

**Нерус** / CUTTING  
TOOL  
EXPERTS

**75** YEARS  
1947-2022



hepuc.com

> 2022

**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



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- › Tarauds machine / Fraises à tarauder en carbure / Tarauds à main / Filières / Filets rapportés / Calibres / Accessoires
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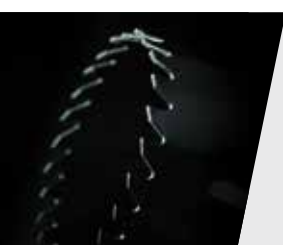
- › Brocas avellanadoras y escalonadas / Avellanadores
- › Fraises coniques et étagées / Fraises à trou et à chanfreiner
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- › Hard Metal mills / HSSE mills / HSSE mills with hole / HSSE special mills / HSSE-PM mills / HM Rotary mills / Hole saws
- › Hartmetall-Fräser / HSSE-Fräser / Bohrungsfräser / HSSE Spezialfräser / HSSE-PM-Fräser / HM-Drehfräser / Hohlfräser Maschinen



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- › Band saw blades / Circular saws / Machine saw blades
- › Bandsägeblätter / Kreissägen / Maschinensägeblätter



## Totem / Display

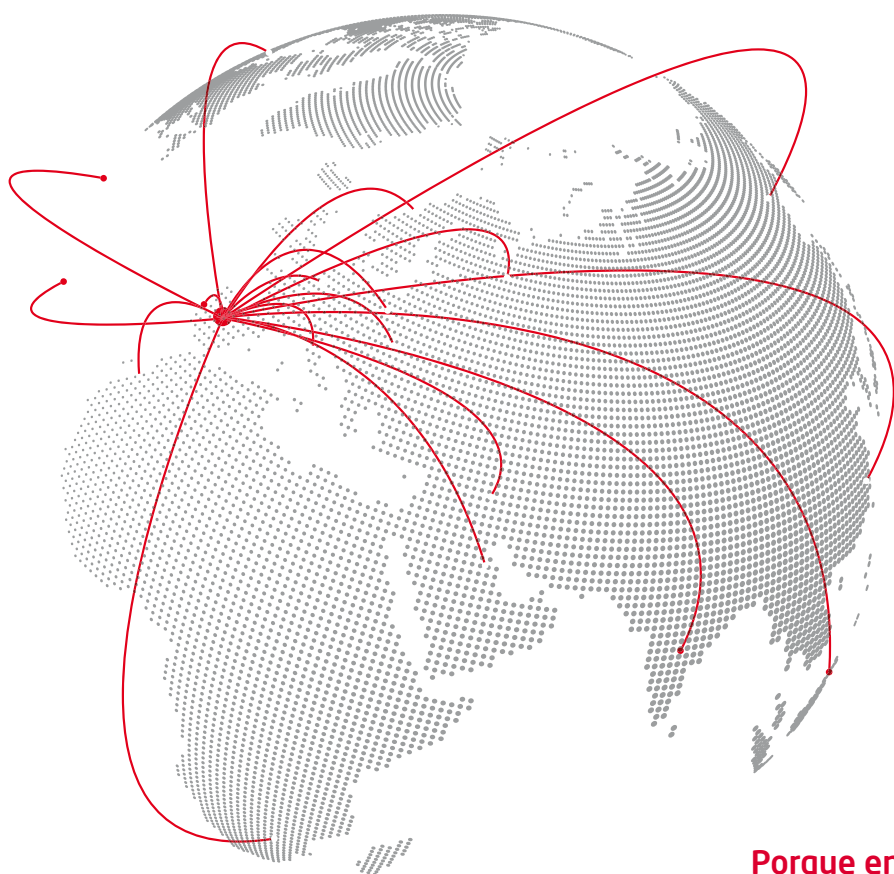
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- › Totem / Display
- › Totem / Display
- › Totem / Display
- › Totem / Display

**75** YEARS  
1947-2022

## Porque somos expertos en herramienta de corte desde hace más de 75 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.**
- › **Marktführer auf dem spanischen Markt für Gewindewerkzeuge. Präsent in mehr als 30 Ländern...**

## Parce que nous sommes experts en outils de coupe depuis plus de 75 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 75 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.

## Weil wir seit mehr als 75 Jahren Experten für Schneidwerkzeuge sind

Und wir heute dank sehr hoher Investitionen, Robotisierung, kontinuierlichem Wachstum der Produktpalette und auf den internationalen Märkten ein Industrie 4.0-Unternehmen mit Präsenz in den innovativsten Produktionsbereichen sind.



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

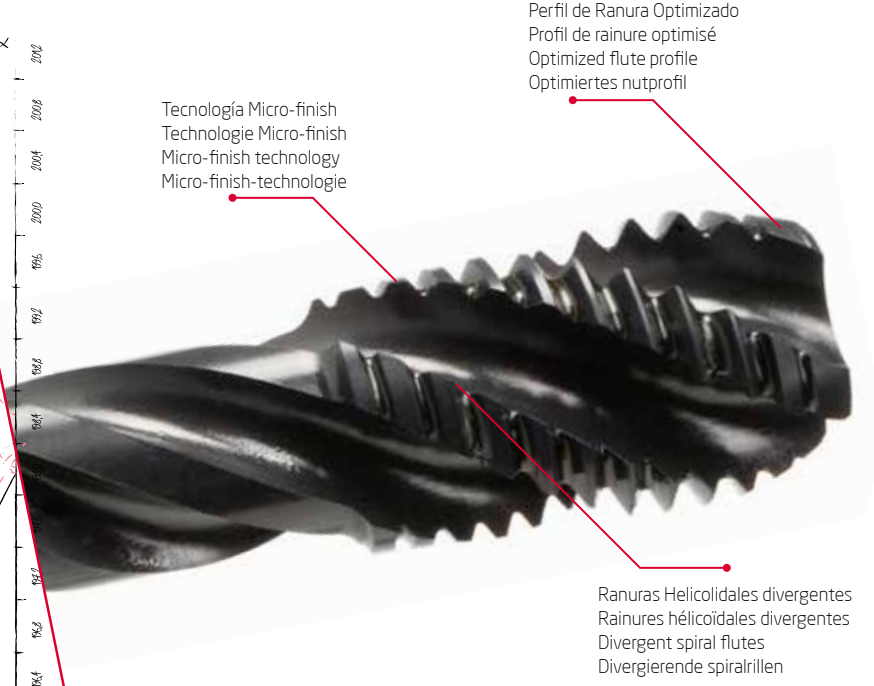
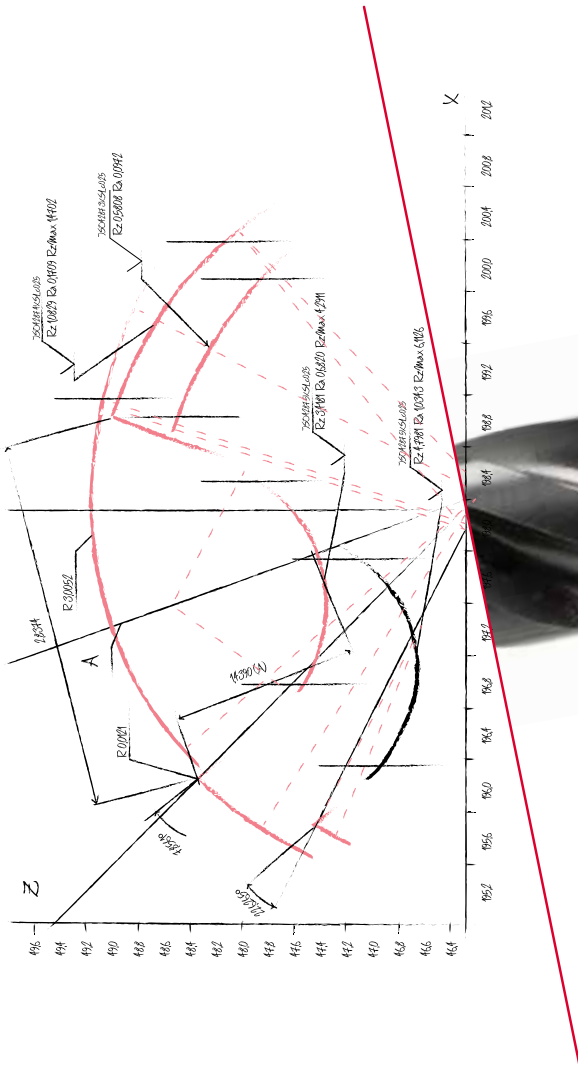
Chez Hepyc, le service du client est notre maître mot. Nous livrons partout dans le monde en quelques heures et nous mettons à votre disposition notre service d'assistance exclusivement conçu pour répondre aux questions de nos clients et leur apporter un support technique et la formation nécessaire.

## 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.

## Denn in weniger als 24 Stunden sind wir bei Ihnen

Hepyc ist ein kundenorientiertes Unternehmen. Mit Lieferungen innerhalb weniger Stunden überall auf der Welt und einer Supportabteilung, die ausschließlich darauf ausgerichtet ist, Fragen zu beantworten, technische Unterstützung zu geben, Schulungen durchzuführen... alles für unsere Kunden.



**Simplifica tareas, ahorra problemas**

Hunix es la nueva gama de machos de roscar universal de Heptyc. 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**



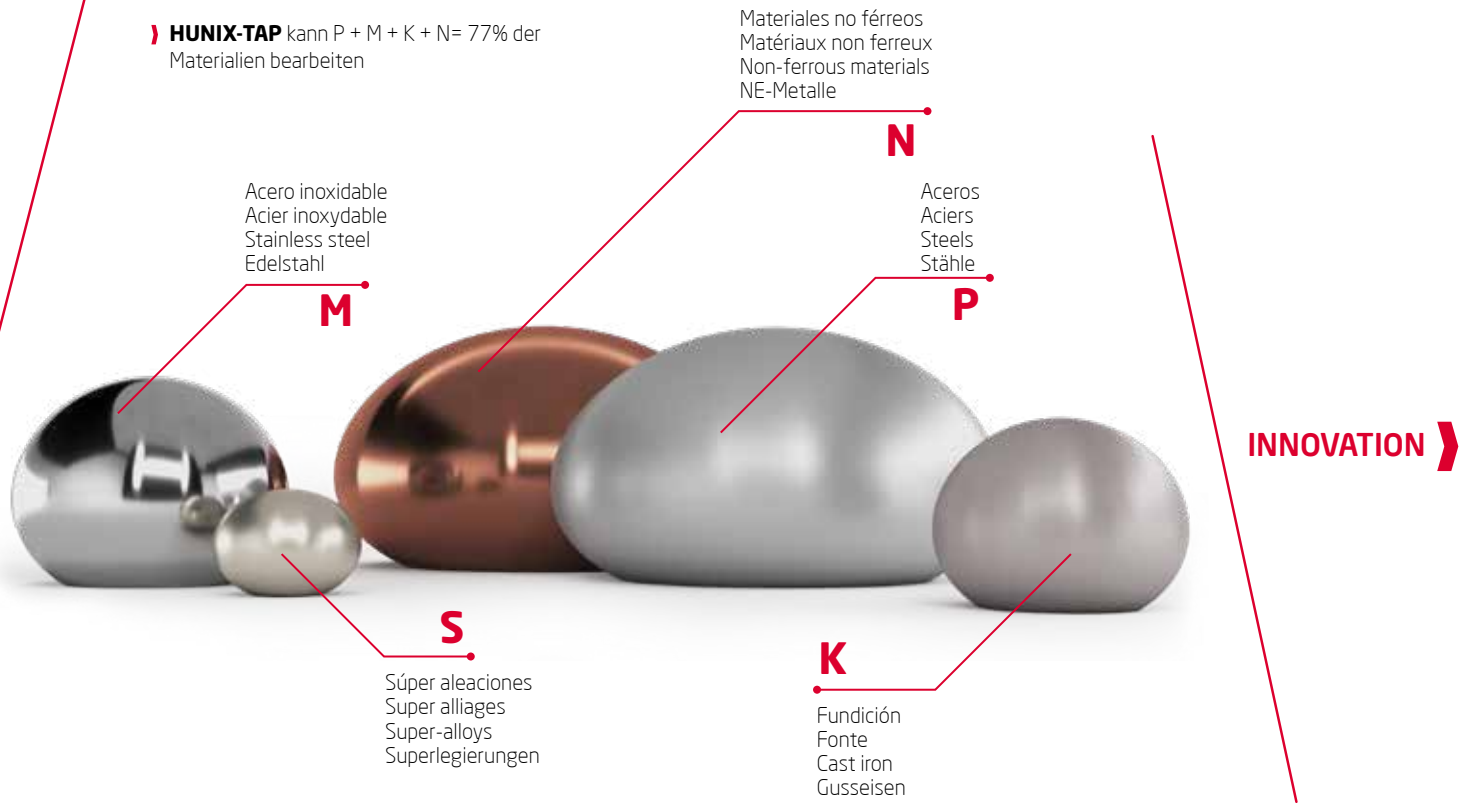
**VAP** / Básico para una mejor Lubricación  
 La base d'une meilleure lubrification  
 Basic for better lubrication  
 Wesentlich für eine bessere Schmierung

**HUNIX/TIN+**



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

- )] **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
- )] **HUNIX-TAP** kann P + M + K + N = 77% der  
Materialien bearbeiten



## 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'usinier 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.

## Vereinfacht Aufgaben, spart Ärger

Hunix ist die neue Universalgewindeschneidbohrer-Serie von Hepyc. Eine firmeneigene Innovation, die ein Werkzeug hervorgebracht hat, das bis zu 77 % der Materialien selbständig bearbeiten kann. Können Sie sich vorstellen, was es für einen Vertragshändler bedeutet, seine Referenzen zu reduzieren und gleichzeitig die Qualität zu erhöhen? Sowie die Optimierung des Bearbeitungsprozesses in einer Branche? Zeitreduzierung, Reduktion der Zwischenfälle, Vereinfachung der Lagerhaltung... weniger Probleme! Mehr Effizienz! Darüber hinaus erzielen wir dank unserer exklusiven Konstruktion und Fertigung eine bis zu 2-fach höhere Lebensdauer und eine verbesserte Bearbeitung.

**HUNIX** / PM



**PM** / Acero pulvimetalúrgicos  
Acier fritté  
Powder-metallurgy steel  
Pulvermetallurgischer Stahl







**75** YEARS  
1947-2022

**Taladrado** >  
**Perçage**  
**Drilling**  
**Bohren**

**Herçs** / CUTTING  
TOOL  
EXPERTS

Brocas Metal Duro / Forets Carbure / Hard Metal Drill-bits / Hartmetall-Bohrer													
1175	HM-MD	DIN 6537 S	TIALN		3XD    DIN 6535	<table border="1"><tr><td>P</td><td>M</td></tr><tr><td>K</td><td>S</td></tr></table>	P	M	K	S	24		
P	M												
K	S												
1176	HM-MD	DIN 6537 S	TIALN		3XD	<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>S</td><td>H</td><td></td></tr></table>	P	M	K	S	H		25
P	M	K											
S	H												
1177	HM-MD	DIN 6537 L	TIALN		5XD	<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>S</td><td>H</td><td></td></tr></table>	P	M	K	S	H		26
P	M	K											
S	H												
1178	HM-MD	DIN 6537 EL	TIALN		8XD	<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>S</td><td>H</td><td></td></tr></table>	P	M	K	S	H		27
P	M	K											
S	H												
1184	HM-MD		TIALN		12XD	<table border="1"><tr><td>P</td><td>M</td></tr><tr><td>K</td><td>S</td></tr></table>	P	M	K	S	28		
P	M												
K	S												
1182	HM-MD		TIN		1XD	<table border="1"><tr><td>H</td></tr></table>	H	28					
H													
1120	HM-MD	DIN 6539			2XD	<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td></td></tr></table>	P	M	K	N	S		29
P	M	K											
N	S												
1109	HM-MD	DIN 338N			4XD	<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td></td></tr></table>	P	M	K	N	S		30
P	M	K											
N	S												

Brocas con mango cilíndrico cortas / Forets à queue cylindrique courtes / Short straight shank drill-bits / Kurzer Zylinderschaft-Bohrer (DIN 338)											
1101	HSS	DIN338N				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		31
P	K										
N											
1101/1	HSS	DIN338N				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		33
P	K										
N											
1104	HSS	DIN338N				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		33
P	K										
N											
1104/9	HSS	ANSI				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		34
P	K										
N											
1501	HSS					<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		34
P	K										
N											
1158	HSS	DIN338NSP				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		35
P	K										
N											
1158/9	HSS	DIN338NSP				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		36
P	K										
N											
1108	HSS	DIN338NSP	TIN			<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		37
P	K										
N											
1103	HSS	DIN338H				<table border="1"><tr><td>N</td></tr></table>	N	38			
N											
1105	HSSCO	DIN 338N				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		39
P	K										
N											

Brocas con mango cilíndrico cortas / Forets à queue cylindrique courtes / Short straight shank drill-bits / Kurzer Zylinderschaft-Bohrer (DIN 338)										
1105/9	HSSCO	DIN 338N				P N	K			40
1161	HSSCO	DIN338N	TIALN			P N	K			41
1107	HSSCO	DIN338N				P N	K			41
1107/9	HSSCO	ANSI				P N	K			42
1187	HSSCO	DIN338W				P N	M	S		43
1106	HSSCO	DIN338W				M S	N			44
1162	HSSCO	DIN338W	TIALN			M S	N			45
1159	HSSCO	DIN338S				P	N			46
1160	HSSCO	DIN338S	TIALN			P	N			47
1110	WIDIA	DIN338N				P N	K			48

Brocas con mango cilíndrico largos / Forets à queue cylindrique longues / Long straight shank drill-bits / Langer Zylinderschaft-Bohrer										
1112	HSS	DIN 340 N				P N	K			49
1113	HSSCO	DIN 340 N				P N	K			50
1114	HSSCO	DIN 340 S				P	N			51
1164	HSSCO	DIN 340 S	TIALN			P	N			52

Brocas con mango cilíndrico extra largos / Forets à queue cylindrique extra longues / Extra-long straight shank drill-bits / Bohrer mit extra langem Zylinderschaft (DIN 1869)										
1115	HSS	DIN 1869 N				P N	K			53
1165	HSSCO	DIN 1869 S				P	N			54

**Brocas con mango cilíndrico extra cortas / Forets à queue cylindrique extra-courtes / Extra-short straight shank drill-bits / Bohrer mit extra kurzem Zylinderschaft (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			P, N	58

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

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 / Mehrfasen-Stufenbohrer**

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

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

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





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

1132	HSS	DIN 333 A			  	P, K, N	72
1188	HSS	DIN 333 A	TIN		  	P, K, N	72
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
1189	HSSCO		TIN		  	P, M, K, N, S	76
1190	HSSCO		TIN		  	P, M, K, N, S	76
1179	HM-MD				1XD  DIN 6535 HA	P, M, K, N, S	77
1180	HM-MD				1XD  DIN 6535 HA	P, M, K, N, S	77
1185	HM-MD		TIALN		1XD  DIN 6535 HA	P, M, K, N, S	78
1186	HM-MD		TIALN		1XD  DIN 6535 HA	P, M, K, N, S	78


















1119	HSSCO	DIN 1897N				P	79
1194	HSSCO	DIN 1897N	TiAlN			P	79

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

5114	HSS					P N	80
5115	HSS		TiN			P N	80

**Accesorios / Accessoires / Accessories/ Zubehör**

6110	<b>Espiga /</b> Queue à tenon / Bit shank / Stift						81
6111	<b>Casquillo DIN 2185 /</b> Douille de réduction / Drill sleeve / Bohrerhülse						81
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6112	<b>Alargadera /</b> Adaptateur / Extension piece / Verlängerungsstück						82
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6101	HP1						83
6120	HP1-CM						83
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6103	HP3						84
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**FORMULARIO BROCAS ESPECIALES**

**FICHE TECHNIQUE FORETS SPECIAUX / TECHNICAL ENQUIRY FOR SPECIAL DRILL BITS /  
SPEZIALBOHRER-FORMULAR**

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 / Durété / Hardness ..... HB ..... HRc Resistencia / Résistance / Resistance ..... N/mm<sup>2</sup>

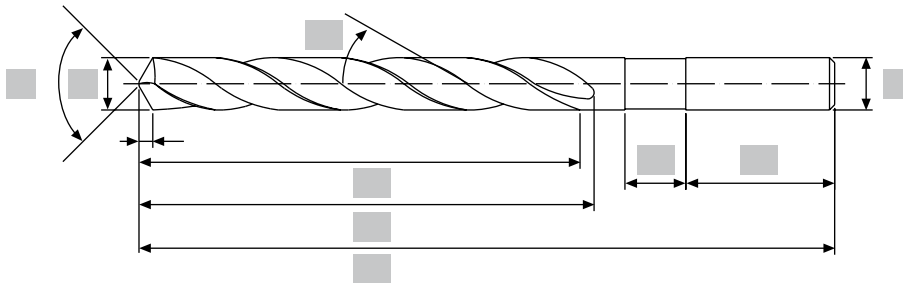
Tipo viruta:  Corta  Larga  Polvo  
 Type copeau Courte Longue Poussière  
 Shaving Short Long Powder

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

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

**HERRAMIENTA / OUTIL / TOOL**

Descripción / Description ..... 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 plaquelette carbure  
 Sharpened: Convencional Lip correction Split Point Welding points Carbide sheet

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

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

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....

.....  
 .....  
 .....



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



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

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	6537S	6537S	6537L	6537L	-	-	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	28	28	29	30

Mat.	Avance/Feed (mm/rpm)						Vc (m/min)							
	Ø2	Ø5	Ø10	Ø15	Ø20									
P.1	<600	0,10-0,14	0,20-0,28	0,30-0,45	0,38-0,55	0,48-0,68	0 80-110	0 90-120	0 90-120	0 90-120	0 70-90		0 40-70	0 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	0 40-80	0 50-90	0 50-90	0 50-90	0 40-80		0 30-60	0 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	0 35-75	0 40-85	0 40-85	0 40-85	0 35-55		0 25-50	0 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	0 30-50	0 35-55	0 35-55	0 35-55	0 30-50		0 20-40	0 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	0 25-40	0 30-45	0 30-45	0 30-45	0 25-40		0 15-25	0 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	0 35-75	0 40-85	0 40-85	0 40-85	0 35-55		0 20-25	0 20-25
M.2		0,04-0,08	0,08-0,16	0,12-0,26	0,15-0,32	0,18-0,40	0 35-75	0 40-85	0 40-85	0 40-85	0 35-55		0 20-25	0 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		0 35-55	0 35-55	0 35-55				
M.4		0,03-0,06	0,06-0,12	0,08-0,20	0,10-0,25	0,12-0,30		0 30-45	0 30-45	0 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	0 100-130	0 120-150	0 120-150	0 120-150	0 90-120		0 50-70	0 50-70
K.2		0,08-0,12	0,16-0,24	0,25-0,38	0,32-0,48	0,40-0,60	0 60-80	0 70-90	0 70-90	0 70-90	0 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	0 80-110	0 90-120	0 90-120	0 90-120	0 70-90		0 40-50	0 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	0 70-90	0 80-110	0 80-110	0 80-110	0 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	0 40-60	0 50-70	0 50-70	0 50-70	0 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							0 100-140	0 100-140
N.1.2		0,08-0,12	0,16-0,24	0,25-0,38	0,32-0,48	0,40-0,60							0 70-100	0 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							0 60-80	0 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							0 40-70	0 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							0 40-70	0 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							0 30-60	0 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							0 25-50	0 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							0 30-60	0 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							0 40-70	0 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	0 20-25	0 25-30	0 25-30	0 25-30	0 20-25		0 10-15	0 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		0 20-25	0 20-25	0 20-25	0 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	0 35-75	0 40-85	0 40-85	0 40-85			0 15-25	0 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	0 25-35	0 30-40	0 30-40	0 30-40			0 10-15	0 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	0 20-25	0 25-30	0 25-30	0 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	0 25-35	0 30-40	0 30-40	0 30-40			0 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	0 15-25	0 20-35	0 20-35	0 20-35			0 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		0 15-25	0 15-25	0 15-25			0 10-15	

● Optima / Optimun ○ Alternativo / Alternative



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

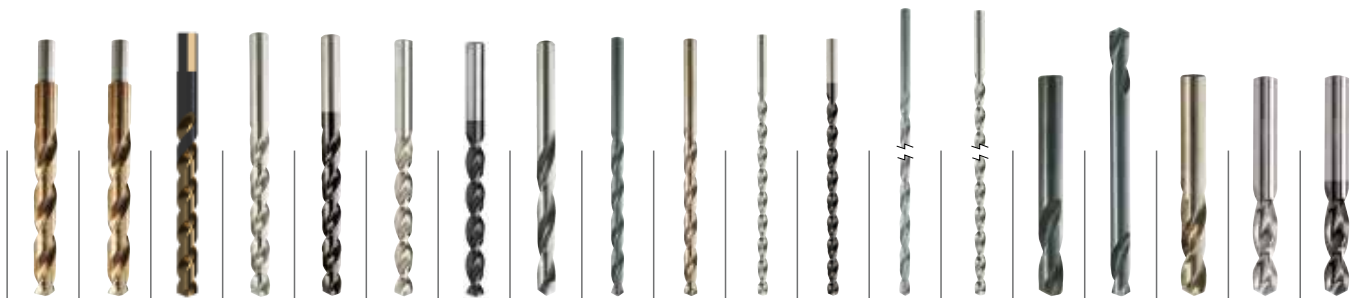


$$\text{r.p.m.} = \frac{V_c \times 1.000}{\pi \times \phi}$$

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)						Vc (m/min)															
	Ø2	Ø5	Ø10	Ø15	Ø20																	
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	○ 25-35	○ 25-35	○ 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										○ 10-14	○ 15-20					
M.2		0,01-0,03	0,05-0,07	0,14-0,18	0,20-0,24	0,22-0,28										○ 8-12	○ 12-18					
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	• 25-30	• 35-40		• 25-30	• 38-45					
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																
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	• 12-16	• 15-20		• 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								○ 75-90								
N.1.2		0,02-0,04	0,05-0,09	0,18-0,21	0,20-0,28	0,25-0,33	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 65-75		○ 50-60	○ 70-80					
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										• 40-60						
N.2.2		0,03-0,05	0,08-0,10	0,18-0,24	0,25-0,32	0,30-0,37										○ 25-60						
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	• 30-60	• 40-70		• 30-60	• 45-80					
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	○ 20-25	○ 20-25	○ 20-25	○ 30-35		○ 20-25	○ 20-25	○ 20-25		○ 20-25	○ 30-35					
N.4.2		0,03-0,04	0,06-0,07	0,12-0,13	0,16-0,17	0,25-0,26																
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																
S.1.2		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		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																
H.2	55 HRC																					
H.3	60 HRC																					

● Optima / Optimun ○ Alternativo / Alternative



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	NSP	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	57	58	58

Vc (m/min)

○ 25-35	○ 25-35	● 35-40						● 25-35	○ 25-35			● 25-35		● 25-35	● 25-35	○ 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
								○ 6-9										
○ 10-14	○ 10-14	● 10-14	● 10-14	● 15-20	○ 10-14	○ 15-20			○ 10-14	○ 10-14	○ 15-20		○ 10-14			○ 10-14	○ 10-14	○ 15-20
○ 8-12	○ 8-12	● 8-12	● 8-12	● 12-18	○ 8-12	○ 12-18			○ 8-12	○ 8-12	○ 12-18		○ 8-12			○ 8-12	○ 8-12	○ 12-18
● 25-30	● 25-30							● 25-30	● 25-30			● 25-30		● 25-30	● 25-30	● 25-30	● 25-30	
● 12-16	● 12-16							● 12-16	● 12-16			● 12-16		● 12-16	● 12-16	● 12-16	● 12-16	
							● 15-20											
		○ 60-80	○ 60-80	○ 85-100	○ 60-80	○ 85-100			○ 60-80	○ 85-100		○ 60-80		○ 60-80		○ 60-80	○ 85-100	
○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 75-90	○ 50-60	○ 75-90		○ 50-60	○ 50-60	○ 50-60	○ 75-90	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 50-60	○ 75-90
		○ 30-40	○ 30-40	○ 45-60	○ 30-40	○ 45-60				○ 30-40	○ 45-60		○ 30-40					
● 30-60	● 30-60	○ 50-70	○ 50-70					● 30-60	● 30-60			● 30-60		● 30-60	● 30-60	● 30-60	● 30-60	
		○ 50-70	○ 50-70	○ 75-95	○ 50-70	○ 70-90				○ 50-70	○ 70-90		○ 50-70				○ 50-70	○ 70-90
○ 20-25	○ 20-25						○ 30-35	○ 20-25	○ 20-25			○ 20-25		○ 20-25	○ 20-25	○ 20-25	○ 20-25	
		● 8-10	● 8-10	● 12-15														

● Optima / Optimun ○ Alternativo / Alternative

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



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

Ref./ Réf. / Ref.	1121	1121/9	1122	1123	1181	1125	1126	1139
DIN	345	345	345	345	1181	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

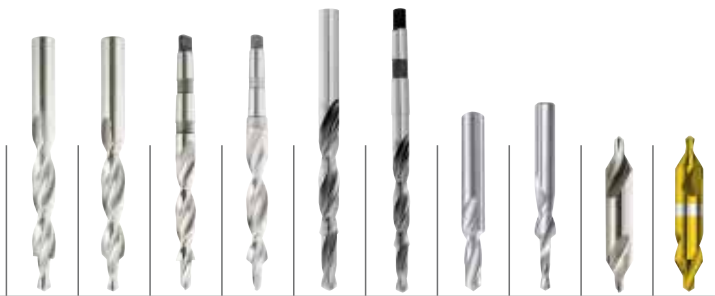
Mat.	Avance/Feed (mm/rpm)						Vc (m/min)							
	$\phi 2$	$\phi 5$	$\phi 10$	$\phi 15$	$\phi 20$									
P.1	<600	0,04-0,06	0,08-0,12	0,20-0,30	0,30-0,40	0,35-0,46	• 25-35	• 25-35	• 25-35		• 25-35	• 25-35	• 25-35	
P.2	<800	0,02-0,06	0,08-0,12	0,12-0,30	0,18-0,40	0,22-0,46	• 15-30	• 15-30	• 15-30	• 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			○ 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	○ 10-25	• 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			○ 6-9	• 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			○ 8-12				○ 8-12	
M.2		0,01-0,03	0,05-0,07	0,14-0,18	0,20-0,24	0,22-0,28			○ 10-14				○ 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				○ 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				○ 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	○ 50-60	○ 50-60	○ 50-60			○ 50-60	○ 50-60	○ 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	○ 20-25	○ 20-25	○ 20-25	○ 30-35		○ 20-25	○ 20-25	○ 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			○ 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					○ 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					○ 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					○ 4-6			
H.2	55 HRC													
H.3	60 HRC													

● Optima / Optimun ○ Alternativo / Alternative



A series of horizontal dotted lines spanning the width of the page, providing a template for writing or drawing.

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

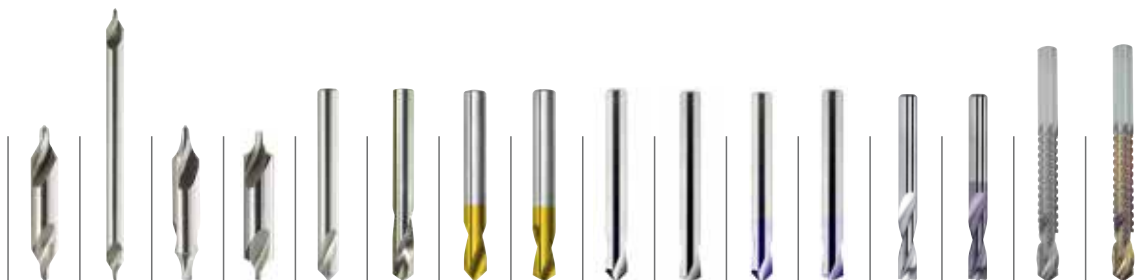


$$r.p.m. = \frac{Vc \times 1.000}{\pi \times \phi}$$

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	180°	90°	180°	90°	90°	90°	90°	90°	60°	60°
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

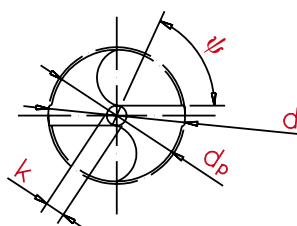
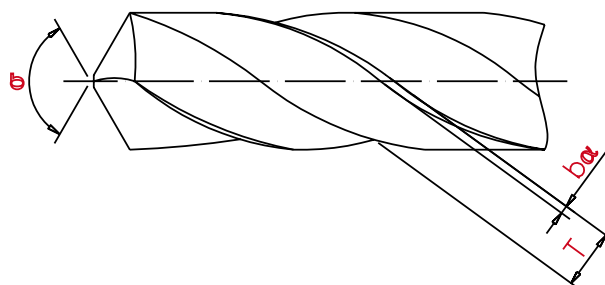
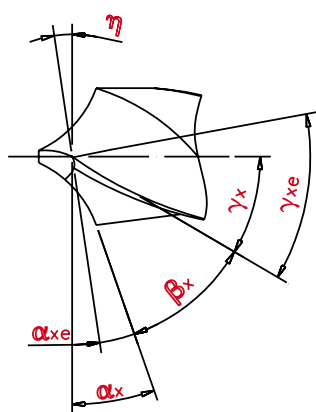
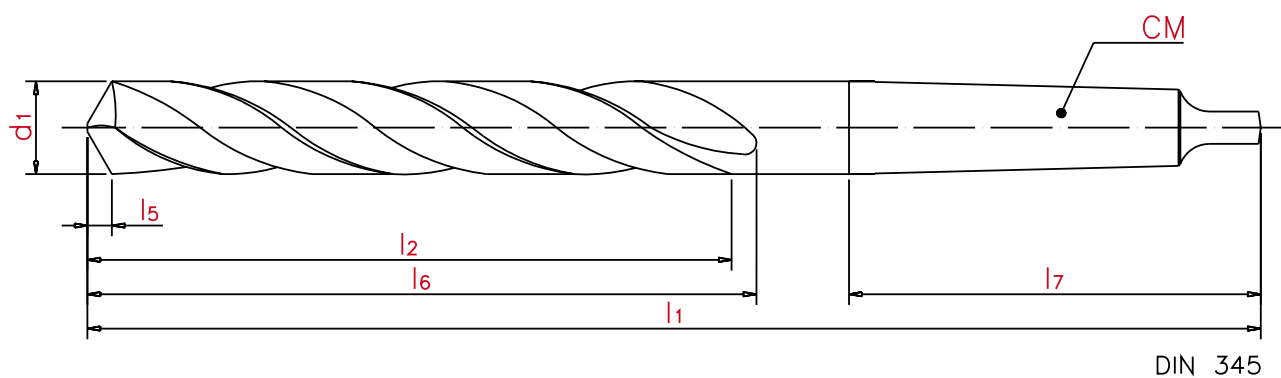
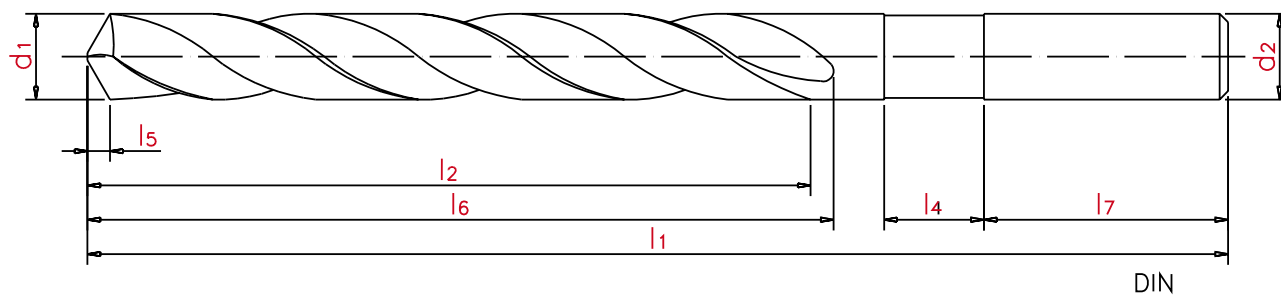
Avance/Feed (mm/rpm) HSS/HSSCo - HM=x2							Vc (m/min)																			
Mat.	Ø2	Ø5	Ø10	Ø15	Ø20																					
P.1	<600	0.04-0.06	0.08-0.12	0.20-0.30	0.30-0.40	0.35-0.46	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
P.2	<800	0.02-0.06	0.08-0.12	0.12-0.30	0.18-0.40	0.22-0.46	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
P.3	<1000	0.02-0.03	0.05-0.07	0.12-0.18	0.18-0.24	0.22-0.28	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
P.4	<1200	0.01-0.04	0.04-0.09	0.09-0.18	0.12-0.28	0.14-0.33									○	○										
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									●	●										
M.2		0.01-0.03	0.05-0.07	0.14-0.18	0.20-0.24	0.22-0.28									●	●										
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	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
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	●	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	
K.4.1		0.04-0.06	0.05-0.09	0.18-0.21	0.20-0.28	0.25-0.33	●	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	
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									●	●										
N.1.2		0.02-0.04	0.05-0.09	0.18-0.21	0.20-0.28	0.25-0.33									●	●										
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	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
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	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N.4.2		0.03-0.04	0.06-0.07	0.12-0.13	0.16-0.17	0.25-0.26									●	●										
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									○	○										
S.1.2		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		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																				
H.2	55 HRC																									
H.3	60 HRC																									

● Optima / Optimun ○ Alternativo / Alternative

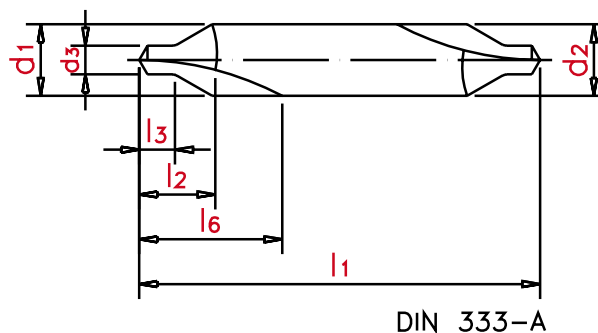
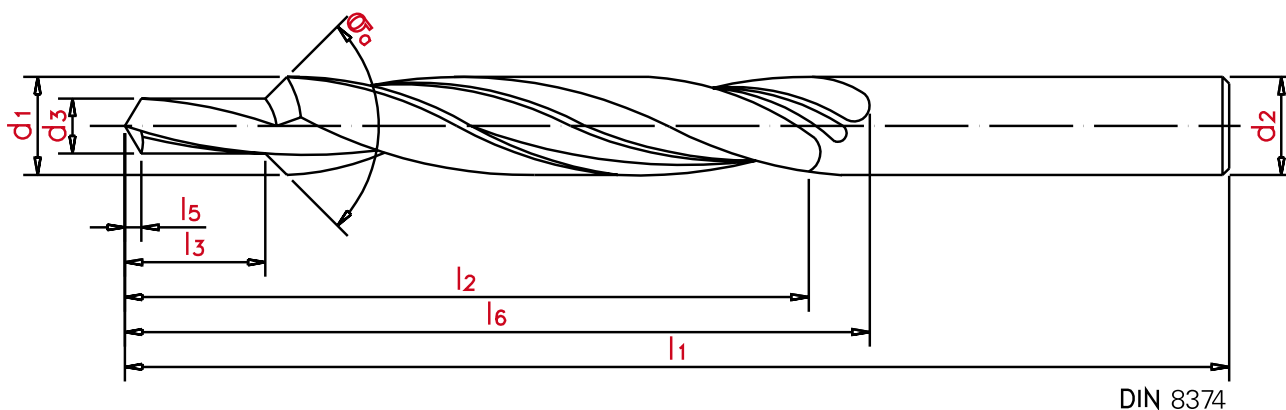


1193	1133	1135	1137	1138	1155	1189	1190	1179	1180	1185	1186	1119	1194	5114	5115
333	333	333	333	CNC	CNC	CNC	CNC	CNC	CNC	CNC	CNC	1897	1897		
60°	60°	Radial	60°-120°	90°	120°	90°	120°	90°	120°	90°	120°	168°-172°	168°-172°	118°	118°
A	A	R	B												
												30°	30°		
HM	HSS	HSS	HSS	HSSCo	HSSCo	HSSCo	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)															
55-60	20-30	20-30	20-30	20-30	20-30	35-40	35-40	60-80	60-80	80-100	80-100	25-30	35-40	20-25	25-35
45-60	20-25	20-25	20-25	20-25	20-25	30-35	30-35	55-70	55-70	70-90	70-90	20-25	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	10-14	10-14	10-14	15-20	10-14	15-20		10-14	10-14	15-20			10-14		
40-55	8-12	8-12	8-12	12-18	8-12	12-18		8-12	8-12	12-18			8-12		
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
40-55								60-80	60-80	80-100	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				
25-30															
100-110															
150-200	10-15	10-15	10-15	25-30	25-30	35-40	35-40	50-70	50-70	50-70	50-70			25-30	35-40
70-100															
20-30															
25-30				10-12	10-12	12-16	12-16	20-30	20-30	25-35	25-35				
25-25															
15-20															
15-20															
10-15															
4-6															

● Optima / Optimun ○ Alternativo / Alternative







<b>l1</b>	Longitud total / Longueur totale / Total length
<b>l2</b>	Longitud de corte / Longueur de coupe / Length of cut
<b>l3</b>	Longitud de corte del diámetro menor / Longueur de coupe du plus petit diamètre / Length of cut of the smaller diameter
<b>l7</b>	Longitud del mango-del cono / Longueur de la queue du cône / Length of cone shank
<b>l5</b>	Longitud de punta / Longueur de pointe / Length of tip
<b>l6</b>	Longitud de ranura / Longueur de rainure / Length of groove
<b>l4</b>	Diámetro de broca / Diamètre de foret / Drill-bit diameter
<b>d1</b>	Longitud de sangrado / Longueur d'indentation / Bled length
<b>d3</b>	Diámetro inicial / Diamètre initial / Initial diameter
<b>d2</b>	Diámetro de mango / Diamètre de queue / Shank diameter
<b>CM</b>	Tamaño del cono morse / Taille du cône morse / Morse taper size
<b>dp</b>	Diámetro posterior / Diamètre postérieur / Rear diameter
<b>b<math>\alpha</math></b>	Ancho de fase / Largeur de phase / Phase width
<b>T</b>	Ancho de alma / Largeur d'âme / Core width
<b>k</b>	Espesor del núcleo / Épaisseur du noyau / Thickness of nucleus
$\sigma$	Ángulo de la punta / Angle de la pointe / Tip angle
<b><math>\sigma\alpha</math></b>	Ángulo de avellanado / Angle de chanfreinage / Countersink angle
$\psi$	Ángulo de corte transversal / Angle de coupe transversale / Transversal cut angle
<b><math>\gamma_{xe}</math></b>	Ángulo de corte lateral efectivo / Angle de coupe latérale effectif / Effective lateral cut angle
<b><math>\gamma_x</math></b>	Ángulo de corte lateral / Angle de coupe latérale / Lateral cut angle
<b><math>\alpha_{xe}</math></b>	Ángulo de incidencia lateral efectivo / Angle d'incidence latérale effectif / Effective lateral angle of incidence
<b><math>\alpha_x</math></b>	Ángulo de incidencia lateral / Angle d'incidence latérale / Lateral angle of incidence
<b><math>\beta_x</math></b>	Ángulo ortogonal de la herramienta / Angle orthogonal de l'outil / Orthogonal angle of the tool
<b><math>\eta</math></b>	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**

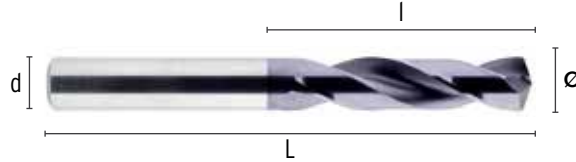


DIN 6535 HA

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

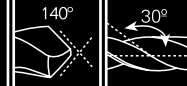


ø mm	d mm	€	L mm	l mm		ø mm	d mm	€	L mm	l mm	
3,00	6,00	36,04	20,00	62,00	1	8,80	10,00	65,13	47,00	89,00	1
3,10	6,00	36,04	20,00	62,00	1	8,90	10,00	65,13	47,00	89,00	1
3,20	6,00	36,04	20,00	62,00	1	9,00	10,00	65,13	47,00	89,00	1
3,30	6,00	36,04	20,00	62,00	1	9,10	10,00	65,13	47,00	89,00	1
3,40	6,00	36,04	20,00	62,00	1	9,20	10,00	65,13	47,00	89,00	1
3,50	6,00	36,04	20,00	62,00	1	9,30	10,00	65,13	47,00	89,00	1
3,60	6,00	36,04	20,00	62,00	1	9,40	10,00	65,13	47,00	89,00	1
3,70	6,00	36,04	20,00	62,00	1	9,50	10,00	65,13	47,00	89,00	1
3,80	6,00	36,04	24,00	66,00	1	9,60	10,00	65,13	47,00	89,00	1
3,90	6,00	36,04	24,00	66,00	1	9,70	10,00	65,13	47,00	89,00	1
4,00	6,00	36,04	24,00	66,00	1	9,80	10,00	65,13	47,00	89,00	1
4,10	6,00	36,04	24,00	66,00	1	9,90	10,00	65,13	47,00	89,00	1
4,20	6,00	36,04	24,00	66,00	1	10,00	10,00	65,13	47,00	89,00	1
4,30	6,00	36,04	24,00	66,00	1	10,10	12,00	98,25	55,00	102,00	1
4,40	6,00	36,04	24,00	66,00	1	10,20	12,00	98,25	55,00	102,00	1
4,50	6,00	36,04	24,00	66,00	1	10,30	12,00	98,25	55,00	102,00	1
4,60	6,00	36,04	24,00	66,00	1	10,40	12,00	98,25	55,00	102,00	1
4,70	6,00	36,04	24,00	66,00	1	10,50	12,00	98,25	55,00	102,00	1
4,80	6,00	36,04	28,00	66,00	1	10,60	12,00	98,25	55,00	102,00	1
4,90	6,00	36,04	28,00	66,00	1	10,70	12,00	98,25	55,00	102,00	1
5,00	6,00	36,04	28,00	66,00	1	10,80	12,00	98,25	55,00	102,00	1
5,10	6,00	36,04	28,00	66,00	1	10,90	12,00	98,25	55,00	102,00	1
5,20	6,00	36,04	28,00	66,00	1	11,00	12,00	98,25	55,00	102,00	1
5,30	6,00	36,04	28,00	66,00	1	11,20	12,00	98,25	55,00	102,00	1
5,40	6,00	36,04	28,00	66,00	1	11,30	12,00	98,25	55,00	102,00	1
5,50	6,00	36,04	28,00	66,00	1	11,50	12,00	98,25	55,00	102,00	1
5,60	6,00	36,04	28,00	66,00	1	11,60	12,00	98,25	55,00	102,00	1
5,70	6,00	36,04	28,00	66,00	1	11,80	12,00	98,25	55,00	102,00	1
5,80	6,00	36,04	28,00	66,00	1	12,00	12,00	98,25	55,00	102,00	1
5,90	6,00	36,04	28,00	66,00	1	12,20	14,00	130,18	60,00	107,00	1
6,00	6,00	36,04	28,00	66,00	1	12,30	14,00	130,18	60,00	107,00	1
6,10	8,00	48,90	34,00	79,00	1	12,50	14,00	130,18	60,00	107,00	1
6,20	8,00	48,90	34,00	79,00	1	12,80	14,00	130,18	60,00	107,00	1
6,30	8,00	48,90	34,00	79,00	1	13,00	14,00	130,18	60,00	107,00	1
6,40	8,00	48,90	34,00	79,00	1	13,30	14,00	130,18	60,00	107,00	1
6,50	8,00	48,90	34,00	79,00	1	13,50	14,00	130,18	60,00	107,00	1
6,60	8,00	48,90	34,00	79,00	1	13,80	14,00	130,18	60,00	107,00	1
6,70	8,00	48,90	34,00	79,00	1	14,00	14,00	130,18	60,00	107,00	1
6,80	8,00	48,90	34,00	79,00	1	14,50	16,00	164,50	65,00	115,00	1
6,90	8,00	48,90	34,00	79,00	1	14,80	16,00	164,50	65,00	115,00	1
7,00	8,00	48,90	34,00	79,00	1	15,00	16,00	164,50	65,00	115,00	1
7,10	8,00	48,90	41,00	79,00	1	15,20	16,00	164,50	65,00	115,00	1
7,20	8,00	48,90	41,00	79,00	1	15,30	16,00	164,50	65,00	115,00	1
7,30	8,00	48,90	41,00	79,00	1	15,40	16,00	164,50	65,00	115,00	1
7,40	8,00	48,90	41,00	79,00	1	15,50	16,00	164,50	65,00	115,00	1
7,50	8,00	48,90	41,00	79,00	1	15,80	16,00	164,50	65,00	115,00	1
7,60	8,00	48,90	41,00	79,00	1	16,00	16,00	164,50	65,00	115,00	1
7,70	8,00	48,90	41,00	79,00	1	16,50	18,00	225,39	73,00	123,00	1
7,80	8,00	48,90	41,00	79,00	1	16,80	18,00	225,39	73,00	123,00	1
7,90	8,00	48,90	41,00	79,00	1	17,00	18,00	225,39	73,00	123,00	1
8,00	8,00	48,90	41,00	79,00	1	17,50	18,00	225,39	73,00	123,00	1
8,10	10,00	65,13	47,00	89,00	1	17,80	18,00	225,39	73,00	123,00	1
8,20	10,00	65,13	47,00	89,00	1	18,00	18,00	225,39	73,00	123,00	1
8,30	10,00	65,13	47,00	89,00	1	18,50	20,00	286,26	79,00	131,00	1
8,40	10,00	65,13	47,00	89,00	1	18,80	20,00	286,26	79,00	131,00	1
8,50	10,00	65,13	47,00	89,00	1	19,00	20,00	286,26	79,00	131,00	1
8,60	10,00	65,13	47,00	89,00	1	19,50	20,00	286,26	79,00	131,00	1
8,70	10,00	65,13	47,00	89,00	1	20,00	20,00	286,26	79,00	131,00	1

**1176**

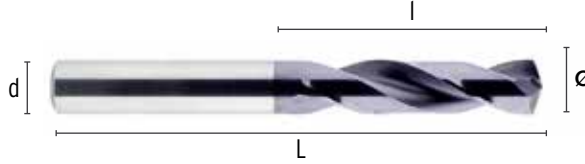
**HM-MD DIN 6537 S**

**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
●	●	●	●	●	○	●	●	●					●	●			○
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		Ø mm	d mm	€	L mm	l mm	
3,00	6,00	57,51	20,00	62,00	1	8,80	10,00	93,75	47,00	89,00	1
3,10	6,00	57,51	20,00	62,00	1	8,90	10,00	93,75	47,00	89,00	1
3,20	6,00	57,51	20,00	62,00	1	9,00	10,00	93,75	47,00	89,00	1
3,30	6,00	57,51	20,00	62,00	1	9,10	10,00	93,75	47,00	89,00	1
3,40	6,00	57,51	20,00	62,00	1	9,20	10,00	93,75	47,00	89,00	1
3,50	6,00	57,51	20,00	62,00	1	9,30	10,00	93,75	47,00	89,00	1
3,60	6,00	57,51	20,00	62,00	1	9,40	10,00	93,75	47,00	89,00	1
3,70	6,00	57,51	20,00	62,00	1	9,50	10,00	93,75	47,00	89,00	1
3,80	6,00	57,51	24,00	66,00	1	9,60	10,00	93,75	47,00	89,00	1
3,90	6,00	57,51	24,00	66,00	1	9,70	10,00	93,75	47,00	89,00	1
4,00	6,00	62,15	24,00	66,00	1	9,80	10,00	93,75	47,00	89,00	1
4,10	6,00	62,15	24,00	66,00	1	9,90	10,00	93,75	47,00	89,00	1
4,20	6,00	62,15	24,00	66,00	1	10,00	10,00	93,75	47,00	89,00	1
4,30	6,00	62,15	24,00	66,00	1	10,10	12,00	132,50	55,00	102,00	1
4,40	6,00	62,15	24,00	66,00	1	10,20	12,00	132,50	55,00	102,00	1
4,50	6,00	62,15	24,00	66,00	1	10,30	12,00	132,50	55,00	102,00	1
4,60	6,00	62,15	24,00	66,00	1	10,40	12,00	132,50	55,00	102,00	1
4,70	6,00	62,15	24,00	66,00	1	10,50	12,00	132,50	55,00	102,00	1
4,80	6,00	62,15	28,00	66,00	1	10,60	12,00	132,50	55,00	102,00	1
4,90	6,00	62,15	28,00	66,00	1	10,70	12,00	132,50	55,00	102,00	1
5,00	6,00	62,15	28,00	66,00	1	10,80	12,00	132,50	55,00	102,00	1
5,10	6,00	62,15	28,00	66,00	1	10,90	12,00	132,50	55,00	102,00	1
5,20	6,00	62,15	28,00	66,00	1	11,00	12,00	132,50	55,00	102,00	1
5,30	6,00	62,15	28,00	66,00	1	11,20	12,00	132,50	55,00	102,00	1
5,40	6,00	62,15	28,00	66,00	1	11,30	12,00	132,50	55,00	102,00	1
5,50	6,00	62,15	28,00	66,00	1	11,50	12,00	132,50	55,00	102,00	1
5,60	6,00	62,15	28,00	66,00	1	11,60	12,00	132,50	55,00	102,00	1
5,70	6,00	62,15	28,00	66,00	1	11,80	12,00	132,50	55,00	102,00	1
5,80	6,00	62,15	28,00	66,00	1	12,00	12,00	132,50	55,00	102,00	1
5,90	6,00	62,15	28,00	66,00	1	12,20	14,00	168,07	60,00	107,00	1
6,00	6,00	62,15	28,00	66,00	1	12,30	14,00	168,07	60,00	107,00	1
6,10	8,00	74,73	34,00	79,00	1	12,50	14,00	168,07	60,00	107,00	1
6,20	8,00	74,73	34,00	79,00	1	12,80	14,00	168,07	60,00	107,00	1
6,30	8,00	74,73	34,00	79,00	1	13,00	14,00	168,07	60,00	107,00	1
6,40	8,00	74,73	34,00	79,00	1	13,30	14,00	168,07	60,00	107,00	1
6,50	8,00	74,73	34,00	79,00	1	13,50	14,00	168,07	60,00	107,00	1
6,60	8,00	74,73	34,00	79,00	1	13,80	14,00	168,07	60,00	107,00	1
6,70	8,00	74,73	34,00	79,00	1	14,00	14,00	168,07	60,00	107,00	1
6,80	8,00	74,73	34,00	79,00	1	14,50	16,00	209,02	65,00	115,00	1
6,90	8,00	74,73	34,00	79,00	1	14,80	16,00	209,02	65,00	115,00	1
7,00	8,00	74,73	34,00	79,00	1	15,00	16,00	209,02	65,00	115,00	1
7,10	8,00	74,73	41,00	79,00	1	15,20	16,00	209,02	65,00	115,00	1
7,20	8,00	74,73	41,00	79,00	1	15,30	16,00	209,02	65,00	115,00	1
7,30	8,00	74,73	41,00	79,00	1	15,40	16,00	209,02	65,00	115,00	1
7,40	8,00	74,73	41,00	79,00	1	15,50	16,00	209,02	65,00	115,00	1
7,50	8,00	74,73	41,00	79,00	1	15,80	16,00	209,02	65,00	115,00	1
7,60	8,00	74,73	41,00	79,00	1	16,00	16,00	209,02	65,00	115,00	1
7,70	8,00	74,73	41,00	79,00	1	16,50	18,00	333,43	73,00	123,00	1
7,80	8,00	74,73	41,00	79,00	1	16,80	18,00	333,43	73,00	123,00	1
7,90	8,00	74,73	41,00	79,00	1	17,00	18,00	333,43	73,00	123,00	1
8,00	8,00	74,73	41,00	79,00	1	17,50	18,00	333,43	73,00	123,00	1
8,10	10,00	93,75	47,00	89,00	1	17,80	18,00	333,43	73,00	123,00	1
8,20	10,00	93,75	47,00	89,00	1	18,00	18,00	333,43	73,00	123,00	1
8,30	10,00	93,75	47,00	89,00	1	18,50	20,00	362,05	79,00	131,00	1
8,40	10,00	93,75	47,00	89,00	1	18,80	20,00	362,05	79,00	131,00	1
8,50	10,00	93,75	47,00	89,00	1	19,00	20,00	362,05	79,00	131,00	1
8,60	10,00	93,75	47,00	89,00	1	19,50	20,00	362,05	79,00	131,00	1
8,70	10,00	93,75	47,00	89,00	1	20,00	20,00	362,05	79,00	131,00	1



# BROCAS METAL DURO FORETS CARBURE / HARD METAL DRILL-BITS / HARTMETALL-BOHRER

1177

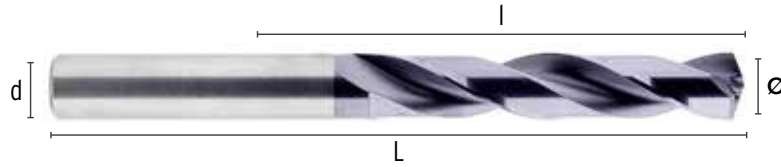
HM-MD DIN 6537 L

5XD



P				M		K			N				S		H		
<800	<1.000	<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		Ø mm	d mm	€	L mm	l mm	
3,00	6,00	66,19	28,00	66,00	1	8,80	10,00	98,64	61,00	103,00	1
3,10	6,00	66,19	28,00	66,00	1	8,90	10,00	98,64	61,00	103,00	1
3,20	6,00	66,19	28,00	66,00	1	9,00	10,00	98,64	61,00	103,00	1
3,30	6,00	66,19	28,00	66,00	1	9,10	10,00	98,64	61,00	103,00	1
3,40	6,00	66,19	28,00	66,00	1	9,20	10,00	98,64	61,00	103,00	1
3,50	6,00	66,19	28,00	66,00	1	9,30	10,00	98,64	61,00	103,00	1
3,60	6,00	66,19	28,00	66,00	1	9,40	10,00	98,64	61,00	103,00	1
3,70	6,00	66,19	28,00	66,00	1	9,50	10,00	98,64	61,00	103,00	1
3,80	6,00	66,19	36,00	74,00	1	9,60	10,00	98,64	61,00	103,00	1
3,90	6,00	66,19	36,00	74,00	1	9,70	10,00	98,64	61,00	103,00	1
4,00	6,00	70,36	36,00	74,00	1	9,80	10,00	98,64	61,00	103,00	1
4,10	6,00	70,36	36,00	74,00	1	9,90	10,00	98,64	61,00	103,00	1
4,20	6,00	70,36	36,00	74,00	1	10,00	10,00	98,64	61,00	103,00	1
4,30	6,00	70,36	36,00	74,00	1	10,10	12,00	139,72	71,00	118,00	1
4,40	6,00	70,36	36,00	74,00	1	10,20	12,00	139,72	71,00	118,00	1
4,50	6,00	70,36	36,00	74,00	1	10,30	12,00	139,72	71,00	118,00	1
4,60	6,00	70,36	36,00	74,00	1	10,40	12,00	139,72	71,00	118,00	1
4,70	6,00	70,36	36,00	74,00	1	10,50	12,00	139,72	71,00	118,00	1
4,80	6,00	70,36	44,00	82,00	1	10,60	12,00	139,72	71,00	118,00	1
4,90	6,00	70,36	44,00	82,00	1	10,70	12,00	139,72	71,00	118,00	1
5,00	6,00	70,36	44,00	82,00	1	10,80	12,00	139,72	71,00	118,00	1
5,10	6,00	70,36	44,00	82,00	1	10,90	12,00	139,72	71,00	118,00	1
5,20	6,00	70,36	44,00	82,00	1	11,00	12,00	139,72	71,00	118,00	1
5,30	6,00	70,36	44,00	82,00	1	11,20	12,00	139,72	71,00	118,00	1
5,40	6,00	70,36	44,00	82,00	1	11,30	12,00	139,72	71,00	118,00	1
5,50	6,00	70,36	44,00	82,00	1	11,50	12,00	139,72	71,00	118,00	1
5,60	6,00	70,36	44,00	82,00	1	11,60	12,00	139,72	71,00	118,00	1
5,70	6,00	70,36	44,00	82,00	1	11,80	12,00	139,72	71,00	118,00	1
5,80	6,00	70,36	44,00	82,00	1	12,00	12,00	139,72	71,00	118,00	1
5,90	6,00	70,36	44,00	82,00	1	12,20	14,00	186,70	77,00	124,00	1
6,00	6,00	70,36	44,00	82,00	1	12,30	14,00	186,70	77,00	124,00	1
6,10	8,00	78,64	53,00	91,00	1	12,50	14,00	186,70	77,00	124,00	1
6,20	8,00	78,64	53,00	91,00	1	12,80	14,00	186,70	77,00	124,00	1
6,30	8,00	78,64	53,00	91,00	1	13,00	14,00	186,70	77,00	124,00	1
6,40	8,00	78,64	53,00	91,00	1	13,30	14,00	186,70	77,00	124,00	1
6,50	8,00	78,64	53,00	91,00	1	13,50	14,00	186,70	77,00	124,00	1
6,60	8,00	78,64	53,00	91,00	1	13,80	14,00	186,70	77,00	124,00	1
6,70	8,00	78,64	53,00	91,00	1	14,00	14,00	186,70	77,00	124,00	1
6,80	8,00	78,64	53,00	91,00	1	14,50	16,00	232,20	83,00	133,00	1
6,90	8,00	78,64	53,00	91,00	1	14,80	16,00	232,20	83,00	133,00	1
7,00	8,00	78,64	53,00	91,00	1	15,00	16,00	232,20	83,00	133,00	1
7,10	8,00	78,64	53,00	91,00	1	15,20	16,00	232,20	83,00	133,00	1
7,20	8,00	78,64	53,00	91,00	1	15,30	16,00	232,20	83,00	133,00	1
7,30	8,00	78,64	53,00	91,00	1	15,40	16,00	232,20	83,00	133,00	1
7,40	8,00	78,64	53,00	91,00	1	15,50	16,00	232,20	83,00	133,00	1
7,50	8,00	78,64	53,00	91,00	1	15,80	16,00	232,20	83,00	133,00	1
7,60	8,00	78,64	53,00	91,00	1	16,00	16,00	232,20	83,00	133,00	1
7,70	8,00	78,64	53,00	91,00	1	16,50	18,00	370,27	93,00	143,00	1
7,80	8,00	78,64	53,00	91,00	1	16,80	18,00	370,27	93,00	143,00	1
7,90	8,00	78,64	53,00	91,00	1	17,00	18,00	370,27	93,00	143,00	1
8,00	8,00	78,64	53,00	91,00	1	17,50	18,00	370,27	93,00	143,00	1
8,10	10,00	98,64	61,00	103,00	1	17,80	18,00	370,27	93,00	143,00	1
8,20	10,00	98,64	61,00	103,00	1	18,00	18,00	370,27	93,00	143,00	1
8,30	10,00	98,64	61,00	103,00	1	18,50	20,00	402,67	101,00	153,00	1
8,40	10,00	98,64	61,00	103,00	1	18,80	20,00	402,67	101,00	153,00	1
8,50	10,00	98,64	61,00	103,00	1	19,00	20,00	402,67	101,00	153,00	1
8,60	10,00	98,64	61,00	103,00	1	19,50	20,00	402,67	101,00	153,00	1
8,70	10,00	98,64	61,00	103,00	1	20,00	20,00	402,67	101,00	153,00	1

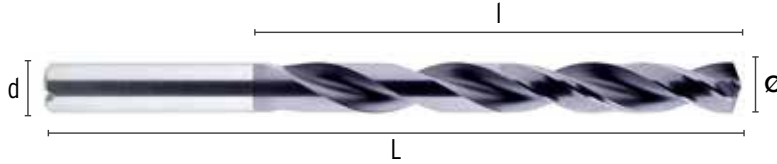
**1178** **HM-MD DIN 6537 EL**

**8XD**



P				M		K			N				S		H		
<800	<1.000	<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

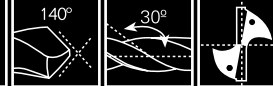


Ø mm	d mm	€	L mm	l mm	Icon	Ø mm	d mm	€	L mm	l mm	Icon
3,00	6,00	157,28	30,00	70,00	1	8,40*	10,00	220,22	87,00	131,00	1
3,10*	6,00	157,28	30,00	70,00	1	8,50	10,00	220,22	87,00	131,00	1
3,20*	6,00	157,28	30,00	70,00	1	8,60*	10,00	220,22	87,00	131,00	1
3,30	6,00	157,28	30,00	70,00	1	8,70*	10,00	220,22	87,00	131,00	1
3,40*	6,00	157,28	35,00	75,00	1	8,80*	10,00	220,22	87,00	131,00	1
3,50	6,00	157,28	35,00	75,00	1	8,90*	10,00	220,22	87,00	131,00	1
3,60*	6,00	157,28	35,00	75,00	1	9,00	10,00	220,22	87,00	131,00	1
3,70	6,00	157,28	35,00	75,00	1	9,10*	10,00	220,22	95,00	139,00	1
3,80*	6,00	157,28	37,00	75,00	1	9,20*	10,00	220,22	95,00	139,00	1
3,90*	6,00	157,28	37,00	75,00	1	9,30*	10,00	220,22	95,00	139,00	1
4,00	6,00	157,28	37,00	75,00	1	9,40*	10,00	220,22	95,00	139,00	1
4,10*	6,00	157,28	37,00	75,00	1	9,50	10,00	220,22	95,00	139,00	1
4,20	6,00	157,28	37,00	75,00	1	9,60*	10,00	220,22	95,00	139,00	1
4,30*	6,00	157,28	45,00	85,00	1	9,70*	10,00	220,22	95,00	139,00	1
4,40*	6,00	157,28	45,00	85,00	1	9,80*	10,00	220,22	95,00	139,00	1
4,50	6,00	157,28	45,00	85,00	1	9,90*	10,00	220,22	95,00	139,00	1
4,60*	6,00	157,28	45,00	85,00	1	10,00	10,00	220,22	95,00	139,00	1
4,70*	6,00	157,28	45,00	85,00	1	10,10*	12,00	300,78	106,00	155,00	1
4,80*	6,00	157,28	50,00	90,00	1	10,20	12,00	300,78	106,00	155,00	1
4,90*	6,00	157,28	50,00	90,00	1	10,30*	12,00	300,78	106,00	155,00	1
5,00	6,00	157,28	50,00	90,00	1	10,40*	12,00	300,78	106,00	155,00	1
5,10*	6,00	157,28	50,00	90,00	1	10,50	12,00	300,78	106,00	155,00	1
5,20*	6,00	157,28	50,00	90,00	1	10,60*	12,00	300,78	106,00	155,00	1
5,30*	6,00	157,28	50,00	90,00	1	10,70*	12,00	300,78	106,00	155,00	1
5,40*	6,00	157,28	57,00	97,00	1	10,80*	12,00	300,78	106,00	155,00	1
5,50	6,00	157,28	57,00	97,00	1	10,90*	12,00	300,78	106,00	155,00	1
5,60*	6,00	157,28	57,00	97,00	1	11,00	12,00	300,78	106,00	155,00	1
5,70*	6,00	157,28	57,00	97,00	1	11,20*	12,00	300,78	114,00	163,00	1
6,00	6,00	157,28	57,00	97,00	1	11,30*	12,00	300,78	114,00	163,00	1
6,10*	8,00	182,79	66,00	106,00	1	11,40*	12,00	300,78	114,00	163,00	1
6,20*	8,00	182,79	66,00	106,00	1	11,50*	12,00	300,78	114,00	163,00	1
6,30*	8,00	182,79	66,00	106,00	1	11,60*	12,00	300,78	114,00	163,00	1
6,40*	8,00	182,79	66,00	106,00	1	11,80*	12,00	300,78	114,00	163,00	1
6,50	8,00	182,79	66,00	106,00	1	12,00	12,00	300,78	114,00	163,00	1
6,60*	8,00	182,79	66,00	106,00	1	12,20*	14,00	428,18	133,00	182,00	1
6,70*	8,00	182,79	66,00	106,00	1	12,30*	14,00	428,18	133,00	182,00	1
6,80	8,00	182,79	66,00	106,00	1	12,50*	14,00	428,18	133,00	182,00	1
6,90*	8,00	182,79	76,00	116,00	1	13,00	14,00	428,18	133,00	182,00	1
7,00	8,00	182,79	76,00	116,00	1	13,50*	14,00	428,18	133,00	182,00	1
7,10*	8,00	182,79	76,00	116,00	1	14,00	14,00	428,18	133,00	182,00	1
7,20*	8,00	182,79	76,00	116,00	1	14,50*	16,00	533,71	152,00	204,00	1
7,30*	8,00	182,79	76,00	116,00	1	15,00	16,00	533,71	152,00	204,00	1
7,40*	8,00	182,79	76,00	116,00	1	15,50*	16,00	533,71	152,00	204,00	1
7,50	8,00	182,79	76,00	116,00	1	16,00	16,00	533,71	152,00	204,00	1
7,60*	8,00	182,79	76,00	116,00	1	16,50*	18,00	596,42	171,00	223,00	1
7,70*	8,00	182,79	76,00	116,00	1	17,00*	18,00	596,42	171,00	223,00	1
7,80*	8,00	182,79	76,00	116,00	1	17,50*	18,00	666,49	171,00	223,00	1
7,90*	8,00	182,79	76,00	116,00	1	18,00*	18,00	666,49	171,00	223,00	1
8,00	8,00	182,79	76,00	116,00	1	18,50*	20,00	943,93	190,00	244,00	1
8,10*	10,00	220,22	87,00	131,00	1	19,00*	20,00	943,93	190,00	244,00	1
8,20*	10,00	220,22	87,00	131,00	1	19,50*	20,00	943,93	190,00	244,00	1
8,30*	10,00	220,22	87,00	131,00	1	20,00*	20,00	943,93	190,00	244,00	1

\* Bajo demanda / Sur demande / Upon request / Auf nachfrage

**1184** **HM-MD**

**12XD**

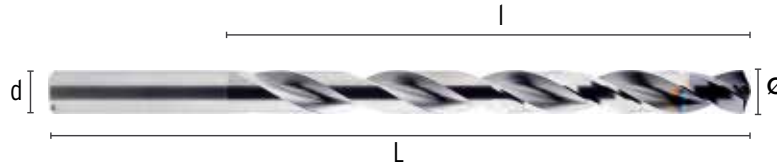


DIN 6535 HA

**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

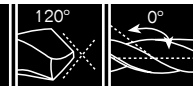


∅ mm	d mm	€	L mm	l mm	
3,00	6	211,27	90	50	1
3,30	6	211,27	90	50	1
3,50	6	211,27	90	50	1
3,70	6	211,27	90	50	1
4,00	6	211,27	102	64	1
4,20	6	211,27	102	64	1
4,50	6	211,27	102	64	1
4,70	6	211,27	102	64	1
5,00	6	211,27	116	78	1
5,50	6	211,27	116	78	1
6,00	6	211,27	116	78	1
6,50	8	260,43	146	108	1
6,80	8	260,43	146	108	1
7,00	8	260,43	146	108	1

∅ mm	d mm	€	L mm	l mm	
7,50	8	260,43	146	108	1
8,00	8	260,43	146	108	1
8,50	10	328,34	162	120	1
9,00	10	328,34	162	120	1
9,50	10	328,34	162	120	1
10,00	10	328,34	162	120	1
10,20	12	435,66	204	156	1
10,50	12	435,66	204	156	1
11,00	12	435,66	204	156	1
12,00	12	435,66	204	156	1
13,00	14	539,74	230	182	1
14,00	14	539,74	230	182	1
15,00	16	763,79	260	208	1
16,00	16	763,79	260	208	1

**1182** **HM-MD**

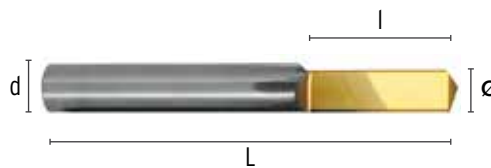
**1XD**



**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"**

∅ mm	M	€	L mm	l mm	d mm
2,5	M3	87,32	38	10	3
3,3	M4	120,11	46	14	4
4,2	M5	135,18	50	19	5
5	M6	150,12	50	23	6

∅ mm	M	€	L mm	l mm	d mm
6,8	M8	165,19	60	23	8
8,5	M10	210,18	80	25	10
10,2	M12	313,08	80	35	12

**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	Icon	Ø mm	€	L mm	l mm	Icon
2,00	7,29	38	12	1	6,40	29,10	70	31	1
2,10	7,95	38	12	1	6,50	29,10	70	31	1
2,20	7,95	40	13	1	6,60	35,21	70	31	1
2,30	7,95	40	13	1	6,70	35,21	70	31	1
2,40	7,95	43	14	1	6,80	35,21	74	34	1
2,50	7,95	43	14	1	6,90	35,21	74	34	1
2,60	7,95	43	14	1	7,00	34,00	74	34	1
2,70	10,67	46	16	1	7,10	41,38	74	34	1
2,80	10,88	46	16	1	7,20	41,38	74	34	1
2,90	10,88	46	16	1	7,30	41,38	74	34	1
3,00	10,67	46	16	1	7,40	41,38	74	34	1
3,10	10,88	49	18	1	7,50	41,38	74	34	1
3,20	10,88	49	18	1	7,60	50,70	79	37	1
3,30	10,88	49	18	1	7,70	50,70	79	37	1
3,40	12,15	52	20	1	7,80	50,70	79	37	1
3,50	12,15	52	20	1	7,90	50,70	79	37	1
3,60	13,41	52	20	1	8,00	46,09	79	37	1
3,70	13,41	52	20	1	8,10	58,28	79	37	1
3,80	13,97	52	20	1	8,20	58,28	79	37	1
3,90	13,97	55	22	1	8,30	58,28	79	37	1
4,00	13,97	55	22	1	8,40	58,28	79	37	1
4,10	15,22	55	22	1	8,50	58,28	79	37	1
4,20	15,22	55	22	1	8,60	61,87	84	40	1
4,30	15,98	58	24	1	8,70	61,87	84	40	1
4,40	15,98	58	24	1	8,80	61,87	84	40	1
4,50	15,98	58	24	1	8,90	61,87	84	40	1
4,60	15,98	58	24	1	9,00	59,60	84	40	1
4,70	16,99	58	24	1	9,10	59,60	84	40	1
4,80	16,99	62	26	1	9,20	61,37	84	40	1
4,90	16,99	62	26	1	9,30	61,37	84	40	1
5,00	16,99	62	26	1	9,40	61,37	84	40	1
5,10	22,56	62	26	1	9,50	65,61	84	40	1
5,20	22,56	62	26	1	9,60	65,61	89	43	1
5,30	24,65	62	26	1	9,70	65,61	89	43	1
5,40	24,65	66	28	1	9,80	65,61	89	43	1
5,50	22,56	66	28	1	9,90	65,61	89	43	1
5,60	26,05	66	28	1	10,00	82,76	89	43	1
5,70	26,05	66	28	1	10,20	84,39	89	43	1
5,80	23,67	66	28	1	10,50	99,71	89	43	1
5,90	26,05	66	28	1	11,00	106,69	95	47	1
6,00	23,67	66	28	1	11,50	113,69	95	47	1
6,10	29,10	70	31	1	12,00	113,69	102	51	1
6,20	29,10	70	31	1	13,00	170,34	102	51	1
6,30	29,10	70	31	1					

**1109**

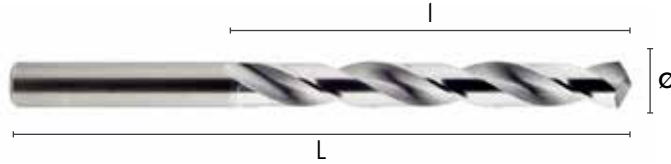
**HM-MD DIN 338 N**

**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



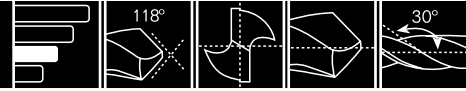
Ø mm	€	L mm	l mm	Icon	Ø mm	€	L mm	l mm	Icon
2,00	9,82	49	24	1	4,60	28,74	80	47	1
2,10	11,59	49	24	1	4,70	28,74	80	47	1
2,20	12,19	53	27	1	4,80	28,74	86	52	1
2,30	12,19	53	27	1	4,90	28,74	86	52	1
2,40	12,19	57	30	1	5,00	28,74	86	52	1
2,50	12,19	57	30	1	5,10	35,26	86	52	1
2,60	14,47	57	30	1	5,20	35,26	86	52	1
2,70	14,87	61	33	1	5,30	35,26	86	52	1
2,80	14,87	61	33	1	5,40	35,26	93	57	1
2,90	14,87	61	33	1	5,50	35,26	93	57	1
3,00	14,87	61	33	1	5,60	37,90	93	57	1
3,10	15,18	65	36	1	5,70	37,90	93	57	1
3,20	15,78	65	36	1	5,80	37,90	93	57	1
3,30	15,88	65	36	1	5,90	37,90	93	57	1
3,40	17,71	70	39	1	6,00	37,90	93	57	1
3,50	17,10	70	39	1	6,10	47,70	101	63	1
3,60	18,37	70	39	1	6,20	47,70	101	63	1
3,70	18,37	70	39	1	6,30	47,70	101	63	1
3,80	18,56	75	43	1	6,40	47,70	101	63	1
3,90	19,28	75	43	1	6,50	47,70	101	63	1
4,00	19,48	75	43	1	6,80	59,35	109	69	1
4,10	24,49	75	43	1	7,00	59,35	109	69	1
4,20	24,49	75	43	1	8,00	81,86	117	75	1
4,30	24,49	80	47	1	8,50	93,95	117	75	1
4,40	24,49	80	47	1	10,00	151,87	113	87	1
4,50	24,43	80	47	1	10,20	151,87	113	87	1



# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

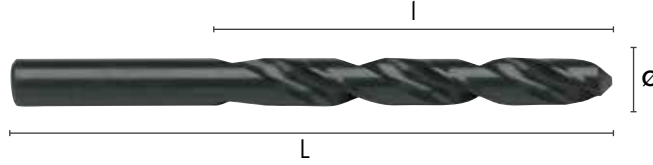
1101

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	Icon	Ø mm	€	L mm	l mm	Icon
0,20	2,69	19	2,50	10	2,70	1,19	61	33	10
0,25	2,69	19	3	10	2,75	1,06	61	33	10
0,30	2,69	19	3	10	2,80	1,19	61	33	10
0,35	2,69	19	3	10	2,85	1,30	61	33	10
0,40	2,69	20	5	10	2,90	1,19	61	33	10
0,45	2,69	22	6	10	2,95	1,30	61	33	10
0,50	1,99	22	6	10	3,00	0,83	61	33	10
0,55	2,02	24	7	10	3,05	1,38	65	36	10
0,60	2,02	24	7	10	3,10	1,18	65	36	10
0,65	2,02	26	8	10	3,15	1,38	65	36	10
0,70	2,02	28	9	10	3,20	1,18	65	36	10
0,75	1,91	28	9	10	3,25	1,04	65	36	10
0,80	1,91	30	10	10	3,30	1,25	65	36	10
0,85	1,91	30	10	10	3,35	1,38	70	39	10
0,90	1,91	32	11	10	3,40	1,25	70	39	10
0,95	1,91	32	11	10	3,45	1,38	70	39	10
1,00	1,14	34	12	10	3,50	1,04	70	39	10
1,05	1,43	34	12	10	3,55	1,54	70	39	10
1,10	1,30	36	14	10	3,60	1,38	70	39	10
1,15	1,30	36	14	10	3,65	1,54	70	39	10
1,20	1,30	38	16	10	3,70	1,38	70	39	10
1,25	1,06	38	16	10	3,75	1,26	70	39	10
1,30	1,19	38	16	10	3,80	1,38	75	43	10
1,35	1,30	40	18	10	3,90	1,38	75	43	10
1,40	1,19	40	18	10	3,95	1,53	75	43	10
1,45	1,24	40	18	10	4,00	1,07	75	43	10
1,50	0,96	40	18	10	4,05	1,64	75	43	10
1,55	1,24	43	20	10	4,10	1,49	75	43	10
1,60	1,14	43	20	10	4,15	1,64	75	43	10
1,65	1,24	43	20	10	4,20	1,49	75	43	10
1,70	1,14	43	20	10	4,25	1,38	75	43	10
1,75	1,06	46	22	10	4,30	1,63	80	47	10
1,80	1,14	46	22	10	4,40	1,63	80	47	10
1,85	1,14	46	22	10	4,50	1,38	80	47	10
1,90	1,14	46	22	10	4,55	2,02	80	47	10
1,95	1,24	49	24	10	4,60	1,84	80	47	10
2,00	0,94	49	24	10	4,65	2,02	80	47	10
2,05	1,24	49	24	10	4,70	1,84	80	47	10
2,10	1,14	49	24	10	4,75	1,70	80	47	10
2,15	1,24	53	27	10	4,80	1,84	86	52	10
2,20	1,14	53	27	10	4,90	1,84	86	52	10
2,25	1,04	53	27	10	5,00	1,36	86	52	10
2,30	1,14	53	27	10	5,10	2,05	86	52	10
2,35	1,14	53	27	10	5,20	2,26	86	52	10
2,40	1,14	57	30	10	5,25	1,73	86	52	10
2,45	1,24	57	30	10	5,30	2,05	86	52	10
2,50	0,94	57	30	10	5,40	2,05	93	57	10
2,55	1,30	57	30	10	5,50	1,73	93	57	10
2,60	1,19	57	30	10	5,60	2,36	93	57	10
2,65	1,19	57	30	10	5,70	2,36	93	57	10

**P** Aceros Aciers Steels Stähle

**M** Aceros Inox Aciers Inox Stainless Steels Edelstahl

**K** Fundicion Fonte Cast Iron Gusseisen



**N** Metales no ferrosos Métal non Ferreaux Non Ferrous metals NE-Metalle

**S** Titanio y Superalaciones Titanium et Superalloys Titanium and Superalloys Titan und Superlegierungen

**H** Materiales Duros Materials Durs Hard materials Hartmaterialien

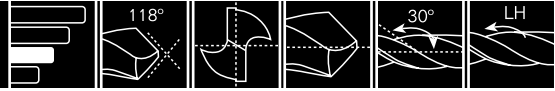
**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

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

Ø mm	€	L mm	l mm		Ø mm	€	L mm	l mm	
5,75	2,15	93	57	10	10,10	7,34	133	87	5
5,80	2,36	93	57	10	10,20	7,34	133	87	5
5,85	2,59	93	57	10	10,25	6,75	133	87	5
5,90	2,36	93	57	10	10,30	7,34	133	87	5
6,00	1,82	93	57	10	10,40	7,34	133	87	5
6,10	2,77	101	63	10	10,50	6,14	133	87	5
6,20	2,77	101	63	10	10,60	8,19	133	87	5
6,25	2,54	101	63	10	10,70	8,19	142	94	5
6,30	2,77	101	63	10	10,75	7,52	142	94	5
6,35	3,05	101	63	10	10,80	8,19	142	94	5
6,40	2,77	101	63	10	10,90	8,19	142	94	5
6,50	2,34	101	63	10	11,00	6,82	142	94	5
6,60	3,20	101	63	10	11,10	9,11	142	94	5
6,70	3,20	101	63	10	11,20	9,11	142	94	5
6,75	2,94	109	69	10	11,25	8,36	142	94	5
6,80	3,20	109	69	10	11,30	9,11	142	94	5
6,90	3,20	109	69	10	11,40	9,11	142	94	5
6,95	3,54	109	69	10	11,50	7,56	142	94	5
7,00	2,69	109	69	10	11,60	9,58	142	94	5
7,10	3,64	109	69	10	11,70	9,58	142	94	5
7,20	3,64	109	69	10	11,75	8,80	142	94	5
7,25	3,35	109	69	10	11,80	9,58	142	94	5
7,30	3,64	109	69	10	11,90	9,58	151	101	5
7,35	3,99	109	69	10	12,00	8,01	151	101	5
7,40	3,64	109	69	10	12,10	10,80	151	101	5
7,50	3,03	109	69	10	12,20	10,80	151	101	5
7,60	3,98	117	75	10	12,25	9,88	151	101	5
7,65	4,38	117	75	10	12,30	10,80	151	101	5
7,70	3,98	117	75	10	12,40	10,80	151	101	5
7,75	3,65	117	75	10	12,50	8,97	151	101	5
7,80	3,98	117	75	10	12,60	11,79	151	101	5
7,90	3,98	117	75	10	12,70	11,79	151	101	5
7,95	4,38	117	75	10	12,75	10,80	151	101	5
8,00	3,17	117	75	10	12,80	11,79	151	101	5
8,10	4,74	117	75	10	12,90	11,79	151	101	5
8,15	5,22	117	75	10	13,00	9,86	151	101	5
8,20	4,74	117	75	10	13,25	13,75	160	108	4
8,25	4,37	117	75	10	13,50	12,51	160	108	4
8,30	4,74	117	75	10	13,75	14,88	160	108	4
8,40	4,74	117	75	10	14,00	13,53	160	108	4
8,45	5,22	117	75	10	14,25	16,96	169	114	4
8,50	3,98	117	75	10	14,50	15,42	169	114	4
8,60	5,18	125	81	10	14,75	19,40	169	114	4
8,65	5,70	125	81	10	15,00	17,63	169	114	4
8,70	5,18	125	81	10	15,25	23,38	178	120	1
8,75	4,74	125	81	10	15,50	21,27	178	120	1
8,80	5,18	125	81	10	15,75	23,38	178	120	1
8,90	5,70	125	81	10	16,00	21,27	178	120	1
8,95	5,70	125	81	10	16,25	30,24	184	125	1
9,00	4,36	125	81	10	16,50	27,46	184	125	1
9,05	6,17	125	81	10	16,75	30,24	184	125	1
9,10	5,82	125	81	10	17,00	27,46	184	125	1
9,20	5,82	125	81	10	17,25	33,64	191	130	1
9,25	5,82	125	81	10	17,50	30,59	191	130	1
9,30	5,82	125	81	10	17,75	33,64	191	130	1
9,35	6,43	125	81	10	18,00	30,59	191	130	1
9,40	5,82	125	81	10	18,25	37,55	198	135	1
9,45	6,43	125	81	10	18,50	34,13	198	135	1
9,50	4,89	125	81	10	18,75	37,55	198	135	1
9,60	6,52	133	87	10	19,00	34,13	198	135	1
9,70	6,52	133	87	10	19,25	45,01	205	140	1
9,75	5,97	133	87	10	19,50	40,93	205	140	1
9,80	6,52	133	87	10	19,75	45,00	205	140	1
9,90	6,52	133	87	10	20,00	40,93	205	140	1
10,00	4,97	133	87	5					

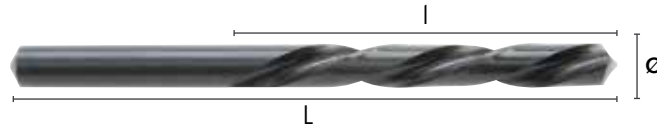
# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

## 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	4,57	49	24	10
2,25	5,05	53	27	10
2,50	4,57	57	30	10
2,75	5,22	61	33	10
3,00	4,07	61	33	10
3,25	5,09	65	36	10
3,50	5,09	70	39	10
3,75	6,28	70	39	10
4,00	5,25	75	43	10
4,50	6,68	80	47	10
5,00	6,64	86	52	10
5,25	8,45	86	52	10
5,50	8,45	93	57	10

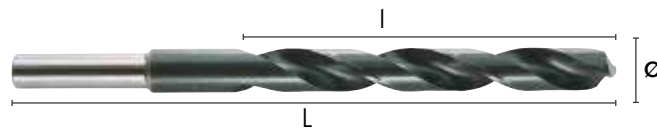
Ø mm	€	L mm	l mm	📦
6,00	8,96	93	57	10
6,50	11,37	101	63	10
7,00	13,15	109	69	10
7,50	14,97	109	69	10
8,00	15,53	117	75	10
8,50	19,56	117	75	10
9,00	21,26	125	81	10
9,50	23,86	125	81	10
10,00	24,39	133	87	5
10,50	30,64	133	87	5
11,00	34,09	142	94	5
11,50	37,79	142	94	5
12,00	39,30	151	101	5

## 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	8,47	133	87	1
10,50	8	9,73	133	87	1
11,00	8	9,73	142	94	1
11,50	8	10,88	142	94	1
12,00	8	10,88	151	101	1
12,50	8	12,00	151	101	1
13,00	10	13,23	151	101	1
13,25	10	16,86	160	108	1
13,50	10	16,86	160	108	1
13,75	10	18,33	160	108	1
14,00	10	16,86	160	108	1
14,25	10	21,14	169	114	1
14,40	10	20,83	169	114	1
14,50	10	20,75	169	114	1
14,75	10	29,75	169	114	1
15,00	10	20,75	169	114	1
15,25	10	27,51	178	120	1
15,50	10	24,57	178	120	1

Ø mm	d mm	€	L mm	l mm	📦
15,75	10	27,02	178	120	1
16,00	12	24,57	178	120	1
16,25	12	34,98	184	125	1
16,40	12	31,67	184	125	1
16,50	12	30,80	184	125	1
16,75	12	33,92	184	125	1
17,00	12	30,80	184	125	1
17,25	12	37,74	191	130	1
17,50	12	34,08	191	130	1
17,75	12	37,47	191	130	1
18,00	12	34,08	191	130	1
18,25	12	41,81	198	135	1
18,50	12	38,27	198	135	1
18,60	12	41,49	198	135	1
18,75	12	42,06	198	135	1
19,00	12	38,27	198	135	1
19,25	12	50,45	205	140	1
19,50	12	45,13	205	140	1



# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

Ø mm	d mm	€	L mm	l mm	📦
19,75	12	49,61	205	149	1
20,00	13	45,13	205	140	1
20,50	13	52,53	212	145	1
20,60	13	43,25	212	145	1
21,00	13	52,53	212	145	1
21,50	13	57,23	219	150	1
22,00	13	57,23	219	150	1
22,50	13	60,52	226	155	1
22,60	13	54,74	226	155	1
23,00	13	60,52	226	155	1
23,50	13	67,37	226	155	1
24,00	13	67,37	233	160	1

Ø mm	d mm	€	L mm	l mm	📦
24,50	13	68,32	233	160	1
25,00	13	68,32	233	160	1
25,50	13	88,71	240	165	1
26,00	13	88,71	240	165	1
26,50	13	95,77	240	165	1
27,00	13	95,77	247	170	1
27,50	13	97,21	247	170	1
28,00	13	97,21	247	170	1
28,50	13	120,83	254	175	1
29,00	13	120,83	254	175	1
29,50	13	126,08	254	175	1
30,00	13	126,08	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"	16,86	152	76	1
9/16"	1/2"	16,86	152	76	1
19/32"	1/2"	20,75	152	76	1
5/8"	1/2"	24,57	152	76	1
21/32"	1/2"	30,80	152	76	1
11/16"	1/2"	34,08	152	76	1
23/32"	1/2"	34,08	152	76	1
3/4"	1/2"	38,27	152	76	1
25/32"	1/2"	45,13	152	76	1

Ø mm	d mm	€	L mm	l mm	📦
13/16"	1/2"	43,25	152	76	1
27/32"	1/2"	52,53	152	76	1
7/8"	1/2"	57,24	152	76	1
29/32"	1/2"	60,52	152	76	1
15/16"	1/2"	67,37	152	76	1
31/32"	1/2"	68,32	152	76	1
1"	1/2"	68,32	152	76	1
1-1/16"	1/2"	95,77	152	76	1
1-1/8"	1/2"	120,83	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	3,72	1
4,00	75	43	4,09	1
5,00	86	52	4,27	1
6,00	93	57	4,60	1

Ø mm	L mm	l mm	€	📦
7,00	109	69	4,74	1
8,00	117	75	5,00	1
9,00	125	81	5,07	1
10,00	133	87	6,38	1

# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

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	Icon	Ø mm	€	L mm	l mm	Icon
1,00	1,25	34	12	10	5,30	2,73	86	52	10
1,10	1,56	36	14	10	5,40	2,73	93	57	10
1,20	1,56	38	16	10	5,50	1,90	93	57	10
1,30	1,38	38	16	10	5,60	2,87	93	57	10
1,40	1,38	40	18	10	5,70	2,87	93	57	10
1,50	1,08	40	18	10	5,75	2,39	93	57	10
1,60	1,33	43	20	10	5,80	2,73	93	57	10
1,70	1,33	43	20	10	5,90	2,73	93	57	10
1,80	1,18	46	22	10	6,00	2,02	93	57	10
1,90	1,18	46	22	10	6,10	3,14	101	63	10
2,00	1,03	49	24	10	6,20	3,14	101	63	10
2,10	1,14	49	24	10	6,25	2,83	101	63	10
2,20	1,14	53	27	10	6,30	3,32	101	63	10
2,25	1,14	53	27	10	6,40	3,37	101	63	10
2,30	1,37	53	27	10	6,50	2,57	101	63	10
2,40	1,37	57	30	10	6,60	4,14	101	63	10
2,50	1,03	57	30	10	6,70	4,14	101	63	10
2,60	1,38	57	30	10	6,75	3,24	109	69	10
2,70	1,38	61	33	10	6,80	3,13	109	69	10
2,75	1,18	61	33	10	6,90	4,58	109	69	10
2,80	1,38	61	33	10	7,00	2,97	109	69	10
2,90	1,38	61	33	10	7,10	4,87	109	69	10
3,00	0,93	61	33	10	7,20	4,87	109	69	10
3,10	1,18	65	36	10	7,25	3,71	109	69	10
3,20	1,18	65	36	10	7,30	4,87	109	69	10
3,25	1,14	65	36	10	7,40	4,87	109	69	10
3,30	1,18	65	36	10	7,50	3,37	109	69	10
3,40	1,51	70	39	10	7,60	5,71	117	75	10
3,50	1,14	70	39	10	7,70	5,71	117	75	10
3,60	1,57	70	39	10	7,75	4,05	117	75	10
3,70	1,57	70	39	10	7,80	5,79	117	75	10
3,75	1,40	70	39	10	7,90	5,79	117	75	10
3,80	1,65	75	43	10	8,00	3,49	117	75	10
3,90	1,65	75	43	10	8,10	5,87	117	75	10
4,00	1,18	75	43	10	8,20	5,87	117	75	10
4,10	1,45	75	43	10	8,25	4,82	117	75	10
4,20	1,45	75	43	10	8,30	6,16	117	75	10
4,25	1,49	75	43	10	8,40	6,16	117	75	10
4,30	1,95	80	47	10	8,50	4,41	117	75	10
4,40	1,95	80	47	10	8,60	7,74	125	81	10
4,50	1,49	80	47	10	8,70	7,74	125	81	10
4,60	1,99	80	47	10	8,75	5,25	125	81	10
4,70	1,99	80	47	10	8,80	7,78	125	81	10
4,75	1,87	80	47	10	8,90	7,78	125	81	10
4,80	2,16	86	52	10	9,00	4,81	125	81	10
4,90	2,13	86	52	10	9,10	7,80	125	81	10
5,00	1,49	86	52	10	9,20	7,80	125	81	10
5,10	2,17	86	52	10	9,25	6,44	125	81	10
5,20	2,17	86	52	10	9,30	7,27	125	81	10
5,25	1,90	86	52	10	9,40	7,27	125	81	10



# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

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

Ø mm	€	L mm	l mm	Icon	Ø mm	€	L mm	l mm	Icon
9,50	5,38	125	81	10	14,00	14,88	169	108	4
9,60	9,31	133	87	10	14,50	16,96	169	114	4
9,70	9,31	133	87	10	15,00	19,38	169	114	4
9,75	6,59	133	87	10	15,50	23,37	178	120	1
9,80	9,17	133	87	10	16,00	23,37	178	120	1
9,90	9,17	133	87	10	16,50	30,19	184	125	1
10,00	5,48	133	87	5	17,00	30,19	184	125	1
10,50	6,77	133	87	5	17,50	33,63	191	130	1
11,00	7,54	142	94	5	18,00	33,63	191	130	1
11,50	8,36	142	94	5	18,50	37,53	198	125	1
12,00	8,85	151	101	5	19,00	37,53	198	125	1
12,50	9,92	151	101	5	19,50	44,98	205	140	1
13,00	10,85	151	101	5	20,00	44,98	205	140	1
13,50	13,74	151	101	4					

## 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	Icon	Ø mm	€	L mm	l mm	Icon
1/16"	1,08	43	20	10	19/64"	3,37	117	75	10
5/64"	1,03	49	24	10	5/16"	3,49	117	75	10
3/32"	1,03	57	30	10	21/64"	4,41	117	75	10
7/64"	1,18	61	33	10	11/32"	4,81	125	81	10
1/8"	0,93	65	36	10	23/64"	4,81	125	81	10
9/64"	1,14	70	39	10	3/8"	5,38	133	87	10
5/32"	1,18	75	43	10	25/64"	5,48	133	87	10
11/64"	1,49	80	47	10	13/32"	6,77	133	87	5
3/16"	1,49	86	52	10	27/64"	7,11	142	94	5
13/64"	1,49	86	52	10	7/16"	7,54	142	94	5
7/32"	1,90	93	57	10	29/64"	8,36	142	94	5
15/64"	2,02	93	57	10	15/32"	8,85	151	101	5
1/4"	2,57	101	63	10	31/64"	9,92	151	101	5
17/64"	2,97	109	69	10	1/2"	10,85	151	101	5
9/32"	2,97	109	69	10					

# BROCAS CON MANGO CILÍNDRICO CORTAS

# FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /

# KURZER ZYLINDERSCHAFT-BOHRER

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	Icon	Ø mm	€	L mm	l mm	Icon
1,00	2,54	34	12	10	5,30	3,64	86	52	10
1,10	2,27	36	14	10	5,40	3,64	93	57	10
1,20	2,27	38	16	10	5,50	3,64	93	57	10
1,30	2,27	38	16	10	5,60	4,02	93	57	10
1,40	2,27	40	18	10	5,70	4,02	93	57	10
1,50	1,97	40	18	10	5,75	4,02	93	57	10
1,60	2,27	43	20	10	5,80	4,02	93	57	10
1,70	2,27	43	20	10	5,90	4,02	93	57	10
1,80	2,27	46	22	10	6,00	4,02	93	57	10
1,90	2,27	46	22	10	6,10	4,94	101	63	10
2,00	1,97	49	24	10	6,20	4,94	101	63	10
2,10	2,27	49	24	10	6,25	4,94	101	63	10
2,20	2,27	53	27	10	6,30	4,94	101	63	10
2,25	2,27	53	27	10	6,40	4,94	101	63	10
2,30	2,27	53	27	10	6,50	4,94	101	63	10
2,40	2,27	57	30	10	6,60	5,71	101	63	10
2,50	1,97	57	30	10	6,70	5,71	101	63	10
2,60	2,27	57	30	10	6,75	5,73	109	69	10
2,70	2,27	61	33	10	6,80	6,60	109	69	10
2,75	1,97	61	33	10	6,90	6,60	109	69	10
2,80	2,27	61	33	10	7,00	6,60	109	69	10
2,90	2,27	61	33	10	7,10	6,60	109	69	10
3,00	2,15	61	33	10	7,20	6,60	109	69	10
3,10	2,53	65	36	10	7,25	7,16	109	69	10
3,20	2,53	65	36	10	7,30	7,16	109	69	10
3,25	2,19	65	36	10	7,40	7,16	109	69	10
3,30	2,53	65	36	10	7,50	7,16	109	69	10
3,40	2,53	70	39	10	7,60	7,47	117	75	10
3,50	2,39	70	39	10	7,70	7,47	117	75	10
3,60	2,80	70	39	10	7,75	7,47	117	75	10
3,70	2,80	70	39	10	7,80	7,54	117	75	10
3,75	2,47	70	39	10	7,90	7,54	117	75	10
3,80	2,80	75	43	10	8,00	7,54	117	75	10
3,90	2,80	75	43	10	8,10	8,71	117	75	10
4,00	2,69	75	43	10	8,20	8,71	117	75	10
4,10	3,37	75	43	10	8,25	8,71	117	75	10
4,20	3,37	75	43	10	8,30	8,71	117	75	10
4,25	2,94	75	43	10	8,40	8,71	117	75	10
4,30	2,94	80	47	10	8,50	8,71	117	75	10
4,40	2,94	80	47	10	8,60	9,50	125	81	10
4,50	2,94	80	47	10	8,70	9,50	125	81	10
4,60	2,94	80	47	10	8,75	9,51	125	81	10
4,70	2,94	80	47	10	8,80	9,50	125	81	10
4,75	3,17	80	47	10	8,90	9,50	125	81	10
4,80	3,17	86	52	10	9,00	9,51	125	81	10
4,90	3,18	86	52	10	9,10	10,73	125	81	10
5,00	3,03	86	52	10	9,20	10,73	125	81	10
5,10	3,64	86	52	10	9,25	10,72	125	81	10
5,20	3,64	86	52	10	9,30	10,73	125	81	10
5,25	3,64	86	52	10	9,40	10,73	125	81	10

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

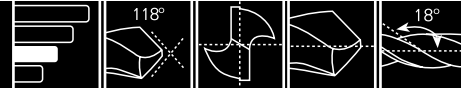
# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

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

Ø mm	€	L mm	l mm	
9,50	10,72	125	81	10
9,60	11,94	133	87	10
9,75	11,94	133	87	10
9,80	11,94	133	87	10
9,90	11,94	133	87	10
10,00	11,94	133	87	5

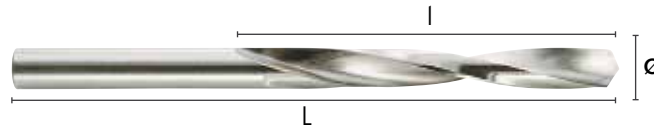
Ø mm	€	L mm	l mm	
10,50	13,79	133	87	5
11,00	15,42	142	94	5
11,50	17,12	142	94	5
12,00	19,66	151	101	5
12,50	20,78	151	101	5
13,00	22,68	151	101	5


## 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	4,06	34	12	1
1,25	4,58	38	16	1
1,50	3,98	40	18	1
1,75	4,46	46	22	1
2,00	3,64	49	24	1
2,25	4,26	53	27	1
2,50	3,71	57	30	1
2,75	4,98	61	33	1
3,00	4,06	61	33	1
3,25	4,98	65	36	1
3,50	4,38	70	39	1
3,75	6,46	70	39	1
4,00	4,70	75	43	1
4,25	7,03	75	43	1
4,50	5,79	80	47	1
4,75	7,93	80	47	1
5,00	6,30	86	52	1
5,25	9,49	86	52	1
5,50	7,62	93	57	1
5,75	11,60	93	57	1
6,00	8,26	93	57	1
6,25	11,60	101	63	1

Ø mm	€	L mm	l mm	
6,50	9,20	101	63	1
6,75	13,97	109	69	1
7,00	9,72	109	69	1
7,25	18,44	109	69	1
7,50	11,43	109	69	1
7,75	21,34	117	75	1
8,00	12,18	117	75	1
8,25	22,79	117	75	1
8,50	14,11	117	75	1
8,75	23,86	125	81	1
9,00	14,82	125	81	1
9,25	30,75	125	81	1
9,50	17,34	125	81	1
9,75	34,03	133	87	1
10,00	18,12	133	87	1
10,50	21,71	133	87	1
11,00	24,24	142	94	1
11,50	29,31	142	94	1
12,00	31,60	151	101	1
12,50	35,82	151	101	1
13,00	38,34	151	101	1



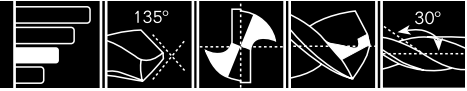
# BROCAS CON MANGO CILÍNDRICO CORTAS

# FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /

# KURZER ZYLINDERSCHAFT-BOHRER

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	Icon	Ø mm	€	L mm	l mm	Icon
0,50	2,97	22	6	10	4,80	2,83	86	52	10
0,60	2,41	24	7	10	4,90	2,85	86	52	10
0,70	2,34	28	9	10	5,00	2,35	86	52	10
0,75	2,34	28	9	10	5,10	2,88	86	52	10
0,80	2,12	30	10	10	5,20	2,89	86	52	10
0,90	2,12	32	11	10	5,25	2,95	86	52	10
1,00	1,86	34	12	10	5,30	2,95	86	52	10
1,10	1,61	36	14	10	5,40	3,40	93	57	10
1,20	1,79	38	16	10	5,50	3,72	93	57	10
1,25	2,12	38	16	10	5,60	3,72	93	57	10
1,30	1,70	38	16	10	5,70	3,72	93	57	10
1,40	1,60	40	18	10	5,75	3,72	93	57	10
1,50	1,70	40	18	10	5,80	3,72	93	57	10
1,60	1,77	43	20	10	5,90	3,72	93	57	10
1,70	1,63	43	20	10	6,00	3,18	93	57	10
1,75	2,39	46	22	10	6,10	4,13	101	63	10
1,80	1,63	46	22	10	6,20	4,17	101	63	10
1,90	1,69	46	22	10	6,25	4,17	101	63	10
2,00	1,74	49	24	10	6,30	4,17	101	63	10
2,10	1,90	49	24	10	6,40	4,48	101	63	10
2,20	1,90	53	27	10	6,50	4,13	101	63	10
2,25	2,75	53	27	10	6,60	4,48	101	63	10
2,30	1,90	53	27	10	6,70	4,48	101	63	10
2,40	1,91	57	30	10	6,75	4,82	109	69	10
2,50	1,86	57	30	10	6,80	4,82	109	69	10
2,60	1,99	57	30	10	6,90	4,82	109	69	10
2,70	1,99	61	33	10	7,00	4,36	109	69	10
2,75	2,05	61	33	10	7,10	5,88	109	69	10
2,80	2,01	61	33	10	7,20	5,88	109	69	10
2,90	2,05	61	33	10	7,25	5,88	109	69	10
3,00	1,55	61	33	10	7,30	5,88	109	69	10
3,10	2,05	65	36	10	7,40	5,88	109	69	10
3,20	2,05	65	36	10	7,50	4,63	109	69	10
3,25	2,07	65	36	10	7,60	7,13	117	75	10
3,30	2,16	65	36	10	7,70	7,13	117	75	10
3,40	2,19	70	39	10	7,75	7,13	117	75	10
3,50	2,05	70	39	10	7,80	7,13	117	75	10
3,60	2,25	70	39	10	7,90	7,13	117	75	10
3,70	2,27	70	39	10	8,00	5,79	117	75	10
3,75	2,46	70	39	10	8,10	7,13	117	75	10
3,80	2,29	75	43	10	8,20	7,13	117	75	10
3,90	2,35	75	43	10	8,25	6,84	117	75	10
4,00	2,01	75	43	10	8,30	7,13	117	75	10
4,10	2,39	75	43	10	8,40	7,13	117	75	10
4,20	2,41	75	43	10	8,50	5,68	117	75	10
4,25	2,35	75	43	10	8,60	8,36	125	81	10
4,30	2,57	80	47	10	8,70	8,36	125	81	10
4,40	2,63	80	47	10	8,75	8,69	125	81	10
4,50	2,46	80	47	10	8,80	8,69	125	81	10
4,60	2,69	80	47	10	8,90	8,69	125	81	10
4,70	2,75	80	47	10	9,00	7,19	125	81	10
4,75	2,73	80	47	10	9,10	9,31	125	81	10



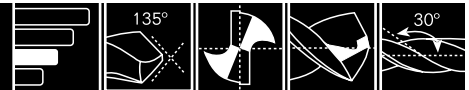
# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

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

Ø mm	€	L mm	l mm		Ø mm	€	L mm	l mm	
9,20	9,31	125	81	10	11,75	21,81	142	94	5
9,25	9,59	125	81	10	11,80	21,81	142	94	5
9,30	10,25	125	81	10	11,90	21,81	151	101	5
9,40	10,25	125	81	10	12,00	16,72	151	101	5
9,50	9,07	125	81	10	12,10	26,04	151	101	5
9,60	11,48	133	87	10	12,20	26,04	151	101	5
9,70	11,76	133	87	10	12,25	26,04	151	101	5
9,75	11,32	133	87	10	12,30	26,04	151	101	5
9,80	11,77	133	87	10	12,40	26,04	151	101	5
9,90	11,77	133	87	10	12,50	22,93	151	101	5
10,00	9,07	133	87	5	12,60	27,19	151	101	5
10,10	14,88	133	87	5	12,70	27,19	151	101	5
10,20	14,88	133	87	5	12,75	27,19	151	101	5
10,25	14,88	133	87	5	12,80	27,19	151	101	5
10,30	14,88	133	87	5	12,90	27,19	151	101	5
10,40	14,88	133	87	5	13,00	23,24	151	101	5
10,50	12,09	133	87	5	13,50	25,62	160	108	4
10,60	17,31	133	87	5	14,00	25,32	160	108	4
10,70	17,31	142	94	5	14,50	35,88	169	114	4
10,75	17,31	142	94	5	15,00	36,47	169	114	4
10,80	17,31	142	94	5	15,50	42,15	178	120	1
10,90	17,31	142	94	5	16,00	43,73	178	120	1
11,00	13,31	142	94	5	16,50	50,02	184	125	1
11,10	20,29	142	94	5	17,00	50,02	184	125	1
11,20	20,29	142	94	5	17,50	55,36	191	130	1
11,25	20,29	142	94	5	18,00	60,35	191	130	1
11,30	20,29	142	94	5	18,50	66,61	198	125	1
11,40	20,29	142	94	5	19,00	66,61	198	125	1
11,50	17,07	142	94	5	19,50	73,87	205	140	1
11,60	21,81	142	94	5	20,00	85,35	205	140	1
11,70	21,81	142	94	5					

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		Ø mm	€	L mm	l mm	
1/16"	1,69	43	20	10	19/64"	4,63	117	75	10
5/64"	1,74	49	24	10	5/16"	5,79	117	75	10
3/32"	1,86	57	30	10	21/64"	5,68	117	75	10
7/64"	2,05	61	33	10	11/32"	8,69	125	81	10
1/8"	1,55	65	36	10	23/64"	7,19	125	81	10
9/64"	2,05	70	39	10	3/8"	9,07	133	87	10
5/32"	2,01	75	43	10	25/64"	9,07	133	87	10
11/64"	2,46	80	47	10	13/32"	12,09	133	87	5
3/16"	2,46	86	52	10	27/64"	17,31	142	94	5
13/64"	2,35	86	52	10	7/16"	13,31	142	94	5
7/32"	3,72	93	57	10	29/64"	17,07	142	94	5
15/64"	3,18	93	57	10	15/32"	16,72	151	101	5
1/4"	4,13	101	63	10	31/64"	22,93	151	101	5
17/64"	4,82	109	69	10	1/2"	23,24	151	101	5
9/32"	4,36	109	69	10					

**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

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	3,69	49	24	1
2,50	3,69	57	30	1
3,00	3,65	61	33	1
3,10	4,59	65	36	1
3,25	4,59	65	36	1
3,30	4,59	65	36	1
3,40	4,78	70	39	1
3,50	4,58	70	39	1
4,00	4,73	75	43	1
4,10	4,97	75	43	1
4,20	4,97	75	43	1
4,25	4,97	75	43	1
4,30	5,01	80	47	1
4,50	5,04	80	47	1
5,00	5,12	86	52	1
5,10	5,50	86	52	1
5,25	5,55	86	52	1

Ø mm	€	L mm	l mm	
5,50	5,80	93	57	1
6,00	6,02	93	57	1
6,50	11,08	101	63	1
7,00	11,73	109	69	1
7,50	12,02	109	69	1
8,00	12,82	117	75	1
8,50	14,28	117	75	1
9,00	15,84	125	81	1
9,50	16,10	125	81	1
10,00	16,90	133	87	1
10,50	29,11	133	87	1
11,00	30,33	142	94	1
11,50	32,19	142	94	1
12,00	33,27	151	101	1
12,50	41,14	151	101	1
13,00	41,82	151	101	1

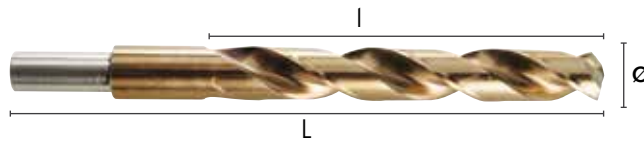
1107

**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	10,78	133	87	1
10,50	8	14,43	133	87	1
11,00	8	15,55	142	94	1
11,50	8	19,09	142	94	1
12,00	8	20,24	151	101	1
12,50	8	24,56	151	101	1
13,00	10	24,90	151	101	1
13,50	10	27,13	160	108	1
14,00	10	26,85	160	108	1
14,50	10	36,77	169	114	1
15,00	10	37,29	169	114	1

Ø mm	d mm	€	L mm	l mm	
15,50	10	42,60	178	120	1
16,00	12	44,12	178	120	1
16,50	12	50,01	184	125	1
17,00	12	50,01	184	125	1
17,50	12	55,02	191	130	1
18,00	12	59,69	191	130	1
18,50	12	65,61	191	130	1
19,00	12	65,61	191	130	1
19,50	12	72,41	191	130	1
20,00	12	83,18	191	130	1

**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

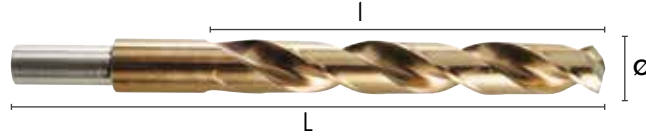
1107/9

**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"	27,13	152	76	1
9/16"	1/2"	26,85	152	76	1
19/32"	1/2"	37,29	152	76	1
5/8"	1/2"	44,12	152	76	1

Ø mm	d mm	€	L mm	l mm	
11/16"	1/2"	55,02	152	76	1
23/32"	1/2"	59,79	152	76	1
3/4"	1/2"	65,61	152	76	1
13/16"	1/2"	83,18	152	76	1

**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

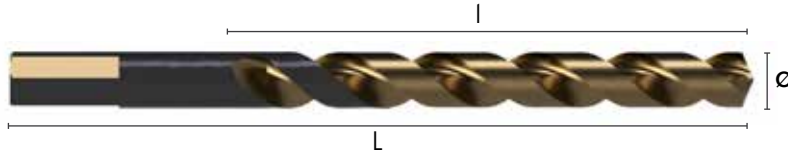
**1187**

**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



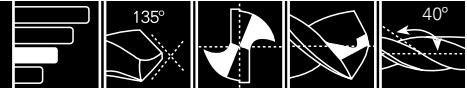
Ø mm	€	L mm	l mm	
1,00	3,06	34	12	10
1,25	3,66	38	16	10
1,50	2,92	40	18	10
1,75	3,66	46	22	10
2,00	2,92	49	24	10
2,25	3,23	53	27	10
2,50	2,66	57	30	10
2,75	3,23	61	33	10
3,00	2,60	61	33	10
3,20	3,19	65	36	10
3,25	3,19	65	36	10
3,30	3,19	65	36	10
3,50	3,14	70	39	10
3,75	3,78	70	39	10
4,00	3,41	75	43	10
4,20	3,78	75	43	10
4,25	3,78	75	43	10
4,50	3,78	80	47	10
4,75	4,23	80	47	10
5,00	4,06	86	52	10
5,20	5,04	86	52	10
5,25	4,75	86	52	10

Ø mm	€	L mm	l mm	
5,50	5,14	93	57	10
5,75	5,75	93	57	10
6,00	5,47	93	57	10
6,25	6,29	101	63	10
6,50	6,40	101	63	10
6,75	7,49	109	69	10
6,80	7,47	109	69	10
7,00	6,97	109	69	10
7,50	7,42	109	69	10
8,00	8,68	117	75	10
8,50	9,06	117	75	10
9,00	11,54	125	81	10
9,50	11,94	125	81	10
10,00	13,18	133	87	5
10,20	17,77	133	87	5
10,50	17,77	133	87	5
11,00	19,62	142	94	5
11,50	22,57	142	94	5
12,00	24,20	151	101	5
12,50	26,93	151	101	5
13,00	27,34	151	101	5



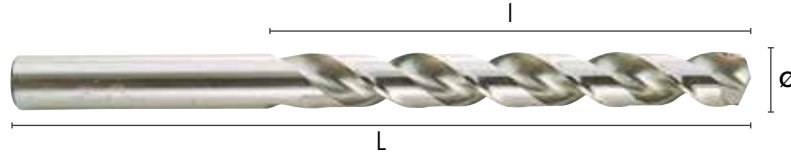
**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

**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	Icon	Ø mm	€	L mm	l mm	Icon
1,00	3,13	34	12	10	5,25	6,16	86	52	10
1,25	3,70	38	16	10	5,50	6,02	93	57	10
1,50	2,98	40	18	10	5,75	6,82	93	57	10
2,00	2,98	49	24	10	6,00	6,69	93	57	10
2,25	3,60	53	27	10	6,25	7,03	101	63	10
2,50	2,97	57	30	10	6,50	7,96	101	63	10
2,75	4,61	61	33	10	6,75	8,38	109	69	10
3,00	3,30	61	33	10	7,00	9,25	109	69	10
3,10	3,58	65	36	10	7,25	10,68	109	69	10
3,20	3,58	65	36	10	7,50	10,54	109	69	10
3,25	3,65	65	36	10	8,00	11,43	117	75	10
3,30	4,57	65	36	10	8,25	12,34	117	75	10
3,50	3,58	70	39	10	8,50	13,77	117	75	10
3,75	4,23	70	39	10	9,00	14,94	125	81	10
4,00	4,06	75	43	10	9,50	16,91	125	81	10
4,10	5,07	75	43	10	10,00	18,59	133	87	5
4,20	5,07	75	43	10	10,25	25,91	133	87	5
4,25	4,71	75	43	10	10,50	22,01	133	87	5
4,50	4,71	80	47	10	11,00	23,47	142	94	5
4,75	4,67	80	47	10	11,50	27,53	142	94	5
5,00	4,95	86	52	10	12,00	27,53	151	101	5
5,10	6,30	86	52	10	12,50	34,52	151	101	5
5,20	5,63	86	52	10	13,00	34,52	151	101	5

**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

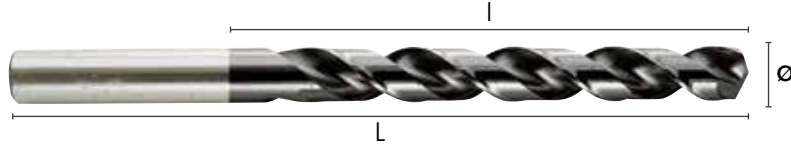
**1162**

**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	5,95	34	12	1
1,25	7,05	38	16	1
1,50	5,66	40	18	1
2,00	5,66	49	24	1
2,25	6,86	53	27	1
2,50	5,64	57	30	1
2,75	8,78	61	33	1
3,00	6,29	61	33	1
3,10	6,83	65	36	1
3,20	6,83	65	36	1
3,25	6,94	65	36	1
3,30	8,66	65	36	1
3,50	6,84	70	39	1
3,75	8,07	70	39	1
4,00	7,74	75	43	1
4,10	9,61	75	43	1
4,20	9,61	75	43	1
4,25	8,98	75	43	1
4,50	8,98	80	47	1
4,75	8,89	80	47	1
5,00	9,42	86	52	1
5,10	11,99	86	52	1
5,20	10,72	86	52	1

Ø mm	€	L mm	l mm	
5,25	11,73	86	52	1
5,50	11,48	93	57	1
5,75	12,97	93	57	1
6,00	12,74	93	57	1
6,25	13,36	101	63	1
6,50	15,18	101	63	1
6,75	15,94	109	69	1
7,00	17,61	109	69	1
7,25	20,34	109	69	1
7,50	20,08	109	69	1
8,00	21,78	117	75	1
8,25	23,51	117	75	1
8,50	26,24	117	75	1
9,00	28,45	125	81	1
9,50	32,20	125	81	1
10,00	35,38	133	87	1
10,25	49,33	133	87	1
10,50	41,90	133	87	1
11,00	44,71	142	94	1
11,50	52,43	142	94	1
12,00	52,43	151	101	1
12,50	65,73	151	101	1
13,00	65,73	151	101	1



**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

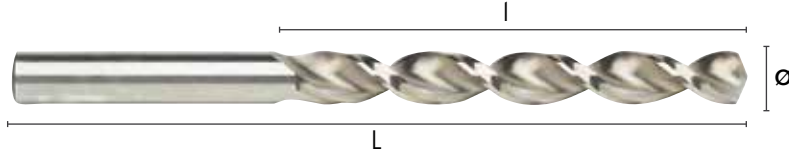
**1159**

**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	Icon	Ø mm	€	L mm	l mm	Icon
2,00	3,99	49	24	10	6,00	8,64	93	57	10
2,10	3,83	49	24	10	6,10	9,59	101	63	10
2,20	3,83	53	27	10	6,20	9,59	101	63	10
2,30	3,83	53	27	10	6,30	9,65	101	63	10
2,40	3,83	57	30	10	6,40	9,65	101	63	10
2,50	3,99	57	30	10	6,50	9,65	101	63	10
2,60	4,12	57	30	10	6,60	11,05	101	63	10
2,70	4,12	61	33	10	6,70	11,05	101	63	10
2,80	4,36	61	33	10	6,80	11,05	109	69	10
2,90	4,36	61	33	10	6,90	11,05	109	69	10
3,00	4,36	61	33	10	7,00	11,05	109	69	10
3,10	4,44	65	36	10	7,10	13,39	109	69	10
3,20	4,44	65	36	10	7,20	13,39	109	69	10
3,30	4,44	65	36	10	7,30	13,39	109	69	10
3,40	4,44	70	39	10	7,40	13,39	109	69	10
3,50	4,96	70	39	10	7,50	11,97	109	69	10
3,60	4,85	70	39	10	7,60	18,27	117	75	10
3,70	4,85	70	39	10	7,70	18,27	117	75	10
3,80	5,61	75	43	10	7,80	18,27	117	75	10
3,90	5,61	75	43	10	7,90	18,27	117	75	10
4,00	5,43	75	43	10	8,00	14,11	117	75	10
4,10	5,61	75	43	10	8,10	18,27	117	75	10
4,20	5,61	75	43	10	8,20	16,00	117	75	10
4,30	5,73	80	47	10	8,30	17,18	117	75	10
4,40	5,73	80	47	10	8,40	17,18	117	75	10
4,50	5,79	80	47	10	8,50	15,54	117	75	10
4,60	6,18	80	47	10	8,60	19,71	125	81	10
4,70	6,18	80	47	10	8,70	19,71	125	81	10
4,80	6,37	86	52	10	8,80	19,71	125	81	10
4,90	6,37	86	52	10	8,90	19,71	125	81	10
5,00	6,13	86	52	10	9,00	18,27	125	81	10
5,10	6,92	86	52	10	9,50	19,68	125	81	10
5,20	7,24	86	52	10	9,80	24,70	133	87	10
5,30	7,24	86	52	10	10,00	22,45	133	87	5
5,40	7,24	93	57	10	10,50	27,62	133	87	5
5,50	8,20	93	57	10	11,00	34,20	142	94	5
5,60	8,66	93	57	10	11,50	41,48	142	94	5
5,70	9,65	93	57	10	12,00	42,79	151	101	5
5,80	8,66	93	57	10	12,50	46,69	151	101	5
5,90	8,66	93	57	10	13,00	46,69	151	101	5



# BROCAS CON MANGO CILÍNDRICO CORTAS FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS / KURZER ZYLINDERSCHAFT-BOHRER

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						

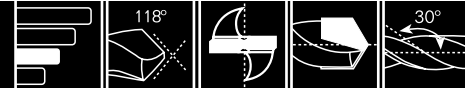
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	€	L mm	l mm		Ø mm	€	L mm	l mm	
2,00	5,59	49	24	1	6,00	12,09	93	57	1
2,10	5,37	49	24	1	6,10	13,42	101	63	1
2,20	5,37	53	27	1	6,20	13,42	101	63	1
2,30	5,37	53	27	1	6,30	13,49	101	63	1
2,40	5,37	57	30	1	6,40	13,49	101	63	1
2,50	5,59	57	30	1	6,50	13,49	101	63	1
2,60	5,76	57	30	1	6,60	15,47	101	63	1
2,70	5,76	61	33	1	6,70	15,47	101	63	1
2,80	6,10	61	33	1	6,80	15,47	109	69	1
2,90	6,10	61	33	1	6,90	15,47	109	69	1
3,00	6,10	61	33	1	7,00	15,16	109	69	1
3,10	6,23	65	36	1	7,10	18,74	109	69	1
3,20	6,23	65	36	1	7,20	18,74	109	69	1
3,30	6,23	65	36	1	7,30	18,74	109	69	1
3,40	6,23	70	39	1	7,40	18,74	109	69	1
3,50	6,93	70	39	1	7,50	16,75	109	69	1
3,60	6,81	70	39	1	7,60	25,60	117	75	1
3,70	6,81	70	39	1	7,70	25,60	117	75	1
3,80	7,85	75	43	1	7,80	25,60	117	75	1
3,90	7,85	75	43	1	7,90	25,60	117	75	1
4,00	7,59	75	43	1	8,00	19,76	117	75	1
4,10	7,85	75	43	1	8,10	25,60	117	75	1
4,20	7,85	75	43	1	8,20	22,39	117	75	1
4,30	8,02	80	47	1	8,30	25,60	117	75	1
4,40	8,12	80	47	1	8,40	25,60	117	75	1
4,50	8,12	80	47	1	8,50	21,74	117	75	1
4,60	8,65	80	47	1	8,60	27,60	125	81	1
4,70	8,65	80	47	1	8,70	27,60	125	81	1
4,80	8,93	86	52	1	8,80	27,60	125	81	1
4,90	8,93	86	52	1	8,90	27,60	125	81	1
5,00	8,56	86	52	1	9,00	25,60	125	81	1
5,10	9,69	86	52	1	9,50	27,56	125	81	1
5,20	10,15	86	52	1	9,80	34,59	133	87	1
5,30	10,15	86	52	1	10,00	31,42	133	87	1
5,40	10,15	93	57	1	10,50	38,68	133	87	1
5,50	11,49	93	57	1	11,00	47,86	142	94	1
5,60	12,15	93	57	1	11,50	58,08	142	94	1
5,70	13,49	93	57	1	12,00	59,89	151	101	1
5,80	12,15	93	57	1	12,50	62,06	151	101	1
5,90	12,15	93	57	1	13,00	65,38	151	101	1

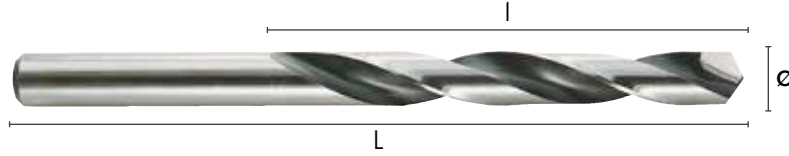
**BROCAS CON MANGO CILÍNDRICO CORTAS**  
**FORETS À QUEUE CYLINDRIQUE COURTES / SHORT STRAIGHT SHANK DRILL-BITS /**  
**KURZER ZYLINDERSCHAFT-BOHRER**

**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	28,67	40	18	1
2,00	21,78	49	24	1
2,50	21,78	57	30	1
3,00	21,78	61	33	1
3,50	21,78	70	39	1
4,00	21,78	75	43	1
4,50	22,27	80	47	1
5,00	22,27	86	52	1
5,50	23,55	93	57	1
6,00	24,70	93	57	1
6,50	29,31	101	63	1
7,00	29,31	109	69	1
7,50	30,48	109	69	1
8,00	30,48	117	75	1
8,50	33,35	117	75	1

Ø mm	€	L mm	l mm	
9,00	33,35	125	81	1
9,50	36,45	125	81	1
10,00	36,45	133	87	1
10,50	46,98	133	87	1
11,00	46,98	142	97	1
12,00	54,06	151	101	1
13,00	64,59	151	101	1
14,00	75,26	160	108	1
15,00	85,71	169	114	1
16,00	98,69	178	120	1
17,00	108,05	184	125	1
18,00	116,34	191	130	1
19,00	144,48	198	135	1
20,00	164,47	205	140	1

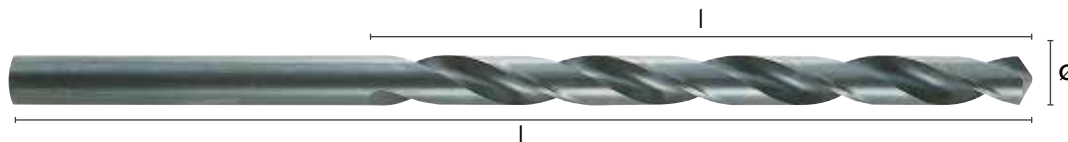
# BROCAS CON MANGO CILÍNDRICO LARGAS FORETS À QUEUE CYLINDRIQUE LONGUES / LONG STRAIGHT SHANK DRILL-BITS / LANGER ZYLINDERSCHAFT-BOHRER

## 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	📦	Ø mm	€	L mm	l mm	📦
1,00	3,42	56	33	10	5,25	5,81	132	87	10
1,10	4,14	60	37	10	5,30	6,39	132	87	10
1,20	4,14	65	41	10	5,40	6,39	139	91	10
1,25	3,76	65	41	10	5,50	5,25	139	91	10
1,30	4,14	65	41	10	5,60	6,39	139	91	10
1,40	4,14	70	45	10	5,70	6,39	139	91	10
1,50	3,42	70	45	10	5,75	5,81	139	91	10
1,60	3,52	76	50	10	5,80	6,39	139	91	10
1,70	3,21	76	50	10	5,90	6,39	139	91	10
1,75	3,21	80	53	10	6,00	5,14	139	91	10
1,80	3,52	80	53	10	6,10	8,11	148	97	10
1,90	3,52	80	53	10	6,20	8,11	148	97	10
2,00	2,94	85	56	10	6,25	7,37	148	97	10
2,10	3,52	85	56	10	6,30	8,11	148	97	10
2,20	3,52	85	56	10	6,40	8,84	148	97	10
2,25	3,21	90	59	10	6,50	6,71	148	97	10
2,30	3,52	90	59	10	6,60	8,11	148	97	10
2,40	3,52	95	62	10	6,70	8,11	148	97	10
2,50	2,94	95	62	10	6,75	7,37	156	102	10
2,60	3,52	100	66	10	6,80	9,37	156	102	10
2,70	3,52	100	66	10	6,90	9,37	156	102	10
2,75	3,21	100	66	10	7,00	6,71	156	102	10
2,80	3,52	100	66	10	7,10	9,91	156	102	10
2,90	3,52	100	66	10	7,20	9,91	156	102	10
3,00	2,66	100	66	10	7,25	9,03	156	102	10
3,10	4,20	106	69	10	7,30	9,91	156	102	10
3,20	4,20	106	69	10	7,40	9,91	156	102	10
3,25	3,82	106	69	10	7,50	8,19	156	102	10
3,30	4,20	106	69	10	7,60	9,91	165	109	10
3,40	4,20	112	73	10	7,70	9,91	165	109	10
3,50	3,47	112	73	10	7,75	9,03	165	109	10
3,60	4,20	112	73	10	7,80	9,91	165	109	10
3,70	4,20	112	73	10	7,90	9,91	165	109	10
3,75	3,82	112	73	10	8,00	8,19	165	109	10
3,80	4,20	119	78	10	8,10	12,22	165	109	10
3,90	4,20	119	78	10	8,20	12,22	165	109	10
4,00	3,24	119	78	10	8,25	11,11	165	109	10
4,10	5,36	119	78	10	8,30	12,22	165	109	10
4,20	5,36	119	78	10	8,40	12,22	165	109	10
4,25	4,89	119	78	10	8,50	10,08	165	109	10
4,30	5,36	126	82	10	8,75	11,11	175	115	10
4,40	5,36	126	82	10	8,80	12,22	175	115	10
4,50	4,52	126	82	10	8,90	12,74	175	115	10
4,60	5,36	126	82	10	9,00	10,08	175	115	10
4,70	5,36	126	82	10	9,25	12,91	175	115	10
4,75	4,89	126	82	10	9,30	14,24	175	115	10
4,80	5,36	132	87	10	9,40	14,24	175	115	10
4,90	5,36	132	87	10	9,50	11,78	175	115	10
5,00	4,18	132	87	10	9,70	14,24	184	121	10
5,10	6,39	132	87	10	9,75	12,91	184	121	10
5,20	6,39	132	87	10	9,90	14,24	184	121	10


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



# BROCAS CON MANGO CILÍNDRICO LARGAS FORETS À QUEUE CYLINDRIQUE LONGUES / LONG STRAIGHT SHANK DRILL-BITS / LANGER ZYLINDERSCHAFT-BOHRER

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

∅ mm	€	L mm	l mm	
10,00	11,78	184	121	5
10,25	17,66	184	121	5
10,30	25,13	184	121	5
10,40	19,44	184	121	5
10,50	16,08	184	121	5
10,75	17,66	195	128	5
11,00	16,08	195	128	5
11,10	23,04	195	128	5
11,20	23,04	195	128	5
11,25	20,96	195	128	5
11,50	19,06	195	128	5
11,75	20,96	195	128	5
12,00	19,06	205	134	5
12,25	25,21	205	134	5
12,50	22,91	205	134	5
12,75	25,21	205	134	5
13,00	22,91	205	134	5

∅ mm	€	L mm	l mm	
13,25	31,48	214	140	1
13,50	28,62	214	140	1
13,75	31,48	214	140	1
14,00	28,62	214	140	1
14,50	31,88	220	144	1
15,00	31,88	220	144	1
15,50	34,84	227	149	1
16,00	34,84	227	149	1
16,50	47,82	235	154	1
17,00	47,82	235	154	1
17,50	52,76	241	158	1
18,00	52,76	241	158	1
18,50	60,08	247	162	1
19,00	60,08	247	162	1
19,50	64,94	254	166	1
20,00	64,94	254	166	1

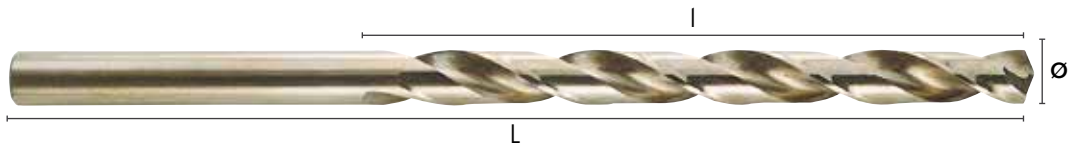
1113


**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



∅ mm	€	L mm	l mm	
2,00	6,97	85	56	10
2,50	6,97	95	62	10
3,00	6,97	100	66	10
3,25	12,16	106	69	10
3,50	8,28	112	73	10
3,75	8,28	112	73	10
4,00	8,28	119	78	10
4,25	9,61	119	78	10
4,50	10,61	126	82	10
4,75	13,18	126	82	10
5,00	10,61	132	87	10
5,25	23,12	132	87	10
5,50	11,62	139	91	10
5,75	15,71	139	91	10
6,00	11,62	139	91	10

∅ mm	€	L mm	l mm	
6,50	14,74	148	97	10
7,00	16,03	156	102	10
7,50	19,62	156	102	10
8,00	18,02	165	109	10
8,50	22,27	165	109	10
9,00	22,27	175	115	10
9,50	25,92	175	115	10
10,00	34,93	184	121	5
10,50	43,97	184	121	5
11,00	45,63	195	128	5
11,50	59,18	195	128	5
12,00	49,03	205	134	5
12,50	62,55	205	134	5
13,00	62,55	204	134	5

# BROCAS CON MANGO CILÍNDRICO LARGAS FORETS À QUEUE CYLINDRIQUE LONGUES / LONG STRAIGHT SHANK DRILL-BITS / LANGER ZYLINDERSCHAFT-BOHRER

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	9,65	85	56	1
2,10	8,96	85	56	1
2,30	9,31	90	59	1
2,50	9,65	95	62	1
2,70	9,82	100	66	1
3,00	10,01	100	66	1
3,10	11,49	106	69	1
3,20	11,49	106	69	1
3,30	11,49	106	69	1
3,50	11,13	112	73	1
3,60	12,14	112	73	1
3,70	12,42	112	73	1
4,00	11,05	119	78	1
4,10	14,28	119	78	1
4,20	14,28	119	78	1
4,30	16,05	126	82	1
4,50	12,78	126	82	1
4,70	15,88	126	82	1
4,80	16,61	132	87	1
5,00	13,75	132	87	1
5,10	17,27	132	87	1
5,20	17,24	132	87	1
5,50	15,93	139	91	1

Ø mm	€	L mm	l mm	
5,60	20,44	139	91	1
5,80	20,94	139	91	1
6,00	16,95	139	91	1
6,20	25,91	148	97	1
6,50	21,02	148	97	1
6,80	32,97	156	102	1
7,00	25,96	156	102	1
7,20	32,50	156	102	1
7,50	29,85	156	102	1
8,00	29,85	165	109	1
8,20	35,33	165	109	1
8,50	34,76	165	109	1
8,80	37,68	175	115	1
9,00	36,23	175	115	1
9,50	47,44	175	115	1
9,80	65,00	184	121	1
10,00	48,47	184	121	1
10,50	75,39	184	121	1
11,00	56,75	195	128	1
11,50	105,35	195	128	1
12,00	78,28	195	128	1
13,00	97,53	195	128	1

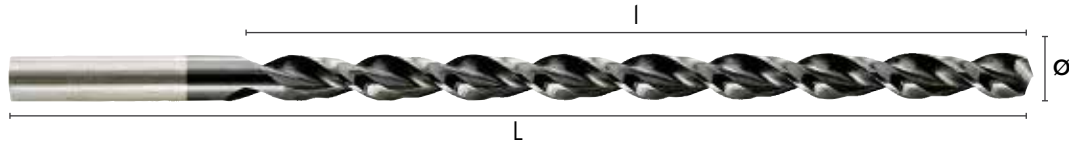
**BROCAS CON MANGO CILÍNDRICO LARGAS**  
**FORETS À QUEUE CYLINDRIQUE LONGUES / LONG STRAIGHT SHANK DRILL-BITS /**  
**LANGER ZYLINDERSCHAFT-BOHRER**

**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	Icon
2,00	12,44	85	56	1
2,10	11,54	85	56	1
2,30	11,99	90	59	1
2,50	12,44	95	62	1
2,70	12,65	100	66	1
3,00	12,87	100	66	1
3,10	14,80	106	69	1
3,20	14,80	106	69	1
3,30	14,80	106	69	1
3,50	14,34	112	73	1
3,60	15,62	112	73	1
3,70	16,00	112	73	1
4,00	14,21	119	78	1
4,10	18,41	119	78	1
4,20	18,41	119	78	1
4,30	20,67	126	82	1
4,50	16,47	126	82	1
4,70	20,46	126	82	1
4,80	21,40	132	87	1
5,00	17,69	132	87	1
5,10	22,23	132	87	1
5,20	22,20	132	87	1
5,50	20,51	139	91	1

Ø mm	€	L mm	l mm	Icon
5,60	26,35	139	91	1
5,80	26,96	139	91	1
6,00	21,84	139	91	1
6,20	33,37	148	97	1
6,50	27,07	148	97	1
6,80	42,47	156	102	1
7,00	33,42	156	102	1
7,20	41,86	156	102	1
7,50	38,45	156	102	1
8,00	38,45	165	109	1
8,20	45,51	165	109	1
8,50	44,75	165	109	1
8,80	48,55	175	115	1
9,00	46,65	175	115	1
9,50	61,11	175	115	1
9,80	83,72	184	121	1
10,00	62,43	184	121	1
10,50	97,10	184	121	1
11,00	73,10	195	128	1
11,50	135,71	195	128	1
12,00	100,83	195	128	1
13,00	125,62	195	128	1

# BROCAS CON MANGO CILÍNDRICO EXTRA LARGAS FORETS À QUEUE CYLINDRIQUE EXTRA LONGUES / EXTRA-LONG STRAIGHT SHANK DRILL-BITS / BOHRER MIT EXTRA LANGEM ZYLINDERSCHAFT

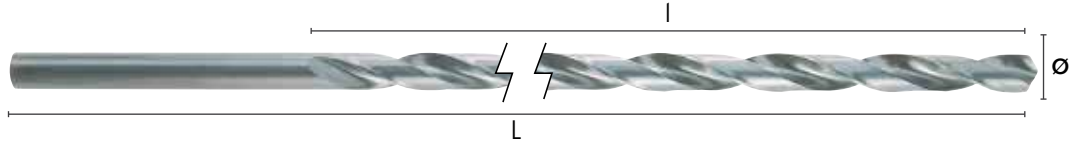
1115

**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

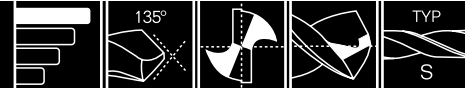


Ø mm	€	L mm	l mm	
2,00	12,74	125	85	1
2,50	13,31	140	95	1
3,00	13,76	150	100	1
3,00	14,71	190	130	1
3,50	15,53	165	115	1
3,50	17,89	210	145	1
3,50	25,62	265	180	1
4,00	15,53	175	120	1
4,00	18,33	220	150	1
4,00	26,11	280	190	1
4,50	17,20	185	125	1
4,50	21,51	235	160	1
4,50	30,76	295	200	1
5,00	18,20	195	135	1
5,00	23,11	245	170	1
5,00	28,43	315	210	1
5,50	21,56	205	140	1
5,50	30,76	260	180	1
5,50	35,54	330	235	1
6,00	21,56	205	140	1
6,00	30,76	260	180	1
6,00	35,54	330	225	1
6,50	25,62	215	150	1
6,50	33,10	275	190	1
6,50	41,26	350	235	1
7,00	27,16	225	155	1
7,00	37,81	290	210	1
7,00	51,09	370	250	1
7,50	30,58	225	155	1
7,50	40,73	290	200	1
7,50	59,36	370	250	1
8,00	33,79	240	165	1

Ø mm	€	L mm	l mm	
8,00	46,78	305	210	1
8,00	60,92	390	265	1
8,50	45,97	240	165	1
8,50	62,65	305	210	1
8,50	86,16	390	265	1
9,00	43,84	250	175	1
9,00	57,89	320	220	1
9,00	84,98	410	280	1
9,50	51,61	250	175	1
9,50	70,95	320	220	1
9,50	95,57	410	280	1
10,00	50,94	265	185	1
10,00	66,63	340	235	1
10,00	92,59	430	295	1
10,50	97,09	265	145	1
10,50	105,22	340	250	1
10,50	111,90	430	295	1
11,00	64,50	280	195	1
11,00	94,47	365	250	1
11,00	110,60	455	310	1
11,50	90,41	280	195	1
11,50	121,37	365	250	1
11,50	125,40	455	310	1
12,00	85,17	295	205	1
12,00	106,58	375	260	1
12,00	130,20	480	315	1
12,50	105,22	295	205	1
12,50	117,82	375	260	1
12,50	143,03	480	315	1
13,00	105,22	295	205	1
13,00	121,39	375	260	1
13,00	144,38	480	315	1

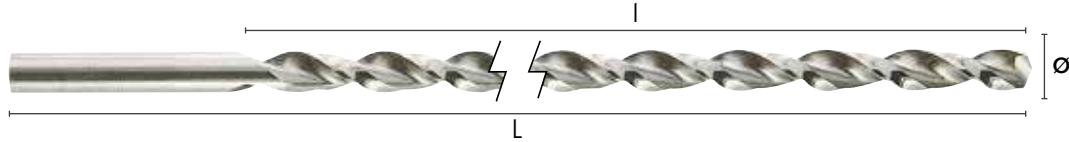
# BROCAS CON MANGO CILÍNDRICO EXTRA LARGAS FORETS À QUEUE CYLINDRIQUE EXTRA LONGUES / EXTRA-LONG STRAIGHT SHANK DRILL-BITS / BOHRER MIT EXTRA LANGEM ZYLINDERSCHAFT

## 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	19,15	125	85	1
2,50	20,89	140	95	1
3,00	20,89	150	100	1
3,00	24,39	190	130	1
3,00	38,32	240	160	1
3,50	22,64	165	115	1
3,50	26,12	210	145	1
3,50	34,84	265	180	1
4,00	24,39	175	120	1
4,00	29,62	220	150	1
4,00	34,84	280	190	1
4,50	26,12	185	125	1
4,50	33,10	235	160	1
4,50	38,32	295	200	1
5,00	27,87	195	135	1
5,00	34,84	245	170	1
5,00	41,81	315	210	1
5,50	31,35	205	140	1
5,50	40,05	260	180	1
5,50	47,03	330	225	1
6,00	29,62	205	140	1
6,00	36,58	260	180	1
6,00	45,30	330	225	1
6,50	33,10	215	150	1
6,50	41,81	275	190	1
6,50	55,72	350	235	1
7,00	38,32	225	155	1
7,00	45,30	290	200	1
7,00	60,97	370	250	1
7,50	41,81	225	155	1

Ø mm	€	L mm	l mm	
7,50	50,51	290	200	1
7,50	66,19	370	250	1
8,00	47,03	240	165	1
8,00	55,72	305	210	1
8,00	80,14	390	265	1
8,50	48,77	240	165	1
8,50	59,21	305	210	1
8,50	83,61	390	265	1
9,00	57,47	250	175	1
9,00	69,67	320	220	1
9,00	97,55	410	280	1
9,50	59,21	250	175	1
9,50	69,67	320	220	1
9,50	102,78	410	280	1
10,00	66,19	265	185	1
10,00	92,32	340	235	1
10,00	113,21	430	295	1
10,50	69,67	265	185	1
10,50	97,55	340	235	1
10,50	116,71	430	295	1
11,00	76,63	280	195	1
11,00	106,24	365	250	1
11,00	130,63	455	310	1
11,50	87,09	280	195	1
11,50	120,18	365	250	1
11,50	146,31	455	310	1
12,00	95,79	295	205	1
12,00	130,63	375	260	1
12,00	161,99	480	330	1



**BROCAS CON MANGO CILÍNDRICO EXTRA CORTAS**  
**FORETS À QUEUE CYLINDRIQUE EXTRA-COURTES EXTRA-SHORT STRAIGHT**  
**SHANK DRILL-BITS / BOHRER MIT EXTRA KURZEM ZYLINDERSCHAFT**

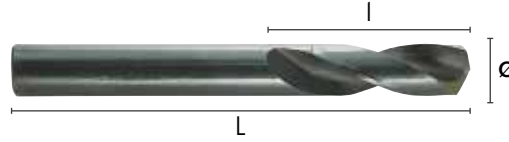
1116

**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

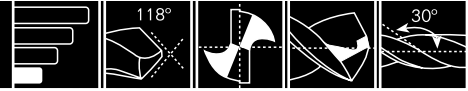


Ø mm	€	L mm	l mm	📦	Ø mm	€	L mm	l mm	📦
1,00	1,30	26	6	10	5,10	2,52	62	26	10
1,10	2,88	28	7	10	5,20	2,52	62	26	10
1,20	3,33	30	8	10	5,25	2,07	62	26	10
1,25	1,18	30	8	10	5,30	2,53	62	26	10
1,30	3,83	30	8	10	5,40	2,53	66	28	10
1,40	4,39	32	9	10	5,50	2,07	66	28	10
1,50	1,14	32	9	10	5,60	2,73	66	28	10
1,60	2,61	34	10	10	5,70	4,10	66	28	10
1,70	3,02	34	10	10	5,75	2,37	66	28	10
1,75	1,14	36	11	10	5,80	2,73	66	28	10
1,80	3,02	36	11	10	5,90	2,88	66	28	10
1,90	3,02	36	11	10	6,00	2,37	66	28	10
2,00	1,14	38	12	10	6,10	3,41	70	31	10
2,10	1,40	38	12	10	6,20	3,41	70	31	10
2,20	1,40	40	13	10	6,25	2,83	70	31	10
2,25	1,14	40	13	10	6,30	3,41	70	31	10
2,30	1,40	40	13	10	6,40	3,41	70	31	10
2,40	1,40	43	14	10	6,50	2,83	70	31	10
2,50	1,14	43	14	10	6,60	3,96	70	31	10
2,60	1,90	43	14	10	6,70	3,96	70	31	10
2,70	1,30	46	16	10	6,75	3,26	74	34	10
2,75	1,19	46	16	10	6,80	3,96	74	34	10
2,80	1,43	46	16	10	6,90	3,96	74	34	10
2,90	1,43	46	16	10	7,00	3,26	74	34	10
3,00	1,19	46	16	10	7,25	3,70	74	34	10
3,10	1,55	49	18	10	7,50	3,70	74	34	10
3,20	1,55	49	18	10	7,75	4,06	79	37	10
3,25	1,29	49	18	10	8,00	4,06	79	37	10
3,30	1,47	49	18	10	8,25	4,85	79	37	10
3,40	1,55	52	20	10	8,50	4,85	79	37	10
3,50	1,29	52	20	10	8,75	5,36	84	40	10
3,60	1,72	52	20	10	9,00	5,30	84	40	10
3,70	1,72	52	20	10	9,25	5,64	84	40	10
3,75	1,39	52	20	10	9,50	5,93	84	40	10
3,80	1,72	55	22	10	9,75	6,63	89	43	10
3,90	1,72	55	22	10	10,00	6,63	89	43	5
4,00	1,39	55	22	10	10,50	7,44	89	43	5
4,10	2,01	55	22	10	11,00	8,31	95	47	5
4,20	2,01	55	22	10	11,50	9,24	95	47	5
4,25	1,69	55	22	10	12,00	9,74	102	51	5
4,30	2,01	58	24	10	13,00	11,99	102	51	5
4,40	2,01	58	24	10	14,00	16,50	107	54	4
4,50	1,69	58	24	10	15,00	21,50	111	56	4
4,60	2,29	58	24	10	16,00	25,91	115	58	1
4,70	2,29	58	24	10	17,00	30,45	119	60	1
4,75	1,88	58	24	10	18,00	33,92	123	62	1
4,80	2,29	62	26	10	19,00	37,81	127	64	1
4,90	2,29	62	26	10	20,00	45,34	131	66	1
5,00	1,88	62	26	10					



# BROCAS CON MANGO CILÍNDRICO EXTRA CORTAS FORETS À QUEUE CYLINDRIQUE EXTRA-COURTES EXTRA-SHORT STRAIGHT SHANK DRILL-BITS / BOHRER MIT EXTRA KURZEM ZYLINDERSCHAFT

## 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	Icon
2,00	2,49	38	9	10
2,25	2,49	40	9	10
2,50	2,49	43	10	10
2,75	2,49	46	10	10
3,00	2,16	46	10	10
3,25	2,16	49	10	10
3,30	2,16	49	10	10
3,50	2,41	52	13	10
3,75	2,76	52	13	10
4,00	2,48	55	13	10
4,10	2,67	55	13	10
4,20	2,67	55	13	10

Ø mm	€	L mm	l mm	Icon
4,25	2,67	55	13	10
4,50	2,76	58	13	10
4,75	4,46	58	13	10
4,80	3,04	58	13	10
5,00	3,16	62	13	10
5,25	4,46	62	13	10
5,50	3,81	66	16	10
5,75	5,27	66	16	10
6,00	4,26	66	16	10
7,00	5,63	74	19	10
8,00	6,90	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



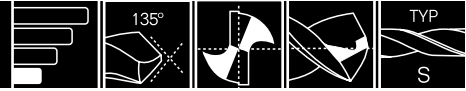
Ø mm	€	L mm	l mm	Icon
2,00	1,51	38	12	10
2,20	2,63	40	13	10
2,25	2,06	40	13	10
2,50	2,15	43	14	10
2,70	3,63	46	16	10
2,75	2,27	46	16	10
3,00	2,27	46	16	10
3,20	2,87	49	18	10
3,25	2,23	49	18	10
3,30	2,97	49	18	10
3,50	2,41	52	20	10
3,75	2,52	52	20	10
4,00	2,65	55	22	10
4,10	4,83	55	22	10
4,20	3,66	55	22	10
4,25	2,87	55	22	10
4,50	3,05	58	24	10
4,75	3,16	58	24	10
4,90	3,83	62	26	10
5,00	3,41	62	26	10
5,10	4,27	62	26	10

Ø mm	€	L mm	l mm	Icon
5,20	4,16	62	26	10
5,25	3,25	62	26	10
5,50	3,56	66	28	10
5,75	3,69	66	28	10
6,00	3,84	66	28	10
6,50	4,39	70	31	10
6,75	7,49	74	34	10
7,00	4,92	74	34	10
7,50	6,24	74	34	10
8,00	6,93	79	37	10
8,25	8,83	79	37	10
8,50	7,49	79	37	10
9,00	8,31	84	40	10
9,50	8,97	84	40	10
10,00	9,95	89	43	5
10,50	14,97	89	43	5
11,00	13,82	95	47	5
11,50	15,51	95	47	5
12,00	19,04	102	51	5
12,50	19,97	102	51	5
13,00	26,10	102	51	5

**BROCAS CON MANGO CILÍNDRICO EXTRA CORTAS**  
**FORETS À QUEUE CYLINDRIQUE EXTRA-COURTES EXTRA-SHORT STRAIGHT SHANK**  
**DRILL-BITS / BOHRER MIT EXTRA KURZEM ZYLINDERSCHAFT**

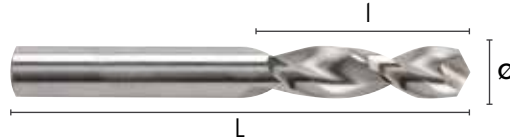
1166

**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	4,40	38	12	10
2,50	3,96	43	14	10
2,80	3,99	46	16	10
3,00	3,82	46	16	10
3,10	4,24	49	18	10
3,20	4,24	49	18	10
3,30	4,24	49	18	10
3,40	4,24	52	20	10
3,50	4,24	52	20	10
3,60	5,16	52	20	10
3,70	5,16	52	20	10
3,80	5,37	55	22	10
3,90	5,16	55	22	10
4,00	4,70	55	22	10
4,10	5,59	55	22	10
4,20	5,59	55	22	10
4,30	6,43	58	24	10
4,40	6,43	58	24	10
4,50	5,59	58	24	10
4,60	6,69	58	24	10
4,70	6,71	58	24	10
4,80	6,71	62	26	10
4,90	6,69	62	26	10
5,00	6,22	62	26	10
5,10	7,61	62	26	10
5,20	7,61	62	26	10
5,30	7,61	62	26	10
5,40	7,60	66	28	10
5,50	6,94	66	28	10
5,60	8,01	66	28	10

Ø mm	€	L mm	l mm	
5,70	8,34	66	28	10
5,80	8,01	66	28	10
5,90	8,01	66	28	10
6,00	7,91	66	28	10
6,10	10,17	66	28	10
6,20	10,13	70	31	10
6,50	9,46	70	31	10
6,80	13,18	70	31	10
7,00	10,83	74	34	10
7,20	13,74	74	34	10
7,50	13,98	74	34	10
7,80	13,98	74	34	10
8,00	13,62	79	37	10
8,20	12,03	79	37	10
8,50	16,15	79	37	10
8,80	23,64	79	37	10
9,00	17,62	84	40	10
9,20	19,85	84	40	10
9,50	19,85	84	40	10
9,80	22,06	84	40	10
10,00	22,06	89	43	10
10,50	23,99	89	43	5
11,00	27,50	89	43	5
11,50	30,54	95	47	5
12,00	32,18	95	47	5
13,00	39,64	102	51	5
14,00	51,09	102	51	5
15,00	56,57	107	54	4
16,00	65,69	111	56	4



**BROCAS CON MANGO CILÍNDRICO EXTRA CORTAS**  
**FORETS À QUEUE CYLINDRIQUE EXTRA-COURTES EXTRA-SHORT STRAIGHT SHANK**  
**DRILL-BITS / BOHRER MIT EXTRA KURZEM ZYLINDERSCHAFT**

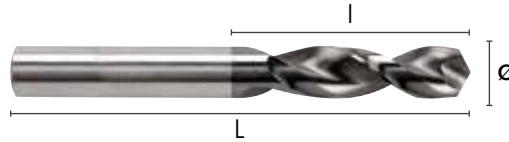
**1167**

**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	6,17	38	12	1
2,50	5,58	43	14	1
2,80	5,58	46	16	1
3,00	5,34	46	16	1
3,10	5,94	49	18	1
3,20	5,94	49	18	1
3,30	5,94	49	18	1
3,40	5,94	52	20	1
3,50	5,94	52	20	1
3,60	7,24	52	20	1
3,70	7,24	52	20	1
3,80	7,53	55	22	1
3,90	7,24	55	22	1
4,00	6,59	55	22	1
4,10	7,80	55	22	1
4,20	7,80	55	22	1
4,30	9,01	58	24	1
4,40	9,01	58	24	1
4,50	7,80	58	24	1
4,60	9,39	58	24	1
4,70	9,40	58	24	1
4,80	9,40	62	26	1
4,90	9,39	62	26	1
5,00	8,73	62	26	1
5,10	10,63	62	26	1
5,20	10,63	62	26	1
5,30	10,63	62	26	1
5,40	10,63	66	28	1
5,50	9,72	66	28	1
5,60	11,23	66	28	1

Ø mm	€	L mm	l mm	📦
5,70	11,67	66	28	1
5,80	11,23	66	28	1
5,90	11,23	66	28	1
6,00	11,07	66	28	1
6,10	14,21	70	31	1
6,20	14,20	70	31	1
6,50	13,21	70	31	1
6,80	18,44	74	34	1
7,00	15,18	74	34	1
7,20	19,25	74	34	1
7,50	19,58	74	34	1
7,80	19,59	79	37	1
8,00	19,07	79	37	1
8,20	16,85	79	37	1
8,50	22,61	79	37	1
8,80	33,08	84	40	1
9,00	24,67	84	40	1
9,20	27,79	84	40	1
9,50	27,79	84	40	1
9,80	30,88	89	43	1
10,00	30,88	89	43	1
10,50	33,58	89	43	1
11,00	38,50	95	47	1
11,50	42,75	95	47	1
12,00	45,08	102	51	1
13,00	55,50	102	51	1
14,00	71,52	107	54	1
15,00	79,18	111	56	1
16,00	91,98	115	58	1

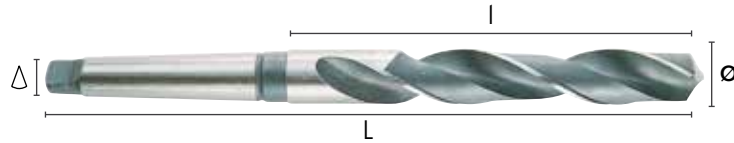
**1121**

**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





▶	△	Ø mm	€	L mm	l mm	📦
	1	5,00	19,21	133	52	1
	1	5,25	22,12	133	52	1
	1	5,50	19,21	138	57	1
	1	5,75	22,12	138	57	1
	1	6,00	19,21	138	57	1
	1	6,25	25,20	144	63	1
	1	6,50	21,88	144	63	1
	1	6,75	25,20	150	69	1
	1	7,00	21,88	150	69	1
	1	7,25	27,05	150	69	1
	1	7,50	23,53	150	69	1
	1	7,75	27,05	156	75	1
	1	8,00	23,53	156	75	1
	1	8,25	31,75	156	75	1
	1	8,50	21,23	156	75	1
	1	8,75	31,75	162	81	1
	1	9,00	21,23	162	81	1
	1	9,25	32,80	162	81	1
	1	9,50	20,97	162	81	1
	1	9,75	32,80	168	87	1
	1	10,00	20,97	168	87	1
	1	10,25	33,47	168	87	1
	1	10,50	22,39	168	87	1
	1	10,75	33,47	175	94	1
	1	11,00	22,39	175	94	1
	1	11,25	35,26	175	94	1
	1	11,50	23,60	175	94	1
	1	11,75	35,26	175	94	1
	1	12,00	23,60	182	101	1
	1	12,25	39,27	182	101	1
	1	12,50	26,26	182	101	1
	1	12,75	39,27	182	101	1
	1	13,00	26,26	182	101	1
	1	13,25	43,17	189	108	1
	1	13,50	28,87	189	108	1
	1	13,75	43,17	189	108	1
	1	14,00	28,87	189	108	1
	2	14,25	46,71	212	114	1
	2	14,50	31,26	212	114	1
	2	14,75	46,71	212	114	1
	2	15,00	31,26	212	114	1
	2	15,25	48,40	218	120	1
	2	15,50	32,34	218	120	1
	2	15,75	48,40	218	120	1
	2	16,00	32,34	218	120	1
	2	16,25	54,71	223	125	1
	2	16,50	36,59	223	125	1
	2	16,75	54,71	223	125	1
	2	17,00	36,59	223	125	1
	2	17,25	60,57	228	130	1
	2	17,50	40,49	228	130	1



▶	△	Ø mm	€	L mm	l mm	📦
	2	17,75	60,57	228	130	1
	2	18,00	40,49	228	130	1
	2	18,25	66,64	233	135	1
	2	18,50	44,57	233	135	1
	2	18,75	66,64	233	135	1
	2	19,00	44,57	233	135	1
	2	19,25	72,56	238	140	1
	2	19,50	48,51	238	140	1
	2	19,75	72,56	238	140	1
	2	20,00	48,51	238	140	1
	2	20,25	75,20	243	145	1
	2	20,50	52,43	243	145	1
	2	20,75	75,20	243	145	1
	2	21,00	52,43	243	145	1
	2	21,25	82,93	248	150	1
	2	21,50	57,88	248	150	1
	2	21,75	82,93	248	150	1
	2	22,00	57,88	248	150	1
	2	22,25	91,84	248	150	1
	2	22,50	63,31	253	155	1
	2	22,75	90,78	253	155	1
	2	23,00	63,31	253	155	1
	3	23,25	100,12	276	155	1
	3	23,50	69,88	276	155	1
	3	23,75	100,12	281	160	1
	3	24,00	69,88	281	160	1
	3	24,25	109,21	281	160	1
	3	24,50	76,17	281	160	1
	3	24,75	109,21	281	160	1
	3	25,00	76,17	281	160	1
	3	25,25	118,82	286	165	1
	3	25,50	82,89	286	165	1
	3	25,75	118,82	286	165	1
	3	26,00	82,89	286	165	1
	3	26,25	128,67	286	165	1
	3	26,50	89,76	286	165	1
	3	26,75	128,67	291	170	1
	3	27,00	92,16	291	170	1
	3	27,25	137,72	291	170	1
	3	27,50	96,11	291	170	1
	3	27,75	137,72	291	170	1
	3	28,00	96,11	291	170	1
	3	28,25	147,71	296	175	1
	3	28,50	103,04	296	175	1
	3	28,75	147,71	296	175	1
	3	29,00	103,04	296	175	1
	3	29,25	162,41	296	175	1
	3	29,50	113,13	296	175	1
	3	29,75	162,41	296	175	1
	3	30,00	113,30	296	175	1
	3	30,25	180,72	301	180	1

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



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

		Ø mm	€	L mm	l mm	
3		30,50	157,16	301	180	1
3		30,75	180,72	301	180	1
3		31,00	126,11	301	180	1
3		31,25	191,40	301	180	1
3		31,50	157,24	301	180	1
3		31,75	191,40	306	185	1
4		32,00	133,53	334	185	1
4		32,50	190,06	334	185	1
4		33,00	152,49	334	185	1
4		33,50	206,66	334	185	1
4		34,00	165,86	339	190	1
4		34,50	225,86	339	190	1
4		35,00	181,26	339	190	1
4		35,50	242,37	339	190	1
4		36,00	194,41	344	195	1
4		36,50	255,48	344	195	1
4		37,00	204,97	344	195	1
4		37,50	268,73	344	195	1
4		38,00	215,65	349	200	1
4		38,50	286,55	349	200	1
4		39,00	229,95	349	200	1
4		39,50	302,61	349	200	1
4		40,00	242,80	349	200	1
4		40,50	318,15	354	205	1
4		41,00	255,28	354	205	1
4		41,50	337,64	354	205	1
4		42,00	270,88	354	205	1
4		42,50	354,09	354	205	1
4		43,00	284,12	359	210	1
4		43,50	370,76	359	210	1
4		44,00	297,45	359	210	1
4		44,50	387,08	359	210	1
4		45,00	308,92	359	210	1
4		45,50	403,45	364	215	1
4		46,00	323,68	364	215	1
4		46,50	419,87	364	215	1
4		47,00	336,91	364	215	1

		Ø mm	€	L mm	l mm	
4		47,50	433,99	364	215	1
4		48,00	348,21	369	220	1
4		48,50	450,64	369	220	1
4		49,00	361,58	369	220	1
4		49,50	467,05	369	220	1
4		50,00	364,70	369	220	1
5		51,00	473,99	412	225	1
5		52,00	503,14	412	225	1
5		53,00	545,04	412	225	1
5		54,00	559,85	417	230	1
5		55,00	561,10	417	230	1
5		56,00	661,16	417	230	1
5		57,00	705,82	422	235	1
5		58,00	705,82	422	235	1
5		59,00	721,91	422	235	1
5		60,00	694,50	422	235	1
5		61,00	773,66	427	240	1
5		62,00	791,70	427	240	1
5		63,00	850,59	427	240	1
5		64,00	886,31	432	245	1
5		65,00	847,88	432	245	1
5		66,00	966,18	432	245	1
5		67,00	994,78	432	245	1
5		68,00	1.025,44	437	250	1
5		69,00	1.052,07	437	250	1
5		70,00	1.084,77	437	250	1
5		71,00	1.028,50	437	250	1
5		72,00	1.187,51	442	255	1
5		73,00	1.212,07	442	255	1
5		74,00	1.243,80	442	255	1
5		75,00	1.280,18	442	255	1
5		76,00	1.205,89	447	260	1
6		77,00	1.419,95	514	260	1
6		78,00	1.523,81	514	260	1
6		79,00	1.553,56	514	260	1
6		*80,00	1.584,85	514	260	1

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



**P** Aceros  
Aciers  
Steels  
Stähle



**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl



**K** Fundición  
Fonte  
Cast Iron  
Gusseisen



**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle



**S** Titanio y Superalaciones  
Titanium et Supeallages  
Titanium and Superalloys  
Titan und Superlegierungen



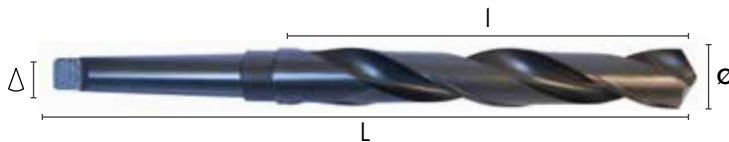
**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**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"	26,26	182	101	1
33/64"	26,26	182	101	1
17/32"	28,87	189	108	1
35/64"	28,87	189	108	1
9/16"	31,26	212	114	1
37/64"	46,71	212	114	1
19/32"	31,26	218	120	1
39/64"	32,34	218	120	1
5/8"	32,34	218	120	1
41/64"	54,71	223	125	1
21/32"	36,59	223	125	1
43/64"	36,59	223	125	1
11/16"	40,49	228	130	1
45/64"	40,49	228	130	1
23/32"	66,64	233	135	1
47/64"	44,57	233	135	1
3/4"	44,57	238	140	1
49/64"	48,51	238	140	1
25/32"	72,56	238	140	1
51/64"	48,51	243	145	1
13/16"	52,43	243	145	1
53/64"	52,43	243	145	1
27/32"	57,88	248	150	1
55/64"	82,93	248	150	1
7/8"	57,88	248	150	1
57/64"	63,31	253	155	1

Ø mm	€	L mm	l mm	
29/32"	63,31	253	155	1
59/64"	69,88	276	155	1
15/16"	137,72	281	160	1
61/64"	69,88	281	160	1
31/32"	57,88	281	160	1
63/64"	76,17	286	160	1
1"	84,16	290	170	1
1-1/16"	92,16	291	170	1
1-1/8"	103,04	296	175	1
1-5/32"	103,04	296	175	1
1-3/16"	113,30	301	180	1
1-7/32"	126,11	301	180	1
1-1/4"	191,40	306	185	1
1-9/32"	190,06	334	185	1
1-5/16"	152,49	334	185	1
1-11/32"	165,86	339	190	1
1-3/8"	181,26	339	190	1
1-13/32"	194,41	344	195	1
1-7/16"	255,48	344	195	1
1-1/2"	215,65	349	200	1
1-9/16"	242,80	349	200	1
1-5/8"	255,28	354	205	1
1-11/16"	284,12	359	210	1
1-3/4"	297,45	359	210	1
2"	364,70	374	225	1

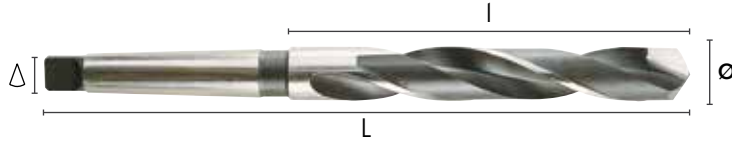
**1123**

**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



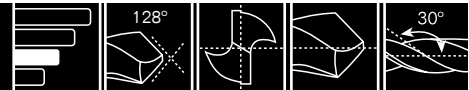
△	Ø mm	€	L mm	l mm	📦
1	10,00	85,10	168	87	1
1	11,00	92,05	175	94	1
1	12,00	96,58	182	101	1
1	13,00	109,76	182	101	1
1	14,00	119,32	189	108	1
1	14,50	134,81	212	114	1
2	15,00	134,81	212	114	1
2	15,50	144,00	218	120	1
2	16,00	144,00	218	120	1
2	16,50	152,75	223	125	1
2	17,00	152,75	223	125	1
2	17,50	164,84	228	130	1
2	18,00	164,84	228	130	1
2	18,50	192,95	233	135	1
2	19,00	192,95	233	135	1

△	Ø mm	€	L mm	l mm	📦
2	19,50	216,85	238	140	1
2	20,00	216,28	238	140	1
2	20,50	220,01	243	145	1
2	21,00	220,01	243	145	1
2	21,50	240,17	248	150	1
2	22,00	240,17	248	150	1
2	22,50	261,13	253	155	1
2	23,00	261,13	253	155	1
3	24,00	286,97	281	160	1
3	25,00	293,82	281	160	1
3	26,00	330,31	286	165	1
3	27,00	352,21	291	170	1
3	28,00	390,03	291	170	1
3	29,00	415,19	296	175	1
3	30,00	441,77	296	175	1



**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



▶	△	Ø mm	€	L mm	l mm	📦
1		10,00	70,73	168	87	1
1		10,50	73,71	168	87	1
1		11,00	70,68	175	94	1
1		11,50	73,71	175	94	1
1		12,00	75,60	182	101	1
1		12,50	80,00	182	101	1
1		13,00	77,63	182	101	1
1		13,50	101,46	189	108	1
1		14,00	99,52	189	108	1
2		14,50	110,45	212	114	1
2		15,00	101,46	212	114	1
2		15,50	112,41	218	120	1
2		16,00	108,47	218	120	1
2		16,50	113,40	223	125	1
2		17,00	112,41	223	125	1
2		17,50	119,44	228	130	1
2		18,00	117,44	228	130	1
2		18,50	128,36	233	135	1
2		19,00	125,40	233	135	1
2		19,50	144,33	238	140	1
2		20,00	140,30	238	140	1
2		20,50	161,22	243	145	1
2		21,00	163,19	243	145	1
2		21,50	184,15	248	150	1
2		22,00	166,08	248	150	1
2		22,50	204,99	253	155	1

▶	△	Ø mm	€	L mm	l mm	📦
2		23,00	193,15	253	155	1
3		23,50	204,99	276	155	1
3		24,00	206,98	281	160	1
3		24,50	220,96	281	160	1
3		25,00	218,63	281	160	1
3		25,50	270,78	286	165	1
3		26,00	256,59	286	165	1
3		26,50	284,61	286	165	1
3		27,00	284,61	291	170	1
3		27,50	340,33	291	170	1
3		28,00	314,87	291	170	1
3		28,50	348,33	296	175	1
3		29,00	321,88	296	175	1
3		29,50	356,31	296	175	1
3		30,00	328,71	296	175	1
3		31,00	328,70	301	180	1
4		32,00	376,66	334	185	1
4		33,00	430,20	334	185	1
4		34,00	511,19	339	190	1
4		35,00	511,19	339	190	1
4		36,00	548,50	344	195	1
4		37,00	566,90	344	195	1
4		38,00	631,44	349	200	1
4		39,00	648,55	349	200	1
4		40,00	684,93	349	200	1



**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

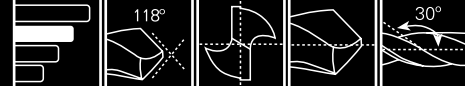


△	Ø mm	€	L mm	l mm	📦
2	10	59,30	190	90	1
2	11	59,30	190	90	1
2	12	64,95	190	90	1
2	13	64,95	190	90	1
2	14	69,14	190	90	1
2	15	70,50	190	90	1
2	16	83,88	190	90	1
2	17	89,42	190	90	1
2	18	90,77	190	90	1
3	19	103,13	225	105	1
3	20	109,65	225	105	1
3	21	119,40	225	105	1
3	22	137,27	225	105	1

△	Ø mm	€	L mm	l mm	📦
3	24	147,87	225	105	1
3	25	175,23	225	105	1
3	26	207,64	225	105	1
4	27	223,30	265	120	1
4	28	231,88	265	120	1
4	30	257,92	265	120	1
4	32	300,18	265	120	1
4	35	375,06	265	120	1
4	36	394,47	265	120	1
4	40	495,91	265	120	1
4	45	674,45	265	120	1
5	50	792,32	340	150	1

**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



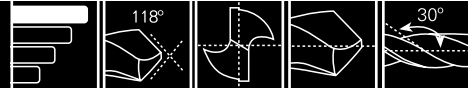
▶	△	Ø mm	€	L mm	l mm	📦
	1	*5,00	26,77	155	74	1
	1	*5,50	36,19	161	80	1
	1	*6,00	28,56	161	80	1
	1	*6,50	30,10	167	86	1
	1	*7,00	31,82	174	93	1
	1	*7,50	33,21	174	93	1
	1	8,00	33,52	181	100	1
	1	8,50	33,52	181	100	1
	1	9,00	36,70	188	107	1
	1	9,50	40,93	188	107	1
	1	10,00	39,74	197	116	1
	1	10,50	39,97	197	116	1
	1	11,00	39,04	206	125	1
	1	11,50	39,04	206	125	1
	1	12,00	41,56	215	134	1
	1	12,50	43,17	215	134	1
	1	13,00	43,17	215	134	1
	1	13,50	45,15	223	142	1
	1	14,00	49,03	223	142	1
	1	14,50	61,69	245	147	1
	2	15,00	61,69	245	147	1
	2	15,50	63,09	251	153	1
	2	16,00	64,12	251	153	1
	2	16,50	67,76	257	159	1
	2	17,00	68,12	257	159	1
	2	17,50	66,48	263	165	1
	2	18,00	73,88	263	165	1
	2	18,50	75,91	269	171	1
	2	19,00	78,31	269	171	1
	2	19,50	82,21	275	177	1
	2	20,00	83,22	275	177	1

▶	△	Ø mm	€	L mm	l mm	📦
	2	20,50	95,40	282	184	1
	2	21,00	92,47	282	184	1
	2	21,50	112,57	289	191	1
	2	22,00	107,44	289	191	1
	2	22,50	117,10	296	198	1
	2	23,00	111,61	296	198	1
	3	23,50	138,86	319	198	1
	3	24,00	136,76	327	206	1
	3	24,50	145,23	327	206	1
	3	25,00	139,19	327	206	1
	3	25,50	165,04	335	214	1
	3	26,00	155,76	335	214	1
	3	26,50	170,24	335	214	1
	3	27,00	165,74	343	222	1
	3	27,50	200,53	343	222	1
	3	28,00	182,08	343	222	1
	3	28,50	238,20	351	230	1
	3	29,00	194,48	351	230	1
	3	29,50	238,20	351	230	1
	3	30,00	219,17	351	230	1
	3	31,00	251,27	360	239	1
	4	32,00	260,52	397	248	1
	4	33,00	291,44	397	248	1
	4	34,00	339,30	406	257	1
	4	35,00	335,95	406	257	1
	4	36,00	389,14	416	267	1
	4	37,00	404,31	416	267	1
	4	38,00	433,04	426	277	1
	4	39,00	439,78	426	277	1
	4	40,00	475,64	426	277	1

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

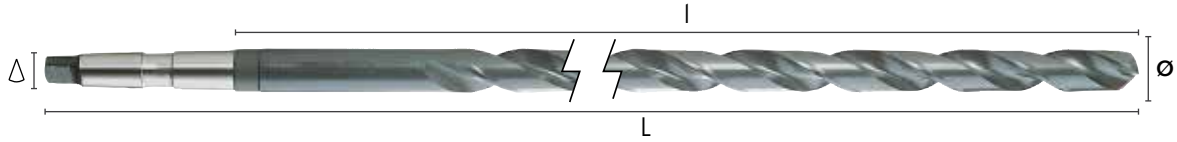
**1126**

**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



△	Ø mm	€	L mm	l mm	📦	△	Ø mm	€	L mm	l mm	📦
1	8,00	84,11	265	165	1	2	20,00	255,09	385	260	1
1	8,00	104,84	330	210	1	2	20,00	310,06	490	325	1
1	8,50	92,33	265	165	1	2	20,50	288,91	385	260	1
1	8,50	107,14	330	210	1	2	20,50	346,94	490	325	1
1	9,00	95,06	275	175	1	2	21,00	288,91	385	260	1
1	9,00	120,87	345	220	1	2	21,00	346,94	490	325	1
1	9,50	101,76	275	175	1	2	21,50	308,09	405	270	1
1	9,50	122,13	345	220	1	2	21,50	372,36	515	345	1
1	10,00	104,55	285	185	1	2	22,00	308,09	405	270	1
1	10,00	128,91	360	235	1	2	22,00	372,36	515	345	1
1	10,50	111,01	285	185	1	2	22,50	351,13	405	270	1
1	10,50	132,88	360	235	1	2	22,50	420,30	515	345	1
1	11,00	115,88	300	195	1	2	23,00	351,13	405	270	1
1	11,00	158,46	375	250	1	2	23,00	420,30	515	345	1
1	11,50	126,89	300	195	1	3	23,50	385,79	425	270	1
1	11,50	158,46	375	250	1	3	23,50	467,77	535	345	1
1	12,00	129,85	310	205	1	3	24,00	385,79	440	290	1
1	12,00	161,81	395	260	1	3	24,00	467,77	555	365	1
1	12,50	138,20	310	205	1	3	24,50	399,81	440	290	1
1	12,50	180,61	395	260	1	3	24,50	493,00	555	365	1
1	13,00	138,20	310	205	1	3	25,00	399,81	440	290	1
1	13,00	180,61	395	260	1	3	25,00	493,00	555	365	1
1	13,50	151,33	325	220	1	3	25,50	413,24	440	290	1
1	13,50	185,48	410	275	1	3	25,50	544,58	555	365	1
1	14,00	151,33	325	220	1	3	26,00	413,24	440	290	1
1	14,00	185,48	410	275	1	3	26,00	544,58	555	365	1
2	14,50	165,75	340	220	1	3	26,50	423,17	440	290	1
2	14,50	202,01	425	275	1	3	26,50	561,90	555	365	1
2	15,00	165,75	340	220	1	3	27,00	423,17	460	305	1
2	15,00	202,01	425	275	1	3	27,00	561,90	580	385	1
2	15,50	185,82	355	230	1	3	27,50	451,45	460	305	1
2	15,50	222,83	445	295	1	3	27,50	607,87	580	385	1
2	16,00	185,82	355	230	1	3	28,00	451,45	460	305	1
2	16,00	222,83	445	295	1	3	28,00	607,87	580	385	1
2	16,50	200,24	355	230	1	3	28,50	467,77	460	305	1
2	16,50	240,77	445	295	1	3	28,50	670,70	580	385	1
2	17,00	200,24	355	230	1	3	29,00	467,77	460	305	1
2	17,00	240,77	445	295	1	3	29,00	670,70	580	385	1
2	17,50	220,33	370	245	1	3	29,50	484,30	460	305	1
2	17,50	265,13	465	310	1	3	29,50	676,23	580	385	1
2	18,00	220,33	370	245	1	3	30,00	484,30	460	305	1
2	18,00	265,13	465	310	1	3	30,00	676,23	580	385	1
2	18,50	238,86	370	245	1	3	31,00	542,88	480	320	1
2	18,50	286,50	465	310	1	3	31,00	720,98	610	410	1
2	19,00	238,86	370	245	1	4	32,00	567,63	505	320	1
2	19,00	286,50	465	310	1	4	32,00	756,44	635	410	1
2	19,50	255,09	385	260	1	4	33,00	618,52	505	320	1
2	19,50	310,06	490	325	1	4	33,00	837,44	635	410	1

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

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

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

▶	△	∅ mm	€	L mm	l mm	📦
4		34,00	670,67	530	340	1
4		34,00	869,68	665	430	1
4		35,00	690,77	530	340	1
4		35,00	944,27	665	430	1
4		36,00	745,25	530	340	1
4		36,00	991,56	665	430	1
4		37,00	764,06	530	340	1
4		37,00	1.101,74	665	430	1
4		38,00	833,50	555	360	1
4		38,00	1.166,67	695	460	1
4		39,00	868,68	555	360	1
4		39,00	1.222,33	695	460	1

▶	△	∅ mm	€	L mm	l mm	📦
4		40,00	915,74	555	360	1
4		40,00	1.165,93	695	460	1
4		41,00	1.325,22	695	460	1
4		42,00	1.414,93	695	460	1
4		43,00	1.443,75	735	490	1
4		44,00	1.494,49	735	490	1
4		45,00	1.564,10	735	490	1
4		46,00	1.634,02	735	490	1
4		47,00	1.714,23	735	490	1
4		48,00	1.813,93	765	510	1
4		49,00	1.882,99	765	510	1
4		50,00	1.932,18	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 ○ Alternativa / Alternative



▶	△	∅ mm	d mm	€	L mm	l mm	📦
1		10,00	7,00	76,08	168	87	1
1		11,00	7,70	78,79	175	94	1
1		12,00	8,40	81,54	182	101	1
1		13,00	9,10	85,21	182	101	1
1		14,00	9,80	90,17	189	108	1
2		15,00	10,50	96,98	212	114	1
2		16,00	11,20	103,24	218	120	1
2		17,00	11,90	112,90	223	125	1
2		18,00	12,60	122,35	228	130	1
2		19,00	13,30	146,10	233	135	1
2		20,00	14,00	147,59	238	140	1
2		21,00	15,00	158,45	243	145	1
2		22,00	15,50	173,38	248	150	1

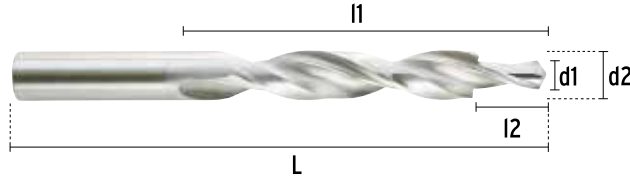
▶	△	∅ mm	d mm	€	L mm	l mm	📦
2		23,00	16,00	185,77	253	155	1
3		24,00	17,00	199,92	281	160	1
3		25,00	17,50	214,06	281	160	1
3		26,00	18,00	236,35	286	165	1
3		27,00	19,00	254,70	291	170	1
3		28,00	19,50	276,11	291	170	1
3		30,00	21,00	320,29	296	175	1
4		32,00	22,00	361,08	334	185	1
4		34,00	24,00	400,35	339	190	1
4		35,00	25,00	434,27	339	190	1
4		36,00	25,50	442,33	344	195	1
4		38,00	26,50	505,10	349	200	1
4		40,00	28,00	555,65	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	66,45	93	57	9	1
M-4	4,50	8,00	69,67	117	75	11	1
M-5	5,50	10,00	82,83	133	87	13	1

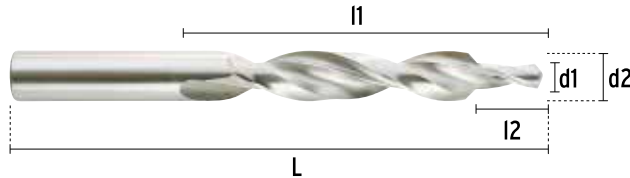
M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	
M-6	6,60	11,00	93,59	142	94	15	1
M-8	9,00	15,00	114,99	169	114	19	1
M-10	11,00	18,00	228,54	191	130	23	1

**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	77,54	93	57	9	1
M-4	4,30	8,00	81,30	117	75	11	1
M-5	5,30	10,00	96,65	133	87	13	1

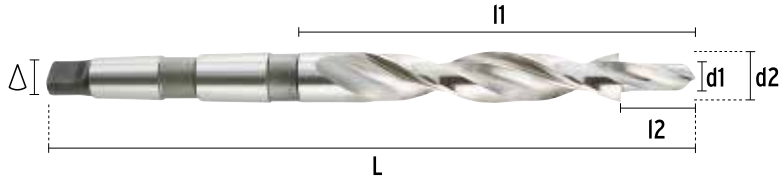
M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	
M-6	6,40	11,50	110,38	142	94	15	1
M-8	8,40	15,00	151,00	169	114	19	1
M-10	10,50	19,00	233,19	198	130	23	1

**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	172,00	212	114	19	1
2	M-10	11,00	18,00	193,86	228	130	23	1
2	M-12	14,00	20,00	216,88	238	140	27	1
3	M-14	16,00	24,00	307,56	281	160	31	1

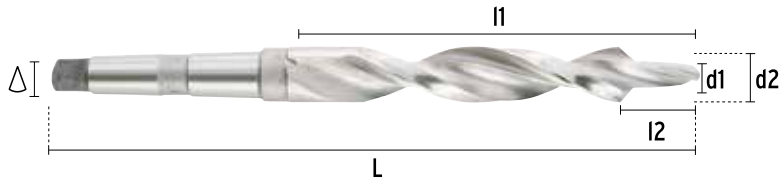
△	M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	📦
3	M-16	18,00	26,00	438,53	286	165	35	1
3	M-18	20,00	30,00	490,39	296	175	39	1
4	M-20	22,00	33,00	553,07	334	185	43	1

**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	166,35	175	94	13	1
1	M-6	6,60	13,00	169,74	182	101	15	1

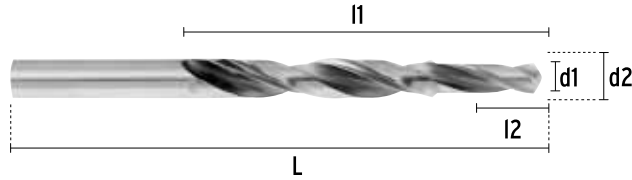
△	M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	📦
2	M-8	9,00	17,20	202,27	228	130	19	1
2	M-10	11,00	21,50	239,48	248	150	23	1

**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	59,56	70	39	8,80	1
M-4	3,30	4,50	64,07	80	47	11,40	1
M-5	4,20	5,50	69,01	93	57	13,60	1
M-6	5,00	6,60	78,50	101	63	16,50	1

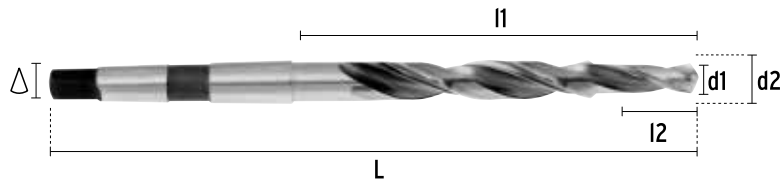
M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	
M-8	6,80	9,00	93,52	125	81	21,00	1
M-10	8,50	11,00	109,11	142	94	25,50	1
M-12	10,20	13,50	135,85	160	108	30,00	1

**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	152,45	162	81	21,00	1
1	M-10	8,50	11,00	166,11	175	94	25,50	1
1	M-12	10,20	13,50	196,23	189	108	30,00	1
2	M-14	12,00	15,50	209,38	218	120	34,50	1

	M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	
2	M-16	14,00	17,50	225,97	228	130	38,50	1
2	M-18	15,50	20,00	252,70	238	140	43,50	1
2	M-20	17,50	22,00	305,59	248	150	47,50	1

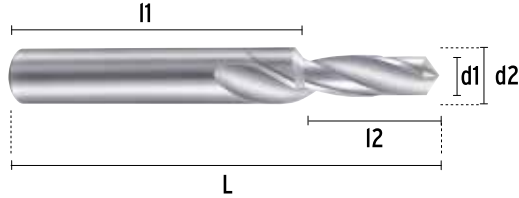


**1191 HSSCO**



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



M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	
M-3	2,50	3,40	39,70	52	20	8	1
M-4	3,30	4,50	42,00	58	24	11	1
M-5	4,20	5,50	43,85	66	28	13	1
M-6	5,00	6,60	48,00	70	31	16	1

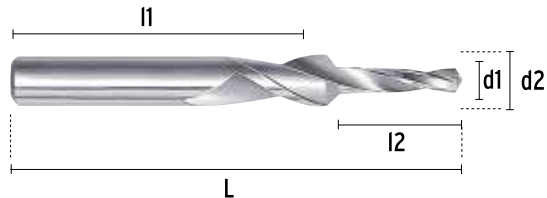
M	d1 mm	d2 mm	€	L mm	l1 mm	l2 mm	
M-8	6,80	9,00	64,61	84	40	20	1
M-10	8,50	11,00	86,76	95	47	24	1
M-12	10,20	14,00	118,16	107	54	29	1

**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			

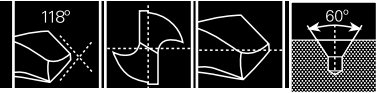
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



M	d1 mm	d2 mm	€	L mm	l2 mm	
M-4	4,30	8,60	105,23	110	30	1
M-5	5,30	10,40	110,77	110	30	1
M-6	6,40	12,40	118,16	110	30	1

M	d1 mm	d2 mm	€	L mm	l2 mm	
M-8	8,40	16,40	156,91	110	30	1
M-10	10,50	20,40	190,14	110	30	1

**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					

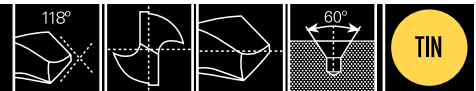
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



d1 mm	d2 mm	€	L mm	l mm	
1,00	3,15	6,43	31,50	1,60	1
1,25	3,15	6,43	33,50	1,90	1
1,25	4,00	7,10	35,50	1,90	1
1,60	4,00	6,43	37,50	2,40	1
1,60	5,00	7,57	40,00	2,40	1
2,00	5,00	6,93	42,00	2,90	1
2,00	6,30	8,05	45,00	2,90	1
2,50	6,30	7,70	47,00	3,60	1
2,50	8,00	9,00	50,00	3,60	1
3,15	8,00	8,48	52,00	4,40	1

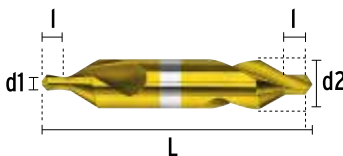
d1 mm	d2 mm	€	L mm	l mm	
3,15	10,00	9,96	56,00	4,40	1
4,00	10,00	11,56	59,00	5,60	1
4,00	12,50	13,65	63,00	5,60	1
5,00	12,50	19,38	66,00	6,90	1
5,00	16,00	32,99	71,00	6,90	1
6,30	16,00	27,68	74,00	8,60	1
6,30	20,00	42,58	80,00	8,60	1
10,00	25,00	83,45	100,00	31,50	1
12,50	31,50	199,14	125,00	33,50	1

**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					

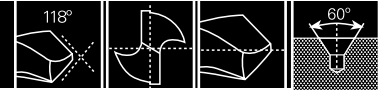
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



d1 mm	d2 mm	€	L mm	l mm	
1,00	3,15	12,26	31,50	1,60	1
1,25	3,15	12,26	33,50	1,90	1
1,60	4,00	12,83	37,50	2,40	1
2,00	5,00	14,05	42,00	2,90	1
2,50	6,30	15,29	47,00	3,60	1
3,15	8,00	16,01	52,00	4,40	1

d1 mm	d2 mm	€	L mm	l mm	
4,00	10,00	22,26	59,00	5,60	1
5,00	12,50	28,49	66,00	6,90	1
6,30	16,00	30,45	74,00	8,60	1
10,00	25,00	91,97	100,00	31,50	1
12,00	31,50	219,06	125,00	33,50	1

**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

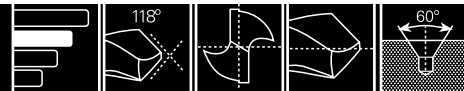
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



d1 mm	d2 mm	€	L mm	l mm	
1,00	3,15	59,76	31,50	1,60	1
1,25	3,15	59,76	33,50	1,90	1
1,60	4,00	61,48	37,50	2,40	1
2,00	5,00	76,84	42,00	2,90	1
2,50	6,30	91,36	47,00	3,60	1

d1 mm	d2 mm	€	L mm	l mm	
3,15	8,00	110,99	52,00	4,40	1
4,00	10,00	147,71	59,00	5,60	1
5,00	12,50	249,32	66,00	6,90	1
6,30	16,00	394,47	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

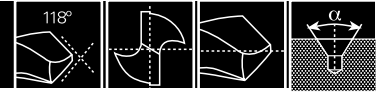


d1 mm	d2 mm	€	L mm	l mm	
1,00	4,00	20,06	60,00	1,30	1
1,50	5,00	20,42	60,00	2,00	1
2,00	6,00	21,28	80,00	2,50	1
2,50	8,00	25,85	80,00	3,10	1
3,00	8,00	25,85	80,00	3,90	1
1,00	4,00	50,05	120,00	1,30	1
1,50	5,00	47,57	120,00	2,00	1

d1 mm	d2 mm	€	L mm	l mm	
2,00	6,00	47,57	120,00	2,50	1
2,50	8,00	55,08	120,00	3,10	1
3,00	8,00	55,08	120,00	3,90	1
3,00	10,00	62,55	120,00	3,90	1
4,00	10,00	62,55	120,00	5,00	1
4,00	12,00	74,65	120,00	5,00	1
5,00	14,00	89,65	120,00	6,30	1



**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					

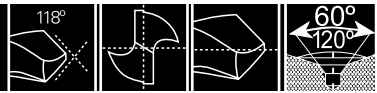
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



d1 mm	d2 mm	€	L mm	l mm	
1,00	3,15	7,07	31,50	3,00	1
1,25	3,15	7,07	33,50	3,35	1
1,25	4,00	7,07	35,50	3,75	1
1,60	4,00	7,07	35,50	4,25	1
1,60	5,00	7,65	40,00	4,75	1
2,00	5,00	7,65	40,00	5,30	1
2,00	6,30	8,50	45,00	6,00	1
2,50	6,30	8,48	45,00	6,70	1
2,50	8,00	9,36	50,00	7,50	1
3,15	8,00	9,36	50,00	8,50	1

d1 mm	d2 mm	€	L mm	l mm	
3,15	10,00	12,19	56,00	9,50	1
4,00	10,00	12,19	56,00	10,60	1
4,00	12,50	20,35	63,00	11,80	1
5,00	12,50	20,38	63,00	13,20	1
5,00	16,00	28,96	71,00	15,00	1
6,30	16,00	29,16	71,00	17,00	1
6,30	20,00	51,95	80,00	19,00	1
8,00	20,00	54,62	80,00	21,20	1
10,00	25,00	87,78	100,00	31,50	1
12,50	31,50	209,43	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					

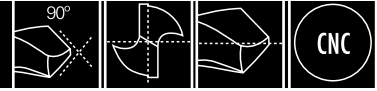
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



d1 mm	d2 mm	€	L mm	l mm	
1,00	4,00	11,67	35,50	1,60	1
1,25	5,00	11,67	40,00	1,90	1
1,60	6,30	11,67	45,00	2,40	1
2,00	8,00	11,67	50,00	2,90	1
2,50	10,00	13,40	56,00	3,60	1

d1 mm	d2 mm	€	L mm	l mm	
3,15	11,20	15,36	60,00	4,40	1
4,00	14,00	23,61	67,00	5,60	1
5,00	18,00	32,91	75,00	6,90	1
6,30	20,00	48,04	80,00	8,60	1

**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			

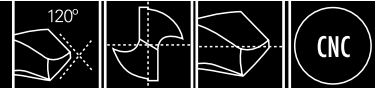
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	€	L mm	l mm	
3,00	23,65	50,00	10,00	1
4,00	23,65	52,00	12,00	1
5,00	26,66	60,00	15,00	1
6,00	26,66	66,00	20,00	1
8,00	30,13	79,00	25,00	1

Ø mm	€	L mm	l mm	
10,00	30,13	89,00	25,00	1
12,00	41,66	102,00	30,00	1
16,00	57,45	115,00	35,00	1
20,00	113,04	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

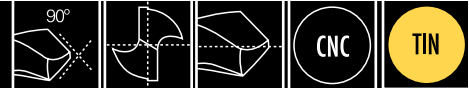


Ø mm	€	L mm	l mm	
3,00	23,65	46	12	1
4,00	23,65	55	12	1
5,00	26,66	62	14	1
6,00	26,66	66	16	1
8,00	30,13	79	21	1

Ø mm	€	L mm	l mm	
10,00	30,13	89	25	1
12,00	41,66	102	30	1
16,00	57,45	115	38	1
20,00	113,04	131	45	1

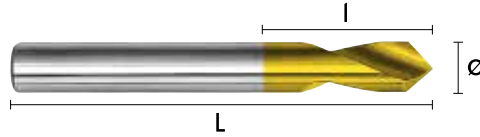
**1189**

**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



Ø mm	€	L mm	l mm	
3,00	30,74	50	10	1
4,00	30,74	52	12	1
5,00	34,66	60	15	1
6,00	34,66	66	20	1
8,00	39,17	79	25	1

Ø mm	€	L mm	l mm	
10,00	39,17	89	25	1
12,00	54,16	102	30	1
16,00	74,69	115	35	1
20,00	146,95	131	40	1

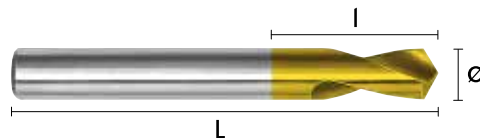
**1190**

**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



Ø mm	€	L mm	l mm	
3,00	30,74	46	12	1
4,00	30,74	55	12	1
5,00	34,66	62	14	1
6,00	34,66	66	16	1
8,00	39,17	79	21	1

Ø mm	€	L mm	l mm	
10,00	39,17	89	25	1
12,00	54,16	102	30	1
16,00	74,69	115	38	1
20,00	146,95	131	45	1

1179

**HM-MD**

1XD



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



∅ mm	d mm	€	L mm	l mm	
6,00	6	26,11	65	15	1
8,00	8	44,97	80	20	1

∅ mm	d mm	€	L mm	l mm	
10,00	10	64,84	90	25	1
12,00	12	90,98	100	30	1

1180

**HM-MD**

1XD



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



∅ mm	d mm	€	L mm	l mm	
6,00	6	26,11	65	15	1
8,00	8	44,97	80	20	1

∅ mm	d mm	€	L mm	l mm	
10,00	10	64,84	90	25	1
12,00	12	90,98	100	30	1

**P** Aceros  
Aciers  
Steels  
Stähle

**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K** Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S** Titanio y Superalaciones  
Titanium et Supealliajes  
Titanium and Superalloys  
Titan und Superlegierungen

**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**1185**

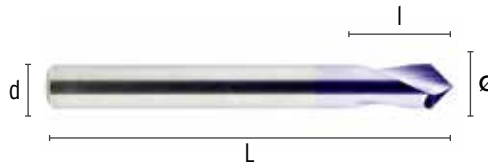
**HM-MD**

**1XD**



P				M		K			N				S		H		
<800	<1.000	<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



∅ mm	d mm	€	L mm	l mm	
6,00	6	33,94	65	15	1
8,00	8	58,46	80	20	1

∅ mm	d mm	€	L mm	l mm	
10,00	10	84,29	90	25	1
12,00	12	118,27	100	30	1

**1186**

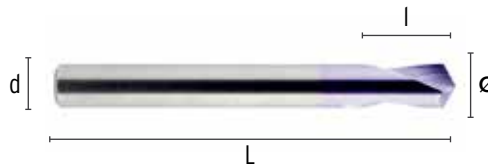
**HM-MD**

**1XD**



P				M		K			N				S		H		
<800	<1.000	<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



∅ mm	d mm	€	L mm	l mm	
6,00	6	33,94	65	15	1
8,00	8	58,46	80	20	1

∅ mm	d mm	€	L mm	l mm	
10,00	10	84,29	90	25	1
12,00	12	118,27	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	13,62	66	28	1
7,00	15,01	74	34	1

Ø mm	€	L mm	l mm	
8,00	16,45	79	37	1
10,00	18,61	89	43	1

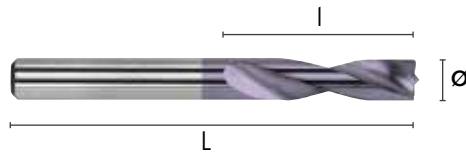
**1194**

**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

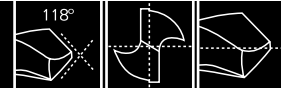


Ø mm	€	L mm	l mm	
6,00	23,84	66	28	1
7,00	26,28	74	34	1

Ø mm	€	L mm	l mm	
8,00	28,79	79	37	1
10,00	32,56	89	43	1

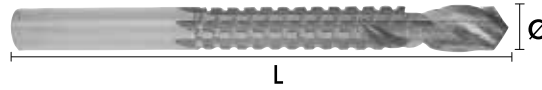


**5114 HSS**



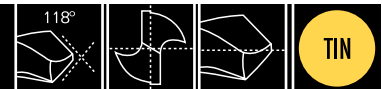
P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●									●	●		●					
10-25									15-20	25-30		25-30					

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



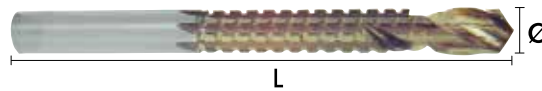
Ø mm	€	L mm	Z	
6,00	17,71	90	5	1
8,00	24,21	90	7	1

**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	32,14	90	5	1
8,00	42,02	90	7	1

**6110** Espiga / Queue à tenon / Bit shank / Stift



	DIN 228	€	L mm	gr	
1	B-12	10,48	89	65	1
1	B-16	10,48	99	80	1
1	B-18	10,48	107	110	1
>2	B-12	12,70	106	140	1
2	B-16	12,70	112	160	1
2	B-18	12,70	119	185	1

	DIN 228	€	L mm	gr	
>3	B-16	15,50	134	305	1
3	B-18	15,50	140	330	1
>4	B-16	22,20	156	120	1
4	B-18	23,93	165	640	1
>5	B-16	94,51	221	1.570	1
5	B-18	94,51	221	1.590	1

**6111** Casquillo DIN 2185 / Douille de réduction / Drill sleeve / Bohrerhülse DIN 2185



	€	L mm	gr	
2 x 1	25,56	92	90	1
3 x 1	31,56	99	200	1
3 x 2	31,56	112	180	1
4 x 1	44,14	124	510	1
4 x 2	41,49	124	420	1
4 x 3	41,49	140	370	1
5 x 1	73,20	180	1.550	1

	€	L mm	gr	
5 x 2	69,38	156	1.200	1
5 x 3	69,38	156	1.150	1
5 x 4	80,97	171	1.023	1
6 x 3	134,75	230	3.800	1
6 x 4	152,88	230	3.390	1
6 x 5	152,88	230	2.700	1

**6114** Contrapunto / Contrepointe / Fixed centre / Reitstock



	HSS €	HM €	
1	15,84	-	1
2	21,09	-	1
3	32,76	79,16	1

	HSS €	HM €	
4	51,21	96,52	1
5	72,32	188,70	1
6	278,89	-	1

**6112** **Alargadera / Adaptateur / Extension piece / Verlängerungsstück**



Ext.	Int.	€	L mm	Box
1	1	32,21	145	1
1	2	49,88	160	1
2	1	32,21	160	1
2	2	46,82	175	1
2	3	67,81	196	1
3	1	46,82	175	1
3	2	48,35	194	1
3	3	70,90	215	1
3	4	114,36	240	1
4	1	67,81	200	1

Ext.	Int.	€	L mm	Box
4	2	66,27	215	1
4	3	69,36	240	1
4	4	114,36	265	1
4	5	191,94	300	1
5	1	130,73	232	1
5	2	121,55	247	1
5	3	128,36	268	1
5	4	145,09	300	1
5	5	240,05	335	1

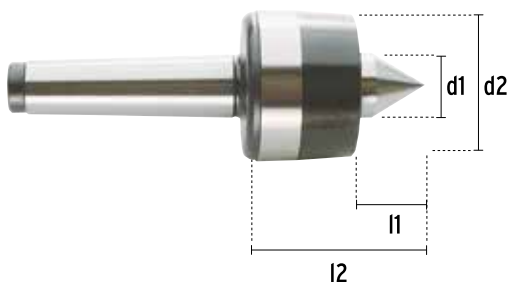
**6113** **Expulsor / Éjecteur / Ejector / Auswerfer**



Ext.	€	gr	Box
1 - 2	13,65	50	1
2 - 3	16,15	80	1
3 - 4	21,31	160	1

Ext.	€	gr	Box
4 - 5	28,95	350	1
5 - 6	47,05	690	1

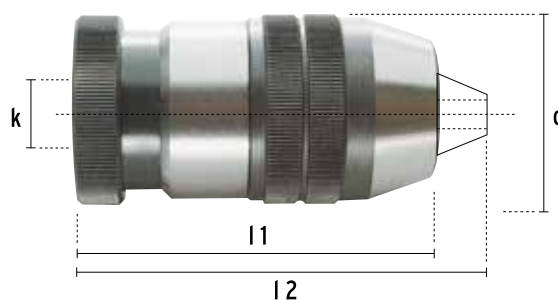
**6115** **Punto giratorio / Pointe tournante / Revolving lathe centre / Mitlaufende Drehbankspitze**



Ext.	d1 mm	d2 mm	l1 mm	l2 mm	Kg	€	Box
1	12	32	18	42	180	151,85	1
2	16	40	23	46	400	169,38	1
3	24	45	27	53	600	227,70	1
4	24	59	36	65	1200	269,85	1
5	38	79	41	77	1500	390,02	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.

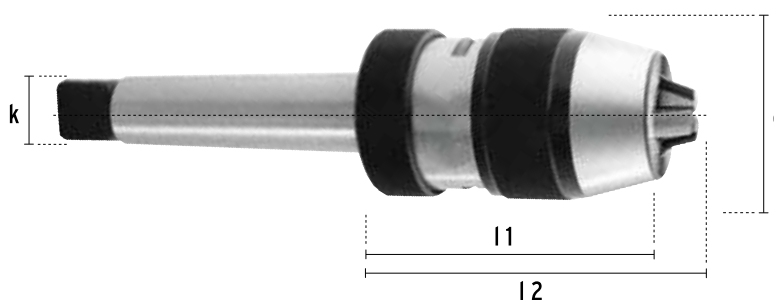


Ø mm	d mm		k Int.	€	l1 mm	l2 mm		Husillo Arbre Spindle €	Juego de garras Jeux de griffes Set of claws €
0,00 - 10,00	41	B16	1/2" - 20H*	182,04	81	89	1	31,14	42,24
1,00 - 13,00	46	B16	1/2" - 20H*	199,87	88	89	1	33,44	45,33

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

**6120** **HP1-CM**

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

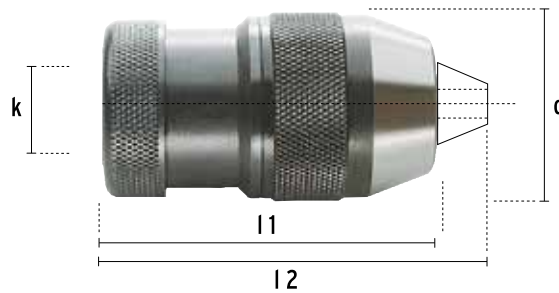


Ø mm	d mm	k 	€	l1 mm	l2 mm		Husillo Arbre Spindle €	Juego de garras Jeux de griffes Set of claws €
0,00 - 10,00	43	CM2	394,53	73	82	1	31,14	42,24
1,00 - 13,00	48	CM2, CM3, CM4	428,35	80	92	1	33,44	45,33
3,00 - 16,00	54	CM2, CM3, CM4	511,72	85	96	1	33,44	46,84



**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.



∅ mm	d mm		k Int.	€	l1 mm	l2 mm		Husillo Arbre Spindle €	Juego de garras Jeu de griffes Set of claws €
0,00 - 10,00	39	B12	1/2" - 20H 3/8" - 24H	99,70	73	80	1	21,04	42,04
2,00 - 13,00	46	B16	1/2" - 20H 3/8" - 24H	125,31	87	95	1	24,27	45,43
3,00 - 16,00	51	B16,B18	5/8" - 16H 1/2" - 20H	166,46	102	115	1	24,27	45,43
5,00 - 20,00	56	B18	-	219,45	95	110	1	29,72	53,43

**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.



∅ mm	d mm		k Int.	€	l1 mm	l2 mm	
1,00 - 10,00	35	B12*	1/2" - 20H, 3/8" - 24H*	67,07	65	72	1
1,50 - 13,00	40	B16	1/2" - 20H	76,96	83	91	1
3,00 - 16,00	53	B16,B18	1/2" - 20H, 5/8" - 24H*	101,64	96	109	1

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


**6122** > **Afilador de Brocas / Affûteuses forets / Twist Drill Sharpener / Bohrschärfer**

- > 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 118°  
 Angle de la point e 118°  
 Point angle of 118°




∅ mm	€	
3 a 13	168,90	1

**6123** > **Porta / Mandrins / Chuck / Bohrfutter**

€	
10,23	1



**6124** > **Muela / Meule / Wheel / Schleifscheibe**

€	
21,71	1



**1171** **Ø 1 a 10 X 0,5 mm**

Ø mm 1 a 10	X mm 0,50	 19	DIN <b>338</b>
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>HSS  
(1101)



>SPEED PLUS  
(1158)



>HSS CO  
(1105)



>HSS CO INOX  
(1106)



>HSS TIN  
(1108)



REF.	€
HSS	49,64
SPEED PLUS	54,43
HSS CO	81,79
HSS CO INOX	167,88
HSS TIN	101,45
VACÍO/VIDE/EMPTY	13,14

**1172** **Ø 1 a 13 X 0,5 mm**

Ø mm 1 a 13	X mm 0,50	 25	DIN <b>338</b>
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>HSS  
(1101)



>SPEED PLUS  
(1158)



>HSS CO  
(1105)



>HSS CO INOX  
(1106)



>HSS TIN  
(1108)



REF.	€
HSS	97,12
SPEED PLUS	106,85
HSS CO	187,28
HSS CO INOX	337,54
HSS TIN	211,05
VACÍO/VIDE/EMPTY	17,53

**1143** **Ø 1 a 10 X 0,25 mm**

Ø mm 1 a 10	X mm 0,25	 37	DIN <b>338</b>
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>HSS  
(1101)



>HSS CO  
(1105)



REF.	€
HSS	136,48
HSS CO	201,45
VACÍO/VIDE/EMPTY	44,42



**1144** **Ø 6 a 10 X 0,10 mm**

Ø mm 6 a 10	X mm 0,10	 41	DIN <b>338</b>
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>HSS  
(1101)



>HSS CO  
(1105)



REF.	€
HSS	256,50
HSS CO	367,25
VACÍO/VIDE/EMPTY	76,88

**1145** **Ø 1 a 13 X 0,25 mm**

Ø mm 1 a 13	X mm 0,25	 49	DIN <b>338</b>
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>HSS  
(1101)



>HSS CO  
(1105)



REF.	€
HSS	237,51
HSS CO	440,55
VACÍO/VIDE/EMPTY	46,13

**1146** **Ø 1 a 6 X 0,10 mm**

Ø mm 1 a 6	X mm 0,10	 51	DIN <b>338</b>
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>HSS  
(1101)



>HSS CO  
(1105)



REF.	€
HSS	104,26
HSS CO	148,04
VACÍO/VIDE/EMPTY	30,75

**1173**

**1/16" a 3/8" X 1/64"**



21

DIN  
**338**

>HSS  
 (1158/9)



>HSS CO  
 (1105/9)



REF.	€
SPEED PLUS	79,45
HSS CO	109,31

**1174**

**1/16" a 1/2" X 1/64"**



29

DIN  
**338**

>SPEED PLUS  
 (1158/9)



>HSS CO  
 (1105/9)



REF.	€
SPEED PLUS	144,34
HSS CO	241,03

# JUEGO DE BROCAS COFFRETS DE FORETS / DRILL SETS / BOHRSATZ

## 1150 Ø 1 a 10 X 0,5 mm

Ø  
mm  
1 a 10

X  
mm  
0,50

DIN  
**338**

>HSS  
(1101)

>HSS NSP  
(1158)

>HSS CO  
(1105)

>HSS TIN  
(1108)



REF.	€
HSS	574,66
HSS NSP	616,68
HSS CO	502,31
HSS TIN	641,25
VACÍO/VIDE/EMPTY	76,88

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  
1 a 10

X  
mm  
0,50

DIN  
**338**

>HSS  
(1101)

>HSS NSP  
(1158)

>HSS CO  
(1105)

>HSS TIN  
(1108)



REF.	€
HSS	888,30
HSS NSP	955,05
HSS CO	1.105,97
HSS TIN	1.265,46
VACÍO/VIDE/EMPTY	153,77

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

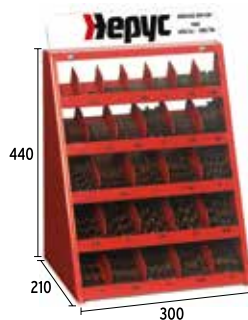
€ 1.518,25 1.659,54 1.804,40 2.359,90 1.903,28

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

>HSS DIN 338 NSP  
 (1158/9)



>HSSCO DIN 338 N  
 (1105/9)

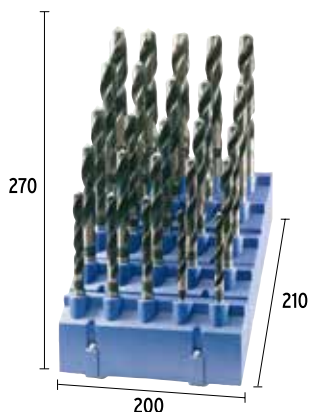


Ø mm	HSS DIN 338 NSP	HSSCO DIN 338 N
1/16"	20	20
5/64"	20	10
3/32"	50	20
7/64"	20	20
1/8"	40	20
9/64"	50	20
5/32"	30	20
11/64"	40	20
3/16"	50	30
13/64"	30	20
7/32"	40	20
15/64"	50	30
1/4"	20	10
17/64"	30	20
9/32"	50	30

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
€	1.966,95	2.111,26



**8203** > Ø 14 a 30 mm (Ref. 1121)



Ø mm	Icon	Ø mm	Icon	Ø mm	Icon
14,00	1	18,50	1	23,00	1
14,50	1	19,00	1	24,00	1
15,00	1	19,50	1	25,00	1
15,50	1	20,00	1	26,00	1
16,00	1	20,50	1	27,00	1
16,50	1	21,00	1	28,00	1
17,00	1	21,50	1	30,00	1
17,50	1	22,00	1		
18,00	1	22,50	1		
				<b>TOTAL</b>	<b>25</b>
				€	1374,16

**8207** > Ø 1 a 16 mm

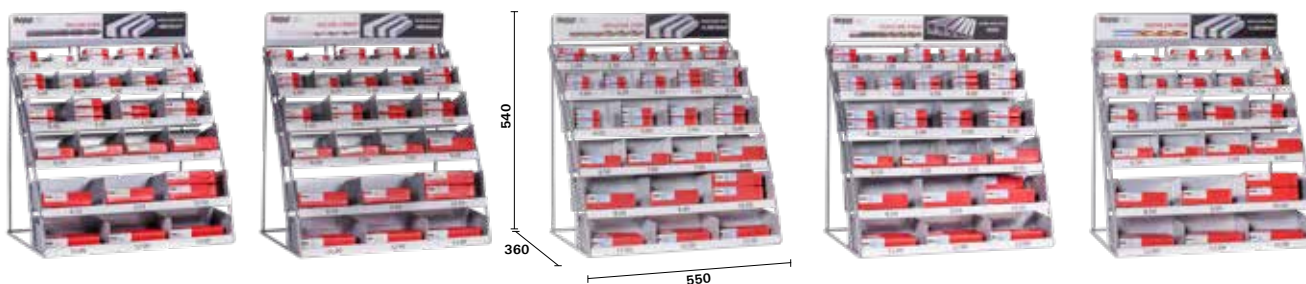
>HSS DIN 338 N  
(1101)

>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
<b>TOTAL</b>	<b>795</b>	<b>795</b>	<b>795</b>	<b>795</b>	<b>795</b>
€	1.469,27	1.619,36	2.704,59	4.153,98	3.334,23



**75** YEARS  
1947-2022

**Roscano**   
**Tarudage**  
**Threading**  
**Gewindeschneiden**

**Херус** / CUTTING  
TOOL  
EXPERTS

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

**Entrada recta (Agujeros Ciegos y pasantes) /**  
Entrée droite (trous borgnes et débouchants) / Straight flute (through and blind holes) / Gerade Nuten (Durchgangs- und Sacklöcher)

2102	HSSE	DIN 371			M-MF DIN 13	Form. C		Tol. 6H	1,5XD	R	P	148	
2101	HSSE	DIN 376/374			M-MF DIN 13	Form. C		Tol. 6H	1,5XD	D	P	149	
2102/5	HSSE	DIN 371			M-MF DIN 13	Form. C		Tol. 6H	LH	1,5XD	P	151	
2101/5	HSSE	DIN 376/374			M-MF DIN 13	Form. C		Tol. 6H	LH	1,5XD	P	151	
2114	HSSE	DIN 371			M-MF DIN 13	Form. A		Tol. 6H	1,5XD	R	P	152	
2113	HSSE	DIN 376/374			M-MF DIN 13	Form. A		Tol. 6H	1,5XD	D	P	152	
2190	HSSE	DIN 371			M DIN 13	Form. E		Tol. 6H	R	1,5XD	M-F	N	153
2191	HSSE	DIN 376			M DIN 13	Form. E		Tol. 6H	D	1,5XD	M-F	N	153
2180	HSSE-PM	DIN 371	TIA SIN+		M DIN 13	Form. C		Tol. 6HX	R	1,5XD	M-F	K	154
2179	HSSE-PM	DIN 376	TIA SIN+		M DIN 13	Form. C		Tol. 6HX	D	1,5XD	M-F	K	154
2274	HM	DIN 371	TICN+		M DIN 13	Form. D		Tol. 6HX	R	1,5XD	M-F	H	155
2275	HM	DIN 376	TICN+		M DIN 13	Form. D		Tol. 6HX	D	1,5XD	M-F	H	155

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

2104	HSSE	DIN 371			M-MF DIN 13	Form. B "Gun"		Tol. 6H	3XD	R	P N	156
2103	HSSE	DIN 376/374			M-MF DIN 13	Form. B "Gun"		Tol. 6H	3XD	D	P N	156
2104/5	HSSE	DIN 371			M-MF DIN 13	Form. B "Gun"		Tol. 6H	3XD	R	P N	158
2103/5	HSSE	DIN 376/374			M-MF DIN 13	Form. B "Gun"		Tol. 6H	3XD	D	P N	158
2111	HSSE	DIN 371-L			M DIN 13	Form. B "Gun"		Tol. 6H	3XD	R	P N	159
2272	HSSE	DIN 376			M DIN 13	Form. B "Gun"		Tol. 6H	3XD	D	P N	159
2110	HSSE	DIN 371			M DIN 13	Form. B "Gun"		Tol. 6H +0,1	3XD	R	P N	160



	2109	HSSE	DIN 376			M DIN 13	Form. B "Gun"	Tol. 6H +0,1	3XD	D	P N	160
	2168	HSSE	DIN 371			M DIN 13	Form. B "Gun"	Tol. 6G	3XD	R	P N	161
	2169	HSSE	DIN 376			M DIN 13	Form. B "Gun"	Tol. 6G	3XD	D	P N	161
NEW	2407	HSSE	DIN 371			M DIN 13	Form. B "Gun"	Tol. 4H	3XD	R	P M K N	162
NEW	2408	HSSE	DIN 376/374			M DIN 13	Form. B "Gun"	Tol. 4H	3XD	D	P M K N	162
	2250	HSSE	DIN 371	VAP		M DIN 13	Form. B "Gun"	Tol. 6H	3XD	R MF	P M N	163
	2251	HSSE	DIN 376/374	VAP		M-MF DIN 13	Form. B "Gun"	Tol. 6H	3XD	D MF	P M N	163
	2116	HSSE	DIN 371	TIN		M DIN 13	Form. B "Gun"	Tol. 6H	3XD	R MF	P M K N	164
	2115	HSSE	DIN 376/374	TIN		M-MF DIN 13	Form. B "Gun"	Tol. 6H	3XD	D MF	P M K N	164
NEW	2254	HSSE-PM	DIN 371	HL		M DIN 13	Form. B "Gun"	Tol. 6HX	3XD	R MF	P M K N S	165
NEW	2255	HSSE-PM	DIN 376/374	HL		M DIN 13	Form. B "Gun"	Tol. 6HX	3XD	D MF	P M K N S	165
	2126	HSSE-PM	DIN 371	TRIASIN+		M DIN 13	Form. B "Gun"	Tol. 6H	3XD	R MF	P K	166
	2125	HSSE-PM	DIN 376/374	TRIASIN+		M-MF DIN 13	Form. B "Gun"	Tol. 6H	3XD	D MF	P K	166
	2176	HSSE-PM	DIN 371	TRIASIN+		M DIN 13	Form. B "Gun"	Tol. 6HX	3XD	R MF	P K	167
	2175	HSSE-PM	DIN 376	TRIASIN+		M DIN 13	Form. B "Gun"	Tol. 6HX	3XD	D MF	P K	167
	2133	HSSE	DIN 371			M DIN 13	B-AZ	Tol. 6H	3XD	R	N	168
	2132	HSSE	DIN 376			M DIN 13	B-AZ	Tol. 6H	3XD	D	N	168
	2258	HSSE-PM	DIN 371 SYNCHRO	HL		M DIN 13	Form. B "Gun"	Tol. 6HX	CNC	3XD R MF	P M K N S	169
	2259	HSSE-PM	DIN 3761 SYNCHRO	HL		M DIN 13	Form. B "Gun"	Tol. 6HX	CNC	3XD D MF	P M K N S	169

Forma Helicoidal (Agujeros ciegos) / Forme helicoidale (Trous borgnes) / Spiral fluted (Blind holes) / Spiralförmig (Sacklöcher)

2106	HSSE	DIN 371			M-MF DIN 13	Form. C		Tol. 6H			3XD		P	N	170
2105	HSSE	DIN 376/374			M-MF DIN 13	Form. C		Tol. 6H			3XD		P	N	170
2106/5	HSSE	DIN 371			M-MF DIN 13	Form. C		Tol. 6H			3XD		P	N	172
2105/5	HSSE	DIN 376/374			M-MF DIN 13	Form. C		Tol. 6H			3XD		P	N	172
2112	HSSE	DIN 371-L			M DIN 13		Form. C		Tol. 6H		3XD		P	N	173
2273	HSSE	DIN 376			M DIN 13		Form. C		Tol. 6H		3XD		P	N	173
2166	HSSE	DIN 371			M DIN 13	Form. C		Tol. 6H +0.1			3XD		P	N	174
2165	HSSE	DIN 376			M DIN 13	Form. C		Tol. 6H +0.1			3XD		P	N	174
2170	HSSE	DIN 371			M DIN 13	Form. C		Tol. 6G			3XD		P	N	175
2208	HSSE	DIN 376			M DIN 13	Form. C		Tol. 6G			3XD		P	N	175
<b>NEW</b> 2409	HSSE	DIN 371			M DIN 13	Form. C		Tol. 4H			3XD		P	M	176
<b>NEW</b> 2410	HSSE	DIN 376/374			M DIN 13	Form. C		Tol. 4H			3XD		P	M	176
2108	HSSE	DIN 371			M DIN 13	Form. C		Tol. 6H			3XD		P	N	177
2107	HSSE	DIN 376/374			M DIN 13	Form. C		Tol. 6H			3XD		P	N	177
2252	HSSE	DIN 371	VAP		M DIN 13	Form. C		Tol. 6H			3XD		P	M	178
2253	HSSE	DIN 376/374	VAP		M-MF DIN 13	Form. C		Tol. 6H			3XD		P	M	178
2118	HSSE	DIN 371	TIN		M DIN 13	Form. C		Tol. 6H			3XD		P	M	179
2117	HSSE	DIN 376/374	TIN		M-MF DIN 13	Form. C		Tol. 6H			3XD		P	M	179

<b>NEW</b>	2256	HSSE-PM	DIN 371	HL		M DIN 13	Form. C		Tol. 6H	45°	3XD	R	MF	P M K N S	180
<b>NEW</b>	2257	HSSE-PM	DIN 376/374	HL		M DIN 13	Form. C		Tol. 6H	45°	3XD	D	MF	P M K N S	180
	2124	HSSE-PM	DIN 371	TRIASIN+		M DIN 13	Form. C		Tol. 6H	35°	3XD	R	MF	P K	181
	2123	HSSE-PM	DIN 376/374	TRIASIN+		M-MF DIN 13	Form. C		Tol. 6H	35°	3XD	D	MF	P K	181
	2178	HSSE-PM	DIN 371	TRIASIN+		M DIN 13	Form. C		Tol. 6HX	15°	3XD	R	MF	P K	182
	2177	HSSE-PM	DIN 376	TRIASIN+		M DIN 13	Form. C		Tol. 6HX	15°	3XD	D	MF	P K	182
	2182	HSSE	DIN 371			M DIN 13	Form. C		Tol. 6HX	45°	3XD	R	MF	N	183
	2181	HSSE	DIN 376			M DIN 13	Form. C		Tol. 6HX	45°	3XD	D	MF	N	183
	2260	HSSE-PM	DIN 371 SYNCHRO	HL		M DIN 13	CNC Form. C		Tol. 6HX	45°	3XD	R	MF	P M K N S	184
	2261	HSSE-PM	DIN 376 SYNCHRO	HL		M DIN 13	CNC Form. C		Tol. 6HX	45°	3XD	D	MF	P M K N S	184

Laminación / Tarauds à refouler / Forming taps / Gewindeformer
































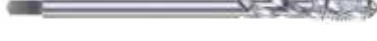



































































































































































	2188	HSSE-PM	DIN 371	TIN		M DIN 13	Form. C		Tol. 6HX	A>12%	1.5XD	R	MF	P M N	185
	2187	HSSE-PM	DIN 376	TIN		M DIN 13	Form. C		Tol. 6HX	A>12%	1.5XD	D	MF	P M N	185
	2214	HSSE-PM	DIN 371	TIN		M DIN 13		Form. C	Tol. 6HX	A>12%	3XD	R	MF	P M N	186
	2213	HSSE-PM	DIN 376	TIN		M-MF DIN 13		Form. C	Tol. 6HX	A>12%	3XD	D	MF	P M N	186
	2216	HSSE-PM	DIN 371	TIN		M DIN 13	Form. C		Tol. 6GX	A>12%	1.5XD	R	MF	P M N	187
	2215	HSSE-PM	DIN 376	TIN		M DIN 13	Form. C		Tol. 6GX	A>12%	1.5XD	D	MF	P M N	187
	2218	HSSE-PM	DIN 371	TIN		M DIN 13		Form. C	Tol. 6GX	A>12%	3XD	R	MF	P M N	188
	2217	HSSE-PM	DIN 376	TIN		M DIN 13		Form. C	Tol. 6GX	A>12%	3XD	D	MF	P M N	188






Otros / Autres / Others / Sonstige

2199	HSSE	DIN 357			M DIN 13	16-18h		Tol. 6H		R	P	189
2134	HSSE		NIT		M DIN 13	16-18h		Tol. 6H		D	P	189
2806	HSSE	DIN 13			M DIN 13			Tol. 6H			P N	190
1504	HSS	Hex			M DIN 13			Tol. 6H			P	190
2248	HSS	ISO 529			M DIN 13	Form. B "Gun"		Tol. 6H		3XD	P N	191
2249	HSS	ISO 529			M DIN 13	Form. C		Tol. 6H		35° 3XD	P N	191
2266	HSSE	JIS			M DIN 13	Form. B "Gun"		Tol. 6H		3XD D	P N	192
2267	HSSE	JIS			M DIN 13	Form. C		Tol. 6H		35° 3XD D	P N	192
2268	HSSE	JIS	VAP		M DIN 13	Form. B "Gun"		Tol. 6H		3XD D MF	P N	193
2269	HSSE	JIS	VAP		M DIN 13	Form. C		Tol. 6H		35° 3XD D MF	P N	193
2270	HSSE	JIS	TIN		M DIN 13	Form. B "Gun"		Tol. 6H		3XD D MF	P N	194
2271	HSSE	JIS	TIN		M DIN 13	Form. C		Tol. 6H		35° 3XD D MF	P N	194











Machos de máquina / Tarauds machine / Machine taps / Maschinengewindebohrer (UNC-UNF-UN-UNS-UNEF)

2148	HSSE	DIN 371			UNC ANSI/ASME B1.3	Form. C		Tol. 2B	1.5XD	R	P	195
2147	HSSE	DIN 376			UNC ANSI/ASME B1.3	Form. C		Tol. 2B	1.5XD	D	P	195
2147/5	HSSE	DIN 376			UNC ANSI/ASME B1.3	Form. C		LH	1.5XD	D	P	196
2150	HSSE	DIN 371			UNC ANSI/ASME B1.3	Form. B "Gun"		Tol. 2B	3XD	R	P N	197
2149	HSSE	DIN 376			UNC ANSI/ASME B1.3	Form. B "Gun"		Tol. 2B	3XD	D	P N	197
2262	HSSE	DIN371	VAP		UNC ANSI/ASME B1.3	Form. B "Gun"		Tol. 2B	3XD	R MF	P M N	198
2263	HSSE	DIN 376	VAP		UNC ANSI/ASME B1.3	Form. B "Gun"		Tol. 2B	3XD	D MF	P M N	198

2234	HSSE	DIN 371	TIN		     	   	199
2235	HSSE	DIN 376	TIN		     	   	199
2152	HSSE	DIN 371			     	 	200
2151	HSSE	DIN 376			     	 	200
2264	HSSE	DIN 371	VAP		      	  	201
2265	HSSE	DIN 376	VAP		      	  	201
2236	HSSE	DIN 371	TIN		      	   	202
2237	HSSE	DIN 376	TIN		      	   	202
2154	HSSE	DIN 371			    		203
2153	HSSE	DIN 374			    		203
2153/5	HSSE	DIN 374			     		204
2156	HSSE	DIN 371			    	 	205
2155	HSSE	DIN 374			    	 	205
2276	HSSE	DIN 371	VAP		     	  	206
2277	HSSE	DIN 374	VAP		     	  	206
2280	HSSE	DIN 371	TIN		     	   	207
2281	HSSE	DIN 374	TIN		     	   	207
2158	HSSE	DIN 371			     	 	208
2157	HSSE	DIN 374			     	 	208
2278	HSSE	DIN 371	VAP		      	  	209

2279	HSSE	DIN 374	VAP		UNF ANSASME B1.1 Form. C Tol. 2B 35° 3XD D MF	P M N	209
2282	HSSE	DIN 371	TIN		UNF ANSASME B1.1 Form. C Tol. 2B 35° 3XD R MF	P M K N	210
2283	HSSE	DIN 374	TIN		UNF ANSASME B1.1 Form. C Tol. 2B 35° 3XD D MF	P M K N	210
2189	HSSE	DIN 374			UN Form. C Tol. 2B 1.5XD D	P	211
2160	HSSE	DIN 374			UNEF Form. C Tol. 2B 1.5XD D	P	211

**Machos de máquina / Tarauds machine / Machine taps / Maschinengewindebohrer (BSW-BSF)**

2136	HSSE	DIN 371			BSW BS 84 Form. C 1.5XD R	P	212
2135	HSSE	DIN 376			BSW BS 84 Form. C 1.5XD D	P	212
2136/5	HSSE	DIN 371			BSW BS 84 Form. C LH 1.5XD R	P	213
2135/5	HSSE	DIN 376			BSW BS 84 Form. C LH 1.5XD D	P	213
2138	HSSE	DIN 371			BSW BS 84 Form. B "Gun" 3XD R	P N	214
2137	HSSE	DIN 376			BSW BS 84 Form. B "Gun" 3XD D	P N	214
2140	HSSE	DIN 371			BSW BS 84 Form. C 35° 3XD R	P N	215
2139	HSSE	DIN 376			BSW BS 84 Form. C 35° 3XD D	P N	215
2141	HSSE	DIN 371			BSF BS 84 Form. C 1.5XD R	P	216
2142	HSSE	DIN 374			BSF BS 84 Form. C 1.5XD D	P	216

**Machos de máquina / Tarauts machine / Machine taps / Maschinengewindebohrer (G-Rc-NPT)**

2144	HSSE	DIN 5156			G ISO 228, Form. C, 1,5XD, D	P	217
2144/5	HSSE	DIN 5156			G ISO 228, Form. C, LH, 1,5XD, D	P	217
2192	HSSE	DIN 5156			G ISO 228, Form. E, 1,5XD, D	N	218
2206	HSSE	DIN 5156			G ISO 228, Form. E, +0,1, 1,5XD, D	N	218
2145	HSSE	DIN 5156			G ISO 228, Form. B "Gun", 3XD, D	P, N	219
2284	HSSE	DIN 5156	VAP		G ISO 228, Form. B "Gun", 3XD, D, MF	P, M, N	219
2286	HSSE	DIN 5156	TIN+		G ISO 228, Form. B "Gun", 3XD, D, MF	P, M, K, N	220
2146	HSSE	DIN 5156			G ISO 228, Form. C, 35°, 3XD, D	P, N	220
2285	HSSE	DIN 5156	VAP		G ISO 228, Form. C, 35°, 3XD, D, MF	P, M, N	221
2287	HSSE	DIN 5156	TIN+		G ISO 228, Form. C, 35°, 3XD, D, MF	P, M, K, N	221
2159	HSSE	DIN 5156			Rc DIN 2999, Form. C, 1,5XD, D	P	222
2164	HSSE	DIN 374			NPT ANSI/ASME B1.20.1, Form. C, 1,5XD, D	P	222

**Machos de máquina / Tarauts machine / Machine taps / Maschinengewindebohrer (TR-VG)**

2212	HSSE				Tr DIN 103, Tol. 7H	P, N	223
2212/5	HSSE				Tr DIN 103, Tol. 7H, LH	P, N	223
2163	HSSE	DIN 40433			PG DIN 40433, Form. C, 1,5XD, D	P	224
2242	HSSE	DIN 371			VG BS 94, Form. C, 1,5XD, R	P	224

**Fresas de roscar de metal duro / Fraises à tarauter en carbure / Solid carbide thread mills / Hartmetall-Gewindfräser**

<b>NEW</b>	2411	HM	TIALCN		M-MF, 15°, DIN 6535 H6 H8	P, M, K, N, S, H	225
<b>NEW</b>	2412	HM	TIALCN		G ISO 228, 15°, DIN 6535 H6 H8	P, M, K, N, S, H	226



Machos de mano / Tarauds à main / Hands taps / Handgewindebohrer									
2301	HSS	DIN 352 / 2181			M-MF DIN 13		Tol. 6H	P N	227
2301/5	HSS	DIN 352			M-MF DIN 13		Tol. 6H	LH	229
2314	HSSE	DIN 352			M DIN 13		Tol. 6HX	P	230
2303	HSSE	DIN 352	VAP		M DIN 13		Tol. 6HX	P M	230
2324	HSSE-PM	DIN 352	TiCN		M DIN 13		Tol. 6HX	P	231
2302	HSS	DIN 352	TiN		M DIN 13		Tol. 6HX	P N	231
2304	HSS	DIN 352			BSW BS 84			P N	232
2304/5	HSS	DIN 352			BSW BS 84		LH 30°	P N	233
2305	HSS	DIN 2181			BSF BS 84			P N	233
2306	HSS	DIN 5157			G ISO 228			P N	234
2306/5	HSS	DIN 5157			G ISO 228		LH 30°	P N	234
2316	HSS	DIN 5157			G ISO 228			N	235
2317	HSS	DIN 5157			G ISO 228		+0,1	N	235








							Pág.
2307	HSS	DIN 352			P N		236
2307/5	HSS	DIN 352			P N		237
2308	HSS	DIN 2181			P N		237
2308/5	HSS	DIN 2181			P N		238
2315	HSS	DIN 2181			P N		238
2309	HSS	DIN 5157			P N		239
2310	HSS	DIN 2181			P N		239
2312	HSS	DIN 40432			P N		240
2313	HSS	DIN 2181			P N		240






**Machos Perfil Completo / Taraud Profil Complet / Non Serial Form Taps / Vollprofilgewindebohrer**

2321	HSS	DIN 352			P N		241
2322	HSS	DIN 352			P N		242
2323	HSS	DIN 2181			P N		242



Cojinetes / Filieres / Dies / Schneideisen							
2501	HSS	DIN EN22568			M-MF DIN 13 Tol. 6g	P N	243
2501/5	HSS	DIN EN22568			M-MF DIN 13 Tol. 6g LH	P N	245
2514	HSSE	DIN EN22568	NIT		M DIN 13 Tol. 6g 2.25mm GUN	P	246
2512	HSSE	DIN EN22568	VAP		M DIN 13 Tol. 6g 2mm GUN	P M	246
2502	HSS	DIN EN22568			BSW BS 84	P N	247
2502/5	HSS	DIN EN22568			BSW BS 84 LH	P N	247
2503	HSS	DIN EN22568			BSF BS 84	P N	248
2504	HSS	DIN EN24231			G ISO 228	P N	248
2504/5	HSS	DIN EN24231			G ISO 228 LH	P N	249
2522	HSS	DIN EN24231			G ISO 228	N	250
2521	HSS	DIN EN24231			G ISO 228 -0.1 GUN	N	250
2505	HSS	DIN EN22568			UNC ANSI/ASME B1.1 Tol. 2A	P N	251
2505/5	HSS	DIN EN22568			UNC ANSI/ASME B1.1 Tol. 2A LH	P N	251
2506	HSS	DIN EN22568			UNF ANSI/ASME B1.1 Tol. 2A	P N	252
2506/5	HSS	DIN EN22568			UNF ANSI/ASME B1.1 Tol. 2A LH	P N	252
2507	HSS	DIN EN24230			R EN 2999	P N	253
2508	HSS	DIN EN22568			UNEF ANSI/ASME B1.1 Tol. 2A	P N	253
2520	HSS	DIN EN22568			UN ANSI/ASME B1.1 Tol. 2A	P N	254
2510	HSS	DIN 40434			PG EN 40434	P N	254
2509	HSS	DIN EN24230			NPT ANSI/ASME B1.20.1	P N	255

Machos máquina para insertos / Tarauds machine pour inserts / Machine taps for wire thread inserts / Maschinengewindebohrer für Genwindeinsätze										
2701	HSS	ISO 529			EG-M STI	Form. D	Tol. 4H	P	N	256
2702	HSS	ISO 529			EG-UNC STI	Form. D	Tol. 4H	P	N	257
2703	HSS	ISO 529			EG-UNF STI	Form. D	Tol. 4H	P	N	257
2704	HSS	ISO 529			EG-W STI	Form. D	Tol. 4H	P	N	258
2715	HSS	ISO 529			EG-G STI	Form. D		P	N	258










Insertos roscados / Filets rapportés / Wire thread inserts / Gewindeeinsätze										
2705	HSS	DIN 8140			M DIN 8140		Tol. 6H			259
2706	HSS	DIN 8140			UNC ANSI/ASME B18.29.1		Tol. 2B			260
2707	HSS	DIN 8140			UNF ANSI/ASME B18.29.1		Tol. 2B			261
2708	HSS	DIN 8140			BSW BS 84					262
2716	HSS	DIN 8140			G ISO 229		Tol. 2B			262

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2709	Insertador / Appareil de pose manuel / Insert Tool / Einsatzwerkzeug									263
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Calibres / Calibres / Gauges / Lehren							
2901/1	ISO 1502		CTPNP	M-MF DIN 13	Tol. 6H	PASA NO PASA	270
2901/4	ISO 1502		CTP	M-MF DIN 13	Tol. 6H	PASA	271
2901/5	ISO 1502		CTNP	M-MF DIN 13	Tol. 6H	NO PASA	271
2901/2	ISO 1502		CAP	M-MF DIN 13	Tol. 6G	PASA	272
2901/3	ISO 1502		CANP	M-MF DIN 13	Tol. 6G	NO PASA	273
2902/1	ISO 228-2		CTPNP	G ISO 228	PASA NO PASA		274
2902/4	ISO 228-2		CTP	G ISO 228	PASA		274
2902/5	ISO 228-2		CTNP	G ISO 228	NO PASA		274
2902/2	ISO 228-2		CAP	G ISO 228	PASA		275
2902/3	ISO 228-2		CANP	G ISO 228	NO PASA		275
2903/1	BS 919		CTPNP	BSW BS 84	PASA NO PASA		276
2903/2	BS 919		CAP	BSW BS 84	PASA		276
2903/3	BS 919		CANP	BSW BS 84	NO PASA		276
2904/1	ANSI / ASME B1.2		CTPNP	UNC ANSI/ASME B1.2	PASA NO PASA		277
2904/2	ANSI / ASME B1.2		CAP	UNC ANSI/ASME B1.2	PASA		277
2904/3	ANSI / ASME B1.2		CANP	UNC ANSI/ASME B1.2	NO PASA		277
2905/1	ANSI / ASME B1.2		CTPNP	UNF ANSI/ASME B1.2	PASA NO PASA		278
2905/2	ANSI / ASME B1.2		CAP	UNF ANSI/ASME B1.2	PASA		278
2905/3	ANSI / ASME B1.2		CANP	UNF ANSI/ASME B1.2	NO PASA		279

2906/1	ANSI / ASME B1.20.1		CTPNP NPT ANSI/ASME B1.20.1 PASA NO PASA	279
2906/2	ANSI / ASME B1.20.1		CAPNP NPT ANSI/ASME B1.20.1 PASA NO PASA	279
2907/1	DIN 7162		CTL PASA NO PASA	280
2907/4	DIN 7162		CTLP H7 PASA	280
2907/5	DIN 7162		CTLNP H7 NO PASA	281
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**Accesorios / Accessoires / Accessories / Zubehör**

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2805	<b>Extractor /</b> Extracteur / Extractor / Auszieher			283
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<b>Estuches /</b> Coffrets / Sets / Sätze				285

### ¿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?

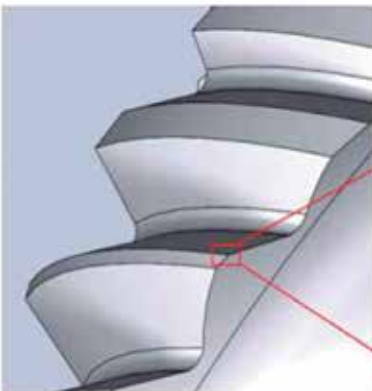
- La technologie MICROFINISH agit après le surfaçage du taraud, qui est nettoyé des bavures et dont les arêtes de coupe sont arrondies.
- L'usure de l'outil est alors mieux contrôlée et plus stable.
- Cela se traduit par une augmentation significative de son rendement.
- Et une amélioration des finitions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

### Warum sich mit weniger zufrieden geben?

- Mit der MICROFINISH-Technologie wird das Gewinde nach dem Schleifen von Gratzen befreit und die Schneidkanten werden abgerundet.
- Hierdurch wird eine bessere Kontrolle und Stabilität des Werkzeugverschleißes erzielt.
- Dies führt zu einer deutlichen Leistungssteigerung.
- Und zu einer Verbesserung der Gewindefläche.



**CON MICROFINISH**  
AVEC MICROFINISH / WITH MICROFINISH /  
MIT MICROFINISH



**SIN MICROFINISH**  
SANS MICROFINISH / WITHOUT MICROFINISH /  
OHNE MICROFINISH

### CON MICROFINISH

AVEC MICROFINISH/ WITH MICROFINISH/ MIT MICROFINISH

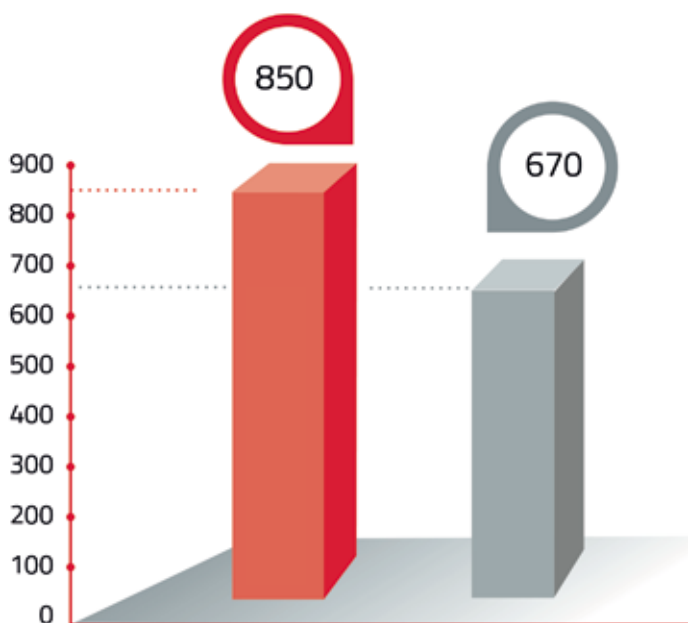
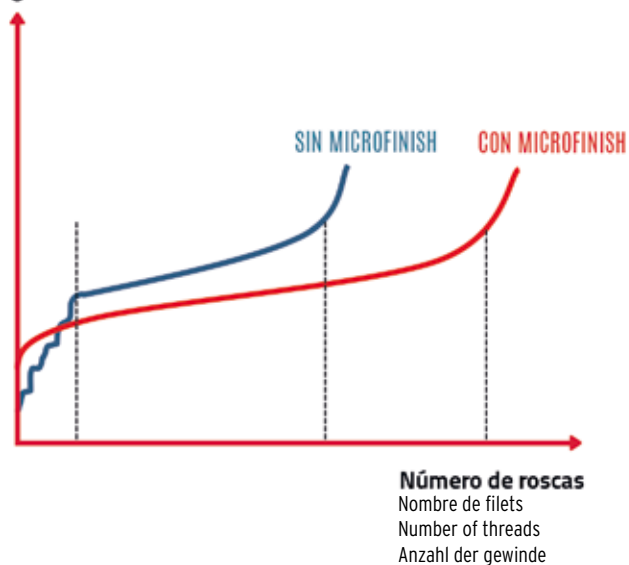


### SIN MICROFINISH

SANS MICROFINISH / WITHOUT MICROFINISH/ OHNE MICROFINISH



**Desgaste** Usure /Wear / Verschleiss



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

## 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.

## 1. A THREAD WITH A HIGHER SURFACE QUALITY

The threads obtained have a superior surface quality, thanks to two effects:

- The constantly rounded geometry along the entire cutting edge of the tap, allows a continuous and homogeneous cutting of the piece's thread.
- The lower surface roughness of the tap's thread reduces friction during threading, which gives a thread with a better surface quality.

## 2. LONGER TOOL LIFE

- Thanks to its new rounded finishing and the fact that the cutting edge wears out in a more controlled and constant way, the skipping of particles of any shape and size is avoided.
- This avoids premature breakage when using.

## 1. EIN GEWINDE MIT HERRVORRAGENDER OBERFLÄCHENGÜTE

Die hierdurch erzielten Gewinde weisen dank zweier Effekte eine höhere Oberflächenqualität auf:

- Die durchgehend abgerundete Geometrie entlang der gesamten Schneidkante des Gewindebohrers ermöglicht ein kontinuierliches und homogenes Schneiden des Gewindes am Werkstück.
- Die geringere Oberflächenrauheit des Gewindebohrers reduziert die Reibung während des Gewindeschneidens, um so ein Gewinde mit höherer Oberflächenqualität zu erzielen.

## 2. LÄNGERE NUTZUNGSDAUER DES WERKZEUGS

- Dank der neuen abgerundeten Oberfläche und der kontrollierteren und gleichmäßigeren Abnutzung der Schneidkante wird das Absplittern von Partikeln jeglicher Form und Größe vermieden.
- Dies verhindert vorzeitigen Bruch beim Gebrauch.



**FICHE TECHNIQUE TARAUDS SPECIAUX / TECHNICAL ENQUIRY FOR SPECIAL TAPS /  
TECHNISCHES DATENBLATT FÜR SONDERGEWINDEBOHRER**

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: .....

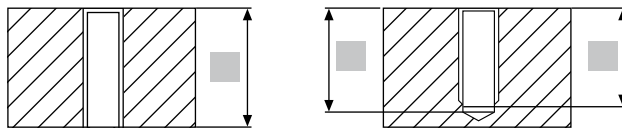
Dureza / Durété / Hardness ..... HB ..... HRC Resistencia / Résistance / Resistance ..... N/mm<sup>2</sup>

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

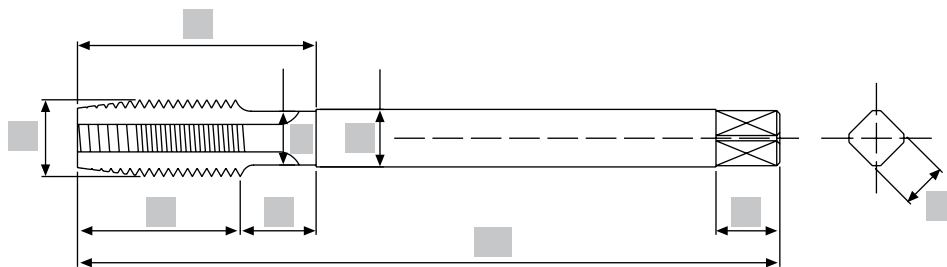
Agujero / Trou / Hole:



**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  Recubrimiento  
 Brillant Revêtement  
 Brilliant Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....



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: .....

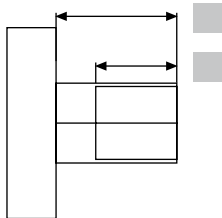
Dureza / Durété / Hardness ..... HB ..... HRC ..... Resistencia / Résistance / Resistance ..... N/mm<sup>2</sup>

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

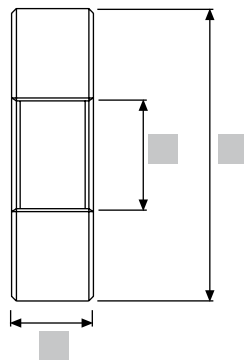
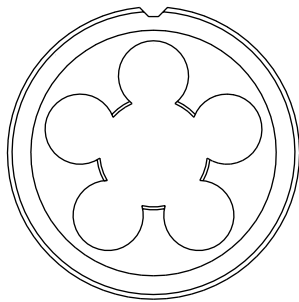
Eje / Axe / Axis:



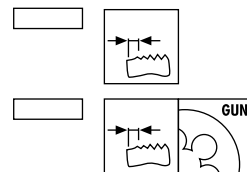
**HERRAMIENTA / OUTIL / TOOL**

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

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



Entrada / Entrée / Entry



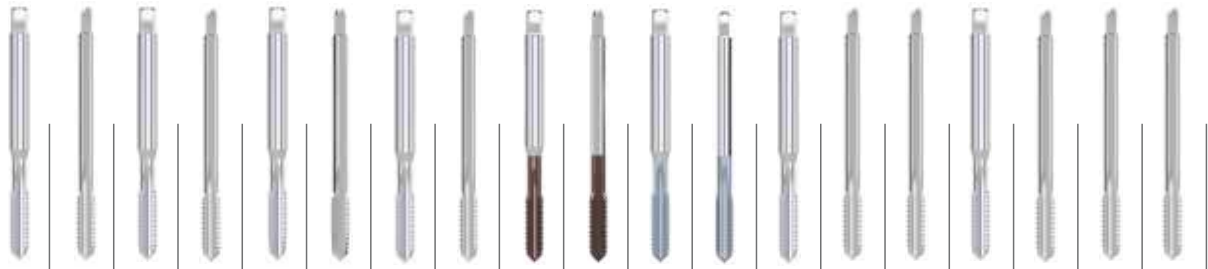
Material / Matière / Material:  HSS  HSSE  HM  HSS-HM

Superficie / Surface:  Brillante  Recubrimiento  
 Brillant Revêtement  
 Brilliant Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....



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



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

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
DIN	371	376-374	371	376-374	371	376-374	371	376-374	371	376-374	371	376	371	376-374	376-374	374	374	374	374
Form.	C(2-3)	C(2-3)	C(2-3)	C(2-3)	A(6-8)	A(6-8)	E(1,5-2)	E(1,5-2)	C(2-3)	C(2-3)	D(2-3)	D(2-3)	C(2-3)	C(2-3)	C(2-3)	C(2-3)	C(2-3)	C(2-3)	C(2-3)
Ejec./Exec./Exec.			LH	LH											LH			LH	
Tol.	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	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.									TIAISIN+	TIAISIN+	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
Gama/Gamme/Range	1-10	3-63	3-10	5-30	2-10	3-52	3-10	6-16	3-10	8-20	3-10	12-16	N.4-5/16	1/4-1"1/2	1/4-1"	N.4-5/16	1/4-1"1/2	1/4-1"	1"1/8-2"
Pag.	148	149	151	151	152	152	153	153	154	154	155	155	195	195	196	203	203	204	211

Mat.		Vc (m/min)																					
P.1	<600	○	○	○	○	○	○									○	○	○	○	○	○	○	○
P.2	<800		●	●	●	●	●	●	●								●	●	●	●	●	●	●
P.3	<1000	○	○	○	○	○	○									○	○	○	○	○	○	○	○
P.4	<1200																						
P.5	<1400																						
M.1	<950																						
M.2																							
M.3	<1200																						
M.4																							
K.1	<500									●	●												
K.2																							
K.3	<800									●	●												
K.4.1		○	○	○	○	○	○									○	○	○	○	○	○	○	○
K.4.2	<1400																						
N.1.1																							
N.1.2	Al																						
N.1.3																							
N.2.1																							
N.2.2	Cu							●	●	○	○												
N.2.3		○	○	○	○	○	○									○	○	○	○	○	○	○	○
N.2.4																							
N.3.1	Mg/Zn																						
N.4.1																							
N.4.2	Plastic																						
N.4.3																							
S.1.1	Ni																						
S.1.2																							
S.2.1																							
S.2.2	Ti																						
S.2.3																							
H.1	50 HRC												●	●									
H.2	55 HRC												●	●									
H.3	60 HRC												●	●									

● Optima / Optimun ○ Alternativo / Alternative



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



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

Ref./ Réf. / Ref.	2104	2103	2104/5	2103/5	2111	2272	2110	2109	2168	2169	2407	2408	2250	2251	2116	2115	2254	2255	2126	2125	2176	2175	
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
DIN	371	374 376	371	374 376	371	374 376-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
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)	B(3,5-5)	
Ejec./Exéc./Exec.			LH	LH																			
Tol.	6H	6H	6H	6H	6H	6H	6H+01	6H+0,1	6G	6G	4H	4H	6H	6H	6H	6H	6HX	6HX	6H	6H	6HX	6HX	
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-PM	HSSE-PM	HSSE-PM
Rec./Rev./Coat.													VAP	VAP	TIN+	TIN+	HL	HL	TIAISIN+	TIAISIN+	TIAISIN+	TIAISIN+	TIAISIN+
Prof./ Depth	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	3xD	2xD	2xD
Gama/Gamme/Range	2-10	3-52	3-10	20-24	3-12	8-16	3-10	8-16	3-10	8-20	3-10	12	2-10	3-24	2-10	3-24	2-10	8-24	3-10	8-24	3-10	8-20	
Pag.	156	156	158	158	159	159	160	160	161	161	162	162	163	163	164	164	165	165	166	166	167	167	

Mat.		Vc (m/min)																						
P.1	<600	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	15-25	20-30	20-30	20-40	20-40				
	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	20-40	20-40				
		<1000	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	12-18	12-18	15-30	15-30	10-15	10-15		
	P.4	<1200														8-12	8-12	10-20	10-20	6-10	6-10	6-10	6-10	
	P.5	<1400																5-10	5-10	0-4-6	0-4-6	0-4-6	0-4-6	
M.1	<950	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	7-10	9-12	9-12	5-15	5-15					
		5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	5-8	6-10	6-10	5-15	5-15					
	<1200														5-8	5-8	6-10	6-10	5-10	5-10	6-12	6-12		
																		5-10	5-10			0-4-6	0-4-6	
K.1	<500																10-15	10-15	10-30	10-30				
																	10-15	10-15	10-30	10-30				
	<800																15-20	15-20	10-20	10-20				
		10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	15-20	15-20	10-30	10-30				
	K.4.2	<1400																5-15	5-15	0-10-20	0-10-20	10-20	10-20	
N.1.1	Al																15-25	15-25	10-30	10-30				
		10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	15-25	15-25	10-30	10-30				
																	15-25	15-25	10-30	10-30				
	Cu																		10-30	10-30	0-4-6	0-4-6	0-4-6	0-4-6
		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	10-20	15-25	15-25	10-30	10-30				
																			10-30	10-30				
	Mg/Zn																		5-15	5-15				
																			10-30	10-30	10-15	10-15	10-15	10-15
	N.4.1	Plastic	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	10-15	12-18	12-18	10-30	10-30				
																		10-30	10-30					
																			10-30	10-30	10-15	10-15	10-15	10-15
S.1.1	Ni																	2-8	2-8					
	Ti																	10-15	10-15					
																		2-8	2-8	0-6-8	0-6-8	0-6-8	0-6-8	
H.1	50 HRC																							
H.2	55 HRC																							
H.3	60 HRC																							

● Optima / Optimun ○ Alternativo / Alternative

<b>P</b> Aceros Aciers Steels Stähle	<b>M</b> Aceros Inox Aciers Inox Stainless Steels Edelstahl	<b>K</b> Fundicion Fonte Cast Iron Gusseisen	<b>N</b> Metales no ferrosos Métal non Ferraux Non Ferrous metals NE-Metalle	<b>S</b> Titanio y Superalloys Titanium et Superalloys Titanium and Superalloys Titan und Superlegierungen	<b>H</b> Materiales Duros Matériels Durs Hard materials Hartmaterialien
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2133	2132	2258	2259	2150	2149	2262	2263	2234	2235	2156	2155	2276	2277	2280	2281	2138	2137	2145	2284	2286	2248	2266	2268	2270		
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	371	374	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)-AZ	B(3,5-5)-AZ	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)		
6H	6H	6HX	6HX	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	Med	Med	Med	Med	Med	6H	6H	6H	6H
HSSE	HSSE	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			VAP	VAP	TIN+	TIN+			VAP	VAP	TIN+	TIN+			VAP	TIN+				VAP	TIN	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	3xD	
3-10	4-16	3-10	12-16	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	1/4-1"	1/8-1"	1/8-1"	1/8-1"	3-30	3-20	3-20	3-20	3-20	
168	168	169	169	197	197	198	198	199	199	205	205	206	206	207	207	214	214	219	219	220	191	192	193	194	194	

Vc (m/min)

		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
		20-50	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
		15-40	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					8-12	8-12					8-12	8-12					8-12				8-12
		5-10	5-10																					
		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	5-8	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			5-8	5-8	6-10	6-10			5-8	5-8	6-10	6-10			5-8	5-8	6-10				
		5-10	5-10																					
		10-40	10-40					10-15	10-15					10-15	10-15					10-15				
		10-40	10-40					10-15	10-15					10-15	10-15					10-15				
		10-20	10-20					15-20	15-20					15-20	15-20					15-20				
		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																					
10-20	10-20	10-40	10-40					15-25	15-25					15-25	15-25					15-25				
10-15	10-15	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
		10-40	10-40					15-25	15-25					15-25	15-25					15-25				
6-8	6-8	10-40	10-40					15-25	15-25					15-25	15-25					15-25				
		10-40	10-40					15-25	15-25					15-25	15-25					15-25				
		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
		10-40	10-40																					
10-20	10-20	5-15	5-15																					
10-15	10-15	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
		10-40	10-40																					
		2-8	2-8																					
		10-15	10-15																					
		2-8	2-8																					

● Optima / Optimun ○ Alternativo / Alternative

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



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

Ref./ Réf. / Ref.	2106	2105	2106/5	2105/5	2112	2273	2166	2165	2170	2208	2409	2410	2108	2107	2252	2253	2118	2117	2256	2257	2124	2123	2178	2177
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°	R35°	R35°	R15°	R15°	R35°	R35°	R35°	R35°	R45°	R45°	R35°	R35°	R15°	R15°
Tol.	6H	6H	6H	6H	6H	6H	6H+0.1	6H+0.1	6G	6G	4H	4H	6H	6H	6H	6H	6H	6H	6HX	6HX	6H	6H	6HX	6HX
Mat.	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Rec./Rev./Coat.															VAP	VAP	TIN+	TIN+	HL	HL	TIAISIN+	TIAISIN+	TIAISIN+	TIAISIN+
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	2,5xD	2,5xD	2,5xD	2,5xD	1,5xD	1,5xD
Gama/Gamme/Range	M2-M10	M3-M52	M3-M10	M10-M24	M3-M12	M8-M16	M3-M10	M8-M16	M3-M10	M8-M20	M3-M10	M12	M2-M10	M4-M36	M2-M10	M3-M24	M2-M10	M3-M24	M2-M10	M8-M24	M3-M10	M8-M24	M3-M10	M8-M20
Pag.	170	170	172	172	73	173	174	174	175	175	176	176	177	177	178	178	179	179	180	180	181	181	182	182

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	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	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20	• 10-20
		<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	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																								
		<1400																								
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	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	
		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	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	
	<1200																									
K.1	<500																									
	<800																									
	<1400																									
N.1.1	Al																									
	Cu																									
	Mg/Zn																									
Plastic																										
S.1.1	Ni																									
	Ti																									
H.1	50 HRC																									
	55 HRC																									
	60 HRC																									

● Optima / Optimun ○ Alternativo / Alternative

<b>P</b> Aceros Aciers Stähle	<b>M</b> Aceros Inox Aciers Inox Stainless Steels Edelstahl	<b>K</b> Fundicion Fonte Cast Iron Gusseisen	<b>N</b> Metales no ferrosos Métal non Ferreaux Non Ferrous metals NE-Metalle	<b>S</b> Titanio y Superalesaciones Titanium et Superaillages Titanium and Superalloys Titan und Superlegierungen	<b>H</b> Materiales Duros Matériels Durs Hard materials Hartmaterialien
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2182	2181	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	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°	R35°	R25°	R35°	R35°	R35°
6H	6H	6HX	6HX	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	Med	Med	Med	Med	Med
HSSE	HSSE	HSSE-PM	HSSE-PM	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSS	HSSE	HSSE
		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	2,5xD	1,5xD	2,5xD	2,5xD	2,5xD
M3-M10	M6-M16	M3-M10	M12-M16	N.4-3/8	1/4-1/4	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"	1/8-1"						
183	183	184	184	200	200	201	201	202	202	208	208	209	209	210	210	215	215	220	221	221	190	191	192	193	194

Vc (m/min)

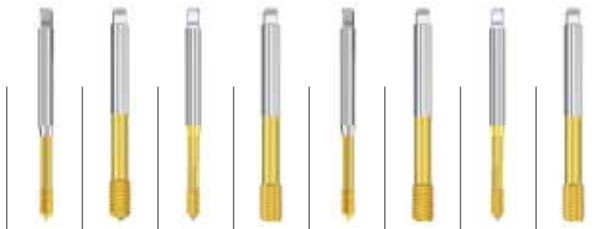
		● 20-50	● 20-50	○ 15-25	○ 15-25	● 15-25	● 15-25	● 20-30	● 20-30	○ 15-25	○ 15-25	● 15-25	● 15-25	● 20-30	● 20-30	○ 15-25	○ 15-25	○ 15-25	● 15-25	● 20-30	○ 15-25	○ 10-20	○ 15-25	○ 15-25	○ 20-30
		● 20-50	● 20-50	● 10-20	● 10-20	● 10-20	● 10-20	● 15-25	● 15-25	● 10-20	● 10-20	● 10-20	● 10-20	● 15-25	● 15-25	● 10-20	● 10-20	● 10-20	● 10-20	● 15-25	● 10-20	● 5-15	● 10-20	● 10-20	● 15-25
		● 15-40	● 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					○ 8-12	○ 8-12					○ 8-12	○ 8-12					○ 8-12					
		● 5-10	● 5-10																						
		● 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	○ 5-8	○ 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			○ 5-8	○ 5-8	○ 6-10	○ 6-10			○ 5-8	○ 5-8	○ 6-10	○ 6-10			○ 5-8	○ 6-10						
		● 5-10	● 5-10																						
		● 10-40	● 10-40																						
		● 10-40	● 10-40																						
		● 10-20	● 10-20					● 15-20	● 15-20					● 15-20	● 15-20						15-20				
		● 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																						
● 10-20	● 10-20	● 10-40	● 10-40																						
○ 10-15	○ 10-15	● 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
		● 10-40	● 10-40																						
○ 6-8	○ 6-8	● 10-40	● 10-40					● 15-25	● 15-25					● 15-25	● 15-25					● 15-25					
		● 10-40	● 10-40																						
		● 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
		● 10-40	● 10-40																						
○ 10-20	○ 10-20	● 5-15	● 5-15																						
○ 10-15	○ 10-15	● 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
		● 10-40	● 10-40																						
		● 2-8	● 2-8																						
		● 10-15	● 10-15																						
		● 2-8	● 2-8																						

● Optima / Optimun ○ Alternativo / Alternative

<b>P</b> Aceros Aciers Steele Stähle	<b>M</b> Aceros Inox Aciers Inox Stainless Steels Edelstahl	<b>K</b> Fundicion Fonte Cast Iron Gusseisen	<b>N</b> Metales no ferrosos Métal non Ferraux Non Ferrous metals NE-Metalle	<b>S</b> Titanio y Superaloaciones Titanium et Supealliajes Titanium and Superalloys Titan und Superlegierungen	<b>H</b> Materiales Duros Materiels Durs Hard materials Hartmaterialien
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# TABLA DE APLICACIONES GUIDE D'APPLICATION / APPLICATION GUIDE / ANWENDUNGSHANDBUCH

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



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.	185	185	186	186	187	187	188	188

Mat.		Vc (m/min)									
P.1	<600	•	•	•	•	•	•	•	•		
	P.2	<800	•	•	•	•	•	•	•		
		P.3	<1000	•	•	•	•	•	•	•	
			P.4	<1200							
				P.5	<1400						
M.1	<950	•	•	•	•	•	•	•	•		
		•	•	•	•	•	•	•	•		
	M.2	•	•	•	•	•	•	•	•		
		<1200									
K.1	<500										
	K.2	<800									
K.3	<800										
	K.4.1	<1400									
K.4.2											
N.1.1	Al	•	•	•	•	•	•	•	•		
		•	•	•	•	•	•	•	•		
N.2.1	Cu	•	•	•	•	•	•	•	•		
		•	•	•	•	•	•	•	•		
N.3.1	Mg/Zn	•	•	•	•	•	•	•	•		
N.4.1	Plastic										
S.1.1	Ni										
S.2.1	Ti	○	○	○	○	○	○	○	○		
H.1	50 HRC										
H.2	55 HRC										
H.3	60 HRC										

● Optima / Optimun ○ Alternativo / Alternative



Aceros  
Aciers  
Steele  
Stähle



Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl



Fundición  
Fonte  
Cast Iron  
Gusseisen



Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle



Titanio y Superalloys  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen



Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien



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

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



Ref./ Réf. / Ref.	2411	2412
Rosca/ Filetage/Thread	M-MF	G
DIN	6535	6535
Form.		
Ejec./Exéc./Exec.	R15°	R15°
Tol.	h6	h6
Mat.	HM	HM
Rec./Rev./Coat.	TiAlCN	TiAlCN
Prof./ Depth		
Gama/Gamme/Range	M2-M24	G1/16-1"
Pag.	225	226
Mat.	Vc (m/min)	
P.1	<600	150-200
P.2	<800	120-170
P.3	<1000	100-140
P.4	<1200	80-120
P.5	<1400	70-110
M.1	<950	130-180
M.2		90-140
M.3	<1200	80-120
M.4		70-110
K.1	<500	130-180
K.2		120-160
K.3	<800	100-150
K.4.1		100-150
K.4.2	<1400	80-120
N.1.1	Al	500-900
N.1.2		300-500
N.1.3		200-400
N.2.1	Cu	150-250
N.2.2		130-180
N.2.3		100-140
N.2.4		60-80
N.3.1	Mg/Zn	100-140
N.4.1	Plastic	120-170
N.4.2		70-100
N.4.3		
S.1.1	Ni	60-80
S.1.2		50-70
S.2.1	Ti	60-80
S.2.2		50-70
S.2.3		30-50
H.1	50 HRC	60-100
H.2	55 HRC	30-60
H.3	60 HRC	20-40



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

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



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.	227	229	231	230	230	231	232	233	233	234	234	235	235

Mat.		Vc (m/min)												
P.1	<600	●	●	●	○	○		●	●	●	●	●		
P.2	<800	●	●	●	●	●	○	●	●	●	●	●		
P.3	<1000			○	●	●	●							
P.4	<1200				○	○	●							
P.5	<1400						●							
M.1	<950				○	●								
M.2					○	●								
M.3							○							
M.4	<1200						○							
K.1	<500													
K.2														
K.3	<800													
K.4.1		○	○	○	○			○	○	○	○	○		
K.4.2	<1400							○						
N.1.1														
N.1.2	Al	○	○	○				○	○	○	○	○		
N.1.3		●	●	●				●	●	●	●	●		
N.2.1														
N.2.2	Cu											●	●	
N.2.3		●	●	●	○	○	○	●	●	●	●	●		
N.2.4														
N.3.1	Mg/Zn													
N.4.1														
N.4.2	Plastic													
N.4.3														
S.1.1	Ni													
S.1.2														
S.2.1						●								
S.2.2	Ti													
S.2.3														
H.1	50 HRC													
H.2	55 HRC													
H.3	60 HRC													

● Optima / Optimun ○ Alternativo / Alternative



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

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



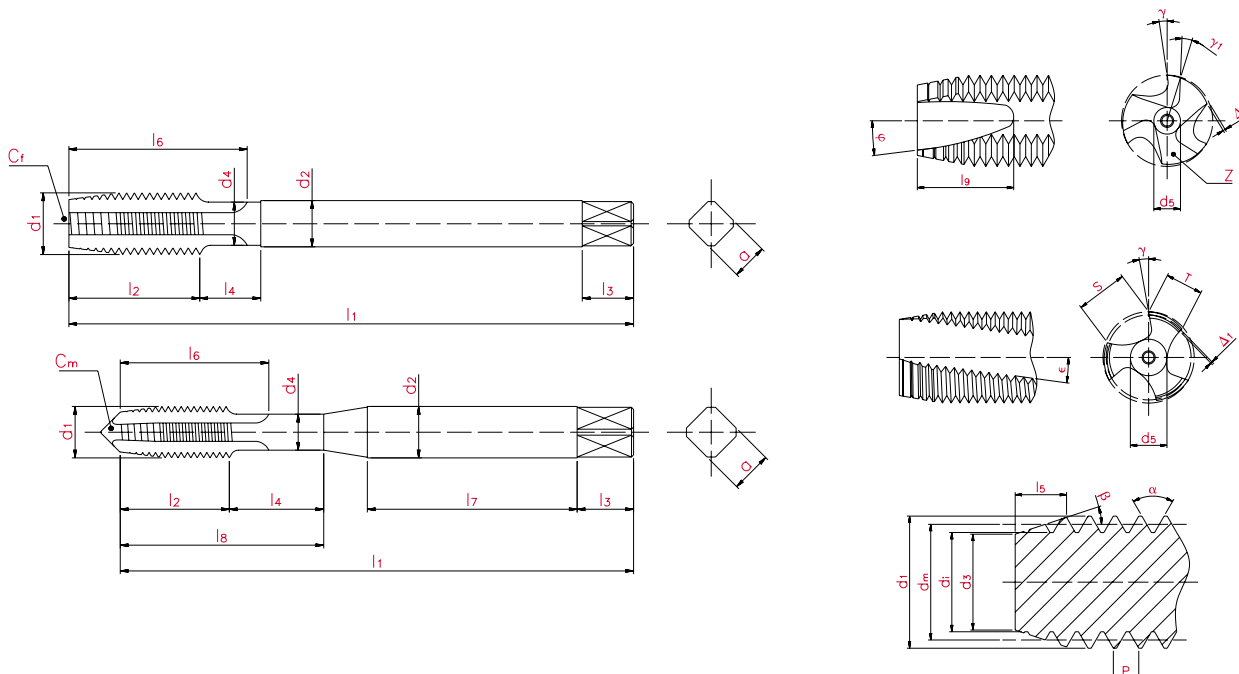
Ref./ Réf. / Ref.	2501	2501/5	2514	2512	2502	2502/5	2503	2504	2504/5	2522	2521
Rosca/ Filetage/Thread	M-MF	M	M	M	BSW	BSW	BSF	G	G	G	G
DIN	22568	22568	22568	22568	22568	22568	22568	24231	24231	24231	24231
Form.											
Ejec./Exéc./Exec.		LH					LH			LH	
Tol.	6g	6g	6g	6g	Med	Med	Med	Med	Med	Med	-0,1
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.	243	245	246	246	247	247	248	248	249	250	250

Mat.		Vc (m/min)										
P.1	<600	●	●	○	○	●	●	●	●	●		
P.2	<800	●	●	●	●	●	●	●	●	●		
P.3	<1000			●	●							
P.4	<1200			○	○	○						
P.5	<1400											
M.1	<950			○	●							
M.2				○	●							
M.3	<1200											
M.4												
K.1	<500											
K.2												
K.3	<800											
K.4.1												
K.4.2	<1400											
N.1.1												
N.1.2	Al	○	○			○	○	○	○	○		
N.1.3		●	●			●	●	●	●	●		
N.2.1												
N.2.2	Cu										●	●
N.2.3		●	●	○	○	●	●	●	●	●		
N.2.4												
N.3.1	Mg/Zn											
N.4.1												
N.4.2	Plastic											
N.4.3												
S.1.1	Ni											
S.1.2												
S.2.1												
S.2.2	Ti				●							
S.2.3												
H.1	50 HRC											
H.2	55 HRC											
H.3	60 HRC											

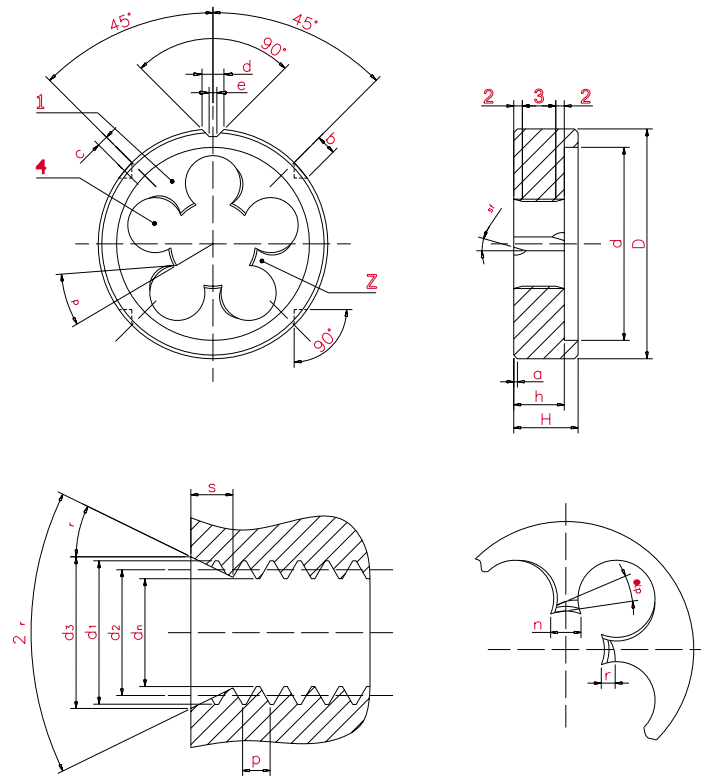
● Optima / Optimun ○ Alternativo / Alternative







<b>l1</b>	Longitud total / Longueur totale / Total length
<b>l2</b>	Longitud de rosca / Longueur de filetage / Thread length
<b>l7</b>	Longitud de mango / Longueur de queue / Shank length
<b>l3</b>	Longitud de cuadro / Longueur du carré / Square length
<b>l4</b>	Longitud de sangrado / Longueur d'indentation / Neck length
<b>l5</b>	Longitud de entrada / Longueur d'entrée / Chamfer length
<b>l6</b>	Longitud de ranura / Longueur de rainure / Flute Length
<b>l8</b>	Longitud útil de corte / Longueur utile de coupe / Useful length of cut
<b>l9</b>	Longitud de la entrada en hélice / Longueur de l'entrée en hélice / Spiral point length
<b>d1</b>	Diámetro exterior / Diamètre extérieur / External diameter
<b>d2</b>	Diámetro de mango / Diamètre de queue / Shank diameter
<b>d3</b>	Diámetro de entrada / Diamètre d'entrée / Chamfer diameter
<b>d4</b>	Diámetro de sangrado / Diamètre d'indentation / Neck diameter
<b>d5</b>	Diámetro del alma / Diamètre de l'âme / Core diameter
<b>dm</b>	Diámetro medio / Diamètre moyen / Pitch diameter
<b>di</b>	Diámetro interno / Diamètre interne / Internal diameter
<b>α</b>	Cuadrado / Carré / Square
<b>Cm</b>	Punto macho / Pointe mâle / Male point
<b>Cf</b>	Punto hembra / Pointe femelle / Female point
<b>p</b>	Paso de la rosca / Pas de filetage / Pitch of thread
<b>s</b>	Ancho de la ranura / Largeur de la rainure / Flute width
<b>t</b>	Ancho del diente / Largeur de la dent / Width of land
<b>z</b>	Número de ranuras / Nombre de rainures / Number of flutes
<b>α</b>	Ángulo de flancos / Angle de flancs / Angle of thread
<b>β</b>	Ángulo de la entrada / Angle de l'entrée / Chamfer angle
<b>γ</b>	Ángulo de corte / Angle de coupe / Rake angle
<b>γ1</b>	Ángulo de corte de la entrada corregida / Angle de coupe de l'entrée corrigée / Spiral point rake angle
<b>φ</b>	Ángulo de la entrada corregida / Angle de l'entrée corrigée / Spiral point angle
<b>ε</b>	Ángulo de la ranura / Angle de la rainure / Flute angle
<b>Δ</b>	Ángulo de destalonado de la entrada / Angle de détalonnage de l'entrée / Chamfer relief angle
<b>Δ1</b>	Ángulo de destalonado de flancos / Angle de détalonnage des flancs / Flank relief angle



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



**Tipos de ranuras y entradas para machos de roscar.**

Flutes and chamfers types for taps / Types de rainures et entrées pour les tarauds / Arten von Nuten und Fasen für Gewindebohrer.

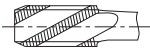
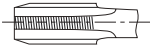
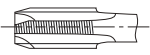
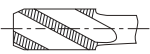
**Ranuras / Flutes / Rainures / Nuten**

**La norma DIN 2197 tipifica los siguientes tipos de ranura para machos de roscar:**

DIN norm 2197 provides regulations for the following types of flute for taps:

La norme DIN 2197 caractérise les types de rainures suivants pour les tarauds:

Die DIN-Norm 2197 definiert folgende Nutenarten für Gewindebohrer:

	Denominación Nomenclature Bezeichnung	Ángulo de hélice Helix angle Angle d'hélice Spiralwinkel Medio/Basic	Formas entrada Chamfer forms Chanfreins Fasen	Descripción Description Description Beschreibung
	<b>L15</b>	15°	D	<b>Ranura en hélice a izquierda para agujeros pasantes</b> Flute on left hand helix for through holes Rainure hélicoïdale à gauche pour les trous débauchants
		0°	A,C,D,E	<b>Ranura recta para agujeros ciegos y pasantes</b> Straight flute for blind and through holes Rainure droite pour trous borgnes et débouchants Linksgedallte Spiralnut für Durchgangslöcher
	Ángulo de hélice en la entrada Spiral point Entrée corrigée	13°	B	<b>Ranura recta con entrada en hélice a izquierda para agujeros pasantes</b> Straight flute with spiral point for through holes Rainure droite avec entrée hélicoïdale gauche pour trous débauchants Gerade Nut für Sack- und Durchgangslöcher
	<b>R15</b> <b>R25</b> <b>R35</b> <b>R45</b>	15° 25° 35° 45°	C,E	<b>Ranura en hélice a derecha para agujeros ciegos</b> Flute on right hand helix for blind holes Rainure hélicoïdale à droite pour trous borgnes Rechtsgedallte Spiralnut für Sacklöcher

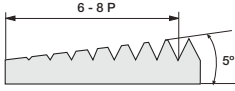
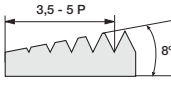
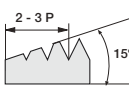
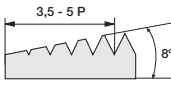
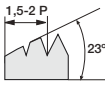
**Entradas / Chamfers / Chanfreins/ Fasen**

**La norma DIN 2197 tipifica los siguientes tipos de entrada para machos de roscar:**

DIN norm 2197 provides regulations for the following types of chamfer for taps:

La norme DIN 2197 caractérise les types d'entrée suivants pour les tarauds:

Die DIN-Norm 2197 definiert folgende Fasenarten für Gewindebohrer:

Forma / Form A		<b>Para agujeros pasantes cortos. Ranura recta</b> For short through holes. Straight flute Pour les trous débauchants courts. Rainure droite Für kurze Durchgangslöcher. Gerade Nut
Forma / Form B		<b>Para agujeros pasantes medios y materiales de viruta larga. Ranura recta con entrada.</b> For medium through holes and materials producing long chips. Straight with spiral flute. Pour les trous débauchants moyens et les matériaux à copeaux longs. Rainure droite avec entrée. Für mittlere Durchgangslöcher und langspanende Werkstoffe. Gerade Nut mit Fase.
Forma / Form C		<b>Para agujeros ciegos o pasantes y materiales de viruta corta. Ranura recta o helicoidal.</b> For blind or through holes and materials producing short chips. Straight or spiral flute. Pour trous borgnes ou débauchants et matériaux à copeaux courts. Rainure droite ou hélicoïdale. Für Sack- oder Durchgangslöcher und kurzspanende Werkstoffe. Gerade oder spiralförmige Nut.
Forma / Form D		<b>Para agujeros ciegos con salida de rosca larga o pasantes. Ranura recta o helicoidal.</b> For blind holes with deeper previous hole or through holes. Straight or spiral flute. Pour trous borgnes avec un trou antérieur plus profond ou des trous débauchants. Rainure droite ou hélicoïdale. Für Sacklöcher mit langem Gewindeausgang oder Durchgangslöcher. Gerade oder spiralförmige Nut.
Forma / Form E		<b>Para agujeros ciegos con salida de rosca corta. Ranura recta o helicoidal.</b> For blind holes with shorter previous hole. Straight or spiral flute. Pour trous borgnes avec trou précédent plus court. Rainure droite ou hélicoïdale. Für Sacklöcher mit kurzem Gewindeausgang. Gerade oder spiralförmige Nut.



Simbolo Symbol Symbol	Ángulo Angle Winkel	Norm. Standar Norm	Descripción / Description / Beschreibung			
M	60°	DIN 13	Rosca Métrica ISO	Metric ISO thread	Filetage Métrique ISO	Metrisches ISO-Gewinde
M	60°	DIN 158	Rosca Métrica ISO Cónica	Taper metric ISO thread	Filetage Métrique ISO conique	Metrisches kegeliges ISO-Gewinde
EG-M	60°	DIN 8140	PART 2 Rosca Métrica ISO para insertos helicoidal o reductores de roscas	Metric ISO thread for helical coil wire screw thread inserts	Filetage Métrique ISO pour des filets rapportées ou réducteurs de filetage	Metrisches ISO-Gewinde für spiralförmige Gewindeeinsätze oder Gewindereduzierungen
MF	60°	DIN 13	Rosca Métrica Fina ISO	Metric fine ISO thread	Filetage Métrique Fine ISO	Metrisches ISO-Feingewinde
MJ	60°	DIN ISO 5855	Rosca Métrica ISO para aeronáutica	Metric ISO thread for aeronautics	Filetage Métrique ISO pour aéronautique	Metrisches ISO-Gewinde für die Luftfahrt
G	55°	DIN-ISO	228 Rosca ISO para tubos, cilíndrica, no estanca	Pipe parallel ISO thread	Filetage ISO pour des tuyaux non étanche	Zylindrisches, nicht dichtendes ISO-Rohrgewinde
R	55°	DIN 259	Rosca para tubos, cilíndrica, no estanca, antigua	Pipe parallel whitworth thread	Filetage pour des tuyaux non étanche ancien	Altes, zylindrisches, nicht dichtendes Rohrgewinde
Rp	55°	DIN 2999-3858	Rosca interior cilíndrica para tubos	Internal dryseal parallel thread	Filetage intérieur cylindrique pour tuyaux	Zylindrisches Innengewinde für Rohre
Tr	30°	DIN 103	Rosca trapezoidal Métrica ISO	Trapezoidal thread	Filetage trapézoïdal Métrique ISO	Metrisches ISO-Trapezgewinde
S	30°+3°	DIN 513	Rosca Diente de Sierra	Saw form thread	Filetage en dents de scie	Sägewinde
S	45°	DIN 2781	Rosca Diente de Sierra (2)	Saw form thread (2)	Filetage en dents de scie (2)	Sägewinde (2)
Rd	30°	DIN: 405/20400/15403	Rosca Redonda	Rounded thread	Filetage rond	Rundgewinde
E	-	DIN 40400	Rosca lámparas eléctricas	Edison Edison form thread	Filetage de lampe électrique Edison	Elektro-(Edison-)Gewinde
Pg	80°	DIN 40430	Rosca para tubos de conducción eléctrica	Steel conduit thread	Filetage pour conduits électriques	Gewinde für Elektroinstallationsrohre
FG	60°	DIN 79012	Rosca para bicicletas	Bicycle thread	Filetage pour vélos	Farradgewinde
Vg	60°	DIN 7756	Rosca para válvulas	Valves thread	Filetage pour vannes	Ventilgewinde
W	55°	DIN 477	Rosca Whitworth cónica para botellas de gas	Whitworth thread for gas bottles valves	Filetage Whitworth conique pour bouteilles de gaz	Kegeliges Whitworth-Gewinde für Gasflaschenventile
BSW	55°	BS84 (1956)	Rosca Whitworth normal	Whitworth coarse thread	Filetage Whitworth normal	Whitworth-Regelgewinde
BSF	55°	BS84 (1956)	Rosca Whitworth fina	Whitworth fine thread	Filetage fin Whitworth	Whitworth-Feingewinde
BA	47°30'	BS93 (1951)	Rosca Inglesa	British association thread	Filetage anglais	Britisches Gewinde
BSC	60°	BS811 (1950)	Rosca Inglesa para bicicletas	British norm thread for bicycles	Filetage anglais pour vélos	Britisches Fahrradgewinde
G	55°	BS2779 (1973)	Rosca Whitworth para tubos cilíndrica (BSP)	Pipe parallel whitworth thread (BSP)	Filetage de tuyau cylindrique Whitworth (BSP)	Zylindrisches Whitworth-Rohrgewinde (BSP)
Rp	55°	BS21 (1973)	Rosca Whitworth cilíndrica para tubos (BSPP)	Pipe parallel thread (BSPP)	Filetage de tuyau cylindrique Whitworth (BSPP)	Zylindrisches Whitworth-Rohrgewinde (BSPP)
R	55°	BS21 (1985)	Rosca Whitworth cónica exterior para tubos estanca (BSPT)	External dryseal pipe taper thread (BSPT)	Filetage extérieur conique Whitworth (BSPT)	Kegeliges Whitworth-Außengewinde (BSPT)
Rc	55	BS21 (1985)	Rosca Whitworth cónica interior para tubos, estanca (BSPT)	Internal dryseal pipe taper thread (BSPT)	Filetage de tuyau conique intérieur Whitworth, étanche (BSPT)	Kegeliges, dichtendes Whitworth-Rohr-Innengewinde (BSPT)
NC	60°	ANSI B1.1 (1960)	Rosca nacional americana normal	American national coarse thread series	Filetagenational américain normal	Amerikanisches Regelgewinde
UNC	60°	ANSI B1.1 (1982)	Rosca unificada americana normal	Unified coarse thread series	Filetage unifié américain standard	Amerikanisches Einheitsgewinde (UNC)
EG-UNC	60°	MS 33537	Rosca unificada americana normal para insertos helicoidal o reductores de roscas	Unified coarse thread series for helical coil wire screw thread inserts	Filetage unifié américain standard pour filets rapportés ou réducteurs de filetage	Amerikanisches Einheitsgewinde für Gewindeeinsätze oder Gewindereduzierungen
NF	60°	ANSI B1.1 (1960)	Rosca nacional americana fina	American national fine thread series	Filetagenational américain fin	Amerikanisches Feingewinde
UNF	60°	ANSI B1.1 (1982)	Rosca unificada americana fina	Unified fine thread series	Filetageunifié américain fin	Amerikanisches Einheits-Feingewinde (UNF)
NEF	60°	ANSI B1.1 (1960)	Rosca nacional americana extra fina	American national extra fine thread series	Filetagenational américain extra fin	Amerikanisches Extrafeingewinde

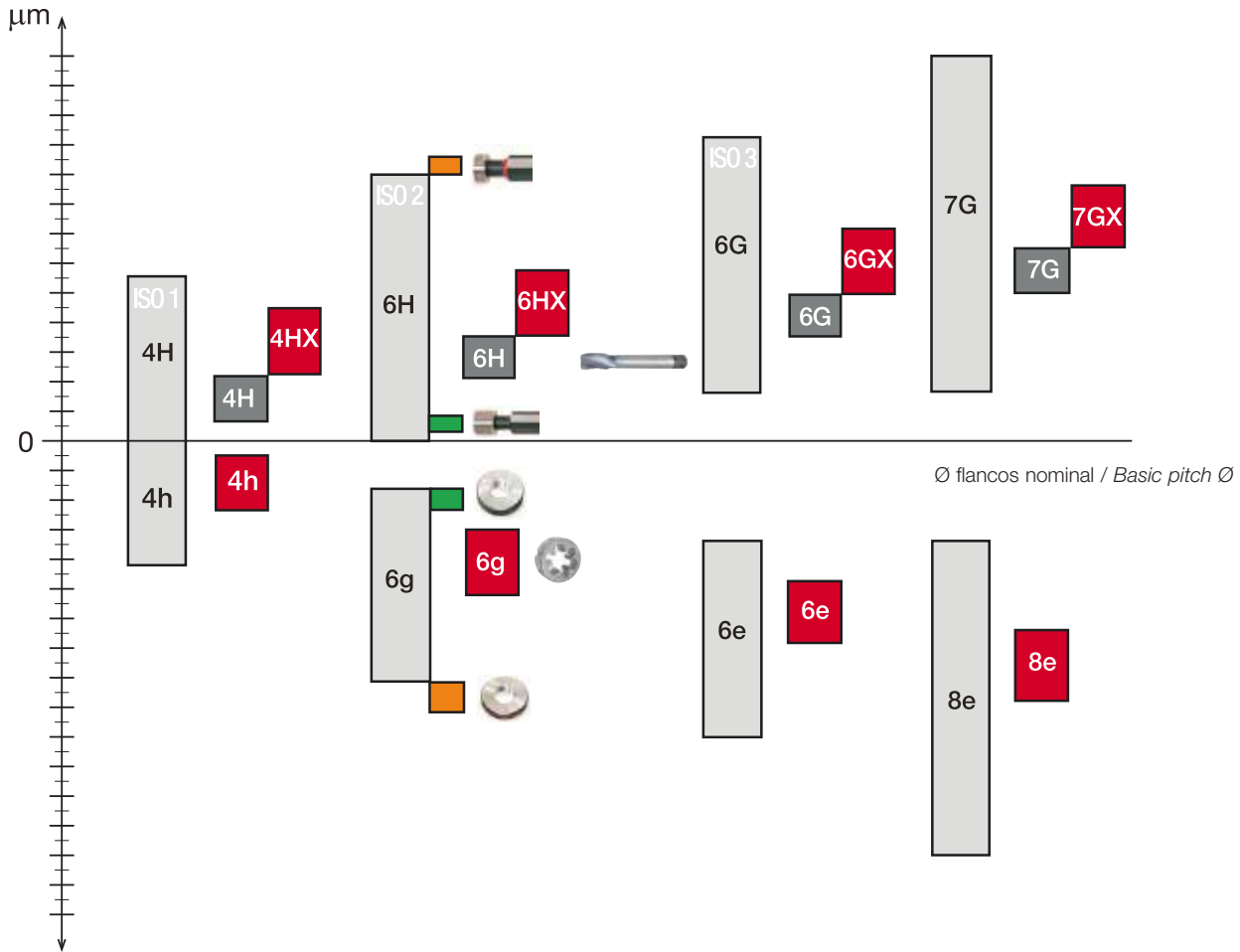
Símbolo Symbol Symbol	Ángulo Angle Winkel	Norm. Standar Norm	Descripción / Description / Beschreibung			
UNEF	60°	ANSI B1.1 (1982)	Rosca unificada americana extra fina	Unified extra fine thread series	Filetage extra fin américain unifié	Amerikanisches Einheits-Extrafeingewinde
N	60°	ANSI B1.1 (1960)	Rosca nacional americana, pasos 8-12-16 Hilos / 1"	American national 8-12-16 T.P.I. pitch series (8N, 12N, 16N)	Filetage national américain, pas 8-12-16 fils / 1"	Amerikanisches Gewinde, Steigungen 8-12-16 Gewinde / 1"
UN	60°	ANSI B1.1 (1982)	Rosca unificada americana, pasos 8-12-16 Hilos/1"	Unified 8-12-16 T.P.I. pitch series	Filetage unifié américain, étapes 8-12-16 Threads / 1"	Amerikanisches Einheitsgewinde, Steigungen 8-12-16 Gewinde / 1"
NS	60°	ANSI B1.1 (1960)	Rosca nacional americana, pasos especiales	American national thread special pitches	Filetagenational américain, emplacements spéciaux	Amerikanisches Gewinde, Sondersteigungen
UNS	60°	ANSI B1.1 (1982)	Rosca unificada americana especial	Unified thread special pitches	Filetageunifié américain spécial	Amerikanisches Spezial-Einheitsgewinde (UNS)
UNM	60°	ASA B1.10 (1958)	Rosca unificada miniatura	Unified miniature thread series	Filetageunifié miniature	Einheits-Miniaturgewinde
UNJ	60°	BS 4084 (1978)	Rosca unif. con radio de fondo controlado 0,15011P A 0,18042P	Unified constant pitch thread series with 0,15011P to 0,18042P controlled root radius	Filetageuniforme avec rayon inférieur contrôlé de 0,15011P à 0,18042P	Einheitsgewinde mit kontrolliertem Bodenradius von 0,15011P bis 0,18042P
UNJC	60°	BS 4084 (1978)	Rosca unificada normal con radio de fondo controlado 0,15011P A 0,18042P	Unified coarse thread series with a 0,15011P to 0,18042P controlled radius	Filetage unitaire standard avec rayon inférieur contrôlé 0,15011P TO 0,18042P	Standard-Einheitsgewinde mit kontrolliertem Bodenradius von 0,15011P bis 0,18042P
UNJF	60°	BS 4084 (1978)	Rosca unificada fina con radio de fondo controlado 0,15011P A 0,18042P	Unified fine thread series with a 0,15011P to 0,18042P controlled root radius	Filetage unifié fin avec rayon inférieur contrôlé 0,15011P TO 0,18042P	Einheits-Feingewinde mit kontrolliertem Bodenradius von 0,15011P bis 0,18042P
UNJEF	60°	BS 4084 (1978)	Rosca unificada extrafina con radio de fondo controlado 0,15011P A 0,18042P	Unified extra fine thread series with a 0,15011P to 0,18042P controlled root radius	Filetage unifié ultrafin avec rayon inférieur contrôlé 0,15011P TO 0,18042P	Einheits-Extrafeingewinde mit kontrolliertem Bodenradius von 0,15011P bis 0,18042P
NH	60°	ANSI B2.4 H28 (1966)	Rosca americana para material contra incendios	American national firehouse and hose coupling thread	Filetageaméricain pour matériel de lutte contre l'incendie	Amerikanisches Gewinde für Brandbekämpfungsgeräte
NPS	60°		Usada para designar los machos NPSC y NPSM	American standard straight pipe thread NPSC & NPSM	Utilisé pour désigner les tarauds NPSC et NPSM	Dient zur Kennzeichnung von NPSC- und NPSM-Gewindebohrern
NPS	60°		Usada para designar los machos NPSC y NPSM	American standard straight pipe thread NPSC & NPSM	Filetage américain cylindrique pour raccords de tuyaux	Zylindrisches amerikanisches Gewinde für Rohrverschraubungen
NPSC	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana cilíndrica para acoplamientos de tubos	American standard straight pipe thread in pipe couplings (marked NPS)	Filetage américain cylindrique étanche pour tuyaux	Dichtendes, zylindrisches amerikanisches Rohrgewinde
NPSF	60°	ANSI B1.20.3 (1976)	Rosca americana estanca cilíndrica para tubos	Dryseal american standard internal straight pipe thread (fuel)	Filetage américain cylindrique pour raccords de tuyaux	Zylindrisches amerikanisches Gewinde für flexible Rohrverschraubungen
NPSH	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana cilíndrica para acoplamientos de tubos flexibles	American standard straight pipe thread for hose couplings	Filetage américain intermédiaire interne cylindrique pour tubes étanches	Mittleres, zylindrisches amerikanisches Innengewinde für Dichtungsschläuche
NPSI	60°	ANSI B1.20.3 - (1976)	Rosca americana intermedia interna cilíndrica para tubos estancos	American standard intermediate internal straight pipe thread	Filetage cylindrique américain pour joints mécaniques	Zylindrisches amerikanisches Rohrgewinde für mechanische Verbindungen
NPSL	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana cilíndrica de tubos para uniones mecánicas	American standard straight pipe thread for loose-fitting mechanical joints	Filetage cylindrique américain pour joints mécaniques	Zylindrisches amerikanisches Rohrgewinde für mechanische Verbindungen
NPSM	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana cilíndrica de tubos para uniones mecánicas	American standard straight pipe thread for free-fitting mechanical joints	Joints mécaniques Filetage cylindrique américain pour joints mécaniques	Zylindrisches amerikanisches Rohrgewinde für mechanische Verbindungen
ANPT	60°	MIL-P-7105	Rosca americana para tubos cónicos en aeronáutica	Aeronautical national form taper pipe thread	Filetage américain pour tubes coniques en aéronautique	Amerikanisches Gewinde für Konusrohre in der Luftfahrt
NPT	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana cónica para tubos	American standard taper pipe thread	Filetage de tuyau américain conique	Kegeliges amerikanisches Rohrgewinde
NPTF	60°	ANSI B1.20.3 (1976)	Rosca americana estanca cónica para tubos (FUEL)	Dryseal american standard taper pipe thread (fuel)	Filetage américain conique étanche pour tuyaux (FUEL)	Kegeliges, dichtendes amerikanisches Rohrgewinde (KRAFTSTOFF)
NPTR	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana cónica para juntas de raíles de ferrocarril	American standard taper pipe thread for railing joints (tap marked NPT)	Filetage américain conique pour les joints de rail de chemin de fer	Kegeliges amerikanisches Gewinde für Schienenstöße
NGO	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana para salidas de gas	National gas outlet thread (specify RH or LH)	Filetageaméricain pour sorties de gaz	Amerikanisches Gewinde für Gasauslässe
NGS	60°	ANSI/ASME B1.20.1 (1983)	Rosca americana GAS cilíndrica	National gas straight thread	Filetage américain GAS cylindrique	Amerikanisches zylindrisches GAS-Gewinde



Simbolo Symbol Symbol	Ángulo Angle Winkel	Norm. Standar Norm	Descripción / Description / Beschreibung			
NGT	60°	ANSI B57.1(1977)	Rosca americana GAS cónica	National gas taper thread (see also «SGT»)	Filetage américain GAS cylindrique	Kegeliges amerikanisches GAS-Gewinde
PTF	60°	ANSI B1.20.3-(1976)	Rosca cónica para tubos SAE corta y estanca	Dryseal SAE short taper pipe thread	Filetage conique pour tubes courts et étanches SAE	Kegeliges Gewinde für kurze und dichtende SAE-Rohre
ACME-C	29°	ANSI B1.5 (1977)	Rosca trapezoidal americana centralizada	Acme thread centralizing	Filetage trapézoïdal américain centralisé	Amerikanisches Trapezgewinde, selbstzentrierend
ACME-G	29°	ANSI B1.5 (1977)	Rosca trapezoidal americana para usos generales	Acme thread general purpose	Filetage trapézoïdal américain à des fins générales	Amerikanisches Trapezgewinde für allgemeine Zwecke
STUB-ACME	29°	ANSI B1.8 (1977)	Rosca trapezoidal americana truncada	Stub Acme thread	Filetage trapézoïdal américain tronqué	Amerikanisches Trapezgewinde, abgeflacht
AMO	55°	ANSI B1.11(1958)	Rosca americana para objetivos de microscopios	American standard microscope objective thread	Filetage américain pour objectifs de microscope	Amerikanisches Gewinde für Mikroskopobjektive
N-BUTT	45°+5°	ANSI B1.9 (1973)	Rosca americana BUTTRESS diente de sierra	American BUTTRESS thread	Dent de scie à filetage américain BUTTRESS	Amerikanisches Sägewinde BUTTRESS
V	60°		Rosca en "V" con cresta y fondos truncados 60°	«V» thread with truncated crest and root (flatted to the user's specifications)	Filetage en "V" avec crête et bas tronqués	"V"-Gewinde mit abgeflachtem Grat und Boden
SB			Roscas para fabricantes de estufas	Manufacturers stovebolt standards thread	Filetage pour les fabricants de poêles	Gewinde für Ofenhersteller
STI	60°		Rosca especial para insertos helicoil o reductores de roscas	Special thread for helical coil wire screw thread inserts	Filetage spécial pour inserts hélicoïdaux ou réducteurs de filetage	Spezialgewinde für spiralförmige Gewindeeinsätze oder Gewindereduzierungen
SGT	60°	ANSI B57.1(1977)	Rosca cónica GAS especial	Special gas taper thread	Filetage conique spécial GAS	"Kegeliges GAS-Spezialgewinde
SPL-PTF	60°	ANSI B1.20.3 (1976)	Rosca estanca especial GAS cónica	Dryseal special taper pipe thread	Filetage spécial étanche Conical GAS	Kegeliges, dichtendes GAS-Spezialgewinde
API	60°		Inst. americano del petróleo. Rosca americana cónica para instalaciones petrolíferas	American national taper form thread for petroleum installations	American Petroleum Inst. Filetage de discussion	American Petroleum Institute (API). Kegeliges amerikanisches Gewinde für die Erdölindustrie

**Tolerancia del diámetro de flancos para roscas Métricas.** Tolerance zones of the pitch diameter for Metric threads. /Tolérance de diamètre de flanc pour les filetages métriques. /Toleranzen des Flankendurchmessers für metrische Gewinde.

**Amplitud de campo de tolerancia** /Tolerance zones of the pitch diameter /Largeur du champ de tolérance /Toleranzfeldbreite



**Rosca interior** /Internal threads /Filetage intérieur /Innengewinde

- Tolerancia de diámetro en los flancos de la rosca interior según DIN ISO 865-1. / Pitch diameter tolerance of the internal thread acc. DIN ISO 865-1. / Tolérance de diamètre sur les flancs du filetage intérieur selon DIN ISO 865-1. / Durchmessertoleranz an den Flanken des Innengewindes gemäß DIN ISO 865-1.
- Tolerancia de diámetro en los flancos del macho de rosca según DIN EN 22857 (DIN 7G según DIN 802-4). / Pitch diameter tolerance of the tap acc. DIN EN 22857 (DIN 7G according to DIN 802-4). / Tolérance de diamètre sur les flancs du taraud selon DIN EN 22857 (DIN 7G selon DIN 802-4). / Durchmessertoleranz an den Flanken des Gewindebohrers gemäß DIN EN 22857 (DIN 7G gemäß DIN 802-4).
- Tolerancia de diámetro en los flancos del macho con sobre-medida según norma HEPYC. Pitch diameter tolerance of the tap according to HEPYC standards /Tolérance de diamètre sur les flancs du mâle avec surdimensionnement selon la norme HEPYC. / Durchmessertoleranz an den Flanken des Gewindebohrers mit Übermaß gemäß HEPYC-Norm.
- Tolerancia de diámetro en los flancos del calibre tampón de rosca no pasa según DIN ISO 1502. / Pitch diameter tolerance of the no-go thread plug gauge acc. DIN ISO 1502. / La tolérance de diamètre sur les flancs de la jauge tampon de filetage ne satisfait pas à la norme DIN ISO 1502. / Die Durchmessertoleranz an den Flanken des Gewindelehrdorns entspricht nicht der DIN ISO 1502.
- Tolerancia de diámetro en los flancos del calibre tampón de rosca pasa según DIN ISO 1502. / Pitch diameter tolerance of the go thread plug gauge according to DIN ISO 1502. / La tolérance de diamètre sur les flancs de la jauge tampon de filetage est conforme à la norme DIN ISO 1502. / Die Durchmessertoleranz an den Flanken des Gewindelehrdorns entspricht der DIN ISO 1502.

**Rosca exterior** /External thread /Filetage externe /Außengewinde

- Tolerancia de diámetro en los flancos de la rosca exterior según DIN ISO 865-1. / Pitch diameter tolerance of the external thread acc. DIN ISO 865-1. / Tolérance de diamètre sur les flancs du filetage extérieur selon DIN ISO 865-1. / Durchmessertoleranz an den Flanken des Außengewindes gemäß DIN ISO 865-1.
- Tolerancia de diámetro en los flancos del cojinete según norma HEPYC. / Pitch diameter tolerance of the die according to HEPYC standards. / Tolérance de diamètre sur les flancs de roulement selon la norme HEPYC. / Durchmessertoleranz an den Flanken des Gewindebohrers gemäß HEPYC-Norm.
- Tolerancia de diámetro en los flancos del calibre anillo de rosca no pasa según DIN ISO 1502. / Pitch diameter tolerance of the no-go thread ring gauge according to DIN ISO 1502. / La tolérance de diamètre sur les flancs de la jauge à bague fileté ne satisfait pas à la norme DIN ISO 1502. / Die Durchmessertoleranz an den Flanken des Gewindelehrrings entspricht nicht der DIN ISO 1502.
- Tolerancia de diámetro en los flancos del anillo calibre de rosca pasa según DIN ISO 1502. / Pitch diameter tolerance of the go thread ring gauge according to DIN ISO 1502. / La tolérance de diamètre sur les flancs de la bague de jauge de filetage est conforme à la norme DIN ISO 1502. / Die Durchmessertoleranz an den Flanken des Gewindelehrrings entspricht der DIN ISO 1502.



**Tolerancias de rosca Métrica ISO**

Tolerance of ISO Metric thread / Tolérances de filetage métrique ISO / Toleranz des metrischen ISO-Gewindes

**Equivalencias entre clases de tolerancia de macho y campos de tolerancia de rosca interior.**

Equivalence between tap class tolerances and nut tolerances.

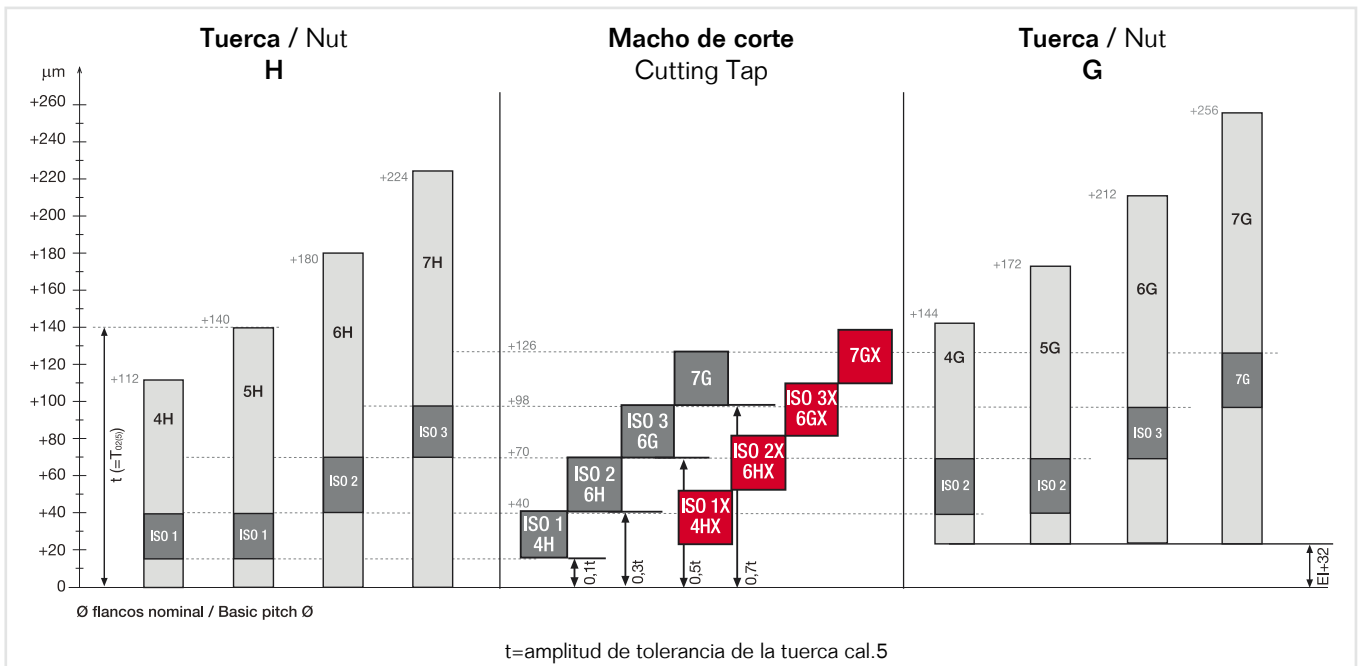
Équivalences entre les classes de tolérance mâles et les champs de tolérance de filetage interne.

Äquivalenzen zwischen Toleranzklassen der Außengewinde und Toleranzfeldern für Innengewinde.

Tolerancia de rosca interior (tuerca) Internal tolerances (Nut)		ANSI B57.1(1977) Tolerancia de macho rosca M Tap tolerances M thread	Tolerancia de macho rosca M Tap tolerances M thread
DIN 13		DIN EN 22857	DIN 802 PARTE I (norma antigua) DIN 802 PART I (old norm)
<b>CLASE / CLASS</b>			
4H	5H	1	ISO 1
4G	5G	2	ISO 2
	6G	3	ISO 3
	7H		
	8H		
	7G		
	8G		
			4H
			6H
			6G
			7G

La tolerancia 7G no está recogida por la norma EN 22857, por lo que nos remitimos a la antigua norma DIN 802 (parte 1) para su aplicación.

Tolerance 7G is not according to norm EN 22857, therefore we refer to the old DIN 802 norm (part 1).



Ejemplos: Valores mostrados en µm para M10 / Example: all values shown for M10 in µm

El campo de tolerancia (x) no está recogido por la norma EN 22857, sin embargo la antigua norma DIN 802 (parte 1) permite que para algunos casos (roscado en materiales abrasivos, machos de laminación, etc.) la tolerancia se pueda modificar a criterio del fabricante.

The tolerance denominated (x) is not on norm EN 22857, nevertheless old DIN 802 norm (part 1) allows the norm to be changed in some cases (threading in abrasive materials, forming taps, etc.), following the manufacturers criterion.

Le champ de tolérance (x) n'est pas couvert par la norme EN 22857, cependant l'ancienne norme DIN 802 (partie 1) permet que dans certains cas (filetage dans des matériaux abrasifs, tarauds de stratification, etc.) la tolérance puisse être modifiée à la discrétion du fabricant.

Das Toleranzfeld (x) wird von der EN 22857 nicht abgedeckt, jedoch erlaubt die alte Norm DIN 802 (Teil 1), dass in bestimmten Fällen (Gewindeschneiden in abrasiven Materialien, Lamellengewindebohrer usw.) die Toleranz nach Ermessen des Herstellers geändert werden kann.

**Tolerancias para el cálculo de roscas métricas de los machos de roscar**

Tolerances of metric thread tap pitch diameter / Tolérances pour le calcul des filetages métriques des tarauds / Toleranzen zur Berechnung der metrischen Gewinde von Gewindebohrern

Ø Rosca Thread Ø D mm.		Paso Pitch P mm.	µm							
Desde/From	Hasta/up to		ISO 1 - 4H		ISO 2 - 6H		ISO 3 - 6G		7G	
			Es	Ei	Es	Ei	Es	Ei	Es	Ei
0,99	1,4	0,2	+15	+3	+25	+15	-	-	-	-
		0,25	+17	+6	+28	+17	-	-	-	-
		0,3	+18	+6	+30	+18	-	-	-	-
1,4	2,8	0,2	+16	+6	+26	+16	-	-	-	-
		0,25	+18	+6	+30	+18	-	-	-	-
		0,35	+20	+6	+34	+20	-	-	-	-
		0,4	+21	+7	+35	+21	+49	+35	-	-
		0,45	+23	+8	+38	+23	+56	+38	-	-
2,8	5,6	0,35	+21	+6	+36	+21	-	-	-	-
		0,5	+24	+8	+40	+24	+56	+40	+72	+56
		0,6	+27	+9	+48	+27	+63	+45	+81	+63
		0,7	+29	+10	+48	+29	+67	+48	+86	+67
		0,75								
		0,8	+30	+10	+50	+30	+70	+50	+90	+70
5,6	11,2	0,5	+27	+9	+45	+27	+63	+45	+81	+63
		0,75	+32	+11	+53	+32	+74	+53	+95	+74
		1	+35	+11	+59	+35	+83	+59	+107	+83
		1,25	+38	+13	+63	+38	+88	+63	+113	+88
		1,5	+42	+14	+70	+42	+98	+70	+126	+98
11,2	22,4	0,5	+29	+10	+48	+29	+67	+48	+86	+67
		0,75	+34	+12	+56	+34	+78	+56	+100	+78
		1	+35	+11	+59	+35	+83	+59	+107	+83
		1,25	+42	+14	+70	+42	+98	+70	+126	+98
		1,5	+45	+15	+75	+45	+105	+75	+135	+105
		1,75	+48	+16	+80	+48	+112	+80	+144	+112
		2	+51	+17	+85	+51	+119	+85	+153	+119
		2,5	+54	+17	+90	+54	+126	+90	+162	+126
22,4	45	0,5	+30	+10	+50	+30	+70	+50	+90	+70
		0,75	+36	+12	+60	+36	+84	+60	+108	+84
		1	+40	+14	+66	+40	+92	+66	+118	+92
		1,5	+48	+16	+80	+48	+112	+80	+144	+112
		2	+54	+18	+90	+54	+126	+90	+162	+126
		3	+64	+22	+106	+64	+148	+106	+190	+148
		3,5	+67	+22	+112	+67	+157	+112	+202	+157
		4	+71	+24	+118	+71	+165	+118	+212	+165
		4,5	+75	+25	+125	+75	+175	+125	+225	+175
45	90	0,5	+34	+12	+56	+34	+78	+56	+100	+78
		0,75	+38	+13	+63	+38	+88	+63	+113	+88
		1	+45	+15	+75	+45	+105	+75	+135	+105
		1,5	+51	+17	+85	+51	+119	+85	+153	+119
		2	+57	+19	+95	+57	+133	+95	+171	+133
		3	+67	+22	+112	+67	+157	+112	+202	+157
		4	+75	+25	+125	+75	+175	+125	+225	+175
		5	+80	+27	+133	+80	+186	+133	+239	+186
		5,5	+84	+28	+140	+84	+196	+140	+252	+196
		6	+90	+30	+150	+90	+210	+150	+270	+210

**Fórmula para el cálculo de medidas / Size formula calculation:**  
**Tolerancias Métricas / Metric tolerances**

$\text{Ø flancos/pitch min.} = \text{Ø flancos nominal} / \text{Basic pitch } \text{Ø} + \text{Ei (mm.)}$ $\text{Ø flancos/pitch max.} = \text{Ø flancos nominal} / \text{Basic pitch } \text{Ø} + \text{Es (mm.)}$	$\text{Ø exterior min.} = \text{Ø nominal} / \text{Basic pitch } \text{Ø} + \text{Es (mm.)}$ $\text{Ø exterior max.} = \text{Ø exterior min.} + 0,030 \text{ (mm.)}$
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**Tolerancia del diámetro de flancos de los machos de roscar / Tolerances of thread tap pitch diameter / Tolérance du diamètre des flancs des tarauds/ Toleranzen des Flankendurchmessers von Gewindebohrern**

**M**

Ø Rosca Thread Ø D mm.			Paso Pitch P mm.	Ø Flancos nominal Basic pitchØ mm.	Ø Rosca Thread Ø D mm.			Paso Pitch P mm.	Ø Flancos nominal Basic pitchØ mm.	Ø Rosca Thread Ø D mm.			Paso Pitch P mm.	Ø Flancos nominal Basic pitchØ mm.
Serie 1	Serie 2	Serie 3			Serie 1	Serie 2	Serie 3			Serie 1	Serie 2	Serie 3		
M1*	M1,1*		0,25	0,838	M8		M7	1	6,350	M36	M39		4	33,402
M1,2*			0,25	0,938				1,25	7,188				4	36,402
			0,25	1,038			M9	1,25	8,188	M42			4,5	39,077
	M1,4*		0,3	1,205	M10			1,5	9,026		M45		4,5	42,077
M1,6	M1,8		0,35	1,373			M11	1,5	0,026	M48			5	44,752
			0,35	1,573	M12			1,75	10,863		M52		5	48,752
M2			0,4	1,740		M14		2	12,701	M56			5,5	52,428
M2,5	M2,2		0,45	1,908	M16			2	14,701		M60		5,5	56,428
			0,45	2,208		M18		2,5	16,376	M64			6	60,103
M3			0,5	2,675	M20			2,5	18,376					
	M3,5		0,6	3,110			M22	2,5	20,376		M68		6	64,103
M4			0,7	3,545	M24			3	22,051					
M5	M4,5		0,75	4,013			M27	3	25,051					
M6			0,8	4,480	M30			3,5	27,727					
			1	5,350			M33	3,5	30,727					



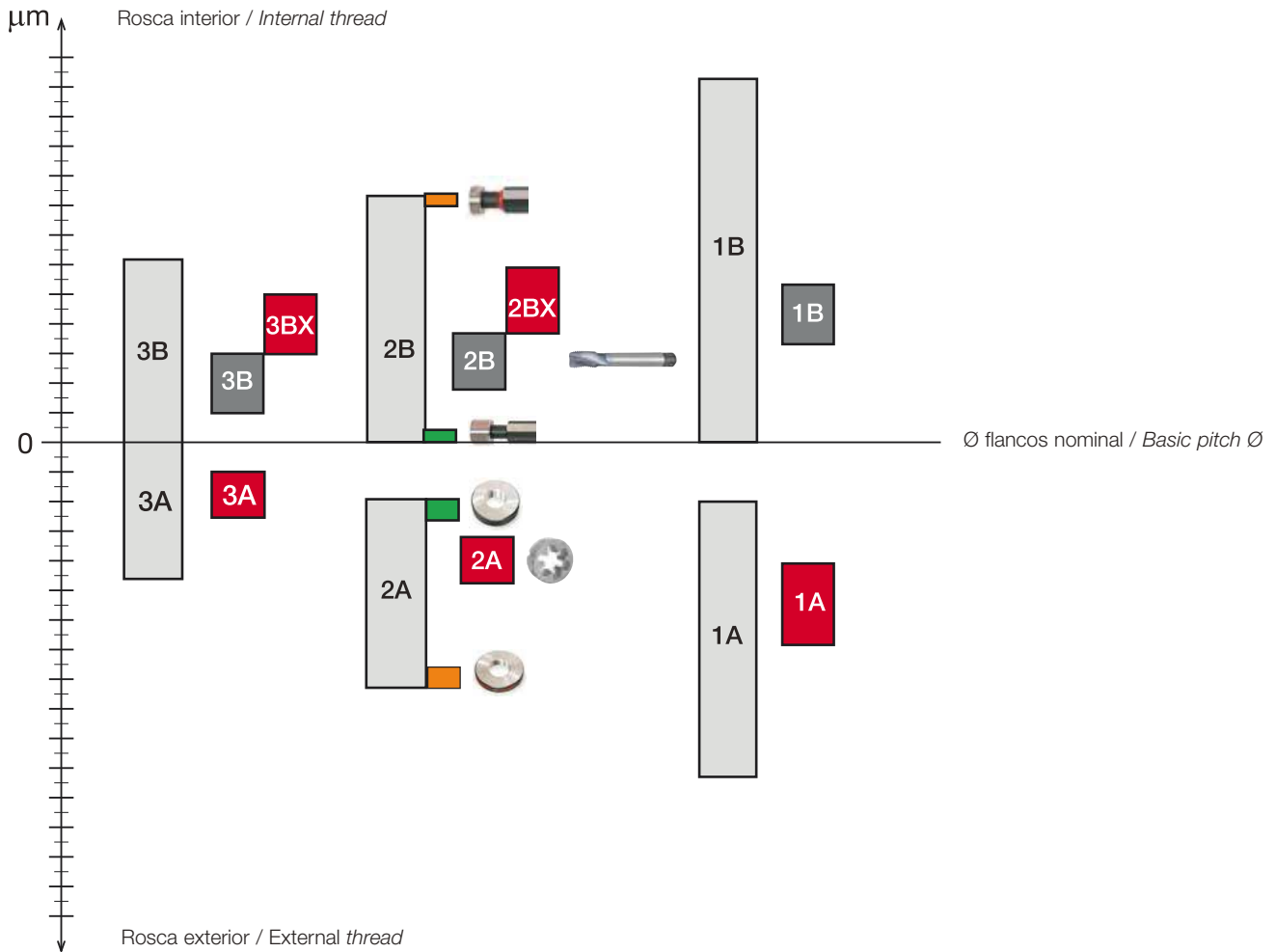
# MF

Ø Rosca Thread Ø D mm.			Paso Pitch P mm.	Ø Flancos nominal Basic pitchØ mm.	Ø Rosca Thread Ø D mm.			Paso Pitch P mm.	Ø Flancos nominal Basic pitchØ mm.	Ø Rosca Thread Ø D mm.			Paso Pitch P mm.	Ø Flancos nominal Basic pitchØ mm.
Serie 1	Serie 2	Serie 3			Serie 1	Serie 2	Serie 3			Serie 1	Serie 2	Serie 3		
M1*			0,2	0,870			M28	2	26,701			M62	3	60,051
M1,2*	M1,1*		0,2	0,970	M30			1	29,350			M62	4	59,402
			0,2	1,070	M30			1,5	29,026	M64			1,5	63,026
M1,6	M1,4*		0,2	1,270	M30			2	28,701	M64			2	62,701
	M1,8		0,2	1,470	M30			3	28,051	M64			3	62,051
			0,2	1,670			M32	1,5	31,026	M64			4	61,402
M2			0,25	1,838			M32	2	30,701			M65	1,5	64,026
M2,5	M2,2		0,25	2,038		M33		1,5	32,026			M65	2	63,701
			0,35	2,273		M33		2	31,701			M65	3	63,051
M3			0,35	2,773				3	31,051			M65	4	62,402
M4	M3,5		0,35	3,237			M35	1,5	34,026		M68		1,5	67,026
			0,5	3,675	M36			1,5	35,026		M68		2	66,701
M5	M4,5		0,5	4,175	M36			2	34,701		M68		2	66,051
			0,5	4,675	M36			3	34,051		M68		3	65,402
		M5,5	0,5	5,175			M38	1,5	37,026			M70	4	69,026
M6			0,5	5,675				1,5	38,026			M70	2	68,701
M6			0,75	5,513		M39		2	37,701			M70	3	68,051
		M7	0,75	6,513		M39		3	37,051			M70	4	67,402
M8			0,5	7,675			M40	1,5	39,026			M70	6	66,103
M8			0,75	7,531			M40	2	38,701	M72			1,5	71,026
M8			1	7,350			M40	3	38,051	M72			2	70,701
M10		M9	1	8,350	M42			1,5	41,026	M72			3	70,051
M10			0,75	9,513	M42			2	40,701	M72			4	69,402
			1	9,350	M42			3	40,051	M72			6	68,103
M10			1,25	3,188	M42			4	39,402			M75	1,5	74,026
		M11	1	10,350		M45		1,5	44,026			M75	2	73,701
M12			1	11,350		M45		2	43,701			M75	3	73,051
M12			1,25	11,188		M45		3	43,051			M75	4	72,402
M12			1,5	11,026		M45		4	42,402		M76		1,5	75,026
	M14		1	13,350	M48			1,5	47,026		M76		2	74,701
			1,25	13,188	M48			2	46,701		M76		3	74,051
	M14		1,5	13,026	M48			3	76,051		M76		4	73,402
		M15	1	14,350	M48			4	45,402		M76		6	72,103
M16			1,5	14,026			M50	1,5	49,026	M80			1,5	79,026
M16			1	15,350			M50	2	48,701	M80			2	78,701
			1,5	15,026			M50	3	48,051	M80			3	78,051
		M17	1	16,350		M52		1,5	51,026	M80			4	77,402
		M17	1,5	16,026		M52		2	50,701	M80			6	76,103
	M18		1	17,350		M52		3	50,051		M85		2	83,701
M20	M18		1,5	17,026		M52		4	79,402		M85		3	83,051
			2	16,701			M55	1,5	54,026		M85		4	82,402
			1	19,350			M55	2	53,701		M85		6	81,103
M20			1,5	19,026			M55	3	53,051	M90			2	88,701
M20			2	18,701			M55	4	52,402	M90			3	88,051
	M22		1	21,350	M56			1,5	55,026	M90			4	87,402
M24	M22		1,5	21,026				2	54,701	M90			6	86,103
			2	20,701	M56			3	54,051		M95		2	93,701
			1	23,350	M56			4	53,402		M95		3	93,051
M24			1,5	23,026			M58	1,5	57,026		M95		4	92,402
M24			2	22,701			M58	2	56,701		M95		6	91,103
		M25	1	24,350			M58	3	56,051	M100			2	98,701
		M25	1,5	24,026			M58	4	55,402	M100			3	98,051
		M25	2	23,701		M60		1,5	59,026	M100			4	97,402
	M27		1	26,350		M60		2	58,701	M100			6	96,103
			1,5	26,026				3	58,051		M105		2	103,701
	M27		2	25,701		M60		4	57,402		M105		3	103,051
		M28	1	27,350			M62	1,5	61,026		M105		4	102,402
		M28	1,5	27,026			M62	2	60,701		M105		6	101,103



**Tolerancia del diámetro de flancos para roscas Americanas.**  
Tolerance zones of the pitch diameter for Unified threads.

**Amplitud de campo de tolerancia / Tolerance zones of the pitch diameter / Largeur du champ de tolérance / Toleranzfeldbreite**



**Rosca interior / Internal threads / Filetage intérieur / Innengewinde**

■ **Tolerancia de diámetro en los flancos de la rosca interior según ASME B1.1**  
Pitch diameter tolerance of the internal thread acc. ASME B1.1  
Tolérance de diamètre sur les flancs du filetage intérieur selon ASME B1.1  
Durchmessertoleranz an den Flanken des Innengewindes nach ASME B1.1

■ **Tolerancia de diámetro en los flancos del macho con sobre-medida según norma HEPYC.**  
Pitch diameter tolerance of the tap according to HEPYC standards.  
Tolérance de diamètre sur les flancs du taraud avec surdimensionnement selon la norme HEPYC / Durchmessertoleranz an den Flanken des Gewindebohrers mit Übermaß gemäß HEPYC-Norm

■ **Tolerancia de diámetro en los flancos del calibre tampón de rosca no pasa según DIN ISO 1502**  
Pitch diameter tolerance of the no-go thread plug gauge acc. DIN ISO 1502  
La tolérance de diamètre sur les flancs du calibre tampon de filetage ne passe pas selon DIN ISO 1502 / Durchmessertoleranz an den Flanken des Gewindelehrdorns entspricht nicht der DIN ISO 1502

■ **Tolerancia de diámetro en los flancos del calibre tampón de rosca pasa según DIN ISO 1502**  
Pitch diameter tolerance of the go thread plug gauge acc. DIN ISO 1502.  
La tolérance de diamètre sur les flancs du calibre tampon de filetage est conforme à la norme DIN ISO 1502 / Durchmessertoleranz an den Flanken des Gewindelehrdorns entspricht der DIN ISO 1502

**Rosca exterior / External thread / Filetage externe / Außengewinde**

■ **Tolerancia de diámetro en los flancos de la rosca exterior según ASME B1.1**  
Pitch diameter tolerance of the external thread acc. ASME B1.1 /  
Tolérance de diamètre sur les flancs du filetage extérieur selon ASME B1.1 / Durchmessertoleranz an den Flanken des Außengewindes nach ASME B1.1

■ **Tolerancia de diámetro en los flancos del cojinete según norma HEPYC** Pitch diameter tolerance of the die according to HEPYC standards. / Tolérance de diamètre sur les flancs de roulement selon la norme HEPYC / Durchmessertoleranz an den Flanken der Schneidbacken gemäß HEPYC-Norm

■ **Tolerancia de diámetro en los flancos del calibre anillo de rosca no pasa según ANSI/ASME B1.2**  
Pitch diameter tolerance of the no-go thread ring gauge acc. ANSI/ASME B1.2 / La tolérance de diamètre sur les flancs de la jauge à bague fileté ne passe pas selon ANSI / ASME B1.2 / Durchmessertoleranz an den Flanken des Gewindelehrrings entspricht nicht der ANSI/ASME B1.2

■ **Tolerancia de diámetro en los flancos del anillo calibre de rosca pasa según ANSI/ASME B1.2**  
Pitch diameter tolerance of the go thread ring gauge acc. ANSI/ASME B1.2 / Tolérance de diamètre sur les flancs de la bague La jauge de filetage passe selon ANSI / ASME B1.2 / Durchmessertoleranz an den Flanken des Gewindelehrrings entspricht der ANSI/ASME B1.2

**Clases de tolerancias para el cálculo de roscas Americanas**

Tolerances to calculate Unified and American threads / Classes de tolérance pour le calcul des filetages Américains / Toleranzklassen zur Berechnung von amerikanischen Gewinden

**Tolerancia de machos recomendados para clase 2, 3, 2B y 3B, UNC, UNF**

Recommended tap for class of thread 2, 3, 2B y 3B, UNC, UNF

Tolérance des tarauds recommandée pour les classes 2, 3, 2B et 3B, UNC, UNF

Empfohlene Gewindetoleranzen für die Klassen 2, 3, 2B und 3B, UNC, UNF

Ø Rosca Thread Ø D inch.	Paso / Pitch tpi.		Clase Class 2	Clase Class 3	Clase normal Normal Class 2B	Clase Class 3B
	NC UNC	NF UNF				
Nº0	..	80	GH1	GH1	GH2	GH1
Nº1	64	..	GH1	GH1	GH2	GH1
Nº1	..	72	GH1	GH1	GH2	GH1
Nº2	56	..	GH1	GH1	GH2	GH1
Nº2	..	64	GH1	GH1	GH2	GH1
Nº3	48	..	GH1	GH1	GH2	GH1
Nº3	..	56	GH1	GH1	GH2	GH1
Nº4	40	..	GH2	GH1	GH2	GH2
Nº4	..	48	GH1	GH1	GH2	GH1
Nº5	40	..	GH2	GH1	GH2	GH2
Nº5	..	44	GH1	GH1	GH2	GH2
Nº6	32	..	GH2	GH1	GH3	GH2
Nº6	..	40	GH2	GH1	GH2	GH2
Nº8	32	..	GH2	GH1	GH3	GH2
Nº8	..	36	GH2	GH1	GH2	GH2
Nº10	24	..	GH3	GH1	GH3	GH3
Nº10	..	32	GH2	GH1	GH3	GH2
Nº12	24	..	GH3	GH1	GH3	GH3
Nº12	..	28	GH3	GH1	GH3	GH3
1/4	20	..	GH3	GH2	GH5	GH3
1/4	..	28	GH3	GH1	GH4	GH3
5/16	18	..	GH3	GH2	GH5	GH3
5/16	..	24	GH3	GH1	GH4	GH3
3/8	16	..	GH3	GH2	GH5	GH3
3/8	..	24	GH3	GH1	GH4	GH3
7/16	14	..	GH5	GH3	GH5	GH3
7/16	..	20	GH3	GH1	GH5	GH3
1/2	13	..	GH5	GH3	GH5	GH3
1/2	..	20	GH3	GH1	GH5	GH3
9/16	12	..	GH5	GH3	GH5	GH3
9/16	..	18	GH3	GH2	GH5	GH3
5/8	11	..	GH5	GH3	GH5	GH3
5/8	..	18	GH3	GH2	GH5	GH3
3/4	10	..	GH5	GH3	GH5	GH5
3/4	..	16	GH3	GH2	GH5	GH3
7/8	9	..	GH6	GH4	GH6	GH4
7/8	..	14	GH4	GH2	GH6	GH4
1"	8	..	GH6	GH4	GH6	GH4
1"	..	12	GH4	GH2	GH6	GH4
1"	..	..	GH4	GH2	GH6	GH4
1" 1/8	7	..	GH8	GH4	GH8	GH4
1" 1/8	..	12	GH4	GH4	GH6	GH4
1" 1/4	7	..	GH8	GH4	GH8	GH4
1" 1/4	..	12	GH4	GH4	GH6	GH4
1" 3/8	6	..	GH8	GH4	GH8	GH4
1" 3/8	..	12	GH4	GH4	GH6	GH4
1" 1/2	6	..	GH8	GH4	GH8	GH4
1" 1/2	..	12	GH4	GH4	GH6	GH4

Fórmula para el cálculo de medidas / Size formula calculation:

Tolerancias Métricas / Metric tolerances

$$\begin{aligned} \text{Ø flancos/pitch max.} &= \text{Ø flancos nominal} / \text{Basic pitch } \text{Ø} + (\text{n}^\circ\text{GH} \times 0,0127) \text{ (mm.)} \\ \text{Ø flancos/pitch min.} &= \text{Ø flancos /pitch max.} - 0,0127 \text{ (mm.) } \text{Ø} + \text{Ei (mm.)} \end{aligned}$$



**Tolerancia del diámetro de flancos de los machos de roscar / Tolerances of thread tap pitch diameter / Tolérance du diamètre des flancs des tarauds / Toleranz des Flankendurchmessers des Gewindebohrers**

## UNC

Ø Rosca Thread Ø D inch.	Paso Pitch P tpi	Ø Flancos nominal Basic pitch Ø mm.	Ø Rosca Thread Ø D inch.	Paso Pitch P tpi	Ø Flancos nominal Basic pitch Ø mm.
Nº 1	64	1,598	1	8	23,338
Nº 2	56	1,890	1 1/8	7	26,218
Nº 3	48	2,172	1 1/4	7	29,393
Nº 4	40	2,433	1 3/8	6	32,174
Nº 5	40	2,764	1 1/2	6	35,349
Nº 6	32	2,990	1 3/4	5	41,151
Nº 8	32	3,650	2	4,5	47,135
Nº 10	24	4,138	2 1/4	4,5	53,485
Nº 12	24	4,798	2 1/2	4	59,375
1/4	20	5,524	2 3/4	4	65,725
5/16	18	7,021	3	4	72,075
3/8	16	8,494	3 1/4	4	78,425
7/16	14	9,934	3 1/2	4	84,775
1/2	13	11,430	3 3/4	4	91,125
9/16	12	12,913	4	4	97,475
5/8	11	14,376			
3/4	10	17,399			
7/8	9	20,391			

## UNF

Ø Rosca Thread Ø D inch.	Paso Pitch P tpi	Ø Flancos nominal Basic pitch Ø mm.	Ø Rosca Thread Ø D inch.	Paso Pitch P tpi	Ø Flancos nominal Basic pitch Ø mm.
Nº 0	80	1,318	3/8	24	8,837
Nº 1	72	1,626	7/16	20	10,287
Nº 2	64	1,928	1/2	20	11,874
Nº 3	56	2,220	9/16	18	13,371
Nº 4	48	2,502	5/8	18	14,958
Nº 5	44	2,799	3/4	16	18,019
Nº 6	40	3,094	7/8	14	21,046
Nº 8	36	3,708	1	12	24,026
Nº 10	32	4,310	1 1/8	12	27,201
Nº 12	28	4,897	1 1/4	12	30,376
1/4	28	5,761	1 3/8	12	33,551
5/16	24	7,249	1 1/2	12	36,726

**TABLAS DE ROSCAS Y PASOS**  
**GRILLES DES FILETAGES ET DES PAS / TABLE OF THREADS AND PITCHES/**  
**TABELLE DER GEWINDE UND STEIGUNGEN**

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

Ø	W 55°	BSF 55°	GAS 55°	BSB BRASS 55°	UNC 60°	UNF 60°	UNEF NEF 60°	NPS NPT API 60°	UN 60°						UNS 60°							
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	36	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/ TABELLE DER GEWINDE UND STEIGUNGEN

- **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.  
Äquivalenzen in mm der folgenden Gewindedurchmesser.

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.  
Äquivalenz der Gewindesteigung pro Zoll zu mm

PASO h/1"	EQUIV. mm	PASO h/1"	EQUIV. mm	PASO h/1"	EQUIV. mm	PASO h/1"	EQUIV. mm	PASO h/1"	EQUIV. mm
PAS h/1"	ÉQUIV. mm	PAS h/1"	ÉQUIV. mm	PAS h/1"	ÉQUIV. mm	PAS h/1"	ÉQUIV. mm	PAS h/1"	ÉQUIV. mm
PITCH h/1"	EQUIV. mm	PITCH h/1"	EQUIV. mm	PITCH h/1"	EQUIV. mm	PITCH h/1"	EQUIV. mm	PITCH h/1"	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.  
Äquivalenz von Gewinden PG zu 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/ DURCHMESSER VOR DEM GEWINDESCHNEIDEN

M		MF		MF		MF	
dl x p (mm)	Øa	dl x p (mm)	Øa	dl x p (mm)	Øa	dl x p (mm)	Øa
M 1 x 0,25	0,75	M 1 x 0,2	0,80	M 18 x 2	16,00	M 42 x 1,5	40,50
M 1,1 x 0,25	0,85	M 1,1 x 0,2	0,90	M 19 x 1	18,00	M 42 x 2	40,00
M 1,2 x 0,25	0,95	M 1,2 x 0,2	1,00	M 19 x 1,25	17,75	M 42 x 3	39,00
M 1,4 x 0,3	1,10	M 1,4 x 0,2	1,20	M 19 x 1,5	17,50	M 44 x 1,5	42,50
M 1,6 x 0,35	1,25	M 1,6 x 0,2	1,40	M 20 x 1	19,00	M 45 x 1,5	43,50
M 1,7 x 0,35	1,30	M 1,7 x 0,2	1,50	M 20 x 1,25	18,75	M 45 x 2	43,00
M 1,8 x 0,35	1,45	M 1,8 x 0,2	1,60	M 20 x 1,5	18,50	M 45 x 3	42,00
M 2 x 0,4	1,60	M 2 x 0,25	1,75	M 20 x 2	18,00	M 45 x 4	41,00
M 2,2 x 0,45	1,75	M 2,2 x 0,25	1,95	M 21 x 1	20,00	M 48 x 1,5	46,50
M 2,3 x 0,4	1,90	M 2,3 x 0,25	2,05	M 21 x 1,25	19,75	M 48 x 2	46,00
M 2,5 x 0,45	2,05	M 2,5 x 0,35	2,15	M 21 x 1,5	19,50	M 48 x 3	45,00
M 2,6 x 0,45	2,10	M 2,6 x 0,35	2,25	M 22 x 1	21,00	M 48 x 4	44,00
M 3 x 0,5	2,50	M 3 x 0,35	2,65	M 22 x 1,25	20,75	M 50 x 1,5	48,50
M 3,5 x 0,6	2,90	M 3,5 x 0,35	3,15	M 22 x 1,5	20,50	M 50 x 2	48,00
M 4 x 0,7	3,30	M 4 x 0,35	3,65	M 22 x 2	20,00	M 50 x 3	47,00
M 4,5 x 0,75	3,70	M 4 x 0,5	3,50	M 23 x 1	22,00	M 52 x 1,5	50,50
M 5 x 0,8	4,20	M 4,5 x 0,5	4,00	M 23 x 1,5	21,50	M 52 x 2	50,00
M 6 x 1	5,00	M 5 x 0,5	4,50	M 24 x 1	23,00	M 52 x 3	49,00
M 7 x 1	6,00	M 5,5 x 0,5	5,00	M 24 x 1,25	22,75	M 52 x 4	48,00
M 8 x 1,25	6,80	M 6 x 0,5	5,50	M 24 x 1,5	22,50	M 56 x 1,5	54,50
M 9 x 1,25	7,80	M 6 x 0,75	5,20	M 24 x 2	22,00	M 56 x 2	54,00
M 10 x 1,5	8,50	M 7 x 0,5	6,50	M 25 x 1	24,00	M 56 x 3	53,00
M 11 x 1,5	9,50	M 7 x 0,75	6,20	M 25 x 1,25	23,75	M 56 x 4	52,00
M 12 x 1,75	10,20	M 8 x 0,5	7,50	M 25 x 1,5	23,50	M 60 x 1,5	58,50
M 14 x 2	12,00	M 8 x 0,75	7,20	M 25 x 2	23,00	M 60 x 2	58,00
M 16 x 2	14,00	M 8 x 1	7,00	M 26 x 1	25,00	M 60 x 3	57,00
M 18 x 2,5	15,50	M 9 x 0,75	8,20	M 26 x 1,5	24,50	M 60 x 4	56,00
M 20 x 2,5	17,50	M 9 x 1	8,00	M 26 x 2	24,00	M 63 x 1,5	61,50
M 22 x 2,5	19,50	M 10 x 0,5	9,50	M 27 x 1	26,00		
M 24 x 3	21,00	M 10 x 0,75	9,20	M 27 x 1,5	25,50		
M 27 x 3	24,00	M 10 x 1	9,00	M 27 x 2	25,00		
M 30 x 3,5	26,50	M 10 x 1,25	8,80	M 28 x 1	27,00		
M 33 x 3,5	29,50	M 11 x 0,75	10,20	M 28 x 1,5	26,50		
M 36 x 4	32,00	M 11 x 1	10,00	M 28 x 2	26,00		
M 39 x 4	35,00	M 11 x 1,25	9,75	M 30 x 1	29,00		
M 42 x 4,5	37,50	M 12 x 0,75	11,25	M 30 x 1,5	28,50		
M 45 x 4,5	40,50	M 12 x 1	11,00	M 30 x 2	28,00		
M 48 x 5	43,00	M 12 x 1,25	10,80	M 30 x 3	27,00		
M 52 x 5	47,00	M 12 x 1,5	10,50	M 32 x 1	31,00		
M 56 x 5,5	50,50	M 13 x 0,75	12,25	M 32 x 1,5	30,50		
M 60 x 5,5	54,50	M 13 x 1	12,00	M 32 x 2	30,00		
M 64 x 6	58,00	M 13 x 1,25	11,75	M 33 x 1	32,00		
M 68 x 6	62,00	M 13 x 1,5	11,50	M 33 x 1,5	31,50		
		M 14 x 0,75	13,25	M 33 x 2	31,00		
		M 14 x 1	13,00	M 33 x 3	30,00		
		M 14 x 1,25	12,80	M 34 x 1,5	32,50		
		M 14 x 1,5	12,50	M 34 x 2	32,00		
		M 15 x 1	14,00	M 35 x 1,5	33,50		
		M 15 x 1,25	13,75	M 36 x 1,5	34,50		
		M 15 x 1,5	13,50	M 36 x 2	34,00		
		M 16 x 1	15,00	M 36 x 3	33,00		
		M 16 x 1,25	14,75	M 38 x 1,5	36,50		
		M 16 x 1,5	14,50	M 38 x 2	36,00		
		M 17 x 1	16,00	M 39 x 1,5	37,50		
		M 17 x 1,25	15,75	M 39 x 2	37,00		
		M 17 x 1,5	15,50	M 39 x 3	36,00		
		M 18 x 1	17,00	M 40 x 1,5	38,50		
		M 18 x 1,25	16,75	M 40 x 2	38,00		
		M 18 x 1,5	16,50	M 40 x 3	37,00		


  


M		BSW	
dl x p (mm)	Øa	dl (") - p (tpi)	Øa
M 3 x 0,6	2,40	W 1/16 - 60	1,15
M 3,5 x 0,75	2,75	W 3/32 - 48	1,80
M 4 x 0,75	3,25	W 1/8 - 40	2,50
M 4 x 0,8	3,20	W 5/32 - 32	3,10
M 5 x 0,9	4,10	W 3/16 - 24	3,60
M 5 x 1	4,00	W 7/32 - 24	4,40
M 5,5 x 0,9	4,60	W 1/4 - 20	5,10
M 6 x 1,25	4,75	W 9/32 - 20	5,90
M 8 x 1,5	6,50	W 5/16 - 18	6,50
M 13 x 1,75	11,25	W 3/8 - 16	7,90
M 15 x 2	13,00	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 / DURCHMESSER VOR DEM GEWINDESCHNEIDEN


BSW			
d1 (") - p (tpi)			Øa
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)			Øa
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)			Øa
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)			Øa
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)			Øa
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)			Øa
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)			Øa
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)			Øa
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)			Øa
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)			Øa
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




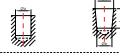
# DIÁMETROS PREVIOS AL ROSCADO DIAMÈTRES PRÉALABLES AU FILETAGE / DIAMETERS BEFORE THREAD/ DURCHMESSER VOR DEM GEWINDESCHNEIDEN


BA			
dl (") - p (tpi)		Øa	
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			
dl (") - p (tpi)		Øa	
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)			
dl - p (mm)		Øa ± 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			
dl (") - p (tpi)		Øa	
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					
dl (") - p (tpi)		L min	Øa	Øb	Øc
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					
dl (") - p (tpi)		L min	Øa	Øb	Øc
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					
dl (") - p (tpi)		L min	Øa	Øb	Øc
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			
dl (") - p (tpi)		Øa	
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 /**  
**ACHSEN VOR DEM GEWINDESCHNEIDEN**

M		MF		MF		MF	
dl x p (mm)	Øa	dl x p (mm)	Øa	dl x p (mm)	Øa	dl x p (mm)	Øa
M 1 x 0,25	0,97	M 2 x 0,25	1,97	M 21 x 1	20,88	M 48 x 1,5	47,85
M 1,1 x 0,25	1,07	M 2,2 x 0,25	2,17	M 21 x 1,25	20,87	M 48 x 2	47,82
M 1,2 x 0,25	1,17	M 2,3 x 0,25	2,27	M 21 x 1,5	20,85	M 48 x 3	47,76
M 1,4 x 0,3	1,36	M 2,5 x 0,35	2,44	M 22 x 1	21,88	M 48 x 4	47,70
M 1,6 x 0,35	1,54	M 2,6 x 0,35	2,54	M 22 x 1,25	21,87	M 50 x 1,5	49,85
M 1,7 x 0,35	1,64	M 3 x 0,35	2,94	M 22 x 1,5	21,85	M 50 x 2	49,82
M 1,8 x 0,35	1,74	M 3,5 x 0,35	3,44	M 22 x 2	21,82	M 50 x 3	49,76
M 2 x 0,4	1,93	M 4 x 0,35	3,94	M 23 x 1	22,88	M 52 x 1,5	51,85
M 2,2 x 0,45	2,13	M 4 x 0,5	3,93	M 23 x 1,5	22,85	M 52 x 2	51,82
M 2,3 x 0,4	2,23	M 4,5 x 0,5	4,42	M 24 x 1	23,88	M 52 x 3	51,76
M 2,5 x 0,45	2,43	M 5 x 0,5	4,93	M 24 x 1,25	23,87	M 52 x 4	51,70
M 2,6 x 0,45	2,53	M 5,5 x 0,5	5,42	M 24 x 1,5	23,85	M 56 x 1,5	55,85
M 3 x 0,5	2,92	M 6 x 0,5	5,93	M 24 x 2	23,82	M 56 x 2	55,82
M 3,5 x 0,6	3,41	M 6 x 0,75	5,90	M 25 x 1	24,88	M 56 x 3	55,76
M 4 x 0,7	3,91	M 7 x 0,5	6,92	M 25 x 1,25	24,87	M 56 x 4	55,70
M 4,5 x 0,75	4,41	M 7 x 0,75	6,90	M 25 x 1,5	24,85	M 60 x 1,5	59,75
M 5 x 0,8	4,90	M 8 x 0,5	7,93	M 25 x 2	24,82	M 60 x 2	59,82
M 6 x 1	5,88	M 8 x 0,75	7,90	M 26 x 1	25,88	M 60 x 3	59,76
M 7 x 1	6,88	M 8 x 1	7,88	M 26 x 1,5	25,85	M 60 x 4	59,70
M 8 x 1,25	7,87	M 9 x 0,75	8,90	M 26 x 2	25,82	M 63 x 1,5	62,85
M 9 x 1,25	8,87	M 9 x 1	8,88	M 27 x 1	26,88		
M 10 x 1,5	9,85	M 10 x 0,5	9,93	M 27 x 1,5	26,85		
M 11 x 1,5	10,85	M 10 x 0,75	9,90	M 27 x 2	26,82		
M 12 x 1,75	11,83	M 10 x 1	9,88	M 28 x 1	27,88		
M 14 x 2	13,82	M 10 x 1,25	9,86	M 28 x 1,5	27,85		
M 16 x 2	15,82	M 11 x 0,75	10,90	M 28 x 2	27,82		
M 18 x 2,5	17,79	M 11 x 1	10,88	M 30 x 1	29,88		
M 20 x 2,5	19,79	M 11 x 1,25	10,87	M 30 x 1,5	29,85		
M 22 x 2,5	21,79	M 12 x 0,75	11,90	M 30 x 2	29,82		
M 24 x 3	23,77	M 12 x 1	11,88	M 30 x 3	29,76		
M 27 x 3	26,77	M 12 x 1,25	11,86	M 32 x 1	31,88		
M 30 x 3,5	29,73	M 12 x 1,5	11,85	M 32 x 1,5	31,85		
M 33 x 3,5	32,73	M 13 x 0,75	12,90	M 32 x 2	31,82		
M 36 x 4	35,70	M 13 x 1	12,88	M 33 x 1	32,88		
M 39 x 4	38,70	M 13 x 1,25	12,87	M 33 x 1,5	32,85		
M 42 x 4,5	41,69	M 13 x 1,5	12,85	M 33 x 2	32,82		
M 45 x 4,5	44,69	M 14 x 0,75	13,90	M 33 x 3	32,76		
M 48 x 5	47,66	M 14 x 1	13,88	M 34 x 1,5	33,85		
M 52 x 5	51,66	M 14 x 1,25	13,86	M 34 x 2	33,82		
M 56 x 5,5	55,65	M 14 x 1,5	13,85	M 35 x 1,5	34,85		
M 60 x 5,5	59,65	M 15 x 1	14,88	M 36 x 1,5	35,85		
M 64 x 6	63,62	M 15 x 1,25	14,87	M 36 x 2	35,82		
M 68 x 6	67,62	M 15 x 1,5	14,85	M 36 x 3	35,76		
		M 16 x 1	15,88	M 38 x 1,5	37,85		
		M 16 x 1,25	15,87	M 38 x 2	37,82		
		M 16 x 1,5	15,85	M 39 x 1,5	38,85		
		M 17 x 1,25	16,87	M 39 x 2	38,82		
		M 17 x 1,5	16,85	M 39 x 3	38,76		
		M 18 x 1	17,88	M 40 x 1,5	39,85		
		M 18 x 1,25	17,85	M 40 x 2	39,82		
		M 18 x 1,5	17,85	M 40 x 3	39,76		
		M 18 x 2	17,82	M 42 x 1,5	41,85		
		M 19 x 1	18,88	M 42 x 2	41,82		
		M 19 x 1,25	18,87	M 42 x 3	41,76		
		M 19 x 1,5	18,85	M 44 x 1,5	43,75		
		M 20 x 1	19,88	M 45 x 1,5	44,85		
		M 20 x 1,25	19,87	M 45 x 2	44,82		
		M 20 x 1,5	19,85	M 45 x 3	44,76		
		M 20 x 2	19,82	M 45 x 4	44,70		

M		BSW	
dl x p (mm)	Øa	dl ("") - p (tpi)	Øa
M 3 x 0,6	2,40	W 1/16 - 60	1,49
M 3,5 x 0,75	2,75	W 3/32 - 48	2,28
M 4 x 0,75	3,25	W 1/8 - 40	3,06
M 4 x 0,8	3,20	W 5/32 - 32	3,85
M 5 x 0,9	4,10	W 3/16 - 24	4,63
M 5 x 1	4,00	W 7/32 - 24	5,42
M 5,5 x 0,9	4,60	W 1/4 - 20	6,18
M 6 x 1,25	4,75	W 5/16 - 18	7,78
M 8 x 1,5	6,50	W 3/8 - 16	9,35
M 13 x 1,75	11,25	W 7/16 - 14	10,90
M 15 x 2	13,00	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 / ACHSEN VOR DEM GEWINDESCHNEIDEN

UNC	
dl (") - p (tpi)	Øa
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	
dl (") - p (tpi)	Øa
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	
dl (") - p (tpi)	Øa
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)	
dl (") - p (tpi)	Øa
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	
dl (") - p (tpi)	Øa
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	
dl (") - p (tpi)	Øa
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	
dl (") - p (tpi)	Øa
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		
dl (") - p (tpi)	L min	Øa
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		
dl (") - p (tpi)	L min	Øa
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		
dl (") - p (tpi)	L min	Øa
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



**TABLA DE CONVERSIÓN DE PULGADAS A MILÍMETROS**  
**TABLE DE CONVERSION DE POUÇES À MILLIMÈTRES**  
**INCHES TO MILLIMETERS CONVERSION TABLE**  
**UMRECHNUNGSTABELLE VON ZOLL IN MILLIMETER**

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	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	304.800 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	305.196 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	305.593 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	305.990 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	230.187 5	255.587 5	280.987 5	306.387 5
5/64	0.078 125	1.984 4	27.384 4	52.784 4	78.184 4	103.584 4	128.984 4	154.384 4	179.784 4	230.584 4	255.984 4	281.384 4	306.784 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	307.181 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	307.578 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	180.975 0	231.775 0	257.175 0	282.575 0	307.975 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	308.371 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	232.568 8	257.968 8	283.368 8	308.768 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	309.165 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	309.562 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	310.000 0
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	183.356 2	234.156 2	259.556 2	284.956 2	310.400 0
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	310.800 0
1/4	0.25	6.350 0	31.750 0	57.150 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	311.200 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	311.600 0
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	312.000 0
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	312.400 0
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	312.800 0
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	313.200 0
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	313.600 0
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	314.000 0
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	187.325 0	238.125 0	263.525 0	288.925 0	314.400 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	314.800 0
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	315.200 0
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	315.600 0
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	316.000 0
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	316.400 0
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	316.800 0
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	317.200 0
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	317.600 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	318.000 0
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	318.400 0
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	318.800 0
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	319.200 0
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	319.600 0
19/32	0.593 75	15.081 2	40.481 2	65.881 2	91.281 2	116.681 2	142.081 2	167.481 2	192.881 2	243.681 2	269.081 2	294.481 2	320.000 0
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	320.400 0
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	320.800 0
41/64	0.640 625	16.271 9	41.671 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	321.200 0
21/32	0.656 25	16.668 8	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	321.600 0
43/64	0.671 875	17.065 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	322.000 0
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	322.400 0
45/64	0.703 125	17.859 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	322.800 0
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	323.200 0
47/64	0.734 375	18.653 1	44.053 1	69.453 1	94.853 1	120.253 1	145.653 1	171.053 1	196.453 1	247.253 1	272.653 1	298.053 1	323.600 0
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	324.000 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	324.400 0
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	324.800 0
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	248.840 6	274.240 6	299.640 6	325.200 0
13/16	0.812 5	20.637 5	46.037 5	71.437 5	96.837 5	122.237 5	147.637 5	173.037 5	198.437 5	249.237 5	274.637 5	300.037 5	325.600 0
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	326.000 0
27/32	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	326.400 0
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	326.800 0
7/8	0.875	22.225 0	47.625 0	73.025 0	98.425 0	123.825 0	149.225 0	174.625 0	200.025 0	250.825 0	276.225 0	301.625 0	327.200 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	327.600 0
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	328.000 0
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	328.400 0
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	328.800 0
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	329.200 0
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			

**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**  
**TABELLE DER TECHNISCHEN DATEN ZUM EINSETZEN VON GEWINDEINSÄTZEN**

Rosca	D	p	Taladro															Rosca															Inserto														
			Diam. (Dt)					Longitud mínima (Lt) mm					Diam.ext (Dr ext) min.*					Diam.int (Dr int) min.*					Diam.ext (Dr ext) max.*					Diam.int (Dr int) max.*					Longitud (V) 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	mm	1xd	1,5xd	2xd	2,5xd	3xd	mm	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	8,80	2,52	2,09	2,18	2,00	3,00	4,00	5,00	6,00	2,80	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	5,75	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	6,60	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	8,80	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	28,12	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	19,75	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	14,70	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	25,5	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	20,3	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	22,8																			
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	26,60	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																				

**2102**

**HSSE DIN 371**

**M-MF**  
**DIN 13**

Form.  
**C**



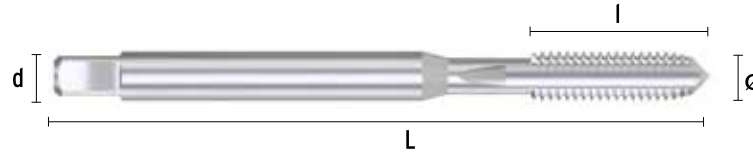
Tol.  
**6H**

**1,5XD**



P				M		K			N				S		H		
<800	<1.000	<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
<b>M1,0</b>	<b>0,25</b>	56,27	<b>40</b>	<b>6</b>	<b>2,10</b>	<b>2,5</b>
<b>M1,1</b>	<b>0,25</b>	56,27	<b>40</b>	<b>6</b>	<b>2,10</b>	<b>2,5</b>
<b>M1,2</b>	<b>0,25</b>	40,25	<b>40</b>	<b>6</b>	<b>2,10</b>	<b>2,5</b>
<b>M1,4</b>	<b>0,30</b>	40,25	<b>40</b>	<b>7</b>	<b>2,10</b>	<b>2,5</b>
<b>M1,6</b>	<b>0,35</b>	39,53	<b>40</b>	<b>8</b>	<b>2,10</b>	<b>2,5</b>
<b>M1,7</b>	<b>0,35</b>	36,12	<b>40</b>	<b>8</b>	<b>2,10</b>	<b>2,5</b>
<b>M1,8</b>	<b>0,35</b>	37,13	<b>40</b>	<b>8</b>	<b>2,10</b>	<b>2,5</b>
<b>M2,0</b>	<b>0,40</b>	17,27	<b>45</b>	<b>10</b>	<b>2,10</b>	<b>2,8</b>
<b>M2,2</b>	<b>0,45</b>	17,85	<b>45</b>	<b>10</b>	<b>2,10</b>	<b>2,8</b>
<b>M2,3</b>	<b>0,40</b>	17,85	<b>45</b>	<b>10</b>	<b>2,10</b>	<b>2,8</b>
<b>M2,5</b>	<b>0,45</b>	17,27	<b>50</b>	<b>9</b>	<b>2,10</b>	<b>2,8</b>
<b>M2,6</b>	<b>0,45</b>	17,27	<b>50</b>	<b>9</b>	<b>2,10</b>	<b>2,8</b>
M3,0	0,35	26,24	56	11	2,70	3,5
<b>M3,0</b>	<b>0,50</b>	11,86	<b>56</b>	<b>11</b>	<b>2,70</b>	<b>3,5</b>
*M3,0	0,60	19,88	56	11	2,70	3,5

Ø	P	€	L mm	l mm	∠ mm	d mm
<b>M3,5</b>	<b>0,60</b>	15,68	<b>56</b>	<b>12</b>	<b>3,00</b>	<b>4,0</b>
*M3,5	0,75	22,66	56	11	3,00	4,0
M4,0	0,50	24,76	63	13	3,40	4,5
<b>M4,0</b>	<b>0,70</b>	12,13	<b>63</b>	<b>13</b>	<b>3,40</b>	<b>4,5</b>
<b>M4,5</b>	<b>0,75</b>	21,62	<b>70</b>	<b>14</b>	<b>4,90</b>	<b>6,0</b>
M5,0	0,50	25,45	70	14	4,90	6,0
*M5,0	0,75	25,99	70	16	4,90	6,0
<b>M5,0</b>	<b>0,80</b>	12,17	<b>70</b>	<b>16</b>	<b>4,90</b>	<b>6,0</b>
M6,0	0,75	21,84	80	14	4,90	6,0
<b>M6,0</b>	<b>1,00</b>	13,82	<b>80</b>	<b>19</b>	<b>4,90</b>	<b>6,0</b>
<b>M7,0</b>	<b>1,00</b>	16,71	<b>80</b>	<b>18</b>	<b>5,50</b>	<b>7,0</b>
M8,0	0,75	25,52	80	18	6,20	8,0
<b>M8,0</b>	<b>1,25</b>	15,53	<b>90</b>	<b>22</b>	<b>6,20</b>	<b>8,0</b>
<b>M9,0</b>	<b>1,25</b>	25,23	<b>90</b>	<b>22</b>	<b>7,00</b>	<b>9,0</b>
<b>M10,0</b>	<b>1,50</b>	17,41	<b>100</b>	<b>24</b>	<b>8,00</b>	<b>10,0</b>

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

**2101**

**HSSE DIN 376/374**

**M-MF**  
DIN 13

Form.  
**C**



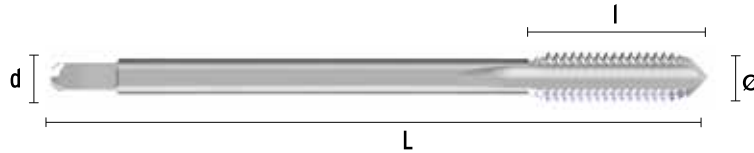
Tol.  
**6H**

**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
<b>M3,0</b>	<b>0,50</b>	11,64	<b>56</b>	<b>11</b>	<b>2,00</b>	<b>2,2</b>
*M3,5	0,60	15,68	56	13	2,10	2,8
<b>M4,0</b>	<b>0,70</b>	12,13	<b>63</b>	<b>13</b>	<b>2,10</b>	<b>2,8</b>
<b>M5,0</b>	<b>0,80</b>	12,17	<b>70</b>	<b>16</b>	<b>2,70</b>	<b>3,5</b>
*M6,0	0,50	30,55	80	18	3,40	4,5
*M6,0	0,75	20,10	80	14	3,40	4,5
<b>M6,0</b>	<b>1,00</b>	13,82	<b>80</b>	<b>19</b>	<b>3,40</b>	<b>4,5</b>
*M7,0	0,50	34,77	80	19	4,30	5,5
*M7,0	0,75	26,82	80	14	4,30	5,5
*M7,0	1,00	16,71	80	19	4,30	5,5
*M8,0	0,50	33,48	80	19	4,90	6,0
*M8,0	0,75	24,46	80	19	4,90	6,0
M8,0	1,00	19,81	90	20	4,90	6,0
<b>M8,0</b>	<b>1,25</b>	15,53	<b>90</b>	<b>22</b>	<b>4,90</b>	<b>6,0</b>
*M9,0	0,75	36,29	90	22	5,50	7,0
M9,0	1,00	30,22	90	20	5,50	7,0
*M9,0	1,25	25,23	90	20	5,50	7,0
*M10,0	0,50	96,17	90	18	5,50	7,0
M10,0	0,75	39,13	90	18	5,50	7,0
M10,0	1,00	22,00	90	20	5,50	7,0
M10,0	1,25	25,17	100	20	5,50	7,0
<b>M10,0</b>	<b>1,50</b>	17,41	<b>100</b>	<b>24</b>	<b>5,50</b>	<b>7,0</b>
M11,0	1,00	38,64	90	20	6,20	8,0
*M11,0	1,25	38,64	90	22	6,20	8,0
M11,0	1,50	31,77	100	24	6,20	8,0
*M12,0	0,75	60,37	100	22	7,00	9,0
M12,0	1,00	30,05	100	20	7,00	9,0
M12,0	1,25	30,39	100	20	7,00	9,0
M12,0	1,50	27,18	100	22	7,00	9,0
<b>M12,0</b>	<b>1,75</b>	22,43	<b>110</b>	<b>29</b>	<b>7,00</b>	<b>9,0</b>
*M13,0	0,75	103,30	100	22	9,00	11,0
*M13,0	1,00	55,81	100	22	9,00	11,0
*M13,0	1,25	55,81	100	22	9,00	11,0
*M13,0	1,50	55,81	100	22	9,00	11,0
*M13,0	1,75	55,81	110	27	9,00	11,0
*M14,0	0,75	103,30	100	22	9,00	11,0
M14,0	1,00	48,31	100	20	9,00	11,0
M14,0	1,25	39,72	100	20	9,00	11,0
M14,0	1,50	31,33	100	20	9,00	11,0
<b>M14,0</b>	<b>2,00</b>	31,08	<b>110</b>	<b>30</b>	<b>9,00</b>	<b>11,0</b>

Ø	P	€	L mm	l mm	∅ mm	d mm
M15,0	1,00	62,22	100	20	9,00	12,0
*M15,0	1,25	67,96	100	22	9,00	12,0
*M15,0	1,50	55,24	100	22	9,00	12,0
*M15,0	2,00	67,60	110	30	9,00	12,0
M16,0	1,00	58,63	100	20	9,00	12,0
*M16,0	1,25	63,95	100	22	9,00	12,0
M16,0	1,50	35,77	100	22	9,00	12,0
<b>M16,0</b>	<b>2,00</b>	36,53	<b>110</b>	<b>30</b>	<b>9,00</b>	<b>12,0</b>
*M17,0	1,00	116,62	100	20	9,00	12,0
*M17,0	1,25	116,62	100	22	9,00	12,0
*M17,0	1,50	116,62	100	22	9,00	12,0
M18,0	1,00	65,65	110	24	11,00	14,0
*M18,0	1,25	82,98	110	25	11,00	14,0
M18,0	1,50	51,27	110	25	11,00	14,0
M18,0	2,00	73,74	125	34	11,00	14,0
<b>M18,0</b>	<b>2,50</b>	52,66	<b>125</b>	<b>34</b>	<b>11,00</b>	<b>14,0</b>
*M19,0	1,00	153,22	110	25	11,00	14,0
*M19,0	1,25	153,13	110	25	11,00	14,0
*M19,0	1,50	153,21	110	25	11,00	14,0
M20,0	1,00	86,67	125	24	12,00	16,0
M20,0	1,25	153,22	125	25	12,00	16,0
M20,0	1,50	58,06	125	25	12,00	16,0
M20,0	2,00	76,08	140	27	12,00	16,0
<b>M20,0</b>	<b>2,50</b>	55,96	<b>140</b>	<b>34</b>	<b>12,00</b>	<b>16,0</b>
*M21,0	1,00	222,44	125	25	12,00	16,0
*M21,0	1,25	222,44	125	25	12,00	16,0
*M21,0	1,50	163,30	125	25	12,00	16,0
M22,0	1,00	97,17	125	24	14,50	18,0
*M22,0	1,25	153,22	125	25	14,50	18,0
M22,0	1,50	69,88	125	24	14,50	18,0
M22,0	2,00	97,17	140	27	14,50	18,0
<b>M22,0</b>	<b>2,50</b>	70,94	<b>140</b>	<b>34</b>	<b>14,50</b>	<b>18,0</b>
*M23,0	1,00	222,34	125	25	14,50	18,0
*M23,0	1,50	222,34	125	25	14,50	18,0
M24,0	1,00	105,94	140	27	14,50	18,0
*M24,0	1,25	222,44	140	28	14,50	18,0
M24,0	1,50	85,93	140	27	14,50	18,0
M24,0	2,00	108,64	140	27	14,50	18,0
<b>M24,0</b>	<b>3,00</b>	84,96	<b>160</b>	<b>38</b>	<b>14,50</b>	<b>18,0</b>
M25,0	1,00	287,75	140	28	14,50	18,0

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

# MACHOS DE MÁQUINA

## TARAUDS MACHINE / MACHINE TAPS / MASCHINENGWINDEBOHRER

Ø	P	€	L mm	I mm	∠ mm	d mm
M25,0	1,50	133,73	140	27	14,50	18,0
*M25,0	2,00	287,75	140	28	14,50	18,0
*M26,0	1,00	287,75	140	28	14,50	18,0
*M26,0	1,50	115,90	140	27	14,50	18,0
*M26,0	2,00	287,75	140	28	14,50	18,0
*M27,0	1,00	145,55	140	27	16,00	20,0
M27,0	1,50	126,57	140	27	16,00	20,0
M27,0	2,00	151,47	140	27	16,00	20,0
<b>M27,0</b>	<b>3,00</b>	<b>106,04</b>	<b>160</b>	<b>38</b>	<b>16,00</b>	<b>20,0</b>
*M28,0	1,00	287,75	140	28	16,00	20,0
M28,0	1,50	126,57	140	27	16,00	20,0
M28,0	2,00	287,75	140	27	16,00	20,0
*M30,0	1,00	161,90	150	27	18,00	22,0
M30,0	1,50	131,92	150	27	18,00	22,0
M30,0	2,00	163,30	150	27	18,00	22,0
*M30,0	3,00	179,55	180	45	18,00	22,0
<b>M30,0</b>	<b>3,50</b>	<b>135,89</b>	<b>180</b>	<b>40</b>	<b>18,00</b>	<b>22,0</b>
*M32,0	1,00	353,20	150	28	18,00	22,0
M32,0	1,50	166,88	150	27	18,00	22,0
*M32,0	2,00	353,35	150	27	18,00	22,0
*M33,0	1,00	353,35	160	30	20,00	25,0
M33,0	1,50	182,89	160	30	20,00	25,0
M33,0	2,00	308,20	160	30	20,00	25,0
*M33,0	3,00	338,87	180	50	20,00	25,0
<b>M33,0</b>	<b>3,50</b>	<b>163,30</b>	<b>180</b>	<b>45</b>	<b>20,00</b>	<b>25,0</b>
*M34,0	1,50	214,91	170	30	22,00	28,0
*M34,0	2,00	387,84	170	30	22,00	28,0
M35,0	1,50	214,34	170	30	22,00	28,0
M36,0	1,50	209,03	170	30	22,00	28,0
M36,0	2,00	282,34	170	30	22,00	28,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M36,0	3,00	323,90	200	50	22,00	28,0
<b>M36,0</b>	<b>4,00</b>	<b>208,71</b>	<b>200</b>	<b>50</b>	<b>22,00</b>	<b>28,0</b>
M38,0	1,50	222,85	170	30	22,00	28,0
*M38,0	2,00	456,78	170	30	22,00	28,0
M39,0	1,50	337,72	170	30	24,00	32,0
M39,0	2,00	337,72	170	30	24,00	32,0
M39,0	3,00	457,29	200	50	24,00	32,0
<b>M39,0</b>	<b>4,00</b>	<b>266,48</b>	<b>200</b>	<b>55</b>	<b>24,00</b>	<b>32,0</b>
M40,0	1,50	291,51	170	30	24,00	32,0
M40,0	2,00	338,62	170	30	24,00	32,0
*M40,0	3,00	338,62	200	60	24,00	32,0
M42,0	1,50	295,89	170	30	24,00	32,0
M42,0	2,00	387,35	170	30	24,00	32,0
M42,0	3,00	387,35	200	50	24,00	32,0
<b>M42,0</b>	<b>4,50</b>	<b>342,55</b>	<b>200</b>	<b>60</b>	<b>24,00</b>	<b>32,0</b>
M45,0	1,50	366,33	180	30	29,00	36,0
M45,0	2,00	465,08	180	30	29,00	36,0
M45,0	3,00	465,08	200	50	29,00	36,0
<b>M45,0</b>	<b>4,50</b>	<b>374,31</b>	<b>220</b>	<b>60</b>	<b>29,00</b>	<b>36,0</b>
M48,0	1,50	374,31	190	30	29,00	36,0
M48,0	2,00	563,66	190	30	29,00	36,0
M48,0	3,00	563,63	225	50	29,00	36,0
<b>M48,0</b>	<b>5,00</b>	<b>460,24</b>	<b>250</b>	<b>65</b>	<b>29,00</b>	<b>36,0</b>
M50,0	1,50	437,72	190	30	29,00	36,0
M52,0	1,50	443,11	190	32	32,00	40,0
M52,0	2,00	677,02	190	32	32,00	40,0
*M52,0	3,00	695,12	225	50	32,00	40,0
<b>M52,0</b>	<b>5,00</b>	<b>471,37</b>	<b>250</b>	<b>65</b>	<b>32,00</b>	<b>40,0</b>
<b>*M63,0</b>	<b>1,50</b>	<b>1.015,56</b>	<b>275</b>	<b>40</b>	<b>32,00</b>	<b>40,0</b>

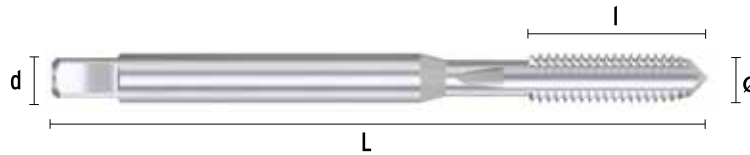
\*(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)



**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



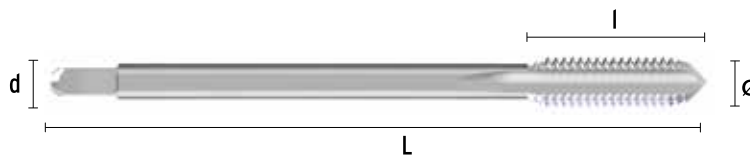
Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	23,73	56	10	2,70	3,5
M4,0	0,70	24,22	63	12	3,40	4,5
M5,0	0,80	24,33	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	27,61	80	18	4,90	6,0
M8,0	1,25	31,09	90	20	6,20	8,0
M10,0	1,50	34,82	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	24,33	70	14	2,70	3,5
*M6,0	1,00	27,61	80	18	3,40	4,5
*M7,0	1,00	33,43	80	18	4,30	5,5
*M8,0	1,00	39,62	90	20	4,90	6,0
*M8,0	1,25	31,09	90	20	4,90	6,0
*M9,0	1,25	50,49	90	20	5,50	7,0
*M10,0	1,00	43,96	90	20	5,50	7,0
*M10,0	1,25	34,82	90	20	5,50	7,0
*M10,0	1,50	34,82	100	20	5,50	7,0
*M12,0	1,25	60,75	100	20	7,00	9,0
*M12,0	1,50	54,34	100	20	7,00	9,0
M12,0	1,75	44,88	110	24	7,00	9,0
*M14,0	1,50	62,65	100	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M14,0	2,00	62,14	110	25	9,00	11,0
*M16,0	1,50	71,52	100	20	9,00	12,0
M16,0	2,00	73,04	110	32	9,00	12,0
*M18,0	1,50	102,54	110	24	11,00	14,0
M18,0	2,50	110,40	125	32	11,00	14,0
*M20,0	1,50	116,12	125	24	12,00	16,0
M20,0	2,50	117,25	140	32	12,00	16,0
*M22,0	1,50	139,78	125	24	14,50	18,0
M22,0	2,50	141,91	140	32	14,50	18,0
*M24,0	1,50	171,89	140	27	14,50	18,0
M24,0	3,00	169,94	160	38	14,50	18,0
*M27,0	3,00	212,06	160	38	16,00	20,0
*M30,0	3,50	271,76	180	40	18,00	22,0

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

**2114**

**HSSE DIN 371**

**M-MF**  
**DIN 13**

**Form.**  
**A**



**Tol.**  
**6H**

**1,5XD**



P				M		K			N				S		H		
<800	<1.000	<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	I mm	∠ mm	d mm
*M2,0	0,40	18,32	45	8	2,10	2,8
*M2,2	0,45	19,83	45	9	2,10	2,8
*M2,3	0,40	18,89	45	9	2,10	2,8
*M2,5	0,45	18,32	50	9	2,10	2,8
*M2,6	0,45	18,32	50	9	2,10	2,8
M3,0	0,50	13,06	56	11	2,70	3,5
*M3,5	0,60	16,63	56	12	3,00	4,0
M4,0	0,70	13,32	63	13	3,40	4,5

Ø	P	€	L mm	I mm	∠ mm	d mm
M4,5	0,75	22,90	70	14	4,90	6,0
M5,0	0,80	13,39	70	16	4,90	6,0
M6,0	1,00	15,19	80	19	4,90	6,0
M7,0	1,00	17,37	80	16	5,50	7,0
M8,0	1,25	17,08	90	19	6,20	8,0
*M9,0	1,25	26,76	90	19	7,00	9,0
M10,0	1,50	19,13	100	22	8,00	10,0

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

**2113**

**HSSE DIN 376/374**

**M-MF**  
**DIN 13**

**Form.**  
**A**



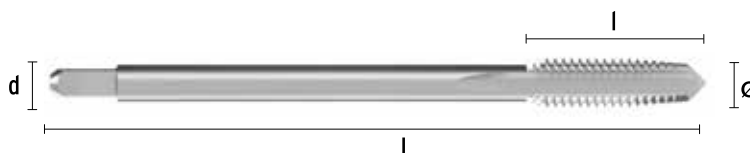
**Tol.**  
**6H**

**1,5XD**



P				M		K			N				S		H		
<800	<1.000	<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	I mm	∠ mm	d mm
*M3,0	0,50	13,06	56	11	2,00	2,2
*M3,5	0,60	16,63	56	13	2,10	2,8
M4,0	0,70	13,32	63	13	2,10	2,8
M5,0	0,80	13,39	70	16	2,70	3,5
M6,0	1,00	15,19	80	19	3,40	4,5
*M7,0	1,00	17,37	80	19	4,30	5,5
M8,0	1,25	17,08	90	22	4,90	6,0
*M9,0	1,25	26,76	90	22	5,50	7,0
M10,0	1,50	19,13	100	24	5,50	7,0
*M11,0	1,50	33,70	100	24	6,20	8,0
M12,0	1,75	24,70	110	29	7,00	9,0
*M13,0	1,75	59,15	110	29	9,00	11,0
M14,0	2,00	32,30	110	30	9,00	11,0
*M15,0	2,00	71,62	110	30	9,00	12,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M16,0	2,00	37,94	110	32	9,00	12,0
M18,0	2,50	58,49	125	34	11,00	14,0
M20,0	2,50	62,13	140	34	12,00	16,0
M22,0	2,50	75,16	140	34	14,50	18,0
M24,0	3,00	90,04	160	38	14,50	18,0
*M27,0	3,00	112,34	160	38	16,00	20,0
*M30,0	3,50	143,98	180	45	18,00	22,0
*M33,0	3,50	173,02	180	50	20,00	25,0
*M36,0	4,00	221,16	200	56	22,00	28,0
*M39,0	4,00	282,33	200	60	24,00	32,0
*M42,0	4,50	362,96	200	60	24,00	32,0
*M45,0	4,50	396,58	220	65	29,00	36,0
*M48,0	5,00	487,65	250	70	29,00	36,0
*M52,0	5,00	499,41	250	70	32,00	40,0

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

**P**

Aceros  
Aciers  
Steels  
Stähle

**M**

Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K**

Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N**

Metales no ferrosos  
Métal non Ferreux  
Non Ferrous metals  
NE-Metalle

**S**

Titanio y Superaloaciones  
Titanium et Superalloages  
Titanium and Superalloys  
Titan und Superlegierungen

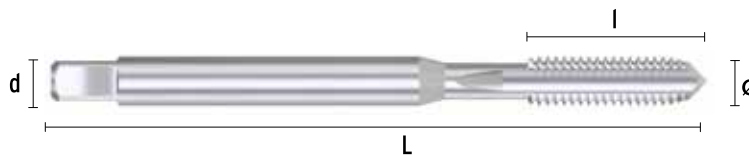
**H**

Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**2190** **HSSE DIN 371** **M** **Form. E** **Tol. 6H** **1,5XD** **R**  
**DIN 13**

P				M		K			N				S		H		
<800	<1.000	<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



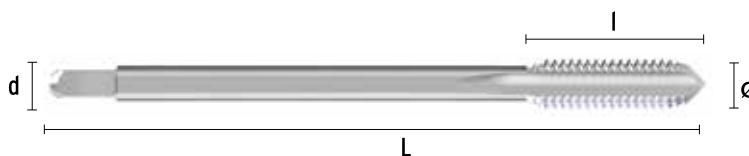
Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	13,26	56	11	2,70	3,5
M4,0	0,70	13,54	63	13	3,40	4,5
M5,0	0,80	13,59	70	16	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	15,46	80	19	4,90	6,0
M8,0	1,25	19,82	90	22	6,20	8,0
M10,0	1,50	25,58	100	24	8,00	10,0

**2191** **HSSE DIN 376** **M** **Form. E** **Tol. 6H** **1,5XD** **D**  
**DIN 13**

P				M		K			N				S		H		
<800	<1.000	<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



Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	15,46	80	19	3,40	4,5
M8,0	1,25	19,82	90	22	4,90	6,0
M10,0	1,50	25,58	100	24	5,50	7,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	34,06	110	29	7,00	9,0
M14,0	2,00	40,05	110	30	9,00	11,0
M16,0	2,00	48,05	110	32	9,00	12,0

**2180**

**HSSE-PM DIN 371**

**M**  
DIN 13

**Form.**  
**C**



**Tol.**  
**6HX**

**1,5XD**



**TIAISIN+**

P				M		K			N				S		H		
<800	<1.000	<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**  
PRECISION TECHNOLOGY



Ø	P	€	L mm	l mm	∅ mm	d mm
M3,0	0,50	23,82	56	10	2,70	3,5
M4,0	0,70	24,31	63	12	3,40	4,5
M5,0	0,80	24,31	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M6,0	1,00	25,77	80	18	4,90	6,0
M8,0	1,25	30,71	90	20	6,20	8,0
M10,0	1,50	37,16	100	20	8,00	10,0

**2179**

**HSSE-PM DIN 376**

**M**  
DIN 13

**Form.**  
**C**



**Tol.**  
**6HX**

**1,5XD**



**TIAISIN+**

P				M		K			N				S		H		
<800	<1.000	<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**  
PRECISION TECHNOLOGY



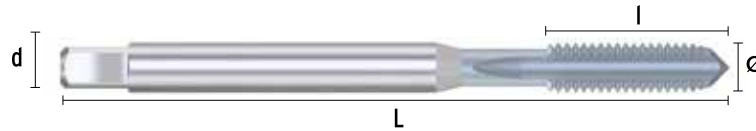
Ø	P	€	L mm	l mm	∅ mm	d mm
M8,0	1,25	30,71	90	20	4,90	6,0
M10,0	1,50	37,16	100	20	5,50	7,0
M12,0	1,75	46,79	110	24	7,00	9,0
M14,0	2,00	59,64	110	25	9,00	11,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M16,0	2,00	68,78	110	32	9,00	12,0
M18,0	2,50	115,46	125	32	11,00	14,0
M20,0	2,50	130,46	140	32	12,00	16,0

**2274** **HM DIN 371** **M** **DIN 13** **Form. D** **ToI. 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



Ø	P	€	L mm	l mm	∅ mm	d mm
M3,0	0,50	99,09	56	10	2,70	3,5
M4,0	0,70	102,26	63	12	3,40	4,5
M5,0	0,80	105,31	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M6,0	1,00	117,68	80	18	4,90	6,0
M8,0	1,25	142,45	90	20	6,20	8,0
M10,0	1,50	247,17	100	20	8,00	10,0

**2275** **HM DIN 376** **M** **DIN 13** **Form. D** **ToI. 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



Ø	P	€	L mm	l mm	∅ mm	d mm
M12,0	1,75	420,41	110	24	7,00	9,0
M14,0	2,00	420,41	110	25	9,00	11,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M16,0	2,00	511,23	110	32	9,00	12,0



**2104**

**HSSE DIN 371**

M-MF  
DIN 13

Form.  
B  
"Gun"



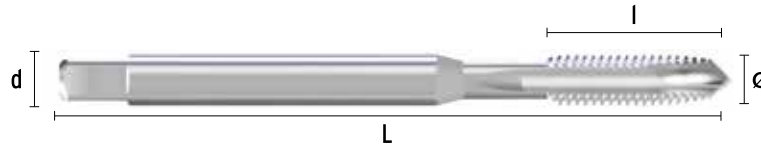
Tol.  
6H

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	18,88	45	10	2,10	2,8
M2,2	0,45	18,88	45	10	2,10	2,8
M2,3	0,45	18,88	45	10	2,10	2,8
M2,5	0,45	18,78	50	9	2,10	2,8
M2,6	0,45	18,78	50	9	2,10	2,8
M3,0	0,35	18,78	56	10	2,70	3,5
M3,0	0,50	13,38	56	11	2,70	3,5
*M3,0	0,60	22,20	56	10	2,70	3,5
M3,5	0,35	22,20	56	10	3,00	4,0
M3,5	0,60	17,13	56	12	3,00	4,0
M4,0	0,50	27,25	63	12	3,00	4,0
M4,0	0,70	13,67	63	13	3,40	4,5

Ø	P	€	L mm	l mm	∠ mm	d mm
*M4,0	0,75	19,54	63	13	3,40	4,5
M4,5	0,75	23,98	70	14	4,90	6,0
M5,0	0,50	28,01	70	14	4,90	6,0
M5,0	0,80	13,70	70	16	4,90	6,0
M6,0	0,75	26,02	80	14	4,90	6,0
M6,0	1,00	15,03	80	19	4,90	6,0
M7,0	1,00	19,66	80	18	5,50	7,0
M8,0	0,75	28,38	80	18	6,20	8,0
M8,0	1,25	16,58	90	22	6,20	8,0
M9,0	1,25	25,73	90	18	7,00	9,0
M10,0	1,50	20,34	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"



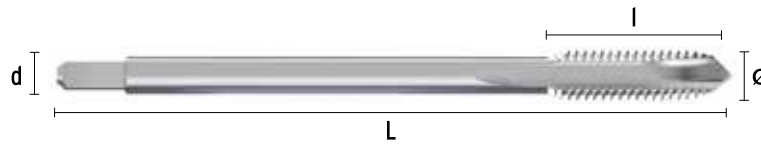
Tol.  
6H

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	13,38	56	11	2,70	3,5
*M3,5	0,60	17,14	56	13	3,00	4,0
M4,0	0,70	13,67	63	13	2,10	2,8
*M4,5	0,75	23,98	70	16	2,70	3,5
M5,0	0,80	13,70	70	16	2,70	3,5
*M6,0	0,75	22,77	80	18	3,40	4,5
M6,0	1,00	15,03	80	19	3,40	4,5
*M7,0	0,75	29,72	80	18	4,30	5,5
*M7,0	1,00	19,66	80	18	4,30	5,5
*M8,0	0,75	28,12	90	20	4,30	5,5
M8,0	1,00	21,78	90	20	4,90	6,0
M8,0	1,25	16,58	90	22	4,90	6,0
M9,0	1,00	33,23	90	20	5,50	7,0
*M9,0	1,25	25,73	90	20	5,50	7,0
M10,0	0,75	39,94	90	18	5,50	7,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M10,0	1,00	24,27	90	20	5,50	7,0
M10,0	1,25	28,91	100	20	5,50	7,0
M10,0	1,50	20,34	100	24	5,50	7,0
M11,0	1,00	42,54	90	20	6,20	8,0
*M11,0	1,25	42,54	100	22	6,20	8,0
M11,0	1,50	34,94	100	22	6,20	8,0
M12,0	1,00	33,07	100	20	7,00	9,0
M12,0	1,25	33,43	100	20	7,00	9,0
M12,0	1,50	29,85	100	20	7,00	9,0
M12,0	1,75	25,96	110	29	7,00	9,0
*M13,0	1,00	61,39	100	22	9,00	11,0
*M13,0	1,25	61,35	100	22	9,00	11,0
*M13,0	1,50	61,35	100	22	9,00	11,0
*M13,0	1,75	61,39	110	27	9,00	11,0
M14,0	1,00	53,14	100	20	9,00	11,0

# MACHOS DE MÁQUINA

## TARAUDS MACHINE / MACHINE TAPS / MASCHINENGWINDEBOHRER

Ø	P	€	L mm	I mm	∠ mm	d mm
M14,0	1,25	43,36	100	20	9,00	11,0
M14,0	1,50	34,49	100	20	9,00	11,0
<b>M14,0</b>	<b>2,00</b>	<b>34,19</b>	<b>110</b>	<b>30</b>	<b>9,00</b>	<b>11,0</b>
M15,0	1,00	68,29	100	20	9,00	12,0
*M15,0	1,25	74,78	100	22	9,00	12,0
*M15,0	1,50	60,74	100	22	9,00	12,0
<b>*M15,0</b>	<b>2,00</b>	<b>74,36</b>	<b>110</b>	<b>30</b>	<b>9,00</b>	<b>12,0</b>
M16,0	1,00	64,47	100	20	9,00	12,0
*M16,0	1,25	71,47	100	22	9,00	12,0
M16,0	1,50	42,98	100	22	9,00	12,0
<b>M16,0</b>	<b>2,00</b>	<b>42,00</b>	<b>110</b>	<b>30</b>	<b>9,00</b>	<b>12,0</b>
M18,0	1,00	72,17	110	24	11,00	14,0
M18,0	1,50	56,40	110	24	11,00	14,0
M18,0	2,00	81,15	125	27	11,00	14,0
<b>M18,0</b>	<b>2,50</b>	<b>57,07</b>	<b>125</b>	<b>34</b>	<b>11,00</b>	<b>14,0</b>
M20,0	1,00	95,36	125	24	12,00	16,0
M20,0	1,50	63,83	125	25	12,00	16,0
M20,0	2,00	83,67	140	27	12,00	16,0
<b>M20,0</b>	<b>2,50</b>	<b>61,57</b>	<b>140</b>	<b>34</b>	<b>12,00</b>	<b>16,0</b>
M22,0	1,00	106,89	125	25	14,50	18,0
M22,0	1,50	76,86	125	25	14,50	18,0
M22,0	2,00	106,89	140	27	14,50	18,0
M22,0	2,50	78,03	140	34	14,50	18,0
M24,0	1,00	133,16	140	28	14,50	18,0
M24,0	1,50	94,48	140	27	14,50	18,0
M24,0	2,00	119,49	140	27	14,50	18,0
<b>M24,0</b>	<b>3,00</b>	<b>92,93</b>	<b>160</b>	<b>38</b>	<b>14,50</b>	<b>18,0</b>
M25,0	1,50	146,82	140	27	14,50	18,0
*M25,0	2,00	316,53	140	28	14,50	18,0
M26,0	1,50	121,52	140	27	14,50	18,0
*M26,0	2,00	316,53	140	28	14,50	18,0
M27,0	1,50	138,90	140	27	16,00	20,0
M27,0	2,00	165,63	140	27	16,00	20,0
<b>M27,0</b>	<b>3,00</b>	<b>116,25</b>	<b>160</b>	<b>38</b>	<b>16,00</b>	<b>20,0</b>
M28,0	1,50	138,90	140	27	16,00	20,0
M28,0	2,00	316,53	140	27	16,00	20,0
*M30,0	1,00	197,58	150	28	18,00	22,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M30,0	1,50	145,15	150	27	18,00	22,0
M30,0	2,00	179,62	150	27	18,00	22,0
<b>M30,0</b>	<b>3,50</b>	<b>149,38</b>	<b>180</b>	<b>40</b>	<b>18,00</b>	<b>22,0</b>
M32,0	1,50	183,48	150	27	18,00	22,0
*M32,0	2,00	388,71	150	28	18,00	22,0
M33,0	1,50	198,56	160	30	20,00	25,0
M33,0	2,00	338,97	160	30	20,00	25,0
<b>M33,0</b>	<b>3,50</b>	<b>187,90</b>	<b>180</b>	<b>45</b>	<b>20,00</b>	<b>25,0</b>
*M34,0	1,50	229,93	170	30	22,00	28,0
M35,0	1,50	242,96	170	30	22,00	28,0
M36,0	1,50	229,93	170	30	22,00	28,0
M36,0	2,00	310,56	170	30	22,00	28,0
M36,0	3,00	356,28	200	50	22,00	28,0
<b>M36,0</b>	<b>4,00</b>	<b>229,57</b>	<b>200</b>	<b>50</b>	<b>22,00</b>	<b>28,0</b>
M38,0	1,50	251,05	170	30	22,00	28,0
M38,0	2,00	502,48	170	30	22,00	28,0
M39,0	1,50	448,17	170	30	24,00	32,0
M39,0	2,00	453,35	170	30	24,00	32,0
M39,0	3,00	604,43	170	30	24,00	32,0
<b>M39,0</b>	<b>4,00</b>	<b>293,14</b>	<b>200</b>	<b>55</b>	<b>24,00</b>	<b>32,0</b>
M40,0	1,50	320,71	170	30	24,00	32,0
M40,0	2,00	341,55	170	30	24,00	32,0
*M40,0	3,00	396,10	200	60	24,00	32,0
M42,0	1,50	326,01	170	30	24,00	32,0
M42,0	2,00	486,57	170	30	24,00	32,0
M42,0	3,00	486,57	170	30	24,00	32,0
<b>M42,0</b>	<b>4,50</b>	<b>376,86</b>	<b>200</b>	<b>60</b>	<b>24,00</b>	<b>32,0</b>
M45,0	1,50	399,19	180	30	29,00	36,0
M45,0	2,00	486,57	180	30	29,00	36,0
M45,0	3,00	452,93	200	50	29,00	36,0
<b>M45,0</b>	<b>4,50</b>	<b>411,69</b>	<b>220</b>	<b>60</b>	<b>29,00</b>	<b>36,0</b>
M48,0	1,50	539,55	190	30	29,00	36,0
M48,0	2,00	543,90	190	30	29,00	36,0
M48,0	3,00	518,02	225	50	29,00	36,0
<b>M48,0</b>	<b>5,00</b>	<b>506,24</b>	<b>250</b>	<b>65</b>	<b>29,00</b>	<b>36,0</b>
M50,0	1,50	486,54	190	30	29,00	36,0
<b>M52,0</b>	<b>5,00</b>	<b>518,23</b>	<b>250</b>	<b>65</b>	<b>32,00</b>	<b>40,0</b>



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

**2104/5**

**HSSE DIN 371**

M-MF  
DIN 13

Form.  
B  
"Gun"



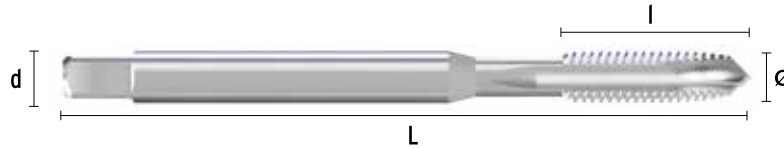
Tol.  
6H

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
● 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	I mm	∅ mm	d mm
M3,0	0,50	25,85	56	11	2,70	3,5
M4,0	0,70	26,14	63	13	3,40	4,5
M5,0	0,80	27,56	70	16	4,90	6,0

Ø	P	€	L mm	I mm	∅ mm	d mm
M6,0	1,00	27,56	80	19	4,90	6,0
M8,0	1,25	32,19	90	22	6,20	8,0
M10,0	1,50	41,23	100	24	8,00	10,0

**2103/5**

**HSSE DIN 376/374**

M-MF  
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
● 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	I mm	∅ mm	d mm
M12,0	1,75	58,25	110	29	7,00	9,0
M16,0	2,00	85,23	110	30	9,00	12,0

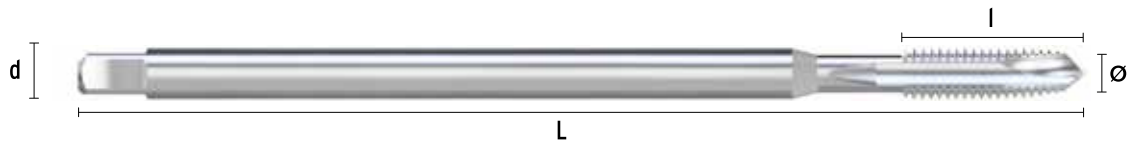
Ø	P	€	L mm	I mm	∅ mm	d mm
M20,0	2,50	124,00	140	34	12,00	16,0
M24,0	3,00	163,68	160	38	14,50	18,0



**2111** **HSSE DIN 371** **M** **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	30,77	100	10	2,70	3,5
M4,0	0,70	30,77	125	12	3,40	4,5
M5,0	0,80	34,75	140	14	4,90	6,0
M6,0	1,00	34,75	160	18	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
*M8,0	1,25	45,88	150	22	6,20	8,0
*M10,0	1,50	55,68	150	24	8,00	10,0
*M12,0	1,75	62,58	150	29	9,00	12,0

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

**2272** **HSSE DIN 376** **M** **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
M8,0	1,25	54,70	180	20	4,90	6,0
M10,0	1,50	67,13	200	20	5,50	7,0
M15,0	1,75	86,19	220	24	7,00	9,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	126,20	220	32	9,00	12,0
M20,0	2,50	142,00	250	-	12,00	16,0

**2110**

**HSSE DIN 371**

**M**  
DIN 13

Form.  
**B**  
"Gun"



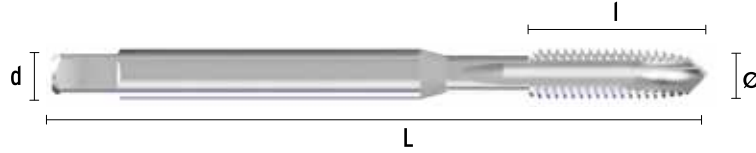
Tol.  
**6H**  
+0,1

**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



∅	P	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	21,26	56	11	2,70	3,5
M4,0	0,70	21,71	63	13	3,40	4,5
M5,0	0,80	21,77	70	14	4,90	6,0

∅	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	24,74	80	16	4,90	6,0
M8,0	1,25	27,85	90	18	6,20	8,0
M10,0	1,50	35,07	100	22	8,00	10,0

**2109**

**HSSE DIN 376**

**M**  
DIN 13

Form.  
**B**  
"Gun"



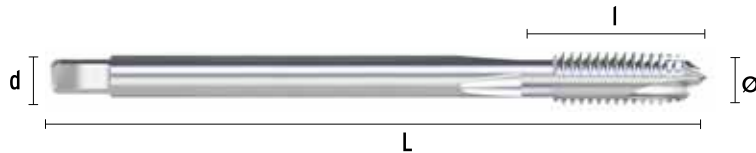
Tol.  
**6H**  
+0,1

**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



∅	P	€	L mm	I mm	∠ mm	d mm
M8,0	1,25	27,85	90	20	4,90	6,0
M10,0	1,50	35,07	100	22	5,50	7,0
M12,0	1,75	44,78	110	27	7,00	9,0

∅	P	€	L mm	I mm	∠ mm	d mm
M14,0	2,00	56,21	110	30	9,00	11,0
M16,0	2,00	68,01	110	30	9,00	12,0

**2168**

**HSSE DIN 371**

**M**  
DIN 13

Form. **B**  
"Gun"



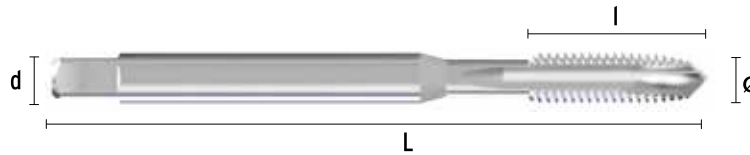
Tol. **6G**

**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	21,02	56	10	2,70	3,5
M4,0	0,70	21,02	63	12	3,40	4,5
M5,0	0,80	21,02	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	21,20	80	18	4,90	6,0
M8,0	1,25	25,43	90	20	6,20	8,0
M10,0	1,50	29,89	100	20	8,00	10,0

**2169**

**HSSE DIN 376**

**M**  
DIN 13

Form. **B**  
"Gun"



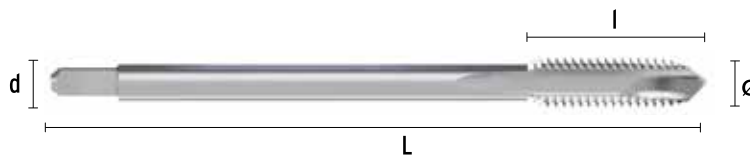
Tol. **6G**

**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	25,43	90	20	4,90	6,0
M10,0	1,50	29,89	100	20	5,50	7,0
M12,0	1,75	37,36	110	24	7,00	9,0
M14,0	2,00	46,85	110	25	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	56,67	110	32	9,00	12,0
M18,0	2,50	77,85	125	32	11,00	14,0
M20,0	2,50	81,38	140	32	12,00	16,0

**P** Aceros Aciers Steels Stähle

**M** Aceros Inox Aciers Inox Stainless Steels Edelstahl

**K** Fundicion Fonte Cast Iron Gusseisen

**N** Metales no ferrosos Métal non Ferraux Non Ferrous metals NE-Metalle

**S** Titanio y Superalaciones Titanium et Supealliajes Titanium and Superalloys Titan und Superlegierungen

**H** Materiales Duros Materiels Durs Hard materials Hartmaterialien

**2407**

**HSSE DIN 371**

**M**  
DIN 13

Form.  
**B**  
"Gun"



Tol.  
**4H**

**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

**NEW**



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	19,40	56	11	2,70	3,5
M4,0	0,70	19,80	63	13	3,40	4,5
M5,0	0,80	19,91	70	16	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	22,11	80	19	4,90	6,0
M8,0	1,25	24,86	90	22	6,20	8,0
M10,0	1,50	30,50	100	24	8,00	10,0

**2408**

**HSSE DIN 376/374**

**M**  
DIN 13

Form.  
**B**  
"Gun"



Tol.  
**4H**

**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

**NEW**



Ø	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	37,62	119	29	7,00	9,0

**P**

Aceros  
Aciers  
Steels  
Stähle

**M**

Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K**

Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N**

Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S**

Titanio y Superalaciones  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen

**H**

Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**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



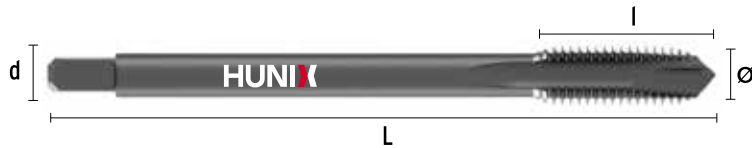
Ø	P	€	L mm	l mm	∠ mm	d mm
M2,0	0,40	28,27	45	10	2,10	2,8
M2,5	0,45	28,27	50	9	2,10	2,8
M3,0	0,50	14,75	56	11	2,70	3,5
M3,5	0,60	19,51	56	12	3,00	4,0
M4,0	0,70	14,96	63	13	3,40	4,5

Ø	P	€	L mm	l mm	∠ mm	d mm
M5,0	0,80	15,76	70	16	4,90	6,0
M6,0	1,00	15,76	80	19	4,90	6,0
M8,0	1,25	18,39	90	22	6,20	8,0
M10,0	1,50	23,53	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



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	17,74	56	11	2,70	3,5
M4,0	0,70	18,93	63	13	2,10	2,8
M5,0	0,80	20,01	70	16	2,70	3,5
M6,0	1,00	20,01	80	19	3,40	4,5
M8,0	1,00	30,23	90	20	4,90	6,0
M8,0	1,25	23,29	90	22	4,90	6,0
M10,0	1,00	34,09	90	20	5,50	7,0
M10,0	1,25	39,82	100	20	5,50	7,0
M10,0	1,50	25,91	100	24	5,50	7,0
M12,0	1,00	44,09	100	20	7,00	9,0
M12,0	1,25	47,73	100	20	7,00	9,0
M12,0	1,50	44,09	100	20	7,00	9,0
M12,0	1,75	33,37	110	29	7,00	9,0
M14,0	1,00	60,18	100	20	9,00	11,0
M14,0	1,25	55,20	100	20	9,00	11,0
M14,0	1,50	60,18	100	20	9,00	11,0
M14,0	2,00	50,09	110	30	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	1,00	69,77	100	20	9,00	12,0
M16,0	1,50	61,79	100	22	9,00	12,0
M16,0	2,00	53,66	110	30	9,00	12,0
M18,0	1,00	95,88	110	24	11,00	14,0
M18,0	1,50	73,69	110	24	11,00	14,0
M18,0	2,50	73,69	125	34	11,00	14,0
M20,0	1,00	93,70	125	24	12,00	16,0
M20,0	1,50	85,87	125	25	12,00	16,0
M20,0	2,50	78,05	140	34	12,00	16,0
M22,0	1,00	133,43	125	25	14,50	18,0
M22,0	1,50	111,25	125	25	14,50	18,0
M22,0	2,50	111,25	140	34	14,50	18,0
M24,0	1,50	113,34	140	27	14,50	18,0
M24,0	2,00	123,65	140	27	14,50	18,0
M24,0	3,00	103,04	160	38	14,50	18,0
M27,0	3,00	128,80	160	38	16,00	20,0
M30,0	3,50	161,00	180	40	18,00	22,0



**2116**

**HSSE DIN 371**

**M**  
DIN 13

Form. **B**  
"Gun"



Tol. **6H**

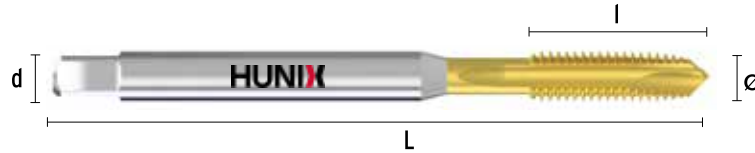
**3XD**



**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 / Alternative



Ø	P	€	L mm	I mm	∠ mm	d mm
M2,0	0,40	29,29	45	10	2,10	2,8
M2,5	0,45	29,29	50	9	2,10	2,8
M3,0	0,50	20,54	56	11	2,70	3,5
M3,5	0,60	24,18	56	12	3,00	4,0
M4,0	0,70	20,71	63	13	3,40	4,5

Ø	P	€	L mm	I mm	∠ mm	d mm
M5,0	0,80	22,65	70	16	4,90	6,0
M6,0	1,00	23,47	80	19	4,90	6,0
M8,0	1,25	28,11	90	22	6,20	8,0
M10,0	1,50	36,96	100	24	8,00	10,0

**2115**

**HSSE DIN 376/374**

M-MF  
DIN13

Form. **B**  
"Gun"



Tol. **6H**

**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 / Alternative



Ø	P	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	22,66	56	11	2,70	3,5
M4,0	0,70	24,41	63	13	2,10	2,8
M5,0	0,80	26,47	70	16	2,70	3,5
M6,0	1,00	27,35	80	19	3,40	4,5
M8,0	1,00	42,06	90	20	4,90	6,0
M8,0	1,25	32,68	90	22	4,90	6,0
M10,0	1,00	49,58	90	20	5,50	7,0
M10,0	1,25	54,15	100	20	5,50	7,0
M10,0	1,50	41,36	100	24	5,50	7,0
M12,0	1,00	61,67	100	20	7,00	9,0
M12,0	1,25	68,30	100	20	7,00	9,0
M12,0	1,50	59,15	100	20	7,00	9,0
M12,0	1,75	51,28	110	29	7,00	9,0
M14,0	1,00	81,32	100	20	9,00	11,0
M14,0	1,25	75,80	100	20	9,00	11,0
M14,0	1,50	78,39	100	20	9,00	11,0
M14,0	2,00	67,65	110	30	9,00	11,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M16,0	1,00	94,29	100	20	9,00	12,0
M16,0	1,50	82,03	100	22	9,00	12,0
M16,0	2,00	73,28	110	30	9,00	12,0
M18,0	1,00	116,71	110	24	11,00	14,0
M18,0	1,50	104,15	110	24	11,00	14,0
M18,0	2,50	99,51	125	34	11,00	14,0
M20,0	1,00	110,73	125	24	12,00	16,0
M20,0	1,50	117,28	125	25	12,00	16,0
M20,0	2,50	108,96	140	34	12,00	16,0
M22,0	1,00	150,27	125	25	14,50	18,0
M22,0	1,50	146,74	125	25	14,50	18,0
M22,0	2,50	146,80	140	34	14,50	18,0
M24,0	1,50	159,71	140	27	14,50	18,0
M24,0	2,00	175,25	140	27	14,50	18,0
M24,0	3,00	150,21	160	38	14,50	18,0
M27,0	3,00	187,76	160	38	16,00	20,0
M30,0	3,50	234,70	180	40	18,00	22,0

**P**

Aceros  
Aciers  
Steels  
Stähle

**M**

Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K**

Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N**

Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S**

Titanio y Superalloys  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen

**H**

Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**2254** **HSSE-PM DIN 371** **M** **Form. B "Gun"** **Tol. 6HX** **3XD** **R** **HL**  
**DIN 13**

P				M		K			N				S		H		
<800	<1.000	<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



**NEW**



Ø	P	€	L mm	l mm	∠ mm	d mm
<b>M2,0</b>	<b>0,40</b>	<i>41,20</i>	<b>45</b>	<b>10</b>	<b>2,10</b>	<b>2,8</b>
<b>M3,0</b>	<b>0,50</b>	<i>30,06</i>	<b>56</b>	<b>5</b>	<b>2,70</b>	<b>3,5</b>
<b>M4,0</b>	<b>0,70</b>	<i>31,65</i>	<b>63</b>	<b>7</b>	<b>3,40</b>	<b>4,5</b>
<b>M5,0</b>	<b>0,80</b>	<i>34,38</i>	<b>70</b>	<b>8</b>	<b>4,90</b>	<b>6,0</b>

Ø	P	€	L mm	l mm	∠ mm	d mm
<b>M6,0</b>	<b>1,00</b>	<i>35,63</i>	<b>80</b>	<b>10</b>	<b>4,90</b>	<b>6,0</b>
<b>M8,0</b>	<b>1,25</b>	<i>42,79</i>	<b>90</b>	<b>13</b>	<b>6,20</b>	<b>8,0</b>
<b>M10,0</b>	<b>1,50</b>	<i>56,28</i>	<b>100</b>	<b>15</b>	<b>8,00</b>	<b>10,0</b>

**2255** **HSSE-PM DIN 376/374** **M** **Form. B "Gun"** **Tol. 6HX** **3XD** **D** **HL**  
**DIN 13**

P				M		K			N				S		H		
<800	<1.000	<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



**NEW**



Ø	P	€	L mm	l mm	∠ mm	d mm
<b>M8,0</b>	<b>1,25</b>	<i>54,45</i>	<b>90</b>	<b>15</b>	<b>4,90</b>	<b>6,0</b>
<b>M10,0</b>	<b>1,00</b>	<i>63,80</i>	<b>90</b>	<b>10</b>	<b>5,50</b>	<b>7,0</b>
<b>M10,0</b>	<b>1,50</b>	<i>66,45</i>	<b>100</b>	<b>17</b>	<b>5,50</b>	<b>7,0</b>
<b>M12,0</b>	<b>1,00</b>	<i>121,85</i>	<b>100</b>	<b>10</b>	<b>7,00</b>	<b>9,0</b>
<b>M12,0</b>	<b>1,25</b>	<i>121,85</i>	<b>100</b>	<b>15</b>	<b>7,00</b>	<b>9,0</b>
<b>M12,0</b>	<b>1,50</b>	<i>88,85</i>	<b>100</b>	<b>15</b>	<b>7,00</b>	<b>9,0</b>
<b>M12,0</b>	<b>1,75</b>	<i>77,35</i>	<b>110</b>	<b>18</b>	<b>7,00</b>	<b>9,0</b>
<b>M14,0</b>	<b>1,50</b>	<i>121,80</i>	<b>100</b>	<b>15</b>	<b>9,00</b>	<b>11,0</b>
<b>M14,0</b>	<b>2,00</b>	<i>104,55</i>	<b>110</b>	<b>20</b>	<b>9,00</b>	<b>11,0</b>

Ø	P	€	L mm	l mm	∠ mm	d mm
<b>M16,0</b>	<b>1,50</b>	<i>122,65</i>	<b>100</b>	<b>15</b>	<b>9,00</b>	<b>12,0</b>
<b>M16,0</b>	<b>2,00</b>	<i>110,00</i>	<b>110</b>	<b>20</b>	<b>9,00</b>	<b>12,0</b>
<b>M18,0</b>	<b>1,50</b>	<i>166,95</i>	<b>110</b>	<b>17</b>	<b>11,00</b>	<b>14,0</b>
<b>M18,0</b>	<b>2,50</b>	<i>166,30</i>	<b>125</b>	<b>25</b>	<b>11,00</b>	<b>14,0</b>
<b>M20,0</b>	<b>1,50</b>	<i>188,90</i>	<b>125</b>	<b>17</b>	<b>12,00</b>	<b>16,0</b>
<b>M20,0</b>	<b>2,50</b>	<i>193,15</i>	<b>140</b>	<b>25</b>	<b>12,00</b>	<b>16,0</b>
<b>M22,0</b>	<b>2,50</b>	<i>245,85</i>	<b>140</b>	<b>25</b>	<b>14,50</b>	<b>18,0</b>
<b>M24,0</b>	<b>3,00</b>	<i>249,40</i>	<b>160</b>	<b>30</b>	<b>14,50</b>	<b>18,0</b>

**2126** **HSSE-PM DIN 371**

**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
●	●	●	○	●	●	●	●	●	○	○	○	○	○	○			
10-15	6-10	4-6		6-12				10-20	4-6	4-6		10-15		4-8			

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



Ø	P	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	23,44	56	10	2,70	3,5
M4,0	0,70	23,78	63	12	3,40	4,5
M5,0	0,80	25,70	70	14	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	26,50	80	18	4,90	6,0
M8,0	1,25	31,80	90	20	6,20	8,0
M10,0	1,50	41,70	100	20	8,00	10,0

**2125** **HSSE-PM DIN 376/374**

**M-MF**  
DIN 13

Form. **B**  
"Gun"



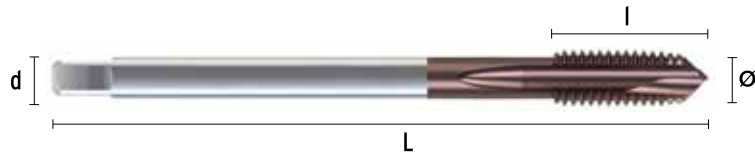
Tol. **6H**

**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
●	●	●	○	●	●	●	●	●	○	○	○	○	○	○			
10-15	6-10	4-6		6-12				10-20	4-6	4-6		10-15		4-8			

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



Ø	P	€	L mm	I mm	∠ mm	d mm
M8,0	1,00	49,38	90	20	4,90	6,0
M8,0	1,25	36,50	90	20	4,90	6,0
M10,0	1,00	51,93	90	20	5,50	7,0
M10,0	1,25	69,63	100	20	5,50	7,0
M10,0	1,50	45,91	100	20	5,50	7,0
M12,0	1,00	67,08	100	20	7,00	9,0
M12,0	1,25	71,65	100	20	7,00	9,0
M12,0	1,50	67,08	110	20	7,00	9,0
M12,0	1,75	58,00	110	24	7,00	9,0
M14,0	1,25	84,40	100	20	9,00	11,0

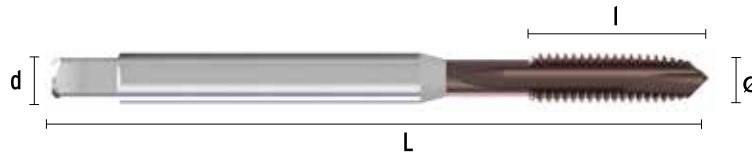
Ø	P	€	L mm	I mm	∠ mm	d mm
M14,0	1,50	89,21	100	20	9,00	11,0
M14,0	2,00	76,73	110	25	9,00	11,0
M16,0	1,50	93,12	100	20	9,00	12,0
M16,0	2,00	83,18	110	32	9,00	12,0
M18,0	1,50	113,12	110	24	11,00	14,0
M18,0	2,50	113,07	125	32	11,00	14,0
M20,0	1,50	135,76	125	24	12,00	16,0
M20,0	2,50	123,41	140	32	12,00	16,0
M22,0	2,50	167,05	140	32	14,50	18,0
M24,0	3,00	169,50	160	38	14,50	18,0



**2176** **HSSE-PM DIN 371** **M** **Form. B "Gun"** **ToI. 6HX** **3XD** **R** **TIASIN+**  
**DIN 13**

P				M		K			N				S		H		
<800	<1.000	<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



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	29,78	56	10	2,70	3,5
M4,0	0,70	30,25	63	12	3,40	4,5
M5,0	0,80	32,52	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	34,62	80	18	4,90	6,0
M8,0	1,25	40,38	90	20	6,20	8,0
M10,0	1,50	50,44	100	20	8,00	10,0

**2175** **HSSE-PM DIN 376** **M** **Form. B "Gun"** **ToI. 6HX** **3XD** **D** **TIASIN+**  
**DIN 13**

P				M		K			N				S		H		
<800	<1.000	<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



Ø	P	€	L mm	l mm	∠ mm	d mm
M8,0	1,25	50,44	90	20	4,90	6,0
M10,0	1,50	65,92	100	20	5,50	7,0
M12,0	1,75	75,61	110	24	7,00	9,0
M14,0	2,00	105,26	110	25	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	111,21	110	32	9,00	12,0
M18,0	2,50	162,65	125	32	11,00	14,0
M20,0	2,50	160,58	140	32	12,00	16,0



**2133**

**HSSE DIN 371**

**M**  
DIN 13

**B-AZ**



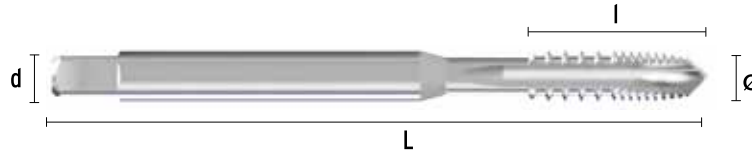
Tol.  
**6H**

**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
									● 10-20	○ 6-8	○ 10-20	○ 10-15					

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



Ø	P	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	21,99	56	11	2,70	3,5
M4,0	0,70	21,99	63	13	3,40	4,5
M5,0	0,80	21,99	70	16	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	23,16	80	19	4,90	6,0
M8,0	1,25	27,70	90	22	6,20	8,0
M10,0	1,50	32,63	100	24	8,00	10,0

**2132**

**HSSE DIN 376**

**M**  
DIN 13

**B-AZ**



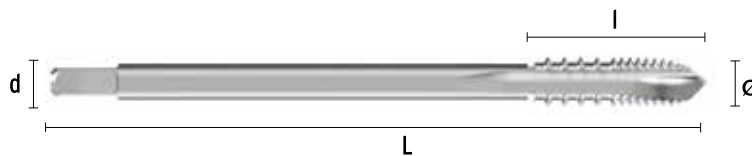
Tol.  
**6H**

**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
									● 10-20	○ 6-8	○ 10-20	○ 10-15					

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



Ø	P	€	L mm	I mm	∠ mm	d mm
*M4,0	0,70	21,99	63	13	2,10	2,8
*M5,0	0,80	21,99	70	16	2,70	3,5
*M6,0	1,00	23,16	80	19	3,40	4,5
*M8,0	1,25	27,70	90	22	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
*M10,0	1,50	32,63	100	24	5,50	7,0
M12,0	1,75	41,17	110	29	7,00	9,0
M14,0	2,00	51,27	110	30	9,00	11,0
M16,0	2,00	67,98	110	32	9,00	12,0

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

**2258** **HSSE-PM DIN 371 SYNCHRO** **M** **Form. B "Gun"** **To. 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



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	28,93	56	5	2,70	3,5
M4,0	0,70	32,10	63	7	3,40	4,5
M5,0	0,80	33,53	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	34,96	80	10	4,90	6,0
M8,0	1,25	42,24	90	13	6,20	8,0
M10,0	1,50	55,59	100	15	8,00	10,0

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

**2259** **HSSE-PM DIN 376 SYNCHRO** **M** **Form. B "Gun"** **To. 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



Ø	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	82,74	110	18	7,00	9,0
M14,0	2,00	111,83	110	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	117,69	110	20	9,00	12,0

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



**2106**

**HSSE DIN 371**

M-MF  
DIN 13

Form.  
**C**



Tol.  
**6H**

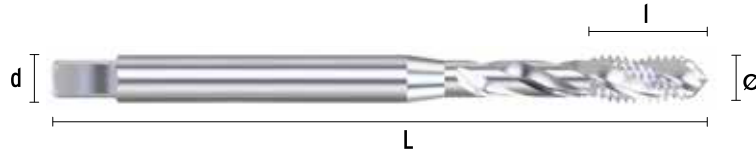


**3XD**

**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	37,11	45	5	2,10	2,8
M2,2	0,45	37,11	45	10	2,10	2,8
M2,3	0,40	37,11	45	10	2,10	2,8
M2,5	0,45	37,11	50	5	2,10	2,8
M2,6	0,45	37,11	50	5	2,10	2,8
M3,0	0,35	37,11	56	5	2,70	3,5
M3,0	0,50	16,49	56	6	2,70	3,5
M3,5	0,35	37,11	56	5	3,00	4,0
M3,5	0,60	20,35	56	6	3,00	4,0
M4,0	0,50	27,26	63	7	3,40	4,5
M4,0	0,70	16,49	63	7	3,40	4,5

Ø	P	€	L mm	l mm	∅ mm	d mm
M4,5	0,75	28,09	70	7	4,90	6,0
M5,0	0,50	38,23	70	8	4,90	6,0
M5,0	0,80	15,94	70	8	4,90	6,0
M6,0	0,75	26,84	80	10	4,90	6,0
M6,0	1,00	17,48	80	10	4,90	6,0
M7,0	1,00	21,40	80	10	5,50	7,0
M8,0	0,75	31,03	80	10	6,20	8,0
M8,0	1,25	20,83	90	14	6,20	8,0
M9,0	1,25	36,18	90	13	7,00	9,0
M10,0	1,50	24,23	100	16	8,00	10,0

**2105**

**HSSE DIN 376/374**

M-MF  
DIN13

Form.  
**C**



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	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	16,49	56	5	2,00	2,2
M4,0	0,70	16,49	63	7	2,10	2,8
M5,0	0,80	15,94	70	8	2,70	3,5
M6,0	1,00	17,48	80	10	3,40	4,5
*M7,0	1,00	21,40	80	10	4,30	5,5
M8,0	1,00	25,78	90	10	4,90	6,0
M8,0	1,25	20,83	90	14	4,90	6,0
M9,0	1,00	33,22	90	10	5,50	7,0
*M9,0	1,25	31,65	90	13	5,50	7,0
M10,0	0,75	46,92	90	10	5,50	7,0
M10,0	1,00	30,44	90	10	5,50	7,0
M10,0	1,25	33,09	100	15	5,50	7,0
M10,0	1,50	24,23	100	16	5,50	7,0
M11,0	1,00	96,91	90	10	6,20	8,0
*M11,0	1,25	86,44	100	15	6,20	8,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M11,0	1,50	70,61	100	15	6,20	8,0
M12,0	1,00	39,14	100	10	7,00	9,0
M12,0	1,25	37,43	100	15	7,00	9,0
M12,0	1,50	36,05	100	15	7,00	9,0
M12,0	1,75	32,36	110	18	7,00	9,0
M14,0	1,00	63,21	100	10	9,00	11,0
M14,0	1,25	53,98	100	15	9,00	11,0
M14,0	1,50	40,65	100	15	9,00	11,0
M14,0	2,00	41,55	110	20	9,00	11,0
M15,0	1,00	82,78	100	10	9,00	12,0
*M15,0	1,50	60,73	100	20	9,00	12,0
M16,0	1,00	132,36	100	10	9,00	12,0
*M16,0	1,25	109,86	100	20	9,00	12,0
M16,0	1,50	53,04	100	15	9,00	12,0
M16,0	2,00	50,17	110	20	9,00	12,0

# MACHOS DE MÁQUINA

## TARAUDS MACHINE / MACHINE TAPS / MASCHINENGEWINDEBOHRER

Ø	P	€	L mm	l mm	mm	d mm
M18,0	1,00	105,38	110	13	11,00	14,0
M18,0	1,50	67,14	110	20	11,00	14,0
M18,0	2,00	126,53	125	20	11,00	14,0
<b>M18,0</b>	<b>2,50</b>	<b>67,46</b>	<b>125</b>	<b>25</b>	<b>11,00</b>	<b>14,0</b>
M20,0	1,00	103,02	125	13	12,00	16,0
M20,0	1,50	76,73	125	20	12,00	16,0
M20,0	2,00	120,23	140	20	12,00	16,0
<b>M20,0</b>	<b>2,50</b>	<b>71,87</b>	<b>140</b>	<b>25</b>	<b>12,00</b>	<b>16,0</b>
M22,0	1,00	101,48	125	13	14,50	18,0
M22,0	1,50	82,80	125	17	14,50	18,0
M22,0	2,00	113,85	140	20	14,50	18,0
<b>M22,0</b>	<b>2,50</b>	<b>88,64</b>	<b>140</b>	<b>27</b>	<b>14,50</b>	<b>18,0</b>
M24,0	1,00	136,07	140	13	14,50	18,0
M24,0	1,50	112,51	140	20	14,50	18,0
M24,0	2,00	136,07	140	20	14,50	18,0
<b>M24,0</b>	<b>3,00</b>	<b>108,21</b>	<b>160</b>	<b>30</b>	<b>14,50</b>	<b>18,0</b>
M25,0	1,50	181,39	140	20	14,50	18,0
M26,0	1,50	121,48	140	20	14,50	18,0
M27,0	1,50	138,84	140	20	16,00	20,0
M27,0	2,00	182,16	140	20	16,00	20,0
<b>M27,0</b>	<b>3,00</b>	<b>132,54</b>	<b>160</b>	<b>30</b>	<b>16,00</b>	<b>20,0</b>
M28,0	1,50	138,84	140	20	16,00	20,0
M28,0	2,00	227,59	140	20	16,00	20,0
M30,0	1,50	173,00	150	22	18,00	22,0
M30,0	2,00	365,49	150	22	18,00	22,0
<b>M30,0</b>	<b>3,50</b>	<b>169,82</b>	<b>180</b>	<b>35</b>	<b>18,00</b>	<b>22,0</b>
M32,0	1,50	213,49	150	22	18,00	22,0
M33,0	1,50	261,80	160	22	20,00	25,0

Ø	P	€	L mm	l mm	mm	d mm
M33,0	2,00	287,87	160	24	20,00	25,0
<b>M33,0</b>	<b>3,50</b>	<b>204,04</b>	<b>180</b>	<b>35</b>	<b>20,00</b>	<b>25,0</b>
M35,0	1,50	292,05	170	22	22,00	28,0
M36,0	1,50	355,91	170	22	22,00	28,0
M36,0	2,00	462,55	170	24	22,00	28,0
M36,0	3,00	360,80	200	30	22,00	28,0
<b>M36,0</b>	<b>4,00</b>	<b>275,34</b>	<b>200</b>	<b>40</b>	<b>22,00</b>	<b>28,0</b>
M38,00	1,50	426,91	170	24	22,00	28,0
M39,00	1,50	344,03	170	25	24,00	32,0
M39,00	2,00	344,03	170	25	24,00	32,0
M39,00	3,00	562,87	200	30	24,00	32,0
<b>M39,00</b>	<b>4,00</b>	<b>581,63</b>	<b>200</b>	<b>40</b>	<b>24,00</b>	<b>32,0</b>
M40,00	1,50	469,54	170	25	24,00	32,0
M40,00	2,00	381,15	170	25	24,00	32,0
M42,00	1,50	504,90	170	25	24,00	32,0
M42,00	2,00	425,70	170	25	24,00	32,0
M42,00	3,00	425,70	200	30	24,00	32,0
<b>M42,00</b>	<b>4,50</b>	<b>424,82</b>	<b>200</b>	<b>45</b>	<b>24,00</b>	<b>32,0</b>
M45,00	1,50	497,48	180	27	29,00	36,0
M45,00	2,00	497,48	180	27	29,00	36,0
M45,00	3,00	594,00	200	30	29,00	36,0
<b>M45,00</b>	<b>4,50</b>	<b>779,63</b>	<b>220</b>	<b>45</b>	<b>29,00</b>	<b>36,0</b>
M48,00	1,50	594,00	190	27	29,00	36,0
M48,00	2,00	594,00	190	27	29,00	36,0
M48,00	3,00	594,00	225	33	29,00	36,0
<b>M48,00</b>	<b>5,00</b>	<b>853,88</b>	<b>250</b>	<b>50</b>	<b>29,00</b>	<b>36,0</b>
M50,00	1,50	693,00	190	27	29,00	36,0
<b>M52,00</b>	<b>5,00</b>	<b>1.014,75</b>	<b>250</b>	<b>50</b>	<b>32,00</b>	<b>40,0</b>



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

**2106/5**

**HSSE DIN 371**

**M**  
DIN 13

Form.  
**C**

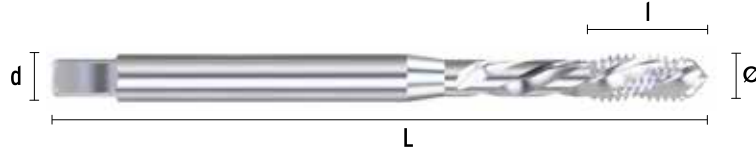


Tol.  
**6H**



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			○ 5-10			○ 10-15		○ 10-15	● 10-20		○ 10-15					

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



∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	27,56	56	6	2,70	3,5
M4,0	0,70	27,90	63	7	3,40	4,5
M5,0	0,80	29,45	70	8	4,90	6,0

∅	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	29,45	80	10	4,90	6,0
M8,0	1,25	34,35	90	14	6,20	8,0
M10,0	1,50	43,95	100	16	8,00	10,0

**2105/5**

**HSSE DIN 376/374**

**M**  
DIN13

Form.  
**C**



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			○ 5-10			○ 10-15		○ 10-15	● 10-20		○ 10-15					

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



∅	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	64,70	110	18	7,00	9,0
M16,0	2,00	94,63	110	20	9,00	12,0

∅	P	€	L mm	l mm	∠ mm	d mm
M20,0	2,50	137,54	140	25	12,00	16,0
M24,0	3,00	181,70	140	20	14,50	18,0

# MACHOS DE MÁQUINA TARAUDS MACHINE / MACHINE TAPS / MASCHINENGWINDEBOHRER

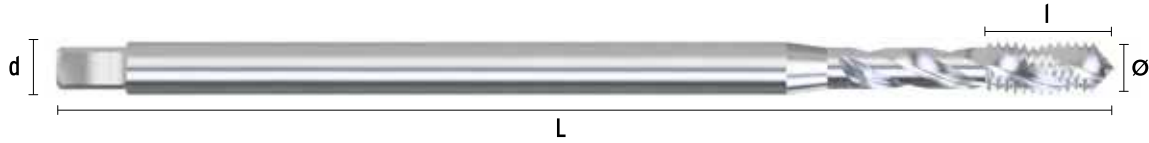
2112

**HSSE DIN 371**



P				M		K			N				S		H		
<800	<1.000	<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	36,34	100	5	2,70	3,5
M4,0	0,70	36,34	125	7	3,40	4,5
M5,0	0,80	41,91	140	8	4,90	6,0
M6,0	1,00	41,91	160	10	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
*M8,0	1,25	53,06	150	14	6,20	8,0
*M10,0	1,50	64,19	150	16	8,00	10,0
*M12,0	1,75	66,79	150	18	9,00	12,0

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

2273

**HSSE DIN 376**



P				M		K			N				S		H		
<800	<1.000	<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	60,28	180	15	4,90	6,0
M10,0	1,50	73,80	200	17	5,50	7,0
M12,0	1,75	94,90	220	18	7,00	9,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	138,84	220	20	9,00	12,0
M20,0	2,50	156,15	250	25	12,00	16,0

**2166**

**HSSE DIN 371**

M  
DIN 13

Form.  
C



Tol.  
6H  
+0,1

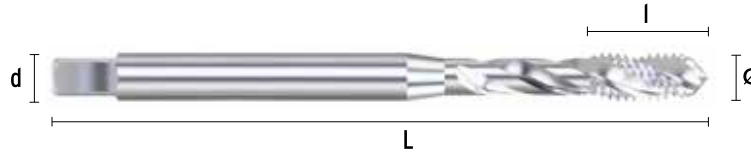


3XD



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



∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	26,63	56	5	2,70	3,5
M4,0	0,70	26,63	63	7	3,40	4,5
M5,0	0,80	25,71	70	8	4,90	6,0

∅	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	28,19	80	10	4,90	6,0
M8,0	1,25	33,65	90	13	4,90	6,0
M10,0	1,50	39,90	110	15	8,00	10,0

**2165**

**HSSE DIN 376**

M  
DIN 13

Form.  
C



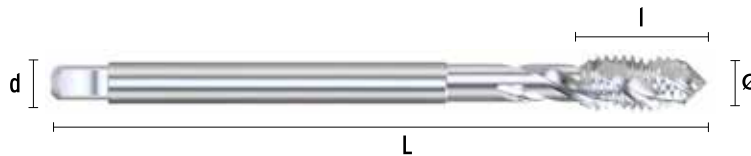
Tol.  
6H  
+0,1



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



∅	P	€	L mm	l mm	∠ mm	d mm
M8,0	1,25	33,65	90	15	4,90	6,0
M10,0	1,50	39,90	100	17	5,50	7,0
M12,0	1,75	44,78	110	18	7,00	9,0

∅	P	€	L mm	l mm	∠ mm	d mm
M14,0	2,00	64,11	110	20	9,00	11,0
M16,0	2,00	77,40	110	20	9,00	12,0



**P** Aceros  
Aciers  
Steels  
Stähle



**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl



**K** Fundicion  
Fonte  
Cast Iron  
Gusseisen



**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle



**S** Titanio y Superaloaciones  
Titanium et Supeallages  
Titanium and Superalloys  
Titan und Superlegierungen



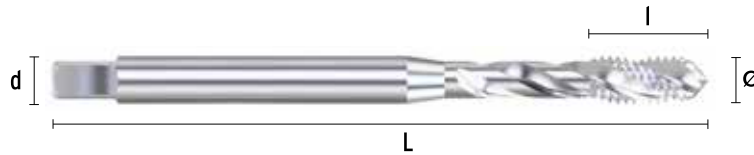
**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien



## 2170 **HSSE DIN 371**

P				M		K			N				S		H		
<800	<1.000	<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	23,16	56	5	2,70	3,5
M4,0	0,70	23,16	63	7	3,40	4,5
M5,0	0,80	22,33	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	24,50	80	10	4,90	6,0
M8,0	1,25	29,25	90	13	6,20	8,0
M10,0	1,50	34,66	110	15	8,00	10,0

## 2208 **HSSE DIN 376**

P				M		K			N				S		H		
<800	<1.000	<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	29,25	90	15	4,90	6,0
M10,0	1,50	34,66	100	17	5,50	7,0
M12,0	1,75	46,26	110	18	7,00	9,0
M14,0	2,00	53,43	110	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	64,52	110	20	9,00	12,0
M18,0	2,50	87,90	125	25	11,00	14,0
M20,0	2,50	92,47	140	25	12,00	16,0

**2409** **HSSE DIN 371** **M** **Form. C** **Tol. 4H** **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

**NEW**



Ø	P	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	23,29	56	6	2,70	3,5
M4,0	0,70	23,76	63	7	3,40	4,5
M5,0	0,80	23,89	70	8	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	26,53	80	10	4,90	6,0
M8,0	1,25	29,83	90	14	6,20	8,0
M10,0	1,50	36,67	100	16	8,00	10,0

**2410** **HSSE DIN 376/374** **M** **Form. C** **Tol. 4H** **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	I mm	∠ mm	d mm
M12,0	1,75	45,14	110	18	7,00	9,0

**2108** **HSSE DIN 371** M Form. Tol. 3XD R  
 DIN 13 C 6H 15°

P				M		K			N				S		H		
<800	<1.000	<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	I mm	∠ mm	d mm
*M2,0	0,40	20,86	45	8	2,10	2,8
M3,0	0,50	17,50	56	11	2,70	3,5
M4,0	0,70	16,80	63	13	3,40	4,5
M5,0	0,80	16,19	70	16	4,90	6,0

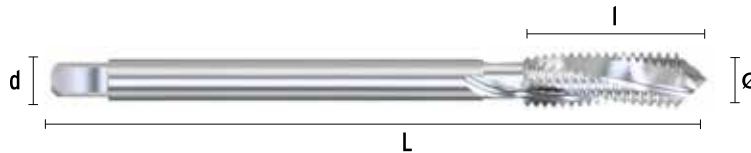
Ø	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	17,75	80	19	4,90	6,0
M7,0	1,00	21,53	80	19	5,50	7,0
M8,0	1,25	21,21	90	22	6,20	8,0
M10,0	1,50	25,12	100	24	8,00	10,0

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

**2107** **HSSE DIN 376/374** M Form. Tol. 3XD D  
 DIN 13 C 6H 15°

P				M		K			N				S		H		
<800	<1.000	<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	I mm	∠ mm	d mm
M4,0	0,70	16,64	63	13	2,10	2,8
M5,0	0,80	16,08	70	16	2,70	3,5
M6,0	1,00	17,75	80	19	3,40	4,5
M7,0	1,00	21,53	80	19	4,30	5,5
M8,0	1,25	21,21	90	22	4,90	6,0
M10,0	1,50	25,12	100	24	5,50	7,0
M12,0	1,75	33,55	110	29	7,00	9,0
M14,0	2,00	39,90	110	30	9,00	11,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M16,0	2,00	48,20	110	32	9,00	12,0
M18,0	2,50	64,85	125	34	11,00	14,0
M20,0	2,50	69,08	140	34	12,00	16,0
M22,0	2,50	85,20	140	34	14,50	18,0
M24,0	3,00	103,51	160	38	14,50	18,0
*M27,0	3,00	127,41	160	38	16,00	20,0
*M30,0	3,50	163,24	180	45	18,00	22,0
*M36,0	4,00	263,23	200	56	22,00	28,0

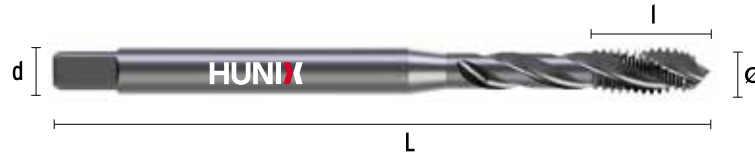
\*Hasta fin de existencias / Jusqu'à épuisement des stocks / Until end of stock

# MACHOS DE MÁQUINA TARAUDS MACHINE / MACHINE TAPS / MASCHINENGWINDEBOHRER

**2252** **HSSE DIN 371** M Form. Tol. 35° 3XD R VAP  
DIN 13 C 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			● 5-10	○ 5-8		○ 10-15			● 10-20		○ 10-15					

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



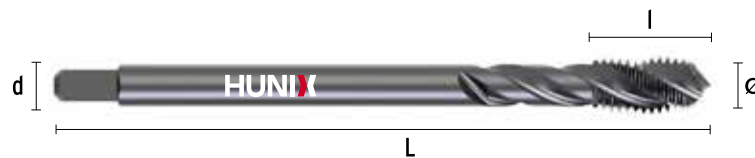
Ø	P	€	L mm	l mm	∠ mm	d mm
M2,0	0,40	32,13	45	5	2,10	2,8
M2,5	0,45	32,13	50	5	2,10	2,8
M3,0	0,50	17,83	56	6	2,70	3,5
M3,5	0,60	21,38	56	6	3,00	4,0
M4,0	0,70	18,13	63	7	3,40	4,5

Ø	P	€	L mm	l mm	∠ mm	d mm
M5,0	0,80	19,15	70	8	4,90	6,0
M6,0	1,00	19,15	80	10	4,90	6,0
M8,0	1,25	22,26	90	14	6,20	8,0
M10,0	1,50	28,49	100	16	8,00	10,0

**2253** **HSSE DIN 376/374** M-MF Form. Tol. 35° 3XD D VAP  
DIN 13 C 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			● 5-10	○ 5-8		○ 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	20,45	56	5	2,00	2,2
M4,0	0,70	20,89	63	7	2,10	2,8
M5,0	0,80	21,97	70	8	2,70	3,5
M6,0	1,00	21,97	80	10	3,40	4,5
M8,0	1,00	33,29	90	10	4,90	6,0
M8,0	1,25	25,60	90	14	4,90	6,0
M10,0	1,00	37,64	90	10	5,50	7,0
M10,0	1,25	43,87	100	15	5,50	7,0
M10,0	1,50	31,38	100	16	5,50	7,0
M12,0	1,00	48,44	100	10	7,00	9,0
M12,0	1,25	52,58	100	15	7,00	9,0
M12,0	1,50	48,44	100	15	7,00	9,0
M12,0	1,75	40,40	110	18	7,00	9,0
M14,0	1,00	66,14	100	10	9,00	11,0
M14,0	1,25	60,71	100	15	9,00	11,0
M14,0	1,50	66,14	100	15	9,00	11,0
M14,0	2,00	55,20	110	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	1,00	76,67	100	10	9,00	12,0
M16,0	1,50	67,87	100	15	9,00	12,0
M16,0	2,00	59,03	110	20	9,00	12,0
M18,0	1,00	105,38	110	13	11,00	14,0
M18,0	1,50	81,07	110	20	11,00	14,0
M18,0	2,50	81,07	125	25	11,00	14,0
M20,0	1,00	103,04	125	13	12,00	16,0
M20,0	1,50	94,41	125	20	12,00	16,0
M20,0	2,50	85,87	140	25	12,00	16,0
M22,0	1,00	172,70	125	13	14,50	18,0
M22,0	1,50	122,33	125	17	14,50	18,0
M22,0	2,50	122,33	140	27	14,50	18,0
M24,0	1,50	124,73	140	20	14,50	18,0
M24,0	2,00	136,05	140	20	14,50	18,0
M24,0	3,00	113,34	160	30	14,50	18,0
M27,0	3,00	141,68	160	30	16,00	20,0
M30,0	3,50	177,10	180	35	18,00	22,0

# MACHOS DE MÁQUINA TARAUDS MACHINE / MACHINE TAPS / MASCHINENGWINDEBOHRER

**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**



Ø	P	€	L mm	l mm	∠ mm	d mm
M2,0	0,40	34,55	45	5	2,10	2,8
M2,5	0,45	34,55	50	5	2,10	2,8
M3,0	0,50	21,47	56	6	2,70	3,5
M3,5	0,60	27,28	56	6	3,00	4,0
M4,0	0,70	21,65	63	7	3,40	4,5

Ø	P	€	L mm	l mm	∠ mm	d mm
M5,0	0,80	23,58	70	8	4,90	6,0
M6,0	1,00	24,41	80	10	4,90	6,0
M8,0	1,25	29,34	90	14	6,20	8,0
M10,0	1,50	38,54	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**



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	23,13	56	5	2,00	2,2
M4,0	0,70	26,52	63	7	2,10	2,8
M5,0	0,80	28,69	70	8	2,70	3,5
M6,0	1,00	29,57	80	10	3,40	4,5
M8,0	1,00	45,65	90	10	4,90	6,0
M8,0	1,25	35,32	90	14	4,90	6,0
M10,0	1,00	53,52	90	10	5,50	7,0
M10,0	1,25	58,55	100	15	5,50	7,0
M10,0	1,50	44,59	100	16	5,50	7,0
M12,0	1,00	66,54	100	10	7,00	9,0
M12,0	1,25	74,04	100	15	7,00	9,0
M12,0	1,50	63,78	100	15	7,00	9,0
M12,0	1,75	55,15	110	18	7,00	9,0
M14,0	1,00	88,19	100	10	9,00	11,0
M14,0	1,25	81,96	100	15	9,00	11,0
M14,0	1,50	84,78	100	15	9,00	11,0
M14,0	2,00	72,93	110	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	1,00	102,04	100	10	9,00	12,0
M16,0	1,50	88,54	100	15	9,00	12,0
M16,0	2,00	79,04	110	20	9,00	12,0
M18,0	1,00	121,67	110	13	11,00	14,0
M18,0	1,50	112,07	110	20	11,00	14,0
M18,0	2,50	107,37	125	25	11,00	14,0
M20,0	1,00	119,47	125	13	12,00	16,0
M20,0	1,50	126,45	125	20	12,00	16,0
M20,0	2,50	117,28	140	25	12,00	16,0
M22,0	1,00	162,81	125	13	14,50	18,0
M22,0	1,50	158,59	125	17	14,50	18,0
M22,0	2,50	158,53	140	27	14,50	18,0
M24,0	1,50	171,73	140	20	14,50	18,0
M24,0	2,00	199,43	140	20	14,50	18,0
M24,0	3,00	161,17	160	30	14,50	18,0
M27,0	3,00	201,47	160	30	16,00	20,0
M30,0	3,50	251,83	180	35	18,00	22,0

**2256** **HSSE-PM DIN 371** **M** **DIN 13** **Form. C** **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	5-15	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



**NEW**



Ø	P	€	L mm	l mm	∠ mm	d mm
M2,0	0,40	45,85	45	10	2,10	2,8
M3,0	0,50	34,19	56	5	2,70	3,5
M4,0	0,70	35,98	63	7	3,40	4,5
M5,0	0,80	39,07	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	40,50	80	10	4,90	6,0
M8,0	1,25	48,63	90	13	6,20	8,0
M10,0	1,50	64,00	100	15	8,00	10,0

**2257** **HSSE-PM DIN 376/374** **M** **DIN 13** **Form. C** **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	5-15	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



**NEW**



Ø	P	€	L mm	l mm	∠ mm	d mm
M8,0	1,25	58,90	90	15	4,90	6,0
M10,0	1,00	74,10	90	10	5,50	7,0
M10,0	1,50	86,45	100	17	5,50	7,0
M12,0	1,00	97,90	100	10	7,00	9,0
M12,0	1,25	132,45	100	15	7,00	9,0
M12,0	1,50	103,35	100	15	7,00	9,0
M12,0	1,75	89,40	110	18	7,00	9,0
M14,0	1,50	136,70	100	15	9,00	11,0
M14,0	2,00	117,70	110	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	1,50	142,85	100	15	9,00	12,0
M16,0	2,00	127,60	110	20	9,00	12,0
M18,0	1,50	194,55	110	17	11,00	14,0
M18,0	2,50	179,85	125	25	11,00	14,0
M20,0	1,50	222,00	125	17	12,00	16,0
M20,0	2,50	214,65	140	25	12,00	16,0
M22,0	2,50	266,15	140	25	14,50	18,0
M24,0	3,00	261,65	160	30	14,50	18,0

**2124** **HSSE-PM DIN 371** **M** **DIN 13** **Form. C** **Tol. 6H** **35°** **3XD** **R** **TIASIN+**

P				M		K			N				S		H		
<800	<1.000	<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



∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	25,43	56	5	2,70	3,5
M4,0	0,70	25,83	63	7	3,40	4,5
M5,0	0,80	27,84	70	8	4,90	6,0

∅	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	28,72	80	10	4,90	6,0
M8,0	1,25	36,97	90	13	6,20	8,0
M10,0	1,50	44,83	100	15	8,00	10,0

**2123** **HSSE-PM DIN 376/374** **M-MF** **DIN 13** **Form. C** **Tol. 6H** **35°** **3XD** **D** **TIASIN+**

P				M		K			N				S		H		
<800	<1.000	<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



∅	P	€	L mm	l mm	∠ mm	d mm
M8,0	1,00	48,81	90	10	4,90	6,0
M8,0	1,25	38,36	90	15	4,90	6,0
M10,0	1,00	56,20	90	10	5,50	7,0
M10,0	1,25	64,63	100	15	5,50	7,0
M10,0	1,50	49,32	100	17	5,50	7,0
M12,0	1,00	83,75	100	10	7,00	9,0
M12,0	1,25	74,83	100	15	7,00	9,0
M12,0	1,50	72,59	100	15	7,00	9,0
M12,0	1,75	62,58	110	18	7,00	9,0
M14,0	1,25	181,03	100	15	9,00	11,0

∅	P	€	L mm	l mm	∠ mm	d mm
M14,0	1,50	96,58	100	15	9,00	11,0
M14,0	2,00	83,03	110	20	9,00	11,0
M16,0	1,50	100,82	100	15	9,00	12,0
M16,0	2,00	89,88	110	20	9,00	12,0
M18,0	1,50	122,17	110	17	11,00	14,0
M18,0	2,50	122,97	125	25	11,00	14,0
M20,0	1,50	143,65	125	17	12,00	16,0
M20,0	2,50	133,08	140	25	12,00	16,0
M22,0	2,50	180,82	140	25	14,50	18,0
M24,0	3,00	196,25	160	30	14,50	18,0

# MACHOS DE MÁQUINA TARAUDS MACHINE / MACHINE TAPS / MASCHINENGEWINDEBOHRER

**2178** **HSSE-PM DIN 371** **M** **Form. C** **Tol. 6HX** **15°** **3XD** **R** **TIAISIN+**

P				M		K			N				S		H		
<800	<1.000	<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



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	38,54	56	10	2,70	3,5
M4,0	0,70	28,44	63	12	3,40	4,5
M5,0	0,80	30,25	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	32,36	80	18	4,90	6,0
M8,0	1,25	36,97	90	20	6,20	8,0
M10,0	1,50	48,44	100	20	8,00	10,0

**2177** **HSSE-PM DIN 376** **M** **Form. C** **Tol. 6HX** **15°** **3XD** **D** **TIAISIN+**

P				M		K			N				S		H		
<800	<1.000	<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



Ø	P	€	L mm	l mm	∠ mm	d mm
M8,0	1,25	55,11	90	20	4,90	6,0
M10,0	1,50	56,79	100	20	5,50	7,0
M12,0	1,75	67,52	110	24	7,00	9,0
M14,0	2,00	93,71	110	25	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	97,12	110	32	9,00	12,0
M18,0	2,50	161,44	125	32	11,00	14,0
M20,0	2,50	149,62	140	32	12,00	16,0



**2182** **HSSE DIN 371** **M** **Form. C** **Tol. 6H** **3XD** **R**  
 DIN 13

P				M		K			N				S		H		
<800	<1.000	<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	I mm	∠ mm	d mm
M3,0	0,50	19,90	56	6	2,70	3,5
M4,0	0,70	19,90	63	7	3,40	4,5
M5,0	0,80	20,31	70	8	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	22,02	80	10	4,90	6,0
M8,0	1,25	26,29	90	14	6,20	8,0
M10,0	1,50	31,06	100	16	8,00	10,0

**2181** **HSSE DIN 376** **M** **Form. C** **Tol. 6H** **3XD** **D**  
 DIN 13

P				M		K			N				S		H		
<800	<1.000	<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	I mm	∠ mm	d mm
*M6,0	1,00	22,02	80	18	3,40	4,5
*M8,0	1,25	26,29	90	20	4,90	6,0
*M10,0	1,50	31,06	100	22	5,50	7,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M12,0	1,75	36,94	110	18	7,00	9,0
M14,0	2,00	53,99	110	20	9,00	11,0
M16,0	2,00	72,81	110	22	9,00	12,0

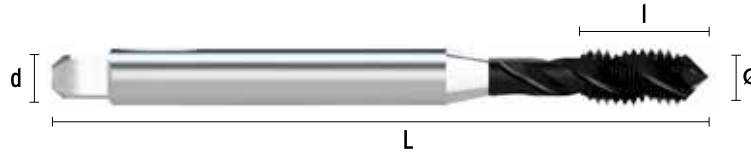
\*Hasta fin de existencias / Jusqu'à epuisement des stocks / Until end of stock

# MACHOS DE MÁQUINA TARAUDS MACHINE / MACHINE TAPS / MASCHINENGEWINDEBOHRER

**2260** **HSSE-PM DIN 371 SYNCHRO** **M** **Form. C** **ToI. 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	10-40	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	I mm	∅ mm	d mm
M3,0	0,50	34,19	56	5	2,70	3,5
M4,0	0,70	35,98	63	7	3,40	4,5
M5,0	0,80	39,07	70	8	4,90	6,0

Ø	P	€	L mm	I mm	∅ mm	d mm
M6,0	1,00	40,50	80	10	4,90	6,0
M8,0	1,25	48,63	90	13	6,20	8,0
M10,0	1,50	64,00	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** **Form. C** **ToI. 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	10-40	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	I mm	∅ mm	d mm
M12,0	1,75	95,65	110	18	7,00	9,0
M14,0	2,00	125,91	110	20	9,00	11,0

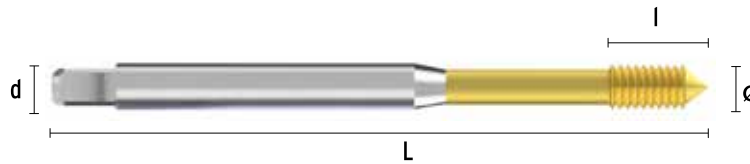
Ø	P	€	L mm	I mm	∅ mm	d mm
M16,0	2,00	136,51	110	20	9,00	12,0

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

**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 / Alternative



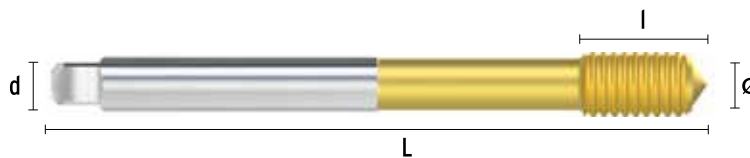
∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	33,19	56	10	2,70	3,5
M4,0	0,70	33,19	63	7	3,40	4,5
M5,0	0,80	34,90	70	8	4,90	6,0

∅	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	37,20	80	10	4,90	6,0
M8,0	1,25	44,44	90	13	6,20	8,0
M10,0	1,50	54,19	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 / Alternative



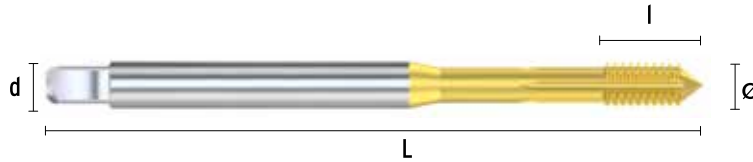
∅	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	70,07	110	18	7,00	9,0
M14,0	2,00	94,49	110	20	9,00	11,0

∅	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	113,40	110	20	9,00	12,0

**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



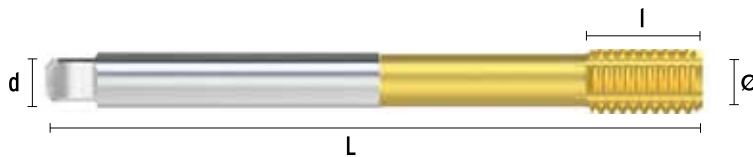
∅	P	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	33,19	56	10	2,70	3,5
M4,0	0,70	33,19	63	7	3,40	4,5
M5,0	0,80	34,90	70	8	4,90	6,0

∅	P	€	L mm	I mm	∠ mm	d mm
M6,0	1,00	37,20	80	10	4,90	6,0
M8,0	1,25	44,44	90	13	6,20	8,0
M10,0	1,50	54,19	100	15	8,00	10,0

**2213** **HSSE-PM DIN 376/374** A>12% **M-MF** **DIN 13** **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



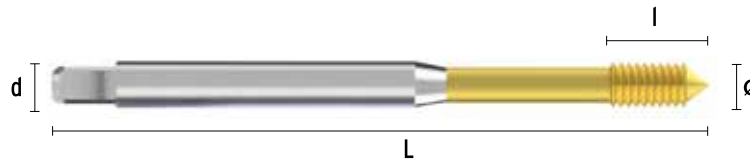
∅	P	€	L mm	I mm	∠ mm	d mm
M8,0	1,00	72,82	90	13	4,90	6,0
M8,0	1,25	62,81	90	13	4,90	6,0
M10,0	1,00	59,68	90	13	5,50	7,0
M10,0	1,25	93,06	100	15	5,50	7,0
M10,0	1,50	74,14	100	15	5,50	7,0
M12,0	1,00	92,13	100	10	7,00	9,0

∅	P	€	L mm	I mm	∠ mm	d mm
M12,0	1,25	96,31	100	15	7,00	9,0
M12,0	1,50	93,67	100	15	7,00	9,0
M12,0	1,75	70,07	110	18	7,00	9,0
M14,0	2,00	94,49	110	20	9,00	11,0
M16,0	1,50	146,30	100	15	9,00	12,0
M16,0	2,00	113,40	110	20	9,00	12,0

**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



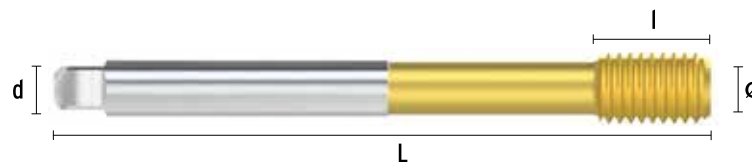
∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	34,85	56	10	2,70	3,5
M4,0	0,70	34,85	63	7	3,40	4,5
M5,0	0,80	36,65	70	8	4,90	6,0

∅	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	39,06	80	10	4,90	6,0
M8,0	1,25	46,66	90	13	6,20	8,0
M10,0	1,50	56,90	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

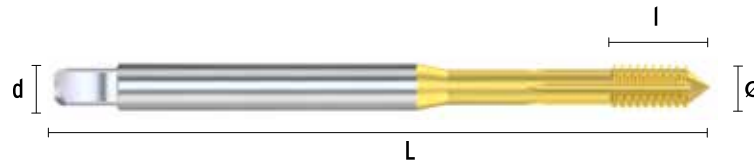


∅	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	80,96	110	18	7,00	9,0

**2218** **HSSE-PM DIN 371** A>12% **M** **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



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	34,85	56	10	2,70	3,5
M4,0	0,70	34,85	63	7	3,40	4,5
M5,0	0,80	36,65	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	39,06	80	10	4,90	6,0
M8,0	1,25	46,66	90	13	6,20	8,0
M10,0	1,50	56,90	100	15	8,00	10,0

**2217** **HSSE-PM DIN 376** A>12% **M** **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



Ø	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	80,96	110	18	7,00	9,0

**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	I mm	∠ mm	d mm
M3,0	0,50	29,12	70	22	2,00	2,2
M4,0	0,70	29,12	90	25	2,10	2,8
M5,0	0,80	29,95	100	28	2,70	3,5
M6,0	1,00	27,76	110	32	3,40	4,5
M8,0	1,25	32,44	125	40	4,90	6,0
M10,0	1,50	49,91	140	45	5,50	7,0
M12,0	1,75	59,87	180	50	7,00	9,0

Ø	P	€	L mm	I mm	∠ mm	d mm
M14,0	2,00	66,52	200	56	9,00	11,0
M16,0	2,00	81,51	200	63	9,00	12,0
M18,0	2,50	99,79	220	63	11,00	14,0
M20,0	2,50	115,58	250	70	12,00	16,0
M22,0	2,50	148,01	280	80	14,50	18,0
M24,0	3,00	174,60	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	I mm	d mm
M3,0	0,50	79,82	280	12	2,7
M4,0	0,70	78,69	280	17	2,1
M5,0	0,80	78,69	280	20	2,7
M6,0	1,00	78,69	280	25	3,4
M8,0	1,25	83,47	280	31	4,9
M10,0	1,50	96,76	280	37	5,5
M12,0	1,75	150,88	420	43	7,0

Ø	P	€	L mm	I mm	d mm
M14,0	2,00	145,73	420	50	9,0
M16,0	2,00	204,94	420	50	9,0
M18,0	2,50	253,10	530	62	14,2
M20,0	2,50	334,71	530	63	12,0
M22,0	2,50	386,62	530	62	18,0
M24,0	3,00	541,51	530	75	19,2

**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	39,47	56	16	2,40	3,0
M4,0	0,70	39,47	63	18	3,00	4,0
M5,0	0,80	39,47	71	20	3,80	5,0
M6,0	1,00	43,62	80	22	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
M8,0	1,25	49,27	95	26	6,20	8,0
M10,0	1,50	54,22	106	30	8,00	10,0
M12,0	1,75	63,99	115	32	9,00	12,0

**1504**

**HSS Hex.**

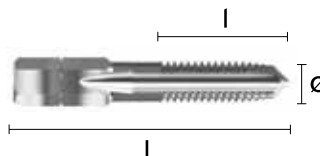
**M**  
DIN 13

**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
●																	
15-45																	

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



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	8,06	33	11		
M4,0	0,70	8,06	35	12		
M5,0	0,80	8,06	36	15		

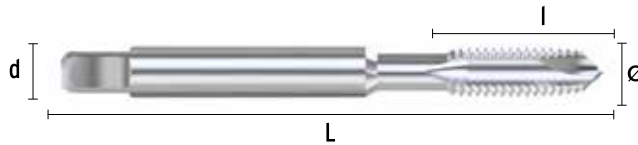
Ø	P	€	L mm	l mm	∠ mm	d mm
M6,0	1,00	8,06	39	18		
M8,0	1,25	11,17	40	19		
M10,0	1,50	12,78	41	21		



**2248** **HSS ISO 529** **M** **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 / Alternative



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	6,55	48	11	2,50	3,2
M4,0	0,70	6,64	53	13	3,15	4,0
M5,0	0,80	8,43	58	16	4,00	5,0
M6,0	1,00	8,81	66	19	5,00	6,3
M8,0	1,25	9,10	72	22	6,30	8,0
M10,0	1,50	11,12	80	24	8,00	10,0
M12,0	1,75	16,84	89	29	7,10	10,2
M14,0	2,00	17,67	95	30	9,00	11,2

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	20,65	102	32	10,00	12,5
M18,0	2,50	25,80	110	37	11,20	14,0
M20,0	2,50	28,83	112	37	11,20	14,0
M22,0	2,50	32,68	118	38	12,50	16,0
M24,0	3,00	41,29	130	45	14,00	18,0
M27,0	3,00	55,44	135	45	16,00	20,0
M30,0	3,50	102,89	138	48	16,00	20,0

**2249** **HSS ISO 529** **M** **Form. C** **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 / Alternative



Ø	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	8,18	48	11	2,50	3,2
M4,0	0,70	8,47	53	13	3,15	4,0
M5,0	0,80	10,49	58	16	4,00	5,0
M6,0	1,00	10,88	66	19	5,00	6,3
M8,0	1,25	11,59	72	22	6,30	8,0
M10,0	1,50	13,90	80	24	8,00	10,0
M12,0	1,75	21,03	89	29	7,10	10,2
M14,0	2,00	23,73	95	30	9,00	11,2

Ø	P	€	L mm	l mm	∠ mm	d mm
M16,0	2,00	25,80	102	32	10,00	12,5
M18,0	2,50	32,38	112	37	11,20	14,0
M20,0	2,50	36,29	112	37	11,20	14,0
M22,0	2,50	40,77	118	38	12,50	16,0
M24,0	3,00	51,49	130	45	14,00	18,0
M27,0	3,00	69,20	135	45	16,00	20,0
M30,0	3,50	116,27	138	48	16,00	20,0

**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	13,38	46	11	3,20	4,0
M4,0	0,70	13,67	52	13	4,00	5,0
M5,0	0,80	13,70	60	16	4,50	5,5
M6,0	1,00	15,03	62	19	4,50	6,0
M8,0	1,25	16,58	70	22	5,00	6,2
M10,0	1,50	20,34	75	24	5,50	7,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M12,0	1,75	25,96	82	29	6,50	8,5
M14,0	2,00	34,19	88	30	8,00	10,5
M16,0	2,00	42,00	95	32	10,00	12,5
M18,0	2,50	57,07	100	37	11,00	14,0
M20,0	2,50	61,57	105	37	12,00	15,0

**2267**

**HSSE JIS**

M  
DIN13

Form.  
C



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	16,49	46	6	3,20	4,0
M4,0	0,70	16,49	52	9	4,00	5,0
M5,0	0,80	15,94	60	10	4,50	5,5
M6,0	1,00	17,48	62	12	4,50	6,0
M8,0	1,25	20,83	70	15	5,00	6,2
M10,0	1,50	24,23	75	18	5,50	7,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M12,0	1,75	32,36	82	21	6,50	8,5
M14,0	2,00	41,55	88	24	8,00	10,5
M16,0	2,00	50,17	95	24	10,00	12,5
M18,0	2,50	67,46	100	30	11,00	14,0
M20,0	2,50	71,87	105	30	12,00	15,0

**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 / Alternative



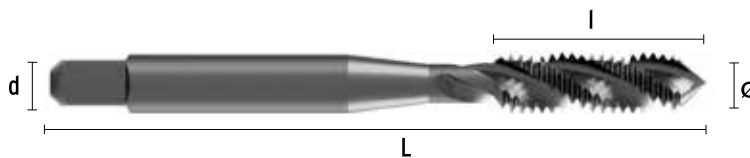
∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	14,97	46	11	3,20	4,0
M4,0	0,70	15,32	52	13	4,00	5,0
M5,0	0,80	15,33	60	16	4,50	5,5
M6,0	1,00	16,83	62	19	4,50	6,0
M8,0	1,25	18,56	70	22	5,00	6,2
M10,0	1,50	22,79	75	24	5,50	7,0

∅	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	29,08	82	29	6,50	8,5
M14,0	2,00	38,29	88	30	8,00	10,5
M16,0	2,00	47,04	95	32	10,00	12,5
M18,0	2,50	63,92	100	37	11,00	14,0
M20,0	2,50	68,96	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 / Alternative



∅	P	€	L mm	l mm	∠ mm	d mm
M3,0	0,50	18,49	46	6	3,20	4,0
M4,0	0,70	18,49	52	9	4,00	5,0
M5,0	0,80	17,85	60	10	4,50	5,5
M6,0	1,00	19,57	62	12	4,50	6,0
M8,0	1,25	23,34	70	15	5,00	6,2
M10,0	1,50	27,16	75	18	5,50	7,0

∅	P	€	L mm	l mm	∠ mm	d mm
M12,0	1,75	36,25	82	21	6,50	8,5
M14,0	2,00	46,53	88	24	8,00	10,5
M16,0	2,00	56,19	95	24	10,00	12,5
M18,0	2,50	75,56	100	30	11,00	14,0
M20,0	2,50	80,51	105	30	12,00	15,0



**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



Ø	P	€	L mm	l mm	∅ mm	d mm
M3,0	0,50	18,72	46	11	3,20	4,0
M4,0	0,70	20,01	52	13	4,00	5,0
M5,0	0,80	20,02	60	16	4,50	5,5
M6,0	1,00	21,35	62	19	4,50	6,0
M8,0	1,25	24,72	70	22	5,00	6,2
M10,0	1,50	32,42	75	24	5,50	7,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M12,0	1,75	39,26	82	29	6,50	8,5
M14,0	2,00	49,27	88	30	8,00	10,5
M16,0	2,00	58,59	95	32	10,00	12,5
M18,0	2,50	73,66	100	37	11,00	14,0
M20,0	2,50	78,14	105	37	12,00	15,0

**2271**

**HSSE JIS**

M  
DIN13

Form.  
C



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



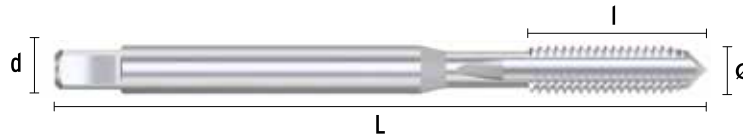
Ø	P	€	L mm	l mm	∅ mm	d mm
M3,0	0,50	22,12	46	6	3,20	4,0
M4,0	0,70	23,13	52	9	4,00	5,0
M5,0	0,80	22,58	60	10	4,50	5,5
M6,0	1,00	24,10	62	12	4,50	6,0
M8,0	1,25	29,37	70	15	5,00	6,2
M10,0	1,50	36,88	75	18	5,50	7,0

Ø	P	€	L mm	l mm	∅ mm	d mm
M12,0	1,75	46,30	82	21	6,50	8,5
M14,0	2,00	57,35	88	24	8,00	10,5
M16,0	2,00	67,55	95	24	10,00	12,5
M18,0	2,50	84,84	100	30	11,00	14,0
M20,0	2,50	89,25	105	30	12,00	15,0

**2148** **HSSE DIN 371** **UNC** **Form. C** **Tol. 2B** **1,5XD** **R**  
 ANSI/ASME B1.1

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
● 10-25	○ 10-15						○ 10-15			○ 10-20							

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



Ø	P	€	L mm	I mm	∠ mm	d mm
Nº4	40,00	26,36	56	11	2,70	3,5
Nº5	40,00	26,36	56	11	2,70	3,5
Nº6	32,00	25,09	56	12	3,00	4,0
Nº8	32,00	25,09	63	13	3,40	4,5

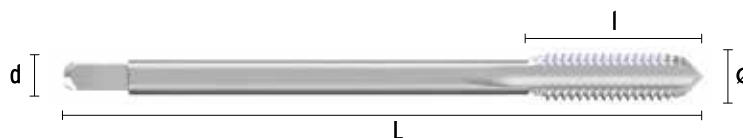
Ø	P	€	L mm	I mm	∠ mm	d mm
Nº10	24,00	26,36	70	14	4,90	6,0
Nº12	24,00	27,65	80	16	4,90	6,0
1/4	20,00	23,40	80	16	5,50	7,0
5/16	18,00	24,88	90	20	6,20	8,0

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

**2147** **HSSE DIN 376** **UNC** **Form. C** **Tol. 2B** **1,5XD** **D**  
 ANSI/ASME B1.1

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
● 10-25	○ 10-15						○ 10-15			○ 10-20							

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



Ø	P	€	L mm	I mm	∠ mm	d mm
1/4	20,00	23,40	80	18	3,40	4,5
5/16	18,00	26,48	90	20	4,90	6,0
3/8	16,00	30,21	100	22	5,50	7,0
7/16	14,00	41,53	100	22	6,20	8,0
1/2	13,00	45,56	110	27	7,00	9,0
9/16	12,00	62,05	110	30	9,00	11,0
5/8	11,00	60,27	110	30	9,00	12,0

Ø	P	€	L mm	I mm	∠ mm	d mm
3/4	10,00	79,65	125	35	11,00	14,0
7/8	9,00	104,93	140	36	14,50	18,0
1	8,00	137,81	160	38	16,00	20,0
1*1/8	7,00	174,00	180	45	18,00	22,0
1*1/4	7,00	213,35	180	45	18,00	22,0
1*1/2	6,00	359,73	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** **Form. C** **Tol. 2B** **1,5XD** **D**

ANSI/ASME B1.1

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
● 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	46,78	80	18	3,40	4,5
5/16	18,00	52,94	90	20	4,90	6,0
3/8	16,00	60,43	100	22	5,50	7,0
7/16	14,00	83,06	100	22	6,20	8,0
1/2	13,00	91,11	110	27	7,00	9,0

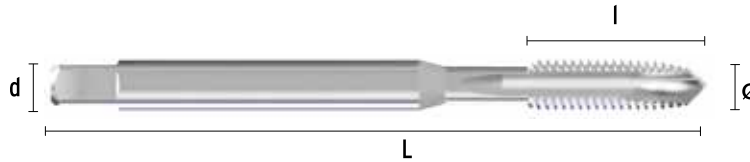
Ø	P	€	L mm	l mm	∅ mm	d mm
9/16	12,00	124,10	110	30	9,00	11,0
5/8	11,00	120,54	110	30	9,00	12,0
3/4	10,00	159,30	125	35	11,00	14,0
7/8	9,00	209,89	140	36	14,50	18,0
1"	8,00	275,58	160	38	16,00	20,0

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

**2150** **HSSE DIN 371** **UNC** **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	I mm	∠ mm	d mm
Nº4	40,00	24,37	56	10	2,70	3,5
Nº5	40,00	22,70	56	10	2,70	3,5
Nº6	32,00	22,70	56	12	3,00	4,0
Nº8	32,00	22,70	63	12	3,40	4,5
Nº10	24,00	22,98	70	14	4,90	6,0

Ø	P	€	L mm	I 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

**2149** **HSSE DIN 376** **UNC** **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	I mm	∠ mm	d mm
*1/4	20,00	24,31	80	18	3,40	4,5
*5/16	18,00	26,26	90	20	4,90	6,0
*3/8	16,00	31,03	100	20	5,50	7,0
7/16	14,00	44,11	100	22	6,20	8,0
1/2	13,00	44,11	110	24	7,00	9,0
9/16	12,00	60,17	110	25	9,00	11,0

Ø	P	€	L mm	I mm	∠ mm	d mm
5/8	11,00	59,02	110	32	9,00	12,0
3/4	10,00	85,86	125	32	11,00	14,0
7/8	9,00	122,32	140	32	14,50	18,0
1"	8,00	113,36	160	38	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 épuisement des stocks / Until end of stock

**2262** **HSSE DIN 371** **UNC** **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



Ø	P	€	L mm	l mm	∠ mm	d mm
Nº4	40,00	26,80	56	10	2,70	3,5
Nº5	40,00	24,98	56	10	2,70	3,5
Nº6	32,00	24,98	56	12	3,00	4,0
Nº8	32,00	24,98	63	12	3,40	4,5
Nº10	24,00	25,28	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
Nº12	24,00	26,74	80	18	4,90	6,0
1/4	20,00	26,74	80	18	5,50	7,0
5/16	18,00	28,89	90	20	6,20	8,0
3/8	16,00	34,13	100	20	8,00	10,0

**2263** **HSSE DIN 376** **UNC** **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



Ø	P	€	L mm	l mm	∠ mm	d mm
7/16	14,00	48,50	100	22	6,20	8,0
1/2	13,00	48,50	110	24	7,00	9,0
9/16	12,00	66,21	110	25	9,00	11,0
5/8	11,00	64,93	110	32	9,00	12,0

Ø	P	€	L mm	l mm	∠ mm	d mm
3/4	10,00	94,46	125	32	11,00	14,0
7/8	9,00	134,56	140	32	14,50	18,0
1"	8,00	124,67	160	38	16,00	20,0



**2234** **HSSE DIN 371** **UNC** **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 / Alternative



Ø	P	€	L mm	l mm	∠ mm	d mm
Nº4	40,00	36,61	56	10	2,70	3,5
Nº5	40,00	33,02	56	10	2,70	3,5
Nº6	32,00	33,02	56	12	3,00	4,0
Nº8	32,00	33,02	63	12	3,40	4,5
Nº10	24,00	35,49	70	14	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
Nº12	24,00	37,10	80	18	4,90	6,0
1/4	20,00	37,10	80	18	5,50	7,0
5/16	18,00	41,61	90	20	6,20	8,0
3/8	16,00	51,12	100	20	8,00	10,0

**2235** **HSSE DIN 376** **UNC** **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 / Alternative



Ø	P	€	L mm	l mm	∠ mm	d mm
7/16	14,00	71,47	100	22	6,20	8,0
1/2	13,00	73,65	110	24	7,00	9,0
9/16	12,00	100,54	110	25	9,00	11,0
5/8	11,00	95,33	110	32	9,00	12,0

Ø	P	€	L mm	l mm	∠ mm	d mm
3/4	10,00	140,68	125	32	11,00	14,0
7/8	9,00	210,80	140	32	14,50	18,0
1"	8,00	194,54	160	38	16,00	20,0

**2152**

**HSSE DIN 371**

**UNC**  
ANSI/ASME  
B1.1

Form.  
**C**



Tol.  
**2B**

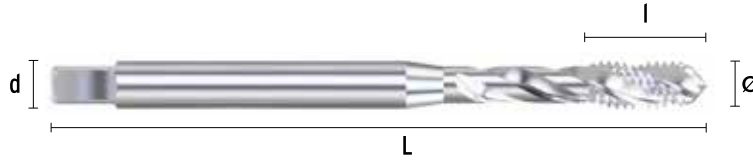


**3XD**



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
Nº4	40,00	26,84	56	5	2,70	3,5
Nº5	40,00	24,92	56	7	2,70	3,5
Nº6	32,00	24,92	56	6	3,00	4,0
Nº8	32,00	24,92	63	7	3,40	4,5
Nº10	24,00	25,36	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
Nº12	24,00	26,79	80	10	4,90	6,0
1/4	20,00	26,79	80	13	5,50	7,0
5/16	18,00	28,93	90	13	6,20	8,0
3/8	16,00	34,16	100	15	8,00	10,0

**2151**

**HSSE DIN 376**

**UNC**  
ANSI/ASME  
B1.1

Form.  
**C**



Tol.  
**2B**

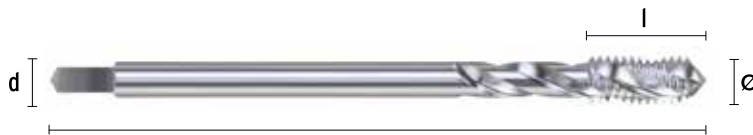


**3XD**



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
*1/4	20,00	26,79	80	13	3,40	4,5
*5/16	18,00	28,93	90	13	4,90	6,0
*3/8	16,00	34,16	100	16	5,50	7,0
7/16	14,00	48,46	100	15	6,20	8,0
1/2	13,00	48,46	110	18	7,00	9,0
9/16	12,00	66,17	110	20	9,00	11,0

Ø	P	€	L mm	l mm	∠ mm	d mm
5/8	11,00	64,96	110	22	9,00	12,0
3/4	10,00	94,44	125	25	11,00	14,0
7/8	9,00	134,53	140	30	14,50	18,0
1"	8,00	124,74	160	30	16,00	20,0
1*1/8	7,00	207,58	180	40	18,00	22,0
1*1/4	7,00	213,44	180	40	18,00	22,0

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

**2264** **HSSE DIN 371** **UNC** **Form. C** **Tol. 2B** **35°** **R** **3XD** **VAP**  
ANSI/ASME B1.1

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
● 10-25	○ 10-15			● 5-10	○ 5-8		○ 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	29,52	56	5	2,70	3,5
Nº5	40,00	27,43	56	7	2,70	3,5
Nº6	32,00	27,43	56	6	3,00	4,0
Nº8	32,00	27,43	63	7	3,40	4,5
Nº10	24,00	27,92	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
Nº12	24,00	29,44	80	10	4,90	6,0
1/4	20,00	29,44	80	13	5,50	7,0
5/16	18,00	31,83	90	13	6,20	8,0
3/8	16,00	37,55	100	15	8,00	10,0

**2265** **HSSE DIN 376** **UNC** **Form. C** **Tol. 2B** **35°** **D** **3XD** **VAP**  
ANSI/ASME B1.1

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
● 10-25	○ 10-15			● 5-10	○ 5-8		○ 10-15			● 10-20		○ 10-15					

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



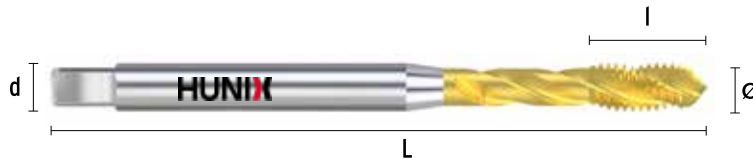
Ø	P	€	L mm	l mm	∠ mm	d mm
7/16	14,00	53,30	100	15	6,20	8,0
1/2	13,00	53,30	110	18	7,00	9,0
9/16	12,00	72,75	110	20	9,00	11,0
5/8	11,00	71,48	110	22	9,00	12,0

Ø	P	€	L mm	l mm	∠ mm	d mm
3/4	10,00	103,85	125	25	11,00	14,0
7/8	9,00	147,99	140	30	14,50	18,0
1"	8,00	137,19	160	30	16,00	20,0

**2236** **HSSE DIN 371** **UNC** ANSI/ASME B1.1 **Form. C** **Tol. 2B** **35°** **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



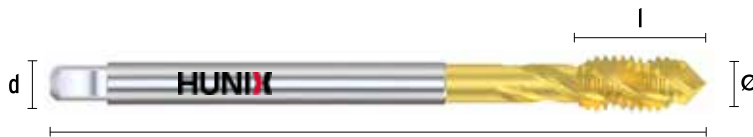
Ø	P	€	L mm	I mm	∠ mm	d mm
Nº4	40,00	36,61	56	5	2,70	3,5
Nº5	40,00	36,61	56	7	2,70	3,5
Nº6	32,00	35,90	56	6	3,00	4,0
Nº8	32,00	35,90	63	7	3,40	4,5
Nº10	24,00	38,45	70	8	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
Nº12	24,00	40,27	80	10	4,90	6,0
1/4	20,00	40,27	80	13	5,50	7,0
5/16	18,00	44,92	90	13	6,20	8,0
3/8	16,00	55,13	100	15	8,00	10,0

**2237** **HSSE DIN 376** **UNC** ANSI/ASME B1.1 **Form. C** **Tol. 2B** **35°** **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



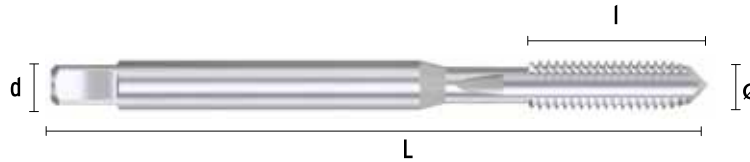
Ø	P	€	L mm	I mm	∠ mm	d mm
7/16	14,00	77,10	100	15	6,20	8,0
1/2	13,00	79,35	110	18	7,00	9,0
9/16	12,00	108,64	110	20	9,00	11,0
5/8	11,00	102,80	110	22	9,00	12,0

Ø	P	€	L mm	I mm	∠ mm	d mm
3/4	10,00	151,72	125	25	11,00	14,0
7/8	9,00	227,27	140	30	14,50	18,0
1"	8,00	209,04	160	30	16,00	20,0

**2154** **HSSE DIN 371** UNF 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	48,00	28,88	56	11	2,70	3,5
Nº5	44,00	28,88	56	11	2,70	3,5
Nº6	40,00	27,68	56	12	3,00	4,0
Nº8	36,00	27,68	63	13	3,40	4,5

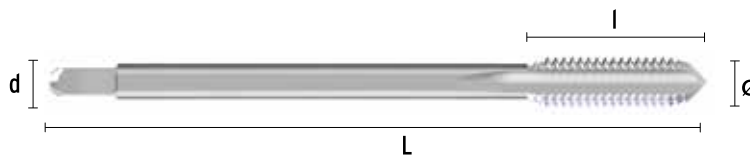
Ø	P	€	L mm	l mm	∠ mm	d mm
Nº10	32,00	27,68	70	14	4,90	6,0
Nº12	28,00	28,88	80	16	4,90	6,0
1/4	28,00	22,22	80	16	5,50	7,0
5/16	24,00	25,54	90	20	6,20	8,0

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

**2153** **HSSE DIN 374** UNF 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	28,00	22,22	80	18	3,40	4,5
5/16	24,00	25,54	90	20	4,90	6,0
3/8	24,00	29,48	90	20	5,50	7,0
7/16	20,00	37,77	100	22	6,20	8,0
1/2	20,00	40,21	100	22	7,00	9,0
9/16	18,00	49,37	100	22	9,00	11,0
5/8	18,00	55,59	100	22	9,00	12,0

Ø	P	€	L mm	l mm	∠ mm	d mm
3/4	16,00	71,13	110	25	11,00	14,0
7/8	14,00	89,47	125	25	14,50	18,0
1"	12,00	117,28	140	27	16,00	20,0
1*1/8	12,00	176,14	150	28	18,00	22,0
1*1/4	12,00	222,62	150	28	18,00	22,0
1*1/2	12,00	373,57	170	30	22,00	28,0

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

# MACHOS DE MÁQUINA

## TARAUDS MACHINE / MACHINE TAPS / MASCHINENGWINDEBOHRER

2153/5

**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	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	28,00	44,41	80	18	3,40	4,5
5/16	24,00	51,06	90	20	4,90	6,0
3/8	24,00	58,95	90	20	5,50	7,0
7/16	20,00	75,52	100	22	6,20	8,0
1/2	20,00	80,39	100	22	7,00	9,0

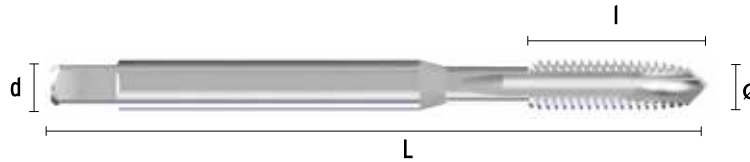
Ø	P	€	L mm	l mm	∠ mm	d mm
9/16	18,00	98,71	100	22	9,00	11,0
5/8	18,00	111,18	100	22	9,00	12,0
3/4	16,00	142,25	110	25	11,00	14,0
7/8	14,00	178,96	125	25	14,50	18,0
1"	12,00	234,59	140	27	16,00	20,0

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

**2156** **HSSE DIN 371** UNF 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	48,00	25,69	56	11	2,70	3,5
Nº5	44,00	25,69	56	11	2,70	3,5
Nº6	40,00	25,87	56	12	3,00	4,0
Nº8	36,00	26,09	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	28,00	29,16	80	18	5,50	7,0
5/16	24,00	30,23	90	20	6,20	8,0
3/8	24,00	35,83	90	20	8,00	10,0

**2155** **HSSE DIN 374** UNF 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	28,00	29,16	80	19	3,40	4,5
*5/16	24,00	30,23	90	22	4,90	6,0
*3/8	24,00	35,83	90	20	5,50	7,0
7/16	20,00	50,68	100	20	6,20	8,0
1/2	20,00	50,68	100	20	7,00	9,0

Ø	P	€	L mm	l mm	∠ mm	d mm
9/16	18,00	69,11	100	20	9,00	11,0
5/8	18,00	67,87	100	20	9,00	12,0
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

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

**2276**

**HSSE DIN 371**

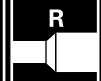
**UNF**  
ANSI/ASME B1.1

**Form. B**  
"Gun"



**Tol. 2B**

**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



Ø	P	€	L mm	I mm	∠ mm	d mm
Nº4	48,00	28,26	56	11	2,70	3,5
Nº5	44,00	28,25	56	11	2,70	3,5
Nº6	40,00	28,47	56	12	3,00	4,0
Nº8	36,00	28,71	63	12	3,40	4,5
Nº10	32,00	29,19	70	14	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
Nº12	28,00	30,65	80	18	4,90	6,0
1/4	28,00	32,08	80	18	5,50	7,0
5/16	24,00	33,25	90	20	6,20	8,0
3/8	24,00	39,40	90	20	8,00	10,0

**2277**

**HSSE DIN 374**

**UNF**  
ANSI/ASME B1.1

**Form. B**  
"Gun"



**Tol. 2B**

**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



Ø	P	€	L mm	I mm	∠ mm	d mm
7/16	20,00	55,75	100	20	6,20	8,0
1/2	20,00	55,75	100	20	7,00	9,0
9/16	18,00	76,02	100	20	9,00	11,0
5/8	18,00	74,66	100	20	9,00	12,0

Ø	P	€	L mm	I mm	∠ mm	d mm
3/4	16,00	108,65	110	24	11,00	14,0
7/8	14,00	154,75	125	24	14,50	18,0
1"	12,00	143,51	140	27	14,50	18,0



**2280** **HSSE DIN 371** UNF 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	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



Ø	P	€	L mm	I mm	∠ mm	d mm
N°4	48,00	41,72	56	11	2,70	3,5
N°5	44,00	37,64	56	11	2,70	3,5
N°6	40,00	37,64	56	12	3,00	4,0
N°8	36,00	37,64	63	12	3,40	4,5
N°10	32,00	40,13	70	14	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
N°12	28,00	41,97	80	18	4,90	6,0
1/4	28,00	41,97	80	18	5,50	7,0
5/16	24,00	47,52	90	20	6,20	8,0
3/8	24,00	59,15	90	20	8,00	10,0

**2281** **HSSE DIN 374** UNF 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	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



Ø	P	€	L mm	I mm	∠ mm	d mm
7/16	20,00	80,69	100	20	6,20	8,0
1/2	20,00	84,77	100	20	7,00	9,0
9/16	18,00	115,61	100	20	9,00	11,0
5/8	18,00	109,55	100	20	9,00	12,0

Ø	P	€	L mm	I mm	∠ mm	d mm
3/4	16,00	161,94	110	24	11,00	14,0
7/8	14,00	237,83	125	24	14,50	18,0
1"	12,00	223,33	140	27	14,50	18,0

**2158**

**HSSE DIN 371**

**UNF**  
ANSI/ASME  
B1.1

**Form.**  
**C**



**Tol.**  
**2B**



**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	I mm	∠ mm	d mm
Nº4	48,00	28,27	56	5	2,70	3,5
Nº5	44,00	28,27	56	5	2,70	3,5
Nº6	40,00	28,63	56	6	3,00	4,0
Nº8	36,00	28,80	63	7	3,40	4,5
Nº10	32,00	29,16	70	8	4,90	6,0

Ø	P	€	L mm	I mm	∠ mm	d mm
Nº12	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	90	15	8,00	10,0

**2157**

**HSSE DIN 374**

**UNF**  
ANSI/ASME  
B1.1

**Form.**  
**C**



**Tol.**  
**2B**



**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	I mm	∠ mm	d mm
*1/4	28,00	32,13	80	13	3,40	4,5
*5/16	24,00	33,29	90	13	4,90	6,0
*3/8	24,00	39,46	90	16	5,50	7,0
7/16	20,00	55,78	100	15	6,20	8,0
1/2	20,00	55,78	100	15	7,00	9,0

Ø	P	€	L mm	I mm	∠ mm	d mm
9/16	18,00	76,22	100	15	9,00	11,0
5/8	18,00	74,71	100	15	9,00	12,0
3/4	16,00	108,64	110	17	11,00	14,0
7/8	14,00	154,81	125	17	14,50	18,0
1"	12,00	143,44	140	20	14,50	18,0

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



**P** Aceros  
Aciers  
Steels  
Stähle



**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl



**K** Fundicion  
Fonte  
Cast Iron  
Gusseisen



**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle



**S** Titanio y Superalaciones  
Titanium et Supeallages  
Titanium and Superalloys  
Titan und Superlegierungen



**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**2278** **HSSE DIN 371** **UNF** **Form. C** **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	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



Ø	P	€	L mm	l mm	∠ mm	d mm
N°4	48,00	31,10	56	5	2,70	3,5
N°5	44,00	31,10	56	5	2,70	3,5
N°6	40,00	31,49	56	6	3,00	4,0
N°8	36,00	31,68	63	7	3,40	4,5
N°10	32,00	32,08	70	8	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
N°12	28,00	33,74	80	10	4,90	6,0
1/4	28,00	35,34	80	10	5,50	7,0
5/16	24,00	36,62	90	13	6,20	8,0
3/8	24,00	43,41	90	15	8,00	10,0

**2279** **HSSE DIN 374** **UNF** **Form. C** **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	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



Ø	P	€	L mm	l mm	∠ mm	d mm
7/16	20,00	61,36	100	20	6,20	8,0
1/2	20,00	61,36	100	20	7,00	9,0
9/16	18,00	83,84	100	20	9,00	11,0
5/8	18,00	82,18	100	20	9,00	12,0

Ø	P	€	L mm	l mm	∠ mm	d mm
3/4	16,00	119,49	110	24	11,00	14,0
7/8	14,00	170,30	125	24	14,50	18,0
1"	12,00	157,78	140	20	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



Ø	P	€	L mm	I mm	∅ mm	d mm
N°4	48,00	46,01	56	5	2,70	3,5
N°5	44,00	41,36	56	5	2,70	3,5
N°6	40,00	41,36	56	6	3,00	4,0
N°8	36,00	41,36	63	7	3,40	4,5
N°10	32,00	43,52	70	8	4,90	6,0

Ø	P	€	L mm	I mm	∅ mm	d mm
N°12	28,00	45,49	80	10	4,90	6,0
1/4	28,00	45,49	80	10	5,50	7,0
5/16	24,00	51,39	90	13	6,20	8,0
3/8	24,00	63,37	90	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



Ø	P	€	L mm	I mm	∅ mm	d mm
7/16	20,00	87,10	100	15	6,20	8,0
1/2	20,00	91,25	100	15	7,00	9,0
9/16	18,00	124,97	100	15	9,00	11,0
5/8	18,00	117,08	100	15	9,00	12,0

Ø	P	€	L mm	I mm	∅ mm	d mm
3/4	16,00	174,47	110	17	11,00	14,0
7/8	14,00	256,71	125	17	14,50	18,0
1"	12,00	239,32	140	20	14,50	18,0

**2189**

**HSSE DIN 374**

**UN**  
ANSI/ASME  
B1.1

Form.  
**C**



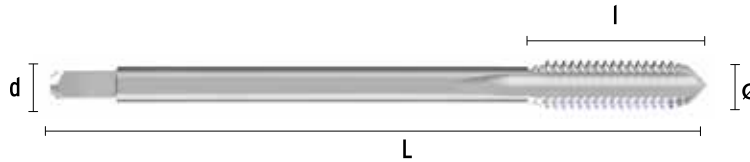
Tol.  
**2B**

**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	460,37	180	45	18,00	22,0
1"1/4	8,00	593,96	180	45	18,00	22,0
1"3/8	8,00	494,77	200	56	22,00	28,0
1"1/2	8,00	566,48	200	60	24,00	32,0

Ø	P	€	L mm	l mm	∠ mm	d mm
1"5/8	8,00	576,68	200	60	24,00	32,0
1"3/4	8,00	722,94	200	50	29,00	36,0
2"	8,00	1.175,12	225	50	32,00	40,0

**2160**

**HSSE DIN 374**

**UNEF**  
ANSI/ASME  
B1.1

Form.  
**C**



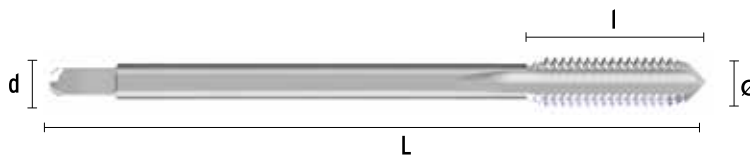
Tol.  
**2B**

**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	94,73	80	18	3,40	4,5
5/16	32,00	110,34	90	20	4,90	6,0
3/8	32,00	126,48	90	20	5,50	7,0
7/16	28,00	160,99	90	22	6,20	8,0
1/2	28,00	172,26	100	22	7,00	9,0

Ø	P	€	L mm	l mm	∠ mm	d mm
9/16	24,00	206,91	100	22	9,00	11,0
5/8	24,00	240,61	100	22	9,00	12,0
3/4	20,00	318,86	110	25	11,00	14,0
1"	20,00	522,47	140	28	14,50	18,0

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

**P**

Aceros  
Aciers  
Steele  
Stähle

**M**

Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K**

Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N**

Metales no ferrosos  
Métal non Ferreux  
Non Ferrous metals  
NE-Metalle

**S**

Titanio y Superalaciones  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen

**H**

Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

**2136**

**HSSE DIN 371**

**BSW**  
BS 84

Form.  
**C**

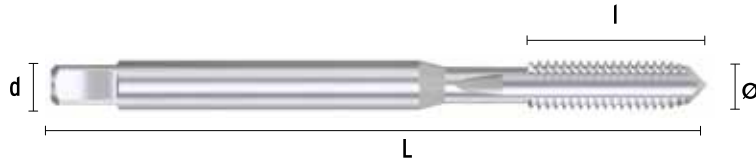


**1,5XD**



P				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	22,26	50	10	2,10	2,8
1/8	40,00	18,60	56	11	2,70	3,5
5/32	32,00	18,60	63	13	3,40	4,5
3/16	24,00	18,60	70	16	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
7/32	24,00	28,27	80	16	4,90	6,0
1/4	20,00	20,27	80	18	5,50	7,0
5/16	18,00	24,88	90	20	6,20	8,0
3/8	16,00	27,49	100	22	8,00	10,0

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

**2135**

**HSSE DIN 376**

**BSW**  
BS 84

Form.  
**C**

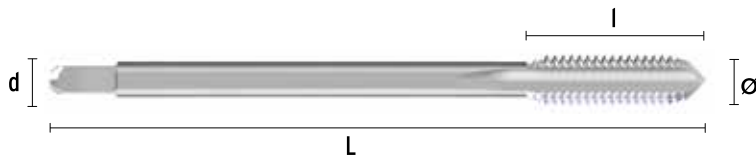


**1,5XD**



P				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	18,60	56	11	2,10	2,8
5/32	32,00	18,60	63	13	2,10	2,8
3/16	24,00	18,60	70	16	2,70	3,5
7/32	24,00	28,27	80	18	3,40	4,5
1/4	20,00	20,27	80	18	3,40	4,5
5/16	18,00	24,88	90	20	4,90	6,0
3/8	16,00	27,49	100	20	5,50	7,0
7/16	14,00	36,27	100	22	6,20	8,0
1/2	12,00	34,78	110	22	7,00	9,0
9/16	12,00	49,89	110	30	9,00	11,0
5/8	11,00	47,18	110	28	9,00	12,0
3/4	10,00	63,14	125	32	11,00	14,0

Ø	P	€	L mm	l mm	∠ mm	d mm
7/8	9,00	85,51	140	36	14,50	18,0
1"	8,00	107,55	160	38	14,50	18,0
1*1/8	7,00	142,67	180	45	18,00	22,0
1*1/4	7,00	207,06	180	45	18,00	22,0
1*3/8	6,00	340,43	200	55	22,00	28,0
1*1/2	6,00	369,55	200	55	24,00	32,0
1*5/8	5,00	539,21	220	60	24,00	32,0
1*3/4	5,00	581,71	220	62	29,00	36,0
1*7/8	4,50	644,91	250	70	29,00	36,0
2"	4,50	832,54	250	70	32,00	40,0
2*1/4	4,00	907,35	280	78	35,00	45,0
2*1/2	4,00	1.048,11	315	90	39,00	50,0

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

**2136/5**

**HSSE DIN 371**

**BSW**  
**BS 84**

**Form.**  
**C**

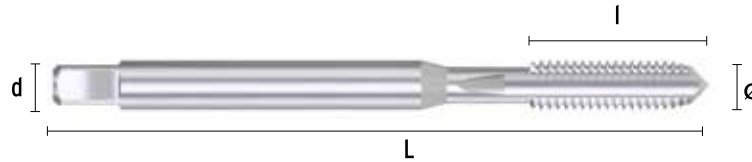


**1,5XD**



P				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



∅	P	€	L mm	l mm	∠ mm	d mm
1/8	40,00	37,21	56	11	2,70	3,5
5/32	32,00	37,21	63	13	3,40	4,5

∅	P	€	L mm	l mm	∠ mm	d mm
3/16	24,00	37,21	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**

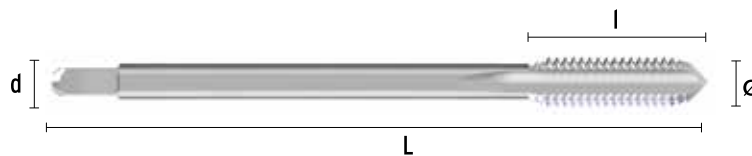


**1,5XD**



P				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



∅	P	€	L mm	l mm	∠ mm	d mm
1/4	20,00	40,55	80	18	3,40	4,5
5/16	18,00	49,76	90	20	4,90	6,0
3/8	16,00	54,98	100	22	5,50	7,0
7/16	14,00	72,52	100	22	6,20	8,0
1/2	12,00	69,54	110	27	7,00	9,0

∅	P	€	L mm	l mm	∠ mm	d mm
9/16	12,00	99,76	110	30	9,00	11,0
5/8	11,00	94,39	110	30	9,00	12,0
3/4	10,00	126,27	125	35	11,00	14,0
7/8	9,00	171,03	140	36	14,50	18,0
1"	8,00	215,08	160	38	14,50	18,0

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

**2138**

**HSSE DIN 371**

**BSW**  
BS 84

Form. **B**  
"Gun"

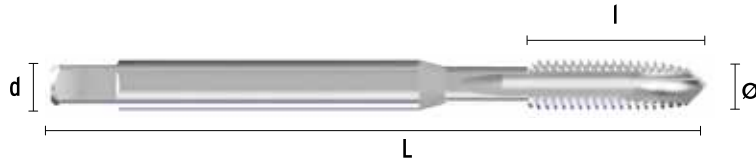


**3XD**

**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	20,55	56	11	2,70	3,5
*5/32	32,00	20,55	63	13	3,40	4,5
3/16	24,00	20,55	70	15	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
1/4	20,00	23,34	80	18	5,50	7,0
5/16	18,00	31,55	90	20	6,20	8,0
3/8	16,00	30,21	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"

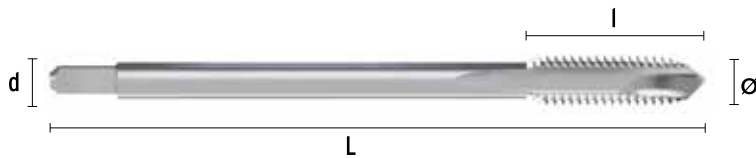


**3XD**

**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	23,34	80	17	3,40	4,5
*5/16	18,00	27,32	90	20	4,90	6,0
*3/8	16,00	30,21	100	22	5,50	7,0
7/16	14,00	38,14	100	22	6,20	8,0
1/2	12,00	39,93	110	27	7,00	9,0

Ø	P	€	L mm	l mm	∠ mm	d mm
9/16	12,00	54,85	110	30	9,00	11,0
5/8	11,00	51,83	110	30	9,00	12,0
3/4	10,00	69,52	125	35	11,00	14,0
7/8	9,00	94,03	140	36	14,50	18,0
1"	8,00	118,23	160	38	14,50	18,0

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



**2140**

**HSSE DIN 371**

**BSW**  
**BS 84**

Form.  
**C**



**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	23,34	56	7	2,70	3,5
*5/32	32,00	23,34	63	7	3,40	4,5
3/16	24,00	23,34	70	10	4,90	6,0

Ø	P	€	L mm	l mm	∠ mm	d mm
1/4	20,00	31,63	80	13	5,50	7,0
5/16	18,00	38,79	90	14	6,20	8,0
3/8	16,00	40,94	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**



**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	23,34	70	14	2,70	3,5
*1/4	20,00	31,63	80	16	3,40	4,5
*5/16	18,00	37,08	90	18	4,90	6,0
*3/8	16,00	40,94	100	20	5,50	7,0
7/16	14,00	46,50	100	15	6,20	8,0
1/2	12,00	44,57	110	18	7,00	9,0

Ø	P	€	L mm	l mm	∠ mm	d mm
9/16	12,00	63,89	110	22	9,00	11,0
5/8	11,00	60,45	110	22	9,00	12,0
3/4	10,00	80,93	125	25	11,00	14,0
7/8	9,00	109,54	140	30	14,50	18,0
1"	8,00	137,51	160	30	16,00	20,0

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

**2141**

**HSSE DIN 371**

**BSF**  
BS 84

Form.  
**C**

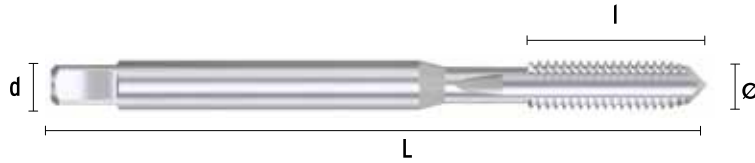


**1,5XD**



P				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	79,84	70	14	4,90	6,0
1/4	26,00	33,99	80	18	3,40	4,5

Ø	P	€	L mm	l mm	∠ mm	d mm
5/16	22,00	40,38	90	20	4,90	6,0
3/8	20,00	42,42	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**

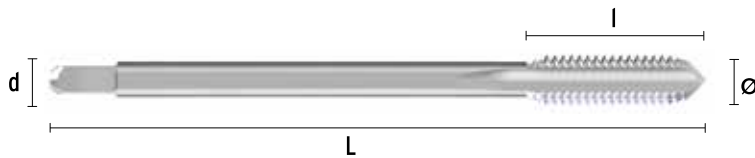


**1,5XD**



P				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	57,24	100	20	6,20	8,0
1/2	16,00	64,76	110	22	7,00	9,0
9/16	16,00	68,54	110	23	9,00	11,0
5/8	14,00	91,34	110	28	9,00	12,0

Ø	P	€	L mm	l mm	∠ mm	d mm
3/4	12,00	108,12	125	32	11,00	14,0
7/8	11,00	150,33	140	34	14,50	18,0
1"	10,00	179,50	140	28	16,00	20,0

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

**2144**

**HSSE DIN 5156**

**G**  
ISO 228

Form.  
**C**

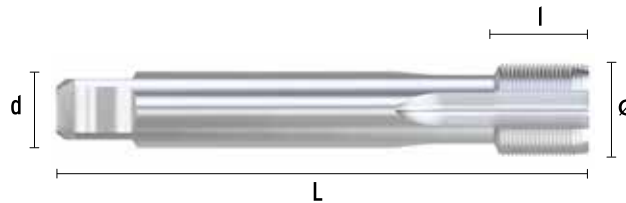


**1,5XD**

**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	31,43	90	20	5,50	7,0
1/4	19,00	44,80	100	22	9,00	11,0
3/8	19,00	53,61	100	22	9,00	12,0
1/2	14,00	67,75	125	25	12,00	16,0
5/8	14,00	84,45	125	25	14,50	18,0
3/4	14,00	106,07	140	28	16,00	20,0
7/8	14,00	142,59	150	30	18,00	22,0

Ø	P	€	L mm	l mm	∠ mm	d mm
1"	11,00	164,59	160	32	20,00	25,0
1"1/8	11,00	250,15	170	34	22,00	28,0
1"1/4	11,00	293,49	170	34	24,00	32,0
1"3/8	11,00	367,08	180	32	29,00	36,0
1"1/2	11,00	465,84	190	36	29,00	36,0
1"3/4	11,00	553,66	190	36	32,00	40,0
2"	11,00	705,53	220	40	35,00	45,0

**2144/5**

**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	62,87	90	20	5,50	7,0
1/4	19,00	89,62	100	22	9,00	11,0
3/8	19,00	107,20	100	22	9,00	12,0
1/2	14,00	135,49	125	25	12,00	16,0

Ø	P	€	L mm	l mm	∠ mm	d mm
5/8	14,00	168,91	125	25	14,50	18,0
3/4	14,00	212,15	140	28	16,00	20,0
1"	11,00	329,19	160	32	20,00	25,0

**2192**

**HSSE DIN 5156**

**G**  
ISO 228

Form.  
**E**

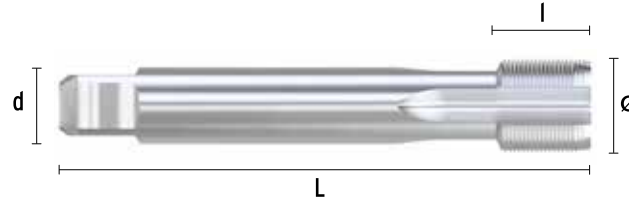


**1,5XD**

**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	I mm	∅ mm	d mm
1/8	28,00	38,12	90	20	5,50	7,0
1/4	19,00	58,53	100	22	9,00	11,0
3/8	19,00	80,83	100	22	9,00	12,0
1/2	14,00	109,07	125	25	12,00	16,0

Ø	P	€	L mm	I mm	∅ mm	d mm
5/8	14,00	113,95	125	25	14,50	18,0
3/4	14,00	160,06	140	28	16,00	20,0
7/8	14,00	195,64	150	28	18,00	22,0
1"	11,00	244,16	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**

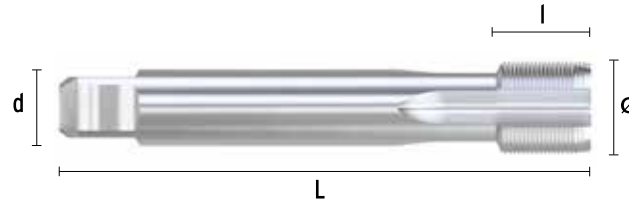


**1,5XD**

**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	I mm	∅ mm	d mm
1/8	28,00	46,46	90	20	5,50	7,0
1/4	19,00	69,23	100	22	9,00	11,0
3/8	19,00	97,00	100	22	9,00	12,0
1/2	14,00	132,42	125	25	12,00	16,0

Ø	P	€	L mm	I mm	∅ mm	d mm
5/8	14,00	138,49	125	25	14,50	18,0
3/4	14,00	192,08	140	28	16,00	20,0
7/8	14,00	226,93	150	28	18,00	22,0
1"	11,00	283,21	160	30	20,00	25,0

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

**2145**

**HSSE DIN 5156**

**G**  
ISO 228

Form. **B**  
"Gun"

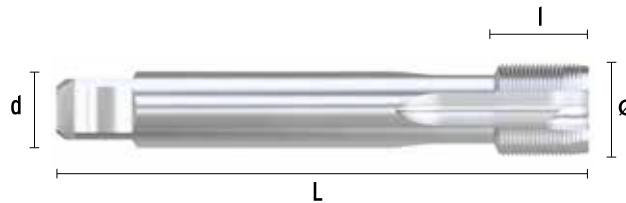


**3XD**

**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	5-10		10-15		10-15	10-20		10-15					

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



∅	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
5/8	14,00	133,43	125	25	14,50	18,0
3/4	14,00	151,79	140	28	16,00	20,0

∅	P	€	L mm	l mm	∠ mm	d mm
7/8	14,00	193,97	150	30	18,00	22,0
1"	11,00	285,58	160	32	20,00	25,0
1"1/8	11,00	426,83	170	30	22,00	28,0
1"1/4	11,00	424,82	170	30	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

**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



∅	P	€	L mm	l mm	∠ mm	d mm
1/8	28,00	39,95	90	20	5,50	7,0
1/4	19,00	71,72	100	22	9,00	11,0
3/8	19,00	70,75	100	22	9,00	12,0
1/2	14,00	94,46	125	25	12,00	16,0

∅	P	€	L mm	l mm	∠ mm	d mm
5/8	14,00	146,77	125	25	14,50	18,0
3/4	14,00	166,97	140	28	16,00	20,0
7/8	14,00	213,38	150	30	18,00	22,0
1"	11,00	314,14	160	32	20,00	25,0

**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



Ø	P	€	L mm	l mm	∠ mm	d mm
1/8	28,00	61,47	90	20	5,50	7,0
1/4	19,00	100,47	100	22	9,00	11,0
3/8	19,00	113,07	100	22	9,00	12,0
1/2	14,00	143,63	125	25	12,00	16,0

Ø	P	€	L mm	l mm	∠ mm	d mm
5/8	14,00	217,21	125	25	14,50	18,0
3/4	14,00	243,68	140	28	16,00	20,0
7/8	14,00	320,14	150	30	18,00	22,0
1"	11,00	436,88	160	32	20,00	25,0

**2146**

**HSSE DIN 5156**

**G**  
ISO 228

Form.  
**C**



**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	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
5/8	14,00	146,77	125	20	14,50	18,0
3/4	14,00	166,95	140	20	16,00	20,0

Ø	P	€	L mm	l mm	∠ mm	d mm
7/8	14,00	213,49	150	22	18,00	22,0
1"	11,00	314,07	160	24	20,00	25,0
1" 1/8	11,00	469,52	170	24	22,00	28,0
1" 1/4	11,00	467,30	170	25	24,00	32,0
1" 3/8	11,00	478,43	190	32	29,00	36,0
1" 1/2	11,00	497,46	190	32	29,00	36,0

**2285** **HSSE DIN 5156** **G ISO 228** **Form. C** **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



Ø	P	€	L mm	l mm	∠ mm	d mm
1/8	28,00	43,80	90	10	5,50	7,0
1/4	19,00	78,90	100	14	9,00	11,0
3/8	19,00	77,94	100	15	9,00	12,0
1/2	14,00	103,85	125	17	12,00	16,0

Ø	P	€	L mm	l mm	∠ mm	d mm
5/8	14,00	161,45	125	20	14,50	18,0
3/4	14,00	183,63	140	20	16,00	20,0
7/8	14,00	234,84	150	22	18,00	22,0
1"	11,00	345,48	160	24	20,00	25,0

**2287** **HSSE DIN 5156** **G ISO 228** **Form. C** **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



Ø	P	€	L mm	l mm	∠ mm	d mm
1/8	28,00	66,19	90	10	5,50	7,0
1/4	19,00	108,85	100	14	9,00	11,0
3/8	19,00	124,41	100	15	9,00	12,0
1/2	14,00	154,68	125	17	12,00	16,0

Ø	P	€	L mm	l mm	∠ mm	d mm
5/8	14,00	234,31	125	20	14,50	18,0
3/4	14,00	260,02	140	20	16,00	20,0
7/8	14,00	344,85	150	22	18,00	22,0
1"	11,00	473,28	160	24	20,00	25,0

**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	52,95	90	18	5,50	7,0
1/4	19,00	76,67	100	22	9,00	11,0
3/8	19,00	105,73	100	22	9,00	12,0
1/2	14,00	147,37	125	25	12,00	16,0

Ø	P	€	L mm	l mm	∅ mm	d mm
3/4	14,00	228,43	140	28	16,00	20,0
*7/8	14,00	394,37	150	28	18,00	22,0
1"	11,00	328,38	160	33	20,00	25,0

\*Hasta fin de existencias / Jusqu'à épuisement 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	66,39	90	12	4,90	6,0
1/8	27,00	52,27	90	15	5,50	7,0
1/4	18,00	71,80	100	20	9,00	11,0
3/8	18,00	92,76	110	22	11,00	14,0
1/2	14,00	123,65	140	27	14,50	18,0

Ø	P	€	L mm	l mm	∅ mm	d mm
3/4	14,00	191,88	140	28	16,00	20,0
1"	11,50	410,96	160	35	20,00	25,0
*1"1/4	11,50	424,30	190	35	24,00	32,0
*1"1/2	11,50	716,33	200	35	29,00	36,0
*2"	11,50	986,32	220	35	35,00	45,0

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



**2212**

**HSSE**

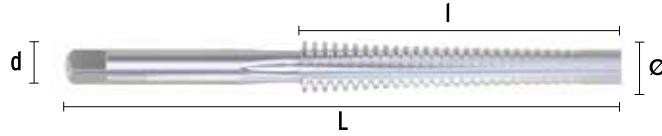
**Tr**  
DIN 103



**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



∅	P	€	L mm	l mm	∠ mm	d mm
10	2,00	411,91	110	63	5,50	7,0
10	3,00	411,91	125	75	5,50	7,0
12	3,00	481,83	165	111	6,20	8,0
14	3,00	493,97	140	85	8,00	10,0
14	4,00	533,42	170	112	8,00	10,0
16	4,00	533,42	180	116	9,00	11,0
18	4,00	571,73	190	120	9,00	12,0

∅	P	€	L mm	l mm	∠ mm	d mm
20	4,00	622,46	200	124	11,00	14,0
22	5,00	622,46	235	155	12,00	16,0
24	5,00	673,38	245	160	14,50	18,0
26	5,00	698,84	255	165	16,00	20,0
28	5,00	762,30	265	170	18,00	22,0
30	6,00	825,96	290	185	18,00	22,0
32	6,00	811,66	300	191	20,00	25,0

**2212/5**

**HSSE**

**Tr**  
DIN 103

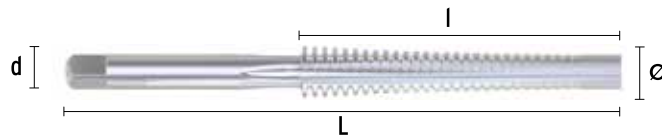


**Tol.**  
**7H**



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



∅	P	€	L mm	l mm	∠ mm	d mm
10	2,00	514,83	110	63	5,50	7,0
10	3,00	514,83	125	75	5,50	7,0
12	3,00	602,27	165	111	6,20	8,0
14	3,00	617,45	140	85	8,00	10,0
14	4,00	666,82	170	112	8,00	10,0
16	4,00	666,82	180	116	9,00	11,0
18	4,00	714,60	190	120	9,00	12,0

∅	P	€	L mm	l mm	∠ mm	d mm
20	4,00	778,06	200	124	11,00	14,0
22	5,00	778,06	235	155	12,00	16,0
24	5,00	841,73	245	160	14,50	18,0
26	5,00	873,57	255	165	16,00	20,0
28	5,00	952,78	265	170	18,00	22,0
30	6,00	1.032,49	290	185	18,00	22,0
32	6,00	1.014,57	300	191	20,00	25,0

**2163** **HSSE DIN 40433** **PG** **Form. C** **1,5XD** **D**  
 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	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	Pg	Ø	P	€	L mm	l mm	∠ mm	d mm
7,0	12,5	20,00	48,71	100	22	7,00	9,0	21,0	28,3	16,00	183,98	150	28	18,00	22,0
9,0	15,2	18,00	67,40	100	22	9,00	11,0	29,0	37,0	16,00	311,03	170	30	22,00	28,0
11,0	18,6	18,00	87,71	110	25	11,00	14,0	36,0	47,0	16,00	545,70	190	32	29,00	36,0
13,5	20,4	18,00	98,44	125	25	12,00	16,0	42,0	54,0	16,00	888,47	190	32	32,00	40,0
16,0	22,5	18,00	115,89	125	25	14,50	18,0	48,0	59,3	16,00	1.083,17	220	40	35,00	45,0

**2242** **HSSE DIN 371** **Vg** **Form. C** **1,5XD** **R**  
 DIN 7756

P				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	Ø	P	€	L mm	l mm	∠ mm	d mm
5,0	36,00	101,67	70	12	4,90	6,0	6,0	32,00	115,75	80	14	5,50	7,0
5,2	24,00	101,67	80	17	4,90	6,0	8,0	32,00	128,79	80	16	6,20	8,0

2411

HM-MD

M-MF



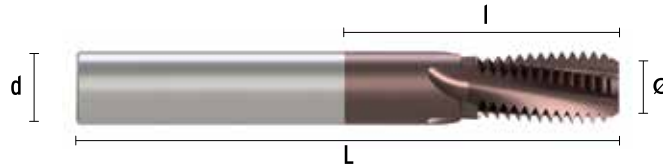
DIN 6535  
HA  
h6



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	Ti	Ni	50 HRC	55 HRC	60 HRC
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○
120-200	100 - 140	80 - 120	70 - 110	90-180	70-120	120-180	100-150	80 - 120	200-900	60-150	100 - 140	70-170	50-80	30-80	60 - 100	30 - 60	20 - 40

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

NEW



Ø	P		€	d mm	D mm	z	l mm	L mm
M2,0	0,40	1,5xD	212,83	4	1,50	3	3,40	50
M2,0	0,40	2,0xD	234,17	4	1,50	3	4,60	50
M2,5	0,45	1,5xD	212,83	4	1,90	3	4,27	50
M2,5	0,45	2,0xD	234,17	4	1,90	3	5,62	50
M3,0	0,50	1,5xD	212,83	4	2,30	3	5,25	50
M3,0	0,50	2,0xD	234,17	4	2,30	3	6,75	50
M4,0	0,70	1,5xD	212,83	4	3,00	3	7,35	50
M4,0	0,70	2,0xD	234,17	4	3,00	3	8,75	50
M5,0	0,80	1,5xD	212,83	4	3,80	3	8,40	50
M5,0	0,80	2,0xD	234,17	4	3,80	3	10,80	50
M6,0	1,00	1,5xD	247,33	6	4,50	3	10,50	63
M6,0	1,00	2,0xD	272,17	6	4,50	3	13,50	63
M6,0	1,00	2,5xD	299,17	6	4,50	3	16,50	63
M8,0	1,25	1,5xD	247,33	6	6,00	3	14,37	63
M8,0	1,25	2,0xD	272,17	6	6,00	3	18,12	63
M8,0	1,25	2,5xD	299,17	6	6,00	3	21,87	63
M10,0	1,00	2,0xD	344,33	8	8,00	4	17,50	63
M10,0	1,50	1,5xD	313,00	8	7,50	3	17,25	63
M10,0	1,50	2,0xD	344,33	8	7,50	3	21,75	76
M10,0	1,50	2,5xD	378,33	8	7,50	3	27,75	76
M12,0	1,75	1,5xD	313,00	8	8,00	3	20,12	76
M12,0	1,75	2,0xD	344,33	8	8,00	3	27,12	76
M12,0	1,75	2,5xD	378,33	10	9,00	3	32,37	100
M14,0	1,50	2,0xD	437,83	10	10,00	4	23,25	76
M14,0	2,00	2,0xD	437,83	10	10,00	3	31,00	100
M14,0	2,00	2,5xD	481,33	10	10,00	3	37,00	100
M16,0	1,50	2,0xD	514,33	12	12,00	4	29,25	83
M16,0	2,00	2,0xD	514,33	12	12,00	4	35,00	100
M16,0	2,00	2,5xD	565,33	12	12,00	4	43,00	100
M20,0	1,50	2,0xD	638,83	16	16,00	6	35,25	100
M20,0	2,50	2,0xD	638,83	14	14,00	4	43,75	100
M20,0	2,50	2,5xD	739,33	16	15,00	4	53,75	120
M24,0	3,00	2,0xD	739,33	16	16,00	3	52,50	100
M24,0	3,00	2,5xD	860,00	18	18,00	3	64,50	120

**P** Aceros  
Aciers  
Steels  
Stähle

**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K** Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S** Titanio y Superaloaciones  
Titanium et Supealliajes  
Titanium and Superalloys  
Titan und Superlegierungen

**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

2412

HM-MD

G  
ISO 228



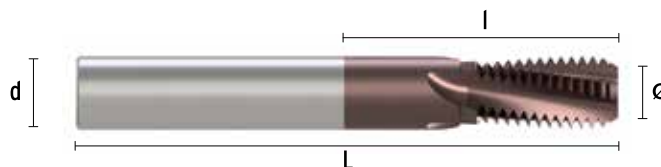
DIN 6535  
HA  
h6

TIALCN

P				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
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○
120-200	100-140	80-120	70-110	90-180	70-120	120-180	100-150	80-120	200-900	60-150	100-140	70-170	50-80	30-80	60-100	30-60	20-40

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

NEW



Ø	P	€	d mm	D mm	z	l mm	L mm
1/16 - 1/8	28	247,33	6	6	3	10,43	63
1/4 - 3/8	19	313,00	8	8	3	15,37	63
1/4 - 3/8	19	398,17	10	10	4	22,06	76
1/2 - 7/8	14	467,33	12	12	4	20,86	83
1/2 - 7/8	14	467,33	12	12	4	28,12	83
1/2 - 7/8	11	514,33	16	16	5	28,12	89
1 - 1 1/2	11	672,50	12	12	3	26,55	83
1 - 3"	11	672,50	16	16	4	40,41	100
≥ 1	11	860,00	20	20	5	49,65	120

# MACHOS DE MANO TARAUDS A MAIN / HAND TAPS / HANDGEWINDEBOHRER

2301

**HSS DIN 352/2181**

M-MF  
DIN 13



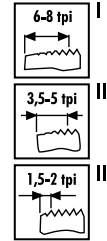
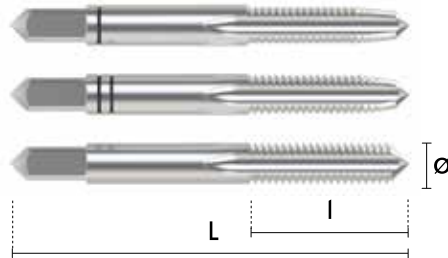
Tol.  
**6H**

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 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3°

PVP = €/3 <math>\left\{ \begin{array}{l} M (\text{€}/3) \\ MF (\text{€}/2) \end{array} \right.</math>



Ø	P	Nº	€	L mm	l mm	∅ mm	d mm	Ø	P	Nº	€	L mm	l mm	∅ mm	d mm
M1,0	0,25	3	81,02	32	5,5	2,10	2,5	M12,0	0,75	2	70,85	70	22	7,00	9,0
M1,1	0,25	3	81,02	32	5,5	2,10	2,5	M12,0	1,00	2	43,73	70	22	7,00	9,0
M1,2	0,25	3	81,02	32	5,5	2,10	2,5	M12,0	1,25	2	43,91	70	22	7,00	9,0
M1,4	0,30	3	81,02	32	7	2,10	2,5	M12,0	1,50	2	37,35	70	22	7,00	9,0
M1,6	0,35	3	73,92	32	8	2,10	2,5	M12,0	1,75	3	39,87	75	28	7,00	9,0
M1,7	0,35	3	46,68	32	8	2,10	2,5	M13,0	0,75	2	124,00	70	20	9,00	11,0
M1,8	0,35	3	69,40	32	8	2,10	2,5	M13,0	1,00	2	71,69	70	22	9,00	11,0
M2,0	0,40	3	36,81	36	8	2,10	2,8	M13,0	1,25	2	71,69	70	22	9,00	11,0
M2,2	0,45	3	39,65	36	9	2,10	2,8	M13,0	1,50	2	71,69	70	22	9,00	11,0
M2,3	0,45	3	39,70	36	9	2,10	2,8	M13,0	1,75	3	90,30	75	30	9,00	11,0
M2,5	0,45	3	38,08	40	9	2,10	2,8	M14,0	0,75	2	124,12	70	22	9,00	11,0
M2,6	0,45	3	35,03	40	9	2,10	2,8	M14,0	1,00	2	65,42	70	22	9,00	11,0
M3,0	0,50	3	20,16	40	11	2,70	3,5	M14,0	1,25	2	53,67	70	22	9,00	11,0
M3,0	0,60	2	38,66	40	11	2,70	3,5	M14,0	1,50	2	41,69	70	22	9,00	11,0
M3,5	0,60	2	27,90	45	12	3,00	4,0	M14,0	2,00	3	52,46	80	30	9,00	11,0
M3,5	0,75	2	46,69	45	14	3,40	4,5	M15,0	1,00	2	96,70	70	22	9,00	12,0
M4,0	0,50	2	39,32	45	13	3,40	4,5	M15,0	1,25	2	101,77	70	22	9,00	12,0
M4,0	0,70	3	18,56	45	14	3,40	4,5	M15,0	1,50	2	99,00	70	22	9,00	12,0
M4,5	0,75	2	35,98	50	16	4,90	6,0	M15,0	2,00	3	103,46	80	32	9,00	12,0
M5,0	0,50	2	41,81	50	12	4,90	6,0	M16,0	1,00	2	91,55	70	22	9,00	12,0
M5,0	0,75	2	38,96	50	12	4,90	6,0	M16,0	1,25	2	96,38	70	22	9,00	12,0
M5,0	0,80	3	20,17	50	16	4,90	6,0	M16,0	1,50	2	51,98	70	22	9,00	12,0
M5,0	1,00	3	22,40	50	14	4,90	6,0	M16,0	2,00	3	73,86	80	32	9,00	12,0
M5,5	0,90	2	136,29	50	18	4,90	6,0	M17,0	1,00	2	147,53	70	22	9,00	12,0
M6,0	0,50	2	41,76	56	14	4,90	6,0	M17,0	1,25	2	147,53	70	22	9,00	12,0
M6,0	0,75	2	23,52	56	14	4,90	6,0	M17,0	1,50	2	147,53	70	22	9,00	12,0
M6,0	0,90	2	136,18	56	19	4,90	6,0	M18,0	1,00	2	101,76	80	22	11,00	14,0
M6,0	1,00	3	20,17	56	19	4,90	6,0	M18,0	1,25	2	145,42	80	22	11,00	14,0
M7,0	0,75	2	29,69	56	14	4,90	6,0	M18,0	1,50	2	68,92	80	22	11,00	14,0
M7,0	1,00	3	27,84	56	19	4,90	6,0	M18,0	2,00	2	109,66	80	22	11,00	14,0
M8,0	0,50	2	44,58	56	18	4,90	6,0	M18,0	2,50	3	98,73	95	34	11,00	14,0
M8,0	0,75	2	34,74	56	18	4,90	6,0	M19,0	1,00	2	214,14	80	22	11,00	14,0
M8,0	1,00	2	23,10	63	22	4,90	6,0	M19,0	1,25	2	213,95	80	22	11,00	14,0
M8,0	1,25	3	24,28	63	22	4,90	6,0	M19,0	1,50	2	214,14	80	22	11,00	14,0
M9,0	1,00	2	29,85	63	22	5,50	7,0	M20,0	1,00	2	135,52	80	22	12,00	16,0
M9,0	1,25	3	43,09	63	22	5,50	7,0	M20,0	1,25	2	214,14	80	22	12,00	16,0
M10,0	0,50	2	113,27	63	18	5,50	7,0	M20,0	1,50	2	86,00	80	22	12,00	16,0
M10,0	0,75	2	49,79	63	20	5,50	7,0	M20,0	2,00	2	113,65	80	22	12,00	16,0
M10,0	1,00	2	25,05	63	20	5,50	7,0	M20,0	2,50	3	110,95	95	34	12,00	16,0
M10,0	1,25	2	25,50	70	24	5,50	7,0	M21,0	1,00	2	276,73	80	22	12,00	16,0
M10,0	1,50	3	30,67	70	24	5,50	7,0	M21,0	1,25	2	276,73	80	22	12,00	16,0
M11,0	0,75	2	124,00	63	20	6,20	8,0	M21,0	1,50	2	218,83	80	22	12,00	16,0
M11,0	1,00	2	44,27	63	20	6,20	8,0	M22,0	1,00	2	151,18	80	22	14,50	18,0
M11,0	1,25	2	44,27	70	22	6,20	8,0	M22,0	1,25	2	214,14	80	22	14,50	18,0
M11,0	1,50	3	59,42	70	24	6,20	8,0	M22,0	1,50	2	94,02	80	22	14,50	18,0

# MACHOS DE MANO

## TARAUDS A MAIN / HAND TAPS / HANDGEWINDEBOHRER

Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
M22,0	2,00	2	151,19	80	22	14,50	18,0	M35,0	1,50	2	415,44	100	25	22,00	28,0
<b>M22,0</b>	<b>2,50</b>	<b>3</b>	<b>136,02</b>	<b>100</b>	<b>34</b>	<b>14,50</b>	<b>18,0</b>	M36,0	1,50	2	346,54	100	25	22,00	28,0
M23,0	1,00	2	276,47	80	22	14,50	18,0	M36,0	2,00	2	443,45	125	40	22,00	28,0
M23,0	1,50	2	276,47	80	22	14,50	18,0	M36,0	3,00	2	604,95	125	40	22,00	28,0
M24,0	1,00	2	169,03	90	22	14,50	18,0	<b>M36,0</b>	<b>4,00</b>	<b>3</b>	<b>457,74</b>	<b>150</b>	<b>56</b>	<b>22,00</b>	<b>28,0</b>
M24,0	1,25	2	276,73	90	22	14,50	18,0	M38,0	1,50	2	389,80	100	25	22,00	28,0
M24,0	1,50	2	120,02	90	22	14,50	18,0	M38,0	2,00	2	699,94	125	40	22,00	28,0
M24,0	2,00	2	169,03	90	22	14,50	18,0	M39,0	1,50	2	522,80	110	25	24,00	32,0
<b>M24,0</b>	<b>3,00</b>	<b>3</b>	<b>171,34</b>	<b>110</b>	<b>38</b>	<b>14,50</b>	<b>18,0</b>	M39,0	2,00	2	522,80	125	40	24,00	32,0
M25,0	1,00	2	242,14	90	22	14,50	18,0	M39,0	3,00	2	508,73	125	40	24,00	32,0
M25,0	1,25	2	394,24	90	22	14,50	18,0	<b>M39,0</b>	<b>4,00</b>	<b>3</b>	<b>508,63</b>	<b>150</b>	<b>60</b>	<b>24,00</b>	<b>32,0</b>
M25,0	1,50	2	209,36	90	22	14,50	18,0	M40,0	1,50	2	457,81	110	25	24,00	32,0
M25,0	2,00	2	405,51	90	22	14,50	18,0	M40,0	2,00	2	531,77	125	40	24,00	32,0
M26,0	1,00	2	394,63	90	22	14,50	18,0	M40,0	3,00	2	526,83	125	40	24,00	32,0
M26,0	1,50	2	191,22	90	22	14,50	18,0	M42,0	1,50	2	506,39	110	25	24,00	32,0
M26,0	2,00	2	394,63	90	22	14,50	18,0	M42,0	2,00	2	608,39	125	40	24,00	32,0
M27,0	1,00	2	237,63	90	22	16,00	20,0	M42,0	3,00	2	608,39	125	40	24,00	32,0
M27,0	1,50	2	211,88	90	22	16,00	20,0	<b>M42,0</b>	<b>4,50</b>	<b>3</b>	<b>637,29</b>	<b>150</b>	<b>60</b>	<b>24,00</b>	<b>32,0</b>
M27,0	2,00	2	234,30	90	22	16,00	20,0	M45,0	1,50	2	570,09	110	25	29,00	36,0
<b>M27,0</b>	<b>3,00</b>	<b>3</b>	<b>220,66</b>	<b>110</b>	<b>38</b>	<b>16,00</b>	<b>20,0</b>	M45,0	2,00	2	724,31	125	40	29,00	36,0
M28,0	1,00	2	394,61	90	22	16,00	20,0	M45,0	3,00	2	724,31	125	40	29,00	36,0
M28,0	1,50	2	212,45	90	22	16,00	20,0	<b>M45,0</b>	<b>4,50</b>	<b>3</b>	<b>739,21</b>	<b>160</b>	<b>65</b>	<b>29,00</b>	<b>36,0</b>
M28,0	2,00	2	394,61	90	22	16,00	20,0	M48,0	1,50	2	642,42	140	40	29,00	36,0
M30,0	1,00	2	244,85	90	22	18,00	22,0	M48,0	2,00	2	952,96	140	40	29,00	36,0
M30,0	1,50	2	220,37	90	22	18,00	22,0	M48,0	3,00	2	876,89	140	40	29,00	36,0
M30,0	2,00	2	254,06	90	22	18,00	22,0	<b>M48,0</b>	<b>5,00</b>	<b>3</b>	<b>887,79</b>	<b>180</b>	<b>70</b>	<b>29,00</b>	<b>36,0</b>
<b>M30,0</b>	<b>3,50</b>	<b>3</b>	<b>280,16</b>	<b>125</b>	<b>45</b>	<b>18,00</b>	<b>22,0</b>	M50,0	1,50	2	702,55	140	40	29,00	36,0
M32,0	1,00	2	512,71	90	22	18,00	22,0	M52,0	1,50	2	745,29	140	40	32,00	40,0
M32,0	1,50	2	271,34	90	22	18,00	22,0	M52,0	2,00	2	1.072,21	140	40	32,00	40,0
M32,0	2,00	2	513,17	90	22	18,00	22,0	M52,0	3,00	2	995,48	140	40	32,00	40,0
M33,0	1,00	2	513,17	100	25	20,00	25,0	<b>M52,0</b>	<b>5,00</b>	<b>3</b>	<b>1.158,53</b>	<b>180</b>	<b>70</b>	<b>32,00</b>	<b>40,0</b>
M33,0	1,50	2	298,95	100	25	20,00	25,0	<b>M56,0</b>	<b>5,50</b>	<b>3</b>	<b>1.673,34</b>	<b>200</b>	<b>70</b>	<b>35,00</b>	<b>45,0</b>
M33,0	2,00	2	355,44	100	25	20,00	25,0	<b>M60,0</b>	<b>5,50</b>	<b>3</b>	<b>2.096,99</b>	<b>200</b>	<b>75</b>	<b>35,00</b>	<b>45,0</b>
<b>M33,0</b>	<b>3,50</b>	<b>3</b>	<b>355,44</b>	<b>125</b>	<b>50</b>	<b>20,00</b>	<b>25,0</b>	M63,0	1,50	2	1.666,75	160	40	39,00	50,0
M34,0	1,50	2	323,49	100	25	22,00	28,0	<b>M64,0</b>	<b>6,00</b>	<b>3</b>	<b>2.618,70</b>	<b>220</b>	<b>80</b>	<b>39,00</b>	<b>50,0</b>

**2301/5**

**HSS DIN 352** Izquierda / A gauche / Left hand

**M-MF**  
**DIN 13**



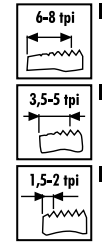
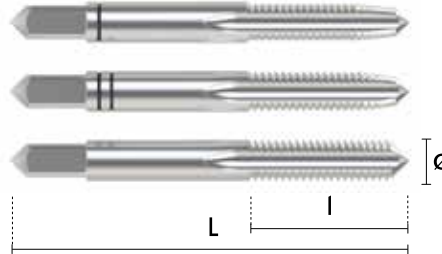
Tol.  
**6H**



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 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } **PVP = €13**



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
M3,0	0,50	3	40,30	40	11	2,70	3,5	M14,0	1,25	2	107,34	70	22	9,00	11,0
M4,0	0,70	3	37,12	45	13	3,40	4,5	M14,0	1,50	2	83,40	70	22	9,00	11,0
M5,0	0,80	3	40,34	50	16	4,90	6,0	M14,0	2,00	3	104,90	80	30	9,00	11,0
M6,0	1,00	3	40,34	56	19	4,90	6,0	M16,0	1,50	2	103,95	70	22	9,00	12,0
M7,0	1,00	3	55,68	56	19	4,90	6,0	M16,0	2,00	3	147,71	80	32	9,00	12,0
M8,0	1,00	2	46,19	63	22	4,90	6,0	M18,0	2,50	3	197,47	95	34	11,00	14,0
M8,0	1,25	3	48,58	63	22	4,90	6,0	M20,0	1,50	2	172,02	80	22	12,00	16,0
M9,0	1,25	3	86,18	63	22	5,50	7,0	M20,0	2,50	3	221,89	95	34	12,00	16,0
M10,0	1,00	2	50,07	63	20	5,50	7,0	M22,0	1,50	2	188,05	80	22	14,50	18,0
M10,0	1,25	2	51,01	70	24	5,50	7,0	M22,0	2,50	3	272,05	100	34	14,50	18,0
M10,0	1,50	3	61,34	70	24	5,50	7,0	M24,0	1,50	2	240,02	90	22	14,50	18,0
M12,0	1,25	2	87,84	70	22	7,00	9,0	M24,0	3,00	3	342,68	110	38	14,50	18,0
M12,0	1,50	2	74,71	70	22	7,00	9,0	M27,0	3,00	3	441,33	110	38	16,00	20,0
M12,0	1,75	3	79,73	75	29	7,00	9,0	M30,0	3,50	3	560,29	125	45	18,00	22,0

**2314**

**HSSE DIN 352**

**M**  
DIN 13

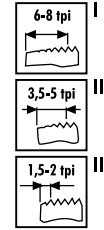
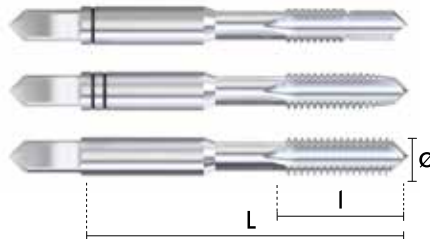


Tol.  
**6HX**

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°  
Gewindebohrer 3° } **PVP = €1/3**



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
M3,0	0,50	3	29,54	40	11	2,70	3,5	M10,0	1,50	3	45,82	70	24	5,50	7,0
M4,0	0,70	3	29,48	45	13	3,40	4,5	M12,0	1,75	3	65,13	75	29	7,00	9,0
M5,0	0,80	3	30,88	50	16	4,90	6,0	M14,0	2,00	3	86,23	80	30	9,00	11,0
M6,0	1,00	3	30,98	56	19	4,90	6,0	M16,0	2,00	3	95,11	80	32	9,00	12,0
M8,0	1,25	3	35,58	63	22	4,90	6,0								

**2303**

**HSSE DIN 352**

**M**  
DIN 13



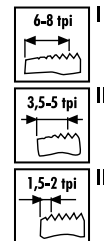
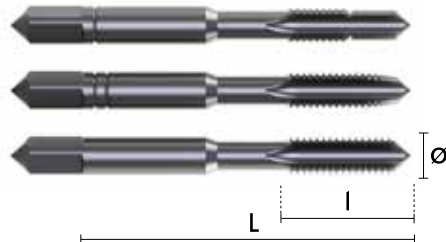
Tol.  
**6HX**

**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°  
Gewindebohrer 3° } **PVP = €1/3**



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
M3,0	0,50	3	30,13	40	11	2,70	3,5	M12,0	1,75	3	67,00	75	29	7,00	9,0
M4,0	0,70	3	30,13	45	13	3,40	4,5	M14,0	2,00	3	74,22	80	30	9,00	11,0
M5,0	0,80	3	31,34	50	16	4,90	6,0	M16,0	2,00	3	101,68	80	32	9,00	12,0
M6,0	1,00	3	31,34	56	19	4,90	6,0	M18,0	2,50	3	138,91	95	40	11,00	14,0
M8,0	1,25	3	36,38	63	22	4,90	6,0	M20,0	2,50	3	154,21	95	40	12,00	16,0
M10,0	1,50	3	46,82	70	24	5,50	7,0								



**2324** **HSSE-PM DIN 352**

M  
DIN 13



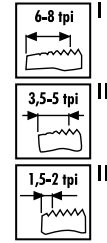
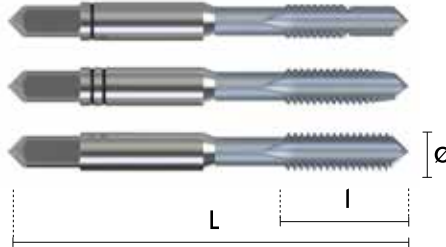
Tol.  
**6HX**



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°  
Gewindebohrer 3° } PVP = € / 3



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
M4,0	0,70	3	107,26	45	13	2,70	3,5	M10,0	1,50	3	151,32	70	24	5,50	7,0
M5,0	0,80	3	108,60	50	16	4,90	6,0	M12,0	1,75	3	183,93	75	29	7,00	9,0
M6,0	1,00	3	108,60	56	19	4,90	6,0	M14,0	2,00	3	270,43	80	30	9,00	11,0
M8,0	1,25	3	122,41	63	22	4,90	6,0	M16,0	2,00	3	270,43	80	32	9,00	12,0

**2302** **HSS DIN 352**

M  
DIN 13



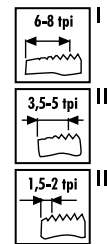
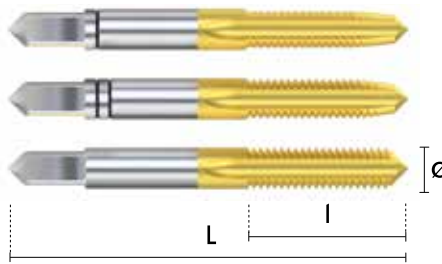
Tol.  
**6H**



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
●	○								●	●							

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

Macho 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } PVP = € / 3



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
M3,0	0,50	3	45,09	40	11	2,70	3,5	M10,0	1,50	3	67,56	70	24	5,50	7,0
M4,0	0,70	3	46,23	45	13	3,40	4,5	M12,0	1,75	3	103,86	75	28	7,00	9,0
M5,0	0,80	3	47,25	50	16	4,90	6,0	M14,0	2,00	3	123,62	80	30	9,00	11,0
M6,0	1,00	3	47,35	56	19	4,90	6,0	M16,0	2,00	3	154,35	80	32	9,00	12,0
M8,0	1,25	3	56,90	63	22	4,90	6,0	M20,0	2,50	3	167,37	95	34	12,00	16,0

**2304 HSS DIN 352**

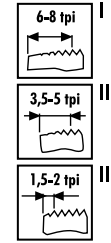
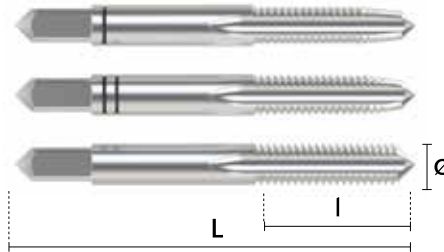
**BSW**  
**BS 84**



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

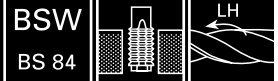
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative

Macho 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } **PVP = €/3**



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
3/32	48,00	3	37,45	36	10	2,10	2,8	1"	8,00	3	223,65	110	50	14,50	18,0
1/8	40,00	3	25,83	40	12	2,70	3,5	1"1/8	7,00	3	333,25	132	56	18,00	22,0
5/32	32,00	3	26,09	45	14	3,40	4,5	1"1/4	7,00	3	403,13	132	56	18,00	22,0
3/16	24,00	3	25,83	50	18	4,90	6,0	1"3/8	6,00	3	501,36	150	63	22,00	28,0
7/32	24,00	3	45,95	50	18	4,90	6,0	1"1/2	6,00	3	603,59	150	63	24,00	32,0
1/4	20,00	3	29,11	50	19	4,90	6,0	1"5/8	5,00	3	905,47	160	70	24,00	32,0
5/16	18,00	3	35,52	56	22	4,90	6,0	1"3/4	5,00	3	1114,41	160	70	29,00	36,0
3/8	16,00	3	39,04	70	24	5,50	7,0	1"7/8	4,50	3	1439,36	190	80	29,00	36,0
7/16	14,00	3	51,91	70	24	6,20	8,0	2"	4,50	3	1511,05	190	80	32,00	40,0
1/2	12,00	3	56,23	75	29	7,00	9,0	2"1/4	4,00	3	1997,42	220	80	35,00	45,0
9/16	12,00	3	76,49	80	30	9,00	11,0	2"1/2	4,00	3	2429,88	220	80	39,00	50,0
5/8	11,00	3	87,92	80	32	9,00	12,0	2"3/4	3,50	3	3469,58	240	80	39,00	50,0
3/4	10,00	3	125,18	95	40	11,00	14,0	3"	3,50	3	4013,92	240	80	39,00	50,0
7/8	9,00	3	183,14	100	40	14,50	18,0								

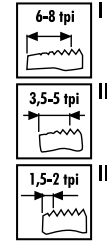
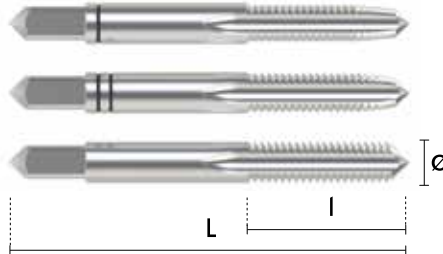
**2304/5 HSS DIN 352** Izquierda / A gauche / Left hand



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
•									•	•							

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

Macho 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } PVP = € / 3



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
1/8	40,00	3	51,68	40	12	2,70	3,5	1/2	12,00	3	112,44	75	29	7,00	9,0
5/32	32,00	3	52,18	45	14	3,40	4,5	9/16	12,00	3	152,98	80	30	9,00	11,0
3/16	24,00	3	51,68	50	18	4,90	6,0	5/8	11,00	3	175,85	80	32	9,00	12,0
1/4	20,00	3	58,18	50	19	4,90	6,0	3/4	10,00	3	250,35	95	40	11,00	14,0
5/16	18,00	3	71,03	56	22	4,90	6,0	7/8	9,00	3	366,24	100	40	14,50	18,0
3/8	16,00	3	78,07	70	24	5,50	7,0	1"	8,00	3	447,30	110	50	14,50	18,0
7/16	14,00	3	103,82	70	24	6,20	8,0								

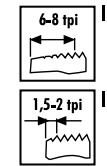
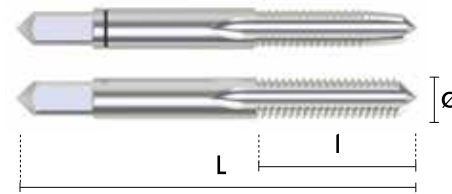
**2305 HSS DIN 2181**



P				M		K			N				S		H		
<800	<1.000	<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°  
Gewindebohrer 3° } PVP = € / 2



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
3/16	32,00	2	98,97	50	14	4,90	6,0	5/8	14,00	2	116,95	80	28	9,00	12,0
1/4	26,00	2	40,79	50	18	4,90	6,0	3/4	12,00	2	179,20	95	32	11,00	14,0
5/16	22,00	2	47,59	56	22	4,90	6,0	7/8	11,00	2	213,87	100	36	14,50	18,0
3/8	20,00	2	55,06	63	22	5,50	7,0	1"	10,00	2	300,20	110	40	14,50	18,0
7/16	18,00	2	66,07	63	22	6,20	8,0	1", 1/8	9,00	2	619,45	110	22	18,00	22,0
1/2	16,00	2	74,70	75	24	7,00	9,0	1", 1/4	9,00	2	707,26	110	22	18,00	22,0
9/16	16,00	2	89,58	80	28	9,00	11,0	1", 1/2	9,00	2	1077,86	125	40	24,00	32,0

**2306**

**HSS DIN 5157**

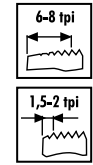
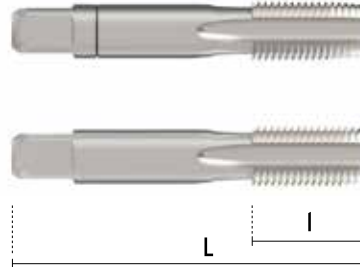
**G**  
ISO 228



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°  
Gewindebohrer 3° } **PVP = € / Z**



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
1/8	28,00	2	33,03	63	20	5,50	7,0	1 1/4	11,00	2	329,66	125	40	24,00	32,0
1/4	19,00	2	46,52	70	22	9,00	11,0	1 3/8	11,00	2	447,82	140	40	29,00	36,0
3/8	19,00	2	58,59	70	22	9,00	12,0	1 1/2	11,00	2	498,30	140	40	29,00	36,0
1/2	16,00	2	81,94	75	24	7,00	9,0	1 3/4	11,00	2	828,41	140	40	32,00	40,0
5/8	14,00	2	108,23	80	22	14,50	18,0	2"	11,00	2	918,34	160	40	35,00	45,0
3/4	14,00	2	127,94	90	22	16,00	20,0	2 1/4	11,00	2	1562,43	160	40	39,00	50,0
7/8	14,00	2	175,99	90	22	18,00	22,0	2 1/2	11,00	2	2348,53	160	40	39,00	50,0
1"	11,00	2	203,67	100	25	20,00	25,0	2 3/4	11,00	2	2847,59	160	40	39,00	50,0
1 1/8	11,00	2	302,57	125	40	22,00	28,0	3"	11,00	2	2963,55	160	40	39,00	50,0

**2306/5**

**HSS DIN 5157** Izquierda / A gauche / Left hand

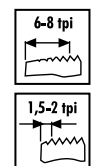
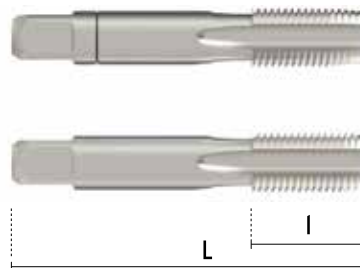
**G**  
ISO 228



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°  
Gewindebohrer 3° } **PVP = € / Z**



Ø	P	Nº	€	L mm	I mm	∅ mm	d mm	Ø	P	Nº	€	L mm	I mm	∅ mm	d mm
1/8	28,00	2	66,08	63	20	5,50	7,0	5/8	14,00	2	216,44	80	22	14,50	18,0
1/4	19,00	2	93,04	70	22	9,00	11,0	3/4	14,00	2	255,88	90	22	16,00	20,0
3/8	19,00	2	117,15	70	22	9,00	12,0	1"	11,00	2	407,37	100	25	20,00	25,0
1/2	14,00	2	163,87	80	22	12,00	16,0								

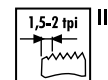
**2316** **HSSE DIN 5157**

**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	Ø	P	Nº	€	L mm	l mm	∠ mm	d mm
1/8	28,00	1	19,54	63	20	5,50	7,0	5/8	14,00	1	74,40	80	22	14,50	18,0
1/4	19,00	1	31,81	70	22	9,00	11,0	3/4	14,00	1	87,03	90	22	16,00	20,0
3/8	19,00	1	34,79	70	22	9,00	11,0	7/8	14,00	1	125,80	90	22	18,00	22,0
1/2	14,00	1	55,66	80	22	12,00	16,0	1"	11,00	1	144,21	100	25	20,00	25,0

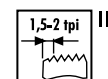
**2317** **HSSE DIN 5157**

**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	Ø	P	Nº	€	L mm	l mm	∠ mm	d mm
1/8	28,00	1	21,45	63	20	5,50	7,0	5/8	14,00	1	81,83	80	22	14,50	18,0
1/4	19,00	1	35,01	70	22	9,00	11,0	3/4	14,00	1	95,70	90	22	16,00	20,0
3/8	19,00	1	38,41	70	22	9,00	11,0	7/8	14,00	1	138,38	90	22	18,00	22,0
1/2	14,00	1	63,61	80	22	12,00	16,0	1"	11,00	1	158,63	100	25	20,00	25,0

**2307**

**HSS DIN 352**

**UNC**  
ANSI/ASME  
B1.1

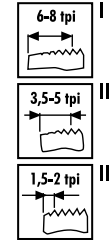
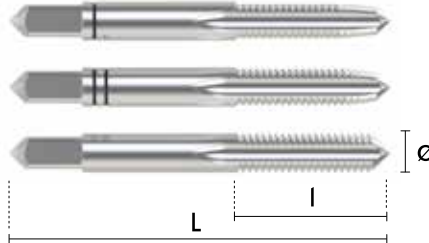


Tol.  
**2B**

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 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } PVP = €3



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
Nº4	40,00	3	51,00	40	12	2,70	3,5	9/16	12,00	3	90,14	80	30	9,00	11,0
Nº5	40,00	3	48,76	40	12	2,70	3,5	5/8	11,00	3	124,35	80	32	9,00	12,0
Nº6	32,00	3	48,76	45	14	3,00	4,0	3/4	10,00	3	169,29	95	40	11,00	14,0
Nº18	32,00	3	48,76	45	14	3,40	4,5	7/8	9,00	3	208,51	100	40	14,50	18,0
Nº10	24,00	3	48,76	50	16	4,90	6,0	1"	8,00	3	281,60	110	50	14,50	18,0
Nº12	24,00	3	48,76	50	18	4,90	6,0	1"1/8	7,00	3	429,87	132	56	18,00	22,0
1/4	20,00	3	39,46	50	19	4,90	6,0	1"1/4	7,00	3	541,10	132	56	18,00	22,0
5/16	18,00	3	45,08	56	22	4,90	6,0	1"3/8	6,00	3	686,42	150	63	22,00	28,0
3/8	16,00	3	50,96	70	24	5,50	7,0	1"1/2	6,00	3	842,81	150	63	24,00	32,0
7/16	14,00	3	66,33	70	24	6,20	8,0	1"3/4	5,00	3	1049,96	160	70	29,00	36,0
1/2	13,00	3	76,35	75	29	7,00	9,0	2"	4,50	3	1207,03	190	80	32,00	40,0

# MACHOS DE MANO TARAUDS A MAIN / HAND TAPS / HANDGEWINDEBOHRER

2307/5

## HSS DIN 352 Izquierda / A gauche / Left hand

UNC  
ANSI/ASME  
B1.1



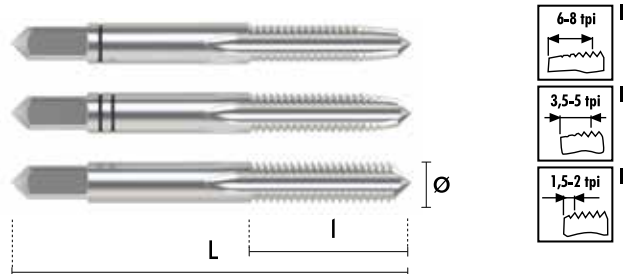
Tol.  
2B



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°  
Gewindebohrer 3° } PVP = €13



Ø	P	Nº	€	L mm	I mm	mm	d mm	Ø	P	Nº	€	L mm	I mm	mm	d mm
1/4	20,00	3	78,93	50	19	4,90	6,0	9/16	12,00	3	180,28	80	30	9,00	11,0
5/16	18,00	3	90,14	56	22	4,90	6,0	5/8	11,00	3	248,67	80	32	9,00	12,0
3/8	16,00	3	101,93	70	24	5,50	7,0	3/4	10,00	3	338,59	95	40	11,00	14,0
7/16	14,00	3	132,70	70	24	6,20	8,0	7/8	9,00	3	416,99	100	40	14,50	18,0
1/2	13,00	3	152,70	75	29	7,00	9,0	1"	8,00	3	563,20	110	50	14,50	18,0

2308

## HSS DIN 2181

UNF  
ANSI/ASME  
B1.1

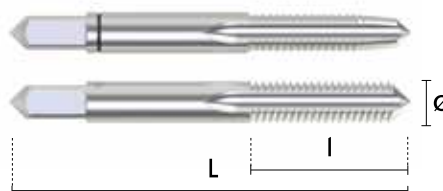


Tol.  
2B

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 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } PVP = €12



Ø	P	Nº	€	L mm	I mm	mm	d mm	Ø	P	Nº	€	L mm	I mm	mm	d mm
Nº4	48,00	2	38,73	36	11	2,70	3,5	1/2	20,00	2	44,82	75	24	7,00	9,0
Nº5	44,00	2	38,73	36	11	2,70	3,5	9/16	18,00	2	58,37	80	28	9,00	11,0
Nº6	40,00	2	37,00	40	12	3,40	4,5	5/8	18,00	2	75,40	80	28	9,00	12,0
Nº8	36,00	2	37,00	40	12	3,40	4,5	3/4	16,00	2	101,29	95	32	11,00	14,0
Nº10	32,00	2	37,00	45	14	4,90	6,0	7/8	14,00	2	130,17	100	36	14,50	18,0
Nº12	28,00	2	38,73	50	14	4,90	6,0	1"	12,00	2	172,58	110	40	14,50	18,0
1/4	28,00	2	26,68	50	18	4,90	6,0	1*1/8	12,00	2	268,74	110	50	18,00	22,0
5/16	24,00	2	28,55	56	22	4,90	6,0	1*1/4	12,00	2	338,99	132	56	18,00	22,0
3/8	24,00	2	33,01	63	22	5,50	7,0	1*3/8	12,00	2	430,51	132	56	22,00	28,0
7/16	20,00	2	43,83	63	22	6,20	8,0	1*1/2	12,00	2	527,13	150	63	24,00	32,0

**2308/5 HSS DIN 2181 Izquierda / A gauche / Left hand**

**UNF**  
ANSI/ASME B1.1



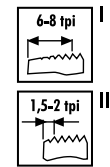
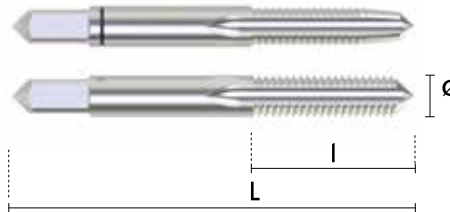
Tol. **2B**



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°  
Gewindebohrer 3° } **PVP = €12**



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
1/4	28,00	2	53,34	50	18	4,90	6,0	9/16	18,00	2	116,73	80	28	9,00	11,0
5/16	24,00	2	57,11	56	22	4,90	6,0	5/8	18,00	2	150,75	80	28	9,00	12,0
3/8	24,00	2	66,02	63	22	5,50	7,0	3/4	16,00	2	202,60	95	32	11,00	14,0
7/16	20,00	2	87,64	63	22	6,20	8,0	7/8	14,00	2	260,36	100	36	14,50	18,0
1/2	20,00	2	89,61	75	24	7,00	9,0	1"	12,00	2	345,16	110	40	14,50	18,0

**2315 HSS DIN 2184**

**UN**  
ANSI/ASME B1.1

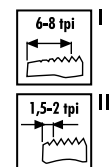
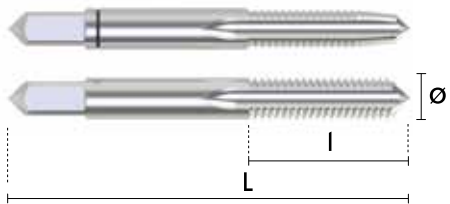


Tol. **2B**

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°  
Gewindebohrer 3° } **PVP = €12**



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
1"1/8	8,00	2	238,02	125	40	18,00	22,0	1"5/8	8,00	2	534,98	125	40	24,00	32,0
1"1/4	8,00	2	307,08	125	40	18,00	22,0	1"3/4	8,00	2	651,71	125	40	29,00	36,0
1"3/8	8,00	2	348,33	125	40	22,00	28,0	2"	8,00	2	698,29	140	40	32,00	40,0
1"1/2	8,00	2	457,36	125	40	24,00	32,0								



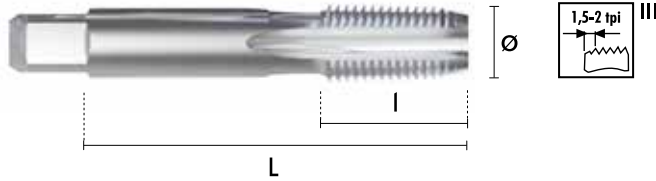
**2309 HSS DIN 5157**

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	Ø	P	Nº	€	L mm	l mm	mm	d mm
1/8	28,00	1	34,81	59	15	6,30	8,0	5/8	14,00	1	174,65	80	36	14,50	18,0
1/4	19,00	1	49,10	67	19	8,00	10,0	3/4	14,00	1	161,97	85	28	16,00	20,0
3/8	19,00	1	68,18	75	21	10,00	12,5	7/8	14,00	1	291,08	100	36	18,00	22,0
1/2	14,00	1	95,43	87	26	12,50	16,0	1"	11,00	1	246,57	109	33	20,00	25,0

**2310 HSS DIN 2181**

UNEF  
ANSI/ASME  
B1.1

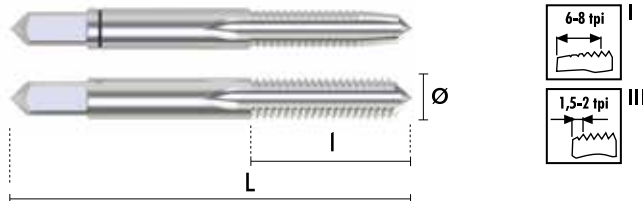


Tol.  
2B

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  
Tap 3º  
Gewindebohrer 3º } PVP = €/2



Ø	P	Nº	€	L mm	l mm	mm	d mm	Ø	P	Nº	€	L mm	l mm	mm	d mm
1/4	32,00	2	109,69	56	14	4,90	6,0	9/16	24,00	2	235,93	70	22	9,00	11,0
5/16	32,00	2	122,56	56	18	4,90	6,0	5/8	24,00	2	328,39	70	22	9,00	12,0
3/8	32,00	2	140,23	63	20	5,50	7,0	3/4	20,00	2	486,31	80	22	11,00	14,0
7/16	28,00	2	178,49	63	20	6,20	8,0	1"	20,00	2	695,82	90	22	14,50	18,0
1/2	28,00	2	201,69	70	22	7,00	9,0								

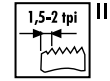
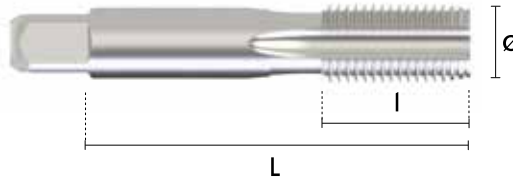
**2312 HSS DIN 40432**

**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	I mm	mm	d mm	PG	Ø	P	Nº	€	L mm	I mm	mm	d mm
7,0	12,5	20,00	1	36,62	70	22	7,00	9,0	21,0	28,3	16,00	1	125,20	90	22	18,00	22,0
9,0	15,2	18,00	1	46,56	70	22	9,00	12,0	29,0	37,0	16,00	1	248,56	100	25	22,00	28,0
11,0	18,6	18,00	1	64,64	80	22	11,00	14,0	36,0	47,0	16,00	1	415,20	140	40	29,00	36,0
13,5	20,4	18,00	1	70,90	80	22	12,00	16,0	42,0	54,0	16,00	1	493,09	140	40	32,00	40,0
16,0	22,5	18,00	1	85,12	80	22	14,50	18,0	48,0	59,3	16,00	1	621,85	160	40	35,00	45,0

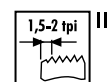
**2313 HSS**

**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	I mm	mm	d mm	Ø	P	Nº	€	L mm	I mm	mm	d mm
1/16	27,00	1	30,21	65	19	5,50	7,0	3/4	14,00	1	125,01	100	33	16,00	20,0
1/8	27,00	1	30,21	65	19	5,50	7,0	1"	11,50	1	139,19	110	38	20,00	25,0
1/4	18,00	1	42,37	70	25	9,00	11,0	1*1/4	11,50	1	228,22	125	41	24,00	32,0
3/8	18,00	1	58,46	75	26	9,00	12,0	1*1/2	11,50	1	346,79	140	42	29,00	36,0
1/2	14,00	1	81,76	80	31	12,00	16,0	2"	11,50	1	541,37	160	44	29,00	36,0

**2321 HSS DIN 352/2181**

M-MF  
DIN 13

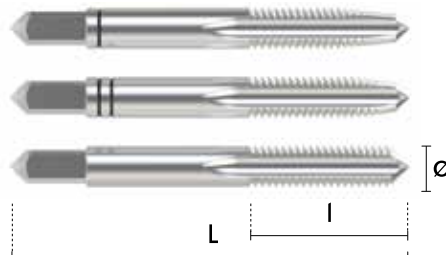


Tol.  
**6H**

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 3°  
Taraud 3°  
Tap 3°  
Gewindebohrer 3° } PVP = €/3



Ø	P	Nº	€	L mm	l mm	∠ mm	d mm	Ø	P	Nº	€	L mm	l mm	∠ mm	d mm
M2,0	0,40	3	36,81	36	8	2,10	2,8	M16,0	1,00	2	91,55	70	22	9,00	12,0
M2,5	0,45	3	38,08	40	9	2,10	2,8	M16,0	1,25	2	96,38	70	22	9,00	12,0
M3,0	0,50	3	20,16	40	11	2,70	3,5	M16,0	1,50	2	51,98	70	22	9,00	12,0
M4,0	0,70	3	18,56	45	13	3,40	4,5	M16,0	2,00	3	73,86	80	22	9,00	12,0
M5,0	0,80	3	20,17	50	16	4,90	6,0	M18,0	1,50	2	68,92	80	22	11,00	14,0
M6,0	1,00	3	20,17	56	19	4,90	6,0	M18,0	2,00	2	109,66	80	22	11,00	14,0
M7,0	1,00	3	27,84	56	19	4,90	6,0	M18,0	2,50	3	98,73	95	34	11,00	14,0
M8,0	1,00	2	23,10	63	22	4,90	6,0	M20,0	1,50	2	86,00	80	22	12,00	16,0
M8,0	1,25	3	24,28	63	22	4,90	6,0	M20,0	2,00	2	113,65	80	22	12,00	16,0
M9,0	1,00	2	29,85	63	22	5,50	7,0	M20,0	2,50	3	110,95	95	34	12,00	16,0
M9,0	1,25	3	43,09	63	22	5,50	7,0	M22,0	1,50	2	94,02	80	22	14,50	18,0
M10,0	1,00	2	25,05	63	20	5,50	7,0	M22,0	2,00	2	151,19	80	22	14,50	18,0
M10,0	1,25	2	25,50	70	24	5,50	7,0	M22,0	2,50	3	136,02	100	34	14,50	18,0
M10,0	1,50	3	30,67	70	24	5,50	7,0	M24,0	1,50	2	120,02	90	22	14,50	18,0
M11,0	1,00	2	44,27	63	20	6,20	8,0	M24,0	2,00	3	169,03	90	22	14,50	18,0
M11,0	1,25	2	44,27	70	24	6,20	8,0	M24,0	3,00	2	171,34	110	38	14,50	18,0
M11,0	1,50	3	59,42	70	24	6,20	8,0	M26,0	1,50	2	191,22	90	22	14,50	18,0
M12,0	1,00	2	43,73	70	22	7,00	9,0	M26,0	2,00	2	394,63	90	22	14,50	18,0
M12,0	1,25	2	43,91	70	22	7,00	9,0	M27,0	3,00	3	220,66	110	38	16,00	20,0
M12,0	1,50	2	37,35	70	22	7,00	9,0	M28,0	1,50	2	212,45	90	22	16,00	20,0
M12,0	1,75	3	39,87	75	28	7,00	9,0	M30,0	3,50	3	280,16	125	45	18,00	22,0
M14,0	1,00	2	65,42	70	22	9,00	11,0	M33,0	3,50	3	355,44	125	50	20,00	25,0
M14,0	1,25	2	53,67	70	22	9,00	11,0	M36,0	4,00	3	457,74	150	56	22,00	28,0
M14,0	1,50	2	41,69	70	22	9,00	11,0	M39,0	4,00	3	508,63	150	60	24,00	32,0
M14,0	2,00	3	52,46	80	30	9,00	11,0	M42,0	4,50	3	637,29	150	60	24,00	32,0

# MACHOS DE MANO PERFIL COMPLETO / TARAUDS À MAIN PROFIL COMPLET / HAND TAPS NON SERIAL FORM / VOLLPROFILHANDGEWINDEBOHRER

**2322**

**HSS DIN 352**

**UNC**  
ANSI/ASME  
B1.1

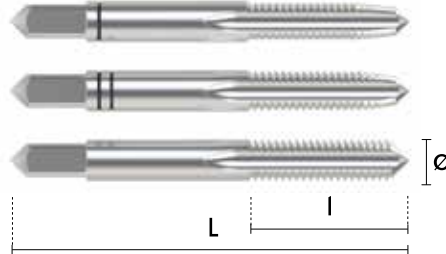


Tol.  
**2B**

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°  
Gewindebohrer 3° } PVP = €/3



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
Nº4	40,00	3	51,00	40	12	2,70	3,5	9/16	12,00	3	90,14	80	30	9,00	11,0
Nº5	40,00	3	48,76	40	12	2,70	3,5	5/8	11,00	3	124,35	80	32	9,00	12,0
Nº6	32,00	3	48,76	45	14	3,00	4,0	3/4	10,00	3	169,29	95	40	11,00	14,0
Nº18	32,00	3	48,76	45	14	3,40	4,5	7/8	9,00	3	208,51	100	40	14,50	18,0
Nº10	24,00	3	48,76	50	16	4,90	6,0	1"	8,00	3	281,60	110	50	14,50	18,0
Nº12	24,00	3	48,76	50	18	4,90	6,0	1 1/8	7,00	3	429,87	132	56	18,00	22,0
1/4	20,00	3	39,46	50	19	4,90	6,0	1 1/4	7,00	3	541,10	132	56	18,00	22,0
5/16	18,00	3	45,08	56	22	4,90	6,0	1 3/8	6,00	3	686,42	150	63	22,00	28,0
3/8	16,00	3	50,96	70	24	5,50	7,0	1 1/2	6,00	3	842,81	150	63	24,00	32,0
7/16	14,00	3	66,33	70	24	6,20	8,0	1 3/4	5,00	3	1049,96	160	70	29,00	36,0
1/2	13,00	3	76,35	75	29	7,00	9,0	2"	4,50	3	1207,03	190	80	32,00	40,0

**2323**

**HSS DIN 2181** Perfil completo / Profil complet / Non serial form

**UNF**  
ANSI/ASME  
B1.1

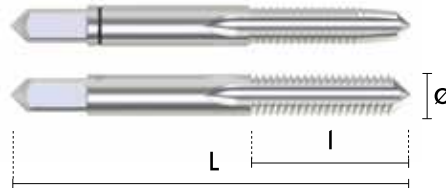


Tol.  
**2B**

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°  
Gewindebohrer 3° } PVP = €12



Ø	P	Nº	€	L mm	I mm	∠ mm	d mm	Ø	P	Nº	€	L mm	I mm	∠ mm	d mm
Nº4	48,00	2	38,73	36	11	2,70	3,5	1/2	20,00	2	44,82	75	24	7,00	9,0
Nº5	44,00	2	38,73	36	11	2,70	3,5	9/16	18,00	2	58,37	80	28	9,00	11,0
Nº6	40,00	2	37,00	40	12	3,40	4,5	5/8	18,00	2	75,40	80	28	9,00	12,0
Nº8	36,00	2	37,00	40	12	3,40	4,5	3/4	16,00	2	101,29	95	32	11,00	14,0
Nº10	32,00	2	37,00	45	14	4,90	6,0	7/8	14,00	2	130,17	100	36	14,50	18,0
Nº12	28,00	2	38,73	50	14	4,90	6,0	1"	12,00	2	172,58	110	40	14,50	18,0
1/4	28,00	2	26,68	50	18	4,90	6,0	1 1/8	12,00	2	268,74	110	50	18,00	22,0
5/16	24,00	2	28,55	56	22	4,90	6,0	1 1/4	12,00	2	338,99	132	56	18,00	22,0
3/8	24,00	2	33,01	63	22	5,50	7,0	1 3/8	12,00	2	430,51	132	56	22,00	28,0
7/16	20,00	2	43,83	63	22	6,20	8,0	1 1/2	12,00	2	527,13	150	63	24,00	32,0

**2501**

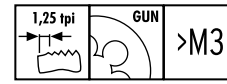
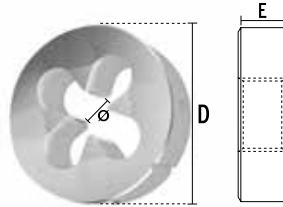
**HSS DIN EN 22568**

**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	53,96	16	5	1
** M1,1	0,25	89,10	16	5	1
** M1,2	0,25	83,60	16	5	1
** M1,4	0,30	76,60	16	5	1
M1,6	0,35	72,38	16	5	1
M1,7	0,35	72,38	16	5	1
M1,8	0,35	72,38	16	5	1
M2,0	0,40	30,63	16	5	1
M2,2	0,45	71,70	16	5	1
M2,3	0,40	30,63	16	5	1
M2,5	0,45	30,63	16	5	1
M2,6	0,45	30,63	16	5	1
M3,0	0,50	26,34	20	5	1
M3,0	0,60	34,21	20	5	1
M3,5	0,60	27,19	20	5	1
M3,5	0,75	88,25	20	5	1
M4,0	0,50	32,53	20	5	1
M4,0	0,70	26,34	20	5	1
M4,5	0,75	35,52	20	7	1
M5,0	0,50	35,88	20	5	1
M5,0	0,75	38,10	20	7	1
M5,0	0,80	26,34	20	7	1
M5,5	0,90	88,25	20	7	1
M6,0	0,50	34,92	20	7	1
M6,0	0,75	32,25	20	7	1
M6,0	1,00	26,34	20	7	1
M7,0	0,75	34,02	25	9	1
M7,0	1,00	28,72	25	9	1
M8,0	0,50	41,92	25	9	1
M8,0	0,75	34,02	25	9	1
M8,0	1,00	34,02	25	9	1
M8,0	1,25	27,52	25	9	1
M9,0	1,00	37,92	25	9	1
M9,0	1,25	40,50	25	9	1
M10,0	0,50	71,51	30	11	1
M10,0	0,75	52,97	30	11	1
M10,0	1,00	36,06	30	11	1
M10,0	1,25	45,17	30	11	1
M10,0	1,50	39,27	30	11	1
M11,0	0,75	97,92	30	11	1
M11,0	1,00	52,68	30	11	1
M11,0	1,25	56,46	30	11	1
M11,0	1,50	52,66	30	11	1
M12,0	0,75	61,20	38	10	1
M12,0	1,00	52,66	38	10	1
M12,0	1,25	52,66	38	10	1
M12,0	1,50	47,03	38	10	1

Ø	P	€	D mm	E mm	
M12,0	1,75	43,17	38	14	1
M13,0	0,75	97,92	38	10	1
M13,0	1,00	61,90	38	10	1
M13,0	1,50	64,56	38	10	1
M13,0	1,75	64,56	38	14	1
M14,0	0,75	96,20	38	10	1
M14,0	1,00	57,78	38	10	1
M14,0	1,25	57,41	38	10	1
M14,0	1,50	49,17	38	10	1
M14,0	2,00	43,17	38	14	1
M15,0	1,00	70,17	38	10	1
M15,0	1,50	70,17	38	10	1
M15,0	2,00	86,53	38	14	1
M16,0	1,00	73,04	45	14	1
M16,0	1,25	66,41	45	14	1
M16,0	1,50	54,74	45	14	1
M16,0	2,00	58,00	45	18	1
M17,0	1,00	104,43	45	14	1
M17,0	1,25	104,43	45	14	1
M17,0	1,50	104,43	45	14	1
M18,0	1,00	76,37	45	14	1
M18,0	1,25	86,81	45	14	1
M18,0	1,50	67,54	45	14	1
M18,0	2,00	76,37	45	14	1
M18,0	2,50	58,00	45	18	1
M19,0	1,00	169,27	45	14	1
M19,0	1,25	169,27	45	14	1
M19,0	1,50	172,30	45	14	1
M20,0	1,00	76,06	45	14	1
M20,0	1,25	169,27	45	14	1
M20,0	1,50	69,71	45	14	1
M20,0	2,00	76,61	45	14	1
M20,0	2,50	58,00	45	18	1
M21,0	1,00	196,34	45	16	1
M21,0	1,25	196,34	45	14	1
M21,0	1,50	161,83	45	14	1
M22,0	1,00	103,86	55	16	1
M22,0	1,25	169,27	55	16	1
M22,0	1,50	89,35	55	16	1
M22,0	2,00	99,41	55	16	1
M22,0	2,50	85,33	55	22	1
M23,0	1,50	196,34	55	16	1
M24,0	1,00	99,41	55	16	1
M24,0	1,25	169,27	55	16	1
M24,0	1,50	89,35	55	16	1
M24,0	2,00	99,41	55	16	1
M24,0	3,00	85,33	55	22	1

\*\*Tol. 6h

(continúa Ref.2501 / suite Réf.2501 / Ref.2501 cont'd)

(continúa Ref.2501 / suite Réf.2501 / Ref.2501 cont'd)

Ø	P	€	D mm	E mm	
M25,0	1,00	153,73	55	16	1
M25,0	1,50	129,80	55	16	1
M26,0	1,00	223,00	55	16	1
M26,0	1,50	122,86	55	16	1
M26,0	2,00	223,00	55	16	1
M27,0	1,00	137,24	65	18	1
M27,0	1,50	135,12	65	18	1
M27,0	2,00	146,95	65	18	1
<b>M27,0</b>	<b>3,00</b>	<b>122,86</b>	<b>65</b>	<b>25</b>	<b>1</b>
M28,0	1,00	223,00	65	18	1
M28,0	1,50	135,12	65	18	1
M28,0	2,00	223,00	65	18	1
M30,0	1,00	150,89	65	18	1
M30,0	1,50	135,09	65	18	1
M30,0	2,00	150,89	65	18	1
<b>M30,0</b>	<b>3,50</b>	<b>126,75</b>	<b>65</b>	<b>25</b>	<b>1</b>
M32,0	1,00	226,98	65	18	1
M32,0	1,50	142,76	65	18	1
M32,0	2,00	223,00	65	18	1
M33,0	1,50	135,12	65	18	1
M33,0	2,00	147,14	65	18	1
<b>M33,0</b>	<b>3,50</b>	<b>126,75</b>	<b>65</b>	<b>25</b>	<b>1</b>
M34,0	1,50	140,96	65	18	1
M34,0	2,00	316,23	65	18	1
M35,0	1,50	146,23	65	18	1
M35,0	2,00	316,23	65	18	1
M36,0	1,50	138,40	65	18	1
M36,0	2,00	147,14	65	18	1
M36,0	3,00	160,13	65	25	1
<b>M36,0</b>	<b>4,00</b>	<b>131,42</b>	<b>65</b>	<b>25</b>	<b>1</b>

Ø	P	€	D mm	E mm	
M38,0	1,50	209,34	75	20	1
M38,0	2,00	400,73	75	20	1
M39,0	1,50	210,36	75	20	1
M39,0	2,00	222,12	75	20	1
M39,0	3,00	252,42	75	30	1
<b>M39,0</b>	<b>4,00</b>	<b>197,27</b>	<b>75</b>	<b>30</b>	<b>1</b>
M40,0	1,50	218,40	75	20	1
M40,0	2,00	222,12	75	20	1
M40,0	3,00	242,26	75	30	1
M42,0	1,50	287,10	75	20	1
M42,0	2,00	320,94	75	20	1
M42,0	3,00	334,83	75	30	1
<b>M42,0</b>	<b>4,50</b>	<b>197,27</b>	<b>75</b>	<b>30</b>	<b>1</b>
M45,0	1,50	287,10	90	22	1
M45,0	2,00	320,94	90	22	1
M45,0	3,00	334,83	90	36	1
<b>M45,0</b>	<b>4,50</b>	<b>301,70</b>	<b>90</b>	<b>36</b>	<b>1</b>
M48,0	1,50	288,91	90	22	1
M48,0	2,00	295,35	90	22	1
M48,0	3,00	320,94	90	36	1
<b>M48,0</b>	<b>5,00</b>	<b>302,06</b>	<b>90</b>	<b>36</b>	<b>1</b>
M50,0	1,50	287,10	90	22	1
M52,0	1,50	287,10	90	22	1
M52,0	2,00	333,67	90	22	1
M52,0	3,00	364,14	90	36	1
<b>M52,0</b>	<b>5,00</b>	<b>302,06</b>	<b>90</b>	<b>36</b>	<b>1</b>
<b>M56,0</b>	<b>5,50</b>	<b>539,26</b>	<b>105</b>	<b>36</b>	<b>1</b>
<b>M60,0</b>	<b>5,50</b>	<b>539,26</b>	<b>105</b>	<b>36</b>	<b>1</b>
M63,0	1,50	1017,80	105	22	1
<b>M64,0</b>	<b>6,00</b>	<b>644,81</b>	<b>120</b>	<b>36</b>	<b>1</b>

**2501/5**

**HSS DIN EN 22568**

Izquierda / A gauche / Left hand

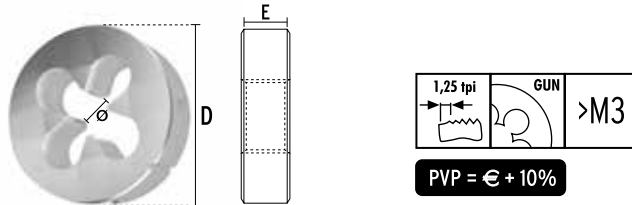
**M-MF**  
**DIN 13**

**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



Ø	P	€	D mm	E mm	
M3,0	0,50	52,68	20	5	1
M4,0	0,70	52,68	20	5	1
M5,0	0,80	52,68	20	7	1
M6,0	1,00	52,68	20	7	1
M7,0	1,00	57,43	25	9	1
M8,0	1,00	67,99	25	9	1
M8,0	1,25	55,02	25	9	1
M10,0	1,00	72,14	30	11	1
M10,0	1,25	90,34	30	11	1
M10,0	1,50	78,56	30	11	1
M12,0	1,25	105,32	38	10	1
M12,0	1,50	78,56	38	10	1
M12,0	1,75	86,34	38	14	1
M14,0	1,50	98,38	38	10	1

Ø	P	€	D mm	E mm	
M14,0	2,00	86,33	38	14	1
M16,0	1,50	109,49	45	14	1
M16,0	2,00	116,01	45	18	1
M18,0	1,50	135,09	45	14	1
M18,0	2,50	116,01	45	18	1
M20,0	1,50	139,40	45	14	1
M20,0	2,50	116,01	45	18	1
M22,0	1,50	178,72	55	16	1
M22,0	2,50	170,66	55	22	1
M24,0	1,50	178,72	55	16	1
M24,0	3,00	170,66	55	22	1
M27,0	3,00	245,71	65	25	1
M30,0	3,50	253,51	65	25	1

**2514**

**HSSE DIN EN 22568**

**M**  
**DIN 13**

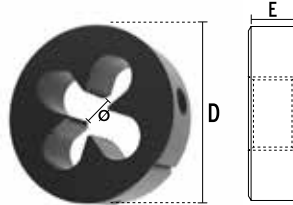
**Tol.**  
**6g**

**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
●	●	○		○						○							

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



∅	P	€	D mm	E mm	
M3,0	0,50	42,22	20	5	1
M4,0	0,70	42,22	20	5	1
M5,0	0,80	42,22	20	7	1
M6,0	1,00	42,22	20	7	1
M8,0	1,25	44,11	25	9	1

∅	P	€	D mm	E mm	
M10,0	1,50	62,92	30	11	1
M12,0	1,75	69,18	38	14	1
M14,0	2,00	71,94	38	14	1
M16,0	2,00	96,61	45	18	1

**2512**

**HSSE DIN EN 22568**

**M**  
**DIN 13**

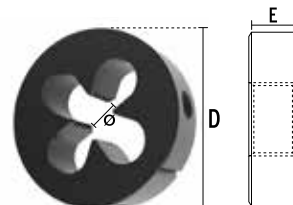
**Tol.**  
**6g**

**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



∅	P	€	D mm	E mm	
M3,0	0,50	35,85	20	5	1
M4,0	0,70	35,85	20	5	1
M5,0	0,80	35,85	20	7	1
M6,0	1,00	35,85	20	7	1
M8,0	1,25	37,45	25	9	1
M10,0	1,50	53,48	30	11	1

∅	P	€	D mm	E mm	
M12,0	1,75	58,79	38	14	1
M14,0	2,00	59,96	38	14	1
M16,0	2,00	80,51	45	18	1
M18,0	2,50	80,51	45	18	1
M20,0	2,50	80,51	45	18	1

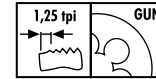
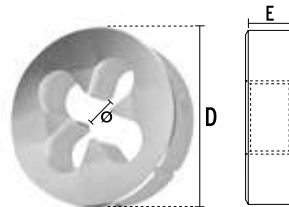


**2502 HSS DIN EN 22568**

**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	36,28	16	5	1
1/8	40,00	29,42	20	5	1
5/32	32,00	29,42	20	7	1
3/16	24,00	29,42	20	7	1
7/32	24,00	29,42	20	7	1
1/4	20,00	29,42	20	7	1
5/16	18,00	30,68	25	9	1
3/8	16,00	44,44	30	11	1
7/16	14,00	44,44	30	11	1
1/2	12,00	44,44	38	14	1
9/16	12,00	53,23	38	14	1
5/8	11,00	64,65	45	18	1

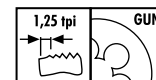
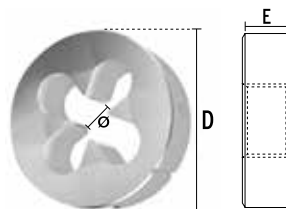
Ø	P	€	D mm	E mm	
3/4	10,00	64,64	45	18	1
7/8	9,00	95,07	55	22	1
1"	8,00	95,07	55	22	1
1*1/8	7,00	149,67	65	25	1
1*1/4	7,00	149,67	65	25	1
1*3/8	6,00	152,44	65	25	1
1*1/2	6,00	231,69	75	30	1
1*5/8	5,00	307,97	75	30	1
1*3/4	5,00	387,57	90	36	1
1*7/8	4,50	424,05	90	36	1
2"	4,50	403,69	90	36	1

**2502/5 HSS DIN EN 22568 Izquierda / A gauche / Left hand / Links**

**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	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	58,83	20	5	1
5/32	32,00	58,83	20	5	1
3/16	24,00	58,83	20	7	1
1/4	20,00	58,83	20	7	1
5/16	18,00	61,36	25	9	1
3/8	16,00	88,87	30	11	1

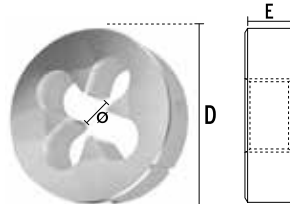
Ø	P	€	D mm	E mm	
7/16	14,00	88,87	38	11	1
1/2	12,00	88,87	38	14	1
9/16	12,00	106,47	38	14	1
5/8	11,00	129,32	45	18	1
7/8	9,00	190,16	55	22	1
1"	8,00	190,16	55	22	1

**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	133,13	20	7	1
1/4	26,00	46,35	20	7	1
5/16	22,00	46,22	25	9	1
3/8	20,00	81,05	30	11	1
7/16	18,00	81,05	30	11	1
1/2	16,00	81,05	38	10	1

Ø	P	€	D mm	E mm	
9/16	16,00	90,38	38	10	1
5/8	14,00	114,19	45	14	1
3/4	12,00	114,19	45	14	1
7/8	11,00	168,85	55	22	1
1"	10,00	168,85	55	22	1

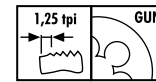
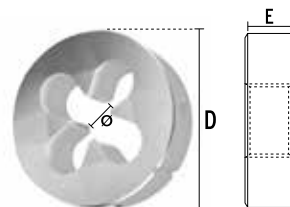
\*(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)

**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	47,34	30	11	1
1/4	19,00	47,34	38	10	1
3/8	19,00	61,20	45	14	1
1/2	14,00	61,20	45	14	1
5/8	14,00	84,86	55	16	1
3/4	14,00	126,85	55	16	1
7/8	14,00	132,79	65	18	1

Ø	P	€	D mm	E mm	
1"	11,00	132,79	65	18	1
1*1/8	11,00	189,27	75	20	1
1*1/4	11,00	186,28	75	20	1
1*3/8	11,00	293,64	90	22	1
1*1/2	11,00	285,36	90	22	1
1*3/4	11,00	293,64	105	22	1
2"	11,00	353,40	105	22	1

**2504/5**

**HSS DIN EN 24231**

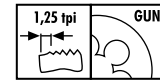
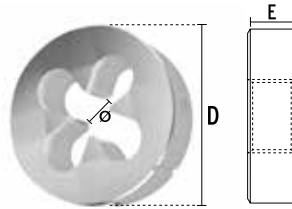
Izquierda / A gauche / Left hand / Links

**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	94,65	30	11	1
1/4	19,00	94,65	38	10	1
3/8	19,00	122,40	45	14	1
1/2	14,00	122,40	45	14	1

Ø	P	€	D mm	E mm	
5/8	14,00	169,76	55	16	1
3/4	14,00	253,72	55	16	1
7/8	14,00	265,58	65	18	1
1"	11,00	265,58	65	18	1

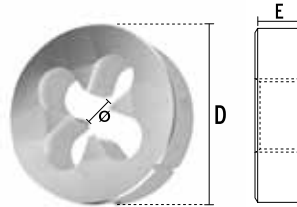
**2522**

**HSS DIN EN 24231**



P				M		K			N				S		H		
<800	<1.000	<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	56,28	30	11	1
1/4	19,00	56,28	38	10	1
3/8	19,00	72,82	45	14	1
1/2	14,00	72,82	45	14	1

Ø	P	€	D mm	E mm	
5/8	14,00	115,00	55	16	1
3/4	14,00	150,82	55	16	1
7/8	14,00	157,89	65	18	1
1"	11,00	157,89	65	18	1

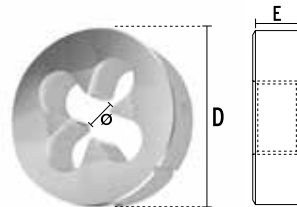
**2521**

**HSS DIN EN 24231**



P				M		K			N				S		H		
<800	<1.000	<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	61,89	30	11	1
1/4	19,00	61,89	38	10	1
3/8	19,00	80,09	45	14	1
1/2	14,00	80,09	45	14	1

Ø	P	€	D mm	E mm	
5/8	14,00	159,78	55	16	1
3/4	14,00	165,90	55	16	1
7/8	14,00	201,69	65	18	1
1"	11,00	201,69	65	18	1

**2505**

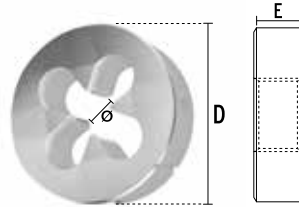
**HSS DIN EN 22568**

**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	37,81	20	5	1
N°5	40,00	37,81	20	5	1
N°6	32,00	37,81	20	5	1
N°8	32,00	37,81	20	7	1
N°10	24,00	37,81	20	7	1
N°12	24,00	37,81	20	7	1
1/4	20,00	34,80	20	7	1
5/16	18,00	34,02	25	9	1
3/8	16,00	50,09	30	11	1
7/16	14,00	50,09	30	11	1
1/2	13,00	51,55	38	14	1

Ø	P	€	D mm	E mm	📦
9/16	12,00	53,93	38	14	1
5/8	11,00	70,78	45	18	1
3/4	10,00	70,78	45	18	1
7/8	9,00	92,58	55	22	1
1"	8,00	92,58	55	22	1
1*1/8	7,00	137,50	65	25	1
1*1/4	7,00	137,50	65	25	1
1*3/8	6,00	137,50	65	25	1
1*1/2	6,00	214,41	75	30	1
1*3/4	5,00	459,44	90	36	1
2"	4,50	465,64	90	36	1

**2505/5**

**HSS DIN EN 22568**

Izquierda / A gauche / Left hand / Links

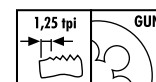
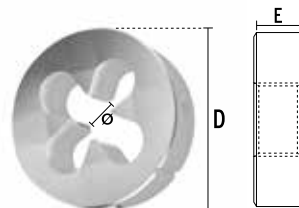
**UNC**  
ANSI/ASME  
B1.1

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	📦
1/4	20,00	69,61	20	7	1
5/16	18,00	67,99	25	9	1
3/8	16,00	100,18	30	11	1
7/16	14,00	100,18	30	11	1
1/2	13,00	103,07	38	14	1

Ø	P	€	D mm	E mm	📦
9/16	12,00	107,90	38	14	1
5/8	11,00	141,55	45	18	1
3/4	10,00	141,55	45	18	1
7/8	9,00	185,19	55	22	1
1"	7,00	185,19	55	22	1

**2506**

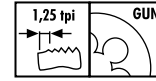
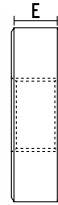
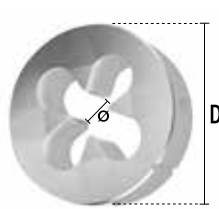
**HSS DIN EN 22568**

**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	38,14	16	5	1
Nº5	44,00	38,14	20	5	1
Nº6	40,00	38,14	20	5	1
Nº8	36,00	38,14	20	7	1
Nº10	32,00	38,14	20	7	1
Nº12	28,00	37,40	20	7	1
1/4	28,00	30,21	20	7	1
5/16	24,00	35,91	25	9	1
3/8	24,00	50,40	30	11	1
7/16	20,00	46,34	30	11	1

Ø	P	€	D mm	E mm	
1/2	20,00	52,92	38	10	1
9/16	18,00	56,99	38	10	1
5/8	18,00	72,83	45	14	1
3/4	16,00	72,83	45	14	1
7/8	14,00	97,82	55	16	1
1"	12,00	97,82	55	16	1
1*1/8	12,00	150,65	65	18	1
1*1/4	12,00	150,65	65	18	1
1*3/8	12,00	225,31	65	18	1
1*1/2	12,00	225,31	75	20	1

**2506/5**

**HSS DIN EN 22568**

Izquierda / A gauche / Left hand / Links

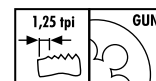
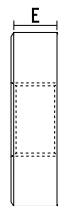
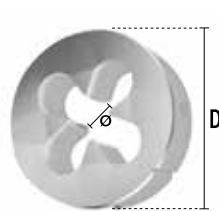
**UNF**  
ANSI/ASME B1.1

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	
1/4	28,00	60,44	20	7	1
5/16	24,00	71,84	25	9	1
3/8	24,00	100,80	30	11	1
7/16	20,00	92,69	30	11	1
1/2	20,00	105,82	38	10	1

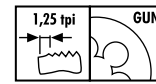
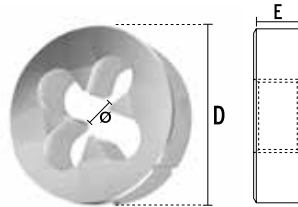
Ø	P	€	D mm	E mm	
9/16	18,00	113,97	38	10	1
5/8	18,00	145,65	45	14	1
3/4	16,00	145,65	45	14	1
7/8	14,00	195,62	55	16	1
1"	12,00	195,62	55	16	1

**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	Icon
1/8	28,00	111,38	30	11	1
1/4	19,00	111,38	38	14	1
3/8	19,00	145,08	45	18	1

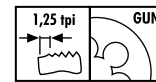
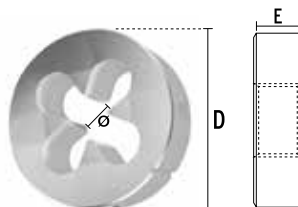
Ø	P	€	D mm	E mm	Icon
1/2	14,00	145,08	55	22	1
3/4	14,00	273,93	55	22	1
1"	11,00	291,86	65	25	1

**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%**

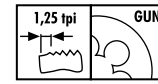
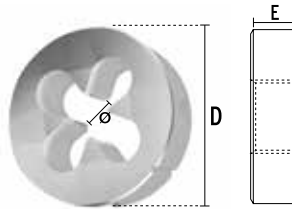
Ø	P	€	D mm	E mm	Icon
1/4	32,00	113,87	20	7	1
5/16	32,00	113,87	25	9	1
3/8	32,00	176,79	30	11	1
7/16	28,00	176,79	30	11	1
1/2	28,00	176,79	38	10	1

Ø	P	€	D mm	E mm	Icon
9/16	24,00	176,79	38	12	1
5/8	24,00	283,36	45	14	1
3/4	20,00	283,36	45	14	1
1"	20,00	346,32	55	16	1

**2520** **HSS DIN EN 22568** **UN** **Tol. 2A**  
ANSI/ASME B1.1

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%

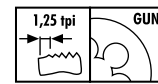
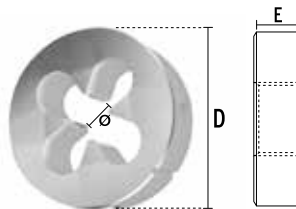
Ø	P	€	D mm	E mm	
1"1/8	8,00	376,78	65	25	1
1"1/4	8,00	376,78	65	25	1
1"3/8	8,00	404,19	65	25	1
1"1/2	8,00	427,78	75	30	1

Ø	P	€	D mm	E mm	
1"5/8	8,00	539,51	75	30	1
1"3/4	8,00	656,25	90	36	1
2"	8,00	656,25	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	67,63	38	10	1
9,0	15,2	18,00	67,63	45	14	1
11,0	18,6	18,00	84,70	45	14	1
13,5	20,4	18,00	84,70	45	14	1
16,0	22,5	18,00	109,21	55	16	1

Pg	Ø	P	€	D mm	E mm	
21,0	28,3	16,00	155,23	65	18	1
29,0	37,0	16,00	155,23	65	18	1
36,0	47,0	16,00	397,84	90	22	1
42,0	54,0	16,00	397,84	105	22	1
48,0	59,3	16,00	527,62	105	22	1



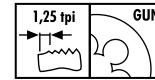
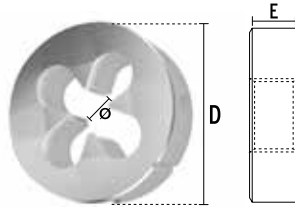
**2509**

**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	86,09	25	9	1
1/8	27,00	71,03	30	11	1
1/4	18,00	71,03	38	14	1
3/8	18,00	92,76	45	18	1
1/2	14,00	92,76	45	18	1

Ø	P	€	D mm	E mm	
3/4	14,00	169,64	55	22	1
1"	11,50	203,98	65	25	1
1"1/4	11,50	253,47	75	25	1
1"1/2	11,50	353,58	90	25	1
2"	11,50	492,30	105	25	1

# INSERTOS ROSCADOS FILETS RAPPORTÉES / WIRE THREAD INSERTS / EINSÄTZE MIT GEWINDE

2701

HSS ISO 529

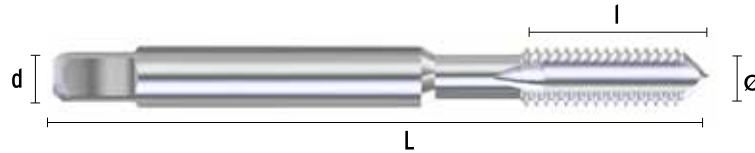
Tol.  
4H

EG-M  
(ST)

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	13,92	44,5	9,5	2,24	2,80
M2,2	0,45	13,92	44,5	9,5	2,24	2,80
M2,5	0,45	13,92	48	11	2,50	3,15
M3,0	0,50	9,03	53	13	3,15	4,00
M3,5	0,60	9,03	53	13	3,55	4,50
M4,0	0,70	10,96	58	16	4,00	5,00
M5,0	0,80	11,32	66	19	5,00	6,30
M6,0	1,00	11,32	72	22	6,30	8,00
M7,0	1,00	18,22	72	22	7,10	9,00
M8,0	1,00	18,22	80	24	8,00	10,00
M8,0	1,25	15,65	80	24	8,00	10,00
M9,0	1,25	22,64	85	25	6,30	8,00
M10,0	1,00	22,09	85	25	6,30	8,00
M10,0	1,25	22,09	85	25	6,30	8,00
M10,0	1,50	20,34	89	29	7,10	9,00
M11,0	1,50	25,96	89	29	7,10	9,00
M12,0	1,00	31,58	95	30	9,00	11,20
M12,0	1,25	31,58	95	30	9,00	11,20
M12,0	1,50	31,58	95	30	9,00	11,20
M12,0	1,75	22,38	95	30	9,00	11,20

Ø	P	€	L mm	l mm	∠ mm	d mm
M14,0	1,25	36,99	102	32	10,00	12,50
M14,0	1,50	36,99	102	32	10,00	12,50
M14,0	1,75	36,99	102	32	10,00	12,50
M14,0	2,00	31,01	102	32	10,00	12,50
M15,0	1,50	38,90	102	32	10,00	12,50
M15,0	2,00	38,90	112	37	11,20	14,00
M16,0	1,50	38,90	104	29	11,20	14,00
M16,0	2,00	38,90	112	37	11,20	14,00
M18,0	1,50	38,90	104	29	11,20	14,00
M18,0	2,00	48,64	104	29	11,20	14,00
M18,0	2,50	48,64	118	38	12,50	16,00
M20,0	1,50	53,95	113	33	12,50	16,00
M20,0	2,00	53,95	113	33	12,50	16,00
M20,0	2,50	53,95	118	38	12,50	16,00
M22,0	1,50	60,96	120	35	14,00	18,00
M22,0	2,00	60,96	120	35	14,00	18,00
M22,0	2,50	60,96	130	45	14,00	18,00
M24,0	1,50	76,83	120	35	14,00	18,00
M24,0	2,00	76,83	127	37	16,00	20,00
M24,0	3,00	76,83	138	48	16,00	20,00

# INSERTOS ROSCADOS FILETS RAPPORTEES / WIRE THREAD INSERTS / EINSÄTZE MIT GEWINDE

**2702**

**HSS ISO 529**

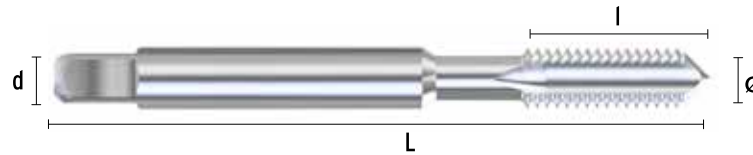
**Tol. 3B**

**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
N°2	56,00	22,83	48	9,5	2,50	3,15
N°4	40,00	22,83	53	13	3,15	4,00
N°6	32,00	22,83	58	16	4,00	5,00
N°8	32,00	22,83	62	17	4,50	5,60
N°10	24,00	15,27	66	19	5,00	6,30
N°12	24,00	15,27	66	19	5,60	7,10
1/4	20,00	15,27	72	22	6,30	8,00
5/16	18,00	16,11	80	24	8,00	10,00
3/8	16,00	17,39	85	25	6,30	8,00

Ø	P	€	L mm	l mm	∠ mm	d mm
7/16	14,00	24,57	95	30	9,00	11,20
1/2	13,00	26,43	102	32	10,00	12,50
9/16	12,00	41,04	112	37	11,20	14,00
5/8	11,00	49,25	112	37	11,20	14,00
11/16	11,00	65,52	112	37	11,20	14,00
3/4	10,00	65,52	118	38	12,50	16,00
7/8	9,00	75,83	130	45	14,00	18,00
1"	8,00	75,83	138	48	16,00	20,00

**2703**

**HSS ISO 529**

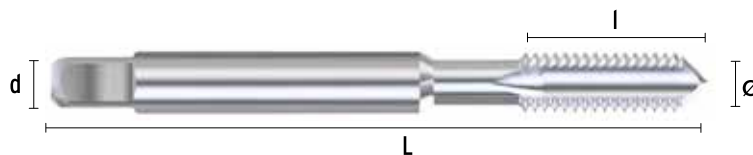
**Tol. 3BH**

**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
N°4	48,00	22,83	53	13	3,15	4,00
N°6	40,00	22,83	53	13	3,55	4,50
N°8	36,00	22,83	62	17	4,50	5,60
N°10	32,00	15,27	66	19	5,00	6,30
1/4	28,00	15,27	69	19	6,30	8,00
5/16	24,00	16,11	76	20	8,00	10,00
3/8	24,00	17,39	82	22	6,30	8,00
7/16	20,00	24,57	84	24	7,10	9,00

Ø	P	€	L mm	l mm	∠ mm	d mm
1/2	20,00	26,43	90	25	9,00	11,20
9/16	18,00	41,04	104	29	10,00	12,50
5/8	18,00	49,25	104	29	11,20	14,00
3/4	16,00	65,52	104	29	11,20	14,00
7/8	14,00	75,83	120	35	14,00	18,00
1"	14,00	75,83	127	37	16,00	20,00
1"	12,00	75,83	127	37	16,00	20,00

**2704**

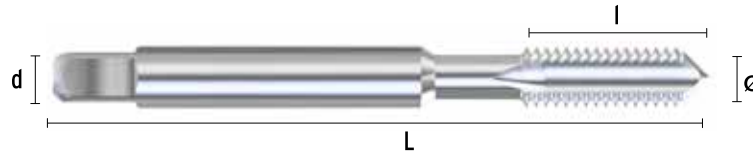
**HSS ISO 529**

**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	I mm	∅ mm	d mm
1/8	40,00	15,27	53	13	3,15	4,00
3/16	24,00	15,27	66	19	5,00	6,30
1/4	20,00	15,27	72	22	6,30	8,00
5/16	18,00	16,11	80	24	8,00	10,00
3/8	16,00	17,39	85	25	6,30	8,00
7/16	14,00	24,57	95	30	9,00	11,20
1/2	12,00	26,43	102	32	10,00	12,50

Ø	P	€	L mm	I mm	∅ mm	d mm
9/16	12,00	41,04	102	32	10,00	12,50
5/8	11,00	49,25	112	37	11,20	14,00
11/16	11,00	65,52	112	37	11,20	14,00
3/4	10,00	65,52	118	38	12,50	16,00
7/8	9,00	75,83	130	45	14,00	18,00
1"	8,00	75,83	138	48	16,00	20,00

**2715**

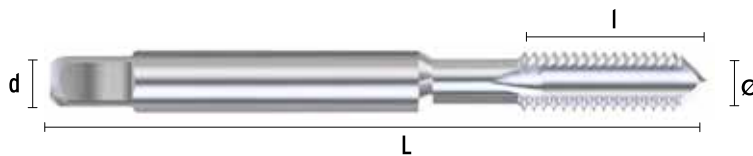
**HSS ISO 529**

**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



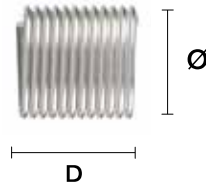
Ø	P	€	L mm	I mm	∅ mm	d mm
1/8	28,00	17,76	59	15	6,30	8,00
1/4	19,00	20,15	67	19	9,00	11,20

Ø	P	€	L mm	I mm	∅ mm	d mm
3/8	19,00	26,52	75	21	11,20	14,00
1/2	14,00	42,96	87	26	12,50	16,00

**2705** > **DIN 8140**

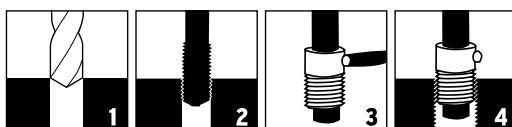
**M**  
 DIN 8140

Tol.  
**6H**



Ø	P	Dmm.					
		1,0 Ø €	1,5 Ø €	2,0 Ø €	2,5 Ø* €	3,0 Ø* €	
M2,0	0,40	0,40	0,42	0,43	0,46	0,51	10
M2,2	0,45	0,38	0,40	0,42	0,43	0,38	10
M2,5	0,45	0,32	0,36	0,38	0,40	0,43	10
M3,0	0,50	0,29	0,30	0,32	0,40	0,43	10
M3,5	0,60	0,38	0,40	0,42	0,43	0,48	10
M4,0	0,70	0,29	0,30	0,32	0,38	0,42	10
M5,0	0,80	0,29	0,30	0,32	0,38	0,42	10
M6,0	1,00	0,29	0,30	0,32	0,38	0,42	10
M7,0	1,00	0,32	0,36	0,38	0,46	0,51	10
M8,0	1,00	0,36	0,40	0,48	0,67	0,78	10
M8,0	1,25	0,32	0,40	0,46	0,57	0,69	10
M9,0	1,25	0,50	0,57	0,70	0,88	1,02	10
M10,0	1,00	0,38	0,46	0,60	0,85	1,02	10
M10,0	1,25	0,38	0,46	0,60	0,85	1,02	10
M10,0	1,50	0,38	0,46	0,60	0,74	0,90	10
M11,0	1,50	0,51	0,81	1,08	1,47	1,82	10
M12,0	1,00	0,46	0,72	0,96	1,47	1,82	10
M12,0	1,25	0,46	0,72	0,96	1,47	1,82	10
M12,0	1,50	0,46	0,72	0,96	1,47	1,82	10
M12,0	1,75	0,46	0,72	0,96	1,30	1,62	10
M14,0	1,00	1,12	1,42	1,82	2,26	2,60	10
M14,0	1,25	1,12	1,42	1,82	2,26	2,60	10
M14,0	1,50	1,12	1,42	1,82	2,26	2,60	10
M14,0	2,00	0,80	1,01	1,28	2,26	2,60	10
M16,0	1,50	1,51	1,87	2,31	2,80	3,29	10
M16,0	2,00	1,06	1,31	1,62	2,80	3,32	10
M18,0	1,50	2,05	2,67	3,25	3,86	4,43	10
M18,0	2,00	2,05	2,67	3,28	3,86	4,41	10
M18,0	2,50	1,63	2,16	2,61	3,86	4,41	10
M20,0	1,50	2,47	3,23	3,92	5,07	5,82	10
M20,0	2,00	2,47	3,23	3,92	5,07	5,82	10
M20,0	2,50	1,98	2,59	3,14	5,07	5,82	10
M22,0	1,50	3,41	4,27	5,29	6,86	7,98	5
M22,0	2,00	3,41	4,27	5,29	6,86	7,98	5
M22,0	2,50	2,73	3,41	4,23	6,86	7,98	5
M24,0	1,50	4,27	5,60	6,81			5
M24,0	2,00	4,27	5,60	6,81			5
M24,0	3,00	4,27	5,60	6,81			5

\* Bajo pedido  
 Sur commande  
 To-order



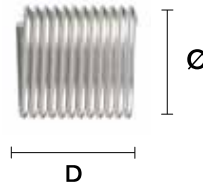
**MODO DE EMPLEO / MODE D'EMPLOI / HOW TO USE**

- 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

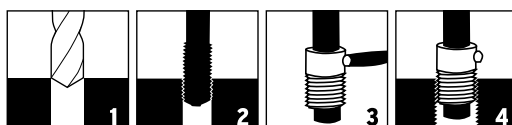
UNC  
ANSI/ASME  
B18.29.1

ToL.  
**2B**



Ø	P	Dmm.					
		1,0 Ø €	1,5 Ø €	2,0 Ø €	2,5 Ø* €	3,0 Ø* €	
Nº 2	56,00	0,67	0,57	0,81	0,88	0,95	10
Nº 4	40,00	0,51	0,46	0,57	0,69	0,74	10
Nº 5	40,00	0,56	0,51	0,65	0,74	0,84	10
Nº 6	32,00	0,51	0,46	0,57	0,69	0,74	10
Nº 8	32,00	0,51	0,46	0,57	0,70	0,81	10
Nº 10	24,00	0,51	0,56	0,57	0,70	0,81	10
Nº 12	24,00	0,57	0,60	0,70	0,69	0,74	10
1/4	20,00	0,51	0,46	0,57	0,72	0,72	10
5/16	18,00	0,57	0,56	0,69	1,12	1,20	10
3/8	16,00	0,67	0,67	1,06	1,45	1,74	10
7/16	14,00	0,75	0,75	1,24	1,74	2,07	10
1/2	13,00	0,84	1,03	1,70	2,50	3,11	10
9/16	12,00	1,57	1,76	2,95	3,63	4,21	5
5/8	11,00	2,14	2,28	3,74	4,48	5,33	5
3/4	10,00	2,88	3,29	5,27	6,20	7,13	5
7/8	9,00	4,59	4,38	7,08	8,38	9,76	5
1"	8,00	5,76	5,69	9,13	11,94	13,72	5

\* Bajo pedido  
Sur commande  
To-order



MODO DE EMPLEO / MODE D'EMPLOI / HOW TO USE

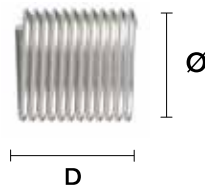
- 1- Taladrado previo / Perçage préalable / Previous drilling
- 2- Roscado previo / Taraudage préalable / Previous threading
- 3- Instalación del inserto en la herramienta / Pose de l'insert dans l'outil / Placement of the insert in the tool
- 4- Introducción del inserto en la rosca / Introduction de l'insert dans le filet / Introduction of the insert in the coil

**2707**

**DIN 8140**

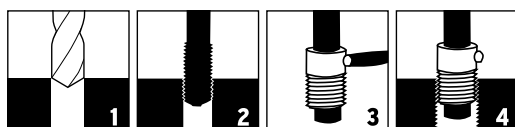
**UNF**  
ANSI/ASME  
B18.29.1

ToI.  
**2B**



Ø	P	Dmm.					
		1,0 Ø €	1,5 Ø €	2,0 Ø €	2,5 Ø* €	3,0 Ø* €	
4	48,00	0,51	0,46	0,57	0,69	0,74	10
6	40,00	0,51	0,46	0,57	0,69	0,74	10
8	36,00	0,57	0,46	0,65	0,70	0,81	10
10	32,00	0,51	0,46	0,57	0,72	0,81	10
1/4	28,00	0,51	0,46	0,57	0,70	0,81	10
5/16	24,00	0,57	0,57	0,84	1,12	1,33	10
3/8	24,00	0,67	0,67	1,06	1,45	1,74	10
7/16	20,00	0,75	0,75	1,24	1,72	2,07	10
1/2	20,00	0,81	1,03	1,70	2,50	3,11	10
9/16	18,00	1,65	1,76	2,95	3,63	4,21	5
5/8	18,00	2,23	2,28	3,74	4,48	5,33	5
3/4	16,00	3,02	3,29	5,27	6,20	7,13	5
7/8	14,00	4,59	4,38	7,08	8,38	9,76	5
1"	12,00	5,76	5,69	9,13	11,94	13,72	5
1"1/8	12,00	9,62	9,57	14,51			5
1"1/4	12,00	10,64	16,53				5
1"3/8	12,00	12,62	11,88				5
1"1/2	12,00	13,31	14,38				5

**\* 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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**P**

Aceros  
Aciers  
Steels  
Stähle

**M**

Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K**

Fundición  
Fonte  
Cast Iron  
Gusseisen

**N**

Metales no ferrosos  
Métal non Ferreux  
Non Ferrous metals  
NE-Metalle

**S**

Titanio y Superalaciones  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen

**H**

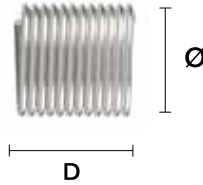
Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

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	0,65	0,51	0,70	0,74	0,84	10
3/16	24,00	0,57	0,46	0,65	0,74	0,84	10
1/4	20,00	0,57	0,46	0,65	0,78	0,90	10
5/16	18,00	0,65	0,57	0,91	1,24	1,45	10
3/8	16,00	0,72	0,67	1,17	1,57	1,91	10
7/16	14,00	0,84	0,75	1,37	1,91	2,28	10
1/2	12,00	0,81	1,24	1,70	2,73	3,40	10
9/16	12,00	1,82	1,96	2,95	3,98	4,61	5
5/8	11,00	2,44	2,28	3,74	4,93	5,82	5
3/4	10,00	3,34	3,29	4,43	5,73	7,83	5
7/8	9,00	4,17	3,50	6,44	8,35	9,74	5
1"	8,00	5,24	4,57	8,31	10,84	12,47	5

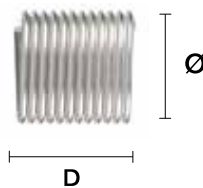
\* Bajo pedido  
Sur commande  
To-order

2716

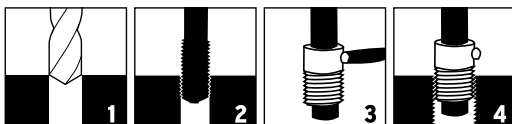
DIN 8140

G  
ISO 229

Tol.  
2B



Ø	P	Dmm.			📦
		1,0 Ø €	1,5 Ø €	2,0 Ø €	
1/8	28,00	0,60	0,87	0,95	10
1/4	19,00	0,82	1,18	1,33	10
3/8	19,00	0,73	1,34	1,52	10
1/2	14,00	1,26	1,93	2,02	10




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
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**2709** > **Insertador / Appareil de pose manuel / Insert Tool / Einsatzwerkzeug**



nº	Ø x P mm	UNC/UNF/BSW/BSF/BSP		€
2	M 2,00 x 0,40	UNC Nº 2	1	26,24
	M 2,20 x 0,45			
3	M 2,50 x 0,45		1	26,24
4	M 3,00 x 0,50	UNC Nº 5, UNC/UNF Nº 4, BSW 18	1	19,80
5	M 3,50 x 0,60	UNC/UNF Nº 6	1	19,80
6	M 4,00 x 0,70	UNC, UNF Nº 8	1	19,80
7		BSW 3/16, UNC Nº 10	1	19,80
8	M 5,00 x 0,80	UNF Nº 10, UNC Nº 12, BSF 3/16	1	19,80
9	M 6,00 x 1,00	UNC, UNF 1/4, BSW, BSF 1/4	1	19,80
10	M 7,00 x 1,00		1	19,80
	M 8,00 x 1,00			
11	M 8,00 x 1,00	UNF, BSF 5/16	1	19,80
	M 8,00 x 1,25	UNC, BSW 5/16		
12	M 9,00 x 1,00		1	19,80
	M 9,00 x 1,25			
13	M 10,00 x 1,00	UNF, BSF 3/8	1	19,80
	M 10,00 x 1,25	UNC, BSW 3/8		
	M 10,00 x 1,50	G 1/18		
14	M 11,00 x 1,25	UNC, UNF 7/16, BSW, BSF 7/16	1	21,12
	M 11,00 x 1,50			
15	M 12,00 x 1,00	UNC, UNF 1/2, BSW, BSF 1/2	1	23,69
	M 12,00 x 1,25			
	M 12,00 x 1,50			
	M 12,00 x 1,75			
16	M 14,00 x 1,50	UNC, UNF 9/16, BSW, BSF 9/16	1	26,36
	M 14,00 x 2,00			
17	M 14,00 x 1,00		1	26,36
	M 14,00 x 1,25			
18	M 16,00 x 1,50	UNC, UNF 5/8, BSW, BSF 5/8	1	26,36
	M 16,00 x 2,00			
20	M 18,00 x 1,50	UNC 3/4, BSW, BSF 3/4	1	32,90
	M 18,00 x 2,00			
	M 18,00 x 2,50			
21	M 20,00 x 1,50	UNF 3/4	1	32,90
	M 20,00 x 2,00			
	M 20,00 x 2,50			
22	M 22,00 x 1,50	UNC, UNF 7/8, BSW, BSF 7/8	1	32,90
	M 22,00 x 2,00			
	M 22,00 x 2,50			
23	M 24,00 x 1,50	UNC, UNF 1", BSW, BSF 1"	1	52,75
	M 24,00 x 2,00			
	M 24,00 x 3,00			

**2710** Rompe Arrastre / Rupteur / Tang break tool / Zapfenbrecher







n°	Ø x P mm	UNC/UNF/BSW/BSF/BSP		€
2	M 2,00 x 0,40 M 2,20 x 0,45	UNC N° 2	1	6,26
3	M 2,50 x 0,45		1	6,26
4	M 3,00 x 0,50	UNC, UNF N° 4	1	6,26
5	M 3,50 x 0,60	UNC, UNF N° 6	1	6,26
6	M 4,00 x 0,70	UNC N° 10, UNC/UNF N° 8, BSF 3/16	1	6,26
8	M 5,00 x 0,80		1	7,87
9	M 6,00 x 1,00	UNC/UNF 1/4, BSW/BSF 1/4	1	7,87
11	M 7,00 x 1,00 M 8,00 x 1,00 M 8,00 x 1,25	UNC/UNF 5/16, BSW/BSF 5/16	1	10,26
12	M 9,00 x 1,00 M 9,00 x 1,25	BSF 3/8	1	10,26
13	M 10,00 x 1,00 M 10,00 x 1,25 M 10,00 x 1,50	UNF 3/8 UNC, BSW 3/8 G 1/8	1	10,26
14	M 11,00 x 1,25 M 11,00 x 1,50	UNC/UNF 7/16, BSW/BSF 7/16	1	10,26
15	M 12,00 x 1,00 M 12,00 x 1,25 M 12,00 x 1,50 M 12,00 x 1,75	UNC/UNF 1/2, BSW/BSF 1/2 G 1/4	1	10,26

2711 Kits / Sets / Sätze

EG-M  
(STI)






Ø	P				1,5D 	€
M2,0	0,40	2,10	No. 2	No. 2	10	64,47
M2,5	0,45	2,60	No. 3	No. 3	10	63,88
M3,0	0,50	3,20	No. 4	No. 4	10	52,31
M3,5	0,60	3,70	No. 5	No. 5	10	53,15
M4,0	0,70	4,20	No. 6	No. 6	10	54,37
M5,0	0,80	5,20	No. 8	No. 8	10	57,45
M6,0	1,00	6,30	No. 9	No. 9	10	57,49
M7,0	1,00	7,30	No. 10	No. 11	10	68,01
M8,0	1,00	8,30	No. 11	No. 11	10	66,88
M8,0	1,25	8,30	No. 11	No. 11	10	69,45
M9,0	1,25	9,30	No. 12		10	66,45
M10,0	1,00	10,30	No. 13		10	66,05
M10,0	1,25	10,30	No. 13		10	66,05
M10,0	1,50	10,40	No. 13		10	64,30
M11,0	1,50	11,40	No. 14		5	72,35
M12,0	1,00	12,30	No. 15		5	81,67
M12,0	1,25	12,30	No. 15		5	81,67
M12,0	1,50	12,40	No. 15		5	81,67
M12,0	1,75	12,40	No. 15		5	72,47
M14,0	1,00		No. 17		5	83,40
M14,0	1,25		No. 17		5	83,40
M14,0	1,50		No. 16		5	83,40
M14,0	2,00		No. 16		5	71,66
M16,0	1,50		No. 18		5	87,46
M16,0	2,00		No. 18		5	87,46
M18,0	1,50		No. 20		5	107,90
M18,0	2,00		No. 20		5	107,90
M18,0	2,50		No. 20		5	107,90
M20,0	1,50		No. 21		5	115,89
M20,0	2,00		No. 21		5	115,89
M20,0	2,50		No. 21		5	115,89
M22,0	1,50		No. 22		5	128,18
M22,0	2,00		No. 22		5	128,18
M22,0	2,50		No. 22		5	128,18
M24,0	1,50		No. 23		5	170,38
M24,0	2,00		No. 23		5	170,38
M24,0	3,00		No. 23		5	170,38

**2712** Kits / Sets / Sätze

**EG-UNC**  
(STI)






	Ø	P				1,5D	€
Nº2		56,00	2,30	No. 2	No. 2	10	75,04
Nº4		40,00	3,00	No. 4	No. 4	10	67,39
Nº6		32,00	3,70	No. 5	No. 5	10	67,56
Nº8		32,00	4,50	No. 6	No. 6	10	67,80
Nº10		24,00	5,20	No. 7	No. 6	10	61,87
Nº12		24,00	5,80	No. 8	No. 8	10	63,98
1/4		20,00	6,70	No. 9	No. 9	10	63,30
5/16		18,00	8,30	No. 11	No. 11	10	68,98
3/8		16,00	9,90	No. 13		10	62,67
7/16		14,00	11,60	No. 14		10	71,20
1/2		13,00	13,00	No. 15		10	77,21
9/16		12,00		No. 16		10	89,09
5/8		11,00		No. 18		10	99,87
3/4		10,00		No. 20		10	127,78
7/8		9,00		No. 22		5	143,48
1"		8,00		No. 23		5	169,92

**2713** Kits / Sets / Sätze

EG-UNF  
 (STI)






Ø	P				1,5D	€
Nº4	48,00	3,00	No. 4	No. 4	10	69,65
Nº6	40,00	3,70	No. 5	No. 5	10	70,14
Nº8	36,00	4,40	No. 6	No. 6	10	70,37
Nº10	32,00	5,10	No. 8	No. 8	10	64,82
1/4	28,00	6,60	No. 9	No. 9	10	65,88
5/16	24,00	8,20	No. 11	No. 11	10	71,76
3/8	24,00	9,80	No. 13	No. 13	10	65,24
7/16	20,00	11,50	No. 14		5	82,22
1/2	20,00	13,00	No. 15		5	90,09
9/16	18,00		No. 16		5	101,98
5/8	18,00		No. 18		5	112,75
3/4	16,00		No. 21		5	166,43
7/8	14,00		No. 22		5	182,12
1"	12,00		No. 23		5	208,58

**2714** Kits / Sets / Sätze

**EG-W**  
(STI)






Ø	P				1,5D	€
1/8	40,00	3,40	No. 4	No. 4	10	63,11
3/16	24,00	5,00	No. 8	No. 8	10	65,88
1/4	20,00	6,70	No. 9	No. 9	10	65,88
5/16	18,00	8,30	No. 11	No. 11	10	71,76
3/8	16,00	9,90	No. 13	No. 13	10	65,24
7/16	14,00	11,60	No. 14		5	82,22
1/2	12,00	13,00	No. 15		5	91,13
9/16	12,00		No. 16		5	103,02
5/8	11,00		No. 18		5	112,75
3/4	10,00		No. 20		5	166,43
7/8	9,00		No. 22		5	177,77
1"	8,00		No. 23		4	202,88

**2717** Kits / Sets / Sätze

**EG-G**  
(STI)







Ø	P				1,5D	€
1/8	28,00	9,90	No. 13	No. 13	5	104,31
1/4	19,00	13,50	No. 16	No. 15	5	110,14
3/8	19,00	17,00	No. 16		5	126,59
1/2	14,00				5	166,41

**7167** Multi-kits / Multi-kits

**EG-M**  
(ST)



Ø	P				1,5D 
M5,0	0,80	5,20	No. 8	No. 8	10
M6,0	1,00	6,30	No. 9	No. 9	10
M8,0	1,25	8,30	No. 11	No. 11	10
M10,0	1,50	10,40	No. 13		10
M12,0	1,75	12,40	No. 15		10

€ 406,20

**2901/1**

**DIN ISO 1502**

PASA  
NO  
PASA

CTPNP

M-MF  
DIN 13

Tol.  
**6H**



Ø	P	€		Ø	P	€		Ø	P	€	
M1,0	0,25	323,78	1	M12,0	0,75	182,13	1	M27,0	1,50	251,51	1
M1,1	0,25	323,78	1	M12,0	1,00	173,46	1	M27,0	2,00	251,51	1
M1,2	0,25	309,33	1	M12,0	1,25	182,13	1	M27,0	3,00	208,14	1
M1,4	0,30	309,33	1	M12,0	1,50	185,02	1	M30,0	1,00	309,33	1
M1,6	0,35	260,18	1	M12,0	1,75	124,31	1	M30,0	1,50	277,53	1
M1,8	0,35	228,38	1	M14,0	1,00	182,13	1	M30,0	2,00	277,53	1
M2,0	0,40	147,44	1	M14,0	1,25	196,58	1	M30,0	3,00	318,00	1
M2,2	0,45	211,25	1	M14,0	1,50	170,56	1	M30,0	3,50	228,38	1
M2,5	0,45	130,09	1	M14,0	2,00	132,98	1	M32,0	1,00	309,33	1
M3,0	0,50	121,42	1	M16,0	1,00	196,58	1	M32,0	1,50	283,31	1
M4,0	0,50	239,94	1	M16,0	1,50	176,34	1	M32,0	2,00	283,31	1
M4,0	0,70	115,64	1	M16,0	2,00	141,66	1	M33,0	1,00	312,22	1
M4,5	0,75	127,81	1	M18,0	1,00	199,47	1	M33,0	1,50	289,09	1
M5,0	0,50	234,16	1	M18,0	1,50	185,02	1	M33,0	2,00	289,09	1
M5,0	0,80	112,74	1	M18,0	2,50	153,22	1	M33,0	3,00	326,67	1
M6,0	0,50	234,16	1	M20,0	1,00	213,93	1	M33,0	3,50	251,51	1
M6,0	0,75	159,00	1	M20,0	1,50	196,58	1	M36,0	1,00	335,34	1
M6,0	1,00	106,96	1	M20,0	2,00	196,58	1	M36,0	1,50	309,33	1
M7,0	1,00	106,96	1	M20,0	2,50	164,78	1	M36,0	2,00	309,33	1
M8,0	0,50	234,16	1	M22,0	1,00	237,06	1	M36,0	3,00	309,33	1
M8,0	0,75	170,56	1	M22,0	1,50	219,71	1	M36,0	4,00	271,74	1
M8,0	1,00	153,22	1	M22,0	2,50	170,56	1	M39,0	1,50	335,34	1
M8,0	1,25	112,74	1	M24,0	1,00	254,40	1	M39,0	2,00	335,34	1
M9,0	1,25	115,64	1	M24,0	1,50	231,27	1	M39,0	3,00	393,16	1
M10,0	0,50	251,51	1	M24,0	2,00	231,27	1	M39,0	4,00	294,87	1
M10,0	0,75	173,46	1	M24,0	3,00	190,80	1	M40,0	1,50	355,58	1
M10,0	1,00	159,00	1	M25,0	1,00	260,18	1	M40,0	2,00	355,58	1
M10,0	1,25	187,91	1	M25,0	1,50	237,06	1	M40,0	3,00	398,94	1
M10,0	1,50	118,53	1	M25,0	2,00	237,06	1				
M12,0	0,50	268,86	1	M27,0	1,00	274,64	1				



**2901/4**

**DIN ISO 1502**

PASA

CTP

M-MF  
 DIN 13

Tol.  
**6H**



∅	P	€	
M42,0	1,50	208,14	1
M42,0	2,00	208,14	1
M42,0	3,00	239,94	1
M42,0	4,50	199,47	1
M45,0	1,50	216,82	1
M45,0	2,00	219,71	1
M45,0	3,00	251,51	1

∅	P	€	
M45,0	4,50	213,93	1
M48,0	1,50	225,49	1
M48,0	2,00	231,27	1
M48,0	3,00	263,07	1
M48,0	5,00	231,27	1
M50,0	1,50	237,06	1
M50,0	2,00	239,94	1

∅	P	€	
M50,0	3,00	274,64	1
M52,0	1,50	242,84	1
M52,0	2,00	251,51	1
M52,0	3,00	289,09	1
M52,0	5,00	242,84	1

**2901/5**

**DIN ISO 1502**

NO  
 PASA

CTNP

M-MF  
 DIN 13

Tol.  
**6H**



∅	P	€	
M42,0	1,50	208,14	1
M42,0	2,00	208,14	1
M42,0	3,00	239,94	1
M42,0	4,50	199,47	1
M45,0	1,50	216,82	1
M45,0	2,00	219,71	1
M45,0	3,00	251,51	1

∅	P	€	
M45,0	4,50	213,93	1
M48,0	1,50	225,49	1
M48,0	2,00	231,27	1
M48,0	3,00	263,07	1
M48,0	5,00	231,27	1
M50,0	1,50	237,06	1
M50,0	2,00	239,94	1

∅	P	€	
M50,0	3,00	274,64	1
M52,0	1,50	242,84	1
M52,0	2,00	251,51	1
M52,0	3,00	289,09	1
M52,0	5,00	242,84	1

**2901/2**

**DIN ISO 1502**




PASA

CAP

M-MF  
DIN 13

Tol.  
**6g**



Ø	P	€		Ø	P	€		Ø	P	€	
M2,0	0,40	164,78	1	M16,0	1,50	185,02	1	M33,0	3,00	338,24	1
M2,2	0,45	193,69	1	M16,0	2,00	179,24	1	M33,0	3,50	344,02	1
M2,5	0,45	127,20	1	M18,0	1,00	213,93	1	M36,0	1,00	375,82	1
M3,0	0,50	124,31	1	M18,0	1,50	199,47	1	M36,0	1,50	332,46	1
M4,0	0,50	257,29	1	M18,0	2,50	205,26	1	M36,0	2,00	349,80	1
M4,0	0,70	115,64	1	M20,0	1,00	228,38	1	M36,0	3,00	390,27	1
M4,5	0,75	115,64	1	M20,0	1,50	213,93	1	M36,0	4,00	370,04	1
M5,0	0,50	257,29	1	M20,0	2,00	228,38	1	M39,0	1,50	367,14	1
M5,0	0,80	115,64	1	M20,0	2,50	228,38	1	M39,0	2,00	381,60	1
M6,0	0,50	257,29	1	M22,0	1,00	280,42	1	M39,0	3,00	396,06	1
M6,0	0,75	159,00	1	M22,0	1,50	228,38	1	M39,0	4,00	401,84	1
M6,0	1,00	115,64	1	M22,0	2,50	245,73	1	M40,0	1,50	367,14	1
M7,0	1,00	147,44	1	M24,0	1,00	265,96	1	M40,0	2,00	390,27	1
M8,0	0,50	248,62	1	M24,0	1,50	248,62	1	M40,0	3,00	407,62	1
M8,0	0,75	179,24	1	M24,0	2,00	257,29	1	M42,0	1,50	381,60	1
M8,0	1,00	138,76	1	M24,0	3,00	260,18	1	M42,0	2,00	318,00	1
M8,0	1,25	115,64	1	M25,0	1,00	312,22	1	M42,0	3,00	419,18	1
M9,0	1,25	159,00	1	M25,0	1,50	254,40	1	M42,0	4,50	436,53	1
M10,0	0,50	286,20	1	M25,0	2,00	257,29	1	M45,0	1,50	401,84	1
M10,0	0,75	199,47	1	M27,0	1,00	335,34	1	M45,0	2,00	326,67	1
M10,0	1,00	153,22	1	M27,0	1,50	265,96	1	M45,0	3,00	424,96	1
M10,0	1,25	187,91	1	M27,0	2,00	280,42	1	M45,0	4,50	462,54	1
M10,0	1,50	130,09	1	M27,0	3,00	289,09	1	M48,0	1,50	424,96	1
M12,0	0,50	326,67	1	M30,0	1,00	318,00	1	M48,0	2,00	332,46	1
M12,0	0,75	237,06	1	M30,0	1,50	286,20	1	M48,0	3,00	439,42	1
M12,0	1,00	173,46	1	M30,0	2,00	286,20	1	M48,0	5,00	488,56	1
M12,0	1,25	211,04	1	M30,0	3,00	320,89	1	M50,0	1,50	439,42	1
M12,0	1,50	164,78	1	M30,0	3,50	318,00	1	M50,0	2,00	346,91	1
M12,0	1,75	150,33	1	M32,0	1,00	341,13	1	M50,0	3,00	450,98	1
M14,0	1,00	185,02	1	M32,0	1,50	306,44	1	M52,0	1,50	462,54	1
M14,0	1,25	265,96	1	M32,0	2,00	306,44	1	M52,0	2,00	355,58	1
M14,0	1,50	170,56	1	M33,0	1,00	349,80	1	M52,0	3,00	491,46	1
M14,0	2,00	164,78	1	M33,0	1,50	312,22	1	M52,0	5,00	526,14	1
M16,0	1,00	199,47	1	M33,0	2,00	318,00	1				

**2901/3**

**DIN ISO 1502**

NO  
PASA

CANP

M-MF  
DIN 13

Tol.  
**6g**



Ø	P	€	☐	Ø	P	€	☐	Ø	P	€	☐
M2,0	0,40	164,78	1	M16,0	1,50	185,02	1	M33,0	3,00	338,24	1
M2,2	0,45	193,69	1	M16,0	2,00	179,24	1	M33,0	3,50	344,02	1
M2,5	0,45	127,20	1	M18,0	1,00	213,93	1	M36,0	1,00	375,82	1
M3,0	0,50	124,31	1	M18,0	1,50	199,47	1	M36,0	1,50	332,46	1
M4,0	0,50	257,29	1	M18,0	2,50	205,26	1	M36,0	2,00	349,80	1
M4,0	0,70	115,64	1	M20,0	1,00	228,38	1	M36,0	3,00	370,04	1
M4,5	0,75	115,64	1	M20,0	1,50	213,93	1	M36,0	4,00	370,04	1
M5,0	0,50	257,29	1	M20,0	2,00	228,38	1	M39,0	1,50	367,14	1
M5,0	0,80	115,64	1	M20,0	2,50	228,38	1	M39,0	2,00	381,60	1
M6,0	0,50	257,29	1	M22,0	1,00	280,42	1	M39,0	3,00	396,06	1
M6,0	0,75	159,00	1	M22,0	1,50	228,38	1	M39,0	4,00	401,84	1
M6,0	1,00	115,64	1	M22,0	2,50	245,73	1	M40,0	1,50	367,14	1
M7,0	1,00	147,44	1	M24,0	1,00	265,96	1	M40,0	2,00	390,27	1
M8,0	0,50	248,62	1	M24,0	1,50	248,62	1	M40,0	3,00	407,62	1
M8,0	0,75	179,24	1	M24,0	2,00	257,29	1	M42,0	1,50	381,60	1
M8,0	1,00	138,76	1	M24,0	3,00	260,18	1	M42,0	2,00	318,00	1
M8,0	1,25	115,64	1	M25,0	1,00	312,22	1	M42,0	3,00	419,18	1
M9,0	1,25	159,00	1	M25,0	1,50	254,40	1	M42,0	4,50	436,53	1
M10,0	0,50	286,20	1	M25,0	2,00	257,29	1	M45,0	1,50	401,84	1
M10,0	0,75	199,47	1	M27,0	1,00	335,34	1	M45,0	2,00	326,67	1
M10,0	1,00	153,22	1	M27,0	1,50	265,96	1	M45,0	3,00	424,96	1
M10,0	1,25	187,91	1	M27,0	2,00	280,42	1	M45,0	4,50	462,54	1
M10,0	1,50	130,09	1	M27,0	3,00	289,09	1	M48,0	1,50	424,96	1
M12,0	0,50	326,67	1	M30,0	1,00	318,00	1	M48,0	2,00	332,46	1
M12,0	0,75	237,06	1	M30,0	1,50	286,20	1	M48,0	3,00	439,42	1
M12,0	1,00	173,46	1	M30,0	2,00	286,20	1	M48,0	5,00	488,56	1
M12,0	1,25	211,04	1	M30,0	3,00	320,89	1	M50,0	1,50	439,42	1
M12,0	1,50	164,78	1	M30,0	3,50	318,00	1	M50,0	2,00	346,91	1
M12,0	1,75	150,33	1	M32,0	1,00	341,13	1	M50,0	3,00	450,98	1
M14,0	1,00	185,02	1	M32,0	1,50	306,44	1	M52,0	1,50	462,54	1
M14,0	1,25	265,96	1	M32,0	2,00	306,44	1	M52,0	2,00	355,58	1
M14,0	1,50	170,56	1	M33,0	1,00	349,80	1	M52,0	3,00	491,46	1
M14,0	2,00	164,78	1	M33,0	1,50	312,22	1	M52,0	5,00	526,14	1
M16,0	1,00	199,47	1	M33,0	2,00	318,00	1				

**2902/1**

**ISO 228-2**

PASA  
 NO  
 PASA

CTPNP

G  
 ISO 228



Ø	P	€	
1/8	28,00	170,56	1
1/4	19,00	182,13	1
3/8	19,00	211,04	1

Ø	P	€	
1/2	14,00	239,94	1
5/8	14,00	254,40	1
3/4	14,00	277,53	1

Ø	P	€	
7/8	14,00	309,33	1
1"	11,00	326,67	1
1"1/8	7,00	370,04	1

**2902/4**

**ISO 228-2**

PASA

CTP

G  
 ISO 228



Ø	P	€	
1"1/4	11,00	228,38	1
1"1/2	11,00	265,96	1

Ø	P	€	
1"3/4	11,00	300,66	1
2"	11,00	329,56	1

Ø	P	€	
2"1/4	11,00	358,47	1
2"1/2	11,00	413,40	1

**2902/5**

**ISO 228-2**

NO  
 PASA

CTNP

G  
 ISO 228



Ø	P	€	
1"1/4	11,00	228,38	1
1"1/2	11,00	265,96	1

Ø	P	€	
1"3/4	11,00	300,66	1
2"	11,00	329,56	1

Ø	P	€	
2"1/4	11,00	358,47	1
2"1/2	11,00	413,40	1

**2902/2**

**DIN ISO 228-2**

PASA

CAP

Tol.  
**A**

**G**  
ISO 228



∅	P	€		∅	P	€		∅	P	€	
1/8	28,00	187,91	1	3/4	14,00	291,98	1	1*1/2	11,00	503,02	1
1/4	19,00	219,71	1	7/8	14,00	329,56	1	1*3/4	11,00	555,06	1
3/8	19,00	263,07	1	1"	11,00	361,36	1	2"	11,00	612,87	1
1/2	14,00	254,40	1	1*1/8	11,00	410,51	1	2*1/4	11,00	662,02	1
5/8	14,00	274,64	1	1*1/4	11,00	448,09	1	2*1/2	11,00	751,64	1

**2902/3**

**DIN ISO 228-2**

NO  
PASA

CANP

Tol.  
**A**

**G**  
ISO 228



∅	P	€		∅	P	€		∅	P	€	
1/8	28,00	187,91	1	3/4	14,00	291,98	1	1*1/2	11,00	503,02	1
1/4	19,00	219,71	1	7/8	14,00	329,56	1	1*3/4	11,00	555,06	1
3/8	19,00	263,07	1	1"	11,00	361,36	1	2"	11,00	612,87	1
1/2	14,00	254,40	1	1*1/8	11,00	410,51	1	2*1/4	11,00	662,02	1
5/8	14,00	274,64	1	1*1/4	11,00	448,09	1	2*1/2	11,00	751,64	1

**2903/1** > **BS 919**

PASA  
NO  
PASA

CTPNP

**BSW**  
BS 84



∅	P	€		∅	P	€		∅	P	€	
1/8	40,00	254,40	1	1/2	12,00	254,40	1	7/8	9,00	367,14	1
1/4	20,00	222,60	1	5/8	11,00	286,20	1	1"	8,00	422,07	1
3/8	16,00	234,16	1	3/4	10,00	329,56	1				

**2903/2** > **BS 919**

PASA

CAP

**BSW**  
BS 84



∅	P	€		∅	P	€		∅	P	€	
1/8	40,00	211,04	1	1/2	12,00	225,49	1	7/8	9,00	349,80	1
1/4	20,00	179,24	1	5/8	11,00	263,07	1	1"	8,00	390,27	1
3/8	16,00	202,36	1	3/4	10,00	306,44	1				

**2903/3** > **BS 919**

NO  
PASA

CANP

**BSW**  
BS 84



∅	P	€		∅	P	€		∅	P	€	
1/8	40,00	211,04	1	1/2	12,00	225,49	1	7/8	9,00	349,80	1
1/4	20,00	179,24	1	5/8	11,00	263,07	1	1"	8,00	390,27	1
3/8	16,00	202,36	1	3/4	10,00	306,44	1				

**2904/1**

**ANSI / ASME B1.2**

PASA  
NO  
PASA

CTPNP

**UNC**  
ANSI/ASME  
B1.1

Tol.  
**2B**



Ø	P	€		Ø	P	€		Ø	P	€	
N°4	40,00	260,18	1	5/16	18,00	156,11	1	7/8	9,00	248,62	1
N°5	40,00	274,64	1	3/8	16,00	156,11	1	1"	8,00	277,53	1
N°6	32,00	164,78	1	7/16	14,00	164,78	1	1" 1/8	7,00	306,44	1
N°8	32,00	159,00	1	1/2	13,00	176,34	1	1" 1/4	7,00	332,46	1
N°10	24,00	156,11	1	9/16	12,00	182,13	1	1" 3/8	6,00	358,47	1
N°12	24,00	150,33	1	5/8	11,00	196,58	1	1" 1/2	6,00	396,06	1
1/4	20,00	150,33	1	3/4	10,00	219,71	1				

**2904/2**

**ANSI / ASME B1.2**

PASA

CAP

**UNC**  
ANSI/ASME  
B1.1

Tol.  
**2A**



Ø	P	€		Ø	P	€		Ø	P	€	
N°4	40,00	239,94	1	5/16	18,00	164,78	1	7/8	9,00	335,34	1
N°5	40,00	179,24	1	3/8	16,00	176,34	1	1"	8,00	375,82	1
N°6	32,00	176,34	1	7/16	14,00	187,91	1	1" 1/8	7,00	416,29	1
N°8	32,00	164,78	1	1/2	13,00	211,04	1	1" 1/4	7,00	477,00	1
N°10	24,00	159,00	1	9/16	12,00	234,16	1	1" 3/8	6,00	526,14	1
N°12	24,00	153,22	1	5/8	11,00	254,40	1	1" 1/2	6,00	560,84	1
1/4	20,00	153,22	1	3/4	10,00	289,09	1				

**2904/3**

**ANSI / ASME B1.2**

NO  
PASA

CANP

**UNC**  
ANSI/ASME  
B1.1

Tol.  
**2A**



Ø	P	€		Ø	P	€		Ø	P	€	
N°4	40,00	239,94	1	5/16	18,00	164,78	1	7/8	9,00	335,34	1
N°5	40,00	179,24	1	3/8	16,00	176,34	1	1"	8,00	375,82	1
N°6	32,00	176,34	1	7/16	14,00	187,91	1	1" 1/8	7,00	416,29	1
N°8	32,00	164,78	1	1/2	13,00	211,04	1	1" 1/4	7,00	477,00	1
N°10	24,00	159,00	1	9/16	12,00	234,16	1	1" 3/8	7,00	526,14	1
N°12	24,00	153,22	1	5/8	11,00	254,40	1	1" 1/2	7,00	560,84	1
1/4	20,00	153,22	1	3/4	10,00	289,09	1				

**2905/1**

**ANSI / ASME B1.2**

PASA  
NO  
PASA

CTPNP

**UNF**  
ANSI/ASME  
B1.1

ToL.  
**2B**



Ø	P	€		Ø	P	€		Ø	P	€	
Nº4	48,00	260,18	1	3/8	24,00	156,11	1	7/8	14,00	228,38	1
Nº5	44,00	170,56	1	5/16	24,00	156,11	1	1"	12,00	254,40	1
Nº6	40,00	164,78	1	1/2	20,00	176,34	1	1"1/8	12,00	277,53	1
Nº8	36,00	159,00	1	7/16	20,00	164,78	1	1"1/4	12,00	291,98	1
Nº10	32,00	156,11	1	5/8	18,00	187,91	1	1"3/8	8,00	318,00	1
Nº12	28,00	175,74	1	9/16	18,00	182,13	1	1"1/2	12,00	349,80	1
1/4	28,00	150,33	1	3/4	16,00	208,14	1				

**2905/2**

**ANSI / ASME B1.2**

PASA

CAP

**UNF**  
ANSI/ASME  
B1.1

ToL.  
**2A**



Ø	P	€		Ø	P	€		Ø	P	€	
Nº4	48,00	237,06	1	3/8	24,00	176,34	1	7/8	14,00	335,34	1
Nº5	44,00	179,24	1	5/16	24,00	164,78	1	1"	12,00	375,82	1
Nº6	40,00	176,34	1	1/2	20,00	211,04	1	1"1/8	12,00	439,42	1
Nº8	36,00	164,78	1	7/16	20,00	187,91	1	1"1/4	12,00	477,00	1
Nº10	32,00	159,00	1	5/8	18,00	254,40	1	1"3/8	8,00	526,14	1
Nº12	28,00	159,00	1	9/16	18,00	234,16	1	1"1/2	12,00	560,84	1
1/4	28,00	153,22	1	3/4	16,00	289,09	1				



**2905/3**

**ANSI / ASME B1.2**

NO  
PASA

CANP

UNF  
ANSI/ASME  
B1.1

Tol.  
2A



∅	P	€		∅	P	€		∅	P	€	
N°4	48,00	237,06	1	3/8	24,00	176,34	1	7/8	14,00	335,34	1
N°5	44,00	179,24	1	5/16	24,00	164,78	1	1"	12,00	375,82	1
N°6	40,00	176,34	1	1/2	20,00	211,04	1	1"1/8	12,00	439,42	1
N°8	36,00	164,78	1	7/16	20,00	187,91	1	1"1/4	12,00	477,00	1
N°10	32,00	159,00	1	5/8	18,00	254,40	1	1"3/8	8,00	526,14	1
N°12	28,00	159,00	1	9/16	18,00	234,16	1	1"1/2	12,00	560,84	1
1/4	28,00	153,22	1	3/4	16,00	289,09	1				

**2906/1**

**ANSI / ASME B1.20.1**

PASA  
NO  
PASA

CTPNP

NPT  
ANSI/ASME  
B1.1



∅	P	€		∅	P	€	
1/16	27,00	332,46	1	3/4	14,00	500,13	1
1/8	27,00	364,26	1	1"	11,50	575,29	1
1/4	18,00	384,49	1	1"1/4	11,50	685,14	1
3/8	18,00	413,40	1	1"1/2	11,50	766,09	1
1/2	14,00	448,09	1	2"	11,50	994,88	1

**2906/2**

**ANSI / ASME B1.20.1**

PASA  
NO  
PASA

CAPNP

NPT  
ANSI/ASME  
B1.1



∅	P	€		∅	P	€	
1/16	27,00	576,82	1	3/4	14,00	714,06	1
1/8	27,00	607,09	1	1"	11,50	803,67	1
1/4	18,00	636,00	1	1"1/4	11,50	939,54	1
3/8	18,00	604,20	1	1"1/2	11,50	1037,84	1
1/2	14,00	653,34	1	2"	11,50	1260,44	1

2907/1

DIN 7162

PASA  
NO  
PASA

H7

CTL PNP



∅	€	
1	78,06	1
2	86,73	1
3	86,73	1
4	78,06	1
5	78,06	1
6	78,06	1
7	72,27	1
8	72,27	1
9	72,27	1
10	72,27	1
11	83,84	1
12	83,84	1
13	83,84	1
14	83,84	1
15	89,62	1
16	89,62	1
17	89,62	1
18	89,62	1

∅	€	
19	101,18	1
20	101,18	1
21	101,18	1
22	101,18	1
23	106,96	1
24	106,96	1
25	106,96	1
26	106,96	1
27	106,96	1
28	118,53	1
30	118,53	1
32	118,53	1
33	132,98	1
34	132,98	1
35	132,98	1
36	132,98	1
37	132,98	1
38	132,98	1

∅	€	
40	141,66	1
42	141,66	1
44	159,00	1
45	159,00	1
46	159,00	1
47	159,00	1
48	159,00	1
50	196,58	1
52	196,58	1
55	196,58	1
58	239,94	1
60	239,94	1
62	239,94	1
65	257,29	1
68	257,29	1
70	257,29	1

2907/4

DIN 7162

PASA

H7

CTL P



∅	€	
72	170,56	1
75	170,56	1
78	187,91	1
80	187,91	1

2907/5

DIN 7162

NO  
PASA

H7

CTLNP



∅	€	
72	170,56	1
75	170,56	1
78	187,91	1
80	187,91	1

2907/2

DIN 2250-C

CAL



∅	€	
4	265,96	1
5	265,96	1
6	213,93	1
7	213,93	1
8	213,93	1
9	213,93	1
10	213,93	1
11	219,71	1
12	219,71	1
13	219,71	1
14	219,71	1
15	239,94	1
16	239,94	1
17	239,94	1
18	239,94	1
19	248,62	1
20	248,62	1
21	248,62	1
22	248,62	1

∅	€	
23	263,07	1
24	263,07	1
25	263,07	1
26	263,07	1
27	263,07	1
28	277,53	1
30	277,53	1
32	277,53	1
33	300,66	1
34	300,66	1
35	300,66	1
36	300,66	1
37	300,66	1
38	300,66	1
40	326,67	1
42	326,67	1
44	341,13	1
45	341,13	1
46	341,13	1

∅	€	
47	341,13	1
48	341,13	1
50	361,36	1
52	361,36	1
55	361,36	1
58	381,60	1
60	381,60	1
62	381,60	1
65	401,84	1
68	401,84	1
70	401,84	1
72	427,86	1
75	427,86	1
78	468,33	1
80	468,33	1
82	468,33	1
85	517,47	1
90	517,47	1

**2801** > **Giramachos / Tourne-à-gauche / Tap turners / Schneideisenhalter**



∅	Nº	€	mm	
M1 - M12	1	18,85	2,00 - 7	1
M4 - M12	2	25,19	3,00 - 9,00	1
M5 - M20	3	35,84	4,90 - 12,00	1
M10 - M27	4	57,18	5,50 - 16,00	1

∅	Nº	€	mm	
M13 - M32	5	120,18	7,00 - 20,00	1
M18 - M42	6	120,18	11,00 - 24,00	1
M25 - M52	7	208,37	16,00 - 32,00	1
M45 - M60	8	301,15	25,00 - 36,00	1

**2802** > **Volvedor / Porte-filière / Tap wrench / Windeisen**



∅ Ext.	H mm	€	
16,00	5,00	10,45	1
20,00	5,00	10,68	1
20,00	7,00	10,71	1
20,60	6,35	10,68	1
25,00	9,00	12,71	1
25,40	9,50	12,71	1
30,00	11,00	14,32	1
38,00	14,00	18,88	1
38,10	12,70	18,88	1
45,00	14,00	23,46	1
45,00	18,00	23,46	1

∅ Ext.	H mm	€	
50,80	15,90	30,71	1
55,00	16,00	30,71	1
55,00	22,00	30,71	1
65,00	18,00	47,17	1
65,00	25,00	47,17	1
75,00	20,00	75,45	1
75,00	30,00	75,44	1
90,00	22,00	95,56	1
90,00	36,00	95,57	1
105,00	22,00	102,04	1
105,00	36,00	102,05	1

**2803** > **Giramacho T / Tourne-à-gauche en T / Tap turner in T / T-Typ Schneideisenhalter**



M DIN	M ISO	€	L mm	gr	mm	
M3 - 10	M3 - 6	21,81	85	180	2,60 - 5,50	1
M5 - 12	M6 - 12	28,46	110	300	4,60 - 8,00	1
M13 - 20	M14 - 20	132,20	117	400	9,00 - 12,50	1

**2804** Giramacho T / Tourne-à-gauche en T / Tap turner in T / T-Typ Schneideisenhalter



M DIN	M ISO	€	L mm	gr	mm	
M3-10	M3-6	34,93	250	250	2,60 - 5,50	1
M5-12	M6-12	41,63	300	440	4,60 - 8,00	1

**2805** Extractor / Extracteur / Extractor / Auszieher



M	Z	€	
M3	3	35,30	1
M4	3	35,30	1
M5	3	35,30	1
M6	3	36,19	1
M8	4,3	38,14	1

M	Z	€	
M10	4,3	39,57	1
M12	4,3	42,61	1
M14	4,3	58,69	1
M16	4,3	64,00	1

**2808** Alargador / Adaptateur / Extension piece / Verlängerungsstück



mm	€	L mm	
2,10	6,84	60	1
2,40	6,84	60	1
2,70	6,84	80	1
3,00	6,84	90	1
3,40	10,71	95	1
3,80	11,21	95	1
4,30	11,96	110	1
4,90	12,48	110	1
5,50	13,07	115	1
6,20	16,85	120	1
7,00	17,56	125	1

mm	€	L mm	
8,00	19,91	130	1
9,00	23,54	130	1
10,00	28,44	130	1
11,00	32,96	150	1
12,00	35,52	155	1
13,00	49,07	155	1
14,50	56,35	175	1
16,00	59,59	180	1
18,00	67,94	200	1
20,00	90,55	220	1

**2834** Extractor / Extracteur / Extractor / Auszieher



M	∅ mm	€	L mm	mm	
M3 - 6	1,80 - 7,00	2,36	50	2,70	1
M6 - 8	3,20 - 10,00	2,36	57	3,80	1
M8 - 11	4,50 - 13,00	2,80	64	4,90	1
M11 - 14	6,50 - 16,00	3,46	71	7,00	1
M14 - 18	8,50 - 21,00	4,47	79	9,00	1
M18 - 24	12,00	7,20	85	12,00	1
M24 - 33	15,30	11,06	92	14,50	1
M33 - 45	20,00	16,17	100	18,00	1

JUEGOS / JEUX / SETS			
M	Pcs.	€	
M3 - 18	5	17,77	1
M3 - 24	6	25,08	1
M3 - 45	8	52,54	1

**2846** Aceite / Huile / Oil / Öl



Envase /Emballage/ Packaging	Litr.	€	
Aerosol /Pulvérisateur/ Spray	400 ml	23,21	1
Granel /Vrac/ Bulk	1 l.	31,41	1
Granel /Vrac/ Bulk	5 l.	113,95	1

**2821 Macho 3° / Taraud 3° / Tap 3° / Gewindebohrer 3°**

**M**  
DIN 13

HSS  
(1101 + 2301/3)



HSSCO  
(1105 + 2314/3)



HSSCO INOX  
(1105 + 2303/3)



	Machos Tarauds / Taps	Brocas Forets / Drill-bits	Giramachos n° Tourne-à-gauche n° Tap turner n°	€
HSS	M3-4-5-6-8-10-12	2,50-3,30-4,20-5,00-6,80-8,50-10,20	1,50	113,06
HSSCO	M3-4-5-6-8-10-12	2,50-3,30-4,20-5,00-6,80-8,50-10,20	1,50	158,78
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	141,94

**2822/2840 Juegos de machos / Jeux de taraud / Tap set**

**M**  
DIN 13

>2822  
(2301)



>2840  
(1101 + 2301)



Ref.	Machos Tarauds / Taps	Brocas Forets / Drill-bits	€
2822 (2301)	M3-4-5-6-8-10-12	-	190,39
2840 (2301)	M3-4-5-6-8-10-12	(1101) 2,50-3,30-4,20-5,00-6,80-8,50-10,20	207,71



**2824** M3-12

Form.  
**B**  
"Gun"

**M**  
3-4-5-6-8-10-12

  
7

>HSS E  
(2103/2014)



>HSSE-PM  
(2125/2126)



>HSSE VAP  
(2250/2251)



>HSSE TIN  
(2115/2116)



REF.	€
HSS E	128,60
HSSE-PM	236,79
HSSE VAP	145,83
HSSE TIN	210,58

**2825** M3-12



**M**  
3-4-5-6-8-10-12

  
7

>HSS E  
(2105/2106)



>HSSE-PM  
(2123/2124)



>HSSE VAP  
(2252/2253)



>HSSE TIN  
(2117/2118)



REF.	€
HSS E	152,86
HSSE-PM	257,29
HSSE VAP	173,67
HSSE TIN	220,63

**2850** M3-12

Form  
**B**

**M**  
3-4-5-6-8-10-12

∅  
2,5-3,3-4,2-5-6,  
8-8,5-10,2

  
14

>HSSE + HSSCO  
(1105 + 2103/2104)



>HSSEVAP + HSSCO  
(1105 + 2250/2251)



REF.	€
HSSE+HSSCO	164,66
HSSEVAP(INOX)+HSSCO	181,90

**2851** M3-12



**M**  
3-4-5-6-8-10-12

∅  
2,5-3,3-4,2-5-6,  
8-8,5-10,2

  
14

>HSSE + HSSCO  
(1105 + 2105/2106)



>HSSEVAP + HSSCO  
(1105 + 2252/2253)



REF.	€
HSSE+HSSCO	188,92
HSSEVAP(INOX)+HSSCO	209,73



2809/2810

M3-12

M  
DIN 13

>2809  
(1101 + 2301 + 2501)



>2810  
(2301 + 2501)



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	-	359,18
2810	M3-4-5-6-8-10-12	-	25x9	1-1/2	1	245,43

2811/2812

M3-20 / M5-20

M  
DIN 13

>2811/2812  
(2301 + 2501)



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	€
2811	M3-4-5-6-8-10-12-14-16-18-20	20x5-20x7-25x9-30x11-38x14-45x18	20x5-20x7-25x9-30x11-38x14-45x18	1 - 3	1 - 2	718,33
2812	M5-6-8-10-12-14-16-18-20	20x7-25x9-30x11-38x14-45x18	20x7-25x9-30x11-38x14-45x18	1 - 3	1 - 2	682,43



2813/2814

M3-24 / M5-30

M  
DIN 13

>2813/2814  
(2301 + 2501)



Ref.	Machos y cojinetes Tarauds et filières Taps and bearing	Volvedores Porte-filières Tap wrench	Giramachos nº Tourne-à-gauche nº 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	1122,38
2814	M5-6-8-10-12-14-16-18-20-22-24-27-30	20x7-25x9-30x11-38x14-45x18-55x22-65x25	3 - 5	1904,75

2841/2842

MF3-12 / MF6-20

MF  
DIN 13

>2841  
(2301 + 2501)



>2842  
(2301 + 2501)



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	€
2841	M3x0,35-4x0,50-5x0,50-6x0,75-8x0,75 8x1,00-10x1,00-12x1,50	20x5-25x9-30x11-38x10	1 - 2	1	737,04
2842	M6x0,75-8x0,75-8x1,00-10x1,00-12x1,50 14x1,25-14x1,50-16x1,50-18x1,50-20x1,50	20x7-25x9-30x11-38x10-45x14	1 - 3	1	1236,51

2815/2816/2817

W1/8-1/2, W1/4-1/2, W1/4-1"

**BSW**  
BS 84

>2815  
(2304 + 2502)



>2816  
(2304 + 2502)



>2817  
(2304 + 2502)



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	589,02
2816	W1/4-5/16-3/8-7/16-1/2	20x7-25x9-30x11-38x14	1 - 2	1	499,24
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	-	1376,8

2843/2818

UNC1/4", UNF1/4-1"

**UNC**  
ANSI/ASME  
B1.1

**UNF**  
ANSI/ASME  
B1.1

>2843/2818  
(2307 + 2505)



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	1983,12
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	1257,05

2819/2820

BSP1/8-1", BSP1/4-1"1/2

G  
ISO 228

>2819  
(2306 + 2504)



>2820  
(2306 + 2504)





Ref.	Machos y cojinetes Tarauds et filières Taps and bearing	Volvedores Porte-filières Tap wrench	Giramachos nº Tourne-à-gauche nº Tap turner nº	€
2819	BSP1/8-1/4-3/8-1/2-3 4-1"	30x11-38x10-45x14-65x18-55x18	1 - 3 - 5	969,73
2820	BSP1/4-3/8-1/2-3/4-1"-1"1/4-1"1/2	38x10-45x14-65x18-75x20-90x22	2 - 4 - 7	2262,73



**75** YEARS  
1947-2022

**Escariado** >  
**Alésage**  
**Reaming**  
**Reibahle**

**Херус** / CUTTING  
TOOL  
EXPERTS

Escariadores de mano / Alésoids à main / Hand reamers / Reibahlen						
4101	HSS	DIN 206		Form. B 8° Tol. H7 ISO 236	P K N	297
4102	HSS	DIN 9		Form. B 8° 2% ISO 3465	P K N	298
4119	HSS			Form. B 8° C. 1:16 (NPT-BSPT)	P K N	298
Escariadores de máquina / Alésoids machine / Machine reamers / Maschinen-Reibahlen						
4118	HM-MD	DIN 212		Form. B-D 8° Tol. H7 ISO 521	P M K N S H	299
4104	HSSCO	DIN 212		Form. B 8° Tol. H7 ISO 521	P M K N S	300
4105	HSSCO	DIN 212		Form. E 45° Tol. H7 ISO 521	P N	301
4103	HSSCO	DIN 2179		Form. E 45° 2% ISO 3466	P K N	302
4106	HSSCO	DIN 208		Form. B 8° Tol. H7 ISO 521	P M K N S	302
4107	HSSCO	DIN 208		Form. C 45° Tol. H7 ISO 521	P N	303
4108	HSS	DIN 311		25° ISO 2238	P K N	303
Escariadores de máquina entrada cónica / Alésoids machine pour goupilles coniques / Machine reamers for taper holes / Maschinen-Reibahlen für Kegelbohrungen						
4115	HSSCO	DIN 212		45° 5%	P K N	304
4116	HSSCO	DIN 212		45° 8%	P K N	304
4117	HSSCO	DIN 212		45° 10%	P K N	305
Escariadores huecos / Alésoids creux finisseurs à machine / Hole machine reamers / Maschinen-Reibahlen für Löcher						
4109	HSS	DIN 219		Form. B 8° Tol. H7 ISO 2402	P M K N S	305
4114	HSS					306
Escariadores extensibles / Alésoids extenseibles / Extendable reamers / Ausziehbare Reibahlen						
4110	HSS			Form. A REFORZ. RENFORC. RENFORC.	P K N	306
4111	HSS			Form. A	P K N	307

**FORMULARIO ESCARIADORES / AVELLANADORES ESPECIALES**  
**FICHE TECHNIQUE ALESOIRS ET FRAISES A TROU SPECIAUX**  
**TECHNICAL ENQUIRY FOR SPECIAL REAMERS AND COUNTERSINK CUTTERS**  
**FORMULAR FÜR SPEZIAL-REIBAHLEN / SENKFRÄSER**

Fecha / Date: .....

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

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

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

**TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK**

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

Dureza / Durété / Hardness ..... HB ..... HRc Resistencia / Résistance / Resistance ..... N/mm<sup>2</sup>

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

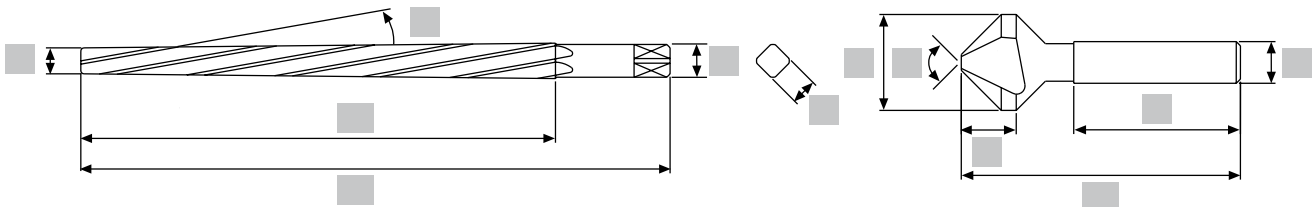
Máquina / Machine ..... Refrigerante / Réfrigérant / Coolant .....

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: .....



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



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

Ref./ Réf. / Ref.	<b>4118</b>	<b>4104</b>
Form.	<b>B</b>	<b>B</b>
Hel./Hél./Spiral	<b>8°</b>	<b>8°</b>
Mat.	<b>HM</b>	<b>HSSCO</b>
Rec./Rev./Coating		
DIN	<b>212</b>	<b>212</b>
Tol.	<b>H7</b>	<b>H7</b>
Gama/Gamme/Range	<b>2-12</b>	<b>1-20</b>
Pag.	<b>299</b>	<b>300</b>

Mat.	Avance/Feed (mm/rpm)																		Vc (m/min)		
	HSS-HSSCO									MD / CARBURE / HARD METAL											
	Ø2	Ø5	Ø10	Ø15	Ø20	Ø25	Ø30	Ø35	Ø40	Ø2	Ø5	Ø10	Ø15	Ø20	Ø25	Ø30	Ø35	Ø40			
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	●	●
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	●	●
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	●	●
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	○	○
P.5	<1400										0.04	0.08	0.16	0.2	0.25	0.32	0.36	0.4	0.43	●	
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	●	●
M.2		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	●	●
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	●	○
M.4		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	●	○
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	●	●
K.2																					
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	●	○
K.4.1		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	●	●
K.4.2	<1400										0.04	0.08	0.16	0.2	0.25	0.32	0.36	0.4	0.43	●	
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	●	●
N.1.2		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	●	●
N.1.3		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	●	●
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	●	●
N.2.2		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	●	●
N.2.3		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	●	●
N.2.4																					
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	●	○
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	●	●
N.4.2		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	●	●
N.4.3																					
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	●	○
S.1.2		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	●	○
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	●	●
S.2.2		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	●	○
S.2.3		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	●	○
H.1	50 HRC										0.03	0.06	0.12	0.16	0.2	0.25	0.28	0.32	0.35	●	
H.2	55 HRC										0.03	0.06	0.12	0.16	0.2	0.25	0.28	0.32	0.35	●	
H.3	60 HRC										0.02	0.05	0.1	0.12	0.16	0.2	0.23	0.25	0.27	○	

● Optima / Optimun ○ Alternativo / Alternative

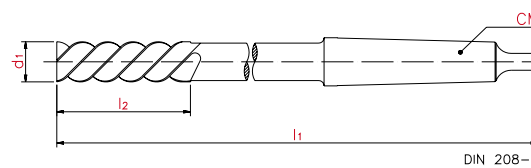
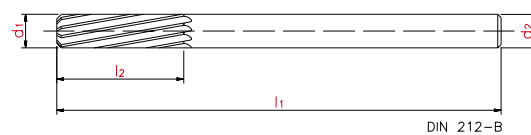
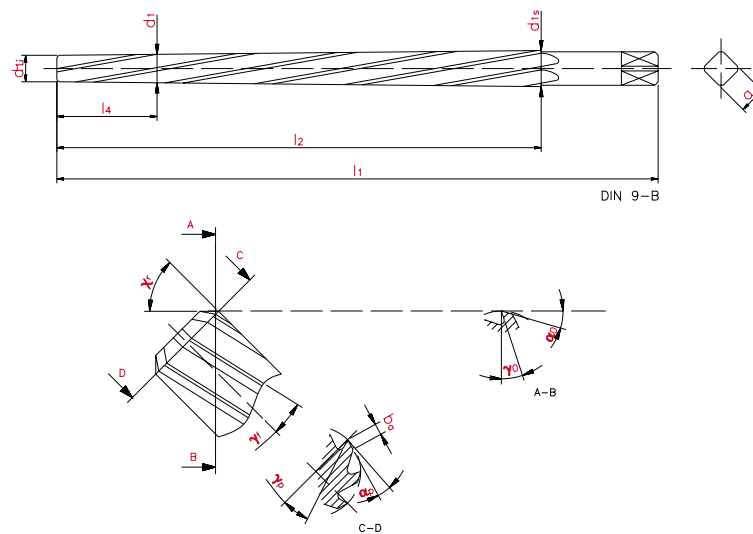




<b>4105</b>	<b>4103</b>	<b>4106</b>	<b>4107</b>	<b>4108</b>	<b>4115</b>	<b>4116</b>	<b>4117</b>	<b>4109</b>
E	E	B	C					B
45°	45°	8°	45°	25°	45°	46°	47°	8°
HSSCO	HSSCO	HSSCO	HSSCO	HSSCO	HSSCO	HSSCO	HSSCO	HSS
212	2179	208	208	311	212	212	212	219
H7		H7	H7					H7
3-16	3-10	4-40	5-29	10-37	3-7	3-6	2-6	32-80
301	302	302	303	303	304	304	305	305
• 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
	○ 4-6	• 6-8		○ 4-6	○ 4-6	○ 4-6	○ 4-6	○ 6-8
		○ 4-6						
	○ 4-6	• 6-8		○ 4-6	○ 4-6	○ 4-6	○ 4-6	• 6-8
	○ 4-6	• 6-8		○ 4-6	○ 4-6	○ 4-6	○ 4-6	• 6-8
		○ 4-6						
		○ 4-6						
	• 10-14	• 12-16		• 10-14	• 10-14	• 10-14	• 10-14	• 10-14
		○ 6-8						○ 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
		○ 12-16						○ 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
		○ 1-3						○ 1-3
		○ 1-3						
	○ 4-6	• 6-8		○ 4-6	○ 4-6	○ 4-6	○ 4-6	• 6-8
		○ 2-6						○ 2-6
		○ 2-6						

● Optima / Optimun ○ Alternativo / Alternative





<b>l1</b>	<b>Longitud total / Longueur totale / Total length</b>
<b>l2</b>	<b>Longitud de corte / Longueur de coupe / Length of cut</b>
<b>l4</b>	<b>Longitud hasta el diámetro nominal / Longueur jusqu'au diamètre nominal / Length to the nominal diameter</b>
<b>a</b>	<b>Cuadrado / Carré / Square</b>
<b>ba</b>	<b>Ancho de fase / Largeur de phase / Phase width</b>
<b>d1</b>	<b>Diámetro nominal / Diamètre nominal / Nominal diameter</b>
<b>d1i</b>	<b>Diámetro inferior / Diamètre inférieur / Inferior diameter</b>
<b>d1s</b>	<b>Diámetro superior / Diamètre supérieur / Superior diameter</b>
<b>d2</b>	<b>Diámetro de mango / Diamètre de queue / Shank diameter</b>
<b>di</b>	<b>Diámetro interior / Diamètre intérieur / Interior diameter</b>
<b>CM</b>	<b>Tamaño del cono morse / Taille du cône morse / Morse taper size</b>
<b>α<sub>0</sub></b>	<b>Ángulo de destalonado / Angle de détalonnage / Relief angle</b>
<b>α<sub>π</sub></b>	<b>Ángulo de destalonado del corte seco / Angle de détalonnage de la coupe sèche / Dry cut relief angle</b>
<b>γ<sub>0</sub></b>	<b>Ángulo corte ortogonal / Angle coupe orthogonale / Orthogonal cut angle</b>
<b>γ<sub>φ</sub></b>	<b>Ángulo de corte lateral / Angle de coupe latérale / Lateral cut angle</b>
<b>γ<sub>π</sub></b>	<b>Ángulo corte posterior / Angle coupe postérieure / Rear cut angle</b>
<b>χ<sub>ρ</sub></b>	<b>Ángulo de posición / Angle de position / Angle of position</b>

# ESCARIADORES DE MANO ALÉSOIRS À MAIN / HAND REAMERS / HAND-REIBAHLEN

**4101** HSS DIN ≈ 206

Form.  
**B**



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	Icon	Ø mm	€	L mm	l mm	Icon
1,50	80,75	41	20	1	12,50	47,69	152	76	1
2,00	22,72	50	25	1	13,00	47,69	152	76	1
2,25	24,98	54	27	1	13,50	133,93	163	81	1
2,50	22,72	58	29	1	14,00	50,93	163	81	1
2,75	24,98	62	31	1	14,50	133,93	163	81	1
3,00	22,72	62	31	1	15,00	55,65	163	81	1
3,25	64,78	66	33	1	15,50	133,93	175	87	1
3,50	22,72	71	35	1	16,00	60,54	175	87	1
3,75	64,78	71	35	1	16,50	133,93	175	87	1
4,00	22,72	76	38	1	17,00	72,89	175	87	1
4,25	64,78	76	38	1	17,50	133,93	188	93	1
4,50	23,74	81	41	1	18,00	87,38	188	93	1
4,75	64,78	81	41	1	18,50	133,93	188	93	1
5,00	23,74	87	44	1	19,00	87,38	188	93	1
5,25	64,78	87	44	1	19,50	192,89	201	100	1
5,50	23,74	93	47	1	20,00	94,53	201	100	1
5,75	64,78	93	47	1	20,50	189,17	201	100	1
6,00	23,74	93	47	1	21,00	118,72	201	100	1
6,25	64,78	100	50	1	21,50	172,73	215	107	1
6,50	23,74	100	50	1	22,00	123,01	215	107	1
6,75	64,78	107	54	1	22,50	199,73	215	107	1
7,00	23,74	107	54	1	23,00	128,48	215	107	1
7,25	65,53	107	54	1	23,50	220,26	215	107	1
7,50	25,04	107	54	1	24,00	141,89	231	115	1
7,75	65,53	115	58	1	24,50	233,75	231	115	1
8,00	25,04	115	58	1	25,00	150,58	231	115	1
8,25	65,53	115	58	1	25,50	366,34	231	115	1
8,50	26,32	115	58	1	26,00	164,53	231	115	1
8,75	65,53	124	62	1	26,50	307,70	231	115	1
9,00	26,32	124	62	1	27,00	179,37	247	124	1
9,25	65,53	124	62	1	27,50	315,08	247	124	1
9,50	27,42	124	62	1	28,00	185,70	247	124	1
9,75	125,59	133	66	1	28,50	331,32	247	124	1
10,00	27,42	133	66	1	29,00	263,30	247	124	1
10,25	125,59	133	66	1	29,50	367,85	247	124	1
10,50	34,76	133	66	1	30,00	236,33	247	124	1
10,75	125,59	142	71	1	32,00	273,82	265	133	1
11,00	34,76	142	71	1	34,00	287,15	284	142	1
11,25	125,59	142	71	1	36,00	323,87	284	142	1
11,50	125,59	142	71	1	38,00	375,50	305	152	1
11,75	133,93	142	71	1	40,00	375,50	305	152	1
12,00	37,35	152	76	1					

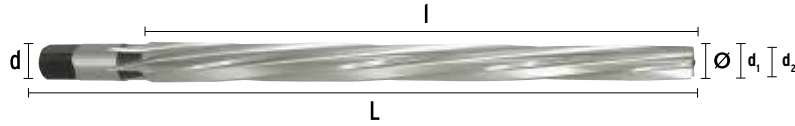
# ESCARIADORES DE MANO ALÉSOIRS À MAIN / HAND REAMERS / HAND-REIBAHLEN

## 4102 HSS DIN 9

Form. **B** 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.	d <sub>1</sub> mm	d <sub>2</sub> mm	d mm	∠ mm	€	L mm	I mm		Ø Nom.	d <sub>1</sub> mm	d <sub>2</sub> mm	d mm	∠ mm	€	L mm	I mm	
*1,50	2,14	1,40	3,15	2,40	53,08	57	37	1	6,00	8,00	5,90	8,00	6,20	30,05	135	105	1
2,00	2,86	1,90	3,15	2,40	40,86	68	48	1	*6,50	8,50	6,40	8,00	6,20	41,74	135	105	1
2,50	3,36	2,40	3,15	2,40	40,86	68	48	1	7,00	9,00	6,90	8,00	6,20	34,67	135	105	1
3,00	4,06	2,90	4,00	3,00	40,86	80	58	1	8,00	10,80	7,90	10,00	8,00	46,66	180	145	1
*3,50	4,56	3,40	4,50	3,00	44,85	87	63	1	10,00	13,40	9,90	12,50	10,00	57,90	215	175	1
4,00	5,26	3,90	5,00	3,80	24,72	93	68	1	12,00	16,00	11,80	14,00	11,00	77,87	255	210	1
*4,50	5,76	4,40	6,00	3,80	32,09	93	68	1	14,00	18,30	13,80	16,00	12,00	109,22	270	225	1
5,00	6,36	4,90	6,30	4,90	25,42	100	73	1	16,00	20,40	15,80	18,00	14,50	121,01	280	230	1
*5,50	7,18	5,40	6,30	4,90	40,27	118	89	1	20,00	24,80	19,80	22,40	18,00	166,58	310	250	1

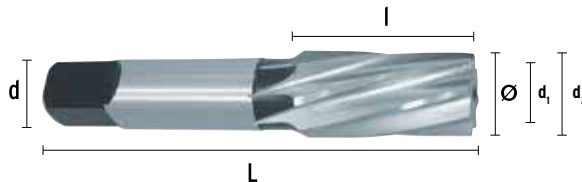
\*(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)

## 4119 HSS

Form. **B** C. 1:16 (NPTBSP)

P				M		K			N				S		H		
<800	<1.000	<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.	d <sub>1</sub> mm	d <sub>2</sub> mm	d mm	∠ mm	€	L mm	I mm		Ø Nom.	d <sub>1</sub> mm	d <sub>2</sub> mm	d mm	∠ mm	€	L mm	I mm	
1/16	5,91	6,98	6	4,90	150,84	70	17	1	1/2	16,91	19,10	16	12,00	183,59	95	35	1
1/8	8,92	9,08	7	5,50	152,80	70	17	1	3/4	22,29	24,42	20	16,00	239,67	105	35	1
1/4	10,28	11,97	11	9,00	160,54	80	27	1	1"	27,97	30,66	25	20,00	305,23	130	43	1
3/8	13,70	15,39	12	9,00	167,11	85	27	1									

# ESCARIADORES DE MÁQUINA ALÉSOIRS MACHINE / MACHINE REAMERS/ MASCHINEN-REIBAHLEN

4118

HM-MD DIN 212

Form.  
**B-D**

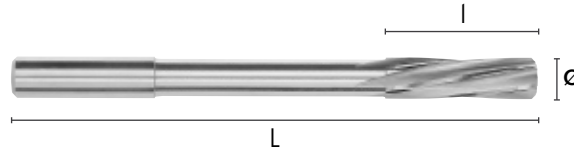


Tol.  
**H7**

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	Icon	Ø mm	€	L mm	l mm	Icon
1,00	88,33	38	7	1	4,00	75,70	75	19	1
1,10	88,33	40	10	1	4,10	87,05	75	19	1
1,20	88,33	40	10	1	4,20	87,05	75	19	1
1,30	88,33	40	10	1	4,30	87,05	80	21	1
1,40	88,33	40	10	1	4,40	87,05	80	21	1
1,50	77,29	40	10	1	4,50	87,05	80	21	1
1,60	77,29	43	11	1	4,60	87,05	80	21	1
1,70	77,29	43	11	1	4,70	87,05	80	21	1
1,80	77,29	49	12	1	4,80	87,05	86	23	1
1,90	77,29	49	12	1	4,90	87,05	86	23	1
2,00	65,32	49	12	1	5,00	80,16	86	23	1
2,10	75,08	49	12	1	5,10	97,43	86	23	1
2,20	75,08	49	12	1	5,20	97,43	86	23	1
2,30	75,08	49	12	1	5,30	97,43	86	23	1
2,40	75,08	57	18	1	5,40	97,43	93	26	1
2,50	75,08	57	18	1	5,50	97,43	93	26	1
2,60	75,08	57	18	1	5,60	97,43	93	26	1
2,70	75,08	57	18	1	5,70	97,43	93	26	1
2,80	75,08	57	18	1	5,80	97,43	93	26	1
2,90	75,08	57	18	1	5,90	97,43	101	28	1
3,00	71,24	57	18	1	6,00	96,46	101	28	1
3,10	79,85	57	18	1	6,50	118,32	101	28	1
3,20	79,85	57	18	1	7,00	124,73	109	31	1
3,30	79,85	57	18	1	8,00	142,53	117	33	1
3,40	79,85	57	18	1	8,50	163,90	117	33	1
3,50	79,85	57	18	1	9,00	163,28	125	36	1
3,60	79,85	57	18	1	10,00	181,13	133	38	11
3,70	79,85	57	18	1	11,00	270,17	133	38	1
3,80	79,85	75	19	1	12,00	285,05	151	44	1
3,90	79,85	75	19	1					

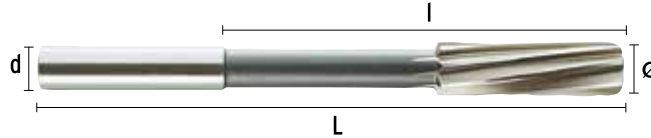
**4104**



**HSSCO DIN 212**

Form. <b>B</b> Ø ≤ 3,70	Form. <b>D</b> Ø > 3,70		Tol. <b>H7</b>	ISO <b>521</b>
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P				M		K			N				S		H		
<800	<1.000	<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		Ø mm	d mm	€	L mm	l mm	
1,00	1,00	40,94	38	5	1	6,20	6,30	32,04	101	28	1
1,20	1,20	40,94	40	7	1	6,30	6,30	32,04	101	28	1
1,40	1,40	36,70	40	7	1	6,40	6,30	32,04	101	28	1
1,50	1,50	36,70	40	7	1	6,50	6,30	24,71	101	28	1
1,60	1,60	36,70	43	11	1	6,60	6,30	32,04	101	28	1
1,80	1,80	36,70	49	12	1	6,70	6,30	32,04	101	28	1
1,90	1,90	36,70	49	12	1	6,80	7,10	32,04	109	31	1
2,00	2,00	36,70	49	12	1	6,90	7,10	32,04	109	31	1
2,10	2,10	36,70	49	12	1	7,00	7,10	24,71	109	31	1
2,20	2,20	36,70	49	12	1	7,10	7,10	32,04	109	31	1
2,30	2,30	36,70	49	12	1	7,20	7,10	32,04	109	31	1
2,40	2,40	32,42	54	18	1	7,30	7,10	32,04	109	31	1
2,50	2,50	32,42	57	18	1	7,40	7,10	32,04	109	31	1
2,60	2,60	32,42	57	18	1	7,50	7,10	26,80	109	31	1
2,70	2,70	29,99	57	18	1	7,60	8,00	35,40	117	33	1
2,80	2,80	29,99	57	18	1	7,70	8,00	35,40	117	33	1
2,90	2,90	29,99	57	18	1	7,80	8,00	35,40	117	33	1
3,00	3,00	22,53	61	15	1	7,90	8,00	35,40	117	33	1
3,10	3,10	29,17	65	16	1	8,00	8,00	27,31	117	33	1
3,20	3,20	29,17	65	16	1	8,10	8,00	40,71	117	33	1
3,30	3,30	29,17	65	16	1	8,20	8,00	40,71	117	33	1
3,40	3,40	29,17	70	18	1	8,30	8,00	40,71	117	33	1
3,50	3,50	22,53	70	18	1	8,40	8,00	40,71	117	33	1
3,60	3,60	29,17	70	18	1	8,50	8,00	29,91	117	33	1
3,70	3,70	29,17	70	18	1	8,60	9,00	40,71	125	36	1
3,80	4,00	29,17	75	19	1	8,70	9,00	40,71	125	36	1
3,90	4,00	29,17	75	19	1	8,80	9,00	40,71	125	19	1
4,00	4,00	22,53	75	19	1	8,90	9,00	40,71	125	36	1
4,10	4,00	29,17	75	19	1	9,00	9,00	32,88	125	36	1
4,20	4,00	29,17	75	19	1	9,10	9,00	40,71	125	36	1
4,30	4,50	29,17	80	21	1	9,20	9,00	40,71	125	36	1
4,40	4,40	29,17	80	21	1	9,30	9,00	40,71	125	36	1
4,50	4,50	22,53	80	21	1	9,40	9,00	40,71	125	36	1
4,60	4,50	29,17	80	21	1	9,50	9,00	33,40	125	36	1
4,70	4,50	29,17	80	21	1	9,60	10,00	44,76	133	38	1
4,80	5,00	29,17	86	23	1	9,70	10,00	44,76	133	38	1
4,90	5,00	29,17	86	23	1	9,80	10,00	44,76	133	38	1
5,00	5,00	22,53	86	23	1	9,90	10,00	44,76	133	38	1
5,10	5,00	29,17	86	23	1	10,00	10,00	33,40	133	38	1
5,20	5,00	29,17	86	23	1	11,00	10,00	39,47	142	41	1
5,30	5,00	29,17	86	23	1	12,00	10,00	38,58	151	44	1
5,40	5,60	29,17	93	26	1	13,00	10,00	66,31	151	44	1
5,50	5,60	22,53	93	26	1	14,00	12,50	63,41	160	47	1
5,60	5,60	29,17	93	26	1	15,00	12,50	69,24	162	50	1
5,70	5,60	29,17	93	26	1	16,00	12,50	74,11	170	52	1
5,80	5,60	29,17	93	26	1	17,00	14,00	85,47	175	54	1
5,90	5,60	29,17	93	26	1	18,00	14,00	89,12	182	56	1
6,00	5,60	24,71	93	26	1	19,00	16,00	94,68	189	58	1
6,10	6,30	32,04	101	28	1	20,00	16,00	95,35	195	60	1

4104/1

HSSCO DIN 212

Form. B  
Ø ≤ 3,70

Form. D  
Ø > 3,70



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	43,17	34	5-7	1
1,32 - 1,54	38,71	40	8	1
1,55 - 1,70	38,71	43	9	1
1,71 - 1,90	38,71	46	10	1
1,91 - 2,12	38,71	49	11	1
2,13 - 2,36	38,71	53	12	1
2,37 - 2,66	34,18	57	14	1
2,67 - 3,05	31,65	61	15	1
3,06 - 3,35	31,65	65	16	1
3,36 - 3,75	35,54	70	18	1
3,76 - 4,25	35,54	75	19	1
4,26 - 4,75	34,64	80	21	1
4,76 - 5,30	34,64	86	23	1
5,31 - 5,95	35,06	93	26	1
5,96 - 6,00	35,93	93	26	1
6,01 - 6,70	35,93	101	28	1
6,71 - 7,29	39,58	109	31	1

Ø mm	€	L mm	l mm	
7,30 - 7,55	44,49	109	32	1
7,56 - 8,50	44,49	117	33	1
8,51 - 9,25	50,24	125	36	1
9,26 - 9,50	57,34	125	36	1
9,51 - 10,64	55,16	133	38	1
10,65 - 11,25	64,77	142	41	1
11,26 - 11,80	66,50	142	41	1
11,81 - 12,02	66,50	151	44	1
12,03 - 13,02	91,44	151	44	1
13,03 - 13,20	91,44	151	44	1
13,21 - 14,00	111,17	160	47	1
14,01 - 14,02	111,17	162	50	1
14,03 - 15,00	135,57	162	50	1
15,01 - 15,02	135,57	170	52	1
15,03 - 16,00	145,14	170	52	1
16,01 - 16,02	145,14	175	54	1

4105

HSSCO DIN 212

Form. E



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



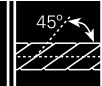
Ø mm	d mm	€	L mm	l mm	
3,00	3,00	30,90	61	15	1
3,50	3,50	30,90	70	18	1
4,00	4,00	30,90	75	19	1
4,50	4,50	31,48	80	21	1
5,00	5,00	31,48	86	23	1
5,50	5,60	31,48	93	26	1
6,00	5,60	31,48	93	26	1
6,50	6,30	36,58	101	28	1
7,00	7,10	32,01	109	31	1
7,50	7,10	37,27	109	31	1
8,00	8,00	32,61	117	33	1

Ø mm	d mm	€	L mm	l mm	
8,50	8,00	41,43	117	33	1
9,00	9,00	36,25	125	36	1
9,50	9,00	41,43	125	36	1
10,00	10,00	36,25	133	38	1
11,00	10,00	55,84	142	41	1
12,00	12,00	53,76	151	44	1
13,00	12,00	63,21	151	44	1
14,00	12,00	68,02	160	47	1
15,00	12,50	91,41	162	50	1
16,00	12,50	113,74	170	52	1

4103

HSSCO DIN 2179

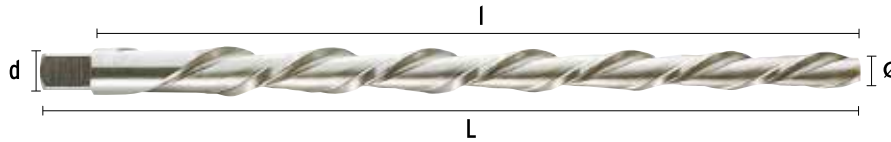
Form.  
**E**



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

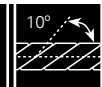


Ø Nom.	D mm	d mm	€	L mm	l mm	Icon	Ø Nom.	D mm	d mm	€	L mm	l mm	Icon
3,00	4,06	2,90	29,22	100	58	1	6,00	8,00	5,90	52,54	160	105	1
4,00	5,26	3,90	47,49	112	68	1	8,00	10,80	7,90	84,37	207	145	1
5,00	6,36	4,90	45,27	122	73	1	10,00	13,40	9,90	167,41	245	175	1

4106

HSSCO DIN 208

Form.  
**B**



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



Icon	Ø mm	€	L mm	l mm	Icon	Icon	Ø mm	€	L mm	l mm	Icon
1	4,00	56,75	129	19	1	2	16,00	67,59	210	52	1
1	5,00	41,13	133	23	1	2	16,50	89,42	214	54	1
1	5,50	50,54	138	26	1	2	17,00	75,56	214	54	1
1	6,00	41,73	138	26	1	2	18,00	80,29	219	56	1
1	6,50	51,54	144	28	1	2	19,00	84,04	223	58	1
1	7,00	42,44	150	31	1	2	20,00	87,26	228	60	1
1	7,50	35,01	150	31	1	2	21,00	108,26	232	62	1
1	8,00	43,45	156	33	1	2	22,00	115,17	237	64	1
1	8,50	55,89	156	33	1	2	23,00	120,30	241	66	1
1	9,00	46,47	162	36	1	3	24,00	145,80	268	68	1
1	9,50	56,43	162	36	1	3	25,00	148,71	268	68	1
1	10,00	44,09	168	38	1	3	26,00	155,73	273	70	1
1	10,50	57,18	168	38	1	3	27,00	179,19	277	71	1
1	11,00	44,66	175	41	1	3	28,00	179,19	277	71	1
1	11,50	60,25	175	41	1	3	29,00	195,23	281	73	1
1	12,00	44,66	182	44	1	3	30,00	195,23	281	73	1
1	12,50	70,63	182	44	1	3	31,00	249,37	285	75	1
1	13,00	58,61	182	44	1	4	32,00	233,66	317	77	1
1	13,50	72,73	189	47	1	4	34,00	245,46	321	78	1
1	14,00	60,26	189	47	1	4	35,00	282,74	321	78	1
2	14,50	76,59	204	50	1	4	36,00	363,27	325	79	1
2	15,00	62,08	204	50	1	4	38,00	386,80	329	81	1
2	15,50	80,48	210	52	1	4	40,00	394,66	329	81	1



**4107**

**HSSCO DIN 208**

Form. **C**



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



1	Ø mm	€	L mm	l mm	1	2	Ø mm	€	L mm	l mm	1
1	5,00	69,64	133	23	1	2	17,00	133,47	214	54	1
1	6,00	69,64	138	26	1	2	18,00	141,80	219	56	1
1	7,00	69,64	150	31	1	2	19,00	150,42	223	58	1
1	8,00	69,64	156	33	1	2	20,00	158,15	228	60	1
1	9,00	67,09	162	36	1	2	21,00	170,90	232	62	1
1	10,00	67,09	168	38	1	2	22,00	182,40	237	64	1
1	11,00	70,04	175	41	1	2	23,00	195,60	241	66	1
1	12,00	70,04	182	44	1	3	24,00	206,32	268	68	1
1	13,00	104,20	182	44	1	3	25,00	219,02	268	68	1
1	14,00	107,44	189	47	1	3	26,00	231,14	273	70	1
2	15,00	117,63	204	50	1	3	28,00	255,52	277	71	1
2	16,00	123,33	210	52	1	3	29,00	268,88	281	73	1

**4108**

**HSS DIN 311**

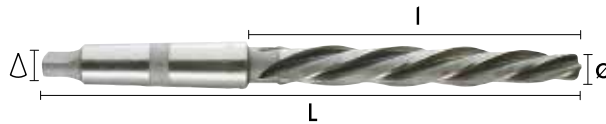


ISO **2238**



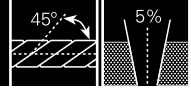
P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●	○			○		●	○	●	●	●	●	●		○			
6-12	4-6			4-6		10-14	6-8		8-22	10-22		14-22		4-6			

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



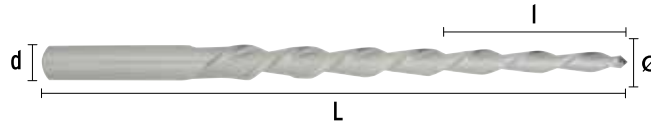
1	Ø mm	€	L mm	l mm	1	3	Ø mm	€	L mm	l mm	1
1	10,00	65,96	171	95	1	3	24,00	171,15	296	180	1
1	11,00	67,76	176	100	1	3	25,00	182,43	296	180	1
2	12,00	70,17	199	105	1	3	26,00	199,22	296	180	1
2	13,00	76,42	199	105	1	3	27,00	213,85	311	195	1
2	14,00	84,18	209	115	1	3	28,00	233,62	311	195	1
2	15,00	88,43	219	125	1	3	29,00	250,74	311	195	1
2	16,00	92,84	229	135	1	3	30,00	251,20	311	195	1
3	17,00	119,90	251	135	1	3	31,00	255,41	326	210	1
3	18,00	124,07	261	145	1	4	32,00	278,03	354	210	1
3	19,00	127,61	261	145	1	4	33,00	371,11	364	220	1
3	20,00	129,91	271	155	1	4	34,00	392,21	364	220	1
3	21,00	142,96	271	155	1	4	35,00	412,37	364	220	1
3	22,00	149,20	281	165	1	4	36,00	479,22	364	220	1
3	23,00	159,97	281	165	1	4	37,00	500,32	364	220	1

**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			

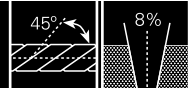
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø Nom.	€	D mm	d mm	L mm	I mm	
3,00	109,88	3	6	110	60	1
4,00	147,96	4	8	130	80	1
5,00	181,64	5	10	155	100	1

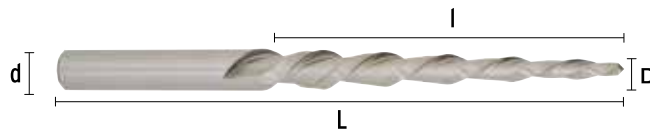
Ø Nom.	€	D mm	d mm	L mm	I mm	
6,00	223,76	6	12	180	120	1
7,00	288,08	7	14	200	140	1

**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			

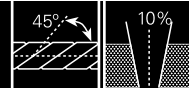
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø Nom.	€	D mm	d mm	L mm	I mm	
3,00	91,07	3	8	110	62	1
4,00	111,97	4	10	130	75	1

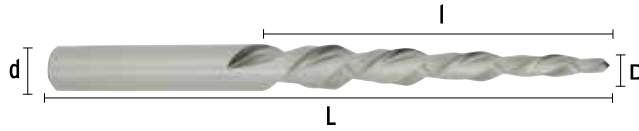
Ø Nom.	€	D mm	d mm	L mm	I mm	
5,00	147,57	5	12	150	90	1
6,00	169,18	6	14	160	100	1

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	86,37	2	6	90	40	1
3,00	107,27	3	8	100	50	1
4,00	134,71	4	10	115	60	1

Ø Nom.	€	D mm	d mm	L mm	l mm	
5,00	135,86	5	12	130	70	1
6,00	238,13	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	107,40	50	36	1
34,00	16,00	119,09	50	36	1
36,00	19,00	136,34	56	40	1
38,00	19,00	145,25	56	40	1
42,00	19,00	165,28	56	40	1
45,00	22,00	194,22	63	45	1
47,00	22,00	205,91	63	45	1
48,00	22,00	218,15	63	45	1
52,00	27,00	264,89	71	50	1

Ø mm	Ø int.	€	L mm	l mm	
55,00	27,00	293,83	71	50	1
58,00	27,00	309,97	71	50	1
62,00	32,00	377,86	80	56	1
65,00	32,00	416,26	80	56	1
70,00	32,00	456,33	80	56	1
72,00	40,00	525,34	90	63	1
75,00	40,00	572,08	90	63	1
80,00	40,00	622,72	90	63	1

**4114** Mandrino / Mandrin / Mandrel



∆	∅ mm	D mm	€	L mm	📦
3	31,00 - 35,00	16	239,66	260	1
4	36,00 - 42,00	19	277,13	298	1
4	43,00 - 50,00	22	352,01	310	1

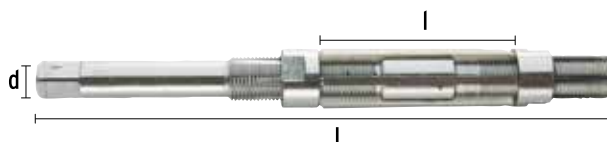
∆	∅ mm	D mm	€	L mm	📦
5	51,00 - 60,00	27	520,53	325	1
5	61,00 - 71,00	32	625,38	376	1
5	72,00 - 85,00	40	793,93	396	1

**4110** Extensible / Extendible

Form. **A** REFOR. REINFORC. 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



∅ mm	d mm	€	L mm	l mm	📦	€ JUCHILLAS J.LAMES/SET OF BLADES
8,00-9,00	4,50	125,22	100	35	1	79,00
9,00-10,00	5,50	125,22	120	39	1	79,00
10,00-11,00	5,90	125,22	125	40	1	79,00
11,00-12,00	6,50	125,22	130	43	1	79,00
12,00-13,50	7,50	125,22	135	46	1	79,00
13,50-15,50	8,00	125,22	140	51	1	79,00
15,50-18,00	9,50	133,25	165	61	1	82,72
18,00-21,00	12,00	137,93	185	66	1	87,19

∅ mm	d mm	€	L mm	l mm	📦	€ JUCHILLAS J.LAMES/SET OF BLADES
21,00-24,00	13,50	160,48	195	70	1	100,37
24,00-27,50	15,00	174,74	215	83	1	105,68
27,50-31,50	18,50	191,09	240	88	1	116,22
31,50-37,00	21,00	249,09	265	91	1	142,98
37,00-45,00	25,00	371,40	310	110	1	221,29
45,00-55,00	32,00	534,34	380	128	1	340,31
55,00-67,00	42,00	971,59	440	150	1	515,66
67,00-80,00	45,00	1473,20	490	170	1	783,55

**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



∅ mm	d mm	€	L mm	l mm	☐ J.CUCHILLAS J.LAMES/SET OF BLADES	€ J.CUCHILLAS J.LAMES/SET OF BLADES	∅ mm	d mm	€	L mm	l mm	☐ J.CUCHILLAS J.LAMES/SET OF BLADES	€ J.CUCHILLAS J.LAMES/SET OF BLADES
8,00-9,00	4,50	160,94	175	35	1	79,00	21,00-24,00	13,50	178,71	320	70	1	100,37
9,00-10,00	5,50	160,94	185	35	1	79,00	24,00-27,50	15,00	190,00	350	83	1	105,68
10,00-11,00	5,90	160,94	195	40	1	79,00	27,50-31,50	18,50	243,21	385	88	1	116,22
11,00-12,00	6,50	160,94	200	41	1	79,00	31,50-37,00	21,00	362,96	424	91	1	142,98
12,00-13,50	7,50	160,94	220	44	1	79,00	37,00-45,00	25,00	528,49	490	110	1	221,29
13,50-15,50	8,00	160,94	243	53	1	79,00	45,00-55,00	32,00	757,45	600	128	1	340,31
15,50-18,00	9,50	170,60	274	61	1	82,72	55,00-67,00	42,00	1208,51	740	150	1	515,66
18,00-21,00	12,00	170,60	300	66	1	87,19	67,00-80,00	45,00	1662,60	830	170	1	783,55



**75** YEARS  
1947-2022

**Avellanado**   
**Chanfreinage**  
**Counterboring**  
**Senkbohren**

**Brocas avellanadoras / Fraises coniques / Counterbore drill-bits / Senkbohrer**

5101	HSS							317
5102	HSSCO							317
5103	HSS		TIALN					318

**Brocas escalonadas / Fraises étagées / Step drill-bits / Stufenbohrer**

5157	HSS							319
5158	HSS		TIALN					319
5105	HSS							320
5106	HSS		TIALN					320
5160	HSS	MULTI						321
5109	HSS							321
5112	HSS							322

**Avellanadores / Fraises à trou et à chanfreiner / Countersink cutters / Senker**

5159	HM-MD		TIALN					323
5116	HSS	DIN 335 C						323
5117	HSSCO	DIN 335 C						324
5118	HSS	DIN 335 C	TIALN					324
5119	HSSCO	DIN 335 C	TIALN					325
1505	HSS	DIN 335 C						325
5120	HSS	DIN 335 C						326



5121	HSS	DIN 335 C			3z	P, K, N	326
5122	HSS				3z	P, K, N	327
5123	HSS	DIN 334 C			3z	P, K, N	327
5124	HSS				3z	P, K, N	328
5161	HSS				3z	P, K, N	328
5125	HSS				1z	P, K, N	329
5126	HSS	DIN 334 A			$z \geq 4$	P, K, N	329
5127	HSS	DIN 335 A			$z \geq 4$	P, K, N	330
5129	HSS	DIN 335 D			3z	P, K, N	330
5130	HSS	DIN 334 D			3z	P, K, N	331
5132	HSS				3z	P, K, N	331

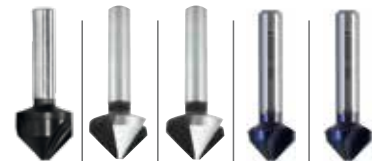
**Avellanadores con agujero / Fraises à trou et à chanfreiner / Countersink cutters / Senker mit Bohrung**

5133	HSS					P, K, N	332
5134	HSSCO					P, M, K, N	332
5135	HSS					P, K, N	333

**Avellanadores Allen / Fraises à trou et à chanfreiner / Countersink cutters / Innensechskant-Senker**

5136	HSS	DIN 373			ALLEN ISO 4206	P, K, N	334
5137	HSS	DIN 375			ALLEN	P, K, N	334
Estuches / Coffrets / Sets / Hüllen							335

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



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

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.	323	323	324	324	325

Mat.		Avance/Feed (mm/rpm) HSS/HSSCo - HM=x1,5									Vc (m/min)				
Mat.	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	•	•	•	•	•
P.2	<800	0,04	0,07	0,10	0,12	0,14	0,18	0,20	0,22	0,22	•	•	•	•	•
P.3	<1000	0,03	0,04	0,05	0,06	0,08	0,10	0,10	0,12	0,12	•	•	•	•	•
P.4	<1200	0,03	0,04	0,05	0,06	0,08	0,10	0,10	0,12	0,12	•	•	•	•	•
P.5	<1400	0,01	0,03	0,03	0,06	0,08	0,10	0,12	0,14	0,16	•	•	•	•	•
M.1	<950	0,04	0,05	0,06	0,07	0,08	0,09	0,10	0,11	0,12	•	•	•	•	•
M.2		0,04	0,05	0,06	0,07	0,08	0,09	0,10	0,11	0,12	•	•	•	•	•
M.3	<1200	0,01	0,03	0,03	0,06	0,08	0,10	0,12	0,14	0,16	•	•	•	•	•
M.4		0,01	0,03	0,03	0,06	0,08	0,10	0,12	0,14	0,16	•	•	•	•	•
K.1	<500	0,08	0,10	0,12	0,16	0,20	0,25	0,25	0,30	0,30	•	•	•	•	•
K.2															
K.3	<800	0,06	0,07	0,08	0,12	0,16	0,20	0,20	0,25	0,25	•	•	•	•	•
K.4.1		0,06	0,07	0,08	0,12	0,16	0,20	0,20	0,25	0,25	•	•	•	•	•
K.4.2	<1400	0,02	0,04	0,04	0,08	0,12	0,16	0,18	0,20	0,22	•	•	•	•	•
N.1.1	Al	0,10	0,12	0,14	0,18	0,20	0,24	0,30	0,35	0,40	•	•	•	•	•
N.1.2		0,08	0,10	0,12	0,16	0,20	0,25	0,25	0,30	0,30	•	•	•	•	•
N.1.3		0,08	0,10	0,12	0,16	0,20	0,25	0,25	0,30	0,30	•	•	•	•	•
N.2.1	Cu	0,06	0,07	0,08	0,12	0,16	0,20	0,20	0,25	0,25	•	•	•	•	•
N.2.2		0,10	0,12	0,14	0,18	0,20	0,24	0,30	0,35	0,40	•	•	•	•	•
N.2.3		0,10	0,12	0,14	0,18	0,20	0,24	0,30	0,35	0,40	•	•	•	•	•
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	•	•	•	•	•
N.4.1	Plastic	0,10	0,12	0,14	0,18	0,20	0,24	0,30	0,35	0,40	•	•	•	•	•
N.4.2		0,04	0,06	0,08	0,10	0,12	0,16	0,20	0,20	0,25	•	•	•	•	•
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	•	•	•	•	•
S.1.2		0,03	0,04	0,05	0,06	0,08	0,1	0,1	0,12	0,12	•	•	•	•	•
S.2.1	Ti	0,04	0,07	0,1	0,12	0,14	0,18	0,2	0,22	0,22	•	•	•	•	•
S.2.2		0,04	0,07	0,1	0,12	0,14	0,18	0,2	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	•	•	•	•	•
H.1	50 HRC	0,01	0,03	0,03	0,06	0,08	0,10	0,12	0,14	0,16	•	•	•	•	•
H.2	55 HRC	0,01	0,03	0,03	0,06	0,08	0,10	0,12	0,14	0,16	•	•	•	•	•
H.3	60 HRC	0,01	0,03	0,03	0,06	0,08	0,10	0,12	0,14	0,16	•	•	•	•	•

● Optima / Optimun ○ Alternativo / Alternative

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
		334				334	335	335	334		335				
C		C				A	A	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
326	327	327	328	328	329	329	330	330	331	331	332	332	333	334	334
<b>Vc (m/min)</b>															
● 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



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



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

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.	317	317	318	319	319

Mat.	Avance/Feed (mm/rpm) HSS/HSSCo - HM=x1,5											Vc (m/min)				
	Ø2	Ø5	Ø10	Ø15	Ø20	Ø25	Ø30	Ø35	Ø40	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	○ 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					

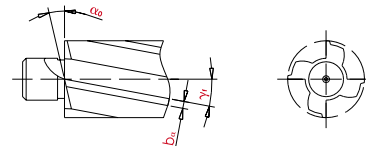
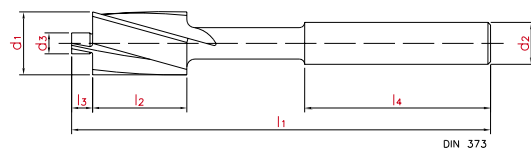
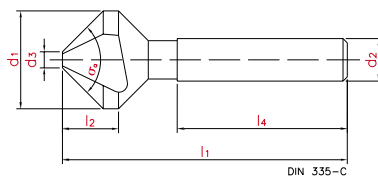
● Optima / Optimun ○ Alternativo / Alternative

<b>5105</b>	<b>5106</b>	<b>5160</b>	<b>5109</b>
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
320	320	321	321
<b>Vc (m/min)</b>			
● 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



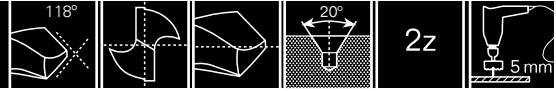
● Optima / Optimun ○ Alternativo / Alternative

MANGO QUEUE SHANK	RAINURA RAIURE GROOVE	FORMA FORME FORM	DIN 334	DIN 335	DIN 347	PLANOS PLANES FLAT
			60°	90°	120°	
CILÍNDRICO CYLINDRIQUE CYLINDRICAL	>4	A				DIN 373 
	3	C				
CÓNICO CONIQUE TAPERED	>4	B				DIN 375 
	3	D				



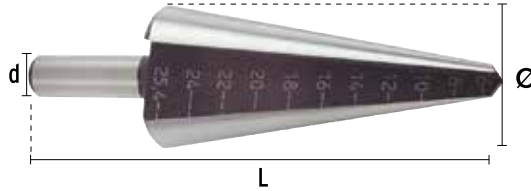
<b>I1</b>	Longitud total / Longueur totale / Total length
<b>I2</b>	Longitud diámetro mayor / Longueur du plus grand diamètre / Greater diameter length
<b>I3</b>	Longitud diámetro menor / Longueur du plus petit diamètre / Lesser diameter length
<b>I4</b>	Longitud mango / Longueur queue / Shank length
<b>ba</b>	Ancho de fase / Largeur de phase / Phase width
<b>d2</b>	Diámetro de mango / Diamètre de queue / Shank diameter
<b>d1</b>	Diámetro mayor / Plus grand diamètre / Greater diameter
<b>d3</b>	Diámetro menor / Plus petit diamètre / Lesser diameter
<b>d6</b>	Diámetro interno / Diamètre interne / Interior diameter
<b>σa</b>	Ángulo de avellanado / Angle de chanfreinage / Countersink angle
<b>α0</b>	Ángulo de destalonado / Angle de détalonnage / Relief angle
<b>γ0</b>	Ángulo corte ortogonal / Angle coupe orthogonale / Orthogonal cut angle
<b>γf</b>	Ángulo de corte lateral / Angle de coupe latérale / Lateral cut angle
<b>γp</b>	Ángulo corte posterior / Angle coupe postérieure / Rear cut angle
<b>χr</b>	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			

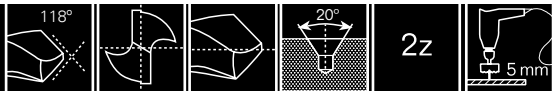
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



∅ mm	d mm	€	L mm	Icon
3,00 - 14,00	6	21,24	62	1
6,00 - 20,00	8	29,65	70	1
16,00 - 30,00	10	60,34	78	1
26,00 - 40,00	12	127,72	86	1
36,00 - 50,00	12	196,75	90	1

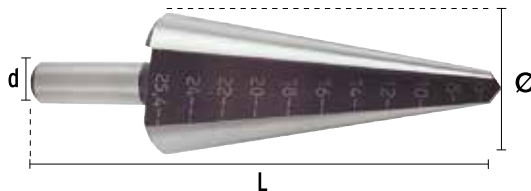
∅ mm	d mm	€	L mm	Icon
46,00 - 60,00	13	382,79	94	1
6,00 - 30,00	10	74,15	106	1
6,00 - 22,50	8	53,56	80	1
6,00 - 25,40	8	59,77	84	1

**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

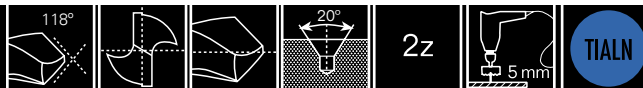


∅ mm	d mm	€	L mm	Icon
3,00 - 14,00	6	29,87	62	1
6,00 - 20,00	8	38,92	70	1

∅ mm	d mm	€	L mm	Icon
16,00 - 30,00	10	74,59	78	1
26,00 - 40,00	12	153,30	86	1

**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	Icon
3,00 - 14,00	6	58,30	62	1
6,00 - 20,00	8	69,21	70	1
6,00 - 30,00	10	127,10	106	1
16,00 - 30,00	10	111,23	78	1

Ø mm	d mm	€	L mm	Icon
26,00 - 40,00	12	196,97	86	1
36,00 - 50,00	12	280,57	90	1
46,00 - 60,00	13	483,29	94	1



**P** Acero  
Aciers  
Steels  
Stähle



**M** Acero Inox  
Aciers Inox  
Stainless Steels  
Edelstahl



**K** Fundición  
Fonte  
Cast Iron  
Gusseisen



**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle



**S** Titanio y Superalloys  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen



**H** Materiales Duros  
Matériels Durs  
Hard materials  
Hartmaterialien



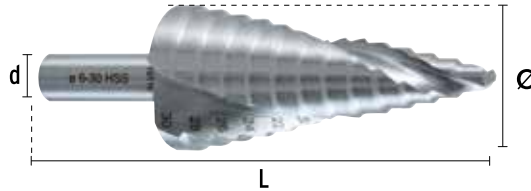
**5157**

**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	Icon
4,00 - 12,00	6	1	63,38	70	1
4,00 - 20,00	8	2	93,02	77	1

Ø mm	d mm	Grad. mm	€	L mm	Icon
6,00 - 30,00	10	2	129,65	98	1
6,00 - 37,00	10	PG	202,26	100	1

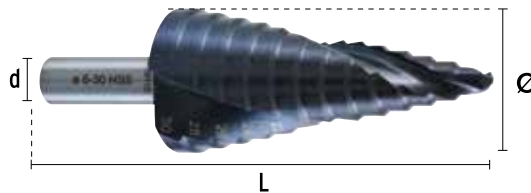
**5158**

**HSS 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		20-70	30-60	60-80	15-50		8-12			

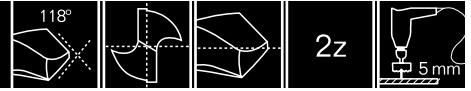
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	d mm	Grad. mm	€	L mm	Icon
4,00 - 12,00	6	1	95,07	70	1
4,00 - 20,00	8	2	139,51	77	1

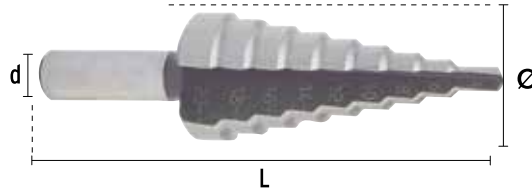
Ø mm	d mm	Grad. mm	€	L mm	Icon
6,00 - 30,00	10	2	194,48	98	1

**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



∅ mm	d mm	Grad. mm	€	L mm	Icon
4,00 - 12,00	6	1	43,47	69	1
4,00 - 12,00	6	2	45,41	69	1
4,00 - 20,00	8	2	58,66	75	1
6,00 - 30,00	10	2	89,09	95	1
12,00 - 20,00	9	1	80,14	75	1

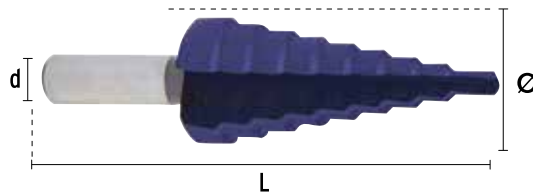
∅ mm	d mm	Grad. mm	€	L mm	Icon
20,00 - 30,00	12	1	111,55	93	1
30,00 - 40,00	12	1	201,98	93	1
40,00 - 50,00	12	1	292,87	97	1
50,00 - 60,00	13	1	426,14	97	1

**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			

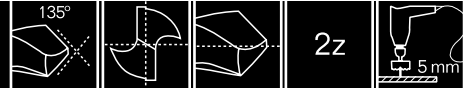
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



∅ mm	d mm	Grad. mm	€	L mm	Icon
4,00 - 12,00	6	1	102,32	69	1
4,00 - 12,00	6	2	105,95	69	1
4,00 - 20,00	8	2	134,59	75	1
6,00 - 30,00	10	2	193,29	95	1

∅ mm	d mm	Grad. mm	€	L mm	Icon
12,00 - 20,00	9	1	121,67	75	1
20,00 - 30,00	12	1	181,16	93	1
30,00 - 40,00	12	1	328,14	93	1

**5160 HSS MULTI**



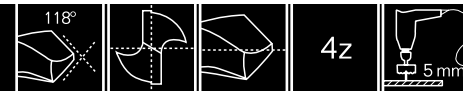
P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●	○			○		●	●		●	●	●	●		○			
20-30	12-18			4-10		15-24	9-13		15-60	25-45	40-60	12-50		4-10			

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



M	Ciego Borgne Bling	Pasante Debouchant Bushing	d mm	€	L mm	
M8	-	Ø 8,5	12	186,98	97	1
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		97	
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 / Alternative




Ø mm	d mm	€	L mm	
9,00 - 36,00	10	233,62	88	1
25,00 - 58,00	10	573,21	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	38,48	40	1

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

5159

HM-MD DIN335C



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



∅ mm	d mm	€	L mm	Icon
6,30	5	81,25	45	1
8,30	6	89,69	50	1
10,40	6	93,65	50	1
12,40	8	100,81	50	1

∅ mm	d mm	€	L mm	Icon
16,50	10	112,19	60	1
20,50	10	123,50	60	1
25,00	10	168,93	67	1
31,00	12	228,08	71	1

5116

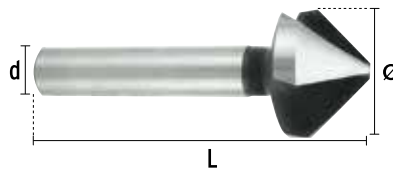
HSS DIN 335 C



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



∅ mm	d mm	€	L mm	Icon
4,30	4	17,85	40	1
5,00	4	17,85	40	1
5,30	4	17,85	40	1
5,80	5	17,85	45	1
6,00	5	15,94	45	1
6,30	5	15,70	45	1
7,00	6	17,85	50	1
7,30	6	17,85	50	1
8,00	6	17,85	50	1
8,30	6	15,23	50	1
9,40	6	20,82	50	1
10,00	6	18,04	50	1
10,40	6	17,71	50	1
11,50	8	20,92	56	1

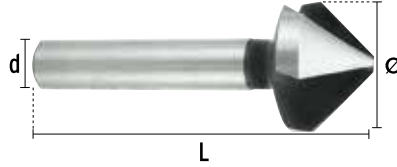
∅ mm	d mm	€	L mm	Icon
12,40	8	17,81	56	1
13,40	8	22,62	56	1
15,00	10	28,72	60	1
16,50	10	24,48	60	1
19,00	10	42,28	63	1
20,50	10	36,01	63	1
23,00	10	52,02	67	1
25,00	10	45,43	67	1
26,00	10	61,72	67	1
28,00	12	75,95	71	1
30,00	12	56,50	71	1
31,00	12	104,08	71	1
40,00	13	120,47	80	1

**5117** HSSCO DIN 335 C



P				M		K			N				S		H		
<800	<1.000	<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	16,63	45	1
6,30	5	16,63	45	1
8,00	6	22,98	50	1
8,30	6	22,99	50	1
9,40	6	26,86	50	1
10,00	6	26,86	50	1
10,40	6	26,86	50	1
11,50	8	29,60	56	1
12,40	8	29,60	56	1

Ø mm	d mm	€	L mm	
15,00	10	40,49	60	1
16,50	10	40,50	60	1
19,00	10	59,64	63	1
20,50	10	59,64	63	1
25,00	10	75,33	57	1
30,00	12	113,81	71	1
31,00	12	121,32	71	1
40,00	13	148,51	80	1

**5118** HSS DIN 335 C



P				M		K			N				S		H		
<800	<1.000	<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	35,35	40	1
5,00	4	35,35	40	1
5,30	4	35,35	40	1
5,80	5	31,07	45	1
6,00	5	30,37	45	1
6,30	5	30,37	45	1
7,00	6	40,53	50	1
7,30	6	40,53	50	1
8,00	6	40,53	50	1
8,30	6	40,53	50	1
9,40	6	45,78	50	1
10,00	6	45,78	50	1
10,40	6	45,78	50	1
11,50	8	48,47	56	1

Ø mm	d mm	€	L mm	
12,40	8	48,47	56	1
13,40	8	50,07	56	1
15,00	10	67,29	60	1
16,50	10	69,12	60	1
19,00	10	84,32	63	1
20,50	10	86,11	63	1
23,00	10	98,11	67	1
25,00	10	99,48	67	1
26,00	12	107,89	71	1
28,00	12	126,45	71	1
30,00	12	131,20	71	1
31,00	12	135,99	71	1
40,00	13	207,58	80	1

**5119 HSSCO DIN 335 C**



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	34,14	45	1
8,30	6	45,78	50	1
10,40	6	52,12	50	1
12,40	8	57,16	56	1

Ø mm	d mm	€	L mm	
16,50	10	81,05	60	1
20,50	10	103,57	63	1
25,00	10	121,56	67	1
30,00	12	164,34	71	1

**1505 HSS DIN 335 C Hex.**



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			

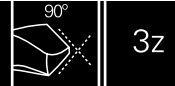
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	L mm	€	
6,30	31	10,39	1
8,30	32	12,01	1
10,40	34	14,28	1

Ø mm	L mm	€	
12,40	36	16,83	1
16,50	40	24,87	1
20,50	43	30,10	1

**5120** HSS DIN 335 C



P				M		K			N				S		H		
<800	<1.000	<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

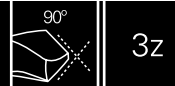


Ø mm	L mm	€	Icon
12,00	120	20,64	1
12,40	130	26,58	1
15,00	150	35,90	1
16,00	150	27,54	1

Ø mm	L mm	€	Icon
16,50	150	36,79	1
19,00	150	50,42	1
20,50	150	50,42	1
25,00	150	61,11	1

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

**5121** HSS DIN 335 C 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
●	○			○		●	●		●	●	●	●		○			
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	Icon
10,40	6	67,84	112	1
12,40	8	82,71	120	1
16,50	10	99,67	120	1

Ø mm	d mm	€	L mm	Icon
20,50	10	133,61	124	1
25,00	10	161,16	128	1
31,00	12	188,76	133	1



5122 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			

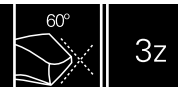
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	d mm	€	L mm	
6,30	5	17,74	45	1
8,30	6	24,45	50	1
10,40	6	28,55	50	1
12,40	8	34,19	56	1

Ø mm	d mm	€	L mm	
16,50	10	43,26	60	1
20,50	10	63,82	63	1
25,00	10	80,48	71	1

5123 HSS DIN 334 C



P				M		K			N				S		H		
<800	<1.000	<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	21,63	45	1
8,00	6	23,80	50	1
10,00	6	25,96	53	1
12,50	8	28,76	56	1

Ø mm	d mm	€	L mm	
16,00	10	36,79	63	1
20,00	10	51,91	67	1
25,00	10	72,46	71	1

5124

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	16,65	45	1
8,30	6	22,71	50	1
10,40	6	26,84	50	1
12,40	8	29,64	56	1

Ø mm	d mm	€	L mm	
16,50	10	37,18	60	1
20,50	10	54,73	63	1
25,00	10	68,98	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			

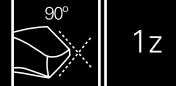
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	d mm	€	L mm	
6,30	5	38,96	50	1
12,40	8	54,54	65	1
16,50	10	66,23	73	1

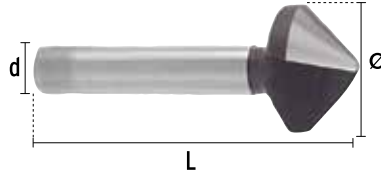
Ø mm	d mm	€	L mm	
20,50	10	89,60	83	1
25,00	10	120,77	90	1
31,00	12	171,40	98	1

5125 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			

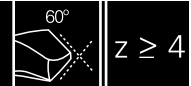
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



∅ mm	d mm	€	L mm	Icon
10,00	8	13,99	46	1
12,00	8	15,49	46	1
16,00	8	21,20	47	1
20,00	8	32,45	47	1

∅ mm	d mm	€	L mm	Icon
25,00	10	44,56	50	1
30,00	12	75,72	71	1
31,00	12	80,16	71	1

5126 HSS DIN 334 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	12-18			4-10		15-24	9-13		15-80	25-60	60-90	12-70		4-10			

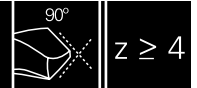
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



∅ mm	d mm	€	L mm	Icon
12,50	8	26,21	50	1
16,00	10	44,00	60	1

∅ mm	d mm	€	L mm	Icon
20,00	10	56,75	60	1
25,00	10	79,42	65	1

5127 HSS DIN 335 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	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	Box
8,00	8	14,32	48	1
12,50	8	20,97	48	1
16,00	10	35,26	56	1

Ø mm	d mm	€	L mm	Box
20,00	10	45,40	60	1
25,00	10	63,58	65	1

5129 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



Δ	Ø mm	€	L mm	Box
2	20,50*	108,17	100	1
2	25,00	112,40	106	1
2	28,00*	114,51	112	1
2	30,00	120,88	112	1
2	31,00	125,12	112	1
2	34,00	131,48	118	1

Δ	Ø mm	€	L mm	Box
2	37,00	144,20	118	1
3	40,00	180,26	140	1
3	50,00	226,90	150	1
4	63,00	366,88	180	s1
4	80,00	627,74	190	1

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

**5130** HSS DIN 334 D



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	231,35	150	1
3	50,00	330,53	160	1
4	63,00	520,53	190	1

**5132** 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	€	L mm	📦
3	40,00	198,29	134	1
3	50,00	256,16	142	1
4	63,00	418,22	178	1

**5133** **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	18,18	45	1
5,00 - 10,00	8	22,71	48	1
10,00 - 15,00	10	40,68	65	1

Ø mm	d mm	€	L mm	
15,00 - 20,00	12	72,66	85	1
20,00 - 25,00	15	122,64	95	1
25,00 - 30,00	15	188,38	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	21,63	45	1
5,00 - 10,00	8	27,06	48	1

Ø mm	d mm	€	L mm	
10,00 - 15,00	10	48,27	65	1
15,00 - 20,00	12	86,53	85	1

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	21,63	45	1
5,00 - 10,00	8	27,06	48	1
10,00 - 15,00	10	48,45	65	1

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	Icon
M3	6,00	3,20	25,31	71	1
M4	8,00	4,30	26,48	71	1
M5	10,00	5,30	25,56	80	1
M6	11,00	6,40	27,00	80	1

M	Ø mm	P mm	€	L mm	Icon
M8	15,00	8,40	35,29	100	1
M10	18,00	10,50	46,03	100	1
M12	20,00	13,00	57,26	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



Icon	M	Ø mm	P mm	€	L mm	Icon
△	M10	18,00	10,50	63,90	140	1
△	M12	20,00	13,00	77,61	140	1
△	M14	24,00	15,00	101,75	150	1
△	M16	26,00	17,00	122,71	180	1

Icon	M	Ø mm	P mm	€	L mm	Icon
△	M18	30,00	19,00	132,31	180	1
△	M20	33,00	21,00	168,73	190	1
△	M22	36,00	23,00	189,69	190	1
△	M24	40,00	25,00	209,12	190	1



**5142** Ø 6 a 19 mm

Ø  
mm  
6 - 8 - 10 - 11,5 - 15 - 19

6

>HSS  
(5116)



>HSS CO  
(5117)



>HSS TIALN  
(5118)



REF.	€
HSS	151,57
HSS CO	201,21
HSS TIALN	302,75

**5143** Ø 6,3 a 20,5 mm

Ø  
mm  
6,3 - 8,3 - 10,4 - 12,4 - 16,5 - 20,5

6

>HSS  
(5116)



>HSS CO  
(5117)



>HSS TIALN  
(5118)



REF.	€
HSS	140,47
HSS CO	203,86
HSS TIALN	323,25




5151 > Ø 2-5 a 10-20 mm

∅  
mm  
2-5/5-10/10-15/15-20



>HSS  
 (5133)



REF.	€	
HSS	184,28	4


5155 > M3 - M10

∅  
mm  
M3/M4/M5/M6/M8/M10



>HSS  
 (5136)



REF.	€	
HSS	250,21	6

**5138** > Ø 3 a 14 / 6 a 20 / 16 a 30 mm

∅  
mm  
3-14,6-20,16-30

3

>HSS  
(5101)



>HSS CO  
(5102)



>HSS TIALN  
(5103)



REF.	€
HSS	125,40
HSS CO	157,55
HSS TIALN	268,76

**5139** > Ø 4 a 12 / 12 a 20 / 20 a 30 mm

∅  
mm  
4-12,12-20,20-30

X  
mm  
1

3

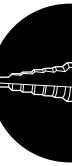
>HSS  
(5105)



>HSS TIALN  
(5106)



REF.	€
HSS	261,79
HSS TIALN	420,01



**5140** > Ø 4 a 12 / 4 a 20 / 6 a 30 mm

Ø  
mm  
4-12,4-20,6-30

X  
mm  
2

3

>HSS  
(5105)

>HSS TIALN  
(5106)

>HSS (35°)  
(5157)

>HSS TIALN (35°)  
(5158)



REF.	€
HSS	218,07
HSS TIALN	448,72
HSS (35°)	300,93
HSS TIALN (35°)	443,94

**5141** > Ø 4 a 20 / 6 a 30 mm

Ø  
mm  
4-20,6-30

X  
mm  
2

2

>HSS  
(5105)

>HSS TIALN  
(5106)



REF.	€
HSS	170,50
HSS TIALN	342,77



**75** YEARS  
1947-2022

**Fresado** >  
**Fraisage**  
**Milling**  
**Fräsen**

**Heruc** / CUTTING  
TOOL  
EXPERTS

**Fresas Metal duro / Fraises carbure / Hard metal mills / Hartmetall-Fräser**

3141	HM-MD					N	365
3189	HM-MD					N	365
3190	HM-MD					N	366
3167	HM-MD	DIN 6527S	TIALN			P M K S	367
3168	HM-MD	DIN 6527L	TIALN			P M K S	367
3169	HM-MD	DIN 6527S	TIALN			P M K N H	368
3170	HM-MD	DIN 6527L	TIALN			P M K N H	368
3191	HM-MD	DIN 6527EL	AlCn			P K S H	369
3171	HM-MD	DIN 6527S	TIALN			P M K S	370
3172	HM-MD	DIN 6527L	TIALN			P M K S	370
3173	HM-MD	DIN 6527S	TIALN			P M K S H	371
3174	HM-MD	DIN 6527L	TIALN			P M K S	371
3175	HM-MD	DIN 6527S	TIALN			P M K S	372
3176	HM-MD	DIN 6527L	TIALN			P M K S	372
3177	HM-MD	DIN 6527L	TIALN			P M K S H	373
3192	HM-MD	DIN 6527 L	AlCn			P M K S H	374
3193	HM-MD	DIN 6527 EL	AlCn			P H	374
<b>NEW</b> 3196	HM-MD	DIN 6527 XXL	AlCn			P H	375
3178	HM-MD	DIN 6527L	AlCn			P M K S H	375

**P** Aceros  
Aciers  
Steels  
Stähle

**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K** Fundicion  
Fonte  
Cast Iron  
Gusseisen

**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S** Titanio y Superalesaciones  
Titanium et Supeallages  
Titanium and Superalloys  
Titan und Superlegierungen

**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

3179	HM-MD	DIN 6527 L	TIALN				376
3180	HM-MD	DIN 6527EL	TIALN				376
3181	HM-MD	DIN 6527L	TIALN				377
3183	HM-MD		TIALN				377
3184	HM-MD		TIALN				378
3185	HM-MD		TIALN				378
3194	HM-MD	DIN 6527L	AlCr				379
3195	HM-MD	DIN 6527EL	AlCr				379
<b>NEW</b> 3197	HM-MD		TiSiN				380
<b>NEW</b> 3198	HM-MD		TiSiN				381
3101	HM-MD						382
3105	HM-MD						382
3107	HM-MD						383

**Fresas metal duro Multifunción / Fraises carbure multifunfion / Hard metal mills multifuction / Hard metal mills multifunfion**

<b>NEW</b> 3301	HM-MD		TiAlN+				384
<b>NEW</b> 3302	HM-MD		TiAlN+				384
<b>NEW</b> 3303	HM-MD		TiAlN+				385
<b>NEW</b> 3304	HM-MD		TiAlN+				385

**Fresas HSSE mango cilíndrico cortas / Fraises HSSE queue cylindrique courtes / HSSE Straight short shank mills / SS-Zylinderschaft Fräser mit kurzem Schaft**

3120	HSSE				 1z	N	386
3121	HSSE				 1z	N	386
3122	HSSE				 1z	N	387
3186	HSSE				 40° 2z	P N	387
3110	HSSE	DIN 327 N			 30° 2z	P	388
3110/1	HSSE	DIN 327 N	TIALN		 30° 2z	P K	389
3112	HSSE	DIN 327 N			 30° 2z	P	390
3112/1	HSSE	DIN 327 N	TIALN		 30° 2z	P K S	390
3187	HSSE	DIN 327 N			 30° 3z	P	391
3187/1	HSSE	DIN 327 N	TIALN		 30° 3z	P K	391
3114	HSSE	DIN 844 W			 45° 3z	P N	392
3114/1	HSSE	DIN 844 W	TIALN		 45° 3z	P N	392
3115	HSSE	DIN 844 N			 30° z≥3	P	393
3115/1	HSSE	DIN 844 N	TIALN		 30° z≥3	P K S	393
3117	HSSE	DIN 844 NR			 30° z≥4	P	394
3117/1	HSSE	DIN 844 NR	TIALN		 30° z≥4	P K	394
3119	HSSE	DIN 844 NRF			 30° z≥4	P K	395
3119/1	HSSE	DIN 844 NRF	TIALN		 30° z≥4	P K	395

**P** Aceros  
Aciers  
Steels  
Stähle

**M** Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K** Fundición  
Fonte  
Cast Iron  
Gusseisen

**N** Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S** Titanio y Superalloys  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen

**H** Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien



3162	HSSE-PM	DIN 844 N	TIALN			P M K S	396
3157	HSSE-PM	DIN 844 NR	TIALN			P M K	396
3159	HSSE-PM	DIN 844 NRF	TIALN			P M K S	397

**Fresas HSSE mango cilíndrico largas / Fraises HSSE queue cylindrique longues / HSSE Straight long shank mills / HSS-Zylinderschaft Fräser mit langem Schaft**

3111	HSSE	DIN 844				P	398
3111/1	HSSE	DIN 844	TIALN			P K	398
3113	HSSE	DIN 844				P	399
3113/1	HSSE	DIN 844	TIALN			P K S	399
3188	HSSE	DIN 327 N				P	400
3188/1	HSSE	DIN 327 N	TIALN			P K	400
3182	HSSE	DIN 844 W				P N	401
3182/1	HSSE	DIN 844 W	TIALN			P N	401
3116	HSSE	DIN 844 N				P	402
3116/1	HSSE	DIN 844 N	TIALN			P K S	402
3118	HSSE	DIN 844 NR				P	403
3118/1	HSSE	DIN 844 NR	TIALN			P K	403
3163	HSSE-PM	DIN 844 N	TIALN			P M K S	404
3158	HSSE-PM	DIN 844 vNR	TIALN			P M K	404
3160	HSSE-PM	DIN 844 NRF	TIALN			P M K S	405



**Fresas mango cónico / Fraises queue conique / Tapered shank mills / Konische Schaftfräser**

3144	HSSE	DIN 326 N				P N	406
3144/1	HSSE	DIN 326 N	TIALN			P K N	406
3145	HSSE	DIN 845 N				P N	407
3145/1	HSSE	DIN 845 N	TIALN			P K N S	407
3146	HSSE	DIN 845 NR				P N	408
3146/1	HSSE	DIN 845 NR	TIALN			P K N	408
3147	HSSE	DIN 845 N				P N	409
3147/1	HSSE	DIN 845 N	TIALN			P K N S	409
3148	HSSE	DIN 845 NR				P N	410
3148/1	HSSE	DIN 845 NR	TIALN			P K N	410

**Fresas con agujero / Fraises à trou / Mills with holes / Bohrungsfräser**










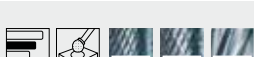

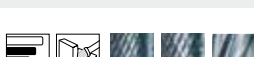
3149	HSSE	DIN 1880 N				P M K N S	411
3150	HSSE	DIN 1880 NR				P M K N S	411
3165	HSSE	DIN 1880 NRF				P M K N S	412
3151	HSSE	DIN 885 D				P K N	412
3161	HSSE	DIN 885 A				P M K N S	413
3166	HSSE	DIN 1834 A				P K N	413

**Fresas HSSE especiales / Fraises HSSE spéciales / HSSE Special mills / HSSE Spezialfräser**


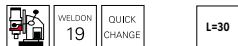





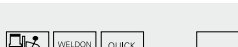













3152	HSSE	DIN 850 D		Tol D (h11) d (h8) L (h8)	P N	414
3153	HSSE	DIN 851 N		Tol ISO D (h11) d (h8) L (h11)	P N	414
3154	HSSE	DIN 851 B		Tol ISO D (h11) L (h11)	P N	415
3155	HSSE	DIN 1833 A		Tol ISO D (h11) d (h8)	P N	415
3156	HSSE	DIN 1833 B		Tol ISO D (h11) d (h8)	P N	416
3164	HSSE	DIN 6518 N		Tol B (h11) d2 (h8)	P N	416

**Fresas rotativas metal duro / Fraises rotatives métal dur / Hard metal rotary mills / Hartmetall-Rotationsfräser**

3201	HM-MD	Cilíndrica Cylindrique Straight Zylindrischer Fräser			P M K N S H	417
3202	HM-MD	Cilíndrica con corte Cylindrique taillée Straight with cut Zylindrischer Fräser mit Schneidvorrichtung			P M K N S H	417
3203	HM-MD	Cilíndrica radio Cylindrique à rayon Straight radius Zylindrischer Fräser mit Radius			P M K N S H	418
3204	HM-MD	Esférica Sphérique Spherical Kugelkopffräser			P M K N S H	418
3205	HM-MD	Oval Ovale Ovalfräser			P M K N S H	419
3206	HM-MD	Árbol con radio Arbre à rayon Arc with radius Welle mit Radius			P M K N S H	419
3207	HM-MD	Árbol Arbre Arc Welle			P M K N S H	420
3208	HM-MD	Llama Flamme Flame Flamme			P M K N S H	420
3209	HM-MD	Cónica Conique Tapered Kegelfräser			P M K N S H	421
3210	HM-MD	Cónica 90° Conique 90° Tapered 90° Kegelfräser 90°			P M K N S H	421
3211	HM-MD	Cónica radio Conique à rayon Tapered radius Kegelfräser mit Radius			P M K N S H	422
3212	HM-MD	Cono invertido Cône inversé Inverted taper Umgekehrter Kegel			P M K N S H	422

3214	HM-MD	Cilíndrica L Cylindrique L Straight L			<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	423
P	M	K										
N	S	H										
3215	HM-MD	Cilíndrica con corte L Cylindrique taillée L Straight with L cut			<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	423
P	M	K										
N	S	H										
3216	HM-MD	Cilíndrica radio L Cylindrique à rayon L Straight L radius			<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	424
P	M	K										
N	S	H										
3217	HM-MD	Árbol L Arbre L L Arc			<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	424
P	M	K										
N	S	H										
3218	HM-MD	Esférica L Sphérique L L Spherical			<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	425
P	M	K										
N	S	H										
3219	HM-MD	Árbol con radio L Arbre à rayon L L Radius arc			<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	425
P	M	K										
N	S	H										

**Fresas huecas máquinas electromagnéticas / Fraises à trou électromagnétiques / Electromagnetics core bits / Hohlfraiser elektromagnetische Maschinen**

7172	HSS				<table border="1"><tr><td>P</td><td>N</td></tr></table>	P	N	426				
P	N											
7172	HSS				<table border="1"><tr><td>P</td><td>N</td></tr></table>	P	N	427				
P	N											
7137	HSSE				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		428		
P	K											
N												
7137	HSSE				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		429		
P	K											
N												
7137	HSSE				<table border="1"><tr><td>P</td><td>K</td></tr><tr><td>N</td><td></td></tr></table>	P	K	N		430		
P	K											
N												
7138	HSSE				<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td></td></tr></table>	P	M	K	N	S		430
P	M	K										
N	S											
7138	HSSE				<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td></td></tr></table>	P	M	K	N	S		431
P	M	K										
N	S											
7139	TCT				<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	432
P	M	K										
N	S	H										
7139	TCT				<table border="1"><tr><td>P</td><td>M</td><td>K</td></tr><tr><td>N</td><td>S</td><td>H</td></tr></table>	P	M	K	N	S	H	432
P	M	K										
N	S	H										
7140		CONO MORSE CONE MORSE MORSE TAPER MORSEKEGEL				433						
7141		PUNZON POINÇON PUNCHER STANZER				433						
7158		ADAPTADOR FEIN FEIN FEIN				433						

**Estuches / Coffrets / Sets / Hüllen**



Fecha / Date: .....

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

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

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

**TRABAJO A REALIZAR / TRAVAIL DEMANDE / REQUESTED WORK**

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

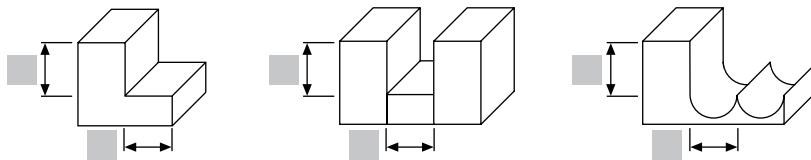
Dureza / Durété / Hardness ..... HB ..... HRC ..... Resistencia / Résistance / Resistance ..... N/mm<sup>2</sup>

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

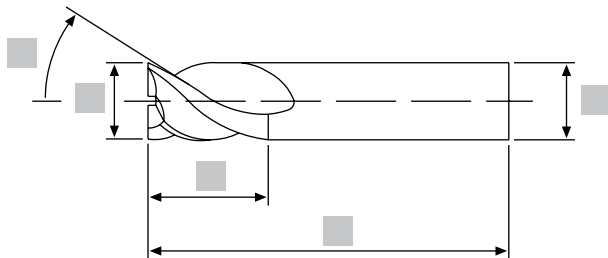
Forma / Forme / Form:



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

Tipos de punta:  Recta  Chaflán  Radial Labios:  Desbaste  Desbaste fino  Acabado  
 Types de pointe: Droite Chanfrein Radiale Lèvres: Dégrossissage Dégrossissage fin Finition  
 Types of tips: Straight Chamfered Radial Lips: Grinding Fine grinding Finishing

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

Superficie / Surface:  Brillante  Recubrimiento  
 Brillant Revêtement  
 Brilliant Coating

COMENTARIOS / COMMENTAIRES/ COMMENTS: .....



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

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



Ref./ Réf. / Ref.	3141	3189	3190	3167	3168	3169	3170	3191	3171	3172	3173	3174	3175	3176	3177
Z	1Z	2Z	3Z	2Z	2Z	2Z	2Z	2Z	3Z	3Z	3Z	3Z	4Z	4Z	4Z
Ejec./Exéc./Exec.	N	W	W	N	N	N	N	N	N	N	W	W	N	N	N-V
Hel./Hel./Spiral	30°	45°	45°	30°	30°	30°	30°	30°	30°	30°	45°	45°	30°	30°	35°-38°
Mat.	HM	HM	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	TIALN	TIALN
DIN				6527S	6527L	6527S	6527L	6527EL	6527S	6527L	6527S	6527L	6527S	6527L	6527L
Arista/Arête/Edge	45°					R	R	R							45°
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	3-20	3-20
Pag.	365	365	366	367	367	368	368	369	370	370	371	371	372	372	373

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	120-220	120-220															
		P.2	<800				110-220	100-200	110-220	110-220	160-220	110-220	100-200	110-220	100-200	110-220	100-200														
				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	70-110																
		M.2				80-140	70-110	70-110	70-110		80-140	70-110	80-140	70-110	80-140	70-110															
		M.3	<1200				60-120	60-100	60-100	60-100		60-120	60-100	60-120	60-100	60-120	60-100														
				M.4				60-120	60-100	60-100	60-100		60-120	60-100	60-120	60-100	60-120	60-100													
K.1	<500				120-180	100-160	120-180	120-180	120-180	120-180	100-160	120-180	100-160	120-180	100-160	100-160															
		K.2	<800				120-180	100-160	120-180	120-180	120-180	120-180	100-160	120-180	100-160	120-180	100-160														
				K.3	<800				100-140	80-120	100-140	100-140	90-130	100-140	80-120	100-140	80-120	100-140	80-120												
						K.4.1	<1400				100-140	80-120	100-140	100-140	90-130	100-140	80-120	100-140	80-120	100-140	80-120										
								K.4.2				60-120	60-90	60-120	60-120	100-140	60-120	60-90	60-120	60-90	60-120	60-90									
N.1.1	Al				150-300	150-300	150-300			150-450	150-450			150-300	110-240																
		N.1.2	<1200				150-300	150-300	150-300			150-450	150-450			150-300	110-240														
				N.1.3	<1200				150-300	150-300	150-300			150-450	150-450			150-300	110-240												
						N.2.1	<1200				120-350	120-350	120-350			120-350	120-350			120-350	110-250										
								N.2.2	<1200				120-350	120-350	120-350			120-350	120-350			120-350	110-250								
										N.2.3	<1200				110-220	100-200	110-220	110-220		110-220	100-200	110-220	100-200	110-220	100-200	100-200					
												N.2.4	<1200						60-120	60-120											
														N.3.1	<1200						150-450	150-450			120-350	90-250					
																N.4.1	<1200						150-450	150-450			150-300	110-240			
																		N.4.2													
N.4.3																															
S.1.1	Ni				60-90	50-80			50-80	60-90	60-90	60-90	60-90	60-90	60-90	60-90															
		S.1.2	<1200				40-75	40-60			40-60	40-75	40-75	40-75	40-75	40-75	40-75	40-60													
				S.2.1	<1200				80-140	70-110			80-140	70-110	80-140	70-110	80-140	70-110	70-110												
						S.2.2	<1200				75-100	70-90			70-90	75-100	75-100	75-100	75-100	75-100	75-100										
								S.2.3				60-90	60-80			60-80	60-90	60-90	60-90	60-90	60-90	60-90	60-80								
H.1	50 HRC								40-80	40-80	90-150			40-80		40-80															
		H.2	55 HRC						30-50	30-50	70-130			30-50			30-50														
				H.3	60 HRC							60-110																			

● Optima / Optimun ○ Alternativo / Alternative



3192	3193	3196	3178	3179	3180	3181	3183	3184	3185	3194	3195	3197	3198	3101	3105	3107
4Z	5Z	5Z	4Z	6,8Z	6,8Z	3,4,5,6Z	4Z	4Z	4Z	4Z	5Z	2Z	2Z	2Z	3Z	4Z
N-V	N-V	N-V	N-V	W	W	WR	60°	90°	r	N-V	N-V	N	N	N	N	N
35°-38°	37°-38°	37°-38°	35°-38°	45°	45°	45°	0°	0°	0°	40°-42°	40°-42°	30°	30°	30°	30°	30°
HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	ALCR	ALCR	TiSiN	TiSiN			
6527L	6527EL	6527XXL	6527L	6527S	6527EL	6527L				6527L	6527EL					
45°	45°	45°	r	45°	45°	45°	30°	45°	r	45°	45°	r	R			
3-20	6-25	3-25	6-16	6-20	6-20	4-20	1,20-2,40	1,20-2,40	0,50-5	3-20	6-25	0,2-2	0,2-2	3-20	3-20	3-20
374	374	375	375	376	376	377	377	378	378	379	379	380	381	382	383	383

Vc (m/min)

180-240	220-380	220-380	180-240	120-220	120-220	120-220	120-220	120-220	120-220					85-155	85-155	85-155
170-220	210-350	210-350	170-220	100-200	100-200	100-200	100-200	100-200	100-200					70-130	70-130	70-130
160-210	200-320	200-320	160-210	80-180	80-180	80-180	80-180	80-180	80-180					60-110	60-110	60-110
150-200	200-300	200-300	150-200	70-150	70-150	70-150	70-150	70-150	70-150					50-105	50-105	50-105
100-140	180-250	180-250	100-140	60-90	60-90	60-90	60-90	60-90	60-90					45-65	45-65	45-65
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
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
60-120			60-120	60-100	60-100	60-100	60-100	60-100	60-100	70-130	130-200			45-70	45-70	45-70
60-120			60-120	60-100	60-100	60-100	60-100	60-100	60-100	70-130	130-200			45-70	45-70	45-70
120-180			120-180	100-160	100-160	100-160	100-160	100-160	100-160					70-115	70-115	70-115
120-180			120-180	100-160	100-160	100-160	100-160	100-160	100-160					70-115	70-115	70-115
90-130			90-130	80-120	80-120	80-120	80-120	80-120	80-120					60-85	60-85	60-85
90-130			90-130	80-120	80-120	80-120	80-120	80-120	80-120					60-85	60-85	60-85
100-140			100-140	60-90	60-90	60-90	60-90	60-90	60-90							
170-220	200-250		170-220	100-200	100-200	100-200	100-200	100-200	100-200					70-130	70-130	70-130
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
40-60			40-60	40-60	40-60	40-60	40-60	40-60	40-60	50-70	40-80			30-45	30-45	30-45
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
70-90			70-90	70-90	70-90	70-90	70-90	70-90	70-90	80-100	80-170			50-80	50-80	50-80
60-80			60-80	60-80	60-80	60-80	60-80	60-80	60-80	60-80	60-120			45-60	45-60	45-60
90-150	70-130	70-130	90-150	60-100	60-100		40-80					50-140	30-180			
70-130	50-120	50-120	70-130	50-80	50-80		30-50					40-120	30-160			
60-110	40-80	40-80	60-110									30-90	30-90			

● Optima / Optimun ○ Alternativo / Alternative

<b>P</b> Aceros Aciers Steels Stähle	<b>M</b> Aceros Inox Aciers Inox Stainless Steels Edelstahl	<b>K</b> Fundición Fonte Cast Iron Gusseisen	<b>N</b> Metales no ferrosos Métal non Ferraux Non Ferrous metals NE-Metalle	<b>S</b> Titanio y Superalloys Titanium et Superalloys Titanium and Superalloys Titan und Superlegierungen	<b>H</b> Materiales Duros Materiels Durs Hard materials Hartmaterialien
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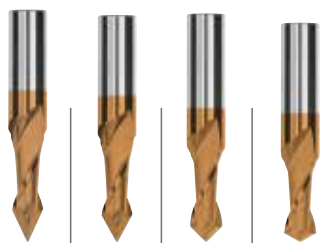


# TABLA DE APLICACIONES GUIDE D'APPLICATION / APPLICATION GUIDE / ANWENDUNGSÜBERSICHT

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

Mat.		Centrado / Chaffinado / Taladrado Centrage / Chanfreinage / Perçage Centering / Chamfering / Drilling								Ranurado en "V" / Rainurage en "V" / "V" Grooving							
		Avance / Avance / Feed (mm/rpm)								Avance / Avance / Feed (mm/rpm)							
		Ø1	Ø2	Ø3	Ø5	Ø8	Ø12	Ø16	Ø20	Ø1	Ø2	Ø3	Ø5	Ø8	Ø12	Ø16	Ø20
P.1	<600	0,010	0,025	0,050	0,100	0,150	0,200	0,250	0,300	0,005	0,008	0,010	0,018	0,030	0,040	0,050	0,650
P.2	<800	0,010	0,025	0,050	0,100	0,150	0,200	0,250	0,300	0,004	0,008	0,010	0,015	0,030	0,040	0,050	0,650
P.3	<1000	0,010	0,023	0,045	0,070	0,120	0,180	0,220	0,280	0,004	0,008	0,010	0,015	0,030	0,040	0,050	0,650
P.4	<1200	0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
P.5	<1400	0,008	0,020	0,040	0,065	0,110	0,160	0,200	0,250	0,003	0,005	0,006	0,010	0,020	0,028	0,035	0,050
M.1	<950	0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
M.2		0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
M.3	<1200	0,008	0,020	0,040	0,065	0,110	0,160	0,200	0,250	0,003	0,005	0,007	0,010	0,022	0,028	0,035	0,050
M.4		0,008	0,020	0,040	0,065	0,110	0,160	0,200	0,250	0,003	0,005	0,007	0,010	0,022	0,028	0,035	0,050
K.1	<500	0,010	0,023	0,045	0,070	0,120	0,180	0,220	0,280	0,004	0,008	0,010	0,015	0,030	0,040	0,050	0,065
K.2		0,010	0,023	0,045	0,070	0,120	0,180	0,220	0,280	0,004	0,008	0,010	0,015	0,030	0,040	0,050	0,065
K.3	<800	0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
K.4.1		0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
K.4.2	<1400	0,008	0,020	0,040	0,065	0,110	0,160	0,200	0,250	0,003	0,005	0,006	0,010	0,020	0,028	0,035	0,050
N.1.1	Al	0,015	0,030	0,050	0,090	0,150	0,200	0,270	0,350	0,006	0,012	0,016	0,021	0,034	0,040	0,060	0,080
N.1.2		0,015	0,030	0,050	0,090	0,150	0,200	0,270	0,350	0,006	0,012	0,016	0,021	0,034	0,040	0,060	0,080
N.1.3		0,015	0,030	0,050	0,090	0,150	0,200	0,270	0,350	0,006	0,012	0,016	0,021	0,034	0,040	0,060	0,080
N.2.1	Cu	0,025	0,050	0,100	0,150	0,250	0,300	0,350	0,450	0,006	0,012	0,016	0,021	0,034	0,040	0,060	0,080
N.2.2		0,025	0,050	0,100	0,150	0,250	0,300	0,350	0,450	0,006	0,012	0,016	0,021	0,034	0,040	0,060	0,080
N.2.3		0,020	0,040	0,080	0,130	0,230	0,270	0,300	0,400	0,005	0,010	0,014	0,017	0,030	0,035	0,050	0,070
N.2.4		0,020	0,040	0,080	0,130	0,230	0,270	0,300	0,400	0,005	0,010	0,014	0,017	0,030	0,035	0,050	0,070
N.3.1	Mg/Zn	0,025	0,050	0,100	0,150	0,250	0,300	0,350	0,450	0,006	0,012	0,016	0,021	0,034	0,040	0,060	0,080
N.4.1	Plastic	0,015	0,030	0,050	0,100	0,200	0,200	0,300	0,400	0,007	0,013	0,020	0,030	0,045	0,060	0,090	0,100
N.4.2																	
N.4.3																	
S.1.1	Ni	0,010	0,020	0,040	0,060	0,110	0,160	0,200	0,250	0,003	0,005	0,006	0,010	0,020	0,026	0,036	0,050
S.1.2		0,080	0,015	0,035	0,050	0,100	0,150	0,180	0,220	0,002	0,004	0,005	0,008	0,015	0,020	0,030	0,040
S.2.1	Ti	0,010	0,020	0,040	0,060	0,110	0,160	0,220	0,250	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
S.2.2		0,010	0,020	0,040	0,060	0,110	0,160	0,220	0,250	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
S.2.3		0,009	0,018	0,035	0,055	0,100	0,150	0,200	0,220	0,003	0,005	0,007	0,010	0,022	0,028	0,035	0,050
H.1	50 HRC	0,008	0,020	0,040	0,065	0,110	0,160	0,200	0,250	0,003	0,005	0,006	0,010	0,020	0,028	0,035	0,050
H.2	55 HRC																
H.3	60 HRC																





Ref./ Réf. / Ref.	<b>3301</b>	<b>3302</b>	<b>3303</b>	<b>3304</b>
Z	2	2	2	2
Hel./Hel./Spiral	40°	60°	90°	120°
Mat.	HM	HM	HM	HM
Rec./Rev./Coat.	TIALN+	TIALN+	TIALN+	TIALN+
Pag	384	384	385	385

Chañales longitudinales / Interpolación / Grabado / Contorneado Chanfreins longitudinaux / Interpolation / Gravage / Contournage Longitudinal chamfering / Interpolation / Engraving / Countouring							
Avance / Avance / Feed (mm/rpm)							
Ø1	Ø2	Ø3	Ø5	Ø8	Ø12	Ø16	Ø20
0,008	0,012	0,015	0,021	0,038	0,060	0,080	0,100
0,007	0,012	0,015	0,020	0,038	0,060	0,080	0,100
0,007	0,012	0,014	0,020	0,038	0,060	0,080	0,090
0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
0,006	0,010	0,012	0,015	0,030	0,045	0,065	0,070
0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
0,006	0,010	0,012	0,018	0,035	0,050	0,070	0,075
0,006	0,010	0,012	0,018	0,035	0,050	0,070	0,075
0,010	0,012	0,014	0,020	0,038	0,060	0,080	0,090
0,010	0,012	0,014	0,020	0,038	0,060	0,080	0,090
0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
0,006	0,010	0,012	0,015	0,030	0,045	0,065	0,070
0,008	0,012	0,017	0,020	0,040	0,060	0,070	0,090
0,008	0,012	0,017	0,020	0,040	0,060	0,070	0,090
0,008	0,012	0,017	0,020	0,040	0,060	0,070	0,090
0,010	0,015	0,020	0,025	0,045	0,070	0,075	0,100
0,010	0,015	0,020	0,025	0,045	0,070	0,075	0,100
0,009	0,012	0,016	0,020	0,040	0,060	0,065	0,085
0,009	0,012	0,016	0,020	0,040	0,060	0,065	0,085
0,010	0,015	0,020	0,025	0,045	0,070	0,075	0,100
0,008	0,012	0,017	0,020	0,040	0,060	0,070	0,090
0,005	0,010	0,012	0,018	0,035	0,050	0,065	0,080
0,004	0,008	0,010	0,015	0,030	0,045	0,058	0,070
0,005	0,010	0,012	0,018	0,035	0,050	0,065	0,080
0,005	0,010	0,012	0,018	0,035	0,050	0,065	0,080
0,004	0,009	0,010	0,015	0,030	0,045	0,060	0,070
0,006	0,010	0,012	0,015	0,030	0,045	0,065	0,070



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

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

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≥3	Z≥3	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.	386	386	387	387	388	389	390	390	391	391	392	392	393	393	394	394	395	395	
Mat.	Vc (m/min)																		
P.1	<600			45-50	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	
P.2	<800			30-36	30-36	48-65	30-36	48-65	30-36	48-65	30-36	48-65	30-36	48-65	35-45	55-65	30-36	48-65	
P.3	<1000			25-30	40-45	25-30	40-45	25-30	40-45	25-30	40-45	25-30	40-45	25-30	40-45	25-30	45-55	25-30	
P.4	<1200				30-35		30-35		30-35		30-35		30-35		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	15-20	25-35	15-20	25-35	15-20	
M.2				15-20	25-35	15-20	25-35	15-20	25-35	15-20	25-35	15-20	25-35	15-20	25-35	15-20	25-35	15-20	
M.3																			
M.4	<1200																		
K.1	<500			34-38	55-60	34-38	55-60	34-38	55-60	34-38	55-60	34-38	55-60	34-38	55-60	34-38	55-60	34-38	
K.2																			
K.3	<800				30-35		30-35		30-35		30-35		30-35		30-35		20-25	30-40	
K.4.1				20-24	30-40	20-24	30-40	20-24	30-40	20-24	30-40	20-24	30-40	20-24	30-40	20-24	34-38	55-60	
K.4.2	<1400				30-35		30-35		30-35		30-35		30-35		30-35				
N.1.1		160-200	160-200	160-200	160-200						100-150	130-200							
N.1.2	Al	160-200	160-200	160-200	160-200						100-150	130-200							
N.1.3		60-100	60-100	60-100	60-100						60-100	100-160							
N.2.1					70-90	90-120	70-90	90-120	70-90	90-120			70-90	90-120	70-90	90-120	70-90	90-120	
N.2.2	Cu				70-90	90-120	70-90	90-120	70-90	90-120			70-90	90-120	70-90	90-120	70-90	90-120	
N.2.3					45-50	70-80	45-50	70-80	45-50	70-80			45-50	70-80	45-50	60-75	45-50	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		50-80	50-80	50-80	50-80						50-80	65-100							
N.4.2	Plastic																		
N.4.3																			
S.1.1	Ni					2-4	4-6						15-20	25-35			15-20	25-35	
S.1.2																			
S.2.1									15-20	25-35			15-20	25-35					
S.2.2	Ti									30-35				30-35					
S.2.3																			
H.1	50 HRC																		
H.2	55 HRC																		
H.3	60 HRC																		

● Optima / Optimun ○ Alternativo / Alternative



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	ZZ	ZZ	ZZ	ZZ	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
396	396	397	398	398	399	399	400	400	401	401	402	402	403	403	404	404	405

Vc (m/min)																	
80-85	85-90	80-85	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	45-50	70-80	80-85	85-90	80-85
55-65	60-70	55-65	30-36	48-65	30-36	48-65	30-36	48-65	30-36	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	25-30	40-45	25-30	40-45			25-30	40-45	25-30	45-55	50-60	50-60	40-50
35-40	45-50	35-40		30-35		30-35		30-35				30-35		35-40	35-40	45-50	35-40
35-40	35-40	30-35	15-20	25-35	15-20	25-35	15-20	25-35			15-20	25-35	15-20	25-35	35-40	35-40	30-35
35-40	35-40	30-35	15-20	25-35	15-20	25-35	15-20	25-35			15-20	25-35	15-20	25-35	35-40	35-40	30-35
28-35	28-35	25-30													28-35	28-35	25-30
28-35	28-35	25-30													28-35	28-35	25-30
55-60	60-65	55-60	34-38	55-60	34-38	55-60	34-38	55-60			34-38	55-60	34-38	55-60	55-60	60-65	55-60
30-35				30-35		30-35		30-35				30-35			30-35		
30-40			20-24	30-40	20-24	30-40	20-24	30-40			20-24	30-40			30-40		
30-35				30-35		30-35		30-35				30-35			30-35		
130-200									100-150	130-200					130-200		
130-200									100-150	130-200					130-200		
90-130									60-100	100-160					90-130		
90-120	120-140	120-140	60-80	80-110	70-90	90-120	55-75	90-120			70-90	90-120	70-90	90-120	90-120	120-140	120-140
90-120	120-140	120-140	60-80	80-110	70-90	90-120	55-75	90-120			70-90	90-120	70-90	90-120	90-120	120-140	120-140
80-85	85-90	80-85	45-50	70-80	45-50	70-80	45-50	70-80			45-50	70-80	45-50	60-75	80-85	85-90	80-85
90-130									60-100	80-120					90-130		
75-190									50-150	65-100					75-190		
35-40		35-40			2-4	4-6					15-20	25-35			35-40		35-40
15-20		15-20													15-20		15-20
35-40		35-40					15-20	25-35			15-20	25-35			35-40		35-40
30-35		30-35						30-35				30-35			30-35		30-35

● Optima / Optimun ○ Alternativo / Alternative



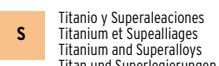
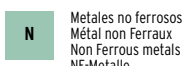
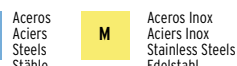
# TABLA DE APLICACIONES GUIDE D'APPLICATION / APPLICATION GUIDE / ANWENDUNGSÜBERSICHT

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



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.	406	406	407	407	408	408	409	409	410	410	
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
	<800	● 30-36	● 48-65	● 30-36	● 48-65	● 35-45	● 55-65	● 30-36	● 48-65	● 35-45	● 55-65
P.2	<1000	○ 25-30	○ 40-45	○ 25-30	○ 40-45	○ 25-30	○ 45-55	○ 25-30	○ 40-45	○ 25-30	○ 45-55
	<1200		○ 30-35		○ 30-35		○ 35-40		○ 30-35		○ 35-40
P.3	<1400										
M.1	<950	○ 15-20	○ 25-35	○ 15-20	○ 25-35	○ 15-20	○ 25-35	○ 15-20	○ 25-35	○ 15-20	○ 25-35
		○ 15-20	○ 25-35	○ 15-20	○ 25-35	○ 15-20	○ 25-35	○ 15-20	○ 25-35	○ 15-20	○ 25-35
M.2	<1200										
M.3											
M.4											
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	<800		○ 30-35		○ 30-35				○ 30-35		
K.3											
K.4.1	<1400	○ 20-24	● 30-40	○ 20-24	● 30-40	○ 20-24	● 30-35	○ 20-24	● 30-40	○ 20-24	● 30-35
K.4.2			○ 30-35		○ 30-35				○ 30-35		
N.1.1	Al	○ 100-150	○ 130-200	○ 100-150	○ 130-200			○ 100-150	○ 130-200		
		○ 100-150	○ 130-200	○ 100-150	○ 130-200			○ 100-150	○ 130-200		
N.1.2		○ 60-100	○ 90-130	○ 60-100	○ 90-130			○ 60-100	○ 90-130		
N.1.3											
N.2.1	Cu	● 55-75	● 90-120	● 55-75	● 90-120	● 55-75	● 90-120	● 55-75	● 90-120	● 55-75	● 90-120
		● 55-75	● 90-120	● 55-75	● 90-120	● 55-75	● 90-120	● 55-75	● 90-120	● 55-75	● 90-120
N.2.2		● 75-95	● 120-140	● 75-95	● 120-140	● 75-95	● 120-140	● 75-95	● 120-140	● 75-95	● 120-140
N.2.3											
N.2.4											
N.3.1	Mg/Zn	○ 60-100	○ 90-130	○ 60-100	○ 90-130			○ 60-100	○ 90-130		
		○ 50-150	○ 75-190	○ 50-150	○ 75-190			○ 50-150	○ 75-190		
N.4.1	Plastic										
N.4.2											
N.4.3											
S.1.1	Ni			○ 15-20	● 25-35			○ 15-20	● 25-35		
S.1.2											
S.2.1	Ti			○ 15-20	○ 25-35			○ 15-20	○ 25-35		
S.2.2											
S.2.3											
H.1	50 HRC										
	55 HRC										
H.2											
H.3	60 HRC										

● Optima / Optimun ○ Alternativo / Alternative





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

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

Ref./Réf./Ref.			
Z			
Ejec./Exéc./Exec.	CRUZ	DIAM	ALU
Hel./Hel./Spiral			
Mat.	HM	HM	HM
Rec./Rev./Coat.			
DIN			
Gama/Gamme/Range			
Pag.			
Mat.	Vc (m/min)		
P.1	<600	400-800	400-800
P.2	<800	400-800	400-800
P.3	<1000	400-800	400-800
P.4	<1200	300-700	300-700
P.5	<1400	300-700	
M.1	<950	600-1000	
M.2		600-1000	
M.3	<1200	400-800	
M.4		400-800	
K.1	<500	500-800	
K.2		500-800	
K.3	<800	400-800	
K.4.1		400-800	
K.4.2	<1400	300-700	
N.1.1			400-1000
N.1.2	Al		400-1000
N.1.3			300-700
N.2.1		400-800	300-700
N.2.2	Cu	400-800	300-700
N.2.3		400-800	
N.2.4		300-700	
N.3.1	Mg/Zn	400-800	400-1000
N.4.1			400-1000
N.4.2	Plastic		400-1000
N.4.3		300-700	
S.1.1	Ni	400-800	400-800
S.1.2		300-700	
S.2.1		600-1000	600-1000
S.2.2	Ti	400-800	
S.2.3		300-700	
H.1	50 HRC	200-600	20-25
H.2	55 HRC	200-600	15-20
H.3	60 HRC		

7172	7137	7138	7139
HSS	HSSE	HSSE	HSS - WIDIA
		TIALN	
12-60	12-60	12-50	18-50
426	428	430	432
Vc (m/min)			
20-25	35-45	45-55	55-65
15-20	25-35	40-50	40-50
	20-25	30-40	30-40
	15-20	20-25	20-25
		15-20	15-20
	15-20	20-25	20-30
	15-20	20-25	20-30
		15-20	15-20
		15-20	15-20
20-30	30-35	45-55	50-60
20-30	30-35	45-55	50-60
15-20	25-30	40-50	45-55
15-20	25-30	40-50	45-55
		15-20	15-20
40-50	50-60	60-70	70-90
40-50	50-60	60-70	70-90
40-50	50-60	60-70	70-90
40-50	50-60	60-70	70-90
40-50	50-60	60-70	70-90
15-20	25-35	40-50	40-50
	15-20	20-25	20-25
20-25	30-35	45-55	50-60
40-50	50-60	60-70	70-90
40-50	50-60	60-70	70-90
		10-15	15-20
			15-20
		20-25	20-30
		15-20	20-25
			15-20
			20-25
			15-20

● Optima / Optimun ○ Alternativo / Alternative



Aceros  
Aciers  
Steels  
Stähle



Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl



Fundicion  
Fonte  
Cast Iron  
Gusseisen



Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle



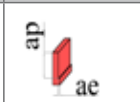




Titanio y Superalloys  
Titanium et Superalloys  
Titanium and Superalloys  
Titan und Superlegierungen



Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

<b>Avance / Feed</b>
$vf \text{ (mm/min)} = \text{rpm} \times Z \times fz \times K$
$\text{rpm} = (Vc \times 1000) / (D \times P)$
<b>Z</b> = número de dientes / nombre de dents / teeth number
<b>fz</b> = avance por diente / avance per dent / feed per tooth

Fresado / Fresage / Milling				
1	2	3	4	5
				

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



**TABLA DE AVANCES**  
**GUIDE D'AVANCES / FEED GUIDE / VORSCHUB-TABELLE**

**FRESAS METAL DURO / FRAISES CARBURE / HARD METAL MILLS / HARTMETALLFRÄSER**

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	5	2xD	0,2xD	-	-	0,031	0,042	0,052	0,063	0,084	0,104	0,125	0,146	0,166	0,187	0,208
3196	2	4xD	0,1xD	-	-	0,050	0,063	0,081	0,099	0,131	0,163	0,194	0,230	0,261	0,293	0,325
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	5	3xD	0,09xD	-	-	0,031	0,042	0,052	0,063	0,084	0,104	0,125	0,146	0,166	0,187	0,208
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

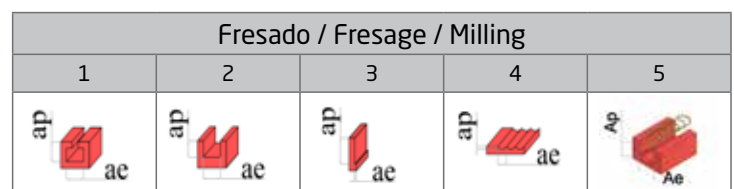
AVANCE / FEED (Fz = mm / Z)												
Ref.	Fres./ Mill	Ap	Ae	D (mm)								
				0,2	0,3	0,4	0,5	0,6	0,8	1	1,5	2
3197	4	0,05xD	1xD	0,003	0,004	0,005	0,008	0,009	0,011	0,014	0,020	0,028
3198	4	0,05xD	0,2xD	0,004	0,007	0,009	0,012	0,014	0,020	0,025	0,040	0,055



# TABLA DE AVANCES GUIDE D'AVANCES / FEED GUIDE / VORSCHUB-TABELLE

## FRESAS HSSE MANGO CILÍNDRICO / FRAISES HSSE QUEUE CYLINDRIQUE / HSSE STRAIGHT SHANK MILLS / HSSE-FRÄSER MIT ZYLINDERSCHAFT

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



**FRESAS MANGO CÓNICO / FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS / KONISCHE SCHAFTFRÄSER**

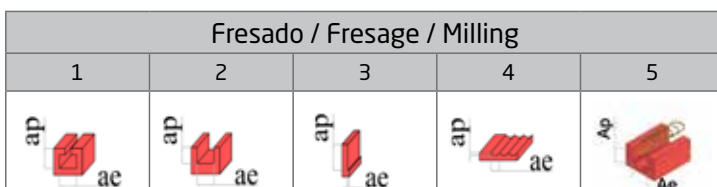
AVANCE / FEED (Fz = mm / Z)									
Ref.	Fres./Mill	Ap	Ae	D (mm)					
				12	16	20	25	32	40
3144	2	0,5xD	1xD	0,050	0,060	0,075	0,090	0,100	0,110
3144/1	2	0,5xD	1xD	0,065	0,078	0,098	0,117	0,130	0,143
3145	3	1xD	0,1xD	0,035	0,045	0,060	0,070	0,080	0,090
3145/1	3	1xD	0,1xD	0,046	0,059	0,078	0,091	0,104	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 / BOHRUNGSFRÄSER**

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 / HSSE SPEZIALFRÄSER**

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



**TABLA DE VELOCIDADES  
GUIDE DE VITESSE / SPEED GUIDE / DREHZAHN-TABELLE**

**FRESAS ROTATIVAS / FRAISES ROTATIVES / ROTARY MILLS / ROTATIONSFRÄSER**

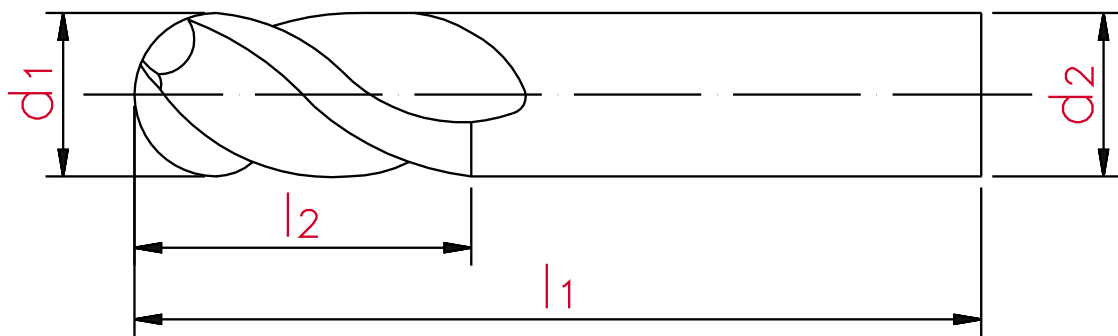
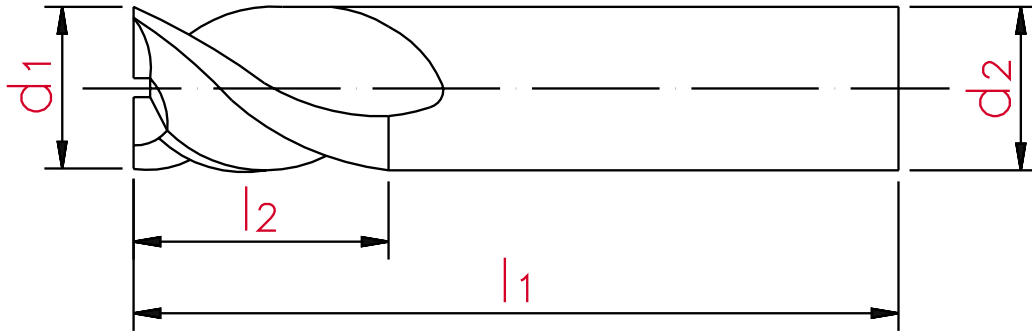
RPM		Vc (m/min)									
		100	200	300	400	500	600	700	800	900	1000
D (mm)	3	10.610	21.221	31.831	42.441	53.052	63.662	74.272	84.882	95.493	106.103
	4	7.958	15.915	23.873	31.831	39.789	47.746	55.704	63.662	71.620	79.577
	5	6.366	12.732	19.099	25.465	31.831	38.197	44.563	50.929	57.296	63.662
	6	5.305	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

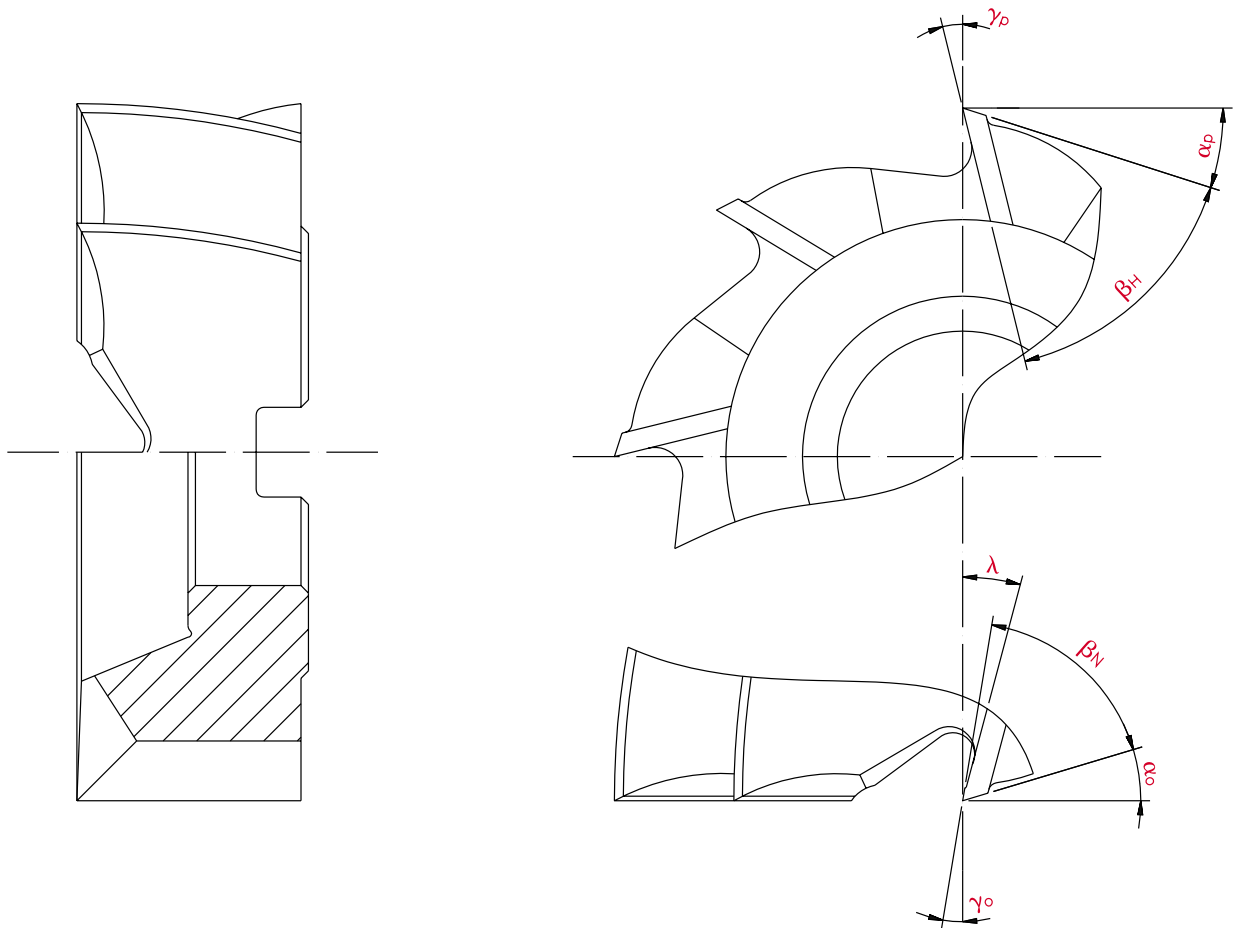


**TABLA DE VELOCIDADES**  
**GUIDE DE VITESSE / SPEED GUIDE / DREHZAHL-TABELLE**

**FRESAS HUECAS / FRAISES À TROU / CORE BITS / HOHLFRÄSER**

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	





<b>l1</b>	Longitud total / Longueur totale / Total length
<b>l2</b>	Longitud de corte / Longueur de coupe / Length of cut
<b>d1</b>	Diámetro de fresa / Diamètre de fraise / Diameter of mill
<b>d2</b>	Longitud mango / Longueur queue / Shank length
<b>λ</b>	Ángulo de espiral / Angle de spirale / Spiral angle
<b>απ</b>	Ángulo de destalonado del corte principal / Angle de détalonnage de la coupe principale / Main cutting relief angle
<b>α0</b>	Ángulo de destalonado del corte secundario / Angle de détalonnage de la coupe secondaire / Secondary cutting relief angle
<b>βH</b>	Ángulo de cuña del corte principal / Angle de coin de la coupe principale / Main cutting wedge angle
<b>βN</b>	Ángulo de cuña del corte secundario / Angle de coin de la coupe secondaire / Secondary cutting wedge angle
<b>γP</b>	Ángulo de desprendimiento del corte principal / Angle de dégagement de la coupe principale / Main cutting rake angle
<b>γ0</b>	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	28,91	50	8	1
4,00	6	28,91	54	11	1
5,00	6	28,91	54	13	1

Ø mm	d mm	€	L mm	l mm	
6,00	6	28,91	54	13	1
8,00	8	40,79	58	19	1
10,00	10	57,97	66	22	1

**3189** **HM-MD**



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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	z	
3,00	6	31,73	57	8	2	1
3,50	6	31,73	57	10	2	1
4,00	6	31,73	57	11	2	1
4,50	6	31,73	57	11	2	1
5,00	6	31,73	57	13	2	1
6,00	6	31,73	57	13	2	1
7,00	8	39,91	63	16	2	1
8,00	8	39,91	63	19	2	1

Ø mm	d mm	€	L mm	l mm	z	
9,00	10	58,42	72	19	2	1
10,00	10	58,42	72	22	2	1
12,00	12	84,41	83	26	2	1
14,00	14	126,70	83	26	2	1
16,00	16	155,97	92	32	2	1
18,00	18	204,86	92	32	2	1
20,00	20	247,43	104	38	2	1

# FRESAS METAL DURO FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER

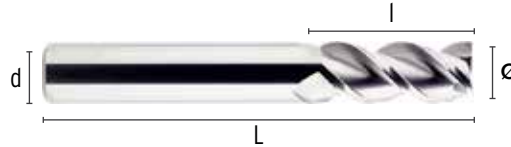
**3190** **HM-MD**



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

Fresado / Fraissage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	Z	
3,00	6	31,73	57	8	3	1
3,50	6	31,73	57	9	3	1
4,00	6	31,73	57	11	3	1
4,50	6	31,73	57	11	3	1
5,00	6	31,73	57	13	3	1
6,00	6	31,73	57	13	3	1
8,00	8	39,91	63	19	3	1

∅ mm	d mm	€	L mm	l mm	Z	
10,00	10	58,42	72	22	3	1
12,00	12	84,41	83	26	3	1
14,00	14	126,70	83	26	3	1
16,00	16	155,97	92	32	3	1
18,00	18	204,86	92	32	3	1
20,00	20	247,43	104	38	3	1



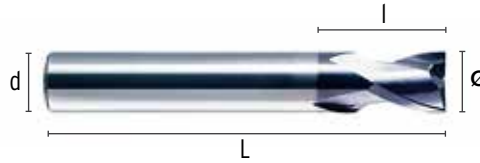
**3167** **HM-MD DIN 6527 S**



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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	z	
3,00	6	25,98	50	4	2	1
3,50	6	25,98	50	4	2	1
4,00	6	26,55	54	5	2	1
4,50	6	26,55	54	5	2	1
5,00	6	26,55	54	6	2	1
6,00	6	26,55	54	7	2	1
7,00	8	35,11	58	8	2	1
8,00	8	35,11	58	9	2	1

∅ mm	d mm	€	L mm	l mm	z	
9,00	10	48,24	66	10	2	1
10,00	10	48,24	66	11	2	1
12,00	12	69,39	73	12	2	1
14,00	14	99,28	75	14	2	1
16,00	16	116,87	82	16	2	1
18,00	18	161,61	84	18	2	1
20,00	20	182,15	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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	z	
3,00	6	23,06	57	7	2	1
3,50	6	23,06	57	7	2	1
4,00	6	23,06	57	8	2	1
4,50	6	23,06	57	8	2	1
5,00	6	23,06	57	10	2	1
6,00	6	23,06	57	10	2	1
7,00	8	33,93	63	13	2	1
8,00	8	33,93	63	16	2	1

∅ mm	d mm	€	L mm	l mm	z	
9,00	10	49,06	72	16	2	1
10,00	10	49,06	72	19	2	1
12,00	12	69,99	83	22	2	1
14,00	14	108,94	83	22	2	1
16,00	16	133,22	92	26	2	1
18,00	18	169,14	92	26	2	1
20,00	20	208,07	104	32	2	1

**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



∅ mm	d mm	€	L mm	l mm	Z	
3,00	6	34,50	50	4	2	1
4,00	6	35,11	54	5	2	1
5,00	6	35,11	54	6	2	1
6,00	6	35,11	54	7	2	1
8,00	8	47,35	58	9	2	1
10,00	10	64,55	66	11	2	1

∅ mm	d mm	€	L mm	l mm	Z	
12,00	12	90,38	73	12	2	1
14,00	14	120,05	75	14	2	1
16,00	16	146,03	82	16	2	1
18,00	18	178,68	84	18	2	1
20,00	20	220,22	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



∅ mm	d mm	€	L mm	l mm	Z	
3,00	6	23,06	57	7	2	1
4,00	6	23,06	57	8	2	1
5,00	6	23,06	57	10	2	1
6,00	6	23,06	57	10	2	1
8,00	8	33,93	63	16	2	1
10,00	10	49,06	72	19	2	1

∅ mm	d mm	€	L mm	l mm	Z	
12,00	12	69,99	83	22	2	1
14,00	14	108,94	83	22	2	1
16,00	16	146,00	92	26	2	1
18,00	18	189,48	92	26	2	1
20,00	20	265,46	104	32	2	1

# FRESAS METAL DURO FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER

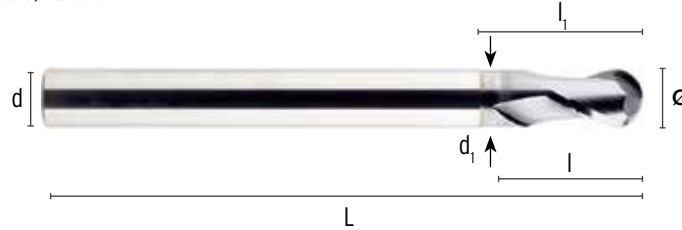
## 3191 HM-MD DIN 6527 EL



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

Fresado / Fraissage / Milling / Fräsen



∅ mm	l mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	Z	
2	7	6	1,9	46,40	62	3	2	1
3	9	6	2,8	46,40	62	4	2	1
4	12	6	4,8	46,40	62	5	2	1
5	14	6	4,8	53,58	80	6	2	1
6	17	6	5,7	53,58	80	7	2	1
8	22	8	7,6	76,32	90	9	2	1

∅ mm	l mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	Z	
10	27	10	9,5	111,42	100	11	2	1
12	32	12	11,5	161,98	120	13	2	1
14	37	14	13,5	191,62	120	15	2	1
16	42	16	15,5	262,68	140	17	2	1
18	47	18	17,5	315,91	140	19	2	1
20	52	20	19,5	415,03	160	21	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



Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Z	
3,00	6	25,98	50	4	3	1
3,50	6	25,98	50	4	3	1
4,00	6	26,55	54	5	3	1
4,50	6	26,55	54	5	3	1
5,00	6	26,55	54	6	3	1
6,00	6	26,55	54	7	3	1
8,00	8	35,11	58	9	3	1

Ø mm	d mm	€	L mm	l mm	Z	
10,00	10	48,24	66	11	3	1
12,00	12	69,39	73	12	3	1
14,00	14	99,28	75	14	3	1
16,00	16	116,87	82	16	3	1
18,00	18	161,61	84	18	3	1
20,00	20	182,15	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



Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Z	
3,00	6	23,06	57	7	3	1
3,50	6	23,06	57	7	3	1
4,00	6	23,06	57	8	3	1
4,50	6	23,06	57	8	3	1
5,00	6	23,06	57	10	3	1
6,00	6	23,06	57	10	3	1
8,00	8	33,93	63	16	3	1

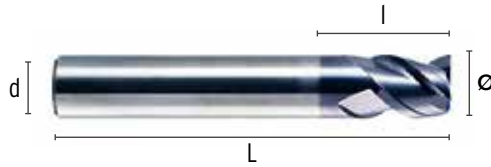
Ø mm	d mm	€	L mm	l mm	Z	
10,00	10	49,06	72	19	3	1
12,00	12	69,99	83	22	3	1
14,00	14	108,94	83	22	3	1
16,00	16	133,22	92	26	3	1
18,00	18	169,14	92	26	3	1
20,00	20	208,07	104	32	3	1

**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 Fresado / Fraise / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Z	
3,00	6	26,55	50	4	3	1
3,50	6	26,55	50	4	3	1
4,00	6	27,09	54	5	3	1
4,50	6	27,09	54	5	3	1
5,00	6	27,09	54	6	3	1
6,00	6	27,09	54	7	3	1
8,00	8	35,23	58	9	3	1

Ø mm	d mm	€	L mm	l mm	Z	
10,00	10	48,46	66	11	3	1
12,00	12	69,39	73	12	3	1
14,00	14	99,28	75	14	3	1
16,00	16	116,87	82	16	3	1
18,00	18	161,61	84	18	3	1
20,00	20	182,02	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 Fresado / Fraise / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Z	
3,00	6	30,43	57	7	3	1
3,50	6	30,43	57	7	3	1
4,00	6	30,43	57	8	3	1
4,50	6	30,43	57	8	3	1
5,00	6	30,43	57	10	3	1
6,00	6	30,43	57	10	3	1
8,00	8	38,80	63	16	3	1

Ø mm	d mm	€	L mm	l mm	Z	
10,00	10	53,42	72	19	3	1
12,00	12	79,40	83	22	3	1
14,00	14	110,03	83	22	3	1
16,00	16	133,78	92	26	3	1
18,00	18	175,70	92	26	3	1
20,00	20	208,13	104	32	3	1



**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					40-90	60-140			

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	Z	
3,00	6	25,98	50	5	4	1
3,50	6	25,98	50	6	4	1
4,00	6	26,55	54	8	4	1
4,50	6	26,55	54	8	4	1
5,00	6	26,55	54	9	4	1
6,00	6	26,55	54	10	4	1
8,00	8	35,11	58	12	4	1

∅ mm	d mm	€	L mm	l mm	Z	
10,00	10	48,24	66	14	4	1
12,00	12	69,39	73	16	4	1
14,00	14	99,28	75	18	4	1
16,00	16	116,87	82	22	4	1
18,00	18	161,61	84	24	4	1
20,00	20	182,15	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					40-80	60-110			

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	Z	
3,00	6	23,06	57	8	4	1
3,50	6	23,06	57	10	4	1
4,00	6	23,06	57	11	4	1
4,50	6	23,06	57	11	4	1
5,00	6	23,06	57	13	4	1
6,00	6	23,06	57	13	4	1
8,00	8	33,93	63	19	4	1

∅ mm	d mm	€	L mm	l mm	Z	
10,00	10	49,06	72	22	4	1
12,00	12	69,99	83	26	4	1
14,00	14	108,94	83	26	4	1
16,00	16	133,22	92	32	4	1
18,00	18	169,14	92	32	4	1
20,00	20	208,07	104	38	4	1

# FRESAS METAL DURO FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER

3177

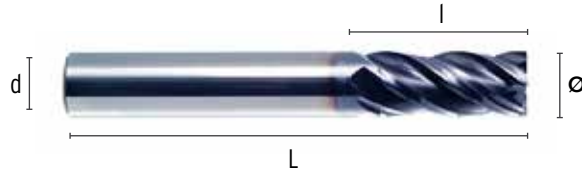
**HM-MD DIN 6527 L**



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

Fresado / Fraisaige / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	Z	
3,00	6	33,23	57	8	4	1
3,50	6	33,23	57	10	4	1
4,00	6	33,23	57	11	4	1
4,50	6	33,23	57	11	4	1
5,00	6	33,23	57	13	4	1
6,00	6	33,23	57	13	4	1
8,00	8	44,36	63	19	4	1

∅ mm	d mm	€	L mm	l mm	Z	
10,00	10	69,39	72	22	4	1
12,00	12	91,65	83	26	4	1
14,00	14	126,88	83	26	4	1
16,00	16	150,10	92	32	4	1
18,00	18	207,75	92	32	4	1
20,00	20	241,36	104	38	4	1

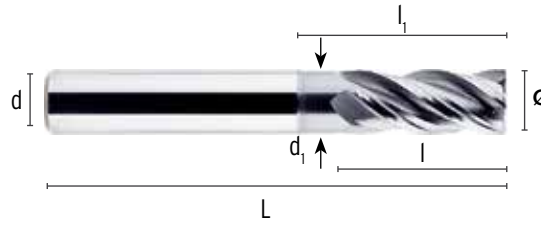


**3192** **HM-MD DIN 6527 L**



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



Ø mm	l mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	Z	
3	14	6	2,8	43,95	57	8	4	1
3,5	16	6	3,3	43,95	57	10	4	1
4	16	6	3,8	43,95	57	11	4	1
4,5	18	6	4,3	43,95	57	11	4	1
5	18	6	4,8	43,95	57	13	4	1
6	19	6	5,7	43,95	57	13	4	1
8	25	8	7,6	55,31	63	19	4	1

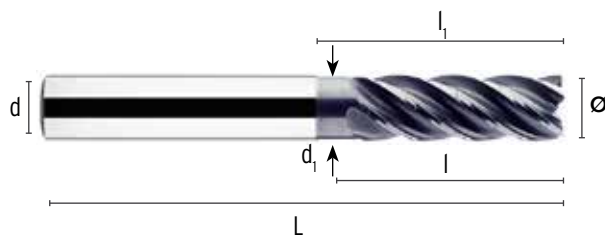
Ø mm	l mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	Z	
10	30	10	9,5	86,32	72	22	4	1
12	36	12	11,5	107,67	83	26	4	1
14	36	14	13,5	149,04	83	26	4	1
16	42	16	15,5	176,30	92	32	4	1
18	42	18	17,5	231,18	92	32	4	1
20	52	20	19,5	268,58	104	38	4	1

**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



Ø mm	l mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	Z	
6	24	6	5,7	48,26	62	18	5	1
8	30	8	7,6	61,79	68	24	5	1
10	38	10	9,5	91,43	80	30	5	1
12	46	12	11,5	121,92	93	36	5	1
14	50	14	13,5	165,66	100	42	5	1

Ø mm	l mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	Z	
16	58	16	15,5	227,01	108	48	5	1
18	67	18	17,5	289,87	115	54	5	1
20	74	20	19,5	351,59	126	60	5	1
25	92	25	24	620,46	150	75	5	1



**FRESAS METAL DURO**  
**FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER**

**3196**

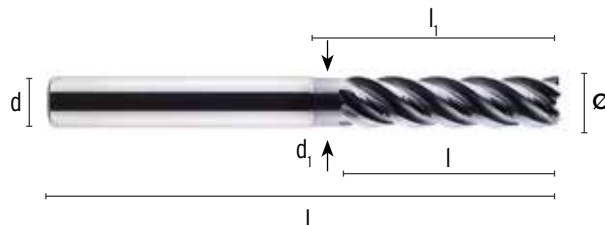
**HM-MD DIN 6527 XXL**



P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●	●	●	●												●	●	○
220-380	210-320	200-300	180-250												70-130	50-120	40-80

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative Fresado / Fraise / Milling / Fräsen

**NEW**



Ø mm	l1 mm	d mm	d1 mm	€	L mm	l mm	Z	⊞	Ø mm	l1 mm	d mm	d1 mm	€	L mm	l mm	Z	⊞
3,00	18,00	6	2,8	80,90	80	12	5	1	12,00	58,00	12	11,5	206,82	120	48	5	1
4,00	21,00	6	3,8	80,90	80	16	5	1	14,00	64,00	14	13,5	263,46	120	56	5	1
5,00	25,00	6	4,8	80,90	80	20	5	1	16,00	74,00	16	15,5	368,80	140	64	5	1
6,00	30,00	6	5,7	80,90	80	24	5	1	18,00	85,00	18	17,5	438,41	140	72	5	1
8,00	38,00	8	7,6	106,19	90	32	5	1	20,00	94,00	20	19,5	559,12	160	80	5	1
10,00	48,00	10	9,5	155,04	100	40	5	1	25,00	117,00	25	24,0	888,69	180	100	5	1

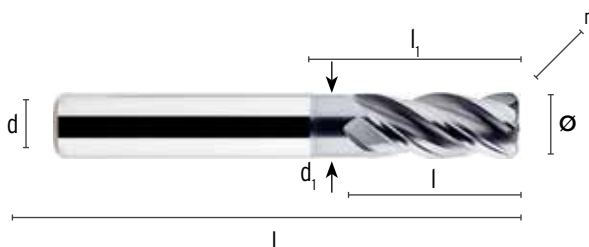
**3178**

**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					40-80	60-140	90-150	70-130	60-110

Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative Fresado / Fraise / Milling / Fräsen



Ø mm	l1 mm	d mm	d1 mm	€	L mm	l mm	r	Z	⊞
6	19	6	5,7	47,70	57	13	0,5	4	1
6	19	6	5,7	47,70	57	13	1,0	4	1
8	25	8	7,6	61,60	63	19	0,5	4	1
8	25	8	7,6	61,60	63	19	1,0	4	1
10	30	10	9,5	92,76	72	22	0,5	4	1
10	30	10	9,5	92,76	72	22	1,0	4	1
10	30	10	9,5	92,76	72	22	2,0	4	1
12	36	12	11,5	119,82	83	26	0,5	4	1
12	36	12	11,5	119,82	83	26	1,0	4	1
12	36	12	11,5	129,84	83	26	2,0	4	1
16	42	16	15,5	190,55	92	32	0,5	4	1
16	42	16	15,5	190,55	92	32	1,0	4	1
16	42	16	15,5	195,38	92	32	2,0	4	1

**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 Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	z	
6,00	6	36,00	57	13	6	1
8,00	8	49,70	63	19	6	1
10,00	10	67,00	72	22	6	1
12,00	12	95,21	83	26	6	1

Ø mm	d mm	€	L mm	l mm	z	
14,00	14	118,93	83	26	6	1
16,00	16	160,11	92	32	6	1
18,00	18	200,72	92	32	6	1
20,00	20	239,52	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 Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	CCC	z	
6,00	6	39,18	62	18	6	1
8,00	8	53,42	68	24	6	1
10,00	10	74,95	80	30	6	1
12,00	12	107,58	93	36	6	1

Ø mm	d mm	€	L mm	l mm	z	
14,00	14	148,98	100	45	6	1
16,00	16	200,56	108	48	6	1
18,00	18	270,30	115	55	6	1
20,00	20	345,63	126	60	8	1

**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 Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Z	
4,00	6	36,95	57	11	3	1
5,00	6	36,95	57	13	4	1
6,00	6	36,95	57	13	4	1
8,00	8	52,53	63	19	4	1
10,00	10	71,45	72	22	4	1
12,00	12	100,01	83	26	4	1

Ø mm	d mm	€	L mm	l mm	Z	
14,00	14	134,51	83	26	4	1
16,00	16	173,63	92	32	4	1
16,00	16	173,63	92	32	5	1
18,00	18	212,14	92	32	5	1
20,00	20	238,02	104	38	5	1
20,00	20	238,02	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 Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Z	
1,20	6	30,67	57	4,8	4	1
1,60	8	42,56	63	6,4	4	1

Ø mm	d mm	€	L mm	l mm	Z	
2,00	10	63,44	72	8	4	1
2,40	12	91,64	83	9,61	4	1

**3184** **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			

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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	Z	
1,20	6	30,67	57	3,39	4	1
1,60	8	42,56	63	4,53	4	1

∅ mm	d mm	€	L mm	l mm	Z	
2,00	10	63,44	72	5,66	4	1
2,40	12	91,64	83	6,79	4	1

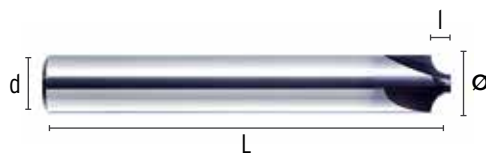
**3185** **HM-MD**



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			

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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	r	d mm	€	L mm	l mm	Z	
5,00	0,50	6	31,99	57	0,79	4	1
4,00	1,00	6	31,99	57	1,57	4	1
5,00	1,50	8	42,56	63	2,36	4	1
4,00	2,00	8	42,56	63	3,14	4	1
5,00	2,50	10	63,44	72	3,93	4	1

∅ mm	r	d mm	€	L mm	l mm	Z	
4,00	3,00	10	63,44	72	4,71	4	1
5,00	3,50	12	91,64	83	5,50	4	1
4,00	4,00	12	91,64	83	6,28	4	1
4,00	5,00	14	122,74	83	7,85	4	1

# FRESAS METAL DURO FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER

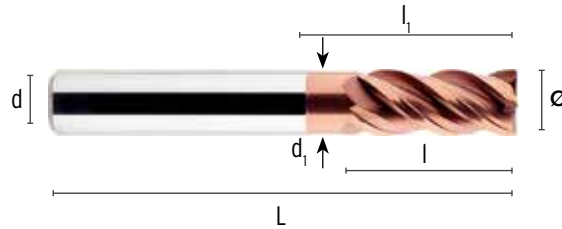
**3194**

**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			

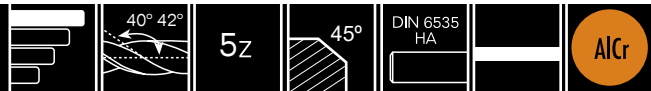
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



Ø mm	l <sub>1</sub> mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	z	📦	Ø mm	l <sub>1</sub> mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	z	📦
3,00	14	6	2,8	47,40	57	8	4	1	10,00	30	10	9,5	92,50	72	22	4	1
3,50	16	6	3,3	47,40	57	10	4	1	12,00	36	12	11,5	113,94	83	26	4	1
4,00	16	6	3,8	47,40	57	11	4	1	14,00	36	14	13,5	153,21	83	26	4	1
4,50	18	6	4,3	47,40	57	11	4	1	16,00	42	16	15,5	205,28	92	32	4	1
5,00	18	6	4,8	47,40	57	13	4	1	18,00	42	18	17,5	254,05	92	32	4	1
6,00	19	6	5,7	47,40	57	13	4	1	20,00	52	20	19,5	307,21	104	38	4	1
8,00	25	8	7,6	60,13	63	19	4	1									

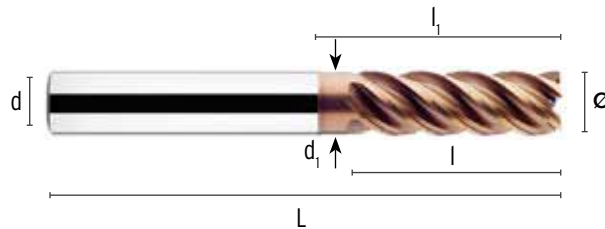
**3195**

**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



Ø mm	l <sub>1</sub> mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	z	📦	Ø mm	l <sub>1</sub> mm	d mm	d <sub>1</sub> mm	€	L mm	l mm	z	📦
6,00	24	6	5,7	52,15	62	18	5	1	16,00	58	16	15,5	243,84	108	48	5	1
8,00	30	8	7,6	64,24	68	24	5	1	18,00	67	18	17,5	308,58	115	54	5	1
10,00	38	10	9,5	95,38	80	30	5	1	20,00	74	20	19,5	373,10	126	60	5	1
12,00	46	12	11,5	127,09	93	36	5	1	25,00	92	25	24	652,61	150	75	5	1
14,00	50	14	13,5	179,68	100	42	5	1									

3197 **HM-MD**

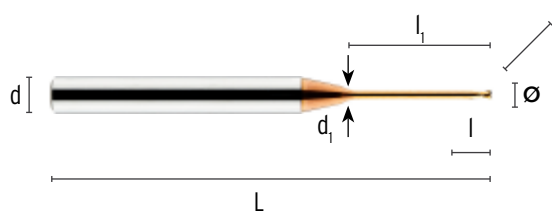


P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC

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

Fresado / Fraisage / Milling / Fräsen

**NEW**



Ø mm	l1 mm	d mm	dl mm	€	L mm	l mm	r	Z	
0,20	0,40	4	0,17	111,74	50	0,20	0,05	2	1
0,20	0,60	4	0,17	111,74	50	0,20	0,05	2	1
0,30	0,60	4	0,27	103,45	50	0,30	0,05	2	1
0,30	0,90	4	0,27	103,45	50	0,30	0,05	2	1
0,30	1,50	4	0,27	103,45	50	0,30	0,05	2	1
0,40	1,50	4	0,37	103,45	50	0,40	0,10	2	1
0,40	3,00	4	0,37	103,45	50	0,40	0,10	2	1
0,40	5,00	4	0,37	103,45	50	0,40	0,10	2	1
0,50	3,00	4	0,46	92,43	50	0,50	0,10	2	1
0,50	5,00	4	0,46	96,37	50	0,50	0,10	2	1
0,60	3,00	4	0,56	92,43	50	0,60	0,10	2	1
0,60	5,00	4	0,56	96,37	50	0,60	0,10	2	1
0,80	3,00	4	0,74	92,43	50	0,80	0,10	2	1
0,80	5,00	4	0,74	96,37	50	0,80	0,10	2	1
1,00	5,00	4	0,94	96,37	50	1,00	0,20	2	1
1,00	10,00	4	0,94	96,37	50	1,00	0,20	2	1
1,00	15,00	4	0,94	100,47	50	1,00	0,20	2	1
1,00	20,00	4	0,94	108,15	75	1,00	0,20	2	1
1,50	5,00	4	1,44	96,37	50	1,50	0,20	2	1
1,50	10,00	4	1,44	96,37	50	1,50	0,20	2	1
1,50	15,00	4	1,44	100,47	50	1,50	0,20	2	1
1,50	20,00	4	1,44	108,15	75	1,50	0,20	2	1
2,00	5,00	4	1,94	96,37	50	2,00	0,20	2	1
2,00	10,00	4	1,94	96,37	50	2,00	0,20	2	1
2,00	15,00	4	1,94	100,47	50	2,00	0,20	2	1
2,00	20,00	4	1,94	108,15	75	2,00	0,20	2	1

# FRESAS METAL DURO FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER

3198

HM-MD

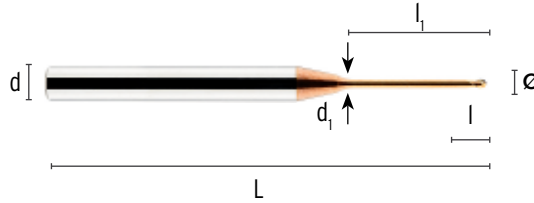


P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC

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

Fresado / Fraiseage / Milling / Fräsen

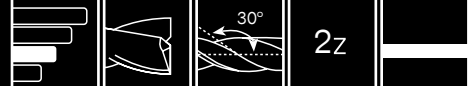
NEW



Ø mm	l mm	d mm	d1 mm	€	L mm	l mm	r	Z	
0,20	0,40	4	0,17	111,74	50	0,20	0,10	2	1
0,20	0,60	4	0,17	111,74	50	0,20	0,10	2	1
0,30	0,60	4	0,27	103,45	50	0,30	0,15	2	1
0,30	0,90	4	0,27	103,45	50	0,30	0,15	2	1
0,30	1,50	4	0,27	103,45	50	0,30	0,15	2	1
0,40	1,50	4	0,37	103,45	50	0,40	0,20	2	1
0,40	3,00	4	0,37	103,45	50	0,40	0,20	2	1
0,40	5,00	4	0,37	96,37	50	0,40	0,20	2	1
0,50	3,00	4	0,46	92,43	50	0,50	0,25	2	1
0,50	5,00	4	0,46	96,37	50	0,50	0,25	2	1
0,60	3,00	4	0,56	92,43	50	0,60	0,30	2	1
0,60	5,00	4	0,56	96,37	50	0,60	0,30	2	1
0,80	3,00	4	0,74	92,43	50	0,80	0,40	2	1
0,80	5,00	4	0,74	96,37	50	0,80	0,40	2	1
1,00	5,00	4	0,94	96,37	50	1,00	0,50	2	1
1,00	10,00	4	0,94	96,37	50	1,00	0,50	2	1
1,00	15,00	4	0,94	100,47	50	1,00	0,50	2	1
1,00	20,00	4	0,94	108,15	75	1,00	0,50	2	1
1,50	5,00	4	1,44	96,37	50	1,50	0,75	2	1
1,50	10,00	4	1,44	96,37	50	1,50	0,75	2	1
1,50	15,00	4	1,44	100,47	50	1,50	0,75	2	1
1,50	20,00	4	1,44	108,15	75	1,50	0,75	2	1
2,00	5,00	4	1,94	96,37	50	2,00	1,00	2	1
2,00	10,00	4	1,94	96,37	50	2,00	1,00	2	1
2,00	15,00	4	1,94	100,47	50	2,00	1,00	2	1
2,00	20,00	4	1,94	108,15	75	2,00	1,00	2	1

**3101**

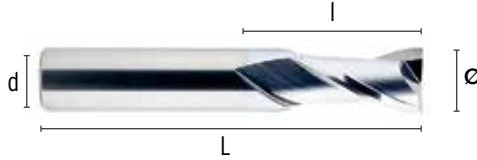
**HM-MD**



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

Fresado / Fraissage / Milling / Fräsen

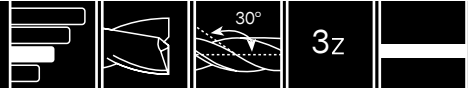


Ø mm	d mm	€	L mm	l mm	
3,00	3	18,91	40	12	1
4,00	4	21,35	40	12	1
5,00	5	22,24	50	14	1
6,00	6	27,43	50	16	1
8,00	8	39,44	60	20	1

Ø mm	d mm	€	L mm	l mm	
10,00	10	53,96	70	22	1
12,00	12	75,89	70	22	1
16,00	16	128,06	75	25	1
20,00	20	194,37	100	32	1

**3105**

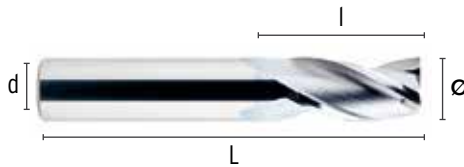
**HM-MD**



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

Fresado / Fraissage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	
3,00	3	18,91	40	12	1
4,00	4	21,35	40	14	1
5,00	5	22,24	50	16	1
6,00	6	27,43	50	19	1
8,00	8	39,44	60	20	1

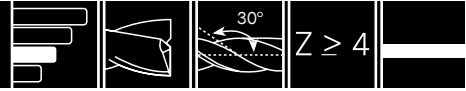
Ø mm	d mm	€	L mm	l mm	
10,00	10	53,96	70	22	1
12,00	12	75,89	70	22	1
16,00	16	128,06	75	25	1
20,00	20	194,37	100	32	1



# FRESAS METAL DURO FRAISES CARBURE / HARD METAL MILLS / HARTMETALL-FRÄSER

3107

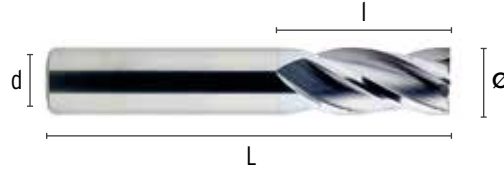
HM-MD



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

Fresado / Fraissage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	
3,00	3	18,91	40	12	1
4,00	4	21,35	40	12	1
5,00	5	22,24	50	14	1
6,00	6	27,43	50	16	1
8,00	8	39,44	60	20	1

Ø mm	d mm	€	L mm	l mm	
10,00	10	53,96	75	22	1
12,00	12	75,89	70	22	1
16,00	16	128,06	75	25	1
20,00	20	194,37	100	32	1



# FRESAS METAL DURO MULTIFUNCIÓN

## FRAISES CARBURE MULTIFUNTION / HARD METAL MILLS MULTIFUNTION / HARTMETALL-MULTIFUNKTIONSFRÄSER

3301

HM-MD



2z

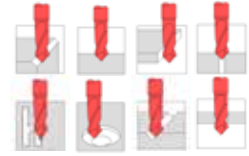
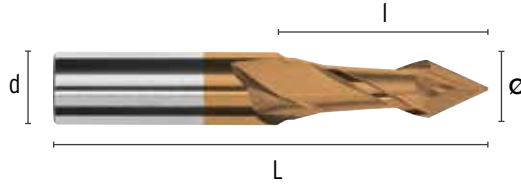
DIN 6535 HA

TiAIN+

P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○		
40-75	35-40	30-35	25-30	30-35	25-30	35-40	30-35	25-30	80-150	40-120	50-120	100-200	10-20	15-30	20-25		

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

NEW



Ø mm	d mm	€	L mm	l mm	T	Z	
3,00	4	88,48	50	6,00	0,30	2	1
5,00	6	97,46	50	10,00	0,50	2	1

Ø mm	d mm	€	L mm	l mm	T	Z	
10,00	12	175,09	70	18,00	1,00	2	1
12,00	12	218,62	70	20,00	1,20	2	1

3302

HM-MD



2z

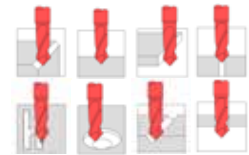
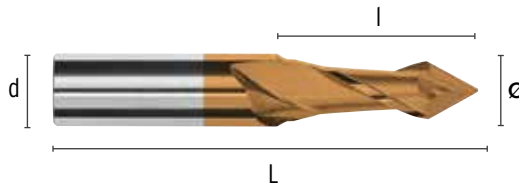
DIN 6535 HA

TiAIN+

P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○		
40-75	35-40	30-35	25-30	30-35	25-30	35-40	30-35	25-30	80-150	40-120	50-120	100-200	10-20	15-30	20-25		

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

NEW



Ø mm	d mm	€	L mm	l mm	T	Z	
3,00	4	88,48	50	6,00	0,30	2	1
4,00	5	88,48	50	8,00	0,40	2	1
5,00	6	97,46	50	10,00	0,50	2	1
6,00	8	99,44	60	12,00	0,60	2	1

Ø mm	d mm	€	L mm	l mm	T	Z	
8,00	10	118,39	70	16,00	0,80	2	1
10,00	12	175,09	70	18,00	1,00	2	1
12,00	12	218,62	70	20,00	1,20	2	1

**P**

Aceros  
Aciers  
Steels  
Stähle

**M**

Aceros Inox  
Aciers Inox  
Stainless Steels  
Edelstahl

**K**

Fundición  
Fonte  
Cast Iron  
Gusseisen

**N**

Metales no ferrosos  
Métal non Ferraux  
Non Ferrous metals  
NE-Metalle

**S**

Titanio y Superalaciones  
Titanium et Supeallages  
Titanium and Superalloys  
Titan und Superlegierungen

**H**

Materiales Duros  
Materiels Durs  
Hard materials  
Hartmaterialien

# FRESAS METAL DURO MULTIFUNCIÓN

## FRAISES CARBURE MULTIFUNTION / HARD METAL MILLS MULTIFUNTION / HARTMETALL-MULTIFUNKTIONSFRÄSER

**3303**

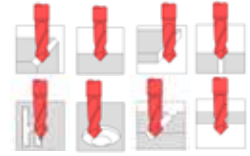
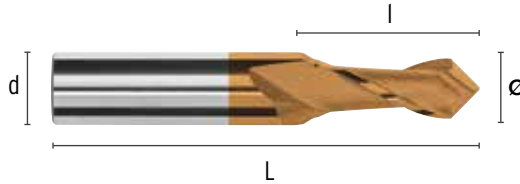
**HM-MD**



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
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○		
40-75	35-40	30-35	25-30	30-35	25-30	35-40	30-35	25-30	80-150	40-120	50-120	100-200	10-20	15-30	20-25		

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

**NEW**



Ø mm	d mm	€	L mm	l mm	T	Z	
3,00	4	88,48	50	6,00	0,30	2	1
4,00	5	88,48	50	8,00	0,40	2	1
5,00	6	97,46	50	10,00	0,50	2	1
6,00	8	99,44	60	12,00	0,60	2	1

Ø mm	d mm	€	L mm	l mm	T	Z	
8,00	10	118,39	70	16,00	0,80	2	1
10,00	12	175,09	70	18,00	1,00	2	1
12,00	12	218,62	70	20,00	1,20	2	1

**3304**

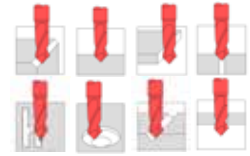
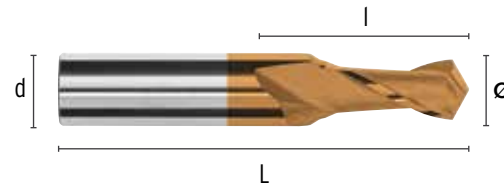
**HM-MD**



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
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○		
40-75	35-40	30-35	25-30	30-35	25-30	35-40	30-35	25-30	80-150	40-120	50-120	100-200	10-20	15-30	20-25		

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

**NEW**



Ø mm	d mm	€	L mm	l mm	T	Z	
3,00	4	88,48	50	6,00	0,30	2	1
4,00	5	88,48	50	8,00	0,40	2	1
5,00	6	97,46	50	10,00	0,50	2	1
6,00	8	99,44	60	12,00	0,60	2	1

Ø mm	d mm	€	L mm	l mm	T	Z	
8,00	10	118,39	70	16,00	0,80	2	1
10,00	12	175,09	70	18,00	1,00	2	1
12,00	12	218,62	70	20,00	1,20	2	1

# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

3120

HSSE W

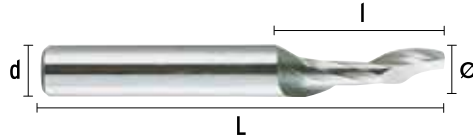


1z

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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	
3,00	8	16,30	60	12	1
4,00*	6	16,30	60	12	1
4,00	8	16,30	60	12	1
5,00*	6	16,30	60	12	1
5,00	8	16,30	60	14	1

∅ mm	d mm	€	L mm	l mm	
6,00	6	16,30	60	14	1
6,00	8	16,30	60	14	1
7,00	8	19,80	60	14	1
8,00	8	19,80	80	14	1
10,00	8	25,03	80	14	1

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

3121

HSSE W

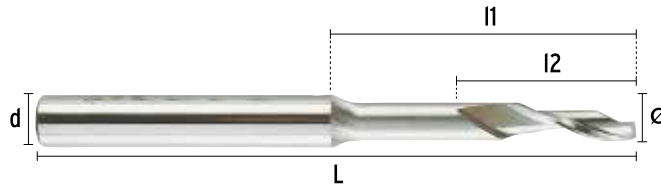


1z

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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l1 mm	l2 mm	
4,00	8	23,09	80	45	16	1
5,00*	6	23,09	80	45	14	1
5,00	8	23,09	80	45	16	1

∅ mm	d mm	€	L mm	l1 mm	l2 mm	
6,00	8	23,09	90	45	16	1
8,00	8	25,60	100	70	30	1

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

# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

## 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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l1 mm	l2 mm	Box
5,00	8	23,09	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

Fresado / Fraisage / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	l mm	Box
2	2	6	16,15	51	7	1
3	2	6	16,15	52	8	1
4	2	6	16,15	55	11	1
5	2	6	16,15	57	13	1
6	2	6	16,15	57	13	1
8	2	10	22,00	69	19	1

Ø mm	Z	d mm	€	L mm	l mm	Box
10	2	10	23,00	72	22	1
12	2	12	29,85	83	26	1
14	2	12	32,99	83	26	1
16	2	16	40,24	92	32	1
18	2	16	49,93	92	32	1
20	2	20	60,76	104	38	1

**P** Aceros Aciers Steels Stähle

**M** Aceros Inox Aciers Inox Stainless Steels Edelstahl

**K** Fundicion Fonte Cast Iron Gusseisen

**N** Metales no ferrosos Métal non Ferreux Non Ferrous metals NE-Metalle

**S** Titanio y Superaloaciones Titanium et Supealliages Titanium and Superalloys Titan und Superlegierungen

**H** Materiales Duros Materiels Durs Hard materials Hartmaterialien

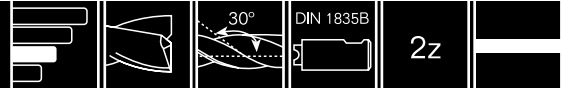
# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

**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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	
2,00	6	14,67	48	4	1
2,50	6	14,67	49	5	1
3,00	6	14,67	49	5	1
3,50	6	15,96	50	6	1
4,00	6	14,67	51	7	1
4,50	6	17,53	51	7	1
5,00	6	14,67	52	8	1
5,50	6	18,61	52	8	1
6,00	6	14,67	52	8	1
6,50	10	24,33	60	10	1
7,00	10	23,60	60	10	1
7,50	10	23,38	60	10	1
8,00	10	21,02	61	11	1
8,50	10	26,25	61	11	1
9,00	10	24,16	61	11	1
9,50	10	25,61	61	11	1
10,00	10	20,80	63	13	1
11,00	12	28,37	70	13	1

Ø mm	d mm	€	L mm	l mm	
12,00	12	26,88	73	16	1
13,00	12	35,47	73	16	1
14,00	12	35,47	73	16	1
15,00	12	39,74	73	16	1
16,00	16	38,80	79	19	1
17,00	16	47,25	79	19	1
18,00	16	47,25	79	19	1
19,00	16	59,67	79	19	1
20,00	20	56,48	88	22	1
22,00	20	73,86	88	22	1
24,00	25	93,56	102	26	1
25,00	25	101,89	102	26	1
28,00	25	118,37	102	26	1
30,00	25	137,69	102	26	1
32,00	32	138,58	112	32	1
36,00	32	185,36	112	32	1
40,00	32	227,58	130	38	1

# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

3110/1

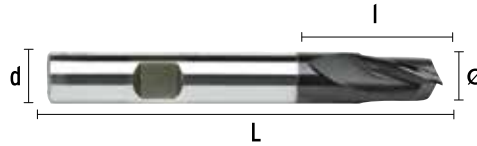
HSSE DIN 327 N



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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	
2,00	6	20,53	48	4	1
2,50	6	20,53	49	5	1
3,00	6	20,53	49	5	1
3,50	6	22,34	50	6	1
4,00	6	20,53	51	7	1
4,50	6	24,54	51	7	1
5,00	6	20,53	52	8	1
5,50	6	26,05	52	8	1
6,00	6	20,53	52	8	1
6,50	10	34,06	60	10	1
7,00	10	33,03	60	10	1
7,50	10	32,73	60	10	1
8,00	10	29,44	61	11	1
8,50	10	36,74	61	11	1
9,00	10	33,81	61	11	1
9,50	10	35,85	61	11	1
10,00	10	29,12	63	13	1
11,00	12	39,72	70	13	1

Ø mm	d mm	€	L mm	l mm	
12,00	12	37,63	73	16	1
13,00	12	49,66	73	16	1
14,00	12	49,66	73	16	1
15,00	12	55,63	73	16	1
16,00	16	54,31	79	19	1
17,00	16	66,17	79	19	1
18,00	16	66,17	79	19	1
19,00	16	83,54	79	19	1
20,00	20	79,07	88	22	1
22,00	20	103,40	88	22	1
24,00	25	130,98	102	26	1
25,00	25	142,63	102	26	1
28,00	25	165,71	102	26	1
30,00	25	192,76	102	26	1
32,00	32	194,01	112	32	1
36,00	32	259,50	112	32	1
40,00	40	318,63	118	38	1

Bajo demanda / Sur commande / Upon request



# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

## 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

Fresado / Fraissage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Box
3,00	6	28,96	49	5	1
4,00	6	28,96	51	7	1
5,00	6	28,96	52	8	1
6,00	6	28,96	52	8	1
7,00	10	34,92	60	10	1
8,00	10	31,09	61	11	1
9,00	10	35,74	61	11	1
10,00	10	30,87	63	13	1
12,00	12	39,78	73	16	1

Ø mm	d mm	€	L mm	l mm	Box
13,00	12	52,57	73	16	1
14,00	12	52,57	73	16	1
15,00	12	52,65	73	16	1
16,00	16	57,44	79	19	1
18,00	16	69,94	79	19	1
20,00	20	83,53	88	22	1
22,00	20	109,32	88	22	1
24,00	25	130,63	102	26	1
25,00	25	120,06	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	60-200	70-120	60-100	50-80	● 4-6				

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

Fresado / Fraissage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Box
3,00	6	40,55	49	5	1
4,00	6	40,55	51	7	1
5,00	6	40,55	52	8	1
6,00	6	40,55	52	8	1
7,00	10	48,88	60	10	1
8,00	10	43,52	61	11	1
9,00	10	50,03	61	11	1
10,00	10	43,21	63	13	1
12,00	12	55,69	73	16	1

Ø mm	d mm	€	L mm	l mm	Box
13,00	12	73,60	73	16	1
14,00	12	73,60	73	16	1
15,00	12	73,70	73	16	1
16,00	16	80,42	79	19	1
18,00	16	97,91	79	19	1
20,00	20	116,94	88	22	1
22,00	20	153,04	88	22	1
24,00	25	182,88	102	26	1
25,00	25	168,08	102	26	1

Bajo demanda / Sur commande / upon request



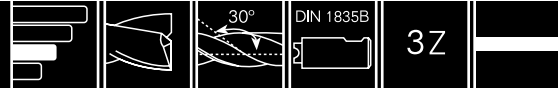
# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

**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 Fresado / Fraise / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	l mm	
2,00	3	6	14,72	48	4	1
3,00	3	6	13,38	49	5	1
4,00	3	6	13,38	51	7	1
5,00	3	6	13,38	52	8	1
6,00	3	6	13,38	52	8	1
7,00	3	10	16,74	60	10	1
8,00	3	10	16,74	61	11	1
9,00	3	10	19,61	61	11	1
10,00	3	10	19,60	63	13	1
11,00	3	12	22,82	70	13	1
12,00	3	12	22,80	73	16	1

Ø mm	Z	d mm	€	L mm	l mm	
13,00	3	12	28,28	73	16	1
14,00	3	12	28,28	73	16	1
15,00	3	12	32,80	73	16	1
16,00	3	16	32,80	79	19	1
18,00	3	16	40,34	79	19	1
20,00	3	20	50,47	88	22	1
22,00	3	20	75,16	88	22	1
25,00	3	25	99,35	102	26	1
28,00	3	25	111,67	102	26	1
30,00	3	25	139,52	102	26	1
32,00	3	32	184,85	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 Fresado / Fraise / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	l mm	
2,00	3	6	20,62	48	4	1
3,00	3	6	18,73	49	5	1
4,00	3	6	18,73	51	7	1
5,00	3	6	18,73	52	8	1
6,00	3	6	18,73	52	8	1
7,00	3	10	23,44	60	10	1
8,00	3	10	23,44	61	11	1
9,00	3	10	27,45	61	11	1
10,00	3	10	27,44	63	13	1
11,00	3	12	31,95	70	13	1
12,00	3	12	31,93	73	16	1

Ø mm	Z	d mm	€	L mm	l mm	
13,00	3	12	39,59	73	16	1
14,00	3	12	39,59	73	16	1
15,00	3	12	45,92	73	16	1
16,00	3	16	45,92	79	19	1
18,00	3	16	56,49	79	19	1
20,00	3	20	70,65	88	22	1
22,00	3	20	105,23	88	22	1
25,00	3	25	139,10	102	26	1
28,00	3	25	156,34	102	26	1
30,00	3	25	195,32	102	26	1
32,00	3	32	258,80	112	32	1

# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

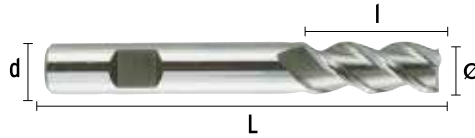
## 3114 HSSE DIN 844 W



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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	z	
2,00	6	17,24	51	7	3	1
3,00	6	17,24	52	8	3	1
4,00	6	17,24	55	11	3	1
5,00	6	17,24	57	13	3	1
6,00	6	21,44	57	13	3	1
7,00	10	23,74	69	16	3	1
8,00	10	26,14	69	19	3	1
9,00	10	28,80	69	19	3	1
10,00	10	26,96	72	22	3	1

∅ mm	d mm	€	L mm	l mm	z	
12,00	12	32,73	83	26	3	1
14,00	12	43,00	83	26	3	1
15,00	12	42,70	83	26	3	1
16,00	16	49,04	92	32	3	1
18,00	16	58,12	92	32	3	1
20,00	20	70,36	104	38	3	1
25,00*	25	116,18	121	45	4	1
30,00*	25	166,09	121	45	4	1

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

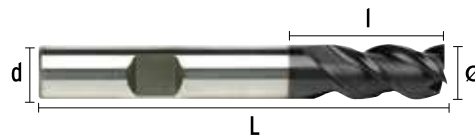
## 3114/1 HSSE DIN 844 W



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

Fresado / Fraiseage / Milling / Fräsen



∅ mm	d mm	€	L mm	l mm	z	
6,00	6	30,03	57	13	3	1
7,00	10	33,24	66	16	3	1
8,00	10	36,60	69	19	3	1
9,00	10	40,32	69	19	3	1
10,00	10	37,74	72	22	3	1
12,00	12	45,82	83	26	3	1

∅ mm	d mm	€	L mm	l mm	z	
14,00	12	60,21	83	26	3	1
15,00	12	59,77	83	26	3	1
16,00	16	68,66	92	32	3	1
18,00	16	81,37	92	32	3	1
20,00	20	98,51	104	38	3	1

Bajo demanda / Sur commande / upon request

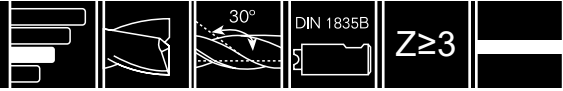
# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	l mm	Icon
2,00	3	6	16,14	51	7	1
2,50	3	6	16,14	52	8	1
3,00	4	6	16,14	52	8	1
4,00	4	6	16,26	55	11	1
5,00	4	6	16,26	57	13	1
6,00	4	6	16,26	57	13	1
7,00	4	10	22,77	69	16	1
8,00	4	10	20,28	69	19	1
9,00	4	10	25,60	69	19	1
10,00	4	10	22,63	72	22	1
11,00	4	12	30,87	79	22	1
12,00	4	12	28,65	83	26	1

Ø mm	Z	d mm	€	L mm	l mm	Icon
13,00	4	12	38,58	83	26	1
14,00	4	12	36,41	83	26	1
15,00	4	12	41,56	83	26	1
16,00	4	16	40,56	92	32	1
18,00	4	16	49,99	92	32	1
20,00	4	20	56,78	104	38	1
22,00	5	20	69,98	104	38	1
25,00	5	25	81,90	121	45	1
28,00	5	25	113,74	121	45	1
30,00	5	25	141,33	121	45	1
32,00	6	32	150,41	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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	l mm	Icon
3,00	4	6	22,60	52	8	1
4,00	4	6	22,60	55	11	1
5,00	4	6	22,60	57	13	1
6,00	4	6	22,77	57	13	1
7,00	4	10	24,54	66	16	1
8,00	4	10	22,77	69	19	1
9,00	4	10	34,35	69	19	1
10,00	4	10	28,39	72	22	1
11,00	4	12	35,84	79	22	1
12,00	4	12	31,68	83	26	1
13,00	4	12	43,21	83	26	1

Ø mm	Z	d mm	€	L mm	l mm	Icon
14,00	4	12	40,11	83	26	1
15,00	4	12	54,02	83	26	1
16,00	4	16	50,96	92	32	1
18,00	4	16	58,18	92	32	1
20,00	4	20	58,50	104	38	1
22,00	5	20	81,24	104	38	1
25,00	5	25	100,95	121	45	1
28,00	5	25	126,21	121	45	1
30,00	5	25	150,41	121	45	1
32,00	6	32	176,70	133	53	1

Bajo demanda / Sur commande / upon request

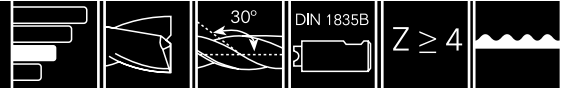


# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

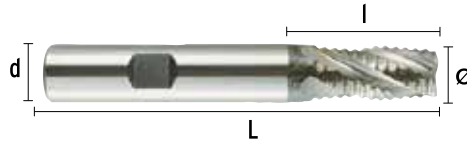
## 3117 HSSE DIN 844 NR



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

Fresado / Fraissage / Milling / Fräsen

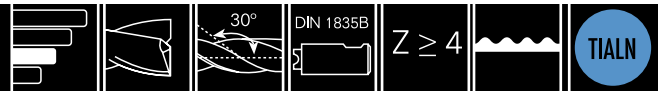


∅ mm	Z	d mm	€	L mm	I mm	
6,00	4	6	41,57	57	13	1
7,00	4	10	50,10	66	16	1
8,00	4	10	46,78	69	19	1
9,00	4	10	51,96	69	19	1
10,00	4	10	41,02	72	22	1
11,00	4	12	61,20	79	22	1
12,00	4	12	53,95	83	26	1
13,00	4	12	73,20	83	26	1
14,00	4	12	58,50	83	26	1
15,00	4	12	76,95	83	26	1
16,00	4	16	71,67	92	32	1
17,00	4	16	94,82	92	32	1

∅ mm	Z	d mm	€	L mm	I mm	
18,00	4	16	75,72	92	32	1
20,00	4	20	94,88	98	38	1
22,00	5	20	109,02	104	38	1
24,00	5	25	137,26	121	45	1
25,00	5	25	136,26	121	45	1
26,00	5	25	162,74	121	45	1
28,00	5	25	157,49	121	45	1
30,00	5	25	174,91	121	45	1
32,00	6	32	191,81	133	53	1
36,00*	6	32	227,11	133	53	1
40,00*	6	32	255,38	155	63	1

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

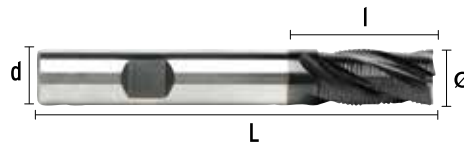
## 3117/1 HSSE DIN 844 NR



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			60-200	60-120	60-100	50-80					

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

Fresado / Fraissage / Milling / Fräsen



∅ mm	Z	d mm	€	L mm	I mm	
6,00	4	6	58,19	57	13	1
7,00	4	10	70,13	66	16	1
8,00	4	10	65,49	69	19	1
9,00	4	10	72,75	69	19	1
10,00	4	10	57,43	72	22	1
11,00	4	12	85,69	79	22	1
12,00	4	12	75,55	83	26	1
13,00	4	12	102,48	83	26	1
14,00	4	12	81,90	83	26	1
15,00	4	12	107,72	83	26	1
16,00	4	16	100,33	92	32	1

∅ mm	Z	d mm	€	L mm	I mm	
17,00	4	16	132,74	92	32	1
18,00	4	16	106,00	92	32	1
20,00	4	20	132,84	98	38	1
22,00	5	20	152,63	104	38	1
24,00	5	25	192,16	121	45	1
25,00	5	25	190,77	121	45	1
26,00	5	25	227,84	121	45	1
28,00	5	25	220,49	121	45	1
30,00	5	25	244,87	121	45	1
32,00	6	32	268,53	133	53	1

Bajo demanda / Sur commade / upon request

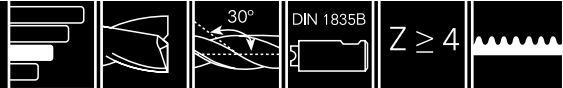
# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

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

Fresado / Fraisage / Milling / Fräsen



∅ mm	Z	d mm	€	L mm	l mm	
6,00	4	6	46,30	57	13	1
8,00	4	10	52,09	69	19	1
10,00	4	10	45,71	72	22	1
12,00	4	12	60,09	83	26	1
14,00	4	12	65,15	83	26	1

∅ mm	Z	d mm	€	L mm	l mm	
16,00	4	16	79,73	9	32	1
18,00	4	16	84,23	92	32	1
20,00	4	20	105,59	104	38	1
25,00	5	25	151,61	121	45	1
30,00	5	25	194,59	121	45	1

3119/1

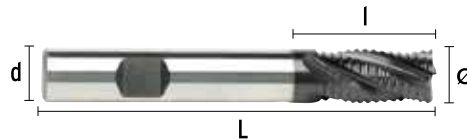
**HSSE DIN 844 NRF**



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

Fresado / Fraisage / Milling / Fräsen



∅ mm	Z	d mm	€	L mm	l mm	
6,00	4	6	64,82	57	13	1
8,00	4	10	72,93	69	19	1
10,00	4	10	63,99	72	22	1
12,00	4	12	84,13	83	26	1
14,00	4	12	91,20	83	26	1

∅ mm	Z	d mm	€	L mm	l mm	
16,00	4	16	111,63	92	32	1
18,00	4	16	117,93	92	32	1
20,00	4	20	147,83	104	38	1
25,00	5	25	212,25	121	45	1
30,00	6	25	272,43	121	45	1

Bajo demanda / Sur commande / upon request

**P** Aceros Aciers Steels Stähle

**M** Aceros Inox Aciers Inox Stainless Steels Edelstahl

**K** Fundicion Fonte Cast Iron Gusseisen

**N** Metales no ferrosos Métal non Ferreux Non Ferrous metals NE-Metalle

**S** Titanio y Superalloys Titanium et Superalloys Titanium and Superalloys Titan und Superlegierungen

**H** Materiales Duros Materiels Durs Hard materials Hartmaterialien

# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

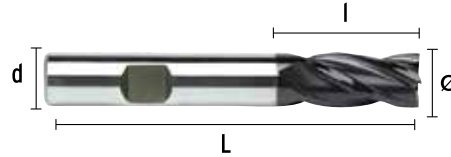
## 3162 HSSE-PM DIN 844 N



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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	L mm	l mm	€	Z	
6,00	6	57	13	31,33	4	1
8,00	10	69	19	39,12	4	1
10,00	10	72	22	46,34	4	1
12,00	12	83	26	55,42	4	1

Ø mm	d mm	L mm	l mm	€	Z	
14,00	12	83	26	64,73	4	1
16,00	16	92	32	76,74	4	1
18,00	16	92	32	93,78	4	1
20,00	20	104	38	115,60	4	1

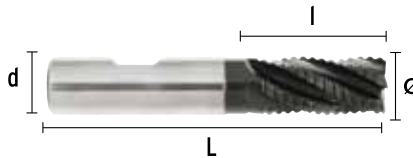
## 3157 HSSE-PM DIN 844 NR



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			60-200	85-140	60-100	50-80					

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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	L mm	l mm	€	Z	
6,00	6	57	13	53,73	4	1
8,00	10	69	19	58,99	4	1
10,00	10	72	22	57,22	4	1
12,00	12	83	26	73,32	4	1
14,00	12	83	26	87,58	4	1
16,00	16	92	32	107,67	4	1
18,00	16	92	32	117,65	4	1

Ø mm	d mm	L mm	l mm	€	Z	
20,00	20	104	38	146,12	4	1
22,00	20	104	38	180,91	5	1
25,00	25	121	45	214,70	5	1
28,00	25	121	45	275,31	5	1
30,00	25	121	45	287,77	5	1
32,00	32	133	53	312,46	6	1

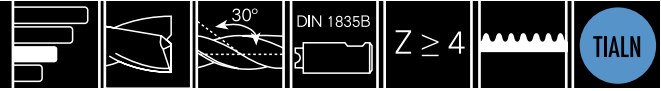
# FRESAS HSSE MANGO CILÍNDRICO CORTAS

# FRAISES HSSE QUEUE CYLINDRIQUE COURTES / HSSE STRAIGHT SHORT SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT KURZEM SCHAFT

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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	L mm	l mm	€	Z	
6,00	6	57	13	59,12	4	1
8,00	10	69	19	64,63	4	1
10,00	10	72	22	62,84	4	1
12,00	12	83	26	80,71	4	1

Ø mm	d mm	L mm	l mm	€	Z	
14,00	12	83	26	96,15	4	1
16,00	16	92	32	118,03	4	1
18,00	16	92	32	129,08	4	1
20,00	20	104	38	159,90	4	1

**P** Aceros Aciers Steels Stähle

**M** Aceros Inox Aciers Inox Stainless Steels Edelstahl

**K** Fundicion Fonte Cast Iron Gusseisen

**N** Metales no ferrosos Métal non Ferreux Non Ferrous metals NE-Metalle

**S** Titanio y Superalaciones Titanium et Supealliajes Titanium and Superalloys Titan und Superlegierungen

**H** Materiales Duros Materiels Durs Hard materials Hartmaterialien

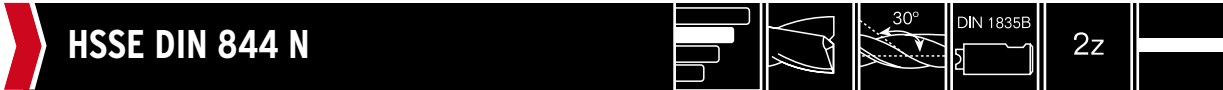


# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

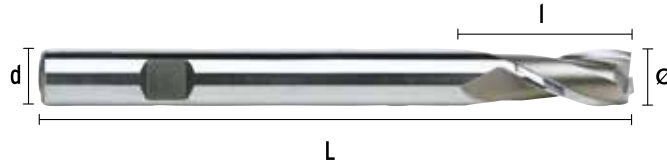
## 3111 HSSE DIN 844 N



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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Box	Ø mm	d mm	€	L mm	l mm	Box
4,00	6	22,42	63	11	1	12,00	12	50,94	110	26	1
5,00	6	22,42	68	13	1	14,00	12	66,23	110	26	1
6,00	6	22,42	68	13	1	16,00	16	77,90	123	32	1
7,00	10	37,29	80	16	1	18,00	16	92,82	123	32	1
8,00	10	32,60	88	19	1	20,00	20	101,38	141	38	1
9,00	10	44,17	88	19	1	22,00	20	137,62	141	38	1
10,00	10	37,29	95	22	1	25,00	25	197,38	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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	Box	Ø mm	d mm	€	L mm	l mm	Box
4,00	6	31,39	63	11	1	12,00	12	71,32	110	26	1
5,00	6	31,39	68	13	1	14,00	12	92,72	110	26	1
6,00	6	31,39	68	13	1	16,00	16	109,05	123	32	1
7,00	10	52,21	80	16	1	18,00	16	129,96	123	32	1
8,00	10	45,63	88	19	1	20,00	20	141,93	141	38	1
9,00	10	61,84	88	19	1	22,00	20	192,67	141	38	1
10,00	10	52,21	95	22	1	25,00	25	276,33	166	45	1

Bajo demanda / Sur commande / upon request



# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

## 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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	
4,00	6	32,68	63	11	1
5,00	6	34,59	68	13	1
6,00	6	31,23	68	13	1
8,00	10	38,30	88	19	1
10,00	12	42,02	95	22	1
12,00	12	53,90	110	26	1

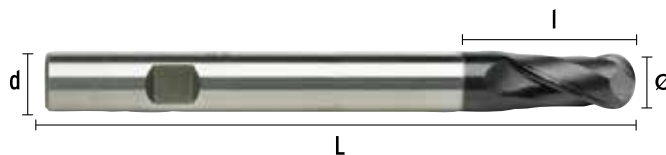
Ø mm	d mm	€	L mm	l mm	
14,00	12	63,40	110	26	1
16,00	16	80,58	123	32	1
18,00	16	96,89	123	32	1
20,00	20	105,04	141	38	1
22,00	20	130,20	141	38	1
25,00	25	193,31	166	45	1

## 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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	
4,00	6	45,75	63	11	1
5,00	6	48,43	68	13	1
6,00	6	43,73	68	13	1
8,00	10	53,61	88	19	1
10,00	10	58,82	95	22	1
12,00	12	75,46	110	26	1

Ø mm	d mm	€	L mm	l mm	
14,00	12	88,75	110	26	1
16,00	16	112,82	123	32	1
18,00	16	135,66	123	32	1
20,00	20	147,04	141	38	1
22,00	20	182,28	141	38	1
25,00	25	270,64	166	45	1

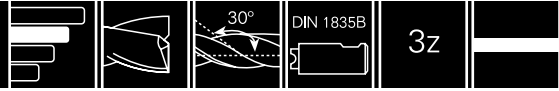
Bajo demanda / Sur commande / upon request



**FRESAS HSSE MANGO CILÍNDRICO LARGAS**  
**FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /**  
**HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT**

**3188**

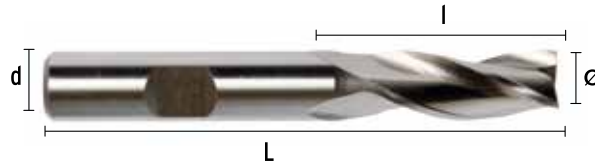
**HSSE DIN 327 N**



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

Fresado / Fraisage / Milling / Fräsen

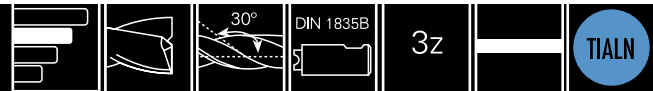


Ø mm	Z	d mm	€	L mm	l mm	
3	3	6	17,31	52	8	1
4	3	6	17,31	55	11	1
5	3	6	17,31	57	13	1
6	3	6	17,31	57	13	1
7	3	10	21,71	66	16	1
8	3	10	21,71	69	19	1
9	3	10	23,43	69	22	1
10	3	10	25,56	72	22	1
11	3	12	27,35	79	22	1

Ø mm	Z	d mm	€	L mm	l mm	
12	3	12	29,62	83	26	1
13	3	12	32,03	83	26	1
14	3	12	36,89	83	26	1
15	3	12	40,36	83	26	1
16	3	16	42,72	92	32	1
18	3	16	52,62	92	32	1
20	3	20	65,66	104	38	1
22	3	20	76,50	104	38	1
25	3	25	84,93	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

Fresado / Fraisage / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	l mm	
3	3	6	24,23	52	8	1
4	3	6	24,23	55	11	1
5	3	6	24,23	57	13	1
6	3	6	24,23	57	13	1
7	3	10	30,39	66	16	1
8	3	10	30,39	69	19	1
9	3	10	32,80	69	22	1
10	3	10	35,78	72	22	1
11	3	12	38,29	79	22	1

Ø mm	Z	d mm	€	L mm	l mm	
12	3	12	41,47	83	26	1
13	3	12	44,85	83	26	1
14	3	12	51,64	83	26	1
15	3	12	56,52	83	26	1
16	3	16	59,81	92	32	1
18	3	16	73,67	92	32	1
20	3	20	91,92	104	38	1
22	3	20	107,09	104	38	1
25	3	25	118,89	121	45	1

# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

3182

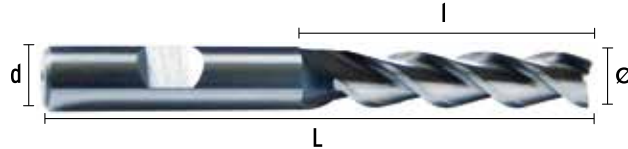
**HSSE DIN 844 W**



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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	z	
6,00	6	23,02	68	24	3	1
8,00	10	29,35	88	38	3	1
10,00	10	34,50	95	45	3	1
12,00	12	41,39	110	53	3	1

Ø mm	d mm	€	L mm	l mm	z	
14,00	12	48,29	110	53	3	1
16,00	16	57,57	123	63	3	1
18,00	16	65,48	123	63	3	1
20,00	20	81,66	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

Fresado / Fraisage / Milling / Fräsen



Ø mm	d mm	€	L mm	l mm	z	
6,00	6	32,23	68	24	3	1
8,00	10	41,09	88	38	3	1
10,00	10	48,30	95	45	3	1
12,00	12	57,95	110	53	3	1

Ø mm	d mm	€	L mm	l mm	z	
14,00	12	67,61	110	53	3	1
16,00	16	80,59	123	63	3	1
18,00	16	91,67	123	63	3	1
20,00	20	114,32	141	75	3	1



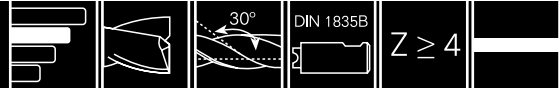
# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

## 3116

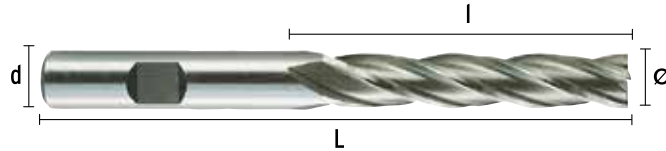
## HSSE DIN 844 N



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

Fresado / Fraissage / Milling / Fräsen



∅ mm	Z	d mm	€	L mm	l mm	Box
3,00	4	6	19,31	56	12	1
4,00	4	6	19,31	63	19	1
5,00	4	6	19,31	68	24	1
6,00	4	6	19,31	68	24	1
7,00	4	10	29,29	80	30	1
8,00	4	10	26,90	88	38	1
9,00	4	10	30,28	88	38	1
10,00	4	10	26,66	95	45	1

∅ mm	Z	d mm	€	L mm	l mm	Box
12,00	4	12	33,79	110	53	1
14,00	4	12	44,20	110	53	1
16,00	4	16	48,35	123	63	1
18,00	4	16	59,04	123	63	1
20,00	4	20	69,14	141	75	1
22,00	5	20	95,89	141	75	1
25,00	5	25	127,19	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

Fresado / Fraissage / Milling / Fräsen



∅ mm	Z	d mm	€	L mm	l mm	Box
6,00	4	6	27,03	68	24	1
7,00	4	10	41,00	80	30	1
8,00	4	10	37,66	88	38	1
9,00	4	10	42,40	88	38	1
10,00	4	10	37,32	95	45	1
12,00	4	12	47,31	110	53	1

∅ mm	Z	d mm	€	L mm	l mm	Box
14,00	4	12	61,87	110	53	1
16,00	4	16	67,69	123	63	1
18,00	4	16	82,66	123	63	1
20,00	4	20	96,80	141	75	1
22,00	5	20	134,24	141	75	1
25,00	5	25	178,07	166	90	1

Bajo demanda / Sur commade / upon request

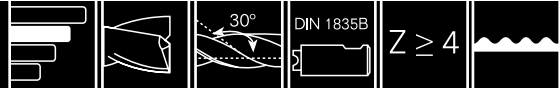
# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

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

Fresado / Fraisage / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	I mm	
6,00	4	6	57,27	68	24	1
8,00	4	10	75,72	88	38	1
10,00	4	10	51,96	95	45	1
12,00	4	12	61,56	110	53	1
14,00	4	12	71,15	110	53	1
16,00	4	16	83,25	123	63	1
18,00	4	16	93,89	123	63	1

Ø mm	Z	d mm	€	L mm	I mm	
20,00	4	20	118,07	141	75	1
22,00	5	20	143,86	141	75	1
25,00	5	25	181,67	166	90	1
28,00	5	25	205,93	166	90	1
30,00	5	25	275,90	166	90	1
32,00	6	32	261,48	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

Fresado / Fraisage / Milling / Fräsen



Ø mm	Z	d mm	€	L mm	I mm	
6,00	4	6	80,19	68	24	1
8,00	4	10	106,00	88	38	1
10,00	4	10	72,75	95	45	1
12,00	4	12	86,19	110	53	1
14,00	4	12	99,60	110	53	1
16,00	4	16	116,56	123	63	1
18,00	4	16	131,45	123	63	1

Ø mm	Z	d mm	€	L mm	I mm	
20,00	4	20	165,31	141	75	1
22,00	5	20	201,41	141	75	1
25,00	5	25	254,35	166	90	1
28,00	5	25	288,30	166	90	1
30,00	5	25	386,26	166	90	1
32,00	6	32	366,07	186	106	1

Bajo demanda / Sur commande / upon request



# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

3163

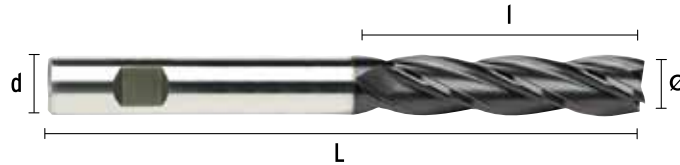
## HSSE-PM DIN 844 N



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

Fresado / Fraiseage / Milling / Fräsen

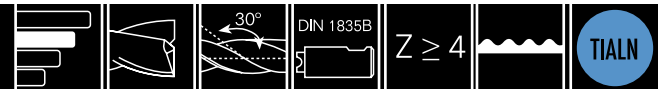


Ø mm	d mm	L mm	l mm	€	Z	
6,00	6	68	24	37,44	4	1
8,00	10	88	38	46,76	4	1
10,00	10	95	45	55,39	4	1
12,00	12	110	53	66,21	4	1

Ø mm	d mm	L mm	l mm	€	Z	
14,00	12	110	53	77,03	4	1
16,00	16	123	63	91,32	4	1
18,00	16	123	63	111,12	4	1
20,00	20	141	75	136,98	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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	d mm	L mm	l mm	€	Z	
6,00	6	68	24	81,26	4	1
8,00	10	88	38	84,88	4	1
10,00	10	95	45	77,31	4	1
12,00	12	110	53	96,89	4	1
14,00	12	110	53	110,55	4	1

Ø mm	d mm	L mm	l mm	€	Z	
16,00	16	123	63	136,59	4	1
18,00	16	123	63	153,89	4	1
20,00	20	141	75	196,98	4	1
25,00	25	166	90	302,67	5	1
32,00	32	186	106	430,53	6	1

# FRESAS HSSE MANGO CILÍNDRICO LARGAS

# FRAISES HSSE QUEUE CYLINDRIQUE LONGUES / HSSE STRAIGHT LONG SHANK MILLS /

# HSS-ZYLINDERSCHAFT FRÄSER MIT LANGEM SCHAFT

3160

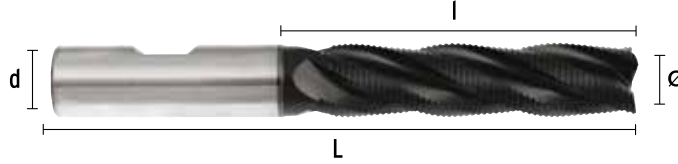
**HSSE-PM DIN 844 NRF**



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

Fresado / Fraisage / Milling / Fräsen



∅ mm	d mm	L mm	l mm	€	Z	
6,00	6	68	24	89,46	4	1
8,00	10	88	38	93,34	4	1
10,00	10	95	45	84,75	4	1
12,00	12	110	53	106,45	4	1

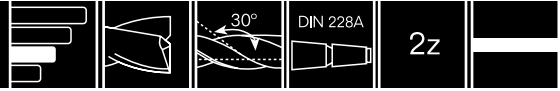
∅ mm	d mm	L mm	l mm	€	Z	
14,00	12	110	53	121,57	4	1
16,00	16	123	63	149,98	4	1
18,00	16	123	63	168,99	4	1
20,00	20	141	75	216,66	4	1



# FRESAS MANGO CÓNICO FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS / KONISCHE SCHAFTFRÄSER

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

Fresado / Fraiseage / Milling / Fräsen

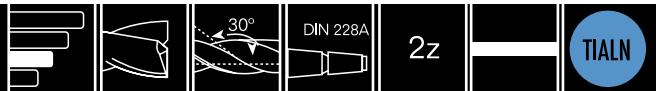


△	Ø mm	Z	€	L mm	l mm	📦
1	12,00	2	85,18	85	14	1
2	14,00	2	87,68	100	16	1
2	16,00	2	93,35	105	18	1
2	18,00	2	104,08	110	20	1
2	20,00	2	113,83	115	20	1
2	22,00	2	136,89	120	22	1
3	24,00	2	153,56	140	25	1

△	Ø mm	Z	€	L mm	l mm	📦
3	25,00	2	164,02	140	25	1
3	28,00	2	194,94	145	28	1
3	30,00	2	207,87	150	30	1
4	32,00	2	235,29	175	32	1
4	36,00	2	297,40	175	35	1
4	40,00	2	361,76	180	38	1

3144/1

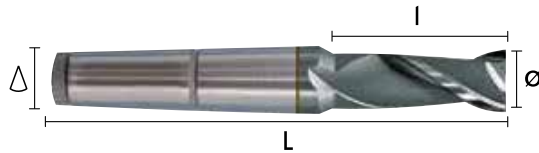
HSSE DIN 326 N



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

Fresado / Fraiseage / Milling / Fräsen



△	Ø mm	Z	€	L mm	l mm	📦
1	12,00	2	119,25	85	14	1
2	14,00	2	122,76	100	16	1
2	16,00	2	130,70	105	18	1
2	18,00	2	145,71	110	20	1
2	20,00	2	159,37	115	20	1
2	22,00	2	191,65	120	22	1
3	24,00	2	214,99	140	25	1

△	Ø mm	Z	€	L mm	l mm	📦
3	25,00	2	229,63	140	25	1
3	28,00	2	272,92	145	28	1
3	30,00	2	291,01	150	30	1
4	32,00	2	329,41	175	32	1
4	36,00	2	416,37	175	35	1
4	40,00	2	506,46	180	38	1

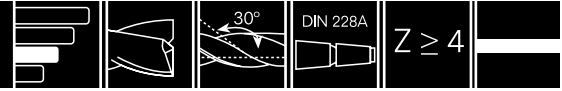
Bajo demanda / Sur commande / upon request



# FRESAS MANGO CÓNICO FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS / KONISCHE SCHAFTFRÄSER

**3145**

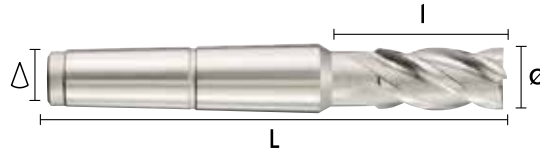
**HSSE DIN 845 N**



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

Fresado / Fraisage / Milling / Fräsen

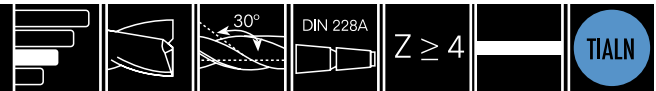


△	Ø mm	Z	€	L mm	I mm	📦
1	12,00	4	84,22	96	26	1
2	14,00	4	93,03	111	26	1
2	16,00	4	93,03	117	32	1
2	18,00	4	100,56	117	32	1
2	20,00	4	110,91	123	38	1
2	22,00	5	126,95	123	38	1
3	24,00	5	179,75	147	45	1
3	25,00	5	168,42	147	45	1

△	Ø mm	Z	€	L mm	I mm	📦
3	26,00	5	190,72	147	45	1
3	28,00	5	191,96	147	45	1
3	30,00	6	209,58	147	45	1
3	32,00	6	276,18	178	53	1
4	36,00	6	316,07	178	53	1
4	40,00	6	381,11	188	63	1
5	50,00	6	573,99	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

Fresado / Fraisage / Milling / Fräsen



△	Ø mm	Z	€	L mm	I mm	📦
1	12,00	4	117,90	96	26	1
2	14,00	4	130,23	111	26	1
2	16,00	4	130,23	117	32	1
2	18,00	4	140,78	117	32	1
2	20,00	4	155,28	123	38	1
2	22,00	5	177,73	123	38	1
3	24,00	5	251,65	147	45	1
3	25,00	5	235,79	147	45	1

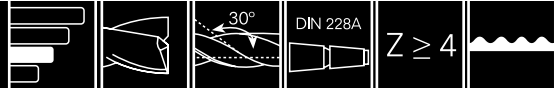
△	Ø mm	Z	€	L mm	I mm	📦
3	26,00	5	266,99	147	45	1
3	28,00	5	268,74	147	45	1
3	30,00	6	293,41	147	45	1
3	32,00	6	386,66	178	53	1
4	36,00	6	442,50	178	53	1
4	40,00	6	533,56	188	63	1
5	50,00	6	803,58	233	75	1

Bajo demanda / Sur commade / upon request

# FRESAS MANGO CÓNICO FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS / KONISCHE SCHAFTFRÄSER

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

Fresado / Fraissage / Milling / Fräsen

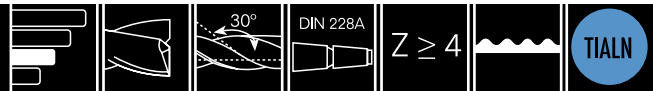


△	Ø mm	Z	€	L mm	I mm	📦
1	12,00	4	109,76	96	26	1
2	14,00	4	110,81	111	26	1
2	16,00	4	120,03	117	32	1
2	18,00	4	126,24	117	32	1
2	20,00	4	139,59	123	38	1
2	22,00	5	178,00	123	38	1
3	25,00	5	207,16	147	45	1

△	Ø mm	Z	€	L mm	I mm	📦
3	28,00	5	233,20	147	45	1
3	30,00	5	252,75	147	45	1
4	32,00	6	282,26	201	53	1
4	36,00	6	317,21	201	53	1
4	40,00	6	362,85	211	63	1
5	50,00	8	518,87	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

Fresado / Fraissage / Milling / Fräsen



△	Ø mm	Z	€	L mm	I mm	📦
1	12,00	4	153,67	96	26	1
2	14,00	4	155,13	111	26	1
2	16,00	4	168,05	117	32	1
2	18,00	4	176,73	117	32	1
2	20,00	4	195,43	123	38	1
2	22,00	5	249,18	123	38	1
3	25,00	5	290,02	147	45	1

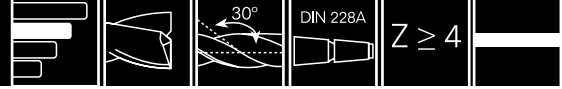
△	Ø mm	Z	€	L mm	I mm	📦
3	28,00	5	326,47	147	45	1
3	30,00	5	353,85	147	45	1
4	32,00	6	395,16	178	53	1
4	36,00	6	444,09	178	53	1
4	40,00	6	507,98	188	63	1
4	50,00	8	726,42	233	75	1

Bajo demanda / Sur commande / upon request

# FRESAS MANGO CÓNICO FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS / KONISCHE SCHAFTFRÄSER

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

Fresado / Fraisage / Milling / Fräsen

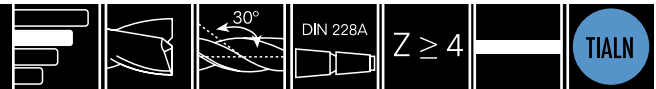


△	Ø mm	Z	€	L mm	l mm	📦
1	12,00	4	96,77	138	53	1
2	14,00	4	101,82	138	53	1
2	16,00	4	110,91	148	63	1
2	18,00	4	125,66	148	63	1
2	20,00	4	179,75	160	75	1
3	22,00	5	191,96	160	75	1
3	25,00	5	211,14	192	90	1

△	Ø mm	Z	€	L mm	l mm	📦
3	28,00	5	234,69	192	90	1
3	30,00	6	300,67	192	90	1
4	32,00	6	322,04	210	106	1
4	36,00	6	386,75	231	106	1
4	40,00	6	442,97	250	125	1
4	50,00	6	682,08	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

Fresado / Fraisage / Milling / Fräsen



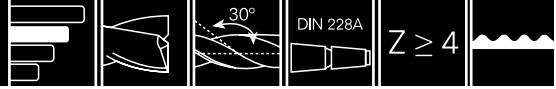
△	Ø mm	Z	€	L mm	l mm	📦
1	12,00	4	135,47	123	53	1
2	14,00	4	142,56	138	53	1
2	16,00	4	155,28	148	63	1
2	18,00	4	175,92	148	63	1
2	20,00	4	251,65	160	75	1
3	22,00	5	268,74	160	75	1
3	25,00	5	295,59	192	90	1

△	Ø mm	Z	€	L mm	l mm	📦
3	28,00	5	328,58	192	90	1
3	30,00	5	420,94	192	90	1
4	32,00	6	450,85	231	106	1
4	36,00	6	541,46	231	106	1
4	40,00	6	620,16	250	125	1
4	50,00	6	954,91	308	150	1

Bajo demanda / Sur commande / upon request

# FRESAS MANGO CÓNICO FRAISES QUEUE CONIQUE / TAPERED SHANK MILLS / KONISCHE SCHAFTFRÄSER

## 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

Fresado / Fraissage / Milling / Fräsen

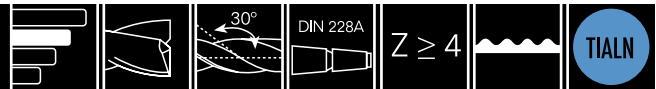


△	Ø mm	Z	€	L mm	I mm	📦
2	16,00*	4	160,84	148	63	1
2	18,00*	4	171,16	148	63	1
2	20,00	4	179,03	160	75	1
2	22,00	5	239,62	160	75	1
3	25,00	5	250,65	192	90	1
3	28,00	5	315,50	192	90	1

△	Ø mm	Z	€	L mm	I mm	📦
3	30,00	5	355,98	192	90	1
4	32,00	6	385,10	254	106	1
4	36,00	6	422,17	254	106	1
4	40,00	6	539,14	273	125	1
5	50,00	8	591,02	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

Fresado / Fraissage / Milling / Fräsen



△	Ø mm	Z	€	L mm	I mm	📦
2	20,00	4	225,18	160	75	1
2	22,00	5	243,14	160	75	1
3	25,00	5	281,56	192	90	1
3	28,00	5	340,41	192	90	1
3	30,00	5	394,18	192	90	1

△	Ø mm	Z	€	L mm	I mm	📦
4	32,00	6	441,70	254	106	1
4	36,00	6	498,37	254	106	1
4	40,00	6	539,41	273	125	1
5	50,00	8	814,44	336	150	1

Bajo demanda / Sur commande / upon request

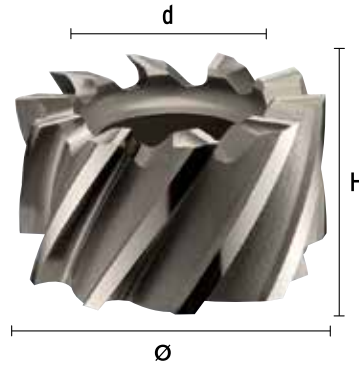
**3149** **HSSE DIN 1880 N**



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

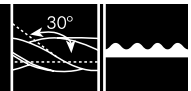
Fresado / Fraissage / Milling / Fräsen



Ø mm	Z	d mm	€	H mm	
40,00	6	16	144,85	32	1
50,00	8	22	184,30	36	1

Ø mm	Z	d mm	€	H mm	
63,00	8	27	250,46	40	1
80,00	10	27	367,49	45	1

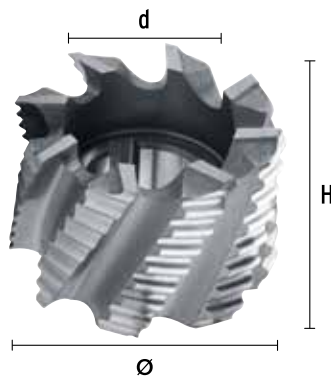
**3150** **HSSE DIN 1880 NR**



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

Fresado / Fraissage / Milling / Fräsen

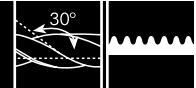


Ø mm	Z	d mm	€	H mm	
40,00	6	16	218,04	32	1
50,00	6	22	270,97	36	1

Ø mm	Z	d mm	€	H mm	
63,00	8	27	343,77	40	1
80,00	8	27	478,01	45	1



**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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	Z	d mm	€	H mm	
40,00	8	16	265,42	32	1
50,00	8	22	329,84	36	1

Ø mm	Z	d mm	€	H mm	
63,00	10	27	426,58	40	1
80,00	10	27	640,88	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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	Z	d mm	€	e mm	
63,00	18	22	163,80	4	1
63,00	18	22	154,65	5	1
63,00	18	22	146,69	6	1
63,00	18	22	156,47	8	1
63,00	18	22	165,01	10	1
80,00	20	27	146,02	4	1
80,00	20	27	184,57	5	1
80,00	20	27	188,31	6	1
80,00	20	27	193,14	8	1
80,00	20	27	211,49	10	1
80,00	20	27	232,26	12	1

Ø mm	Z	d mm	€	e mm	
100,00	24	32	224,92	6	1
100,00	24	32	246,92	8	1
100,00	24	32	272,60	10	1
100,00	24	32	301,94	12	1
100,00	24	32	349,62	14	1
125,00	24	32	352,06	6	1
125,00	24	32	363,05	8	1
125,00	24	32	381,39	10	1
125,00	24	32	443,72	12	1
125,00	24	32	470,63	14	1
125,00	24	32	410,98	16	1

**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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	Z	d mm	€	e mm	
63,00	18	22	125,31	4	1
63,00	18	22	129,14	5	1
63,00	18	22	134,60	6	1
63,00	18	22	144,87	8	1
63,00	18	22	161,73	10	1
80,00	20	27	155,82	4	1
80,00	20	27	162,42	5	1
80,00	20	27	171,42	6	1
80,00	20	27	181,94	8	1
80,00	18	27	186,53	10	1
80,00	18	27	210,08	12	1

Ø mm	Z	d mm	€	e mm	
100,00	20	32	203,42	6	1
100,00	20	32	225,95	8	1
100,00	20	32	261,95	10	1
100,00	20	32	282,45	12	1
100,00	20	32	315,11	14	1
125,00	24	32	240,24	6	1
125,00	24	32	286,05	8	1
125,00	22	32	313,52	10	1
125,00	22	32	373,94	12	1
125,00	22	32	421,36	14	1
125,00	22	32	436,82	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

Fresado / Fraiseage / Milling / Fräsen



Ø mm	Z	d mm	€	e mm	
50,00	24	16	151,69	1,6	1
50,00	24	16	147,50	2	1
50,00	24	16	150,01	2,5	1
50,00	24	16	152,53	3	1
63,00	28	22	160,73	4	1
63,00	28	22	169,40	5	1
63,00	28	22	185,96	6	1
80,00	32	27	169,61	1,6	1
80,00	32	27	164,76	2	1
80,00	32	27	167,51	2,5	1
80,00	32	27	172,12	3	1
80,00	32	27	184,45	4	1
80,00	32	27	206,65	5	1
80,00	32	27	219,24	6	1
100,00	36	32	202,91	1,6	1
100,00	36	32	201,79	2	1

Ø mm	Z	d mm	€	e mm	
100,00	36	32	201,63	2,5	1
100,00	36	32	205,25	3	1
100,00	36	32	221,30	4	1
100,00	36	32	234,58	5	1
100,00	36	32	263,56	6	1
100,00	28	32	291,32	8	1
125,00	40	32	256,62	1,6	1
125,00	40	32	246,81	2	1
125,00	40	32	252,96	2,5	1
125,00	40	32	259,10	3	1
125,00	40	32	277,58	4	1
125,00	40	32	297,13	5	1
125,00	40	32	319,25	6	1
125,00	40	32	373,23	8	1
125,00	40	32	413,67	10	1

**3152** HSSE DIN 850 D



**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

Fresado / Fraisage / Milling / Fräsen



∅ mm	d mm	L mm	l mm	€	Z	
4,50	6	50	1,00	58,73	6	1
7,50	6	50	1,50	61,14	6	1
7,50	6	50	2,00	61,14	6	1
10,50	6	50	2,00	65,80	6	1
10,50	6	50	2,50	65,80	6	1
10,50	6	50	3,00	65,80	6	1
13,50	10	56	3,00	66,84	6	1
13,50	10	56	4,00	66,84	6	1
16,50	10	56	3,00	67,46	6	1
16,50	10	56	4,00	67,46	6	1
16,50	10	56	5,00	67,46	6	1
19,50	10	63	4,00	76,80	8	1
19,50	10	63	5,00	76,80	8	1

∅ mm	d mm	L mm	l mm	€	Z	
19,50	10	63	6,00	76,80	8	1
22,50	10	63	5,00	84,42	8	1
22,50	10	63	6,00	84,42	8	1
22,50	10	63	8,00	84,42	8	1
25,50	10	63	6,00	98,47	10	1
28,50	10	63	6,00	100,21	10	1
28,50	10	63	8,00	100,21	10	1
28,50	12	71	10,00	100,21	10	1
32,50	12	71	7,00	124,16	10	1
32,50	12	71	8,00	124,16	10	1
32,50	12	71	10,00	124,16	10	1
45,50	12	71	10,00	196,57	12	1

**3153** HSSE DIN 851 N



**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

Fresado / Fraisage / Milling / Fräsen



∅ mm	d mm	L mm	l mm	€	Z	
11,00	10	53,50	4	107,95	6	1
12,50	10	57	6	112,22	6	1
16,00	10	62	8	123,42	6	1
18,00	12	70	8	129,96	8	1

∅ mm	d mm	L mm	l mm	€	Z	
21,00	12	74	9	143,18	6	1
25,00	16	82	11	161,58	8	1
32,00	16	90	14	203,26	8	1
40,00	25	108	18	282,09	10	1



**3154** HSSE DIN 851 N


DIN 228A 	ISO 1641	ToI D (d11) I (d11)
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P				M		K			N				S		H		
<800	<1.000	<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

Fresado / Fraiseage / Milling / Fräsen



∅	L	I	€	Z	
18,00	82	8	144,30	8	1
21,00	102	9	159,08	8	1
25,00	104	11	164,90	8	1
32,00	111	14	244,93	8	1

∅	L	I	€	Z	
3	40,00	18	322,79	8	1
4	50,00	22	391,99	8	1
4	60,00	28	566,35	10	1
5	72,00	35	737,73	10	1

**3155** HSSE DIN 1833 A


DIN 1835B 	ISO 3859	ToI D (js16) d (h8)
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P				M		K			N				S		H		
<800	<1.000	<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

Fresado / Fraiseage / Milling / Fräsen



∅	d	Ang °	L	I	€	Z	
16,00	12	45	60	4,00	109,56	8	1
20,00	12	45	63	5,00	116,57	8	1
25,00	12	45	67	6,30	142,11	10	1
32,00	16	45	71	8,00	158,57	12	1

∅	d	Ang °	L	I	€	Z	
16,00	12	60	60	6,30	109,56	8	1
20,00	12	60	63	8,00	116,57	8	1
25,00	12	60	67	10,00	142,11	10	1
32,00	16	60	71	12,50	158,57	12	1



3156

**HSSE DIN 1833 B**

DIN 1835B



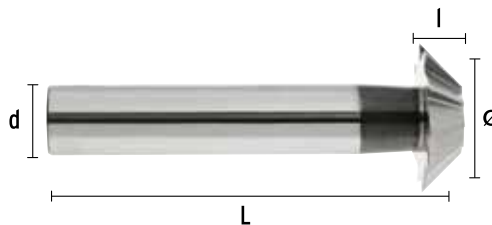
ISO 3859

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

Fresado / Fraisaige / Milling / Fräsen



Ø mm	d mm	Ang °	L mm	l mm	€	Z	
16,00	12	45	60	4,00	88,20	10	1
20,00	12	45	63	5,00	99,23	10	1
25,00	12	45	67	6,30	111,57	10	1
32,00	16	45	71	8,00	126,86	12	1

Ø mm	d mm	Ang °	L mm	l mm	€	Z	
16,00	12	60	60	6,30	88,20	10	1
20,00	12	60	63	8,00	99,23	10	1
25,00	12	60	67	10,00	111,57	10	1
32,00	16	60	71	12,50	126,86	12	1

3164

**HSSE DIN 6518 N**

DIN 1835B



Tol R (H11) dz (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

Fresado / Fraisaige / Milling / Fräsen



Ø mm	Radio mm	d mm	L mm	€	Z	
8,00	1,00	10	60	74,38	4	1
9,20	1,60	10	60	81,21	4	1
10,00	2,00	10	60	81,21	4	1
11,00	2,50	10	60	81,21	4	1
12,00	3,00	12	60	84,43	4	1
14,00	4,00	12	60	91,36	4	1
16,00	5,00	12	60	97,94	4	1
20,00	6,00	16	67	103,24	4	1
22,00	7,00	16	71	126,79	4	1
24,00	8,00	16	71	126,79	4	1

Ø mm	Radio mm	d mm	L mm	€	Z	
26,00	9,00	25	85	152,63	4	1
28,00	10,00	25	85	152,63	4	1
32,00	11,00	25	90	168,54	4	1
34,00	12,00	25	90	168,54	4	1
42,00	13,00	25	100	236,00	6	1
44,00	14,00	25	100	236,00	6	1
46,00	15,00	25	100	269,89	6	1
48,00	16,00	25	100	269,89	6	1
52,00	18,00	32	112	304,49	6	1
56,00	20,00	32	112	338,19	6	1

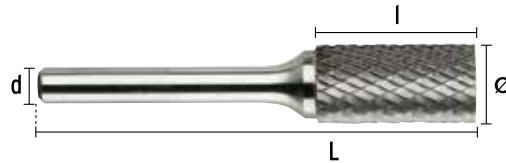
# FRESAS ROTATIVAS METAL DURO FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS / HARTMETALL-ROTATIONSFRÄSER

## 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	13,10	14,41		38	13	1
4,00	4	21,84	24,02		50	13	1
6,00	6	25,63	28,20		50	19	1
8,00	6	32,18	35,40		65	19	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	
10,00	6	35,98	39,58	39,78	65	19	1
12,00	6	51,55	56,70	56,01	70	25	1
16,00	6	64,86	71,35	81,17	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	14,24	15,66		38	13	1
4,00	4	26,12	28,73		50	13	1
6,00	6	28,39	31,23		50	19	1
8,00	6	35,98	39,58		65	19	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	
10,00	6	39,59	43,54	47,37	65	19	1
12,00	6	56,87	62,55	70,15	70	25	1
16,00	6	75,85	83,44	92,56	70	25	1



# FRESAS ROTATIVAS METAL DURO FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS / HARTMETALL-ROTATIONSFRÄSER

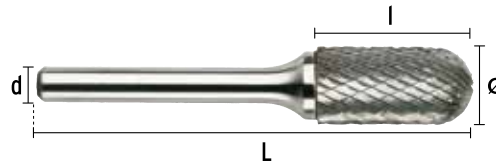
**3203**

**Cilíndrica radio / Cylindrique à rayon / Straight radius / Zylindrischer Fräser mit 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	I mm	
3,00	3	14,63	16,08		38	13	1
6,00	3	23,73	26,11		50	13	1
6,00	6	28,95	31,84		50	19	1
8,00	6	34,19	37,60		65	19	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	
10,00	6	37,97	41,76	45,95	65	19	1
12,00	6	57,90	63,70	72,20	70	25	1
16,00	6	72,06	79,27	97,76	70	25	1

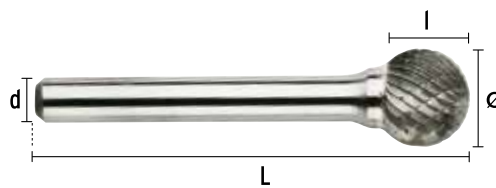
**3204**

**Esférica / Sphérique / Spherical / Kugelkopffräser**



	P				M		K			N				S		H		
	<800	<1.000	<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	I mm	
3,00	3	14,91	16,41		38	2,50	1
6,00	3	22,46	24,71		44	5,00	1
6,00	6	26,50	29,15		50	5,00	1
8,00	6	29,43	32,37		51	6,40	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	
10,00	6	30,17	33,18	41,30	53	8,00	1
12,00	6	40,66	44,73	53,07	56	11,00	1
16,00	6	54,98	60,48	66,37	59	14,00	1
19,00	6	73,10	80,40		61	16,00	1

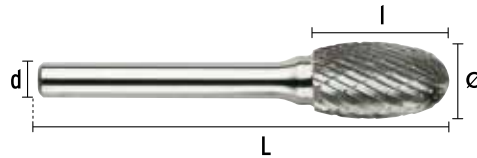
**FRESAS ROTATIVAS METAL DURO**  
**FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS /**  
**HARTMETALL-ROTATIONSFRÄSER**

**3205** **Oval / Ovale / Ovalfräser**



	P				M		K			N				S		H		
	<800	<1.000	<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	Icon
3,00	3	16,13	17,76		38	6	1
6,00	3	23,27	31,16		47	10	1
8,00	6	32,18	35,40		58	13	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
10,00	6	36,68	40,34		60	16	1
12,00	6	49,27	54,21		67	22	1
16,00	6	73,96	81,34		70	25	1

**3206** **Árbol con radio / Arbre à rayon / Arc with radius / Welle mit 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	Icon
3,00	3	18,01	19,81		38	13	1
6,00	3	23,73	26,11		50	13	1
10,00	6	42,19	46,41	47,37	65	19	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
12,00	6	56,00	61,60	68,07	70	25	1
16,00	6	73,39	80,73	94,85	70	25	1



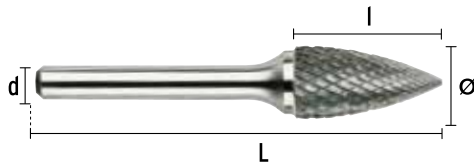
# FRESAS ROTATIVAS METAL DURO FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS / HARTMETALL-ROTATIONSFRÄSER

## 3207 Árbol / Arbre / Arc / Welle



	P				M		K			N				S		H		
	<800	<1.000	<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	I mm	Icon
3,00	3	17,00	18,70		38	13	1
6,00	3	24,60	27,06		50	13	1
6,00	6	30,28	33,32		50	16	1

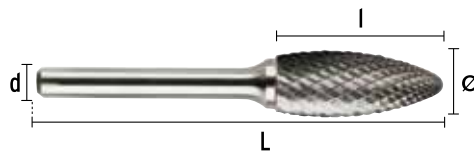
Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	Icon
10,00	6	40,80	44,88		65	19	1
12,00	6	52,22	57,43		70	25	1
16,00	6	72,57	79,82		70	25	1

## 3208 Llama / Flamme / Flame / Flamme



	P				M		K			N				S		H		
	<800	<1.000	<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	I mm	Icon
3,00	3	18,43	20,28		38	6	1
6,00	6	31,33	34,46		50	13	1

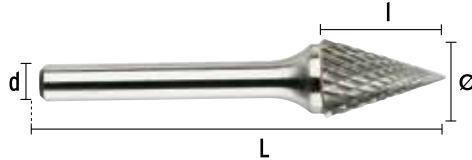
Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	Icon
8,00	6	35,94	39,54		65	19	1
12,00	6	72,81	80,09		77	32	1

**FRESAS ROTATIVAS METAL DURO**  
**FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS /**  
**HARTMETALL-ROTATIONSFRÄSER**

**3209** Cónica / Conique / Tapered / Kegelfräser

	P				M		K			N				S		H		
	<800	<1.000	<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



∅ mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
3,00	3	16,50	18,16		38	11	1
6,00	6	26,73	29,40		50	19	1

∅ mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
10,00	6	35,94	39,54		61	16	1
12,00	6	50,68	55,75		67	25	1

**3210** Cónica 90° / Conique 90° / Tapered 90° / Kegelfräser 90°

	P				M		K			N				S		H		
	<800	<1.000	<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



∅ mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
10,00	6	31,84	35,03		50	5	1
16,00	6	51,53	56,68		53	8	1

**FRESAS ROTATIVAS METAL DURO**  
**FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS /**  
**HARTMETALL-ROTATIONSFRÄSER**

**3211** Cónica radio / Conique à rayon / Tapered radius / Kegelfräser mit 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	●	●	○		●	○	●	●			●	●		○	●			
DIAM	○	●	●	●	○	●	●	●	●		○		○	●	●	●	●	
ALU									●	●	○	●						

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



Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	Icon
3,00	3	18,07	19,88		38	10	1
6,00	6	30,96	34,06		50	16	1
10,00	6	45,99	50,59	55,78	72	27	1

Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	Icon
12,00	6	54,45	59,90	65,90	73	28	1
16,00	6	86,55	95,20	132,46	78	33	1

**3212** Cono invertido / Cône inversé / Inverted taper / Umgekehrter Kegel



	P				M		K			N				S		H		
	<800	<1.000	<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	●	●	○		●	○	●	●			●	●		○	●			
DIAM	○	●	●	●	○	●	●	●	●		○		○	●	●	●	●	
ALU										●	●	○	●					

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



Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	I mm	Icon
3,00	3	19,33	21,27		38	4	1
6,00	6	28,01	30,81		50	8	1



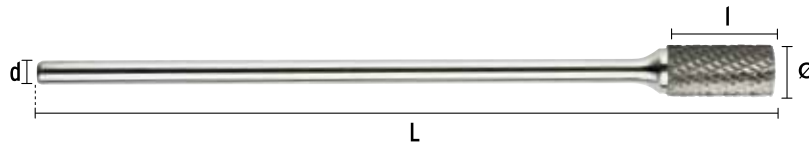
**FRESAS ROTATIVAS METAL DURO**  
**FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS /**  
**HARTMETALL-ROTATIONSFRÄSER**

**3214** Cilíndrica L / Cylindrique L / Straight L / Zylindrischer Fräser 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	Icon
10,00	6	45,99	50,59		169	19	1

**3215** Cilíndrica con corte L / Cylindrique taillée L / Straight with L cut / Zylindrischer Fräser mit Schneidvorrichtung in 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	Icon
6,00	6	39,64	43,61		162	16	1

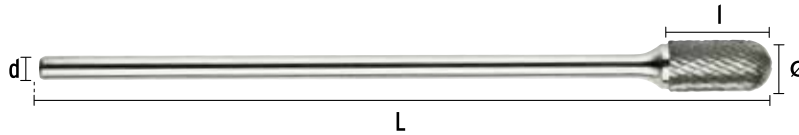
**FRESAS ROTATIVAS METAL DURO**  
**FRAISES ROTATIVES CARBURE / HARD METAL ROTARY MILLS /**  
**HARTMETALL-ROTATIONSFRÄSER**

**3216** Cilíndrica radio L / Cylindrique à rayon L / Straight L radius / Zylindrischer Fräser mit 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	●	●	○		●	○	●	●			●	○		○	●			
DIAM	○	●	●	●	○	○	●	●	●		○		○	●	●	●	●	
ALU									●	●	○	●						

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



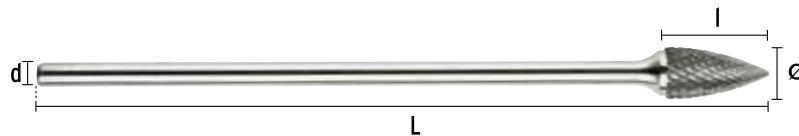
∅ mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Box
10,00	6	54,38	59,82		169	19	1
12,00	6	72,24	79,46		175	25	1

**3217** Árbol L / Arbre L / L Arc / L-Welle



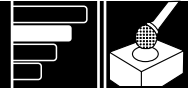
	P				M		K			N				S		H		
	<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
CRUZ	●	●	○		●	○	●	●			●	○		○	●			
DIAM	○	●	●	●	○	○	●	●	●		○		○	●	●	●	●	
ALU									●	●	○	●						

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



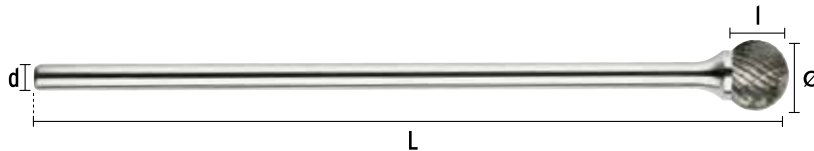
∅ mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Box
12,00	6	71,79	78,97		175	25	1

**3218** **Esférica L / Sphérique L / L Spherical / Kugelkopffräser 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	●	●	○		●	○	●	●			●	●		○	●			
DIAM	○	●	●	●	○	●	●	●	●		○		○	●	●	●	●	
ALU										●	●	○	●					

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



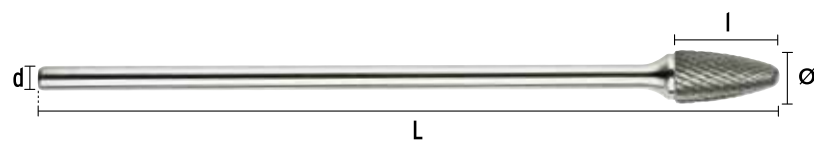
Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
12,00	6	56,69	62,35		161	11	Icon

**3219** **Árbol con radio L / Arbre à rayon L / L Radius arc / Welle mit 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	●	●	○		●	○	●	●			●	●		○	●			
DIAM	○	●	●	●	○	●	●	●	●		○		○	●	●	●	●	
ALU										●	●	○	●					

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



Ø mm	d mm	CRUZ €	DIAM €	ALU €	L mm	l mm	Icon
12,00	6	78,96	78,58		175	25	Icon



# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

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	35,06	1
13,00	19	30	35,06	1
14,00	19	30	35,97	1
15,00	19	30	37,43	1
16,00	19	30	38,74	1
17,00	19	30	40,22	1
18,00	19	30	45,22	1
19,00	19	30	46,12	1
20,00	19	30	48,01	1
21,00	19	30	51,41	1
22,00	19	30	53,64	1
23,00	19	30	55,51	1
24,00	19	30	57,60	1
25,00	19	30	59,55	1
26,00	19	30	61,22	1
27,00	19	30	66,02	1
28,00	19	30	66,09	1
29,00	19	30	68,52	1
30,00	19	30	70,27	1
31,00	19	30	76,66	1
32,00	19	30	86,26	1
33,00	19	30	87,44	1
34,00	19	30	101,91	1
35,00	19	30	112,35	1
36,00	19	30	115,13	1

Ø mm	d mm	L mm	€	📦
37,00	19	30	121,74	1
38,00	19	30	123,48	1
39,00	19	30	128,14	1
40,00	19	30	131,27	1
41,00	19	30	136,62	1
42,00	19	30	144,00	1
43,00	19	30	147,13	1
44,00	19	30	157,56	1
45,00	19	30	162,71	1
46,00	19	30	166,05	1
47,00	19	30	171,61	1
48,00	19	30	179,75	1
49,00	19	30	182,47	1
50,00	19	30	186,98	1
51,00	19	30	188,10	1
52,00	19	30	189,36	1
53,00	19	30	190,60	1
54,00	19	30	193,87	1
55,00	19	30	197,84	1
56,00	19	30	202,15	1
57,00	19	30	206,33	1
58,00	19	30	210,78	1
59,00	19	30	215,30	1
60,00	19	30	219,26	1

# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

7172

HSS

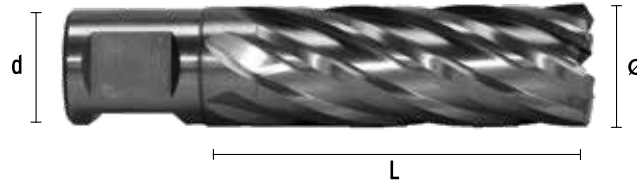
L=50



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	54,33	1
13,00	19	50	55,44	1
14,00	19	50	57,94	1
15,00	19	50	58,30	1
16,00	19	50	58,50	1
17,00	19	50	60,17	1
18,00	19	50	66,72	1
19,00	19	50	68,79	1
20,00	19	50	72,07	1
21,00	19	50	77,22	1
22,00	19	50	79,79	1
23,00	19	50	85,08	1
24,00	19	50	87,79	1
25,00	19	50	88,08	1
26,00	19	50	90,37	1
27,00	19	50	94,54	1
28,00	19	50	98,64	1
29,00	19	50	102,75	1
30,00	19	50	107,27	1
31,00	19	50	112,48	1
32,00	19	50	117,63	1
33,00	19	50	123,48	1
34,00	19	50	128,14	1
35,00	19	50	133,42	1
36,00	19	50	139,55	1

Ø mm	d mm	L mm	€	📦
37,00	19	50	141,78	1
38,00	19	50	147,13	1
39,00	19	50	157,56	1
40,00	19	50	169,11	1
41,00	19	50	170,91	1
42,00	19	50	180,31	1
43,00	19	50	185,81	1
44,00	19	50	190,88	1
45,00	19	50	220,24	1
46,00	19	50	236,38	1
47,00	19	50	252,24	1
48,00	19	50	260,38	1
49,00	19	50	262,94	1
50,00	19	50	264,27	1
51,00	19	50	264,83	1
52,00	19	50	266,16	1
53,00	19	50	267,68	1
54,00	19	50	272,69	1
55,00	19	50	276,45	1
56,00	19	50	278,11	1
57,00	19	50	284,65	1
58,00	19	50	286,10	1
59,00	19	50	290,92	1
60,00	19	50	293,69	1

# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

**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	48,18	1
13,00	19	30	48,18	1
14,00	19	30	48,18	1
15,00	19	30	55,58	1
16,00	19	30	59,13	1
17,00	19	30	60,77	1
18,00	19	30	64,19	1
19,00	19	30	67,88	1
20,00	19	30	71,31	1
21,00	19	30	75,03	1
22,00	19	30	78,45	1
23,00	19	30	80,93	1
24,00	19	30	84,37	1
25,00	19	30	88,05	1
26,00	19	30	89,99	1
27,00	19	30	91,58	1
28,00	19	30	94,84	1
29,00	19	30	98,38	1
30,00	19	30	101,63	1
31,00	19	30	114,69	1
32,00	19	30	118,24	1

Ø mm	d mm	L mm	€	📦
33,00	19	30	134,30	1
34,00	19	30	138,20	1
35,00	19	30	142,42	1
36,00	19	30	146,32	1
37,00	19	30	150,56	1
38,00	19	30	154,46	1
39,00	19	30	158,69	1
40,00	19	30	162,59	1
41,00	19	30	166,82	1
42,00	19	30	170,72	1
43,00	19	30	174,95	1
44,00	19	30	178,84	1
45,00	19	30	183,07	1
46,00	19	30	186,98	1
47,00	19	30	191,20	1
48,00	19	30	195,11	1
49,00	19	30	199,34	1
50,00	19	30	203,24	1
55,00	19	30	223,72	1
60,00	19	30	243,88	1

# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

**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	58,53	1
13,00	19	50	63,41	1
14,00	19	50	68,29	1
15,00	19	50	73,17	1
16,00	19	50	78,05	1
17,00	19	50	82,93	1
18,00	19	50	87,80	1
19,00	19	50	92,69	1
20,00	19	50	97,55	1
21,00	19	50	102,43	1
22,00	19	50	107,30	1
23,00	19	50	112,19	1
24,00	19	50	117,07	1
25,00	19	50	121,95	1
26,00	19	50	126,83	1
27,00	19	50	131,72	1
28,00	19	50	136,58	1
29,00	19	50	141,45	1
30,00	19	50	146,32	1
31,00	19	50	151,21	1
32,00	19	50	156,09	1
33,00	19	50	160,97	1
34,00	19	50	165,85	1
35,00	19	50	170,72	1
36,00	19	50	175,60	1

Ø mm	d mm	L mm	€	☐
37,00	19	50	180,48	1
38,00	19	50	185,35	1
39,00	19	50	190,24	1
40,00	19	50	195,11	1
41,00	19	50	199,99	1
42,00	19	50	204,87	1
43,00	19	50	209,74	1
44,00	19	50	214,62	1
45,00	19	50	219,49	1
46,00	19	50	224,37	1
47,00	19	50	229,26	1
48,00	19	50	234,13	1
49,00	19	50	239,02	1
50,00	19	50	243,88	1
51,00	19	50	248,77	1
52,00	19	50	253,64	1
53,00	19	50	258,51	1
54,00	19	50	263,39	1
55,00	19	50	268,28	1
56,00	19	50	273,15	1
57,00	19	50	278,04	1
58,00	19	50	282,90	1
59,00	19	50	287,79	1
60,00	19	50	292,67	1

# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

**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	€	Icon
20,00	19	110	154,86	1
22,00	19	110	161,48	1
24,00	19	110	170,49	1
25,00	19	110	176,96	1
26,00	19	110	192,67	1
28,00	19	110	208,11	1

Ø mm	d mm	L mm	€	Icon
30,00	19	110	221,18	1
32,00	19	110	238,36	1
35,00	19	110	253,37	1
40,00	19	110	341,44	1
45,00	19	110	429,49	1
50,00	19	110	502,49	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	€	Icon
12,00	19	30	88,39	1
13,00	19	30	88,39	1
14,00	19	30	88,39	1
15,00	19	30	92,08	1
16,00	19	30	92,08	1
17,00	19	30	99,23	1
18,00	19	30	102,90	1
19,00	19	30	104,98	1
20,00	19	30	109,13	1
21,00	19	30	116,94	1
22,00	19	30	122,01	1
23,00	19	30	126,39	1
24,00	19	30	130,98	1
25,00	19	30	136,05	1
26,00	19	30	141,13	1

Ø mm	d mm	L mm	€	Icon
27,00	19	30	145,97	1
28,00	19	30	150,56	1
29,00	19	30	155,40	1
30,00	19	30	159,78	1
31,00	19	30	174,51	1
32,00	19	30	186,95	1
33,00	19	30	198,92	1
34,00	19	30	211,10	1
35,00	19	30	218,24	1
36,00	19	30	229,76	1
37,00	19	30	248,63	1
38,00	19	30	260,15	1
39,00	19	30	271,65	1
40,00	19	30	280,87	1



# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

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	€	Icon
12,00	19	50	118,09	1
13,00	19	50	118,09	1
14,00	19	50	118,09	1
15,00	19	50	128,24	1
16,00	19	50	137,21	1
17,00	19	50	142,28	1
18,00	19	50	152,86	1
19,00	19	50	156,77	1
20,00	19	50	164,84	1
21,00	19	50	177,03	1
22,00	19	50	182,79	1
23,00	19	50	189,01	1
24,00	19	50	195,00	1
25,00	19	50	201,22	1
26,00	19	50	206,95	1
27,00	19	50	216,40	1

Ø mm	d mm	L mm	€	Icon
28,00	19	50	225,83	1
29,00	19	50	237,12	1
30,00	19	50	246,33	1
31,00	19	50	257,83	1
32,00	19	50	262,45	1
33,00	19	50	273,96	1
34,00	19	50	283,18	1
35,00	19	50	294,69	1
36,00	19	50	303,88	1
37,00	19	50	317,70	1
38,00	19	50	326,91	1
39,00	19	50	336,13	1
40,00	19	50	354,54	1
45,00	19	50	421,32	1
50,00	19	50	534,09	1



# FRESAS HUECAS MÁQUINAS ELECTROMAGNÉTICAS FRAISES A TROU ELECTROMAGNETIQUES / ELECTROMAGNETICS HOLE SAWS / HOHLFRÄSER ELEKTROMAGNETISCHE MASCHINEN

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	€	Icon
18,00	19	35	178,38	1
19,00	19	35	178,38	1
20,00	19	35	178,38	1
21,00	19	35	178,38	1
22,00	19	35	181,56	1
23,00	19	35	181,56	1
24,00	19	35	183,12	1
25,00	19	35	183,12	1
26,00	19	35	185,02	1

Ø mm	d mm	L mm	€	Icon
27,00	19	35	185,02	1
28,00	19	35	185,02	1
29,00	19	35	185,02	1
30,00	19	35	189,75	1
31,00	19	35	189,75	1
32,00	19	35	189,75	1
33,00	19	35	189,75	1
34,00	19	35	189,75	1
35,00	19	35	204,59	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	€	Icon
18,00	19	50	191,34	1
19,00	19	50	191,34	1
20,00	19	50	191,34	1
21,00	19	50	191,34	1
22,00	19	50	194,80	1
23,00	19	50	194,80	1
24,00	19	50	196,38	1
25,00	19	50	196,38	1
26,00	19	50	197,97	1
27,00	19	50	197,97	1
28,00	19	50	197,97	1
29,00	19	50	197,97	1
30,00	19	50	203,01	1
31,00	19	50	203,01	1
32,00	19	50	203,01	1
33,00	19	50	203,01	1
34,00	19	50	203,01	1

Ø mm	d mm	L mm	€	Icon
35,00	19	50	217,53	1
36,00	19	50	217,53	1
37,00	19	50	217,53	1
38,00	19	50	217,53	1
39,00	19	50	217,53	1
40,00	19	50	245,64	1
41,00	19	50	245,64	1
42,00	19	50	245,64	1
43,00	19	50	245,64	1
44,00	19	50	245,64	1
45,00	19	50	245,64	1
46,00	19	50	325,20	1
47,00	19	50	325,20	1
48,00	19	50	325,20	1
49,00	19	50	325,20	1
50,00	19	50	325,20	1

**Accesorios / Accessoires / Accessories / Zubehörteil**

**7140** Cono Morse / Cône Morse / Morse Taper / Morsekegel



Δ	€	L mm
Nº 2	340,14	180
Nº 3	340,14	185

**7141** Punzon / Poinçon / Puncher / Stanzer



Ref.	€	Ø mm	L mm	L Fresa L Fraise Cutting L
7137-7138- 7172	20,34	6,35	77	30
	20,34	6,35	87	35
	20,34	6,35	102	50
	25,67	8,00	160	110
7139	20,34	8,00	87	35
	20,34	8,00	102	50

**7158** Adaptador para Taladros Fein / Adapteur pour perceuses Fein / Adaptor for Fein drills / Adapter für fein bomber



€	112,28
---	--------



**3138** > **Ø 4 a 12 mm**

Ø  
mm  
4-5-6  
8-10-12

2z

3110/1

3110



REF	€
HSS E	136,25
HSS E TIALN	190,76

**3139** > **Ø 4 a 12 mm**

Ø  
mm  
6-8  
10-12

3z

3114

3114/1



REF	€
HSS E	165,39
HSS E TIALN	231,55

**3140** > **Ø 4 a 12 mm**

Ø  
mm  
4-5-6  
8-10-12

4z

3115

3115/1



REF	€
HSS E	143,90
HSS E TIALN	201,46

3220

10 PCS



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
			€	455,34

3221

5 PCS



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
			€	273,76



7168 **7 PCS**

L = 25



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
			€	440,92

7169 **7 PCS**


L = 50











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
			€	569,00



**75** YEARS  
1947-2022

**Sierras y Coronas**   
**Scies et scies Trépans**  
**Saws and Hole**  
**Sägen und Bohrkronen**

**Herps** / CUTTING  
TOOL  
EXPERTS

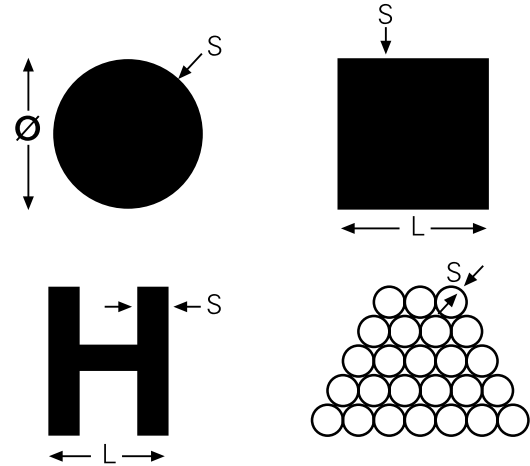
Hojas sierra cinta / Lames de scie à ruban / Band saw blades / Bandsägeblätter					
7202-7213	M42- CONSTANTE		68-69 HRC M42 (8% CO) CR CP	P M K N	444
7301-7314	M42- VARIABLE		68-69 HRC M42 (8% CO) VR VP	P M K N	445
7321-7324	M51- VARIABLE		68-69 HRC M51 (10% CO) VP 	P M K N	446
Sierras circulares / Scies circulaires / Circular saws / Kreissägen					
7801	HSS DIN1837 N		ISO 2296 Form. A Tot. Ø (q15) d (H7) Tot. I (q11) D1 (q18)	P K N	447
7802	HSS DIN1838 N		ISO 2296 Form. B Tot. Ø (q15) d (H7) Tot. I (q11) D1 (q18)	P K N	448
Hojas sierra de máquina / Lames de scie pour machine / Machine saw blades / Maschinensägeblätter					
7401	HSS DC		M2 DC 	P M K	449



**Dentado y amarre del material / Denture et fixation du matériel / Toothing and securing of material / Verzahnung und Materialaufspannung**

**> Selección del correcto dentado para el corte de tubos y perfiles.**

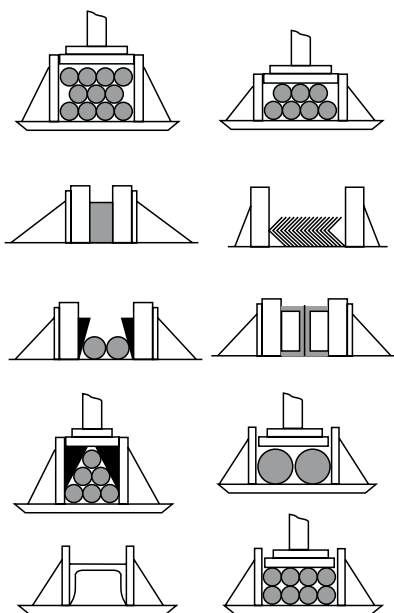
Choix de la denture appropriée pour la coupe de tubes et de profilés.  
 Select correct toothing to cut tubes and beams.  
 Wahl der richtigen Verzahnung zur Rohr- und Profilbearbeitung.



S mm	ØL mm																			
	20	40	60	80	100	120	150	200	300	400	500									
2				14					10/14											
3	14	14	14	10/14	10/14	10/14	10/14	10/14	10/14	10/14	8/12									
4																				
5																				
6		10/14	10/14	10/14	6/10	6/10	6/10	6/10	6/10	6/10	6/10									
7	10/14	8/12	8/12	6/10	6/10	6/10	6/10	6/10	6/10	4/6	4/6									
8																				
10		8/12	8/12	6/10	6/10	5/8	5/8	5/8	4/6	4/6	4/6									
12		6/10	6/10	5/8	5/8	5/8	4/6	4/6	4/6	3/4	3/4									
15																				
20			5/8	4/6	4/6	4/6	3/4	3/4	3/4	3/4	3/4									
30				4/6	3/4	3/4	3/4	3/4	3/4	3/4	3/4									
50							2/3	2/3	2/3	2/3	2/3									

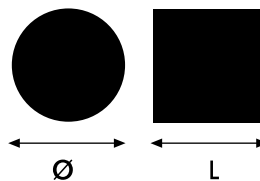
**> Selección correcta de amarre de material.**

Choix du type de fixation du matériel approprié.  
 Correct selection to secure material.  
 Richtige Wahl der Materialaufspannung.



**> Para el corte de secciones macizas.**

Pour la coupe de sections massives.  
 For cutting solid sections.  
 Für Vollprofilsschnitte.



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 / ANWENDUNGSÜBERSICHT



							7202-7213				
							Constante/ Constant				
							M42				
							444	444	444	444	444
Ref./ Réf. / Ref.											
Diente/ Dent/ Teech											
Mat.											
Pag.											
Z	10-14	6-12	4-8	3-6	2-4	10-14	6-12	4-8	3-6	2-4	
	10/14v	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	100-120	95-115	90-110	80-100	70-90	
P.2	<800	42-52	45-55	50-65	55-70	75-100	70-95	65-90	60-80	55-70	
P.3	<1000	30-39	32-42	35-45	40-52	55-75	50-70	45-65	40-60	35-55	
P.4	<1200	9-17	10-17	10-20	12-22	32-50	30-47	28-45	25-40	22-35	
P.5	<1400	5-13	5-14	5-15	6-17						
M.1	<950	14-28	15-30	17-35	19-38	27-50	25-47	22-45	20-40	18-35	
M.2		14-28	15-30	17-35	19-38	27-50	25-47	22-45	20-40	18-35	
M.3	<1200	5-14	5-15	5-17	6-19						
M.4		5-14	5-15	5-17	6-19						
K.1	<500	26-33	28-36	30-40	35-45	60-85	57-82	55-80	50-70	45-60	
K.2		26-33	28-36	30-40	35-45	60-85	57-82	55-80	50-70	45-60	
K.3	<800	30-37	32-43	35-45	40-50	50-80	47-70	45-65	40-60	35-55	
K.4.1		30-37	32-43	35-45	40-50	50-80	47-70	45-65	40-60	35-55	
K.4.2	<1400	11-18	12-20	13-22	15-25						
N.1.1	Al	90-110	95-120	110-135	120-150	175-230	170-225	165-220	150-200	135-180	
N.1.2		90-110	95-120	110-135	120-150	120-175	115-170	110-165	100-150	90-135	
N.1.3		52-90	55-95	75-110	70-120	100-120	95-115	90-110	80-100	70-90	
N.2.1	Cu	90-105	95-112	110-125	120-140	120-145	115-140	110-135	100-120	90-115	
N.2.2		75-83	80-88	90-100	100-110	100-120	95-115	90-110	80-100	70-90	
N.2.3		50-60	52-65	60-70	65-80	75-100	70-95	65-90	60-80	55-70	
N.2.4		15-26	16-28	18-30	20-35	40-60	37-57	35-55	30-50	25-45	
N.3.1	Mg/Zn	42-52	45-55	50-60	55-70	75-105	70-100	65-95	60-90	55-80	
N.4.1	Plastic	90-110	95-120	110-135	120-150	120-175	115-170	110-165	100-150	90-135	
N.4.2		52-90	55-95	75-110	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

7301-7314					7321-7324				
Variable					Variable				
M42					M51				
445	445	445	445	445	446	446	446	446	446
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	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	○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 70-90
● 75-100	● 70-95	● 65-90	● 60-80	● 55-70	○ 75-100	○ 70-95	○ 65-90	○ 60-80	○ 55-70
● 55-75	● 50-70	● 45-65	● 40-60	● 35-55	○ 55-75	○ 50-70	○ 45-65	○ 40-60	○ 35-55
○ 32-50	○ 30-47	○ 28-45	○ 25-40	○ 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
○ 18-30	○ 18-30	○ 17-28	○ 15-25	○ 13-22	○ 18-30	○ 18-30	○ 17-28	○ 15-25	○ 13-22
○ 18-30	○ 18-30	○ 17-28	○ 15-25	○ 13-22	○ 18-30	○ 18-30	○ 17-28	○ 15-25	○ 13-22
○ 60-85	○ 57-82	○ 55-80	○ 50-70	○ 45-60	○ 60-85	○ 57-82	○ 55-80	○ 50-70	○ 45-60
○ 60-85	○ 57-82	○ 55-80	○ 50-70	○ 45-60	○ 60-85	○ 57-82	○ 55-80	○ 50-70	○ 45-60
○ 50-80	○ 47-70	○ 45-65	○ 40-60	○ 35-55	○ 50-80	○ 47-70	○ 45-65	○ 40-60	○ 35-55
○ 50-80	○ 47-70	○ 45-65	○ 40-60	○ 35-55	○ 50-80	○ 47-70	○ 45-65	○ 40-60	○ 35-55
					○ 32-50	○ 30-47	○ 28-45	○ 25-40	○ 22-35
○ 175-230	○ 170-225	○ 165-220	○ 150-200	○ 135-180	○ 175-230	○ 170-225	○ 165-220	○ 150-200	○ 135-180
○ 120-175	○ 115-170	○ 110-165	○ 100-150	○ 90-135	○ 120-175	○ 115-170	○ 110-165	○ 100-150	○ 90-135
○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 70-90	○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 70-90
○ 120-145	○ 115-140	○ 110-135	○ 100-120	○ 90-115	○ 120-145	○ 115-140	○ 110-135	○ 100-120	○ 90-115
○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 70-90	○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 70-90
● 75-100	● 70-95	● 65-90	● 60-80	● 55-70	○ 75-100	○ 70-95	○ 65-90	○ 60-80	○ 55-70
● 40-60	● 37-57	● 35-55	● 30-50	● 25-45	○ 40-60	○ 37-57	○ 35-55	○ 30-50	○ 25-45
○ 75-105	○ 70-100	○ 65-95	○ 60-90	○ 55-80	○ 75-105	○ 70-100	○ 65-95	○ 60-90	○ 55-80
○ 120-175	○ 115-170	○ 110-165	○ 100-150	○ 90-135	○ 120-175	○ 115-170	○ 110-165	○ 100-150	○ 90-135
○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 70-90	○ 100-120	○ 95-115	○ 90-110	○ 80-100	○ 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



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

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.		447	448
Mat.		fz mm	Vc (m/min)
P.1	<600	0,03-0,06	● 25-50
P.2	<800	0,03-0,04	● 15-30
P.3	<1000	0,02-0,03	● 10-20
P.4	<1200	0,01-0,03	○ 5-10
P.5	<1400		
M.1	<950	0,01-0,03	○ 10-20
M.2		0,01-0,03	○ 10-20
M.3	<1200	0,01-0,03	○ 5-10
M.4		0,01-0,03	○ 5-10
K.1	<500	0,04-0,05	● 15-30
K.2		0,04-0,05	● 15-30
K.3	<800	0,03-0,04	○ 10-20
K.4.1		0,03-0,04	○ 10-20
K.4.2	<1400		
N.1.1	Al	0,04-0,09	● 1000-2000
N.1.2		0,03-0,06	● 500-1000
N.1.3		0,03-0,04	● 120-200
N.2.1	Cu	0,04-0,06	● 100-400
N.2.2		0,04-0,06	● 100-400
N.2.3		0,04-0,06	● 40-120
N.2.4		0,01-0,03	○ 10-20
N.3.1	Mg/Zn	0,04-0,06	○ 40-120
N.4.1	Plastic	0,04-0,09	○ 500-1000
N.4.2		0,04-0,09	○ 500-1000
N.4.3			
S.1.1	Ni	0,03-0,04	○ 20-30
S.1.2			
S.2.1	Ti	0,01-0,03	○ 10-20
S.2.2		0,03-0,04	○ 10-20
S.2.3			
H.1	50 HRC		
H.2	55 HRC		
H.3	60 HRC		

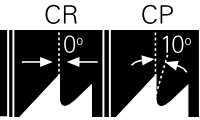
● Optima / Optimun ○ Alternativo / Alternative

**7202-7213**

**M42 Dentado constante**  
M42 Denture constant / M42 Constant tooth / M42 Konstante Verzahnung

68-69 HRC

M42 (8% 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		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.								€ m	€ soldadura soudure welding		
			1,25	2	3	4	6	8	10	14			18	
*7202	6,00	0,90					CP		CP		CR	CR	18,74	10,65
*7204	10,00	0,90				CP		CP			CR	CR	18,74	10,65
7205	13,00	0,65				CP					CR	CR	17,21	10,65
7206	13,00	0,90			CP	CP					CR	CR	17,21	10,65
7207	20,00	0,90			CP							CR	19,68	10,65
7208	27,00	0,90		CP	CP	CP-CR		CR				CR	20,26	10,65
7209	34,00	1,10	CP										28,14	14,01
7210	41,00	1,30	CP	CP	CP								35,20	17,70
7212	54,00	1,60	CP										51,57	29,81
7213	67,00	1,60	CP										87,84	54,97

\* Se vende sólo en rollos de 30 m.  
Vendu uniquement en rouleaux de 30 m.  
Only sold in 30 m rolls.

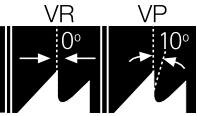
A x e mm	L	€	📦	A x e mm	L	€	📦	A x e mm	L	€	📦			
13x0,65	1.138	30,24	3	27x0,90	2.550	60,85	1	34x1,10	4.870	109,28	1			
	1.140	30,27	3		2.000	51,16	1		5.000	111,91	1			
	1.300	33,02	3		2.060	52,36	1		3.180	103,54	1			
	1.325	33,45	3		2.070	52,57	1		3.420	110,30	1			
	1.330	33,55	3		2.080	52,77	1		3.505	112,69	1			
	1.440	35,44	3		2.150	54,19	1		3.660	117,06	1			
	1.470	35,96	3		2.352	58,28	1		3.720	118,74	1			
	1.638	38,85	3		2.360	58,45	1		3.800	121,00	1			
	1.640	38,88	3		2.370	58,64	1		4.100	129,45	1			
	1.735	40,51	3		2.420	59,66	1		4.115	129,86	1			
13x0,90	1.140	30,27	3	27x0,90	2.480	60,87	1	34x1,10	4.640	144,65	1			
	1.325	33,45	3		2.500	61,28	1		4.800	149,14	1			
	1.330	33,55	3		2.550	62,30	1		4.860	150,84	1			
	1.638	38,85	3		2.600	63,30	1		4.990	154,50	1			
	1.640	38,88	3		2.650	64,32	1		5.270	162,37	1			
	1.735	40,51	3		2.700	65,34	1		5.300	163,22	1			
	1.750	40,77	3		2.750	66,35	1		5.550	170,26	1			
	2.000	45,08	3		2.755	66,45	1		5.620	172,23	1			
	20x0,90	2.000	50,03		1	27x0,90	2.765		66,64	1	34x1,10	5.800	177,31	1
		2.060	51,21		1		2.825		67,86	1		6.000	182,93	1
2.070		51,41	1	2.835	68,06		1	41x1,30	4.100	162,01		1		
2.080		51,61	1	2.845	68,26		1		4.520	176,80		1		
2.090		51,80	1	2.850	68,37		1		4.570	178,56		1		
2.100		52,00	1	2.895	69,27		1		5.300	204,25		1		
2.110		52,21	1	2.945	70,29		1		5.500	211,29		1		
2.115		52,30	1	2.950	70,39		1		5.550	213,05		1		
2.120		52,39	1	2.960	70,60		1		5.800	221,86		1		
2.140		52,79	1	3.010	71,61		1		6.000	228,89		1		
2.265		55,25	1	3.100	73,43		1		6.200	235,93		1		
2.360		57,12	1	3.180	75,05		1		6.300	239,45		1		
2.362		57,17	1	3.420	79,91		1		6.600	250,01		1		
2.370		57,32	1	3.505	81,63		1		6.700	253,53		1		
2.375		57,42	1	3.660	84,77		1		6.900	260,58		1		
2.400	57,91	1	3.800	87,61	1	7.000	264,09		1					
2.465	59,19	1	4.100	93,68	1	6x0,90	30 M		562,35	1				
2.520	60,27	1	4.250	96,73	1		10x0,90	30 M	562,35	1				
2.530	60,47	1	4.570	103,20	1									

7301-7314

**M42 Dentado variable**  
M42 Denture variable / M42 Variable tooth / M42 Variable Verzahnung

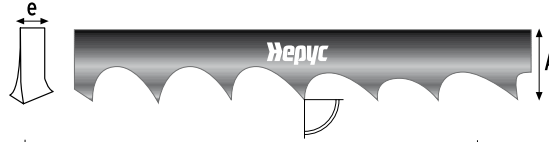
68-69 HRC

M42 (8% 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		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.										€	soldadura soudure welding		
			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				
7302*	6,00	0,90												VR	18,74	10,65
7304*	10,00	0,90												VR	18,74	10,65
7305	13,00	0,65												VR	17,21	10,65
7306	13,00	0,90												VR	17,21	10,65
7307	20,00	0,90												VR	19,68	10,65
7308	27,00	0,90						VP	VP-VR	VP-VR	VP-VR		VR	VR	20,26	10,65
7309	34,00	1,10						VP	VP-VR	VP-VR	VP-VR		VR	VR	28,17	14,01
7310	41,00	1,30						VP	VP	VP-VR	VP-VR	VP-VR			35,20	17,70
7311	54,00	1,30						VP	VP	VP-VR					51,57	29,81
7312	54,00	1,60	VP	VP	VP	VP	VP								51,57	29,81
7313	67,00	1,60	VP	VP	VP	VP									87,84	54,97
7314	80,00	1,60	VP												102,82	91,65

\* Se vende sólo en rollos de 30m. / Vendu uniquement en rouleaux de 30 m.  
Only sold in 30 m rolls. / Nur in 30 m-Rollen erhältlich.

A x e mm	L	€	📦	A x e mm	L	€	📦	A x e mm	L	€	📦
13x0,65	1.138	30,24	3		2.550	60,85	1		4.870	109,28	1
	1.140	30,27	3	27x0,90	2.000	51,16	1		5.000	111,91	1
	1.300	33,02	3		2.060	52,36	1	34x1,10	3.180	103,57	1
	1.325	33,45	3		2.070	52,57	1		3.420	110,34	1
	1.330	33,55	3		2.080	52,77	1		3.505	112,72	1
	1.440	35,44	3		2.150	54,19	1		3.660	117,10	1
	1.470	35,96	3		2.352	58,28	1		3.720	118,78	1
	1.638	38,85	3		2.360	58,45	1		3.800	121,04	1
	1.640	38,88	3		2.370	58,64	1		4.100	129,49	1
	1.735	40,51	3		2.420	59,66	1		4.115	129,91	1
	1.750	40,77	3		2.450	60,27	1		4.520	141,32	1
	2.000	45,08	3		2.460	60,47	1		4.570	142,72	1
13x0,90	1.140	30,27	3		2.480	60,87	1		4.640	144,69	1
	1.325	33,45	3		2.500	61,28	1		4.800	149,20	1
	1.330	33,55	3		2.550	62,30	1		4.860	150,89	1
	1.638	38,85	3		2.600	63,30	1		4.990	154,55	1
	1.640	38,88	3		2.650	64,32	1		5.270	162,45	1
	1.735	40,51	3		2.700	65,34	1		5.300	163,29	1
	1.750	40,77	3		2.750	66,35	1		5.550	170,32	1
	2.000	45,08	3		2.755	66,45	1		5.620	172,29	1
20x0,90	2.000	50,03	1		2.765	66,64	1		5.800	177,37	1
	2.060	51,21	1		2.825	67,86	1		6.000	183,00	1
	2.070	51,41	1		2.835	68,06	1	41x1,30	4.100	162,01	1
	2.080	51,61	1		2.845	68,26	1		4.520	176,80	1
	2.090	51,80	1		2.850	68,37	1		4.570	178,56	1
	2.100	52,00	1		2.895	69,27	1		5.300	204,25	1
	2.110	52,21	1		2.945	70,29	1		5.500	211,29	1
	2.115	52,30	1		2.950	70,39	1		5.550	213,05	1
	2.120	52,39	1		2.960	70,60	1		5.800	221,86	1
	2.140	52,79	1		3.010	71,61	1		6.000	228,89	1
	2.265	55,25	1		3.100	73,43	1		6.200	235,93	1
	2.360	57,12	1		3.180	75,05	1		6.300	239,45	1
	2.362	57,17	1		3.420	79,91	1		6.600	250,01	1
	2.370	57,32	1		3.505	81,63	1		6.700	253,53	1
	2.375	57,42	1		3.660	84,77	1		6.900	260,58	1
	2.400	57,91	1		3.800	87,61	1		7.000	264,09	1
	2.465	59,19	1		4.100	93,68	1	6x0,90	30 M	562,35	1
	2.520	60,27	1		4.250	96,73	1	10x0,90	30 M	562,35	1
	2.530	60,47	1		4.570	103,20	1				



**7321-7324**

**M51 Dentado variable**  
M51 Denture variable / M51 Variable tooth / M51 Variable Verzahnung

VP

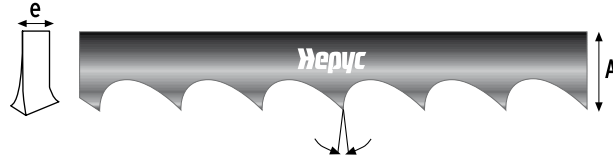


68-69  
HRC

**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.				€ m	€ soldadura soudure welding
			0,75/1,25	1,5/2	2/3	3/4		
7321	27,00	0,90			VP	VP	38,34	91,65
7322	34,00	1,10			VP	VP	39,25	91,65
7323	41,00	1,30		VP	VP	VP	47,95	91,65
7324	54,00	1,60	VP	VP	VP	VP	85,10	91,65

A x e mm	L	€	📦
27x0,90	2.000	89,05	1
	2.060	91,35	1
	2.070	91,73	1
	2.080	92,12	1
	2.150	94,81	1
	2.352	102,56	1
	2.370	103,24	1
	2.360	102,85	1
	2.420	105,15	1
	2.450	106,31	1
	2.460	106,69	1
	2.480	107,46	1
	2.500	108,23	1
	2.550	110,14	1
	2.600	112,05	1
	2.650	113,97	1
	2.700	115,90	1
	2.750	117,81	1
	2.755	118,00	1

A x e mm	L	€	📦	
	4.570	187,60	1	
	4.870	199,09	1	
	5.000	204,08	1	
	34x1,10	3.180	141,08	1
		3.420	150,50	1
3.505		153,83	1	
3.660		159,91	1	
3.720		162,28	1	
3.800		165,41	1	
4.100		177,19	1	
4.115		177,78	1	
4.520		193,67	1	
4.570		195,64	1	
4.640		198,39	1	
4.800		204,66	1	
4.860		207,02	1	
4.990		212,13	1	
5.270		223,12	1	
5.300	224,30	1		
5.550	234,11	1		
5.620	236,86	1		
5.800	243,93	1		
6.000	251,77	1		
41x1,30	4.100	217,20	1	
	4.520	237,34	1	
	4.570	239,74	1	
	5.300	274,75	1	
	5.500	284,35	1	
	5.550	286,74	1	
	5.800	298,73	1	
	6.000	308,32	1	
	6.200	317,92	1	
	6.300	322,72	1	
6.600	337,10	1		
6.700	341,90	1		
6.900	351,49	1		
7.000	356,29	1		



7801

HSS DIN 1837 N

ISO  
2296

Form.  
A

Tol.  
Ø (j15)  
d (H7)

Tol.  
I (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	17,77
	0,25		64	17,87
	0,30	64	16,82	
	0,40	64	16,47	
	0,50	48	16,47	
	0,60	48	15,53	
	0,80	48	16,00	
	1,00	40	16,94	
	1,20	40	17,41	
	1,60	40	18,05	
2,00	32	19,29		
25	0,20	8	80	18,35
	0,25		80	18,35
	0,30	80	17,41	
	0,40	64	16,18	
	0,50	64	16,47	
	0,60	64	16,65	
	0,80	48	16,65	
	1,00	48	16,82	
	1,20	48	17,41	
	1,60	40	17,87	
2,00	40	18,35		
2,50	40	20,42		
32	0,20	8	100	17,41
	0,25		100	15,71
	0,30	80	14,47	
	0,40	80	14,00	
	0,50	80	14,11	
	0,60	64	14,29	
	0,80	64	14,60	
	1,00	64	15,71	
	1,20	48	15,71	
	1,60	48	16,82	
2,00	48	18,70		
2,50	40	21,53		
3,00	40	23,40		
40	0,20	10	128	18,05
	0,25		100	17,12
	0,30	100	15,23	
	0,40	100	14,76	
	0,50	80	14,76	
	0,60	80	14,94	
	0,80	80	16,00	
	1,00	64	17,41	
	1,20	64	17,41	
	1,60	64	19,29	

D mm	e mm	d mm	z	€
	2,00		48	20,75
	2,50		48	24,05
	3,00		48	26,52
	3,00		48	26,52
50	0,25	13	128	20,75
	0,30		128	16,94
	0,40	100	16,18	
	0,50	100	16,82	
	0,60	100	16,82	
	0,80	80	23,30	
	1,00	80	23,30	
	1,20	80	23,30	
63	1,60	64	23,30	
	2,00		64	23,30
	2,50	64	25,94	
	3,00	48	28,76	
	4,00	48	34,41	
	5,00	48	39,11	
	0,30	16	128	22,76
	0,40		128	20,60
80	0,50	128	20,75	
	0,60		100	20,75
	0,80	100	23,35	
	1,00	100	25,29	
	1,20	80	25,46	
	1,60	80	26,70	
	2,00	80	28,41	
	2,50	64	33,17	
100	3,00	64	36,58	
	4,00		64	44,11
	5,00	48	53,12	
	6,00	48	59,22	
	0,50	22	128	26,24
	0,60		128	27,00
	0,80	128	29,82	
	1,00	100	29,35	
125	1,20	80	25,46	
	1,60		80	26,70
	2,00	80	28,41	
	2,50	64	33,17	
	3,00	64	36,58	
	4,00	64	44,11	
	5,00	48	53,12	
	6,00	48	59,22	

D mm	e mm	d mm	z	€
125	1,20	100	128	36,94
	1,60		100	42,88
	2,00		100	45,70
	2,50		100	55,12
	3,00		80	62,05
	4,00		80	74,28
160	5,00	80	90,94	
	6,00		64	104,45
	0,80	22	160	56,05
	1,00		160	59,40
	1,20	128	59,40	
	1,60	128	60,46	
200	2,00	128	63,93	
	2,50		100	74,93
	3,00	100	85,29	
	4,00	100	103,81	
	5,00	80	124,58	
	6,00	80	140,58	
	1,20	32	200	76,52
	1,60		160	87,51
250	2,00	128	92,52	
	2,50		128	109,46
	3,00	128	136,17	
	4,00	100	175,75	
	5,00	100	219,09	
	6,00	100	255,56	
	1,60	32	160	130,87
	2,00		160	140,86
315	2,50	160	165,11	
	3,00		128	203,73
	4,00	128	274,38	
	5,00	128	340,08	
	6,00	100	394,43	
	2,00	32	200	183,26
	2,50		160	217,22
	3,00	160	269,38	
4,00	160	338,19		
5,00	128	423,96		
6,00	128	474,83		
315	2,50	40	200	344,61
	3,00		200	401,02
	4,00	160	503,42	
	5,00	160	624,21	
6,00	160	722,03		



7802

HSS DIN 1838 N

ISO  
2296

Form.  
B

Tol.  
Ø (j15)  
d (H7)

Tol.  
I (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	€	D mm	e mm	d mm	z	€	
50	0,50	13	48	16,82	125	3,00	22	40	62,05	
	0,60		48	16,82		4,00		40	74,28	
	0,80		40	23,30		5,00		40	90,94	
	1,00		40	23,30		6,00		32	104,45	
	1,20		40	23,30		160		0,80	80	56,05
	1,60		32	23,30				1,00	80	59,40
	2,00		32	23,30				1,20	64	59,40
	2,50		32	25,94				1,60	64	60,46
	3,00		24	28,76				2,00	64	63,93
	4,00		24	34,41				2,50	64	74,93
5,00	24	39,11	3,00	48	85,29					
63	0,50	16	64	20,75	4,00		48	103,81		
	0,60		48	20,75	5,00		40	124,58		
	0,80		48	23,35	6,00		40	140,58		
	1,00		48	25,29	200	1,20	32	80	76,52	
	1,20		40	25,46		1,60	80	87,51		
	1,60		40	26,70		2,00	64	92,52		
	2,00		40	28,41		2,50	64	109,46		
	2,50		32	33,17		3,00	64	136,17		
	3,00		32	36,58		4,00	48	175,75		
	4,00		32	44,11		5,00	48	219,09		
5,00	24	53,12	6,00	48		255,56				
6,00	24	59,22	250	1,60		32	80	130,87		
80	0,60	22		64		27,00	2,00	80	140,86	
	0,80			64	29,82	2,50	80	165,11		
	1,00			48	29,35	3,00	64	203,73		
	1,20			48	30,64	4,00	64	274,38		
	1,60			48	33,46	5,00	64	340,08		
	2,00			40	34,99	6,00	48	394,43		
	2,50			40	40,99	315	2,00	32	100	183,26
	3,00			40	46,65		2,50	80	217,22	
	4,00			32	57,00		3,00	80	269,38	
	5,00		32	68,93	4,00		80	338,19		
6,00	32	78,99	5,00	80	423,96					
100	0,80	22	64	38,18	6,00		64	474,83		
	1,00		64	36,94	250		2,50	40	100	344,61
	1,20		64	36,94			3,00	100	401,02	
	1,60		48	42,88			4,00	80	503,42	
	2,00		48	45,70			5,00	80	624,21	
	2,50		48	55,12		6,00	80	722,03		

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				■	■	19,07
350	25	1,25	14	8,5				■		17,45
350	25	1,50	14	8,5					■	21,41
350	30	1,50	14	8,5				■	■	24,22
350	30	2,00	14	8,5		■		■		32,20
400	25	1,50	16	8,5				■	■	24,85
400	30	1,50	16	8,5		■	■	■	■	29,95
400	30	2,00	16	8,5		■	■	■	■	34,74
450	30	2,00	18	10,5	■	■	■	■		34,74
450	35	2,00	18	10,5		■	■	■		40,00
450	40	2,00	18	10,5	■	■		■		45,33
500	40	2,00	20	10,5	■	■	■	■		58,63
600	50	2,50	24	13		■				88,89

**Heruc** / CUTTING  
TOOL  
EXPERTS



**Nuevo Display  
Modular  
con placas intercambiables**

**Nouveau Présentoir  
Modulaire  
avec étages réaménageables**

**New Modular Display  
with exchangeable plates**

**Neues modulares Display  
Mit austauschbaren Platten**

# EXPOSITOR TOTEM PRÉSENTOIRS / DISPLAY STANDS / VERKAUFSSTÄNDER

## DISPLAY MODULAR

- Diseño Activo
- 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

## MODULARES DISPLAY

- Attraktives Design
- Übersichtliche Darstellung
- Platzsparend
- Mehrzweck-Display: erhältlich für Bohrer, Gewindebohrer, Schafffräser usw.
- Prospektständer



**Base + 2 pisos fijos**  
**Posibilidad de añadir un 3º y 4º módulo.**

**Base + 2 étages fixes**  
**Possibilité d'ajouter un 3<sup>ème</sup> et 4<sup>ème</sup> module.**

**Base + 2 fixed floors**  
**Possibility of adding a 3<sup>th</sup> and 4<sup>th</sup> floor.**

**Basis+2 feste Einsätze**  
**Möglichkeit, ein 3. und 4. Modul hinzuzufügen.**

**A elegir entre diferentes composiciones.**

**A choisir entre différentes compositions.**

**To chose among different compositions.**

**Möglichkeit verschiedener Zusammenstellungen.**

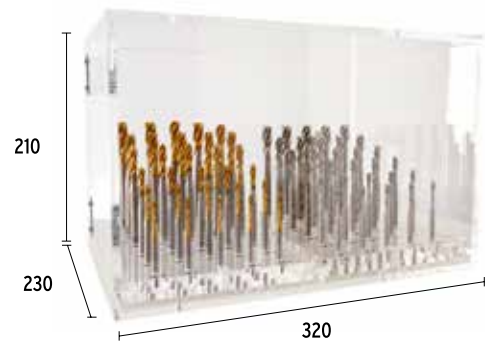


> Ref. 8214



€ Vacío 1.070,10

> Ref. 8214/1



€ Urna vacía 112,29



€ Vacío 957,83



€ Vacío 845,53

**BROCAS CILÍNDRICAS / FORETS CYLINDRIQUES / STRAIGHT DRILL-BITS / ZYLINDERBOHRER**

**8214/2 HSS DIN 338 NSP**



Ref. 1158

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 153,49

**8214/3 HSS TIN DIN 338 NSP**



Ref. 1108

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 330,73

**8214/4 HSSCO DIN 338 N**



Ref. 1105

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 262,28

**8214/5 HSSCO TIALN DIN 338 N**



Ref. 1161

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 537,69

**8214/6 HSSCO DIN 338 W**



Ref. 1106

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 501,90

**8214/7 HSSCO TIALN DIN 338 W**



Ref. 1162

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 955,91

**8214/8 HSSCO DIN 338S**



Ref. 1169

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 669,23

**8214/9 HSSCO TIALN DIN 338S**



Ref. 1160

Ø mm	Icon
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs. 50  
 € 936,62



**8214/12** > **HSSCO DIN 1897 S**



Ref. 1166

Ø mm	
4	10
5	10
6	10
8	10
10	5
12	5

TOTAL pcs.	50
€	595,67

**8214/13** > **HSSCO TIALN DIN 1897**



Ref. 1167

Ø mm	
4	10
5	10
6	10
8	10
10	5
12	5


TOTAL pcs.	50
€	834,43



**BROCAS ESCALONADAS Y AVELLANADORAS / FRAISES ETAGEES ET CONIQUES /  
 STEP AND COUNTERBORE DRILL-BITS / STUFEN- UND SENKBOHRER**

**8214/20 HSS**

Ref. 5105


∅ mm	
4-12*2	6
4-20	6
6-30	5
20-30	4



TOTAL pcs. 21  
 € 1516,10

**8214/21 HSS TIALN**

Ref. 5106


∅ mm	
4-12*2	6
4-20	6
6-30	5
20-30	4



TOTAL pcs. 21  
 € 3134,30

**8214/22 HSS 35°**

Ref. 5157


∅ mm	
4-12*2	12
4-20	6
6-30	10



TOTAL pcs. 28  
 € 2615,10

**8214/23 HSS 35° TIALN**

Ref. 5158


∅ mm	
4-12*2	12
4-20	6
6-30	10



TOTAL pcs. 28  
 € 3922,64

**8214/24 HSS**

Ref. 5101


∅ mm	
3-14	6
6-20	6
16-30	5
26-40	4



TOTAL pcs. 21  
 € 1117,94

**8214/25 HSS TIALN**

Ref. 5103

∅ mm	
3-14	6
6-20	6
16-30	5
26-40	4



TOTAL pcs. 21  
 € 2109,03



**AVELLANADORES 90° / FRAISES A CHANFREINER 90° /  
 COUNTERSINK CUTTERS 90° / 90°-SENKER**

**8214/26 HSS DIN 335C**



Ref. 5116

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  
 € 1084,56

**8214/27 HSS TIALN DIN 335C**



Ref. 5113

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  
 € 2676,17

**8214/28 HSSCO DIN 335C**



Ref. 5117

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  
 € 1849,82

**8214/29 HSSCO TIALN DIN 335C**



Ref. 5119

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  
 € 3199,67

MACHOS MÁQUINA / TARAUDS MACHINE / MACHINE TAPS / MASCHINENGEWINDEBOHRER

**8214/30** HSSE DIN 371/376B



Ref. 2104/2103

Ø mm			
M4	5	TOTAL pcs.	30
M5	5		
M6	5		
M8	5		
M10	5		
M12	5		

**8214/31** HSSE DIN 371/376 R35°



Ref. 2106/2105

Ø mm			
M4	5	TOTAL pcs.	30
M5	5		
M6	5		
M8	5		
M10	5		
M12	5		

**8214/38** HSSE VAP DIN 371/376B



Ref. 2250/2251

Ø mm			
M4	5	TOTAL pcs.	30
M5	5		
M6	5		
M8	5		
M10	5		
M12	5		

**8214/39** HSSE VAP DIN 371/376 R35°



Ref. 2252/2253

Ø mm			
M4	5	TOTAL pcs.	30
M5	5		
M6	5		
M8	5		
M10	5		
M12	5		

**8214/32** HSSE TIN DIN 371/376B



Ref. 2116/2115

Ø mm			
M4	5	TOTAL pcs.	30
M5	5		
M6	5		
M8	5		
M10	5		
M12	5		

**8214/33** HSSE TIN DIN 371/376 R35°



Ref. 2118/2117

Ø mm			
M4	5	TOTAL pcs.	30
M5	5		
M6	5		
M8	5		
M10	5		
M12	5		



**8214/34** > **HSSEX TICN DIN 371/376B**



Ref. 2126/2125

Ø mm	
M4	5
M5	5
M6	5
M8	5
M10	5
M12	5
TOTAL pcs.	30
€	1.037,41

**8214/35** > **HSSEX TICN DIN 371/376 R35°**



Ref. 2124/2123

Ø mm	
M4	5
M5	5
M6	5
M8	5
M10	5
M12	5
TOTAL pcs.	30
€	1.133,83

**8214/36** > **HSSEX TICN DIN 371/376 B**



Ref. 2176/2175

Ø mm	
M4	5
M5	5
M6	5
M8	5
M10	5
M12	5
TOTAL pcs.	30
€	1.319,07

**8214/37** > **HSSEX TICN DIN 371/376 R15°**



Ref. 2178/2177

Ø mm	
M4	5
M5	5
M6	5
M8	5
M10	5
M12	5
TOTAL pcs.	30
€	1.219,90

**8214/49** > **HSSE TIN DIN 371/376 6HX R**



Ref. 2214/2213

Ø mm	
M4	5
M5	5
M6	5
M8	5
M10	5
M12	5
TOTAL pcs.	30
€	1.377,92

**8214/53** > **HSSE TIN DIN 371/376 6GX R**



Ref. 2218/2217

Ø mm	
M4	5
M5	5
M6	5
M8	5
M10	5
M12	5
TOTAL pcs.	30
€	1.319,18

**FRESAS FRONTALES / FRAISES FRONTALES / END MILLS / FRÄSRN**

**8214/54** > **HSSE DIN 327 N 2Z**



Ref. 3110

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 563,57

**8214/55** > **HSSE TIALN DIN 327 N 2Z**



Ref. 3110/1

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 788,91

**8214/56** > **HSSE DIN 327 N 2Z**



Ref. 3112

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 943,05

**8214/57** > **HSSE TIALN DIN 327 N 2Z**



Ref. 3112/1

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 1.320,28

**8214/58** > **HSSE DIN 844 W 3Z**



Ref. 3114

Ø mm	
6	5
8	5
10	5
12	5

TOTAL pcs. 20  
 € 708,81

**8214/59** > **HSSE TIALN DIN 844 W 3Z**



Ref. 3114/1

Ø mm	
6	5
8	5
10	5
12	5

TOTAL pcs. 20  
 € 750,96

**8214/60** > **HSSE DIN 844 N 4Z**



Ref. 3115

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 601,69

**8214/61** > **HSSE TIALN DIN 844 N 4Z**



Ref. 3115/1

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 754,03



**8214/62** > **HSSEX TIALN DIN 844 NR**



Ref. 3117/1

Ø mm	
6	5
8	5
10	5
12	5

TOTAL pcs.	20
€	1.216,34

**8214/63** > **HSSEX TIALN DIN 844 NRF**



Ref. 3119/1

Ø mm	
6	5
8	5
10	5
12	5

TOTAL pcs.	20
€	1.336,44

FRESAS ROTATIVAS / FRAISES ROTATIVES / ROTARY MILLS / ROTATIONSFRÄSEN

**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
€	1.351,37

CORONAS METAL / SCIES TREPAN METAUX / METAL HOLE SAWS / METALL-BOHRKRONEN

**8214/64** > **HSSE**

Ref. 7137

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
€	961,69

**8214/65** > **HSS**

Ref. 7172

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
€	701,97

METAL DURO / CARBURE / HARD METAL / HARTMETALL

**8214/72** > **HM-MD DIN 6537L**



Ref. 1177

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 2.640,40

**8214/73** > **HM-MD DIN 6537S**



Ref. 1176

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 2.299,15

**8214/74** > **HM-MD DIN 6527L**



Ref. 3176

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 1.047,85

**8214/75** > **HM-MD DIN 6527L**



Ref. 3177

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 1.439,10

**8214/76** > **HM-MD DIN 6527L**



Ref. 3192

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 1.797,85

**8214/77** > **HM-MD DIN 6527L**



Ref. 3194

Ø mm	
4	5
5	5
6	5
8	5
10	5
12	5

TOTAL pcs. 30  
 € 1.928,20

**Consultar otras composiciones.**

Merci de consulter d'autres compositions.  
 Thank you for consulting other compositions.  
 Konsultieren sie andere optionen.



**75** YEARS  
1947-2022



# Can we **Help** you?

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