







75 YEARS
1947-2022

Escariado >
Alésage
Reaming
Reibahle

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/mm²

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

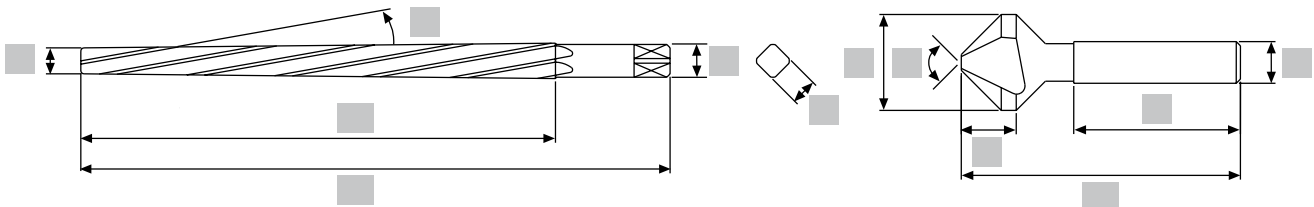
Máquina / Machine Refrigerante / Réfrigérant / Coolant

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.	4118	4104
Form.	B	B
Hel./Hél./Spiral	8°	8°
Mat.	HM	HSSCO
Rec./Rev./Coating		
DIN	212	212
Tol.	H7	H7
Gama/Gamme/Range	2-12	1-20
Pag.	299	300

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	○	

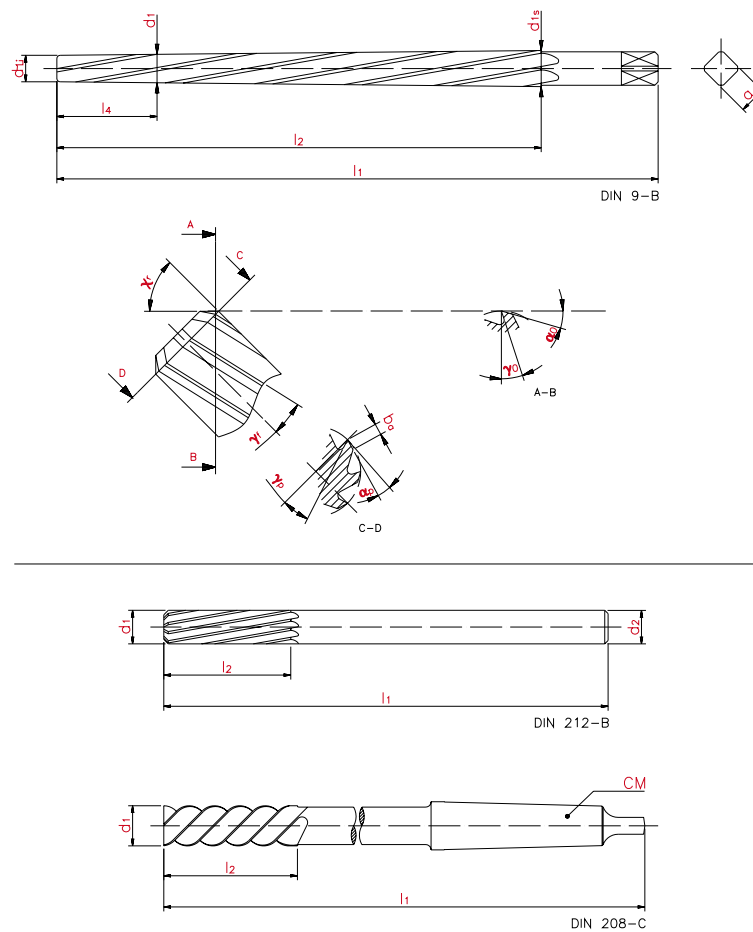
● Optima / Optimun ○ Alternativo / Alternative



4105	4103	4106	4107	4108	4115	4116	4117	4109
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





l1	Longitud total / Longueur totale / Total length
l2	Longitud de corte / Longueur de coupe / Length of cut
l4	Longitud hasta el diámetro nominal / Longueur jusqu'au diamètre nominal / Length to the nominal diameter
a	Cuadrado / Carré / Square
ba	Ancho de fase / Largeur de phase / Phase width
d1	Diámetro nominal / Diamètre nominal / Nominal diameter
d1i	Diámetro inferior / Diamètre inférieur / Inferior diameter
d1s	Diámetro superior / Diamètre supérieur / Superior diameter
d2	Diámetro de mango / Diamètre de queue / Shank diameter
di	Diámetro interior / Diamètre intérieur / Interior diameter
CM	Tamaño del cono morse / Taille du cône morse / Morse taper size
α	Ángulo de destalonado / Angle de détalonnage / Relief angle
$\alpha\pi$	Ángulo de destalonado del corte seco / Angle de détalonnage de la coupe sèche / Dry cut relief angle
γ_0	Ángulo corte ortogonal / Angle coupe orthogonale / Orthogonal cut angle
$\gamma\phi$	Ángulo de corte lateral / Angle de coupe latérale / Lateral cut angle
$\gamma\pi$	Ángulo corte posterior / Angle coupe postérieure / Rear cut angle
$\gamma\rho$	Ángulo de posición / Angle de position / Angle of position

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					

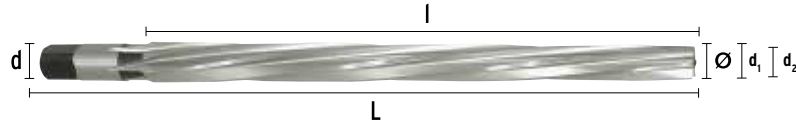
ESCARIADORES DE MANO ALÉSOIRS À MAIN / HAND REAMERS / HAND-REIBAHLEN



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 ₁ mm	d ₂ mm	d mm	∠ mm	€	L mm	l mm		Ø Nom.	d ₁ mm	d ₂ mm	d mm	∠ mm	€	L mm	l 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

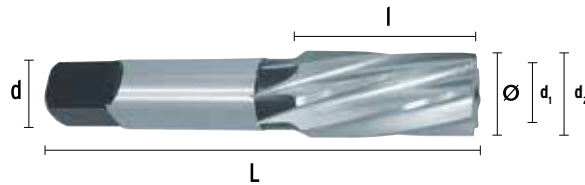
*(Hasta fin de existencias / Jusqu'à épuisement des stocks / While supplies last)



4119 HSS

Form. **B**  C. 1:16 (NPTBSP1)

P				M		K			N				S		H		
<800	<1.000	<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 ₁ mm	d ₂ mm	d mm	∠ mm	€	L mm	l mm		Ø Nom.	d ₁ mm	d ₂ mm	d mm	∠ mm	€	L mm	l 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

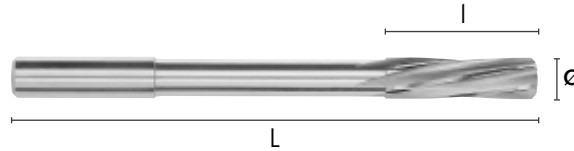


Tol.
H7

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					

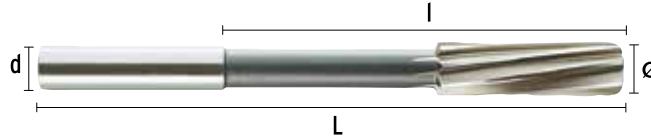
4104



HSSCO DIN 212

Form. B Ø ≤ 3,70	Form. D Ø > 3,70		Tol. H7	ISO 521
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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**
 $\emptyset \leq 3,70$

Form. **D**
 $\emptyset > 3,70$



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

\emptyset 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

\emptyset 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



\emptyset 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

\emptyset 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

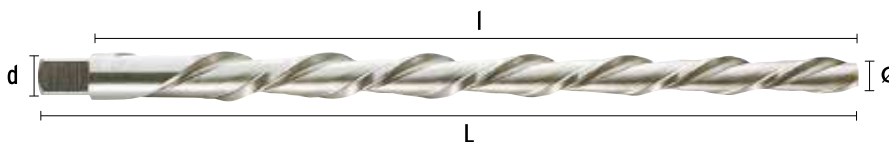
Form.
E



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

P

Aceros
Aciers
Steeels
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

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**



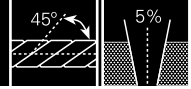
P				M		K			N				S		H		
<800	<1.000	<1.200	<1.400	<950	<1.200	<500	<800	<1.400	Al	Cu	Mg/Zn	Plastic	Ni	Ti	50 HRC	55 HRC	60 HRC
●	○			○		●	○		●	○		●		○			
6-12	4-6			4-6		10-14	6-8		8-22	10-22		14-22		4-6			

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



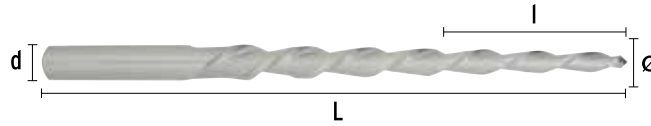
1	Ø mm	€	L mm	l mm	1	3	Ø mm	€	L mm	l mm	1
1	10,00	65,96	171	95	1	3	24,00	171,15	296	180	1
1	11,00	67,76	176	100	1	3	25,00	182,43	296	180	1
2	12,00	70,17	199	105	1	3	26,00	199,22	296	180	1
2	13,00	76,42	199	105	1	3	27,00	213,85	311	195	1
2	14,00	84,18	209	115	1	3	28,00	233,62	311	195	1
2	15,00	88,43	219	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			

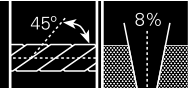
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



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

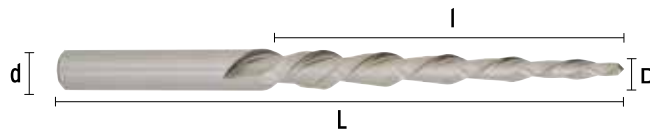
Ø Nom.	€	D mm	d mm	L mm	I mm	
6,00	223,76	6	12	180	120	1
7,00	288,08	7	14	200	140	1

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			

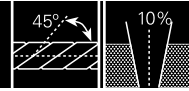
Vc (m/min). ● Optima / Optimun ○ Alternativo / Alternative



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

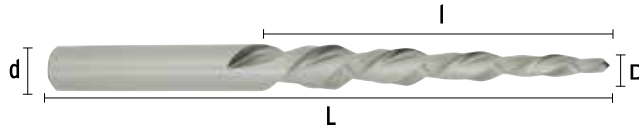
Ø Nom.	€	D mm	d mm	L mm	I mm	
5,00	147,57	5	12	150	90	1
6,00	169,18	6	14	160	100	1

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

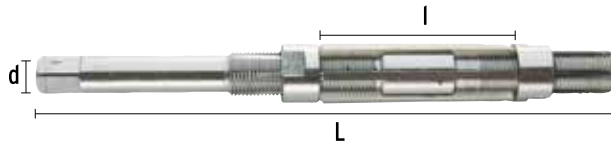
∆	∅ mm	D mm	€	L mm	📦
5	51,00 - 60,00	27	520,53	325	1
5	61,00 - 71,00	32	625,38	376	1
5	72,00 - 85,00	40	793,93	396	1

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	∅ mm	d mm	€	L mm	l mm	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

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