 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *88,29* | 110 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | *146,76* | 125 | 32 | 11,00 | 14,0 |
| M20,0 | 0,25 | *136,02* | 140 | 32 | 12,00 | 16,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2120 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H | 35° | 3XD | R | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | ● 5-10 | | | | | | | | | | ○ 10-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *20,18* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *20,18* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *20,18* | 70 | 8 | 4,90 | 6,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *21,55* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *25,31* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *30,88* | 100 | 15 | 8,00 | 10,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock
*Para mismo rendimiento / Pour le même rendement / For the same performance **Ref. 2252**
*Para mayor rendimiento / Pour plus rendement / For higher performance **Ref. 2118**

## 2119 HSSE DIN 376/374

M-MF DIN 13 | Form. C | Tol. 6H | 35° | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | ● 5-10 | | | | | | | | | | ○ 10-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,00 | *29,89* | 90 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *25,31* | 90 | 15 | 4,90 | 6,0 |
| M10,0 | 1,00 | *36,63* | 90 | 10 | 5,50 | 7,0 |
| M10,0 | 1,25 | *39,09* | 100 | 15 | 5,50 | 7,0 |
| M10,0 | 1,50 | *30,88* | 100 | 17 | 5,50 | 7,0 |
| M12,0 | 1,00 | *48,03* | 100 | 10 | 7,00 | 9,0 |
| M12,0 | 1,25 | *46,46* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,50 | *48,14* | 110 | 15 | 7,00 | 9,0 |
| M12,0 | 1,75 | *41,76* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 1,25 | *67,43* | 100 | 15 | 9,00 | 11,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 1,50 | *51,08* | 100 | 15 | 9,00 | 11,0 |
| M14,0 | 2,00 | *51,92* | 110 | 20 | 9,00 | 11,0 |
| M16,0 | 1,50 | *65,40* | 100 | 15 | 9,00 | 12,0 |
| M16,0 | 2,00 | *62,74* | 110 | 20 | 9,00 | 12,0 |
| M18,0 | 1,50 | *83,75* | 110 | 17 | 11,00 | 14,0 |
| M18,0 | 2,50 | *84,33* | 125 | 25 | 11,00 | 14,0 |
| M20,0 | 1,50 | *94,35* | 125 | 17 | 12,00 | 16,0 |
| M20,0 | 2,50 | *89,86* | 140 | 25 | 12,00 | 16,0 |
| M22,0 | 2,50 | *95,75* | 140 | 25 | 14,50 | 18,0 |
| M24,0 | 3,00 | *101,51* | 160 | 30 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock
*Para mismo rendimiento / Pour le même rendement / For the same performance **Ref. 2253**
*Para mayor rendimiento / Pour plus rendement / For higher performance **Ref. 2117**

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2182 HSSE DIN 371

M DIN 13 | Form. C | Tol. 6H | 45° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 10-20 | ○ 6-8 | ○ 10-20 | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *18,09* | 56 | 6 | 2,70 | 3,5 |
| M4,0 | 0,70 | *18,09* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *18,46* | 70 | 8 | 4,90 | 6,0 |

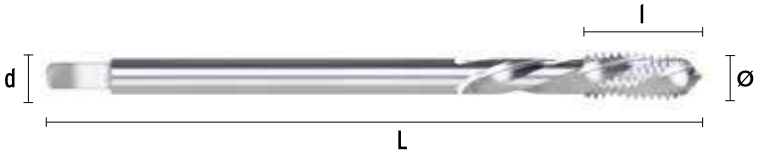
| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *20,02* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *23,90* | 90 | 14 | 6,20 | 8,0 |
| M10,0 | 1,50 | *28,24* | 100 | 16 | 8,00 | 10,0 |

## 2181 HSSE DIN 376

M DIN 13 | Form. C | Tol. 6H | 45° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 10-20 | ○ 6-8 | ○ 10-20 | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *20,02* | 80 | 18 | 3,40 | 4,5 |
| M8,0 | 1,25 | *23,90* | 90 | 20 | 4,90 | 6,0 |
| M10,0 | 1,50 | *28,24* | 100 | 22 | 5,50 | 7,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *33,58* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *49,08* | 110 | 20 | 9,00 | 11,0 |
| M16,0 | 2,00 | *66,19* | 110 | 22 | 9,00 | 12,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

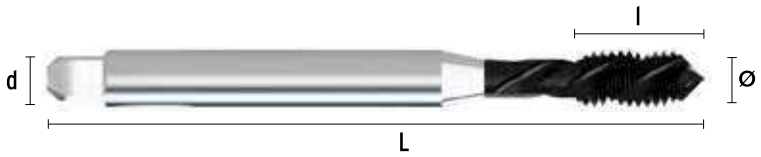
## 2256 HSSE-PM DIN 371 MULTI

M DIN 13 | Form. C | Tol. 6HX | 45° | 3XD | R | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-40 | ● 15-30 | ● 10-20 | ● 5-10 | ● 5-15 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 2-8 | ● 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *31,08* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *32,71* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *35,52* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *36,82* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *44,21* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *58,18* | 100 | 15 | 8,00 | 10,0 |

## 2257 HSSE-PM DIN 376 MULTI

M DIN 13 | Form. C | Tol. 6HX | 45° | 3XD | D | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-40 | ● 15-30 | ● 10-20 | ● 5-10 | ● 5-15 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 10-30 | ● 5-15 | ● 10-30 | ● 2-8 | ● 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *86,95* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *114,46* | 110 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *124,1* | 110 | 20 | 9,00 | 12,0 |

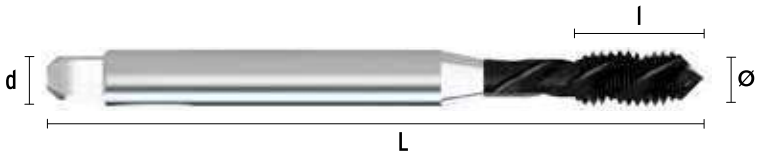
P Aceros Aciers Steels | M Aceros Inox Aciers Inox Stainless Steels | K Fundicion Fonte Cast Iron | N Metales no ferrosos Métal non Ferraux Non Ferrous metals | S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys | H Materiales Duros Materiels Durs Hard materials

## 2260 HSSE-PM DIN 371 SYNCHRO

M DIN 13 | Form. C | Tol. 6HX | 45° | CNC | 3XD | R | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| 20-50 | 15-40 | 10-20 | 5-10 | 5-15 | 5-10 | 10-40 | 10-40 | 5-15 | 10-40 | 10-40 | 5-15 | 10-40 | 2-8 | 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *31,08* | 56 | 5 | 2,70 | 3,5 |
| M4,0 | 0,70 | *32,71* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *35,52* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *36,82* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *44,21* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *58,18* | 100 | 15 | 8,00 | 10,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2261 HSSE-PM DIN 376 SYNCHRO

M DIN 13 | Form. C | Tol. 6HX | 45° | CNC | 3XD | D | HL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | |
| 20-50 | 15-40 | 10-20 | 5-10 | 5-15 | 5-10 | 10-40 | 10-40 | 5-15 | 10-40 | 10-40 | 5-15 | 10-40 | 2-8 | 2-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *86,95* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *114,46* | 110 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *124,10* | 110 | 20 | 9,00 | 12,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

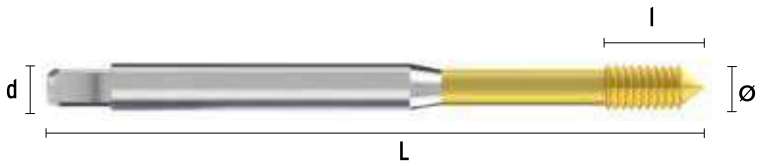
## 2188 HSSE-PM DIN 371

A>12% | M DIN 13 | Form. C | Tol. 6HX | 1,5XD | R | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *30,17* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *30,17* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *31,73* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *33,82* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *40,40* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *49,26* | 100 | 15 | 8,00 | 10,0 |

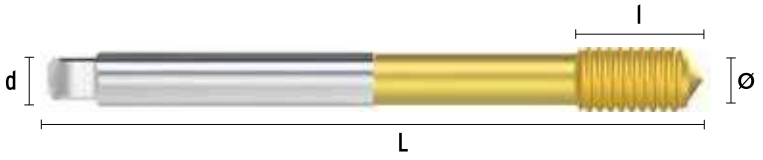
## 2187 HSSE-PM DIN 376

A>12% | M DIN 13 | Form. C | Tol. 6HX | 1,5XD | D | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *63,70* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *85,90* | 110 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *103,09* | 110 | 20 | 9,00 | 12,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

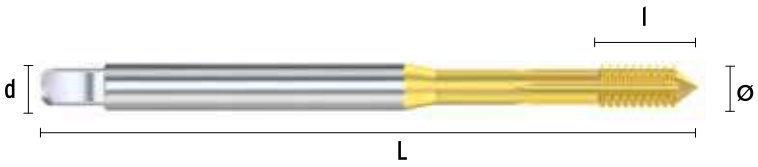
## 2214 HSSE-PM DIN 371

A>12% | M DIN 13 | Form. C | Tol. 6HX | 3XD | R | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *30,17* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *30,17* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *31,73* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *33,82* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *40,40* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *49,26* | 100 | 15 | 8,00 | 10,0 |

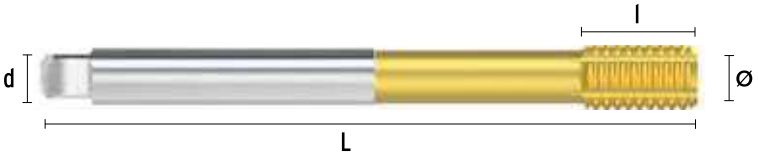
## 2213 HSSE-PM DIN 376/374

A>12% | M-MF DIN13 | Form. C | Tol. 6HX | 3XD | D | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,00 | *66,20* | 90 | 13 | 4,90 | 6,0 |
| M8,0 | 1,25 | *57,10* | 90 | 13 | 4,90 | 6,0 |
| M10,0 | 1,00 | *54,25* | 90 | 13 | 5,50 | 7,0 |
| M10,0 | 1,25 | *84,60* | 100 | 15 | 5,50 | 7,0 |
| M10,0 | 1,50 | *67,40* | 100 | 15 | 5,50 | 7,0 |
| M12,0 | 1,00 | *83,75* | 100 | 10 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,25 | *87,55* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,50 | *85,15* | 100 | 15 | 7,00 | 9,0 |
| M12,0 | 1,75 | *65,15* | 110 | 18 | 7,00 | 9,0 |
| M14,0 | 2,00 | *85,90* | 110 | 20 | 9,00 | 11,0 |
| M16,0 | 1,50 | *133,00* | 100 | 15 | 9,00 | 12,0 |
| M16,0 | 2,00 | *103,10* | 110 | 20 | 9,00 | 12,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

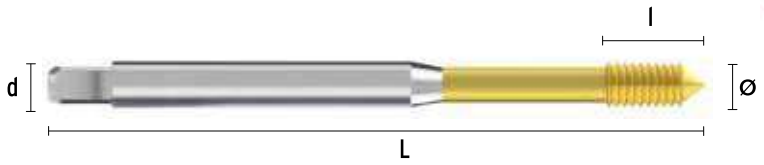
## 2216 HSSE-PM DIN 371

A>12% | M DIN 13 | Form. C | Tol. 6GX | 1,5XD | R | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *25,90* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *26,80* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *27,50* | 70 | 8 | 4,90 | 6,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *28,60* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *38,90* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *48,80* | 100 | 15 | 8,00 | 10,0 |

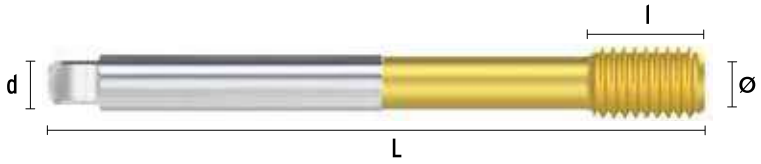
## 2215 HSSE-PM DIN 376

A>12% | M DIN 13 | Form. C | Tol. 6GX | 1,5XD | D | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *73,60* | 110 | 18 | 7,00 | 9,0 |

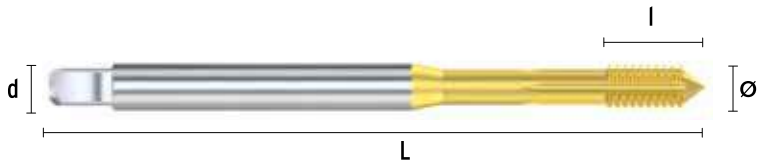
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2218 HSSE-PM DIN 371 A>12% | M DIN 13 | Form. C | Tol. 6GX | 3XD | R | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *25,45* | 56 | 10 | 2,70 | 3,5 |
| M4,0 | 0,70 | *31,55* | 63 | 7 | 3,40 | 4,5 |
| M5,0 | 0,80 | *33,40* | 70 | 8 | 4,90 | 6,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M6,0 | 1,00 | *26,75* | 80 | 10 | 4,90 | 6,0 |
| M8,0 | 1,25 | *43,45* | 90 | 13 | 6,20 | 8,0 |
| M10,0 | 1,50 | *52,35* | 100 | 15 | 8,00 | 10,0 |

## 2217 HSSE-PM DIN 376 A>12% | M DIN 13 | Form. C | Tol. 6GX | 3XD | D | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | ● 15-25 | | | ● 10-25 | | | | | ● 15-40 | ● 15-30 | ● 20-40 | | | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *52,35* | 110 | 18 | 7,00 | 9,0 |



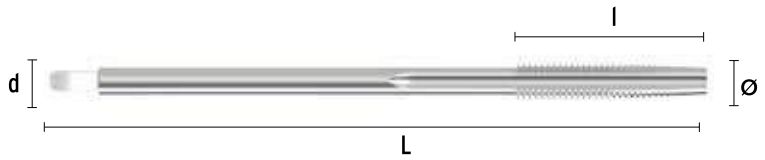
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2199 HSSE DIN 357

M DIN 13 | Tol. 6H | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *26,47* | 70 | 22 | | 2,2 |
| M4,0 | 0,70 | *26,47* | 90 | 25 | 2,10 | 2,8 |
| M5,0 | 0,80 | *27,23* | 100 | 28 | 2,70 | 3,5 |
| M6,0 | 1,00 | *25,24* | 110 | 32 | 3,40 | 4,5 |
| M8,0 | 1,25 | *29,49* | 125 | 40 | 4,90 | 6,0 |
| M10,0 | 1,50 | *45,37* | 140 | 45 | 5,50 | 7,0 |
| M12,0 | 1,75 | *54,43* | 180 | 50 | 7,00 | 9,0 |

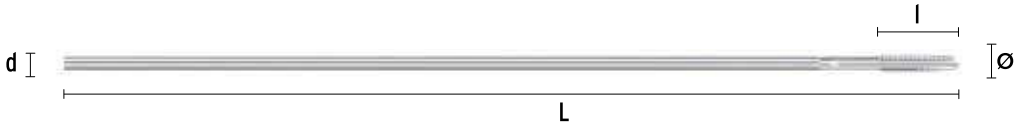
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 2,00 | *60,47* | 200 | 56 | 9,00 | 11,0 |
| M16,0 | 2,00 | *74,10* | 200 | 63 | 9,00 | 12,0 |
| M18,0 | 2,50 | *90,72* | 220 | 63 | 11,00 | 14,0 |
| M20,0 | 2,50 | *105,07* | 250 | 70 | 12,00 | 16,0 |
| M22,0 | 2,50 | *134,55* | 280 | 80 | 14,50 | 18,0 |
| M24,0 | 3,00 | *158,73* | 280 | 80 | 14,50 | 18,0 |

## 2134 HSSE

M DIN 13 | 16-18 tpi | Tol. 6H | D | NIT

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | d mm |
|---|---|---|---|---|---|
| M3,0 | 0,50 | *72,56* | 280 | 12 | 2,7 |
| M4,0 | 0,70 | *71,54* | 280 | 17 | 2,1 |
| M5,0 | 0,80 | *71,54* | 280 | 20 | 2,7 |
| M6,0 | 1,00 | *71,54* | 280 | 25 | 3,4 |
| M8,0 | 1,25 | *75,88* | 280 | 31 | 4,9 |
| M10,0 | 1,50 | *87,96* | 280 | 37 | 5,5 |
| M12,0 | 1,75 | *137,16* | 420 | 43 | 7,0 |

| Ø | P | € | L mm | l mm | d mm |
|---|---|---|---|---|---|
| M14,0 | 2,00 | *132,48* | 420 | 50 | 9,0 |
| M16,0 | 2,00 | *186,31* | 420 | 50 | 9,0 |
| M18,0 | 2,50 | *230,09* | 530 | 62 | 14,2 |
| M20,0 | 2,50 | *304,28* | 530 | 63 | 12,0 |
| M22,0 | 2,50 | *351,47* | 530 | 62 | 18,0 |
| M24,0 | 3,00 | *492,28* | 530 | 75 | 19,2 |

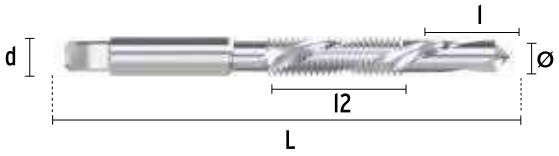
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2806 HSSE DIN 13

M DIN 13 | Tol. 6H

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | | | | | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | ○ | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *35,88* | 56 | 16 | 2,40 | 3,0 |
| M4,0 | 0,70 | *35,88* | 63 | 18 | 3,00 | 4,0 |
| M5,0 | 0,80 | *35,88* | 71 | 20 | 3,80 | 5,0 |
| M6,0 | 1,00 | *39,65* | 80 | 22 | 4,90 | 6,0 |

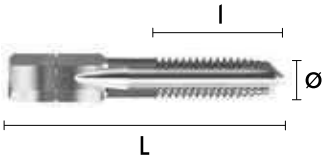
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M8,0 | 1,25 | *44,79* | 95 | 26 | 6,20 | 8,0 |
| M10,0 | 1,50 | *49,29* | 106 | 30 | 8,00 | 10,0 |
| M12,0 | 1,75 | *58,17* | 115 | 32 | 9,00 | 12,0 |

## 1504 HSS Hex.

M DIN 13 | Tol. 6H | 1/4"

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-45 | | | | | | | | | | | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm |
|---|---|---|---|---|---|
| M3,0 | 0,50 | *7,33* | 33 | 11 | 1/4" |
| M4,0 | 0,70 | *7,33* | 35 | 12 | 1/4" |
| M5,0 | 0,80 | *7,33* | 36 | 15 | 1/4" |

| Ø | P | € | L mm | l mm | ⊠ mm |
|---|---|---|---|---|---|
| M6,0 | 1,00 | *7,33* | 39 | 18 | 1/4" |
| M8,0 | 1,25 | *10,15* | 40 | 19 | 1/4" |
| M10,0 | 1,50 | *11,62* | 41 | 21 | 1/4" |



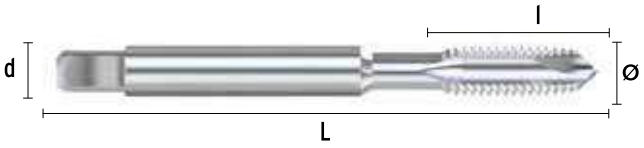
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2248 HSS ISO 529

M DIN 13 | Form. B "Gun" | Tol. 6H | 3XD

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 5-20 | | | | | | | ○ 5-15 | | ○ 10-15 | ● 5-15 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *5,95* | 48 | 11 | 2,50 | 3,2 |
| M4,0 | 0,70 | *6,04* | 53 | 13 | 3,15 | 4,0 |
| M5,0 | 0,80 | *7,66* | 58 | 16 | 4,00 | 5,0 |
| M6,0 | 1,00 | *8,01* | 66 | 19 | 5,00 | 6,3 |
| M8,0 | 1,25 | *8,27* | 72 | 22 | 6,30 | 8,0 |
| M10,0 | 1,50 | *10,11* | 80 | 24 | 8,00 | 10,0 |
| M12,0 | 1,75 | *15,31* | 89 | 29 | 7,10 | 10,2 |
| M14,0 | 2,00 | *16,06* | 95 | 30 | 9,00 | 11,2 |

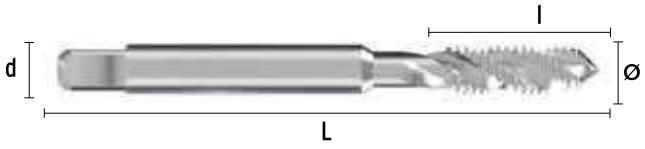
| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *18,77* | 102 | 32 | 10,00 | 12,5 |
| M18,0 | 2,50 | *23,45* | 110 | 37 | 11,20 | 14,0 |
| M20,0 | 2,50 | *26,21* | 112 | 37 | 11,20 | 14,0 |
| M22,0 | 2,50 | *29,71* | 118 | 38 | 12,50 | 16,0 |
| M24,0 | 3,00 | *37,54* | 130 | 45 | 14,00 | 18,0 |
| M27,0 | 3,00 | *50,40* | 135 | 45 | 16,00 | 20,0 |
| M30,0 | 3,50 | *93,54* | 138 | 48 | 16,00 | 20,0 |

## 2249 HSS ISO 529

M DIN 13 | Form. C | 35° | Tol. 6H | 3XD

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 5-20 | | | | | | | ○ 5-15 | | ○ 10-15 | ● 5-15 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *7,44* | 48 | 11 | 2,50 | 3,2 |
| M4,0 | 0,70 | *7,70* | 53 | 13 | 3,15 | 4,0 |
| M5,0 | 0,80 | *9,54* | 58 | 16 | 4,00 | 5,0 |
| M6,0 | 1,00 | *9,89* | 66 | 19 | 5,00 | 6,3 |
| M8,0 | 1,25 | *10,54* | 72 | 22 | 6,30 | 8,0 |
| M10,0 | 1,50 | *12,64* | 80 | 24 | 8,00 | 10,0 |
| M12,0 | 1,75 | *19,12* | 89 | 29 | 7,10 | 10,2 |
| M14,0 | 2,00 | *21,57* | 95 | 30 | 9,00 | 11,2 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M16,0 | 2,00 | *23,45* | 102 | 32 | 10,00 | 12,5 |
| M18,0 | 2,50 | *29,44* | 112 | 37 | 11,20 | 14,0 |
| M20,0 | 2,50 | *32,99* | 112 | 37 | 11,20 | 14,0 |
| M22,0 | 2,50 | *37,06* | 118 | 38 | 12,50 | 16,0 |
| M24,0 | 3,00 | *46,81* | 130 | 45 | 14,00 | 18,0 |
| M27,0 | 3,00 | *62,91* | 135 | 45 | 16,00 | 20,0 |
| M30,0 | 3,50 | *105,70* | 138 | 48 | 16,00 | 20,0 |

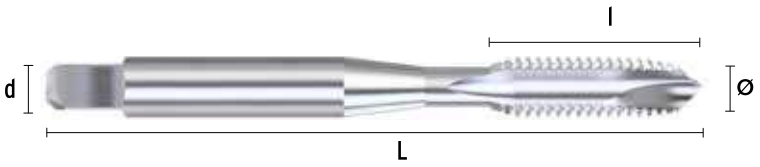
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2266 HSSE JIS

M DIN13 | Form. B "Gun" | HH1 HH4 | 3XD

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *12,16* | 46 | 11 | 3,20 | 4,0 |
| M4,0 | 0,70 | *12,43* | 52 | 13 | 4,00 | 5,0 |
| M5,0 | 0,80 | *12,45* | 60 | 16 | 4,50 | 5,5 |
| M6,0 | 1,00 | *13,66* | 62 | 19 | 4,50 | 6,0 |
| M8,0 | 1,25 | *15,07* | 70 | 22 | 5,00 | 6,2 |
| M10,0 | 1,50 | *18,49* | 75 | 24 | 5,50 | 7,0 |

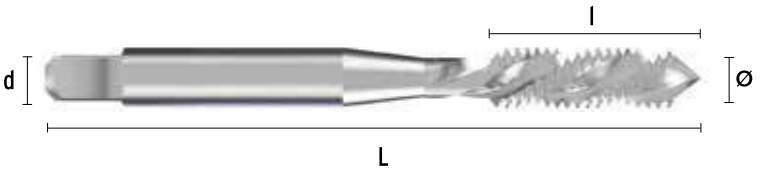
| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *23,60* | 82 | 29 | 6,50 | 8,5 |
| M14,0 | 2,00 | *31,08* | 88 | 30 | 8,00 | 10,5 |
| M16,0 | 2,00 | *38,18* | 95 | 32 | 10,00 | 12,5 |
| M18,0 | 2,50 | *51,88* | 100 | 37 | 11,00 | 14,0 |
| M20,0 | 2,50 | *55,97* | 105 | 37 | 12,00 | 15,0 |

## 2267 HSSE JIS

M DIN13 | Form. C | HH1 HH4 | 35° | 3XD

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *14,99* | 46 | 6 | 3,20 | 4,0 |
| M4,0 | 0,70 | *14,99* | 52 | 9 | 4,00 | 5,0 |
| M5,0 | 0,80 | *14,49* | 60 | 10 | 4,50 | 5,5 |
| M6,0 | 1,00 | *15,89* | 62 | 12 | 4,50 | 6,0 |
| M8,0 | 1,25 | *18,94* | 70 | 15 | 5,00 | 6,2 |
| M10,0 | 1,50 | *22,03* | 75 | 18 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *29,42* | 82 | 21 | 6,50 | 8,5 |
| M14,0 | 2,00 | *37,77* | 88 | 24 | 8,00 | 10,5 |
| M16,0 | 2,00 | *45,61* | 95 | 24 | 10,00 | 12,5 |
| M18,0 | 2,50 | *61,33* | 100 | 30 | 11,00 | 14,0 |
| M20,0 | 2,50 | *65,34* | 105 | 30 | 12,00 | 15,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2268 HSSE JIS

M DIN13 | Form. B "Gun" | HH1 HH4 | 3XD | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *13,61* | 46 | 11 | 3,20 | 4,0 |
| M4,0 | 0,70 | *13,93* | 52 | 13 | 4,00 | 5,0 |
| M5,0 | 0,80 | *13,94* | 60 | 16 | 4,50 | 5,5 |
| M6,0 | 1,00 | *15,30* | 62 | 19 | 4,50 | 6,0 |
| M8,0 | 1,25 | *16,87* | 70 | 22 | 5,00 | 6,2 |
| M10,0 | 1,50 | *20,72* | 75 | 24 | 5,50 | 7,0 |

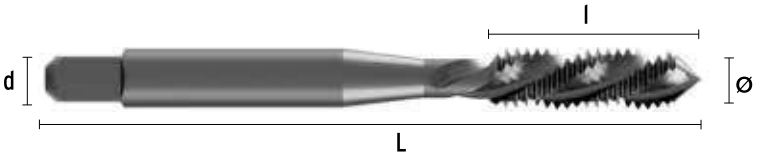
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *26,44* | 82 | 29 | 6,50 | 8,5 |
| M14,0 | 2,00 | *34,81* | 88 | 30 | 8,00 | 10,5 |
| M16,0 | 2,00 | *42,76* | 95 | 32 | 10,00 | 12,5 |
| M18,0 | 2,50 | *58,11* | 100 | 37 | 11,00 | 14,0 |
| M20,0 | 2,50 | *62,69* | 105 | 37 | 12,00 | 15,0 |

## 2269 HSSE JIS

M DIN13 | Form. C | HH1 HH4 | 35° | 3XD | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *16,81* | 46 | 6 | 3,20 | 4,0 |
| M4,0 | 0,70 | *16,81* | 52 | 9 | 4,00 | 5,0 |
| M5,0 | 0,80 | *16,23* | 60 | 10 | 4,50 | 5,5 |
| M6,0 | 1,00 | *17,79* | 62 | 12 | 4,50 | 6,0 |
| M8,0 | 1,25 | *21,22* | 70 | 15 | 5,00 | 6,2 |
| M10,0 | 1,50 | *24,69* | 75 | 18 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *32,95* | 82 | 21 | 6,50 | 8,5 |
| M14,0 | 2,00 | *42,30* | 88 | 24 | 8,00 | 10,5 |
| M16,0 | 2,00 | *51,08* | 95 | 24 | 10,00 | 12,5 |
| M18,0 | 2,50 | *68,69* | 100 | 30 | 11,00 | 14,0 |
| M20,0 | 2,50 | *73,19* | 105 | 30 | 12,00 | 15,0 |

P Aceros Aciers Steels | M Aceros Inox Aciers Inox Stainless Steels | K Fundicion Fonte Cast Iron | N Metales no ferrosos Métal non Ferraux Non Ferrous metals | S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys | H Materiales Duros Materiels Durs Hard materials

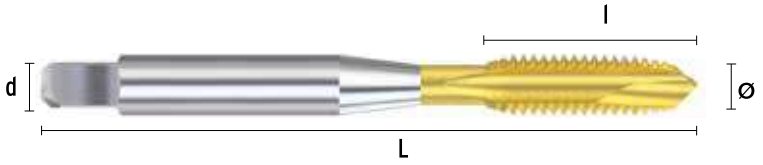
## 2270 HSSE JIS

M DIN13 | Form. B "Gun" | HH1 HH4 | 3XD | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 12-18 | | | ○ 5-10 | | | ○ 15-20 | | ○ 15-20 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *17,02* | 46 | 11 | 3,20 | 4,0 |
| M4,0 | 0,70 | *18,19* | 52 | 13 | 4,00 | 5,0 |
| M5,0 | 0,80 | *18,20* | 60 | 16 | 4,50 | 5,5 |
| M6,0 | 1,00 | *19,41* | 62 | 19 | 4,50 | 6,0 |
| M8,0 | 1,25 | *22,47* | 70 | 22 | 5,00 | 6,2 |
| M10,0 | 1,50 | *29,47* | 75 | 24 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *35,69* | 82 | 29 | 6,50 | 8,5 |
| M14,0 | 2,00 | *44,79* | 88 | 30 | 8,00 | 10,5 |
| M16,0 | 2,00 | *53,26* | 95 | 32 | 10,00 | 12,5 |
| M18,0 | 2,50 | *66,96* | 100 | 37 | 11,00 | 14,0 |
| M20,0 | 2,50 | *71,04* | 105 | 37 | 12,00 | 15,0 |

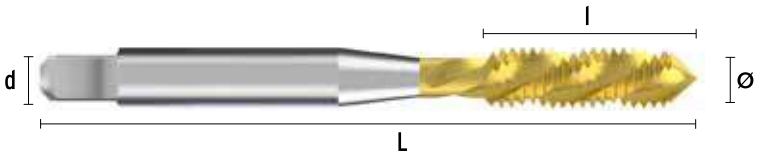
## 2271 HSSE JIS

M DIN13 | Form. C | HH1 HH4 | 35° | 3XD | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 12-18 | | | ○ 5-10 | | | ○ 15-20 | | ○ 15-20 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M3,0 | 0,50 | *20,11* | 46 | 6 | 3,20 | 4,0 |
| M4,0 | 0,70 | *21,03* | 52 | 9 | 4,00 | 5,0 |
| M5,0 | 0,80 | *20,53* | 60 | 10 | 4,50 | 5,5 |
| M6,0 | 1,00 | *21,91* | 62 | 12 | 4,50 | 6,0 |
| M8,0 | 1,25 | *26,70* | 70 | 15 | 5,00 | 6,2 |
| M10,0 | 1,50 | *33,53* | 75 | 18 | 5,50 | 7,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M12,0 | 1,75 | *42,09* | 82 | 21 | 6,50 | 8,5 |
| M14,0 | 2,00 | *52,14* | 88 | 24 | 8,00 | 10,5 |
| M16,0 | 2,00 | *61,41* | 95 | 24 | 10,00 | 12,5 |
| M18,0 | 2,50 | *77,13* | 100 | 30 | 11,00 | 14,0 |
| M20,0 | 2,50 | *81,14* | 105 | 30 | 12,00 | 15,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2148 HSSE DIN 371

UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *23,96* | 56 | 11 | 2,70 | 3,5 |
| Nº5 | 40,00 | *23,96* | 56 | 11 | 2,70 | 3,5 |
| Nº6 | 32,00 | *22,81* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 32,00 | *22,81* | 63 | 13 | 3,40 | 4,5 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº10 | 24,00 | *23,96* | 70 | 14 | 4,90 | 6,0 |
| Nº12 | 24,00 | *25,14* | 80 | 16 | 4,90 | 6,0 |
| 1/4 | 20,00 | *21,27* | 80 | 16 | 5,50 | 7,0 |
| 5/16 | 18,00 | *22,62* | 90 | 20 | 6,20 | 8,0 |

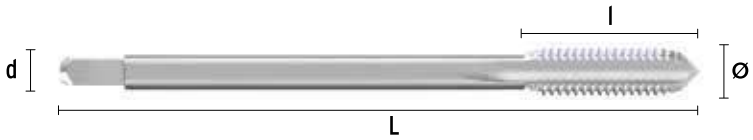
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2147 HSSE DIN 376

UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 20,00 | *21,27* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 18,00 | *24,07* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 16,00 | *27,46* | 100 | 22 | 5,50 | 7,0 |
| 7/16 | 14,00 | *37,75* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 13,00 | *41,42* | 110 | 27 | 7,00 | 9,0 |
| 9/16 | 12,00 | *56,41* | 110 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | *54,79* | 110 | 30 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 10,00 | *72,41* | 125 | 35 | 11,00 | 14,0 |
| 7/8 | 9,00 | *95,39* | 140 | 36 | 14,50 | 18,0 |
| 1 | 8,00 | *125,28* | 160 | 38 | 16,00 | 20,0 |
| 1"1/8 | 7,00 | *158,18* | 180 | 45 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | *193,95* | 180 | 45 | 18,00 | 22,0 |
| 1"1/2 | 6,00 | *327,03* | 200 | 55 | 24,00 | 32,0 |

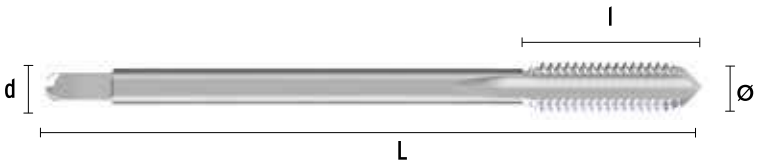
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

# 2147/5 HSSE DIN 376

UNC ANSI/ASME B1.1 | Form. C | LH | Tol. 2B | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 20,00 | *42,53* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 18,00 | *48,13* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 16,00 | *54,94* | 100 | 22 | 5,50 | 7,0 |
| 7/16 | 14,00 | *75,51* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 13,00 | *82,83* | 110 | 27 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 12,00 | *112,82* | 110 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | *109,58* | 110 | 30 | 9,00 | 12,0 |
| 3/4 | 10,00 | *144,82* | 125 | 35 | 11,00 | 14,0 |
| 7/8 | 9,00 | *190,81* | 140 | 36 | 14,50 | 18,0 |
| 1" | 8,00 | *250,53* | 160 | 38 | 16,00 | 20,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



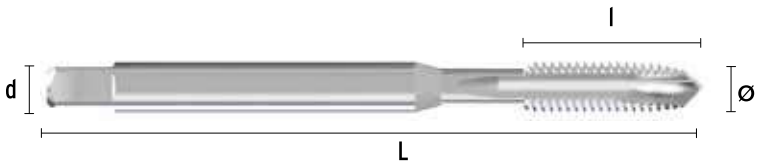
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2150 HSSE DIN 371

UNC ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *22,15* | 56 | 10 | 2,70 | 3,5 |
| Nº5 | 40,00 | *20,64* | 56 | 10 | 2,70 | 3,5 |
| Nº6 | 32,00 | *20,64* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 32,00 | *20,64* | 63 | 12 | 3,40 | 4,5 |
| Nº10 | 24,00 | *20,89* | 70 | 14 | 4,90 | 6,0 |

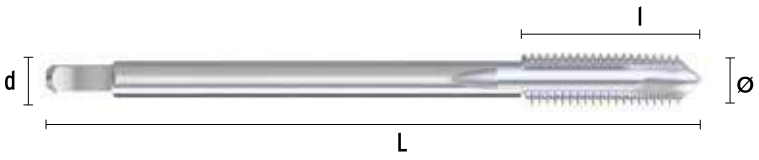
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 24,00 | *22,10* | 80 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | *22,10* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 18,00 | *23,87* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 16,00 | *28,21* | 100 | 20 | 8,00 | 10,0 |

## 2149 HSSE DIN 376

UNC ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *1/4 | 20,00 | *22,10* | 80 | 18 | 3,40 | 4,5 |
| *5/16 | 18,00 | *23,87* | 90 | 20 | 4,90 | 6,0 |
| *3/8 | 16,00 | *28,21* | 100 | 20 | 5,50 | 7,0 |
| 7/16 | 14,00 | *40,10* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 13,00 | *40,10* | 110 | 24 | 7,00 | 9,0 |
| 9/16 | 12,00 | *54,70* | 110 | 25 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 11,00 | *53,65* | 110 | 32 | 9,00 | 12,0 |
| 3/4 | 10,00 | *78,05* | 125 | 32 | 11,00 | 14,0 |
| 7/8 | 9,00 | *111,20* | 140 | 32 | 14,50 | 18,0 |
| 1" | 8,00 | *103,05* | 160 | 38 | 16,00 | 20,0 |
| 1"1/8 | 7,00 | *171,55* | 180 | 40 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | *176,40* | 180 | 40 | 18,00 | 22,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2262 HSSE DIN 371

UNC ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | R | 3XD | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *24,36* | 56 | 10 | 2,70 | 3,5 |
| Nº5 | 40,00 | *22,71* | 56 | 10 | 2,70 | 3,5 |
| Nº6 | 32,00 | *22,71* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 32,00 | *22,71* | 63 | 12 | 3,40 | 4,5 |
| Nº10 | 24,00 | *22,98* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 24,00 | *24,31* | 80 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | *24,31* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 18,00 | *26,26* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 16,00 | *31,03* | 100 | 20 | 8,00 | 10,0 |

## 2263 HSSE DIN 376

UNC ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | D | 3XD | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 14,00 | *44,09* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 13,00 | *44,09* | 110 | 24 | 7,00 | 9,0 |
| 9/16 | 12,00 | *60,19* | 110 | 25 | 9,00 | 11,0 |
| 5/8 | 11,00 | *59,03* | 110 | 32 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 10,00 | *85,87* | 125 | 32 | 11,00 | 14,0 |
| 7/8 | 9,00 | *122,33* | 140 | 32 | 14,50 | 18,0 |
| 1" | 8,00 | *113,34* | 160 | 38 | 16,00 | 20,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2234 HSSE DIN 371

UNC ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | R | 3XD | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *33,28* | 56 | 10 | 2,70 | 3,5 |
| Nº5 | 40,00 | *30,02* | 56 | 10 | 2,70 | 3,5 |
| Nº6 | 32,00 | *30,02* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 32,00 | *30,02* | 63 | 12 | 3,40 | 4,5 |
| Nº10 | 24,00 | *32,26* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 24,00 | *33,73* | 80 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | *33,73* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 18,00 | *37,83* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 16,00 | *46,47* | 100 | 20 | 8,00 | 10,0 |

## 2235 HSSE DIN 376

UNC ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | D | 3XD | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 14,00 | *64,97* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 13,00 | *66,95* | 110 | 24 | 7,00 | 9,0 |
| 9/16 | 12,00 | *91,40* | 110 | 25 | 9,00 | 11,0 |
| 5/8 | 11,00 | *86,66* | 110 | 32 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 10,00 | *127,89* | 125 | 32 | 11,00 | 14,0 |
| 7/8 | 9,00 | *191,64* | 140 | 32 | 14,50 | 18,0 |
| 1" | 8,00 | *176,85* | 160 | 38 | 16,00 | 20,0 |

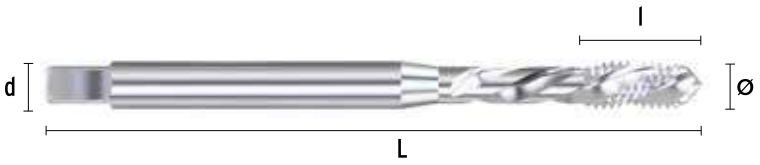
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2152 HSSE DIN 371

UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *24,40* | 56 | 5 | 2,70 | 3,5 |
| Nº5 | 40,00 | *22,65* | 56 | 7 | 2,70 | 3,5 |
| Nº6 | 32,00 | *22,65* | 56 | 6 | 3,00 | 4,0 |
| Nº8 | 32,00 | *22,65* | 63 | 7 | 3,40 | 4,5 |
| Nº10 | 24,00 | *23,05* | 70 | 8 | 4,90 | 6,0 |

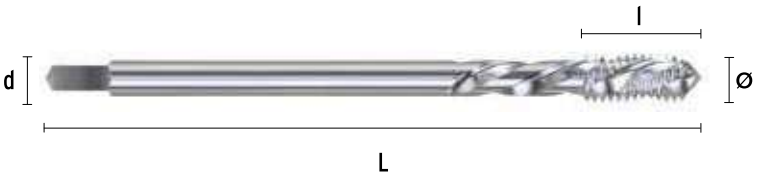
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 24,00 | *24,35* | 80 | 10 | 4,90 | 6,0 |
| 1/4 | 20,00 | *24,35* | 80 | 13 | 5,50 | 7,0 |
| 5/16 | 18,00 | *26,30* | 90 | 13 | 6,20 | 8,0 |
| 3/8 | 16,00 | *31,05* | 100 | 15 | 8,00 | 10,0 |

## 2151 HSSE DIN 376

UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *1/4 | 20,00 | *24,35* | 80 | 13 | 3,40 | 4,5 |
| *5/16 | 18,00 | *26,30* | 90 | 13 | 4,90 | 6,0 |
| *3/8 | 16,00 | *31,05* | 100 | 16 | 5,50 | 7,0 |
| 7/16 | 14,00 | *44,05* | 100 | 15 | 6,20 | 8,0 |
| 1/2 | 13,00 | *44,05* | 110 | 18 | 7,00 | 9,0 |
| 9/16 | 12,00 | *60,15* | 110 | 20 | 9,00 | 11,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 11,00 | *59,05* | 110 | 22 | 9,00 | 12,0 |
| 3/4 | 10,00 | *85,85* | 125 | 25 | 11,00 | 14,0 |
| 7/8 | 9,00 | *122,30* | 140 | 30 | 14,50 | 18,0 |
| 1" | 8,00 | *113,40* | 160 | 30 | 16,00 | 20,0 |
| 1"1/8 | 7,00 | *188,71* | 180 | 40 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | *194,04* | 180 | 40 | 18,00 | 22,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2264 HSSE DIN 371

UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | R | 3XD | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *26,84* | 56 | 5 | 2,70 | 3,5 |
| Nº5 | 40,00 | *24,94* | 56 | 7 | 2,70 | 3,5 |
| Nº6 | 32,00 | *24,94* | 56 | 6 | 3,00 | 4,0 |
| Nº8 | 32,00 | *24,94* | 63 | 7 | 3,40 | 4,5 |
| Nº10 | 24,00 | *25,38* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 24,00 | *26,76* | 80 | 10 | 4,90 | 6,0 |
| 1/4 | 20,00 | *26,76* | 80 | 13 | 5,50 | 7,0 |
| 5/16 | 18,00 | *28,94* | 90 | 13 | 6,20 | 8,0 |
| 3/8 | 16,00 | *34,14* | 100 | 15 | 8,00 | 10,0 |

## 2265 HSSE DIN 376

UNC ANSI/ASME | Form. C | Tol. 2B | 35° | D | 3XD | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 14,00 | *48,45* | 100 | 15 | 6,20 | 8,0 |
| 1/2 | 13,00 | *48,45* | 110 | 18 | 7,00 | 9,0 |
| 9/16 | 12,00 | *66,14* | 110 | 20 | 9,00 | 11,0 |
| 5/8 | 11,00 | *64,98* | 110 | 22 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 10,00 | *94,41* | 125 | 25 | 11,00 | 14,0 |
| 7/8 | 9,00 | *134,54* | 140 | 30 | 14,50 | 18,0 |
| 1" | 8,00 | *124,72* | 160 | 30 | 16,00 | 20,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2236 HSSE DIN 371

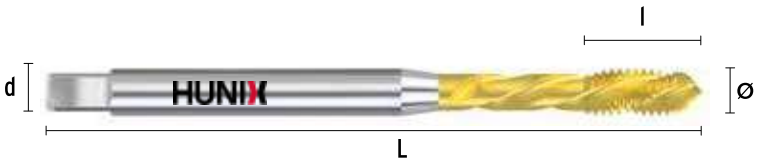
UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | R | 3XD | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 40,00 | *33,28* | 56 | 5 | 2,70 | 3,5 |
| Nº5 | 40,00 | *33,28* | 56 | 7 | 2,70 | 3,5 |
| Nº6 | 32,00 | *32,64* | 56 | 6 | 3,00 | 4,0 |
| Nº8 | 32,00 | *32,64* | 63 | 7 | 3,40 | 4,5 |
| Nº10 | 24,00 | *34,95* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 24,00 | *36,61* | 80 | 10 | 4,90 | 6,0 |
| 1/4 | 20,00 | *36,61* | 80 | 13 | 5,50 | 7,0 |
| 5/16 | 18,00 | *40,84* | 90 | 13 | 6,20 | 8,0 |
| 3/8 | 16,00 | *50,12* | 100 | 15 | 8,00 | 10,0 |

## 2237 HSSE DIN 376

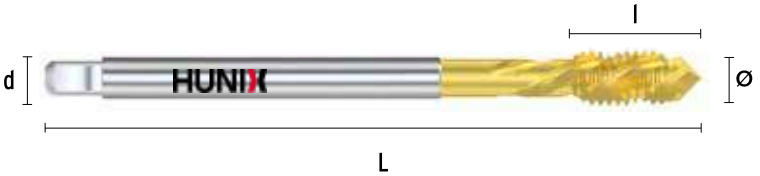
UNC ANSI/ASME B1.1 | Form. C | Tol. 2B | D | 3XD | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 14,00 | *70,09* | 100 | 15 | 6,20 | 8,0 |
| 1/2 | 13,00 | *72,14* | 110 | 18 | 7,00 | 9,0 |
| 9/16 | 12,00 | *98,76* | 110 | 20 | 9,00 | 11,0 |
| 5/8 | 11,00 | *93,45* | 110 | 22 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 10,00 | *137,93* | 125 | 25 | 11,00 | 14,0 |
| 7/8 | 9,00 | *206,61* | 140 | 30 | 14,50 | 18,0 |
| 1" | 8,00 | *190,04* | 160 | 30 | 16,00 | 20,0 |



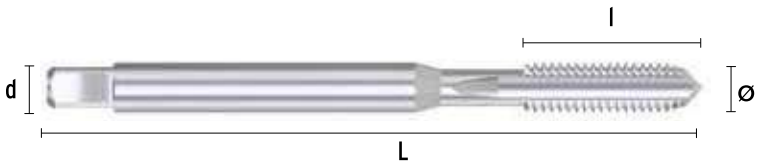
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2154 HSSE DIN 371

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *26,25* | 56 | 11 | 2,70 | 3,5 |
| Nº5 | 44,00 | *26,25* | 56 | 11 | 2,70 | 3,5 |
| Nº6 | 40,00 | *25,16* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 36,00 | *25,16* | 63 | 13 | 3,40 | 4,5 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº10 | 32,00 | *25,16* | 70 | 14 | 4,90 | 6,0 |
| Nº12 | 28,00 | *26,25* | 80 | 16 | 4,90 | 6,0 |
| 1/4 | 28,00 | *20,20* | 80 | 16 | 5,50 | 7,0 |
| 5/16 | 24,00 | *23,22* | 90 | 20 | 6,20 | 8,0 |

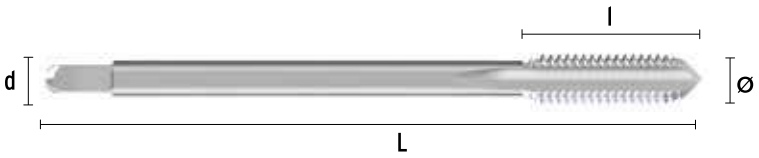
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2153 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 28,00 | *20,20* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 24,00 | *23,22* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 24,00 | *26,80* | 100 | 20 | 5,50 | 7,0 |
| 7/16 | 20,00 | *34,34* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 20,00 | *36,55* | 100 | 22 | 7,00 | 9,0 |
| 9/16 | 18,00 | *44,88* | 100 | 22 | 9,00 | 11,0 |
| 5/8 | 18,00 | *50,54* | 100 | 22 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 16,00 | *64,66* | 110 | 25 | 11,00 | 14,0 |
| 7/8 | 14,00 | *81,34* | 125 | 25 | 14,50 | 18,0 |
| 1" | 12,00 | *106,62* | 140 | 28 | 16,00 | 20,0 |
| 1"1/8 | 12,00 | *160,13* | 150 | 28 | 18,00 | 22,0 |
| 1"1/4 | 12,00 | *202,38* | 150 | 28 | 18,00 | 22,0 |
| 1"1/2 | 12,00 | *339,61* | 170 | 30 | 22,00 | 28,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

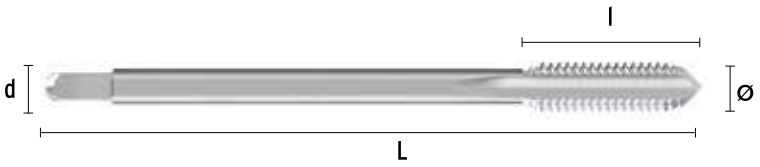
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 2153/5 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. C | LH | Tol. 2B | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 28,00 | *40,37* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 24,00 | *46,42* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 24,00 | *53,59* | 100 | 20 | 5,50 | 7,0 |
| 7/16 | 20,00 | *68,65* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 20,00 | *73,08* | 100 | 22 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 18,00 | *89,74* | 100 | 22 | 9,00 | 11,0 |
| 5/8 | 18,00 | *101,07* | 100 | 22 | 9,00 | 12,0 |
| 3/4 | 16,00 | *129,32* | 110 | 25 | 11,00 | 14,0 |
| 7/8 | 14,00 | *162,69* | 125 | 25 | 14,50 | 18,0 |
| 1" | 12,00 | *213,26* | 140 | 28 | 16,00 | 20,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



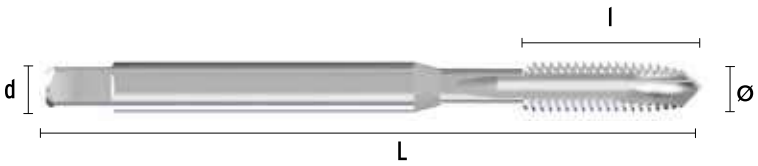
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2156 HSSE DIN 371

UNF ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *23,35* | 56 | 11 | 2,70 | 3,5 |
| Nº5 | 44,00 | *23,35* | 56 | 11 | 2,70 | 3,5 |
| Nº6 | 40,00 | *23,52* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 36,00 | *23,72* | 63 | 12 | 3,40 | 4,5 |
| Nº10 | 32,00 | *24,13* | 70 | 14 | 4,90 | 6,0 |

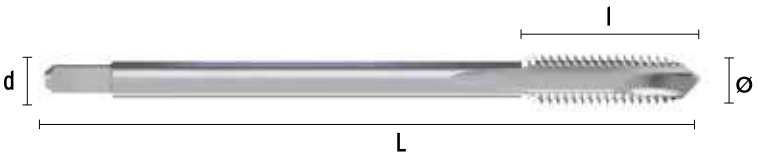
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 28,00 | *25,33* | 80 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | *26,51* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 24,00 | *27,48* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 24,00 | *32,57* | 100 | 20 | 8,00 | 10,0 |

## 2155 HSSE DIN 376

UNF ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *1/4 | 28,00 | *26,51* | 80 | 19 | 3,40 | 4,5 |
| *5/16 | 24,00 | *27,48* | 90 | 22 | 4,90 | 6,0 |
| *3/8 | 24,00 | *32,57* | 90 | 20 | 5,50 | 7,0 |
| 7/16 | 20,00 | *46,07* | 100 | 20 | 6,20 | 8,0 |
| 1/2 | 20,00 | *46,07* | 100 | 20 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 18,00 | *62,83* | 100 | 20 | 9,00 | 11,0 |
| 5/8 | 18,00 | *61,70* | 100 | 20 | 9,00 | 12,0 |
| 3/4 | 16,00 | *89,79* | 110 | 24 | 11,00 | 14,0 |
| 7/8 | 14,00 | *127,89* | 125 | 24 | 14,50 | 18,0 |
| 1" | 12,00 | *118,60* | 140 | 27 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

P Aceros Aciers Steels | M Aceros Inox Aciers Inox Stainless Steels | K Fundicion Fonte Cast Iron | N Metales no ferrosos Métal non Ferraux Non Ferrous metals | S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys | H Materiales Duros Materiels Durs Hard materials

## 2276 HSSE DIN 371

UNF ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | R | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *25,69* | 56 | 11 | 2,70 | 3,5 |
| Nº5 | 44,00 | *25,68* | 56 | 11 | 2,70 | 3,5 |
| Nº6 | 40,00 | *25,88* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 36,00 | *26,10* | 63 | 12 | 3,40 | 4,5 |
| Nº10 | 32,00 | *26,54* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 28,00 | *27,86* | 80 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | *29,16* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 24,00 | *30,23* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 24,00 | *35,82* | 100 | 20 | 8,00 | 10,0 |

## 2277 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 20,00 | *50,68* | 100 | 20 | 6,20 | 8,0 |
| 1/2 | 20,00 | *50,68* | 100 | 20 | 7,00 | 9,0 |
| 9/16 | 18,00 | *69,11* | 100 | 20 | 9,00 | 11,0 |
| 5/8 | 18,00 | *67,87* | 100 | 20 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 16,00 | *98,77* | 110 | 24 | 11,00 | 14,0 |
| 7/8 | 14,00 | *140,68* | 125 | 24 | 14,50 | 18,0 |
| 1" | 12,00 | *130,46* | 140 | 27 | 14,50 | 18,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2280 HSSE DIN 371

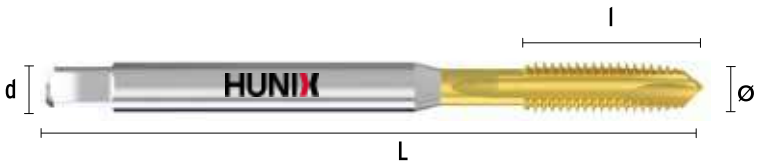
UNF ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | R | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *37,93* | 56 | 11 | 2,70 | 3,5 |
| Nº5 | 44,00 | *34,22* | 56 | 11 | 2,70 | 3,5 |
| Nº6 | 40,00 | *34,22* | 56 | 12 | 3,00 | 4,0 |
| Nº8 | 36,00 | *34,22* | 63 | 12 | 3,40 | 4,5 |
| Nº10 | 32,00 | *36,48* | 70 | 14 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 28,00 | *38,15* | 80 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | *38,15* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 24,00 | *43,20* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 24,00 | *53,77* | 100 | 20 | 8,00 | 10,0 |

## 2281 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. B "Gun" | Tol. 2B | 3XD | D | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 20,00 | *73,35* | 100 | 20 | 6,20 | 8,0 |
| 1/2 | 20,00 | *77,06* | 100 | 20 | 7,00 | 9,0 |
| 9/16 | 18,00 | *105,10* | 100 | 20 | 9,00 | 11,0 |
| 5/8 | 18,00 | *99,59* | 100 | 20 | 9,00 | 12,0 |

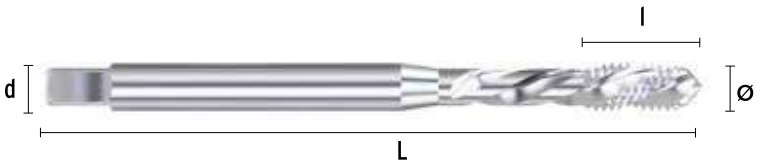
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 16,00 | *147,22* | 110 | 24 | 11,00 | 14,0 |
| 7/8 | 14,00 | *216,21* | 125 | 24 | 14,50 | 18,0 |
| 1" | 12,00 | *203,03* | 140 | 27 | 14,50 | 18,0 |

## 2158 HSSE DIN 371

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *25,70* | 56 | 5 | 2,70 | 3,5 |
| Nº5 | 44,00 | *25,70* | 56 | 5 | 2,70 | 3,5 |
| Nº6 | 40,00 | *26,03* | 56 | 6 | 3,00 | 4,0 |
| Nº8 | 36,00 | *26,18* | 63 | 7 | 3,40 | 4,5 |
| Nº10 | 32,00 | *26,51* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 28,00 | *27,88* | 80 | 10 | 4,90 | 6,0 |
| 1/4 | 28,00 | *29,21* | 80 | 10 | 5,50 | 7,0 |
| 5/16 | 24,00 | *30,26* | 90 | 13 | 6,20 | 8,0 |
| 3/8 | 24,00 | *35,87* | 100 | 15 | 8,00 | 10,0 |

## 2157 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *1/4 | 28,00 | *29,21* | 80 | 13 | 3,40 | 4,5 |
| *5/16 | 24,00 | *30,26* | 90 | 13 | 4,90 | 6,0 |
| *3/8 | 24,00 | *35,87* | 100 | 16 | 5,50 | 7,0 |
| 7/16 | 20,00 | *50,71* | 100 | 15 | 6,20 | 8,0 |
| 1/2 | 20,00 | *50,71* | 100 | 15 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 18,00 | *69,29* | 100 | 15 | 9,00 | 11,0 |
| 5/8 | 18,00 | *67,92* | 100 | 15 | 9,00 | 12,0 |
| 3/4 | 16,00 | *98,76* | 110 | 17 | 11,00 | 14,0 |
| 7/8 | 14,00 | *140,74* | 125 | 17 | 14,50 | 18,0 |
| 1" | 12,00 | *130,40* | 140 | 20 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2278 HSSE DIN 371

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | R | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| N°4 | 48,00 | *28,27* | 56 | 5 | 2,70 | 3,5 |
| N°5 | 44,00 | *28,27* | 56 | 5 | 2,70 | 3,5 |
| N°6 | 40,00 | *28,63* | 56 | 6 | 3,00 | 4,0 |
| N°8 | 36,00 | *28,80* | 63 | 7 | 3,40 | 4,5 |
| N°10 | 32,00 | *29,16* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| N°12 | 28,00 | *30,67* | 80 | 10 | 4,90 | 6,0 |
| 1/4 | 28,00 | *32,13* | 80 | 10 | 5,50 | 7,0 |
| 5/16 | 24,00 | *33,29* | 90 | 13 | 6,20 | 8,0 |
| 3/8 | 24,00 | *39,46* | 100 | 15 | 8,00 | 10,0 |

## 2279 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 20,00 | *55,78* | 100 | 20 | 6,20 | 8,0 |
| 1/2 | 20,00 | *55,78* | 100 | 20 | 7,00 | 9,0 |
| 9/16 | 18,00 | *76,22* | 100 | 20 | 9,00 | 11,0 |
| 5/8 | 18,00 | *74,71* | 100 | 20 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 16,00 | *108,63* | 110 | 24 | 11,00 | 14,0 |
| 7/8 | 14,00 | *154,82* | 125 | 24 | 14,50 | 18,0 |
| 1" | 12,00 | *143,44* | 140 | 27 | 14,50 | 18,0 |

## 2282 HSSE DIN 371

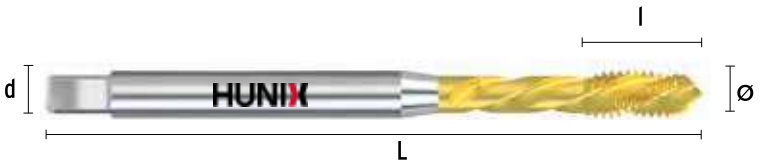
UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | R | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *41,83* | 56 | 5 | 2,70 | 3,5 |
| Nº5 | 44,00 | *37,60* | 56 | 5 | 2,70 | 3,5 |
| Nº6 | 40,00 | *37,60* | 56 | 6 | 3,00 | 4,0 |
| Nº8 | 36,00 | *37,60* | 63 | 7 | 3,40 | 4,5 |
| Nº10 | 32,00 | *39,56* | 70 | 8 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº12 | 28,00 | *41,35* | 80 | 10 | 4,90 | 6,0 |
| 1/4 | 28,00 | *41,35* | 80 | 10 | 5,50 | 7,0 |
| 5/16 | 24,00 | *46,72* | 90 | 13 | 6,20 | 8,0 |
| 3/8 | 24,00 | *57,61* | 100 | 15 | 8,00 | 10,0 |

## 2283 HSSE DIN 374

UNF ANSI/ASME B1.1 | Form. C | Tol. 2B | 35° | 3XD | D | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 20,00 | *79,18* | 100 | 15 | 6,20 | 8,0 |
| 1/2 | 20,00 | *82,95* | 100 | 15 | 7,00 | 9,0 |
| 9/16 | 18,00 | *113,61* | 100 | 15 | 9,00 | 11,0 |
| 5/8 | 18,00 | *106,44* | 100 | 15 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 16,00 | *158,61* | 110 | 17 | 11,00 | 14,0 |
| 7/8 | 14,00 | *233,37* | 125 | 17 | 14,50 | 18,0 |
| 1" | 12,00 | *217,56* | 140 | 20 | 14,50 | 18,0 |



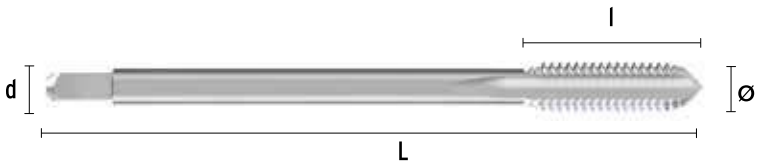
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2189 HSSE DIN 374

UN ANSI/ASME B1.1 | Form. C | Tol. 2B | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1"1/8 | 8,00 | *418,52* | 180 | 45 | 18,00 | 22,0 |
| 1"1/4 | 8,00 | *539,96* | 180 | 45 | 18,00 | 22,0 |
| 1"3/8 | 8,00 | *449,79* | 200 | 56 | 22,00 | 28,0 |
| 1"1/2 | 8,00 | *514,98* | 200 | 60 | 24,00 | 32,0 |

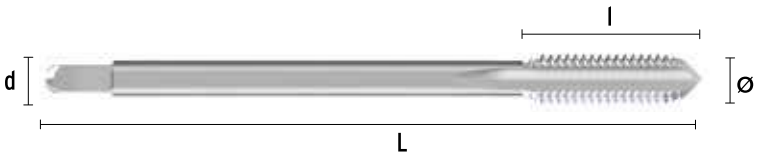
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1"5/8 | 8,00 | *524,25* | 200 | 60 | 24,00 | 32,0 |
| 1"3/4 | 8,00 | *657,22* | 200 | 50 | 29,00 | 36,0 |
| 2" | 8,00 | *1.068,29* | 225 | 50 | 32,00 | 40,0 |

## 2160 HSSE DIN 374

UNEF ANSI/ASME B1.1 | Form. C | Tol. 2B | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 32,00 | *86,12* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 32,00 | *100,31* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 32,00 | *114,98* | 90 | 20 | 5,50 | 7,0 |
| 7/16 | 28,00 | *146,35* | 90 | 22 | 6,20 | 8,0 |
| 1/2 | 28,00 | *156,60* | 100 | 22 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 24,00 | *188,10* | 100 | 22 | 9,00 | 11,0 |
| 5/8 | 24,00 | *218,74* | 100 | 22 | 9,00 | 12,0 |
| 3/4 | 20,00 | *289,87* | 110 | 25 | 11,00 | 14,0 |
| 1" | 20,00 | *474,97* | 140 | 28 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

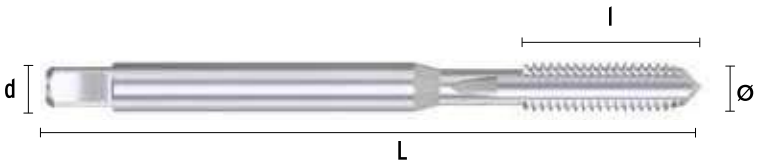
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2136 HSSE DIN 371

BSW BS 84 | Form. C | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/32 | 48,00 | *20,24* | 50 | 10 | 2,10 | 2,8 |
| 1/8 | 40,00 | *16,91* | 56 | 11 | 2,70 | 3,5 |
| 5/32 | 32,00 | *16,91* | 63 | 13 | 3,40 | 4,5 |
| 3/16 | 24,00 | *16,91* | 70 | 16 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/32 | 24,00 | *25,70* | 80 | 16 | 4,90 | 6,0 |
| 1/4 | 20,00 | *18,43* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 18,00 | *22,62* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 16,00 | *24,99* | 100 | 22 | 8,00 | 10,0 |

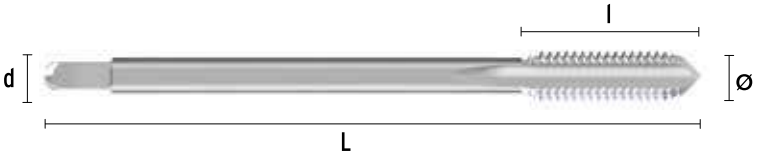
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2135 HSSE DIN 376

BSW BS 84 | Form. C | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 40,00 | *16,91* | 56 | 11 | 2,10 | 2,8 |
| 5/32 | 32,00 | *16,91* | 63 | 13 | 2,10 | 2,8 |
| 3/16 | 24,00 | *16,91* | 70 | 16 | 2,70 | 3,5 |
| 7/32 | 24,00 | *25,70* | 80 | 18 | 3,40 | 4,5 |
| 1/4 | 20,00 | *18,43* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 18,00 | *22,62* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 16,00 | *24,99* | 100 | 20 | 5,50 | 7,0 |
| 7/16 | 14,00 | *32,97* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 12,00 | *31,62* | 110 | 22 | 7,00 | 9,0 |
| 9/16 | 12,00 | *45,35* | 110 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | *42,89* | 110 | 28 | 9,00 | 12,0 |
| 3/4 | 10,00 | *57,40* | 125 | 32 | 11,00 | 14,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/8 | 9,00 | *77,74* | 140 | 36 | 14,50 | 18,0 |
| 1" | 8,00 | *97,77* | 160 | 38 | 14,50 | 18,0 |
| 1"1/8 | 7,00 | *129,70* | 180 | 45 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | *188,24* | 180 | 45 | 18,00 | 22,0 |
| 1"3/8 | 6,00 | *309,48* | 200 | 55 | 22,00 | 28,0 |
| 1"1/2 | 6,00 | *335,95* | 200 | 55 | 24,00 | 32,0 |
| 1"5/8 | 5,00 | *490,19* | 220 | 60 | 24,00 | 32,0 |
| 1"3/4 | 5,00 | *528,83* | 220 | 62 | 29,00 | 36,0 |
| 1"7/8 | 4,50 | *586,28* | 250 | 70 | 29,00 | 36,0 |
| 2" | 4,50 | *756,85* | 250 | 70 | 32,00 | 40,0 |
| 2"1/4 | 4,00 | *824,86* | 280 | 78 | 35,00 | 45,0 |
| 2"1/2 | 4,00 | *952,83* | 315 | 90 | 39,00 | 50,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



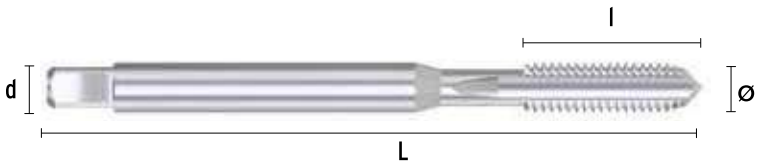
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2136/5 HSSE DIN 371

BSW BS 84 | Form. C | LH | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 40,00 | *33,83* | 56 | 11 | 2,70 | 3,5 |
| 5/32 | 32,00 | *33,83* | 63 | 13 | 3,40 | 4,5 |
| 3/16 | 24,00 | *33,83* | 70 | 14 | 4,90 | 6,0 |

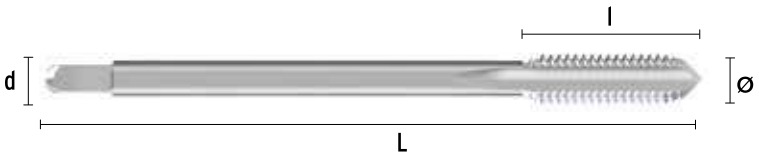
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2135/5 HSSE DIN 376

BSW BS 84 | Form. C | LH | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 20,00 | *36,86* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 18,00 | *45,24* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 16,00 | *49,98* | 100 | 22 | 5,50 | 7,0 |
| 7/16 | 14,00 | *65,93* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 12,00 | *63,22* | 110 | 27 | 7,00 | 9,0 |
| 9/16 | 12,00 | *90,69* | 110 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | *85,81* | 110 | 30 | 9,00 | 12,0 |
| 3/4 | 10,00 | *114,79* | 125 | 35 | 11,00 | 14,0 |
| 7/8 | 9,00 | *155,48* | 140 | 36 | 14,50 | 18,0 |
| 1" | 8,00 | *195,53* | 160 | 38 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

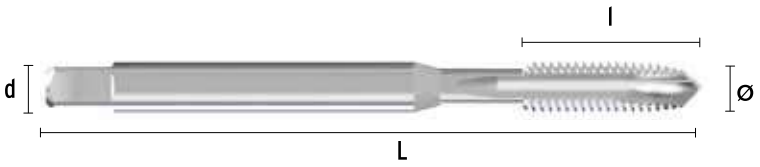
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2138 HSSE DIN 371

BSW BS 84 | Form. B "Gun" | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 40,00 | *18,68* | 56 | 11 | 2,70 | 3,5 |
| *5/32 | 32,00 | *18,68* | 63 | 13 | 3,40 | 4,5 |
| 3/16 | 24,00 | *18,68* | 70 | 15 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 20,00 | *21,22* | 80 | 18 | 5,50 | 7,0 |
| 5/16 | 18,00 | *28,68* | 90 | 20 | 6,20 | 8,0 |
| 3/8 | 16,00 | *27,46* | 100 | 20 | 8,00 | 10,0 |

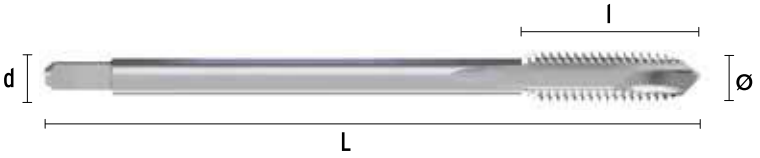
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2137 HSSE DIN 376

BSW BS 84 | Form. B "Gun" | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *1/4 | 20,00 | *21,22* | 80 | 17 | 3,40 | 4,5 |
| *5/16 | 18,00 | *24,84* | 90 | 20 | 4,90 | 6,0 |
| *3/8 | 16,00 | *27,46* | 100 | 22 | 5,50 | 7,0 |
| 7/16 | 14,00 | *34,67* | 100 | 22 | 6,20 | 8,0 |
| 1/2 | 12,00 | *36,30* | 110 | 27 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 12,00 | *49,86* | 110 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | *47,12* | 110 | 30 | 9,00 | 12,0 |
| 3/4 | 10,00 | *63,20* | 125 | 35 | 11,00 | 14,0 |
| 7/8 | 9,00 | *85,48* | 140 | 36 | 14,50 | 18,0 |
| 1" | 8,00 | *107,48* | 160 | 38 | 14,50 | 18,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2140 HSSE DIN 371

BSW BS 84 | Form. C | 35° | 3XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 40,00 | *21,22* | 56 | 7 | 2,70 | 3,5 |
| *5/32 | 32,00 | *21,22* | 63 | 7 | 3,40 | 4,5 |
| 3/16 | 24,00 | *21,22* | 70 | 10 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/4 | 20,00 | *28,75* | 80 | 13 | 5,50 | 7,0 |
| 5/16 | 18,00 | *35,26* | 90 | 14 | 6,20 | 8,0 |
| 3/8 | 16,00 | *37,22* | 100 | 20 | 8,00 | 10,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2139 HSSE DIN 376

BSW BS 84 | Form. C | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| *3/16 | 24,00 | *21,22* | 70 | 14 | 2,70 | 3,5 |
| *1/4 | 20,00 | *28,75* | 80 | 16 | 3,40 | 4,5 |
| *5/16 | 18,00 | *33,71* | 90 | 18 | 4,90 | 6,0 |
| 3/8 | 16,00 | *37,22* | 100 | 20 | 5,50 | 7,0 |
| 7/16 | 14,00 | *42,27* | 100 | 15 | 6,20 | 8,0 |
| 1/2 | 12,00 | *40,52* | 110 | 18 | 7,00 | 9,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 12,00 | *58,08* | 110 | 22 | 9,00 | 11,0 |
| 5/8 | 11,00 | *54,95* | 110 | 22 | 9,00 | 12,0 |
| 3/4 | 10,00 | *73,57* | 125 | 25 | 11,00 | 14,0 |
| 7/8 | 9,00 | *99,58* | 140 | 30 | 14,50 | 18,0 |
| 1" | 8,00 | *125,01* | 160 | 30 | 16,00 | 20,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

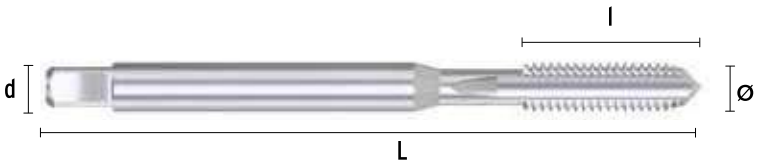
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2141 HSSE DIN 371

BSF BS 84 | Form. C | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/16 | 32,00 | *72,58* | 70 | 14 | 4,90 | 6,0 |
| 1/4 | 26,00 | *30,90* | 80 | 18 | 3,40 | 4,5 |
| 5/16 | 22,00 | *36,71* | 90 | 20 | 4,90 | 6,0 |
| 3/8 | 20,00 | *38,56* | 100 | 22 | 5,50 | 7,0 |

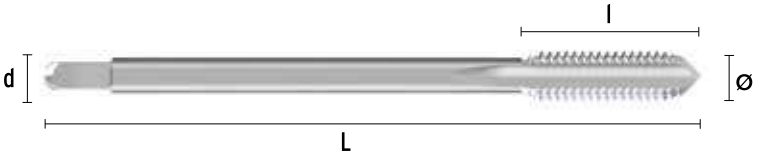
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2142 HSSE DIN 374

BSF BS 84 | Form. C | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 18,00 | *52,04* | 100 | 20 | 6,20 | 8,0 |
| 1/2 | 16,00 | *58,87* | 110 | 22 | 7,00 | 9,0 |
| 9/16 | 16,00 | *62,31* | 110 | 23 | 9,00 | 11,0 |
| 5/8 | 14,00 | *83,04* | 110 | 28 | 9,00 | 12,0 |
| 3/4 | 12,00 | *98,29* | 125 | 32 | 11,00 | 14,0 |
| 7/8 | 11,00 | *136,66* | 140 | 34 | 14,50 | 18,0 |
| 1" | 10,00 | *163,18* | 140 | 28 | 16,00 | 20,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



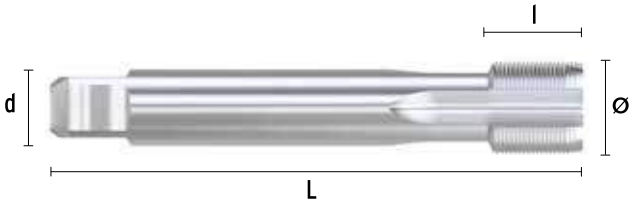
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2144 HSSE DIN 5156

G ISO 228 | Form. C | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *28,57* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *40,73* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *48,74* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *61,59* | 125 | 25 | 12,00 | 16,0 |
| 5/8 | 14,00 | *76,77* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *96,43* | 140 | 28 | 16,00 | 20,0 |
| 7/8 | 14,00 | *129,63* | 150 | 30 | 18,00 | 22,0 |

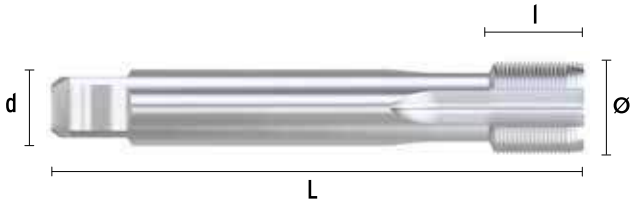
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1" | 11,00 | *149,63* | 160 | 32 | 20,00 | 25,0 |
| 1"1/8 | 11,00 | *227,41* | 170 | 34 | 22,00 | 28,0 |
| 1"1/4 | 11,00 | *266,81* | 170 | 34 | 24,00 | 32,0 |
| 1"3/8 | 11,00 | *333,71* | 180 | 32 | 29,00 | 36,0 |
| 1"1/2 | 11,00 | *423,49* | 190 | 36 | 29,00 | 36,0 |
| 1"3/4 | 11,00 | *503,33* | 190 | 36 | 32,00 | 40,0 |
| 2" | 11,00 | *641,39* | 220 | 40 | 35,00 | 45,0 |

## 2144/5 HSSE DIN 5156

G ISO 228 | Form. C | LH | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *57,15* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *81,47* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *97,45* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *123,17* | 125 | 25 | 12,00 | 16,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *153,55* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *192,86* | 140 | 28 | 16,00 | 20,0 |
| 1" | 11,00 | *299,26* | 160 | 32 | 20,00 | 25,0 |

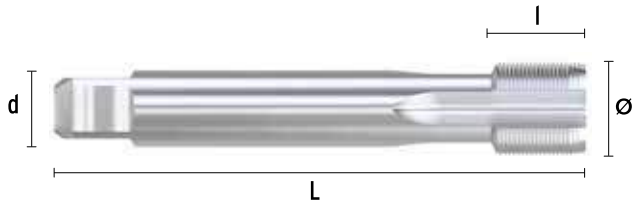
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2192 HSSE DIN 5156

G ISO 228 | Form. E | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● 25-35 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *34,65* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *53,21* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *73,48* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *99,15* | 125 | 25 | 12,00 | 16,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *103,59* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *145,51* | 140 | 28 | 16,00 | 20,0 |
| 7/8 | 14,00 | *177,85* | 150 | 28 | 18,00 | 22,0 |
| 1" | 11,00 | *221,96* | 160 | 30 | 20,00 | 25,0 |

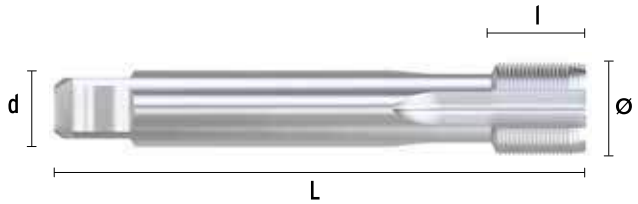
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2206 HSSE DIN 5156

+0,1 | G ISO 228 | Form. E | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● 25-35 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *42,24* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *62,94* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *88,18* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *120,38* | 125 | 25 | 12,00 | 16,0 |

| Ø | P | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *125,90* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *174,62* | 140 | 28 | 16,00 | 20,0 |
| 7/8 | 14,00 | *206,30* | 150 | 28 | 18,00 | 22,0 |
| 1" | 11,00 | *257,46* | 160 | 30 | 20,00 | 25,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



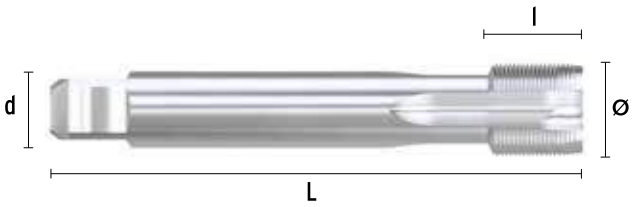
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2145 HSSE DIN 5156

G ISO 228 | Form. B "Gun" | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *33,02* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *59,27* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *58,47* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *78,06* | 125 | 25 | 12,00 | 16,0 |
| 5/8 | 14,00 | *121,30* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *137,99* | 140 | 28 | 16,00 | 20,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/8 | 14,00 | *176,34* | 150 | 30 | 18,00 | 22,0 |
| 1" | 11,00 | *259,62* | 160 | 32 | 20,00 | 25,0 |
| 1"1/8 | 11,00 | *388,03* | 170 | 30 | 22,00 | 28,0 |
| 1"1/4 | 11,00 | *386,20* | 170 | 30 | 24,00 | 32,0 |
| 1"3/8 | 11,00 | *395,40* | 190 | 32 | 29,00 | 36,0 |
| 1"1/2 | 11,00 | *411,13* | 190 | 32 | 29,00 | 36,0 |

## 2284 HSSE DIN 5156

G ISO 228 | Form. B "Gun" | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-10 | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *36,32* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *65,20* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *64,32* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *85,87* | 125 | 25 | 12,00 | 16,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *133,43* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *151,79* | 140 | 28 | 16,00 | 20,0 |
| 7/8 | 14,00 | *193,98* | 150 | 30 | 18,00 | 22,0 |
| 1" | 11,00 | *285,58* | 160 | 32 | 20,00 | 25,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2286 HSSE DIN 5156

G ISO 228 | Form. B "Gun" | 3XD | D | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 15-30 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | ● 10-15 | ● 15-20 | | ● 15-25 | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *55,88* | 90 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | *91,34* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *102,79* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *130,57* | 125 | 25 | 12,00 | 16,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *197,46* | 125 | 25 | 14,50 | 18,0 |
| 3/4 | 14,00 | *221,53* | 140 | 28 | 16,00 | 20,0 |
| 7/8 | 14,00 | *291,04* | 150 | 30 | 18,00 | 22,0 |
| 1" | 11,00 | *397,16* | 160 | 32 | 20,00 | 25,0 |

## 2146 HSSE DIN 5156

G ISO 228 | Form. C | 35° | 3XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ○ 5-10 | | | ○ 10-15 | | ○ 10-15 | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *36,20* | 90 | 10 | 5,50 | 7,0 |
| 1/4 | 19,00 | *65,21* | 100 | 14 | 9,00 | 11,0 |
| 3/8 | 19,00 | *64,41* | 100 | 15 | 9,00 | 12,0 |
| 1/2 | 14,00 | *85,83* | 125 | 17 | 12,00 | 16,0 |
| 5/8 | 14,00 | *133,43* | 125 | 20 | 14,50 | 18,0 |
| 3/4 | 14,00 | *151,77* | 140 | 20 | 16,00 | 20,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/8 | 14,00 | *194,08* | 150 | 22 | 18,00 | 22,0 |
| 1" | 11,00 | *285,52* | 160 | 24 | 20,00 | 25,0 |
| 1" 1/8 | 11,00 | *426,84* | 170 | 24 | 22,00 | 28,0 |
| 1"1/4 | 11,00 | *424,82* | 170 | 25 | 24,00 | 32,0 |
| 1" 3/8 | 11,00 | *434,94* | 190 | 32 | 29,00 | 36,0 |
| 1" 1/2 | 11,00 | *452,24* | 190 | 32 | 29,00 | 36,0 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2285 HSSE DIN 5156

G ISO 228 | Form. C | 35° | 3XD | D | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | ● 5-10 | ○ 5-8 | | ○ 10-15 | | | ● 10-20 | | ○ 10-15 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *39,82* | 90 | 10 | 5,50 | 7,0 |
| 1/4 | 19,00 | *71,73* | 100 | 14 | 9,00 | 11,0 |
| 3/8 | 19,00 | *70,85* | 100 | 15 | 9,00 | 12,0 |
| 1/2 | 14,00 | *94,41* | 125 | 17 | 12,00 | 16,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *146,77* | 125 | 20 | 14,50 | 18,0 |
| 3/4 | 14,00 | *166,94* | 140 | 20 | 16,00 | 20,0 |
| 7/8 | 14,00 | *213,49* | 150 | 22 | 18,00 | 22,0 |
| 1" | 11,00 | *314,07* | 160 | 24 | 20,00 | 25,0 |

## 2287 HSSE DIN 5156

G ISO 228 | Form. C | 35° | 3XD | D | TIN+

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ● 12-18 | ○ 8-12 | | ● 6-12 | ○ 6-10 | | ● 15-20 | | | ● 15-25 | | ○ 12-18 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

MICRO FINISH

NEW

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *60,17* | 90 | 10 | 5,50 | 7,0 |
| 1/4 | 19,00 | *98,95* | 100 | 14 | 9,00 | 11,0 |
| 3/8 | 19,00 | *113,10* | 100 | 15 | 9,00 | 12,0 |
| 1/2 | 14,00 | *140,62* | 125 | 17 | 12,00 | 16,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5/8 | 14,00 | *213,01* | 125 | 20 | 14,50 | 18,0 |
| 3/4 | 14,00 | *236,38* | 140 | 20 | 16,00 | 20,0 |
| 7/8 | 14,00 | *313,50* | 150 | 22 | 18,00 | 22,0 |
| 1" | 11,00 | *430,25* | 160 | 24 | 20,00 | 25,0 |

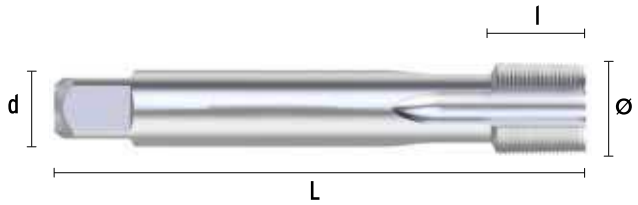
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2159 HSSE DIN 5156

Rc DIN 2999 | Form. C | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 7-15 | ○ 7-10 | | | | | | ○ 7-10 | | | ○ 7-15 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *48,14* | 90 | 18 | 5,50 | 7,0 |
| 1/4 | 19,00 | *69,70* | 100 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | *96,12* | 100 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | *133,97* | 125 | 25 | 12,00 | 16,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 14,00 | *207,66* | 140 | 28 | 16,00 | 20,0 |
| *7/8 | 14,00 | *358,52* | 150 | 28 | 18,00 | 22,0 |
| 1" | 11,00 | *298,53* | 160 | 33 | 20,00 | 25,0 |

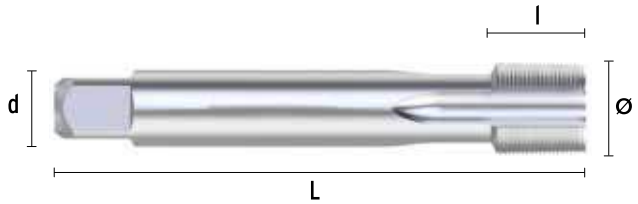
*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 2164 HSSE DIN 374

NPT ANSI/ASME B1.20.1 | Form. C | Tol. 6H | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 7-15 | ○ 7-10 | | | | | | ○ 7-10 | | | ○ 7-15 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/16 | 27,00 | *60,35* | 90 | 12 | 4,90 | 6,0 |
| 1/8 | 27,00 | *47,52* | 90 | 15 | 5,50 | 7,0 |
| 1/4 | 18,00 | *65,27* | 100 | 20 | 9,00 | 11,0 |
| 3/8 | 18,00 | *84,33* | 110 | 22 | 11,00 | 14,0 |
| 1/2 | 14,00 | *112,41* | 140 | 27 | 14,50 | 18,0 |

| ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/4 | 14,00 | *174,44* | 140 | 28 | 16,00 | 20,0 |
| 1" | 11,50 | *373,60* | 160 | 35 | 20,00 | 25,0 |
| *1"1/4 | 11,50 | *385,73* | 190 | 35 | 24,00 | 32,0 |
| *1"1/2 | 11,50 | *651,21* | 200 | 35 | 29,00 | 36,0 |
| *2" | 11,50 | *896,65* | 220 | 35 | 35,00 | 45,0 |

*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock



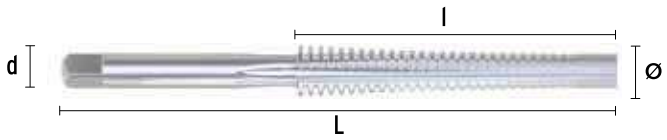
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2212 HSSE

Tr DIN 103 | Tol. 7H

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 2-8 | ○ 1-5 | | | | | | | | | ● 2-6 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 10 | 2,00 | *374,46* | 110 | 63 | 5,50 | 7,0 |
| 10 | 3,00 | *374,46* | 125 | 75 | 5,50 | 7,0 |
| 12 | 3,00 | *438,03* | 165 | 111 | 6,20 | 8,0 |
| 14 | 3,00 | *449,06* | 140 | 85 | 8,00 | 10,0 |
| 14 | 4,00 | *484,93* | 170 | 112 | 8,00 | 10,0 |
| 16 | 4,00 | *484,93* | 180 | 116 | 9,00 | 11,0 |
| 18 | 4,00 | *519,75* | 190 | 120 | 9,00 | 12,0 |

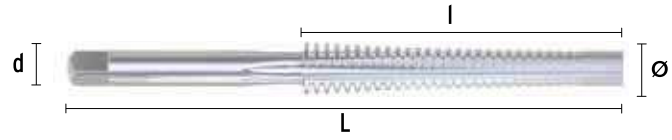
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 20 | 4,00 | *565,87* | 200 | 124 | 11,00 | 14,0 |
| 22 | 5,00 | *565,87* | 235 | 155 | 12,00 | 16,0 |
| 24 | 5,00 | *612,16* | 245 | 160 | 14,50 | 18,0 |
| 26 | 5,00 | *635,31* | 255 | 165 | 16,00 | 20,0 |
| 28 | 5,00 | *693,00* | 265 | 170 | 18,00 | 22,0 |
| 30 | 6,00 | *750,87* | 290 | 185 | 18,00 | 22,0 |
| 32 | 6,00 | *737,87* | 300 | 191 | 20,00 | 25,0 |

## 2212/5 HSSE

Tr DIN 103 | Tol. 7H | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 2-8 | ○ 1-5 | | | | | | | | | ● 2-6 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 10 | 2,00 | *468,03* | 110 | 63 | 5,50 | 7,0 |
| 10 | 3,00 | *468,03* | 125 | 75 | 5,50 | 7,0 |
| 12 | 3,00 | *547,52* | 165 | 111 | 6,20 | 8,0 |
| 14 | 3,00 | *561,32* | 140 | 85 | 8,00 | 10,0 |
| 14 | 4,00 | *606,20* | 170 | 112 | 8,00 | 10,0 |
| 16 | 4,00 | *606,20* | 180 | 116 | 9,00 | 11,0 |
| 18 | 4,00 | *649,64* | 190 | 120 | 9,00 | 12,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 20 | 4,00 | *707,33* | 200 | 124 | 11,00 | 14,0 |
| 22 | 5,00 | *707,33* | 235 | 155 | 12,00 | 16,0 |
| 24 | 5,00 | *765,21* | 245 | 160 | 14,50 | 18,0 |
| 26 | 5,00 | *794,15* | 255 | 165 | 16,00 | 20,0 |
| 28 | 5,00 | *866,16* | 265 | 170 | 18,00 | 22,0 |
| 30 | 6,00 | *938,63* | 290 | 185 | 18,00 | 22,0 |
| 32 | 6,00 | *922,34* | 300 | 191 | 20,00 | 25,0 |

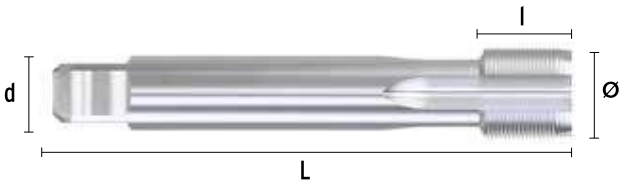
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2163 HSSE DIN 40433

PG DIN 40430 | Form. C | 1,5XD | D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Pg | Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 7,0 | 12,5 | 20,00 | *44,28* | 100 | 22 | 7,00 | 9,0 |
| 9,0 | 15,2 | 18,00 | *61,27* | 100 | 22 | 9,00 | 11,0 |
| 11,0 | 18,6 | 18,00 | *79,74* | 110 | 25 | 11,00 | 14,0 |
| 13,5 | 20,4 | 18,00 | *89,49* | 125 | 25 | 12,00 | 16,0 |
| 16,0 | 22,5 | 18,00 | *105,35* | 125 | 25 | 14,50 | 18,0 |

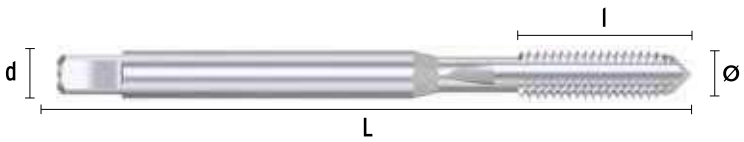
| Pg | Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 21,0 | 28,3 | 16,00 | *167,25* | 150 | 28 | 18,00 | 22,0 |
| 29,0 | 37,0 | 16,00 | *282,75* | 170 | 30 | 22,00 | 28,0 |
| 36,0 | 47,0 | 16,00 | *496,09* | 190 | 32 | 29,00 | 36,0 |
| 42,0 | 54,0 | 16,00 | *807,70* | 190 | 32 | 32,00 | 40,0 |
| 48,0 | 59,3 | 16,00 | *984,70* | 220 | 40 | 35,00 | 45,0 |

## 2242 HSSE DIN 371

Vg DIN 7756 | Form. C | 1,5XD | R

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● 10-25 | ○ 10-15 | | | | | | ○ 10-15 | | | ○ 10-20 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 5,0 | 36,00 | *92,43* | 70 | 12 | 4,90 | 6,0 |
| 5,2 | 24,00 | *92,43* | 80 | 17 | 4,90 | 6,0 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 6,0 | 32,00 | *105,23* | 80 | 14 | 5,50 | 7,0 |
| 8,0 | 32,00 | *117,08* | 80 | 16 | 6,20 | 8,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 2301 HSS DIN 352/2181

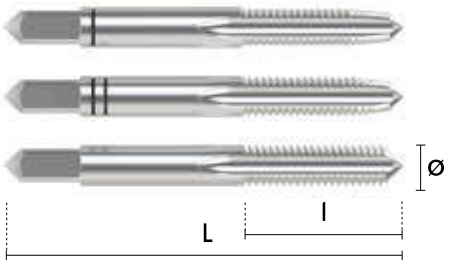
M-MF
DIN 13

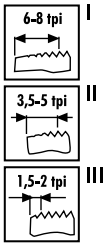
Tol.
6H

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
PVP = €/3 < M (€/3) MF (€/2)




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| **M1,0** | **0,25** | **3** | *76,43* | **32** | **5,5** | **2,10** | **2,5** |
| **M1,1** | **0,25** | **3** | *76,43* | **32** | **5,5** | **2,10** | **2,5** |
| **M1,2** | **0,25** | **3** | *76,43* | **32** | **5,5** | **2,10** | **2,5** |
| **M1,4** | **0,30** | **3** | *76,43* | **32** | **7** | **2,10** | **2,5** |
| **M1,6** | **0,35** | **3** | *69,74* | **32** | **8** | **2,10** | **2,5** |
| **M1,7** | **0,35** | **3** | *44,04* | **32** | **8** | **2,10** | **2,5** |
| **M1,8** | **0,35** | **3** | *65,47* | **32** | **8** | **2,10** | **2,5** |
| **M2,0** | **0,40** | **3** | *34,73* | **36** | **8** | **2,10** | **2,8** |
| **M2,2** | **0,45** | **3** | *37,41* | **36** | **9** | **2,10** | **2,8** |
| **M2,3** | **0,45** | **3** | *37,45* | **36** | **9** | **2,10** | **2,8** |
| **M2,5** | **0,45** | **3** | *35,92* | **40** | **9** | **2,10** | **2,8** |
| **M2,6** | **0,45** | **3** | *33,05* | **40** | **9** | **2,10** | **2,8** |
| **M3,0** | **0,50** | **3** | *19,02* | **40** | **11** | **2,70** | **3,5** |
| M3,0 | 0,60 | 2 | *36,47* | 40 | 11 | 2,70 | 3,5 |
| M3,5 | 0,60 | 2 | *26,32* | 45 | 12 | 3,00 | 4,0 |
| M3,5 | 0,75 | 2 | *44,05* | 45 | 14 | 3,40 | 4,5 |
| M4,0 | 0,50 | 2 | *37,09* | 45 | 13 | 3,40 | 4,5 |
| **M4,0** | **0,70** | **3** | *17,51* | **45** | **14** | **3,40** | **4,5** |
| M4,5 | 0,75 | 2 | *33,94* | 50 | 16 | 4,90 | 6,0 |
| M5,0 | 0,50 | 2 | *39,44* | 50 | 12 | 4,90 | 6,0 |
| M5,0 | 0,75 | 2 | *36,75* | 50 | 12 | 4,90 | 6,0 |
| **M5,0** | **0,80** | **3** | *19,03* | **50** | **16** | **4,90** | **6,0** |
| M5,0 | 1,00 | 3 | *21,13* | 50 | 14 | 4,90 | 6,0 |
| M5,5 | 0,90 | 2 | *128,58* | 50 | 18 | 4,90 | 6,0 |
| M6,0 | 0,50 | 2 | *39,40* | 56 | 14 | 4,90 | 6,0 |
| M6,0 | 0,75 | 2 | *22,19* | 56 | 14 | 4,90 | 6,0 |
| M6,0 | 0,90 | 2 | *128,47* | 56 | 19 | 4,90 | 6,0 |
| **M6,0** | **1,00** | **3** | *19,03* | **56** | **19** | **4,90** | **6,0** |
| M7,0 | 0,75 | 2 | *28,01* | 56 | 14 | 4,90 | 6,0 |
| **M7,0** | **1,00** | **3** | *26,26* | **56** | **19** | **4,90** | **6,0** |
| M8,0 | 0,50 | 2 | *42,06* | 56 | 18 | 4,90 | 6,0 |
| M8,0 | 0,75 | 2 | *32,77* | 56 | 18 | 4,90 | 6,0 |
| M8,0 | 1,00 | 2 | *21,79* | 63 | 22 | 4,90 | 6,0 |
| **M8,0** | **1,25** | **3** | *22,91* | **63** | **22** | **4,90** | **6,0** |
| M9,0 | 1,00 | 2 | *28,16* | 63 | 22 | 5,50 | 7,0 |
| **M9,0** | **1,25** | **3** | *40,65* | **63** | **22** | **5,50** | **7,0** |
| M10,0 | 0,50 | 2 | *106,86* | 63 | 18 | 5,50 | 7,0 |
| M10,0 | 0,75 | 2 | *46,97* | 63 | 20 | 5,50 | 7,0 |
| M10,0 | 1,00 | 2 | *23,63* | 63 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | 2 | *24,06* | 70 | 24 | 5,50 | 7,0 |
| **M10,0** | **1,50** | **3** | *28,93* | **70** | **24** | **5,50** | **7,0** |
| M11,0 | 0,75 | 2 | *116,98* | 63 | 20 | 6,20 | 8,0 |
| M11,0 | 1,00 | 2 | *41,76* | 63 | 20 | 6,20 | 8,0 |
| M11,0 | 1,25 | 2 | *41,76* | 70 | 22 | 6,20 | 8,0 |
| **M11,0** | **1,50** | **3** | *56,06* | **70** | **24** | **6,20** | **8,0** |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| M12,0 | 0,75 | 2 | *66,84* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,00 | 2 | *41,25* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,25 | 2 | *41,42* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,50 | 2 | *35,24* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,75 | 3 | *37,61* | 75 | 28 | 7,00 | 9,0 |
| M13,0 | 0,75 | 2 | *116,98* | 70 | 20 | 9,00 | 11,0 |
| M13,0 | 1,00 | 2 | *67,63* | 70 | 22 | 9,00 | 11,0 |
| M13,0 | 1,25 | 2 | *67,63* | 70 | 22 | 9,00 | 11,0 |
| M13,0 | 1,50 | 2 | *67,63* | 70 | 22 | 9,00 | 11,0 |
| **M13,0** | **1,75** | **3** | *85,19* | **75** | **30** | **9,00** | **11,0** |
| M14,0 | 0,75 | 2 | *117,09* | 70 | 22 | 9,00 | 11,0 |
| M14,0 | 1,00 | 2 | *61,72* | 70 | 22 | 9,00 | 11,0 |
| M14,0 | 1,25 | 2 | *50,63* | 70 | 22 | 9,00 | 11,0 |
| M14,0 | 1,50 | 2 | *39,33* | 70 | 22 | 9,00 | 11,0 |
| **M14,0** | **2,00** | **3** | *49,49* | **80** | **30** | **9,00** | **11,0** |
| M15,0 | 1,00 | 2 | *91,23* | 70 | 22 | 9,00 | 12,0 |
| M15,0 | 1,25 | 2 | *96,01* | 70 | 22 | 9,00 | 12,0 |
| M15,0 | 1,50 | 2 | *93,40* | 70 | 22 | 9,00 | 12,0 |
| **M15,0** | **2,00** | **3** | *97,60* | **80** | **32** | **9,00** | **12,0** |
| M16,0 | 1,00 | 2 | *86,37* | 70 | 22 | 9,00 | 12,0 |
| M16,0 | 1,25 | 2 | *90,92* | 70 | 22 | 9,00 | 12,0 |
| M16,0 | 1,50 | 2 | *49,04* | 70 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | **3** | *69,68* | **80** | **32** | **9,00** | **12,0** |
| M17,0 | 1,00 | 2 | *139,18* | 70 | 22 | 9,00 | 12,0 |
| M17,0 | 1,25 | 2 | *139,18* | 70 | 22 | 9,00 | 12,0 |
| M17,0 | 1,50 | 2 | *139,18* | 70 | 22 | 9,00 | 12,0 |
| M18,0 | 1,00 | 2 | *96,00* | 80 | 22 | 11,00 | 14,0 |
| M18,0 | 1,25 | 2 | *137,19* | 80 | 22 | 11,00 | 14,0 |
| M18,0 | 1,50 | 2 | *65,02* | 80 | 22 | 11,00 | 14,0 |
| M18,0 | 2,00 | 2 | *103,45* | 80 | 22 | 11,00 | 14,0 |
| **M18,0** | **2,50** | **3** | *93,14* | **95** | **34** | **11,00** | **14,0** |
| M19,0 | 1,00 | 2 | *202,02* | 80 | 22 | 11,00 | 14,0 |
| M19,0 | 1,25 | 2 | *201,84* | 80 | 22 | 11,00 | 14,0 |
| M19,0 | 1,50 | 2 | *202,02* | 80 | 22 | 11,00 | 14,0 |
| M20,0 | 1,00 | 2 | *127,85* | 80 | 22 | 12,00 | 16,0 |
| M20,0 | 1,25 | 2 | *202,02* | 80 | 22 | 12,00 | 16,0 |
| M20,0 | 1,50 | 2 | *81,13* | 80 | 22 | 12,00 | 16,0 |
| M20,0 | 2,00 | 2 | *107,22* | 80 | 22 | 12,00 | 16,0 |
| **M20,0** | **2,50** | **3** | *104,67* | **95** | **34** | **12,00** | **16,0** |
| M21,0 | 1,00 | 2 | *261,07* | 80 | 22 | 12,00 | 16,0 |
| M21,0 | 1,25 | 2 | *261,07* | 80 | 22 | 12,00 | 16,0 |
| M21,0 | 1,50 | 2 | *206,44* | 80 | 22 | 12,00 | 16,0 |
| M22,0 | 1,00 | 2 | *142,62* | 80 | 22 | 14,50 | 18,0 |
| M22,0 | 1,25 | 2 | *202,02* | 80 | 22 | 14,50 | 18,0 |
| M22,0 | 1,50 | 2 | *88,70* | 80 | 22 | 14,50 | 18,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

| Ø | P | Nº | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|---|
| M22,0 | 2,00 | 2 | *142,63* | 80 | 22 | 14,50 | 18,0 |
| **M22,0** | **2,50** | **3** | *128,32* | **100** | **34** | **14,50** | **18,0** |
| M23,0 | 1,00 | 2 | *260,82* | 80 | 22 | 14,50 | 18,0 |
| M23,0 | 1,50 | 2 | *260,82* | 80 | 22 | 14,50 | 18,0 |
| M24,0 | 1,00 | 2 | *159,46* | 90 | 22 | 14,50 | 18,0 |
| M24,0 | 1,25 | 2 | *261,07* | 90 | 22 | 14,50 | 18,0 |
| M24,0 | 1,50 | 2 | *113,23* | 90 | 22 | 14,50 | 18,0 |
| M24,0 | 2,00 | 2 | *159,46* | 90 | 22 | 14,50 | 18,0 |
| **M24,0** | **3,00** | **3** | *161,64* | **110** | **38** | **14,50** | **18,0** |
| M25,0 | 1,00 | 2 | *228,43* | 90 | 22 | 14,50 | 18,0 |
| M25,0 | 1,25 | 2 | *371,92* | 90 | 22 | 14,50 | 18,0 |
| M25,0 | 1,50 | 2 | *197,51* | 90 | 22 | 14,50 | 18,0 |
| M25,0 | 2,00 | 2 | *382,56* | 90 | 22 | 14,50 | 18,0 |
| M26,0 | 1,00 | 2 | *372,29* | 90 | 22 | 14,50 | 18,0 |
| M26,0 | 1,50 | 2 | *180,40* | 90 | 22 | 14,50 | 18,0 |
| M26,0 | 2,00 | 2 | *372,29* | 90 | 22 | 14,50 | 18,0 |
| M27,0 | 1,00 | 2 | *224,18* | 90 | 22 | 16,00 | 20,0 |
| M27,0 | 1,50 | 2 | *199,89* | 90 | 22 | 16,00 | 20,0 |
| M27,0 | 2,00 | 2 | *221,04* | 90 | 22 | 16,00 | 20,0 |
| **M27,0** | **3,00** | **3** | *208,17* | **110** | **38** | **16,00** | **20,0** |
| M28,0 | 1,00 | 2 | *372,27* | 90 | 22 | 16,00 | 20,0 |
| M28,0 | 1,50 | 2 | *200,42* | 90 | 22 | 16,00 | 20,0 |
| M28,0 | 2,00 | 2 | *372,27* | 90 | 22 | 16,00 | 20,0 |
| M30,0 | 1,00 | 2 | *230,99* | 90 | 22 | 18,00 | 22,0 |
| M30,0 | 1,50 | 2 | *207,90* | 90 | 22 | 18,00 | 22,0 |
| M30,0 | 2,00 | 2 | *239,68* | 90 | 22 | 18,00 | 22,0 |
| **M30,0** | **3,50** | **3** | *264,30* | **125** | **45** | **18,00** | **22,0** |
| M32,0 | 1,00 | 2 | *483,69* | 90 | 22 | 18,00 | 22,0 |
| M32,0 | 1,50 | 2 | *255,98* | 90 | 22 | 18,00 | 22,0 |
| M32,0 | 2,00 | 2 | *484,12* | 90 | 22 | 18,00 | 22,0 |
| M33,0 | 1,00 | 2 | *484,12* | 100 | 25 | 20,00 | 25,0 |
| M33,0 | 1,50 | 2 | *282,03* | 100 | 25 | 20,00 | 25,0 |
| M33,0 | 2,00 | 2 | *335,32* | 100 | 25 | 20,00 | 25,0 |
| **M33,0** | **3,50** | **3** | *335,32* | **125** | **50** | **20,00** | **25,0** |
| M34,0 | 1,50 | 2 | *305,18* | 100 | 25 | 22,00 | 28,0 |

| Ø | P | Nº | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|---|
| M35,0 | 1,50 | 2 | *391,92* | 100 | 25 | 22,00 | 28,0 |
| M36,0 | 1,50 | 2 | *326,92* | 100 | 25 | 22,00 | 28,0 |
| M36,0 | 2,00 | 2 | *418,35* | 125 | 40 | 22,00 | 28,0 |
| M36,0 | 3,00 | 2 | *570,71* | 125 | 40 | 22,00 | 28,0 |
| **M36,0** | **4,00** | **3** | *431,83* | **150** | **56** | **22,00** | **28,0** |
| M38,0 | 1,50 | 2 | *367,74* | 100 | 25 | 22,00 | 28,0 |
| M38,0 | 2,00 | 2 | *660,32* | 125 | 40 | 22,00 | 28,0 |
| M39,0 | 1,50 | 2 | *493,21* | 110 | 25 | 24,00 | 32,0 |
| M39,0 | 2,00 | 2 | *493,21* | 125 | 40 | 24,00 | 32,0 |
| M39,0 | 3,00 | 2 | *479,93* | 125 | 40 | 24,00 | 32,0 |
| **M39,0** | **4,00** | **3** | *479,84* | **150** | **60** | **24,00** | **32,0** |
| M40,0 | 1,50 | 2 | *431,90* | 110 | 25 | 24,00 | 32,0 |
| M40,0 | 2,00 | 2 | *501,67* | 125 | 40 | 24,00 | 32,0 |
| M40,0 | 3,00 | 2 | *497,01* | 125 | 40 | 24,00 | 32,0 |
| M42,0 | 1,50 | 2 | *477,73* | 110 | 25 | 24,00 | 32,0 |
| M42,0 | 2,00 | 2 | *573,95* | 125 | 40 | 24,00 | 32,0 |
| M42,0 | 3,00 | 2 | *573,95* | 125 | 40 | 24,00 | 32,0 |
| **M42,0** | **4,50** | **3** | *601,22* | **150** | **60** | **24,00** | **32,0** |
| M45,0 | 1,50 | 2 | *537,82* | 110 | 25 | 29,00 | 36,0 |
| M45,0 | 2,00 | 2 | *683,31* | 125 | 40 | 29,00 | 36,0 |
| M45,0 | 3,00 | 2 | *683,31* | 125 | 40 | 29,00 | 36,0 |
| **M45,0** | **4,50** | **3** | *697,37* | **160** | **65** | **29,00** | **36,0** |
| M48,0 | 1,50 | 2 | *606,06* | 140 | 40 | 29,00 | 36,0 |
| M48,0 | 2,00 | 2 | *899,02* | 140 | 40 | 29,00 | 36,0 |
| M48,0 | 3,00 | 2 | *827,25* | 140 | 40 | 29,00 | 36,0 |
| **M48,0** | **5,00** | **3** | *837,54* | **180** | **70** | **29,00** | **36,0** |
| M50,0 | 1,50 | 2 | *662,78* | 140 | 40 | 29,00 | 36,0 |
| M52,0 | 1,50 | 2 | *703,10* | 140 | 40 | 32,00 | 40,0 |
| M52,0 | 2,00 | 2 | *1.011,52* | 140 | 40 | 32,00 | 40,0 |
| M52,0 | 3,00 | 2 | *939,13* | 140 | 40 | 32,00 | 40,0 |
| **M52,0** | **5,00** | **3** | *1.092,95* | **180** | **70** | **32,00** | **40,0** |
| **M56,0** | **5,50** | **3** | *1.578,62* | **200** | **70** | **35,00** | **45,0** |
| **M60,0** | **5,50** | **3** | *1.978,29* | **200** | **75** | **35,00** | **45,0** |
| M63,0 | 1,50 | 2 | *1.572,41* | 160 | 40 | 39,00 | 50,0 |
| **M64,0** | **6,00** | **3** | *2.470,47* | **220** | **80** | **39,00** | **50,0** |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

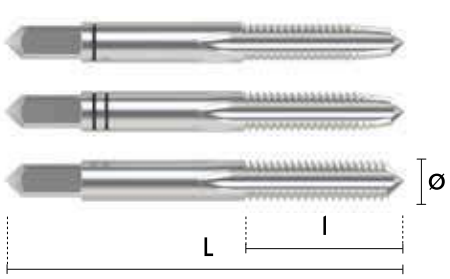
# 2301/5 HSS DIN 352 Izquierda / A gauche / Left hand

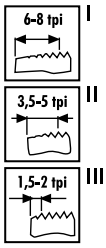
M-MF DIN 13 | Tol. 6H | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º } PVP = €/3
Tap 3º




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| **M3,0** | **0,50** | **3** | *38,02* | **40** | **11** | **2,70** | **3,5** |
| **M4,0** | **0,70** | **3** | *35,02* | **45** | **13** | **3,40** | **4,5** |
| **M5,0** | **0,80** | **3** | *38,06* | **50** | **16** | **4,90** | **6,0** |
| **M6,0** | **1,00** | **3** | *38,06* | **56** | **19** | **4,90** | **6,0** |
| **M7,0** | **1,00** | **3** | *52,53* | **56** | **19** | **4,90** | **6,0** |
| M8,0 | 1,00 | 2 | *43,58* | 63 | 22 | 4,90 | 6,0 |
| **M8,0** | **1,25** | **3** | *45,83* | **63** | **22** | **4,90** | **6,0** |
| **M9,0** | **1,25** | **3** | *81,30* | **63** | **22** | **5,50** | **7,0** |
| M10,0 | 1,00 | 2 | *47,24* | 63 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | 2 | *48,12* | 70 | 24 | 5,50 | 7,0 |
| **M10,0** | **1,50** | **3** | *57,87* | **70** | **24** | **5,50** | **7,0** |
| M12,0 | 1,25 | 2 | *82,87* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,50 | 2 | *70,48* | 70 | 22 | 7,00 | 9,0 |
| **M12,0** | **1,75** | **3** | *75,22* | **75** | **29** | **7,00** | **9,0** |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| M14,0 | 1,25 | 2 | *101,26* | 70 | 22 | 9,00 | 11,0 |
| M14,0 | 1,50 | 2 | *78,68* | 70 | 22 | 9,00 | 11,0 |
| **M14,0** | **2,00** | **3** | *98,96* | **80** | **30** | **9,00** | **11,0** |
| M16,0 | 1,50 | 2 | *98,07* | 70 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | **3** | *139,35* | **80** | **32** | **9,00** | **12,0** |
| **M18,0** | **2,50** | **3** | *186,29* | **95** | **34** | **11,00** | **14,0** |
| M20,0 | 1,50 | 2 | *162,28* | 80 | 22 | 12,00 | 16,0 |
| **M20,0** | **2,50** | **3** | *209,33* | **95** | **34** | **12,00** | **16,0** |
| M22,0 | 1,50 | 2 | *177,41* | 80 | 22 | 14,50 | 18,0 |
| **M22,0** | **2,50** | **3** | *256,65* | **100** | **34** | **14,50** | **18,0** |
| M24,0 | 1,50 | 2 | *226,43* | 90 | 22 | 14,50 | 18,0 |
| **M24,0** | **3,00** | **3** | *323,28* | **110** | **38** | **14,50** | **18,0** |
| **M27,0** | **3,00** | **3** | *416,35* | **110** | **38** | **16,00** | **20,0** |
| **M30,0** | **3,50** | **3** | *528,58* | **125** | **45** | **18,00** | **22,0** |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

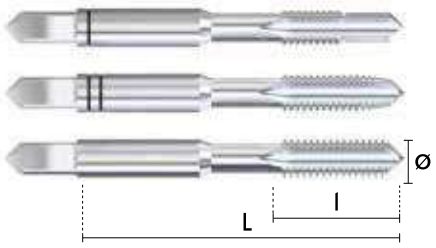
## 2314 HSSE DIN 352

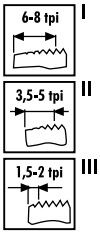
M DIN 13 | Tol. 6HX

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ○ | | | | | | ○ | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3°
Taraud 3°
Tap 3°
} PVP = €/3




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| M3,0 | 0,50 | 3 | *27,87* | 40 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | 3 | *27,81* | 45 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | 3 | *29,13* | 50 | 16 | 4,90 | 6,0 |
| M6,0 | 1,00 | 3 | *29,23* | 56 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | 3 | *33,57* | 63 | 22 | 4,90 | 6,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| M10,0 | 1,50 | 3 | *43,23* | 70 | 24 | 5,50 | 7,0 |
| M12,0 | 1,75 | 3 | *61,44* | 75 | 29 | 7,00 | 9,0 |
| M14,0 | 2,00 | 3 | *81,35* | 80 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | 3 | *89,73* | 80 | 32 | 9,00 | 12,0 |

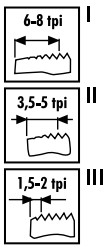
## 2303 HSSE DIN 352

M DIN 13 | Tol. 6HX | VAP

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | | | | | | | | | ● | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3°
Taraud 3°
Tap 3°
} PVP = €/3




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| M3,0 | 0,50 | 3 | *28,42* | 40 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | 3 | *28,42* | 45 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | 3 | *29,57* | 50 | 16 | 4,90 | 6,0 |
| M6,0 | 1,00 | 3 | *29,57* | 56 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | 3 | *34,32* | 63 | 22 | 4,90 | 6,0 |
| M10,0 | 1,50 | 3 | *44,17* | 70 | 24 | 5,50 | 7,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| M12,0 | 1,75 | 3 | *63,21* | 75 | 29 | 7,00 | 9,0 |
| M14,0 | 2,00 | 3 | *70,02* | 80 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | 3 | *95,92* | 80 | 32 | 9,00 | 12,0 |
| M18,0 | 2,50 | 3 | *131,05* | 95 | 40 | 11,00 | 14,0 |
| M20,0 | 2,50 | 3 | *145,48* | 95 | 40 | 12,00 | 16,0 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

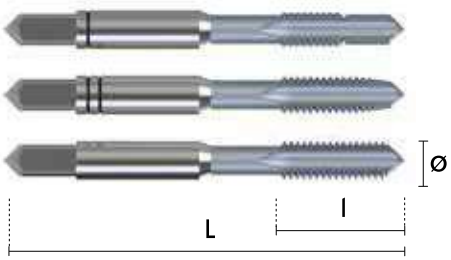
## 2324 HSSE-PM DIN 352

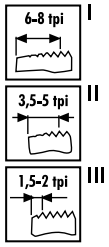
M DIN 13 | Tol. 6HX | TICN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ○ | ● | ● | ● | | ○ | | | ○ | | ○ | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3°
Taraud 3° } PVP = €/3
Tap 3°




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| M4,0 | 0,70 | 3 | *101,19* | 45 | 13 | 2,70 | 3,5 |
| M5,0 | 0,80 | 3 | *102,45* | 50 | 16 | 4,90 | 6,0 |
| M6,0 | 1,00 | 3 | *102,45* | 56 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | 3 | *115,48* | 63 | 22 | 4,90 | 6,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| M10,0 | 1,50 | 3 | *142,75* | 70 | 24 | 5,50 | 7,0 |
| M12,0 | 1,75 | 3 | *173,52* | 75 | 29 | 7,00 | 9,0 |
| M14,0 | 2,00 | 3 | *255,12* | 80 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | 3 | *255,12* | 80 | 32 | 9,00 | 12,0 |

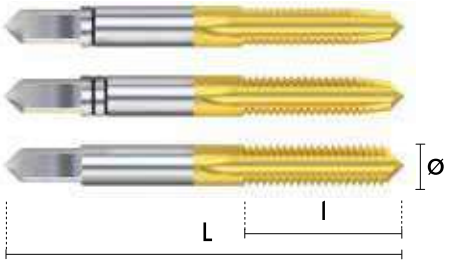
## 2302 HSS DIN 352

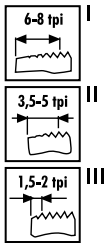
M DIN 13 | Tol. 6H | TIN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3°
Taraud 3° } PVP = €/3
Tap 3°




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| M3,0 | 0,50 | 3 | *42,54* | 40 | 11 | 2,70 | 3,5 |
| M4,0 | 0,70 | 3 | *43,61* | 45 | 13 | 3,40 | 4,5 |
| M5,0 | 0,80 | 3 | *44,58* | 50 | 16 | 4,90 | 6,0 |
| M6,0 | 1,00 | 3 | *44,67* | 56 | 19 | 4,90 | 6,0 |
| M8,0 | 1,25 | 3 | *53,68* | 63 | 22 | 4,90 | 6,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| M10,0 | 1,50 | 3 | *63,74* | 70 | 24 | 5,50 | 7,0 |
| M12,0 | 1,75 | 3 | *97,98* | 75 | 28 | 7,00 | 9,0 |
| M14,0 | 2,00 | 3 | *116,62* | 80 | 30 | 9,00 | 11,0 |
| M16,0 | 2,00 | 3 | *145,61* | 80 | 32 | 9,00 | 12,0 |
| M20,0 | 2,50 | 3 | *157,90* | 95 | 34 | 12,00 | 16,0 |

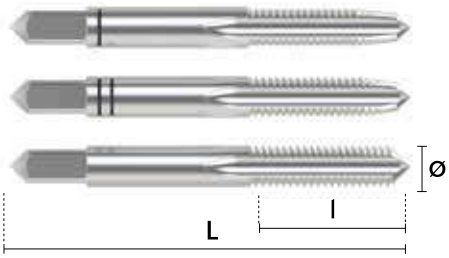
# 2304 HSS DIN 352

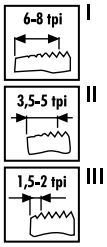
BSW
BS 84

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
} PVP = €/3




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 3/32 | 48,00 | 3 | *35,33* | 36 | 10 | 2,10 | 2,8 |
| 1/8 | 40,00 | 3 | *24,37* | 40 | 12 | 2,70 | 3,5 |
| 5/32 | 32,00 | 3 | *24,61* | 45 | 14 | 3,40 | 4,5 |
| 3/16 | 24,00 | 3 | *24,37* | 50 | 18 | 4,90 | 6,0 |
| 7/32 | 24,00 | 3 | *43,35* | 50 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | 3 | *27,46* | 50 | 19 | 4,90 | 6,0 |
| 5/16 | 18,00 | 3 | *33,51* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 16,00 | 3 | *36,83* | 70 | 24 | 5,50 | 7,0 |
| 7/16 | 14,00 | 3 | *48,97* | 70 | 24 | 6,20 | 8,0 |
| 1/2 | 12,00 | 3 | *53,05* | 75 | 29 | 7,00 | 9,0 |
| 9/16 | 12,00 | 3 | *72,16* | 80 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | 3 | *82,94* | 80 | 32 | 9,00 | 12,0 |
| 3/4 | 10,00 | 3 | *118,09* | 95 | 40 | 11,00 | 14,0 |
| 7/8 | 9,00 | 3 | *172,77* | 100 | 40 | 14,50 | 18,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1" | 8,00 | 3 | *210,99* | 110 | 50 | 14,50 | 18,0 |
| 1"1/8 | 7,00 | 3 | *314,39* | 132 | 56 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | 3 | *380,31* | 132 | 56 | 18,00 | 22,0 |
| 1"3/8 | 6,00 | 3 | *472,98* | 150 | 63 | 22,00 | 28,0 |
| 1"1/2 | 6,00 | 3 | *569,42* | 150 | 63 | 24,00 | 32,0 |
| 1"5/8 | 5,00 | 3 | *854,22* | 160 | 70 | 24,00 | 32,0 |
| 1"3/4 | 5,00 | 3 | *1.051,33* | 160 | 70 | 29,00 | 36,0 |
| 1"7/8 | 4,50 | 3 | *1.357,89* | 190 | 80 | 29,00 | 36,0 |
| 2" | 4,50 | 3 | *1.425,52* | 190 | 80 | 32,00 | 40,0 |
| 2"1/4 | 4,00 | 3 | *1.884,36* | 220 | 80 | 35,00 | 45,0 |
| 2"1/2 | 4,00 | 3 | *2.292,34* | 220 | 80 | 39,00 | 50,0 |
| 2"3/4 | 3,50 | 3 | *3.273,19* | 240 | 80 | 39,00 | 50,0 |
| 3" | 3,50 | 3 | *3.786,72* | 240 | 80 | 39,00 | 50,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2304/5 HSS DIN 352 Izquierda / A gauche / Left hand

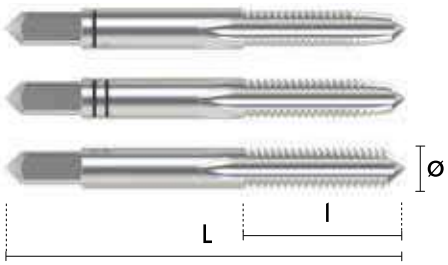
BSW
BS 84

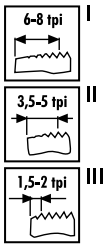
LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
PVP = €/3




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/8 | 40,00 | 3 | *48,75* | 40 | 12 | 2,70 | 3,5 |
| 5/32 | 32,00 | 3 | *49,23* | 45 | 14 | 3,40 | 4,5 |
| 3/16 | 24,00 | 3 | *48,75* | 50 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | 3 | *54,89* | 50 | 19 | 4,90 | 6,0 |
| 5/16 | 18,00 | 3 | *67,01* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 16,00 | 3 | *73,65* | 70 | 24 | 5,50 | 7,0 |
| 7/16 | 14,00 | 3 | *97,94* | 70 | 24 | 6,20 | 8,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/2 | 12,00 | 3 | *106,08* | 75 | 29 | 7,00 | 9,0 |
| 9/16 | 12,00 | 3 | *144,32* | 80 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | 3 | *165,90* | 80 | 32 | 9,00 | 12,0 |
| 3/4 | 10,00 | 3 | *236,18* | 95 | 40 | 11,00 | 14,0 |
| 7/8 | 9,00 | 3 | *345,51* | 100 | 40 | 14,50 | 18,0 |
| 1" | 8,00 | 3 | *421,98* | 110 | 50 | 14,50 | 18,0 |

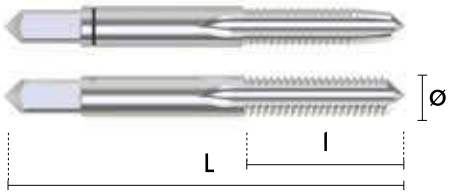
## 2305 HSS DIN 2181

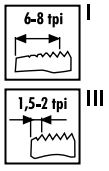
BSF
BS 84

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
PVP = €/2




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 3/16 | 32,00 | 2 | *93,37* | 50 | 14 | 4,90 | 6,0 |
| 1/4 | 26,00 | 2 | *38,48* | 50 | 18 | 4,90 | 6,0 |
| 5/16 | 22,00 | 2 | *44,90* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 20,00 | 2 | *51,94* | 63 | 22 | 5,50 | 7,0 |
| 7/16 | 18,00 | 2 | *62,33* | 63 | 22 | 6,20 | 8,0 |
| 1/2 | 16,00 | 2 | *70,47* | 75 | 24 | 7,00 | 9,0 |
| 9/16 | 16,00 | 2 | *84,51* | 80 | 28 | 9,00 | 11,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 5/8 | 14,00 | 2 | *110,33* | 80 | 28 | 9,00 | 12,0 |
| 3/4 | 12,00 | 2 | *169,06* | 95 | 32 | 11,00 | 14,0 |
| 7/8 | 11,00 | 2 | *201,76* | 100 | 36 | 14,50 | 18,0 |
| 1" | 10,00 | 2 | *283,21* | 110 | 40 | 14,50 | 18,0 |
| 1",1/8 | 9,00 | 2 | *584,39* | 110 | 22 | 18,00 | 22,0 |
| 1",1/4 | 9,00 | 2 | *667,23* | 110 | 22 | 18,00 | 22,0 |
| 1",1/2 | 9,00 | 2 | *1.016,85* | 125 | 40 | 24,00 | 32,0 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

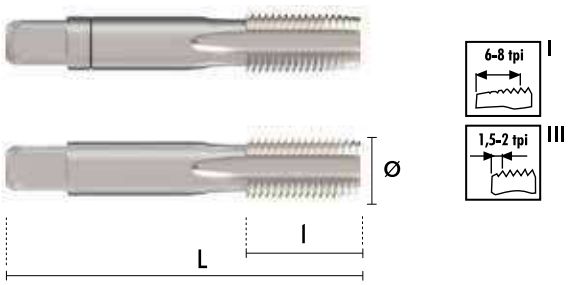
## 2306 HSS DIN 5157

G ISO 228

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3° / Taraud 3° / Tap 3° } PVP = €/2







| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/8 | 28,00 | 2 | *31,16* | 63 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | 2 | *43,89* | 70 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | 2 | *55,27* | 70 | 22 | 9,00 | 12,0 |
| 1/2 | 16,00 | 2 | *77,30* | 75 | 24 | 7,00 | 9,0 |
| 5/8 | 14,00 | 2 | *102,10* | 80 | 22 | 14,50 | 18,0 |
| 3/4 | 14,00 | 2 | *120,70* | 90 | 22 | 16,00 | 20,0 |
| 7/8 | 14,00 | 2 | *166,03* | 90 | 22 | 18,00 | 22,0 |
| 1" | 11,00 | 2 | *192,14* | 100 | 25 | 20,00 | 25,0 |
| 1"1/8 | 11,00 | 2 | *285,44* | 125 | 40 | 22,00 | 28,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1"1/4 | 11,00 | 2 | *311,00* | 125 | 40 | 24,00 | 32,0 |
| 1"3/8 | 11,00 | 2 | *422,47* | 140 | 40 | 29,00 | 36,0 |
| 1"1/2 | 11,00 | 2 | *470,09* | 140 | 40 | 29,00 | 36,0 |
| 1"3/4 | 11,00 | 2 | *781,52* | 140 | 40 | 32,00 | 40,0 |
| 2" | 11,00 | 2 | *866,36* | 160 | 40 | 35,00 | 45,0 |
| 2"1/4 | 11,00 | 2 | *1.473,99* | 160 | 40 | 39,00 | 50,0 |
| 2"1/2 | 11,00 | 2 | *2.215,59* | 160 | 40 | 39,00 | 50,0 |
| 2"3/4 | 11,00 | 2 | *2.686,41* | 160 | 40 | 39,00 | 50,0 |
| 3" | 11,00 | 2 | *2.795,80* | 160 | 40 | 39,00 | 50,0 |

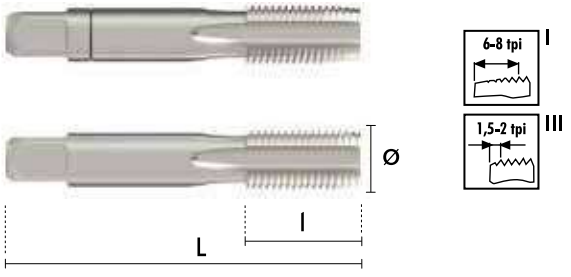
## 2306/5 HSS DIN 5157 Izquierda / A gauche / Left hand

G ISO 228 LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3° / Taraud 3° / Tap 3° } PVP = €/2







| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/8 | 28,00 | 2 | *62,34* | 63 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | 2 | *87,77* | 70 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | 2 | *110,52* | 70 | 22 | 9,00 | 12,0 |
| 1/2 | 14,00 | 2 | *154,59* | 80 | 22 | 12,00 | 16,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 5/8 | 14,00 | 2 | *204,19* | 80 | 22 | 14,50 | 18,0 |
| 3/4 | 14,00 | 2 | *241,40* | 90 | 22 | 16,00 | 20,0 |
| 1" | 11,00 | 2 | *384,31* | 100 | 25 | 20,00 | 25,0 |



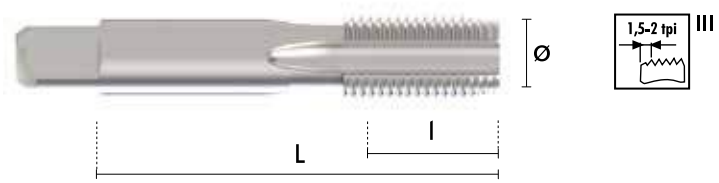
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2316 HSSE DIN 5157

G ISO 228

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | Nº | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/8 | 28,00 | 1 | *18,43* | 63 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | 1 | *30,01* | 70 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | 1 | *32,82* | 70 | 22 | 9,00 | 11,0 |
| 1/2 | 14,00 | 1 | *52,51* | 80 | 22 | 12,00 | 16,0 |

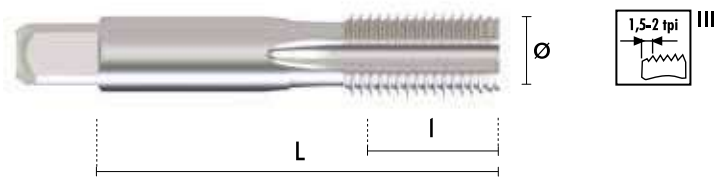
| Ø | P | Nº | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|---|
| 5/8 | 14,00 | 1 | *70,19* | 80 | 22 | 14,50 | 18,0 |
| 3/4 | 14,00 | 1 | *82,10* | 90 | 22 | 16,00 | 20,0 |
| 7/8 | 14,00 | 1 | *118,68* | 90 | 22 | 18,00 | 22,0 |
| 1" | 11,00 | 1 | *136,05* | 100 | 25 | 20,00 | 25,0 |

## 2317 HSSE DIN 5157

G ISO 228 +0,1

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | Nº | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/8 | 28,00 | 1 | *20,24* | 63 | 20 | 5,50 | 7,0 |
| 1/4 | 19,00 | 1 | *33,03* | 70 | 22 | 9,00 | 11,0 |
| 3/8 | 19,00 | 1 | *36,24* | 70 | 22 | 9,00 | 11,0 |
| 1/2 | 14,00 | 1 | *60,01* | 80 | 22 | 12,00 | 16,0 |

| Ø | P | Nº | € | L mm | l mm | ☒ mm | d mm |
|---|---|---|---|---|---|---|---|
| 5/8 | 14,00 | 1 | *77,20* | 80 | 22 | 14,50 | 18,0 |
| 3/4 | 14,00 | 1 | *90,28* | 90 | 22 | 16,00 | 20,0 |
| 7/8 | 14,00 | 1 | *130,55* | 90 | 22 | 18,00 | 22,0 |
| 1" | 11,00 | 1 | *149,65* | 100 | 25 | 20,00 | 25,0 |

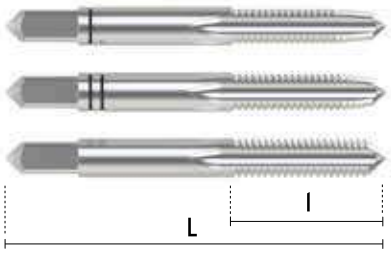
# 2307 HSS DIN 352

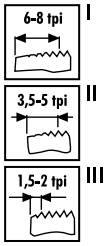
UNC ANSI/ASME B1.1 | Tol. 2B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º } PVP = €/3
Tap 3º




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| Nº4 | 40,00 | 3 | *48,11* | 40 | 12 | 2,70 | 3,5 |
| Nº5 | 40,00 | 3 | *46,00* | 40 | 12 | 2,70 | 3,5 |
| Nº6 | 32,00 | 3 | *46,00* | 45 | 14 | 3,00 | 4,0 |
| Nº18 | 32,00 | 3 | *46,00* | 45 | 14 | 3,40 | 4,5 |
| Nº10 | 24,00 | 3 | *46,00* | 50 | 16 | 4,90 | 6,0 |
| Nº12 | 24,00 | 3 | *46,00* | 50 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | 3 | *37,23* | 50 | 19 | 4,90 | 6,0 |
| 5/16 | 18,00 | 3 | *42,53* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 16,00 | 3 | *48,08* | 70 | 24 | 5,50 | 7,0 |
| 7/16 | 14,00 | 3 | *62,58* | 70 | 24 | 6,20 | 8,0 |
| 1/2 | 13,00 | 3 | *72,03* | 75 | 29 | 7,00 | 9,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 9/16 | 12,00 | 3 | *85,04* | 80 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | 3 | *117,31* | 80 | 32 | 9,00 | 12,0 |
| 3/4 | 10,00 | 3 | *159,71* | 95 | 40 | 11,00 | 14,0 |
| 7/8 | 9,00 | 3 | *196,71* | 100 | 40 | 14,50 | 18,0 |
| 1" | 8,00 | 3 | *265,66* | 110 | 50 | 14,50 | 18,0 |
| 1"1/8 | 7,00 | 3 | *405,54* | 132 | 56 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | 3 | *510,47* | 132 | 56 | 18,00 | 22,0 |
| 1"3/8 | 6,00 | 3 | *647,57* | 150 | 63 | 22,00 | 28,0 |
| 1"1/2 | 6,00 | 3 | *795,10* | 150 | 63 | 24,00 | 32,0 |
| 1"3/4 | 5,00 | 3 | *990,53* | 160 | 70 | 29,00 | 36,0 |
| 2" | 4,50 | 3 | *1.138,71* | 190 | 80 | 32,00 | 40,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

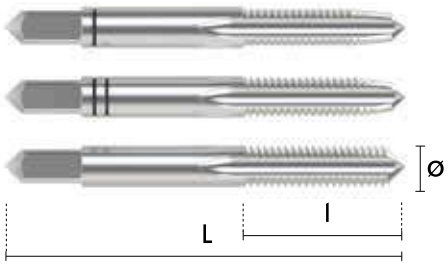
## 2307/5 HSS DIN 352 Izquierda / A gauche / Left hand

UNC ANSI/ASME B1.1 | Tol. 2B | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
} PVP = €/3



| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/4 | 20,00 | 3 | *74,46* | 50 | 19 | 4,90 | 6,0 |
| 5/16 | 18,00 | 3 | *85,04* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 16,00 | 3 | *96,16* | 70 | 24 | 5,50 | 7,0 |
| 7/16 | 14,00 | 3 | *125,19* | 70 | 24 | 6,20 | 8,0 |
| 1/2 | 13,00 | 3 | *144,06* | 75 | 29 | 7,00 | 9,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 9/16 | 12,00 | 3 | *170,08* | 80 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | 3 | *234,59* | 80 | 32 | 9,00 | 12,0 |
| 3/4 | 10,00 | 3 | *319,42* | 95 | 40 | 11,00 | 14,0 |
| 7/8 | 9,00 | 3 | *393,39* | 100 | 40 | 14,50 | 18,0 |
| 1" | 8,00 | 3 | *531,32* | 110 | 50 | 14,50 | 18,0 |

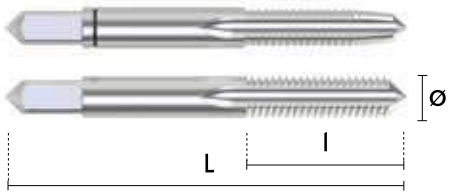
## 2308 HSS DIN 2181

UNF ANSI/ASME B1.1 | Tol. 2B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
} PVP = €/2




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| Nº4 | 48,00 | 2 | *36,54* | 36 | 11 | 2,70 | 3,5 |
| Nº5 | 44,00 | 2 | *36,54* | 36 | 11 | 2,70 | 3,5 |
| Nº6 | 40,00 | 2 | *34,91* | 40 | 12 | 3,40 | 4,5 |
| Nº8 | 36,00 | 2 | *34,91* | 40 | 12 | 3,40 | 4,5 |
| Nº10 | 32,00 | 2 | *34,91* | 45 | 14 | 4,90 | 6,0 |
| Nº12 | 28,00 | 2 | *36,54* | 50 | 14 | 4,90 | 6,0 |
| 1/4 | 28,00 | 2 | *25,17* | 50 | 18 | 4,90 | 6,0 |
| 5/16 | 24,00 | 2 | *26,93* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 24,00 | 2 | *31,14* | 63 | 22 | 5,50 | 7,0 |
| 7/16 | 20,00 | 2 | *41,35* | 63 | 22 | 6,20 | 8,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/2 | 20,00 | 2 | *42,28* | 75 | 24 | 7,00 | 9,0 |
| 9/16 | 18,00 | 2 | *55,07* | 80 | 28 | 9,00 | 11,0 |
| 5/8 | 18,00 | 2 | *71,13* | 80 | 28 | 9,00 | 12,0 |
| 3/4 | 16,00 | 2 | *95,56* | 95 | 32 | 11,00 | 14,0 |
| 7/8 | 14,00 | 2 | *122,80* | 100 | 36 | 14,50 | 18,0 |
| 1" | 12,00 | 2 | *162,81* | 110 | 40 | 14,50 | 18,0 |
| 1"1/8 | 12,00 | 2 | *253,53* | 110 | 50 | 18,00 | 22,0 |
| 1"1/4 | 12,00 | 2 | *319,80* | 132 | 56 | 18,00 | 22,0 |
| 1"3/8 | 12,00 | 2 | *406,14* | 132 | 56 | 22,00 | 28,0 |
| 1"1/2 | 12,00 | 2 | *497,29* | 150 | 63 | 24,00 | 32,0 |

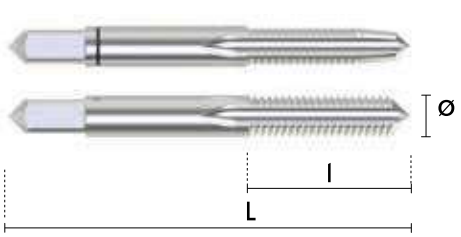
## 2308/5 HSS DIN 2181 Izquierda / A gauche / Left hand

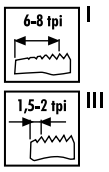
UNF ANSI/ASME B1.1 | Tol. 2B | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3° / Taraud 3° / Tap 3° } PVP = €/2




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/4 | 28,00 | 2 | *50,32* | 50 | 18 | 4,90 | 6,0 |
| 5/16 | 24,00 | 2 | *53,88* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 24,00 | 2 | *62,28* | 63 | 22 | 5,50 | 7,0 |
| 7/16 | 20,00 | 2 | *82,68* | 63 | 22 | 6,20 | 8,0 |
| 1/2 | 20,00 | 2 | *84,54* | 75 | 24 | 7,00 | 9,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 9/16 | 18,00 | 2 | *110,12* | 80 | 28 | 9,00 | 11,0 |
| 5/8 | 18,00 | 2 | *142,22* | 80 | 28 | 9,00 | 12,0 |
| 3/4 | 16,00 | 2 | *191,13* | 95 | 32 | 11,00 | 14,0 |
| 7/8 | 14,00 | 2 | *245,62* | 100 | 36 | 14,50 | 18,0 |
| 1" | 12,00 | 2 | *325,62* | 110 | 40 | 14,50 | 18,0 |

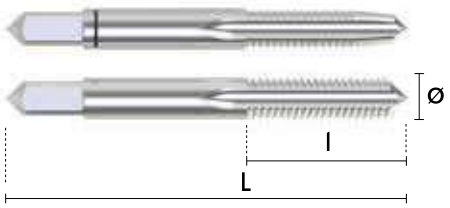
## 2315 HSS DIN 2184

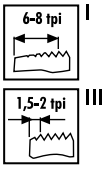
UN ANSI/ASME B1.1 | Tol. 2B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3° / Taraud 3° / Tap 3° } PVP = €/2




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1"1/8 | 8,00 | 2 | *224,55* | 125 | 40 | 18,00 | 22,0 |
| 1"1/4 | 8,00 | 2 | *289,70* | 125 | 40 | 18,00 | 22,0 |
| 1"3/8 | 8,00 | 2 | *328,61* | 125 | 40 | 22,00 | 28,0 |
| 1"1/2 | 8,00 | 2 | *431,47* | 125 | 40 | 24,00 | 32,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1"5/8 | 8,00 | 2 | *504,70* | 125 | 40 | 24,00 | 32,0 |
| 1"3/4 | 8,00 | 2 | *614,82* | 125 | 40 | 29,00 | 36,0 |
| 2" | 8,00 | 2 | *658,76* | 140 | 40 | 32,00 | 40,0 |



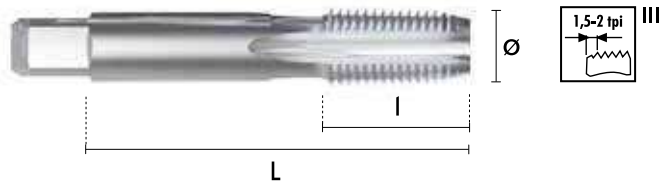
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2309 HSS DIN 5157

Rc
DIN 2999

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/8 | 28,00 | 1 | *32,84* | 59 | 15 | 6,30 | 8,0 |
| 1/4 | 19,00 | 1 | *46,32* | 67 | 19 | 8,00 | 10,0 |
| 3/8 | 19,00 | 1 | *64,32* | 75 | 21 | 10,00 | 12,5 |
| 1/2 | 14,00 | 1 | *90,03* | 87 | 26 | 12,50 | 16,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 5/8 | 14,00 | 1 | *164,76* | 80 | 36 | 14,50 | 18,0 |
| 3/4 | 14,00 | 1 | *152,80* | 85 | 28 | 16,00 | 20,0 |
| 7/8 | 14,00 | 1 | *274,60* | 100 | 36 | 18,00 | 22,0 |
| 1" | 11,00 | 1 | *232,61* | 109 | 33 | 20,00 | 25,0 |

## 2310 HSS DIN 2181

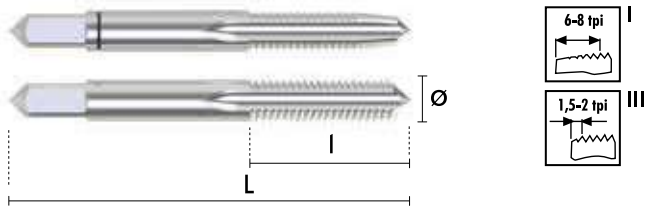
UNEF
ANSI/ASME B1.1

Tol. 2B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

**Macho 3º**
**Taraud 3º** } **PVP = €/2**
**Tap 3º**




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/4 | 32,00 | 2 | *103,48* | 56 | 14 | 4,90 | 6,0 |
| 5/16 | 32,00 | 2 | *115,62* | 56 | 18 | 4,90 | 6,0 |
| 3/8 | 32,00 | 2 | *132,29* | 63 | 20 | 5,50 | 7,0 |
| 7/16 | 28,00 | 2 | *168,39* | 63 | 20 | 6,20 | 8,0 |
| 1/2 | 28,00 | 2 | *190,27* | 70 | 22 | 7,00 | 9,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 9/16 | 24,00 | 2 | *222,58* | 70 | 22 | 9,00 | 11,0 |
| 5/8 | 24,00 | 2 | *309,80* | 70 | 22 | 9,00 | 12,0 |
| 3/4 | 20,00 | 2 | *458,78* | 80 | 22 | 11,00 | 14,0 |
| 1" | 20,00 | 2 | *656,43* | 90 | 22 | 14,50 | 18,0 |

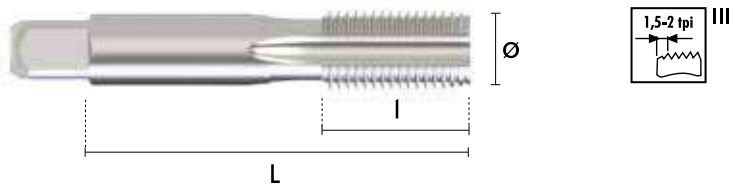
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2312 HSS DIN 40432

PG
DIN 40430

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| PG | Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|---|
| 7,0 | 12,5 | 20,00 | 1 | *34,55* | 70 | 22 | 7,00 | 9,0 |
| 9,0 | 15,2 | 18,00 | 1 | *43,92* | 70 | 22 | 9,00 | 12,0 |
| 11,0 | 18,6 | 18,00 | 1 | *60,98* | 80 | 22 | 11,00 | 14,0 |
| 13,5 | 20,4 | 18,00 | 1 | *66,89* | 80 | 22 | 12,00 | 16,0 |
| 16,0 | 22,5 | 18,00 | 1 | *80,30* | 80 | 22 | 14,50 | 18,0 |

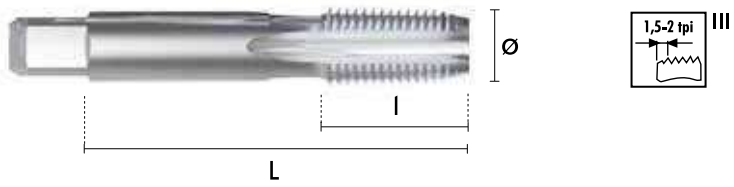
| PG | Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|---|
| 21,0 | 28,3 | 16,00 | 1 | *118,11* | 90 | 22 | 18,00 | 22,0 |
| 29,0 | 37,0 | 16,00 | 1 | *234,49* | 100 | 25 | 22,00 | 28,0 |
| 36,0 | 47,0 | 16,00 | 1 | *391,70* | 140 | 40 | 29,00 | 36,0 |
| 42,0 | 54,0 | 16,00 | 1 | *465,18* | 140 | 40 | 32,00 | 40,0 |
| 48,0 | 59,3 | 16,00 | 1 | *586,65* | 160 | 40 | 35,00 | 45,0 |

## 2313 HSS

NPT
ANSI/ASME B1.20.1

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/16 | 27,00 | 1 | *28,50* | 65 | 19 | 5,50 | 7,0 |
| 1/8 | 27,00 | 1 | *28,50* | 65 | 19 | 5,50 | 7,0 |
| 1/4 | 18,00 | 1 | *39,97* | 70 | 25 | 9,00 | 11,0 |
| 3/8 | 18,00 | 1 | *55,15* | 75 | 26 | 9,00 | 12,0 |
| 1/2 | 14,00 | 1 | *77,13* | 80 | 31 | 12,00 | 16,0 |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| 3/4 | 14,00 | 1 | *117,93* | 100 | 33 | 16,00 | 20,0 |
| 1" | 11,50 | 1 | *131,31* | 110 | 38 | 20,00 | 25,0 |
| 1"1/4 | 11,50 | 1 | *215,30* | 125 | 41 | 24,00 | 32,0 |
| 1"1/2 | 11,50 | 1 | *327,16* | 140 | 42 | 29,00 | 36,0 |
| 2" | 11,50 | 1 | *510,73* | 160 | 44 | 29,00 | 36,0 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

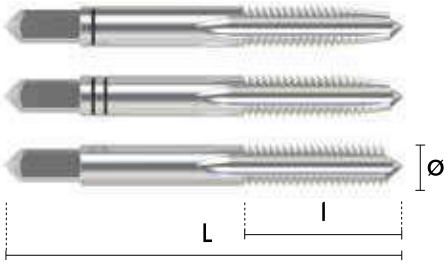
## 2321 HSS DIN 352

M-MF DIN 13 | Tol. 6H

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3º
Taraud 3º
Tap 3º
} PVP = €/3




| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| **M2,0** | **0,40** | **3** | *34,73* | **36** | **8** | **2,10** | **2,8** |
| **M2,5** | **0,45** | **3** | *35,92* | **40** | **9** | **2,10** | **2,8** |
| **M3,0** | **0,50** | **3** | *19,02* | **40** | **11** | **2,70** | **3,5** |
| **M4,0** | **0,70** | **3** | *17,51* | **45** | **13** | **3,40** | **4,5** |
| **M5,0** | **0,80** | **3** | *19,03* | **50** | **16** | **4,90** | **6,0** |
| **M6,0** | **1,00** | **3** | *19,03* | **56** | **19** | **4,90** | **6,0** |
| **M7,0** | **1,00** | **3** | *26,26* | **56** | **19** | **4,90** | **6,0** |
| M8,0 | 1,00 | 2 | *21,79* | 63 | 22 | 4,90 | 6,0 |
| **M8,0** | **1,25** | **3** | *22,91* | **63** | **22** | **4,90** | **6,0** |
| M9,0 | 1,00 | 2 | *28,16* | 63 | 22 | 5,50 | 7,0 |
| **M9,0** | **1,25** | **3** | *40,65* | **63** | **22** | **5,50** | **7,0** |
| M10,0 | 1,00 | 2 | *23,63* | 63 | 20 | 5,50 | 7,0 |
| M10,0 | 1,25 | 2 | *24,06* | 70 | 24 | 5,50 | 7,0 |
| **M10,0** | **1,50** | **3** | *28,93* | **70** | **24** | **5,50** | **7,0** |
| M11,0 | 1,00 | 2 | *41,76* | 63 | 20 | 6,20 | 8,0 |
| M11,0 | 1,25 | 2 | *41,76* | 70 | 24 | 6,20 | 8,0 |
| **M11,0** | **1,50** | **3** | *56,06* | **70** | **24** | **6,20** | **8,0** |
| M12,0 | 1,00 | 2 | *41,25* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,25 | 2 | *41,42* | 70 | 22 | 7,00 | 9,0 |
| M12,0 | 1,50 | 2 | *35,24* | 70 | 22 | 7,00 | 9,0 |
| **M12,0** | **1,75** | **3** | *37,61* | **75** | **28** | **7,00** | **9,0** |
| M14,0 | 1,00 | 2 | *61,72* | 70 | 22 | 9,00 | 11,0 |
| M14,0 | 1,25 | 2 | *50,63* | 70 | 22 | 9,00 | 11,0 |
| M14,0 | 1,50 | 2 | *39,33* | 70 | 22 | 9,00 | 11,0 |
| **M14,0** | **2,00** | **3** | *49,49* | **80** | **30** | **9,00** | **11,0** |

| Ø | P | Nº | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|---|
| M16,0 | 1,00 | 2 | *86,37* | 70 | 22 | 9,00 | 12,0 |
| M16,0 | 1,25 | 2 | *90,92* | 70 | 22 | 9,00 | 12,0 |
| M16,0 | 1,50 | 2 | *49,04* | 70 | 22 | 9,00 | 12,0 |
| **M16,0** | **2,00** | **3** | *69,68* | **80** | **32** | **9,00** | **12,0** |
| M18,0 | 1,50 | 2 | *65,02* | 80 | 22 | 11,00 | 14,0 |
| M18,0 | 2,00 | 2 | *103,45* | 80 | 22 | 11,00 | 14,0 |
| **M18,0** | **2,50** | **3** | *93,14* | **95** | **34** | **11,00** | **14,0** |
| M20,0 | 1,50 | 2 | *81,13* | 80 | 22 | 12,00 | 16,0 |
| M20,0 | 2,00 | 2 | *107,22* | 80 | 22 | 12,00 | 16,0 |
| **M20,0** | **2,50** | **3** | *104,67* | **95** | **34** | **12,00** | **16,0** |
| M22,0 | 1,50 | 2 | *88,70* | 80 | 22 | 14,50 | 18,0 |
| M22,0 | 2,00 | 2 | *142,63* | 80 | 22 | 14,50 | 18,0 |
| **M22,0** | **2,50** | **3** | *128,32* | **100** | **34** | **14,50** | **18,0** |
| M24,0 | 1,50 | 2 | *113,23* | 90 | 22 | 14,50 | 18,0 |
| **M24,0** | **2,00** | **3** | *159,46* | **90** | **22** | **14,50** | **18,0** |
| M24,0 | 3,00 | 2 | *161,64* | 110 | 38 | 14,50 | 18,0 |
| M26,0 | 1,50 | 2 | *180,40* | 90 | 22 | 14,50 | 18,0 |
| M26,0 | 2,00 | 2 | *372,29* | 90 | 22 | 14,50 | 18,0 |
| **M27,0** | **3,00** | **3** | *208,17* | **110** | **38** | **16,00** | **20,0** |
| M28,0 | 1,50 | 2 | *200,42* | 90 | 22 | 16,00 | 20,0 |
| **M30,0** | **3,50** | **3** | *264,30* | **125** | **45** | **18,00** | **22,0** |
| **M33,0** | **3,50** | **3** | *335,32* | **125** | **50** | **20,00** | **25,0** |
| **M36,0** | **4,00** | **3** | *431,83* | **150** | **56** | **22,00** | **28,0** |
| **M39,0** | **4,00** | **3** | *479,84* | **150** | **60** | **24,00** | **32,0** |
| **M42,0** | **4,50** | **3** | *601,22* | **150** | **60** | **24,00** | **32,0** |

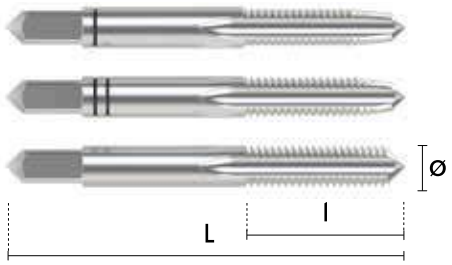
## 2322 HSS DIN 352

UNC ANSI/ASME B1.1 — Tol. 2B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3° / Taraud 3° / Tap 3° } PVP = €/3




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| Nº4 | 40,00 | 3 | *48,11* | 40 | 12 | 2,70 | 3,5 |
| Nº5 | 40,00 | 3 | *46,00* | 40 | 12 | 2,70 | 3,5 |
| Nº6 | 32,00 | 3 | *46,00* | 45 | 14 | 3,00 | 4,0 |
| Nº18 | 32,00 | 3 | *46,00* | 45 | 14 | 3,40 | 4,5 |
| Nº10 | 24,00 | 3 | *46,00* | 50 | 16 | 4,90 | 6,0 |
| Nº12 | 24,00 | 3 | *46,00* | 50 | 18 | 4,90 | 6,0 |
| 1/4 | 20,00 | 3 | *37,23* | 50 | 19 | 4,90 | 6,0 |
| 5/16 | 18,00 | 3 | *42,53* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 16,00 | 3 | *48,08* | 70 | 24 | 5,50 | 7,0 |
| 7/16 | 14,00 | 3 | *62,58* | 70 | 24 | 6,20 | 8,0 |
| 1/2 | 13,00 | 3 | *72,03* | 75 | 29 | 7,00 | 9,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 9/16 | 12,00 | 3 | *85,04* | 80 | 30 | 9,00 | 11,0 |
| 5/8 | 11,00 | 3 | *117,31* | 80 | 32 | 9,00 | 12,0 |
| 3/4 | 10,00 | 3 | *159,71* | 95 | 40 | 11,00 | 14,0 |
| 7/8 | 9,00 | 3 | *196,71* | 100 | 40 | 14,50 | 18,0 |
| 1" | 8,00 | 3 | *265,66* | 110 | 50 | 14,50 | 18,0 |
| 1"1/8 | 7,00 | 3 | *405,54* | 132 | 56 | 18,00 | 22,0 |
| 1"1/4 | 7,00 | 3 | *510,47* | 132 | 56 | 18,00 | 22,0 |
| 1"3/8 | 6,00 | 3 | *647,57* | 150 | 63 | 22,00 | 28,0 |
| 1"1/2 | 6,00 | 3 | *795,10* | 150 | 63 | 24,00 | 32,0 |
| 1"3/4 | 5,00 | 3 | *990,53* | 160 | 70 | 29,00 | 36,0 |
| 2" | 4,50 | 3 | *1.138,71* | 190 | 80 | 32,00 | 40,0 |

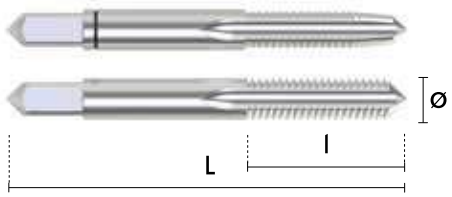
## 2323 HSS DIN 352 Perfil completo / Profil complet / Non serial form

UNF ANSI/ASME B1.1 — Tol. 2B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3° / Taraud 3° / Tap 3° } PVP = €/2




| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| Nº4 | 48,00 | 2 | *36,54* | 36 | 11 | 2,70 | 3,5 |
| Nº5 | 44,00 | 2 | *36,54* | 36 | 11 | 2,70 | 3,5 |
| Nº6 | 40,00 | 2 | *34,91* | 40 | 12 | 3,40 | 4,5 |
| Nº8 | 36,00 | 2 | *34,91* | 40 | 12 | 3,40 | 4,5 |
| Nº10 | 32,00 | 2 | *34,91* | 45 | 14 | 4,90 | 6,0 |
| Nº12 | 28,00 | 2 | *36,54* | 50 | 14 | 4,90 | 6,0 |
| 1/4 | 28,00 | 2 | *25,17* | 50 | 18 | 4,90 | 6,0 |
| 5/16 | 24,00 | 2 | *26,93* | 56 | 22 | 4,90 | 6,0 |
| 3/8 | 24,00 | 2 | *31,14* | 63 | 22 | 5,50 | 7,0 |
| 7/16 | 20,00 | 2 | *41,35* | 63 | 22 | 6,20 | 8,0 |

| Ø | P | Nº | € | L mm | l mm | ☐ mm | d mm |
|---|---|---|---|---|---|---|---|
| 1/2 | 20,00 | 2 | *42,28* | 75 | 24 | 7,00 | 9,0 |
| 9/16 | 18,00 | 2 | *55,07* | 80 | 28 | 9,00 | 11,0 |
| 5/8 | 18,00 | 2 | *71,13* | 80 | 28 | 9,00 | 12,0 |
| 3/4 | 16,00 | 2 | *95,56* | 95 | 32 | 11,00 | 14,0 |
| 7/8 | 14,00 | 2 | *122,80* | 100 | 36 | 14,50 | 18,0 |
| 1" | 12,00 | 2 | *162,81* | 110 | 40 | 14,50 | 18,0 |
| 1"1/8 | 12,00 | 2 | *253,53* | 110 | 50 | 18,00 | 22,0 |
| 1"1/4 | 12,00 | 2 | *319,80* | 132 | 56 | 18,00 | 22,0 |
| 1"3/8 | 12,00 | 2 | *406,14* | 132 | 56 | 22,00 | 28,0 |
| 1"1/2 | 12,00 | 2 | *497,29* | 150 | 63 | 24,00 | 32,0 |



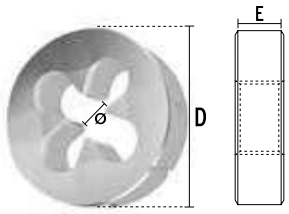
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

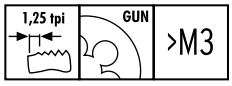
# 2501 HSS DIN EN 22568

M-MF DIN 13 | Tol. 6g

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| | Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|---|
| ** | **M1,0** | **0,25** | *50,91* | **16** | **5** | **1** |
| ** | **M1,1** | **0,25** | *84,06* | **16** | **5** | **1** |
| ** | **M1,2** | **0,25** | *78,87* | **16** | **5** | **1** |
| ** | **M1,4** | **0,30** | *72,26* | **16** | **5** | **1** |
| | **M1,6** | **0,35** | *68,28* | **16** | **5** | **1** |
| | **M1,7** | **0,35** | *68,28* | **16** | **5** | **1** |
| | **M1,8** | **0,35** | *68,28* | **16** | **5** | **1** |
| | **M2,0** | **0,40** | *28,90* | **16** | **5** | **1** |
| | **M2,2** | **0,45** | *67,64* | **16** | **5** | **1** |
| | **M2,3** | **0,40** | *28,90* | **16** | **5** | **1** |
| | **M2,5** | **0,05** | *28,90* | **16** | **5** | **1** |
| | **M2,6** | **0,45** | *28,90* | **16** | **5** | **1** |
| | **M3,0** | **0,50** | *24,85* | **20** | **5** | **1** |
| | M3,0 | 0,60 | *32,27* | 25 | 5 | 1 |
| | M3,5 | 0,60 | *25,65* | 20 | 5 | 1 |
| | M3,5 | 0,75 | *83,25* | 20 | 5 | 1 |
| | M4,0 | 0,50 | *30,69* | 20 | 5 | 1 |
| | **M4,0** | **0,70** | *24,85* | **20** | **5** | **1** |
| | **M4,5** | **0,75** | *33,51* | **20** | **7** | **1** |
| | M5,0 | 0,05 | *33,85* | 20 | 5 | 1 |
| | M5,0 | 0,75 | *35,94* | 25 | 7 | 1 |
| | **M5,0** | **0,80** | *24,85* | **20** | **7** | **1** |
| | M5,5 | 0,90 | *83,25* | 20 | 7 | 1 |
| | M6,0 | 0,50 | *32,94* | 20 | 7 | 1 |
| | M6,0 | 0,75 | *30,42* | 20 | 7 | 1 |
| | **M6,0** | **1,00** | *24,85* | **20** | **7** | **1** |
| | M7,0 | 0,75 | *32,09* | 25 | 9 | 1 |
| | **M7,0** | **1,00** | *27,09* | **25** | **9** | **1** |
| | M8,0 | 0,50 | *39,55* | 25 | 9 | 1 |
| | M8,0 | 0,75 | *32,09* | 25 | 9 | 1 |
| | M8,0 | 1,00 | *32,09* | 25 | 9 | 1 |
| | **M8,0** | **1,25** | *25,96* | **25** | **9** | **1** |
| | M9,0 | 1,00 | *35,77* | 25 | 9 | 1 |
| | **M9,0** | **1,25** | *38,21* | **25** | **9** | **1** |
| | M10,0 | 0,50 | *67,46* | 30 | 11 | 1 |
| | M10,0 | 0,75 | *49,97* | 30 | 11 | 1 |
| | M10,0 | 1,00 | *34,02* | 30 | 11 | 1 |
| | M10,0 | 1,25 | *42,61* | 30 | 11 | 1 |
| | **M10,0** | **1,50** | *37,05* | **30** | **11** | **1** |
| | M11,0 | 0,75 | *92,38* | 30 | 11 | 1 |
| | M11,0 | 1,00 | *49,70* | 30 | 11 | 1 |
| | M11,0 | 1,25 | *53,26* | 30 | 11 | 1 |
| | **M11,0** | **1,50** | *49,68* | **30** | **11** | **1** |
| | M12,0 | 0,75 | *57,74* | 38 | 10 | 1 |
| | M12,0 | 1,00 | *49,68* | 38 | 10 | 1 |
| | M12,0 | 1,25 | *49,68* | 38 | 10 | 1 |
| | M12,0 | 1,50 | *44,37* | 38 | 10 | 1 |
| | **M12,0** | **1,75** | *40,73* | **38** | **14** | **1** |
| | M13,0 | 0,75 | *92,38* | 38 | 10 | 1 |
| | M13,0 | 1,00 | *58,40* | 38 | 10 | 1 |
| | M13,0 | 1,50 | *60,91* | 38 | 10 | 1 |
| | **M13,0** | **1,75** | *60,91* | **38** | **14** | **1** |
| | M14,0 | 0,75 | *90,75* | 38 | 10 | 1 |
| | M14,0 | 1,00 | *54,51* | 38 | 10 | 1 |
| | M14,0 | 1,25 | *54,16* | 38 | 10 | 1 |
| | M14,0 | 1,50 | *46,39* | 38 | 10 | 1 |
| | **M14,0** | **2,00** | *40,73* | **38** | **14** | **1** |
| | M15,0 | 1,00 | *66,20* | 38 | 10 | 1 |
| | M15,0 | 1,50 | *66,20* | 38 | 10 | 1 |
| | **M15,0** | **2,00** | *81,63* | **38** | **14** | **1** |
| | M16,0 | 1,00 | *68,91* | 45 | 14 | 1 |
| | M16,0 | 1,25 | *62,65* | 45 | 14 | 1 |
| | M16,0 | 1,50 | *51,64* | 45 | 14 | 1 |
| | **M16,0** | **2,00** | *54,72* | **45** | **18** | **1** |
| | M17,0 | 1,00 | *98,52* | 45 | 14 | 1 |
| | M17,0 | 1,25 | *98,52* | 45 | 14 | 1 |
| | M17,0 | 1,50 | *98,52* | 45 | 14 | 1 |
| | M18,0 | 1,00 | *72,05* | 45 | 14 | 1 |
| | M18,0 | 1,25 | *81,90* | 45 | 14 | 1 |
| | M18,0 | 1,50 | *63,72* | 45 | 14 | 1 |
| | M18,0 | 2,00 | *72,05* | 45 | 14 | 1 |
| | **M18,0** | **2,50** | *54,72* | **45** | **18** | **1** |
| | M19,0 | 1,00 | *159,69* | 45 | 14 | 1 |
| | M19,0 | 1,25 | *159,69* | 45 | 14 | 1 |
| | M19,0 | 1,50 | *162,55* | 45 | 14 | 1 |
| | M20,0 | 1,00 | *71,75* | 45 | 14 | 1 |
| | M20,0 | 1,25 | *159,69* | 45 | 14 | 1 |
| | M20,0 | 1,50 | *65,76* | 45 | 14 | 1 |
| | M20,0 | 2,00 | *72,27* | 45 | 14 | 1 |
| | **M20,0** | **2,50** | *54,72* | **45** | **18** | **1** |
| | M21,0 | 1,00 | *185,23* | 45 | 16 | 1 |
| | M21,0 | 1,25 | *185,23* | 45 | 14 | 1 |
| | M21,0 | 1,50 | *152,67* | 45 | 14 | 1 |
| | M22,0 | 1,00 | *97,98* | 55 | 16 | 1 |
| | M22,0 | 1,25 | *159,69* | 55 | 16 | 1 |
| | M22,0 | 1,50 | *84,29* | 55 | 16 | 1 |
| | M22,0 | 2,00 | *93,78* | 55 | 16 | 1 |
| | **M22,0** | **2,50** | *80,50* | **55** | **22** | **1** |
| | M23,0 | 1,50 | *185,23* | 55 | 16 | 1 |
| | M24,0 | 1,00 | *93,78* | 55 | 16 | 1 |
| | M24,0 | 1,25 | *159,69* | 55 | 16 | 1 |

**Tol. 6h

(**continúa Ref.2501** / suite Réf.2501 / Ref.2501 cont'd)

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

(**continúa Ref.2501** / suite Réf.2501 / Ref.2501 cont'd)

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| **M24,0** | **3,00** | *80,50* | **55** | **22** | **1** |
| M25,0 | 1,00 | *145,03* | 55 | 16 | 1 |
| M25,0 | 1,50 | *122,45* | 55 | 16 | 1 |
| M26,0 | 1,00 | *210,38* | 55 | 16 | 1 |
| M26,0 | 1,50 | *115,91* | 55 | 16 | 1 |
| M26,0 | 2,00 | *210,38* | 55 | 16 | 1 |
| M27,0 | 1,00 | *129,47* | 65 | 18 | 1 |
| M27,0 | 1,50 | *127,47* | 65 | 18 | 1 |
| M27,0 | 2,00 | *138,63* | 65 | 18 | 1 |
| **M27,0** | **3,00** | *115,91* | **65** | **25** | **1** |
| M28,0 | 1,00 | *210,38* | 65 | 18 | 1 |
| M28,0 | 1,50 | *127,47* | 65 | 18 | 1 |
| M28,0 | 2,00 | *210,38* | 65 | 18 | 1 |
| M30,0 | 1,00 | *142,35* | 65 | 18 | 1 |
| M30,0 | 1,50 | *127,44* | 65 | 18 | 1 |
| M30,0 | 2,00 | *142,35* | 65 | 18 | 1 |
| **M30,0** | **3,50** | *119,58* | **65** | **25** | **1** |
| M32,0 | 1,00 | *214,13* | 65 | 18 | 1 |
| M32,0 | 1,50 | *134,68* | 65 | 18 | 1 |
| M32,0 | 2,00 | *210,38* | 65 | 18 | 1 |
| M33,0 | 1,50 | *127,47* | 65 | 18 | 1 |
| M33,0 | 2,00 | *138,81* | 65 | 18 | 1 |
| **M33,0** | **3,50** | *119,58* | **65** | **25** | **1** |
| M34,0 | 1,50 | *132,98* | 65 | 18 | 1 |
| M34,0 | 2,00 | *298,33* | 65 | 18 | 1 |
| M35,0 | 1,50 | *137,95* | 65 | 18 | 1 |
| M35,0 | 2,00 | *298,33* | 65 | 18 | 1 |
| M36,0 | 1,50 | *130,57* | 65 | 18 | 1 |
| M36,0 | 2,00 | *138,81* | 65 | 18 | 1 |
| M36,0 | 3,00 | *151,07* | 65 | 25 | 1 |
| **M36,0** | **4,00** | *123,98* | **65** | **25** | **1** |

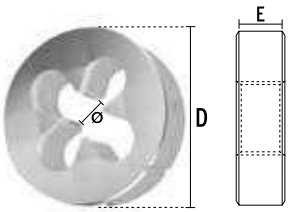
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M38,0 | 1,50 | *197,49* | 75 | 20 | 1 |
| M38,0 | 2,00 | *378,05* | 75 | 20 | 1 |
| M39,0 | 1,50 | *198,45* | 75 | 20 | 1 |
| M39,0 | 2,00 | *209,55* | 75 | 20 | 1 |
| M39,0 | 3,00 | *238,13* | 75 | 30 | 1 |
| **M39,0** | **4,00** | *186,10* | **75** | **30** | **1** |
| M40,0 | 1,50 | *206,04* | 75 | 20 | 1 |
| M40,0 | 2,00 | *209,55* | 75 | 20 | 1 |
| M40,0 | 3,00 | *228,55* | 75 | 30 | 1 |
| M42,0 | 1,50 | *270,85* | 75 | 20 | 1 |
| M42,0 | 2,00 | *302,77* | 75 | 20 | 1 |
| M42,0 | 3,00 | *315,88* | 75 | 30 | 1 |
| **M42,0** | **4,50** | *186,10* | **75** | **30** | **1** |
| M45,0 | 1,50 | *270,85* | 90 | 22 | 1 |
| M45,0 | 2,00 | *302,77* | 90 | 22 | 1 |
| M45,0 | 3,00 | *315,88* | 90 | 36 | 1 |
| **M45,0** | **4,50** | *284,62* | **90** | **36** | **1** |
| M48,0 | 1,50 | *272,56* | 90 | 22 | 1 |
| M48,0 | 2,00 | *278,63* | 90 | 22 | 1 |
| M48,0 | 3,00 | *302,77* | 90 | 36 | 1 |
| **M48,0** | **5,00** | *284,96* | **90** | **36** | **1** |
| M50,0 | 1,50 | *270,85* | 90 | 22 | 1 |
| M52,0 | 1,50 | *270,85* | 90 | 22 | 1 |
| M52,0 | 2,00 | *314,78* | 90 | 22 | 1 |
| M52,0 | 3,00 | *343,53* | 90 | 36 | 1 |
| **M52,0** | **5,00** | *284,96* | **90** | **36** | **1** |
| **M56,0** | **5,50** | *508,74* | **105** | **36** | **1** |
| **M60,0** | **5,50** | *508,74* | **105** | **36** | **1** |
| M63,0 | 1,50 | *960,19* | 105 | 22 | 1 |
| **M64,0** | **6,00** | *608,31* | **120** | **36** | **1** |

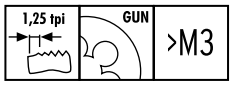
# 2501/5 HSS DIN EN 22568 Izquierda / A gauche / Left hand

M-MF DIN 13 | Tol. 6g | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M3,0 | 0,50 | *49,70* | 20 | 5 | 1 |
| M4,0 | 0,70 | *49,70* | 20 | 5 | 1 |
| M5,0 | 0,80 | *49,70* | 20 | 7 | 1 |
| M6,0 | 1,00 | *49,70* | 25 | 7 | 1 |
| M7,0 | 1,00 | *54,18* | 25 | 9 | 1 |
| M8,0 | 1,00 | *64,14* | 25 | 9 | 1 |
| M8,0 | 1,25 | *51,91* | 25 | 9 | 1 |
| M10,0 | 1,00 | *68,06* | 30 | 11 | 1 |
| M10,0 | 1,25 | *85,23* | 30 | 11 | 1 |
| M10,0 | 1,50 | *74,11* | 30 | 11 | 1 |
| M12,0 | 1,25 | *99,36* | 38 | 10 | 1 |
| M12,0 | 1,50 | *74,11* | 38 | 10 | 1 |
| M12,0 | 1,75 | *81,45* | 38 | 14 | 1 |
| M14,0 | 1,50 | *92,81* | 38 | 10 | 1 |

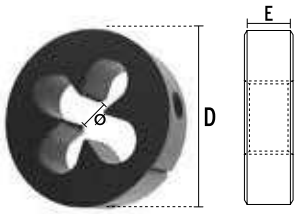
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M14,0 | 2,00 | *81,44* | 38 | 14 | 1 |
| M16,0 | 1,50 | *103,29* | 45 | 14 | 1 |
| M16,0 | 2,00 | *109,44* | 45 | 18 | 1 |
| M18,0 | 1,50 | *127,44* | 45 | 14 | 1 |
| M18,0 | 2,50 | *109,44* | 45 | 18 | 1 |
| M20,0 | 1,50 | *131,51* | 45 | 14 | 1 |
| M20,0 | 2,50 | *109,44* | 45 | 18 | 1 |
| M22,0 | 1,50 | *168,60* | 55 | 16 | 1 |
| M22,0 | 2,50 | *161,00* | 55 | 22 | 1 |
| M24,0 | 1,50 | *168,60* | 55 | 16 | 1 |
| M24,0 | 3,00 | *161,00* | 55 | 22 | 1 |
| M27,0 | 3,00 | *231,80* | 65 | 25 | 1 |
| M30,0 | 3,50 | *239,16* | 65 | 25 | 1 |

## 2514 HSSE DIN EN 22568

M DIN 13 | Tol. 6g | NIT | 2 tpi | GUN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ○ | | | | | | ○ | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M3,0 | 0,50 | *39,83* | 20 | 5 | 1 |
| M4,0 | 0,70 | *39,83* | 20 | 5 | 1 |
| M5,0 | 0,80 | *39,83* | 20 | 7 | 1 |
| M6,0 | 1,00 | *39,83* | 20 | 7 | 1 |
| M8,0 | 1,25 | *41,61* | 25 | 9 | 1 |

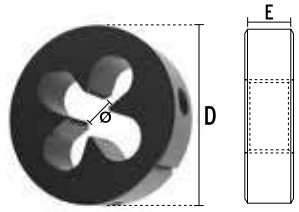
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M10,0 | 1,50 | *59,36* | 30 | 11 | 1 |
| M12,0 | 1,75 | *65,26* | 38 | 14 | 1 |
| M14,0 | 2,00 | *67,87* | 38 | 14 | 1 |
| M16,0 | 2,00 | *91,14* | 45 | 18 | 1 |

## 2512 HSSE DIN EN 22568

M DIN 13 | Tol. 6g | VAP | 2 tpi | GUN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | | | | | | | | ○ | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M3,0 | 0,50 | *33,82* | 20 | 5 | 1 |
| M4,0 | 0,70 | *33,82* | 20 | 5 | 1 |
| M5,0 | 0,80 | *33,82* | 20 | 7 | 1 |
| M6,0 | 1,00 | *33,82* | 20 | 7 | 1 |
| M8,0 | 1,25 | *35,33* | 25 | 9 | 1 |
| M10,0 | 1,50 | *50,45* | 30 | 11 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| M12,0 | 1,75 | *55,46* | 38 | 14 | 1 |
| M14,0 | 2,00 | *56,57* | 38 | 14 | 1 |
| M16,0 | 2,00 | *75,95* | 45 | 18 | 1 |
| M18,0 | 2,50 | *75,95* | 45 | 18 | 1 |
| M20,0 | 2,50 | *75,95* | 45 | 18 | 1 |



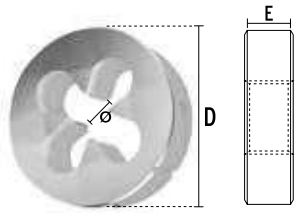
P Aceros Aciers Steels | M Aceros Inox Aciers Inox Stainless Steels | K Fundicion Fonte Cast Iron | N Metales no ferrosos Métal non Ferraux Non Ferrous metals | S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys | H Materiales Duros Materiels Durs Hard materials

## 2502 HSS DIN EN 22568

BSW
BS 84

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 3/32 | 48,00 | *34,23* | | | 1 |
| 1/8 | 40,00 | *27,75* | 20 | 5 | 1 |
| 5/32 | 32,00 | *27,75* | 20 | 7 | 1 |
| 3/16 | 24,00 | *27,75* | 20 | 7 | 1 |
| 7/32 | 24,00 | *27,75* | 20 | 7 | 1 |
| 1/4 | 20,00 | *27,75* | 20 | 7 | 1 |
| 5/16 | 18,00 | *28,94* | 25 | 9 | 1 |
| 3/8 | 16,00 | *41,92* | 30 | 11 | 1 |
| 7/16 | 14,00 | *41,92* | 30 | 11 | 1 |
| 1/2 | 12,00 | *41,92* | 38 | 14 | 1 |
| 9/16 | 12,00 | *50,22* | 38 | 14 | 1 |
| 5/8 | 11,00 | *60,99* | 45 | 18 | 1 |

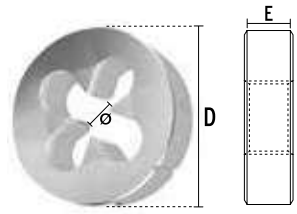
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 3/4 | 10,00 | *60,98* | 45 | 18 | 1 |
| 7/8 | 9,00 | *89,69* | 55 | 22 | 1 |
| 1" | 8,00 | *89,69* | 55 | 22 | 1 |
| 1"1/8 | 7,00 | *141,20* | 65 | 25 | 1 |
| 1"1/4 | 7,00 | *141,20* | 65 | 25 | 1 |
| 1"3/8 | 6,00 | *143,81* | 65 | 25 | 1 |
| 1"1/2 | 6,00 | *218,58* | 75 | 30 | 1 |
| 1"5/8 | 5,00 | *290,54* | 75 | 30 | 1 |
| 1"3/4 | 5,00 | *365,63* | 90 | 36 | 1 |
| 1"7/8 | 4,50 | *400,05* | 90 | 36 | 1 |
| 2" | 4,50 | *380,84* | 90 | 36 | 1 |

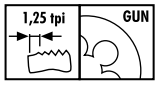
## 2502/5 HSS DIN EN 22568 Izquierda / A gauche / Left hand

BSW
BS 84
LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ti | Ni | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/8 | 40,00 | *55,50* | 20 | 5 | 1 |
| 5/32 | 32,00 | *55,50* | 20 | 5 | 1 |
| 3/16 | 24,00 | *55,50* | 20 | 7 | 1 |
| 1/4 | 20,00 | *55,50* | 20 | 7 | 1 |
| 5/16 | 18,00 | *57,89* | 25 | 9 | 1 |
| 3/8 | 16,00 | *83,84* | 30 | 11 | 1 |

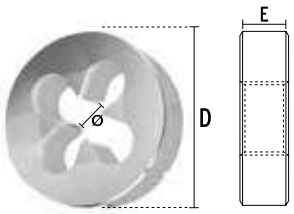
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 7/16 | 14,00 | *83,84* | 38 | 11 | 1 |
| 1/2 | 12,00 | *83,84* | 38 | 14 | 1 |
| 9/16 | 12,00 | *100,44* | 38 | 14 | 1 |
| 5/8 | 11,00 | *122,00* | 45 | 18 | 1 |
| 7/8 | 9,00 | *179,40* | 55 | 22 | 1 |
| 1" | 8,00 | *179,40* | 55 | 22 | 1 |

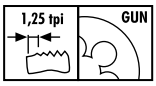
## 2503 HSS DIN EN 22568

**BSF**
**BS 84**

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 3/16 | 32,00 | *125,59* | 20 | 7 | 1 |
| 1/4 | 26,00 | *43,73* | 20 | 7 | 1 |
| 5/16 | 22,00 | *43,60* | 25 | 9 | 1 |
| 3/8 | 20,00 | *76,46* | 30 | 11 | 1 |
| 7/16 | 18,00 | *76,46* | 30 | 11 | 1 |
| 1/2 | 16,00 | *76,46* | 38 | 10 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 9/16 | 16,00 | *85,26* | 38 | 10 | 1 |
| 5/8 | 14,00 | *107,73* | 45 | 14 | 1 |
| 3/4 | 12,00 | *107,73* | 45 | 14 | 1 |
| 7/8 | 11,00 | *159,29* | 55 | 22 | 1 |
| 1" | 10,00 | *159,29* | 55 | 22 | 1 |

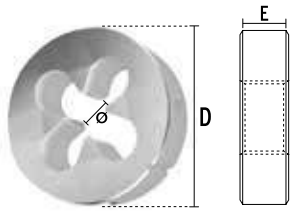
***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)

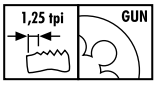
## 2504 HSS DIN EN 24231

**G**
**ISO 228**

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/8 | 28,00 | *44,66* | 30 | 11 | 1 |
| 1/4 | 19,00 | *44,66* | 38 | 10 | 1 |
| 3/8 | 19,00 | *57,74* | 45 | 14 | 1 |
| 1/2 | 14,00 | *57,74* | 45 | 14 | 1 |
| 5/8 | 14,00 | *80,06* | 55 | 16 | 1 |
| 3/4 | 14,00 | *119,67* | 55 | 16 | 1 |
| 7/8 | 14,00 | *125,27* | 65 | 18 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1" | 11,00 | *125,27* | 65 | 18 | 1 |
| 1"1/8 | 11,00 | *178,56* | 75 | 20 | 1 |
| 1"1/4 | 11,00 | *175,74* | 75 | 20 | 1 |
| 1"3/8 | 11,00 | *277,02* | 90 | 22 | 1 |
| 1"1/2 | 11,00 | *269,21* | 90 | 22 | 1 |
| 1"3/4 | 11,00 | *277,02* | 105 | 22 | 1 |
| 2" | 11,00 | *333,40* | 105 | 22 | 1 |



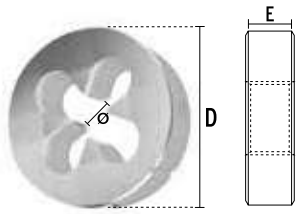
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

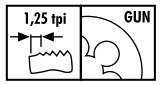
# 2504/5 HSS DIN EN 24231 Izquierda / A gauche / Left hand

G ISO 228 — LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/8 | 28,00 | *89,29* | 30 | 11 | 1 |
| 1/4 | 19,00 | *89,29* | 38 | 10 | 1 |
| 3/8 | 19,00 | *115,47* | 45 | 14 | 1 |
| 1/2 | 14,00 | *115,47* | 45 | 14 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 5/8 | 14,00 | *160,15* | 55 | 16 | 1 |
| 3/4 | 14,00 | *239,36* | 55 | 16 | 1 |
| 7/8 | 14,00 | *250,55* | 65 | 18 | 1 |
| 1" | 11,00 | *250,55* | 65 | 18 | 1 |

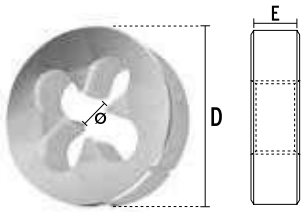
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 2522 HSS DIN EN 24231

1,5 tpi | GUN | G ISO 228

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/8 | 28,00 | *53,09* | 30 | 11 | 1 |
| 1/4 | 19,00 | *53,09* | 38 | 10 | 1 |
| 3/8 | 19,00 | *68,70* | 45 | 14 | 1 |
| 1/2 | 14,00 | *68,70* | 45 | 14 | 1 |

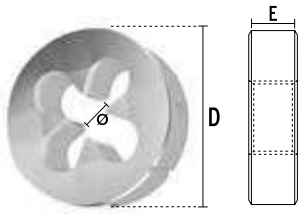
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 5/8 | 14,00 | *108,49* | 55 | 16 | 1 |
| 3/4 | 14,00 | *142,28* | 55 | 16 | 1 |
| 7/8 | 14,00 | *148,95* | 65 | 18 | 1 |
| 1" | 11,00 | *148,95* | 65 | 18 | 1 |

## 2521 HSS DIN EN 24231

2 tpi | GUN | - 0,1 | G ISO 228

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/8 | 28,00 | *58,39* | 30 | 11 | 1 |
| 1/4 | 19,00 | *58,39* | 38 | 10 | 1 |
| 3/8 | 19,00 | *75,56* | 45 | 14 | 1 |
| 1/2 | 14,00 | *75,56* | 45 | 14 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 5/8 | 14,00 | *150,74* | 55 | 16 | 1 |
| 3/4 | 14,00 | *156,51* | 55 | 16 | 1 |
| 7/8 | 14,00 | *190,27* | 65 | 18 | 1 |
| 1" | 11,00 | *190,27* | 65 | 18 | 1 |



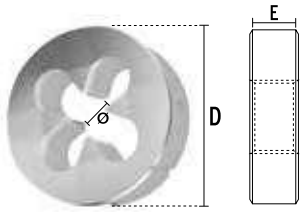
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

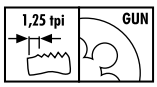
## 2505 HSS DIN EN 22568

UNC ANSI/ASME B1.1 | Tol. 2A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| N°4 | 40,00 | *35,67* | 20 | 5 | 1 |
| N°5 | 40,00 | *35,67* | 20 | 5 | 1 |
| N°6 | 32,00 | *35,67* | 20 | 5 | 1 |
| N°8 | 32,00 | *35,67* | 20 | 7 | 1 |
| N°10 | 24,00 | *35,67* | 20 | 7 | 1 |
| N°12 | 24,00 | *35,67* | 20 | 7 | 1 |
| 1/4 | 20,00 | *32,83* | 20 | 7 | 1 |
| 5/16 | 18,00 | *32,09* | 25 | 9 | 1 |
| 3/8 | 16,00 | *47,25* | 30 | 11 | 1 |
| 7/16 | 14,00 | *47,25* | 30 | 11 | 1 |
| 1/2 | 13,00 | *48,63* | 38 | 14 | 1 |

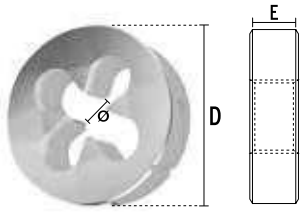
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 9/16 | 12,00 | *50,88* | 38 | 14 | 1 |
| 5/8 | 11,00 | *66,77* | 45 | 18 | 1 |
| 3/4 | 10,00 | *66,77* | 45 | 18 | 1 |
| 7/8 | 9,00 | *87,34* | 55 | 22 | 1 |
| 1" | 8,00 | *87,34* | 55 | 22 | 1 |
| 1"1/8 | 7,00 | *129,72* | 65 | 25 | 1 |
| 1"1/4 | 7,00 | *129,72* | 65 | 25 | 1 |
| 1"3/8 | 6,00 | *129,72* | 65 | 25 | 1 |
| 1"1/2 | 6,00 | *202,27* | 75 | 30 | 1 |
| 1"3/4 | 5,00 | *433,43* | 90 | 36 | 1 |
| 2" | 4,50 | *439,28* | 90 | 36 | 1 |

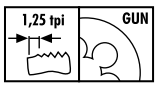
## 2505/5 HSS DIN EN 22568 Izquierda / A gauche / Left hand

UNC ANSI/ASME B1.1 | Tol. 2A | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/4 | 20,00 | *65,67* | 20 | 7 | 1 |
| 5/16 | 18,00 | *64,14* | 25 | 9 | 1 |
| 3/8 | 16,00 | *94,51* | 30 | 11 | 1 |
| 7/16 | 14,00 | *94,51* | 30 | 11 | 1 |
| 1/2 | 13,00 | *97,24* | 38 | 14 | 1 |

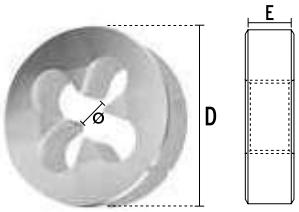
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 9/16 | 12,00 | *101,79* | 38 | 14 | 1 |
| 5/8 | 11,00 | *133,54* | 45 | 18 | 1 |
| 3/4 | 10,00 | *133,54* | 45 | 18 | 1 |
| 7/8 | 9,00 | *174,71* | 55 | 22 | 1 |
| 1" | 7,00 | *174,71* | 55 | 22 | 1 |

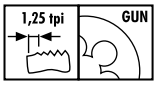
## 2506 HSS DIN EN 22568

UNF ANSI/ASME B1.1 | Tol. 2A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| Nº4 | 48,00 | *35,98* | 16 | 5 | 1 |
| Nº5 | 44,00 | *35,98* | 20 | 5 | 1 |
| Nº6 | 40,00 | *35,98* | 20 | 5 | 1 |
| Nº8 | 36,00 | *35,98* | 20 | 7 | 1 |
| Nº10 | 32,00 | *35,98* | 20 | 7 | 1 |
| Nº12 | 28,00 | *35,28* | 20 | 7 | 1 |
| 1/4 | 28,00 | *28,50* | 20 | 7 | 1 |
| 5/16 | 24,00 | *33,88* | 25 | 9 | 1 |
| 3/8 | 24,00 | *47,55* | 30 | 11 | 1 |
| 7/16 | 20,00 | *43,72* | 30 | 11 | 1 |

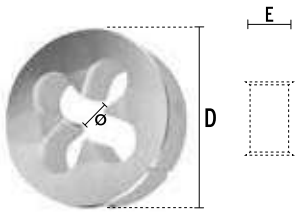
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/2 | 20,00 | *49,92* | 38 | 10 | 1 |
| 9/16 | 18,00 | *53,76* | 38 | 10 | 1 |
| 5/8 | 18,00 | *68,71* | 45 | 14 | 1 |
| 3/4 | 16,00 | *68,71* | 45 | 14 | 1 |
| 7/8 | 14,00 | *92,28* | 55 | 16 | 1 |
| 1" | 12,00 | *92,28* | 55 | 16 | 1 |
| 1"1/8 | 12,00 | *142,12* | 65 | 18 | 1 |
| 1"1/4 | 12,00 | *142,12* | 65 | 18 | 1 |
| 1"3/8 | 12,00 | *212,56* | 65 | 18 | 1 |
| 1"1/2 | 12,00 | *212,56* | 75 | 20 | 1 |

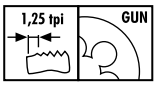
## 2506/5 HSS DIN EN 22568 Izquierda / A gauche / Left hand

UNF ANSI/ASME B1.1 | Tol. 2A | LH

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/4 | 28,00 | *57,02* | 20 | 7 | 1 |
| 5/16 | 24,00 | *67,77* | 25 | 9 | 1 |
| 3/8 | 24,00 | *95,09* | 30 | 11 | 1 |
| 7/16 | 20,00 | *87,44* | 30 | 11 | 1 |
| 1/2 | 20,00 | *99,83* | 38 | 10 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 9/16 | 18,00 | *107,52* | 38 | 10 | 1 |
| 5/8 | 18,00 | *137,41* | 45 | 14 | 1 |
| 3/4 | 16,00 | *137,41* | 45 | 14 | 1 |
| 7/8 | 14,00 | *184,55* | 55 | 16 | 1 |
| 1" | 12,00 | *184,55* | 55 | 16 | 1 |



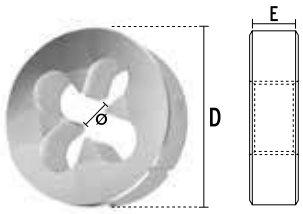
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

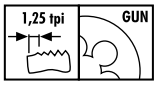
## 2507 HSS DIN EN 24230

R
DIN 2999

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/8 | 28,00 | *105,08* | 30 | 11 | 1 |
| 1/4 | 19,00 | *105,08* | 38 | 14 | 1 |
| 3/8 | 19,00 | *136,87* | 45 | 18 | 1 |

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/2 | 14,00 | *136,87* | 55 | 22 | 1 |
| 3/4 | 14,00 | *258,42* | 55 | 22 | 1 |
| 1" | 11,00 | *275,34* | 65 | 25 | 1 |

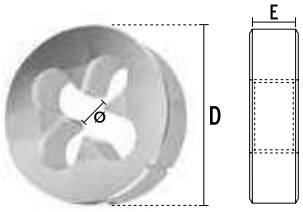
## 2508 HSS DIN EN 22568

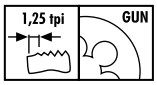
UNEF
ANSI/ASME B1.1

Tol.
2A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/4 | 32,00 | *107,42* | 20 | 7 | 1 |
| 5/16 | 32,00 | *107,42* | 25 | 9 | 1 |
| 3/8 | 32,00 | *166,78* | 30 | 11 | 1 |
| 7/16 | 28,00 | *166,78* | 30 | 11 | 1 |
| 1/2 | 28,00 | *166,78* | 38 | 10 | 1 |

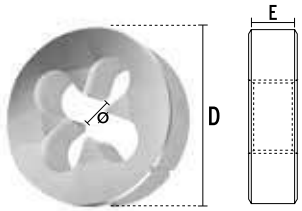
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 9/16 | 24,00 | *166,78* | 38 | 12 | 1 |
| 5/8 | 24,00 | *267,32* | 45 | 14 | 1 |
| 3/4 | 20,00 | *267,32* | 45 | 14 | 1 |
| 1" | 20,00 | *326,72* | 55 | 16 | 1 |

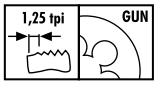
## 2520 HSS DIN EN 22568

UN ANSI/ASME B1.1 | Tol. 2A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1"1/8 | 8,00 | *355,45* | 65 | 25 | 1 |
| 1"1/4 | 8,00 | *355,45* | 65 | 25 | 1 |
| 1"3/8 | 8,00 | *381,31* | 65 | 25 | 1 |
| 1"1/2 | 8,00 | *403,57* | 75 | 30 | 1 |

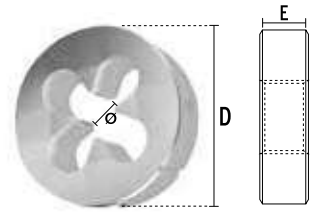
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1"5/8 | 8,00 | *508,97* | 75 | 30 | 1 |
| 1"3/4 | 8,00 | *619,10* | 90 | 36 | 1 |
| 2" | 8,00 | *619,10* | 90 | 36 | 1 |

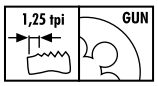
## 2510 HSS DIN 40434

PG DIN 40430

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Pg | Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|---|
| 7,0 | 12,5 | 20,00 | *63,80* | 38 | 10 | 1 |
| 9,0 | 15,2 | 18,00 | *63,80* | 45 | 14 | 1 |
| 11,0 | 18,6 | 18,00 | *79,91* | 45 | 14 | 1 |
| 13,5 | 20,4 | 18,00 | *79,91* | 45 | 14 | 1 |
| 16,0 | 22,5 | 18,00 | *103,03* | 55 | 16 | 1 |

| Pg | Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|---|
| 21,0 | 28,3 | 16,00 | *146,44* | 65 | 18 | 1 |
| 29,0 | 37,0 | 16,00 | *146,44* | 65 | 18 | 1 |
| 36,0 | 47,0 | 16,00 | *375,32* | 90 | 22 | 1 |
| 42,0 | 54,0 | 16,00 | *375,32* | 105 | 22 | 1 |
| 48,0 | 59,3 | 16,00 | *497,75* | 105 | 22 | 1 |



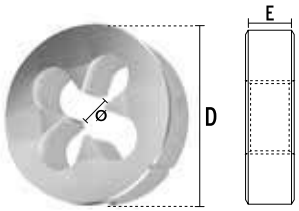
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

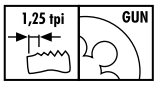
# 2509 HSS DIN EN 24230

**NPT**
ANSI/ASME B1.20.1

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




PVP = € + 10%

| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 1/16 | 27,00 | *81,22* | 25 | 9 | 1 |
| 1/8 | 27,00 | *67,01* | 30 | 11 | 1 |
| 1/4 | 14,00 | *67,01* | 38 | 14 | 1 |
| 3/8 | 18,00 | *87,51* | 45 | 18 | 1 |
| 1/2 | 14,00 | *87,51* | 45 | 18 | 1 |

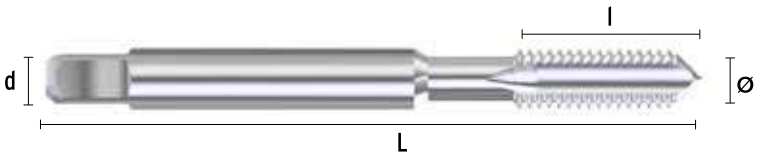
| Ø | P | € | D mm | E mm | |
|---|---|---|---|---|---|
| 3/4 | 14,00 | *160,04* | 55 | 22 | 1 |
| 1" | 11,50 | *192,43* | 65 | 25 | 1 |
| 1"1/4 | 11,50 | *239,12* | 75 | 25 | 1 |
| 1"1/2 | 11,50 | *333,57* | 90 | 25 | 1 |
| 2" | 11,50 | *464,43* | 105 | 25 | 1 |

# 2701 HSS ISO 529

**Tol. 4H** | **EG-M (STI)** | **Form. D**

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M2,0 | 0,40 | *13,13* | 44,5 | 9,5 | 2,24 | 2,80 |
| M2,2 | 0,45 | *13,13* | 44,5 | 9,5 | 2,24 | 2,80 |
| M2,5 | 0,45 | *13,13* | 48 | 11 | 2,50 | 3,15 |
| M3,0 | 0,50 | *8,52* | 53 | 13 | 3,15 | 4,00 |
| M3,5 | 0,60 | *8,52* | 53 | 13 | 3,55 | 4,50 |
| M4,0 | 0,70 | *10,34* | 58 | 16 | 4,00 | 5,00 |
| M5,0 | 0,80 | *10,68* | 66 | 19 | 5,00 | 6,30 |
| M6,0 | 1,00 | *10,68* | 72 | 22 | 6,30 | 8,00 |
| M7,0 | 1,00 | *17,19* | 72 | 22 | 7,10 | 9,00 |
| M8,0 | 1,00 | *17,19* | 80 | 24 | 8,00 | 10,00 |
| M8,0 | 1,25 | *14,76* | 80 | 24 | 8,00 | 10,00 |
| M9,0 | 1,25 | *21,36* | 85 | 25 | 6,30 | 8,00 |
| M10,0 | 1,00 | *20,84* | 85 | 25 | 6,30 | 8,00 |
| M10,0 | 1,25 | *20,84* | 85 | 25 | 6,30 | 8,00 |
| M10,0 | 1,50 | *19,19* | 89 | 29 | 7,10 | 9,00 |
| M11,0 | 1,50 | *24,49* | 89 | 29 | 7,10 | 9,00 |
| M12,0 | 1,00 | *29,79* | 95 | 30 | 9,00 | 11,20 |
| M12,0 | 1,25 | *29,79* | 95 | 30 | 9,00 | 11,20 |
| M12,0 | 1,50 | *29,79* | 95 | 30 | 9,00 | 11,20 |
| M12,0 | 1,75 | *21,11* | 95 | 30 | 9,00 | 11,20 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| M14,0 | 1,25 | *34,90* | 102 | 32 | 10,00 | 12,50 |
| M14,0 | 1,50 | *34,90* | 102 | 32 | 10,00 | 12,50 |
| M14,0 | 1,75 | *34,90* | 102 | 32 | 10,00 | 12,50 |
| M14,0 | 2,00 | *29,25* | 102 | 32 | 10,00 | 12,50 |
| M15,0 | 1,50 | *36,70* | 102 | 32 | 10,00 | 12,50 |
| M15,0 | 2,00 | *36,70* | 112 | 37 | 11,20 | 14,00 |
| M16,0 | 1,50 | *36,70* | 104 | 29 | 11,20 | 14,00 |
| M16,0 | 2,00 | *36,70* | 112 | 37 | 11,20 | 14,00 |
| M18,0 | 1,50 | *36,70* | 104 | 29 | 11,20 | 14,00 |
| M18,0 | 2,00 | *45,89* | 104 | 29 | 11,20 | 14,00 |
| M18,0 | 2,50 | *45,89* | 118 | 38 | 12,50 | 16,00 |
| M20,0 | 1,50 | *50,90* | 113 | 33 | 12,50 | 16,00 |
| M20,0 | 2,00 | *50,90* | 113 | 33 | 12,50 | 16,00 |
| M20,0 | 2,50 | *50,90* | 118 | 38 | 12,50 | 16,00 |
| M22,0 | 1,50 | *57,51* | 120 | 35 | 14,00 | 18,00 |
| M22,0 | 2,00 | *57,51* | 120 | 35 | 14,00 | 18,00 |
| M22,0 | 2,50 | *57,51* | 130 | 45 | 14,00 | 18,00 |
| M24,0 | 1,50 | *72,48* | 120 | 35 | 14,00 | 18,00 |
| M24,0 | 2,00 | *72,48* | 127 | 37 | 16,00 | 20,00 |
| M24,0 | 3,00 | *72,48* | 138 | 48 | 16,00 | 20,00 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 2702 HSS ISO 529

Tol. 3B | EG-UNC (STI) | Form. D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº2 | 56,00 | *21,54* | 48 | 9,5 | 2,50 | 3,15 |
| Nº4 | 40,00 | *21,54* | 53 | 13 | 3,15 | 4,00 |
| Nº6 | 32,00 | *21,54* | 58 | 16 | 4,00 | 5,00 |
| Nº8 | 32,00 | *21,54* | 62 | 17 | 4,50 | 5,60 |
| Nº10 | 24,00 | *14,41* | 66 | 19 | 5,00 | 6,30 |
| Nº12 | 24,00 | *14,41* | 66 | 19 | 5,60 | 7,10 |
| 1/4 | 20,00 | *14,41* | 72 | 22 | 6,30 | 8,00 |
| 5/16 | 18,00 | *15,20* | 80 | 24 | 8,00 | 10,00 |
| 3/8 | 16,00 | *16,41* | 85 | 25 | 6,30 | 8,00 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 7/16 | 14,00 | *23,18* | 95 | 30 | 9,00 | 11,20 |
| 1/2 | 13,00 | *24,93* | 102 | 32 | 10,00 | 12,50 |
| 9/16 | 12,00 | *38,72* | 112 | 37 | 11,20 | 14,00 |
| 5/8 | 11,00 | *46,46* | 112 | 37 | 11,20 | 14,00 |
| 11/16 | 11,00 | *61,81* | 112 | 37 | 11,20 | 14,00 |
| 3/4 | 10,00 | *61,81* | 118 | 38 | 12,50 | 16,00 |
| 7/8 | 9,00 | *71,54* | 130 | 45 | 14,00 | 18,00 |
| 1" | 8,00 | *71,54* | 138 | 48 | 16,00 | 20,00 |

## 2703 HSS ISO 529

Tol. 3BH | EG-UNF (STI) | Form. D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | *21,54* | 53 | 13 | 3,15 | 4,00 |
| Nº6 | 40,00 | *21,54* | 53 | 13 | 3,55 | 4,50 |
| Nº8 | 36,00 | *21,54* | 62 | 17 | 4,50 | 5,60 |
| Nº10 | 32,00 | *14,41* | 66 | 19 | 5,00 | 6,30 |
| 1/4 | 28,00 | *14,41* | 69 | 19 | 6,30 | 8,00 |
| 5/16 | 24,00 | *15,20* | 76 | 20 | 8,00 | 10,00 |
| 3/8 | 24,00 | *16,41* | 82 | 22 | 6,30 | 8,00 |
| 7/16 | 20,00 | *23,18* | 84 | 24 | 7,10 | 9,00 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/2 | 20,00 | *24,93* | 90 | 25 | 9,00 | 11,20 |
| 9/16 | 18,00 | *38,72* | 104 | 29 | 10,00 | 12,50 |
| 5/8 | 18,00 | *46,46* | 104 | 29 | 11,20 | 14,00 |
| 3/4 | 16,00 | *61,81* | 104 | 29 | 11,20 | 14,00 |
| 7/8 | 14,00 | *71,54* | 120 | 35 | 14,00 | 18,00 |
| 1" | 14,00 | *71,54* | 127 | 37 | 16,00 | 20,00 |
| 1" | 12,00 | *71,54* | 127 | 37 | 16,00 | 20,00 |

## 2704 HSS ISO 529

EG-W (STI) | Form. D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 40,00 | *14,41* | 53 | 13 | 3,15 | 4,00 |
| 3/16 | 24,00 | *14,41* | 66 | 19 | 5,00 | 6,30 |
| 1/4 | 20,00 | *14,41* | 72 | 22 | 6,30 | 8,00 |
| 5/16 | 18,00 | *15,20* | 80 | 24 | 8,00 | 10,00 |
| 3/8 | 16,00 | *16,41* | 85 | 25 | 6,30 | 8,00 |
| 7/16 | 14,00 | *23,18* | 95 | 30 | 9,00 | 11,20 |
| 1/2 | 12,00 | *24,93* | 102 | 32 | 10,00 | 12,50 |

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 9/16 | 12,00 | *38,72* | 102 | 32 | 10,00 | 12,50 |
| 5/8 | 11,00 | *46,46* | 112 | 37 | 11,20 | 14,00 |
| 11/16 | 11,00 | *61,81* | 112 | 37 | 11,20 | 14,00 |
| 3/4 | 10,00 | *61,81* | 118 | 38 | 12,50 | 16,00 |
| 7/8 | 9,00 | *71,54* | 130 | 45 | 14,00 | 18,00 |
| 1" | 8,00 | *71,54* | 138 | 48 | 16,00 | 20,00 |

## 2715 HSS ISO 529

EG-G (STI) | Form. D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | | | | ● | ● | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | *16,75* | 59 | 15 | 6,30 | 8,00 |
| 1/4 | 19,00 | *19,01* | 67 | 19 | 9,00 | 11,20 |

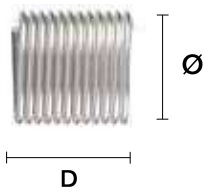
| Ø | P | € | L mm | l mm | ⊠ mm | d mm |
|---|---|---|---|---|---|---|
| 3/8 | 19,00 | *25,02* | 75 | 21 | 11,20 | 14,00 |
| 1/2 | 14,00 | *40,53* | 87 | 26 | 12,50 | 16,00 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

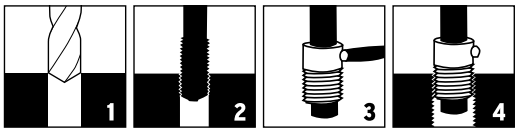
# 2705 DIN 8140

M DIN 8140 | Tol. 6H




| Ø | P | Dmm. 1,0 Ø € | 1,5 Ø € | 2,0 Ø € | 2,5 Ø* € | 3,0 Ø* € | |
|---|---|---|---|---|---|---|---|
| M2,0 | 0,40 | *0,38* | *0,40* | *0,41* | *0,43* | *0,48* | 10 |
| M2,2 | 0,45 | *0,36* | *0,38* | *0,40* | *0,41* | *0,36* | 10 |
| M2,5 | 0,45 | *0,30* | *0,34* | *0,36* | *0,38* | *0,41* | 10 |
| M3,0 | 0,50 | *0,27* | *0,28* | *0,30* | *0,38* | *0,41* | 10 |
| M3,5 | 0,60 | *0,36* | *0,38* | *0,40* | *0,41* | *0,45* | 10 |
| M4,0 | 0,70 | *0,27* | *0,28* | *0,30* | *0,36* | *0,40* | 10 |
| M5,0 | 0,80 | *0,27* | *0,28* | *0,30* | *0,36* | *0,40* | 10 |
| M6,0 | 1,00 | *0,27* | *0,28* | *0,30* | *0,36* | *0,40* | 10 |
| M7,0 | 1,00 | *0,30* | *0,34* | *0,36* | *0,43* | *0,48* | 10 |
| M8,0 | 1,00 | *0,34* | *0,38* | *0,45* | *0,63* | *0,74* | 5 |
| M8,0 | 1,25 | *0,30* | *0,38* | *0,43* | *0,54* | *0,65* | 5 |
| M9,0 | 1,25 | *0,47* | *0,54* | *0,66* | *0,83* | *0,96* | 5 |
| M10,0 | 1,00 | *0,36* | *0,43* | *0,57* | *0,80* | *0,96* | 5 |
| M10,0 | 1,25 | *0,36* | *0,43* | *0,57* | *0,80* | *0,96* | 5 |
| M10,0 | 1,50 | *0,36* | *0,43* | *0,57* | *0,70* | *0,85* | 10 |
| M11,0 | 1,50 | *0,48* | *0,76* | *1,02* | *1,39* | *1,72* | 10 |
| M12,0 | 1,00 | *0,43* | *0,68* | *0,91* | *1,39* | *1,72* | 10 |
| M12,0 | 1,25 | *0,43* | *0,68* | *0,91* | *1,39* | *1,72* | 10 |
| M12,0 | 1,50 | *0,43* | *0,68* | *0,91* | *1,39* | *1,72* | 10 |
| M12,0 | 1,75 | *0,43* | *0,68* | *0,91* | *1,23* | *1,53* | 10 |
| M14,0 | 1,00 | *1,06* | *1,34* | *1,72* | *2,13* | *2,45* | 10 |
| M14,0 | 1,25 | *1,06* | *1,34* | *1,72* | *2,13* | *2,45* | 10 |
| M14,0 | 1,50 | *1,06* | *1,34* | *1,72* | *2,13* | *2,45* | 10 |
| M14,0 | 2,00 | *0,75* | *0,95* | *1,21* | *2,13* | *2,45* | 5 |
| M16,0 | 1,50 | *1,42* | *1,76* | *2,18* | *2,64* | *3,10* | 5 |
| M16,0 | 2,00 | *1,00* | *1,24* | *1,53* | *2,64* | *3,13* | 5 |
| M18,0 | 1,50 | *1,93* | *2,52* | *3,07* | *3,64* | *4,18* | 5 |
| M18,0 | 2,00 | *1,93* | *2,52* | *3,09* | *3,64* | *4,16* | 5 |
| M18,0 | 2,50 | *1,54* | *2,04* | *2,46* | *3,64* | *4,16* | 5 |
| M20,0 | 1,50 | *2,33* | *3,05* | *3,70* | *4,78* | *5,49* | 5 |
| M20,0 | 2,00 | *2,33* | *3,05* | *3,70* | *4,78* | *5,49* | 5 |
| M20,0 | 2,50 | *1,87* | *2,44* | *2,96* | *4,78* | *5,49* | 5 |
| M22,0 | 1,50 | *3,22* | *4,03* | *4,99* | *6,47* | *7,53* | 5 |
| M22,0 | 2,00 | *3,22* | *4,03* | *4,99* | *6,47* | *7,53* | 5 |
| M22,0 | 2,50 | *2,58* | *3,22* | *3,99* | *6,47* | *7,53* | 5 |
| M24,0 | 1,50 | *4,03* | *5,28* | *6,42* | | | 5 |
| M24,0 | 2,00 | *4,03* | *5,28* | *6,42* | | | 5 |
| M24,0 | 3,00 | *4,03* | *5,28* | *6,42* | | | 5 |

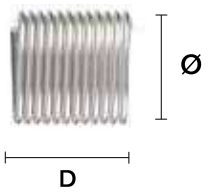
*** Bajo pedido**
Sur commande
To-order




MODO DE EMPLEO / MODE D´EMPLOI / HOW TO USE
1- Taladrado previo / Perçage préalable / Previous drilling
2- Roscado previo / Taraudage préalable / Previous threading
3- Instalación del inserto en la herramienta / Pose de l'insert dans l'outil / Placement of the insert in the tool
4- Introducción del inserto en la rosca / Introduction de l'insert dans le filet / Introduction of the insert in the coil

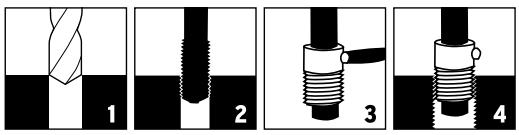
# 2706 DIN 8140

UNC ANSI/ASME B18.29.1 | Tol. 2B




| Ø | P | Dmm. 1,0 Ø € | 1,5 Ø € | 2,0 Ø € | 2,5 Ø* € | 3,0 Ø* € | |
|---|---|---|---|---|---|---|---|
| Nº 2 | 56,00 | *0,63* | *0,54* | *0,76* | *0,83* | *0,90* | 10 |
| Nº 4 | 40,00 | *0,48* | *0,43* | *0,54* | *0,65* | *0,70* | 10 |
| Nº 5 | 40,00 | *0,53* | *0,48* | *0,61* | *0,70* | *0,79* | 10 |
| Nº 6 | 32,00 | *0,48* | *0,43* | *0,54* | *0,65* | *0,70* | 10 |
| Nº 8 | 32,00 | *0,48* | *0,43* | *0,54* | *0,66* | *0,76* | 10 |
| Nº 10 | 24,00 | *0,48* | *0,53* | *0,54* | *0,66* | *0,76* | 10 |
| Nº 12 | 24,00 | *0,54* | *0,57* | *0,66* | *0,65* | *0,70* | 10 |
| 1/4 | 20,00 | *0,48* | *0,43* | *0,54* | *0,68* | *0,68* | 10 |
| 5/16 | 18,00 | *0,54* | *0,53* | *0,65* | *1,06* | *1,13* | 10 |
| 3/8 | 16,00 | *0,63* | *0,63* | *1,00* | *1,37* | *1,64* | 5 |
| 7/16 | 14,00 | *0,71* | *0,71* | *1,17* | *1,64* | *1,95* | 5 |
| 1/2 | 13,00 | *0,79* | *0,97* | *1,60* | *2,36* | *2,93* | 5 |
| 9/16 | 12,00 | *1,48* | *1,66* | *2,78* | *3,42* | *3,97* | 5 |
| 5/8 | 11,00 | *2,02* | *2,15* | *3,53* | *4,23* | *5,03* | 5 |
| 3/4 | 10,00 | *2,72* | *3,10* | *4,97* | *5,85* | *6,73* | 10 |
| 7/8 | 9,00 | *4,33* | *4,13* | *6,68* | *7,91* | *9,21* | 10 |
| 1" | 8,00 | *5,43* | *5,37* | *8,61* | *11,26* | *12,94* | 10 |

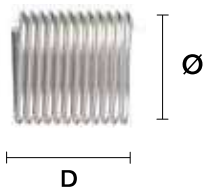
*** Bajo pedido**
Sur commande
To-order




MODO DE EMPLEO / MODE D´EMPLOI / HOW TO USE
1- Taladrado previo / Perçage préalable / Previous drilling
2- Roscado previo / Taraudage préalable / Previous threading
3- Instalación del inserto en la herramienta / Pose de l'insert dans l'outil / Placement of the insert in the tool
4- Introducción del inserto en la rosca / Introduction de l'insert dans le filet / Introduction of the insert in the coil

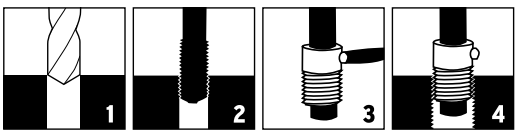
# 2707 DIN 8140

UNF ANSI/ASME B18.29.1 | Tol. 2B




| Ø | P | Dmm. 1,0 Ø € | 1,5 Ø € | 2,0 Ø € | 2,5 Ø* € | 3,0 Ø* € | |
|---|---|---|---|---|---|---|---|
| 4 | 48,00 | *0,48* | *0,43* | *0,54* | *0,65* | *0,70* | 10 |
| 6 | 40,00 | *0,48* | *0,43* | *0,54* | *0,65* | *0,70* | 10 |
| 8 | 36,00 | *0,54* | *0,43* | *0,61* | *0,66* | *0,76* | 10 |
| 10 | 32,00 | *0,48* | *0,43* | *0,54* | *0,68* | *0,76* | 10 |
| 1/4 | 28,00 | *0,48* | *0,43* | *0,54* | *0,66* | *0,76* | 10 |
| 5/16 | 24,00 | *0,54* | *0,54* | *0,79* | *1,06* | *1,25* | 10 |
| 3/8 | 24,00 | *0,63* | *0,63* | *1,00* | *1,37* | *1,64* | 10 |
| 7/16 | 20,00 | *0,71* | *0,71* | *1,17* | *1,62* | *1,95* | 10 |
| 1/2 | 20,00 | *0,76* | *0,97* | *1,60* | *2,36* | *2,93* | 10 |
| 9/16 | 18,00 | *1,56* | *1,66* | *2,78* | *3,42* | *3,97* | 5 |
| 5/8 | 18,00 | *2,10* | *2,15* | *3,53* | *4,23* | *5,03* | 5 |
| 3/4 | 16,00 | *2,85* | *3,10* | *4,97* | *5,85* | *6,73* | 5 |
| 7/8 | 14,00 | *4,33* | *4,13* | *6,68* | *7,91* | *9,21* | 5 |
| 1" | 12,00 | *5,43* | *5,37* | *8,61* | *11,26* | *12,94* | 5 |
| 1"1/8 | 12,00 | *9,08* | *9,03* | *13,69* | | | 10 |
| 1"1/4 | 12,00 | *10,04* | *15,59* | | | | 10 |
| 1"3/8 | 12,00 | *11,91* | *11,21* | | | | 10 |
| 1"1/2 | 12,00 | *12,56* | *13,57* | | | | |

*** Bajo pedido**
Sur commande
To-order




MODO DE EMPLEO / MODE D´EMPLOI / HOW TO USE
1- Taladrado previo / Perçage préalable / Previous drilling
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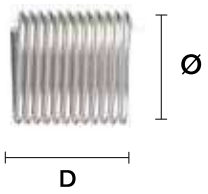
## 2708 DIN 8140

BSW BS 84 | Tol. 2B

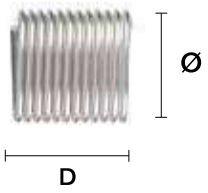



| Ø | P | Dmm. 1,0 Ø € | 1,5 Ø € | 2,0 Ø € | 2,5 Ø* € | 3,0 Ø* € | |
|---|---|---|---|---|---|---|---|
| 1/8 | 48,00 | *0,61* | *0,48* | *0,66* | *0,70* | *0,79* | 10 |
| 3/16 | 24,00 | *0,54* | *0,43* | *0,61* | *0,70* | *0,79* | 10 |
| 1/4 | 20,00 | *0,54* | *0,43* | *0,61* | *0,74* | *0,85* | 10 |
| 5/16 | 18,00 | *0,61* | *0,54* | *0,86* | *1,17* | *1,37* | 10 |
| 3/8 | 16,00 | *0,68* | *0,63* | *1,10* | *1,48* | *1,80* | 10 |
| 7/16 | 14,00 | *0,79* | *0,71* | *1,29* | *1,80* | *2,15* | 10 |
| 1/2 | 12,00 | *0,76* | *1,17* | *1,60* | *2,58* | *3,21* | 10 |
| 9/16 | 12,00 | *1,72* | *1,85* | *2,78* | *3,75* | *4,35* | 10 |
| 5/8 | 11,00 | *2,30* | *2,15* | *3,53* | *4,65* | *5,49* | 10 |
| 3/4 | 10,00 | *3,15* | *3,10* | *4,18* | *5,41* | *7,39* | 5 |
| 7/8 | 9,00 | *3,93* | *3,30* | *6,08* | *7,88* | *9,19* | 5 |
| 1" | 8,00 | *4,94* | *4,31* | *7,84* | *10,23* | *11,76* | 5 |

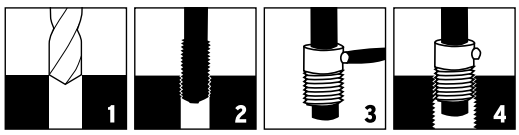
*** Bajo pedido**
Sur commande
To-order

## 2716 DIN 8140

G ISO 229 | Tol. 2B




| Ø | P | Dmm. 1,0 Ø € | 1,5 Ø € | 2,0 Ø € | |
|---|---|---|---|---|---|
| 1/8 | 28,00 | *0,57* | *0,82* | *0,90* | 10 |
| 1/4 | 19,00 | *0,77* | *1,11* | *1,25* | 10 |
| 3/8 | 19,00 | *0,69* | *1,26* | *1,43* | 10 |
| 1/2 | 14,00 | *1,19* | *1,82* | *1,91* | 10 |




MODO DE EMPLEO / MODE D´EMPLOI / HOW TO USE
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## 2709 Insertador / Appareil de pose manuel / Insert Tool

| nº | Ø x P mm | UNC/UNF/BSW/BSF/BSP | | € |
|---|---|---|---|---|
| 2 | M 2,00 x 0,40<br>M 2,20 x 0,45 | UNC Nº 2 | 1 | *24,75* |
| 3 | M 2,50 x 0,45 | | 1 | *24,75* |
| 4 | M 3,00 x 0,50 | UNC Nº 5, UNC/UNF Nº 4, BSW 18 | 1 | *18,68* |
| 5 | M 3,50 x 0,60 | UNC/UNF Nº 6 | 1 | *18,68* |
| 6 | M 4,00 x 0,70 | UNC, UNF Nº 8 | 1 | *18,68* |
| 7 | | BSW 3/16, UNC Nº 10 | 1 | *18,68* |
| 8 | M 5,00 x 0,80 | UNF Nº 10, UNC Nº 12, BSF 3/16 | 1 | *18,68* |
| 9 | M 6,00 x 1,00 | UNC, UNF 1/4, BSW, BSF 1/4 | 1 | *18,68* |
| 10 | M 7,00 x 1,00 | | 1 | *18,68* |
| 11 | M 8,00 x 1,00<br>M 8,00 x 1,25 | UNF, BSF 5/16<br>UNC, BSW 5/16 | 1 | *18,68* |
| 12 | M 9,00 x 1,00<br>M 9,00 x 1,25 | | 1 | *18,68* |
| 13 | M 10,00 x 1,00<br>M 10,00 x 1,25<br>M 10,00 x 1,50 | UNF, BSF 3/8<br>UNC, BSW 3/8<br>G 1/18 | 1 | *18,68* |
| 14 | M 11,00 x 1,25<br>M 11,00 x 1,50 | UNC, UNF 7/16, BSW, BSF 7/16 | 1 | *19,92* |
| 15 | M 12,00 x 1,00<br>M 12,00 x 1,25<br>M 12,00 x 1,50<br>M 12,00 x 1,75 | UNC, UNF 1/2, BSW, BSF 1/2 | 1 | *22,35* |
| 16 | M 14,00 x 1,50<br>M 14,00 x 2,00 | UNC, UNF 9/16, BSW, BSF 9/16<br>G 1/4, G 3/8 | 1 | *24,87* |
| 17 | M 14,00 x 1,00<br>M 14,00 x 1,25 | | 1 | *24,87* |
| 18 | M 16,00 x 1,50<br>M 16,00 x 2,00 | UNC, UNF 5/8, BSW, BSF 5/8 | 1 | *24,87* |
| 20 | M 18,00 x 1,50<br>M 18,00 x 2,00<br>M 18,00 x 2,50 | UNC 3/4, BSW, BSF 3/4 | 1 | *31,04* |
| 21 | M 20,00 x 1,50<br>M 20,00 x 2,00<br>M 20,00 x 2,50 | UNF 3/4 | 1 | *31,04* |
| 22 | M 22,00 x 1,50<br>M 22,00 x 2,00<br>M 22,00 x 2,50 | UNC, UNF 7/8, BSW, BSF 7/8<br>G 1/2 | 1 | *31,04* |
| 23 | M 24,00 x 1,50<br>M 24,00 x 2,00<br>M 24,00 x 3,00 | UNC, UNF 1", BSW, BSF 1" | 1 | *49,76* |

## 2710 Rompe Arrastre / Rupteur / Tang break tool

| nº | Ø x P mm | UNC/UNF/BSW/BSF/BSP | | € |
|---|---|---|---|---|
| 2 | M 2,00 x 0,40<br>M 2,20 x 0,45 | UNC Nº 2 | 1 | *5,91* |
| 3 | M 2,50 x 0,45 | | 1 | *5,91* |
| 4 | M 3,00 x 0,50 | UNC, UNF Nº 4 | 1 | *5,91* |
| 5 | M 3,50 x 0,60 | UNC, UNF Nº 6 | 1 | *5,91* |
| 6 | M 4,00 x 0,70 | UNC Nº 10, UNC/UNF Nº 8, BSF 3/16 | 1 | *5,91* |
| 8 | M 5,00 x 0,80 | | 1 | *7,42* |
| 9 | M 6,00 x 1,00 | UNC/UNF 1/4, BSW/BSF 1/4 | 1 | *7,42* |
| 11 | M 7,00 x 1,00<br>M 8,00 x 1,00<br>M 8,00 x 1,25 | UNC/UNF 5/16, BSW/BSF 5/16 | 1 | *9,68* |
| 12 | M 9,00 x 1,00<br>M 9,00 x 1,25 | BSF 3/8 | 1 | *9,68* |
| 13 | M 10,00 x 1,00<br>M 10,00 x 1,25<br>M 10,00 x 1,50 | UNF 3/8<br>UNC, BSW 3/8<br>G 1/8 | 1 | *9,68* |
| 14 | M 11,00 x 1,25<br>M 11,00 x 1,50 | UNC/UNF 7/16, BSW/BSF 7/16 | 1 | *9,68* |
| 15 | M 12,00 x 1,00<br>M 12,00 x 1,25<br>M 12,00 x 1,50<br>M 12,00 x 1,75 | UNC/UNF 1/2, BSW/BSF 1/2<br>G 1/4 | 1 | *9,68* |

# 2711 Kits / Kits

EG-M (STI)

| Ø | P | | | | 1,5D | € |
|---|---|---|---|---|---|---|
| M2,0 | 0,40 | 2,10 | No. 2 | No. 2 | 10 | *60,82* |
| M2,5 | 0,45 | 2,60 | No. 3 | No. 3 | 10 | *60,26* |
| M3,0 | 0,50 | 3,20 | No. 4 | No. 4 | 10 | *49,35* |
| M3,5 | 0,60 | 3,70 | No. 5 | No. 5 | 10 | *50,14* |
| M4,0 | 0,70 | 4,20 | No. 6 | No. 6 | 10 | *51,29* |
| M5,0 | 0,80 | 5,20 | No. 8 | No. 8 | 10 | *54,20* |
| M6,0 | 1,00 | 6,30 | No. 9 | No. 9 | 10 | *54,24* |
| M7,0 | 1,00 | 7,30 | No. 10 | No. 11 | 10 | *64,16* |
| M8,0 | 1,00 | 8,30 | No. 11 | No. 11 | 10 | *63,09* |
| M8,0 | 1,25 | 8,30 | No. 11 | No. 11 | 10 | *65,52* |
| M9,0 | 1,25 | 9,30 | No. 12 | | 10 | *62,69* |
| M10,0 | 1,00 | 10,40 | No. 13 | | 10 | *62,31* |
| M10,0 | 1,25 | 10,30 | No. 13 | | 10 | *62,31* |
| M10,0 | 1,50 | 10,30 | No. 13 | | 10 | *60,66* |
| M11,0 | 1,50 | 11,40 | No. 14 | | 5 | *68,25* |
| M12,0 | 1,00 | 12,40 | No. 15 | | 5 | *77,05* |
| M12,0 | 1,25 | 12,40 | No. 15 | | 5 | *77,05* |
| M12,0 | 1,50 | 12,30 | No. 15 | | 5 | *68,37* |
| M12,0 | 1,75 | 12,30 | No. 15 | | 5 | *78,68* |
| M14,0 | 1,00 | | No. 16 | | 5 | *67,60* |
| M14,0 | 1,25 | | No. 16 | | 5 | *78,68* |
| M14,0 | 1,50 | | No. 17 | | 5 | *78,68* |
| M14,0 | 2,00 | | No. 17 | | 5 | *67,60* |
| M16,0 | 1,50 | | No. 18 | | 5 | *82,51* |
| M16,0 | 2,00 | | No. 18 | | 5 | *82,51* |
| M18,0 | 1,50 | | No. 20 | | 5 | *101,79* |
| M18,0 | 2,00 | | No. 20 | | 5 | *101,79* |
| M18,0 | 2,50 | | No. 20 | | 5 | *101,79* |
| M20,0 | 1,50 | | No. 21 | | 5 | *109,33* |
| M20,0 | 2,00 | | No. 21 | | 5 | *109,33* |
| M20,0 | 2,50 | | No. 21 | | 5 | *109,33* |
| M22,0 | 1,50 | | No. 22 | | 5 | *120,92* |
| M22,0 | 2,00 | | No. 22 | | 5 | *120,92* |
| M22,0 | 2,50 | | No. 22 | | 5 | *120,92* |
| M24,0 | 1,50 | | No. 23 | | 5 | *160,74* |
| M24,0 | 2,00 | | No. 23 | | 5 | *160,74* |
| M24,0 | 3,00 | | No. 23 | | 5 | *160,74* |

# 2712 Kits / Kits

EG-UNC (STI)

| Ø | P | | | | 1,5 D | € |
|---|---|---|---|---|---|---|
| N°2 | 56,00 | 2,10 | No. 2 | No. 2 | 10 | *70,79* |
| N°4 | 40,00 | 2,60 | No. 3 | No. 3 | 10 | *63,58* |
| N°6 | 32,00 | 3,20 | No. 4 | No. 4 | 10 | *63,74* |
| N°8 | 32,00 | 3,70 | No. 5 | No. 5 | 10 | *63,96* |
| N°10 | 24,00 | 4,20 | No. 6 | No. 6 | 10 | *58,37* |
| N°12 | 24,00 | 5,20 | No. 8 | No. 8 | 10 | *60,36* |
| 1/4 | 20,00 | 6,30 | No. 9 | No. 9 | 10 | *59,72* |
| 5/16 | 18,00 | 7,30 | No. 10 | No. 11 | 10 | *65,08* |
| 3/8 | 16,00 | 8,30 | No. 11 | No. 11 | 10 | *59,12* |
| 7/16 | 14,00 | 8,30 | No. 11 | No. 11 | 10 | *67,17* |
| 1/2 | 13,00 | 9,30 | No. 12 | | 10 | *72,84* |
| 9/16 | 12,00 | 10,40 | No. 13 | | 10 | *84,05* |
| 5/8 | 11,00 | 10,30 | No. 13 | | 10 | *94,22* |
| 3/4 | 10,00 | 10,30 | No. 13 | | 10 | *120,55* |
| 7/8 | 9,00 | 11,40 | No. 14 | | 5 | *135,36* |
| 1" | 8,00 | 12,40 | No. 15 | | 5 | *160,30* |

# 2713 Kits / Kits

EG-UNF (STI)

| Ø | P | | | | 1,5D | € |
|---|---|---|---|---|---|---|
| Nº4 | 48,00 | 2,10 | No. 2 | No. 2 | 10 | *65,71* |
| Nº6 | 40,00 | 2,60 | No. 3 | No. 3 | 10 | *66,17* |
| Nº8 | 36,00 | 3,20 | No. 4 | No. 4 | 10 | *66,39* |
| Nº10 | 32,00 | 3,70 | No. 5 | No. 5 | 10 | *61,15* |
| 1/4 | 28,00 | 4,20 | No. 6 | No. 6 | 10 | *62,15* |
| 5/16 | 24,00 | 5,20 | No. 8 | No. 8 | 10 | *67,70* |
| 3/8 | 24,00 | 6,30 | No. 9 | No. 9 | 10 | *61,55* |
| 7/16 | 20,00 | 7,30 | No. 10 | No. 11 | 10 | *77,57* |
| 1/2 | 20,00 | 8,30 | No. 11 | No. 11 | 10 | *84,99* |
| 9/16 | 18,00 | 8,30 | No. 11 | No. 11 | 10 | *96,21* |
| 5/8 | 18,00 | 9,30 | No. 12 | | 10 | *106,37* |
| 3/4 | 16,00 | 10,40 | No. 13 | | 10 | *157,01* |
| 7/8 | 14,00 | 10,30 | No. 13 | | 10 | *171,81* |
| 1" | 12,00 | 10,30 | No. 13 | | 10 | *196,77* |

## 2714 Kits / Kits

EG-W (STI)

| Ø | P | | | | 1,5D | € |
|---|---|---|---|---|---|---|
| 1/8 | 40,00 | 2,10 | No. 2 | No. 2 | 10 | *59,54* |
| 3/16 | 24,00 | 2,60 | No. 3 | No. 3 | 10 | *62,15* |
| 1/4 | 20,00 | 3,20 | No. 4 | No. 4 | 10 | *62,15* |
| 5/16 | 18,00 | 3,70 | No. 5 | No. 5 | 10 | *67,70* |
| 3/8 | 16,00 | 4,20 | No. 6 | No. 6 | 10 | *61,55* |
| 7/16 | 14,00 | 5,20 | No. 8 | No. 8 | 10 | *77,57* |
| 1/2 | 12,00 | 6,30 | No. 9 | No. 9 | 10 | *85,97* |
| 9/16 | 12,00 | 7,30 | No. 10 | No. 11 | 10 | *97,19* |
| 5/8 | 11,00 | 8,30 | No. 11 | No. 11 | 10 | *106,37* |
| 3/4 | 10,00 | 8,30 | No. 11 | No. 11 | 10 | *157,01* |
| 7/8 | 9,00 | 9,30 | No. 12 | | 10 | *167,71* |
| 1" | 8,00 | 10,40 | No. 13 | | 10 | *191,40* |

## 2717 Kits / Kits

EG-G (STI)

| Ø | P | | | | 1,5D | € |
|---|---|---|---|---|---|---|
| 1/8 | 28,00 | 2,10 | No. 2 | No. 2 | 10 | *98,41* |
| 1/4 | 19,00 | 2,60 | No. 3 | No. 3 | 10 | *103,91* |
| 3/8 | 19,00 | 3,20 | No. 4 | No. 4 | 10 | *119,42* |
| 1/2 | 14,00 | 3,70 | No. 5 | No. 5 | 10 | *156,99* |

## 7167 Multi-kits / Multi-kits

EG-M (STI)

| Ø | P | | | | 1,5 D |
|---|---|---|---|---|---|
| M5,0 | 0,80 | 2,10 | No. 2 | No. 2 | 10 |
| M6,0 | 1,00 | 2,60 | No. 3 | No. 3 | 10 |
| M8,0 | 1,25 | 3,20 | No. 4 | No. 4 | 10 |
| M10,0 | 1,50 | 3,70 | No. 5 | No. 5 | 10 |
| M12,0 | 1,75 | 4,20 | No. 6 | No. 6 | 10 |

| € | *383,21* |
|---|---|

# 2901/1 DIN ISO 1502

PASA NO PASA | CTPNP | M-MF DIN 13 | Tol. 6H

| Ø | P | € | |
|---|---|---|---|
| M1,0 | 0,25 | *305,45* | 1 |
| M1,1 | 0,25 | *305,45* | 1 |
| M1,2 | 0,25 | *291,82* | 1 |
| M1,4 | 0,30 | *291,82* | 1 |
| M1,6 | 0,35 | *245,45* | 1 |
| M1,8 | 0,35 | *215,45* | 1 |
| M2,0 | 0,40 | *139,09* | 1 |
| M2,2 | 0,45 | *199,29* | 1 |
| M2,5 | 0,45 | *122,73* | 1 |
| M3,0 | 0,50 | *114,55* | 1 |
| M4,0 | 0,50 | *226,36* | 1 |
| M4,0 | 0,70 | *109,09* | 1 |
| M4,5 | 0,75 | *120,58* | 1 |
| M5,0 | 0,50 | *220,91* | 1 |
| M5,0 | 0,80 | *106,36* | 1 |
| M6,0 | 0,50 | *220,91* | 1 |
| M6,0 | 0,75 | *150,00* | 1 |
| M6,0 | 1,00 | *100,91* | 1 |
| M7,0 | 1,00 | *100,91* | 1 |
| M8,0 | 0,50 | *220,91* | 1 |
| M8,0 | 0,75 | *160,91* | 1 |
| M8,0 | 1,00 | *144,55* | 1 |
| M8,0 | 1,25 | *106,36* | 1 |
| M9,0 | 1,25 | *109,09* | 1 |
| M10,0 | 0,50 | *237,27* | 1 |
| M10,0 | 0,75 | *163,64* | 1 |
| M10,0 | 1,00 | *150,00* | 1 |
| M10,0 | 1,25 | *177,27* | 1 |
| M10,0 | 1,50 | *111,82* | 1 |
| M12,0 | 0,50 | *253,64* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M12,0 | 0,75 | *171,82* | 1 |
| M12,0 | 1,00 | *163,64* | 1 |
| M12,0 | 1,25 | *171,82* | 1 |
| M12,0 | 1,50 | *174,55* | 1 |
| M12,0 | 1,75 | *117,27* | 1 |
| M14,0 | 1,00 | *171,82* | 1 |
| M14,0 | 1,25 | *185,45* | 1 |
| M14,0 | 1,50 | *160,91* | 1 |
| M14,0 | 2,00 | *125,45* | 1 |
| M16,0 | 1,00 | *185,45* | 1 |
| M16,0 | 1,50 | *166,36* | 1 |
| M16,0 | 2,00 | *133,64* | 1 |
| M18,0 | 1,00 | *188,18* | 1 |
| M18,0 | 1,50 | *174,55* | 1 |
| M18,0 | 2,50 | *144,55* | 1 |
| M20,0 | 1,00 | *201,82* | 1 |
| M20,0 | 1,50 | *185,45* | 1 |
| M20,0 | 2,00 | *185,45* | 1 |
| M20,0 | 2,50 | *155,45* | 1 |
| M22,0 | 1,00 | *223,64* | 1 |
| M22,0 | 1,50 | *207,27* | 1 |
| M22,0 | 2,50 | *160,91* | 1 |
| M24,0 | 1,00 | *240,00* | 1 |
| M24,0 | 1,50 | *218,18* | 1 |
| M24,0 | 2,00 | *218,18* | 1 |
| M24,0 | 3,00 | *180,00* | 1 |
| M25,0 | 1,00 | *245,45* | 1 |
| M25,0 | 1,50 | *223,64* | 1 |
| M25,0 | 2,00 | *223,64* | 1 |
| M27,0 | 1,00 | *259,09* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M27,0 | 1,50 | *237,27* | 1 |
| M27,0 | 2,00 | *237,27* | 1 |
| M27,0 | 3,00 | *196,36* | 1 |
| M30,0 | 1,00 | *291,82* | 1 |
| M30,0 | 1,50 | *261,82* | 1 |
| M30,0 | 2,00 | *261,82* | 1 |
| M30,0 | 3,00 | *300,00* | 1 |
| M30,0 | 3,50 | *215,45* | 1 |
| M32,0 | 1,00 | *291,82* | 1 |
| M32,0 | 1,50 | *267,27* | 1 |
| M32,0 | 2,00 | *267,27* | 1 |
| M33,0 | 1,00 | *294,55* | 1 |
| M33,0 | 1,50 | *272,73* | 1 |
| M33,0 | 2,00 | *272,73* | 1 |
| M33,0 | 3,00 | *308,18* | 1 |
| M33,0 | 3,50 | *237,27* | 1 |
| M36,0 | 1,00 | *316,36* | 1 |
| M36,0 | 1,50 | *291,82* | 1 |
| M36,0 | 2,00 | *291,82* | 1 |
| M36,0 | 3,00 | *291,82* | 1 |
| M36,0 | 4,00 | *256,36* | 1 |
| M39,0 | 1,50 | *316,36* | 1 |
| M39,0 | 2,00 | *316,36* | 1 |
| M39,0 | 3,00 | *370,91* | 1 |
| M39,0 | 4,00 | *278,18* | 1 |
| M40,0 | 1,50 | *335,45* | 1 |
| M40,0 | 2,00 | *335,45* | 1 |
| M40,0 | 3,00 | *376,36* | 1 |

## 2901/4 DIN ISO 1502

PASA | CTP | M-MF DIN 13 | Tol. 6H

| Ø | P | € | |
|---|---|---|---|
| M42,0 | 1,50 | *196,36* | 1 |
| M42,0 | 2,00 | *196,36* | 1 |
| M42,0 | 3,00 | *226,36* | 1 |
| M42,0 | 4,50 | *188,18* | 1 |
| M45,0 | 1,50 | *204,55* | 1 |
| M45,0 | 2,00 | *207,27* | 1 |
| M45,0 | 3,00 | *237,27* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M45,0 | 4,50 | *201,82* | 1 |
| M48,0 | 1,50 | *212,73* | 1 |
| M48,0 | 2,00 | *218,18* | 1 |
| M48,0 | 3,00 | *248,18* | 1 |
| M48,0 | 5,00 | *218,18* | 1 |
| M50,0 | 1,50 | *223,64* | 1 |
| M50,0 | 2,00 | *226,36* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M50,0 | 3,00 | *259,09* | 1 |
| M52,0 | 1,50 | *229,09* | 1 |
| M52,0 | 2,00 | *237,27* | 1 |
| M52,0 | 3,00 | *272,73* | 1 |
| M52,0 | 5,00 | *229,09* | 1 |

## 2901/5 DIN ISO 1502

NO PASA | CTNP | M-MF DIN 13 | Tol. 6H

| Ø | P | € | |
|---|---|---|---|
| M42,0 | 1,50 | *196,36* | 1 |
| M42,0 | 2,00 | *196,36* | 1 |
| M42,0 | 3,00 | *226,36* | 1 |
| M42,0 | 4,50 | *188,18* | 1 |
| M45,0 | 1,50 | *204,55* | 1 |
| M45,0 | 2,00 | *207,27* | 1 |
| M45,0 | 3,00 | *237,27* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M45,0 | 4,50 | *201,82* | 1 |
| M48,0 | 1,50 | *212,73* | 1 |
| M48,0 | 2,00 | *218,18* | 1 |
| M48,0 | 3,00 | *248,18* | 1 |
| M48,0 | 5,00 | *218,18* | 1 |
| M50,0 | 1,50 | *223,64* | 1 |
| M50,0 | 2,00 | *226,36* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M50,0 | 3,00 | *259,09* | 1 |
| M52,0 | 1,50 | *229,09* | 1 |
| M52,0 | 2,00 | *237,27* | 1 |
| M52,0 | 3,00 | *272,73* | 1 |
| M52,0 | 5,00 | *229,09* | 1 |

## 2901/2 DIN ISO 1502

PASA | CAP | M-MF DIN 13 | Tol. 6g

| Ø | P | € | |
|---|---|---|---|
| M2,0 | 0,40 | *155,45* | 1 |
| M2,2 | 0,45 | *182,73* | 1 |
| M2,5 | 0,45 | *120,00* | 1 |
| M3,0 | 0,50 | *117,27* | 1 |
| M4,0 | 0,50 | *242,73* | 1 |
| M4,0 | 0,70 | *109,09* | 1 |
| M4,5 | 0,75 | *109,09* | 1 |
| M5,0 | 0,50 | *242,73* | 1 |
| M5,0 | 0,80 | *109,09* | 1 |
| M6,0 | 0,50 | *242,73* | 1 |
| M6,0 | 0,75 | *150,00* | 1 |
| M6,0 | 1,00 | *109,09* | 1 |
| M7,0 | 1,00 | *139,09* | 1 |
| M8,0 | 0,50 | *234,55* | 1 |
| M8,0 | 0,75 | *169,09* | 1 |
| M8,0 | 1,00 | *130,91* | 1 |
| M8,0 | 1,25 | *109,09* | 1 |
| M9,0 | 1,25 | *150,00* | 1 |
| M10,0 | 0,50 | *270,00* | 1 |
| M10,0 | 0,75 | *188,18* | 1 |
| M10,0 | 1,00 | *144,55* | 1 |
| M10,0 | 1,25 | *177,27* | 1 |
| M10,0 | 1,50 | *122,73* | 1 |
| M12,0 | 0,50 | *308,18* | 1 |
| M12,0 | 0,75 | *223,64* | 1 |
| M12,0 | 1,00 | *163,64* | 1 |
| M12,0 | 1,25 | *199,09* | 1 |
| M12,0 | 1,50 | *155,45* | 1 |
| M12,0 | 1,75 | *141,82* | 1 |
| M14,0 | 1,00 | *174,55* | 1 |
| M14,0 | 1,25 | *250,91* | 1 |
| M14,0 | 1,50 | *160,91* | 1 |
| M14,0 | 2,00 | *155,45* | 1 |
| M16,0 | 1,00 | *188,18* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M16,0 | 1,50 | *174,55* | 1 |
| M16,0 | 2,00 | *169,09* | 1 |
| M18,0 | 1,00 | *201,82* | 1 |
| M18,0 | 1,50 | *188,18* | 1 |
| M18,0 | 2,50 | *193,64* | 1 |
| M20,0 | 1,00 | *215,45* | 1 |
| M20,0 | 1,50 | *201,82* | 1 |
| M20,0 | 2,00 | *215,45* | 1 |
| M20,0 | 2,50 | *215,45* | 1 |
| M22,0 | 1,00 | *264,55* | 1 |
| M22,0 | 1,50 | *215,45* | 1 |
| M22,0 | 2,50 | *231,82* | 1 |
| M24,0 | 1,00 | *250,91* | 1 |
| M24,0 | 1,50 | *234,55* | 1 |
| M24,0 | 2,00 | *242,73* | 1 |
| M24,0 | 3,00 | *245,45* | 1 |
| M25,0 | 1,00 | *294,55* | 1 |
| M25,0 | 1,50 | *240,00* | 1 |
| M25,0 | 2,00 | *242,73* | 1 |
| M27,0 | 1,00 | *316,36* | 1 |
| M27,0 | 1,50 | *250,91* | 1 |
| M27,0 | 2,00 | *264,55* | 1 |
| M27,0 | 3,00 | *272,73* | 1 |
| M30,0 | 1,00 | *300,00* | 1 |
| M30,0 | 1,50 | *270,00* | 1 |
| M30,0 | 2,00 | *270,00* | 1 |
| M30,0 | 3,00 | *302,73* | 1 |
| M30,0 | 3,50 | *300,00* | 1 |
| M32,0 | 1,00 | *321,82* | 1 |
| M32,0 | 1,50 | *289,09* | 1 |
| M32,0 | 2,00 | *289,09* | 1 |
| M33,0 | 1,00 | *330,00* | 1 |
| M33,0 | 1,50 | *294,55* | 1 |
| M33,0 | 2,00 | *300,00* | 1 |

| Ø | P | € | |
|---|---|---|---|
| M33,0 | 3,00 | *319,09* | 1 |
| M33,0 | 3,50 | *324,55* | 1 |
| M36,0 | 1,00 | *354,55* | 1 |
| M36,0 | 1,50 | *313,64* | 1 |
| M36,0 | 2,00 | *330,00* | 1 |
| M36,0 | 3,00 | *368,18* | 1 |
| M36,0 | 4,00 | *349,09* | 1 |
| M39,0 | 1,50 | *346,36* | 1 |
| M39,0 | 2,00 | *360,00* | 1 |
| M39,0 | 3,00 | *373,64* | 1 |
| M39,0 | 4,00 | *379,09* | 1 |
| M40,0 | 1,50 | *346,36* | 1 |
| M40,0 | 2,00 | *368,18* | 1 |
| M40,0 | 3,00 | *384,55* | 1 |
| M42,0 | 1,50 | *360,00* | 1 |
| M42,0 | 2,00 | *300,00* | 1 |
| M42,0 | 3,00 | *395,45* | 1 |
| M42,0 | 4,50 | *411,82* | 1 |
| M45,0 | 1,50 | *379,09* | 1 |
| M45,0 | 2,00 | *308,18* | 1 |
| M45,0 | 3,00 | *400,91* | 1 |
| M45,0 | 4,50 | *436,36* | 1 |
| M48,0 | 1,50 | *400,91* | 1 |
| M48,0 | 2,00 | *313,64* | 1 |
| M48,0 | 3,00 | *414,55* | 1 |
| M48,0 | 5,00 | *460,91* | 1 |
| M50,0 | 1,50 | *414,55* | 1 |
| M50,0 | 2,00 | *327,27* | 1 |
| M50,0 | 3,00 | *425,45* | 1 |
| M52,0 | 1,50 | *436,36* | 1 |
| M52,0 | 2,00 | *335,45* | 1 |
| M52,0 | 3,00 | *463,64* | 1 |
| M52,0 | 5,00 | *496,36* | 1 |

# 2901/3 DIN ISO 1502

NO PASA | CANP | M-MF DIN 13 | Tol. 6g

| Ø | P | € | |
|---|---|---|---|
| M2,0 | 0,40 | 155,45 | 1 |
| M2,2 | 0,45 | 182,73 | 1 |
| M2,5 | 0,45 | 120,00 | 1 |
| M3,0 | 0,50 | 117,27 | 1 |
| M4,0 | 0,50 | 242,73 | 1 |
| M4,0 | 0,70 | 109,09 | 1 |
| M4,5 | 0,75 | 109,09 | 1 |
| M5,0 | 0,50 | 242,73 | 1 |
| M5,0 | 0,80 | 109,09 | 1 |
| M6,0 | 0,50 | 242,73 | 1 |
| M6,0 | 0,75 | 150,00 | 1 |
| M6,0 | 1,00 | 109,09 | 1 |
| M7,0 | 1,00 | 139,09 | 1 |
| M8,0 | 0,50 | 234,55 | 1 |
| M8,0 | 0,75 | 169,09 | 1 |
| M8,0 | 1,00 | 130,91 | 1 |
| M8,0 | 1,25 | 109,09 | 1 |
| M9,0 | 1,25 | 150,00 | 1 |
| M10,0 | 0,50 | 270,00 | 1 |
| M10,0 | 0,75 | 188,18 | 1 |
| M10,0 | 1,00 | 144,55 | 1 |
| M10,0 | 1,25 | 177,27 | 1 |
| M10,0 | 1,50 | 122,73 | 1 |
| M12,0 | 0,50 | 308,18 | 1 |
| M12,0 | 0,75 | 223,64 | 1 |
| M12,0 | 1,00 | 163,64 | 1 |
| M12,0 | 1,25 | 199,09 | 1 |
| M12,0 | 1,50 | 155,45 | 1 |
| M12,0 | 1,75 | 141,82 | 1 |
| M14,0 | 1,00 | 174,55 | 1 |
| M14,0 | 1,25 | 250,91 | 1 |
| M14,0 | 1,50 | 160,91 | 1 |
| M14,0 | 2,00 | 155,45 | 1 |
| M16,0 | 1,00 | 188,18 | 1 |

| Ø | P | € | |
|---|---|---|---|
| M16,0 | 1,50 | 174,55 | 1 |
| M16,0 | 2,00 | 169,09 | 1 |
| M18,0 | 1,00 | 201,82 | 1 |
| M18,0 | 1,50 | 188,18 | 1 |
| M18,0 | 2,50 | 193,64 | 1 |
| M20,0 | 1,00 | 215,45 | 1 |
| M20,0 | 1,50 | 201,82 | 1 |
| M20,0 | 2,00 | 215,45 | 1 |
| M20,0 | 2,50 | 215,45 | 1 |
| M22,0 | 1,00 | 264,55 | 1 |
| M22,0 | 1,50 | 215,45 | 1 |
| M22,0 | 2,50 | 231,82 | 1 |
| M24,0 | 1,00 | 250,91 | 1 |
| M24,0 | 1,50 | 234,55 | 1 |
| M24,0 | 2,00 | 242,73 | 1 |
| M24,0 | 3,00 | 245,45 | 1 |
| M25,0 | 1,00 | 294,55 | 1 |
| M25,0 | 1,50 | 240,00 | 1 |
| M25,0 | 2,00 | 242,73 | 1 |
| M27,0 | 1,00 | 316,36 | 1 |
| M27,0 | 1,50 | 250,91 | 1 |
| M27,0 | 2,00 | 264,55 | 1 |
| M27,0 | 3,00 | 272,73 | 1 |
| M30,0 | 1,00 | 300,00 | 1 |
| M30,0 | 1,50 | 270,00 | 1 |
| M30,0 | 2,00 | 270,00 | 1 |
| M30,0 | 3,00 | 302,73 | 1 |
| M30,0 | 3,50 | 300,00 | 1 |
| M32,0 | 1,00 | 321,82 | 1 |
| M32,0 | 1,50 | 289,09 | 1 |
| M32,0 | 2,00 | 289,09 | 1 |
| M33,0 | 1,00 | 330,00 | 1 |
| M33,0 | 1,50 | 294,55 | 1 |
| M33,0 | 2,00 | 300,00 | 1 |

| Ø | P | € | |
|---|---|---|---|
| M33,0 | 3,00 | 319,09 | 1 |
| M33,0 | 3,50 | 324,55 | 1 |
| M36,0 | 1,00 | 354,55 | 1 |
| M36,0 | 1,50 | 313,64 | 1 |
| M36,0 | 2,00 | 330,00 | 1 |
| M36,0 | 3,00 | 349,09 | 1 |
| M36,0 | 4,00 | 349,09 | 1 |
| M39,0 | 1,50 | 346,36 | 1 |
| M39,0 | 2,00 | 360,00 | 1 |
| M39,0 | 3,00 | 373,64 | 1 |
| M39,0 | 4,00 | 379,09 | 1 |
| M40,0 | 1,50 | 346,36 | 1 |
| M40,0 | 2,00 | 368,18 | 1 |
| M40,0 | 3,00 | 384,55 | 1 |
| M42,0 | 1,50 | 360,00 | 1 |
| M42,0 | 2,00 | 300,00 | 1 |
| M42,0 | 3,00 | 395,45 | 1 |
| M42,0 | 4,50 | 411,82 | 1 |
| M45,0 | 1,50 | 379,09 | 1 |
| M45,0 | 2,00 | 308,18 | 1 |
| M45,0 | 3,00 | 400,91 | 1 |
| M45,0 | 4,50 | 436,36 | 1 |
| M48,0 | 1,50 | 400,91 | 1 |
| M48,0 | 2,00 | 313,64 | 1 |
| M48,0 | 3,00 | 414,55 | 1 |
| M48,0 | 5,00 | 460,91 | 1 |
| M50,0 | 1,50 | 414,55 | 1 |
| M50,0 | 2,00 | 327,27 | 1 |
| M50,0 | 3,00 | 425,45 | 1 |
| M52,0 | 1,50 | 436,36 | 1 |
| M52,0 | 2,00 | 335,45 | 1 |
| M52,0 | 3,00 | 463,64 | 1 |
| M52,0 | 5,00 | 496,36 | 1 |

## 2902/1 ISO 228-2

PASA NO PASA | CTPNP | G ISO 228

| Ø | P | € | |
|---|---|---|---|
| 1/8 | 28,00 | *160,91* | 1 |
| 1/4 | 19,00 | *171,82* | 1 |
| 3/8 | 19,00 | *199,09* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1/2 | 14,00 | *226,36* | 1 |
| 5/8 | 14,00 | *240,00* | 1 |
| 3/4 | 14,00 | *261,82* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 14,00 | *291,82* | 1 |
| 1" | 11,00 | *308,18* | 1 |
| 1"1/8 | 7,00 | *349,09* | 1 |

## 2902/4 ISO 228-2

PASA | CTP | G ISO 228

| Ø | P | € | |
|---|---|---|---|
| 1"1/4 | 11,00 | *215,45* | 1 |
| 1"1/2 | 11,00 | *250,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1"3/4 | 11,00 | *283,64* | 1 |
| 2" | 11,00 | *310,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 2"1/4 | 11,00 | *338,18* | 1 |
| 2"1/2 | 11,00 | *390,00* | 1 |

## 2902/5 ISO 228-2

NO PASA | CTNP | G ISO 228

| Ø | P | € | |
|---|---|---|---|
| 1"1/4 | 11,00 | *215,45* | 1 |
| 1"1/2 | 11,00 | *250,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1"3/4 | 11,00 | *283,64* | 1 |
| 2" | 11,00 | *310,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 2"1/4 | 11,00 | *338,18* | 1 |
| 2"1/2 | 11,00 | *390,00* | 1 |

## 2902/2 DIN ISO 228-2

PASA | CAP | Tol. A | G ISO 228

| Ø | P | € | |
|---|---|---|---|
| 1/8 | 28,00 | *177,27* | 1 |
| 1/4 | 19,00 | *207,27* | 1 |
| 3/8 | 19,00 | *248,18* | 1 |
| 1/2 | 14,00 | *240,00* | 1 |
| 5/8 | 14,00 | *259,09* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/4 | 14,00 | *275,45* | 1 |
| 7/8 | 14,00 | *310,91* | 1 |
| 1" | 11,00 | *340,91* | 1 |
| 1"1/8 | 11,00 | *387,27* | 1 |
| 1"1/4 | 11,00 | *422,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1"1/2 | 11,00 | *474,55* | 1 |
| 1"3/4 | 11,00 | *523,64* | 1 |
| 2" | 11,00 | *578,18* | 1 |
| 2"1/4 | 11,00 | *624,55* | 1 |
| 2"1/2 | 11,00 | *709,09* | 1 |

## 2902/3 DIN ISO 228-2

NO PASA | CANP | Tol. A | G ISO 228

| Ø | P | € | |
|---|---|---|---|
| 1/8 | 28,00 | *177,27* | 1 |
| 1/4 | 19,00 | *207,27* | 1 |
| 3/8 | 19,00 | *248,18* | 1 |
| 1/2 | 14,00 | *240,00* | 1 |
| 5/8 | 14,00 | *259,09* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/4 | 14,00 | *275,45* | 1 |
| 7/8 | 14,00 | *310,91* | 1 |
| 1" | 11,00 | *340,91* | 1 |
| 1"1/8 | 11,00 | *387,27* | 1 |
| 1"1/4 | 11,00 | *422,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1"1/2 | 11,00 | *474,55* | 1 |
| 1"3/4 | 11,00 | *523,64* | 1 |
| 2" | 11,00 | *578,18* | 1 |
| 2"1/4 | 11,00 | *624,55* | 1 |
| 2"1/2 | 11,00 | *709,09* | 1 |

## 2903/1 BS 919

PASA NO PASA | CTPNP | BSW BS 84

| Ø | P | € | |
|---|---|---|---|
| 1/8 | 40,00 | *240,00* | 1 |
| 1/4 | 20,00 | *210,00* | 1 |
| 3/8 | 16,00 | *220,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1/2 | 12,00 | *240,00* | 1 |
| 5/8 | 11,00 | *270,00* | 1 |
| 3/4 | 10,00 | *310,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 9,00 | *346,36* | 1 |
| 1 | 8,00 | *398,18* | 1 |

## 2903/2 BS 919

PASA | CAP | BSW BS 84

| Ø | P | € | |
|---|---|---|---|
| 1/8 | 40,00 | *199,09* | 1 |
| 1/4 | 20,00 | *169,09* | 1 |
| 3/8 | 16,00 | *190,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1/2 | 12,00 | *212,73* | 1 |
| 5/8 | 11,00 | *248,18* | 1 |
| 3/4 | 10,00 | *289,09* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 9,00 | *330,00* | 1 |
| 1 | 8,00 | *368,18* | 1 |

## 2903/3 BS 919

NO PASA | CANP | BSW BS 84

| Ø | P | € | |
|---|---|---|---|
| 1/8 | 40,00 | *199,09* | 1 |
| 1/4 | 20,00 | *169,09* | 1 |
| 3/8 | 16,00 | *190,91* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 1/2 | 12,00 | *212,73* | 1 |
| 5/8 | 11,00 | *248,18* | 1 |
| 3/4 | 10,00 | *289,09* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 9,00 | *330,00* | 1 |
| 1 | 8,00 | *368,18* | 1 |

## 2904/1 ANSI / ASME B1.2

PASA NO PASA | CTPNP | UNC ANSI/ASME B1.1 | Tol. 2B

| Ø | P | € | |
|---|---|---|---|
| N°4 | 40,00 | *245,45* | 1 |
| N°5 | 40,00 | *259,09* | 1 |
| N°6 | 32,00 | *155,45* | 1 |
| N°8 | 32,00 | *150,00* | 1 |
| N°10 | 24,00 | *147,27* | 1 |
| N°12 | 24,00 | *141,82* | 1 |
| 1/4 | 20,00 | *141,82* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 5/16 | 18,00 | *147,27* | 1 |
| 3/8 | 16,00 | *147,27* | 1 |
| 7/16 | 14,00 | *155,45* | 1 |
| 1/2 | 13,00 | *166,36* | 1 |
| 9/16 | 12,00 | *171,82* | 1 |
| 5/8 | 11,00 | *185,45* | 1 |
| 3/4 | 10,00 | *207,27* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 9,00 | *234,55* | 1 |
| 1 | 8,00 | *261,82* | 1 |
| 1,1/8 | 7,00 | *289,09* | 1 |
| 1,1/4 | 7,00 | *313,64* | 1 |
| 1"3/8 | 6,00 | *338,18* | 1 |
| 1"1/2 | 6,00 | *373,64* | 1 |

## 2904/2 ANSI / ASME B1.2

PASA | CAP | UNC ANSI/ASME B1.1 | Tol. 2A

| Ø | P | € | |
|---|---|---|---|
| N°4 | 40,00 | *226,36* | 1 |
| N°5 | 40,00 | *169,09* | 1 |
| N°6 | 32,00 | *166,36* | 1 |
| N°8 | 32,00 | *155,45* | 1 |
| N°10 | 24,00 | *150,00* | 1 |
| N°12 | 24,00 | *144,55* | 1 |
| 1/4 | 20,00 | *144,55* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 5/16 | 18,00 | *155,45* | 1 |
| 3/8 | 16,00 | *166,36* | 1 |
| 7/16 | 14,00 | *177,27* | 1 |
| 1/2 | 13,00 | *199,09* | 1 |
| 9/16 | 12,00 | *220,91* | 1 |
| 5/8 | 11,00 | *240,00* | 1 |
| 3/4 | 10,00 | *272,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 9,00 | *316,36* | 1 |
| 1 | 8,00 | *354,55* | 1 |
| 1,1/8 | 7,00 | *392,73* | 1 |
| 1,1/4 | 7,00 | *450,00* | 1 |
| 1"3/8 | 6,00 | *496,36* | 1 |
| 1"1/2 | 6,00 | *529,09* | 1 |

## 2904/3 ANSI / ASME B1.2

NO PASA | CANP | UNC ANSI/ASME B1.1 | Tol. 2A

| Ø | P | € | |
|---|---|---|---|
| N°4 | 40,00 | *226,36* | 1 |
| N°5 | 40,00 | *169,09* | 1 |
| N°6 | 32,00 | *166,36* | 1 |
| N°8 | 32,00 | *155,45* | 1 |
| N°10 | 24,00 | *150,00* | 1 |
| N°12 | 24,00 | *144,55* | 1 |
| 1/4 | 20,00 | *144,55* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 5/16 | 18,00 | *155,45* | 1 |
| 3/8 | 16,00 | *166,36* | 1 |
| 7/16 | 14,00 | *177,27* | 1 |
| 1/2 | 13,00 | *199,09* | 1 |
| 9/16 | 12,00 | *220,91* | 1 |
| 5/8 | 11,00 | *240,00* | 1 |
| 3/4 | 10,00 | *272,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 9,00 | *316,36* | 1 |
| 1 | 8,00 | *354,55* | 1 |
| 1,1/8 | 7,00 | *392,73* | 1 |
| 1,1/4 | 7,00 | *450,00* | 1 |
| 1"3/8 | 7,00 | *496,36* | 1 |
| 1"1/2 | 7,00 | *529,09* | 1 |

## 2905/1 ANSI / ASME B1.2

PASA NO PASA | CTPNP | UNF ANSI/ASME B1.1 | Tol. 2B

| Ø | P | € | |
|---|---|---|---|
| Nº4 | 48,00 | *245,45* | 1 |
| Nº5 | 44,00 | *160,91* | 1 |
| Nº6 | 40,00 | *155,45* | 1 |
| Nº8 | 36,00 | *150,00* | 1 |
| Nº10 | 32,00 | *147,27* | 1 |
| Nº12 | 28,00 | *165,79* | 1 |
| 1/4 | 28,00 | *141,82* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/8 | 24,00 | *147,27* | 1 |
| 5/16 | 24,00 | *147,27* | 1 |
| 1/2 | 20,00 | *166,36* | 1 |
| 7/16 | 20,00 | *155,45* | 1 |
| 5/8 | 18,00 | *177,27* | 1 |
| 9/16 | 18,00 | *171,82* | 1 |
| 3/4 | 16,00 | *196,36* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 14,00 | *215,45* | 1 |
| 1" | 12,00 | *240,00* | 1 |
| 1"1/8 | 12,00 | *261,82* | 1 |
| 1"1/4 | 12,00 | *275,45* | 1 |
| 1"3/8 | 8,00 | *300,00* | 1 |
| 1"1/2 | 12,00 | *330,00* | 1 |

## 2905/2 ANSI / ASME B1.2

PASA | CAP | UNF ANSI/ASME B1.1 | Tol. 2A

| Ø | P | € | |
|---|---|---|---|
| Nº4 | 48,00 | *223,64* | 1 |
| Nº5 | 44,00 | *169,09* | 1 |
| Nº6 | 40,00 | *166,36* | 1 |
| Nº8 | 36,00 | *155,45* | 1 |
| Nº10 | 32,00 | *150,00* | 1 |
| Nº12 | 28,00 | *150,00* | 1 |
| 1/4 | 28,00 | *144,55* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/8 | 24,00 | *166,36* | 1 |
| 5/16 | 24,00 | *155,45* | 1 |
| 1/2 | 20,00 | *199,09* | 1 |
| 7/16 | 20,00 | *177,27* | 1 |
| 5/8 | 18,00 | *240,00* | 1 |
| 9/16 | 18,00 | *220,91* | 1 |
| 3/4 | 16,00 | *272,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 14,00 | *316,36* | 1 |
| 1" | 12,00 | *354,55* | 1 |
| 1"1/8 | 12,00 | *414,55* | 1 |
| 1"1/4 | 12,00 | *450,00* | 1 |
| 1"3/8 | 8,00 | *496,36* | 1 |
| 1"1/2 | 12,00 | *529,09* | 1 |

## 2905/3 ANSI / ASME B1.2

NO PASA | CANP | UNF ANSI/ASME B1.1 | Tol. 2A

| Ø | P | € | |
|---|---|---|---|
| Nº4 | 48,00 | *223,64* | 1 |
| Nº5 | 44,00 | *169,09* | 1 |
| Nº6 | 40,00 | *166,36* | 1 |
| Nº8 | 36,00 | *155,45* | 1 |
| Nº10 | 32,00 | *150,00* | 1 |
| Nº12 | 28,00 | *150,00* | 1 |
| 1/4 | 28,00 | *144,55* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/8 | 24,00 | *166,36* | 1 |
| 5/16 | 24,00 | *155,45* | 1 |
| 1/2 | 20,00 | *199,09* | 1 |
| 7/16 | 20,00 | *177,27* | 1 |
| 5/8 | 18,00 | *240,00* | 1 |
| 9/16 | 18,00 | *220,91* | 1 |
| 3/4 | 16,00 | *272,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 7/8 | 14,00 | *316,36* | 1 |
| 1" | 12,00 | *354,55* | 1 |
| 1"1/8 | 12,00 | *414,55* | 1 |
| 1"1/4 | 12,00 | *450,00* | 1 |
| 1"3/8 | 8,00 | *496,36* | 1 |
| 1"1/2 | 12,00 | *529,09* | 1 |

## 2906/1 ANSI / ASME B1.20.1

PASA NO PASA | CTPNP | NPT ANSI/ASME B1.1

| Ø | P | € | |
|---|---|---|---|
| 1/16 | 27,00 | *313,64* | 1 |
| 1/8 | 27,00 | *343,64* | 1 |
| 1/4 | 18,00 | *362,73* | 1 |
| 3/8 | 18,00 | *390,00* | 1 |
| 1/2 | 14,00 | *422,73* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/4 | 14,00 | *471,82* | 1 |
| 1 | 11,50 | *542,73* | 1 |
| 1"1/4 | 11,50 | *646,36* | 1 |
| 1"1/2 | 11,50 | *722,73* | 1 |
| 2" | 11,50 | *938,57* | 1 |

## 2906/2 ANSI / ASME B1.20.1

PASA NO PASA | CAPNP | NPT ANSI/ASME B1.1

| Ø | P | € | |
|---|---|---|---|
| 1/16 | 27,00 | *544,17* | 1 |
| 1/8 | 27,00 | *572,73* | 1 |
| 1/4 | 18,00 | *600,00* | 1 |
| 3/8 | 18,00 | *570,00* | 1 |
| 1/2 | 14,00 | *616,36* | 1 |

| Ø | P | € | |
|---|---|---|---|
| 3/4 | 14,00 | *673,64* | 1 |
| 1 | 11,50 | *758,18* | 1 |
| 1"1/4 | 11,50 | *886,36* | 1 |
| 1"1/2 | 11,50 | *979,09* | 1 |
| 2" | 11,50 | *1.189,09* | 1 |

## 2907/1 DIN 7162

PASA NO PASA | H7 | CTLPNP

| ø | € | |
|---|---|---|
| 1 | 73,64 | 1 |
| 2 | 81,82 | 1 |
| 3 | 81,82 | 1 |
| 4 | 73,64 | 1 |
| 5 | 73,64 | 1 |
| 6 | 73,64 | 1 |
| 7 | 68,18 | 1 |
| 8 | 68,18 | 1 |
| 9 | 68,18 | 1 |
| 10 | 68,18 | 1 |
| 11 | 79,09 | 1 |
| 12 | 79,09 | 1 |
| 13 | 79,09 | 1 |
| 14 | 79,09 | 1 |
| 15 | 84,55 | 1 |
| 16 | 84,55 | 1 |
| 17 | 84,55 | 1 |
| 18 | 84,55 | 1 |

| ø | € | |
|---|---|---|
| 19 | 95,45 | 1 |
| 20 | 95,45 | 1 |
| 21 | 95,45 | 1 |
| 22 | 95,45 | 1 |
| 23 | 100,91 | 1 |
| 24 | 100,91 | 1 |
| 25 | 100,91 | 1 |
| 26 | 100,91 | 1 |
| 27 | 100,91 | 1 |
| 28 | 111,82 | 1 |
| 30 | 111,82 | 1 |
| 32 | 111,82 | 1 |
| 33 | 125,45 | 1 |
| 34 | 125,45 | 1 |
| 35 | 125,45 | 1 |
| 36 | 125,45 | 1 |
| 37 | 125,45 | 1 |
| 38 | 125,45 | 1 |

| ø | € | |
|---|---|---|
| 40 | 133,64 | 1 |
| 42 | 133,64 | 1 |
| 44 | 150,00 | 1 |
| 45 | 150,00 | 1 |
| 46 | 150,00 | 1 |
| 47 | 150,00 | 1 |
| 48 | 150,00 | 1 |
| 50 | 185,45 | 1 |
| 52 | 185,45 | 1 |
| 55 | 185,45 | 1 |
| 58 | 226,36 | 1 |
| 60 | 226,36 | 1 |
| 62 | 226,36 | 1 |
| 65 | 242,73 | 1 |
| 68 | 242,73 | 1 |
| 70 | 242,73 | 1 |

## 2907/4 DIN 7162

PASA | H7 | CTLP

| ø | € | |
|---|---|---|
| 72 | 160,91 | 1 |
| 75 | 160,91 | 1 |
| 78 | 177,27 | 1 |
| 80 | 177,27 | 1 |

## 2907/5 DIN 7162

NO PASA | H7 | CTLNP

| Ø | € | |
|---|---|---|
| 72 | *160,91* | 1 |
| 75 | *160,91* | 1 |
| 78 | *177,27* | 1 |
| 80 | *177,27* | 1 |

## 2907/2 DIN 2250-C

CAL

| Ø | € | |
|---|---|---|
| 4 | *250,91* | 1 |
| 5 | *250,91* | 1 |
| 6 | *201,82* | 1 |
| 7 | *201,82* | 1 |
| 8 | *201,82* | 1 |
| 9 | *201,82* | 1 |
| 10 | *201,82* | 1 |
| 11 | *207,27* | 1 |
| 12 | *207,27* | 1 |
| 13 | *207,27* | 1 |
| 14 | *207,27* | 1 |
| 15 | *226,36* | 1 |
| 16 | *226,36* | 1 |
| 17 | *226,36* | 1 |
| 18 | *226,36* | 1 |
| 19 | *234,55* | 1 |
| 20 | *234,55* | 1 |
| 21 | *234,55* | 1 |
| 22 | *234,55* | 1 |

| Ø | € | |
|---|---|---|
| 23 | *248,18* | 1 |
| 24 | *248,18* | 1 |
| 25 | *248,18* | 1 |
| 26 | *248,18* | 1 |
| 27 | *248,18* | 1 |
| 28 | *261,82* | 1 |
| 30 | *261,82* | 1 |
| 32 | *261,82* | 1 |
| 33 | *283,64* | 1 |
| 34 | *283,64* | 1 |
| 35 | *283,64* | 1 |
| 36 | *283,64* | 1 |
| 37 | *283,64* | 1 |
| 38 | *283,64* | 1 |
| 40 | *308,18* | 1 |
| 42 | *308,18* | 1 |
| 44 | *321,82* | 1 |
| 45 | *321,82* | 1 |
| 46 | *321,82* | 1 |

| Ø | € | |
|---|---|---|
| 47 | *321,82* | 1 |
| 48 | *321,82* | 1 |
| 50 | *340,91* | 1 |
| 52 | *340,91* | 1 |
| 55 | *340,91* | 1 |
| 58 | *360,00* | 1 |
| 60 | *360,00* | 1 |
| 62 | *360,00* | 1 |
| 65 | *379,09* | 1 |
| 68 | *379,09* | 1 |
| 70 | *379,09* | 1 |
| 72 | *403,64* | 1 |
| 75 | *403,64* | 1 |
| 78 | *441,82* | 1 |
| 80 | *441,82* | 1 |
| 82 | *441,82* | 1 |
| 85 | *488,18* | 1 |
| 90 | *488,18* | 1 |

## 2801 Giramachos / Tourne-à-gauche / Tap turners

| Ø | Nº | € | mm | |
|---|---|---|---|---|
| M1 - M12 | 1 | 17,78 | 2,00 - 6,30 | 1 |
| M4 - M12 | 2 | 23,76 | 3,00 - 9,00 | 1 |
| M5 - M20 | 3 | 33,81 | 4,90 - 12,00 | 1 |
| M10 - M27 | 4 | 53,94 | 5,50- 16,00 | 1 |

| Ø | Nº | € | mm | |
|---|---|---|---|---|
| M13 - M32 | 5 | 113,38 | 7,00 - 20,00 | 1 |
| M18 - M42 | 6 | 113,38 | 11,00 - 24,00 | 1 |
| M25 - M52 | 7 | 196,58 | 16,00 - 32,00 | 1 |
| M45 - M60 | 8 | 284,10 | 25,00- 36,00 | 1 |

## 2802 Volvedor / Porte-filières / Tap wrench

| Ø Ext. | H mm | € | |
|---|---|---|---|
| 16,00 | 5,00 | *9,86* | 1 |
| 20,00 | 5,00 | *10,08* | 1 |
| 20,00 | 7,00 | *10,10* | 1 |
| 20,60 | 6,35 | *10,08* | 1 |
| 25,00 | 9,00 | *11,99* | 1 |
| 25,40 | 9,50 | *11,99* | 1 |
| 30,00 | 11,00 | *13,51* | 1 |
| 38,00 | 14,00 | *17,81* | 1 |
| 38,10 | 12,70 | *17,81* | 1 |
| 45,00 | 14,00 | *22,13* | 1 |
| 45,00 | 18,00 | *22,13* | 1 |

| Ø Ext. | H mm | € | |
|---|---|---|---|
| 50,80 | 15,90 | *28,97* | 1 |
| 55,00 | 16,00 | *28,97* | 1 |
| 55,00 | 22,00 | *28,97* | 1 |
| 65,00 | 18,00 | *44,50* | 1 |
| 65,00 | 25,00 | *44,50* | 1 |
| 75,00 | 20,00 | *71,18* | 1 |
| 75,00 | 30,00 | *71,17* | 1 |
| 90,00 | 22,00 | *90,15* | 1 |
| 90,00 | 36,00 | *90,16* | 1 |
| 105,00 | 22,00 | *96,26* | 1 |
| 105,00 | 36,00 | *96,27* | 1 |

## 2803 Giramacho T / Tourne-à-gauche en T / Tap turner in T

| M DIN | M ISO | € | L mm | gr | mm | |
|---|---|---|---|---|---|---|
| M3 - 10 | M3 - 6 | *20,58* | 85 | 180 | 2,60 - 5,50 | 1 |
| M5 - 12 | M6 - 12 | *26,85* | 110 | 300 | 4,60 - 8,00 | 1 |
| M13- 20 | M14 - 20 | *104,10* | 117 | 400 | 9,00 - 12,50 | 1 |

## 2804 Giramacho T / Tourne-à-gauche en T / Tap turner in T

| M DIN | M ISO | € | L mm | gr | ⊠ mm | ▣ |
|---|---|---|---|---|---|---|
| M3-10 | M3-6 | *32,95* | 250 | 250 | 2,60 - 5,50 | 1 |
| M5-12 | M6-12 | *39,27* | 300 | 440 | 4,60 - 8,00 | 1 |

## 2805 Extractor / Extracteur

| M | Z | € | ▣ |
|---|---|---|---|
| M3 | 3 | *33,30* | 1 |
| M4 | 3 | *33,30* | 1 |
| M5 | 3 | *33,30* | 1 |
| M6 | 3 | *34,14* | 1 |
| M8 | 4,3 | *35,98* | 1 |

| M | Z | € | ▣ |
|---|---|---|---|
| M10 | 4,3 | *37,33* | 1 |
| M12 | 4,3 | *40,20* | 1 |
| M14 | 4,3 | *55,37* | 1 |
| M16 | 4,3 | *60,38* | 1 |

## 2808 Alargador / Adaptateur / Extension piece

| ⊠ mm | € | L mm | ▣ |
|---|---|---|---|
| 2,10 | *6,45* | 60 | 1 |
| 2,40 | *6,45* | 60 | 1 |
| 2,70 | *6,45* | 80 | 1 |
| 3,00 | *6,45* | 90 | 1 |
| 3,40 | *10,10* | 95 | 1 |
| 3,80 | *10,58* | 95 | 1 |
| 4,30 | *11,28* | 110 | 1 |
| 4,90 | *11,77* | 110 | 1 |
| 5,50 | *12,33* | 115 | 1 |
| 6,20 | *15,90* | 120 | 1 |
| 7,00 | *16,57* | 125 | 1 |

| ⊠ mm | € | L mm | ▣ |
|---|---|---|---|
| 8,00 | *18,78* | 130 | 1 |
| 9,00 | *22,21* | 130 | 1 |
| 10,00 | *26,83* | 130 | 1 |
| 11,00 | *31,09* | 150 | 1 |
| 12,00 | *33,51* | 155 | 1 |
| 13,00 | *46,29* | 155 | 1 |
| 14,50 | *53,16* | 175 | 1 |
| 16,00 | *56,22* | 180 | 1 |
| 18,00 | *64,09* | 200 | 1 |
| 20,00 | *85,42* | 220 | 1 |

## 2834 Extractor / Extracteur

| M | ø mm | € | L mm | mm | |
|---|---|---|---|---|---|
| M3 - 6 | 1,80 - 7,00 | *2,23* | 50 | 2,70 | 1 |
| M6 - 8 | 3,20 - 10,00 | *2,23* | 57 | 3,80 | 1 |
| M8 - 11 | 4,50 - 13,00 | *2,64* | 64 | 4,90 | 1 |
| M11 - 14 | 6,50 - 16,00 | *3,26* | 71 | 7,00 | 1 |
| M14 - 18 | 8,50 - 21,00 | *4,22* | 79 | 9,00 | 1 |
| M18 - 24 | 12,00 | *6,79* | 85 | 12,00 | 1 |
| M24 - 33 | 15,30 | *10,43* | 92 | 14,50 | 1 |
| M33 - 45 | 20,00 | *15,25* | 100 | 18,00 | 1 |

**JUEGOS** / JEUX / SETS

| M | Pcs. | € | |
|---|---|---|---|
| M3 - 18 | 5 | *16,76* | 1 |
| M3 - 24 | 6 | *23,66* | 1 |
| M3 - 45 | 8 | *49,57* | 1 |

## 2846 Aceite de corte uso general / Huile de coupe usage général / Cutting oil for general uses

| **Envase /Emballage/ Packaging** | Litr. | € | |
|---|---|---|---|
| **Aerosol /Pulvérisateur/ Spray** | 400 ml | *19,04* | 1 |
| **Granel /Vrac/ Bulk** | 1 l. | *25,76* | 1 |
| **Granel /Vrac/ Bulk** | 5 l. | *93,48* | 1 |

## 2821 Macho Nº3 / Taraud / Tap

M
DIN 13

HSS

HSSCO

HSSCO INOX

| | Machos<br>Tarauds / Taps | Brocas<br>Forets / Drill-bits | Giramachos nº<br>Tourne-à-gauche nº<br>Tap turner nº | € |
|---|---|---|---|---|
| HSS | M3-4-5-6-8-10-12 | 2,50-3,30-4,20-5,00-6,80-8,50-10,20 | 1,50 | *90,24* |
| HSSCO | M3-4-5-6-8-10-12 | 2,50-3,30-4,20-5,00-6,80-8,50-10,20 | 1,50 | *154,36* |
| HSSCO INOX | M3-4-5-6-8-10-12 | 2,50-3,30-4,20-5,00-6,80-8,50-10,20 | 1,50 | *156,15* |

## 2822/2840 Juegos de machos / Jeux de taraud / Tap set

M
DIN 13

>2822

>2840

| Ref. | Machos<br>Tarauds / Taps | Brocas<br>Forets / Drill-bits | € |
|---|---|---|---|
| 2822 | M3-4-5-6-8-10-12 | - | *137,20* |
| 2840 | M3-4-5-6-8-10-12 | 2,50-3,30-4,20-5,00-6,80-8,50-10,20 | *200,28* |

## 2824 M3-12

| Form. B "Gun" | M 3-4-5-6-8-10-12 | 7 |
|---|---|---|

›HSS E ›HSSE-PM ›HSSE VAP ›HSSE TIN

| REF. | € |
|---|---|
| HSS E | *134,80* |
| HSSE-PM | *209,93* |
| HSSE VAP | *124,12* |
| HSSE TIN | *185,20* |

## 2825 M3-12

| M 3-4-5-6-8-10-12 | 7 |
|---|---|

›HSS E ›HSSE-PM ›HSSE VAP ›HSSE TIN

| REF. | € |
|---|---|
| HSS E | *139,50* |
| HSSE-PM | *229,27* |
| HSSE VAP | *150,38* |
| HSSE TIN | *194,68* |

## 2850 M3-12

| Form B | M 3-4-5-6-8-10-12 | Ø 2,5-3,3-4,2-5-6, 8-8,5-10,2 | 14 |
|---|---|---|---|

›HSSE + HSSCO ›HSSEVAP + HSSCO

| REF. | € |
|---|---|
| HSSE+HSSCO | *166,99* |
| HSSEVAP(INOX)+HSSCO | *202,38* |

## 2851 M3-12

| M 3-4-5-6-8-10-12 | Ø 2,5-3,3-4,2-5-6, 8-8,5-10,2 | 14 |
|---|---|---|

›HSSE + HSSCO ›HSSEVAP + HSSCO

| REF. | € |
|---|---|
| HSSE+HSSCO | *171,70* |
| HSSEVAP(INOX)+HSSCO | *221,33* |

## 2809/2810 M3-12 — M DIN 13

›2809

›2810

| Ref. | **Machos y cojinetes** Tarauds et filières Taps and bearing | **Brocas** Forets/Drill-bits | **Volvedores** Porte-filières Tap wrench | **Giramachos nº** Tourne-à-gauche nº Tap turner nº | **Carraca nº** Cliquet nº Ratchet nº | € |
|---|---|---|---|---|---|---|
| 2809 | M3-4-5-6-8-10-12 | 2,50-3,30-4,20-5,00-6,80-8,50-10,20 | 20x5-20x7-25x9-30x11-38x40 | 1-2 | - | *338,85* |
| 2810 | M3-4-5-6-8-10-12 | - | 25x9 | 1-1/2 | 1 | *231,54* |

## 2811/2812 M3-20 / M5-20 — M DIN 13

›2811/2812

| Ref. | **Machos y cojinetes** Tarauds et filières Taps and bearing | **Volvedores** Porte-filières Tap wrench | **Giramachos nº** Tourne-à-gauche nº Tap turner nº | **Carraca nº** Cliquet nº Ratchet nº | € |
|---|---|---|---|---|---|
| 2811 | M3-4-5-6-8-10-12-14-16-18-20 | 20x5-20x7-25x9-30x11-38x14-45x18 | 1 - 3 | 1 - 2 | *677,67* |
| 2812 | M5-6-8-10-12-14-16-18-20 | 20x7-25x9-30x11-38x14-45x18 | 1 - 3 | 1 - 2 | *643,80* |

## 2813/2814 M3-24 / M5-30 — M DIN 13

›2813/2814

| Ref. | **Machos y cojinetes**<br>Tarauds et filières<br>Taps and bearing | **Volvedores**<br>Porte-filières<br>Tap wrench | **Giramachos nº**<br>Tourne-à-gauche nº<br>Tap turner nº | € |
|---|---|---|---|---|
| 2813 | M3-4-5-6-8-10-12-14-16-18-20-22-24 | 20x5-20x7-25x9-30x11-38x14-45x18-55x22 | 1 - 4 | *1058,85* |
| 2814 | M5-6-8-10-12-14-16-18-20-22-24-27-30 | 20x7-25x9-30x11-38x14-45x18-55x22-65x25 | 3 - 5 | *1796,93* |

## 2841/2842 MF3-12 / MF6-20 — MF DIN 13

›2841

›2842

| Ref. | **Machos y cojinetes**<br>Tarauds et filières<br>Taps and bearing | **Volvedores**<br>Porte-filières<br>Tap wrench | **Giramachos nº**<br>Tourne-à-gauche nº<br>Tap turner nº | **Carraca nº**<br>Cliquet nº<br>Ratchet nº | € |
|---|---|---|---|---|---|
| 2841 | M3x0,35-4x0,50-5x0,50-6x0,75-8x0,75<br>8x1,00-10x1,00-12x1,50 | 20x5-25x9-30x11-38x10 | 1 - 2 | 1 | *695,32* |
| 2842 | M6x0,75-8x0,75-8x1,00-10x1,00-12x1,00-12x1,50<br>14x1,25-14x1,50-16x1,50-18x1,50-20x1,50 | 20x7-25x9-30x11-38x10-45x14 | 1 - 3 | 1 | *1166,52* |

## 2815/2816/2817 W1/8-1/2, W1/4-1/2, W1/4-1" BSW BS 84

>2815

>2816

>2817

| Ref. | **Machos y cojinetes** Tarauds et filières Taps and bearing | **Volvedores** Porte-filières Tap wrench | **Giramachos nº** Tourne-à-gauche nº Tap turner nº | **Carraca nº** Cliquet nº Ratchet nº | € |
|---|---|---|---|---|---|
| 2815 | W1/8-3/16-1/4-5/16-3/8-7/16-1/2 | 20x5-20x7-25x9-30x11-38x14 | 1 - 2 | 1 | *555,68* |
| 2816 | W1/4-5/16-3/8-7/16-1/2 | 20x7-25x9-30x11-38x14 | 1 - 2 | 1 | *470,98* |
| 2817 | W1/4-5/16-3/8-7/16-1/2-5/8-3/4-7/8-1" | 20x7-25x9-30x11-38x14-45x18-55x22 | 1 - 4 | - | *1298,87* |

## 2843/2818 UNC1/4", UNF1/4-1" UNC ANSI/ASME B1.1 UNF ANSI/ASME B1.1

>2843/2818

| Ref. | **Machos y cojinetes** Tarauds et filières Taps and bearing | **Volvedores** Porte-filières Tap wrench | **Giramachos nº** Tourne-à-gauche nº Tap turner nº | € |
|---|---|---|---|---|
| 2843 | UNC1/4-5/16-3/8-7/16-1/2-5/8-3/4-7/8-1" | 20x7-25x9-30x11-38x14-45x18-55x22 | 1 - 4 | *1870,87* |
| 2818 | UNF1/4-5/16-3/8-7/16-1/2-5/8-3/4-7/8-1" | 20x7-25x9-30x11-38x10-45x14-55x16 | 1 - 4 | *1185,90* |

# 2819/2820 BSP1/8-1", BSP1/4-1"1/2

G
ISO 228

>2819

>2820

| Ref. | **Machos y cojinetes**<br>Tarauds et filières<br>Taps and bearing | **Volvedores**<br>Porte-filières<br>Tap wrench | **Giramachos nº**<br>Tourne-à-gauche nº<br>Tap turner nº | € |
|---|---|---|---|---|
| 2819 | BSP1/8-1/4-3/8-1/2-3 4-1" | 30x11-38x10-45x14-65x18-55x18 | 1 - 3 - 5 | *914,84* |
| 2820 | BSP1/4-3/8-1/2-3/4-1"-1"1/4-1"1/2 | 38x10-45x14-65x18-75x20-90x22 | 2 - 4 - 7 | *2134,65* |

# Escariado
# Alésage
# Reaming

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Hepyc CUTTING TOOL EXPERTS

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**Escariadores de mano /** Alésoirs à main / Hand reamers

| | | | | | | | |
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| 4101 | HSS | DIN 206 | | Form. B · 8° · Tol. H7 · ISO 236 | P K N | 283 |
| 4102 | HSS | DIN 9 | | Form. B · 8° · 2% · ISO 3465 | P K N | 284 |
| 4119 | HSS | | | Form. B · 8° · C. 1:16 (NPT-BSPT) | P K N | 284 |

**Escariadores de máquina /** Alésoirs machine / Machine reamers

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4118 | HM-MD | DIN 212 | | Form. B-D · 8° · Tol. H7 · ISO 521 | P M K N S H | 285 |
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| 4105 | HSSCO | DIN 212 | | Form. E · 45° · Tol. H7 · ISO 521 | P N | 287 |
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**Escariadores de máquina entrada cónica /** Alésoirs machine pour goupilles coniques / Machine reamers for taper holes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4115 | HSSCO | DIN 212 | | 45° · 5% | P K N | 290 |
| 4116 | HSSCO | DIN 212 | | 45° · 8% | P K N | 290 |
| 4117 | HSSCO | DIN 212 | | 45° · 10% | P K N | 291 |

**Escariadores huecos /** Alésoirs creux finisseurs à machine / Hole machine reamers

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4109 | HSS | DIN 219 | | Form. B · 8° · Tol. H7 · ISO 2402 | P M K N S | 291 |
| 4114 | HSS | | | | | 292 |

**Escariadores extensibles /** Alésoirs extenseibles / Extendables reamers

| | | | | | | | |
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| 4110 | HSS | | | Form. A · REFORZ. RENFORC. RENFORC. | P K N | 292 |
| 4111 | HSS | | | Form. A | P K N | 293 |




P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# FORMULARIO ESCARIADORES / AVELLANADORES ESPECIALES
# FICHE TECNIQUE ALESOIRS ET FRAISES A TROU SPECIAUX
# TECHNICAL ENQUIRY FOR SPECIAL REAMERS AND COUNTERSINK CUTTERS

Fecha / Date: .....

Empresa / Entreprise / Company: ..... Contacto / Contact: .....

Dirección / Adresse / Adress: ..... Población / Ville / Town: .....

Tel / Fax: ..... E-mail: .....

.....

TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK

Material / Matière / Material ..... Norma / Norme / Norm: .....

Dureza / Dureté / Hardness ..... HB ..... HRc Resistencia / Résistance / Resistance ..... N/mm$^2$

Tipo viruta: ☐ Corta ☐ Larga ☐ Polvo
Type copeau Courte Longue Poussière
Shaving Short Long Powder

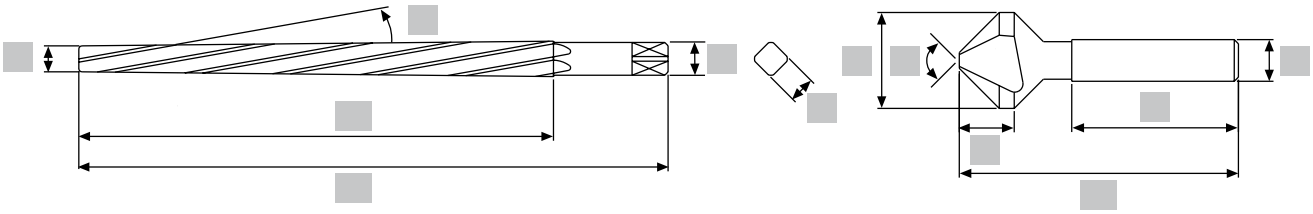
Máquina / Machine ..... Refrigerante / Réfrigérant / Coolant .....

Posición / Position ☐ Horizontal ☐ Vertical ☐ V. Corte ☐ V. avance
V. Coupe Avance
Cutting Speed Feed

HERRAMIENTA / OUTIL / TOOL

Descripción / Description ..... Tolerancia / Tolérance / Tolerance .....

Cantidad / Quantité / Quantity ..... Número ranuras / Rainures / Grooves .....



Mango: ☐ Cilíndrico ☐ Weldon ☐ Cónico ☐ Rebajado
Queue: Cylindrique Weldon Conique Réduite
Shank: Straight Weldon Taper Reduced

Material / Matière / Material: ☐ HSS ☐ HSSE ☐ HM ☐ HSS-HM

Superficie / Surface: ☐ Brillante ☐ Negra ☐ Recubrimiento
Brillant Noire Revêtement
Brilliant Black Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....

.....

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.....

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# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

Hepyc CUTTING TOOL EXPERTS

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

| | | |
|---|---|---|
| Ref./ Réf. / Ref. | 4118 | 4104 |
| Form. | B | B |
| Hel./Hél./Spiral | 8° | 8° |
| Mat. | HM | HSSCO |
| Rec./Rev./Coating | | |
| DIN | 212 | 212 |
| Tol. | H7 | H7 |
| Gama/Gamme/Range | 2-12 | 1-20 |
| Pag. | 285 | 286 |

| Mat. | | Avance/Feed (mm/rpm) Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Ø25 | Ø30 | Ø35 | Ø40 | Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Ø25 | Ø30 | Ø35 | Ø40 | Vc (m/min) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.1 | <600 | 0.05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | ● 14-18 | ● 10-14 |
| P.2 | <800 | 0.05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | ● 12-16 | ● 8-12 |
| P.3 | <1000 | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | ● 10-14 | ● 6-8 |
| P.4 | <1200 | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | 0,05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | ● 6-10 | ○ 4-6 |
| P.5 | <1400 | | | | | | | | | | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | ● 4-6 | |
| M.1 | <950 | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | ● 8-12 | ● 6-8 |
| M.2 | <950 | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | ● 8-12 | ● 6-8 |
| M.3 | <1200 | 0,02 | 0,05 | 0,1 | 0,12 | 0,16 | 0,2 | 0,23 | 0,25 | 0,27 | 0,02 | 0,05 | 0,1 | 0,12 | 0,16 | 0,2 | 0,23 | 0,25 | 0,27 | ● 6-10 | ○ 4-6 |
| M.4 | <1200 | 0,02 | 0,05 | 0,1 | 0,12 | 0,16 | 0,2 | 0,23 | 0,25 | 0,27 | 0,02 | 0,05 | 0,1 | 0,12 | 0,16 | 0,2 | 0,23 | 0,25 | 0,27 | ● 6-10 | ○ 4-6 |
| K.1 | <500 | 0.05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | ● 25-30 | ● 12-16 |
| K.2 | <500 | | | | | | | | | | | | | | | | | | | | |
| K.3 | <800 | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | ● 8-12 | ○ 6-8 |
| K.4.1 | <800 | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | ● 14-18 | ● 10-12 |
| K.4.2 | <1400 | | | | | | | | | | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | ● 6-10 | |
| N.1.1 | Al | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 30-35 | ● 20-25 |
| N.1.2 | Al | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 25-30 | ● 16-22 |
| N.1.3 | Al | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 20-30 | ● 14-20 |
| N.2.1 | Cu | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | ● 20-25 | ● 12-20 |
| N.2.2 | Cu | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 30-35 | ● 20-25 |
| N.2.3 | Cu | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | ● 20-25 | ● 16-22 |
| N.2.4 | Cu | | | | | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | 0,63 | 0,12 | 0,25 | 0,3 | 0,4 | 0,5 | 0,53 | 0,56 | 0,6 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 20-25 | ○ 12-16 |
| N.4.1 | Plastic | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 15-20 | ● 10-14 |
| N.4.2 | Plastic | 0,08 | 0,16 | 0,3 | 0,4 | 0,5 | 0,6 | 0,7 | 0,75 | 0,8 | 0,1 | 0,2 | 0,4 | 0,5 | 0,65 | 0,8 | 0,9 | 0,95 | 1 | ● 12-18 | ● 8-10 |
| N.4.3 | Plastic | | | | | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | 0,05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | ● 4-6 | ○ 1-3 |
| S.1.2 | Ni | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | ● 4-6 | ○ 1-3 |
| S.2.1 | Ti | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | 0,05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | ● 8-12 | ● 6-8 |
| S.2.2 | Ti | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | 0,05 | 0,1 | 0,2 | 0,26 | 0,33 | 0,4 | 0,45 | 0,5 | 0,55 | ● 6-10 | ○ 2-6 |
| S.2.3 | Ti | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | 0,04 | 0,08 | 0,16 | 0,2 | 0,25 | 0,32 | 0,36 | 0,4 | 0,43 | ● 6-10 | ○ 2-6 |
| H.1 | 50 HRC | | | | | | | | | | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | ● 3-4 | |
| H.2 | 55 HRC | | | | | | | | | | 0,03 | 0,06 | 0,12 | 0,16 | 0,2 | 0,25 | 0,28 | 0,32 | 0,35 | ● 3-4 | |
| H.3 | 60 HRC | | | | | | | | | | 0,02 | 0,05 | 0,1 | 0,12 | 0,16 | 0,2 | 0,23 | 0,25 | 0,27 | ○ 3-4 | |

● Optima / Optimun ○ Alternativo / Alternative

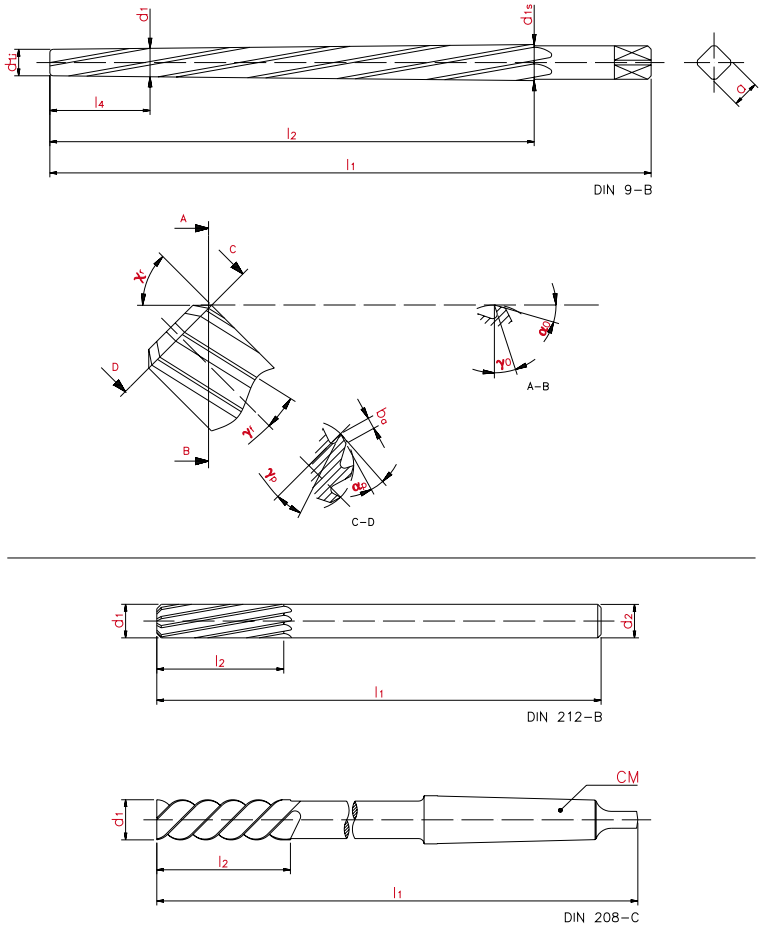
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

| 4105 | 4103 | 4106 | 4107 | 4108 | 4115 | 4116 | 4117 | 4109 |
|---|---|---|---|---|---|---|---|---|
| E | E | B | C | | | | | B |
| 45º | 45º | 8º | 45º | 25º | 45º | 46º | 47º | 8º |
| HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSSCO | HSS |
| | | | | | | | | |
| 212 | 2179 | 208 | 208 | 311 | 212 | 212 | 212 | 219 |
| H7 | | H7 | H7 | | | | | H7 |
| 3-16 | 3-10 | 4-40 | 5-29 | 10-37 | 3-7 | 3-6 | 2-6 | 32-80 |
| 287 | 288 | 288 | 289 | 289 | 290 | 290 | 291 | 291 |
| | | | | | | | | |
| ● 12-16 | ● 8-12 | ● 10-14 | ● 12-16 | ● 8-12 | ● 8-12 | ● 8-12 | ● 8-12 | ● 10-14 |
| ● 10-14 | ● 6-12 | ● 8-12 | ● 10-14 | ● 6-12 | ● 6-12 | ● 6-12 | ● 6-12 | ● 8-12 |
| | o 4-6 | ● 6-8 | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | o 6-8 |
| | | o 4-6 | | | | | | |
| | | | | | | | | |
| | o 4-6 | ● 6-8 | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | ● 6-8 |
| | o 4-6 | ● 6-8 | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | ● 6-8 |
| | | o 4-6 | | | | | | |
| | | o 4-6 | | | | | | |
| | ● 10-14 | ● 12-16 | | ● 10-14 | ● 10-14 | ● 10-14 | ● 10-14 | ● 10-14 |
| | | | | | | | | |
| | | o 6-8 | | | | | | o 6-8 |
| | ● 6-8 | ● 10-12 | | ● 6-8 | ● 6-8 | ● 6-8 | ● 6-8 | ● 10-12 |
| | | | | | | | | |
| ● 20-25 | ● 16-22 | ● 20-25 | ● 20-25 | ● 16-22 | ● 16-22 | ● 16-22 | ● 16-22 | ● 20-25 |
| ● 16-22 | ● 14-20 | ● 16-22 | ● 16-22 | ● 14-20 | ● 14-20 | ● 14-20 | ● 14-20 | ● 16-22 |
| ● 14-20 | ● 8-12 | ● 14-20 | ● 14-20 | ● 8-12 | ● 8-12 | ● 8-12 | ● 8-12 | ● 14-20 |
| | ● 10-16 | ● 12-20 | | ● 10-16 | ● 10-16 | ● 10-16 | ● 10-16 | ● 12-20 |
| | ● 16-22 | ● 20-25 | | ● 16-22 | ● 16-22 | ● 16-22 | ● 16-22 | ● 20-25 |
| ● 14-20 | ● 12-18 | ● 16-22 | ● 14-20 | ● 12-18 | ● 12-18 | ● 12-18 | ● 12-18 | ● 16-22 |
| | | | | | | | | |
| | | o 12-16 | | | | | | o 12-16 |
| ● 12-16 | ● 16-22 | ● 10-14 | ● 12-16 | ● 16-22 | ● 16-22 | ● 16-22 | ● 16-22 | ● 10-14 |
| ● 10-14 | ● 14-20 | ● 8-10 | ● 10-14 | ● 14-20 | ● 14-20 | ● 14-20 | ● 14-20 | ● 8-10 |
| | | | | | | | | |
| | | o 1-3 | | | | | | o 1-3 |
| | | o 1-3 | | | | | | |
| | o 4-6 | ● 6-8 | | o 4-6 | o 4-6 | o 4-6 | o 4-6 | ● 6-8 |
| | | o 2-6 | | | | | | o 2-6 |
| | | o 2-6 | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TERMINOLOGÍA
# TERMINOLOGIE / TERMINOLOGY



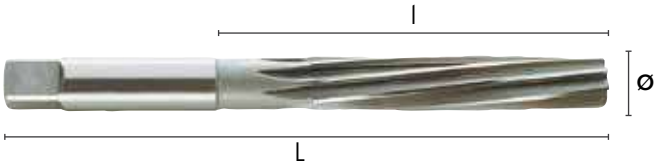

| | |
|---|---|
| **l1** | **Longitud total** / Longueur totale / Total length |
| **l2** | **Longitud de corte** / Longueur de coupe / Length of cut |
| **l4** | **Longitud hasta el diámetro nominal** / Longueur jusqu'au diamètre nominal / Length to the nominal diametre |
| **a** | **Cuadradillo** / Carré / Square |
| **ba** | **Ancho de fase** / Largeur de phase / Phase width |
| **d1** | **Diámetro nominal** / Diamètre nominal / Nominal diametre |
| **d1i** | **Diámetro inferior** / Diamètre inférieur / Inferior diametre |
| **d1s** | **Diámetro superior** / Diamètre supérieur / Superior diametre |
| **d2** | **Diámetro de mango** / Diamètre de queue / Shank diametre |
| **di** | **Diámetro interior** / Diamètre intérieur / Interior diametre |
| **CM** | **Tamaño del cono morse** / Taille du cône morse / Morse taper size |
| $\alpha$**0** | **Ángulo de destalonado** / Angle de détalonnage / Relief angle |
| $\alpha\pi$ | **Ángulo de destalonado del corte seco** / Angle de détalonnage de la coupe sèche / Dry cut relief angle |
| $\gamma$**0** | **Ángulo corte ortogonal** / Angle coupe orthogonale / Orthogonal cut angle |
| $\gamma\phi$ | **Ángulo de corte lateral** / Angle de coupe latérale / Lateral cut angle |
| $\gamma\pi$ | **Ángulo corte posterior** / Angle coupe postérieure / Rear cut angle |
| $\chi\rho$ | **Ángulo de posición** / Angle de position / Angle of position |

# 4101 HSS DIN ≃ 206

Form. B | 7° | Tol. H7 | ISO 236

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | ● | ● | | ● | ● | | ● | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,50 | *76,18* | 41 | 20 | 1 |
| 2,00 | *21,43* | 50 | 25 | 1 |
| 2,25 | *23,56* | 54 | 27 | 1 |
| 2,50 | *21,43* | 58 | 29 | 1 |
| 2,75 | *23,56* | 62 | 31 | 1 |
| 3,00 | *21,43* | 62 | 31 | 1 |
| 3,25 | *61,11* | 66 | 33 | 1 |
| 3,50 | *21,43* | 71 | 35 | 1 |
| 3,75 | *61,11* | 71 | 35 | 1 |
| 4,00 | *21,43* | 76 | 38 | 1 |
| 4,25 | *61,11* | 76 | 38 | 1 |
| 4,50 | *22,40* | 81 | 41 | 1 |
| 4,75 | *61,11* | 81 | 41 | 1 |
| 5,00 | *22,40* | 87 | 44 | 1 |
| 5,25 | *61,11* | 87 | 44 | 1 |
| 5,50 | *22,40* | 93 | 47 | 1 |
| 5,75 | *61,11* | 93 | 47 | 1 |
| 6,00 | *22,40* | 93 | 47 | 1 |
| 6,25 | *61,11* | 100 | 50 | 1 |
| 6,50 | *22,40* | 100 | 50 | 1 |
| 6,75 | *61,11* | 107 | 54 | 1 |
| 7,00 | *22,40* | 107 | 54 | 1 |
| 7,25 | *61,82* | 107 | 54 | 1 |
| 7,50 | *23,63* | 107 | 54 | 1 |
| 7,75 | *61,82* | 115 | 58 | 1 |
| 8,00 | *23,63* | 115 | 58 | 1 |
| 8,25 | *61,82* | 115 | 58 | 1 |
| 8,50 | *24,83* | 115 | 58 | 1 |
| 8,75 | *61,82* | 124 | 62 | 1 |
| 9,00 | *24,83* | 124 | 62 | 1 |
| 9,25 | *61,82* | 124 | 62 | 1 |
| 9,50 | *25,87* | 124 | 62 | 1 |
| 9,75 | *118,48* | 133 | 66 | 1 |
| 10,00 | *25,87* | 133 | 66 | 1 |
| 10,25 | *118,48* | 133 | 66 | 1 |
| 10,50 | *32,79* | 133 | 66 | 1 |
| 10,75 | *118,48* | 142 | 71 | 1 |
| 11,00 | *32,79* | 142 | 71 | 1 |
| 11,25 | *118,48* | 142 | 71 | 1 |
| 11,50 | *118,48* | 142 | 71 | 1 |
| 11,75 | *126,35* | 142 | 71 | 1 |
| 12,00 | *35,24* | 152 | 76 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 12,50 | *44,99* | 152 | 76 | 1 |
| 13,00 | *44,99* | 152 | 76 | 1 |
| 13,50 | *126,35* | 163 | 81 | 1 |
| 14,00 | *48,05* | 163 | 81 | 1 |
| 14,50 | *126,35* | 163 | 81 | 1 |
| 15,00 | *52,50* | 163 | 81 | 1 |
| 15,50 | *126,35* | 175 | 87 | 1 |
| 16,00 | *57,11* | 175 | 87 | 1 |
| 16,50 | *126,35* | 175 | 87 | 1 |
| 17,00 | *68,76* | 175 | 87 | 1 |
| 17,50 | *126,35* | 188 | 93 | 1 |
| 18,00 | *82,44* | 188 | 93 | 1 |
| 18,50 | *126,35* | 188 | 93 | 1 |
| 19,00 | *82,44* | 188 | 93 | 1 |
| 19,50 | *181,97* | 201 | 100 | 1 |
| 20,00 | *89,18* | 201 | 100 | 1 |
| 20,50 | *178,46* | 201 | 100 | 1 |
| 21,00 | *112,00* | 201 | 100 | 1 |
| 21,50 | *162,95* | 215 | 107 | 1 |
| 22,00 | *116,05* | 215 | 107 | 1 |
| 22,50 | *188,43* | 215 | 107 | 1 |
| 23,00 | *121,21* | 215 | 107 | 1 |
| 23,50 | *207,79* | 215 | 107 | 1 |
| 24,00 | *133,85* | 231 | 115 | 1 |
| 24,50 | *220,52* | 231 | 115 | 1 |
| 25,00 | *142,05* | 231 | 115 | 1 |
| 25,50 | *345,60* | 231 | 115 | 1 |
| 26,00 | *155,22* | 231 | 115 | 1 |
| 26,50 | *290,29* | 231 | 115 | 1 |
| 27,00 | *169,22* | 247 | 124 | 1 |
| 27,50 | *297,25* | 247 | 124 | 1 |
| 28,00 | *175,19* | 247 | 124 | 1 |
| 28,50 | *312,57* | 247 | 124 | 1 |
| 29,00 | *248,40* | 247 | 124 | 1 |
| 29,50 | *347,03* | 247 | 124 | 1 |
| 30,00 | *222,96* | 247 | 124 | 1 |
| 32,00 | *258,32* | 265 | 133 | 1 |
| 34,00 | *270,90* | 284 | 142 | 1 |
| 36,00 | *305,54* | 284 | 142 | 1 |
| 38,00 | *354,25* | 305 | 152 | 1 |
| 40,00 | *354,25* | 305 | 152 | 1 |

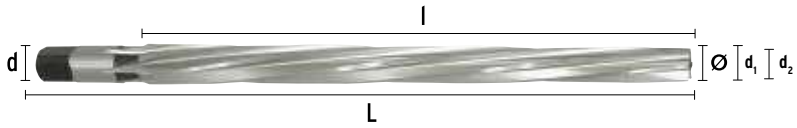
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 4102 HSS DIN 9

Form. B | 7° | 2% | ISO 3465

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | ● | ● | | ● | ● | | ● | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø Nom. | d1 mm | d2 mm | d mm | ☐ mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|---|---|
| *1,50 | 2,14 | 1,40 | 3,15 | 2,40 | *50,07* | 57 | 37 | 1 |
| 2,00 | 2,86 | 1,90 | 3,15 | 2,40 | *38,55* | 68 | 48 | 1 |
| 2,50 | 3,36 | 2,40 | 3,15 | 2,40 | *38,55* | 68 | 48 | 1 |
| 3,00 | 4,06 | 2,90 | 4,00 | 3,00 | *38,55* | 80 | 58 | 1 |
| *3,50 | 4,56 | 3,40 | 4,50 | 3,00 | *42,32* | 87 | 63 | 1 |
| 4,00 | 5,26 | 3,90 | 5,00 | 3,80 | *23,32* | 93 | 68 | 1 |
| *4,50 | 5,76 | 4,40 | 6,00 | 3,80 | *30,27* | 93 | 68 | 1 |
| 5,00 | 6,36 | 4,90 | 6,30 | 4,90 | *23,98* | 100 | 73 | 1 |
| *5,50 | 7,18 | 5,40 | 6,30 | 4,90 | *37,99* | 118 | 89 | 1 |

| Ø Nom. | d1 mm | d2 mm | d mm | ☐ mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|---|---|
| 6,00 | 8,00 | 5,90 | 8,00 | 6,20 | *28,35* | 135 | 105 | 1 |
| *6,50 | 8,50 | 6,40 | 8,00 | 6,20 | *39,38* | 135 | 105 | 1 |
| 7,00 | 9,00 | 6,90 | 8,00 | 6,20 | *32,71* | 135 | 105 | 1 |
| 8,00 | 10,80 | 7,90 | 10,00 | 8,00 | *44,02* | 180 | 145 | 1 |
| 10,00 | 13,40 | 9,90 | 12,50 | 10,00 | *54,62* | 215 | 175 | 1 |
| 12,00 | 16,00 | 11,80 | 14,00 | 11,00 | *73,46* | 255 | 210 | 1 |
| 14,00 | 18,30 | 13,80 | 16,00 | 12,00 | *103,04* | 270 | 225 | 1 |
| 16,00 | 20,40 | 15,80 | 18,00 | 14,50 | *114,16* | 280 | 230 | 1 |
| 20,00 | 24,80 | 19,80 | 22,40 | 18,00 | *157,15* | 310 | 250 | 1 |

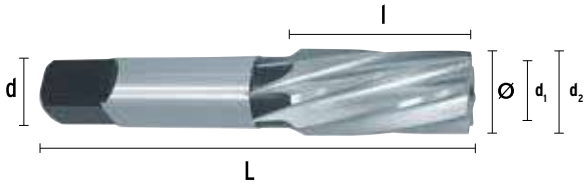
***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)

## 4119 HSS

Form. B | 8° | C. 1:16 (NPTBSPT)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | ● | ● | | ● | ● | | ● | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø Nom. | d1 mm | d2 mm | d mm | ☐ mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|---|---|
| 1/16 | 5,91 | 6,98 | 6 | 4,90 | *142,30* | 70 | 17 | 1 |
| 1/8 | 8,92 | 9,08 | 7 | 5,50 | *144,15* | 70 | 17 | 1 |
| 1/4 | 10,28 | 11,97 | 11 | 9,00 | *151,45* | 80 | 27 | 1 |
| 3/8 | 13,70 | 15,39 | 12 | 9,00 | *157,65* | 85 | 27 | 1 |

| Ø Nom. | d1 mm | d2 mm | d mm | ☐ mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|---|---|
| 1/2 | 16,91 | 19,10 | 16 | 12,00 | *173,20* | 95 | 35 | 1 |
| 3/4 | 22,29 | 24,42 | 20 | 16,00 | *226,10* | 105 | 35 | 1 |
| 1" | 27,97 | 30,66 | 25 | 20,00 | *287,95* | 130 | 43 | 1 |



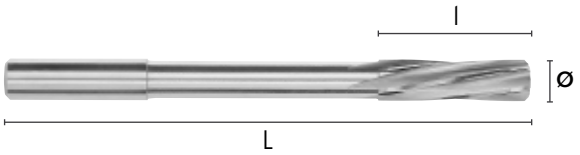
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 4118 HM-MD DIN 212

Form. B-D | 8° | Tol. H7 | ISO 521

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ |
| 12-18 | 10-14 | 6-10 | 4-6 | 8-12 | 6-10 | 25-30 | 8-18 | 6-10 | 20-35 | 20-35 | 20-25 | 12-20 | 4-6 | 6-12 | 3-4 | 3-4 | 3-4 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 1,00 | *111,64* | 38 | 7 | 1 |
| 1,10 | *116,09* | 40 | 10 | 1 |
| 1,20 | *116,09* | 40 | 10 | 1 |
| 1,30 | *116,09* | 40 | 10 | 1 |
| 1,40 | *116,09* | 40 | 10 | 1 |
| 1,50 | *116,09* | 40 | 10 | 1 |
| 1,60 | *111,64* | 43 | 11 | 1 |
| 1,70 | *111,64* | 43 | 11 | 1 |
| 1,80 | *109,36* | 49 | 12 | 1 |
| 1,90 | *109,36* | 49 | 12 | 1 |
| 2,00 | *67,23* | 49 | 12 | 1 |
| 2,10 | *109,36* | 49 | 12 | 1 |
| 2,20 | *109,36* | 49 | 12 | 1 |
| 2,30 | *109,36* | 49 | 12 | 1 |
| 2,40 | *107,18* | 57 | 18 | 1 |
| 2,50 | *77,27* | 57 | 18 | 1 |
| 2,60 | *107,18* | 57 | 18 | 1 |
| 2,70 | *107,18* | 57 | 18 | 1 |
| 2,80 | *107,18* | 57 | 18 | 1 |
| 2,90 | *107,18* | 57 | 18 | 1 |
| 3,00 | *73,32* | 57 | 18 | 1 |
| 3,10 | *107,18* | 57 | 18 | 1 |
| 3,20 | *107,18* | 57 | 18 | 1 |
| 3,30 | *107,18* | 57 | 18 | 1 |
| 3,40 | *107,18* | 57 | 18 | 1 |
| 3,50 | *82,18* | 57 | 18 | 1 |
| 3,60 | *107,18* | 57 | 18 | 1 |
| 3,70 | *107,18* | 57 | 18 | 1 |
| 3,80 | *118,32* | 75 | 19 | 1 |
| 3,90 | *118,32* | 75 | 19 | 1 |

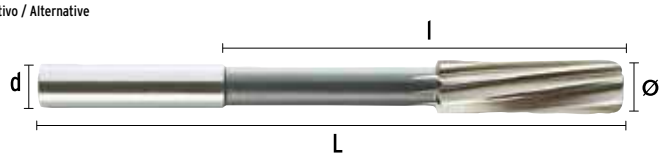
| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 4,00 | *77,91* | 75 | 19 | 1 |
| 4,10 | *118,32* | 75 | 19 | 1 |
| 4,20 | *118,32* | 75 | 19 | 1 |
| 4,30 | *133,95* | 80 | 21 | 1 |
| 4,40 | *133,95* | 80 | 21 | 1 |
| 4,50 | *89,59* | 80 | 21 | 1 |
| 4,60 | *133,95* | 80 | 21 | 1 |
| 4,70 | *133,95* | 80 | 21 | 1 |
| 4,80 | *129,50* | 86 | 23 | 1 |
| 4,90 | *129,50* | 86 | 23 | 1 |
| 5,00 | *82,50* | 86 | 23 | 1 |
| 5,10 | *129,50* | 86 | 23 | 1 |
| 5,20 | *129,50* | 86 | 23 | 1 |
| 5,30 | *129,50* | 86 | 23 | 1 |
| 5,40 | *145,09* | 93 | 26 | 1 |
| 5,50 | *100,27* | 93 | 26 | 1 |
| 5,60 | *145,09* | 93 | 26 | 1 |
| 5,70 | *145,09* | 93 | 26 | 1 |
| 5,80 | *145,09* | 93 | 26 | 1 |
| 5,90 | *140,64* | 101 | 28 | 1 |
| 6,00 | *99,27* | 101 | 28 | 1 |
| 6,50 | *121,77* | 101 | 28 | 1 |
| 7,00 | *128,36* | 109 | 31 | 1 |
| 8,00 | *146,68* | 117 | 33 | 1 |
| 8,50 | *168,68* | 117 | 33 | 1 |
| 9,00 | *168,05* | 125 | 36 | 1 |
| 10,00 | *186,41* | 133 | 38 | 11 |
| 11,00 | *278,05* | 133 | 38 | 1 |
| 12,00 | *293,36* | 151 | 44 | 1 |

# 4104 HSSCO DIN 212

Form. B Ø ≤3,70 | Form. D Ø >3,70 | 10° | Tol. H7 | ISO 521

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 8-14 | ● 6-8 | ○ 4-6 | | ● 6-8 | ○ 4-6 | ● 12-16 | ● 6-12 | | ● 14-25 | ● 12-25 | ○ 12-16 | ● 8-14 | ○ 1-3 | ● 2-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1,00 | 1,00 | *38,63* | 34 | 7 | 1 |
| 1,20 | 1,20 | *38,63* | 34 | 7 | 1 |
| 1,40 | 1,40 | *34,63* | 40 | 8 | 1 |
| 1,50 | 1,50 | *34,63* | 40 | 8 | 1 |
| 1,60 | 1,60 | *34,63* | 43 | 9 | 1 |
| 1,80 | 1,80 | *34,63* | 46 | 10 | 1 |
| 1,90 | 1,90 | *34,63* | 46 | 10 | 1 |
| 2,00 | 2,00 | *34,63* | 49 | 11 | 1 |
| 2,10 | 2,10 | *34,63* | 49 | 11 | 1 |
| 2,20 | 2,20 | *34,63* | 53 | 12 | 1 |
| 2,30 | 2,30 | *34,63* | 53 | 12 | 1 |
| 2,40 | 2,40 | *30,58* | 57 | 14 | 1 |
| 2,50 | 2,50 | *30,58* | 57 | 14 | 1 |
| 2,60 | 2,60 | *30,58* | 57 | 14 | 1 |
| 2,70 | 2,70 | *28,29* | 61 | 15 | 1 |
| 2,80 | 2,80 | *28,29* | 61 | 15 | 1 |
| 2,90 | 2,90 | *28,29* | 61 | 15 | 1 |
| 3,00 | 3,00 | *21,25* | 61 | 15 | 1 |
| 3,10 | 3,10 | *27,52* | 65 | 16 | 1 |
| 3,20 | 3,20 | *27,52* | 65 | 16 | 1 |
| 3,30 | 3,30 | *27,52* | 65 | 16 | 1 |
| 3,40 | 3,40 | *27,52* | 70 | 18 | 1 |
| 3,50 | 3,50 | *21,25* | 70 | 18 | 1 |
| 3,60 | 3,60 | *27,52* | 70 | 18 | 1 |
| 3,70 | 3,70 | *27,52* | 70 | 18 | 1 |
| 3,80 | 4,00 | *27,52* | 75 | 19 | 1 |
| 3,90 | 4,00 | *27,52* | 75 | 19 | 1 |
| 4,00 | 4,00 | *21,25* | 75 | 19 | 1 |
| 4,10 | 4,00 | *27,52* | 75 | 19 | 1 |
| 4,20 | 4,00 | *27,52* | 75 | 19 | 1 |
| 4,30 | 4,50 | *27,52* | 80 | 21 | 1 |
| 4,40 | 4,40 | *27,52* | 80 | 21 | 1 |
| 4,50 | 4,50 | *21,25* | 80 | 21 | 1 |
| 4,60 | 4,50 | *27,52* | 80 | 21 | 1 |
| 4,70 | 4,50 | *27,52* | 80 | 21 | 1 |
| 4,80 | 5,00 | *27,52* | 86 | 23 | 1 |
| 4,90 | 5,00 | *27,52* | 86 | 23 | 1 |
| 5,00 | 5,00 | *21,25* | 86 | 23 | 1 |
| 5,10 | 5,00 | *27,52* | 86 | 23 | 1 |
| 5,20 | 5,00 | *27,52* | 86 | 23 | 1 |
| 5,30 | 5,00 | *27,52* | 86 | 23 | 1 |
| 5,40 | 5,60 | *27,52* | 93 | 26 | 1 |
| 5,50 | 5,60 | *21,25* | 93 | 26 | 1 |
| 5,60 | 5,60 | *27,52* | 93 | 26 | 1 |
| 5,70 | 5,60 | *27,52* | 93 | 26 | 1 |
| 5,80 | 5,60 | *27,52* | 93 | 26 | 1 |
| 5,90 | 5,60 | *27,52* | 93 | 26 | 1 |
| 6,00 | 5,60 | *23,31* | 93 | 26 | 1 |
| 6,10 | 6,30 | *30,23* | 101 | 28 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,20 | 6,30 | *30,23* | 101 | 28 | 1 |
| 6,30 | 6,30 | *30,23* | 101 | 28 | 1 |
| 6,40 | 6,30 | *30,23* | 101 | 28 | 1 |
| 6,50 | 6,30 | *23,31* | 101 | 28 | 1 |
| 6,60 | 6,30 | *30,23* | 101 | 28 | 1 |
| 6,70 | 6,30 | *30,23* | 101 | 28 | 1 |
| 6,80 | 7,10 | *30,23* | 109 | 31 | 1 |
| 6,90 | 7,10 | *30,23* | 109 | 31 | 1 |
| 7,00 | 7,10 | *23,31* | 109 | 31 | 1 |
| 7,10 | 7,10 | *30,23* | 109 | 31 | 1 |
| 7,20 | 7,10 | *30,23* | 109 | 31 | 1 |
| 7,30 | 7,10 | *30,23* | 109 | 31 | 1 |
| 7,40 | 7,10 | *30,23* | 109 | 31 | 1 |
| 7,50 | 7,10 | *25,28* | 109 | 31 | 1 |
| 7,60 | 8,00 | *33,40* | 117 | 33 | 1 |
| 7,70 | 8,00 | *33,40* | 117 | 33 | 1 |
| 7,80 | 8,00 | *33,40* | 117 | 33 | 1 |
| 7,90 | 8,00 | *33,40* | 117 | 33 | 1 |
| 8,00 | 8,00 | *25,77* | 117 | 33 | 1 |
| 8,10 | 8,00 | *38,40* | 117 | 33 | 1 |
| 8,20 | 8,00 | *38,40* | 117 | 33 | 1 |
| 8,30 | 8,00 | *38,40* | 117 | 33 | 1 |
| 8,40 | 8,00 | *38,40* | 117 | 33 | 1 |
| 8,50 | 8,00 | *28,21* | 117 | 33 | 1 |
| 8,60 | 9,00 | *38,40* | 125 | 36 | 1 |
| 8,70 | 9,00 | *38,40* | 125 | 36 | 1 |
| 8,80 | 9,00 | *38,40* | 125 | 19 | 1 |
| 8,90 | 9,00 | *38,40* | 125 | 36 | 1 |
| 9,00 | 9,00 | *31,02* | 125 | 36 | 1 |
| 9,10 | 9,00 | *38,40* | 125 | 36 | 1 |
| 9,20 | 9,00 | *38,40* | 125 | 36 | 1 |
| 9,30 | 9,00 | *38,40* | 125 | 36 | 1 |
| 9,40 | 9,00 | *38,40* | 125 | 36 | 1 |
| 9,50 | 9,00 | *31,51* | 125 | 36 | 1 |
| 9,60 | 10,00 | *42,22* | 133 | 38 | 1 |
| 9,70 | 10,00 | *42,22* | 133 | 38 | 1 |
| 9,80 | 10,00 | *42,22* | 133 | 38 | 1 |
| 9,90 | 10,00 | *42,22* | 133 | 38 | 1 |
| 10,00 | 10,00 | *31,51* | 133 | 38 | 1 |
| 11,00 | 10,00 | *37,23* | 142 | 41 | 1 |
| 12,00 | 10,00 | *36,39* | 151 | 44 | 1 |
| 13,00 | 10,00 | *62,56* | 151 | 44 | 1 |
| 14,00 | 12,50 | *59,82* | 160 | 47 | 1 |
| 15,00 | 12,50 | *65,32* | 162 | 50 | 1 |
| 16,00 | 12,50 | *69,92* | 170 | 52 | 1 |
| 17,00 | 14,00 | *80,63* | 175 | 54 | 1 |
| 18,00 | 14,00 | *84,07* | 182 | 56 | 1 |
| 19,00 | 16,00 | *89,32* | 189 | 58 | 1 |
| 20,00 | 16,00 | *89,95* | 195 | 60 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 4104/1 HSSCO DIN 212

Form. B Ø ≤ 3,70 | Form. D Ø > 3,70 | 8° | ISO 521

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 8-14 | ● 6-8 | ○ 4-6 | | ● 6-8 | ○ 4-6 | ● 12-16 | ● 6-12 | | ● 14-25 | ● 12-25 | ○ 12-16 | ● 8-14 | ○ 1-3 | ● 2-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 0,95 - 1,31 | *40,73* | 34 | 5-7 | 1 |
| 1,32 - 1,54 | *36,52* | 40 | 8 | 1 |
| 1,55 - 1,70 | *36,52* | 43 | 9 | 1 |
| 1,71 - 1,90 | *36,52* | 46 | 10 | 1 |
| 1,91 - 2,12 | *36,52* | 49 | 11 | 1 |
| 2,13 - 2,36 | *36,52* | 53 | 12 | 1 |
| 2,37 - 2,66 | *32,25* | 57 | 14 | 1 |
| 2,67 - 3,05 | *29,86* | 61 | 15 | 1 |
| 3,06 - 3,35 | *29,86* | 65 | 16 | 1 |
| 3,36 - 3,75 | *33,53* | 70 | 18 | 1 |
| 3,76 - 4,25 | *33,53* | 75 | 19 | 1 |
| 4,26 - 4,75 | *32,68* | 80 | 21 | 1 |
| 4,76 - 5,30 | *32,68* | 86 | 23 | 1 |
| 5,31 - 5,95 | *33,08* | 93 | 26 | 1 |
| 5,96 - 6,00 | *33,89* | 93 | 26 | 1 |
| 6,01 - 6,70 | *33,89* | 101 | 28 | 1 |
| 6,71 - 7,29 | *37,34* | 109 | 31 | 1 |

| Ø mm | € | L mm | l mm | |
|---|---|---|---|---|
| 7,30 - 7,55 | *41,97* | 109 | 32 | 1 |
| 7,56 - 8,50 | *41,97* | 117 | 33 | 1 |
| 8,51 - 9,25 | *47,40* | 125 | 36 | 1 |
| 9,26 - 9,50 | *54,10* | 125 | 36 | 1 |
| 9,51 - 10,64 | *52,04* | 133 | 38 | 1 |
| 10,65 - 11,25 | *61,10* | 142 | 41 | 1 |
| 11,26 - 11,80 | *62,74* | 142 | 41 | 1 |
| 11,81 - 12,02 | *62,74* | 151 | 44 | 1 |
| 12,03 - 13,02 | *86,27* | 151 | 44 | 1 |
| 13,03 - 13,20 | *86,27* | 151 | 44 | 1 |
| 13,21 - 14,00 | *104,87* | 160 | 47 | 1 |
| 14,01 - 14,02 | *104,87* | 162 | 50 | 1 |
| 14,03 - 15,00 | *127,90* | 162 | 50 | 1 |
| 15,01 - 15,02 | *127,90* | 170 | 52 | 1 |
| 15,03 - 16,00 | *136,92* | 170 | 52 | 1 |
| 16,01 - 16,02 | *136,92* | 175 | 54 | 1 |

## 4105 HSSCO DIN 212

Form. E | 45° | Tol. H7 | ISO 521

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-16 | | | | | | | | | ● 14-25 | ● 14-20 | | ● 10-16 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 3,00 | *29,15* | 61 | 15 | 1 |
| 3,50 | 3,50 | *29,15* | 70 | 18 | 1 |
| 4,00 | 4,00 | *29,15* | 75 | 19 | 1 |
| 4,50 | 4,50 | *29,69* | 80 | 21 | 1 |
| 5,00 | 5,00 | *29,69* | 86 | 23 | 1 |
| 5,50 | 5,60 | *29,69* | 93 | 26 | 1 |
| 6,00 | 5,60 | *29,69* | 93 | 26 | 1 |
| 6,50 | 6,30 | *34,51* | 101 | 28 | 1 |
| 7,00 | 7,10 | *30,20* | 109 | 31 | 1 |
| 7,50 | 7,10 | *35,16* | 109 | 31 | 1 |
| 8,00 | 8,00 | *30,77* | 117 | 33 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 8,50 | 8,00 | *39,08* | 117 | 33 | 1 |
| 9,00 | 9,00 | *34,20* | 125 | 36 | 1 |
| 9,50 | 9,00 | *39,08* | 125 | 36 | 1 |
| 10,00 | 10,00 | *34,20* | 133 | 38 | 1 |
| 11,00 | 10,00 | *52,68* | 142 | 41 | 1 |
| 12,00 | 10,00 | *50,72* | 151 | 44 | 1 |
| 13,00 | 10,00 | *59,63* | 151 | 44 | 1 |
| 14,00 | 12,50 | *64,17* | 160 | 47 | 1 |
| 15,00 | 12,50 | *86,24* | 162 | 50 | 1 |
| 16,00 | 12,50 | *107,30* | 170 | 52 | 1 |

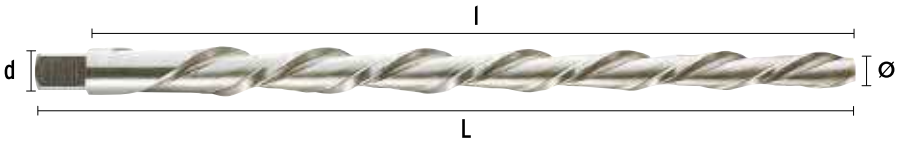
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 4103 HSSCO DIN 2179

Form. E | 45° | 2% | ISO 3466

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 6-12 | ○ 4-6 | | | ○ 4-6 | | ● 10-14 | ● 6-8 | | ● 8-22 | ● 10-22 | | ● 14-22 | | ○ 4-6 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø Nom. | D mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3,00 | 4,06 | 2,90 | *27,56* | 100 | 58 | 1 |
| 4,00 | 5,26 | 3,90 | *44,80* | 112 | 68 | 1 |
| 5,00 | 6,36 | 4,90 | *42,70* | 122 | 73 | 1 |
| 6,00 | 8,00 | 5,90 | *49,57* | 160 | 105 | 1 |
| 8,00 | 10,80 | 7,90 | *79,59* | 207 | 145 | 1 |
| 10,00 | 13,40 | 9,90 | *157,93* | 245 | 175 | 1 |

## 4106 HSSCO DIN 208

Form. B | 10° | Tol. H7 | ISO 521

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 8-14 | ● 6-8 | ○ 4-6 | | ● 6-8 | ○ 4-6 | ● 12-16 | ● 6-12 | | ● 14-25 | ● 12-25 | ○ 12-16 | ● 8-14 | ○ 1-3 | ● 2-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 4,00 | *53,54* | 129 | 19 | 1 |
| 1 | 5,00 | *38,80* | 133 | 23 | 1 |
| 1 | 5,50 | *47,68* | 138 | 26 | 1 |
| 1 | 6,00 | *39,36* | 138 | 26 | 1 |
| 1 | 6,50 | *48,62* | 144 | 28 | 1 |
| 1 | 7,00 | *40,04* | 150 | 31 | 1 |
| 1 | 7,50 | *33,02* | 150 | 31 | 1 |
| 1 | 8,00 | *40,99* | 156 | 33 | 1 |
| 1 | 8,50 | *52,73* | 156 | 33 | 1 |
| 1 | 9,00 | *43,84* | 162 | 36 | 1 |
| 1 | 9,50 | *53,23* | 162 | 36 | 1 |
| 1 | 10,00 | *41,59* | 168 | 38 | 1 |
| 1 | 10,50 | *53,94* | 168 | 38 | 1 |
| 1 | 11,00 | *42,14* | 175 | 41 | 1 |
| 1 | 11,50 | *56,84* | 175 | 41 | 1 |
| 1 | 12,00 | *42,14* | 182 | 44 | 1 |
| 1 | 12,50 | *66,64* | 182 | 44 | 1 |
| 1 | 13,00 | *55,29* | 182 | 44 | 1 |
| 1 | 13,50 | *68,62* | 189 | 47 | 1 |
| 1 | 14,00 | *56,85* | 189 | 47 | 1 |
| 2 | 14,50 | *72,25* | 204 | 50 | 1 |
| 2 | 15,00 | *58,57* | 204 | 50 | 1 |
| 2 | 15,50 | *75,92* | 210 | 52 | 1 |
| 2 | 16,00 | *63,77* | 210 | 52 | 1 |
| 2 | 16,50 | *84,36* | 214 | 54 | 1 |
| 2 | 17,00 | *71,28* | 214 | 54 | 1 |
| 2 | 18,00 | *75,75* | 219 | 56 | 1 |
| 2 | 19,00 | *79,29* | 223 | 58 | 1 |
| 2 | 20,00 | *82,32* | 228 | 60 | 1 |
| 2 | 21,00 | *102,13* | 232 | 62 | 1 |
| 2 | 22,00 | *108,65* | 237 | 64 | 1 |
| 2 | 23,00 | *113,49* | 241 | 66 | 1 |
| 3 | 24,00 | *137,55* | 268 | 68 | 1 |
| 3 | 25,00 | *140,29* | 268 | 68 | 1 |
| 3 | 26,00 | *146,92* | 273 | 70 | 1 |
| 3 | 27,00 | *169,05* | 277 | 71 | 1 |
| 3 | 28,00 | *169,05* | 277 | 71 | 1 |
| 3 | 29,00 | *184,18* | 281 | 73 | 1 |
| 3 | 30,00 | *184,18* | 281 | 73 | 1 |
| 3 | 31,00 | *235,25* | 285 | 75 | 1 |
| 4 | 32,00 | *220,44* | 317 | 77 | 1 |
| 4 | 34,00 | *231,57* | 321 | 78 | 1 |
| 4 | 35,00 | *266,73* | 321 | 78 | 1 |
| 4 | 36,00 | *342,71* | 325 | 79 | 1 |
| 4 | 38,00 | *364,91* | 329 | 81 | 1 |
| 4 | 40,00 | *372,32* | 329 | 81 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 4107 HSSCO DIN 208

Form. C | 45° | Tol. H7 | ISO 521

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 10-16 | | | | | | | | | ● 14-25 | ● 14-20 | | ● 10-16 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 5,00 | *65,70* | 133 | 23 | 1 |
| 1 | 6,00 | *65,70* | 138 | 26 | 1 |
| 1 | 7,00 | *65,70* | 150 | 31 | 1 |
| 1 | 8,00 | *65,70* | 156 | 33 | 1 |
| 1 | 9,00 | *63,29* | 162 | 36 | 1 |
| 1 | 10,00 | *63,29* | 168 | 38 | 1 |
| 1 | 11,00 | *66,08* | 175 | 41 | 1 |
| 1 | 12,00 | *66,08* | 182 | 44 | 1 |
| 1 | 13,00 | *98,30* | 182 | 44 | 1 |
| 1 | 14,00 | *101,36* | 189 | 47 | 1 |
| 2 | 15,00 | *110,97* | 204 | 50 | 1 |
| 2 | 16,00 | *116,35* | 210 | 52 | 1 |

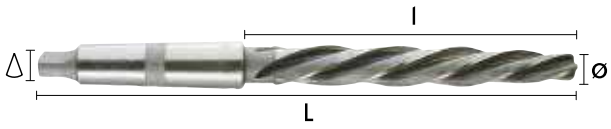
| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2 | 17,00 | *125,92* | 214 | 54 | 1 |
| 2 | 18,00 | *133,77* | 219 | 56 | 1 |
| 2 | 19,00 | *141,91* | 223 | 58 | 1 |
| 2 | 20,00 | *149,19* | 228 | 60 | 1 |
| 2 | 21,00 | *161,23* | 232 | 62 | 1 |
| 2 | 22,00 | *172,07* | 237 | 64 | 1 |
| 2 | 23,00 | *184,53* | 241 | 66 | 1 |
| 3 | 24,00 | *194,64* | 268 | 68 | 1 |
| 3 | 25,00 | *206,62* | 268 | 68 | 1 |
| 3 | 26,00 | *218,05* | 273 | 70 | 1 |
| 3 | 28,00 | *241,06* | 277 | 71 | 1 |
| 3 | 29,00 | *253,66* | 281 | 73 | 1 |

## 4108 HSS DIN 311

25° | ISO 2238 | 1:10

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 6-12 | ○ 4-6 | | | ○ 4-6 | | ● 10-14 | ● 6-8 | | ● 8-22 | ● 10-22 | | ● 14-22 | | ○ 4-6 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

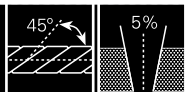



| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 1 | 10,00 | *62,22* | 171 | 95 | 1 |
| 1 | 11,00 | *63,92* | 176 | 100 | 1 |
| 2 | 12,00 | *66,20* | 199 | 105 | 1 |
| 2 | 13,00 | *72,09* | 199 | 105 | 1 |
| 2 | 14,00 | *79,41* | 209 | 115 | 1 |
| 2 | 15,00 | *83,42* | 219 | 125 | 1 |
| 2 | 16,00 | *87,58* | 229 | 135 | 1 |
| 3 | 17,00 | *113,12* | 251 | 135 | 1 |
| 3 | 18,00 | *117,04* | 261 | 145 | 1 |
| 3 | 19,00 | *120,38* | 261 | 145 | 1 |
| 3 | 20,00 | *122,56* | 271 | 155 | 1 |
| 3 | 21,00 | *134,87* | 271 | 155 | 1 |
| 3 | 22,00 | *140,75* | 281 | 165 | 1 |
| 3 | 23,00 | *150,92* | 281 | 165 | 1 |

| Δ | Ø mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3 | 24,00 | *161,46* | 296 | 180 | 1 |
| 3 | 25,00 | *172,11* | 296 | 180 | 1 |
| 3 | 26,00 | *187,94* | 296 | 180 | 1 |
| 3 | 27,00 | *201,75* | 311 | 195 | 1 |
| 3 | 28,00 | *220,40* | 311 | 195 | 1 |
| 3 | 29,00 | *236,54* | 311 | 195 | 1 |
| 3 | 30,00 | *236,99* | 311 | 195 | 1 |
| 3 | 31,00 | *240,95* | 326 | 210 | 1 |
| 4 | 32,00 | *262,29* | 354 | 210 | 1 |
| 4 | 33,00 | *350,10* | 364 | 220 | 1 |
| 4 | 34,00 | *370,01* | 364 | 220 | 1 |
| 4 | 35,00 | *389,03* | 364 | 220 | 1 |
| 4 | 36,00 | *452,10* | 364 | 220 | 1 |
| 4 | 37,00 | *472,00* | 364 | 220 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 4115 HSSCO 5%



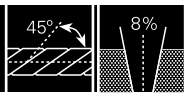

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 6-12 | ○ 4-6 | | | ○ 4-6 | | ● 10-14 | ● 6-8 | | ● 8-22 | ● 10-22 | | ● 14-22 | | ○ 4-6 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø Nom. | € | D mm | d mm | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3,00 | *103,66* | 3 | 6 | 110 | 60 | 1 |
| 4,00 | *139,59* | 4 | 8 | 130 | 80 | 1 |
| 5,00 | *171,36* | 5 | 10 | 155 | 100 | 1 |

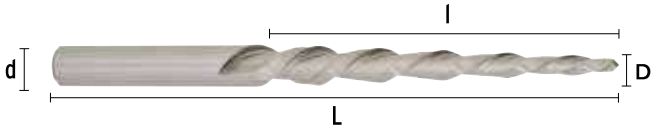
| Ø Nom. | € | D mm | d mm | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | *211,09* | 6 | 12 | 180 | 120 | 1 |
| 7,00 | *271,77* | 7 | 14 | 200 | 140 | 1 |

## 4116 HSSCO 8%




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 6-12 | ○ 4-6 | | | ○ 4-6 | | ● 10-14 | ● 6-8 | | ● 8-22 | ● 10-22 | | ● 14-22 | | ○ 4-6 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



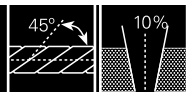

| Ø Nom. | € | D mm | d mm | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3,00 | *85,91* | 3 | 8 | 110 | 62 | 1 |
| 4,00 | *105,63* | 4 | 10 | 130 | 75 | 1 |

| Ø Nom. | € | D mm | d mm | L mm | l mm | |
|---|---|---|---|---|---|---|
| 5,00 | *139,22* | 5 | 12 | 150 | 90 | 1 |
| 6,00 | *159,60* | 6 | 14 | 160 | 100 | 1 |



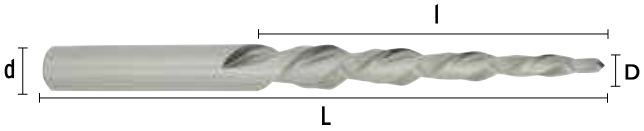
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 4117 HSSCO 10%




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 6-12 | ○ 4-6 | | | ○ 4-6 | | ● 10-14 | ● 6-8 | | ● 8-22 | ● 10-22 | | ● 14-22 | | ○ 4-6 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

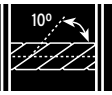



| Ø Nom. | € | D mm | d mm | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2,00 | *81,48* | 2 | 6 | 90 | 40 | 1 |
| 3,00 | *101,20* | 3 | 8 | 100 | 50 | 1 |
| 4,00 | *127,08* | 4 | 10 | 115 | 60 | 1 |

| Ø Nom. | € | D mm | d mm | L mm | l mm | |
|---|---|---|---|---|---|---|
| 5,00 | *128,17* | 5 | 12 | 130 | 70 | 1 |
| 6,00 | *224,65* | 6 | 14 | 140 | 80 | 1 |

## 4109 HSS DIN 219

Form. B




Tol. H7

ISO 2402

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 8-14 | ○ 6-8 | | | ● 6-8 | | ● 12-16 | ● 6-12 | | ● 14-25 | ● 16-25 | ○ 12-16 | ● 8-14 | ○ 1-3 | ● 2-8 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Ø int. | € | L mm | l mm | |
|---|---|---|---|---|---|
| 32,00 | 16,00 | *101,33* | 50 | 36 | 1 |
| 34,00 | 16,00 | *112,35* | 50 | 36 | 1 |
| 36,00 | 19,00 | *128,63* | 56 | 40 | 1 |
| 38,00 | 19,00 | *137,03* | 56 | 40 | 1 |
| 42,00 | 19,00 | *155,93* | 56 | 40 | 1 |
| 45,00 | 22,00 | *183,23* | 63 | 45 | 1 |
| 47,00 | 22,00 | *194,25* | 63 | 45 | 1 |
| 48,00 | 22,00 | *205,80* | 63 | 45 | 1 |
| 52,00 | 27,00 | *249,90* | 71 | 50 | 1 |

| Ø mm | Ø int. | € | L mm | l mm | |
|---|---|---|---|---|---|
| 55,00 | 27,00 | *277,20* | 71 | 50 | 1 |
| 58,00 | 27,00 | *292,43* | 71 | 50 | 1 |
| 62,00 | 32,00 | *356,48* | 80 | 56 | 1 |
| 65,00 | 32,00 | *392,70* | 80 | 56 | 1 |
| 70,00 | 32,00 | *430,50* | 80 | 56 | 1 |
| 72,00 | 40,00 | *495,60* | 90 | 63 | 1 |
| 75,00 | 40,00 | *539,70* | 90 | 63 | 1 |
| 80,00 | 40,00 | *587,48* | 90 | 63 | 1 |

## 4114 Mandrino / Mandrin / Mandrel

| △ | Ø mm | D mm | € | L mm | |
|---|---|---|---|---|---|
| 3 | 31,00 - 35,00 | 16 | *226,10* | 260 | 1 |
| 4 | 36,00 - 42,00 | 19 | *261,44* | 298 | 1 |
| 4 | 43,00 - 50,00 | 22 | *332,08* | 310 | 1 |

| △ | Ø mm | D mm | € | L mm | |
|---|---|---|---|---|---|
| 5 | 51,00 - 60,00 | 27 | *491,06* | 325 | 1 |
| 5 | 61,00 - 71,00 | 32 | *589,98* | 376 | 1 |
| 5 | 72,00 - 85,00 | 40 | *748,99* | 396 | 1 |

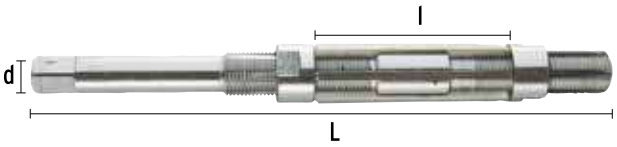
## 4110 Extensible / Extendible

Form. A

REFORZ. RENFORC. REINFORC.

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | ● | ● | | ● | ● | | ● | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | | € J.CUCHILLAS J.LAMES/SET OF BLADES |
|---|---|---|---|---|---|---|
| 8,00-9,00 | 4,50 | *118,14* | 100 | 35 | 1 | *74,53* |
| 9,00-10,00 | 5,50 | *118,14* | 120 | 39 | 1 | *74,53* |
| 10,00-11,00 | 5,90 | *118,14* | 125 | 40 | 1 | *74,53* |
| 11,00-12,00 | 6,50 | *118,14* | 130 | 43 | 1 | *74,53* |
| 12,00-13,50 | 7,50 | *118,14* | 135 | 46 | 1 | *74,53* |
| 13,50-15,50 | 8,00 | *118,14* | 140 | 51 | 1 | *74,53* |
| 15,50-18,00 | 9,50 | *125,71* | 165 | 61 | 1 | *78,04* |
| 18,00-21,00 | 12,00 | *130,13* | 185 | 66 | 1 | *82,26* |

| Ø mm | d mm | € | L mm | l mm | | € J.CUCHILLAS J.LAMES/SET OF BLADES |
|---|---|---|---|---|---|---|
| 21,00-24,00 | 13,50 | *151,40* | 195 | 7 0 | 1 | *94,69* |
| 24,00-27,50 | 15,00 | *164,85* | 215 | 83 | 1 | *99,70* |
| 27,50-31,50 | 18,50 | *180,27* | 240 | 88 | 1 | *109,64* |
| 31,50-37,00 | 21,00 | *234,99* | 265 | 91 | 1 | *134,88* |
| 37,00-45,00 | 25,00 | *350,37* | 310 | 110 | 1 | *208,76* |
| 45,00-55,00 | 32,00 | *504,09* | 380 | 128 | 1 | *321,05* |
| 55,00-67,00 | 42,00 | *916,60* | 440 | 150 | 1 | *486,48* |
| 67,00-80,00 | 45,00 | *1.389,81* | 490 | 170 | 1 | *739,20* |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
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S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 4111 Extensible guía / Extensible guide / Extendible guide

Form. A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | | | | | | ● | ● | | ● | ● | | ● | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | | € J.CUCHILLAS J.LAMES/SET OF BLADES |
|---|---|---|---|---|---|---|
| 8,00-9,00 | 4,50 | *151,83* | 175 | 35 | 1 | *74,53* |
| 9,00-10,00 | 5,50 | *151,83* | 185 | 35 | 1 | *74,53* |
| 10,00-11,00 | 5,90 | *151,83* | 195 | 40 | 1 | *74,53* |
| 11,00-12,00 | 6,50 | *151,83* | 200 | 41 | 1 | *74,53* |
| 12,00-13,50 | 7,50 | *151,83* | 220 | 44 | 1 | *74,53* |
| 13,50-15,50 | 8,00 | *151,83* | 243 | 53 | 1 | *74,53* |
| 15,50-18,00 | 9,50 | *160,94* | 274 | 61 | 1 | *78,04* |
| 18,00-21,00 | 12,00 | *160,94* | 300 | 66 | 1 | *82,26* |

| Ø mm | d mm | € | L mm | l mm | | € J.CUCHILLAS J.LAMES/SET OF BLADES |
|---|---|---|---|---|---|---|
| 21,00-24,00 | 13,50 | *168,60* | 320 | 70 | 1 | *94,69* |
| 24,00-27,50 | 15,00 | *179,25* | 350 | 83 | 1 | *99,70* |
| 27,50-31,50 | 18,50 | *229,45* | 385 | 88 | 1 | *109,64* |
| 31,50-37,00 | 21,00 | *342,42* | 424 | 91 | 1 | *134,88* |
| 37,00-45,00 | 25,00 | *498,57* | 490 | 110 | 1 | *208,76* |
| 45,00-55,00 | 32,00 | *714,58* | 600 | 128 | 1 | *321,05* |
| 55,00-67,00 | 42,00 | *1.140,10* | 740 | 150 | 1 | *486,48* |
| 67,00-80,00 | 45,00 | *1.568,49* | 830 | 170 | 1 | *739,20* |

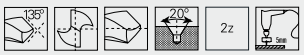
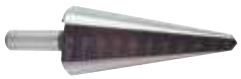
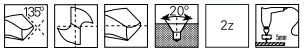
Avellanado
Chanfreinage
Counterboring

# ÍNDICE
# SOMMAIRE / INDEX

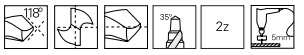
Hepyc CUTTING TOOL EXPERTS

Pág.

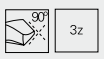
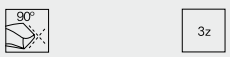
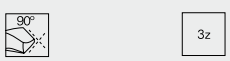
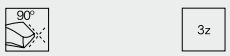

**Brocas avellanadoras /** Fraises coniques / Counterbore drill-bits

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5101 | HSS | | | |  | P K N | 303 |
| 5102 | HSSCO | | |  |  | P K N S | 303 |
| 5103 | HSS | | TIALN | | | P K N | 304 |

**Brocas escalonadas /** Fraises étagées / Step drill-bits

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5157 | HSS | | | | | P K N | 305 |
| 5158 | HSS | | TIALN | |  | P K N | 305 |
| 5105 | HSS | | | | | P K N | 306 |
| 5106 | HSS | | TIALN | | | P K N | 306 |
| 5160 | HSS | MULTI | | | | P K N | 307 |
| 5109 | HSS | | | | | P K N | 307 |
| 5112 | HSS | | | | | | 308 |

**Avellanadores /** Fraises à trou et à chanfreiner / Countersink cutters

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5159 | HM-MD | | TIALN | |  | P M K N S H | 309 |
| 5116 | HSS | DIN 335 C | | | | P K N | 309 |
| 5117 | HSSCO | DIN 335 C | | |  | P M K N S | 310 |
| 5118 | HSS | DIN 335 C | TIALN | | | P K N | 310 |
| 5119 | HSSCO | DIN 335 C | TIALN | |  | P M K N S | 311 |
| 1505 | HSS | DIN 335 C | | | | P K N | 311 |
| 5120 | HSS | DIN 335 C | | |  | P K N | 312 |




P Aceros / Aciers / Steels

M Aceros Inox / Aciers Inox / Stainless Steels

K Fundicion / Fonte / Cast Iron

N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals

S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys

H Materiales Duros / Materiels Durs / Hard materials

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| 5122 | HSS | DIN 335 C | | 120° | 3z | P K N | 313 |
| 5123 | HSS | DIN 334 C | | 60° | 3z | P K N | 313 |
| 5124 | HSS | DIN 335 C | | 75° | 3z | P K N | 314 |
| 5161 | HSS | | | 30° | 3z | P K N | 314 |
| 5125 | HSS | DIN 335 C | | 90° | 1z | P K N | 315 |
| 5126 | HSS | DIN 334 A | | 60° | z ≥ 4 | P K N | 315 |
| 5127 | HSS | DIN 335 A | | 90° | z ≥ 4 | P K N | 316 |
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| 5130 | HSS | DIN 334 D | | 60° | 3z | P K N | 317 |
| 5132 | HSS | DIN 334 D | | 120° | 3z | P K N | 317 |


**Avellanadores con agujero /** Fraises à trou et à chanfreiner / Countersink cutters


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5133 | HSS | | | 90° | | P K N | 318 |
| 5134 | HSSCO | | | 90° | | P M K N | 318 |
| 5135 | HSS | | | 75° | | P K N | 319 |


**Avellanadores Allen /** Fraises à trou et à chanfreiner / Countersink cutters


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5136 | HSS | DIN 373 | | | ALLEN ISO 4206 | P K N | 320 |
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| Estuches / Coffrets / Sets | | | | | | | 321 |


P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| Ref./ Réf. / Ref. | 5159 | 5116 | 5117 | 5118 | 5119 |
|---|---|---|---|---|---|
| Z | 3 | 3 | 3 | 3 | 3 |
| Punta/Poin/Point | 90° | 90° | 90° | 90° | 90° |
| Mat. | HM | HSS | HSSCo | HSS | HSSCo |
| Rec./Rev./Coat. | | | | TIALN | TIALN |
| DIN | 335 | 335 | 335 | 335 | 335 |
| Form. | C | C | C | C | C |
| Gama/Gamme/Range | 6,30-31 | 4,30-40 | 6-40 | 4,30-40 | 6,30-30 |
| Pag. | 309 | 309 | 310 | 310 | 311 |

| Mat. | | Avance/Feed (mm/rpm) HSS/HSSCo - HM=x1,5 | | | | | | | | | Vc (m/min) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Ø25 | Ø30 | Ø35 | Ø40 | | | | | |
| P.1 | <600 | 0,05 | 0,08 | 0,12 | 0,14 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | ● 40-80 | ● 25-30 | ● 25-30 | ● 30-35 | ● 30-35 |
| P.2 | <800 | 0,04 | 0,07 | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,22 | 0,22 | ● 35-60 | ● 20-25 | ● 20-25 | ● 25-30 | ● 25-30 |
| P.3 | <1000 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 | 0,10 | 0,12 | 0,12 | ● 30-40 | ○ 12-18 | ● 12-18 | ○ 15-20 | ● 15-20 |
| P.4 | <1200 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 | 0,10 | 0,12 | 0,12 | ● 15-25 | | ○ 4-8 | | ○ 6-10 |
| P.5 | <1400 | 0,01 | 0,03 | 0,03 | 0,06 | 0,08 | 0,10 | 0,12 | 0,14 | 0,16 | ● 10-15 | | | | |
| M.1 | <950 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 | 0,11 | 0,12 | ● 20-30 | ○ 4-10 | ● 4-10 | ○ 6-12 | ● 6-12 |
| M.2 | | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 | 0,11 | 0,12 | ● 20-30 | ○ 4-10 | ● 4-10 | ○ 6-12 | ● 6-12 |
| M.3 | <1200 | 0,01 | 0,03 | 0,03 | 0,06 | 0,08 | 0,10 | 0,12 | 0,14 | 0,16 | ● 15-25 | | | | ○ 4-6 |
| M.4 | | 0,01 | 0,03 | 0,03 | 0,06 | 0,08 | 0,10 | 0,12 | 0,14 | 0,16 | ● 15-25 | | | | ○ 4-6 |
| K.1 | <500 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,25 | 0,25 | 0,30 | 0,30 | ● 40-70 | ● 15-24 | ● 15-24 | ● 20-30 | ● 20-30 |
| K.2 | | | | | | | | | | | | | | | |
| K.3 | <800 | 0,06 | 0,07 | 0,08 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | ● 25-35 | ○ 9-13 | ○ 9-13 | ○ 12-16 | ● 12-16 |
| K.4.1 | | 0,06 | 0,07 | 0,08 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | ● 25-35 | ● 9-13 | ● 9-13 | ● 12-16 | ● 12-16 |
| K.4.2 | <1400 | 0,02 | 0,04 | 0,04 | 0,08 | 0,12 | 0,16 | 0,18 | 0,20 | 0,22 | ● 20-30 | | | | ○ 6-10 |
| N.1.1 | Al | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | ● 60-120 | ● 50-80 | ● 50-80 | ● 65-100 | ● 65-100 |
| N.1.2 | | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,25 | 0,25 | 0,30 | 0,30 | ● 50-90 | ● 30-50 | ● 30-50 | ● 40-65 | ● 40-65 |
| N.1.3 | | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,25 | 0,25 | 0,30 | 0,30 | ● 40-80 | ● 15-30 | ● 15-30 | ● 20-40 | ● 20-40 |
| N.2.1 | Cu | 0,06 | 0,07 | 0,08 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | ● 40-80 | ● 25-35 | ● 25-35 | ● 30-45 | ● 30-45 |
| N.2.2 | | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | ● 60-100 | ● 40-60 | ● 40-60 | ● 50-75 | ● 50-75 |
| N.2.3 | | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | ● 50-90 | ● 30-50 | ● 30-50 | ● 40-65 | ● 40-65 |
| N.2.4 | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | 0,10 | 0,13 | 0,16 | 0,20 | 0,25 | 0,30 | 0,30 | 0,35 | 0,35 | ● 80-140 | ● 60-90 | ● 60-90 | ● 75-115 | ● 75-115 |
| N.4.1 | Plastic | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | ● 60-100 | ● 35-70 | ● 35-70 | ● 45-90 | ● 45-90 |
| N.4.2 | | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | ● 30-60 | ● 12-24 | ● 12-24 | ● 15-30 | ● 15-30 |
| N.4.3 | | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,04 | 0,07 | 0,1 | 0,12 | 0,14 | 0,18 | 0,2 | 0,22 | 0,22 | ● 15-25 | | ○ 4-6 | | ● 6-8 |
| S.1.2 | | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,1 | 0,1 | 0,12 | 0,12 | ● 10-15 | | ○ 2-5 | | ● 3-6 |
| S.2.1 | Ti | 0,04 | 0,07 | 0,1 | 0,12 | 0,14 | 0,18 | 0,2 | 0,22 | 0,22 | ● 20-30 | ○ 4-10 | ● 6-10 | ○ 8-12 | ● 8-12 |
| S.2.2 | | 0,04 | 0,07 | 0,1 | 0,12 | 0,14 | 0,18 | 0,2 | 0,22 | 0,22 | ● 15-25 | | ○ 4-6 | | ● 6-8 |
| S.2.3 | | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,1 | 0,1 | 0,12 | 0,12 | ● 10-15 | | ○ 2-5 | | ● 3-6 |
| H.1 | 50 HRC | 0,01 | 0,03 | 0,03 | 0,06 | 0,08 | 0,10 | 0,12 | 0,14 | 0,16 | ● 6-10 | | | | |
| H.2 | 55 HRC | 0,01 | 0,03 | 0,03 | 0,06 | 0,08 | 0,10 | 0,12 | 0,14 | 0,16 | ● 6-10 | | | | |
| H.3 | 60 HRC | 0,01 | 0,03 | 0,03 | 0,06 | 0,08 | 0,10 | 0,12 | 0,14 | 0,16 | ○ 4-8 | | | | |

● Optima / Optimun ○ Alternativo / Alternative



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

| 5121 | 5122 | 5123 | 5124 | 5161 | 5125 | 5126 | 5127 | 5129 | 5130 | 5132 | 5133 | 5134 | 5135 | 5136 | 5137 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 | 1 | >4 | >4 | 3 | 3 | 3 | | | | | |
| 90° | 120° | 60° | 75° | 30° | 90° | 60° | 90° | 90° | 60° | 120° | 90° | 90° | 75° | ALLEN | ALLEN |
| HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSS | HSSCo | HSS | HSS | HSS |
| | | | | | | | | | | | | | | | |
| 335 | 335 | 334 | 335 | | 335 | 334 | 335 | 335 | 334 | 334 | 335 | | | | |
| C | C | C | C | | C | A | A | D | D | D | | | | | |
| 10,40-31 | 6,30-25 | 6,30-25 | 6,30-25 | 6,30-31 | 10-31 | 12,50-25 | 8-25 | 20,50-80 | 40-63 | 40-63 | 2-5 - 25-30 | 2-5 - 15-20 | 2-5 - 10-15 | M3-M12 | M10-M24 |
| 311 | 313 | 313 | 314 | 314 | 315 | 315 | 316 | 316 | 317 | 317 | 318 | 318 | 319 | 320 | 320 |
| Vc (m/min) | | | | | | | | | | | | | | | |
| ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 | ● 25-30 |
| ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 | ● 20-25 |
| ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 | ● 12-18 | ○ 12-18 | ○ 12-18 | ○ 12-18 |
| | | | | | | | | | | | | ○ 4-8 | | | |
| | | | | | | | | | | | | | | | |
| ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ● 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 |
| ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ● 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 | ● 15-24 |
| | | | | | | | | | | | | | | | |
| ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 | ○ 9-13 |
| ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 | ● 9-13 |
| | | | | | | | | | | | | | | | |
| ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 |
| ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 |
| ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 | ● 15-30 |
| ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 | ● 25-35 |
| ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 |
| ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 | ● 30-50 |
| | | | | | | | | | | | | | | | |
| ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 |
| ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 | ● 35-70 |
| ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 | ● 12-24 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | ○ 4-6 | | | |
| | | | | | | | | | | | | ○ 2-5 | | | |
| ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 | ○ 6-10 | ○ 4-10 | ○ 4-10 | ○ 4-10 |
| | | | | | | | | | | | | ○ 4-6 | | | |
| | | | | | | | | | | | | ○ 2-5 | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | | | | | | |
|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | 5101 | 5102 | 5103 | 5157 | 5158 |
| Z | 2 | 2 | 2 | 2 | 2 |
| Punta/Poin/Point | 118° | 118° | 118° | 118° | 118° |
| Mat. | HSS | HSSCo | HSS | HSS | HSS |
| Rec./Rev./Coat. | | | TiAlN | | TiAlN |
| DIN | | | | | |
| Form. | | | | 35° | 35° |
| Gama/Gamme/Range | 3-14 - 6-25,40 | 3-14 - 26-40 | 3-14 - 46-60 | 4-12 - 6-37 | 4-12 - 6-30 |
| Pag. | 303 | 303 | 304 | 305 | 305 |

| Mat. | | Avance/Feed (mm/rpm) HSS/HSSCo - HM=x1,5 | | | | | | | | | | Vc (m/min) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ø2 | Ø5 | Ø10 | Ø15 | Ø20 | Ø25 | Ø30 | Ø35 | Ø40 | Ø40 | | | | | |
| P.1 | <600 | 0,05 | 0,08 | 0,12 | 0,14 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | 0,40 | ● 25-30 | ● 25-30 | ● 30-35 | ● 25-30 | ● 30-35 |
| P.2 | <800 | 0,04 | 0,07 | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,22 | 0,22 | 0,30 | ● 20-25 | ● 20-25 | ● 25-30 | ● 20-25 | ● 25-30 |
| P.3 | <1000 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 | 0,10 | 0,12 | 0,12 | 0,22 | ○ 12-18 | ● 12-18 | ○ 15-20 | ○ 12-18 | ○ 15-20 |
| P.4 | <1200 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 | 0,10 | 0,12 | 0,12 | 0,22 | | ○ 4-8 | | | |
| P.5 | | | | | | | | | | | 0,16 | | | | | |
| M.1 | <950 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 | 0,11 | 0,12 | 0,16 | ○ 4-10 | ● 4-10 | ○ 6-12 | ○ 4-10 | ○ 6-12 |
| M.2 | | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 | 0,11 | 0,12 | 0,16 | ○ 4-10 | ● 4-10 | ○ 6-12 | ○ 4-10 | ○ 6-12 |
| M.3 | <1200 | | | | | | | | | | 0,16 | | | | | |
| M.4 | | | | | | | | | | | 0,16 | | | | | |
| K.1 | <500 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,25 | 0,25 | 0,30 | 0,30 | 0,35 | ● 15-24 | ● 15-24 | ● 20-30 | ● 15-24 | ● 20-30 |
| K.2 | | | | | | | | | | | | | | | | |
| K.3 | <800 | 0,06 | 0,07 | 0,08 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | 0,30 | ○ 9-13 | ○ 9-13 | ○ 12-16 | ○ 9-13 | ○ 12-16 |
| K.4.1 | | 0,06 | 0,07 | 0,08 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | 0,30 | ● 9-13 | ● 9-13 | ● 12-16 | ● 9-13 | ● 12-16 |
| K.4.2 | <1400 | | | | | | | | | | 0,22 | | | | | |
| N.1.1 | Al | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | 0,40 | ● 40-60 | ● 40-60 | ● 50-70 | ● 40-60 | ● 50-70 |
| N.1.2 | | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,25 | 0,25 | 0,30 | 0,30 | 0,40 | ● 25-40 | ● 25-40 | ● 30-50 | ● 25-40 | ● 30-50 |
| N.1.3 | | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,25 | 0,25 | 0,30 | 0,30 | 0,35 | ● 15-30 | ● 15-30 | ● 20-40 | ● 15-30 | ● 20-40 |
| N.2.1 | Cu | 0,06 | 0,07 | 0,08 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,25 | 0,30 | ● 25-35 | ● 25-35 | ● 30-40 | ● 25-35 | ● 30-40 |
| N.2.2 | | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | 0,40 | ● 35-45 | ● 35-45 | ● 40-60 | ● 35-45 | ● 40-60 |
| N.2.3 | | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | 0,30 | ● 25-35 | ● 25-35 | ● 30-50 | ● 25-35 | ● 30-50 |
| N.2.4 | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | 0,10 | 0,13 | 0,16 | 0,20 | 0,25 | 0,30 | 0,30 | 0,35 | 0,35 | 0,40 | ● 40-60 | ● 40-60 | ● 60-80 | ● 40-60 | ● 60-80 |
| N.4.1 | Plastic | 0,10 | 0,12 | 0,14 | 0,18 | 0,20 | 0,24 | 0,30 | 0,35 | 0,40 | 0,40 | ● 30-50 | ● 30-50 | ● 35-50 | ● 30-50 | ● 35-50 |
| N.4.2 | | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,20 | 0,25 | 0,35 | ● 12-24 | ● 12-24 | ● 15-30 | ● 12-24 | ● 15-30 |
| N.4.3 | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | 0,04 | 0,07 | 0,1 | 0,12 | 0,14 | 0,18 | 0,2 | 0,22 | 0,22 | 0,22 | | | | | |
| S.1.2 | | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,1 | 0,1 | 0,12 | 0,12 | 0,16 | | | | | |
| S.2.1 | Ti | 0,04 | 0,07 | 0,1 | 0,12 | 0,14 | 0,18 | 0,2 | 0,22 | 0,22 | 0,22 | ○ 4-10 | ● 6-10 | ○ 8-12 | ○ 4-10 | ○ 8-12 |
| S.2.2 | | 0,04 | 0,07 | 0,1 | 0,12 | 0,14 | 0,18 | 0,2 | 0,22 | 0,22 | 0,22 | | | | | |
| S.2.3 | | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,1 | 0,1 | 0,12 | 0,12 | 0,16 | | | | | |
| H.1 | 50 HRC | | | | | | | | | | 0,16 | | | | | |
| H.2 | 55 HRC | | | | | | | | | | 0,16 | | | | | |
| H.3 | 60 HRC | | | | | | | | | | 0,16 | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



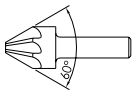
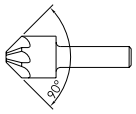
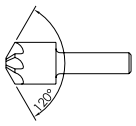
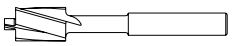
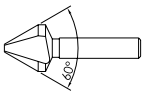
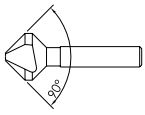
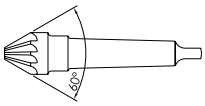
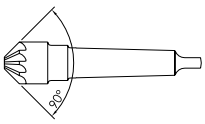
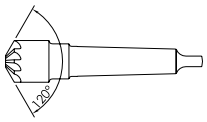
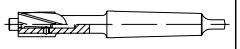
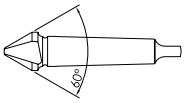
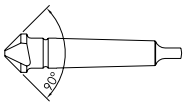
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

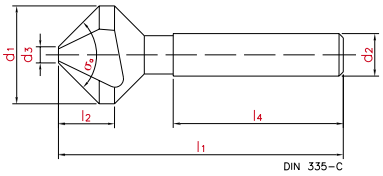
| | | | |
|---|---|---|---|
| 5105 | 5106 | 5160 | 5109 |
| 2 | 2 | 2 | 4 |
| 118° | 118° | 118° | 118° |
| HSS | HSS | HSS | HSS |
| | TiAlN | | |
| | | | |
| | | | |
| 4-12 - 50-60 | 4-12 - 30-40 | M8-M40 | 9-36 - 25-58 |
| 306 | 306 | 307 | 307 |
| Vc (m/min) | | | |
| ● 20-25 | ● 30-35 | ● 25-30 | ● 25-30 |
| ● 20-25 | ● 25-30 | ● 20-25 | ● 20-25 |
| ○ 12-18 | ○ 15-20 | ○ 12-18 | ○ 12-18 |
| | | | |
| | | | |
| ○ 4-10 | ○ 6-12 | ○ 4-10 | ○ 4-10 |
| ○ 4-10 | ○ 6-12 | ○ 4-10 | ○ 4-10 |
| | | | |
| | | | |
| ● 15-24 | ● 20-30 | ● 15-24 | ● 15-24 |
| | | | |
| ○ 9-13 | ○ 12-16 | ○ 9-13 | ○ 9-13 |
| ● 9-13 | ● 12-16 | ● 9-13 | ● 9-13 |
| | | | |
| ● 40-60 | ● 50-70 | ● 40-60 | ● 40-60 |
| ● 25-40 | ● 30-50 | ● 25-40 | ● 25-40 |
| ● 15-30 | ● 20-40 | ● 15-30 | ● 15-30 |
| ● 25-35 | ● 30-40 | ● 25-35 | ● 25-35 |
| ● 35-45 | ● 40-60 | ● 35-45 | ● 35-45 |
| ● 25-35 | ● 30-50 | ● 25-35 | ● 25-35 |
| | | | |
| ● 40-60 | ● 60-80 | ● 40-60 | ● 40-60 |
| ● 30-50 | ● 35-50 | ● 30-50 | ● 30-50 |
| ● 12-24 | ● 15-30 | ● 12-24 | ● 12-24 |
| | | | |
| | | | |
| | | | |
| ○ 4-10 | ○ 8-12 | ○ 4-10 | ○ 4-10 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

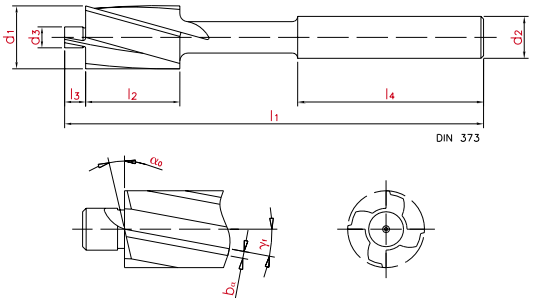
● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TERMINOLOGÍA
# TERMINOLOGIE / TERMINOLOGY

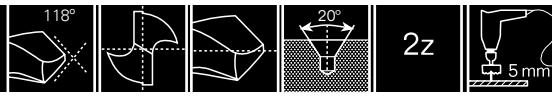
| MANGO QUEUE SHANK | RANURA RAINURE GROOVE | FORMA FORME FORM | DIN 334 | DIN 335 | DIN 347 | PLANOS PLANES FLAT | |
|---|---|---|---|---|---|---|---|
| | | | 60º | 90º | 120º | | |
| CILÍNDRICO CYLINDRIQUE CYLINDRICAL | >4 | A |  |  |  | DIN 373 |  |
| | 3 | C |  |  | | | |
| CÓNICO CONIQUE TAPERED | >4 | B |  |  |  | DIN 375 |  |
| | 3 | D |  |  | | | |



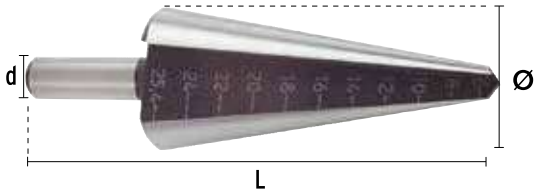

| | |
|---|---|
| **l1** | **Longitud total** / Longueur totale / Total length |
| **l2** | **Longitud diámetro mayor** / Longueur du plus grand diamètre / Greater diametre length |
| **l3** | **Longitud diámetro menor** / Longueur du plus petit diamètre / Lesser diametre length |
| **l4** | **Longitud mango** / Longueur queue / Shank length |
| **ba** | **Ancho de fase** / Largeur de phase / Phase width |
| **d2** | **Diámetro de mango** / Diamètre de queue / Shank diametre |
| **d1** | **Diámetro mayor** / Plus grand diamètre / Greater diametre |
| **d3** | **Diámetro menor** / Plus petit diamètre / Lesser diametre |
| **d6** | **Diámetro interno** / Diamètre interne / Interior diametre |
| **σa** | **Ángulo de avellanado** / Angle de chanfreinage / Countersink angle |
| **α0** | **Ángulo de destalonado** / Angle de détalonnage / Relief angle |
| **γ0** | **Ángulo corte ortogonal** / Angle coupe orthogonale / Orthogonal cut angle |
| **γf** | **Ángulo de corte lateral** / Angle de coupe latérale / Lateral cut angle |
| **γp** | **Ángulo corte posterior** / Angle coupe postérieure / Rear cut angle |
| **χr** | **Ángulo de posición** / Angle de position / Angle of position |

## 5101 HSS




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-60 | 25-45 | 40-60 | 12-50 | | 4-10 | | | |

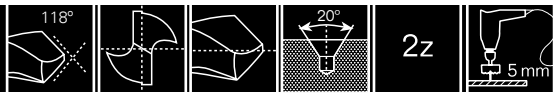
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 3,00 - 14,00 | 6 | *20,04* | 62 | 1 |
| 6,00 - 20,00 | 8 | *27,97* | 70 | 1 |
| 16,00 - 30,00 | 10 | *56,92* | 78 | 1 |
| 26,00 - 40,00 | 12 | *120,49* | 86 | 1 |
| 36,00 - 50,00 | 12 | *185,61* | 90 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 46,00 - 60,00 | 13 | *361,12* | 94 | 1 |
| 6,00 - 30,00 | 10 | *69,95* | 106 | 1 |
| 6,00 - 22,50 | 8 | *50,53* | 80 | 1 |
| 6,00 - 25,40 | 8 | *56,39* | 84 | 1 |

## 5102 HSSCO




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | ● | ● | | ● | ● | ● | ● | | ● | | | |
| 20-30 | 12-18 | 4-8 | | 4-10 | | 15-24 | 9-13 | | 15-60 | 25-45 | 40-60 | 12-50 | | 6-10 | | | |

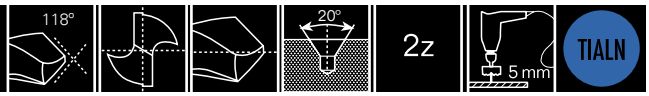
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 3,00 - 14,00 | 6 | *28,18* | 62 | 1 |
| 6,00 - 20,00 | 8 | *36,72* | 70 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 16,00 - 30,00 | 10 | *70,37* | 78 | 1 |
| 26,00 - 40,00 | 12 | *144,62* | 86 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 5103 HSS




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-35 | ○ 15-20 | | | ○ 6-12 | | ● 20-30 | ● 12-16 | | ● 20-70 | ● 30-60 | ● 60-80 | ● 15-50 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 3,00 - 14,00 | 6 | *55,00* | 62 | 1 |
| 6,00 - 20,00 | 8 | *65,29* | 70 | 1 |
| 6,00 - 30,00 | 10 | *119,91* | 106 | 1 |
| 16,00 - 30,00 | 10 | *104,93* | 78 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 26,00 - 40,00 | 12 | *185,82* | 86 | 1 |
| 36,00 - 50,00 | 12 | *264,69* | 90 | 1 |
| 46,00 - 60,00 | 13 | *455,93* | 94 | 1 |

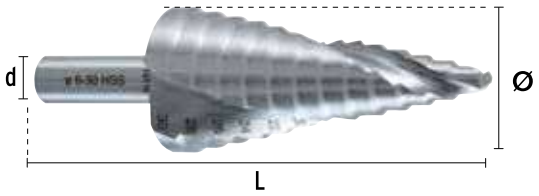


P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5157 HSS

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-60 | 25-45 | 40-60 | 12-50 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



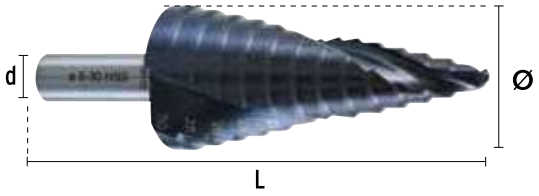

| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 4,00 - 12,00 | 6 | 1 | *59,79* | 70 | 1 |
| 4,00 - 20,00 | 8 | 2 | *87,75* | 77 | 1 |

| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 6,00 - 30,00 | 10 | 2 | *122,31* | 98 | 1 |
| 6,00 - 37,00 | 10 | PG | *190,81* | 100 | 1 |

## 5158 HSS

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 25-35 | 15-20 | | | 6-12 | | 20-30 | 12-16 | | 20-70 | 30-60 | 60-80 | 15-50 | | 8-12 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

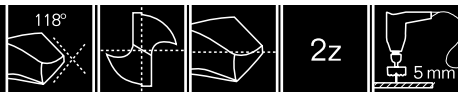



| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 4,00 - 12,00 | 6 | 1 | *89,69* | 70 | 1 |
| 4,00 - 20,00 | 8 | 2 | *131,61* | 77 | 1 |

| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 6,00 - 30,00 | 10 | 2 | *183,47* | 98 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5105 HSS



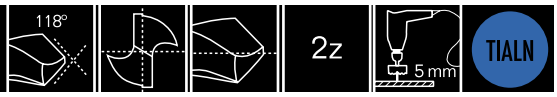

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-60 | 25-45 | 40-60 | 12-50 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 4,00 - 12,00 | 6 | 1 | *41,01* | 69 | 1 |
| 4,00 - 12,00 | 6 | 2 | *42,84* | 69 | 1 |
| 4,00 - 20,00 | 8 | 2 | *55,34* | 75 | 1 |
| 6,00 - 30,00 | 10 | 2 | *84,05* | 95 | 1 |
| 12,00 - 20,00 | 9 | 1 | *75,60* | 75 | 1 |

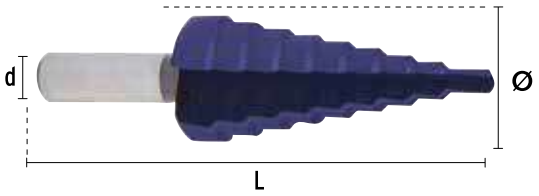
| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 20,00 - 30,00 | 12 | 1 | 105,24 | *93* | 1 |
| 30,00 - 40,00 | 12 | 1 | 190,55 | *93* | 1 |
| 40,00 - 50,00 | 12 | 1 | 276,29 | *97* | 1 |
| 50,00 - 60,00 | 13 | 1 | 402,02 | *97* | 1 |

## 5106 HSS




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 25-35 | 15-20 | | | 6-12 | | 20-30 | 12-16 | | 20-70 | 30-60 | 60-80 | 15-50 | | 8-12 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



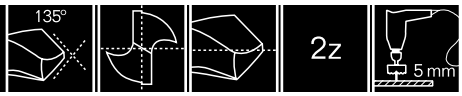

| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 4,00 - 12,00 | 6 | 1 | *96,53* | 69 | 1 |
| 4,00 - 12,00 | 6 | 2 | *99,95* | 69 | 1 |
| 4,00 - 20,00 | 8 | 2 | *126,97* | 75 | 1 |
| 6,00 - 30,00 | 10 | 2 | *182,35* | 95 | 1 |

| Ø mm | d mm | Grad. mm | € | L mm | |
|---|---|---|---|---|---|
| 12,00 - 20,00 | 9 | 1 | *114,78* | 75 | 1 |
| 20,00 - 30,00 | 12 | 1 | *170,91* | 93 | 1 |
| 30,00 - 40,00 | 12 | 1 | *309,57* | 93 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 5160 HSS MULTI

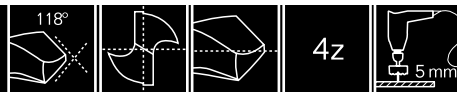



| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-60 | ● 25-45 | ● 40-60 | ● 12-50 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

| M | Ciego Borgne Bling | Pasante Debouchant Bushing | d mm | € | L mm | |
|---|---|---|---|---|---|---|
| M8 | - | Ø 8,5 | 12 | | 97 | |
| M10 | Ø 8,5 | Ø 10,5 | 12 | | 97 | |
| M12 | Ø 10,5 | Ø 12,5 | 12 | | 97 | |
| M16 | Ø 14,5 | Ø 16,5 | 12 | *176,4* | 97 | 1 |
| M20 | Ø 18,5 | Ø 20,5 | 12 | | 97 | |
| M25 | Ø 23,5 | Ø 25,5 | 12 | | 97 | |
| M32 | Ø 30,5 | Ø 32,5 | 12 | | 97 | |
| M40 | Ø 38,5 | Ø 40,5 | 12 | | 97 | |

## 5109 HSS




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-60 | ● 25-45 | ● 40-60 | ● 12-50 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternativo

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 9,00 - 36,00 | 10 | *220,40* | 88 | 1 |
| 25,00 - 58,00 | 10 | *540,76* | 91 | 1 |

***(Hasta fin de existencias** / Jusqu'à épuisement des stocks / While supplies last)*

## 5112 **Broca piloto /** Foret pilote / Pilot drill-bit

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 7,00 | 4 | *36,30* | 40 | 1 |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)

## 5159 HM-MD DIN335C

90° | 3z | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 35-80 | ● 30-40 | ● 15-25 | ● 10-15 | ● 20-30 | ● 15-25 | ● 40-70 | ● 25-35 | ● 20-30 | ● 40-120 | ● 40-100 | ● 80-140 | ● 30-100 | ● 10-25 | ● 10-30 | ● 6-10 | ● 6-10 | ○ 4-8 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,30 | 6 | *76,65* | 50 | 1 |
| 8,30 | 6 | *84,61* | 50 | 1 |
| 10,40 | 8 | *88,35* | 50 | 1 |
| 12,40 | 8 | *95,10* | 50 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 16,50 | 10 | *105,84* | 60 | 1 |
| 20,50 | 10 | *116,51* | 60 | 1 |
| 25,00 | 10 | *159,37* | 67 | 1 |
| 31,00 | 12 | *215,17* | 71 | 1 |

## 5116 HSS DIN 335 C

90° | 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 4,30 | 4 | *16,84* | 40 | 1 |
| 5,00 | 4 | *16,84* | 40 | 1 |
| 5,30 | 4 | *16,84* | 40 | 1 |
| 5,80 | 5 | *16,84* | 45 | 1 |
| 6,00 | 5 | *15,04* | 45 | 1 |
| 6,30 | 5 | *14,81* | 45 | 1 |
| 7,00 | 6 | *16,84* | 50 | 1 |
| 7,30 | 6 | *16,84* | 50 | 1 |
| 8,00 | 6 | *16,84* | 50 | 1 |
| 8,30 | 6 | *14,37* | 50 | 1 |
| 9,40 | 6 | *19,64* | 50 | 1 |
| 10,00 | 6 | *17,02* | 50 | 1 |
| 10,40 | 6 | *16,71* | 50 | 1 |
| 11,50 | 8 | *19,74* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 12,40 | 8 | *16,80* | 56 | 1 |
| 13,40 | 8 | *21,34* | 56 | 1 |
| 15,00 | 10 | *27,09* | 60 | 1 |
| 16,50 | 10 | *23,09* | 60 | 1 |
| 19,00 | 10 | *39,89* | 63 | 1 |
| 20,50 | 10 | *33,97* | 63 | 1 |
| 23,00 | 10 | *49,08* | 67 | 1 |
| 25,00 | 10 | *42,86* | 67 | 1 |
| 26,00 | 10 | *58,23* | 67 | 1 |
| 28,00 | 12 | *71,65* | 71 | 1 |
| 30,00 | 12 | *53,30* | 71 | 1 |
| 31,00 | 12 | *98,19* | 71 | 1 |
| 40,00 | 13 | *113,65* | 80 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5117 HSSCO DIN 335 C

90° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | ● | ● | | ● | ● | ● | ● | ○ | ● | | | |
| 20-30 | 12-18 | 4-8 | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | 2-6 | 2-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,00 | 5 | *15,69* | 45 | 1 |
| 6,30 | 5 | *15,69* | 45 | 1 |
| 8,00 | 6 | *21,68* | 50 | 1 |
| 8,30 | 6 | *21,69* | 50 | 1 |
| 9,40 | 6 | *25,34* | 50 | 1 |
| 10,00 | 6 | *25,34* | 50 | 1 |
| 10,40 | 6 | *25,34* | 50 | 1 |
| 11,50 | 8 | *27,92* | 56 | 1 |
| 12,40 | 8 | *27,92* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 15,00 | 10 | *38,20* | 60 | 1 |
| 16,50 | 10 | *38,21* | 60 | 1 |
| 19,00 | 10 | *56,26* | 63 | 1 |
| 20,50 | 10 | *56,26* | 63 | 1 |
| 25,00 | 10 | *71,07* | 57 | 1 |
| 30,00 | 12 | *107,37* | 71 | 1 |
| 31,00 | 12 | *114,45* | 71 | 1 |
| 40,00 | 13 | *140,10* | 80 | 1 |

## 5118 HSS DIN 335 C

90° 3z TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 25-35 | 15-20 | | | 6-12 | | 20-30 | 12-16 | | 20-100 | 30-75 | 75-115 | 15-90 | | 8-12 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 4,30 | 4 | *33,35* | 40 | 1 |
| 5,00 | 4 | *33,35* | 40 | 1 |
| 5,30 | 4 | *33,35* | 40 | 1 |
| 5,80 | 5 | *29,31* | 45 | 1 |
| 6,00 | 5 | *28,65* | 45 | 1 |
| 6,30 | 5 | *28,65* | 45 | 1 |
| 7,00 | 6 | *38,24* | 50 | 1 |
| 7,30 | 6 | *38,24* | 50 | 1 |
| 8,00 | 6 | *38,24* | 50 | 1 |
| 8,30 | 6 | *38,24* | 50 | 1 |
| 9,40 | 6 | *43,19* | 50 | 1 |
| 10,00 | 6 | *43,19* | 50 | 1 |
| 10,40 | 6 | *43,19* | 50 | 1 |
| 11,50 | 8 | *45,73* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 12,40 | 8 | *45,73* | 56 | 1 |
| 13,40 | 8 | *47,24* | 56 | 1 |
| 15,00 | 10 | *63,48* | 60 | 1 |
| 16,50 | 10 | *65,21* | 60 | 1 |
| 19,00 | 10 | *79,55* | 63 | 1 |
| 20,50 | 10 | *81,24* | 63 | 1 |
| 23,00 | 10 | *92,56* | 67 | 1 |
| 25,00 | 10 | *93,85* | 67 | 1 |
| 26,00 | 12 | *101,78* | 71 | 1 |
| 28,00 | 12 | *119,29* | 71 | 1 |
| 30,00 | 12 | *123,77* | 71 | 1 |
| 31,00 | 12 | *128,29* | 71 | 1 |
| 40,00 | 13 | *195,83* | 80 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5119 HSSCO DIN 335 C

90° | 3z | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-35 | ● 15-20 | ○ 6-10 | | ● 6-12 | ○ 4-6 | ● 20-30 | ● 12-16 | ○ 6-10 | ● 20-100 | ● 30-75 | ● 75-115 | ● 15-90 | ● 3-8 | ● 3-12 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,30 | 5 | *32,21* | 45 | 1 |
| 8,30 | 6 | *43,19* | 50 | 1 |
| 10,40 | 6 | *49,17* | 50 | 1 |
| 12,40 | 8 | *53,92* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 16,50 | 10 | *76,46* | 60 | 1 |
| 20,50 | 10 | *97,71* | 63 | 1 |
| 25,00 | 10 | *114,68* | 67 | 1 |
| 30,00 | 12 | *155,04* | 71 | |

## 1505 HSS DIN 335 C Hex.

90° | 1/4" | 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | L mm | € | |
|---|---|---|---|
| 6,30 | 31 | *9,80* | 1 |
| 8,30 | 32 | *11,33* | 1 |
| 10,40 | 34 | *13,47* | 1 |

| Ø mm | L mm | € | |
|---|---|---|---|
| 12,40 | 36 | *15,88* | 1 |
| 16,50 | 40 | *23,46* | 1 |
| 20,50 | 43 | *28,40* | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5120 HSS DIN 335 C

90° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | L mm | € | |
|---|---|---|---|
| 12,00 | 120 | *19,47* | 1 |
| 12,40 | 130 | *25,08* | 1 |
| 15,00 | 150 | *33,87* | 1 |
| 16,00 | 150 | *25,98* | 1 |

| Ø mm | L mm | € | |
|---|---|---|---|
| 16,50 | 150 | *34,71* | 1 |
| 19,00 | 150 | *47,57* | 1 |
| 20,50 | 150 | *47,57* | 1 |
| 25,00 | 150 | *57,65* | 1 |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)

## 5121 HSS DIN 335 C EL

90° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 10,40 | 6 | *64,00* | 112 | 1 |
| 12,40 | 8 | *78,03* | 120 | 1 |
| 16,50 | 10 | *94,03* | 120 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 20,50 | 10 | *126,05* | 124 | 1 |
| 25,00 | 10 | *152,04* | 128 | 1 |
| 31,00 | 12 | *178,08* | 133 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 5122 HSS DIN 335 C

120° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,30 | 5 | *16,74* | 45 | 1 |
| 8,30 | 6 | *23,07* | 50 | 1 |
| 10,40 | 6 | *26,93* | 50 | 1 |
| 12,40 | 8 | *32,25* | 56 | 1 |

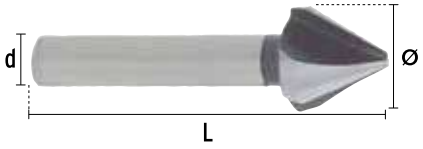
| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 16,50 | 10 | *40,81* | 60 | 1 |
| 20,50 | 10 | *60,21* | 63 | 1 |
| 25,00 | 10 | *75,92* | 71 | 1 |

## 5123 HSS DIN 334 C

60° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

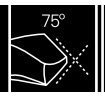



| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,30 | 5 | *20,41* | 45 | 1 |
| 8,00 | 6 | *22,45* | 50 | 1 |
| 10,00 | 6 | *24,49* | 53 | 1 |
| 12,50 | 8 | *27,13* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 16,00 | 10 | *34,71* | 63 | 1 |
| 20,00 | 10 | *48,97* | 67 | 1 |
| 25,00 | 10 | *68,36* | 71 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5124 HSS DIN 335 C




3z

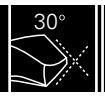
| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,30 | 5 | *15,71* | 45 | 1 |
| 8,30 | 6 | *21,42* | 50 | 1 |
| 10,40 | 6 | *25,32* | 50 | 1 |
| 12,40 | 8 | *27,96* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 16,50 | 10 | *35,08* | 60 | 1 |
| 20,50 | 10 | *51,63* | 63 | 1 |
| 25,00 | 10 | *65,08* | 67 | 1 |

## 5161 HSS




3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 6,30 | 5 | *36,75* | 50 | 1 |
| 12,40 | 8 | *51,45* | 65 | 1 |
| 16,50 | 10 | *62,48* | 73 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 20,50 | 10 | *84,53* | 83 | 1 |
| 25,00 | 10 | *113,93* | 90 | 1 |
| 31,00 | 12 | *161,70* | 98 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5125 HSS DIN 335 C

90° | 1z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 10,00 | 8 | *13,20* | 46 | 1 |
| 12,00 | 8 | *14,61* | 46 | 1 |
| 16,00 | 8 | *20,00* | 47 | 1 |
| 20,00 | 8 | *30,61* | 47 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 25,00 | 10 | *42,04* | 50 | 1 |
| 30,00 | 12 | *71,43* | 71 | 1 |
| 31,00 | 12 | *75,62* | 71 | 1 |

## 5126 HSS DIN 334 A

60° | z ≥ 4

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 12,50 | 8 | *24,73* | 50 | 1 |
| 16,00 | 10 | *41,51* | 60 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 20,00 | 10 | *53,54* | 60 | 1 |
| 25,00 | 10 | *74,92* | 65 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 5127 HSS DIN 335 A

90° | z ≥ 4

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 8,00 | 8 | *13,51* | 48 | 1 |
| 12,50 | 8 | *19,78* | 48 | 1 |
| 16,00 | 10 | *33,26* | 56 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 20,00 | 10 | *42,83* | 60 | 1 |
| 25,00 | 10 | *59,98* | 65 | 1 |

## 5129 HSS DIN 335 D

90° | 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| △ | Ø mm | € | L mm | |
|---|---|---|---|---|
| 2 | 20,50* | *102,05* | 100 | 1 |
| 2 | 23,00* | *106,04* | 106 | 1 |
| 2 | 25,00 | *106,04* | 106 | 1 |
| 2 | 26,00 | *106,04* | 106 | 1 |
| 2 | 28,00 | *108,03* | 112 | 1 |
| 2 | 30,00 | *114,04* | 112 | 1 |
| 2 | 31,00 | *118,04* | 112 | 1 |

| △ | Ø mm | € | L mm | |
|---|---|---|---|---|
| 2 | 34,00 | *124,04* | 118 | 1 |
| 2 | 37,00 | *136,04* | 118 | 1 |
| 3 | 40,00 | *170,06* | 140 | 1 |
| 3 | 50,00 | *214,06* | 150 | 1 |
| 4 | 63,00 | *346,11* | 180 | 1 |
| 4 | 80,00 | *592,21* | 190 | 1 |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 5130 HSS DIN 334 D

60° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| △ | Ø mm | € | L mm | |
|---|---|---|---|---|
| 3 | 40,00 | *218,25* | 150 | 1 |
| 3 | 50,00 | *311,82* | 160 | 1 |
| 4 | 63,00 | *491,07* | 190 | 1 |

## 5132 HSS DIN 334 D

120° 3z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| △ | Ø mm | € | L mm | |
|---|---|---|---|---|
| 3 | 40,00 | *187,07* | 134 | 1 |
| 3 | 50,00 | *241,66* | 142 | 1 |
| 4 | 63,00 | *394,55* | 178 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 5133 HSS DIN 335 D

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 2,00 - 5,00 | 6 | *17,15* | 45 | 1 |
| 5,00 - 10,00 | 8 | *21,42* | 48 | 1 |
| 10,00 - 15,00 | 10 | *38,38* | 65 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 15,00 - 20,00 | 12 | *68,55* | 85 | 1 |
| 20,00 - 25,00 | 15 | *115,70* | 95 | 1 |
| 25,00 - 30,00 | 15 | *177,72* | 100 | 1 |

## 5134 HSSCO

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | | ● | ● | | ● | ● | ● | ● | ○ | ○ | | | |
| 20-30 | 12-18 | 4-8 | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | 2-6 | 2-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 2,00 - 5,00 | 6 | *20,41* | 45 | 1 |
| 5,00 - 10,00 | 8 | *25,53* | 48 | 1 |

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 10,00 - 15,00 | 10 | *45,54* | 65 | 1 |
| 15,00 - 20,00 | 12 | *81,63* | 85 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 5135 HSS

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ○ | | | ○ | | ● | ● | | ● | ● | ● | ● | | ○ | | | |
| 20-30 | 12-18 | | | 4-10 | | 15-24 | 9-13 | | 15-80 | 25-60 | 60-90 | 12-70 | | 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | |
|---|---|---|---|---|
| 2,00 - 5,00 | 6 | *20,41* | 45 | 1 |
| 5,00 - 10,00 | 8 | *25,53* | 48 | 1 |
| 10,00 - 15,00 | 10 | *45,71* | 65 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 5136 HSS DIN 373 — ALLEN — ISO 4206

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| M | Ø mm | P mm | € | L mm | |
|---|---|---|---|---|---|
| M3 | 6,00 | 3,20 | *23,88* | 71 | 1 |
| M4 | 8,00 | 4,30 | *24,98* | 71 | 1 |
| M5 | 10,00 | 5,30 | *24,11* | 80 | 1 |
| M6 | 11,00 | 6,40 | *25,47* | 80 | 1 |

| M | Ø mm | P mm | € | L mm | |
|---|---|---|---|---|---|
| M8 | 15,00 | 8,40 | *33,29* | 100 | 1 |
| M10 | 18,00 | 10,50 | *43,42* | 100 | 1 |
| M12 | 20,00 | 13,00 | *54,02* | 100 | 1 |

## 5137 HSS DIN 375 — ALLEN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 20-30 | ○ 12-18 | | | ○ 4-10 | | ● 15-24 | ● 9-13 | | ● 15-80 | ● 25-60 | ● 60-90 | ● 12-70 | | ○ 4-10 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| △ | M | Ø mm | P mm | € | L mm | |
|---|---|---|---|---|---|---|
| 2 | M10 | 18,00 | 10,50 | *60,28* | 140 | 1 |
| 2 | M12 | 20,00 | 13,00 | *73,22* | 140 | 1 |
| 2 | M14 | 24,00 | 15,00 | *95,99* | 150 | 1 |
| 3 | M16 | 26,00 | 17,00 | *115,76* | 180 | 1 |

| △ | M | Ø mm | P mm | € | L mm | |
|---|---|---|---|---|---|---|
| 3 | M18 | 30,00 | 19,00 | *124,82* | 1 | 1 |
| 3 | M20 | 33,00 | 21,00 | *159,18* | 1 | 1 |
| 3 | M22 | 36,00 | 23,00 | *178,95* | 1 | 1 |
| 3 | M24 | 40,00 | 25,00 | *197,28* | 1 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 5142 Ø 6 a 19 mm

| Ø mm | |
|---|---|
| 6 - 8 - 10 - 11,5 - 15 - 19 | 6 |

›HSS ›HSS CO ›HSS TIALN

| REF. | € |
|---|---|
| HSS | *142,99* |
| HSS CO | *189,82* |
| HSS TIALN | *285,61* |

## 5143 Ø 6,3 a 20,5 mm

| Ø mm | |
|---|---|
| 6,3 - 8,3 - 10,4 - 12,4 - 16,5 - 20,5 | 6 |

›HSS ›HSS CO ›HSS TIALN

| REF. | € |
|---|---|
| HSS | *132,52* |
| HSS CO | *192,32* |
| HSS TIALN | *304,95* |

## 5151 Ø 2-5 a 10-20 mm

| Ø mm | |
|---|---|
| 2-5/5-10/10-15/15-20 | 4 |

›HSS

| REF. | € | |
|---|---|---|
| HSS | *173,85* | 4 |

## 5155 M3 - M10

| Ø mm | |
|---|---|
| M3/M4/M5/M6/M8/M10 | 6 |

›HSS

| REF. | € | |
|---|---|---|
| HSS | *236,05* | 6 |

## 5138 Ø 3 a 14 / 6 a 20 / 16 a 30 mm

| Ø mm | |
|---|---|
| 3-14,6-20,16-30 | 3 |

›HSS

›HSS CO

›HSS TIALN

| REF. | € |
|---|---|
| HSS | *118,30* |
| HSS CO | *148,63* |
| HSS TIALN | *253,55* |

## 5139 Ø 4 a 12 / 12 a 20 / 20 a 30 mm

| Ø mm | X mm | |
|---|---|---|
| 4-12,12-20,20-30 | 1 | 3 |

›HSS

›HSS TIALN

| REF. | € |
|---|---|
| HSS | *246,97* |
| HSS TIALN | *396,24* |

## 5140 Ø 4 a 12 / 4 a 20 / 6 a 30 mm

| Ø mm | X mm | |
|---|---|---|
| 4-12,4-20,6-30 | 2 | 3 |

›HSS

›HSS TIALN

›HSS (35º)

›HSS TIALN (35º)

| REF. | € |
|---|---|
| HSS | *205,73* |
| HSS TIALN | *423,32* |
| HSS (35º) | *283,90* |
| HSS TIALN (35º) | *418,81* |

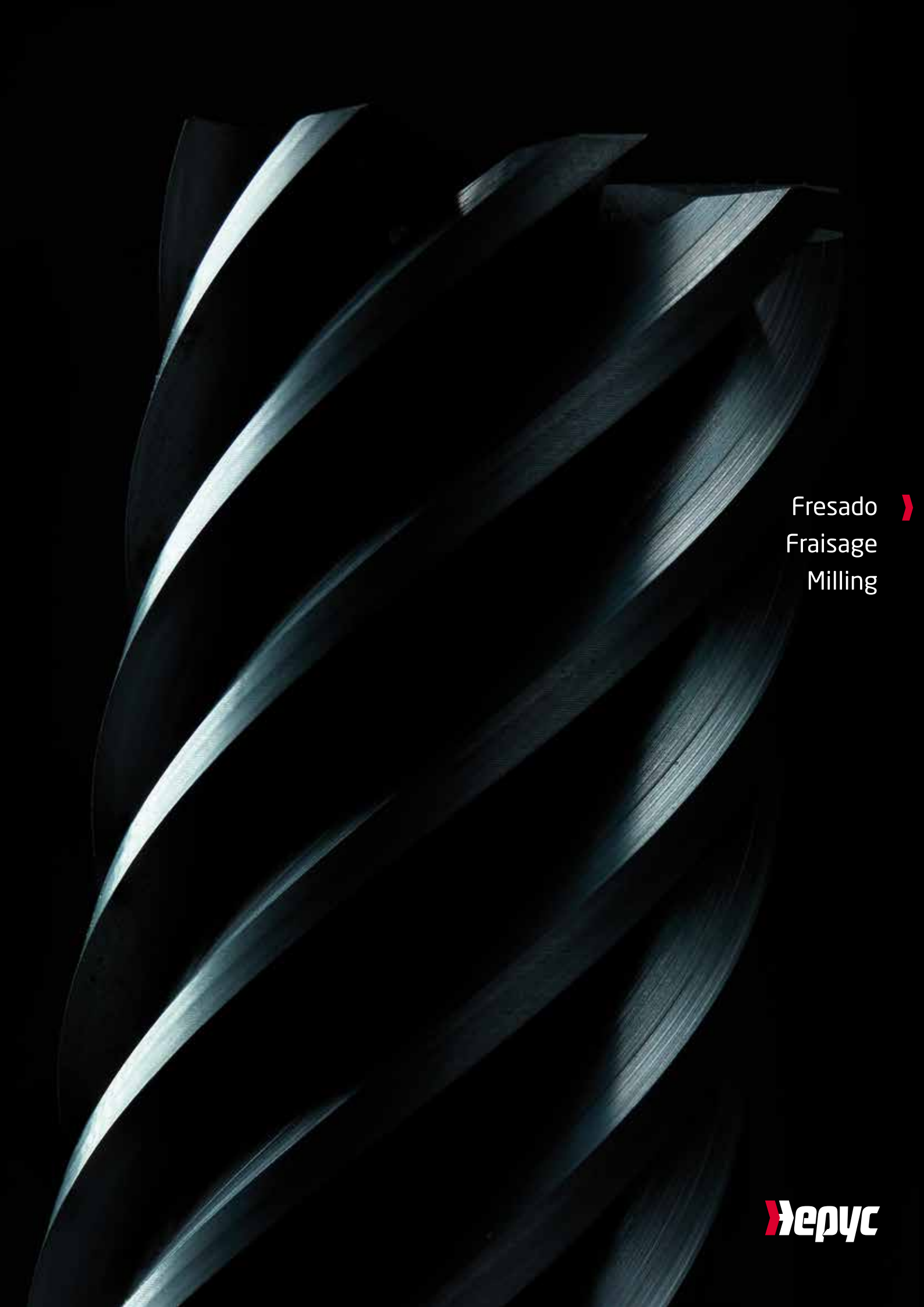
## 5141 Ø 4 a 20 / 6 a 30 mm

| Ø mm | X mm | |
|---|---|---|
| 4-20,6-30 | 2 | 2 |

›HSS

›HSS TIALN

| REF. | € |
|---|---|
| HSS | *160,85* |
| HSS TIALN | *323,37* |



# Fresado
# Fraisage
# Milling

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## **Fresas Metal duro /** Fraises carbure / Hard metal mills


| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3141 | HM-MD | | | | 1z | N | 349 |
| | 3189 | HM-MD | | | | 2z 45° DIN 6535 HA | N | 349 |
| NEW | 3190 | HM-MD | | | | 45° 3z DIN 6535 HA | N | 350 |
| | 3167 | HM-MD | DIN 6527S | TIALN | | 2z 30° DIN 6535 HA | P M K S | 350 |
| | 3168 | HM-MD | DIN 6527L | TIALN | | 2z 30° DIN 6535 HA | P M K S | 351 |
| | 3169 | HM-MD | DIN 6527S | TIALN | | 2z 30° DIN 6535 HA | P M K N H | 352 |
| | 3170 | HM-MD | DIN 6527L | TIALN | | 2z 30° DIN 6535 HA | P M K N H | 352 |
| NEW | 3191 | HM-MD | DIN 6527EL | AlCrN | | 2z 30° DIN 6535 HA | P K S H | 353 |
| | 3171 | HM-MD | DIN 6527S | TIALN | | 3z 30° DIN 6535 HA | P M K S | 353 |
| | 3172 | HM-MD | DIN 6527L | TIALN | | 3z 30° DIN 6535 HA | P M K S | 354 |
| | 3173 | HM-MD | DIN 6527S | TIALN | | 3z 45° DIN 6535 HA | P M K S H | 354 |
| | 3174 | HM-MD | DIN 6527L | TIALN | | 3z 45° DIN 6535 HA | P M K S | 355 |
| | 3175 | HM-MD | DIN 6527S | TIALN | | 4z 30° DIN 6535 HA | P M K S | 356 |
| | 3176 | HM-MD | DIN 6527L | TIALN | | 4z 30° DIN 6535 HA | P M K S | 356 |
| | 3177 | HM-MD | DIN 6527L | TIALN | | 4z 35°38° DIN 6535 HA | P M K S H | 357 |
| NEW | 3192 | HM-MD | DIN 6527 L | AlCrN | | 4z 35°38° DIN 6535 HA | P M K S H | 358 |
| NEW | 3193 | HM-MD | DIN 6527 EL | AlCrN | | 5z 35°38° DIN 6535 HA | P H | 358 |
| | 3178 | HM-MD | DIN 6527L | AlCrN | | 4z 35°38° DIN 6535 HA | P M K S H | 359 |
| | 3179 | HM-MD | DIN 6527L | TIALN | | 6,8z 45° DIN 6535 HA | P M K S H | 360 |




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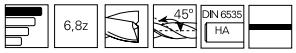
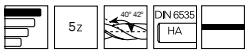
|---|---|---|---|---|---|---|---|
| | 3180 | HM-MD | DIN 6527EL | TIALN | |  | P M K S H | 360 |
| | 3181 | HM-MD | DIN 6527L | TIALN | | | P M K S | 361 |
| | 3183 | HM-MD | | TIALN | | | P M K S H | 361 |
| | 3184 | HM-MD | | TIALN | | | P M K S | 362 |
| | 3185 | HM-MD | | TIALN | | | P M K S | 362 |
| NEW | 3194 | HM-MD | DIN 6527 L | AlCr | | | M S | 363 |
| NEW | 3195 | HM-MD | DIN 6527 EL | AlCr | |  | M S | 363 |
| | 3101 | HM-MD | | | | | P M K S | 364 |
| | 3105 | HM-MD | | | | | P M K S | 364 |
| | 3107 | HM-MD | | | | | P M K S | 365 |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**Fresas HSSE mango cilíndrico cortas /** Fraises HSSE queue cylindrique courtes / HSSE Straight short shank mills


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3120 | HSSE | | | | 1z | N | 366 |
| 3121 | HSSE | | | | 1z | N | 366 |
| 3122 | HSSE | | | | 1z | N | 367 |
| 3186 | HSSE | | | | 40° 2z | P N | 367 |
| 3110 | HSSE | DIN 327 N | | | 30° 2z | P | 368 |
| 3110/1 | HSSE | DIN 327 N | TIALN | | 30° 2z | P K | 369 |
| 3112 | HSSE | DIN 327 N | | | 30° 2z | P | 370 |
| 3112/1 | HSSE | DIN 327 N | TIALN | | 30° 2z | P K S | 370 |
| 3187 | HSSE | DIN 327 N | | | 30° 3z | P | 371 |
| 3187/1 | HSSE | DIN 327 N | TIALN | | 30° 3z | P K | 371 |
| 3114 | HSSE | DIN 844 W | | | 45° 3z | P N | 372 |
| 3114/1 | HSSE | DIN 844 W | TIALN | | 45° 3z | P N | 372 |
| 3115 | HSSE | DIN 844 N | | | 30° z≥4 | P | 373 |
| 3115/1 | HSSE | DIN 844 N | TIALN | | 30° z≥4 | P K S | 373 |
| 3117 | HSSE | DIN 844 NR | | | 30° z≥4 | P | 374 |
| 3117/1 | HSSE | DIN 844 NR | TIALN | | 30° z≥4 | P K | 374 |
| 3119 | HSSE | DIN 844 NRF | | | 30° z≥4 | P K | 375 |
| 3119/1 | HSSE | DIN 844 NRF | TIALN | | 30° z≥4 | P K | 375 |




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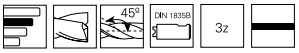
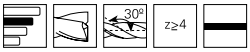
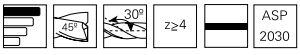
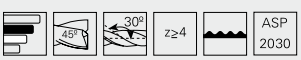
|---|---|---|---|---|---|---|---|
| 3162 | HSSE-PM | DIN 844 N | TIALN | | | P M K S | 376 |
| 3157 | HSSE-PM | DIN 844 NR | TIALN | | | P M K | 376 |
| 3159 | HSSE-PM | DIN 844 NRF | TIALN | | | P M K S | 377 |

**Fresas HSSE mango cilíndrico largas /** Fraises HSSE queue cylindrique longues / HSSE Straight long shank mills

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3111 | HSSE | DIN 844 | | | | P | 378 |
| 3111/1 | HSSE | DIN 844 | | | | P K | 378 |
| 3113 | HSSE | DIN 844 | | | | P | 379 |
| 3113/1 | HSSE | DIN 844 | TIALN | | | P K S | 379 |
| 3188 | HSSE | DIN 327 N | | | | P | 380 |
| 3188/1 | HSSE | DIN 327 N | TIALN | | | P K | 380 |
| 3182 | HSSE | DIN 844 W | | |  | P N | 381 |
| 3182/1 | HSSE | DIN 844 W | TIALN | | | P N | 381 |
| 3116 | HSSE | DIN 844 N | | |  | P | 382 |
| 3116/1 | HSSE | DIN 844 N | TIALN | | | P K S | 382 |
| 3118 | HSSE | DIN 844 NR | | | | P | 383 |
| 3118/1 | HSSE | DIN 844 NR | TIALN | | | P K | 383 |
| 3163 | HSSE-PM | DIN 844 N | TIALN | |  | P M K S | 384 |
| 3158 | HSSE-PM | DIN 844 vNR | TIALN | |  | P M K | 384 |
| 3160 | HSSE-PM | DIN 844 NRF | TIALN | | | P M K S | 385 |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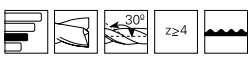
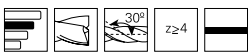
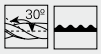
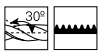
## **Fresas mango cónico** / Fraises queue conique / Tapered shank mills


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3144 | HSSE | DIN 326 N | | | | P N | 386 |
| 3144/1 | HSSE | DIN 326 N | TIALN | | | P K N | 386 |
| 3145 | HSSE | DIN 845 N | | | | P N | 387 |
| 3145/1 | HSSE | DIN 845 N | TIALN | | | P K N S | 387 |
| 3146 | HSSE | DIN 845 NR | | | | P N | 388 |
| 3146/1 | HSSE | DIN 845 NR | TIALN | |  | P K N | 388 |
| 3147 | HSSE | DIN 845 N | | | | P N | 389 |
| 3147/1 | HSSE | DIN 845 N | TIALN | |  | P K N S | 389 |
| 3148 | HSSE | DIN 845 NR | | | | P N | 390 |
| 3148/1 | HSSE | DIN 845 NR | TIALN | | | P K N | 390 |


## **Fresas con agujero /** Fraises à trou / Mills with holes


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3149 | HSSE | DIN 1880 N | | | | P M K N S | 391 |
| 3150 | HSSE | DIN 1880 NR | | |  | P M K N S | 391 |
| 3165 | HSSE | DIN 1880 NRF | | |  | P M K N S | 392 |
| 3151 | HSSE | DIN 885 D | | | | P K N | 392 |
| 3161 | HSSE | DIN 885 A | | | | P M K N S | 393 |
| 3166 | HSSE | DIN 1834 A | | | | P K N | 393 |

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## **Fresas HSSE especiales /** Fraises HSSE spéciales / HSSE Special mills


| | | | | | | |
|---|---|---|---|---|---|---|
| 3152 | HSSE | DIN 850 D | | Tol D (h11) d (h8) l (e8) | P N | 394 |
| 3153 | HSSE | DIN 851 N | | Tol D (h11) d (h8) l (d11) ISO 3337 | P N | 394 |
| 3154 | HSSE | DIN 851 B | | Tol D (h11) l (d11) ISO 1641 | P N | 395 |
| 3155 | HSSE | DIN 1833 A | | Tol D (js11) d (h8) ISO 3859 | P N | 395 |
| 3156 | HSSE | DIN 1833 B | | Tol D (js11) d (h8) ISO 3859 | P N | 396 |
| 3164 | HSSE | DIN 6518 N | | Tol R (h11) d2 (h6) | P N | 396 |


## **Fresas rotativas metal duro /** Fraises rotatives métal dur / Hard metal rotary mills


| | | | | | | |
|---|---|---|---|---|---|---|
| 3201 | HM-MD | Cilíndrica<br>Cylindrique<br>Straight | | DIAM CRUZ ALU | P M K N S H | 397 |
| 3202 | HM-MD | Cilíndrica con corte<br>Cylindrique taillée<br>Straight with cut | | DIAM CRUZ ALU | P M K N S H | 397 |
| 3203 | HM-MD | Cilíndrica radio<br>Cylindrique à rayon<br>Straight radius | | DIAM CRUZ ALU | P M K N S H | 398 |
| 3204 | HM-MD | Esférica<br>Sphérique<br>Spherical | | DIAM CRUZ ALU | P M K N S H | 398 |
| 3205 | HM-MD | Oval<br>Ovale | | DIAM CRUZ ALU | P M K N S H | 399 |
| 3206 | HM-MD | Árbol con radio<br>Arbre à rayon<br>Arc with radius | | DIAM CRUZ ALU | P M K N S H | 399 |
| 3207 | HM-MD | Árbol<br>Arbre<br>Arc | | DIAM CRUZ ALU | P M K N S H | 400 |
| 3208 | HM-MD | Llama<br>Flamme<br>Flame | | DIAM CRUZ ALU | P M K N S H | 400 |
| 3209 | HM-MD | Cónica<br>Conique<br>Tapered | | DIAM CRUZ ALU | P M K N S H | 401 |
| 3210 | HM-MD | Cónica 90º<br>Conique 90º<br>Tapered 90º | | DIAM CRUZ ALU | P M K N S H | 401 |
| 3211 | HM-MD | Cónica radio<br>Conique à rayon<br>Tapered radius | | DIAM CRUZ ALU | P M K N S H | 402 |
| 3212 | HM-MD | Cono invertido<br>Cône inversé<br>Inverted taper | | DIAM CRUZ ALU | P M K N S H | 402 |


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|---|---|---|---|---|---|---|---|
| 3214 | HM-MD | Cilíndrica L<br>Cylindrique L<br>Straight L | | | DIAM CRUZ ALU | P M K N S H | 403 |
| 3215 | HM-MD | Cilíndrica con corte L<br>Cylindrique taillée L<br>Straight with L cut | | | DIAM CRUZ ALU | P M K N S H | 403 |
| 3216 | HM-MD | Cilíndrica radio L<br>Cylindrique à rayon L<br>Straight L radius | | | DIAM CRUZ ALU | P M K N S H | 404 |
| 3217 | HM-MD | Árbol L<br>Arbre L<br>L Arc | | | DIAM CRUZ ALU | P M K N S H | 404 |
| 3218 | HM-MD | Esférica L<br>Sphérique L<br>L Spherical | | | DIAM CRUZ ALU | P M K N S H | 405 |
| 3219 | HM-MD | Árbol con radio L<br>Arbre à rayon L<br>L Radius arc | | | DIAM CRUZ ALU | P M K N S H | 405 |


**Fresas huecas máquinas electromagnéticas /** Fraises à trou électromagnétiques / Electromagnetics core bits


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7172 | HSS | | | | WELDON 19 QUICK CHANGE | L=30 | P N | 406 |
| 7172 | HSS | | | | WELDON 19 QUICK CHANGE | L=50 | P N | 407 |
| 7137 | HSSE | | | | WELDON 19 QUICK CHANGE | L=30 | P K N | 408 |
| 7137 | HSSE | | | | WELDON 19 QUICK CHANGE | L=50 | P K N | 409 |
| 7137 | HSSE | | | | WELDON 19 QUICK CHANGE | L=100 | P K N | 410 |
| 7138 | HSSE | | TIALN | | WELDON 19 QUICK CHANGE | L=30 | P M K N S | 410 |
| 7138 | HSSE | | TIALN | | WELDON 19 QUICK CHANGE | L=50 | P M K N S | 411 |
| 7139 | TCT | | | | WELDON 19 QUICK CHANGE | L=35 | P M K N S H | 412 |
| 7139 | TCT | | | | WELDON 19 QUICK CHANGE | L=50 | P M K N S H | 412 |
| 7140 | | CONO MORSE<br>CONE MORSE<br>MORSE TAPER | | | | | | 413 |
| 7141 | | PUNZON<br>POINÇON<br>PUNCHER | | | | | | 413 |
| 7158 | | ADAPTADOR FEIN<br>FEIN<br>FEIN | | | | | | 413 |
| **Estuches** / Coffrets / Sets | | | | | | | | 414 |




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# FORMULARIO FRESAS ESPECIALES
# FICHE TECHIQUE FRAISES SPECIAUX / TECHNICAL ENQUIRY FOR SPECIAL MILLS

**Fecha /** Date: .....

**Empresa /** Entreprise / Company: ..... **Contacto /** Contact: .....

**Dirección /** Adresse / Adress: ..... **Población /** Ville / Town: .....

**Tel / Fax:** ..... **E-mail:** .....

.....

## TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK

**Material /** Matière / Material ..... **Norma /** Norme / Norm: .....

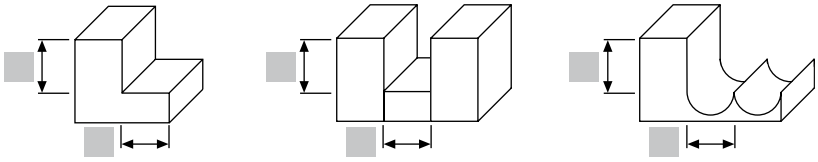
**Dureza /** Dureté / Hardness ..... **HB** ..... **HRc** **Resistencia /** Résistance / Resistance .....N/mm²

**Tipo viruta:** Type copeau Shaving ☐ **Corta** Courte Short ☐ **Larga** Longue Long ☐ **Polvo** Poussière Powder

**Máquina /** Machine ..... **Refrigerante /** Réfrigérant / Coolant .....

**Posición /** Position: ☐ **Horizontal** ☐ **Vertical** ☐ **V. Corte** V. Coupe Cutting Speed ☐ **V. avance** Avance Feed

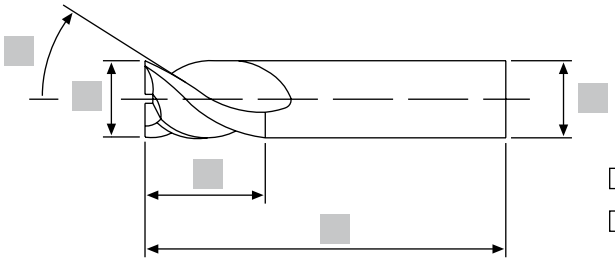
**Forma /** Forme / Form:



## HERRAMIENTA / OUTIL / TOOL

**Descripción /** Description .....

**Cantidad /** Quantité / Quantity..... **Número ranuras /** Rainures / Grooves .....



☐ **Corte al centro /** Coupe au centre / Cut to the center

☐ **Sin corte al centro /** Sans coupe au centre / Without cut to the center

**Mango:** Queue: Shank: ☐ **Cilíndrico** Cylindrique Straight ☐ **Weldon** Weldon Weldon ☐ **Cónico** Conique Taper ☐ **Rebajado** Réduite Reduced

**Tipos de punta:** Types de pointe: Types of tips: ☐ **Recta** Droite Straight ☐ **Chaflán** Chanfrein Chamfered ☐ **Radial** Radiale Radial

**Labios:** Lèvres: Lips: ☐ **Desbaste** Dégrossissage Grinding ☐ **Desbaste fino** Dégrossissage fin Fine grinding ☐ **Acabado** Finition Finishing

**Material /** Matière / Material: ☐ **HSS** ☐ **HSSE** ☐ **HM** ☐ **HSS-HM**

**Superficie /** Surface: ☐ **Brillante** Brillant Brilliant ☐ **Recubrimiento** Revêtement Coating

**COMENTARIOS /** COMMENTAIRES/ COMMENTS: .....

.....

.....

.....

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# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

Hepyc CUTTING TOOL EXPERTS

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

| | | 3141 | 3189 | 3190 | 3167 | 3168 | 3169 | 3170 | 3191 | 3171 | 3172 | 3173 | 3174 | 3175 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 3141 | 3189 | 3190 | 3167 | 3168 | 3169 | 3170 | 3191 | 3171 | 3172 | 3173 | 3174 | 3175 |
| Z | | 1Z | 2Z | 3Z | 2Z | 2Z | 2Z | 2Z | 2Z | 3Z | 3Z | 3Z | 3Z | 4Z |
| Ejec./Exéc./Exec. | | N | W | W | N | N | N | N | N | N | N | W | W | N |
| Hel./Hel./Spiral | | 30° | 45° | 45° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 45° | 45° | 30° |
| Mat. | | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM |
| Rec./Rev./Coat. | | | | | TIALN | TIALN | TIALN | TIALN | AICRN | TIALN | TIALN | TIALN | TIALN | TIALN |
| DIN | | | | | 6527S | 6527L | 6527S | 6527L | 6527EL | 6527S | 6527L | 6527S | 6527L | 6527S |
| Arista/Arête/Edge | | 45° | | | | | R | R | R | | | | | |
| Gama/Gamme/Range | | 3-10 | 3-20 | 3-20 | 3-20 | 3-20 | 3-20 | 3-20 | 2-20 | 3-20 | 3-20 | 3-20 | 3-20 | 3-20 |
| Pag. | | 349 | 349 | 350 | 351 | 351 | 352 | 352 | 353 | 354 | 354 | 355 | 355 | 356 |
| Mat. | | Vc (m/min) | | | | | | | | | | | | |
| P.1 | <600 | | | | ● 140-250 | ● 120-220 | ● 140-250 | ● 140-250 | ● 180-240 | ● 140-250 | ● 120-220 | ● 140-250 | ● 120-220 | ● 140-250 |
| P.2 | <800 | | | | ● 110-220 | ● 100-200 | ● 110-220 | ● 110-220 | ● 160-220 | ● 110-220 | ● 100-200 | ● 110-220 | ● 100-200 | ● 110-220 |
| P.3 | <1000 | | | | ● 90-200 | ● 80-180 | ● 90-200 | ● 90-200 | ● 140-210 | ● 90-200 | ● 80-180 | ● 90-200 | ● 80-180 | ● 90-200 |
| P.4 | <1200 | | | | ● 75-180 | ● 70-150 | ● 75-180 | ● 75-180 | ● 150-200 | ● 75-180 | ● 70-150 | ● 75-180 | ● 70-150 | ● 75-180 |
| P.5 | <1400 | | | | ● 60-120 | ● 60-90 | ● 60-120 | ● 60-120 | ● 100-140 | ● 60-120 | ● 60-90 | ● 60-120 | ● 60-90 | ● 60-120 |
| M.1 | <950 | | | | ● 80-140 | ● 70-110 | ● 70-110 | ● 70-110 | | ● 80-140 | ● 70-110 | ● 80-140 | ● 70-110 | ● 80-140 |
| M.2 | <950 | | | | ● 80-140 | ● 70-110 | ● 70-110 | ● 70-110 | | ● 80-140 | ● 70-110 | ● 80-140 | ● 70-110 | ● 80-140 |
| M.3 | <1200 | | | | ● 60-120 | ● 60-100 | ● 60-100 | ● 60-100 | | ● 60-120 | ● 60-100 | ● 60-120 | ● 60-100 | ● 60-120 |
| M.4 | <1200 | | | | ● 60-120 | ● 60-100 | ● 60-100 | ● 60-100 | | ● 60-120 | ● 60-100 | ● 60-120 | ● 60-100 | ● 60-120 |
| K.1 | <500 | | | | ● 120-180 | ● 100-160 | ● 120-180 | ● 120-180 | ● 120-180 | ● 120-180 | ● 100-160 | ● 120-180 | ● 100-160 | ● 120-180 |
| K.2 | <500 | | | | ● 120-180 | ● 100-160 | ● 120-180 | ● 120-180 | ● 120-180 | ● 120-180 | ● 100-160 | ● 120-180 | ● 100-160 | ● 120-180 |
| K.3 | <800 | | | | ● 100-140 | ● 80-120 | ● 100-140 | ● 100-140 | ● 90-130 | ● 100-140 | ● 80-120 | ● 100-140 | ● 80-120 | ● 100-140 |
| K.4.1 | <800 | | | | ● 100-140 | ● 80-120 | ● 100-140 | ● 100-140 | ● 90-130 | ● 100-140 | ● 80-120 | ● 100-140 | ● 80-120 | ● 100-140 |
| K.4.2 | <1400 | | | | ○ 60-120 | ○ 60-90 | ○ 60-120 | ○ 60-120 | ○ 100-140 | ○ 60-120 | ○ 60-90 | ○ 60-120 | ○ 60-90 | ○ 60-120 |
| N.1.1 | Al | ● 150-300 | ● 150-300 | ● 150-300 | | | ○ 150 - 450 | ○ 150 - 450 | | | | ○ 150-300 | ○ 110-240 | |
| N.1.2 | Al | ● 150-300 | ● 150-300 | ● 150-300 | | | ○ 150 - 450 | ○ 150 - 450 | | | | ○ 150-300 | ○ 110-240 | |
| N.1.3 | Al | ● 150-300 | ● 150-300 | ● 150-300 | | | ○ 150 - 450 | ○ 150 - 450 | | | | ○ 150-300 | ○ 110-240 | |
| N.2.1 | Cu | ● 120-350 | ● 120-350 | ● 120-350 | | | ● 120-350 | ● 120-350 | | | | ○ 120-350 | ○ 110-250 | |
| N.2.2 | Cu | ● 120-350 | ● 120-350 | ● 120-350 | | | ● 120-350 | ● 120-350 | | | | ○ 120-350 | ○ 110-250 | |
| N.2.3 | Cu | | | | ○ 110-220 | ○ 100-200 | ● 110-220 | ● 110-220 | | ○ 110-220 | ○ 100-200 | ○ 110-220 | ○ 100-200 | ○ 110-220 |
| N.2.4 | Cu | | | | | | ● 60-120 | ● 60-120 | | | | | | |
| N.3.1 | Mg/Zn | ● 120-350 | ● 120-350 | ● 120-350 | | | ● 150 - 450 | ● 150 - 450 | | | | ○ 120-350 | ○ 90-250 | |
| N.4.1 | Plastic | ● 150-300 | ● 150-300 | ● 150-300 | | | ● 150 - 450 | ● 150 - 450 | | | | ○ 150-300 | ○ 110-240 | |
| N.4.2 | Plastic | | | | | | | | | | | | | |
| N.4.3 | Plastic | | | | | | | | | | | | | |
| S.1.1 | Ni | | | | ● 60-90 | ● 50-80 | | | ● 50-80 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 |
| S.1.2 | Ni | | | | ● 40-75 | ● 40-60 | | | ● 40-60 | ● 40-75 | ● 40-75 | ● 40-75 | ● 40-75 | ● 40-75 |
| S.2.1 | Ti | | | | ● 80-140 | ● 70-110 | | | | ● 80-140 | ● 70-110 | ● 80-140 | ● 70-110 | ● 80-140 |
| S.2.2 | Ti | | | | ● 75-100 | ● 70-90 | | | ● 70-90 | ● 75-100 | ● 75-100 | ● 75-100 | ● 75-100 | ● 75-100 |
| S.2.3 | Ti | | | | ● 60-90 | ● 60-80 | | | ● 60-80 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 |
| H.1 | 50 HRC | | | | | | ● 40-80 | ● 40-80 | ● 90-150 | | | ● 40-80 | | |
| H.2 | 55 HRC | | | | | | ○ 30-50 | ○ 30-50 | ● 70-130 | | | ○ 30-50 | | |
| H.3 | 60 HRC | | | | | | | | ○ 60-110 | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

| 3176 | 3177 | 3192 | 3193 | 3178 | 3179 | 3180 | 3181 | 3183 | 3184 | 3185 | 3194 | 3195 | 3101 | 3105 | 3107 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4Z | 4Z | 4Z | 5Z | 4Z | 6,8Z | 6,8Z | 3,4,5,6Z | 4Z | 4Z | 4Z | 4Z | 5Z | 2Z | 3Z | 4Z |
| N | N-V | N-V | N-V | N-V | W | W | WR | 60º | 90º | r | N-V | N-V | N | N | N |
| 30º | 35º-38º | 35º-38º | 37º-38º | 35º-38º | 45º | 45º | 45º | 0º | 0º | 0º | 40º-42º | 40º-42º | 30º | 30º | 30º |
| HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM | HM |
| TIALN | TIALN | AICRN | AICRN | AICRN | TIALN | TIALN | TIALN | TIALN | TIALN | TIALN | ALCR | ALCR | | | |
| 6527L | 6527L | 6527L | 6527EL | 6527L | 6527S | 6527EL | 6527L | | | | 6527L | 6527EL | | | |
| | 45º | 45º | 45º | r | 45º | 45º | 45º | 30º | 45º | r | 45º | 45º | | | |
| 3-20 | 3-20 | 3-20 | 6-25 | 6-16 | 6-20 | 6-20 | 4-20 | 1,20-2,40 | 1,20-2,40 | 0,50-5 | 3-20 | 6-25 | 3-20 | 3-20 | 3-20 |
| 356 | 357 | 358 | 358 | 359 | 360 | 360 | 361 | 361 | 362 | 362 | 363 | 363 | 364 | 364 | 365 |
| Vc (m/min) | | | | | | | | | | | | | | | |
| ● 120-220 | ● 120-220 | ● 180-240 | ● 220-380 | ● 180-240 | ● 120-220 | ● 120-220 | ● 120-220 | ● 120-220 | ● 120-220 | ● 120-220 | | | ● 85-155 | ● 85-155 | ● 85-155 |
| ● 100-200 | ● 100-200 | ● 170-220 | ● 210-350 | ● 170-220 | ● 100-200 | ● 100-200 | ● 100-200 | ● 100-200 | ● 100-200 | ● 100-200 | | | ● 70-130 | ● 70-130 | ● 70-130 |
| ● 80-180 | ● 80-180 | ● 160-210 | ● 200-320 | ● 160-210 | ● 80-180 | ● 80-180 | ● 80-180 | ● 80-180 | ● 80-180 | ● 80-180 | | | ● 60-110 | ● 60-110 | ● 60-110 |
| ● 70-150 | ● 70-150 | ● 150-200 | ● 200-300 | ● 150-200 | ● 70-150 | ● 70-150 | ● 70-150 | ● 70-150 | ● 70-150 | ● 70-150 | | | ● 50-105 | ● 50-105 | ● 50-105 |
| ● 60-90 | ● 60-90 | ● 100-140 | ● 180-250 | ● 100-140 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | ● 60-90 | | | ○ 45-65 | ○ 45-65 | ○ 45-65 |
| ● 70-110 | ● 70-110 | ● 80-140 | | ● 80-140 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 90-150 | ● 150-230 | ● 50-80 | ● 50-80 | ● 50-80 |
| ● 70-110 | ● 70-110 | ● 80-140 | | ● 80-140 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 90-150 | ● 150-230 | ● 50-80 | ● 50-80 | ● 50-80 |
| ● 60-100 | ● 60-100 | ● 60-120 | | ● 60-120 | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | ● 70-130 | ● 130-200 | ● 45-70 | ● 45-70 | ● 45-70 |
| ● 60-100 | ● 60-100 | ● 60-120 | | ● 60-120 | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | ● 70-130 | ● 130-200 | ● 45-70 | ● 45-70 | ● 45-70 |
| ● 100-160 | ● 100-160 | ● 120-180 | | ● 120-180 | ● 100-160 | ● 100-160 | ● 100-160 | ● 100-160 | ● 100-160 | ● 100-160 | | | ● 70-115 | ● 70-115 | ● 70-115 |
| ● 100-160 | ● 100-160 | ● 120-180 | | ● 120-180 | ● 100-160 | ● 100-160 | ● 100-160 | ● 100-160 | ● 100-160 | ● 100-160 | | | ● 70-115 | ● 70-115 | ● 70-115 |
| ● 80-120 | ● 80-120 | ● 90-130 | | ● 90-130 | ● 80-120 | ● 80-120 | ● 80-120 | ● 80-120 | ● 80-120 | ● 80-120 | | | ● 60-85 | ● 60-85 | ● 60-85 |
| ● 80-120 | ● 80-120 | ● 90-130 | | ● 90-130 | ● 80-120 | ● 80-120 | ● 80-120 | ● 80-120 | ● 80-120 | ● 80-120 | | | ● 60-85 | ● 60-85 | ● 60-85 |
| ○ 60-90 | ○ 60-90 | ○ 100-140 | | ○ 100-140 | ○ 60-90 | ○ 60-90 | ○ 60-90 | ○ 60-90 | ○ 60-90 | ○ 60-90 | | | | | |
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| ○ 100-200 | ○ 100-200 | ○ 170-220 | ○ 200-250 | ○ 170-220 | ○ 100-200 | ○ 100-200 | ○ 100-200 | ○ 100-200 | ○ 100-200 | ○ 100-200 | | | ○ 70-130 | ○ 70-130 | ○ 70-130 |
| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |
| ● 60-90 | | ● 50-80 | | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | ● 60-80 | ● 50-100 | ● 40-60 | ● 40-60 | ● 40-60 |
| ● 40-75 | ● 40-60 | ● 40-60 | | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 40-60 | ● 50-70 | ● 40-80 | ● 30-45 | ● 30-45 | ● 30-45 |
| ● 70-110 | | ● 80-140 | | ● 80-140 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 70-110 | ● 90-150 | ● 150-230 | ● 50-80 | ● 50-80 | ● 50-80 |
| ● 75-100 | | ● 70-90 | | ● 70-90 | ● 70-90 | ● 70-90 | ● 70-90 | ● 70-90 | ● 70-90 | ● 70-90 | ● 80-100 | ● 80-170 | ● 50-80 | ● 50-80 | ● 50-80 |
| ● 60-90 | ● 60-80 | ● 60-80 | | ● 60-80 | ● 60-80 | ● 60-80 | ● 60-80 | ● 60-80 | ● 60-80 | ● 60-80 | ● 60-80 | ● 60-120 | ● 45-60 | ● 45-60 | ● 45-60 |
| | ● 40-80 | ● 90-150 | ● 70-130 | ● 90-150 | ● 60-100 | ● 60-100 | | ● 40-80 | | | | | | | |
| | ○ 30-50 | ● 70-130 | ● 50-120 | ● 70-130 | ○ 50-80 | ○ 50-80 | | ○ 30-50 | | | | | | | |
| | | ○ 60-110 | ○ 40-80 | ○ 60-110 | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | | Ref./ Réf. / Ref. | 3120 | 3121 | 3122 | 3186 | 3110 | 3110/1 | 3112 | 3112/1 | 3187 | 3187/1 | 3114 | 3114/1 | 3115 | 3115/1 | 3117 | 3117/1 | 3119 | 3119/1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Z | 1Z | 1Z | 1Z | 2Z | 2Z | 2Z | 2Z | 2Z | 3Z | 3Z | 3Z | 3Z | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 |
| | | Ejec./Exéc./Exec. | W | W | W | W | N | N | N | N | N | N | W | W | N | N | NR | NR | NRF | NRF |
| | | Hel./Hel./Spiral | | | | 40° | 30° | 30° | 30° | 30° | 30° | 30° | 45° | 45° | 30° | 30° | 30° | 30° | 30° | 30° |
| | | Mat. | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE |
| | | Rec./Rev./Coat. | | | | | | TIALN | | TIALN | | TIALN | | TIALN | | TIALN | | TIALN | | TIALN |
| | | DIN | | | | | 327 | 327 | 327 | 327 | 327 | 327 | 844 | 844 | 844 | 844 | 844 | 844 | 844 | 844 |
| | | Gama/Gamme/Range | 3-10 | 4-8 | 5 | 2-20 | 2,40 | 2-40 | 3-25 | 3-25 | 2-32 | 2-32 | 2-30 | 6-20 | 2-32 | 3-32 | 6-40 | 6-32 | 6-30 | 6-30 |
| | | Pag. | 366 | 366 | 367 | 367 | 368 | 369 | 370 | 370 | 371 | 371 | 372 | 372 | 373 | 373 | 374 | 374 | 375 | 375 |
| Mat. | | | Vc (m/min) | | | | | | | | | | | | | | | | | |
| P.1 | <600 | | | | | ● 45-50 | ● 45-50 | o 70-80 | ● 45-50 | o 70-80 | ● 45-50 | o 70-80 | ● 45-50 | ● 70-80 | ● 45-50 | o 70-80 | ● 45-50 | ● 70-80 | o 45-50 | o 70-80 |
| P.2 | <800 | | | | | o 30-36 | ● 30-36 | ● 48-65 | ● 30-36 | ● 48-65 | ● 30-36 | ● 48-65 | ● 30-36 | o 48-65 | ● 30-36 | ● 48-65 | ● 35-45 | ● 55-65 | ● 30-36 | ● 48-65 |
| P.3 | <1000 | | | | | | o 25-30 | ● 40-45 | o 25-30 | ● 40-45 | o 25-30 | ● 40-45 | | | o 25-30 | ● 40-45 | o 25-30 | ● 45-55 | ● 25-30 | ● 40-45 |
| P.4 | <1200 | | | | | | | o 30-35 | | o 30-35 | | o 30-35 | | | | o 30-35 | | o 35-40 | | |
| P.5 | <1400 | | | | | | | | | | | | | | | | | | | |
| M.1 | <950 | | | | | | o 15-20 | o 25-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 | | | o 15-20 | o 25-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 |
| M.2 | | | | | | | o 15-20 | o 25-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 | | | o 15-20 | o 25-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 |
| M.3 | <1200 | | | | | | | | | | | | | | | | | | | |
| M.4 | | | | | | | | | | | | | | | | | | | | |
| K.1 | <500 | | | | | | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 | | | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 |
| K.2 | | | | | | | | | | | | | | | | | | | | |
| K.3 | <800 | | | | | | | o 30-35 | | o 30-35 | | o 30-35 | | | | o 30-35 | | | ● 20-25 | ● 30-40 |
| K.4.1 | | | | | | | o 20-24 | ● 30-40 | o 20-24 | ● 30-40 | o 20-24 | ● 30-40 | | | o 20-24 | ● 30-40 | | | o 34-38 | o 55-60 |
| K.4.2 | <1400 | | | | | | | o 30-35 | | o 30-35 | | o 30-35 | | | | o 30-35 | | | | |
| N.1.1 | Al | | ● 160-200 | ● 160-200 | ● 160-200 | ● 160-200 | | | | | | | ● 100-150 | ● 130-200 | | | | | | |
| N.1.2 | | | ● 160-200 | ● 160-200 | ● 160-200 | ● 160-200 | | | | | | | ● 100-150 | ● 130-200 | | | | | | |
| N.1.3 | | | o 60-100 | o 60-100 | o 60-100 | o 60-100 | | | | | | | o 60-100 | o 100-160 | | | | | | |
| N.2.1 | Cu | | | | | | o 70-90 | o 90-120 | o 70-90 | o 90-120 | o 70-90 | o 90-120 | | | o 70-90 | o 90-120 | o 70-90 | o 90-120 | o 70-90 | o 90-120 |
| N.2.2 | | | | | | | o 70-90 | o 90-120 | o 70-90 | o 90-120 | o 70-90 | o 90-120 | | | o 70-90 | o 90-120 | o 70-90 | o 90-120 | o 70-90 | o 90-120 |
| N.2.3 | | | | | | | o 45-50 | o 70-80 | o 45-50 | o 70-80 | o 45-50 | o 70-80 | | | o 45-50 | o 70-80 | o 45-50 | o 60-75 | o 45-50 | o 60-75 |
| N.2.4 | | | | | | | | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | ● 60-100 | ● 60-100 | ● 60-100 | ● 60-100 | | | | | | | ● 60-100 | ● 80-120 | | | | | | |
| N.4.1 | Plastic | | ● 50-80 | ● 50-80 | ● 50-80 | ● 50-80 | | | | | | | ● 50-80 | ● 65-100 | | | | | | |
| N.4.2 | | | | | | | | | | | | | | | | | | | | |
| N.4.3 | | | | | | | | | | | | | | | | | | | | |
| S.1.1 | Ni | | | | | | | | o 2-4 | ● 4-6 | | | | | o 15-20 | ● 25-35 | | | o 15-20 | o 25-35 |
| S.1.2 | | | | | | | | | | | | | | | | | | | | |
| S.2.1 | Ti | | | | | | | | | | o 15-20 | o 25-35 | | | o 15-20 | ● 25-35 | | | | |
| S.2.2 | | | | | | | | | | | | o 30-35 | | | | o 30-35 | | | | |
| S.2.3 | | | | | | | | | | | | | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

| 3162 | 3157 | 3159 | 3111 | 3111/1 | 3113 | 3113/1 | 3188 | 3188/1 | 3182 | 3182/1 | 3116 | 3116/1 | 3118 | 3118/1 | 3163 | 3158 | 3160 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z>4 | Z>4 | Z>4 | 2Z | 2Z | 2Z | 2Z | 3Z | 3Z | 3Z | 3Z | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 |
| N | NR | NRF | N | N | N | N | N | N | W | W | N | N | NR | NR | N | NR | NRF |
| 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 40° | 40° | 30° | 30° | 30° | 30° | 30° | 30° | 30° |
| HSSE-PM | HSSE-PM | HSSE-PM | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE-PM | HSSE-PM | HSSE-PM |
| TIALN | TIALN | TIALN | | TIALN | | TIALN | | TIALN | | TIALN | | TIALN | | TIALN | TIALN | TIALN | TIALN |
| 844 | 844 | 844 | 844-L | 844-L | 327-L | 327-L | 327-L | 327-L | 844-L | 844-L | 844-L | 844-L | 844-L | 844-L | 844-L | 844-L | 844-L |
| 6-20 | 6-32 | 6-20 | 4-25 | 4-25 | 4-25 | 4-25 | 3-25 | 3-25 | 6-20 | 6-20 | 3-25 | 6-25 | 6-32 | 6-32 | 6-20 | 6-32 | 6-20 |
| 376 | 376 | 377 | 378 | 378 | 379 | 379 | 380 | 380 | 381 | 381 | 382 | 382 | 383 | 383 | 384 | 384 | 385 |
| Vc (m/min) | | | | | | | | | | | | | | | | | |
| o 80-85 | o 85-90 | o 80-85 | ● 45-50 | o 70-80 | ● 45-50 | o 70-80 | ● 45-50 | o 70-80 | ● 45-50 | ● 70-80 | ● 45-50 | o 70-80 | ● 45-50 | ● 70-80 | o 80-85 | o 85-90 | o 80-85 |
| ● 55-65 | ● 60-70 | ● 55-65 | ● 30-36 | ● 48-65 | ● 30-36 | ● 48-65 | ● 30-36 | ● 48-65 | o 30-36 | o 48-65 | ● 35-45 | ● 48-65 | ● 35-45 | ● 55-65 | ● 55-65 | ● 60-70 | ● 55-65 |
| ● 50-60 | ● 50-60 | ● 40-50 | 25-30 | ● 40-45 | o 25-30 | ● 40-45 | o 25-30 | ● 40-45 | | | o 25-30 | ● 40-45 | o 25-30 | ● 45-55 | ● 50-60 | ● 50-60 | ● 40-50 |
| o 35-40 | o 45-50 | o 35-40 | | o 30-35 | | o 30-35 | | o 30-35 | | | | o 30-35 | | o 35-40 | o 35-40 | o 45-50 | o 35-40 |
| | | | | | | | | | | | | | | | | | |
| ● 35-40 | ● 35-40 | ● 30-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 | | | o 15-20 | o 25-35 | o 15-20 | o 25-35 | ● 35-40 | ● 35-40 | ● 30-35 |
| ● 35-40 | ● 35-40 | ● 30-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 | o 15-20 | o 25-35 | | | o 15-20 | o 25-35 | o 15-20 | o 25-35 | ● 35-40 | ● 35-40 | ● 30-35 |
| o 28-35 | o 28-35 | o 25-30 | | | | | | | | | | | | | o 28-35 | o 28-35 | o 25-30 |
| o 28-35 | o 28-35 | o 25-30 | | | | | | | | | | | | | o 28-35 | o 28-35 | o 25-30 |
| ● 55-60 | ● 60-65 | ● 55-60 | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 | | | o 34-38 | ● 55-60 | o 34-38 | ● 55-60 | ● 55-60 | ● 60-65 | ● 55-60 |
| | | | | | | | | | | | | | | | | | |
| o 30-35 | | | | o 30-35 | | o 30-35 | | o 30-35 | | | | o 30-35 | | | o 30-35 | | |
| ● 30-40 | | | o 20-24 | ● 30-40 | o 20-24 | ● 30-40 | o 20-24 | ● 30-40 | | | o 20-24 | ● 30-40 | | | ● 30-40 | | |
| o 30-35 | | | | o 30-35 | | o 30-35 | | o 30-35 | | | | o 30-35 | | | o 30-35 | | |
| o 130-200 | | | | | | | | | ● 100-150 | ● 130-200 | | | | | o 130-200 | | |
| o 130-200 | | | | | | | | | ● 100-150 | ● 130-200 | | | | | o 130-200 | | |
| o 90-130 | | | | | | | | | o 60-100 | o 100-160 | | | | | o 90-130 | | |
| o 90-120 | o 120-140 | o 120-140 | o 60-80 | o 80-110 | o 70-90 | o 90-120 | o 55-75 | o 90-120 | | | o 70-90 | o 90-120 | o 70-90 | o 90-120 | o 90-120 | o 120-140 | o 120-140 |
| o 90-120 | o 120-140 | o 120-140 | o 60-80 | o 80-110 | o 70-90 | o 90-120 | o 55-75 | o 90-120 | | | o 70-90 | o 90-120 | o 70-90 | o 90-120 | o 90-120 | o 120-140 | o 120-140 |
| o 80-85 | o 85-90 | o 80-85 | o 45-50 | o 70-80 | o 45-50 | o 70-80 | o 45-50 | o 70-80 | | | o 45-50 | o 70-80 | o 45-50 | o 60-75 | o 80-85 | o 85-90 | o 80-85 |
| | | | | | | | | | | | | | | | | | |
| o 90-130 | | | | | | | | | o 60-100 | o 80-120 | | | | | o 90-130 | | |
| o 75-190 | | | | | | | | | o 50-150 | o 65-100 | | | | | o 75-190 | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| ● 35-40 | | ● 35-40 | | | o 2-4 | ● 4-6 | | | | | o 15-20 | ● 25-35 | | | ● 35-40 | | ● 35-40 |
| 15-20 | | 15-20 | | | | | | | | | | | | | 15-20 | | 15-20 |
| ● 35-40 | | ● 35-40 | | | | | o 15-20 | o 25-35 | | | o 15-20 | o 25-35 | | | ● 35-40 | | ● 35-40 |
| o 30-35 | | o 30-35 | | | | | | o 30-35 | | | | o 30-35 | | | o 30-35 | | o 30-35 |
| | | | | | | | | | | | | | | | | | |
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● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
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r.p.m.= $\frac{Vc \times 1.000}{\pi x \varnothing}$

| | | 3144 | 3144/1 | 3145 | 3145/1 | 3146 | 3146/1 | 3147 | 3147/1 | 3148 | 3148/1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 3144 | 3144/1 | 3145 | 3145/1 | 3146 | 3146/1 | 3147 | 3147/1 | 3148 | 3148/1 |
| Z | | 2Z | 2Z | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 | Z>4 |
| Ejec./Exéc./Exec. | | N | N | N | N | NR | NR | N | N | NR | NR |
| Hel./Hel./Spiral | | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° | 30° |
| Mat. | | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE |
| Rec./Rev./Coat. | | | TIALN | | TIALN | | TIALN | | TIALN | | TIALN |
| DIN | | 326 | 326 | 845 | 845 | 845 | 845 | 845-L | 845-L | 845-L | 845-L |
| Gama/Gamme/Range | | 12-40 | 12-40 | 12-50 | 12-50 | 12-50 | 12-50 | 12-50 | 12-50 | 16-50 | 20-50 |
| Pag. | | 386 | 386 | 387 | 387 | 388 | 388 | 389 | 389 | 390 | 390 |
| Mat. | | Vc (m/min) | | | | | | | | | |
| P.1 | <600 | ● 45-50 | ● 70-80 | ● 45-50 | ● 70-80 | ● 50-55 | ● 70-80 | ● 45-50 | ● 70-80 | ● 50-55 | ● 70-80 |
| P.2 | <800 | ● 30-36 | ● 48-65 | ● 30-36 | ● 48-65 | ● 35-45 | ● 55-65 | ● 30-36 | ● 48-65 | ● 35-45 | ● 55-65 |
| P.3 | <1000 | ○ 25-30 | ● 40-45 | ○ 25-30 | ● 40-45 | ○ 25-30 | ● 45-55 | ○ 25-30 | ● 40-45 | ○ 25-30 | ● 45-55 |
| P.4 | <1200 | | ○ 30-35 | | ○ 30-35 | | ○ 35-40 | | ○ 30-35 | | ○ 35-40 |
| P.5 | <1400 | | | | | | | | | | |
| M.1 | <950 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 |
| M.2 | <950 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 | ○ 15-20 | ○ 25-35 |
| M.3 | <1200 | | | | | | | | | | |
| M.4 | <1200 | | | | | | | | | | |
| K.1 | <500 | ○ 34-38 | ● 55-60 | ○ 34-38 | ● 55-60 | ○ 38-42 | ● 55-60 | ○ 34-38 | ● 55-60 | ○ 38-42 | ● 55-60 |
| K.2 | <500 | | | | | | | | | | |
| K.3 | <800 | | ○ 30-35 | | ○ 30-35 | | | | ○ 30-35 | | |
| K.4.1 | <800 | ○ 20-24 | ● 30-40 | ○ 20-24 | ● 30-40 | ○ 20-24 | ● 30-35 | ○ 20-24 | ● 30-40 | ○ 20-24 | ● 30-35 |
| K.4.2 | <1400 | | ○ 30-35 | | ○ 30-35 | | | | ○ 30-35 | | |
| N.1.1 | Al | ○ 100-150 | ○ 130-200 | ○ 100-150 | ○ 130-200 | | | ○ 100-150 | ○ 130-200 | | |
| N.1.2 | Al | ○ 100-150 | ○ 130-200 | ○ 100-150 | ○ 130-200 | | | ○ 100-150 | ○ 130-200 | | |
| N.1.3 | Al | ○ 60-100 | ○ 90-130 | ○ 60-100 | ○ 90-130 | | | ○ 60-100 | ○ 90-130 | | |
| N.2.1 | Cu | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 |
| N.2.2 | Cu | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 | ● 55-75 | ● 90-120 |
| N.2.3 | Cu | ● 75-95 | ● 120-140 | ● 75-95 | ● 120-140 | ● 75-95 | ● 120-140 | ● 75-95 | ● 120-140 | ● 75-95 | ● 120-140 |
| N.2.4 | Cu | | | | | | | | | | |
| N.3.1 | Mg/Zn | ○ 60-100 | ○ 90-130 | ○ 60-100 | ○ 90-130 | | | ○ 60-100 | ○ 90-130 | | |
| N.4.1 | Plastic | ○ 50-150 | ○ 75-190 | ○ 50-150 | ○ 75-190 | | | ○ 50-150 | ○ 75-190 | | |
| N.4.2 | Plastic | | | | | | | | | | |
| N.4.3 | Plastic | | | | | | | | | | |
| S.1.1 | Ni | | | ○ 15-20 | ● 25-35 | | | ○ 15-20 | ● 25-35 | | |
| S.1.2 | Ni | | | | | | | | | | |
| S.2.1 | Ti | | | ○ 15-20 | ○ 25-35 | | | ○ 15-20 | ○ 25-35 | | |
| S.2.2 | Ti | | | | ○ 30-35 | | | | ○ 30-35 | | |
| S.2.3 | Ti | | | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
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$$r.p.m.= \frac{Vc \times 1.000}{\pi x \varnothing}$$

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref./ Réf. / Ref. | | 3149 | 3150 | 3165 | 3151 | 3161 | 3166 | 3152 | 3153 | 3154 | 3155 | 3156 | 3164 |
| Z | | 6-10 | 6-10 | 8-10 | 18-24 | 18-24 | 16-40 | 6-12 | 4-10 | 8-10 | 8-12 | 10-12 | 4 |
| Ejec./Exéc./Exec. | | N | NR | NRF | H | H | H | | N | N | | | |
| Hel./Hel./Spiral | | 30° | 30° | 30° | 0° | 10° | 10° | 10° | 10° | 10° | 0° | 0° | 0° |
| Mat. | | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE | HSSE |
| Rec./Rev./Coat. | | | | | | | | | | | | | |
| DIN | | 1880 | 1880 | 1880 | 885-B | 885-A | 1834-A | 850 | 851 | 851 | 1833-A | 1833-B | 6518 |
| Gama/Gamme/Range | | 40-80 | 40-80 | 40-80 | 63-125 | 63-125 | 50-125 | 4,5-45,50 | 11-40 | 18-72 | 16-32 | 16-32 | 8-56 |
| Pag. | | 391 | 391 | 392 | 392 | 393 | 393 | 394 | 394 | 395 | 395 | 396 | 396 |
| Mat. | | Vc (m/min) | | | | | | Vc (m/min) | | | | | |
| P.1 | <600 | ● 35-40 | ● 40-50 | ● 35-40 | ● 35-40 | ● 35-40 | ● 35-40 | ● 35-40 | ● 35-40 | ● 35-40 | ● 35-40 | ● 35-40 | ● 40-50 |
| P.2 | <800 | ● 30-35 | ● 35-45 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 35-45 |
| P.3 | <1000 | ● 15-25 | ● 25-35 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | ● 25-35 |
| P.4 | <1200 | | | ● 15-20 | ● 15-20 | ● 15-20 | ● 15-20 | | | | | | |
| P.5 | <1400 | | | | | | | | | | | | |
| M.1 | <950 | ● 10-15 | ● 15-20 | ● 10-15 | | ● 10-15 | | | | | | | |
| M.2 | | ● 10-15 | ● 15-20 | ● 10-15 | | ● 10-15 | | | | | | | |
| M.3 | <1200 | | | | | | | | | | | | |
| M.4 | | | | | | | | | | | | | |
| K.1 | <500 | | | o 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | | | | | | |
| K.2 | | | | o 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | | | | | | |
| K.3 | <800 | ● 20-24 | ● 25-30 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | | | | | | |
| K.4.1 | | ● 20-24 | ● 25-30 | ● 15-25 | ● 15-25 | ● 15-25 | ● 15-25 | o 20-24 | o 20-24 | o 20-24 | o 20-24 | o 20-24 | o 25-30 |
| K.4.2 | <1400 | | | | | | | | | | | | |
| N.1.1 | Al | | | | | | o 60-100 | o 100-150 | o 100-150 | o 100-150 | o 100-150 | o 100-150 | |
| N.1.2 | | | | | | | ● 160-260 | o 100-150 | o 100-150 | o 100-150 | o 100-150 | o 100-150 | |
| N.1.3 | | | | | | | o 60-100 | o 60-100 | o 60-100 | o 60-100 | o 60-100 | o 60-100 | |
| N.2.1 | Cu | | | | | | | ● 55-75 | ● 55-75 | ● 55-75 | ● 55-75 | ● 55-75 | |
| N.2.2 | | | | | ● 60-100 | ● 60-100 | ● 60-100 | ● 55-75 | ● 55-75 | ● 55-75 | ● 55-75 | ● 55-75 | |
| N.2.3 | | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 30-35 | ● 75-95 | ● 75-95 | ● 75-95 | ● 75-95 | ● 75-95 | |
| N.2.4 | | | | | | | | | | | | | |
| N.3.1 | Mg/Zn | | | | ● 50-90 | ● 50-90 | ● 50-90 | o 60-100 | o 60-100 | o 60-100 | o 60-100 | o 60-100 | |
| N.4.1 | Plastic | | | | | | | | | | | | |
| N.4.2 | | | | | | | | | | | | | |
| N.4.3 | | | | | | | | | | | | | |
| S.1.1 | Ni | | | o 10-15 | | | | | | | | | |
| S.1.2 | | | | ● 5-10 | | | | | | | | | |
| S.2.1 | Ti | ● 10-15 | ● 15-20 | ● 10-15 | | ● 10-15 | | | | | | | |
| S.2.2 | | | | | | | | | | | | | |
| S.2.3 | | | | | | | | | | | | | |
| H.1 | 50 HRC | | | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

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

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| Ref./ Réf. / Ref. | | | | | 7172 | 7137 | 7138 | 7139 |
| Z | | | | | | | | |
| Ejec./Exéc./Exec. | | CRUZ | DIAM | ALU | | | | |
| Hel./Hel./Spiral | | | | | | | | |
| Mat. | | HM | HM | HM | HSS | HSSE | HSSE | HSS - WIDIA |
| Rec./Rev./Coat. | | | | | | | TIALN | |
| DIN | | | | | | | | |
| Gama/Gamme/Range | | | | | 12-60 | 12-60 | 12-50 | 18-50 |
| Pag. | | | | | 406 | 408 | 410 | 412 |
| Mat. | | Vc (m/min) | | | Vc (m/min) | | | |
| P.1 | <600 | ● 400-800 | o 400-800 | | ● 20-25 | ● 35-45 | o 45-55 | o 55-65 |
| P.2 | <800 | ● 400-800 | o 400-800 | | ● 15-20 | ● 25-35 | ● 40-50 | ● 40-50 |
| P.3 | <1000 | ● 400-800 | ● 400-800 | | | ● 20-25 | ● 30-40 | ● 30-40 |
| P.4 | <1200 | o 300-700 | ● 300-700 | | | o 15-20 | ● 20-25 | ● 20-25 |
| P.5 | <1400 | | ● 300-700 | | | | o 15-20 | ● 15-20 |
| M.1 | <950 | ● 600-1000 | o 600-1000 | | | o 15-20 | ● 20-25 | ● 20-30 |
| M.2 | | ● 600-1000 | o 600-1000 | | | o 15-20 | ● 20-25 | ● 20-30 |
| M.3 | <1200 | o 400-800 | ● 400-800 | | | | o 15-20 | o 15-20 |
| M.4 | | o 400-800 | ● 400-800 | | | | o 15-20 | o 15-20 |
| K.1 | <500 | ● 500-800 | ● 500-800 | | o 20-30 | ● 30-35 | ● 45-55 | ● 50-60 |
| K.2 | | ● 500-800 | ● 500-800 | | o 20-30 | ● 30-35 | ● 45-55 | ● 50-60 |
| K.3 | <800 | ● 400-800 | ● 400-800 | | o 15-20 | o 25-30 | o 40-50 | ● 45-55 |
| K.4.1 | | ● 400-800 | ● 400-800 | | o 15-20 | o 25-30 | o 40-50 | ● 45-55 |
| K.4.2 | <1400 | | ● 300-700 | | | | o 15-20 | o 15-20 |
| N.1.1 | Al | | | ● 400-1000 | ● 40-50 | ● 50-60 | ● 60-70 | ● 70-90 |
| N.1.2 | | | | ● 400-1000 | o 40-50 | o 50-60 | o 60-70 | o 70-90 |
| N.1.3 | | | | ● 300-700 | o 40-50 | o 50-60 | o 60-70 | o 70-90 |
| N.2.1 | Cu | o 400-800 | | ● 300-700 | o 40-50 | ● 50-60 | ● 60-70 | ● 70-90 |
| N.2.2 | | o 400-800 | o 400-800 | ● 300-700 | o 40-50 | ● 50-60 | ● 60-70 | ● 70-90 |
| N.2.3 | | ● 400-800 | | | o 15-20 | ● 25-35 | ● 40-50 | ● 40-50 |
| N.2.4 | | | o 300-700 | | | o 15-20 | ● 20-25 | ● 20-25 |
| N.3.1 | Mg/Zn | ● 400-800 | | o 400-1000 | o 20-25 | ● 30-35 | ● 45-55 | ● 50-60 |
| N.4.1 | Plastic | | | ● 400-1000 | o 40-50 | o 50-60 | o 60-70 | o 70-90 |
| N.4.2 | | | | ● 400-1000 | o 40-50 | o 50-60 | o 60-70 | o 70-90 |
| N.4.3 | | | o 300-700 | | | | | |
| S.1.1 | Ni | o 400-800 | ● 400-800 | | | | o 10-15 | ● 15-20 |
| S.1.2 | | | o 300-700 | | | | | o 15-20 |
| S.2.1 | Ti | ● 600-1000 | ● 600-1000 | | | | ● 20-25 | ● 20-30 |
| S.2.2 | | | ● 400-800 | | | | o 15-20 | ● 20-25 |
| S.2.3 | | | o 300-700 | | | | | o 15-20 |
| H.1 | 50 HRC | | ● 200-600 | | | | | ● 20-25 |
| H.2 | 55 HRC | | ● 200-600 | | | | | o 15-20 |
| H.3 | 60 HRC | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

| Avance / Feed |
|---|
| vf (mm/min) = rpm x Z x fz x K |
| **rpm =** (Vc x 1000) / (D x P) |
| **Z =** número de dientes / nombre de dents / teeth number |
| **fz =** avance por diente / avance per dent / feed per tooth |

| Fresado / Fresage / Milling | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | |

| K = Coef. x material (rest = 1) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P.4 | P.5 | M.3 | M.4 | K.4.2 | N.1.1 | N.1.2 | N.1.3 | N.4.1 | N.4.2 | N.4.3 | S.1.2 | S.2.3 | H.1 | H.2 | H.3 |
| 0,7 | 0,7 | 0,7 | 0,7 | 0,7 | 1,3 | 1,3 | 1,3 | 1,3 | 1,3 | 1,3 | 0,7 | 0,7 | 0,7 | 0,7 | 0,7 |

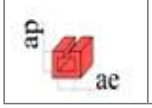
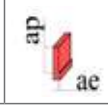
## FRESAS METAL DURO / FRAISES CARBURE / HARD METAL MILLS

| AVANCE / FEED (Fz = mm / Z) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref. | Fres./ Mill | Ap | Ae | D (mm) | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3189 | 2 | 1xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,060 | 0,067 |
| 3190 | 2 | 1xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,060 | 0,067 |
| 3167 | 2 | 0,5xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,060 | 0,067 |
| 3168 | 2 | 0,75xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,060 | 0,067 |
| 3169 | 4 | 0,025xD | 0,05xD | - | - | 0,050 | 0,067 | 0,083 | 0,100 | 0,133 | 0,167 | 0,200 | 0,233 | 0,267 | 0,300 | 0,333 |
| 3170 | 4 | 0,025xD | 0,05xD | - | - | 0,045 | 0,060 | 0,075 | 0,090 | 0,120 | 0,150 | 0,180 | 0,210 | 0,240 | 0,270 | 0,300 |
| 3191 | 4 | 0,1xD | 0,05xD | - | - | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 |
| 3171 | 2 | 0,25xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,062 | 0,067 |
| 3171 | 3 | 0,75xD | 0,2xD | - | - | 0,020 | 0,025 | 0,033 | 0,040 | 0,050 | 0,065 | 0,080 | 0,090 | 0,100 | 0,110 | 0,130 |
| 3172 | 2 | 0,5xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,062 | 0,067 |
| 3172 | 3 | 1,5xD | 0,2xD | - | - | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 |
| 3173 | 2 | 0,25xD | 1xD | - | - | 0,015 | 0,020 | 0,025 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 |
| 3173 | 3 | 0,75xD | 0,2xD | - | - | 0,030 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 | 0,120 | 0,135 | 0,160 | 0,180 | 0,200 |
| 3174 | 2 | 0,5xD | 1xD | - | - | 0,010 | 0,013 | 0,017 | 0,020 | 0,027 | 0,033 | 0,040 | 0,047 | 0,053 | 0,060 | 0,067 |
| 3174 | 3 | 1,5xD | 0,2xD | - | - | 0,025 | 0,035 | 0,040 | 0,050 | 0,065 | 0,080 | 0,100 | 0,115 | 0,130 | 0,150 | 0,170 |
| 3175 | 3 | 1xD | 0,2xD | - | - | 0,020 | 0,025 | 0,033 | 0,040 | 0,050 | 0,065 | 0,080 | 0,090 | 0,100 | 0,110 | 0,130 |
| 3176 | 3 | 1,75xD | 0,2xD | - | - | 0,012 | 0,017 | 0,022 | 0,025 | 0,035 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,090 |
| 3177 | 3 | 1,5xD | 0,3xD | - | - | 0,018 | 0,025 | 0,031 | 0,039 | 0,050 | 0,060 | 0,075 | 0,085 | 0,100 | 0,115 | 0,120 |
| 3177 | 2 | 1xD | 1xD | - | - | 0,012 | 0,016 | 0,020 | 0,024 | 0,032 | 0,040 | 0,048 | 0,056 | 0,064 | 0,072 | 0,080 |
| 3192 | 3 | 1,5xD | 0,3xD | - | - | 0,020 | 0,025 | 0,033 | 0,040 | 0,050 | 0,060 | 0,070 | 0,085 | 0,100 | 0,110 | 0,120 |
| 3193 | 2 | 3xD | 0,2xD | - | - | 0,015 | 0,023 | 0,043 | 0,062 | 0,083 | 0,104 | 0,125 | 0,146 | 0,166 | 0,187 | 0,208 |
| 3178 | 3 | 1,5xD | 0,3xD | - | - | 0,010 | 0,015 | 0,015 | 0,020 | 0,020 | 0,025 | 0,025 | 0,030 | 0,030 | 0,035 | 0,035 |
| 3178 | 2 | 1xD | 1xD | - | - | 0,010 | 0,015 | 0,015 | 0,020 | 0,025 | 0,025 | 0,030 | 0,030 | 0,030 | 0,035 | 0,035 |
| 3179 | 3 | 1,75xD | 0,05xD | - | - | 0,020 | 0,025 | 0,030 | 0,035 | 0,045 | 0,055 | 0,070 | 0,080 | 0,090 | 0,100 | 0,115 |
| 3180 | 3 | 2,75xD | 0,05xD | - | - | 0,010 | 0,015 | 0,018 | 0,022 | 0,032 | 0,038 | 0,045 | 0,052 | 0,060 | 0,067 | 0,075 |
| 3181 | 3 | 1,5xD | 0,4xD | - | - | 0,015 | 0,018 | 0,022 | 0,027 | 0,035 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,090 |
| 3181 | 2 | 1xD | 1xD | - | - | 0,012 | 0,015 | 0,019 | 0,023 | 0,030 | 0,038 | 0,045 | 0,053 | 0,060 | 0,068 | 0,075 |
| 3183 | 3 | 30° | - | 0,030 | 0,070 | 0,110 | - | - | - | - | - | - | - | - | - | - |
| 3184 | 3 | 45° | - | 0,040 | 0,100 | 0,140 | - | - | - | - | - | - | - | - | - | - |
| 3185 | 3 | r | - | - | - | 0,030 | 0,040 | 0,050 | 0,070 | 0,120 | 0,150 | - | - | - | - | - |
| 3194 | 3 | 1,5xD | 0,3xD | - | - | 0,020 | 0,025 | 0,030 | 0,038 | 0,050 | 0,060 | 0,072 | 0,085 | 0,095 | 0,110 | 0,125 |
| 3194 | 2 | 1xD | 1xD | - | - | 0,020 | 0,025 | 0,030 | 0,035 | 0,050 | 0,060 | 0,070 | 0,085 | 0,095 | 0,105 | 0,120 |
| 3195 | 2 | 3xD | 0,12xD | - | - | 0,010 | 0,015 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 |
| 3101 | 2 | 0,75xD | 1xD | - | - | 0,007 | 0,009 | 0,012 | 0,014 | 0,019 | 0,023 | 0,028 | 0,033 | 0,037 | 0,042 | 0,047 |
| 3105 | 3 | 1,5xD | 0,2xD | - | - | 0,010 | 0,015 | 0,020 | 0,025 | 0,030 | 0,035 | 0,040 | 0,045 | 0,050 | 0,055 | 0,060 |
| 3105 | 2 | 0,5xD | 1xD | - | - | 0,007 | 0,009 | 0,012 | 0,014 | 0,019 | 0,023 | 0,028 | 0,032 | 0,037 | 0,042 | 0,047 |
| 3107 | 3 | 1,75xD | 0,2xD | - | - | 0,010 | 0,015 | 0,020 | 0,024 | 0,028 | 0,035 | 0,040 | 0,047 | 0,055 | 0,065 | 0,075 |

| Fresado / Fresage / Milling | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | |

## FRESAS HSSE MANGO CILÍNDRICO / FRAISES HSSE QUEUE CYLINDRIQUE / HSSE STRAIGHT SHANK MILLS

| AVANCE / FEED (Fz = mm / Z) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ref. | Fres./ Mill | Ap | Ae | D (mm) | | | | | | | | | | | |
| | | | | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 25 | 32 |
| 3120 | 1 | - | - | 0,015 | 0,020 | 0,025 | 0,030 | 0,050 | 0,050 | 0,055 | 0,055 | 0,060 | 0,060 | 0,065 | 0,065 | 0,070 |
| 3121 | 1 | - | - | 0,015 | 0,020 | 0,025 | 0,030 | 0,050 | 0,050 | 0,055 | 0,055 | 0,060 | 0,060 | 0,065 | 0,065 | 0,070 |
| 3122 | 1 | - | - | 0,015 | 0,020 | 0,025 | 0,030 | 0,050 | 0,050 | 0,055 | 0,055 | 0,060 | 0,060 | 0,065 | 0,065 | 0,070 |
| 3186 | 2 | 0,5xD | 1xD | 0,009 | 0,013 | 0,016 | 0,022 | 0,029 | 0,036 | 0,044 | 0,051 | 0,058 | 0,065 | 0,073 | 0,091 | 0,116 |
| 3110 | 2 | 0,5xD | 1xD | 0,009 | 0,013 | 0,016 | 0,022 | 0,029 | 0,036 | 0,044 | 0,051 | 0,058 | 0,065 | 0,073 | 0,091 | 0,116 |
| 3110/1 | 2 | 0,5xD | 1xD | 0,012 | 0,017 | 0,021 | 0,029 | 0,038 | 0,047 | 0,057 | 0,066 | 0,075 | 0,085 | 0,095 | 0,118 | 0,151 |
| 3112 | 4 | 0,05xD | 0,05xD | 0,020 | 0,022 | 0,025 | 0,029 | 0,036 | 0,044 | 0,058 | 0,062 | 0,065 | 0,073 | 0,080 | 0,100 | 0,130 |
| 3112/1 | 4 | 0,05xD | 0,05xD | 0,026 | 0,029 | 0,033 | 0,038 | 0,047 | 0,057 | 0,075 | 0,081 | 0,085 | 0,095 | 0,104 | 0,130 | 0,169 |
| 3114 | 2 | 1xD | 0,1xD | 0,006 | 0,008 | 0,011 | 0,015 | 0,021 | 0,028 | 0,034 | 0,040 | 0,044 | 0,051 | 0,057 | 0,071 | 0,091 |
| 3114/1 | 2 | 1xD | 0,1xD | 0,008 | 0,010 | 0,014 | 0,020 | 0,027 | 0,036 | 0,044 | 0,052 | 0,057 | 0,066 | 0,074 | 0,092 | 0,118 |
| 3187 | 2 | 0,5xD | 1xD | 0,009 | 0,013 | 0,016 | 0,022 | 0,029 | 0,036 | 0,044 | 0,051 | 0,058 | 0,065 | 0,073 | 0,091 | 0,116 |
| 3187/1 | 2 | 0,5xD | 1xD | 0,012 | 0,017 | 0,021 | 0,029 | 0,038 | 0,047 | 0,057 | 0,066 | 0,075 | 0,085 | 0,095 | 0,118 | 0,151 |
| 3115 | 3 | 1xD | 0,1xD | 0,011 | 0,015 | 0,018 | 0,020 | 0,025 | 0,035 | 0,040 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| 3115/1 | 3 | 1xD | 0,1xD | 0,014 | 0,020 | 0,023 | 0,026 | 0,033 | 0,046 | 0,052 | 0,078 | 0,091 | 0,104 | 0,117 | 0,130 | 0,156 |
| 3162 | 3 | 1xD | 0,1xD | 0,016 | 0,021 | 0,026 | 0,029 | 0,036 | 0,050 | 0,057 | 0,086 | 0,100 | 0,114 | 0,129 | 0,143 | 0,172 |
| 3157 | 3 | 1,5xD | 0,5xD | 0,018 | 0,025 | 0,030 | 0,033 | 0,041 | 0,058 | 0,066 | 0,099 | 0,115 | 0,132 | 0,148 | 0,164 | 0,197 |
| 3159 | 3 | 1,5xD | 0,5xD | 0,018 | 0,025 | 0,030 | 0,033 | 0,041 | 0,058 | 0,066 | 0,099 | 0,115 | 0,132 | 0,148 | 0,164 | 0,197 |
| 3117 | 3 | 1,5xD | 0,5xD | 0,012 | 0,015 | 0,018 | 0,020 | 0,025 | 0,035 | 0,040 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| 3117/1 | 3 | 1,5xD | 0,5xD | 0,016 | 0,020 | 0,023 | 0,026 | 0,033 | 0,046 | 0,052 | 0,078 | 0,091 | 0,104 | 0,117 | 0,130 | 0,156 |
| 3119 | 3 | 1,5xD | 0,5xD | 0,012 | 0,015 | 0,018 | 0,020 | 0,025 | 0,035 | 0,040 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| 3119/1 | 3 | 1,5xD | 0,5xD | 0,016 | 0,020 | 0,023 | 0,026 | 0,033 | 0,046 | 0,052 | 0,078 | 0,091 | 0,104 | 0,117 | 0,130 | 0,156 |
| 3111 | 2 | 1,2xD | 1xD | 0,009 | 0,013 | 0,016 | 0,022 | 0,029 | 0,036 | 0,044 | 0,051 | 0,058 | 0,065 | 0,073 | 0,091 | 0,116 |
| 3111/1 | 2 | 1,2xD | 1xD | 0,012 | 0,017 | 0,021 | 0,029 | 0,038 | 0,047 | 0,057 | 0,066 | 0,075 | 0,085 | 0,095 | 0,118 | 0,151 |
| 3113 | 4 | 0,05xD | 0,05xD | 0,020 | 0,022 | 0,025 | 0,029 | 0,036 | 0,044 | 0,058 | 0,062 | 0,065 | 0,073 | 0,080 | 0,100 | 0,130 |
| 3113/1 | 4 | 0,05xD | 0,05xD | 0,026 | 0,029 | 0,033 | 0,038 | 0,047 | 0,057 | 0,075 | 0,081 | 0,085 | 0,095 | 0,104 | 0,130 | 0,169 |
| 3188 | 2 | 0,5xD | 1xD | 0,009 | 0,013 | 0,016 | 0,022 | 0,029 | 0,036 | 0,044 | 0,051 | 0,058 | 0,065 | 0,073 | 0,091 | 0,116 |
| 3188/1 | 2 | 0,5xD | 1xD | 0,012 | 0,017 | 0,021 | 0,029 | 0,038 | 0,047 | 0,057 | 0,066 | 0,075 | 0,085 | 0,095 | 0,118 | 0,151 |
| 3182 | 3 | 2,5xD | 0,3xD | 0,006 | 0,008 | 0,011 | 0,015 | 0,021 | 0,028 | 0,034 | 0,040 | 0,044 | 0,051 | 0,057 | 0,071 | 0,091 |
| 3182/1 | 3 | 2,5xD | 0,3xD | 0,008 | 0,010 | 0,014 | 0,020 | 0,027 | 0,036 | 0,044 | 0,052 | 0,057 | 0,066 | 0,074 | 0,092 | 0,118 |
| 3116 | 3 | 2,5xD | 0,3xD | 0,011 | 0,015 | 0,018 | 0,020 | 0,025 | 0,035 | 0,040 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| 3116/1 | 3 | 2,5xD | 0,3xD | 0,014 | 0,020 | 0,023 | 0,026 | 0,033 | 0,046 | 0,052 | 0,078 | 0,091 | 0,104 | 0,117 | 0,130 | 0,156 |
| 3118 | 3 | 2,5xD | 0,5xD | 0,011 | 0,015 | 0,018 | 0,020 | 0,025 | 0,035 | 0,040 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,120 |
| 3118/1 | 3 | 2,5xD | 0,5xD | 0,014 | 0,020 | 0,023 | 0,026 | 0,033 | 0,046 | 0,052 | 0,078 | 0,091 | 0,104 | 0,117 | 0,130 | 0,156 |
| 3163 | 3 | 2,5xD | 0,3xD | 0,016 | 0,021 | 0,026 | 0,029 | 0,036 | 0,050 | 0,057 | 0,086 | 0,100 | 0,114 | 0,129 | 0,143 | 0,172 |
| 3158 | 3 | 2,5xD | 0,5xD | 0,018 | 0,025 | 0,030 | 0,033 | 0,041 | 0,058 | 0,066 | 0,099 | 0,115 | 0,132 | 0,148 | 0,164 | 0,197 |
| 3160 | 3 | 2,5xD | 0,5xD | 0,018 | 0,025 | 0,030 | 0,033 | 0,041 | 0,058 | 0,066 | 0,099 | 0,115 | 0,132 | 0,148 | 0,164 | 0,197 |

| Fresado / Fresage / Milling | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
|  | |  | |

# TABLA DE AVANCES
# GUIDE D'AVANCES / FEED GUIDE

## FRESAS MANGO CÓNICO / FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS

| AVANCE / FEED (Fz = mm / Z) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ref. | Fres./Mill | Ap | Ae | D (mm) | | | | | |
| | | | | 12 | 16 | 20 | 25 | 32 | 40 |
| 3144 | 2 | 0,5xD | 1xD | 0,050 | 0,060 | 0,075 | 0,090 | 0,100 | 0,110 |
| 3144/1 | 2 | 0,5xD | 1xD | 0,065 | 0,078 | 0,098 | 0,117 | 0,130 | 0,143 |
| 3145 | 3 | 1xD | 0,1xD | 0,035 | 0,045 | 0,060 | 0,070 | 0,080 | 0,090 |
| 3145/1 | 3 | 1xD | 0,1xD | 0,046 | 0,059 | 0,078 | 0,091 | 0,104 | 0,117 |
| 3146 | 3 | 1,5xD | 0,5xD | 0,040 | 0,070 | 0,090 | 0,110 | 0,120 | 0,130 |
| 3146/1 | 3 | 1,5xD | 0,5xD | 0,052 | 0,091 | 0,117 | 0,143 | 0,156 | 0,169 |
| 3147 | 3 | 1xD | 0,1xD | 0,035 | 0,045 | 0,060 | 0,070 | 0,080 | 0,090 |
| 3147/1 | 3 | 1xD | 0,1xD | 0,046 | 0,059 | 0,078 | 0,091 | 0,104 | 0,117 |
| 3148 | 3 | 1,5xD | 0,5xD | 0,040 | 0,070 | 0,090 | 0,110 | 0,120 | 0,130 |
| 3148/1 | 3 | 1,5xD | 0,5xD | 0,052 | 0,091 | 0,117 | 0,143 | 0,156 | 0,169 |

## FRESAS CON AGUJERO / FRAISES À TROU / MILLS WITH HOLES

| AVANCE / FEED (Fz = mm / Z) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ref. | Fres./Mill | Ap | Ae | D (mm) | | | | | |
| | | | | 40 | 50 | 80 | 100 | 160 | 200 |
| 3149 | 3 | 0,05xD | 0,75xD | 0,080 | 0,085 | 0,110 | 0,110 | | |
| 3150 | 3 | 0,05xD | 0,75xD | 0,080 | 0,085 | 0,110 | 0,110 | | |
| 3165 | 3 | 0,05xD | 0,75xD | 0,080 | 0,085 | 0,110 | 0,110 | | |
| 3151 | 2 | 0,1xD | 1xe | | 0,050 | 0,070 | 0,080 | 0,090 | 0,090 |
| 3161 | 2 | 0,1xD | 1xe | | 0,050 | 0,070 | 0,080 | 0,090 | 0,090 |
| 3166 | 2 | 0,1xD | 1xe | | 0,050 | 0,070 | 0,080 | 0,090 | 0,090 |

## FRESAS HSSE ESPECIALES / FRAISES HSSE SPECIALES / HSSE SPECIAL MILLS

| AVANCE / FEED (Fz = mm / Z) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ref. | Fres./Mill | Ap | Ae | D (mm) | | | | | | |
| | | | | 8 | 12 | 16 | 20 | 25 | 32 | 45 |
| 3152 | 1 | - | - | 0,040 | 0,055 | 0,070 | 0,075 | 0,090 | 0,090 | 0,100 |
| 3153 | 1 | - | - | 0,040 | 0,055 | 0,070 | 0,075 | 0,080 | 0,080 | 0,100 |
| 3154 | 1 | 0,1xD | 1xl | 0,040 | 0,055 | 0,070 | 0,075 | 0,080 | 0,080 | 0,100 |
| 3155 | 2 | - | - | 0,040 | 0,055 | 0,070 | 0,075 | 0,080 | 0,080 | 0,100 |
| 3156 | 2 | - | 1xl | 0,040 | 0,055 | 0,070 | 0,075 | 0,080 | 0,080 | 0,100 |
| 3164 | 3 | - | - | 0,040 | 0,060 | 0,065 | 0,070 | 0,075 | 0,080 | 0,100 |

| Fresado / Fresage / Milling | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| | | | |

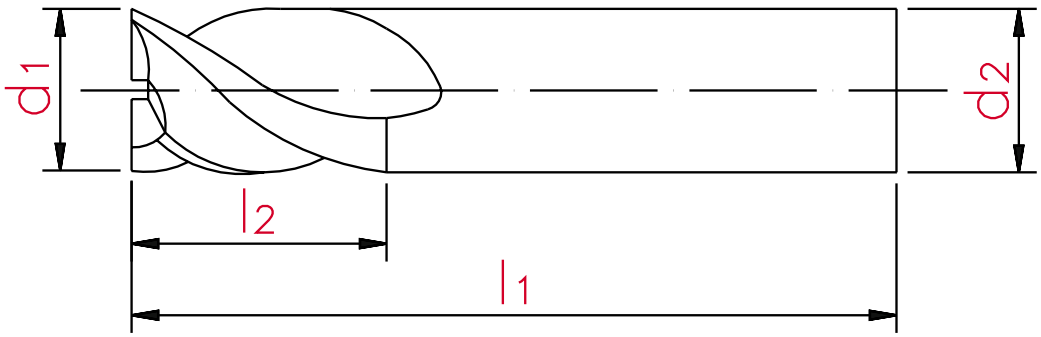
## FRESAS ROTATIVAS / FRAISES ROTATIVES / ROTARY MILLS

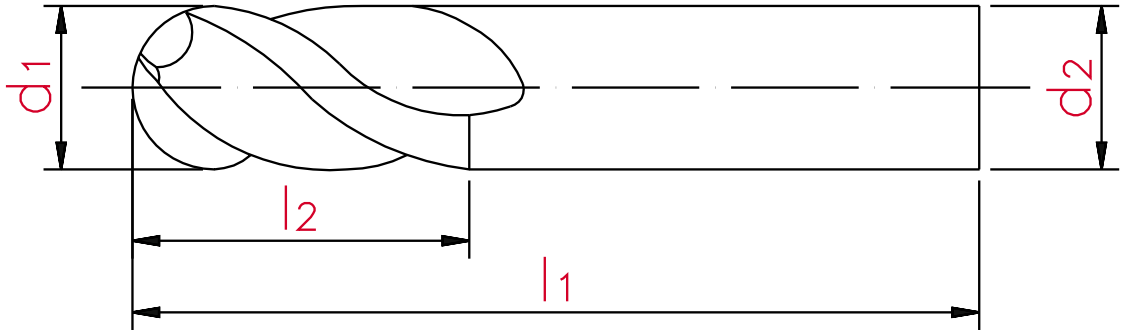
| RPM | | Vc (m/min) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |
| D (mm) | 3 | 10.610 | 21.221 | 31.831 | 42.441 | 53.052 | 63.662 | 74.272 | 84.882 | 95.493 | 106.103 |
| | 4 | 7.958 | 15.915 | 23.873 | 31.831 | 39.789 | 47.746 | 55.704 | 63.662 | 71.620 | 79.577 |
| | 5 | 6.366 | 12.732 | 19.099 | 25.465 | 31.831 | 38.197 | 44.563 | 50.929 | 57.296 | 63.662 |
| | 6 | 5.305 | 10.610 | 15.915 | 21.221 | 26.526 | 31.831 | 37.136 | 42.441 | 47.746 | 53.052 |
| | 7 | 4.547 | 9.095 | 13.642 | 18.189 | 22.736 | 27.284 | 31.831 | 36.378 | 40.925 | 45.473 |
| | 8 | 3.979 | 7.958 | 11.937 | 15.915 | 19.894 | 23.873 | 27.852 | 31.831 | 35.810 | 39.789 |
| | 9 | 3.537 | 7.074 | 10.610 | 14.147 | 17.684 | 21.221 | 24.757 | 28.294 | 31.831 | 35.368 |
| | 10 | 3.183 | 6.366 | 9.549 | 12.732 | 15.915 | 19.099 | 22.282 | 25.465 | 28.648 | 31.831 |
| | 11 | 2.894 | 5.787 | 8.681 | 11.575 | 14.469 | 17.362 | 20.256 | 23.150 | 26.043 | 28.937 |
| | 12 | 2.653 | 5.305 | 7.958 | 10.610 | 13.263 | 15.915 | 18.568 | 21.221 | 23.873 | 26.526 |
| | 13 | 2.449 | 4.897 | 7.346 | 9.794 | 12.243 | 14.691 | 17.140 | 19.588 | 22.037 | 24.485 |
| | 14 | 2.274 | 4.547 | 6.821 | 9.095 | 11.368 | 13.642 | 15.915 | 18.189 | 20.463 | 22.736 |
| | 15 | 2.122 | 4.244 | 6.366 | 8.488 | 10.610 | 12.732 | 14.854 | 16.976 | 19.099 | 21.221 |
| | 16 | 1.989 | 3.979 | 5.968 | 7.958 | 9.947 | 11.937 | 13.926 | 15.915 | 17.905 | 19.894 |

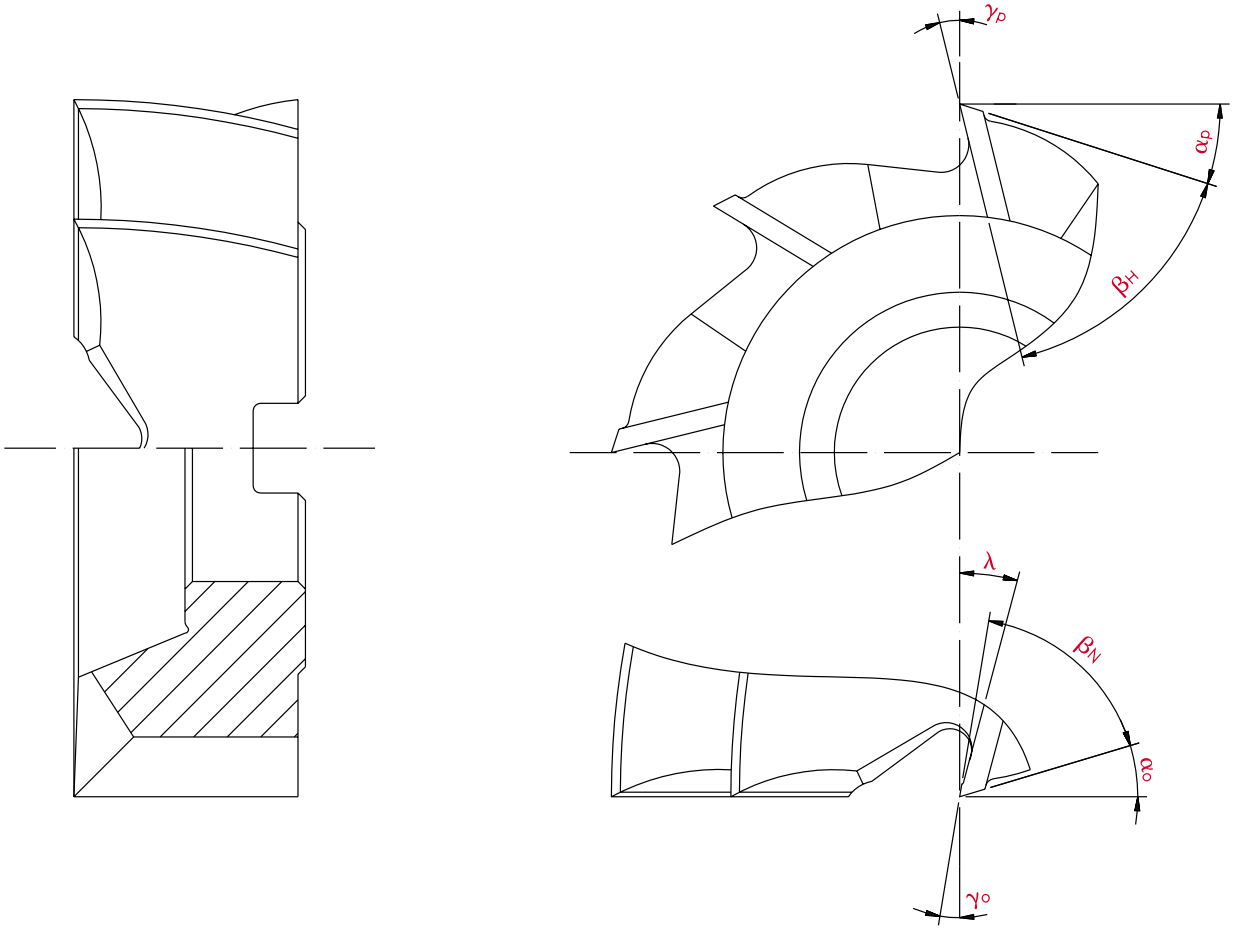
# TABLA DE VELOCIDADES
# GUIDE DE VITESSE / SPEED GUIDE

## FRESAS HUECAS / FRAISES À TROU / CORE BITS

| RPM | | Vc (m/min) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |
| D (mm) | 12 | 265 | 531 | 796 | 1.061 | 1.326 | 1.592 | 1.857 | 2.122 | 2.387 | 2.653 |
| | 13 | 245 | 490 | 735 | 979 | 1.224 | 1.469 | 1.714 | 1.959 | 2.204 | 2.449 |
| | 14 | 227 | 455 | 682 | 909 | 1.137 | 1.364 | 1.592 | 1.819 | 2.046 | 2.274 |
| | 15 | 212 | 424 | 637 | 849 | 1.061 | 1.273 | 1.485 | 1.698 | 1.910 | 2.122 |
| | 16 | 199 | 398 | 597 | 796 | 995 | 1.194 | 1.393 | 1.592 | 1.790 | 1.989 |
| | 17 | 187 | 374 | 562 | 749 | 936 | 1.123 | 1.311 | 1.498 | 1.685 | 1.872 |
| | 18 | 177 | 354 | 531 | 707 | 884 | 1.061 | 1.238 | 1.415 | 1.592 | 1.768 |
| | 19 | 168 | 335 | 503 | 670 | 838 | 1.005 | 1.173 | 1.340 | 1.508 | 1.675 |
| | 20 | 159 | 318 | 477 | 637 | 796 | 955 | 1.114 | 1.273 | 1.432 | 1.592 |
| | 21 | 152 | 303 | 455 | 606 | 758 | 909 | 1.061 | 1.213 | 1.364 | 1.516 |
| | 22 | 145 | 289 | 434 | 579 | 723 | 868 | 1.013 | 1.157 | 1.302 | 1.447 |
| | 23 | 138 | 277 | 415 | 554 | 692 | 830 | 969 | 1.107 | 1.246 | 1.384 |
| | 24 | 133 | 265 | 398 | 531 | 663 | 796 | 928 | 1.061 | 1.194 | 1.326 |
| | 25 | 127 | 255 | 382 | 509 | 637 | 764 | 891 | 1.019 | 1.146 | 1.273 |
| | 26 | 122 | 245 | 367 | 490 | 612 | 735 | 857 | 979 | 1.102 | 1.224 |
| | 27 | 118 | 236 | 354 | 472 | 589 | 707 | 825 | 943 | 1.061 | 1.179 |
| | 28 | 114 | 227 | 341 | 455 | 568 | 682 | 796 | 909 | 1.023 | 1.137 |
| | 29 | 110 | 220 | 329 | 439 | 549 | 659 | 768 | 878 | 988 | 1.098 |
| | 30 | 106 | 212 | 318 | 424 | 531 | 637 | 743 | 849 | 955 | 1.061 |
| | 31 | 103 | 205 | 308 | 411 | 513 | 616 | 719 | 821 | 924 | 1.027 |
| | 32 | 99 | 199 | 298 | 398 | 497 | 597 | 696 | 796 | 895 | 995 |
| | 33 | 96 | 193 | 289 | 386 | 482 | 579 | 675 | 772 | 868 | 965 |
| | 34 | 94 | 187 | 281 | 374 | 468 | 562 | 655 | 749 | 843 | 936 |
| | 35 | 91 | 182 | 273 | 364 | 455 | 546 | 637 | 728 | 819 | 909 |
| | 36 | 88 | 177 | 265 | 354 | 442 | 531 | 619 | 707 | 796 | 884 |
| | 37 | 86 | 172 | 258 | 344 | 430 | 516 | 602 | 688 | 774 | 860 |
| | 38 | 84 | 168 | 251 | 335 | 419 | 503 | 586 | 670 | 754 | 838 |
| | 39 | 82 | 163 | 245 | 326 | 408 | 490 | 571 | 653 | 735 | 816 |
| | 40 | 80 | 159 | 239 | 318 | 398 | 477 | 557 | 637 | 716 | 796 |
| | 41 | 78 | 155 | 233 | 311 | 388 | 466 | 543 | 621 | 699 | 776 |
| | 42 | 76 | 152 | 227 | 303 | 379 | 455 | 531 | 606 | 682 | 758 |
| | 43 | 74 | 148 | 222 | 296 | 370 | 444 | 518 | 592 | 666 | 740 |
| | 44 | 72 | 145 | 217 | 289 | 362 | 434 | 506 | 579 | 651 | 723 |
| | 45 | 71 | 141 | 212 | 283 | 354 | 424 | 495 | 566 | 637 | 707 |
| | 46 | 69 | 138 | 208 | 277 | 346 | 415 | 484 | 554 | 623 | 692 |
| | 47 | 68 | 135 | 203 | 271 | 339 | 406 | 474 | 542 | 610 | 677 |
| | 48 | 66 | 133 | 199 | 265 | 332 | 398 | 464 | 531 | 597 | 663 |
| | 49 | 65 | 130 | 195 | 260 | 325 | 390 | 455 | 520 | 585 | 650 |
| | 50 | 64 | 127 | 191 | 255 | 318 | 382 | 446 | 509 | 573 | 637 |
| | 51 | 62 | 125 | 187 | 250 | 312 | 374 | 437 | 499 | 562 | 624 |
| | 52 | 61 | 122 | 184 | 245 | 306 | 367 | 428 | 490 | 551 | 612 |
| | 53 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 541 | 601 |
| | 54 | 59 | 118 | 177 | 236 | 295 | 354 | 413 | 472 | 531 | 589 |
| | 55 | 58 | 116 | 174 | 231 | 289 | 347 | 405 | 463 | 521 | 579 |
| | 56 | 57 | 114 | 171 | 227 | 284 | 341 | 398 | 455 | 512 | 568 |
| | 57 | 56 | 112 | 168 | 223 | 279 | 335 | 391 | 447 | 503 | 558 |
| | 58 | 55 | 110 | 165 | 220 | 274 | 329 | 384 | 439 | 494 | 549 |
| | 59 | 54 | 108 | 162 | 216 | 270 | 324 | 378 | 432 | 486 | 540 |
| | 60 | 53 | 106 | 159 | 212 | 265 | 318 | 371 | 424 | 477 | 531 |


d1
d2
l2
l1


d1
d2
l2
l1




| | |
|---|---|
| **l1** | **Longitud total** / Longueur totale / Total length |
| **l2** | **Longitud de corte** / Longueur de coupe / Length of cut |
| **d1** | **Diámetro de fresa** / Diamètre de fraise / Diametre of mill |
| **d2** | **Longitud mango** / Longueur queue / Shank length |
| λ | **Ángulo de espiral** / Angle de spirale / Spiral angle |
| απ | **Ángulo de destalonado del corte principal** / Angle de détalonnage de la coupe principale / Main cutting relief angle |
| α() | **Ángulo de destalonado del corte secundario** / Angle de détalonnage de la coupe secondaire / Secondary cutting relief angle |
| βH | **Ángulo de cuña del corte principal** / Angle de coin de la coupe principale / Main cutting wedge angle |
| βN | **Ángulo de cuña del corte secundario** / Angle de coin de la coupe secondaire / Secondary cutting wedge angle |
| γp | **Ángulo de desprendimiento del corte principal** / Angle de dégagement de la coupe principale / Main cutting rake angle |
| γ0 | **Ángulo de desprendimiento del corte secundario** / Angle de dégagement de la coupe secondaire / Secondary cutting rake angle |

## 3141 HM-MD

1z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 150-300 | ● 120-350 | ● 120-350 | ● 150-300 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6 | *27,27* | 50 | 8 | 1 |
| 4,00 | 6 | *27,27* | 54 | 11 | 1 |
| 5,00 | 6 | *27,27* | 54 | 13 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,00 | 6 | *27,27* | 54 | 13 | 1 |
| 8,00 | 8 | *38,48* | 58 | 19 | 1 |
| 10,00 | 10 | *54,69* | 66 | 22 | 1 |

## 3189 HM-MD

45° 2z DIN 6535 HA

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 150-300 | ● 120-350 | ● 120-350 | ● 150-300 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *29,93* | 57 | 8 | 2 | 1 |
| 3,50 | 6 | *29,93* | 57 | 10 | 2 | 1 |
| 4,00 | 6 | *29,93* | 57 | 11 | 2 | 1 |
| 4,50 | 6 | *29,93* | 57 | 11 | 2 | 1 |
| 5,00 | 6 | *29,93* | 57 | 13 | 2 | 1 |
| 6,00 | 6 | *29,93* | 57 | 13 | 2 | 1 |
| 7,00 | 8 | *37,65* | 63 | 16 | 2 | 1 |
| 8,00 | 8 | *37,65* | 63 | 19 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 9,00 | 10 | *55,11* | 72 | 19 | 2 | 1 |
| 10,00 | 10 | *55,11* | 72 | 22 | 2 | 1 |
| 12,00 | 12 | *79,63* | 83 | 26 | 2 | 1 |
| 14,00 | 14 | *119,53* | 83 | 26 | 2 | 1 |
| 16,00 | 16 | *147,14* | 92 | 32 | 2 | 1 |
| 18,00 | 18 | *193,26* | 92 | 32 | 2 | 1 |
| 20,00 | 20 | *233,42* | 104 | 38 | 2 | 1 |

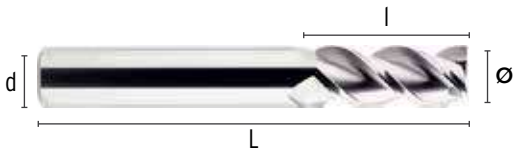
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 3190 HM-MD

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 150-300 | ● 120-350 | ● 120-350 | ● 150-300 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *29,93* | 57 | 8 | 3 | 1 |
| 3,50 | 6 | *29,93* | 57 | 9 | 3 | 1 |
| 4,00 | 6 | *29,93* | 57 | 11 | 3 | 1 |
| 4,50 | 6 | *29,93* | 57 | 11 | 3 | 1 |
| 5,00 | 6 | *29,93* | 57 | 13 | 3 | 1 |
| 6,00 | 6 | *29,93* | 57 | 13 | 3 | 1 |
| 8,00 | 8 | *37,65* | 63 | 19 | 3 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *55,11* | 72 | 22 | 3 | 1 |
| 12,00 | 12 | *79,63* | 83 | 26 | 3 | 1 |
| 14,00 | 14 | *119,53* | 83 | 26 | 3 | 1 |
| 16,00 | 16 | *147,14* | 92 | 32 | 3 | 1 |
| 18,00 | 18 | *193,26* | 92 | 32 | 3 | 1 |
| 20,00 | 20 | *233,42* | 104 | 38 | 3 | 1 |

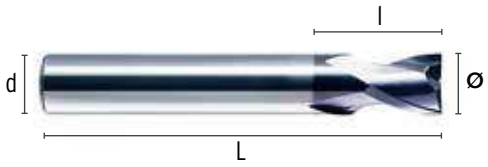


P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3167 HM-MD DIN 6527 S

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 110-250 | ● 90-200 | ● 75-180 | ● 60-120 | ● 80-140 | ● 60-120 | ● 120-180 | ● 100-140 | ○ 60-120 | | ○ 110-220 | | | ● 40-90 | ● 60-140 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *24,51* | 50 | 4 | 2 | 1 |
| 3,50 | 6 | *24,51* | 50 | 4 | 2 | 1 |
| 4,00 | 6 | *25,05* | 54 | 5 | 2 | 1 |
| 4,50 | 6 | *25,05* | 54 | 5 | 2 | 1 |
| 5,00 | 6 | *25,05* | 54 | 6 | 2 | 1 |
| 6,00 | 6 | *25,05* | 54 | 7 | 2 | 1 |
| 7,00 | 8 | *33,12* | 58 | 8 | 2 | 1 |
| 8,00 | 8 | *33,12* | 58 | 9 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 9,00 | 10 | *45,51* | 66 | 10 | 2 | 1 |
| 10,00 | 10 | *45,51* | 66 | 11 | 2 | 1 |
| 12,00 | 12 | *65,46* | 73 | 12 | 2 | 1 |
| 14,00 | 14 | *93,66* | 75 | 14 | 2 | 1 |
| 16,00 | 16 | *110,25* | 82 | 16 | 2 | 1 |
| 18,00 | 18 | *152,46* | 84 | 18 | 2 | 1 |
| 20,00 | 20 | *171,84* | 92 | 20 | 2 | 1 |

## 3168 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 100-220 | ● 80-180 | ● 70-150 | ● 60-90 | ● 70-110 | ● 60-100 | ● 100-160 | ● 80-120 | ○ 60-90 | | ○ 100-200 | | | ● 40-80 | ● 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *21,75* | 57 | 7 | 2 | 1 |
| 3,50 | 6 | *21,75* | 57 | 7 | 2 | 1 |
| 4,00 | 6 | *21,75* | 57 | 8 | 2 | 1 |
| 4,50 | 6 | *21,75* | 57 | 8 | 2 | 1 |
| 5,00 | 6 | *21,75* | 57 | 10 | 2 | 1 |
| 6,00 | 6 | *21,75* | 57 | 10 | 2 | 1 |
| 7,00 | 8 | *32,01* | 63 | 13 | 2 | 1 |
| 8,00 | 8 | *32,01* | 63 | 16 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 9,00 | 10 | *46,28* | 72 | 16 | 2 | 1 |
| 10,00 | 10 | *46,28* | 72 | 19 | 2 | 1 |
| 12,00 | 12 | *66,03* | 83 | 22 | 2 | 1 |
| 14,00 | 14 | *102,77* | 83 | 22 | 2 | 1 |
| 16,00 | 16 | *125,68* | 92 | 26 | 2 | 1 |
| 18,00 | 18 | *159,57* | 92 | 26 | 2 | 1 |
| 20,00 | 20 | *196,29* | 104 | 32 | 2 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3169 HM-MD DIN 6527 S

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | |
| 110-250 | 90-200 | 75-180 | 60-120 | 70-110 | 60-100 | 120-180 | 100-140 | 60-120 | 150-450 | 60-350 | 150-450 | 150-450 | 40-80 | 60-110 | 40-80 | 30-50 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

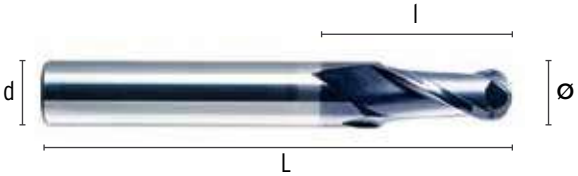
| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *32,55* | 50 | 4 | 2 | 1 |
| 4,00 | 6 | *33,12* | 54 | 5 | 2 | 1 |
| 5,00 | 6 | *33,12* | 54 | 6 | 2 | 1 |
| 6,00 | 6 | *33,12* | 54 | 7 | 2 | 1 |
| 8,00 | 8 | *44,67* | 58 | 9 | 2 | 1 |
| 10,00 | 10 | *60,90* | 66 | 11 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 12,00 | 12 | *85,26* | 73 | 12 | 2 | 1 |
| 14,00 | 14 | *113,25* | 75 | 14 | 2 | 1 |
| 16,00 | 16 | *137,76* | 82 | 16 | 2 | 1 |
| 18,00 | 18 | *168,57* | 84 | 18 | 2 | 1 |
| 20,00 | 20 | *207,75* | 92 | 20 | 2 | 1 |

## 3170 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | |
| 110-250 | 90-200 | 75-180 | 60-120 | 70-110 | 60-100 | 120-180 | 100-140 | 60-120 | 150-450 | 60-350 | 150-450 | 150-450 | 40-80 | 60-110 | 40-80 | 30-50 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *21,75* | 57 | 7 | 2 | 1 |
| 4,00 | 6 | *21,75* | 57 | 8 | 2 | 1 |
| 5,00 | 6 | *21,75* | 57 | 10 | 2 | 1 |
| 6,00 | 6 | *21,75* | 57 | 10 | 2 | 1 |
| 8,00 | 8 | *32,01* | 63 | 16 | 2 | 1 |
| 10,00 | 10 | *46,28* | 72 | 19 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 12,00 | 12 | *66,03* | 83 | 22 | 2 | 1 |
| 14,00 | 14 | *102,77* | 83 | 22 | 2 | 1 |
| 16,00 | 16 | *137,74* | 92 | 26 | 2 | 1 |
| 18,00 | 18 | *178,75* | 92 | 26 | 2 | 1 |
| 20,00 | 20 | *250,43* | 104 | 32 | 2 | 1 |



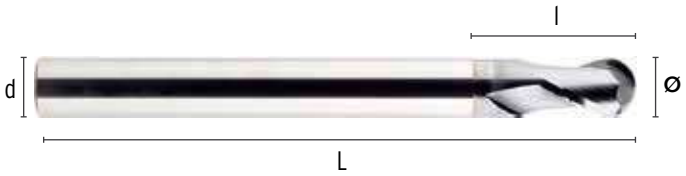
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 3191 HM-MD DIN 6527 EL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | | | ● | ● | ○ | | ○ | | | ● | ● | ● | ● | ○ |
| 160-240 | 140-210 | 150-200 | 100-140 | | | 120-180 | 90-130 | 100-140 | | 100-200 | | | 40-80 | 60-90 | 90-150 | 70-130 | 60-110 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| Ø mm | d mm | € | L mm | l mm | r | Z | |
|---|---|---|---|---|---|---|---|
| 2,00 | 6 | *43,77* | 62 | 3 | 1,0 | 2 | 1 |
| 3,00 | 6 | *43,77* | 62 | 4 | 1,5 | 2 | 1 |
| 4,00 | 6 | *43,77* | 62 | 5 | 2,0 | 2 | 1 |
| 5,00 | 6 | *50,55* | 80 | 6 | 2,5 | 2 | 1 |
| 6,00 | 6 | *50,55* | 80 | 7 | 3,0 | 2 | 1 |
| 8,00 | 8 | *72,00* | 90 | 9 | 4,0 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | r | Z | |
|---|---|---|---|---|---|---|---|
| 10,00 | 10 | *105,11* | 100 | 11 | 5,0 | 2 | 1 |
| 12,00 | 12 | *152,81* | 120 | 13 | 6,0 | 2 | 1 |
| 14,00 | 14 | *180,77* | 120 | 15 | 7,0 | 2 | 1 |
| 16,00 | 16 | *247,81* | 140 | 17 | 8,0 | 2 | 1 |
| 18,00 | 18 | *298,03* | 140 | 19 | 9,0 | 2 | 1 |
| 20,00 | 20 | *391,54* | 160 | 21 | 10,0 | 2 | 1 |

## 3171 HM-MD DIN 6527 S

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 110-250 | ● 90-200 | ● 75-180 | ● 60-120 | ● 80-140 | ● 60-120 | ● 120-180 | ● 100-140 | ○ 60-120 | | ○ 110-220 | | | ● 40-90 | ● 60-140 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

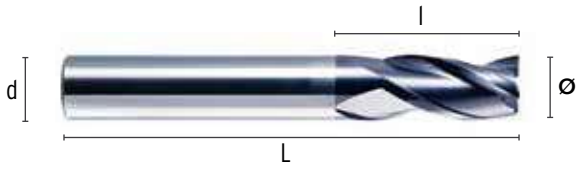
| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *24,51* | 50 | 4 | 2 | 1 |
| 3,50 | 6 | *24,51* | 50 | 4 | 2 | 1 |
| 4,00 | 6 | *25,05* | 54 | 5 | 2 | 1 |
| 4,50 | 6 | *25,05* | 54 | 5 | 2 | 1 |
| 5,00 | 6 | *25,05* | 54 | 6 | 2 | 1 |
| 6,00 | 6 | *25,05* | 54 | 7 | 2 | 1 |
| 8,00 | 8 | *33,12* | 58 | 9 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *45,51* | 66 | 11 | 3 | 1 |
| 12,00 | 12 | *65,46* | 73 | 12 | 3 | 1 |
| 14,00 | 14 | *93,66* | 75 | 14 | 3 | 1 |
| 16,00 | 16 | *110,25* | 82 | 16 | 3 | 1 |
| 18,00 | 18 | *152,46* | 84 | 18 | 3 | 1 |
| 20,00 | 20 | *171,84* | 92 | 20 | 3 | 1 |

## 3172 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 100-220 | ● 80-180 | ● 70-150 | ● 60-90 | ● 70-110 | ● 60-100 | ● 100-160 | ● 80-120 | ○ 60-90 | | ○ 100-200 | | | ● 40-80 | ● 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *21,75* | 57 | 7 | 3 | 1 |
| 3,50 | 6 | *21,75* | 57 | 7 | 3 | 1 |
| 4,00 | 6 | *21,75* | 57 | 8 | 3 | 1 |
| 4,50 | 6 | *21,75* | 57 | 8 | 3 | 1 |
| 5,00 | 6 | *21,75* | 57 | 10 | 3 | 1 |
| 6,00 | 6 | *21,75* | 57 | 10 | 3 | 1 |
| 8,00 | 8 | *32,01* | 63 | 16 | 3 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *46,28* | 72 | 19 | 3 | 1 |
| 12,00 | 12 | *66,03* | 83 | 22 | 3 | 1 |
| 14,00 | 14 | *102,77* | 83 | 22 | 3 | 1 |
| 16,00 | 16 | *125,68* | 92 | 26 | 3 | 1 |
| 18,00 | 18 | *159,57* | 92 | 26 | 3 | 1 |
| 20,00 | 20 | *196,29* | 104 | 32 | 3 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3173 HM-MD DIN 6527 S

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ | |
| 110-250 | 90-200 | 75-180 | 60-120 | 80-140 | 60-120 | 120-180 | 100-140 | 60-120 | 150-300 | 110-350 | 120-350 | 150-300 | 40-90 | 60-140 | 40-80 | 30-50 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *25,05* | 50 | 4 | 2 | 1 |
| 3,50 | 6 | *25,05* | 50 | 4 | 2 | 1 |
| 4,00 | 6 | *25,56* | 54 | 5 | 2 | 1 |
| 4,50 | 6 | *25,56* | 54 | 5 | 2 | 1 |
| 5,00 | 6 | *25,56* | 54 | 6 | 2 | 1 |
| 6,00 | 6 | *25,56* | 54 | 7 | 2 | 1 |
| 8,00 | 8 | *33,24* | 58 | 9 | 2 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *45,72* | 66 | 11 | 3 | 1 |
| 12,00 | 12 | *65,46* | 73 | 12 | 3 | 1 |
| 14,00 | 14 | *93,66* | 75 | 14 | 3 | 1 |
| 16,00 | 16 | *110,25* | 82 | 16 | 3 | 1 |
| 18,00 | 18 | *152,46* | 84 | 18 | 3 | 1 |
| 20,00 | 20 | *171,72* | 92 | 20 | 3 | 1 |

## 3174 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | | ○ | ● | ● | | | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | 110-240 | 100-250 | | 110-240 | 40-80 | 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *28,71* | 57 | 7 | 3 | 1 |
| 3,50 | 6 | *28,71* | 57 | 7 | 3 | 1 |
| 4,00 | 6 | *28,71* | 57 | 8 | 3 | 1 |
| 4,50 | 6 | *28,71* | 57 | 8 | 3 | 1 |
| 5,00 | 6 | *28,71* | 57 | 10 | 3 | 1 |
| 6,00 | 6 | *28,71* | 57 | 10 | 3 | 1 |
| 8,00 | 8 | *36,60* | 63 | 16 | 3 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *50,40* | 72 | 19 | 3 | 1 |
| 12,00 | 12 | *74,91* | 83 | 22 | 3 | 1 |
| 14,00 | 14 | *103,80* | 83 | 22 | 3 | 1 |
| 16,00 | 16 | *126,21* | 92 | 26 | 3 | 1 |
| 18,00 | 18 | *165,75* | 92 | 26 | 3 | 1 |
| 20,00 | 20 | *196,35* | 104 | 32 | 3 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3175 HM-MD DIN 6527 S

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | | | |
| 110-250 | 90-200 | 75-180 | 60-120 | 80-140 | 60-120 | 120-180 | 100-140 | 60-120 | | 110-220 | | | 40-90 | 60-140 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

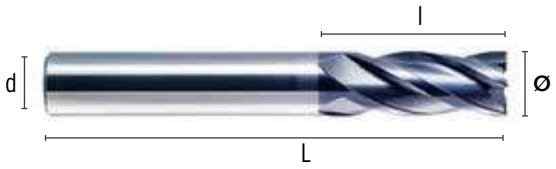
| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *24,51* | 50 | 5 | 4 | 1 |
| 3,50 | 6 | *24,51* | 50 | 6 | 4 | 1 |
| 4,00 | 6 | *25,05* | 54 | 8 | 4 | 1 |
| 4,50 | 6 | *25,05* | 54 | 8 | 4 | 1 |
| 5,00 | 6 | *25,05* | 54 | 9 | 4 | 1 |
| 6,00 | 6 | *25,05* | 54 | 10 | 4 | 1 |
| 8,00 | 8 | *33,12* | 58 | 12 | 4 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *45,51* | 66 | 14 | 4 | 1 |
| 12,00 | 12 | *65,46* | 73 | 16 | 4 | 1 |
| 14,00 | 14 | *93,66* | 75 | 18 | 4 | 1 |
| 16,00 | 16 | *110,25* | 82 | 22 | 4 | 1 |
| 18,00 | 18 | *152,46* | 84 | 24 | 4 | 1 |
| 20,00 | 20 | *171,84* | 92 | 26 | 4 | 1 |

## 3176 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | | | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | | 100-200 | | | 40-80 | 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *21,75* | 57 | 8 | 4 | 1 |
| 3,50 | 6 | *21,75* | 57 | 10 | 4 | 1 |
| 4,00 | 6 | *21,75* | 57 | 11 | 4 | 1 |
| 4,50 | 6 | *21,75* | 57 | 11 | 4 | 1 |
| 5,00 | 6 | *21,75* | 57 | 13 | 4 | 1 |
| 6,00 | 6 | *21,75* | 57 | 13 | 4 | 1 |
| 8,00 | 8 | *32,01* | 63 | 19 | 4 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *46,28* | 72 | 22 | 4 | 1 |
| 12,00 | 12 | *66,03* | 83 | 26 | 4 | 1 |
| 14,00 | 14 | *102,77* | 83 | 26 | 4 | 1 |
| 16,00 | 16 | *125,68* | 92 | 32 | 4 | 1 |
| 18,00 | 18 | *159,57* | 92 | 32 | 4 | 1 |
| 20,00 | 20 | *196,29* | 104 | 38 | 4 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 3177 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | ● | ○ | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | | 100-200 | | | 40-60 | 60-80 | 40-80 | 30-50 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *31,35* | 57 | 8 | 4 | 1 |
| 3,50 | 6 | *31,35* | 57 | 10 | 4 | 1 |
| 4,00 | 6 | *31,35* | 57 | 11 | 4 | 1 |
| 4,50 | 6 | *31,35* | 57 | 11 | 4 | 1 |
| 5,00 | 6 | *31,35* | 57 | 13 | 4 | 1 |
| 6,00 | 6 | *31,35* | 57 | 13 | 4 | 1 |
| 8,00 | 8 | *41,85* | 63 | 19 | 4 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *65,46* | 72 | 22 | 4 | 1 |
| 12,00 | 12 | *86,46* | 83 | 26 | 4 | 1 |
| 14,00 | 14 | *119,70* | 83 | 26 | 4 | 1 |
| 16,00 | 16 | *141,60* | 92 | 32 | 4 | 1 |
| 18,00 | 18 | *195,99* | 92 | 32 | 4 | 1 |
| 20,00 | 20 | *227,70* | 104 | 38 | 4 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3192 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 170-240 | ● 160-210 | ● 150-200 | ● 100-140 | ● 80-140 | ● 60-120 | ● 120-180 | ● 90-130 | ○ 100-140 | | ○ 170-220 | | | ● 40-80 | ● 60-140 | ● 90-150 | ● 70-130 | ○ 60-110 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *41,46* | 57 | 8 | 4 | 1 |
| 3,50 | 6 | *41,46* | 57 | 9 | 4 | 1 |
| 4,00 | 6 | *41,46* | 57 | 11 | 4 | 1 |
| 4,50 | 6 | *41,46* | 57 | 11 | 4 | 1 |
| 5,00 | 6 | *41,46* | 57 | 13 | 4 | 1 |
| 6,00 | 6 | *41,46* | 57 | 13 | 4 | 1 |
| 8,00 | 8 | *52,18* | 63 | 19 | 4 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *81,43* | 72 | 22 | 4 | 1 |
| 12,00 | 12 | *101,58* | 83 | 26 | 4 | 1 |
| 14,00 | 14 | *140,60* | 83 | 26 | 4 | 1 |
| 16,00 | 16 | *166,32* | 92 | 32 | 4 | 1 |
| 18,00 | 18 | *218,09* | 92 | 32 | 4 | 1 |
| 20,00 | 20 | *253,38* | 104 | 38 | 4 | 1 |

## 3193 HM-MD DIN 6527 EL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 210-380 | ● 200-320 | ● 200-300 | ● 180-250 | | | | | | | ○ 200-250 | | | | | ● 70-130 | ● 50-120 | ○ 40-80 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

| Ø mm | d mm | € | L mm | l mm | z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *45,53* | 62 | 18 | 5 | 1 |
| 8,00 | 8 | *58,29* | 68 | 24 | 5 | 1 |
| 10,00 | 10 | *86,25* | 80 | 30 | 5 | 1 |
| 12,00 | 12 | *115,02* | 93 | 36 | 5 | 1 |
| 14,00 | 14 | *156,28* | 100 | 42 | 5 | 1 |

| Ø mm | d mm | € | L mm | l mm | z | |
|---|---|---|---|---|---|---|
| 16,00 | 16 | *214,16* | 108 | 48 | 5 | 1 |
| 18,00 | 18 | *273,46* | 115 | 54 | 5 | 1 |
| 20,00 | 20 | *331,69* | 126 | 60 | 5 | 1 |
| 25,00 | 25 | *585,34* | 150 | 75 | 5 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 3178 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | ● | ● | ○ |
| 170-240 | 160-210 | 150-200 | 100-140 | 80-140 | 60-120 | 120-180 | 90-130 | 100-140 | | 170-220 | | | 40-80 | 60-140 | 90-150 | 70-130 | 60-110 |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | r | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *45,00* | 57 | 13 | 0,5 | 1 |
| 6,00 | 6 | *45,00* | 57 | 13 | 1,0 | 1 |
| 8,00 | 8 | *58,11* | 63 | 19 | 0,5 | 1 |
| 8,00 | 8 | *58,11* | 63 | 19 | 1,0 | 1 |
| 10,00 | 10 | *87,51* | 72 | 22 | 0,5 | 1 |
| 10,00 | 10 | *87,51* | 72 | 22 | 1,0 | 1 |
| 10,00 | 10 | *87,51* | 72 | 22 | 2,0 | 1 |

| Ø mm | d mm | € | L mm | l mm | r | |
|---|---|---|---|---|---|---|
| 12,00 | 12 | *113,04* | 83 | 26 | 0,5 | 1 |
| 12,00 | 12 | *113,04* | 83 | 26 | 1,0 | 1 |
| 12,00 | 12 | *122,49* | 83 | 26 | 2,0 | 1 |
| 16,00 | 16 | *179,76* | 92 | 32 | 0,5 | 1 |
| 16,00 | 16 | *179,76* | 92 | 32 | 1,0 | 1 |
| 16,00 | 16 | *184,32* | 92 | 32 | 2,0 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3179 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 100-220 | ● 80-180 | ● 70-150 | ● 60-90 | ● 70-110 | ● 60-100 | ● 100-160 | ● 80-120 | ○ 60-90 | | ○ 100-200 | | | ● 40-80 | ● 60-110 | ● 60-100 | ○ 50-80 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *33,96* | 57 | 13 | 6 | 1 |
| 8,00 | 8 | *46,89* | 63 | 19 | 6 | 1 |
| 10,00 | 10 | *63,21* | 72 | 22 | 6 | 1 |
| 12,00 | 12 | *89,82* | 83 | 26 | 6 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 14 | *112,20* | 83 | 26 | 6 | 1 |
| 16,00 | 16 | *151,05* | 92 | 32 | 6 | 1 |
| 18,00 | 18 | *189,36* | 92 | 32 | 6 | 1 |
| 20,00 | 20 | *225,96* | 104 | 38 | 8 | 1 |

## 3180 HM-MD DIN 6527 EL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 100-220 | ● 80-180 | ● 70-150 | ● 60-90 | ● 70-110 | ● 60-100 | ● 100-160 | ● 80-120 | ○ 60-90 | | ○ 100-200 | | | ● 40-90 | ● 60-110 | ● 60-100 | ○ 50-80 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *36,96* | 62 | 18 | 6 | 1 |
| 8,00 | 8 | *50,40* | 68 | 24 | 6 | 1 |
| 10,00 | 10 | *70,71* | 80 | 30 | 6 | 1 |
| 12,00 | 12 | *101,49* | 93 | 36 | 6 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 14 | *140,55* | 100 | 45 | 6 | 1 |
| 16,00 | 16 | *189,21* | 108 | 48 | 6 | 1 |
| 18,00 | 18 | *255,00* | 115 | 55 | 6 | 1 |
| 20,00 | 20 | *326,07* | 126 | 60 | 8 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3181 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | | | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | | 100-200 | | | 40-90 | 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 4,00 | 6 | *34,86* | 57 | 11 | 3 | 1 |
| 5,00 | 6 | *34,86* | 57 | 13 | 4 | 1 |
| 6,00 | 6 | *34,86* | 57 | 13 | 4 | 1 |
| 8,00 | 8 | *49,56* | 63 | 19 | 4 | 1 |
| 10,00 | 10 | *67,41* | 72 | 22 | 4 | 1 |
| 12,00 | 12 | *94,35* | 83 | 26 | 4 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 14 | *126,90* | 83 | 26 | 4 | 1 |
| 16,00 | 16 | *163,80* | 92 | 32 | 4 | 1 |
| 16,00 | 16 | *163,80* | 92 | 32 | 5 | 1 |
| 18,00 | 18 | *200,13* | 92 | 32 | 5 | 1 |
| 20,00 | 20 | *224,55* | 104 | 38 | 5 | 1 |
| 20,00 | 20 | *224,55* | 104 | 38 | 6 | 1 |

## 3183 HM-MD

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | ● | ○ | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | | 100-200 | | | 40-90 | 60-110 | 40-80 | 30-50 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | Z | |
|---|---|---|---|---|---|
| 1,20 | 6 | *28,93* | 57 | 4 | 1 |
| 1,60 | 8 | *40,15* | 63 | 4 | 1 |

| Ø mm | d mm | € | L mm | Z | |
|---|---|---|---|---|---|
| 2,00 | 10 | *59,85* | 72 | 4 | 1 |
| 2,40 | 12 | *86,45* | 83 | 4 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3184 HM-MD

90° | 4z | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | | | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | | 100-200 | | | 40-90 | 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | Z | |
|---|---|---|---|---|---|
| 1,20 | 6 | *28,93* | 57 | 4 | 1 |
| 1,60 | 8 | *40,15* | 63 | 4 | 1 |

| Ø mm | d mm | € | L mm | Z | |
|---|---|---|---|---|---|
| 2,00 | 10 | *59,85* | 72 | 4 | 1 |
| 2,40 | 12 | *86,45* | 83 | 4 | 1 |

## 3185 HM-MD

r | 4z | DIN 6535 HA | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ○ | | ○ | | | ● | ● | | | |
| 100-220 | 80-180 | 70-150 | 60-90 | 70-110 | 60-100 | 100-160 | 80-120 | 60-90 | | 100-200 | | | 40-90 | 60-110 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | r | d mm | € | L mm | Z | |
|---|---|---|---|---|---|---|
| 5,00 | 0,50 | 6 | *30,18* | 57 | 4 | 1 |
| 4,00 | 1,00 | 6 | *30,18* | 57 | 4 | 1 |
| 5,00 | 1,50 | 8 | *40,15* | 63 | 4 | 1 |
| 4,00 | 2,00 | 8 | *40,15* | 63 | 4 | 1 |
| 5,00 | 2,50 | 10 | *59,85* | 72 | 4 | 1 |

| Ø mm | r | d mm | € | L mm | Z | |
|---|---|---|---|---|---|---|
| 4,00 | 3,00 | 10 | *59,85* | 72 | 4 | 1 |
| 5,00 | 3,50 | 12 | *86,45* | 83 | 4 | 1 |
| 4,00 | 4,00 | 12 | *86,45* | 83 | 4 | 1 |
| 4,00 | 5,00 | 14 | *115,79* | 83 | 4 | 1 |



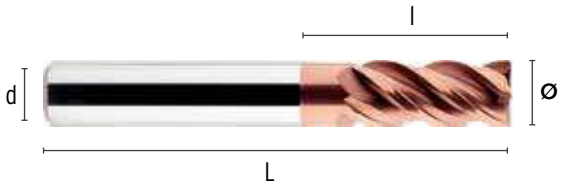
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3194 HM-MD DIN 6527 L

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | ● 90-150 | ● 70-130 | | | | | | | | ● 50-80 | ● 60-150 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW




| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 3,00 | 6 | *44,72* | 57 | 8 | 4 | 1 |
| 3,50 | 6 | *44,72* | 57 | 10 | 4 | 1 |
| 4,00 | 6 | *44,72* | 57 | 11 | 4 | 1 |
| 4,50 | 6 | *44,72* | 57 | 11 | 4 | 1 |
| 5,00 | 6 | *44,72* | 57 | 13 | 4 | 1 |
| 6,00 | 6 | *44,72* | 57 | 13 | 4 | 1 |
| 8,00 | 8 | *56,73* | 63 | 19 | 4 | 1 |

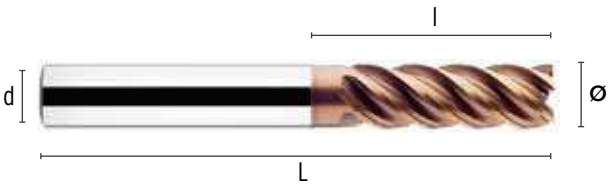
| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 10,00 | 10 | *87,26* | 72 | 22 | 4 | 1 |
| 12,00 | 12 | *107,49* | 83 | 26 | 4 | 1 |
| 14,00 | 14 | *144,54* | 83 | 26 | 4 | 1 |
| 16,00 | 16 | *193,66* | 92 | 32 | 4 | 1 |
| 18,00 | 18 | *239,67* | 92 | 32 | 4 | 1 |
| 20,00 | 20 | *289,82* | 104 | 38 | 4 | 1 |

## 3195 HM-MD DIN 6527 EL

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | ● 150-230 | ● 130-200 | | | | | | | | ● 40-100 | ● 60-230 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

NEW

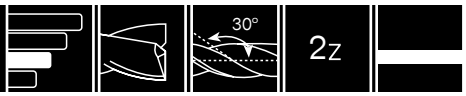



| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *49,20* | 62 | 18 | 5 | 1 |
| 8,00 | 8 | *60,60* | 68 | 24 | 5 | 1 |
| 10,00 | 10 | *89,98* | 80 | 30 | 5 | 1 |
| 12,00 | 12 | *119,90* | 93 | 36 | 5 | 1 |
| 14,00 | 14 | *169,51* | 100 | 42 | 5 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 16,00 | 16 | *230,04* | 108 | 48 | 5 | 1 |
| 18,00 | 18 | *291,11* | 115 | 54 | 5 | 1 |
| 20,00 | 20 | *351,98* | 126 | 60 | 5 | 1 |
| 25,00 | 25 | *615,67* | 150 | 75 | 5 | 1 |

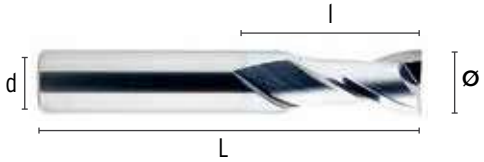
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3101 HM-MD




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ○ | ● | ● | ● | ● | | | ○ | | | ● | ● | | | |
| 70-155 | 60-110 | 50-105 | 45-65 | 50-80 | 45-70 | 70-115 | 60-85 | | | 70-130 | | | 30-60 | 45-80 | | | |

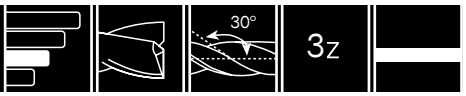
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 3 | *17,84* | 40 | 12 | 1 |
| 4,00 | 4 | *20,14* | 40 | 12 | 1 |
| 5,00 | 5 | *20,98* | 50 | 14 | 1 |
| 6,00 | 6 | *25,88* | 50 | 16 | 1 |
| 8,00 | 8 | *37,21* | 60 | 20 | 1 |

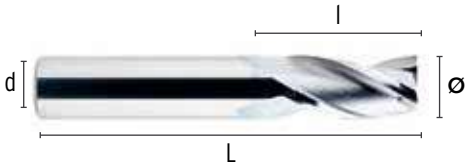
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *50,91* | 70 | 22 | 1 |
| 12,00 | 12 | *71,59* | 70 | 22 | 1 |
| 16,00 | 16 | *120,81* | 75 | 25 | 1 |
| 20,00 | 20 | *183,37* | 100 | 32 | 1 |

## 3105 HM-MD




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ○ | ● | ● | ● | ● | | | ○ | | | ● | ● | | | |
| 70-155 | 60-110 | 50-105 | 45-65 | 50-80 | 45-70 | 70-115 | 60-85 | | | 70-130 | | | 30-60 | 45-80 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



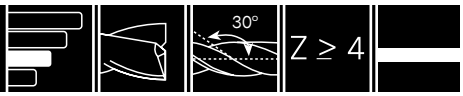

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 3 | *17,84* | 40 | 12 | 1 |
| 4,00 | 4 | *20,14* | 40 | 14 | 1 |
| 5,00 | 5 | *20,98* | 50 | 16 | 1 |
| 6,00 | 6 | *25,88* | 50 | 19 | 1 |
| 8,00 | 8 | *37,21* | 60 | 20 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *50,91* | 70 | 22 | 1 |
| 12,00 | 12 | *71,59* | 70 | 22 | 1 |
| 16,00 | 16 | *120,81* | 75 | 25 | 1 |
| 20,00 | 20 | *183,37* | 100 | 32 | 1 |



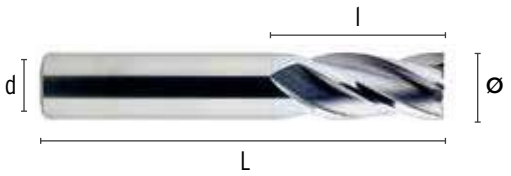
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 3107 HM-MD




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 70-155 | ● 60-110 | ● 50-105 | ○ 45-65 | ● 50-80 | ● 45-70 | ● 70-115 | ● 60-85 | | | ○ 70-130 | | | ● 30-60 | ● 45-80 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 3 | *17,84* | 40 | 12 | 1 |
| 4,00 | 4 | *20,14* | 40 | 12 | 1 |
| 5,00 | 5 | *20,98* | 50 | 14 | 1 |
| 6,00 | 6 | *25,88* | 50 | 16 | 1 |
| 8,00 | 8 | *37,21* | 60 | 20 | 1 |

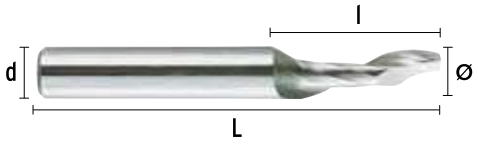
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 10,00 | 10 | *50,91* | 75 | 22 | 1 |
| 12,00 | 12 | *71,59* | 70 | 22 | 1 |
| 16,00 | 16 | *120,81* | 75 | 25 | 1 |
| 20,00 | 20 | *183,37* | 100 | 32 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3120 HSSE W — 1z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 60-200 | | ● 60-100 | ● 50-80 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 8 | *15,38* | 60 | 12 | 1 |
| 4,00* | 6 | *15,38* | 60 | 12 | 1 |
| 4,00 | 8 | *15,38* | 60 | 12 | 1 |
| 5,00* | 6 | *15,38* | 60 | 12 | 1 |
| 5,00 | 8 | *15,38* | 60 | 14 | 1 |

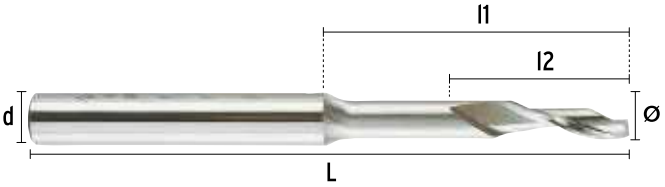
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 6,00 | 6 | *15,38* | 60 | 14 | 1 |
| 6,00 | 8 | *15,38* | 60 | 14 | 1 |
| 7,00 | 8 | *18,68* | 60 | 14 | 1 |
| 8,00 | 8 | *18,68* | 80 | 14 | 1 |
| 10,00 | 8 | *23,61* | 80 | 14 | 1 |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)

## 3121 HSSE W — 1z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 60-200 | | ● 60-100 | ● 50-80 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|
| 4,00 | 8 | *21,78* | 80 | 45 | 16 | 1 |
| 5,00* | 6 | *21,78* | 80 | 45 | 14 | 1 |
| 5,00 | 8 | *21,78* | 80 | 45 | 16 | 1 |

| Ø mm | d mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|
| 6,00 | 8 | *21,78* | 90 | 45 | 16 | 1 |
| 8,00 | 8 | *24,15* | 100 | 70 | 30 | 1 |

***(Hasta fin de existencias /** Jusqu'à épuisement des stocks / While supplies last)



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3122 HSSE W — 1z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| | | | | | | | | | ● 60-200 | | ● 60-100 | ● 50-80 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l1 mm | l2 mm | |
|---|---|---|---|---|---|---|
| 5,00 | 8 | *21,78* | 100 | 55 | 35 | 1 |

## 3186 HSSE W — 2z

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | | | | | | | | | ● 60-150 | | ● 60-100 | ● 50-80 | | | | | |

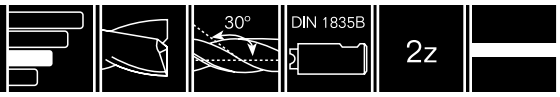
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2 | 2 | 6 | *15,24* | 51 | 7 | 1 |
| 3 | 2 | 6 | *15,24* | 52 | 8 | 1 |
| 4 | 2 | 6 | *15,24* | 55 | 11 | 1 |
| 5 | 2 | 6 | *15,24* | 57 | 13 | 1 |
| 6 | 2 | 6 | *15,24* | 57 | 13 | 1 |
| 8 | 2 | 10 | *20,75* | 69 | 19 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 10 | 2 | 10 | *21,70* | 72 | 22 | 1 |
| 12 | 2 | 12 | *28,16* | 83 | 26 | 1 |
| 14 | 2 | 12 | *31,12* | 83 | 26 | 1 |
| 16 | 2 | 16 | *37,96* | 92 | 32 | 1 |
| 18 | 2 | 16 | *47,10* | 92 | 32 | 1 |
| 20 | 2 | 20 | *57,32* | 104 | 38 | 1 |

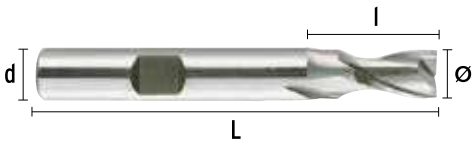
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 3110 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 45-90 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



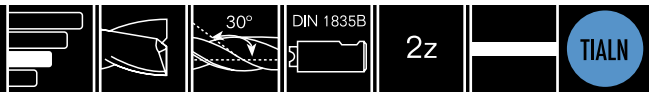

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2,00 | 6 | *13,84* | 48 | 4 | 1 |
| 2,50 | 6 | *13,84* | 49 | 5 | 1 |
| 3,00 | 6 | *13,84* | 49 | 5 | 1 |
| 3,50 | 6 | *15,06* | 50 | 6 | 1 |
| 4,00 | 6 | *13,84* | 51 | 7 | 1 |
| 4,50 | 6 | *16,54* | 51 | 7 | 1 |
| 5,00 | 6 | *13,84* | 52 | 8 | 1 |
| 5,50 | 6 | *17,56* | 52 | 8 | 1 |
| 6,00 | 6 | *13,84* | 52 | 8 | 1 |
| 6,50 | 10 | *22,95* | 60 | 10 | 1 |
| 7,00 | 10 | *22,26* | 60 | 10 | 1 |
| 7,50 | 10 | *22,06* | 60 | 10 | 1 |
| 8,00 | 10 | *19,83* | 61 | 11 | 1 |
| 8,50 | 10 | *24,76* | 61 | 11 | 1 |
| 9,00 | 10 | *22,79* | 61 | 11 | 1 |
| 9,50 | 10 | *24,16* | 61 | 11 | 1 |
| 10,00 | 10 | *19,62* | 63 | 13 | 1 |
| 11,00 | 12 | *26,76* | 70 | 13 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 12,00 | 12 | *25,36* | 73 | 16 | 1 |
| 13,00 | 12 | *33,46* | 73 | 16 | 1 |
| 14,00 | 12 | *33,46* | 73 | 16 | 1 |
| 15,00 | 12 | *37,49* | 73 | 16 | 1 |
| 16,00 | 16 | *36,60* | 79 | 19 | 1 |
| 17,00 | 16 | *44,58* | 79 | 19 | 1 |
| 18,00 | 16 | *44,58* | 79 | 19 | 1 |
| 19,00 | 16 | *56,29* | 79 | 19 | 1 |
| 20,00 | 20 | *53,28* | 88 | 22 | 1 |
| 22,00 | 20 | *69,68* | 88 | 22 | 1 |
| 24,00 | 25 | *88,26* | 102 | 26 | 1 |
| 25,00 | 25 | *96,12* | 102 | 26 | 1 |
| 28,00 | 25 | *111,67* | 102 | 26 | 1 |
| 30,00 | 25 | *129,90* | 102 | 26 | 1 |
| 32,00 | 32 | *130,74* | 112 | 32 | 1 |
| 36,00 | 32 | *174,87* | 112 | 32 | 1 |
| 40,00 | 32 | *214,70* | 130 | 38 | 1 |



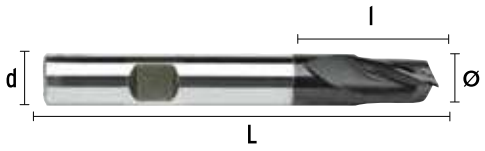
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 3110/1 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ○ 70-120 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

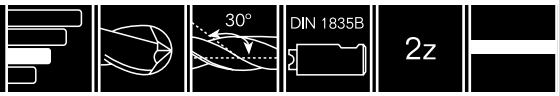



| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 2,00 | 6 | *19,37* | 48 | 4 | 1 |
| 2,50 | 6 | *19,37* | 49 | 5 | 1 |
| 3,00 | 6 | *19,37* | 49 | 5 | 1 |
| 3,50 | 6 | *21,08* | 50 | 6 | 1 |
| 4,00 | 6 | *19,37* | 51 | 7 | 1 |
| 4,50 | 6 | *23,15* | 51 | 7 | 1 |
| 5,00 | 6 | *19,37* | 52 | 8 | 1 |
| 5,50 | 6 | *24,58* | 52 | 8 | 1 |
| 6,00 | 6 | *19,37* | 52 | 8 | 1 |
| 6,50 | 10 | *32,13* | 60 | 10 | 1 |
| 7,00 | 10 | *31,16* | 60 | 10 | 1 |
| 7,50 | 10 | *30,88* | 60 | 10 | 1 |
| 8,00 | 10 | *27,77* | 61 | 11 | 1 |
| 8,50 | 10 | *34,66* | 61 | 11 | 1 |
| 9,00 | 10 | *31,90* | 61 | 11 | 1 |
| 9,50 | 10 | *33,82* | 61 | 11 | 1 |
| 10,00 | 10 | *27,47* | 63 | 13 | 1 |
| 11,00 | 12 | *37,47* | 70 | 13 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 12,00 | 12 | *35,50* | 73 | 16 | 1 |
| 13,00 | 12 | *46,85* | 73 | 16 | 1 |
| 14,00 | 12 | *46,85* | 73 | 16 | 1 |
| 15,00 | 12 | *52,48* | 73 | 16 | 1 |
| 16,00 | 16 | *51,24* | 79 | 19 | 1 |
| 17,00 | 16 | *62,42* | 79 | 19 | 1 |
| 18,00 | 16 | *62,42* | 79 | 19 | 1 |
| 19,00 | 16 | *78,81* | 79 | 19 | 1 |
| 20,00 | 20 | *74,59* | 88 | 22 | 1 |
| 22,00 | 20 | *97,55* | 88 | 22 | 1 |
| 24,00 | 25 | *123,57* | 102 | 26 | 1 |
| 25,00 | 25 | *134,56* | 102 | 26 | 1 |
| 28,00 | 25 | *156,33* | 102 | 26 | 1 |
| 30,00 | 25 | *181,85* | 102 | 26 | 1 |
| 32,00 | 32 | *183,03* | 112 | 32 | 1 |
| 36,00 | 32 | *244,81* | 112 | 32 | 1 |
| 40,00 | 40 | *300,59* | 118 | 38 | 1 |

**Bajo demanda** / Sur commande / Upon request

## 3112 HSSE DIN 327 N



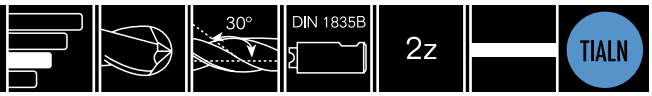

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 45-90 | | | ○ 2-4 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6 | *27,32* | 49 | 5 | 1 |
| 4,00 | 6 | *27,32* | 51 | 7 | 1 |
| 5,00 | 6 | *27,32* | 52 | 8 | 1 |
| 6,00 | 6 | *27,32* | 52 | 8 | 1 |
| 7,00 | 10 | *32,94* | 60 | 10 | 1 |
| 8,00 | 10 | *29,33* | 61 | 11 | 1 |
| 9,00 | 10 | *33,72* | 61 | 11 | 1 |
| 10,00 | 10 | *29,12* | 63 | 13 | 1 |
| 12,00 | 12 | *37,53* | 73 | 16 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 13,00 | 12 | *49,59* | 73 | 16 | 1 |
| 14,00 | 12 | *49,59* | 73 | 16 | 1 |
| 15,00 | 12 | *49,67* | 73 | 16 | 1 |
| 16,00 | 16 | *54,19* | 79 | 19 | 1 |
| 18,00 | 16 | *65,98* | 79 | 19 | 1 |
| 20,00 | 20 | *78,80* | 88 | 22 | 1 |
| 22,00 | 20 | *103,13* | 88 | 22 | 1 |
| 24,00 | 25 | *123,24* | 102 | 26 | 1 |
| 25,00 | 25 | *113,26* | 102 | 26 | 1 |

## 3112/1 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ○ 70-120 | | | ● 4-6 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 3,00 | 6 | *38,25* | 49 | 5 | 1 |
| 4,00 | 6 | *38,25* | 51 | 7 | 1 |
| 5,00 | 6 | *38,25* | 52 | 8 | 1 |
| 6,00 | 6 | *38,25* | 52 | 8 | 1 |
| 7,00 | 10 | *46,11* | 60 | 10 | 1 |
| 8,00 | 10 | *41,06* | 61 | 11 | 1 |
| 9,00 | 10 | *47,20* | 61 | 11 | 1 |
| 10,00 | 10 | *40,76* | 63 | 13 | 1 |
| 12,00 | 12 | *52,54* | 73 | 16 | 1 |

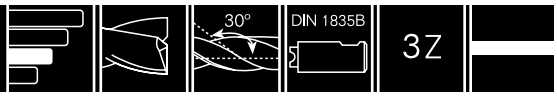
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 13,00 | 12 | *69,43* | 73 | 16 | 1 |
| 14,00 | 12 | *69,43* | 73 | 16 | 1 |
| 15,00 | 12 | *69,53* | 73 | 16 | 1 |
| 16,00 | 16 | *75,87* | 79 | 19 | 1 |
| 18,00 | 16 | *92,37* | 79 | 19 | 1 |
| 20,00 | 20 | *110,32* | 88 | 22 | 1 |
| 22,00 | 20 | *144,38* | 88 | 22 | 1 |
| 24,00 | 25 | *172,53* | 102 | 26 | 1 |
| 25,00 | 25 | *158,57* | 102 | 26 | 1 |

**Bajo demanda /** Sur commade / upon request



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3187 HSSE DIN 327 N



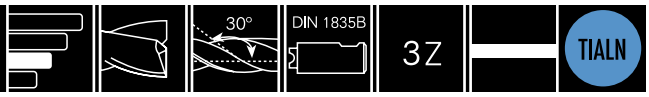

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 45-90 | | | | ○ 15-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2,00 | 3 | 6 | *13,89* | 48 | 4 | 1 |
| 3,00 | 3 | 6 | *12,62* | 49 | 5 | 1 |
| 4,00 | 3 | 6 | *12,62* | 51 | 7 | 1 |
| 5,00 | 3 | 6 | *12,62* | 52 | 8 | 1 |
| 6,00 | 3 | 6 | *12,62* | 52 | 8 | 1 |
| 7,00 | 3 | 10 | *15,79* | 60 | 10 | 1 |
| 8,00 | 3 | 10 | *15,79* | 61 | 11 | 1 |
| 9,00 | 3 | 10 | *18,50* | 91 | 11 | 1 |
| 10,00 | 3 | 10 | *18,49* | 63 | 13 | 1 |
| 11,00 | 3 | 12 | *21,53* | 70 | 13 | 1 |
| 12,00 | 3 | 12 | *21,51* | 73 | 16 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 13,00 | 3 | 12 | *26,68* | 73 | 16 | 1 |
| 14,00 | 3 | 12 | *26,68* | 73 | 16 | 1 |
| 15,00 | 3 | 12 | *30,94* | 73 | 16 | 1 |
| 16,00 | 3 | 16 | *30,94* | 79 | 19 | 1 |
| 18,00 | 3 | 16 | *38,06* | 79 | 19 | 1 |
| 20,00 | 3 | 20 | *47,61* | 88 | 22 | 1 |
| 22,00 | 3 | 20 | *70,91* | 88 | 22 | 1 |
| 25,00 | 3 | 25 | *93,73* | 102 | 26 | 1 |
| 28,00 | 3 | 25 | *105,35* | 102 | 26 | 1 |
| 30,00 | 3 | 25 | *131,62* | 102 | 26 | 1 |
| 32,00 | 3 | 32 | *174,39* | 112 | 32 | 1 |

## 3187/1 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ○ 70-120 | | | | ○ 25-35 | | | |

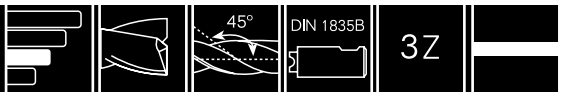
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2,00 | 3 | 6 | *19,45* | 48 | 4 | 1 |
| 3,00 | 3 | 6 | *17,67* | 49 | 5 | 1 |
| 4,00 | 3 | 6 | *17,67* | 51 | 7 | 1 |
| 5,00 | 3 | 6 | *17,67* | 52 | 8 | 1 |
| 6,00 | 3 | 6 | *17,67* | 52 | 8 | 1 |
| 7,00 | 3 | 10 | *22,11* | 60 | 10 | 1 |
| 8,00 | 3 | 10 | *22,11* | 61 | 11 | 1 |
| 9,00 | 3 | 10 | *25,90* | 91 | 11 | 1 |
| 10,00 | 3 | 10 | *25,89* | 63 | 13 | 1 |
| 11,00 | 3 | 12 | *30,14* | 70 | 13 | 1 |
| 12,00 | 3 | 12 | *30,12* | 73 | 16 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 13,00 | 3 | 12 | *37,35* | 73 | 16 | 1 |
| 14,00 | 3 | 12 | *37,35* | 73 | 16 | 1 |
| 15,00 | 3 | 12 | *43,32* | 73 | 16 | 1 |
| 16,00 | 3 | 16 | *43,32* | 79 | 19 | 1 |
| 18,00 | 3 | 16 | *53,29* | 79 | 19 | 1 |
| 20,00 | 3 | 20 | *66,65* | 88 | 22 | 1 |
| 22,00 | 3 | 20 | *99,27* | 88 | 22 | 1 |
| 25,00 | 3 | 25 | *131,23* | 102 | 26 | 1 |
| 28,00 | 3 | 25 | *147,49* | 102 | 26 | 1 |
| 30,00 | 3 | 25 | *184,26* | 102 | 26 | 1 |
| 32,00 | 3 | 32 | *244,15* | 112 | 32 | 1 |

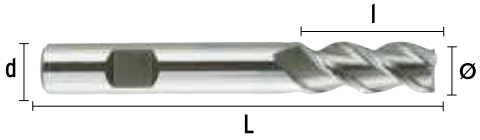
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3114 HSSE DIN 844 W




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | | | | | | | | | ● 60-150 | | ● 60-100 | ● 50-80 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

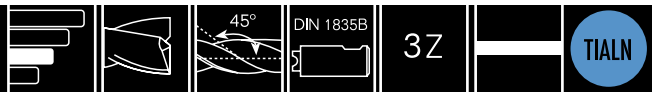



| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 2,00 | 6 | *16,26* | 51 | 7 | 3 | 1 |
| 3,00 | 6 | *16,26* | 52 | 8 | 3 | 1 |
| 4,00 | 6 | *16,26* | 55 | 11 | 3 | 1 |
| 5,00 | 6 | *16,26* | 57 | 13 | 3 | 1 |
| 6,00 | 6 | *20,23* | 57 | 13 | 3 | 1 |
| 7,00 | 10 | *22,40* | 69 | 16 | 3 | 1 |
| 8,00 | 10 | *24,66* | 69 | 19 | 3 | 1 |
| 9,00 | 10 | *27,17* | 69 | 19 | 3 | 1 |
| 10,00 | 10 | *25,43* | 72 | 22 | 3 | 1 |

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 12,00 | 12 | *30,88* | 83 | 26 | 3 | 1 |
| 14,00 | 12 | *40,57* | 83 | 26 | 3 | 1 |
| 15,00 | 12 | *40,28* | 83 | 26 | 3 | 1 |
| 16,00 | 16 | *46,26* | 92 | 32 | 3 | 1 |
| 18,00 | 16 | *54,83* | 92 | 32 | 3 | 1 |
| 20,00 | 20 | *66,38* | 104 | 38 | 3 | 1 |
| 25,00* | 25 | *109,60* | 121 | 45 | 4 | 1 |
| 30,00* | 25 | *156,69* | 121 | 45 | 4 | 1 |

* Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 3114/1 HSSE DIN 844 W




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | | | | | | | | | ● 100-200 | | ● 80-120 | ● 65-100 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *28,33* | 57 | 13 | 3 | 1 |
| 7,00 | 10 | *31,36* | 66 | 16 | 3 | 1 |
| 8,00 | 10 | *34,53* | 69 | 19 | 3 | 1 |
| 9,00 | 10 | *38,04* | 69 | 19 | 3 | 1 |
| 10,00 | 10 | *35,60* | 72 | 22 | 3 | 1 |
| 12,00 | 12 | *43,23* | 83 | 26 | 3 | 1 |

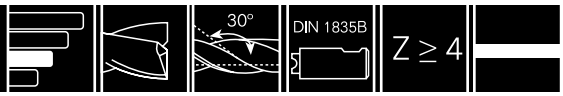
| Ø mm | d mm | € | L mm | l mm | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | *56,80* | 83 | 26 | 3 | 1 |
| 15,00 | 12 | *56,39* | 83 | 26 | 3 | 1 |
| 16,00 | 16 | *64,77* | 92 | 32 | 3 | 1 |
| 18,00 | 16 | *76,76* | 92 | 32 | 3 | 1 |
| 20,00 | 20 | *92,93* | 104 | 38 | 3 | 1 |

**Bajo demanda /** Sur commade / upon request



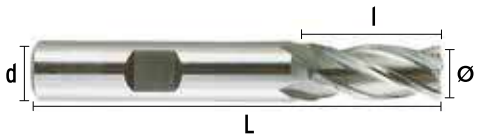
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3115 HSSE DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 45-90 | | | ○ 15-20 | ● 15-20 | | | |

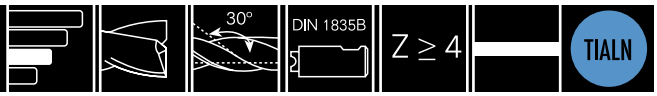
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2,00 | 3 | 6 | *15,23* | 51 | 7 | 1 |
| 2,50 | 3 | 6 | *15,23* | 52 | 8 | 1 |
| 3,00 | 4 | 6 | *15,23* | 52 | 8 | 1 |
| 4,00 | 4 | 6 | *15,34* | 55 | 11 | 1 |
| 5,00 | 4 | 6 | *15,34* | 57 | 13 | 1 |
| 6,00 | 4 | 6 | *15,34* | 57 | 13 | 1 |
| 7,00 | 4 | 10 | *23,15* | 69 | 16 | 1 |
| 8,00 | 4 | 10 | *19,13* | 69 | 19 | 1 |
| 9,00 | 4 | 10 | *24,15* | 69 | 19 | 1 |
| 10,00 | 4 | 10 | *21,35* | 72 | 22 | 1 |
| 11,00 | 4 | 12 | *29,12* | 79 | 22 | 1 |
| 12,00 | 4 | 12 | *27,03* | 83 | 26 | 1 |

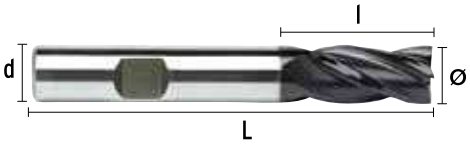
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 13,00 | 4 | 12 | *36,40* | 83 | 26 | 1 |
| 14,00 | 4 | 12 | *34,35* | 83 | 26 | 1 |
| 15,00 | 4 | 12 | *39,21* | 83 | 26 | 1 |
| 16,00 | 4 | 16 | *38,26* | 92 | 32 | 1 |
| 18,00 | 4 | 16 | *47,16* | 92 | 32 | 1 |
| 20,00 | 4 | 20 | *55,19* | 104 | 38 | 1 |
| 22,00 | 5 | 20 | *76,64* | 104 | 38 | 1 |
| 25,00 | 5 | 25 | *95,24* | 121 | 45 | 1 |
| 28,00 | 5 | 25 | *119,07* | 121 | 45 | 1 |
| 30,00 | 5 | 25 | *141,90* | 121 | 45 | 1 |
| 32,00 | 6 | 32 | *141,90* | 133 | 53 | 1 |

## 3115/1 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | ○ 90-200 | ○ 70-120 | | | ● 25-35 | ● 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



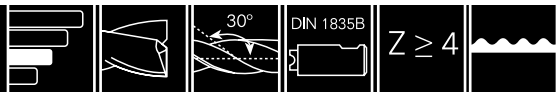

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3,00 | 4 | 6 | *21,32* | 52 | 8 | 1 |
| 4,00 | 4 | 6 | *21,32* | 55 | 11 | 1 |
| 5,00 | 4 | 6 | *21,32* | 57 | 13 | 1 |
| 6,00 | 4 | 6 | *21,48* | 57 | 13 | 1 |
| 7,00 | 4 | 10 | *21,48* | 66 | 16 | 1 |
| 8,00 | 4 | 10 | *21,48* | 69 | 19 | 1 |
| 9,00 | 4 | 10 | *32,41* | 69 | 19 | 1 |
| 10,00 | 4 | 10 | *26,78* | 72 | 22 | 1 |
| 11,00 | 4 | 12 | *33,81* | 79 | 22 | 1 |
| 12,00 | 4 | 12 | *29,89* | 83 | 26 | 1 |
| 13,00 | 4 | 12 | *40,76* | 83 | 26 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 14,00 | 4 | 12 | *37,84* | 83 | 26 | 1 |
| 15,00 | 4 | 12 | *50,96* | 83 | 26 | 1 |
| 16,00 | 4 | 16 | *48,08* | 92 | 32 | 1 |
| 18,00 | 4 | 16 | *54,89* | 92 | 32 | 1 |
| 20,00 | 4 | 20 | *53,57* | 104 | 38 | 1 |
| 22,00 | 5 | 20 | *66,02* | 104 | 38 | 1 |
| 25,00 | 5 | 25 | *77,26* | 121 | 45 | 1 |
| 28,00 | 5 | 25 | *107,30* | 121 | 45 | 1 |
| 30,00 | 5 | 25 | *133,33* | 121 | 45 | 1 |
| 32,00 | 6 | 32 | *166,70* | 133 | 53 | 1 |

**Bajo demanda /** Sur commade / upon request

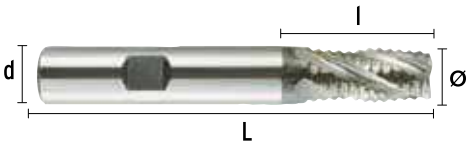
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3117 HSSE DIN 844 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 35-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | | | | ○ 45-90 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

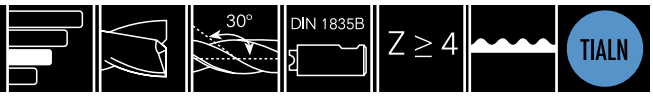



| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *39,22* | 57 | 13 | 1 |
| 7,00 | 4 | 10 | *47,26* | 66 | 16 | 1 |
| 8,00 | 4 | 10 | *44,13* | 69 | 19 | 1 |
| 9,00 | 4 | 10 | *49,02* | 69 | 19 | 1 |
| 10,00 | 4 | 10 | *38,70* | 72 | 22 | 1 |
| 11,00 | 4 | 12 | *57,74* | 79 | 22 | 1 |
| 12,00 | 4 | 12 | *50,90* | 83 | 26 | 1 |
| 13,00 | 4 | 12 | *69,06* | 83 | 26 | 1 |
| 14,00 | 4 | 12 | *55,19* | 83 | 26 | 1 |
| 15,00 | 4 | 12 | *72,59* | 83 | 26 | 1 |
| 16,00 | 4 | 16 | *67,61* | 92 | 32 | 1 |
| 17,00 | 4 | 16 | *89,45* | 92 | 32 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 18,00 | 4 | 16 | *71,43* | 92 | 32 | 1 |
| 20,00 | 4 | 20 | *89,51* | 98 | 38 | 1 |
| 22,00 | 5 | 20 | *102,85* | 104 | 38 | 1 |
| 24,00 | 5 | 25 | *129,49* | 121 | 45 | 1 |
| 25,00 | 5 | 25 | *128,55* | 121 | 45 | 1 |
| 26,00 | 5 | 25 | *153,53* | 121 | 45 | 1 |
| 28,00 | 5 | 25 | *148,58* | 121 | 45 | 1 |
| 30,00 | 5 | 25 | *165,01* | 121 | 45 | 1 |
| 32,00 | 6 | 32 | *180,95* | 133 | 53 | 1 |
| 36,00* | 6 | 32 | *214,25* | 133 | 53 | 1 |
| 40,00* | 6 | 32 | *240,92* | 155 | 63 | 1 |

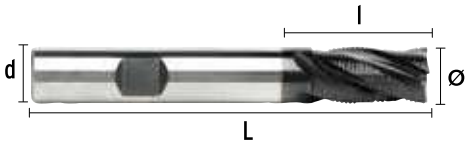
* Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 3117/1 HSSE DIN 844 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-80 | ● 45-55 | ○ 35-40 | | ○ 25-35 | | ● 55-60 | | | | ○ 60-120 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *54,90* | 57 | 13 | 1 |
| 7,00 | 4 | 10 | *66,16* | 66 | 16 | 1 |
| 8,00 | 4 | 10 | *61,78* | 69 | 19 | 1 |
| 9,00 | 4 | 10 | *68,63* | 69 | 19 | 1 |
| 10,00 | 4 | 10 | *54,18* | 72 | 22 | 1 |
| 11,00 | 4 | 12 | *80,84* | 79 | 22 | 1 |
| 12,00 | 4 | 12 | *71,27* | 83 | 26 | 1 |
| 13,00 | 4 | 12 | *96,68* | 83 | 26 | 1 |
| 14,00 | 4 | 12 | *77,26* | 83 | 26 | 1 |
| 15,00 | 4 | 12 | *101,62* | 83 | 26 | 1 |
| 16,00 | 4 | 16 | *94,65* | 92 | 32 | 1 |

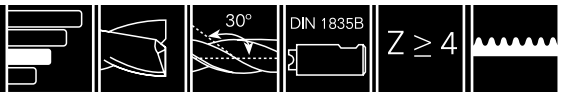
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 17,00 | 4 | 16 | *125,23* | 92 | 32 | 1 |
| 18,00 | 4 | 16 | *100,00* | 92 | 32 | 1 |
| 20,00 | 4 | 20 | *125,32* | 98 | 38 | 1 |
| 22,00 | 5 | 20 | *143,99* | 104 | 38 | 1 |
| 24,00 | 5 | 25 | *181,28* | 121 | 45 | 1 |
| 25,00 | 5 | 25 | *179,97* | 121 | 45 | 1 |
| 26,00 | 5 | 25 | *214,94* | 121 | 45 | 1 |
| 28,00 | 5 | 25 | *208,01* | 121 | 45 | 1 |
| 30,00 | 5 | 25 | *231,01* | 121 | 45 | 1 |
| 32,00 | 6 | 32 | *253,33* | 133 | 53 | 1 |

**Bajo demanda /** Sur commade / upon request



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3119 HSSE DIN 844 NRF



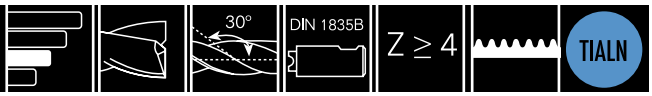

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ● 20-38 | | | ○ 50-90 | | | ○ 15-20 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *43,68* | 57 | 13 | 1 |
| 8,00 | 4 | 10 | *49,14* | 69 | 19 | 1 |
| 10,00 | 4 | 10 | *43,12* | 72 | 22 | 1 |
| 12,00 | 4 | 12 | *56,69* | 83 | 26 | 1 |
| 14,00 | 4 | 12 | *61,46* | 83 | 26 | 1 |

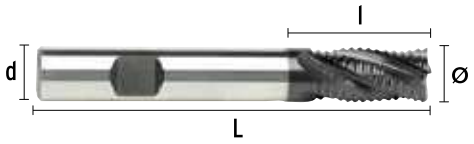
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 16,00 | 4 | 16 | *75,22* | 9 | 32 | 1 |
| 18,00 | 4 | 16 | *79,46* | 92 | 32 | 1 |
| 20,00 | 4 | 20 | *99,61* | 104 | 38 | 1 |
| 25,00 | 5 | 25 | *143,03* | 121 | 45 | 1 |
| 30,00 | 5 | 25 | *183,58* | 121 | 45 | 1 |

## 3119/1 HSSE DIN 844 NRF




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 40-45 | | | ○ 25-35 | | ● 55-60 | ● 20-38 | | | ○ 60-120 | | | ○ 25-35 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



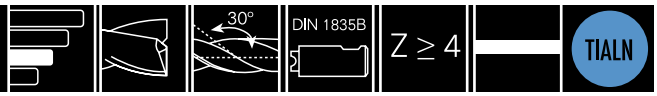

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *61,15* | 57 | 13 | 1 |
| 8,00 | 4 | 10 | *68,80* | 69 | 19 | 1 |
| 10,00 | 4 | 10 | *60,37* | 72 | 22 | 1 |
| 12,00 | 4 | 12 | *79,37* | 83 | 26 | 1 |
| 14,00 | 4 | 12 | *86,04* | 83 | 26 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 16,00 | 4 | 16 | *105,31* | 92 | 32 | 1 |
| 18,00 | 4 | 16 | *111,25* | 92 | 32 | 1 |
| 20,00 | 4 | 20 | *139,46* | 104 | 38 | 1 |
| 25,00 | 5 | 25 | *200,24* | 121 | 45 | 1 |
| 30,00 | 6 | 25 | *257,01* | 121 | 45 | 1 |

**Bajo demanda /** Sur commade / upon request

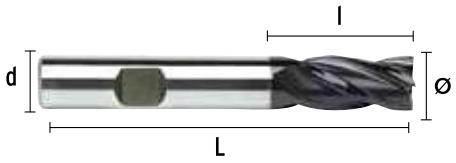
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3162 HSSE-PM DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-85 | ● 50-60 | ○ 35-40 | | ● 35-40 | ○ 28-35 | ● 55-60 | ● 30-40 | ○ 30-35 | ○ 90-200 | ○ 80-120 | ○ 90-130 | ○ 75-190 | ● 15-40 | ● 30-40 | | | |

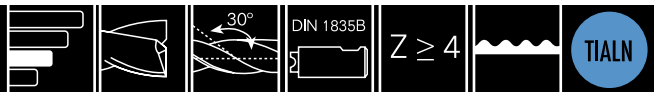
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | 57 | 13 | *42,23* | 4 | 1 |
| 8,00 | 10 | 69 | 19 | *52,73* | 4 | 1 |
| 10,00 | 10 | 72 | 22 | *62,46* | 4 | 1 |
| 12,00 | 12 | 83 | 26 | *74,69* | 4 | 1 |

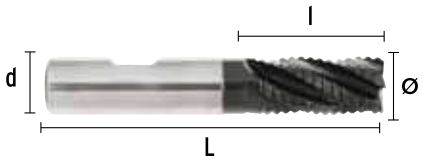
| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | 83 | 26 | *87,24* | 4 | 1 |
| 16,00 | 16 | 92 | 32 | *103,43* | 4 | 1 |
| 18,00 | 16 | 92 | 32 | *126,39* | 4 | 1 |
| 20,00 | 20 | 104 | 38 | *155,81* | 4 | 1 |

## 3157 HSSE-PM DIN 844 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 60-90 | ● 50-60 | ○ 45-50 | | ● 35-40 | ○ 28-35 | ● 60-65 | | | | ○ 85-140 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



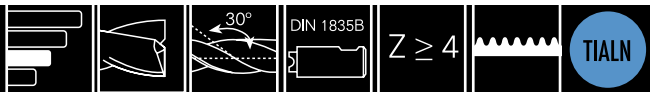

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | 57 | 13 | *72,42* | 4 | 1 |
| 8,00 | 10 | 69 | 19 | *79,50* | 4 | 1 |
| 10,00 | 10 | 72 | 22 | *77,12* | 4 | 1 |
| 12,00 | 12 | 83 | 26 | *98,82* | 4 | 1 |
| 14,00 | 12 | 83 | 26 | *118,04* | 4 | 1 |
| 16,00 | 16 | 92 | 32 | *145,11* | 4 | 1 |
| 18,00 | 16 | 92 | 32 | *158,55* | 4 | 1 |

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 20,00 | 20 | 104 | 38 | *196,94* | 4 | 1 |
| 22,00 | 20 | 104 | 38 | *243,81* | 5 | 1 |
| 25,00 | 25 | 121 | 45 | *289,35* | 5 | 1 |
| 28,00 | 25 | 121 | 45 | *371,04* | 5 | 1 |
| 30,00 | 25 | 121 | 45 | *387,83* | 5 | 1 |
| 32,00 | 32 | 133 | 53 | *421,10* | 6 | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 3159 HSSE-PM DIN 844 NRF




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-85 | ● 40-50 | ○ 35-40 | | ● 30-35 | ○ 25-30 | ● 55-60 | | | | ○ 80-140 | | | ● 15-40 | ● 30-40 | | | |

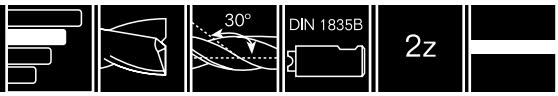
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | 57 | 13 | *79,67* | 4 | 1 |
| 8,00 | 10 | 69 | 19 | *87,11* | 4 | 1 |
| 10,00 | 10 | 72 | 22 | *84,69* | 4 | 1 |
| 12,00 | 12 | 83 | 26 | *108,77* | 4 | 1 |

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | 83 | 26 | *129,59* | 4 | 1 |
| 16,00 | 16 | 92 | 32 | *159,08* | 4 | 1 |
| 18,00 | 16 | 92 | 32 | *173,96* | 4 | 1 |
| 20,00 | 20 | 104 | 38 | *215,51* | 4 | 1 |

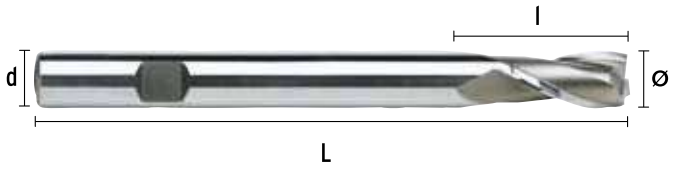
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3111 HSSE DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 45-80 | | | | | | | |

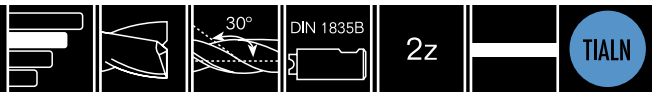
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4,00 | 6 | *21,15* | 63 | 11 | 1 |
| 5,00 | 6 | *21,15* | 68 | 13 | 1 |
| 6,00 | 6 | *21,15* | 68 | 13 | 1 |
| 7,00 | 10 | *35,18* | 80 | 16 | 1 |
| 8,00 | 10 | *30,75* | 88 | 19 | 1 |
| 9,00 | 10 | *41,67* | 88 | 19 | 1 |
| 10,00 | 10 | *35,18* | 95 | 22 | 1 |

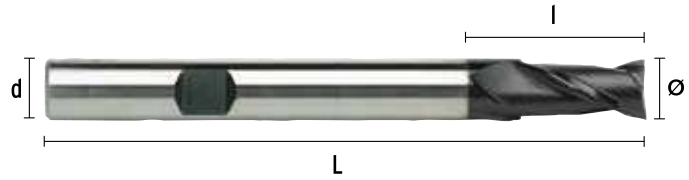
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 12,00 | 12 | *48,06* | 110 | 26 | 1 |
| 14,00 | 12 | *62,48* | 110 | 26 | 1 |
| 16,00 | 16 | *73,49* | 123 | 32 | 1 |
| 18,00 | 16 | *87,57* | 123 | 32 | 1 |
| 20,00 | 20 | *95,64* | 141 | 38 | 1 |
| 22,00 | 20 | *129,83* | 141 | 38 | 1 |
| 25,00 | 25 | *186,21* | 166 | 45 | 1 |

## 3111/1 HSSE DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ○ 70-110 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4,00 | 6 | *29,61* | 63 | 11 | 1 |
| 5,00 | 6 | *29,61* | 68 | 13 | 1 |
| 6,00 | 6 | *29,61* | 68 | 13 | 1 |
| 7,00 | 10 | *49,25* | 80 | 16 | 1 |
| 8,00 | 10 | *43,05* | 88 | 19 | 1 |
| 9,00 | 10 | *58,34* | 88 | 19 | 1 |
| 10,00 | 10 | *49,25* | 95 | 22 | 1 |

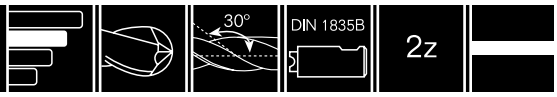
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 12,00 | 12 | *67,28* | 110 | 26 | 1 |
| 14,00 | 12 | *87,47* | 110 | 26 | 1 |
| 16,00 | 16 | *102,88* | 123 | 32 | 1 |
| 18,00 | 16 | *122,60* | 123 | 32 | 1 |
| 20,00 | 20 | *133,90* | 141 | 38 | 1 |
| 22,00 | 20 | *181,76* | 141 | 38 | 1 |
| 25,00 | 25 | *260,69* | 166 | 45 | 1 |

**Bajo demanda /** Sur commade / upon request



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3113 HSSE DIN 844 N



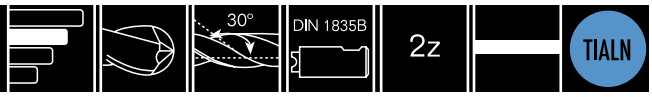

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 45-90 | | | ○ 2-4 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4,00 | 6 | *30,83* | 63 | 11 | 1 |
| 5,00 | 6 | *32,63* | 68 | 13 | 1 |
| 6,00 | 6 | *29,46* | 68 | 13 | 1 |
| 8,00 | 10 | *36,13* | 88 | 19 | 1 |
| 10,00 | 12 | *39,64* | 95 | 22 | 1 |
| 12,00 | 12 | *50,85* | 110 | 26 | 1 |

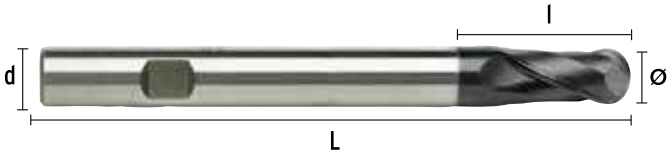
| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 14,00 | 12 | *59,81* | 110 | 26 | 1 |
| 16,00 | 16 | *76,02* | 123 | 32 | 1 |
| 18,00 | 16 | *91,41* | 123 | 32 | 1 |
| 20,00 | 20 | *99,09* | 141 | 38 | 1 |
| 22,00 | 20 | *122,83* | 141 | 38 | 1 |
| 25,00 | 25 | *182,37* | 166 | 45 | 1 |

## 3113/1 HSSE DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ○ 70-120 | | | ● 4-6 | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



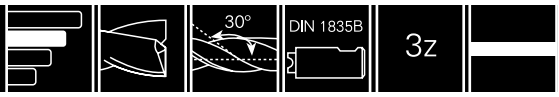

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 4,00 | 6 | *43,16* | 63 | 11 | 1 |
| 5,00 | 6 | *45,69* | 68 | 13 | 1 |
| 6,00 | 6 | *41,25* | 68 | 13 | 1 |
| 8,00 | 10 | *50,58* | 88 | 19 | 1 |
| 10,00 | 10 | *55,49* | 95 | 22 | 1 |
| 12,00 | 12 | *71,19* | 110 | 26 | 1 |

| Ø mm | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|
| 14,00 | 12 | *83,73* | 110 | 26 | 1 |
| 16,00 | 16 | *106,43* | 123 | 32 | 1 |
| 18,00 | 16 | *127,98* | 123 | 32 | 1 |
| 20,00 | 20 | *138,72* | 141 | 38 | 1 |
| 22,00 | 20 | *171,96* | 141 | 38 | 1 |
| 25,00 | 25 | *255,32* | 166 | 45 | 1 |

**Bajo demanda /** Sur commade / upon request

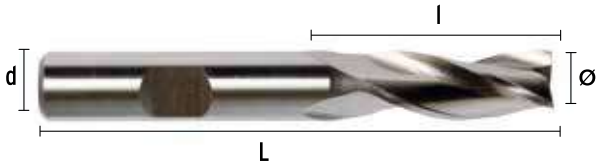
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3188 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ○ 55-75 | | | | ○ 15-20 | | | |

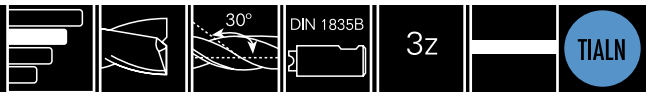
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 3 | 6 | *16,33* | 52 | 8 | 1 |
| 4 | 3 | 6 | *16,33* | 55 | 11 | 1 |
| 5 | 3 | 6 | *16,33* | 57 | 13 | 1 |
| 6 | 3 | 6 | *16,33* | 57 | 13 | 1 |
| 7 | 3 | 10 | *20,48* | 66 | 16 | 1 |
| 8 | 3 | 10 | *20,48* | 69 | 19 | 1 |
| 9 | 3 | 10 | *22,10* | 69 | 22 | 1 |
| 10 | 3 | 10 | *24,11* | 72 | 22 | 1 |
| 11 | 3 | 12 | *25,80* | 79 | 22 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 12 | 3 | 12 | *27,94* | 83 | 26 | 1 |
| 13 | 3 | 12 | *30,22* | 83 | 26 | 1 |
| 14 | 3 | 12 | *34,80* | 83 | 26 | 1 |
| 15 | 3 | 12 | *38,08* | 83 | 26 | 1 |
| 16 | 3 | 16 | *40,30* | 92 | 32 | 1 |
| 18 | 3 | 16 | *49,64* | 92 | 32 | 1 |
| 20 | 3 | 20 | *61,94* | 104 | 38 | 1 |
| 22 | 3 | 20 | *72,17* | 104 | 38 | 1 |
| 25 | 3 | 25 | *80,12* | 121 | 45 | 1 |

## 3188/1 HSSE DIN 327 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ○ 70-120 | | | | ○ 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

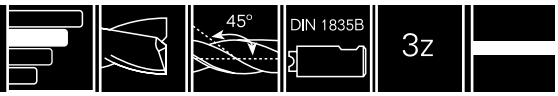
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 3 | 6 | *22,86* | 52 | 8 | 1 |
| 4 | 3 | 6 | *22,86* | 55 | 11 | 1 |
| 5 | 3 | 6 | *22,86* | 57 | 13 | 1 |
| 6 | 3 | 6 | *22,86* | 57 | 13 | 1 |
| 7 | 3 | 10 | *28,67* | 66 | 16 | 1 |
| 8 | 3 | 10 | *28,67* | 69 | 19 | 1 |
| 9 | 3 | 10 | *30,94* | 69 | 22 | 1 |
| 10 | 3 | 10 | *33,75* | 72 | 22 | 1 |
| 11 | 3 | 12 | *36,12* | 79 | 22 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 12 | 3 | 12 | *39,12* | 83 | 26 | 1 |
| 13 | 3 | 12 | *42,31* | 83 | 26 | 1 |
| 14 | 3 | 12 | *48,72* | 83 | 26 | 1 |
| 15 | 3 | 12 | *53,32* | 83 | 26 | 1 |
| 16 | 3 | 16 | *56,42* | 92 | 32 | 1 |
| 18 | 3 | 16 | *69,50* | 92 | 32 | 1 |
| 20 | 3 | 20 | *86,72* | 104 | 38 | 1 |
| 22 | 3 | 20 | *101,03* | 104 | 38 | 1 |
| 25 | 3 | 25 | *112,16* | 121 | 45 | 1 |



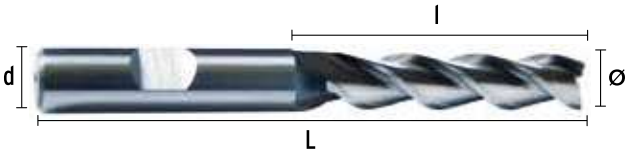
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3182 HSSE DIN 844 W




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | | | | | | | | | ● 60-150 | | ○ 60-100 | ○ 50-150 | | | | | |

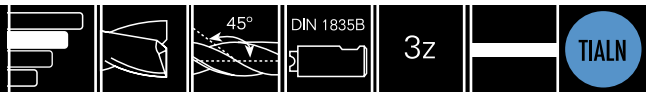
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | € | L mm | l mm | z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *21,72* | 68 | 24 | 3 | 1 |
| 8,00 | 10 | *27,69* | 88 | 38 | 3 | 1 |
| 10,00 | 10 | *32,55* | 95 | 45 | 3 | 1 |
| 12,00 | 12 | *39,05* | 110 | 53 | 3 | 1 |

| Ø mm | d mm | € | L mm | l mm | z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | *45,56* | 110 | 53 | 3 | 1 |
| 16,00 | 16 | *54,31* | 123 | 63 | 3 | 1 |
| 18,00 | 16 | *61,77* | 123 | 63 | 3 | 1 |
| 20,00 | 20 | *77,04* | 141 | 75 | 3 | 1 |

## 3182/1 HSSE DIN 844 W




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | | | | | | | | | ● 60-150 | | ● 60-100 | ● 50-150 | | | | | |

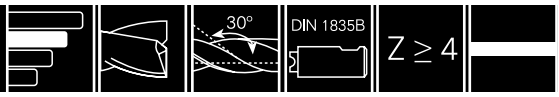
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | € | L mm | l mm | z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | *30,41* | 68 | 24 | 3 | 1 |
| 8,00 | 10 | *38,76* | 88 | 38 | 3 | 1 |
| 10,00 | 10 | *45,57* | 95 | 45 | 3 | 1 |
| 12,00 | 12 | *54,67* | 110 | 53 | 3 | 1 |

| Ø mm | d mm | € | L mm | l mm | z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | *63,78* | 110 | 53 | 3 | 1 |
| 16,00 | 16 | *76,03* | 123 | 63 | 3 | 1 |
| 18,00 | 16 | *86,48* | 123 | 63 | 3 | 1 |
| 20,00 | 20 | *107,85* | 141 | 75 | 3 | 1 |

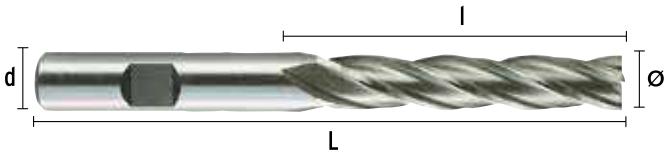
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3116 HSSE DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | | ● 55-75 | | | ○ 15-20 | ○ 15-20 | | | |

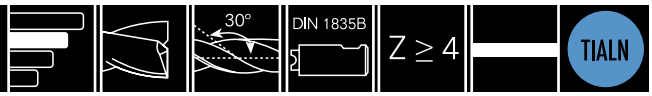
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3,00 | 4 | 6 | *18,22* | 56 | 12 | 1 |
| 4,00 | 4 | 6 | *18,22* | 63 | 19 | 1 |
| 5,00 | 4 | 6 | *18,22* | 68 | 24 | 1 |
| 6,00 | 4 | 6 | *18,22* | 68 | 24 | 1 |
| 7,00 | 4 | 10 | *27,63* | 80 | 30 | 1 |
| 8,00 | 4 | 10 | *25,38* | 88 | 38 | 1 |
| 9,00 | 4 | 10 | *28,57* | 88 | 38 | 1 |
| 10,00 | 4 | 10 | *25,15* | 95 | 45 | 1 |

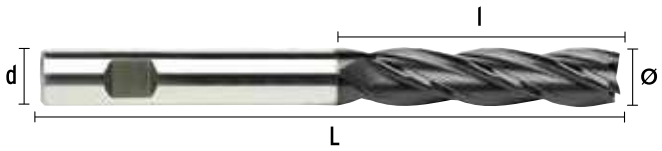
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 12,00 | 4 | 12 | *31,88* | 110 | 53 | 1 |
| 14,00 | 4 | 12 | *41,70* | 110 | 53 | 1 |
| 16,00 | 4 | 16 | *45,61* | 123 | 63 | 1 |
| 18,00 | 4 | 16 | *55,70* | 123 | 63 | 1 |
| 20,00 | 4 | 20 | *65,23* | 141 | 75 | 1 |
| 22,00 | 5 | 20 | *90,46* | 141 | 75 | 1 |
| 25,00 | 5 | 25 | *119,99* | 166 | 90 | 1 |

## 3116/1 HSSE DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | | ● 70-120 | | | ● 25-35 | ○ 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *25,50* | 68 | 24 | 1 |
| 7,00 | 4 | 10 | *38,68* | 80 | 30 | 1 |
| 8,00 | 4 | 10 | *35,53* | 88 | 38 | 1 |
| 9,00 | 4 | 10 | *40,00* | 88 | 38 | 1 |
| 10,00 | 4 | 10 | *35,21* | 95 | 45 | 1 |
| 12,00 | 4 | 12 | *44,63* | 110 | 53 | 1 |

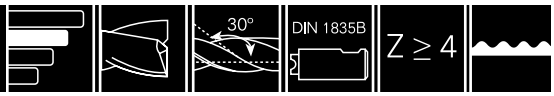
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 14,00 | 4 | 12 | *58,37* | 110 | 53 | 1 |
| 16,00 | 4 | 16 | *63,86* | 123 | 63 | 1 |
| 18,00 | 4 | 16 | *77,98* | 123 | 63 | 1 |
| 20,00 | 4 | 20 | *91,32* | 141 | 75 | 1 |
| 22,00 | 5 | 20 | *126,64* | 141 | 75 | 1 |
| 25,00 | 5 | 25 | *167,99* | 166 | 90 | 1 |

**Bajo demanda /** Sur commade / upon request



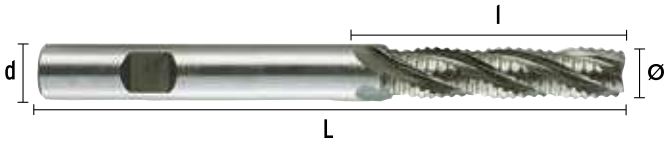
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3118 HSSE DIN 844 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 35-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | | | | ○ 45-90 | | | | | | | |

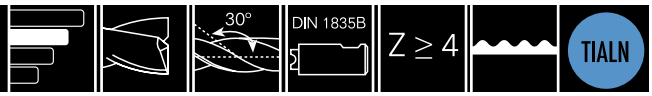
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *54,03* | 68 | 24 | 1 |
| 8,00 | 4 | 10 | *71,43* | 88 | 38 | 1 |
| 10,00 | 4 | 10 | *49,02* | 95 | 45 | 1 |
| 12,00 | 4 | 12 | *58,08* | 110 | 53 | 1 |
| 14,00 | 4 | 12 | *67,12* | 110 | 53 | 1 |
| 16,00 | 4 | 16 | *78,54* | 123 | 63 | 1 |
| 18,00 | 4 | 16 | *88,58* | 123 | 63 | 1 |

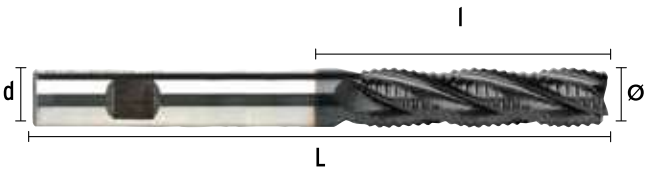
| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 20,00 | 4 | 20 | *111,39* | 141 | 75 | 1 |
| 22,00 | 5 | 20 | *135,72* | 141 | 75 | 1 |
| 25,00 | 5 | 25 | *171,39* | 166 | 90 | 1 |
| 28,00 | 5 | 25 | *194,27* | 166 | 90 | 1 |
| 30,00 | 5 | 25 | *260,28* | 166 | 90 | 1 |
| 32,00 | 6 | 32 | *246,68* | 186 | 106 | 1 |

## 3118/1 HSSE DIN 844 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-80 | ● 45-55 | ○ 35-40 | | ○ 25-35 | | ● 55-60 | | | | ○ 60-120 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



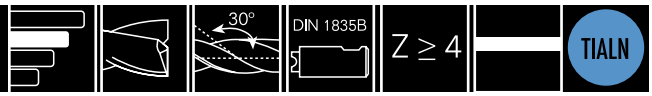

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 6,00 | 4 | 6 | *75,65* | 68 | 24 | 1 |
| 8,00 | 4 | 10 | *100,00* | 88 | 38 | 1 |
| 10,00 | 4 | 10 | *68,63* | 95 | 45 | 1 |
| 12,00 | 4 | 12 | *81,31* | 110 | 53 | 1 |
| 14,00 | 4 | 12 | *93,96* | 110 | 53 | 1 |
| 16,00 | 4 | 16 | *109,96* | 123 | 63 | 1 |
| 18,00 | 4 | 16 | *124,01* | 123 | 63 | 1 |

| Ø mm | Z | d mm | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 20,00 | 4 | 20 | *155,95* | 141 | 75 | 1 |
| 22,00 | 5 | 20 | *190,01* | 141 | 75 | 1 |
| 25,00 | 5 | 25 | *239,95* | 166 | 90 | 1 |
| 28,00 | 5 | 25 | *271,98* | 166 | 90 | 1 |
| 30,00 | 5 | 25 | *364,40* | 166 | 90 | 1 |
| 32,00 | 6 | 32 | *345,35* | 186 | 106 | 1 |

**Bajo demanda /** Sur commade / upon request

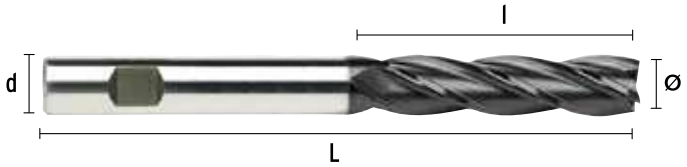
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3163 HSSE-PM DIN 844 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-85 | ● 50-60 | ○ 35-40 | | ● 35-40 | ○ 28-35 | ● 55-60 | ● 30-40 | ○ 30-35 | ○ 90-200 | ○ 80-120 | ○ 90-130 | ○ 75-190 | ● 15-40 | ● 30-40 | | | |

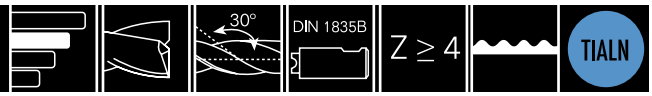
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | 68 | 24 | *35,32* | 4 | 1 |
| 8,00 | 10 | 88 | 38 | *44,11* | 4 | 1 |
| 10,00 | 10 | 95 | 45 | *52,25* | 4 | 1 |
| 12,00 | 12 | 110 | 53 | *62,46* | 4 | 1 |

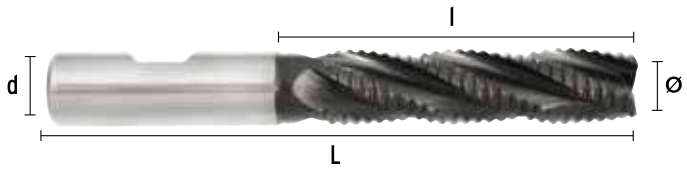
| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | 110 | 53 | *72,67* | 4 | 1 |
| 16,00 | 16 | 123 | 63 | *86,15* | 4 | 1 |
| 18,00 | 16 | 123 | 63 | *104,83* | 4 | 1 |
| 20,00 | 20 | 141 | 75 | *129,23* | 4 | 1 |

## 3158 HSSE-PM DIN 844 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 60-90 | ● 50-60 | ○ 45-50 | | ● 35-40 | ○ 28-35 | ● 60-65 | | | | ○ 85-140 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



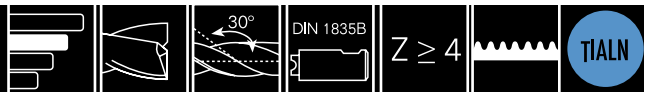

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | 68 | 24 | *76,66* | 4 | 1 |
| 8,00 | 10 | 88 | 38 | *80,08* | 4 | 1 |
| 10,00 | 10 | 95 | 45 | *72,93* | 4 | 1 |
| 12,00 | 12 | 110 | 53 | *91,41* | 4 | 1 |
| 14,00 | 12 | 110 | 53 | *104,29* | 4 | 1 |

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 16,00 | 16 | 123 | 63 | *128,86* | 4 | 1 |
| 18,00 | 16 | 123 | 63 | *145,18* | 4 | 1 |
| 20,00 | 20 | 141 | 75 | *185,83* | 4 | 1 |
| 25,00 | 25 | 166 | 90 | *285,54* | 5 | 1 |
| 32,00 | 32 | 186 | 106 | *406,16* | 6 | 1 |



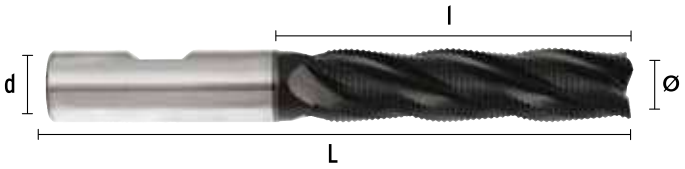
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 3160 HSSE-PM DIN 844 NRF




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-85 | ● 40-50 | ○ 35-40 | | ● 30-35 | ○ 25-30 | ● 55-60 | | | | ○ 80-140 | | | ● 15-40 | ● 30-40 | | | |

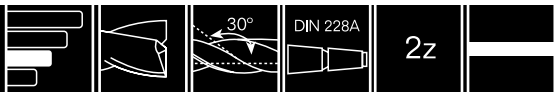
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 6,00 | 6 | 68 | 24 | *84,40* | 4 | 1 |
| 8,00 | 10 | 88 | 38 | *88,06* | 4 | 1 |
| 10,00 | 10 | 95 | 45 | *79,95* | 4 | 1 |
| 12,00 | 12 | 110 | 53 | *100,42* | 4 | 1 |

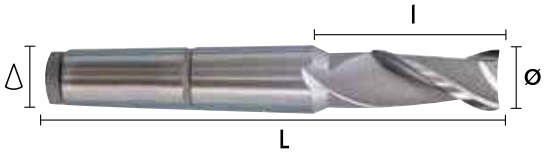
| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 14,00 | 12 | 110 | 53 | *114,69* | 4 | 1 |
| 16,00 | 16 | 123 | 63 | *141,49* | 4 | 1 |
| 18,00 | 16 | 123 | 63 | *159,42* | 4 | 1 |
| 20,00 | 20 | 141 | 75 | *204,40* | 4 | 1 |

## 3144 HSSE DIN 326 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | ○ 50-150 | | | | | |

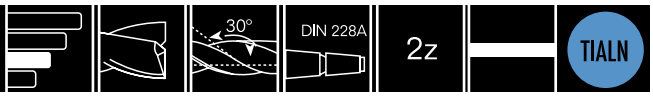
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 2 | *80,36* | 85 | 14 | 1 |
| 2 | 14,00 | 2 | *82,72* | 100 | 16 | 1 |
| 2 | 16,00 | 2 | *88,07* | 105 | 18 | 1 |
| 2 | 18,00 | 2 | *98,19* | 110 | 20 | 1 |
| 2 | 20,00 | 2 | *107,39* | 115 | 20 | 1 |
| 2 | 22,00 | 2 | *129,14* | 120 | 22 | 1 |
| 3 | 24,00 | 2 | *144,87* | 140 | 25 | 1 |

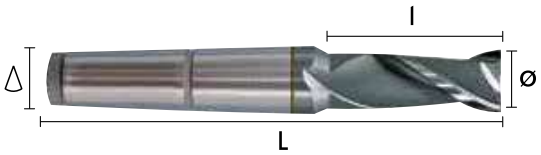
| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 25,00 | 2 | *154,74* | 140 | 25 | 1 |
| 3 | 28,00 | 2 | *183,91* | 145 | 28 | 1 |
| 3 | 30,00 | 2 | *196,10* | 150 | 30 | 1 |
| 4 | 32,00 | 2 | *221,97* | 175 | 32 | 1 |
| 4 | 36,00 | 2 | *280,57* | 175 | 35 | 1 |
| 4 | 40,00 | 2 | *341,28* | 180 | 38 | 1 |

## 3144/1 HSSE DIN 326 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | ○ 90-200 | ● 90-140 | ○ 90-130 | ○ 75-190 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 2 | *112,50* | 85 | 14 | 1 |
| 2 | 14,00 | 2 | *115,81* | 100 | 16 | 1 |
| 2 | 16,00 | 2 | *123,30* | 105 | 18 | 1 |
| 2 | 18,00 | 2 | *137,46* | 110 | 20 | 1 |
| 2 | 20,00 | 2 | *150,35* | 115 | 20 | 1 |
| 2 | 22,00 | 2 | *180,80* | 120 | 22 | 1 |
| 3 | 24,00 | 2 | *202,82* | 140 | 25 | 1 |

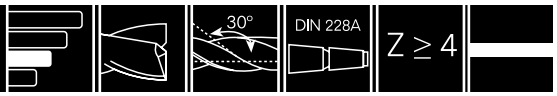
| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 25,00 | 2 | *216,63* | 140 | 25 | 1 |
| 3 | 28,00 | 2 | *257,47* | 145 | 28 | 1 |
| 3 | 30,00 | 2 | *274,54* | 150 | 30 | 1 |
| 4 | 32,00 | 2 | *310,76* | 175 | 32 | 1 |
| 4 | 36,00 | 2 | *392,80* | 175 | 35 | 1 |
| 4 | 40,00 | 2 | *477,79* | 180 | 38 | 1 |

**Bajo demanda /** Sur commade / upon request



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3145 HSSE DIN 845 N



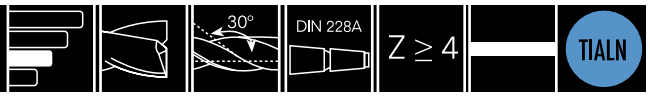

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | ○ 50-150 | ○ 15-20 | ○ 15-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 4 | *79,45* | 96 | 26 | 1 |
| 2 | 14,00 | 4 | *87,76* | 111 | 26 | 1 |
| 2 | 16,00 | 4 | *87,76* | 117 | 32 | 1 |
| 2 | 18,00 | 4 | *94,87* | 117 | 32 | 1 |
| 2 | 20,00 | 4 | *104,63* | 123 | 38 | 1 |
| 2 | 22,00 | 5 | *119,76* | 123 | 38 | 1 |
| 3 | 24,00 | 5 | *169,58* | 147 | 45 | 1 |
| 3 | 25,00 | 5 | *158,89* | 147 | 45 | 1 |

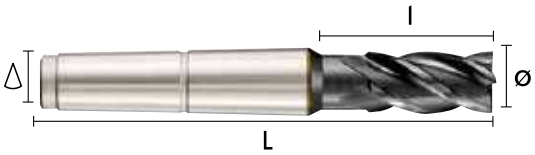
| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 26,00 | 5 | *179,92* | 147 | 45 | 1 |
| 3 | 28,00 | 5 | *181,09* | 147 | 45 | 1 |
| 3 | 30,00 | 6 | *197,72* | 147 | 45 | 1 |
| 3 | 32,00 | 6 | *260,55* | 178 | 53 | 1 |
| 4 | 36,00 | 6 | *298,18* | 178 | 53 | 1 |
| 4 | 40,00 | 6 | *359,54* | 188 | 63 | 1 |
| 5 | 50,00 | 6 | *541,50* | 233 | 75 | 1 |

## 3145/1 HSSE DIN 845 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | ○ 90-200 | ● 90-140 | ○ 90-130 | ○ 75-190 | ● 25-35 | ○ 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



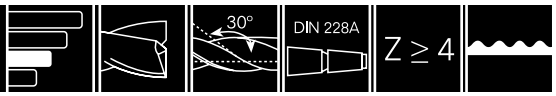

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 4 | *111,23* | 96 | 26 | 1 |
| 2 | 14,00 | 4 | *122,86* | 111 | 26 | 1 |
| 2 | 16,00 | 4 | *122,86* | 117 | 32 | 1 |
| 2 | 18,00 | 4 | *132,81* | 117 | 32 | 1 |
| 2 | 20,00 | 4 | *146,49* | 123 | 38 | 1 |
| 2 | 22,00 | 5 | *167,67* | 123 | 38 | 1 |
| 3 | 24,00 | 5 | *237,41* | 147 | 45 | 1 |
| 3 | 25,00 | 5 | *222,44* | 147 | 45 | 1 |

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 26,00 | 5 | *251,88* | 147 | 45 | 1 |
| 3 | 28,00 | 5 | *253,53* | 147 | 45 | 1 |
| 3 | 30,00 | 6 | *276,80* | 147 | 45 | 1 |
| 3 | 32,00 | 6 | *364,77* | 178 | 53 | 1 |
| 4 | 36,00 | 6 | *417,45* | 178 | 53 | 1 |
| 4 | 40,00 | 6 | *503,36* | 188 | 63 | 1 |
| 5 | 50,00 | 6 | *758,09* | 233 | 75 | 1 |

**Bajo demanda /** Sur commade / upon request

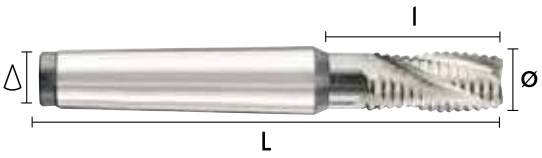
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3146 HSSE DIN 845 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 35-55 | ○ 25-30 | | | ○ 15-20 | | ○ 38-42 | ○ 20-24 | | | ● 55-95 | | | | | | | |

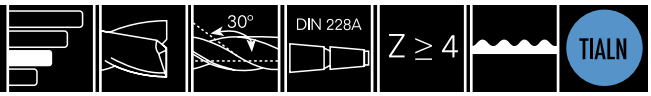
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 4 | *103,55* | 96 | 26 | 1 |
| 2 | 14,00 | 4 | *104,54* | 111 | 26 | 1 |
| 2 | 16,00 | 4 | *113,24* | 117 | 32 | 1 |
| 2 | 18,00 | 4 | *119,09* | 117 | 32 | 1 |
| 2 | 20,00 | 4 | *131,69* | 123 | 38 | 1 |
| 2 | 22,00 | 5 | *167,92* | 123 | 38 | 1 |
| 3 | 25,00 | 5 | *195,43* | 147 | 45 | 1 |

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 28,00 | 5 | *220,00* | 147 | 45 | 1 |
| 3 | 30,00 | 5 | *238,44* | 147 | 45 | 1 |
| 4 | 32,00 | 6 | *266,28* | 201 | 53 | 1 |
| 4 | 36,00 | 6 | *299,25* | 201 | 53 | 1 |
| 4 | 40,00 | 6 | *342,31* | 211 | 63 | 1 |
| 5 | 50,00 | 8 | *489,50* | 261 | 75 | 1 |

## 3146/1 HSSE DIN 845 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-80 | ● 45-55 | ○ 35-40 | | ○ 25-35 | | ● 55-60 | ● 30-35 | | | ● 90-140 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 4 | *144,97* | 96 | 26 | 1 |
| 2 | 14,00 | 4 | *146,35* | 111 | 26 | 1 |
| 2 | 16,00 | 4 | *158,54* | 117 | 32 | 1 |
| 2 | 18,00 | 4 | *166,73* | 117 | 32 | 1 |
| 2 | 20,00 | 4 | *184,37* | 123 | 38 | 1 |
| 2 | 22,00 | 5 | *235,08* | 123 | 38 | 1 |
| 3 | 25,00 | 5 | *273,60* | 147 | 45 | 1 |

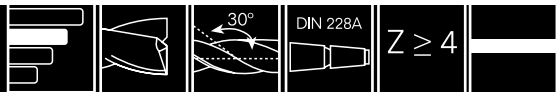
| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 28,00 | 5 | *307,99* | 147 | 45 | 1 |
| 3 | 30,00 | 5 | *333,82* | 147 | 45 | 1 |
| 4 | 32,00 | 6 | *372,79* | 178 | 53 | 1 |
| 4 | 36,00 | 6 | *418,95* | 178 | 53 | 1 |
| 4 | 40,00 | 6 | *479,23* | 188 | 63 | 1 |
| 4 | 50,00 | 8 | *685,30* | 233 | 75 | 1 |

**Bajo demanda /** Sur commade / upon request



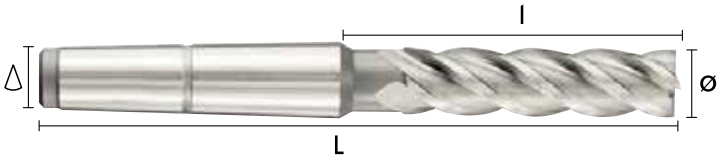
P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3147 HSSE DIN 845 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-50 | ○ 25-30 | | | ○ 15-20 | | ○ 34-38 | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | ○ 50-150 | ○ 15-20 | ○ 15-20 | | | |

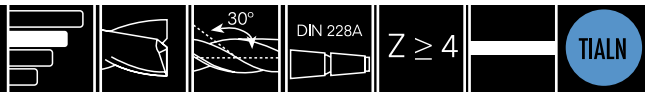
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 4 | *91,29* | 138 | 53 | 1 |
| 2 | 14,00 | 4 | *96,06* | 138 | 53 | 1 |
| 2 | 16,00 | 4 | *104,63* | 148 | 63 | 1 |
| 2 | 18,00 | 4 | *118,55* | 148 | 63 | 1 |
| 2 | 20,00 | 4 | *169,58* | 160 | 75 | 1 |
| 3 | 22,00 | 5 | *181,09* | 160 | 75 | 1 |
| 3 | 25,00 | 5 | *199,19* | 192 | 90 | 1 |

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 28,00 | 5 | *221,41* | 192 | 90 | 1 |
| 3 | 30,00 | 6 | *283,65* | 192 | 90 | 1 |
| 4 | 32,00 | 6 | *303,81* | 210 | 106 | 1 |
| 4 | 36,00 | 6 | *364,86* | 231 | 106 | 1 |
| 4 | 40,00 | 6 | *417,90* | 250 | 125 | 1 |
| 4 | 50,00 | 6 | *643,47* | 308 | 150 | 1 |

## 3147/1 HSSE DIN 845 N




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 48-80 | ● 40-45 | ○ 30-35 | | ○ 25-35 | | ● 55-60 | ● 30-40 | ○ 30-35 | ○ 90-200 | ● 90-140 | ○ 90-130 | ○ 75-190 | ● 25-35 | ○ 25-35 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

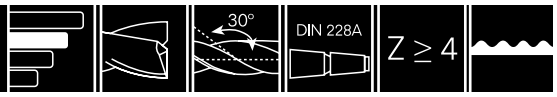
| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 1 | 12,00 | 4 | *127,80* | 123 | 53 | 1 |
| 2 | 14,00 | 4 | *134,49* | 138 | 53 | 1 |
| 2 | 16,00 | 4 | *146,49* | 148 | 63 | 1 |
| 2 | 18,00 | 4 | *165,96* | 148 | 63 | 1 |
| 2 | 20,00 | 4 | *237,41* | 160 | 75 | 1 |
| 3 | 22,00 | 5 | *253,53* | 160 | 75 | 1 |
| 3 | 25,00 | 5 | *278,86* | 192 | 90 | 1 |

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 28,00 | 5 | *309,98* | 192 | 90 | 1 |
| 3 | 30,00 | 5 | *397,11* | 192 | 90 | 1 |
| 4 | 32,00 | 6 | *425,33* | 231 | 106 | 1 |
| 4 | 36,00 | 6 | *510,81* | 231 | 106 | 1 |
| 4 | 40,00 | 6 | *585,06* | 250 | 125 | 1 |
| 4 | 50,00 | 6 | *900,86* | 308 | 150 | 1 |

**Bajo demanda /** Sur commade / upon request

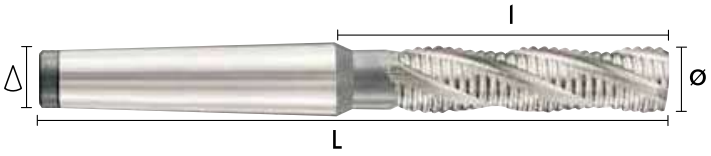
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3148 HSSE DIN 845 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 35-55 | ○ 25-30 | | | ○ 15-20 | | ○ 38-42 | ○ 20-24 | | | ● 55-95 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

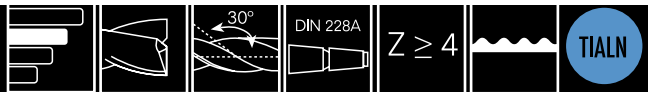



| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2 | 16,00* | 4 | *151,74* | 148 | 63 | 1 |
| 2 | 18,00* | 4 | *161,47* | 148 | 63 | 1 |
| 2 | 20,00 | 4 | *168,90* | 160 | 75 | 1 |
| 2 | 22,00 | 5 | *229,38* | 160 | 75 | 1 |
| 3 | 25,00 | 5 | *265,62* | 192 | 90 | 1 |
| 3 | 28,00 | 5 | *297,64* | 192 | 90 | 1 |

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 3 | 30,00 | 5 | *335,83* | 192 | 90 | 1 |
| 4 | 32,00 | 6 | *363,30* | 254 | 106 | 1 |
| 4 | 36,00 | 6 | *398,27* | 254 | 106 | 1 |
| 4 | 40,00 | 6 | *508,88* | 273 | 125 | 1 |
| 5 | 50,00 | 8 | *768,34* | 336 | 150 | 1 |

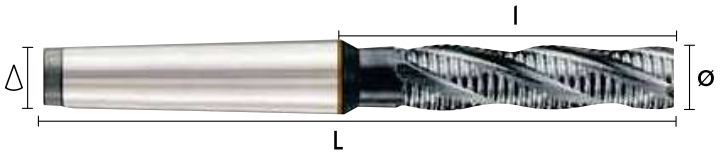
* Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

## 3148/1 HSSE DIN 845 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 55-80 | ● 45-55 | ○ 35-40 | | ○ 25-35 | | ● 55-60 | ● 30-35 | | | ● 90-140 | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 2 | 20,00 | 4 | *212,43* | 160 | 75 | 1 |
| 2 | 22,00 | 5 | *226,06* | 160 | 75 | 1 |
| 3 | 25,00 | 5 | *236,46* | 192 | 90 | 1 |
| 3 | 28,00 | 5 | *321,14* | 192 | 90 | 1 |
| 3 | 30,00 | 5 | *371,87* | 192 | 90 | 1 |

| Δ | Ø mm | Z | € | L mm | l mm | |
|---|---|---|---|---|---|---|
| 4 | 32,00 | 6 | *416,70* | 254 | 106 | 1 |
| 4 | 36,00 | 6 | *470,16* | 254 | 106 | 1 |
| 4 | 40,00 | 6 | *508,62* | 273 | 125 | 1 |
| 5 | 50,00 | 8 | *557,57* | 336 | 150 | 1 |

**Bajo demanda /** Sur commade / upon request

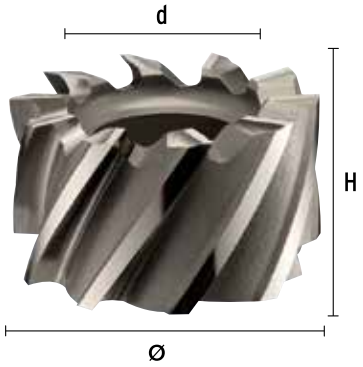


P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3149 HSSE DIN 1880 N

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | ● 15-25 | | | ● 10-15 | | | ● 20-24 | | | ● 30-35 | | | | ● 10-15 | | | |

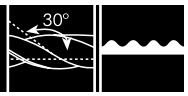
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | H mm | |
|---|---|---|---|---|---|
| 40,00 | 6 | 16 | *136,65* | 32 | 1 |
| 50,00 | 8 | 22 | *173,87* | 36 | 1 |

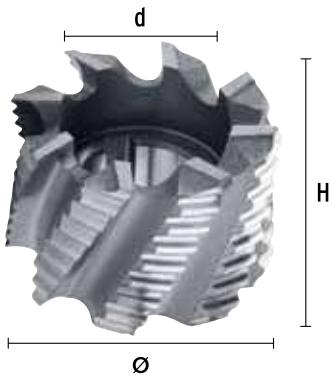
| Ø mm | Z | d mm | € | H mm | |
|---|---|---|---|---|---|
| 63,00 | 8 | 27 | *236,28* | 40 | 1 |
| 80,00 | 10 | 27 | *346,69* | 45 | 1 |

## 3150 HSSE DIN 1880 NR




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 35-50 | ● 25-35 | | | ● 15-20 | | | ● 25-30 | | | ● 30-35 | | | | ● 15-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

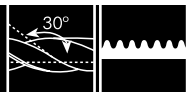



| Ø mm | Z | d mm | € | H mm | |
|---|---|---|---|---|---|
| 40,00 | 6 | 16 | *205,70* | 32 | 1 |
| 50,00 | 6 | 22 | *255,63* | 36 | 1 |

| Ø mm | Z | d mm | € | H mm | |
|---|---|---|---|---|---|
| 63,00 | 8 | 27 | *324,31* | 40 | 1 |
| 80,00 | 8 | 27 | *450,95* | 45 | 1 |

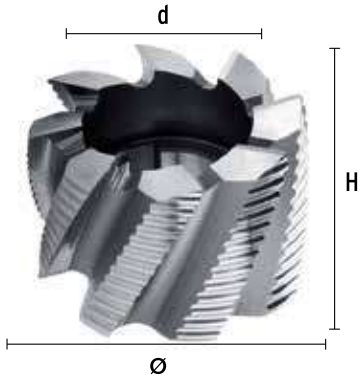
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3165 HSSE DIN 1880 NRF




| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | ● 15-25 | ● 15-20 | | ● 10-15 | | ○ 30-35 | ● 15-25 | | | ● 30-100 | | | ● 5-15 | ● 10-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | Z | d mm | € | H mm | |
|---|---|---|---|---|---|
| 40,00 | 8 | 16 | *250,40* | 32 | 1 |
| 50,00 | 8 | 22 | *311,17* | 36 | 1 |

| Ø mm | Z | d mm | € | H mm | |
|---|---|---|---|---|---|
| 63,00 | 10 | 27 | *402,43* | 40 | 1 |
| 80,00 | 10 | 27 | *604,60* | 45 | 1 |

## 3151 HSSE DIN 885 B

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | ● 15-25 | ● 15-20 | | | | ● 30-35 | ● 15-25 | | | ● 30-100 | ● 50-90 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | e mm | |
|---|---|---|---|---|---|
| 63,00 | 18 | 22 | *154,53* | 4 | 1 |
| 63,00 | 18 | 22 | *145,90* | 5 | 1 |
| 63,00 | 18 | 22 | *138,39* | 6 | 1 |
| 63,00 | 18 | 22 | *147,61* | 8 | 1 |
| 63,00 | 18 | 22 | *155,67* | 10 | 1 |
| 80,00 | 20 | 27 | *137,75* | 4 | 1 |
| 80,00 | 20 | 27 | *174,12* | 5 | 1 |
| 80,00 | 20 | 27 | *177,65* | 6 | 1 |
| 80,00 | 20 | 27 | *182,21* | 8 | 1 |
| 80,00 | 20 | 27 | *199,52* | 10 | 1 |
| 80,00 | 20 | 27 | *219,11* | 12 | 1 |

| Ø mm | Z | d mm | € | e mm | |
|---|---|---|---|---|---|
| 100,00 | 24 | 32 | *212,19* | 6 | 1 |
| 100,00 | 24 | 32 | *232,94* | 8 | 1 |
| 100,00 | 24 | 32 | *257,17* | 10 | 1 |
| 100,00 | 24 | 32 | *284,85* | 12 | 1 |
| 100,00 | 24 | 32 | *329,83* | 14 | 1 |
| 125,00 | 24 | 32 | *332,13* | 6 | 1 |
| 125,00 | 24 | 32 | *342,50* | 8 | 1 |
| 125,00 | 24 | 32 | *359,80* | 10 | 1 |
| 125,00 | 24 | 32 | *418,60* | 12 | 1 |
| 125,00 | 24 | 32 | *443,99* | 14 | 1 |
| 125,00 | 24 | 32 | *387,72* | 16 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3161 HSSE DIN 885 A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | ● 15-25 | ● 15-20 | | ● 10-15 | | ● 30-35 | ● 15-25 | | | ● 30-100 | ● 50-90 | | | ● 10-15 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | e mm | |
|---|---|---|---|---|---|
| 63,00 | 18 | 22 | *118,22* | 4 | 1 |
| 63,00 | 18 | 22 | *121,83* | 5 | 1 |
| 63,00 | 18 | 22 | *126,98* | 6 | 1 |
| 63,00 | 18 | 22 | *136,67* | 8 | 1 |
| 63,00 | 18 | 22 | *152,58* | 10 | 1 |
| 80,00 | 20 | 27 | *147,00* | 4 | 1 |
| 80,00 | 20 | 27 | *153,23* | 5 | 1 |
| 80,00 | 20 | 27 | *161,72* | 6 | 1 |
| 80,00 | 20 | 27 | *171,64* | 8 | 1 |
| 80,00 | 18 | 27 | *175,97* | 10 | 1 |
| 80,00 | 18 | 27 | *198,19* | 12 | 1 |

| Ø mm | Z | d mm | € | e mm | |
|---|---|---|---|---|---|
| 100,00 | 20 | 32 | *191,91* | 6 | 1 |
| 100,00 | 20 | 32 | *213,16* | 8 | 1 |
| 100,00 | 20 | 32 | *247,12* | 10 | 1 |
| 100,00 | 20 | 32 | *266,46* | 12 | 1 |
| 100,00 | 20 | 32 | *297,27* | 14 | 1 |
| 125,00 | 24 | 32 | *226,64* | 6 | 1 |
| 125,00 | 24 | 32 | *269,86* | 8 | 1 |
| 125,00 | 24 | 32 | *295,77* | 10 | 1 |
| 125,00 | 24 | 32 | *352,77* | 12 | 1 |
| 125,00 | 24 | 32 | *397,51* | 14 | 1 |
| 125,00 | 24 | 32 | *412,09* | 16 | 1 |

## 3166 HSSE DIN 1834 A

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-40 | ● 15-25 | ● 15-20 | | | | ● 30-35 | ● 15-25 | | ● 60-260 | ● 30-100 | ● 50-90 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Z | d mm | € | e mm | |
|---|---|---|---|---|---|
| 50,00 | 24 | 16 | *143,10* | 1,6 | 1 |
| 50,00 | 24 | 16 | *139,15* | 2 | 1 |
| 50,00 | 24 | 16 | *141,52* | 2,5 | 1 |
| 50,00 | 24 | 16 | *143,90* | 3 | 1 |
| 63,00 | 28 | 22 | *151,63* | 4 | 1 |
| 63,00 | 28 | 22 | *159,81* | 5 | 1 |
| 63,00 | 28 | 22 | *175,43* | 6 | 1 |
| 80,00 | 32 | 27 | *160,01* | 1,6 | 1 |
| 80,00 | 32 | 27 | *155,43* | 2 | 1 |
| 80,00 | 32 | 27 | *158,03* | 2,5 | 1 |
| 80,00 | 32 | 27 | *162,38* | 3 | 1 |
| 80,00 | 32 | 27 | *174,01* | 4 | 1 |
| 80,00 | 32 | 27 | *194,95* | 5 | 1 |
| 80,00 | 32 | 27 | *206,83* | 6 | 1 |
| 100,00 | 36 | 32 | *191,42* | 1,6 | 1 |
| 100,00 | 36 | 32 | *190,37* | 2 | 1 |

| Ø mm | Z | d mm | € | e mm | |
|---|---|---|---|---|---|
| 100,00 | 36 | 32 | *190,22* | 2,5 | 1 |
| 100,00 | 36 | 32 | *193,63* | 3 | 1 |
| 100,00 | 36 | 32 | *208,77* | 4 | 1 |
| 100,00 | 36 | 32 | *221,30* | 5 | 1 |
| 100,00 | 36 | 32 | *248,64* | 6 | 1 |
| 100,00 | 28 | 32 | *274,83* | 8 | 1 |
| 125,00 | 40 | 32 | *242,09* | 1,6 | 1 |
| 125,00 | 40 | 32 | *232,84* | 2 | 1 |
| 125,00 | 40 | 32 | *238,64* | 2,5 | 1 |
| 125,00 | 40 | 32 | *244,43* | 3 | 1 |
| 125,00 | 40 | 32 | *261,87* | 4 | 1 |
| 125,00 | 40 | 32 | *280,31* | 5 | 1 |
| 125,00 | 40 | 32 | *301,18* | 6 | 1 |
| 125,00 | 40 | 32 | *352,10* | 8 | 1 |
| 125,00 | 40 | 32 | *390,25* | 10 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3152 HSSE DIN 850 D

DIN 1835B

**Tol**
D (h11)
d (h8)
l (e8)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-04 | ● 15-25 | | | | | | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 4,50 | 6 | 50 | 1,00 | *55,41* | 6 | 1 |
| 7,50 | 6 | 50 | 1,50 | *57,68* | 6 | 1 |
| 7,50 | 6 | 50 | 2,00 | *57,68* | 6 | 1 |
| 10,50 | 6 | 50 | 2,00 | *62,08* | 6 | 1 |
| 10,50 | 6 | 50 | 2,50 | *62,08* | 6 | 1 |
| 10,50 | 6 | 50 | 3,00 | *62,08* | 6 | 1 |
| 13,50 | 10 | 56 | 3,00 | *63,06* | 6 | 1 |
| 13,50 | 10 | 56 | 4,00 | *63,06* | 6 | 1 |
| 16,50 | 10 | 56 | 3,00 | *63,64* | 6 | 1 |
| 16,50 | 10 | 56 | 4,00 | *63,64* | 6 | 1 |
| 16,50 | 10 | 56 | 5,00 | *63,64* | 6 | 1 |
| 19,50 | 10 | 63 | 4,00 | *72,45* | 8 | 1 |
| 19,50 | 10 | 63 | 5,00 | *72,45* | 8 | 1 |

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 19,50 | 10 | 63 | 6,00 | *72,45* | 8 | 1 |
| 22,50 | 10 | 63 | 5,00 | *79,64* | 8 | 1 |
| 22,50 | 10 | 63 | 6,00 | *79,64* | 8 | 1 |
| 22,50 | 10 | 63 | 8,00 | *79,64* | 8 | 1 |
| 25,50 | 10 | 63 | 6,00 | *92,90* | 10 | 1 |
| 28,50 | 10 | 63 | 6,00 | *94,54* | 10 | 1 |
| 28,50 | 10 | 63 | 8,00 | *94,54* | 10 | 1 |
| 28,50 | 12 | 71 | 10,00 | *94,54* | 10 | 1 |
| 32,50 | 12 | 71 | 7,00 | *117,13* | 10 | 1 |
| 32,50 | 12 | 71 | 8,00 | *117,13* | 10 | 1 |
| 32,50 | 12 | 71 | 10,00 | *117,13* | 10 | 1 |
| 45,50 | 12 | 71 | 10,00 | *185,44* | 12 | 1 |

## 3153 HSSE DIN 851 N

DIN 1835B

**ISO 3337**

**Tol**
D (d11)
d (h8)
l (d11)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-04 | ● 15-25 | | | | | | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 11,00 | 10 | 53,50 | 4 | *101,84* | 6 | 1 |
| 12,50 | 10 | 57 | 6 | *105,87* | 6 | 1 |
| 16,00 | 10 | 62 | 8 | *116,43* | 6 | 1 |
| 18,00 | 12 | 70 | 8 | *122,60* | 8 | 1 |

| Ø mm | d mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 21,00 | 12 | 74 | 9 | *135,08* | 6 | 1 |
| 25,00 | 16 | 82 | 11 | *152,43* | 8 | 1 |
| 32,00 | 16 | 90 | 14 | *191,75* | 8 | 1 |
| 40,00 | 25 | 108 | 18 | *266,12* | 10 | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3154 HSSE DIN 851 N

DIN 228A | ISO 1641 | Tol D (d11) I (d11)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-04 | ● 15-25 | | | | | | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Δ | Ø mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 1 | 18,00 | 82 | 8 | *136,13* | 8 | 1 |
| 2 | 21,00 | 102 | 9 | *150,08* | 8 | 1 |
| 2 | 25,00 | 104 | 11 | *155,57* | 8 | 1 |
| 2 | 32,00 | 111 | 14 | *231,07* | 8 | 1 |

| Δ | Ø mm | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|
| 3 | 40,00 | 138 | 18 | *304,52* | 8 | 1 |
| 4 | 50,00 | 173 | 22 | *369,80* | 8 | 1 |
| 4 | 60,00 | 188 | 28 | *534,29* | 10 | 1 |
| 5 | 72,00 | 229 | 35 | *695,97* | 10 | 1 |

## 3155 HSSE DIN 1833 A

DIN 1835B | ISO 3859 | Tol D (js16) d (h8)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-04 | ● 15-25 | | | | | | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | Ang º | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|---|
| 16,00 | 12 | 45 | 60 | 4,00 | *103,36* | 8 | 1 |
| 20,00 | 12 | 45 | 63 | 5,00 | *109,97* | 8 | 1 |
| 25,00 | 12 | 45 | 67 | 6,30 | *134,07* | 10 | 1 |
| 32,00 | 16 | 45 | 71 | 8,00 | *149,59* | 12 | 1 |

| Ø mm | d mm | Ang º | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|---|
| 16,00 | 12 | 60 | 60 | 6,30 | *103,36* | 8 | 1 |
| 20,00 | 12 | 60 | 63 | 8,00 | *109,97* | 8 | 1 |
| 25,00 | 12 | 60 | 67 | 10,00 | *134,07* | 10 | 1 |
| 32,00 | 16 | 60 | 71 | 12,50 | *149,59* | 12 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3156 HSSE DIN 1833 B

DIN 1835B | ISO 3859 | Tol D (js16) d (h8)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-04 | ● 15-25 | | | | | | ○ 20-24 | | ○ 60-150 | ● 55-95 | ○ 60-100 | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | Ang º | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|---|
| 16,00 | 12 | 45 | 60 | 4,00 | *83,21* | 10 | 1 |
| 20,00 | 12 | 45 | 63 | 5,00 | *93,61* | 10 | 1 |
| 25,00 | 12 | 45 | 67 | 6,30 | *105,25* | 10 | 1 |
| 32,00 | 16 | 45 | 71 | 8,00 | *119,68* | 12 | 1 |

| Ø mm | d mm | Ang º | L mm | l mm | € | Z | |
|---|---|---|---|---|---|---|---|
| 16,00 | 12 | 60 | 60 | 6,30 | *83,21* | 10 | 1 |
| 20,00 | 12 | 60 | 63 | 8,00 | *93,61* | 10 | 1 |
| 25,00 | 12 | 60 | 67 | 10,00 | *105,25* | 10 | 1 |
| 32,00 | 16 | 60 | 71 | 12,50 | *119,68* | 12 | 1 |

## 3164 HSSE DIN 6518 N

DIN 1835B | Tol R (H11) d2 (h6)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 30-04 | ● 15-25 | | | | | | ○ 20-24 | | | | | | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | Radio mm | d mm | L mm | € | Z | |
|---|---|---|---|---|---|---|
| 8,00 | 1,00 | 10 | 60 | *70,17* | 4 | 1 |
| 9,20 | 1,60 | 10 | 60 | *76,61* | 4 | 1 |
| 10,00 | 2,00 | 10 | 60 | *76,61* | 4 | 1 |
| 11,00 | 2,50 | 10 | 60 | *76,61* | 4 | 1 |
| 12,00 | 3,00 | 12 | 60 | *79,65* | 4 | 1 |
| 14,00 | 4,00 | 12 | 60 | *86,19* | 4 | 1 |
| 16,00 | 5,00 | 12 | 60 | *92,40* | 4 | 1 |
| 20,00 | 6,00 | 16 | 67 | *97,40* | 4 | 1 |
| 22,00 | 7,00 | 16 | 71 | *119,61* | 4 | 1 |
| 24,00 | 8,00 | 16 | 71 | *119,61* | 4 | 1 |

| Ø mm | Radio mm | d mm | L mm | € | Z | |
|---|---|---|---|---|---|---|
| 26,00 | 9,00 | 25 | 85 | *143,99* | 4 | 1 |
| 28,00 | 10,00 | 25 | 85 | *143,99* | 4 | 1 |
| 32,00 | 11,00 | 25 | 90 | *159,00* | 4 | 1 |
| 34,00 | 12,00 | 25 | 90 | *159,00* | 4 | 1 |
| 42,00 | 13,00 | 25 | 100 | *222,64* | 6 | 1 |
| 44,00 | 14,00 | 25 | 100 | *222,64* | 6 | 1 |
| 46,00 | 15,00 | 25 | 100 | *254,61* | 6 | 1 |
| 48,00 | 16,00 | 25 | 100 | *254,61* | 6 | 1 |
| 52,00 | 18,00 | 32 | 112 | *287,25* | 6 | 1 |
| 56,00 | 20,00 | 32 | 112 | *319,05* | 6 | 1 |

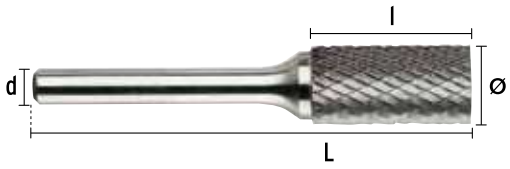


P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3201 Cilíndrica / Cylindrique / Straight

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



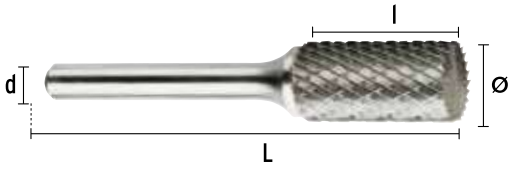

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | 12,36 | 13,59 | | 38 | 13 | 1 |
| 4,00 | 4 | 20,60 | 22,66 | | 50 | 13 | 1 |
| 6,00 | 6 | 24,18 | 26,60 | | 50 | 19 | 1 |
| 8,00 | 6 | 30,36 | 33,40 | | 65 | 19 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | 33,94 | 37,34 | 37,53 | 65 | 19 | 1 |
| 12,00 | 6 | 48,63 | 53,49 | 52,84 | 70 | 25 | 1 |
| 16,00 | 6 | 61,19 | 67,31 | 76,58 | 70 | 25 | 1 |

## 3202 Cilíndrica con corte / Cylindrique taillée / Straight with cut

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | 13,43 | 14,77 | | 38 | 13 | 1 |
| 4,00 | 4 | 24,64 | 27,10 | | 50 | 13 | 1 |
| 6,00 | 6 | 26,78 | 29,46 | | 50 | 19 | 1 |
| 8,00 | 6 | 33,94 | 37,34 | | 65 | 19 | 1 |

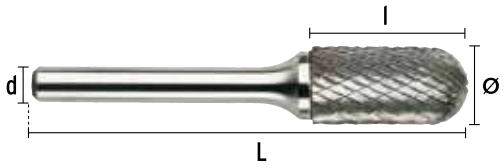
| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | 37,35 | 41,08 | 44,69 | 65 | 19 | 1 |
| 12,00 | 6 | 53,65 | 59,01 | 66,18 | 70 | 25 | 1 |
| 16,00 | 6 | 71,56 | 78,72 | 87,32 | 70 | 25 | 1 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3203 Cilíndrica radio / Cylindrique à rayon / Straight radius

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



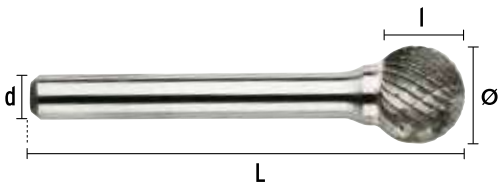

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *13,80* | *15,17* | | 38 | 13 | 1 |
| 6,00 | 3 | *22,39* | *24,63* | | 50 | 13 | 1 |
| 6,00 | 6 | *27,31* | *30,04* | | 50 | 19 | 1 |
| 8,00 | 6 | *32,25* | *35,47* | | 65 | 19 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *35,82* | *39,40* | *43,35* | 65 | 19 | 1 |
| 12,00 | 6 | *54,62* | *60,09* | *68,11* | 70 | 25 | 1 |
| 16,00 | 6 | *67,98* | *74,78* | *92,23* | 70 | 25 | 1 |

## 3204 Esférica / Sphérique / Spherical

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *14,07* | *15,48* | | 38 | 2,50 | 1 |
| 6,00 | 3 | *21,19* | *23,31* | | 44 | 5,00 | 1 |
| 6,00 | 6 | *25,00* | *27,50* | | 50 | 5,00 | 1 |
| 8,00 | 6 | *27,76* | *30,54* | | 51 | 6,40 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *28,46* | *31,30* | *38,96* | 53 | 8,00 | 1 |
| 12,00 | 6 | *38,36* | *42,20* | *50,07* | 56 | 11,00 | 1 |
| 16,00 | 6 | *51,87* | *57,06* | *62,61* | 59 | 14,00 | 1 |
| 19,00 | 6 | *68,96* | *75,85* | | 61 | 16,00 | 1 |

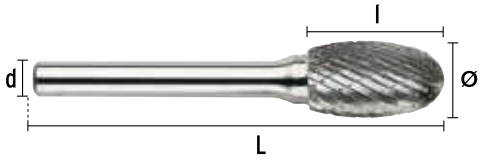


P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

## 3205 Oval / Ovale

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



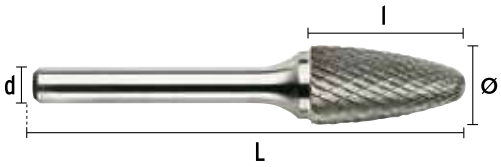

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *15,22* | *16,75* | | 38 | 6 | 1 |
| 6,00 | 3 | *21,95* | *29,40* | | 47 | 10 | 1 |
| 8,00 | 6 | *30,36* | *33,40* | | 58 | 13 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *34,60* | *38,06* | | 60 | 16 | 1 |
| 12,00 | 6 | *46,48* | *51,14* | | 67 | 22 | 1 |
| 16,00 | 6 | *69,77* | *76,74* | | 70 | 25 | 1 |

## 3206 Árbol con radio / Arbre à rayon / Arc with radius

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *16,99* | *18,69* | | 38 | 13 | 1 |
| 6,00 | 3 | *22,39* | *24,63* | | 50 | 13 | 1 |
| 10,00 | 6 | *39,80* | *43,78* | *44,69* | 65 | 19 | 1 |

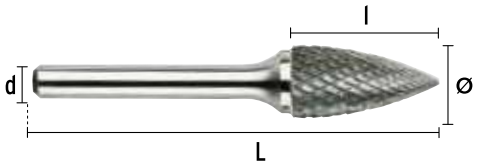
| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 12,00 | 6 | *52,83* | *58,11* | *64,22* | 70 | 25 | 1 |
| 16,00 | 6 | *69,24* | *76,16* | *89,48* | 70 | 25 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3207 Árbol / Arbre / Arc

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



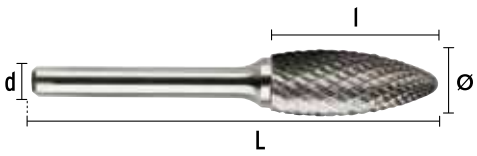

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *16,04* | *17,64* | | 38 | 13 | 1 |
| 6,00 | 3 | *23,21* | *25,53* | | 50 | 13 | 1 |
| 6,00 | 6 | *28,57* | *31,43* | | 50 | 16 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *38,49* | *42,34* | | 65 | 19 | 1 |
| 12,00 | 6 | *49,26* | *54,18* | | 70 | 25 | 1 |
| 16,00 | 6 | *68,46* | *75,30* | | 70 | 25 | 1 |

## 3208 Llama / Flamme / Flame

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *17,39* | *19,13* | | 38 | 6 | 1 |
| 6,00 | 6 | *29,56* | *32,51* | | 50 | 13 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 8,00 | 6 | *33,91* | *37,30* | | 65 | 19 | 1 |
| 12,00 | 6 | *68,69* | *75,56* | | 77 | 32 | 1 |

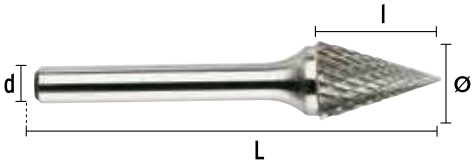


P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3209 Cónica / Conique / Tapered

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *15,57* | *17,13* | | 38 | 11 | 1 |
| 6,00 | 6 | *25,22* | *27,74* | | 50 | 19 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *33,91* | *37,30* | | 61 | 16 | 1 |
| 12,00 | 6 | *47,81* | *52,59* | | 67 | 25 | 1 |

## 3210 Cónica 90º / Conique 90º / Tapered 90º

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *30,04* | *33,05* | | 50 | 5 | 1 |
| 16,00 | 6 | *48,61* | *53,47* | | 53 | 8 | 1 |

## 3211 Cónica radio / Conique à rayon / Tapered radius

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

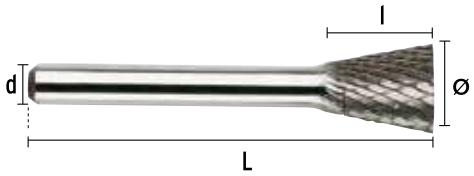
| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *17,05* | *18,75* | | 38 | 10 | 1 |
| 6,00 | 6 | *29,21* | *32,13* | | 50 | 16 | 1 |
| 10,00 | 6 | *43,39* | *47,73* | *52,62* | 72 | 27 | 1 |

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 12,00 | 6 | *51,37* | *56,51* | *62,17* | 73 | 28 | 1 |
| 16,00 | 6 | *81,65* | *89,81* | *124,96* | 78 | 33 | 1 |

## 3212 Cono invertido / Cône inversé / Inverted taper

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 3,00 | 3 | *18,24* | *20,07* | | 38 | 4 | 1 |
| 6,00 | 6 | *26,42* | *29,07* | | 50 | 8 | 1 |

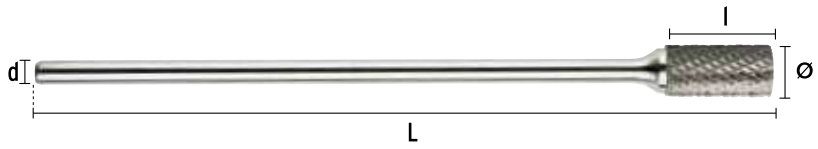


P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3214 Cilíndrica L / Cylindrique L / Straight L

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

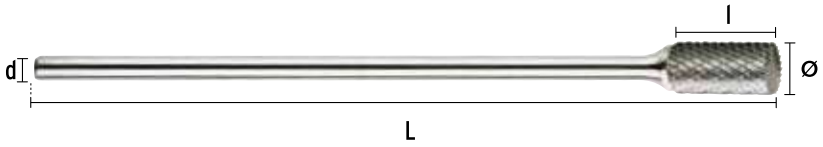



| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *43,39* | *47,73* | | 169 | 19 | 1 |

## 3215 Cilíndrica con corte L / Cylindrique taillée L / Straight with L cut

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

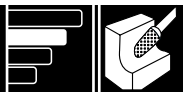
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 6,00 | 6 | *37,40* | *41,14* | | 162 | 16 | 1 |

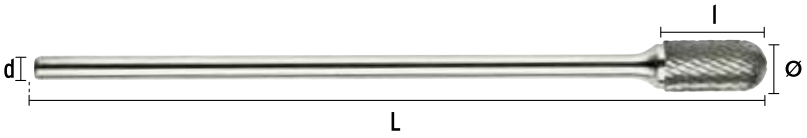
P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3216 Cilíndrica radio L / Cylindrique à rayon L / Straight L radius



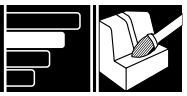
| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



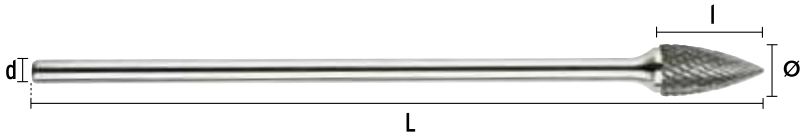

| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 10,00 | 6 | *51,30* | *56,43* | | 169 | 19 | 1 |
| 12,00 | 6 | *68,15* | *74,96* | | 175 | 25 | 1 |

## 3217 Árbol L / Arbre L / L Arc



| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 12,00 | 6 | *67,73* | *74,50* | | 175 | 25 | 1 |

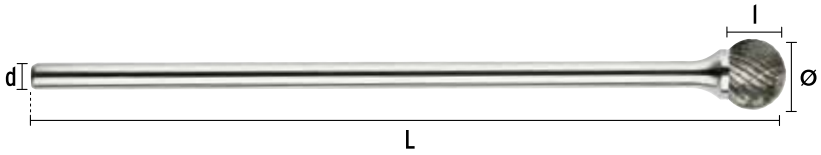


P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

## 3218 Esférica L / Sphérique L / L Spherical

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

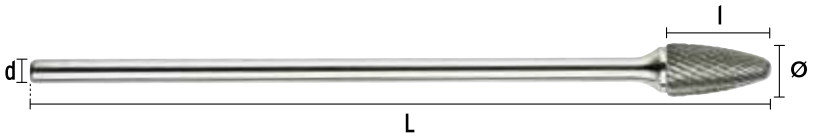



| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 12,00 | 6 | *53,48* | *58,82* | | 161 | 11 | 1 |

## 3219 Árbol radio L / Arbre à rayon L / L Radius arc

| | P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| CRUZ | ● 400-800 | ● 400-800 | ○ 300-700 | | ● 600-1000 | ○ 400-800 | ● 500-800 | ● 400-800 | | | ● 400-800 | ● 400-800 | | ○ 400-800 | ● 600-1000 | | | |
| DIAM | ○ 400-800 | ● 400-800 | ● 300-700 | ● 300-700 | ○ 600-1000 | ● 400-800 | ● 500-800 | ● 400-800 | ● 300-700 | | ○ 300-800 | | ○ 300-700 | ● 300-800 | ● 300-1000 | ● 200-600 | ● 200-600 | |
| ALU | | | | | | | | | | ● 300-1000 | ● 300-700 | ○ 400-1000 | ● 400-1000 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | CRUZ € | DIAM € | ALU € | L mm | l mm | |
|---|---|---|---|---|---|---|---|
| 12,00 | 6 | *74,49* | *74,13* | | 175 | 25 | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 7172 HSS

L=30

WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | | | | | | ○ 20-30 | ○ 15-20 | | ● 40-50 | ○ 15-50 | ○ 20-25 | ○ 40-50 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 12,00 | 19 | 30 | *33,08* | 1 |
| 13,00 | 19 | 30 | *33,08* | 1 |
| 14,00 | 19 | 30 | *33,93* | 1 |
| 15,00 | 19 | 30 | *35,31* | 1 |
| 16,00 | 19 | 30 | *36,55* | 1 |
| 17,00 | 19 | 30 | *37,94* | 1 |
| 18,00 | 19 | 30 | *42,66* | 1 |
| 19,00 | 19 | 30 | *43,51* | 1 |
| 20,00 | 19 | 30 | *45,29* | 1 |
| 21,00 | 19 | 30 | *48,50* | 1 |
| 22,00 | 19 | 30 | *50,60* | 1 |
| 23,00 | 19 | 30 | *52,37* | 1 |
| 24,00 | 19 | 30 | *54,34* | 1 |
| 25,00 | 19 | 30 | *56,18* | 1 |
| 26,00 | 19 | 30 | *57,75* | 1 |
| 27,00 | 19 | 30 | *62,28* | 1 |
| 28,00 | 19 | 30 | *62,35* | 1 |
| 29,00 | 19 | 30 | *64,64* | 1 |
| 30,00 | 19 | 30 | *66,29* | 1 |
| 31,00 | 19 | 30 | *72,32* | 1 |
| 32,00 | 19 | 30 | *81,38* | 1 |
| 33,00 | 19 | 30 | *82,49* | 1 |
| 34,00 | 19 | 30 | *96,14* | 1 |
| 35,00 | 19 | 30 | *105,99* | 1 |
| 36,00 | 19 | 30 | *108,61* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 37,00 | 19 | 30 | *114,85* | 1 |
| 38,00 | 19 | 30 | *116,49* | 1 |
| 39,00 | 19 | 30 | *120,89* | 1 |
| 40,00 | 19 | 30 | *123,84* | 1 |
| 41,00 | 19 | 30 | *128,89* | 1 |
| 42,00 | 19 | 30 | *135,85* | 1 |
| 43,00 | 19 | 30 | *138,80* | 1 |
| 44,00 | 19 | 30 | *148,64* | 1 |
| 45,00 | 19 | 30 | *153,50* | 1 |
| 46,00 | 19 | 30 | *156,65* | 1 |
| 47,00 | 19 | 30 | *161,90* | 1 |
| 48,00 | 19 | 30 | *169,58* | 1 |
| 49,00 | 19 | 30 | *172,14* | 1 |
| 50,00 | 19 | 30 | *176,40* | 1 |
| 51,00 | 19 | 30 | *177,45* | 1 |
| 52,00 | 19 | 30 | *178,64* | 1 |
| 53,00 | 19 | 30 | *179,81* | 1 |
| 54,00 | 19 | 30 | *182,90* | 1 |
| 55,00 | 19 | 30 | *186,64* | 1 |
| 56,00 | 19 | 30 | *190,71* | 1 |
| 57,00 | 19 | 30 | *194,65* | 1 |
| 58,00 | 19 | 30 | *198,85* | 1 |
| 59,00 | 19 | 30 | *203,11* | 1 |
| 60,00 | 19 | 30 | *206,85* | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 7172 HSS

L=50

WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-25 | | | | | | ○ 20-30 | ○ 15-20 | | ● 40-50 | ○ 15-50 | ○ 20-25 | ○ 40-50 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 12,00 | 19 | 50 | *51,25* | 1 |
| 13,00 | 19 | 50 | *52,30* | 1 |
| 14,00 | 19 | 50 | *54,66* | 1 |
| 15,00 | 19 | 50 | *55,00* | 1 |
| 16,00 | 19 | 50 | *55,19* | 1 |
| 17,00 | 19 | 50 | *56,76* | 1 |
| 18,00 | 19 | 50 | *62,94* | 1 |
| 19,00 | 19 | 50 | *64,90* | 1 |
| 20,00 | 19 | 50 | *67,99* | 1 |
| 21,00 | 19 | 50 | *72,85* | 1 |
| 22,00 | 19 | 50 | *75,27* | 1 |
| 23,00 | 19 | 50 | *80,26* | 1 |
| 24,00 | 19 | 50 | *82,82* | 1 |
| 25,00 | 19 | 50 | *83,09* | 1 |
| 26,00 | 19 | 50 | *85,25* | 1 |
| 27,00 | 19 | 50 | *89,19* | 1 |
| 28,00 | 19 | 50 | *93,06* | 1 |
| 29,00 | 19 | 50 | *96,93* | 1 |
| 30,00 | 19 | 50 | *101,20* | 1 |
| 31,00 | 19 | 50 | *106,11* | 1 |
| 32,00 | 19 | 50 | *110,97* | 1 |
| 33,00 | 19 | 50 | *116,49* | 1 |
| 34,00 | 19 | 50 | *120,89* | 1 |
| 35,00 | 19 | 50 | *125,87* | 1 |
| 36,00 | 19 | 50 | *131,65* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 37,00 | 19 | 50 | *133,75* | 1 |
| 38,00 | 19 | 50 | *138,80* | 1 |
| 39,00 | 19 | 50 | *148,64* | 1 |
| 40,00 | 19 | 50 | *159,54* | 1 |
| 41,00 | 19 | 50 | *161,24* | 1 |
| 42,00 | 19 | 50 | *170,10* | 1 |
| 43,00 | 19 | 50 | *175,29* | 1 |
| 44,00 | 19 | 50 | *180,08* | 1 |
| 45,00 | 19 | 50 | *207,77* | 1 |
| 46,00 | 19 | 50 | *223,00* | 1 |
| 47,00 | 19 | 50 | *237,96* | 1 |
| 48,00 | 19 | 50 | *245,64* | 1 |
| 49,00 | 19 | 50 | *248,06* | 1 |
| 50,00 | 19 | 50 | *249,31* | 1 |
| 51,00 | 19 | 50 | *249,84* | 1 |
| 52,00 | 19 | 50 | *251,09* | 1 |
| 53,00 | 19 | 50 | *252,53* | 1 |
| 54,00 | 19 | 50 | *257,25* | 1 |
| 55,00 | 19 | 50 | *260,80* | 1 |
| 56,00 | 19 | 50 | *262,37* | 1 |
| 57,00 | 19 | 50 | *268,54* | 1 |
| 58,00 | 19 | 50 | *269,91* | 1 |
| 59,00 | 19 | 50 | *274,45* | 1 |
| 60,00 | 19 | 50 | *277,07* | 1 |

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

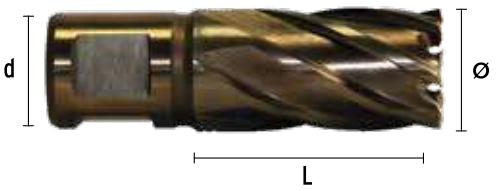
# 7137 HSSE

L=30

WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 20-25 | ○ 15-20 | | ○ 15-20 | | ● 30-35 | ● 25-30 | | ● 50-60 | ● 25-60 | ● 30-35 | ○ 50-60 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 12,00 | 19 | 30 | *45,45* | 1 |
| 13,00 | 19 | 30 | *45,45* | 1 |
| 14,00 | 19 | 30 | *45,45* | 1 |
| 15,00 | 19 | 30 | *52,43* | 1 |
| 16,00 | 19 | 30 | *55,78* | 1 |
| 17,00 | 19 | 30 | *57,33* | 1 |
| 18,00 | 19 | 30 | *60,56* | 1 |
| 19,00 | 19 | 30 | *64,04* | 1 |
| 20,00 | 19 | 30 | *67,27* | 1 |
| 21,00 | 19 | 30 | *70,78* | 1 |
| 22,00 | 19 | 30 | *74,01* | 1 |
| 23,00 | 19 | 30 | *76,35* | 1 |
| 24,00 | 19 | 30 | *79,59* | 1 |
| 25,00 | 19 | 30 | *83,07* | 1 |
| 26,00 | 19 | 30 | *84,90* | 1 |
| 27,00 | 19 | 30 | *86,40* | 1 |
| 28,00 | 19 | 30 | *89,47* | 1 |
| 29,00 | 19 | 30 | *92,81* | 1 |
| 30,00 | 19 | 30 | *95,88* | 1 |
| 31,00 | 19 | 30 | *108,20* | 1 |
| 32,00 | 19 | 30 | *111,55* | 1 |
| 33,00 | 19 | 30 | *126,70* | 1 |
| 34,00 | 19 | 30 | *130,38* | 1 |
| 35,00 | 19 | 30 | *134,36* | 1 |
| 36,00 | 19 | 30 | *138,04* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 37,00 | 19 | 30 | *142,04* | 1 |
| 38,00 | 19 | 30 | *145,72* | 1 |
| 39,00 | 19 | 30 | *149,71* | 1 |
| 40,00 | 19 | 30 | *153,39* | 1 |
| 41,00 | 19 | 30 | *157,38* | 1 |
| 42,00 | 19 | 30 | *161,06* | 1 |
| 43,00 | 19 | 30 | *165,05* | 1 |
| 44,00 | 19 | 30 | *168,72* | 1 |
| 45,00 | 19 | 30 | *172,71* | 1 |
| 46,00 | 19 | 30 | *176,40* | 1 |
| 47,00 | 19 | 30 | *180,38* | 1 |
| 48,00 | 19 | 30 | *184,07* | 1 |
| 49,00 | 19 | 30 | *188,06* | 1 |
| 50,00 | 19 | 30 | *191,74* | 1 |
| 55,00 | 19 | 30 | *211,06* | 1 |
| 60,00 | 19 | 30 | *230,08* | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 7137 HSSE

L=50

WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 20-25 | ○ 15-20 | | ○ 15-20 | | ● 30-35 | ● 25-30 | | ● 50-60 | ● 25-60 | ● 30-35 | ○ 50-60 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 12,00 | 19 | 50 | *55,22* | 1 |
| 13,00 | 19 | 50 | *59,82* | 1 |
| 14,00 | 19 | 50 | *64,42* | 1 |
| 15,00 | 19 | 50 | *69,03* | 1 |
| 16,00 | 19 | 50 | *73,63* | 1 |
| 17,00 | 19 | 50 | *78,24* | 1 |
| 18,00 | 19 | 50 | *82,83* | 1 |
| 19,00 | 19 | 50 | *87,44* | 1 |
| 20,00 | 19 | 50 | *92,03* | 1 |
| 21,00 | 19 | 50 | *96,63* | 1 |
| 22,00 | 19 | 50 | *101,23* | 1 |
| 23,00 | 19 | 50 | *105,84* | 1 |
| 24,00 | 19 | 50 | *110,44* | 1 |
| 25,00 | 19 | 50 | *115,05* | 1 |
| 26,00 | 19 | 50 | *119,65* | 1 |
| 27,00 | 19 | 50 | *124,26* | 1 |
| 28,00 | 19 | 50 | *128,85* | 1 |
| 29,00 | 19 | 50 | *133,44* | 1 |
| 30,00 | 19 | 50 | *138,04* | 1 |
| 31,00 | 19 | 50 | *142,65* | 1 |
| 32,00 | 19 | 50 | *147,25* | 1 |
| 33,00 | 19 | 50 | *151,86* | 1 |
| 34,00 | 19 | 50 | *156,46* | 1 |
| 35,00 | 19 | 50 | *161,06* | 1 |
| 36,00 | 19 | 50 | *165,66* | 1 |

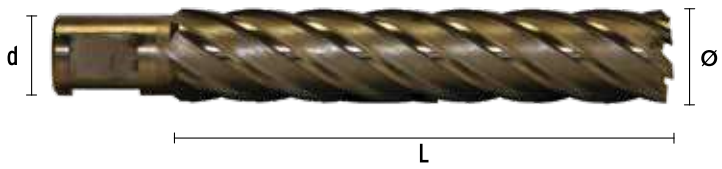
| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 37,00 | 19 | 50 | *170,26* | 1 |
| 38,00 | 19 | 50 | *174,86* | 1 |
| 39,00 | 19 | 50 | *179,47* | 1 |
| 40,00 | 19 | 50 | *184,07* | 1 |
| 41,00 | 19 | 50 | *188,67* | 1 |
| 42,00 | 19 | 50 | *193,27* | 1 |
| 43,00 | 19 | 50 | *197,87* | 1 |
| 44,00 | 19 | 50 | *202,47* | 1 |
| 45,00 | 19 | 50 | *207,07* | 1 |
| 46,00 | 19 | 50 | *211,67* | 1 |
| 47,00 | 19 | 50 | *216,28* | 1 |
| 48,00 | 19 | 50 | *220,88* | 1 |
| 49,00 | 19 | 50 | *225,49* | 1 |
| 50,00 | 19 | 50 | *230,08* | 1 |
| 51,00 | 19 | 50 | *234,69* | 1 |
| 52,00 | 19 | 50 | *239,28* | 1 |
| 53,00 | 19 | 50 | *243,88* | 1 |
| 54,00 | 19 | 50 | *248,48* | 1 |
| 55,00 | 19 | 50 | *253,09* | 1 |
| 56,00 | 19 | 50 | *257,69* | 1 |
| 57,00 | 19 | 50 | *262,30* | 1 |
| 58,00 | 19 | 50 | *266,89* | 1 |
| 59,00 | 19 | 50 | *271,50* | 1 |
| 60,00 | 19 | 50 | *276,10* | 1 |

## 7137 HSSE

L=110 | WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 25-45 | ● 20-25 | ○ 15-20 | | ○ 15-20 | | ● 30-35 | ● 25-30 | | ● 50-60 | ● 25-60 | ● 30-35 | ○ 50-60 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 20,00 | 19 | 110 | *146,09* | 1 |
| 22,00 | 19 | 110 | *152,34* | 1 |
| 24,00 | 19 | 110 | *160,84* | 1 |
| 25,00 | 19 | 110 | *166,94* | 1 |
| 26,00 | 19 | 110 | *181,76* | 1 |
| 28,00 | 19 | 110 | *196,33* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 30,00 | 19 | 110 | *208,66* | 1 |
| 32,00 | 19 | 110 | *224,87* | 1 |
| 35,00 | 19 | 110 | *239,03* | 1 |
| 40,00 | 19 | 110 | *322,11* | 1 |
| 45,00 | 19 | 110 | *405,18* | 1 |
| 50,00 | 19 | 110 | *474,05* | 1 |

## 7138 HSSE

L=30 | WELDON 19 | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 40-55 | ● 30-40 | ● 20-25 | ○ 15-20 | ● 20-25 | ○ 15-20 | ● 45-55 | ● 40-50 | ○ 15-20 | ● 60-70 | ● 20-70 | ● 45-55 | ○ 60-70 | ○ 10-15 | ● 15-25 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 12,00 | 19 | 30 | *83,39* | 1 |
| 13,00 | 19 | 30 | *83,39* | 1 |
| 14,00 | 19 | 30 | *83,39* | 1 |
| 15,00 | 19 | 30 | *86,87* | 1 |
| 16,00 | 19 | 30 | *86,87* | 1 |
| 17,00 | 19 | 30 | *93,61* | 1 |
| 18,00 | 19 | 30 | *97,08* | 1 |
| 19,00 | 19 | 30 | *99,04* | 1 |
| 20,00 | 19 | 30 | *102,95* | 1 |
| 21,00 | 19 | 30 | *110,32* | 1 |
| 22,00 | 19 | 30 | *115,10* | 1 |
| 23,00 | 19 | 30 | *119,24* | 1 |
| 24,00 | 19 | 30 | *123,57* | 1 |
| 25,00 | 19 | 30 | *128,35* | 1 |
| 26,00 | 19 | 30 | *133,14* | 1 |
| 27,00 | 19 | 30 | *137,71* | 1 |
| 28,00 | 19 | 30 | *142,04* | 1 |
| 29,00 | 19 | 30 | *146,60* | 1 |
| 30,00 | 19 | 30 | *150,74* | 1 |
| 31,00 | 19 | 30 | *164,63* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 32,00 | 19 | 30 | *176,37* | 1 |
| 33,00 | 19 | 30 | *187,66* | 1 |
| 34,00 | 19 | 30 | *199,15* | 1 |
| 35,00 | 19 | 30 | *205,89* | 1 |
| 36,00 | 19 | 30 | *216,75* | 1 |
| 37,00 | 19 | 30 | *234,56* | 1 |
| 38,00 | 19 | 30 | *245,42* | 1 |
| 39,00 | 19 | 30 | *256,27* | 1 |
| 40,00 | 19 | 30 | *264,97* | 1 |



P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

# 7138 HSSE

L=50 | WELDON 19 | TIALN

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 40-55 | ● 30-40 | ● 20-25 | ○ 15-20 | ● 20-25 | ○ 15-20 | ● 45-55 | ● 40-50 | ○ 15-20 | ● 60-70 | ● 20-70 | ● 45-55 | ○ 60-70 | ○ 10-15 | ● 15-25 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 12,00 | 19 | 50 | *111,41* | 1 |
| 13,00 | 19 | 50 | *111,41* | 1 |
| 14,00 | 19 | 50 | *111,41* | 1 |
| 15,00 | 19 | 50 | *120,98* | 1 |
| 16,00 | 19 | 50 | *129,44* | 1 |
| 17,00 | 19 | 50 | *134,23* | 1 |
| 18,00 | 19 | 50 | *144,21* | 1 |
| 19,00 | 19 | 50 | *147,90* | 1 |
| 20,00 | 19 | 50 | *155,51* | 1 |
| 21,00 | 19 | 50 | *167,01* | 1 |
| 22,00 | 19 | 50 | *172,44* | 1 |
| 23,00 | 19 | 50 | *178,31* | 1 |
| 24,00 | 19 | 50 | *183,96* | 1 |
| 25,00 | 19 | 50 | *189,83* | 1 |
| 26,00 | 19 | 50 | *195,24* | 1 |
| 27,00 | 19 | 50 | *204,15* | 1 |
| 28,00 | 19 | 50 | *213,05* | 1 |
| 29,00 | 19 | 50 | *223,70* | 1 |
| 30,00 | 19 | 50 | *232,39* | 1 |
| 31,00 | 19 | 50 | *243,24* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 32,00 | 19 | 50 | *247,59* | 1 |
| 33,00 | 19 | 50 | *258,45* | 1 |
| 34,00 | 19 | 50 | *267,15* | 1 |
| 35,00 | 19 | 50 | *278,01* | 1 |
| 36,00 | 19 | 50 | *286,68* | 1 |
| 37,00 | 19 | 50 | *299,72* | 1 |
| 38,00 | 19 | 50 | *308,41* | 1 |
| 39,00 | 19 | 50 | *317,10* | 1 |
| 40,00 | 19 | 50 | *334,47* | 1 |
| 45,00 | 19 | 50 | *397,47* | 1 |
| 50,00 | 19 | 50 | *503,86* | 1 |

## 7139 TCT — L=35 — WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ○ | ● | ● | ● | ○ | ● | ○ | ○ | ● | ● | ● | ○ | |
| 40-65 | 30-40 | 20-25 | 15-20 | 20-30 | 15-20 | 50-60 | 45-55 | 15-20 | 70-90 | 40-90 | 50-60 | 70-90 | 15-20 | 15-30 | 20-25 | 15-20 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 18,00 | 19 | 35 | *168,28* | 1 |
| 19,00 | 19 | 35 | *168,28* | 1 |
| 20,00 | 19 | 35 | *168,28* | 1 |
| 21,00 | 19 | 35 | *168,28* | 1 |
| 22,00 | 19 | 35 | *171,28* | 1 |
| 23,00 | 19 | 35 | *171,28* | 1 |
| 24,00 | 19 | 35 | *172,75* | 1 |
| 25,00 | 19 | 35 | *172,75* | 1 |
| 26,00 | 19 | 35 | *174,55* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 27,00 | 19 | 35 | *174,55* | 1 |
| 28,00 | 19 | 35 | *174,55* | 1 |
| 29,00 | 19 | 35 | *174,55* | 1 |
| 30,00 | 19 | 35 | *179,01* | 1 |
| 31,00 | 19 | 35 | *179,01* | 1 |
| 32,00 | 19 | 35 | *179,01* | 1 |
| 33,00 | 19 | 35 | *179,01* | 1 |
| 34,00 | 19 | 35 | *179,01* | 1 |
| 35,00 | 19 | 35 | *193,01* | 1 |

## 7139 TCT — L=50 — WELDON 19

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ○ | ● | ● | ● | ○ | ● | ○ | ○ | ● | ● | ● | ○ | |
| 40-65 | 30-40 | 20-25 | 15-20 | 20-30 | 15-20 | 50-60 | 45-55 | 15-20 | 70-90 | 40-90 | 50-60 | 70-90 | 15-20 | 15-30 | 20-25 | 15-20 | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 18,00 | 19 | 50 | *180,51* | 1 |
| 19,00 | 19 | 50 | *180,51* | 1 |
| 20,00 | 19 | 50 | *180,51* | 1 |
| 21,00 | 19 | 50 | *180,51* | 1 |
| 22,00 | 19 | 50 | *183,77* | 1 |
| 23,00 | 19 | 50 | *183,77* | 1 |
| 24,00 | 19 | 50 | *185,26* | 1 |
| 25,00 | 19 | 50 | *185,26* | 1 |
| 26,00 | 19 | 50 | *186,76* | 1 |
| 27,00 | 19 | 50 | *186,76* | 1 |
| 28,00 | 19 | 50 | *186,76* | 1 |
| 29,00 | 19 | 50 | *186,76* | 1 |
| 30,00 | 19 | 50 | *191,52* | 1 |
| 31,00 | 19 | 50 | *191,52* | 1 |
| 32,00 | 19 | 50 | *191,52* | 1 |
| 33,00 | 19 | 50 | *191,52* | 1 |
| 34,00 | 19 | 50 | *191,52* | 1 |

| Ø mm | d mm | L mm | € | |
|---|---|---|---|---|
| 35,00 | 19 | 50 | *205,22* | 1 |
| 36,00 | 19 | 50 | *205,22* | 1 |
| 37,00 | 19 | 50 | *205,22* | 1 |
| 38,00 | 19 | 50 | *205,22* | 1 |
| 39,00 | 19 | 50 | *205,22* | 1 |
| 40,00 | 19 | 50 | *231,74* | 1 |
| 41,00 | 19 | 50 | *231,74* | 1 |
| 42,00 | 19 | 50 | *231,74* | 1 |
| 43,00 | 19 | 50 | *231,74* | 1 |
| 44,00 | 19 | 50 | *231,74* | 1 |
| 45,00 | 19 | 50 | *231,74* | 1 |
| 46,00 | 19 | 50 | *306,79* | 1 |
| 47,00 | 19 | 50 | *306,79* | 1 |
| 48,00 | 19 | 50 | *306,79* | 1 |
| 49,00 | 19 | 50 | *306,79* | 1 |
| 50,00 | 19 | 50 | *306,79* | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# Accesorios / Accessoires / Accessories

## 7140 Cono Morse / Cône Morse / Morse taper

| △ | € | L mm |
|---|---|---|
| Nº 2 | *320,89* | 180 |
| Nº 3 | *320,89* | 185 |

## 7141 Punzón / Poinçon / Puncher

| Ref. | € | Ø mm | L mm | L Fresa L Fraise Cutting L |
|---|---|---|---|---|
| 7137-7138-7172 | *19,19* | 6,35 | 77 | 30 |
| | *19,19* | 6,35 | 87 | 35 |
| | *19,19* | 6,35 | 102 | 50 |
| | *24,22* | 8,00 | 160 | 110 |
| 7139 | *19,19* | 8,00 | 87 | 35 |
| | *19,19* | 8,00 | 102 | 50 |

## 7158 Adaptador para Taladros Fein / Adaptateur pour perceuses Fein / Adaptor for Fein drills

| € | *105,92* |
|---|---|

## 3138 Ø 4 a 12 mm

Ø mm 4-5-6 8-10-12 | 2z

| REF | € |
|---|---|
| HSS E | *128,54* |
| HSS E TIALN | *179,96* |

## 3139 Ø 4 a 12 mm

Ø mm 6-8 10-12 | 3z

| REF | € |
|---|---|
| HSS E | *156,03* |
| HSS E TIALN | *218,44* |

## 3140 Ø 4 a 12 mm

Ø mm 4-5-6 8-10-12 | 4z

| REF | € |
|---|---|
| HSS E | *135,75* |
| HSS E TIALN | *190,06* |

## 3220 10 PCS

10 CRUZ

| Ref. | Ø mm | d mm | L mm | l mm |
|---|---|---|---|---|
| 3201 | 10,00 | 6 | 65 | 19 |
| 3201 | 12,00 | 6 | 70 | 25 |
| 3203 | 10,00 | 6 | 65 | 19 |
| 3203 | 12,00 | 6 | 70 | 25 |
| 3204 | 10,00 | 6 | 53 | 9 |
| 3205 | 10,00 | 6 | 60 | 16 |
| 3206 | 12,00 | 6 | 70 | 25 |
| 3207 | 10,00 | 6 | 65 | 19 |
| 3207 | 12,00 | 6 | 70 | 25 |
| 3211 | 12,00 | 6 | 75 | 30 |
| | | | € | *429,57* |

## 3221 5 PCS

5 CRUZ

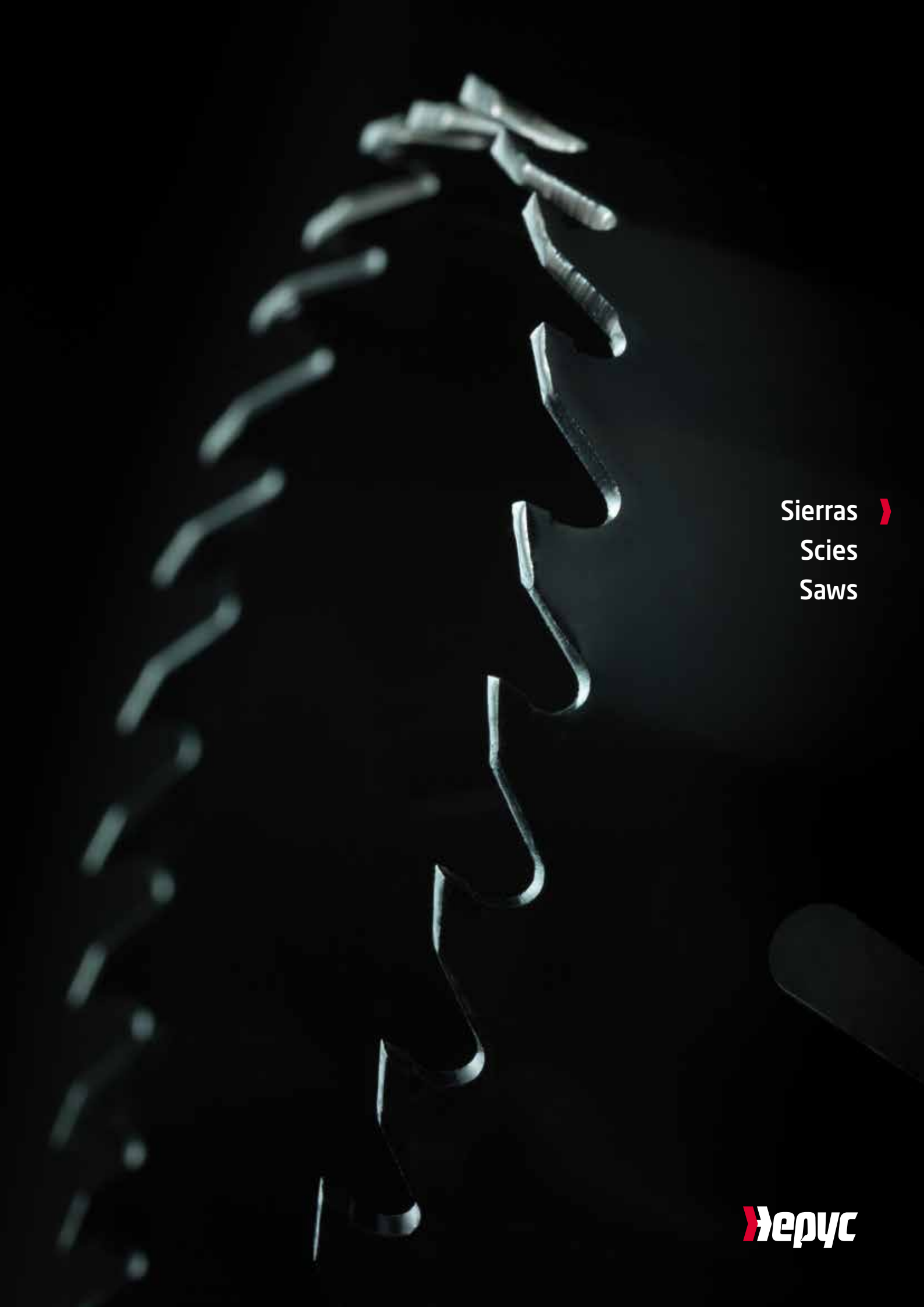
| Ref. | Ø mm | d mm | L mm | l mm |
|---|---|---|---|---|
| 3201 | 12,00 | 6 | 70 | 25 |
| 3203 | 12,00 | 6 | 70 | 25 |
| 3207 | 12,00 | 6 | 70 | 25 |
| 3211 | 12,00 | 6 | 75 | 30 |
| 3206 | 12,00 | 6 | 75 | 30 |
| | | | € | *258,26* |

## 7168 7 PCS — L = 25 — 7

| Ref. | Ø mm | d mm | L mm | Pcs. |
|---|---|---|---|---|
| 7137 | 12 | 19 | 25 | 1 |
| 7137 | 14 | 19 | 25 | 1 |
| 7137 | 16 | 19 | 25 | 1 |
| 7137 | 18 | 19 | 25 | 1 |
| 7137 | 20 | 19 | 25 | 1 |
| 7137 | 22 | 19 | 25 | 1 |
| 7141 | 6,35 | | 77 | 1 |
| | | | € | *415,96* |

## 7169 7 PCS — L = 50 — 7

| Ref. | Ø mm | d mm | L mm | Pcs. |
|---|---|---|---|---|
| 7137 | 12 | 19 | 50 | 1 |
| 7137 | 14 | 19 | 50 | 1 |
| 7137 | 16 | 19 | 50 | 1 |
| 7137 | 18 | 19 | 50 | 1 |
| 7137 | 20 | 19 | 50 | 1 |
| 7137 | 22 | 19 | 50 | 1 |
| 7141 | 6,35 | | 102 | 1 |
| | | | € | *536,79* |



# Sierras
# Scies
# Saws

Hepyc

# ÍNDICE
# SOMMAIRE / INDEX

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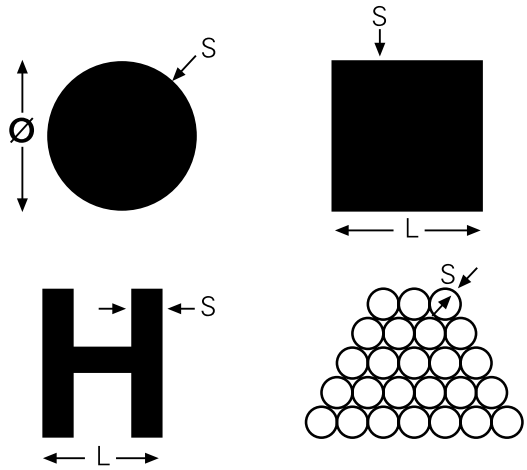
| | | | | | |
|---|---|---|---|---|---|
| **Hojas sierra cinta / Lames de scie à ruban / Band saw blades** | | | | | |
| 7202-7213 | M42- CONSTANTE | | 68-69 HRC · M42 (8% CO) · CR · CP | P M K N | 424 |
| 7301-7314 | M42- VARIABLE | | 68-69 HRC · M42 (8% CO) · VR · VP | P M K N | 425 |
| 7321-7324 | M51- VARIABLE | | 68-69 HRC · M51 (10% CO) · VP · 10° | P M K N | 426 |
| **Sierras Circulares / Scies Circulaires / Circular Saw** | | | | | |
| 7801 | HSS DIN1837 N | | ISO 2296 · Form. A · Tol. Ø (j15) d (H7) · Tol. l (j11) D1 (j18) | P K N | 427 |
| 7802 | HSS DIN1838 N | | ISO 2296 · Form. B · Tol. Ø (j15) d (H7) · Tol. l (j11) D1 (j18) | P K N | 428 |
| **Hojas sierra de máquina / Lames de scie pour machine / Machine saw blades** | | | | | |
| 7401 | HSS DC | | M2 · DC · 0° | P M K | 429 |




P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

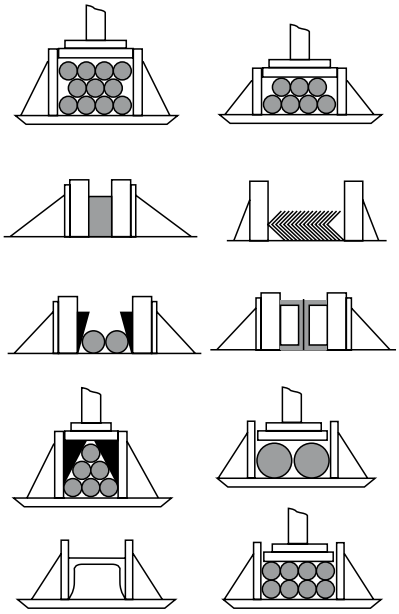
## Dentado y amarre del material / Denture et fixation du matériel / Toothing and securing of material

**> Selección del correcto dentado para el corte de tubos y perfiles.**
Choix de la denture appropriée pour la coupe de tubes et de profilés.
Select correct toothing to cut tubes and beams.

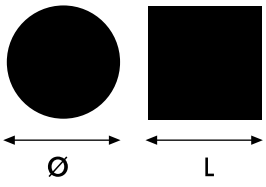



| S mm | ØL mm | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20 | 40 | 60 | 80 | 100 | 120 | 150 | 200 | 300 | 400 | 500 |
| 2 | 14 | 14 | 14 | 14 | 10/14 | 10/14 | 10/14 | 10/14 | 10/14 | 8/12 | 8/12 |
| 3 | | | | 10/14 | | | | | 6/10 | | |
| 4 | | | 10/14 | | | | 6/10 | 6/10 | | 6/10 | 6/10 |
| 5 | | 10/14 | | | 6/10 | 6/10 | | | 4/6 | 4/6 | 4/6 |
| 6 | 10/14 | | 8/12 | 6/10 | | | 5/8 | 4/6 | | | |
| 7 | | 8/12 | | | 5/8 | 5/8 | | | | | 3/4 |
| 8 | | | 6/10 | | | | 4/6 | | 3/4 | 3/4 | |
| 10 | | 6/10 | | 5/8 | 4/6 | 4/6 | | 3/4 | | | |
| 12 | | | 5/8 | | | | 3/4 | | | | 2/3 |
| 15 | | | | 4/6 | 3/4 | 3/4 | | | | | |
| 20 | | | | | | | 2/3 | 2/3 | 2/3 | 2/3 | |
| 30 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |

**> Selección correcta de amarre de material.**
Choix du type de fixation du matériel approprié.
Correct selection to secure material.



**> Para el corte de secciones macizas.**
Pour la coupe de sections massives.
For cutting solid sections.




| Ø L (mm) | tpi |
|---|---|
| < 20 | 10/14 ó 8/12 |
| 20 - 40 | 6/10 ó 6 |
| 40 - 70 | 6 ó 4/6 |
| 70 - 140 | 4 ó 3/4 |
| 140 - 200 | 3/4 ó 3 |
| 200 - 400 | 3 ó 2/3 |
| > 400 | 1/2 ó 1,25 |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Ref./ Réf. / Ref. | 7202-7213 | | | | |
| | | | | | | Diente/ Dent/ Teech | Constante/ Constant | | | | |
| | | | | | | Mat. | M42 | | | | |
| | | | | | | Pag. | 424 | 424 | 424 | 424 | 424 |
| | Z | 10/14 | 8/12-6/10 | 5/8-4/6 | 4/6-3/4 | 3/4-2/3 | 10/14 | 8/12-6/10 | 5/8-4/6 | 4/6-3/4 | 3/4-2/3 |
| | Ø/L | 0-13mm | 13-25mm | 25-75mm | 75-150mm | >150mm | 0-13mm | 13-25mm | 25-75mm | 75-150mm | >150mm |
| Mat. | | Avance/Feed (cm2/min) | | | | | Vc (m/min) | | | | |
| P.1 | <600 | 55-75 | 60-80 | 70-90 | 77-100 | 77-100 | o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 |
| P.2 | <800 | 42-52 | 45-55 | 50-65 | 55-70 | 55-70 | o 75-100 | o 70-95 | o 65-90 | o 60-80 | o 55-70 |
| P.3 | <1000 | 30-39 | 32-42 | 35-45 | 40-52 | 40-52 | o 55-75 | o 50-70 | o 45-65 | o 40-60 | o 35-55 |
| P.4 | <1200 | 9-17 | 10-17 | 10-20 | 12-22 | 12-22 | o 32-50 | o 30-47 | o 28-45 | o 25-40 | o 22-35 |
| P.5 | <1400 | 5-13 | 5-14 | 5-15 | 6-17 | 6-17 | | | | | |
| M.1 | <950 | 14-28 | 15-30 | 17-35 | 19-38 | 19-38 | o 27-50 | o 25-47 | o 22-45 | o 20-40 | o 18-35 |
| M.2 | | 14-28 | 15-30 | 17-35 | 19-38 | 19-38 | o 27-50 | o 25-47 | o 22-45 | o 20-40 | o 18-35 |
| M.3 | <1200 | 5-14 | 5-15 | 5-17 | 6-19 | 6-19 | | | | | |
| M.4 | | 5-14 | 5-15 | 5-17 | 6-19 | 6-19 | | | | | |
| K.1 | <500 | 26-33 | 28-36 | 30-40 | 35-45 | 35-45 | o 60-85 | o 57-82 | o 55-80 | o 50-70 | o 45-60 |
| K.2 | | 26-33 | 28-36 | 30-40 | 35-45 | 35-45 | o 60-85 | o 57-82 | o 55-80 | o 50-70 | o 45-60 |
| K.3 | <800 | 30-37 | 32-43 | 35-45 | 40-50 | 40-50 | o 50-80 | o 47-70 | o 45-65 | o 40-60 | o 35-55 |
| K.4.1 | | 30-37 | 32-43 | 35-45 | 40-50 | 40-50 | o 50-80 | o 47-70 | o 45-65 | o 40-60 | o 35-55 |
| K.4.2 | <1400 | 11-18 | 12-20 | 13-22 | 15-25 | 15-25 | | | | | |
| N.1.1 | Al | 90-110 | 95-120 | 110-135 | 120-150 | 120-150 | ● 175-230 | ● 170-225 | ● 165-220 | ● 150-200 | ● 135-180 |
| N.1.2 | | 90-110 | 95-120 | 110-135 | 120-150 | 120-150 | ● 120-175 | ● 115-170 | ● 110-165 | ● 100-150 | ● 90-135 |
| N.1.3 | | 52-90 | 55-95 | 75-110 | 70-120 | 70-120 | ● 100-120 | ● 95-115 | ● 90-110 | ● 80-100 | ● 70-90 |
| N.2.1 | Cu | 90-105 | 95-112 | 110-125 | 120-140 | 120-140 | ● 120-145 | ● 115-140 | ● 110-135 | ● 100-120 | ● 90-115 |
| N.2.2 | | 75-83 | 80-88 | 90-100 | 100-110 | 100-110 | ● 100-120 | ● 95-115 | ● 90-110 | ● 80-100 | ● 70-90 |
| N.2.3 | | 50-60 | 52-65 | 60-70 | 65-80 | 65-80 | o 75-100 | o 70-95 | o 65-90 | o 60-80 | o 55-70 |
| N.2.4 | | 15-26 | 16-28 | 18-30 | 20-35 | 20-35 | o 40-60 | o 37-57 | o 35-55 | o 30-50 | o 25-45 |
| N.3.1 | Mg/Zn | 42-52 | 45-55 | 50-60 | 55-70 | 55-70 | ● 75-105 | ● 70-100 | ● 65-95 | ● 60-90 | ● 55-80 |
| N.4.1 | Plastic | 90-110 | 95-120 | 110-135 | 120-150 | 120-150 | ● 120-175 | ● 115-170 | ● 110-165 | ● 100-150 | ● 90-135 |
| N.4.2 | | 52-90 | 55-95 | 75-110 | 70-120 | 70-120 | ● 100-120 | ● 95-115 | ● 90-110 | ● 80-100 | ● 70-90 |
| N.4.3 | | | | | | | | | | | |
| S.1.1 | Ni | 4-15 | 5-16 | 5-18 | 6-20 | 6-20 | | | | | |
| S.1.2 | | 4-7 | 5-8 | 5-9 | 6-10 | 6-10 | | | | | |
| S.2.1 | Ti | 4-7 | 5-8 | 5-9 | 6-10 | 6-10 | | | | | |
| S.2.2 | | 4-7 | 5-8 | 5-9 | 6-10 | 6-10 | | | | | |
| S.2.3 | | 4-7 | 5-8 | 5-9 | 6-10 | 6-10 | | | | | |
| H.1 | 50 HRC | | | | | | | | | | |
| H.2 | 55 HRC | | | | | | | | | | |
| H.3 | 60 HRC | | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

P Aceros Aciers Steels
M Aceros Inox Aciers Inox Stainless Steels
K Fundicion Fonte Cast Iron
N Metales no ferrosos Métal non Ferraux Non Ferrous metals
S Titanio y Superaleaciones Titanium et Supealliages Titanium and Superalloys
H Materiales Duros Materiels Durs Hard materials

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **7301-7314** | | | | | **7321-7324** | | | | |
| **Variable** | | | | | **Variable** | | | | |
| **M42** | | | | | **M51** | | | | |
| **425** | **425** | **425** | **425** | **425** | **426** | **426** | **426** | **426** | **426** |
| **10/14** | **8/12-6/10** | **5/8-4/6** | **4/6-3/4** | **3/4-2/3** | **10/14** | **8/12-6/10** | **5/8-4/6** | **4/6-3/4** | **3/4-2/3** |
| **0-13mm** | **13-25mm** | **25-75mm** | **75-150mm** | **150->mm** | **0-13mm** | **13-25mm** | **25-75mm** | **75-150mm** | **>150mm** |
| **Vc (m/min)** | | | | | | | | | |
| ● 100-120 | ● 95-115 | ● 90-110 | ● 80-100 | ● 70-90 | o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 |
| ● 75-100 | ● 70-95 | ● 65-90 | ● 60-80 | ● 55-70 | o 75-100 | o 70-95 | o 65-90 | o 60-80 | o 55-70 |
| ● 55-75 | ● 50-70 | ● 45-65 | ● 40-60 | ● 35-55 | ● 55-75 | ● 50-70 | ● 45-65 | ● 40-60 | ● 35-55 |
| o 32-50 | o 30-47 | o 28-45 | o 25-40 | o 22-35 | ● 32-50 | ● 30-47 | ● 28-45 | ● 25-40 | ● 22-35 |
| | | | | | ● 20-32 | ● 18-30 | ● 17-28 | ● 15-25 | ● 13-22 |
| ● 27-50 | ● 25-47 | ● 22-45 | ● 20-40 | ● 18-35 | ● 27-50 | ● 25-47 | ● 22-45 | ● 20-40 | ● 18-35 |
| ● 27-50 | ● 25-47 | ● 22-45 | ● 20-40 | ● 18-35 | ● 27-50 | ● 25-47 | ● 22-45 | ● 20-40 | ● 18-35 |
| o 18-30 | o 18-30 | o 17-28 | o 15-25 | o 13-22 | ● 18-30 | ● 18-30 | ● 17-28 | ● 15-25 | ● 13-22 |
| o 18-30 | o 18-30 | o 17-28 | o 15-25 | o 13-22 | ● 18-30 | ● 18-30 | ● 17-28 | ● 15-25 | ● 13-22 |
| o 60-85 | o 57-82 | o 55-80 | o 50-70 | o 45-60 | ● 60-85 | ● 57-82 | ● 55-80 | ● 50-70 | ● 45-60 |
| o 60-85 | o 57-82 | o 55-80 | o 50-70 | o 45-60 | ● 60-85 | ● 57-82 | ● 55-80 | ● 50-70 | ● 45-60 |
| o 50-80 | o 47-70 | o 45-65 | o 40-60 | o 35-55 | ● 50-80 | ● 47-70 | ● 45-65 | ● 40-60 | ● 35-55 |
| o 50-80 | o 47-70 | o 45-65 | o 40-60 | o 35-55 | ● 50-80 | ● 47-70 | ● 45-65 | ● 40-60 | ● 35-55 |
| | | | | | ● 32-50 | ● 30-47 | ● 28-45 | ● 25-40 | ● 22-35 |
| o 175-230 | o 170-225 | o 165-220 | o 150-200 | o 135-180 | o 175-230 | o 170-225 | o 165-220 | o 150-200 | o 135-180 |
| o 120-175 | o 115-170 | o 110-165 | o 100-150 | o 90-135 | o 120-175 | o 115-170 | o 110-165 | o 100-150 | o 90-135 |
| o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 | o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 |
| o 120-145 | o 115-140 | o 110-135 | o 100-120 | o 90-115 | o 120-145 | o 115-140 | o 110-135 | o 100-120 | o 90-115 |
| o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 | o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 |
| ● 75-100 | ● 70-95 | ● 65-90 | ● 60-80 | ● 55-70 | o 75-100 | o 70-95 | o 65-90 | o 60-80 | o 55-70 |
| ● 40-60 | ● 37-57 | ● 35-55 | ● 30-50 | ● 25-45 | ● 40-60 | ● 37-57 | ● 35-55 | ● 30-50 | ● 25-45 |
| o 75-105 | o 70-100 | o 65-95 | o 60-90 | o 55-80 | o 75-105 | o 70-100 | o 65-95 | o 60-90 | o 55-80 |
| o 120-175 | o 115-170 | o 110-165 | o 100-150 | o 90-135 | o 120-175 | o 115-170 | o 110-165 | o 100-150 | o 90-135 |
| o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 | o 100-120 | o 95-115 | o 90-110 | o 80-100 | o 70-90 |
| | | | | | | | | | |
| | | | | | ● 25-30 | ● 25-30 | ● 22-28 | ● 20-25 | ● 18-22 |
| | | | | | ● 18-25 | ● 18-25 | ● 17-22 | ● 15-20 | ● 13-18 |
| | | | | | ● 25-47 | ● 25-47 | ● 22-45 | ● 20-40 | ● 18-35 |
| | | | | | ● 25-30 | ● 25-30 | ● 22-28 | ● 20-25 | ● 18-22 |
| | | | | | ● 18-25 | ● 18-25 | ● 17-22 | ● 15-20 | ● 13-18 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

● Optima / Optimun ○ Alternativo / Alternative

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P | Aceros<br>Aciers<br>Steels | M | Aceros Inox<br>Aciers Inox<br>Stainless Steels | K | Fundicion<br>Fonte<br>Cast Iron | N | Metales no ferrosos<br>Métal non Ferraux<br>Non Ferrous metals | S | Titanio y Superaleaciones<br>Titanium et Supealliages<br>Titanium and Superalloys | H | Materiales Duros<br>Materiels Durs<br>Hard materials |

# TABLA DE APLICACIONES
# GUIDE D'APPLICATION / APPLICATION GUIDE

| | | Ref./ Réf. / Ref. | 7801 | 7802 |
|---|---|---|---|---|
| | | Z | 32-200 | 24-100 |
| | | Ejec./Exéc./Exec. | N | N |
| | | Hel./Hel./Spiral | | |
| | | Mat. | HSS | HSS |
| | | Rec./Rev./Coat. | | |
| | | DIN | 1837-A | 1838-B |
| | | Gama/Gamme/Range | 20-315 | 50-315 |
| | | Pag. | 427 | 428 |
| Mat. | | fz mm | Vc (m/min) | |
| P.1 | <600 | 0,03-0,06 | ● 25-50 | ● 25-50 |
| P.2 | <800 | 0,03-0,04 | ● 15-30 | ● 15-30 |
| P.3 | <1000 | 0,02-0,03 | ● 10-20 | ● 10-20 |
| P.4 | <1200 | 0,01-0,03 | ○ 5-10 | ○ 5-10 |
| P.5 | <1400 | | | |
| M.1 | <950 | 0,01-0,03 | ○ 10-20 | ○ 10-20 |
| M.2 | | 0,01-0,03 | ○ 10-20 | ○ 10-20 |
| M.3 | <1200 | 0,01-0,03 | ○ 5-10 | ○ 5-10 |
| M.4 | | 0,01-0,03 | ○ 5-10 | ○ 5-10 |
| K.1 | <500 | 0,04-0,05 | ● 15-30 | ● 15-30 |
| K.2 | | 0,04-0,05 | ● 15-30 | ● 15-30 |
| K.3 | <800 | 0,03-0,04 | ○ 10-20 | ○ 10-20 |
| K.4.1 | | 0,03-0,04 | ○ 10-20 | ○ 10-20 |
| K.4.2 | <1400 | | | |
| N.1.1 | Al | 0,04-0,09 | ● 1000-2000 | ● 1000-2000 |
| N.1.2 | | 0,03-0,06 | ● 500-1000 | ● 500-1000 |
| N.1.3 | | 0,03-0,04 | ● 120-200 | ● 120-200 |
| N.2.1 | Cu | 0,04-0,06 | ● 100-400 | ● 100-400 |
| N.2.2 | | 0,04-0,06 | ● 100-400 | ● 100-400 |
| N.2.3 | | 0,04-0,06 | ● 40-120 | ● 40-120 |
| N.2.4 | | 0,01-0,03 | ○ 10-20 | ○ 10-20 |
| N.3.1 | Mg/Zn | 0,04-0,06 | ○ 40-120 | ○ 40-120 |
| N.4.1 | Plastic | 0,04-0,09 | ○ 500-1000 | ○ 500-1000 |
| N.4.2 | | 0,04-0,09 | ○ 500-1000 | ○ 500-1000 |
| N.4.3 | | | | |
| S.1.1 | Ni | 0,03-0,04 | ○ 20-30 | ○ 20-30 |
| S.1.2 | | | | |
| S.2.1 | Ti | 0,01-0,03 | ○ 10-20 | ○ 10-20 |
| S.2.2 | | 0,03-0,04 | ○ 10-20 | ○ 10-20 |
| S.2.3 | | | | |
| H.1 | 50 HRC | | | |
| H.2 | 55 HRC | | | |
| H.3 | 60 HRC | | | |

● Optima / Optimun ○ Alternativo / Alternative

P Aceros / Aciers / Steels

M Aceros Inox / Aciers Inox / Stainless Steels

K Fundicion / Fonte / Cast Iron

N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals

S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys

H Materiales Duros / Materiels Durs / Hard materials

# 7202-7213 M42 Dentado constante
## M42 Denture constant / M42 Constant tooth

68-69 HRC | M42 (8% CO) | CR 0° | CP 10°

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ○ 55-120 | ○ 35-75 | ○ 22-50 | | ○ 18-50 | | ○ 45-85 | ○ 35-80 | | ● 70-230 | ● 25-45 | ● 55-105 | ● 70-175 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| Ref. | A mm | e mm | t.p.i. 1,25 | 2 | 3 | 4 | 6 | 8 | 10 | 14 | 18 | € m | € soldadura soudure welding |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *7202 | 6,00 | 0,90 | | | | CP | CP | | CR | CR | | *17,68* | *10,05* |
| *7204 | 10,00 | 0,90 | | | | CP | CP | | CR | CR | | *17,68* | *10,05* |
| 7205 | 13,00 | 0,65 | | | | | CP | | CR | CR | CR | *16,24* | *10,05* |
| 7206 | 13,00 | 0,90 | | | CP | CP | CP | | CR | CR | | *16,24* | *10,05* |
| 7207 | 20,00 | 0,90 | | | CP | CP | CR | CR | CR | CR | | *18,57* | *10,05* |
| 7208 | 27,00 | 0,90 | | CP | CP | CP-CR | CR | CR | CR | CR | | *19,11* | *10,05* |
| 7209 | 34,00 | 1,10 | CP | CP | CP | CR | | | | | | *26,55* | *13,22* |
| 7210 | 41,00 | 1,30 | CP | CP | CP | | | | | | | *33,21* | *16,70* |
| 7212 | 54,00 | 1,60 | CP | | | | | | | | | *48,65* | *28,12* |
| 7213 | 67,00 | 1,60 | CP | | | | | | | | | *82,87* | *51,86* |

*** Se vende sólo en rollos de 30 m.**
Vendu uniquement en rouleaux de 30 m.
Only sold in 30 m rolls.

| Axe mm | L | € | | Axe mm | L | € | | Axe mm | L | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13x0,65 | 1.138 | *28,53* | 3 | | 2.550 | *57,41* | 1 | | 4.870 | *103,09* | 1 |
| | 1.140 | *28,56* | 3 | 27x0,90 | 2.000 | *48,26* | 1 | | 5.000 | *105,58* | 1 |
| | 1.300 | *31,15* | 3 | | 2.060 | *49,40* | 1 | 34x1,10 | 3.180 | *97,68* | 1 |
| | 1.325 | *31,56* | 3 | | 2.070 | *49,59* | 1 | | 3.420 | *104,06* | 1 |
| | 1.330 | *31,65* | 3 | | 2.080 | *49,78* | 1 | | 3.505 | *106,31* | 1 |
| | 1.440 | *33,43* | 3 | | 2.150 | *51,12* | 1 | | 3.660 | *110,43* | 1 |
| | 1.470 | *33,92* | 3 | | 2.352 | *54,98* | 1 | | 3.720 | *112,02* | 1 |
| | 1.638 | *36,65* | 3 | | 2.360 | *55,14* | 1 | | 3.800 | *114,15* | 1 |
| | 1.640 | *36,68* | 3 | | 2.370 | *55,32* | 1 | | 4.100 | *122,12* | 1 |
| | 1.735 | *38,22* | 3 | | 2.420 | *56,28* | 1 | | 4.115 | *122,51* | 1 |
| | 1.750 | *38,46* | 3 | | 2.450 | *56,86* | 1 | | 4.520 | *133,27* | 1 |
| | 2.000 | *42,53* | 3 | | 2.460 | *57,05* | 1 | | 4.570 | *134,60* | 1 |
| 13x0,90 | 1.140 | *28,56* | 3 | | 2.480 | *57,42* | 1 | | 4.640 | *136,46* | 1 |
| | 1.325 | *31,56* | 3 | | 2.500 | *57,81* | 1 | | 4.800 | *140,70* | 1 |
| | 1.330 | *31,65* | 3 | | 2.550 | *58,77* | 1 | | 4.860 | *142,30* | 1 |
| | 1.638 | *36,65* | 3 | | 2.600 | *59,72* | 1 | | 4.990 | *145,75* | 1 |
| | 1.640 | *36,68* | 3 | | 2.650 | *60,68* | 1 | | 5.270 | *153,18* | 1 |
| | 1.735 | *38,22* | 3 | | 2.700 | *61,64* | 1 | | 5.300 | *153,98* | 1 |
| | 1.750 | *38,46* | 3 | | 2.750 | *62,59* | 1 | | 5.550 | *160,62* | 1 |
| | 2.000 | *42,53* | 3 | | 2.755 | *62,69* | 1 | | 5.620 | *162,48* | 1 |
| 20x0,90 | 2.000 | *47,20* | 1 | | 2.765 | *62,87* | 1 | | 5.800 | *167,27* | 1 |
| | 2.060 | *48,31* | 1 | | 2.825 | *64,02* | 1 | | 6.000 | *172,58* | 1 |
| | 2.070 | *48,50* | 1 | | 2.835 | *64,21* | 1 | 41x1,30 | 4.100 | *152,84* | 1 |
| | 2.080 | *48,69* | 1 | | 2.845 | *64,40* | 1 | | 4.520 | *166,79* | 1 |
| | 2.090 | *48,87* | 1 | | 2.850 | *64,50* | 1 | | 4.570 | *168,45* | 1 |
| | 2.100 | *49,06* | 1 | | 2.895 | *65,35* | 1 | | 5.300 | *192,69* | 1 |
| | 2.110 | *49,25* | 1 | | 2.945 | *66,31* | 1 | | 5.500 | *199,33* | 1 |
| | 2.115 | *49,34* | 1 | | 2.950 | *66,41* | 1 | | 5.550 | *200,99* | 1 |
| | 2.120 | *49,42* | 1 | | 2.960 | *66,60* | 1 | | 5.800 | *209,30* | 1 |
| | 2.140 | *49,80* | 1 | | 3.010 | *67,56* | 1 | | 6.000 | *215,93* | 1 |
| | 2.265 | *52,12* | 1 | | 3.100 | *69,27* | 1 | | 6.200 | *222,58* | 1 |
| | 2.360 | *53,89* | 1 | | 3.180 | *70,80* | 1 | | 6.300 | *225,90* | 1 |
| | 2.362 | *53,93* | 1 | | 3.420 | *75,39* | 1 | | 6.600 | *235,86* | 1 |
| | 2.370 | *54,08* | 1 | | 3.505 | *77,01* | 1 | | 6.700 | *239,18* | 1 |
| | 2.375 | *54,17* | 1 | | 3.660 | *79,97* | 1 | | 6.900 | *245,83* | 1 |
| | 2.400 | *54,63* | 1 | | 3.800 | *82,65* | 1 | | 7.000 | *249,14* | 1 |
| | 2.465 | *55,84* | 1 | | 4.100 | *88,38* | 1 | 6x0,90 | 30 M | *530,52* | 1 |
| | 2.520 | *56,86* | 1 | | 4.250 | *91,25* | 1 | 10x0,90 | 30 M | *530,52* | 1 |
| | 2.530 | *57,05* | 1 | | 4.570 | *97,36* | 1 | | | | |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

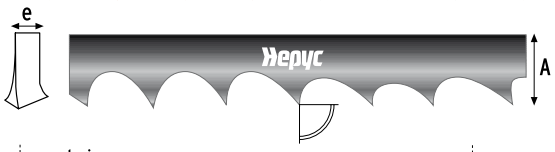
# 7301-7314 M42 Dentado variable

## M42 Denture variable / M42 Variable tooth

68-69 HRC | M42 (8% CO) | VR 0° | VP 10°

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ● | ○ | ○ | ○ | | ○ | ● | ○ | ○ | | | | | |
| 55-120 | 35-75 | 22-50 | | 18-50 | 13-30 | 45-85 | 35-80 | | 70-230 | 25-45 | 55-105 | 70-175 | | | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ref. | A mm | e mm | t.p.i. 0,75/1,25 | 1,10/1,40 | 1,40/2 | 2/3 | 3/4 | 4/6 | 5/8 | 6/10 | 8/12 | 10/14 | € m | € soldadura soudure welding |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7302* | 6,00 | 0,90 | | | | | | | | | | VR | *17,68* | *10,05* |
| 7304* | 10,00 | 0,90 | | | | | | | | | | VR | *17,68* | *10,05* |
| 7305 | 13,00 | 0,65 | | | | | | | | VR | VR | VR | *16,24* | *10,05* |
| 7306 | 13,00 | 0,90 | | | | | | | | VR | VR | VR | *16,24* | *10,05* |
| 7307 | 20,00 | 0,90 | | | | | | VP-VR | VR | VR | VR | VR | *18,57* | *10,05* |
| 7308 | 27,00 | 0,90 | | | | VP | VP-VR | VP-VR | VP-VR | VR | VR | VR | *19,11* | *10,05* |
| 7309 | 34,00 | 1,10 | | | | VP | VP-VR | VP-VR | VP-VR | VR | VR | | *26,58* | *13,22* |
| 7310 | 41,00 | 1,30 | | | VP | VP | VP-VR | VP-VR | VP-VR | | | | *33,21* | *16,70* |
| 7311 | 54,00 | 1,30 | | | VP | VP | VP-VR | VP-VR | | | | | *48,65* | *28,12* |
| 7312 | 54,00 | 1,60 | VP | VP | VP | VP | VP | | | | | | *48,65* | *28,12* |
| 7313 | 67,00 | 1,60 | VP | VP | VP | VP | | | | | | | *82,87* | *51,86* |
| 7314 | 80,00 | 1,60 | VP | | | | | | | | | | *97,00* | *86,46* |

*** Se vende sólo en rollos de 30 m.**
Vendu uniquement en rouleaux de 30 m.
Only sold in 30 m rolls.

| Axe mm | L | € | | Axe mm | L | € | | Axe mm | L | € | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13x0,65 | 1.138 | *28,53* | 3 | | 2.550 | *57,41* | 1 | | 4.870 | *103,09* | 1 |
| | 1.140 | *28,56* | 3 | 27x0,90 | 2.000 | *48,26* | 1 | | 5.000 | *105,58* | 1 |
| | 1.300 | *31,15* | 3 | | 2.060 | *49,40* | 1 | 34x1,10 | 3.180 | *97,71* | 1 |
| | 1.325 | *31,56* | 3 | | 2.070 | *49,59* | 1 | | 3.420 | *104,09* | 1 |
| | 1.330 | *31,65* | 3 | | 2.080 | *49,78* | 1 | | 3.505 | *106,34* | 1 |
| | 1.440 | *33,43* | 3 | | 2.150 | *51,12* | 1 | | 3.660 | *110,47* | 1 |
| | 1.470 | *33,92* | 3 | | 2.352 | *54,98* | 1 | | 3.720 | *112,06* | 1 |
| | 1.638 | *36,65* | 3 | | 2.360 | *55,14* | 1 | | 3.800 | *114,19* | 1 |
| | 1.640 | *36,68* | 3 | | 2.370 | *55,32* | 1 | | 4.100 | *122,16* | 1 |
| | 1.735 | *38,22* | 3 | | 2.420 | *56,28* | 1 | | 4.115 | *122,56* | 1 |
| | 1.750 | *38,46* | 3 | | 2.450 | *56,86* | 1 | | 4.520 | *133,32* | 1 |
| | 2.000 | *42,53* | 3 | | 2.460 | *57,05* | 1 | | 4.570 | *134,64* | 1 |
| 13x0,90 | 1.140 | *28,56* | 3 | | 2.480 | *57,42* | 1 | | 4.640 | *136,50* | 1 |
| | 1.325 | *31,56* | 3 | | 2.500 | *57,81* | 1 | | 4.800 | *140,75* | 1 |
| | 1.330 | *31,65* | 3 | | 2.550 | *58,77* | 1 | | 4.860 | *142,35* | 1 |
| | 1.638 | *36,65* | 3 | | 2.600 | *59,72* | 1 | | 4.990 | *145,80* | 1 |
| | 1.640 | *36,68* | 3 | | 2.650 | *60,68* | 1 | | 5.270 | *153,25* | 1 |
| | 1.735 | *38,22* | 3 | | 2.700 | *61,64* | 1 | | 5.300 | *154,05* | 1 |
| | 1.750 | *38,46* | 3 | | 2.750 | *62,59* | 1 | | 5.550 | *160,68* | 1 |
| | 2.000 | *42,53* | 3 | | 2.755 | *62,69* | 1 | | 5.620 | *162,54* | 1 |
| 20x0,90 | 2.000 | *47,20* | 1 | | 2.765 | *62,87* | 1 | | 5.800 | *167,33* | 1 |
| | 2.060 | *48,31* | 1 | | 2.825 | *64,02* | 1 | | 6.000 | *172,64* | 1 |
| | 2.070 | *48,50* | 1 | | 2.835 | *64,21* | 1 | 41x1,30 | 4.100 | *152,84* | 1 |
| | 2.080 | *48,69* | 1 | | 2.845 | *64,40* | 1 | | 4.520 | *166,79* | 1 |
| | 2.090 | *48,87* | 1 | | 2.850 | *64,50* | 1 | | 4.570 | *168,45* | 1 |
| | 2.100 | *49,06* | 1 | | 2.895 | *65,35* | 1 | | 5.300 | *192,69* | 1 |
| | 2.110 | *49,25* | 1 | | 2.945 | *66,31* | 1 | | 5.500 | *199,33* | 1 |
| | 2.115 | *49,34* | 1 | | 2.950 | *66,41* | 1 | | 5.550 | *200,99* | 1 |
| | 2.120 | *49,42* | 1 | | 2.960 | *66,60* | 1 | | 5.800 | *209,30* | 1 |
| | 2.140 | *49,80* | 1 | | 3.010 | *67,56* | 1 | | 6.000 | *215,93* | 1 |
| | 2.265 | *52,12* | 1 | | 3.100 | *69,27* | 1 | | 6.200 | *222,58* | 1 |
| | 2.360 | *53,89* | 1 | | 3.180 | *70,80* | 1 | | 6.300 | *225,90* | 1 |
| | 2.362 | *53,93* | 1 | | 3.420 | *75,39* | 1 | | 6.600 | *235,86* | 1 |
| | 2.370 | *54,08* | 1 | | 3.505 | *77,01* | 1 | | 6.700 | *239,18* | 1 |
| | 2.375 | *54,17* | 1 | | 3.660 | *79,97* | 1 | | 6.900 | *245,83* | 1 |
| | 2.400 | *54,63* | 1 | | 3.800 | *82,65* | 1 | | 7.000 | *249,14* | 1 |
| | 2.465 | *55,84* | 1 | | 4.100 | *88,38* | 1 | 6x0,90 | 30 M | *530,52* | 1 |
| | 2.520 | *56,86* | 1 | | 4.250 | *91,25* | 1 | 10x0,90 | 30 M | *530,52* | 1 |
| | 2.530 | *57,05* | 1 | | 4.570 | *97,36* | 1 | | | | |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

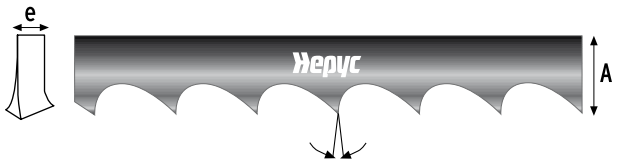
# 7321-7324 M51 Dentado variable

## M42 Denture variable / M42 Variable tooth

VP 10° | 68-69 HRC | M51 (10% CO)

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ● | ● | ● | ● | ● | ● | ● | ○ | ● | ○ | ○ | ● | ● | | | |
| 55-120 | 35-75 | 22-50 | 13-32 | 18-50 | 13-30 | 45-85 | 35-80 | 22-50 | 70-230 | 25-45 | 55-105 | 70-175 | 13-30 | 13-47 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative




| Ref. | A mm | e mm | t.p.i. 0,75/1,25 | 1,5/2 | 2/3 | 3/4 | 4/6 | € m | € soldadura soudure welding |
|---|---|---|---|---|---|---|---|---|---|
| 7321 | 27,00 | 0,90 | | | VP | VP | VP | *36,17* | *86,46* |
| 7322 | 34,00 | 1,10 | | | VP | VP | VP | *37,03* | *86,46* |
| 7323 | 41,00 | 1,30 | | VP | VP | VP | VP | *45,24* | *86,46* |
| 7324 | 54,00 | 1,60 | VP | VP | VP | VP | | *80,28* | *86,46* |

| Axe mm | L | € | |
|---|---|---|---|
| 27x0,90 | 2.000 | *84,01* | 1 |
| | 2.060 | *86,18* | 1 |
| | 2.070 | *86,54* | 1 |
| | 2.080 | *86,91* | 1 |
| | 2.150 | *89,44* | 1 |
| | 2.352 | *96,75* | 1 |
| | 2.370 | *97,40* | 1 |
| | 2.360 | *97,03* | 1 |
| | 2.420 | *99,20* | 1 |
| | 2.450 | *100,29* | 1 |
| | 2.460 | *100,65* | 1 |
| | 2.480 | *101,38* | 1 |
| | 2.500 | *102,10* | 1 |
| | 2.550 | *103,91* | 1 |
| | 2.600 | *105,71* | 1 |
| | 2.650 | *107,52* | 1 |
| | 2.700 | *109,34* | 1 |
| | 2.750 | *111,14* | 1 |
| | 2.755 | *111,32* | 1 |
| | 2.765 | *111,68* | 1 |
| | 2.825 | *113,85* | 1 |
| | 2.835 | *114,22* | 1 |
| | 2.845 | *114,58* | 1 |
| | 2.850 | *114,75* | 1 |
| | 2.895 | *116,38* | 1 |
| | 2.945 | *118,20* | 1 |
| | 2.950 | *118,38* | 1 |
| | 2.960 | *118,73* | 1 |
| | 3.010 | *120,55* | 1 |
| | 3.100 | *123,81* | 1 |
| | 3.180 | *126,69* | 1 |
| | 3.420 | *135,38* | 1 |
| | 3.505 | *138,45* | 1 |
| | 3.660 | *144,06* | 1 |
| | 3.800 | *149,12* | 1 |
| | 4.100 | *159,98* | 1 |
| | 4.250 | *165,40* | 1 |

| Axe mm | L | € | |
|---|---|---|---|
| | 4.570 | *176,98* | 1 |
| | 4.870 | *187,82* | 1 |
| | 5.000 | *192,53* | 1 |
| 34x1,10 | 3.180 | *133,09* | 1 |
| | 3.420 | *141,98* | 1 |
| | 3.505 | *145,12* | 1 |
| | 3.660 | *150,86* | 1 |
| | 3.720 | *153,09* | 1 |
| | 3.800 | *156,05* | 1 |
| | 4.100 | *167,16* | 1 |
| | 4.115 | *167,72* | 1 |
| | 4.520 | *182,71* | 1 |
| | 4.570 | *184,57* | 1 |
| | 4.640 | *187,16* | 1 |
| | 4.800 | *193,08* | 1 |
| | 4.860 | *195,30* | 1 |
| | 4.990 | *200,12* | 1 |
| | 5.270 | *210,49* | 1 |
| | 5.300 | *211,60* | 1 |
| | 5.550 | *220,86* | 1 |
| | 5.620 | *223,45* | 1 |
| | 5.800 | *230,12* | 1 |
| | 6.000 | *237,52* | 1 |
| 41x1,30 | 4.100 | *204,91* | 1 |
| | 4.520 | *223,91* | 1 |
| | 4.570 | *226,17* | 1 |
| | 5.300 | *259,20* | 1 |
| | 5.500 | *268,25* | 1 |
| | 5.550 | *270,51* | 1 |
| | 5.800 | *281,82* | 1 |
| | 6.000 | *290,87* | 1 |
| | 6.200 | *299,92* | 1 |
| | 6.300 | *304,45* | 1 |
| | 6.600 | *318,02* | 1 |
| | 6.700 | *322,55* | 1 |
| | 6.900 | *331,59* | 1 |
| | 7.000 | *336,12* | 1 |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 7801 HSS DIN 1837 N

| ISO | Form. | Tol. | Tol. |
|---|---|---|---|
| 2296 | A | Ø (j15) d (H7) | l (j11) D1 (j18) |

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● 15-50 | ● 10-20 | ○ 5-10 | | ○ 10-20 | ○ 5-10 | ● 15-30 | ○ 10-20 | | ● 120-2000 | ● 10-400 | ○ 40-120 | ● 500-1000 | ○ 20-30 | ○ 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| D mm | e mm | d mm | z | € |
|---|---|---|---|---|
| 20 | 0,20 | 5 | 80 | 16,76 |
| | 0,25 | | 64 | 16,86 |
| | 0,30 | | 64 | 15,87 |
| | 0,40 | | 64 | 15,54 |
| | 0,50 | | 48 | 15,54 |
| | 0,60 | | 48 | 14,65 |
| | 0,80 | | 48 | 15,09 |
| | 1,00 | | 40 | 15,98 |
| | 1,20 | | 40 | 16,42 |
| | 1,60 | | 40 | 17,03 |
| | 2,00 | | 32 | 18,20 |
| 25 | 0,20 | 8 | 80 | 17,31 |
| | 0,25 | | 80 | 17,31 |
| | 0,30 | | 80 | 16,42 |
| | 0,40 | | 64 | 15,26 |
| | 0,50 | | 64 | 15,54 |
| | 0,60 | | 64 | 15,71 |
| | 0,80 | | 48 | 15,71 |
| | 1,00 | | 48 | 15,87 |
| | 1,20 | | 48 | 16,42 |
| | 1,60 | | 40 | 16,86 |
| | 2,00 | | 40 | 17,31 |
| | 2,50 | | 40 | 19,26 |
| 32 | 0,20 | 8 | 100 | 16,42 |
| | 0,25 | | 100 | 14,82 |
| | 0,30 | | 80 | 13,65 |
| | 0,40 | | 80 | 13,21 |
| | 0,50 | | 80 | 13,31 |
| | 0,60 | | 64 | 13,48 |
| | 0,80 | | 64 | 13,77 |
| | 1,00 | | 64 | 14,82 |
| | 1,20 | | 48 | 14,82 |
| | 1,60 | | 48 | 15,87 |
| | 2,00 | | 48 | 17,64 |
| | 2,50 | | 40 | 20,31 |
| | 3,00 | | 40 | 22,08 |
| 40 | 0,20 | 10 | 128 | 17,03 |
| | 0,25 | | 100 | 16,15 |
| | 0,30 | | 100 | 14,37 |
| | 0,40 | | 100 | 13,92 |
| | 0,50 | | 80 | 13,92 |
| | 0,60 | | 80 | 14,09 |
| | 0,80 | | 80 | 15,09 |
| | 1,00 | | 64 | 16,42 |
| | 1,20 | | 64 | 16,42 |
| | 1,60 | | 64 | 18,20 |
| | 2,00 | | 48 | 19,58 |
| | 2,50 | | 48 | 22,69 |
| | 3,00 | | 48 | 25,02 |
| 50 | 0,25 | 13 | 128 | 19,58 |
| | 0,30 | | 128 | 15,98 |
| | 0,40 | | 100 | 15,26 |
| | 0,50 | | 100 | 15,87 |
| | 0,60 | | 100 | 15,87 |
| | 0,80 | | 80 | 21,98 |
| | 1,00 | | 80 | 21,98 |
| | 1,20 | | 80 | 21,98 |
| | 1,60 | | 64 | 21,98 |
| | 2,00 | | 64 | 21,98 |
| | 2,50 | | 64 | 24,47 |
| | 3,00 | | 48 | 27,13 |
| | 4,00 | | 48 | 32,46 |
| | 5,00 | | 48 | 36,90 |
| 63 | 0,30 | 16 | 128 | 21,47 |
| | 0,40 | | 128 | 19,43 |
| | 0,50 | | 128 | 19,58 |
| | 0,60 | | 100 | 19,58 |
| | 0,80 | | 100 | 22,03 |
| | 1,00 | | 100 | 23,86 |
| | 1,20 | | 80 | 24,02 |
| | 1,60 | | 80 | 25,19 |
| | 2,00 | | 80 | 26,80 |
| | 2,50 | | 64 | 31,29 |
| | 3,00 | | 64 | 34,51 |
| | 4,00 | | 64 | 41,61 |
| | 5,00 | | 48 | 50,11 |
| | 6,00 | | 48 | 55,87 |
| 80 | 0,50 | 22 | 128 | 24,75 |
| | 0,60 | | 128 | 25,47 |
| | 0,80 | | 128 | 28,13 |
| | 1,00 | | 100 | 27,69 |
| | 1,20 | | 100 | 28,91 |
| | 1,60 | | 100 | 31,57 |
| | 2,00 | | 80 | 33,01 |
| | 2,50 | | 80 | 38,67 |
| | 3,00 | | 80 | 44,01 |
| | 4,00 | | 64 | 53,77 |
| | 5,00 | | 64 | 65,03 |
| | 6,00 | | 64 | 74,52 |
| 100 | 0,60 | 22 | 160 | 32,46 |
| | 0,80 | | 128 | 36,02 |
| | 1,00 | | 128 | 34,85 |
| | 1,20 | | 128 | 34,85 |
| | 1,60 | | 100 | 40,45 |
| | 2,00 | | 100 | 43,11 |
| | 2,50 | | 100 | 52,00 |
| | 3,00 | | 80 | 58,54 |
| | 4,00 | | 80 | 70,08 |
| | 5,00 | | 80 | 85,79 |
| | 6,00 | | 64 | 98,54 |
| 125 | 0,80 | 22 | 160 | 52,88 |
| | 1,00 | | 160 | 56,04 |
| | 1,20 | | 128 | 56,04 |
| | 1,60 | | 128 | 57,04 |
| | 2,00 | | 128 | 60,31 |
| | 2,50 | | 100 | 70,69 |
| | 3,00 | | 100 | 80,46 |
| | 4,00 | | 100 | 97,93 |
| | 5,00 | | 80 | 117,53 |
| | 6,00 | | 80 | 132,62 |
| 160 | 1,20 | 32 | 200 | 72,19 |
| | 1,60 | | 160 | 82,56 |
| | 2,00 | | 128 | 87,28 |
| | 2,50 | | 128 | 103,26 |
| | 3,00 | | 128 | 128,46 |
| | 4,00 | | 100 | 165,80 |
| | 5,00 | | 100 | 206,69 |
| | 6,00 | | 100 | 241,09 |
| 200 | 1,60 | 32 | 160 | 123,46 |
| | 2,00 | | 160 | 132,89 |
| | 2,50 | | 160 | 155,76 |
| | 3,00 | | 128 | 192,20 |
| | 4,00 | | 128 | 258,85 |
| | 5,00 | | 128 | 320,83 |
| | 6,00 | | 100 | 372,10 |
| 250 | 2,00 | 32 | 200 | 172,89 |
| | 2,50 | | 160 | 204,92 |
| | 3,00 | | 160 | 254,13 |
| | 4,00 | | 160 | 319,05 |
| | 5,00 | | 128 | 399,96 |
| | 6,00 | | 128 | 447,95 |
| 315 | 2,50 | 40 | 200 | 325,10 |
| | 3,00 | | 200 | 378,32 |
| | 4,00 | | 160 | 474,92 |
| | 5,00 | | 160 | 588,88 |
| | 6,00 | | 160 | 681,16 |

P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 7802 HSS DIN 1838 N

| ISO | Form. | Tol. | Tol. |
|---|---|---|---|
| 2296 | B | Ø (j15) d (H7) | l (j11) D1 (j18) |

| P | | | | M | | K | | | N | | | | S | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <800 | <1.000 | <1.200 | <1.400 | <950 | <1.200 | <500 | <800 | <1.400 | Al | Cu | Mg/Zn | Plastic | Ni | Ti | 50 HRC | 55 HRC | 60 HRC |
| ● | ● | ○ | | ○ | ○ | ● | ○ | | ● | ● | ○ | ● | ○ | ○ | | | |
| 15-50 | 10-20 | 5-10 | | 10-20 | 5-10 | 15-30 | 10-20 | | 120-2000 | 10-400 | 40-120 | 500-1000 | 20-30 | 10-20 | | | |

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

| D mm | e mm | d mm | z | € |
|---|---|---|---|---|
| 50 | 0,50 | 13 | 48 | *15,87* |
| | 0,60 | | 48 | *15,87* |
| | 0,80 | | 40 | *21,98* |
| | 1,00 | | 40 | *21,98* |
| | 1,20 | | 40 | *21,98* |
| | 1,60 | | 32 | *21,98* |
| | 2,00 | | 32 | *21,98* |
| | 2,50 | | 32 | *24,47* |
| | 3,00 | | 24 | *27,13* |
| | 4,00 | | 24 | *32,46* |
| | 5,00 | | 24 | *36,90* |
| 63 | 0,50 | 16 | 64 | *19,58* |
| | 0,60 | | 48 | *19,58* |
| | 0,80 | | 48 | *22,03* |
| | 1,00 | | 48 | *23,86* |
| | 1,20 | | 40 | *24,02* |
| | 1,60 | | 40 | *25,19* |
| | 2,00 | | 40 | *26,80* |
| | 2,50 | | 32 | *31,29* |
| | 3,00 | | 32 | *34,51* |
| | 4,00 | | 32 | *41,61* |
| | 5,00 | | 24 | *50,11* |
| | 6,00 | | 24 | *55,87* |
| 80 | 0,60 | 22 | 64 | *25,47* |
| | 0,80 | | 64 | *28,13* |
| | 1,00 | | 48 | *27,69* |
| | 1,20 | | 48 | *28,91* |
| | 1,60 | | 48 | *31,57* |
| | 2,00 | | 40 | *33,01* |
| | 2,50 | | 40 | *38,67* |
| | 3,00 | | 40 | *44,01* |
| | 4,00 | | 32 | *53,77* |
| | 5,00 | | 32 | *65,03* |
| | 6,00 | | 32 | *74,52* |
| 100 | 0,80 | 22 | 64 | *36,02* |
| | 1,00 | | 64 | *34,85* |
| | 1,20 | | 64 | *34,85* |
| | 1,60 | | 48 | *40,45* |
| | 2,00 | | 48 | *43,11* |
| | 2,50 | | 48 | *52,00* |

| D mm | e mm | d mm | z | € |
|---|---|---|---|---|
| | 3,00 | | 40 | *58,54* |
| | 4,00 | | 40 | *70,08* |
| | 5,00 | | 40 | *85,79* |
| | 6,00 | | 32 | *98,54* |
| 125 | 0,80 | 22 | 80 | *52,88* |
| | 1,00 | | 80 | *56,04* |
| | 1,20 | | 64 | *56,04* |
| | 1,60 | | 64 | *57,04* |
| | 2,00 | | 64 | *60,31* |
| | 2,50 | | 64 | *70,69* |
| | 3,00 | | 48 | *80,46* |
| | 4,00 | | 48 | *97,93* |
| | 5,00 | | 40 | *117,53* |
| | 6,00 | | 40 | *132,62* |
| 160 | 1,20 | 32 | 80 | *72,19* |
| | 1,60 | | 80 | *82,56* |
| | 2,00 | | 64 | *87,28* |
| | 2,50 | | 64 | *103,26* |
| | 3,00 | | 64 | *128,46* |
| | 4,00 | | 48 | *165,80* |
| | 5,00 | | 48 | *206,69* |
| | 6,00 | | 48 | *241,09* |
| 200 | 1,60 | 32 | 80 | *123,46* |
| | 2,00 | | 80 | *132,89* |
| | 2,50 | | 80 | *155,76* |
| | 3,00 | | 64 | *192,20* |
| | 4,00 | | 64 | *258,85* |
| | 5,00 | | 64 | *320,83* |
| | 6,00 | | 48 | *372,10* |
| 250 | 2,00 | 32 | 100 | *172,89* |
| | 2,50 | | 80 | *204,92* |
| | 3,00 | | 80 | *254,13* |
| | 4,00 | | 80 | *319,05* |
| | 5,00 | | 80 | *399,96* |
| | 6,00 | | 64 | *447,95* |
| 315 | 2,50 | 40 | 100 | *325,10* |
| | 3,00 | | 100 | *378,32* |
| | 4,00 | | 80 | *474,92* |
| | 5,00 | | 80 | *588,88* |
| | 6,00 | | 80 | *681,16* |



P Aceros / Aciers / Steels
M Aceros Inox / Aciers Inox / Stainless Steels
K Fundicion / Fonte / Cast Iron
N Metales no ferrosos / Métal non Ferraux / Non Ferrous metals
S Titanio y Superaleaciones / Titanium et Supealliages / Titanium and Superalloys
H Materiales Duros / Materiels Durs / Hard materials

# 7401 HSS DC

M2 | 0° | DC

| L mm | A mm | e mm | Pulgadas Pouces Inches | Ø Taladro Perceuse Drill | tpi 4 | 6 | 8 | 10 | 14 | € |
|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25 | 1,50 | 12 | 8,5 | | | | ■ | ■ | *17,99* |
| 350 | 25 | 1,25 | 14 | 8,5 | | | | ■ | | *16,46* |
| 350 | 25 | 1,50 | 14 | 8,5 | | | | | ■ | *20,20* |
| 350 | 30 | 1,50 | 14 | 8,5 | | | | ■ | ■ | *22,85* |
| 350 | 30 | 2,00 | 14 | 8,5 | | ■ | | ■ | | *30,38* |
| 400 | 25 | 1,50 | 16 | 8,5 | | | | ■ | ■ | *23,44* |
| 400 | 30 | 1,50 | 16 | 8,5 | | ■ | ■ | ■ | ■ | *28,25* |
| 400 | 30 | 2,00 | 16 | 8,5 | | ■ | ■ | ■ | ■ | *32,77* |
| 450 | 30 | 2,00 | 18 | 8,5 | ■ | ■ | ■ | ■ | | *32,77* |
| 450 | 35 | 2,00 | 18 | 8,5 | | ■ | ■ | ■ | | *37,74* |
| 450 | 40 | 2,00 | 18 | 10,5 | ■ | ■ | | ■ | | *42,76* |
| 500 | 40 | 2,00 | 20 | 10,5 | ■ | ■ | ■ | ■ | | *55,31* |
| 600 | 50 | 2,50 | 24 | 13 | | ■ | | | | *83,86* |

Hepyc Display

# Nuevo Display Modular
## con placas intercambiables

# Nouveau Présentoir Modulaire
## avec étages réaménageables

# New Modular Display
## with exchangeable plates

# EXPOSITOR TOTEM
# PRÉSENTOIRS / DISPLAY STANDS

**DISPLAY MODULAR**
- Diseño atractivo
- Claridad expositiva
- Ahorro de espacio
- Expositor polivalente: para brocas, machos, fresas, etc
- Portafolletos

**PRESENTOIR MODULAIRE**
- Design attirant
- Mise en valeur des produits
- Encombrement réduit
- Présentoir polyvalent: pour forets, tarauds, fraises, etc...
- Porte-documents

**MODULAR DISPLAY**
- Attractive design
- Clear exposition
- Saving space
- Available for drill-bits, taps, end mills, etc.
- Brochure holders

**Base + 2 pisos fijos**
**Posibilidad de añadir un 3º y un 4º módulo.**

**Base + 2 étages fixes**
**Possibilité d´ajouter un 3ème et 4ème module.**

**Base + 2 fixed floors**
**Possibility of adding a 3th and 4th floor.**

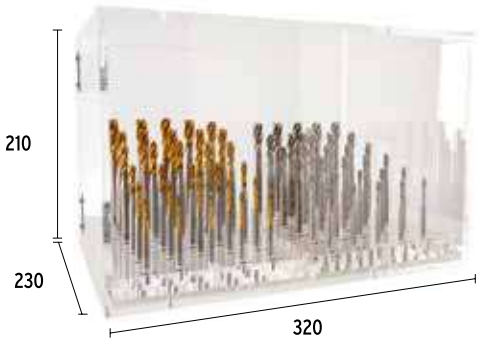
**A elegir entre diferentes composiciones.**

**A choisir entre différentes compositions.**
**To chose among different compositions.**

**› Ref. 8214**

€ Vacío | *1009,53*

**› Ref. 8214/1**




€ Urna vacía | *105,93*

€ Vacío | *903,61*

€ Vacío | *797,67*

## BROCAS CILÍNDRICAS / FORETS CYLINDRIQUES / STRAIGHT DRILL-BITS

### 8214/2 HSS DIN 338 NSP

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 144,80

### 8214/3 HSS TIN DIN 338 NSP

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 312,01

### 8214/4 HSSCO DIN 338 N

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 247,43

### 8214/5 HSSCO TIALN DIN 338 N

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 508,52

### 8214/6 HSSCO DIN 338 IX

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 473,49

### 8214/7 HSSCO TIALN DIN 338 IX

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 901,80

### 8214/8 HSSCO DIN 338S

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 631,35

### 8214/9 HSSCO TIALN DIN 338S

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 50
€ 883,60

## 8214/12 HSSCO DIN 1897 S

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

| TOTAL pcs. | 50 |
|---|---|
| € | *561,95* |

## 8214/13 HSSCO TIALN DIN 1897

| Ø mm | |
|---|---|
| 4 | 10 |
| 5 | 10 |
| 6 | 10 |
| 8 | 10 |
| 10 | 5 |
| 12 | 5 |

| TOTAL pcs. | 50 |
|---|---|
| € | *787,20* |

## BROCAS ESCALONADAS Y AVELLANADORAS
## FRAISES ETAGEES ET CONIQUES / STEP AND COUNTERBORE DRILL-BITS

### 8214/20 HSS

| Ø mm | |
|---|---|
| 4-12*2 | 6 |
| 4-20 | 6 |
| 6-30 | 5 |
| 20-30 | 4 |

TOTAL pcs. 21
€ *1.430,28*

### 8214/21 HSS TIALN

| Ø mm | |
|---|---|
| 4-12*2 | 6 |
| 4-20 | 6 |
| 6-30 | 5 |
| 20-30 | 4 |

TOTAL pcs. 21
€ *2.956,89*

### 8214/22 HSS 35º

| Ø mm | |
|---|---|
| 4-12*2 | 12 |
| 4-20 | 6 |
| 6-30 | 10 |

TOTAL pcs. 28
€ *2.467,08*

### 8214/23 HSS 35º TIALN

| Ø mm | |
|---|---|
| 4-12*2 | 12 |
| 4-20 | 6 |
| 6-30 | 10 |

TOTAL pcs. 28
€ *3.700,60*

### 8214/24 HSS

| Ø mm | |
|---|---|
| 3-14 | 6 |
| 6-20 | 6 |
| 16-30 | 5 |
| 26-40 | 4 |

TOTAL pcs. 21
€ *1.054,66*

### 8214/25 HSS TIALN

| Ø mm | |
|---|---|
| 3-14 | 6 |
| 6-20 | 6 |
| 16-30 | 5 |
| 26-40 | 4 |

TOTAL pcs. 21
€ *1.989,65*

## AVELLANADORES 90º / FRAISES A CHANFREINER 90º / COUNTERSINK CUTTERS 90º

### 8214/26 HSS DIN 335C

| Ø mm | |
|---|---|
| 8,30 | 6 |
| 10,40 | 6 |
| 12,40 | 6 |
| 16,50 | 6 |
| 20,50 | 5 |
| 25,00 | 5 |
| 30,00 | 4 |

| TOTAL pcs. | 38 |
|---|---|
| € | *1.023,17* |

### 8214/27 HSS TIALN DIN 335C

| Ø mm | |
|---|---|
| 8,30 | 6 |
| 10,40 | 6 |
| 12,40 | 6 |
| 16,50 | 6 |
| 20,50 | 5 |
| 25,00 | 5 |
| 30,00 | 4 |

| TOTAL pcs. | 38 |
|---|---|
| € | *2.524,69* |

### 8214/28 HSSCO DIN 335C

| Ø mm | |
|---|---|
| 8,30 | 6 |
| 10,40 | 6 |
| 12,40 | 6 |
| 16,50 | 6 |
| 20,50 | 5 |
| 25,00 | 5 |
| 30,00 | 4 |

| TOTAL pcs. | 38 |
|---|---|
| € | *1.745,11* |

### 8214/29 HSSCO TIALN DIN 335C

| Ø mm | |
|---|---|
| 8,30 | 6 |
| 10,40 | 6 |
| 12,40 | 6 |
| 16,50 | 6 |
| 20,50 | 5 |
| 25,00 | 5 |
| 30,00 | 4 |

| TOTAL pcs. | 38 |
|---|---|
| € | *3.018,56* |

## MACHOS MÁQUINA / TARAUDS MACHINE / MACHINE TAPS

### 8214/30 HSSE DIN 371/376B

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

TOTAL pcs. 30
€ 478,54

### 8214/31 HSSE DIN 371/376 R35º

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

TOTAL pcs. 30
€ 578,81

### 8214/38 HSSE VAP DIN 371/376B

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

TOTAL pcs. 30
€ 553,55

### 8214/39 HSSE VAP DIN 371/376 R35º

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

TOTAL pcs. 30
€ 670,85

### 8214/32 HSSE TIN DIN 371/376B

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

TOTAL pcs. 30
€ 832,65

### 8214/33 HSSE TIN DIN 371/376 R35º

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

TOTAL pcs. 30
€ 875,80

## 8214/34 HSSEX TICN DIN 371/376B

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *943,10* |

## 8214/35 HSSEX TICN DIN 371/376 R35º

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *1.030,75* |

## 8214/36 HSSEX TICN DIN 371/376 B

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *1.199,15* |

## 8214/37 HSSEX TICN DIN 371/376 R15º LH

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *1.109,00* |

## 8214/49 HSSE TIN DIN 371/376 6HX R

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *1.252,65* |

## 8214/53 HSSE TIN DIN 371/376 6GX R

| Ø mm | |
|---|---|
| M4 | 5 |
| M5 | 5 |
| M6 | 5 |
| M8 | 5 |
| M10 | 5 |
| M12 | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *1.199,25* |

## FRESAS FRONTALES / FRAISES FRONTALES / END MILLS

### 8214/54 HSSE DIN 327 N 2Z

| Ø mm | |
|---|---|
| 4 | 5 |
| 5 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 30
€ 531,67

### 8214/55 HSSE TIALN DIN 327 N 2Z

| Ø mm | |
|---|---|
| 4 | 5 |
| 5 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 30
€ 744,25

### 8214/56 HSSE DIN 327 N 2Z

| Ø mm | |
|---|---|
| 4 | 5 |
| 5 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 30
€ 889,67

### 8214/57 HSSE TIALN DIN 327 N 2Z

| Ø mm | |
|---|---|
| 4 | 5 |
| 5 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 30
€ 1.245,55

### 8214/58 HSSE DIN 844 W 3Z

| Ø mm | |
|---|---|
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 20
€ 668,69

### 8214/59 HSSE TIALN DIN 844 W 3Z

| Ø mm | |
|---|---|
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 20
€ 708,45

### 8214/60 HSSE DIN 844 N 4Z

| Ø mm | |
|---|---|
| 4 | 5 |
| 5 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 30
€ 567,63

### 8214/61 HSSE TIALN DIN 844 N 4Z

| Ø mm | |
|---|---|
| 4 | 5 |
| 5 | 5 |
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

TOTAL pcs. 30
€ 711,35

## 8214/62 HSSEX TIALN DIN 844 NR

| Ø mm | |
|---|---|
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

| TOTAL pcs. | 20 |
|---|---|
| € | *1.147,49* |

## 8214/63 HSSEX TIALN DIN 844 NRF

| Ø mm | |
|---|---|
| 6 | 5 |
| 8 | 5 |
| 10 | 5 |
| 12 | 5 |

| TOTAL pcs. | 20 |
|---|---|
| € | *1.260,79* |

### FRESAS ROTATIVAS / FRAISES ROTATIVES / ROTARY MILLS

## 8214/69 FRESAS ROTATIVAS

| Ø mm | |
|---|---|
| 12x6 (3201) | 2 |
| 10x6 (3201) | 2 |
| 8x6 (3201) | 1 |
| 12x6 (3202) | 2 |
| 10x6 (3202) | 2 |
| 8x6 (3202) | 1 |
| 12x6 (3203) | 2 |
| 10x6 (3203) | 2 |

| Ø mm | |
|---|---|
| 8x6 (3203) | 1 |
| 12x6 (3204) | 2 |
| 10x6 (3204) | 2 |
| 8x6 (3204) | 1 |
| 12x6 (3207) | 3 |
| 10x6 (3207) | 2 |
| 12x6 (3206) | 5 |

| TOTAL pcs. | 30 |
|---|---|
| € | *1.409,10* |

### CORONAS METAL / SCIES TREPAN METAUX / METAL HOLE SAWS

## 8214/64 HSSE

| Ø mm | |
|---|---|
| 14x25 | 1 |
| 16x25 | 1 |
| 18x25 | 1 |
| 20x25 | 1 |
| 22x25 | 1 |
| 24x25 | 1 |
| 14x50 | 1 |
| 16x50 | 1 |
| 18x50 | 1 |
| 20x50 | 1 |
| 22x50 | 1 |
| 24x50 | 1 |

| TOTAL pcs. | 12 |
|---|---|
| € | *907,25* |

## 8214/65 HSS

| Ø mm | |
|---|---|
| 14x25 | 1 |
| 16x25 | 1 |
| 18x25 | 1 |
| 20x25 | 1 |
| 22x25 | 1 |
| 24x25 | 1 |
| 14x50 | 1 |
| 16x50 | 1 |
| 18x50 | 1 |
| 20x50 | 1 |
| 22x50 | 1 |
| 24x50 | 1 |

| TOTAL pcs. | 12 |
|---|---|
| € | *662,24* |

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| **1108** | 37 | **1175** | 24 | **2126** | 152 | **2191** | 141 | **2279** | 197 |
| **1109** | 30 | **1176** | 25 | **2132** | 155 | **2192** | 206 | **2280** | 195 |
| **1110** | 48 | **1177** | 26 | **2133** | 155 | **2199** | 177 | **2281** | 195 |
| **1112** | 49 | **1178** | 27 | **2134** | 177 | **2206** | 206 | **2282** | 198 |
| **1113** | 50 | **1179** | 77 | **2135** | 200 | **2208** | 163 | **2283** | 198 |
| **1114** | 51 | **1180** | 77 | **2136** | 200 | **2212** | 211 | **2284** | 207 |
| **1115** | 53 | **1181** | 64 | **2137** | 202 | **2213** | 174 | **2285** | 209 |
| **1116** | 55 | **1182** | 28 | **2138** | 202 | **2214** | 174 | **2286** | 208 |
| **1117** | 56 | **1183** | 89 | **2139** | 203 | **2215** | 175 | **2287** | 209 |
| **1118** | 56 | **1184** | 27 | **2140** | 203 | **2216** | 175 | **2301** | 213 |
| **1119** | 79 | **1185** | 78 | **2141** | 204 | **2217** | 176 | **2302** | 217 |
| **1120** | 29 | **1186** | 78 | **2142** | 204 | **2218** | 176 | **2303** | 216 |
| **1121** | 59 | **1187** | 43 | **2144** | 205 | **2234** | 187 | **2304** | 218 |
| **1122** | 63 | **1188** | 72 | **2145** | 207 | **2235** | 187 | **2305** | 219 |
| **1123** | 62 | **1189** | 76 | **2146** | 208 | **2236** | 190 | **2306** | 220 |
| **1125** | 65 | **1190** | 76 | **2147** | 183 | **2237** | 190 | **2307** | 222 |
| **1126** | 66 | **1191** | 71 | **2148** | 183 | **2242** | 212 | **2308** | 223 |
| **1127** | 68 | **1192** | 71 | **2149** | 185 | **2248** | 179 | **2309** | 225 |
| **1128** | 68 | **1193** | 73 | **2150** | 185 | **2249** | 179 | **2310** | 225 |
| **1129** | 69 | **1194** | 79 | **2151** | 188 | **2250** | 150 | **2312** | 226 |
| **1130** | 69 | **1501** | 34 | **2152** | 188 | **2251** | 150 | **2313** | 226 |
| **1132** | 72 | **1504** | 178 | **2153** | 191 | **2252** | 165 | **2314** | 216 |
| **1133** | 73 | **1505** | 311 | **2154** | 191 | **2253** | 165 | **2315** | 224 |
| **1135** | 74 | **2101** | 137 | **2155** | 193 | **2254** | 156 | **2316** | 221 |
| **1137** | 74 | **2102** | 136 | **2156** | 193 | **2255** | 156 | **2317** | 221 |
| **1138** | 75 | **2103** | 144 | **2157** | 196 | **2256** | 171 | **2321** | 227 |
| **1139** | 67 | **2104** | 144 | **2158** | 196 | **2257** | 171 | **2322** | 228 |
| **1143** | 86 | **2105** | 158 | **2159** | 210 | **2258** | 157 | **2323** | 228 |
| **1144** | 87 | **2106** | 158 | **2160** | 199 | **2259** | 157 | **2324** | 217 |
| **1145** | 87 | **2107** | 164 | **2163** | 212 | **2260** | 172 | **2501** | 229 |
| **1146** | 87 | **2108** | 164 | **2164** | 210 | **2261** | 172 | **2502** | 233 |
| **1150** | 89 | **2109** | 148 | **2165** | 162 | **2262** | 186 | **2503** | 234 |
| **1152** | 70 | **2110** | 148 | **2166** | 162 | **2263** | 186 | **2504** | 234 |
| **1153** | 70 | **2111** | 147 | **2168** | 149 | **2264** | 189 | **2505** | 237 |
| **1155** | 75 | **2112** | 161 | **2169** | 149 | **2265** | 189 | **2506** | 238 |
| **1158** | 35 | **2113** | 140 | **2170** | 163 | **2266** | 180 | **2507** | 239 |
| **1159** | 46 | **2114** | 140 | **2175** | 153 | **2267** | 180 | **2508** | 239 |
| **1160** | 47 | **2115** | 151 | **2176** | 153 | **2268** | 181 | **2509** | 241 |
| **1161** | 41 | **2116** | 151 | **2177** | 168 | **2269** | 181 | **2510** | 240 |
| **1162** | 45 | **2117** | 166 | **2178** | 168 | **2270** | 182 | **2512** | 232 |
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| **1165** | 54 | **2119** | 169 | **2180** | 142 | **2272** | 147 | **2520** | 240 |

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| **2521** | 236 | **2850** | 272 | **3170** | 352 | **4103** | 288 | **5142** | 321 |
| **2522** | 236 | **2851** | 272 | **3171** | 353 | **4104** | 286 | **5143** | 321 |
| **2701** | 242 | **3101** | 364 | **3172** | 354 | **4105** | 287 | **5151** | 322 |
| **2702** | 243 | **3105** | 364 | **3173** | 354 | **4106** | 288 | **5155** | 322 |
| **2703** | 243 | **3107** | 365 | **3174** | 355 | **4107** | 289 | **5157** | 305 |
| **2704** | 244 | **3110** | 368 | **3175** | 356 | **4108** | 289 | **5158** | 305 |
| **2705** | 245 | **3111** | 378 | **3176** | 356 | **4109** | 291 | **5159** | 309 |
| **2706** | 246 | **3112** | 370 | **3177** | 357 | **4110** | 292 | **5160** | 307 |
| **2707** | 247 | **3113** | 379 | **3178** | 359 | **4111** | 293 | **5161** | 314 |
| **2708** | 248 | **3114** | 372 | **3179** | 360 | **4114** | 292 | **6101** | 83 |
| **2709** | 249 | **3115** | 373 | **3180** | 360 | **4115** | 290 | **6102** | 84 |
| **2710** | 250 | **3116** | 382 | **3181** | 361 | **4116** | 290 | **6103** | 84 |
| **2711** | 251 | **3117** | 374 | **3182** | 381 | **4117** | 291 | **6110** | 81 |
| **2712** | 252 | **3118** | 383 | **3183** | 361 | **4118** | 285 | **6111** | 81 |
| **2713** | 253 | **3119** | 375 | **3184** | 362 | **4119** | 284 | **6112** | 82 |
| **2714** | 254 | **3120** | 366 | **3185** | 362 | **5101** | 303 | **6113** | 82 |
| **2715** | 244 | **3121** | 366 | **3186** | 367 | **5102** | 303 | **6114** | 81 |
| **2716** | 248 | **3122** | 367 | **3187** | 371 | **5103** | 304 | **6115** | 83 |
| **2717** | 254 | **3138** | 414 | **3188** | 380 | **5105** | 306 | **6120** | 83 |
| **2801** | 268 | **3139** | 414 | **3189** | 349 | **5106** | 306 | **6122** | 85 |
| **2802** | 268 | **3140** | 414 | **3190** | 350 | **5109** | 307 | **6123** | 85 |
| **2803** | 268 | **3141** | 349 | **3191** | 353 | **5112** | 308 | **6124** | 85 |
| **2804** | 269 | **3144** | 386 | **3192** | 358 | **5114** | 80 | **7137** | 408 |
| **2805** | 269 | **3145** | 387 | **3193** | 358 | **5115** | 80 | **7138** | 410 |
| **2806** | 178 | **3146** | 388 | **3194** | 363 | **5116** | 309 | **7139** | 412 |
| **2808** | 269 | **3147** | 389 | **3195** | 363 | **5117** | 310 | **7140** | 413 |
| **2809** | 273 | **3148** | 390 | **3201** | 397 | **5118** | 310 | **7141** | 413 |
| **2810** | 273 | **3149** | 391 | **3202** | 397 | **5119** | 311 | **7158** | 413 |
| **2811** | 273 | **3150** | 391 | **3203** | 398 | **5120** | 312 | **7167** | 255 |
| **2812** | 273 | **3151** | 392 | **3204** | 398 | **5121** | 312 | **7168** | 416 |
| **2813** | 274 | **3152** | 394 | **3205** | 399 | **5122** | 313 | **7169** | 416 |
| **2814** | 274 | **3153** | 394 | **3206** | 399 | **5123** | 313 | **7172** | 406 |
| **2815** | 275 | **3154** | 395 | **3207** | 400 | **5124** | 314 | **7401** | 429 |
| **2816** | 275 | **3155** | 395 | **3208** | 400 | **5125** | 315 | **7801** | 427 |
| **2817** | 275 | **3156** | 396 | **3209** | 401 | **5126** | 315 | **7802** | 428 |
| **2818** | 275 | **3157** | 376 | **3210** | 401 | **5127** | 316 | **8201** | 90 |
| **2819** | 276 | **3158** | 384 | **3211** | 402 | **5129** | 316 | **8203** | 92 |
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## FICHA DE CLIENTE

Representante: ..... Código de cliente (rellenar por Hepyc): .....

CIF: ..... Persona de contacto (nombre y apellido): .....

Dirección de facturación: ..... C.P. .....

Dirección de envío de mercancías (si es diferente): .....

Telf.: ..... Fax: ..... E-mail: .....

Forma de pago: ..... Días pago: .....

CC: ..... Dto a aplicar: .....

## FORMULAIRE NOUVEAUX CLIENTS

Agent comercial: ..... Nom de la société: .....

Raison sociale: ..... SIREN/SIRET: .....

N° Intracommunautaire (TVA): .....

Personne à contacter: .....

Adresse de facturation: .....

Tél.: ..... Fax: ..... E-mail: .....

Mode de réglement: .....

IBAN: ..... Remise: .....

## CLIENT DATA SHEET

Representative: ..... Client code (to be filled out by Hepyc): .....

Tax Identification Number: .....

Contact person (name and surname): .....

Invoice address: .....

Merchandise delivery address (if different) ..... P.C.: .....

Tel.: ..... Fax: ..... E-mail: .....

Payment method: ..... Payment days: .....

IBAN code: ..... Discount to be applied: .....

**1º Condiciones de pago:**
Giro a 60 días f.f.: NETO.

**2º Vencimientos:**
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 cualquier caso, de 60 días, fecha factura o envío.

**3º Seguros:**
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.

**4º Reclamaciones:**
Se atenderán aquellas reclamaciones que se planteen dentro de los 8 días siguientes a la recepción del material, no aceptando ninguna devolución sin previo conocimiento de Manufacturas Hepyc, S.A.

**5º Condicionalidad:**
La aceptación de las mercancías, sin el rechazo inme-diato 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 Manufacturas Hepyc, S.A.

**6º IVA:**
Los precios están sujetos al impuesto sobre el valor añadido, siendo a cargo del cliente el recargo correspondiente.

**7º Garantías:**
Todas las herramientas están garantizadas contra cualquier defecto de fabricación y materiales, sin responsabilizarse Manufacturas Hepyc, S.A. de la utilización inadecuada de las mismas. En cualquier caso, nuestra responsabilidad estará limitada al valor de la herramienta suministrada. Nos reservamos el derecho de modificar, sin previo aviso, las dimensiones, calidades de acero y en general todas las características técnicas de las herramientas. No será sustituida ninguna herramienta sin un informe previo de Control de Calidad.

**8º Portes:**
Se suministrarán a portes pagados aquellos envíos a Península y Baleares cuyo valor neto en factura supere los 150 euros.
En aquellos casos de facturación mensual, quincenal, etc., Manufacturas Hepyc, S.A. cargará en factura los portes correspondientes a los envíos inferiores a 150 euros aunque la factura global (mensual, quincenal) supere dicha cantidad.

**9º Importe mínimo por pedido:**
Queda establecido como pedido mínimo la cantidad de 60 euros netos. Los clientes no habituales que cursen pedidos inferiores a 60 euros pagarán al contado o contra reembolso.

**10º Envío de facturas:**
Salvo indicación expresa por parte del cliente, se despacharán directamente.

**11º Reserva de dominio:**
Nuestras ventas se consideran siempre bajo la condición de "RESERVA DE DOMINIO", según el artículo 1506 del C.C. hasta que se haya hecho efectivo ínte-gramente el pago de todo lo adeudado.

**12º Jurisdicción competente:**
En caso de cualquier litigio por razón de incumplimiento por cualquiera de las partes, se someterán ambas al fuero de los JUZGADOS Y TRIBUNALES DE SAN SEBASTIÁN, con denuncia al que pudiera corresponderles.

## CONDITIONS DE VENTE (France)

**1° Tarif de prix:**
Les prix figurants dans ce tarif sont des prix conseillés et s´entendent HORS TAXES, emballage compris.

**2° Remise sur Tarif:**
Remise à confirmer par notre agent.

**3° Delai d´expédition:**
Service normal: Commandes recues avant 14 heures partiront de Hepyc le jour même et seront chez le client en 24-48 heures.
Service express: Sous 24 heures.

**4° Port:**
FRANCO pour les expédition dont la valeur nette facturée dépasse les 250 euros.
Les commandes inférieures à 250 euros seront majorés d´un forfait de 15 euros.
Manufacturas Hepyc, SA se réserve le droit d´utiliser le moyen de transport le plus économique.
Manufacturas Hepyc, SA facturera les ports concernant les envois d´outils peu courants qui, à la demande du client, devront être livrés en urgence à travers des agences de transport rapide.

**5° Condition de paiement:**
Le délai de paiement part de la date de facturation. Par LCR magnétique à 60 jours calendaires ou 45 jours fin de mois.

**6° Assurances:**
Le marchandises seront transportées aux risque et périls exclusifs de l´acheteur, celui-ci étant responsable de la prime d´assurance le cas échéant.

**7° Réclamations:**
Les réclamations seront acceptées dans un délai de 8 jours à partir de la réception du matériel; aucun retour ne sera accepté sans l´accord préalable de Manufacturas Hepyc, SA.

**8° Conditionnalité:**
L´acceptation de marchandises sans le rejet immédiat de la part de l´acheteur suppose l´approbation de ces conditions générales de vente et leur modification n´aura de validité que sur confirmation écrite de Manufacturas Hepyc, SA.

**9° Garanties:**
Tous les outils son garantis contre n´importe quel défaut de fabrication et de matériaux, Manufacturas Hepyc, SA. n´étant pas responsable de leur utilisation inadéquate. Dans tous les cas, notre responsabilité sera limité à la valeur de l´outil fourni. Nous nous réservons le droit de modifier, sans avertissement préalable, les dimensions, les qualités d´acier et en général toutes les caractéristiques techniques des outils. Aucun outil ne sera remplacé sans rapport préalable du contrôle de qualité.

**10° Reserve de propieté:**
La marchandise reste la pleine et entière propriété de la Société Manufacturas Hepyc, SA tant que le règlement intégral n´aura pas été effectué et ce en application de la loi du 12 mai 1980.

## SALES CONDITIONS (Export)

**1. Price List:**
The prices that appear on this price list are recommended and DO NOT INCLUDE TAXES or packaging.

**2. Discount:** Discount to be confirmed by Manufacturas Hepyc.

**3. Payment conditions:**
Terms of payment set from invoice date.
Firts order must be paid in advanced. Rest of the orders to be agreed.

**4. Insurance:**
The merchandise will be transported exclusively at the purchaser's risk, the purchaser is responsible for the insurance premium if it is necessary.

**5. Claims:**
Claims will be accepted within the 8 days following the receipt of the merchandise; no returns will be accepted without the prior agreement of Manufacturas Hepyc, SA.

**6. Conditions :**
The acceptance of merchandise without the immediate rejection on the part of the purchaser supposes the acceptance of these general sales conditions and their modification will not be valid without the written consent of Manufacturas Hepyc, SA.

**7. Guarantees:**
All tools are guaranteed against any material or manufacturing defect, Manufacturas Hepyc, SA. is not responsible for their improper use. In all cases, our responsibility will be limited to the tool provided. We reserve the right to modify, without preliminary warning, the dimensions, steel qualities and all design feature of the tools in general. No tool will be replaced without the preliminary quality control report.

**8. Reservation of title:**
The merchandise remains the sole and exclusive property of the Manufacturas Hepyc, SA Corporation as long as the full payment is outstanding pursuant to the law of 12 May 1980.

BUREAU VERITAS
Certification

# Certification

Awarded to

## MANUFACTURAS HEPYC SA

Bº ZIKUÑAGA,57 E IZQDA. POL IND IBARLUZE - 20120 - HERNANI - GIPUZKOA - ESPAÑA

Bureau Veritas certification certifies that the Management System has been audited and found to be in accordance with the requirements of standard:

STANDARD

## ISO 9001:2015

Scope of certification:

## DESIGN, MANUFACTURING AND DISTRIBUTION OF CUTTING TOOLS.

| | |
|---|---|
| Certificate Number: | ES108200-1 |
| Original approval date: | 04-07-2001 |
| Certification/Renovation Audit: | 14-10-2019 |
| Expiry date of previous cycle: | 29-11-2019 |
| Effective date: | 30-11-2019 |
| Certificate expiration date: | 29-11-2022 |

Certification Manager:

*This certificate is valid, subject to the general and specific terms and conditions of certification services*

Certification Body: Bureau Veritas Iberia S.L.
C/ Valportillo Primera 22-24, Edificio Caoba, Pol. Ind. La granja,
28108 Alcobendas - Madrid, España

ENAC
CERTIFICACION
Nº 04/C-SC004

# Can we Help you?


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