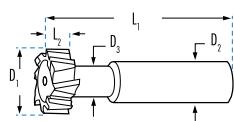
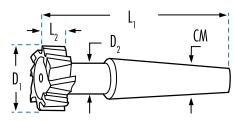


FRESAS PARA RANURAR

Ref. FF17

RANURAR
EN "T"
DIN
851A

Ref. FF17C

RANURAR
EN "T"
DIN
851BTOL D1
d11 TOL D2
h6

FF17

D ₁ x L ₂ mm	D ₂ mm	D ₃ mm	Z	L ₁ mm	HSSCo €	TiAIN €
11,0x4,0	10	4	4	53,5	106,12	130,40
12,5x6,0	10	5	6	57,0	110,31	137,91
16,0x8,0	10	7	6	62,0	121,30	153,89
18,0x8,0	12	8	8	70,0	127,77	164,54
21,0x9,0	12	10	8	74,0	140,72	197,66
25,0x11,0	16	12	8	82,0	158,82	215,25
32,0x14,0	16	15	10	90,0	200,34	279,15
40,0x18,0	25	19	10	108,0	277,89	389,15
50,0x22,0	32	25	10	124,0	334,15	438,22
60,0x28,0	32	30	10	139,0	349,30	458,13
72,0x35,0	32	35	10	153,0	364,49	478,05

TOL D2
h12

FF17C

D ₁ x L ₂ mm	CM	ROSCA	D ₂ mm	L ₁ mm	HSSCo €	TiAIN €
18,0x8,0	1	M6	8	70	139,21	172,62
21,0x9,0	2	M10	10	74	152,85	189,53
25,0x11,0	2	M10	12	82	159,35	197,60
32,0x14,0	2	M10	16	90	212,52	263,53
40,0x18,0	3	M12	20	108	268,68	333,16
50,0x22,0	4	M16	25	124	354,87	440,02
60,0x28,0	4	M16	31	139	469,53	582,21
72,0x35,0	5	M20	36	153	637,31	790,25

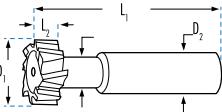
FRESA DE 1/4 DE CÍRCULO PARA
REMATADO DE ARISTAS

4 Z

HSSCo
8%
DIN
6518N

	TOL H11	js15	TOL h6	D ₂ mm	L ₁ mm	€
	R	D ₁ mm				
FF1/4R1	1,0	8		10	60	74,32
FF1/4R1,50	1,5	9		10	60	71,88
FF1/4R2	2,0	10		10	60	60,48
FF1/4R2,50	2,5	11		10	60	69,58
FF1/4R3	3,0	12		12	60	69,32
FF1/4R3,50	3,5	13		12	60	90,28
FF1/4R4	4,0	14		12	60	76,98
FF1/4R4,50	4,5	15		12	60	102,90
FF1/4R5	5,0	16		12	60	86,26
FF1/4R5,50	5,5	19		16	67	102,90
FF1/4R6	6,0	20		16	67	86,41
FF1/4R6,50	6,5	21		16	71	130,97
FF1/4R7	7,0	22		16	71	118,09
FF1/4R7,50	7,5	23		16	71	142,56
FF1/4R8	8,0	24		16	71	118,09
FF1/4R8,50	8,5	25		25	85	174,63
FF1/4R9	9,0	26		25	85	153,91
FF1/4R9,50	9,5	27		25	85	183,53
FF1/4R10	10,0	28		25	85	153,91
FF1/4R10,50	10,5	31		25	90	213,82
FF1/4R11	11,0	32		25	90	205,48
FF1/4R12	12,0	34		25	90	169,30
FF1/4R12,50	12,5	41		25	100	219,87
FF1/4R13	13,0	42		25	100	272,54
FF1/4R14	14,0	44		25	100	282,80
FF1/4R15	15,0	46		25	100	352,06
FF1/4R16	16,0	48		25	100	323,59
FF1/4R18	18,0	52		32	112	417,39
FF1/4R20	20,0	56		32	112	468,92

Ref. FF16

TIPO
WOODRUFF
DIN
850BTOL D1
h12 TOL D2
h6

FF16

D ₁ x L ₂ mm	D ₂ mm	Z	L ₁ mm	HSSCo €	TiAIN €
4,5x1,0	6	6	50	60,33	71,35
7,5x1,5	6	6	50	62,82	75,50
7,5x2,0	6	6	50	62,82	75,50
10,5x2,0	6	6	50	67,58	81,47
10,5x2,5	6	6	50	67,58	81,47
10,5x3,0	6	6	50	67,58	81,47
13,5x3,0	10	6	56	68,65	85,76
13,5x4,0	10	6	56	68,65	85,76
16,5x3,0	10	6	56	69,27	91,83
16,5x4,0	10	6	56	69,27	91,83
16,5x5,0	10	6	56	69,27	88,84
19,5x4,0	10	8	63	78,86	104,18
19,5x5,0	10	8	63	78,86	99,82
19,5x6,0	10	8	63	78,86	99,82
22,5x5,0	10	8	63	86,38	115,71
22,5x6,0	10	8	63	86,38	116,28
22,5x8,0	10	8	63	86,38	116,28
25,5x6,0	10	10	63	101,16	144,01
28,5x6,0	10	10	63	102,91	145,74
28,5x8,0	10	10	63	102,91	145,74
28,5x10,0	12	10	71	102,91	145,74
32,5x7,0	12	10	71	127,62	174,41
32,5x8,0	12	10	71	127,62	174,41
32,5x10,0	12	10	71	127,62	174,41
45,5x10,0	12	12	71	201,88	287,01

FRESAS CÓNICAS ANGULARES, CON MANGO CILÍNDRICO HSSCo



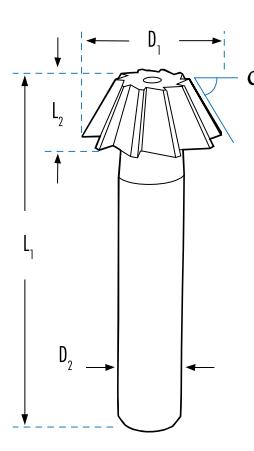
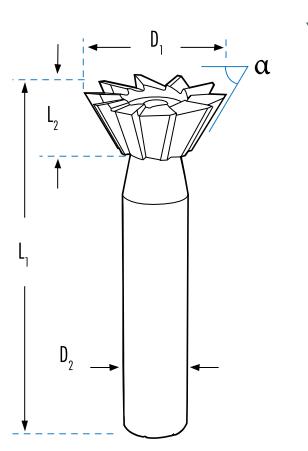
Ref. FF98
Ref. FF99

HSSCo

DIN
1833ATOL D1
js16TOL D2
h6

Ref. FF97
Ref. FF95

HSSCo

DIN
1833BTOL D1
js16TOL D2
h6

FF98

45°	D ₁ mm	α	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
FF981600	16	45°	12	60	4,0	8	107,32
FF982000	20	45°	12	63	5,0	10	113,79
FF982500	25	45°	12	67	6,3	12	139,13
FF983200	32	45°	16	71	8,0	14	155,25

FF97

45°	D ₁ mm	α	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
FF971600	16	45°	12	60	4,0	8	86,40
FF972000	20	45°	12	63	5,0	10	97,16
FF972500	25	45°	12	67	6,3	12	109,25
FF973200	32	45°	16	71	8,0	12	124,24

FF99

60°	D ₁ mm	α	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
FF991600	16	60°	12	60	6,3	8	107,28
FF992000	20	60°	12	63	8,0	10	113,74
FF992500	25	60°	12	67	10,0	12	139,11
FF993200	32	60°	16	71	12,5	14	155,22

FF95

60°	D ₁ mm	α	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
FF951600	16	60°	12	60	6,3	8	84,76
FF952000	20	60°	12	63	8,0	10	95,33
FF952500	25	60°	12	67	10,0	12	107,21
FF953200	32	60°	16	71	12,5	12	121,92

MEDIDAS ESPECIALES

							FF99
FF991600-50	16	50°	12	60	5,0	8	120,47
FF992000-50	20	50°	12	63	6,3	10	128,42
FF992500-50	25	50°	12	67	8,0	12	158,67
FF991600-55	16	55°	12	60	5,6	8	120,47
FF992000-55	20	55°	12	63	7,1	10	128,42
FF992500-55	25	55°	12	67	9,0	12	158,67
FF991600-75	16	75°	12	60	8,0	8	120,47
FF992500-75	25	75°	12	67	10,0	12	158,67
FF991600-80	16	80°	12	60	8,0	8	120,47
FF992500-80	25	80°	12	67	10,0	12	158,67
FF991600-85	16	85°	12	60	8,0	8	120,47
FF992500-85	25	85°	12	67	10,0	12	158,67

MEDIDAS ESPECIALES

							FF95
FF951600-50	16	50°	12	60	5,0	8	100,58
FF952000-50	20	50°	12	63	6,3	10	128,40
FF952500-50	25	50°	12	67	8,0	12	160,19
FF951600-55	16	55°	12	60	5,6	8	100,58
FF952000-55	20	55°	12	63	7,1	10	128,40
FF952500-55	25	55°	12	67	9,0	12	160,19
FF951600-75	16	75°	12	60	8,0	8	100,58
FF952500-75	25	75°	12	67	10,0	12	160,19

FRESAS FRONTALES CON MANGO CÓNICO SERIE CORTA

4-8 Z

30° N
CÓNICO

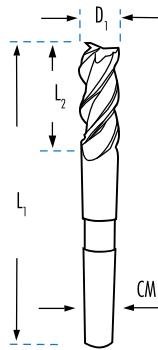
INOX

Al

2 Z



SERIE CORTA



Fresos

Rosa

DIN 845B	MATERIAL	FF09	FF35	FF39	FF10	FF46	FF48	DIN 326	HSSCo 8% BRILLANTE	TOL e8	
		HSSCo 8% BRILLANTE	HSSCo 8% TiN	HSSCo 8% TiAlN	HSSCo 8% BRILLANTE	HSSCo 8% TiN	HSSCo 8% TiAlN				
D ₁ mm	L ₁ mm	L ₂ mm	Z	CM	ROSCA	€	€	€	€	€	€
10,00	92	22	4	1	M6	56,26	78,12	80,45	83,46	104,26	107,30
12,00	111	26	4	2	M6	74,38	95,42	100,02	85,06	106,46	110,58
14,00	111	26	4	2	M10	82,41	104,49	110,53	96,64	118,96	124,74
15,00	111	26	4	2	M10	88,43	114,37	119,88	120,72	145,44	152,52
16,00	117	32	4	2	M10	82,05	108,46	113,68	99,67	126,08	130,96
18,00	117	32	4	2	M10	87,15	113,20	118,64	109,39	135,01	141,60
20,00	123	38	4	2	M10	97,22	127,47	133,62	120,31	150,13	157,45
22,00	123	38	5	2	M10	109,95	138,68	146,70	132,44	161,34	169,17
24,00	147	45	6	3	M12	166,29	190,79	203,72	184,66	211,75	222,03
25,00	154	45	5	3	M12	150,09	184,60	195,34	184,71	219,32	229,98
26,00	147	45	6	3	M12	151,56	191,68	195,34	202,91	236,05	247,56
28,00	154	50	5	3	M12	151,56	191,68	195,34	202,97	236,05	247,56
30,00	154	50	6	3	M12	167,47	220,24	224,42	238,32	281,90	295,63
32,00	178	53	6	4	M16	219,99	282,60	287,99	282,59	348,71	365,65
36,00	178	53	6	4	M16	250,58	313,00	322,12	311,53	378,52	396,93
40,00	188	63	6	4	M16	301,89	375,65	386,56	435,20	512,28	537,18
45,00	188	63	6	4	M16	388,81	476,04	489,74	494,66	566,44	593,98
50,00	233	75	6	5	M20	468,40	550,10	565,96	524,60	617,64	647,64
56,00	233	75	8	5	M20	646,16	715,59	736,21	746,99	798,30	837,11
63,00	241	90	8	5	M20	811,25	869,30	894,34	938,23	974,02	1.021,34

*Hasta fin de existencias

FRESAS FRONTALES CON MANGO CÓNICO SERIE LARGA DIN 845B/L

4-8 Z



30° N



CÓNICO

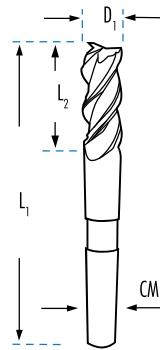


INOX



Al

SERIE LARGA



DIN 845B/L						MATERIAL	FF11	FF61	FF71	FF12	FF33	FF43
D ₁ mm	L ₁ mm	L ₂ mm	Z	CM	ROSCA	ACABADO	HSSCo 8% BRILLANTE	HSSCo 8% TiN	HSSCo 8% TiAlN	HSSCo 8% BRILLANTE	HSSCo 8% TiN	HSSCo 8% TiAlN
						CALIDAD	★★	★★★	★★★	★★	★★★	★★★
						DESBASTE	TOL k10	TOL k10	TOL k10	TOL k12	TOL k12	TOL k12
							€	€	€	€	€	€
10,00	115	45	4	1	M6	HSSCo 8%	102,20	124,56	128,78	149,16	170,45	176,24
12,00	138	53	4	2	M6	BRILLANTE	96,36	124,56	132,43	151,95	172,69	180,21
14,00	138	53	4	2	M10	★★	101,40	135,31	141,20	191,45	211,93	221,18
15,00	138	53	4	2	M10	★★★	111,32	141,86	148,02	220,17	243,51	254,17
16,00	148	63	4	2	M10	110,19	138,30	144,33	159,24	185,93	194,05	
18,00	148	63	4	2	M10	125,18	151,82	158,41	165,30	191,69	200,05	
20,00	160	75	4	2	M10	138,89	169,83	177,22	189,62	219,95	229,53	
22,00	160	75	5	2	M10	157,19	186,86	195,89	196,94	226,82	236,71	
24,00	192	90	5	3	M12	213,80	241,99	254,89	267,39	295,91	310,80	
25,00	184	80	5	3	M12	212,35	249,70	262,39	279,57	315,18	328,92	
26,00	192	90	5	3	M12	235,19	269,61	283,32	290,52	325,53	339,74	
28,00	192	90	5	3	M12	238,32	285,29	300,50	288,41	325,53	339,74	
30,00	192	90	5	3	M12	274,72	320,34	336,60	343,97	389,90	406,93	
32,00	229	100	6	4	M16	323,88	379,31	398,57	409,64	465,48	485,83	
36,00	231	106	6	4	M16	370,86	425,34	446,92	469,20	523,72	546,58	
40,00	250	125	6	4	M16	412,09	478,58	502,90	576,58	640,88	668,89	
45,00	250	125	6	4	M16	555,41	636,33	670,29	735,43	809,86	845,25	
50,00	268	110	6	5	M20	677,84	745,53	785,34	917,74	982,12	1.025,01	
56,00	308	150	8	5	M20	713,33	778,39	821,29	1.069,44	1.125,43	1.185,59	
63,00	338	180	8	5	M20	943,54	992,75	1.045,53	1.346,36	1.387,05	1.461,15	

JUEGOS DE FREASAS CON CORTE AL CENTRO EN ESTUCHES DE PLÁSTICO

2 Z

DIN
327

4 Z

DIN
844

REFERENCIA

PTF20

Nº FREASAS

8

TIPO

Ref. FF02

CALIDAD

HSSCo 8%

CONTENIDO

 $\frac{6}{2} \frac{8}{2} \frac{10}{2} \frac{12}{2}$

Ø mm

152,15

P.V.P. €

PTF60

8

Ref. FF60

TiAIN

 $\frac{6}{2} \frac{8}{2} \frac{10}{2} \frac{12}{2}$

Ø mm

241,25

REFERENCIA

PTF24

8

Ref. FF18

CALIDAD

HSSCo 8%

CONTENIDO

 $\frac{6}{2} \frac{8}{2} \frac{10}{2} \frac{12}{2}$

Ø mm

168,46

PTF64

8

Ref. FF20

TiAIN

 $\frac{6}{2} \frac{8}{2} \frac{10}{2} \frac{12}{2}$

Ø mm

255,58

2 Z

DIN
327

4 Z

DIN
844

REFERENCIA

PTF21

Nº FREASAS

6

TIPO

Ref. FF02

CALIDAD

HSSCo 8%

CONTENIDO

6-8-10-12-16-20

Ø mm

164,66

P.V.P. €

PTF61

6

Ref. FF60

TiAIN

6-8-10-12-16-20

Ø mm

250,50

REFERENCIA

PTF25

6

Ref. FF18

CALIDAD

HSSCo 8%

CONTENIDO

6-8-10-12-16-20

Ø mm

183,88

PTF65

6

Ref. FF20

TiAIN

6-8-10-12-16-20

Ø mm

265,21

2 Z

DIN
327

4 Z

DIN
844

REFERENCIA

PTF22

Nº FREASAS

6

TIPO

Ref. FF02

CALIDAD

HSSCo 8%

CONTENIDO

4-5-6-8-10-12

Ø mm

104,34

P.V.P. €

PTF62

6

Ref. FF60

TiAIN

4-5-6-8-10-12

Ø mm

167,80

REFERENCIA

PTF26

6

Ref. FF18

CALIDAD

HSSCo 8%

CONTENIDO

4-5-6-8-10-12

Ø mm

115,54

PTF66

6

Ref. FF20

TiAIN

4-5-6-8-10-12

Ø mm

178,15

JUEGOS DE FRESAS CON CORTE AL CENTRO EN ESTUCHES METÁLICOS



REFERENCIA	FF010787	FF020787	FT020787	FF600787
Nº FRESAS	6	6	6	6
TIPO	Ref. FF01	Ref. FF02	Ref. FT02	Ref. FF60
CALIDAD	HSS	HSSCo 8%	TIAISIN	TIAIN
CONTENIDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	96,58	127,73	148,94	191,18

REFERENCIA	FF010447	FF020447	FT020447	FF600447
Nº FRESAS	6	6	6	6
TIPO	Ref. FF01	Ref. FF02	Ref. FT02	Ref. FF60
CALIDAD	HSS	HSSCo 8%	TIAISIN	TIAIN
CONTENIDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	144,47	191,59	223,42	277,40

JUEGOS DE FRESAS EN ESTUCHES METÁLICOS



REFERENCIA	FF030787	FF040787	FT040787	FF540787
Nº FRESAS	6	6	6	6
TIPO	Ref. FF03	Ref. FF04	Ref. FT04	Ref. FF54
CALIDAD	HSS	HSSCo 8%	TIAISIN	TIAIN
CONTENIDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	94,99	125,28	146,78	191,17

REFERENCIA	FF030847	FF040847	FT040847	FF540847
Nº FRESAS	6	6	6	6
TIPO	Ref. FF03	Ref. FF04	Ref. FT04	Ref. FF54
CALIDAD	HSS	HSSCo 8%	TIAISIN	TIAIN
CONTENIDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	141,94	190,43	223,14	274,33

REFERENCIA	FF250847	FT250847	FF270847
Nº FRESAS	6	6	6
TIPO	Ref. FF25	Ref. FT25	Ref. FF27
CALIDAD	HSSCo 8%	TIAISIN	TIAIN
CONTENIDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	354,47	413,37	426,37



JUEGOS DE FRESES EN ESTUCHES METÁLICOS

4 Z

DIN
844

Ref. FF180787

REFERENCIA	FF180787	FT180787	FF200787
Nº FRESAS	6	6	6
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
CALIDAD	HSSCo 8%	TiAlSiN	TiAlN
CONTENIDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	133,38	155,54	201,52



Ref. FF180847

REFERENCIA	FF180847	FT180847	FF200847
Nº FRESAS	6	6	6
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
CALIDAD	HSSCo 8%	TiAlSiN	TiAlN
CONTENIDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	208,51	243,17	289,32



EXPOSITOR DE METACRILATO

Ref. MF-01

MF-01

Contenido: 163 Fresas

Ref. FF13	1 Z	HSSCo	AI	SERIE CORTA	$\frac{\emptyset}{\text{Cant.}}$	$\frac{5 \times 8}{5}$	Mango	$\frac{6 \times 8}{5}$	Mango
Ref. FF14	1 Z	HSSCo	AI	SERIE LARGA	$\frac{\emptyset}{\text{Cant.}}$	$\frac{5 \times 8}{5}$	Mango	$\frac{6 \times 8}{5}$	Mango
Ref. FF02	2 Z		HSSCo	DIN 327N		$\frac{\emptyset}{\text{Cant.}}$	2 3 4 5 6 7 8 9 10 12 14 16	$\frac{5}{5} \frac{5}{5} \frac{3}{3}$	
Ref. FF18	4 Z		HSSCo	DIN 844N		$\frac{\emptyset}{\text{Cant.}}$	2 3 4 5 6 7 8 9 10 12 14 16	$\frac{5}{5} \frac{5}{5} \frac{3}{3}$	
Ref. FF25	4 Z		HSSCo	DIN 844N		$\frac{\emptyset}{\text{Cant.}}$	6 7 8 9 10 11 12 13 14 15 16	$\frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3} \frac{3}{3}$	

Dimensiones: ancho 245 x fondo 210 x alto 350 mm

NOTA: Composiciones especiales bajo demanda

P.V.P. 4.311,24 €

PARÁMETROS DE CORTE ORIENTATIVOS FRESAS HSSCO 8%

Fresas

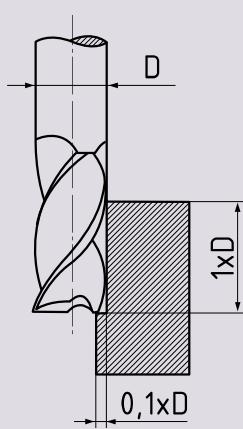
Rosa

		DIÁMETRO Ø (mm)												
		2	4	6	8	10	12	18	22	26	30	32	36	40
Rosa		ACERO BLANDO 70 kg/mm ²	V/C 39	RPM	6207	3104	2069	1552	1241	1035	690	564	477	414
		AVANCE (mm/min)		2	50	56	74	84	82	81	80	81	76	68
			Nº cortes	3	74	84	112	126	123	121	120	122	115	102
Roja		ACERO TRATADO 120 kg/mm ²	V/C 20	RPM	3183	1592	1061	796	637	531	354	289	245	212
		AVANCE (mm/min)		2	25	29	38	43	42	41	41	42	39	35
			Nº cortes	3	38	43	57	64	63	62	62	63	59	52
Azul		INOXIDABLE	V/C 15	RPM	2387	1194	796	597	477	398	265	217	184	159
		AVANCE (mm/min)		2	19	21	29	32	32	31	31	31	29	26
			Nº cortes	3	29	32	43	48	47	47	46	47	44	39
Verde		ALUMINIO	V/C 230	RPM	36606	18303	12202	9151	7321	6101	4067	3328	2816	2440
		AVANCE (mm/min)		2	293	329	439	494	483	476	472	479	451	400
			Nº cortes	3	439	494	659	741	725	714	708	719	676	600
Naranja		TITANIO	V/C 12	RPM	1910	955	637	477	382	318	212	174	147	127
		AVANCE (mm/min)		2	15	17	23	26	25	25	25	25	24	21
			Nº cortes	3	23	26	34	39	38	37	37	38	35	31
Amarillo				4	31	34	46	52	50	50	49	50	47	42

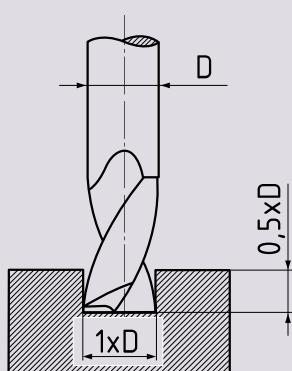
* Para fresas recubiertas multiplicar los parámetros de la tabla por 1.3 y para fresas ASP 60 multiplicar por 1.8

* V/C: Velocidad de corte (m/min)

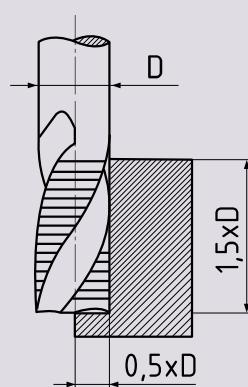
PROFUNDIDAD DE PASADA EN FUNCIÓN DE LA OPERACIÓN A REALIZAR



FRESADO LATERAL



VACIADO



FRESADO BASTO