
IZAR®
CUTTING TOOLS
IND-16
izartool.com

TABLA MATERIALES
Material Table
Tableau de Materiaux

GRUPO GROUP GROUPE	SUBGRUPO SUBGROUP S. GROUPE	MATERIALES MATERIALS MATERIAUX	DUREZA (HB) Hardness (HB) Dureté (HB)	TRACCIÓN (N/mm²) Tensile (N/mm²) Traction (N/mm²)
1. **ACERO** **STEEL** ACIER	**1.1**	**Aceros Construcción - Aceros Cementación** **Structural Steels - Case Hardening Steels** Aciers de Construction - Aciers Superieurs	<250	<850
		Aceros al Carbono No Aleados - Aceros Bonificados Unalloyed Carbon Steels - Heat-Treatable Steels Acieurs au Carbone Sans Alliage - Aciers Superieurs		
	1.2	**Aceros Aleados** **Alloyed Steels** Aciers Allies	<300	<1000
	1.3	**Aceros Aleados Tratados - Aceros Bonificados** **Heat-Treatable Alloyed Steels** Aciers Allies Superieurs	300-400	850-1300
	1.4	**Materiales resistentes al desgaste** **Wear-Resistant Materials** - Matériaux résistant a l'usure	400-500	1330-1600
2. **INOX** **STAINLESS STEEL** INOX	**2.1**	**INOX Austeníticos** **Austenitic Stainless** INOX Austenitiques	<250	<850
	2.2	**INOX Ferríticos-Martensíticos** **Ferritic-Martensitic Stainless** INOX Ferritiques-Martensitiques	<320	<1100
3. **FUNDICIÓN** **CAST IRON** FONTE	**3.1**	**Fundición Gris Grafito Esferoidal - Fundición Maleable** **Spheroidal Graphite Cast Iron - Malleable Cast Iron** Fonte Grise Graphite Spherique	<200	<700
	3.2	**Fundición Gris Grafito Esferoidal - Fundición Maleable** **Spheroidal Graphite Cast Iron - Malleable Cast Iron** Fonte Grise Graphite Spherique	>200<300	>700<1000
4. **TITANIO** **TITANIUM** TITANE		**Aleaciones Titanio / Alloyed Titanium /** Alliages Titane		
5. **COBRE** **BRONCE - LATÓN** **COPPER** **BRONZE** - BRASS CUIVRE BRONZE - LAITON	**5.1**	**Cobre - Bronce - Latón Viruta Corta** **Copper - Bronze - Brass (Short Chip)** Cuivre - Bronze - Laiton (Coupeaux Courts)	<200	<700
	5.2	**Cobre - Bronce - Latón Viruta Larga** **Copper - Bronze - Brass (Long Chip)** Cuivre - Bronze - Laiton (Coupeaux Longs)	<200	<700
6. **ALUMINIO** **MAGNESIO** **ALUMINIUM** **MAGNESIUM**	**6.1**	**Al - Mg No Aleado** **Unalloyed Al - Mg** Al - Mg Sans Alliage	<100	<350
	6.2	**Aleaciones Al Si < 10%** **Al Alloys Si < 10%** Alliages Al Si < 10%	<180	<600
	6.3	**Aleaciones Al Si > 10%** **Al Alloys Si > 10%** Alliages Al Si > 10%	<180	<600
7. **MATERIALES** **SINTÉTICOS** **SYNTHETIC** **MATERIALS** MATERIAUX SYNTHETIQUES	**7.1**	**Termoplásticos** **Thermo-Plastics** Thermoplastiques		
	7.2	**Duroplásticos** **Hard-Plastics** Plastiques Durs		

	España Spain - Espagne	Alemania Germany - Allemagne		Francia France	Reino Unido UK - Royaume-Uni	Italia Italy - Italie	EE.UU. USA - États-Unis
	UNE	Nº MATERIAL	DIN	AFNOR	B.S.	UNI	AISI
GRUPO GROUP GROUPE 1	**ACEROS - STEELS - ACIERS**						
1.1	**ACEROS DE CONSTRUCCIÓN / STRUCTURAL STEELS / ACIERS DE CONSTRUCTION (<850 N/mm² / <250 HB)**						
	AE235B,FE360 B	1,0036	FE360 (ST 37-2)	E -42-2	FE 360 B	FE 360 B FU	A 570 GR.33,36
	AE235B,FE360B	1,0037	FE 360 B(RST 37-2)	E 24-2	FE 360 B	FE 360 B,C,D	A 283 CR.C
	AE275B,FE430BFN	1,0044	FE 430 B (ST 44-2)	E 28-2	FE 430 B FN	FE 430 B	A 570 GR.40
	A490-2,FE490-2FN	1,0050	FE 490-2 (ST 50-2)	A 50-2	FE 490-2 FN	FE 490	A 570 GR.50
	A590-2,FE590-2FN	1,0060	FE 590-2 (ST 60-2)	A 60-2	FE 590-2 FN	FE 60-2	A 572 GR.65
	A690-2,FE690-2FN	1,0070	FE 690-2 (ST 70-2)	A 70-2	FE 690-2 FN	FE 70-2,FE 690	
	AE 235 D,FE360D1FF	1,0116	FE 360D1 (ST 37-3)	A 24-3	FE 360 D1 FF	FE 360 C,D	A 284 GR.D
	ACEROS DE CEMENTACIÓN / CASE HARDENING STEELS / ACIERS DE CIMENTERIE						
	F.111	1,0401	C 15	AF 37 C 12	080 A 15	C 15	M 1015
	F.1510-C10K	1,1121	CK 10	XC 10	040 A 10	C 10	1010
	F.1110-C15K	1,1141	C15	C18RR	080M15	C15	GR.1016
		1,7015	15 CR 3	12C8	523M15		5015
	F.1516-16MNCR5	1,7131	16MNCR5	16MC5	527M17	16MNCR5	NO.5115
	F.150 D	1,7147	20MNCR5	20MC5		20MNCR5	5120
	ACEROS DE FÁCIL MECANIZACIÓN / FREE-CUTTING STEELS / ACIERS D´USINAGE MECANIQUE FACILE						
	F.2111-11SMN28	1,0712	9SMN28	S 250	230M07	CF 9 SMN 28	1213
	F.2112-11SMN PB28	1,0718	9 SMN PB 28	S 250 PB		CF 9SMN PB28	12 L 13
	F.2121-10S20	1,0721	10S20	10F1	210M15	CF10S20	GR.1108
	F.210-G	1,0726	35S20	35 MF 6	212M36	CF 35 SMN 10	1140
		1,0727	45 S 20	45 MF 4			1146
	F.2113-12SMN35	1,0736	9 SMN 36	S 300		CF 9 SMN 36	1215
	F.210-F	1,0723	15 S 20		210 A 15		
	ACEROS DE CONSTRUCCIÓN FUNDIDOS / CAST STEELS / ACIERS DE CONSTRUCTION FONTE						
		1,0416	GS-83,3	A 42C-M	AM 1	FEG38VR	GR. N1
		1,0551	GS-52	E26-52-M	161GR400A	GC20	GR.N 2
		1,0553	GS-60	30M6M	A 3		GR.80-40
		1,0554	GS-62	E26-52-M	AW3		GR.105-85
	ACEROS AL CARBONO NO ALEADOS / UNALLOYED CARBON STEELS / ACIERS AU CARBONE SANS ALLIAGE						
	ACEROS BONIFICADOS / HEAT-TREATABLE STEELS / ACIERS SUPERIEURS						
	F . 112	1,0402	C 22	1 C 22	070 M 20	C 25	M 1023
	F. 113	1,5010	C 35	C 35	40 HS	C 35	GR.1035
	F.114	1,0503	C 45	C 45	50 HS	C 45	GR.1043
	F.115	1,0535	C 55	C 54	50	C 55	GR.1055
		1,0601	CK 60	C 60	60 HS,CS	C 60	1060
	F.1120-C25K	1,1151	CK 22	2 C 22	055 M 15	C 20, C 25	1020
		1,1157	40 MN 4	35 M 5	150 M 36		1035
	F.1130-C35K	1,1181	CK 35	2 C 35	080 A 35	C 35	1038
	F.1140-C45K	1,1191	CK 45	2 C 45	080 M 46	C45	1045
	F.1150-C55K	1,1203	CK 55	2 C 55	060 A 57	C 55	1055
		1,1221	CK 60	2 C 60	060 A 62	C 60	1060
	ACEROS ALEADOS - ALLOYED STEELS - ACIERS ALLIES (<1000 N/mm² / <300 HB)						
1.2	**ACEROS ALEADOS PARA HERRAMIENTAS / ALLOYED TOOL STEELS / ACIERS ALLIES POUR OUTILS**						
	F.5230-100 CR6	1,2067	100 CR 6	Y 100 C 6	BL 3		L 1 , L 3
	F.5212-X210CR12	1,2080	X210 CR 12	Z 200 C 12	B D 3	X 205CR12 KU	D 3
	F.5227-X100CRMO V5	1,2363	X 100 CRMO V5	Z 100	CDV 5	X100CRMOV51KU	A 2
		1,2379	X 155CRVMO 12	Z 160CDV12	BD2	X155CRVMO121KU	D 2
	F.5220-95MNCRW5	1,2510	100 MNCRW 4	90 MWCV 5	BO 1	95MNWCR5KU	O 1
		1,2550	60 WCRV 7	55 W C20	BS 1	55 WCR V8 KU	S 1
		1,2842	90MN CRV8	90 MNV8	B 02	90MNVCR8KU	O 2
	ACEROS RÁPIDOS / HIGH SPEED STEELS / ACIERS RAPIDES						
	F.5563.12-1-5-5	1,3202	HS 12-1-4-5	HS 12-1-5-5	BT 15	HS12-1-5-5	T 15
	F.5553.10-4-3-10	1,3207	HS 10-4-3-10	Z130WKCDV	BT 42	HS 10-4-3-10	T 42
	F.5613-6-5-2-5	1,3243	HS 6-5-2-5	Z85WDKCV06	BM 35	HS 6-5-2-5	M 35
	F.5617.-2-10-1-8	1,3247	S 2 10 1 8	Z110DKCWV	BM 42	HS 5-5-2	M 42
	F.5603.-6-5-2	1,3343	HS 6-5-2	Z85WDCV06	BM 2	HS 6-5-2	M 2
	FUNDICIÓN ALEADA / ALLOYED CAST IRON / FONTE ALLIEE						
	F.8372-AM26CRMO4	1,7218	GS-25 CRMO 4	25 CD 4	70 8A 25	25 CRM04	4130
	F.8331-AM34CRMO 4	1,7220	34 CRM 04	25 CD 4	708 A25	30 CRM04	4130
	ACEROS BONIFICADOS / ALLOYED HEAT-TREATABLE STEELS / ACIERS SUPERIEURS						
	F. 114	1,0503	C 45	C 45	50 HS	C 45	GR.1043
	F.8331-AM34CRMO 4	1,7220	34 CRMO 4	25 CD4	708 A25	30 CRMO 4	4130
	F.8332-AM42CRMO 4	1,7225	41 CRMO 4	42 CD4	708M 40	38CRMO 4KB	GR.414O
		1,7228	50 CRMO 4	50 CR MO 4	708 A 47		4150
	ACEROS NITRURACIÓN / NITRIDING STEELS / ACIERS AVEC NITRATE						
		1,7779	20 CRMOV 1 3 5				
		1,8504	34 CR AL 6				
	F,1741-34CRAIMO 5	1,8507	34 CRAIMO 5	30 CAD 6,12		34 CR AI MO 7	A 355 Cl.D
	F.1740-41 CRAIMO 7	1,8509	41 CRAIMO 7	40 CAD 6,12	905 M 39	41 CR AI MO 7	A 355 Cl.A
	F.1712-31 CRMO 12	1,8515	31 CRMO 12	30 CD 12	722 M 24	30 CR MO 12	

TABLA MATERIALES
Material Table
Tableau de Materiaux

	España Spain - Espagne	Alemania Germany - Allemagne		Francia France	Reino Unido UK - Royaume-Uni	Italia Italy - Italie	EE.UU. USA - États-Unis
	UNE	Nº MATERIAL	DIN	AFNOR	B.S.	UNI	AISI
ACEROS ALEADOS BONIFICADOS - HEAT-TREATABLE ALLOYED STEEL - ACIERS ALLIES SUPERIEURS (850-1300 N/mm² / 300-400 HB)							
1.3	**ACEROS ALEADOS HERRAMIENTAS / ALLOYED TOOL STEELS / ACIERS ALLIES OUTILS**						
		1,2311	40 CRMNMO 7				
		1,2312	40 CRMNMOS 8 6				
	F.5213-X210CRW 12	1,2436	X 210 CRW 12	Z 200 CW 12		X 215 CRW 12 1 KU	
		1,2713	55 NICRMOV 6	55 NCDV	BH 224/5		L 6
		1,2714	56 NICRMOV 7	55 NCDV 7	BH 224/5	56 NICRMOV7KU	L 6
	ACEROS ALEADOS HTAS. TRABAJO CALIENTE / TOOL STEELS WARM WORKING / ACIERS ALLIES OUTILS TRAVAIL EN CHAUD						
	F.5317-X37CRMOV 5	1,2343	X38CRMOV5.1	Z 38CDV 5	BH 11	X37CRMOV51KU	H 11
	F.5318-X40CRMOV 5	1,2344	X 40CRMOV 51	X 40CRMOV 5	BH 13	X 40CRMOV511KU	H 13
	F.5318-X40CRMOV 5						
	F.5313-30CRMOV 12	1,2365	X 32CRMOV 3 3	32CDV12-28	BH 10	30CRMOV1227KU	H 10
	F.5323-X30WCRV 9 3	1,2581	X30WCRV 9,3	Z30WCV 9	BH 21	X 30WCRV 93KU	H 21
		1,2550	60 WCRV 7	55 WC 20	BS 1	55 WCRV 8 KU	S 1
		1,2567	X 30 WCRV 5 3	Z 32 WCV 5		X 30 WCRV 53 KU	
	ACEROS BONIFICADOS / HEAT-TREATABLE STEELS / ACIERS SUPERIEURS						
		1,5864	35 NICR 18				
		1,6580	30 NICRMO 8				
	F-124 A	1,7361	32 CRMO 12	30 CD 12	722 M 24	32 CRMO 12	
		1,7707	30 CRMOV 9			31 CRMOV 10	
	ACEROS NITRURACIÓN / NITRIDING STEELS / ACIERS AVEC NITRATE						
	F.1712-31 CRMO 12	1,8515	31 CRMO 12	30 CD 12	722 M 24	30 CRMO 12	
		1,8523	39 CRMOV 13 9		897 M 39		
1.4	**Materiales resistentes al desgaste - Wear-Resistant Materials - Matériaux résistant a l'usure** **HARDOX 450 - XAR 450 - RAEX - FORA - CREUSABRO**						
GRUPO GROUP GROUPE 2 ACEROS INOXIDABLES - STAINLESS STEELS - ACIERS INOX							
2.1	**ACEROS INOX AUSTENÍTICOS / AUSTENITIC STAINLESS STEELS / ACIERS INOX AUSTENITIQUES (< 850 N/mm² / <250 HB)**						
	F.3507-X 10CRNI 18-8	1,4300	X 12 CRNI 18 8				302
	F.3504-X5CRNI 18-10	1,4301	X5 CRNI 18-10	X5 CRNI 18-10	304 S31	X5 CRNI 18-10	304
	F.3541-X2CRNIN 18-10	1,4311	X 2 CRNIN 18-10	Z 3CN 18.07AZ	304 S 61	X 2 CRNIN 18 11	304 LN
	F.3542-X2CRNIMON17-12-2	1,4406	X 2 CRNIMON 17-12-2	Z 3 CND17.11.02	316 S 61	X 2 CRNIMON 17 12	316 LN
	F.3533-X2CRNIMO17-13-2	1,4435	X2CRNIMO 18-14-3	Z3CND 17-12-03	316 S14	X2CRNIMO 1713	316 L
	F.3523-X6CRNITI 18-10	1,4541	X 6CRNITI 18-10	Z 6CNT 18-10	321 S31	X 6CRNITI 18 11	321
	F.3535-X6CRNITI 17-12-2	1,4571	X 6 CRNIMOTI 17 12 2	Z 6CNDT 17,12	320 S18	X 6 CRNIMOTI 17 12	316 TI
	F.3535-X6CRNIMOTI17-12	1,4573	X 10 CRNIMOTI 18 12		320 S33	X 6 CRNIMOTI 17 13	316 TI
	F.3312-X15CRNISI20-12	1,4828	X 15CRNISI 20 12	Z 17CNS 20 12	309 S24	X 16CRNI 23 14	309
2.2	**ACEROS INOX MARTENSÍTICOS / MARTENSITIC STAINLESS STEEL / ACIERS INOX MARTENSITIQUES (<1100 N/mm² / <320 HB)**						
	F.3402-X20CR13	1,4021	X 20 CR 13	X 20 CR 13	420 S 37	X 20 CR 13	420
	F.3427-X19CRNI 17-2	1,4057	X 20 CRNI 17 2	Z 15 CN16,02	431 S29	X 16 CRNI16	431
	F.3220-X45CRSI09-03	1,4718	X 45 CRSI 9,3	Z 45 CS9	401 S45	X 45CR SI 8	HNV 3
	ACEROS INOX FERRÍTICOS / FERRITIC STAINLESS STEELS / ACIERS INOX FERRITIQUES (<1100 N/mm² / <320 HB)						
	F.3111-X6CRAI 13	1,4002	X 6 CRAI 13	Z 8CA 12	405 S17	X 6 CRAI 13	405
	F.3401-X 10 CR 13	1,4006	X 10 CR13	Z 12 C 13	410 S2	X 12 CR 13	410
	F.3113-X6 CR17	1,4016	X 6 CR 17	Z 8 C 17	430 S18	X 8 CR 17	430
	F.3115-X5CRTI 17	1,4510	X 6 CRTI 17	Z 8C T 17		X 6 CRTI 17	430 TI
		1,4512	X 6 CRTI 12	Z 6CT 12	409 S19	X 6 CRTI 12	409
GRUPO GROUP GROUPE 3 FUNDICIÓN - CAST IRON - FONTE							
3.1	**F. GRIS GRAFITO ESFEROIDAL / CAST IRON SPHEROIDAL GRAPHITE / F. GRISE GRAPHITE SPHERIQUE (<700N/mm²/<200 HB)**						
		0.7033	GGG 35-3	FGS 370-71	GR.350/22	GJS 370-17	
		0.7040	GGG 40	FGS 400-12	GR.420-12	GJS 400-15	GR.60-40-18
		0.7050	GGG 50	FGS 500-7	500/7	GJS 500-7	65-45-12
		0.7060	GGG 60	FGS 600-3	GR.600/3	GJS 600-3	GR.80-55-06
		0.8135	GTS 35-10	MN 35-10	B 35-12	B 35-10	GR.32510
		0.8145	GTS 45-06	MN 450-6	P 45-06	P 45-06	GR.45006
		0.8155	GTS 55-04	MN 550-4	P 55-04	P 55-04	6004
3.2	**F. GRIS GRAFITO ESFEROIDAL / CAST IRON SPHEROIDAL GRAPHITE / F. GRISE GRAPHITE SPHERIQUE (700-1000N/mm² /200-300 HB)**						
		0.7070	GGG 70	FGS 700-2	GR.700/2	GS 700-2	100-70-03
		0.8080	GGG 80	FGS 800-2	GR.800/2	GS 800-2	GR.120-90-02
GRUPO GROUP GROUPE 4 TITANIO - TITANIUM - TITANE							
	TITANIO PURO / UNALLOYED TITANIUM / TITANE PUR (<700 N/mm² / <200 HB)						
		3,7024	TI 99,5 GRADO 1	T 35			
		3,7034	TI 99,7 GRADO 2	T 40			
		3,7055	TI 99,4 GRADO 3	T 50			
		3,7065	TI 4	T 60			
	TITANIO ALEADO / ALLOYED TITANIUM / ALLIAGES TITANE (< 900 N/mm² / <270 HB)						
		3,7114	TIAL 5 SN 2				
		3,7124	TICU 2,5	TU 2			
		3,7164	TIAL 6 V 4	T-AGV	2 TA 10		

TABLA MATERIALES
Material Table
Tableau de Materiaux

	España Spain - Espagne	Alemania Germany - Allemagne		Francia France	Reino Unido UK - Royaume-Uni	Italia Italy - Italie	EE.UU. USA - États-Unis
	UNE	N° MATERIAL	DIN	AFNOR	B.S.	UNI	AISI
GRUPO GROUP GROUPE 5 **COBRE - LATÓN - BRONCE - COPPER - BRASS - BRONZE - CUIVRE - LAITON - BRONZE (< 700 N/mm² / <200-300 HB)**							
5.1	**BRONCES / BRONZE / BRONZES**						
		2,1020	CU SN 6				
	C 715O	2,1030	CU SN 8				
	ALEACIONES COBRE VIRUTA CORTA / SHORT CHIPPING COPPER / ALLIAGE CUIVRE COPEAUX COURTS						
		2,0360	CU ZN 40	CU ZN 40	CZ 109	P-CU ZN 40	C 28000
		2,0402	CU ZN 40 PB2	CU ZN 39 PB2	CZ 122		C 38000
	LATONES / BRASS / LAITONS (< 700 N/mm² / < 200-300 HB)						
		2,0250	CU ZN 20	CU ZN 20	CZ 103		C 24000
		2,0265	CU ZN 30	CU ZN 30	CZ 106	P-CU ZN 30	C 26000
		2,0321	CU ZN 37	CU ZN 37	CZ 108		C 27400
5.2	**ALEACIÓN Cu VIRUTA LARGA / LONG CHIPS ALLOYED Cu / ALLIAGE Cu COPEAUX LONGS (< 700 N/mm² / <200-300 HB)**						
		2,1245	CUBE 1,7	CU BE 1,7	CB101		C 17000
		2,1247	CUBE 2	CU BE 1,9			C 17200
GRUPO GROUP GROUPE 6 **ALUMINIO - MAGNESIO - ALUMINIUM - MAGNESIUM**							
6.1	**Al - Mg SIN ALEAR / UNALLOYED ALUMINIUM - MAGNESIUM / ALUMINIUM - MAGNESIUM SANS ALLIAGE (<350 N/mm² / <100 HB)**						
		3,0250	Al 99,5 H				
		3,0280	Al 99,8 H				
6.2	**ALEACIONES ALUMINIO / ALUMINIUM ALLOYS / ALLIAGES ALUMINIUM Si<10% (< 600 N/mm² / <180 HB)**						
	L-3811	3,0515	AlMn 1	3103	3103	P-ALMN 1,2 CU	A 93003
	L-3120-38-312	3,1325	AlCuMg 1	2017 A		P-AlCu4MgMnSi	A 92017
	L-3140-38-314	3,1355	AlCuMg 2	2024	2024	P-AlCu4-4MgMn	2024
	L-3710-38.371	3,4365	AlZnMgCu-1,5	7075	7075	P-AlZnMgCu-1,5	A 9775
	FUNDICIÓN ALUMINIO / CAST ALUMINIUM / FONTE ALUMINIUM						
		3,3292	GD-AlMg 9	A-G10SY 4	LM 10		A 05200
6.3	**ALEACIONES ALUMINIO / ALUMINIUM ALLOYS / ALLIAGES ALUMINIUM Si>10% (<600 N/mm² / <180 HB)**						
	L-256O-61	3,2381	G-AlSi 10 Mg	A-S10G		G-AlSi9Mg	A-0359.0
	L-253O	3,2583	G-AlSi 11	A-S12U	LM 20	G-AlSi13CuMn	A-04130
GRUPO GROUP GROUPE 7 **MATERIALES SINTÉTICOS - SYNTHETIC MATERIALS - MATERIELS SYNTHETIQUES**							
7.1	**TERMOPLÁSTICOS / THERMOPLASTICS / THERMOPLASTIQUES**						
		POLIPROPILENO			PP		
		POLISTIROL		PS			
		POLIVILNICLORITO			PVC		
		POLICARBONATO		MACRALON	PC		
	ULTRAMID	POLIAMIDA		PA			
		POLIMETILMETACRILATO		PLEXIGLAS	PMMA		
7.2	**DUROPLÁSTICOS / HARD-PLASTICS / PLASTIQUES DURS**						
	BAQUELITA						
	PERTINAX						
	MOLTOPREN						
	RESOPAL	GRAFITO					

TABLA USO TALADRADO
Drilling Use Table
Tableau Usage Perçage

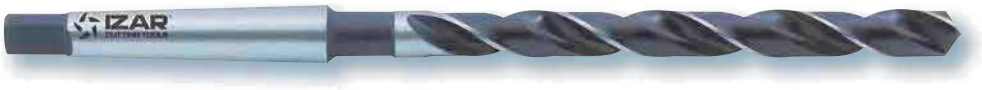
BROCAS
Twist Drills / Forets

DIN		340	340	1869	1869	IZAR Std.	345	345	345	IZAR Std.	341	1870
Tipo DIN Type		N	N		N		N	N	N		N	N
Ref.		**1030**	**9036**	**9040**	**1040**	**1045**	**9116**	**1110**	**9196**	**1154**	**1130**	**1140**
Material		HSS	MD/HM/ Carbure	HSSE 5% Co	HSS	HSS	HSSE 5% Co	HSS	MD/HM/ Carbure	Cobalt "S"	HSS	HSS
Recubrimiento Coating Revêtement		TIN						TIN		X-AlCr		
Pag.		**71**	**73**	**74**	**75**	**75**	**82**	**83**	**85**	**86**	**87**	**88**
Imagen Picture Photo												

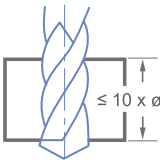
Material		● **Uso Recomendado** / **Recommended Use** / Utilisation Conseillée ○ **Uso Alternativo** / **Alternative Use** / Option d´emploi										
1.	**1.1** <850 N/mm²	●			●	●		●			●	●
	1.2 < 1000 N/mm²		●	●			●	○	●		○	○
	1.3 850-1300 N/mm²		●						●			
	1.4 ANTIDESGASTE Wear-Resistant Anti-Usure									●		
2. INOX Stainless Steel Aciers Inox	**2.1** AUSTENÍTICO Austenitic Austenitique		●	●			●		●			
	2.2 MARTENSÍTICO Martensitic Martensitique		●	●			●		●			
3. FUNDICIÓN Cast Iron Fonte	**3.1** < 700 N/mm²	●	○	●	●	●	●	●	○		●	●
	3.2 700-1000 N/mm²	●	○	●	●	●	●	●	○		●	●
4. Ti			●						●			
5. Cu - BRONCE - LATÓN Copper - Bronze - Brass Cuivre - Bronze - Laiton	**5.1** VIRUTA CORTA Short Chip Coupeaux Courts		●					○	●		○	○
	5.2 VIRUTA LARGA Long Chip Coupeaux Longs		●					○	●		○	○
6. ALUMINIO - MAGNESIO Aluminium - Magnesium	**6.1** NO ALEADO Unalloyed Sans Alliage	○			○	○						
	6.2 < 10% Si	○			○	○						
	6.3 > 10% Si	○			○	○						
7.	**7.1** TERMOPLÁSTICOS Thermo-Plastics Thermoplastiques											
	7.2 DUROPLÁSTICOS Hard-Plastics Plastiques Durs		●						●			

Ref. 1130

BROCA MANGO CÓNICO HSS. SERIE LARGA
HSS Morse Taper Shank Twist Drill. Long Series
Foret Queue Cóne Morse HSS. Serie Longue



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



Material		Vc	Avances mm/rev. Feed / Pas								
Grupo	Sub.	HSS	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 30	Ø 40
1	1.1	25-30	0,080	0,100	0,120	0,150	0,160	0,180	0,250	0,300	0,310	0,400
1	1.2	15-20	0,060	0,080	0,100	0,120	0,130	0,160	0,200	0,250	0,260	0,300
3	3.1	30-35	0,120	0,150	0,180	0,210	0,250	0,300	0,360	0,430	0,510	0,620
	3.2	25-30	0,100	0,120	0,140	0,170	0,200	0,240	0,280	0,340	0,410	0,490
5	5.1	30-40	0,100	0,120	0,140	0,170	0,200	0,240	0,280	0,340	0,410	0,490
	5.2	30-40	0,120	0,150	0,180	0,210	0,250	0,300	0,360	0,430	0,510	0,620

Vc= m/min.

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

D mm	L mm	l mm	CM	N° Art. HSS	€
5,00	155	74	1	15122	18,46
5,50	161	80	1	15125	24,71
6,00	161	80	1	15128	19,60
6,50	167	86	1	15131	20,03
7,00	174	93	1	15137	21,25
7,50	174	93	1	15140	22,35
8,00	181	100	1	15143	22,74
8,20	181	100	1	23621	31,01
8,50	181	100	1	15146	22,74
9,00	188	107	1	15152	25,07
9,50	188	107	1	15155	27,43
10,00	197	116	1	15164	28,26
10,50	197	116	1	15167	29,44
11,00	206	125	1	15170	28,26
11,50	206	125	1	15173	28,26
12,00	215	125	1	15176	30,23
12,50	215	134	1	15179	31,01
13,00	215	134	1	15182	31,01
13,50	223	134	1	15185	33,75
14,00	223	142	1	15188	34,88
14,50	245	142	2	15194	43,92
15,00	245	147	2	15197	43,92
15,50	251	147	2	15200	43,11
16,00	251	153	2	15203	44,70
16,50	257	153	2	15206	48,63
17,00	257	159	2	15209	48,63
17,50	263	159	2	15212	55,69
18,00	263	165	2	15218	54,11
18,50	269	165	2	15221	61,16
19,00	269	171	2	15224	57,26
19,50	275	171	2	15227	66,68
20,00	275	177	2	15230	61,16
20,50	282	177	2	15233	78,44
21,00	282	184	2	15236	70,60
21,50	289	184	2	15239	85,49
22,00	289	191	2	15242	80,03

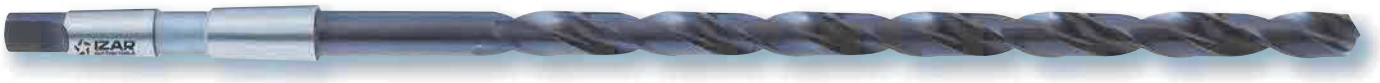
D mm	L mm	l mm	CM	N° Art. HSS	€
22,50	296	191	2	15245	87,90
23,00	296	198	3	15248	80,03
23,50	319	198	3	15251	101,94
24,00	327	198	3	15254	102,73
24,50	327	206	3	15257	109,08
25,00	327	206	3	15260	102,73
25,50	335	206	3	15263	123,92
26,00	335	214	3	15266	108,27
26,50	335	214	3	15269	127,86
27,00	343	214	3	15272	116,88
27,50	343	222	3	15275	150,60
28,00	343	222	3	15278	133,36
28,50	351	222	3	15281	178,88
29,00	351	230	3	15284	145,88
29,50	351	230	3	15287	178,88
30,00	351	230	3	15290	149,77
30,50	360	230	3	15293	205,43
31,00	360	239	3	15296	189,85
31,50	360	239	3	15299	219,61
32,00	397	239	4	15302	189,85
32,50	397	248	4	15305	241,51
33,00	397	248	4	15308	202,38
33,50	397	248	4	15311	238,44
34,00	406	257	4	15314	246,21
34,50	406	257	4	15317	262,00
35,00	406	257	4	15320	247,89
35,50	406	257	4	15323	262,00
36,00	416	267	4	15326	285,61
36,50	416	267	4	15329	362,49
37,00	416	267	4	15332	308,96
37,50	416	267	4	15335	359,19
38,00	426	277	4	15338	321,69
38,50	426	277	4	15341	409,45
39,00	426	277	4	15344	335,61
39,50	426	277	4	15347	409,45
40,00	426	277	4	15350	363,91

Ref. **1140**

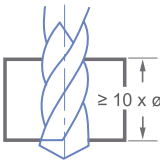
BROCA MANGO CÓNICO HSS. SERIE EXTRA LARGA

HSS Morse Taper Shank Twist Drill. Extra Long Series

Foret Queue Cóne Morse HSS. Serie Extra-Longue



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



Material		Vc	Avances mm/rev. Feed / Pas									
Grupo	Sub.	HSS	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 30	Ø 40
1	1.1	25-30	0,080	0,100	0,120	0,150	0,160	0,180	0,250	0,300	0,310	0,400
1	1.2	15-20	0,060	0,080	0,100	0,120	0,130	0,160	0,200	0,250	0,260	0,300
3	3.1	30-35	0,120	0,150	0,180	0,210	0,250	0,300	0,360	0,430	0,510	0,620
	3.2	25-30	0,100	0,120	0,140	0,170	0,200	0,240	0,280	0,340	0,410	0,490
5	5.1	30-40	0,100	0,120	0,140	0,170	0,200	0,240	0,280	0,340	0,410	0,490
	5.2	30-40	0,120	0,150	0,180	0,210	0,250	0,300	0,360	0,430	0,510	0,620

Vc= m/min.

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

D mm	L mm	l mm	CM	N° Art. HSS	€
8,00	265	165	1	15440	63,43
8,00	330	210	1	15443	79,07
8,50	265	165	1	15446	69,66
8,50	330	210	1	15449	80,83
9,00	275	175	1	15452	71,69
9,00	345	220	1	15455	91,15
9,50	275	175	1	15458	76,74
9,50	345	220	1	15461	92,11
10,00	285	185	1	15464	78,84
10,00	360	235	1	15467	97,21
10,50	285	185	1	15470	83,72
10,50	360	235	1	15473	100,22
11,00	300	195	1	15476	87,39
11,00	375	250	1	15479	103,94
11,50	300	195	1	15482	95,70
11,50	375	250	1	15485	119,50
12,00	310	205	1	15488	97,94
12,00	395	260	1	15491	122,03
12,50	310	205	1	15494	104,23
12,50	395	260	1	15497	136,23
13,00	310	205	1	15500	104,23
13,00	395	260	1	15503	136,23
13,50	325	220	1	15506	114,14
13,80	410	275	1	15509	139,89
14,00	325	220	1	15512	114,14
14,00	410	275	1	15515	139,89
14,50	340	220	2	15518	124,99
14,50	425	275	2	15521	152,34
15,00	340	220	2	15524	124,99
15,00	425	275	2	15527	152,34
15,50	355	230	2	15530	140,13
15,50	445	295	2	15533	168,05
16,00	355	230	2	15536	140,13
16,00	445	295	2	15539	168,05
16,50	355	230	2	15542	151,01
16,50	445	295	2	15545	181,59
17,00	355	230	2	15548	151,01
17,00	445	295	2	15551	181,59
17,50	370	245	2	15554	166,17
17,50	465	310	2	15557	199,93

D mm	L mm	l mm	CM	N° Art. HSS	€
18,00	370	245	2	15560	166,17
18,00	465	310	2	15563	199,93
18,50	370	245	2	15566	180,12
18,50	465	310	2	15569	216,08
19,00	370	245	2	15572	180,12
19,00	465	310	2	15575	216,08
19,50	385	260	2	15578	192,39
19,50	490	325	2	15581	233,86
20,00	385	260	2	15584	192,39
20,00	490	325	2	15587	233,86
20,50	385	260	2	15590	217,91
20,50	490	325	2	15593	261,65
21,00	385	260	2	15596	217,91
21,00	490	325	2	15599	261,65
21,50	405	270	2	15602	232,37
21,50	515	345	2	15605	280,84
22,00	405	270	2	15608	232,37
22,00	515	345	2	15611	280,84
22,50	405	270	2	15614	264,80
22,50	515	345	2	15617	317,00
23,00	405	270	2	15620	264,80
23,00	515	345	2	15623	317,00
23,50	425	270	3	15626	290,92
23,50	535	345	3	15629	352,79
24,00	440	290	3	15632	290,92
24,00	555	365	3	15635	352,79
24,50	440	290	3	15638	301,51
24,50	555	365	3	15641	371,78
25,00	440	290	3	15644	301,51
25,00	555	365	3	15647	371,78
25,50	440	290	3	15650	311,63
25,50	555	365	3	15653	410,73
26,00	440	290	3	15656	311,63
26,00	555	365	3	15659	410,73
26,50	440	290	3	15662	319,13
26,50	555	365	3	15665	423,78
27,00	460	305	3	15668	319,13
27,00	580	385	3	15671	423,78
27,50	460	305	3	15674	340,45
27,50	580	385	3	15677	458,42