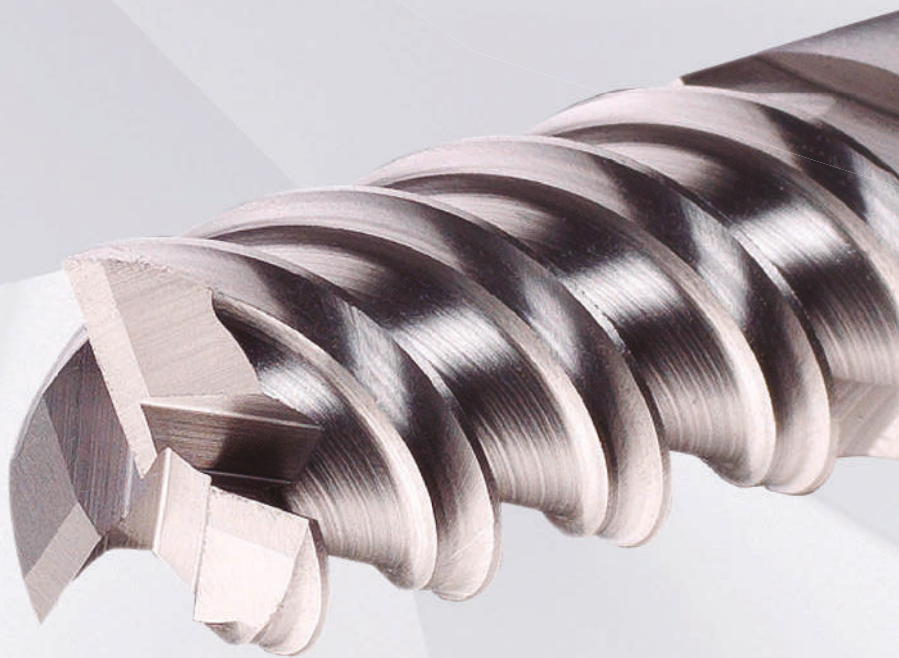


AIR/ALDE

FRESAS



BLUE-MASTER[®]
by *celesa*

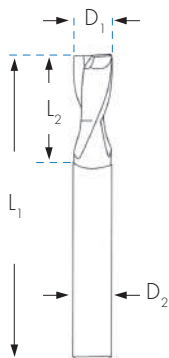
CUTTING TECHNOLOGIES

Pol. ind. Eitua nº52 Pab. 5A - 48240 Berriz (Bizkaia)
T.946236010/F.946236011 - airtalde@airtalde.es - www.airtalde.es

FRESAS FRONTALES SERIE CORTA DE 2 CORTES DIN 327 Y DIN 844
2Z

INOX
Al
**TOL D₂
h6**

Ref. FFAL


SERIE CORTA


Consultar dimensiones DIN844 en páginas sucesivas



DIN 327	MATERIAL ACABADO CALIDAD				FF01	FF02	FF60	FT02	FF92	FP05	FT12	FP08	FT01	DIN 844	FFAL
					HSS BRILLANTE ★	HSSCo 8% BRILLANTE ★★	HSSCo 8% TiAlN ★★★	HSSCo 8% TiAlSiN ★★★★	HSSCo 8% BRILLANTE ★★	ASP 60 BRILLANTE Premium Quality	ASP 60 TiAlSiN Premium Quality	ASP 60 BRILLANTE Premium Quality	ASP 60 TiAlSiN Premium Quality		HSSCo 8% BRILLANTE Al
	D ₁ mm	L ₁ mm	L ₂ mm	D ₂ mm	TOL e8 €	TOL e8 €	TOL e8 €	TOL e8 €	TOL h10 €	TOL e8 €	TOL e8 €	TOL h10 €	TOL h10 €		TOL e8 €
1,00	47	2,5	6							23,85	30,89	34,77	41,50		
2,00	48	4,0	6		10,84	13,73	22,52	26,26	27,95	20,12	27,46	30,69	37,73		16,61
2,50	49	5,0	6		10,84*	13,73	22,52	26,26	29,73						16,94
3,00	49	5,0	6		10,84	13,73	22,52	26,26	28,09	20,12	27,46	30,69	37,73		16,57
3,50	50	6,0	6			14,91	23,68	27,59	29,73						17,58
4,00	51	7,0	6		10,63	13,73	22,53	26,27	28,09	18,29	26,25	30,69	37,73		17,06
4,50	52	8,0	6		10,63*	16,40	24,99	29,14	29,73						18,67
5,00	52	8,0	6		10,63	13,73	22,53	26,27	28,09	18,29	26,25	30,69	37,73		17,06
5,50	52	8,0	6			16,97	25,64	29,89	29,73						20,89
6,00	52	8,0	6		10,63	13,73	22,53	26,27	28,09	18,29	26,25	30,69	37,73		18,49
6,50	60	10,0	10		15,86*	22,21	32,13	37,46							27,33
7,00	60	10,0	10		15,86	21,55	31,45	36,67	33,85	27,60	36,30	40,61	53,70		24,85
7,50	61	11,0	10			21,35	31,24	36,43							29,13
8,00	61	11,0	10		12,90	17,75	27,78	32,41	30,14	23,97	35,59	40,61	53,70		22,49
8,50	61	11,0	10			23,98	34,75	40,52							30,71
9,00	61	11,0	10		16,49	21,92	32,85	38,29	34,65	29,51	39,20	40,61	55,32		27,84
9,50	63	13,0	10			23,46	34,00	39,63							
10,00	63	13,0	10		13,57	17,63	28,61	33,53	29,90	26,70	36,27	40,61	55,32		24,31
10,50	70	13,0	12			28,18	42,80	49,21							
11,00	70	13,0	12			26,76	39,16	45,67	42,23						33,57
12,00	73	16,0	12		17,73	23,62	35,86	41,81	39,86	34,07	46,81	55,30	70,30		30,49
13,00	73	16,0	12			34,44	48,29	56,31	52,66						43,45
14,00	73	16,0	12		25,22	34,44	48,29	56,31	52,66	41,53	57,40	62,49	77,79		42,65
15,00	73	16,0	12			38,51	54,70	63,80	56,64						46,85
16,00	79	19,0	16		26,33	34,09	50,20	58,55	57,54	51,99	68,04	73,07	90,77		45,64
17,00	79	19,0	16			46,27	64,10	74,75							63,51
18,00	79	19,0	16		34,49	46,27	64,16	74,83	70,08	65,84	81,15	92,62	139,90		57,01
19,00	79	19,0	16			57,82	77,70	90,63							76,89
20,00	88	22,0	16			54,73	74,77	87,20							
20,00	88	22,0	20		40,43	54,73	74,77	87,20	83,69	77,55	97,61	107,97	142,89		65,90
22,00	88	22,0	20		55,46	72,29	99,09	115,54	109,52	98,77	136,91	128,22	164,10		91,74
24,00	102	26,0	25		69,60	93,29	123,04	143,46	130,88						137,87
25,00	102	26,0	25		69,62	90,88	117,98	137,58	120,27	131,86	164,96	168,08	207,67		116,77
26,00	102	26,0	25			106,61	163,36	187,83							183,38
28,00	102	26,0	25		87,21	114,76	153,09	179,38							142,09
30,00	102	26,0	25		100,34	130,76	169,47	197,62	174,20						163,51
32,00	112	32,0	32		104,05	134,32	172,58	201,25							173,18
36,00	112	32,0	32		133,96	179,66	221,69	258,52							
40,00	130	38,0	40		162,87	220,62	274,10	319,64							

*Hasta fin de existencias

FRESAS FRONTALES SERIE LARGA DE 2 CORTES DIN 327 Y DIN 844/L

2Z



Ref. FFLAL



SERIE LARGA



DIN 327/L				MATERIAL ACABADO CALIDAD					DIN 844/L			
				FF06	FF67	FT06	FF15	FP21				FFLAL
				HSSCo 8% BRILLANTE ★★ TOL e8	HSSCo 8% TiAlN ★★★ TOL e8	HSSCo 8% TiAlSiN ★★★★ TOL e8	HSSCo 8% BRILLANTE ★★ TOL h10	ASP 60 BRILLANTE Premium Quality TOL h10				
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	L1 mm	L2 mm	D2 mm	€
2,00	54	7	6	15,13	23,87	27,83	30,73	36,05	54	10	6	25,03
2,50	56	8	6	15,21	23,87	27,83	30,77		56	12	6	
3,00	56	8	6	15,13	23,93	27,91	30,77	37,15	56	12	6	25,15
3,50	59	10	6	17,19	28,42	33,17			59	15	6	
4,00	63	11	6	15,20	23,93	27,91	30,77	37,15	63	19	6	25,31
4,50	63	11	6	17,19	24,44	28,50			63	19	6	
5,00	68	13	6	15,20	23,93	27,91	32,58	39,33	68	24	6	25,43
5,50	68	13	6	17,19	28,42	33,17			68	24	6	
6,00	68	13	6	15,20	23,93	27,91	29,44	35,53	68	24	6	26,40
6,50	80	16	10	28,51	46,65	53,64			68	24	6	
7,00	80	16	10	25,10	35,04	40,87	37,13	44,40	80	30	10	
7,50	88	19	10						80	30	10	
8,00	88	19	10	22,09	31,99	37,33	37,13	44,81	88	38	10	36,08
8,50	88	19	10	33,81	46,01	53,65			88	38	10	
9,00	88	19	10	29,72	40,52	47,23	40,73	48,72	88	38	10	38,05
10,00	95	22	10	24,34	37,06	43,21	40,56	49,19	95	45	10	36,08
11,00	102	22	12	38,37	51,76	60,35	54,02		102	45	12	50,56
12,00	110	26	12	34,99	48,94	57,08	52,98	63,66	110	53	12	46,67
13,00	110	26	12						110	53	12	
14,00	110	26	12	46,12	59,82	69,75	70,29	79,79	110	53	12	53,42
15,00	123	32	16						110	53	12	
16,00	123	32	16	52,86	73,82	86,10	80,00	95,22	123	63	16	65,21
17,00	123	32	16						123	63	16	
18,00	123	32	16	60,39	86,65	101,02	96,14	114,41	123	63	16	80,70
20,00	141	38	20	69,45	95,05	110,85	104,25	124,05	141	75	20	96,26
22,00	141	38	20	95,22	128,98	150,40	129,22	153,79	141	75	20	
24,00	166	45	25	144,90	164,10	188,67	173,83		166	90	25	
25,00	166	45	25	136,60	173,56	202,39	158,93	189,13	166	90	25	
26,00	166	45	25	181,38	193,23	222,17			166	90	25	
28,00	166	45	25	165,53	211,30	246,41			166	90	25	
30,00	166	45	25	184,01	227,46	265,24	236,75		166	90	25	
32,00	186	53	32	254,58	296,52	345,76	308,48		186	106	32	
36,00	186	53	32	288,02	337,14	393,14			186	106	32	
40,00	196	63	32	377,43	455,50	531,18			196	125	40	

FRESAS FRONTALES SERIE CORTA DE 3 CORTES DIN 844 Y DIN 327

Fresas

Rosa

3Z









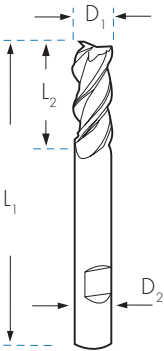
INOX

Al

TOL D2
h6



SERIE CORTA



DIN 844				MATERIAL				FF63		FF75		FT63		FF73		FF76		FT73		DIN 327				FP06		FT03	
				ACABADO				HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%						ASP 60		ASP 60	
				BRILLANTE				BRILLANTE		TiAlN		TiAlSiN		BRILLANTE		TiAlN		TiAlSiN						BRILLANTE		TiAlSiN	
				★★				★★★		★★★★		★★		★★★		★★★★		★★★★						Premium Quality		Premium Quality	
				DESABASTE				TOL k10		TOL k10		TOL k10		NR		NR		NR						TOL k12		TOL k12	
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	L1 mm	L2 mm	D2 mm	€	€			
1,00	49	3	6																	47	2,5	6	25,63	31,92			
2,00	51	7	6	15,09	23,75	27,69														48	4,0	6	20,83	31,18			
2,50	52	8	6	15,09	23,75	27,69														49	5,0	6					
3,00	52	8	6	15,05	23,75	27,69														49	5,0	6	20,83	31,18			
3,50	55	11	6	15,55	24,19	28,36														50	6,0	6					
4,00	55	11	6	15,08	23,75	27,69														51	7,0	6	20,83	31,18			
4,50	57	13	6	16,61	25,10	29,27														52	8,0	6					
5,00	57	13	6	15,08	23,86	27,83														52	8,0	6	20,83	31,18			
5,50	57	13	6	20,50	32,65	38,07														52	8,0	6					
6,00	57	13	6	15,88	26,68	31,11	43,05	52,00	59,77											52	8,0	6	20,83	31,18			
6,50	66	16	10	28,48	43,67	50,22														60	10,0	10					
7,00	66	16	10	22,19	32,07	37,55	50,92	62,07	71,37											60	10,0	10	28,04	38,00			
7,50	69	19	10	28,69	44,13	50,75														61	11,0	10					
8,00	69	19	10	19,82	29,60	34,53	44,12	51,39	59,94											61	11,0	10	28,04	38,00			
8,50	69	19	10	30,24	45,58	52,40														61	11,0	10					
9,00	69	19	10	24,75	35,50	41,39	52,36	61,46	71,67											61	11,0	10					
9,50	72	22	10	32,68	47,89	55,06														63	13,0	10					
10,00	72	22	10	21,47	32,13	37,46	44,39	54,63	63,69											63	13,0	10	29,72	39,31			
11,00	79	22	12	34,10	50,71	58,31	64,06	73,80	86,08											70	13,0	12					
12,00	83	26	12	26,96	38,35	44,72	53,41	62,87	73,32											73	16,0	12	38,34	49,71			
13,00	83	26	12	42,88	58,96	67,80	69,77	81,27	94,79											73	16,0	12					
14,00	83	26	12	36,73	50,30	58,66	60,95	71,71	83,63											73	16,0	12	49,67	60,54			
15,00	83	26	12	44,06	61,19	70,37	77,14	84,44	93,08											73	16,0	12					
16,00	92	32	16	40,33	56,13	65,46	73,88	89,10	103,93											79	19,0	16	58,42	69,69			
17,00	92	32	16	66,00	86,66	99,63														79	19,0	16					
18,00	92	32	16	50,67	68,54	79,93	80,84	98,09	114,39											79	19,0	16	71,89	85,24			
19,00	92	31	16	80,71	99,70	114,65														79	19,0	16					
20,00	104	38	20	58,18	77,25	90,10	98,63	115,38	134,55											88	22,0	20	85,50	102,05			
22,00	104	38	20	92,75	116,64	134,12														88	22,0	20	114,13	145,99			
25,00	121	45	25	121,18	154,43	177,58	149,40	170,73	199,10											102	26,0	25	143,28	164,63			
28,00	121	45	25	140,77	172,69	198,55														102	26,0	25					
30,00	121	45	25	173,17	202,82	233,20	185,79	219,21	255,64											102	26,0	25					
32,00	133	53	32	176,26	218,89	251,68														112	32,0	32					

FRESAS FRONTALES SERIE LARGA DE 3 CORTES DIN 844/L

3Z



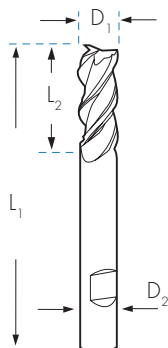
INOX

Al

**TOL D1
k10**

**TOL D2
h6**

SERIE LARGA



DIN 844/L		MATERIAL ACABADO CALIDAD		FF83	FF86	FT83
				HSSCo 8% BRILLANTE ★★	HSSCo 8% TiAIN ★★★	HSSCo 8% TiAlSiN ★★★★
				€	€	€
D1 mm	L1 mm	L2 mm	D2 mm			
1,00	52	7	6			
2,00	54	10	6	20,34	29,78	34,72
2,50	56	12	6	20,72	29,73	34,68
3,00	56	12	6	20,34	29,69	34,62
3,50	59	15	6	22,76	31,83	37,13
4,00	63	19	6	20,34	29,69	34,62
4,50	63	19	6	22,76	31,83	37,13
5,00	68	24	6	20,34	29,69	34,62
5,50	68	24	6	22,76	31,83	37,13
6,00	68	24	6	22,79	31,05	36,21
6,50	68	24	6			
7,00	80	30	10	30,87	41,57	48,48
7,50	80	30	10			
8,00	88	38	10	28,24	37,50	43,73
8,50	88	38	10			
9,00	88	38	10	34,36	44,48	51,88
9,50	88	38	10			
10,00	95	45	10	28,39	41,24	48,09
11,00	102	45	12	43,65	56,16	65,49
12,00	110	53	12	36,12	50,27	58,63
13,00	110	53	12			
14,00	110	53	12	47,05	61,47	71,69
15,00	110	53	12			
16,00	123	63	16	53,01	74,09	86,41
17,00	123	63	16			
18,00	123	63	16	64,24	87,58	102,14
19,00	123	63	16			
20,00	141	75	20	75,41	100,21	116,85
22,00	141	75	20	95,11	129,22	150,69
25,00	166	90	25	138,61	170,71	199,08
28,00	166	90	25	154,31	204,42	238,40
30,00	166	90	25	171,80	218,36	254,64
32,00	186	106	32	204,41	245,93	286,80

FRESAS FRONTALES SERIE CORTA Y LARGA VARIOS CORTES DIN 844 Y DIN 844/L

Fresas

Rosa

4-6 Z

INOX

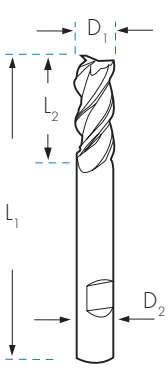
Al

TOL D1
k10

TOL D2
h6



SERIE CORTA



SERIE LARGA



DIN 844					FF18		FF20		FT18		FP07		FT09	
MATERIAL					HSSCo 8%		HSSCo 8%		HSSCo 8%		ASP 60		ASP 60	
ACABADO					BRILLANTE		TiAIN		TiAlSiN		BRILLANTE		TiAlSiN	
CALIDAD					★★		★★★		★★★★		Premium Quality		Premium Quality	
D1 mm	L1 mm	L2 mm	D2 mm	Z	€		€		€		€		€	
1,00	49	3	6	4							28,42		33,75	
2,00	51	7	6	4	15,14		23,82		27,76		20,77		28,47	
2,50	52	8	6	4	15,14		23,82		27,76		20,77		28,47	
3,00	52	8	6	4	15,14		23,82		27,76		20,77		28,47	
3,50	55	11	6	4	15,59		24,26		28,30					
4,00	55	11	6	4	15,14		23,82		27,76		20,77		28,47	
4,50	57	13	6	4	16,64		25,15		29,32					
5,00	57	13	6	4	15,14		23,82		27,76		20,77		28,47	
5,50	57	13	6	4	24,20		32,65		38,07					
6,00	57	13	6	4	15,80		24,56		28,63		20,77		28,47	
6,50	66	16	10	4	24,15		33,99		39,63					
7,00	66	16	10	4	22,19		32,08		37,40		28,23		40,62	
7,50	69	16	10	4	28,60		38,18		44,53					
8,00	69	19	10	4	19,53		29,72		34,66		28,11		40,22	
8,50	69	19	10	4	29,82		40,38		47,10					
9,00	69	19	10	4	24,64		35,54		41,45		33,21		43,87	
9,50	69	19	10	4	31,55		42,01		48,98					
10,00	72	22	10	4	21,36		32,26		37,63		29,85		41,23	
11,00	79	22	12	4	29,71		41,98		48,96					
12,00	83	26	12	4	26,96		37,29		43,49		39,42		54,59	
13,00	83	26	12	4	38,03		51,87		60,49					
14,00	83	26	12	4	35,89		50,60		59,02		48,98		58,15	
15,00	83	26	12	4	40,99		56,55		65,95					
16,00	92	32	16	4	40,00		56,41		65,76		57,41		68,87	
17,00	92	32	16	4	49,84		67,54		78,76					
18,00	92	32	16	4	49,27		68,61		79,99		70,02		86,13	
19,00	92	31	16	4	58,36		77,64		90,52					
20,00	104	38	20	4	57,68		77,64		90,52		82,35		111,89	
22,00	104	38	20	4	80,07		107,61		125,50		108,50		131,97	
24,00	121	45	25	5	100,66		126,81		147,88					
25,00	121	45	25	5	96,22		126,21		147,19		140,00		174,02	
26,00	121	45	25	5	115,50		153,21		181,25					
28,00	121	45	25	5	114,53		153,55		185,20					
30,00	121	45	25	6	133,14		170,43		208,65					
32,00	133	53	32	6	136,51		174,36		213,46					
36,00	133	53	32	6	206,74		250,33		306,43					
40,00	155	63	32	6	248,54		304,43		372,66					

DIN 844/L					FF21		FF23		FT21		FP20	
MATERIAL					HSSCo 8%		HSSCo 8%		HSSCo 8%		ASP 60	
ACABADO					BRILLANTE		TiAIN		TiAlSiN		BRILLANTE	
CALIDAD					★★		★★★		★★★★		Premium Quality	
L1 mm	L2 mm	D2 mm	Z		€		€		€		€	
52	7	6	4									
54	10	6	4		18,48		27,05		31,54		29,51	
56	12	6	4		18,38		27,05		31,54			
56	12	6	4		18,48		27,06		31,55		29,51	
59	15	6	4		24,29		32,80		38,24			
63	19	6	4		18,48		27,06		31,55		29,51	
63	19	6	4		24,29		32,80		38,24			
68	24	6	4		18,48		27,06		31,55		29,51	
68	24	6	4		24,13		32,80		38,24			
68	24	6	4		18,48		27,06		31,55		29,51	
68	24	6	4									
80	30	10	4		28,04		37,62		43,88		44,02	
80	30	10	4									
88	38	10	4		25,47		33,90		39,53		44,02	
88	38	10	4									
88	38	10	4		29,02		39,52		46,09		44,02	
88	38	10	4									
95	45	10	4		25,58		37,41		43,64		44,02	
102	45	12	4		36,34		49,30		57,51			
110	53	12	4		33,47		46,83		54,63		63,83	
110	53	12	4									
110	53	12	4		43,80		57,10		66,59		73,68	
110	53	12	4									
123	63	16	4		47,88		67,18		78,35		91,30	
123	63	16	4									
123	63	16	4		58,49		79,97		93,26		116,82	
123	63	16	4									
141	75	20	4		68,50		92,38		107,72		143,25	
141	75	20	5		94,99		121,75		141,99		160,68	
141	75	25	5									
166	90	25	5		125,94		155,49		181,31		233,41	
166	90	25	5									
166	90	25	5		140,87		184,97		215,69			
166	90	25	6		159,01		203,19		236,97			
186	106	32	6		160,30		204,63		238,62			
186	106	32	6		229,77		275,86		321,68			
217	125	32	6		254,67		328,90		385,37			

FRESAS FRONTALES DE DESBASTE VARIOS CORTES DIN 844 Y DIN 844/L

4-6 Z



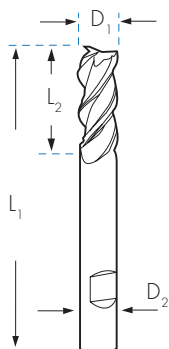
INOX

Al

**TOL D1
k12**

**TOL D2
h6**

SERIE CORTA



SERIE LARGA



DIN 844		MATERIAL			FF25			FF27			FT25		
		ACABADO			HSSCo 8%			HSSCo 8%			HSSCo 8%		
		BRILLANTE			★★★★			TiAlN			TiAlSiN		
		CALIDAD			★★			★★★★			★★★★		
		DESABASTE			NR			NR			NR		
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	€	€	€	€	€	€	€	€
6,00	57	13	6	4	38,75	46,78	54,55						
7,00	66	16	10	4	46,57	55,84	65,11						
8,00	69	19	10	4	40,45	49,72	57,98						
9,00	69	19	10	4	48,35	58,54	68,29						
10,00	72	22	10	4	40,13	49,24	57,41						
11,00	79	22	12	4	58,81	70,53	82,26						
12,00	83	26	12	4	48,47	60,03	69,99						
13,00	83	26	12	4	68,82	81,44	94,97						
14,00	83	26	12	4	56,27	69,62	81,19						
15,00	83	26	12	4	74,00	89,61	104,50						
16,00	92	32	16	4	66,75	82,04	95,68						
17,00	92	32	16	4	91,15	108,45	126,46						
18,00	92	32	16	4	72,79	90,39	105,40						
19,00	92	31	16	4	107,72	125,70	146,60						
20,00	104	38	20	4	91,21	110,41	128,76						

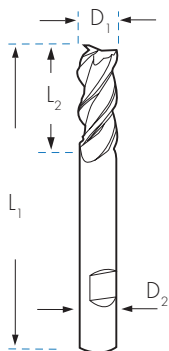
DIN 844/L		MATERIAL			FF29			FF31			FT29		
		ACABADO			HSSCo 8%			HSSCo 8%			HSSCo 8%		
		BRILLANTE			★★★★			TiAlN			TiAlSiN		
		CALIDAD			★★			★★★★			★★★★		
		DESABASTE			NR			NR			NR		
L1 mm	L2 mm	D2 mm	Z	€	€	€	€	€	€	€	€	€	€
68	24	6	4	54,92	62,12	72,79							
80	30	10	4	56,62	70,97	82,76							
88	38	10	4	56,80	65,68	76,59							
88	38	10	4	62,28	71,96	83,91							
95	45	10	4	49,47	61,17	71,34							
102	45	12	4	80,96	92,77	108,20							
110	53	12	4	61,11	73,93	86,22							
110	53	12	4										
110	53	12	4	70,61	83,53	97,43							
110	53	12	4										
123	63	16	4	82,65	101,37	118,20							
123	63	16	4										
123	63	16	4	96,53	118,53	138,22							
123	63	16	4										
141	75	20	4	117,48	139,73	162,94							

SIN CORTE AL CENTRO					FF05	FF74	FT05
22,00	104	38	20	6	103,05	133,23	
24,00	121	45	25	6	129,80	157,99	176,31
25,00	121	45	25	6	128,58	157,08	175,29
26,00	121	45	25	6	148,90	192,21	214,48
28,00	121	45	25	6	162,43	209,12	233,35
30,00	121	45	25	6	174,49	228,89	255,41
32,00	133	53	32	6	197,68	246,18	274,70
36,00	133	53	32	6	234,29	283,68	316,57
40,00	155	63	32	6	263,39	328,50	366,58

				FF08	FF58	FT08
141	75	20	6	132,33	178,49	199,18
141	75	25	6			
166	90	25	6	167,11	211,45	235,96
166	90	25	6			
166	90	25	6	188,45	243,10	271,27
166	90	25	6	244,33	290,38	324,05
186	106	32	6	255,55	296,87	331,28
186	106	32	6	306,86	354,51	395,59
217	125	40	6	362,81	441,25	492,40

FRESAS FRONTALES, SIN CORTE AL CENTRO, VARIOS CORTES DIN 844 Y DIN 844/L
4-6 Z

INOX
Al
**TOL D1
k10**
**TOL D2
h6**

SERIE CORTA
SERIE LARGA


DIN 844					MATERIAL				ACABADO				CALIDAD				FF03				FF04				FF54				FT04			
																	HSS				HSSCo 8%				HSSCo 8%				HSSCo 8%			
																	BRILLANTE				BRILLANTE				TiAIN				TiAlSiN			
													★				★★				★★★				★★★★							
D1	L1	L2	D2	Z													€				€				€				€			
mm	mm	mm	mm																													
2,00	51	7	6	4													10,85				14,22				22,88				26,70			
2,50	52	8	6	4													10,85				14,22				22,88				26,70			
3,00	52	8	6	4													10,85				14,22				22,88				26,70			
3,50	55	11	6	4													11,19				14,66				23,40				27,27			
4,00	55	11	6	4													10,85				14,22				22,97				26,77			
4,50	57	13	6	4													11,19				14,65				23,40				27,27			
5,00	57	13	6	4													10,85				14,22				22,97				26,77			
5,50	57	13	6	4													16,86				22,12				30,76				35,86			
6,00	57	13	6	4													10,85				14,22				22,96				26,75			
6,50	66	16	10	4													16,86*				22,12				31,83				37,13			
7,00	66	16	10	4													15,91				20,89				30,67				35,76			
7,50	69	16	10	4													19,94				26,13				35,65				41,58			
8,00	69	19	10	4													12,36				16,04				26,00				30,33			
8,50	69	19	10	4													20,78				27,30				37,77				44,04			
9,00	69	19	10	4													16,64				21,81				32,58				37,99			
9,50	72	22	10	4													22,56				28,84				39,66				46,26			
10,00	72	22	10	4													15,10				19,79				30,69				35,78			
11,00	79	22	12	4													20,81				27,30				39,59				46,17			
12,00	83	26	12	4													17,95				23,62				35,62				41,53			
13,00	83	26	12	4													26,76				35,24				48,52				56,57			
14,00	83	26	12	4													25,32				33,13				46,67				54,42			
15,00	83	26	12	4													28,86				37,82				53,75				62,67			
16,00	92	32	16	4													28,16				36,88				52,87				61,64			
17,00	92	32	16	4													34,69				45,66				63,21				73,71			
18,00	92	32	16	4													34,65				45,47				63,21				73,71			
19,00	92	31	16	4													41,04				53,50				72,52				84,59			
20,00	104	38	20	4													40,62				53,50				72,52				84,59			
22,00	104	38	20	5													56,39				74,25				100,38				117,07			
24,00	121	45	25	5													70,04				92,27				118,00				137,61			
25,00	121	45	25	5													69,81				92,27				118,00				137,61			
26,00	121	45	25	5													87,56				115,35				149,17				173,95			
28,00	121	45	25	5													87,56				115,35				153,20				178,64			
30,00	121	45	25	6													101,51				132,96				170,83				199,22			
32,00	133	53	32	6													104,40*				136,39				174,80				203,85			
36,00	133	53	32	6													136,62				179,93				218,88				255,24			
40,00	143	63	32	6													163,79				216,28				268,60				313,23			

*Hasta fin de existencias

FRESAS FRONTALES DE DESBASTE VARIOS CORTES DIN 844 Y DIN 844/L

3-5 Z



INOX

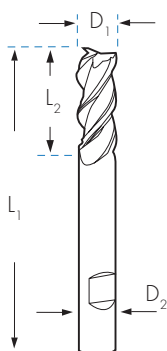
Al

**TOL D1
k12**

**TOL D2
h6**

SERIE CORTA

SERIE LARGA



DIN 844		MATERIAL ACABADO DESBASTE CALIDAD			FP10		FT10		FP11		FT11	
					ASP 60		ASP 60		ASP 60		ASP 60	
					BRILLANTE		TiAlSiN		BRILLANTE		TiAlSiN	
					NF		NF		NR		NR	
					Premium Quality		Premium Quality		Premium Quality		Premium Quality	
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	€	€	€				
2,00	51	7	6	3								
2,50	52	8	6	3								
3,00	52	8	6	3								
3,50	55	11	6	3								
4,00	55	11	6	3								
4,50	57	13	6	3								
5,00	57	13	6	3								
5,50	57	13	6	3								
6,00	57	13	6	3	48,53	55,69	44,97	51,71				
6,50	66	16	10	3								
7,00	66	16	10	3	62,23	67,76	56,46	64,25				
7,50	69	19	10	3								
8,00	69	19	10	3	53,60	62,43	49,14	56,77				
8,50	69	19	10	3								
9,00	69	19	10	3	64,56	70,69	58,73	67,19				
9,50	72	22	10	3								
10,00	72	22	10	4	51,11	60,58	46,33	57,53				
11,00	79	22	12	4								
12,00	83	26	12	4	67,23	76,14	61,30	70,14				
13,00	83	26	12	4								
14,00	83	26	12	4	81,64	92,82	74,02	84,17				
15,00	83	26	12	4								
16,00	92	32	16	4	100,08	110,35	91,25	102,81				
17,00	92	32	16	4								
18,00	92	32	16	4	109,88	119,99	99,01	112,45				
19,00	92	31	16	4								
20,00	104	38	20	4	136,31	150,27	123,21	140,97				
22,00	104	38	20	5	168,04	185,13	152,38	173,18				
24,00	121	45	25	5								
25,00	121	45	25	5	199,19	221,33	180,68	204,99				
26,00	121	45	25	5								
28,00	121	45	25	5								
30,00	121	45	25	5								
32,00	133	53	32	5								
36,00	133	53	32	5								
40,00	155	63	40	5								

DIN 844/L				MATERIAL				FP15	FT15	FP13	FT13
				ACABADO				ASP 60	ASP 60	ASP 60	ASP 60
				DESBASTE				BRILLANTE	TiAlSiN	BRILLANTE	TiAlSiN
				CALIDAD				NF	NF	NR	NR
											
L1 mm	L2 mm	D2 mm	Z	€	€	€	€				
54	10	6	3								
56	12	6	3								
56	12	6	3								
59	15	6	3								
63	19	6	3								
63	19	6	3								
68	24	6	3								
68	24	6	3								
68	24	6	3	76,15	80,45	67,55	74,34				
68	24	6	3								
80	30	10	3	86,09	98,01	78,18	91,30				
80	30	10	3								
88	38	10	3	80,10	85,25	70,90	79,41				
88	38	10	3								
88	38	10	3	84,49	96,69	78,18	91,88				
88	38	10	3								
95	45	10	4	72,07	80,15	64,22	74,01				
102	45	12	4								
110	53	12	4	91,33	99,77	80,66	91,33				
110	53	12	4								
110	53	12	4	107,05	122,83	96,27	108,71				
110	53	12	4								
123	63	16	4	128,05	140,65	114,25	129,78				
123	63	16	4								
123	63	16	4	143,23	166,78	130,49	148,68				
123	63	16	4								
141	75	20	4	186,18	204,23	164,95	189,89				
141	75	20	5	284,45	303,97	249,08	275,75				
141	75	25	5								
166	90	25	5	285,63	313,61	251,96	292,25				
166	90	25	5								
166	90	25	5								
166	90	25	5								
186	106	32	5								
186	106	32	5								
217	125	40	5								

FRESAS SERIE SUPER CORTA Y EXTRA CORTA DE 3 CORTES

3Z



INOX

Al

TOL D1
e8

TOL D2
h6

SERIE SUPER CORTA

SERIE EXTRA CORTA

MATERIAL ACABADO					FF51 HSSCo 8% BRILLANTE
D1 mm	L1 mm	L2 mm	D2 mm	Z	€
1,00	34	2	6	3	14,48
1,50	34	3	6	3	14,48
2,00	35	4	6	3	14,45
2,50	36	5	6	3	14,45
3,00	36	5	6	3	14,45
3,50	37	6	6	3	14,45
4,00	38	7	6	3	14,45
4,50	38	7	6	3	14,45
5,00	39	8	6	3	14,45
5,50	39	8	6	3	14,45
6,00	39	8	6	3	14,45
6,50	42	10	8	3	19,87
7,00	42	10	8	3	19,87
7,50	42	10	8	3	19,87
8,00	43	11	8	3	19,87
8,50	48	11	10	3	22,77
9,00	48	11	10	3	22,77
9,50	48	11	10	3	22,77
10,00	50	13	10	3	22,77



MATERIAL ACABADO					FF53 HSSCo 8% BRILLANTE
D1 mm	L1 mm	L2 mm	D2 mm	Z	€
2,00	38	7	6	3	15,85
2,50	39	8	6	3	15,85
3,00	39	8	6	3	15,85
3,50	41	10	6	3	15,85
4,00	42	11	6	3	15,85
4,50	42	11	6	3	15,85
5,00	44	13	6	3	15,85
5,50	44	13	6	3	15,85
6,00	44	13	6	3	15,85
6,50	48	16	8	3	21,81
7,00	48	16	8	3	21,81
8,00	51	19	8	3	21,81
8,50	56	19	10	3	24,94
9,00	56	19	10	3	24,94
10,00	59	22	10	3	24,94



3Z



DIN
844N

HSS
PM



Al

Cu

TOL D1
k10

TOL D2
h6

Mejora la extracción
de viruta



	FP22					
	D1 mm	L1 mm	L2 mm	D2 mm	Z	€
FP220600	6,00	57	13	6	3	35,03*
FP220700	7,00	66	16	10	3	47,33*
FP220800	8,00	69	19	10	3	47,33*
FP220900	9,00	69	19	10	3	47,33*
FP221000	10,00	72	22	10	3	47,33*
FP221200	12,00	83	26	12	3	65,14*
FP221400	14,00	83	26	12	3	74,27*
FP221500	15,00	83	26	12	3	90,71*
FP221600	16,00	92	32	16	3	90,71*
FP221800	18,00	92	32	16	3	127,17*
FP222000	20,00	104	38	20	3	151,76*



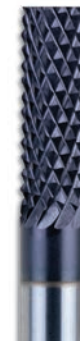
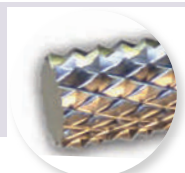
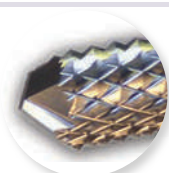
*Hasta fin de existencias

FRESAS DE METAL DURO PARA MATERIALES COMPUESTOS: FIBRA DE CARBONO, PANEL FENÓLICO, ETC...

MD

REVOLUCIONES Y AVANCES

D ₁ mm	RPM rev./min	AVANCE mm/min
1,50	60.000	3.000
2,00	50.000	2.500
3,00	32.000	1.600
5,00	20.000	1.200
6,00	16.000	1.000
6,35	14.000	1.000
8,00	9.000	700
10,00	7.000	550
12,00	6.000	450



				RFC		RF		RFC _{TL}		RFTL	
D ₁ mm	L ₁ mm	L ₂ mm	D ₂ mm		€		€	TiAIN	€	TiAIN	€
1,50	38	5	3,00	RFC0150	18,63	RF0150	17,66	RFC0150TL	28,16	RF0150TL	27,19
2,00	38	10	3,00	RFC0200	18,63	RF0200	17,66	RFC0200TL	28,16	RF0200TL	27,19
3,00	38	12	3,00	RFC0300	18,63	RF0300	17,66	RFC0300TL	28,16	RF0300TL	27,19
5,00	50	16	5,00	RFC0500	36,98	RF0500	33,59	RFC0500TL	46,53	RF0500TL	43,12
6,00	63	25	6,00	RFC0600	43,98	RF0600	39,87	RFC0600TL	55,57	RF0600TL	51,48
6,35	75	30	6,35	RFC0635	48,83	RF0635	44,70	RFC0635TL	60,46	RF0635TL	56,31
8,00	63	25	8,00	RFC0800	73,22	RF0800	66,47	RFC0800TL	84,19	RF0800TL	77,41
10,00	63	25	10,00	RFC1000	93,02	RF1000	84,59	RFC1000TL	104,53	RF1000TL	96,09
12,00	75	25	12,00	RFC1200	116,94	RF1200	106,35	RFC1200TL	131,20	RF1200TL	120,58

FRESA DE METAL DURO PARA REPARACIÓN DE PINCHAZOS

MD



	D ₁ mm	L ₁ mm	L ₂ mm	D ₂ mm	RN €
RN0300	3,00	50	25	3	18,13
RN0600	6,00	80	50	6	43,76
RN0800	8,00	110	50	8	49,28
RN1000	10,00	110	60	10	77,34

FRESAS DE METAL DURO ACCESORIOS TIPO ROTOZIP



Ref.: RR0317



Ref.: RR0635



Ref.: RR0435



Ref.: RR0247

		D ₁ mm	L ₁ mm	L ₂ mm	D ₂ mm	RR €
RR0317	Cortador Azulejo	3,17	50	25	3,17	20,91*
RR0635	Cortador Azulejo	6,35	50	25	6,35	35,05*
RR0435	Trabajos en Yeso	6,35	52	32	6,35	43,86*
RR0247	Argamasa	2,47	38	14	3,17	15,37*

*Hasta fin de existencias

FRESAS DE 1 LABIO HSSCo
HSSCo
Al
PVC
**TOL D1
k12**
**TOL D2
h6**
SERIE CORTA

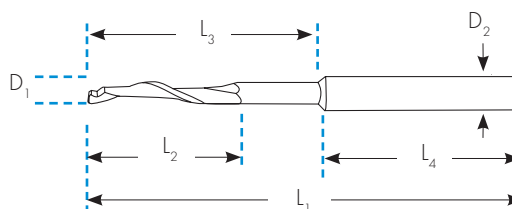
FF13

	D1 mm	L1 mm	L2 mm	D2 mm	HSSCo €	TiN €
FF1381	1,0	60	12	8	44,70	62,96
FF1382	2,0	60	12	8	44,70	62,96
FF1383	3,0	60	12	8	17,03	24,85
FF1384	4,0	60	12	8	17,03	24,85
FF1385	5,0	60	13	8	17,03	24,85
FF1386	6,0	60	16	8	17,97	25,75
FF1387	7,0	60	16	8	20,78	29,22
FF1388	8,0	80	16	8	20,78	29,22
FF131010	10,0	80	15	10	23,05	30,28
FF1361	1,0	45	6	6	31,20	41,37
FF13615	1,5	45	6	6	31,20	41,37
FF1362	2,0	45	6	6	31,20	41,37
FF1363	3,0	60	12	6	16,16	22,66
FF1364	4,0	60	12	6	16,21	22,66
FF1365	5,0	60	12	6	16,21	22,66
FF1366	6,0	60	14	6	16,21	22,66

SERIE LARGA

FF14

	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	HSSCo €	TiN €
FF1483	3	80	16	45	8	29,31	37,20
FF1484	4	80	16	45	8	24,95	33,03
FF1485	5	80	16	45	8	24,95	33,03
FF1486	6	90	16	45	8	24,95	33,03
FF1487	7	90	20	50	8	32,31	40,73
FF1488	8	100	30	70	8	29,21	37,55
FF1465	5	80	14	45	6	24,93	33,03
FF1466	6	80	14	45	6	24,95	33,03


SERIE EXTRA LARGA

FF14-E

	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	L4 mm	HSSCo €	TiN €
FF1485-E	5	100	30	55	8	45	24,43	30,59
FF1485-EL	5	100	50	-	8	50	29,25	41,54

ALUMINIO LACADO

FF50

	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	HSSCo €	TiN €
FF5084	4	80	16	35	8	22,66	30,92
FF5085	5	80	18	35	8	22,66	30,92

MEDIDAS ESPECIALES

FF14 Especiales

	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	HSSCo €
FF148412020	4	120	20	-	8	24,71
FF14856018	5	60	18	-	8	20,37
FF14859025	5	90	25	-	8	26,58
FF148510025	5	100	25	-	8	24,70
FF148512014	5	120	14	-	8	24,70
FF14851001817	5	100	18	35	8	25,10
FF14851201461	5	120	14	75	8	33,80
FF14851201817	5	120	18	35	8	33,80
FF1486801421	6	80	14	35	8	28,00
FF14861001835	6	100	18	35	8	28,00
FF14861201461	6	120	14	75	8	40,50

FF14 Especiales

	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	HSSCo €
FF14861003045	6	100	30	45	8	33,97
FF14861006040	6	100	60	-	8	43,61
FF14888025	8	80	25	-	8	21,14
FF148810014	8	100	14	-	8	23,38
FF148812014	8	120	14	-	8	25,38
FF14881201476	8	120	14	90	8	30,63
FF14898014	9	80	14	-	8	24,52
FF148108014	10	80	14	-	8	26,10
FF1410101003040	10	100	30	70	10	31,86
FF1410101201481	10	120	14	95	10	33,93
FF14101012014	10	120	14	-	10	27,35
FF148128014	12	80	14	-	8	29,60

FRESAS DE 1 LABIO DE METAL DURO

MD

Al

PVC

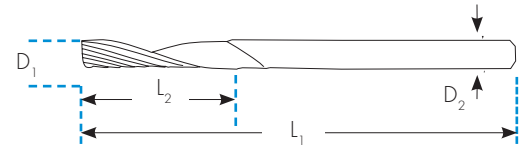
TOL
h10

TOL D2
h6

HÉLICE A - SERIE CORTA



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13
					MD €
FMGA13305	0,5	39	1,5	3	51,93
FMGA1331	1,0	39	3,0	3	39,81
FMGA13315	1,5	39	4,0	3	35,83
FMGA1322	2,0	40	10,0	2	30,19
FMGA1333	3,0	40	12,0	3	25,57
FMGA1336	3,0	64	12,0	6	44,73
FMGA1338	3,0	64	12,0	8	64,79
FMGA1344	4,0	50	16,0	4	28,11
FMGA1346	4,0	64	16,0	6	45,18
FMGA1348	4,0	64	16,0	8	75,39
FMGA135550	5,0	50	16,0	5	29,17
FMGA1355	5,0	64	16,0	5	31,96
FMGA1356	5,0	64	16,0	6	50,86
FMGA1358	5,0	64	16,0	8	77,10
FMGA136650	6,0	50	16,0	6	39,22
FMGA1366	6,0	64	20,0	6	43,21
FMGA1368	6,0	64	20,0	8	78,27
FMGA1378	7,0	64	20,0	8	87,75
FMGA138816	8,0	66	16,0	8	44,49
FMGA1388	8,0	76	38,0	8	59,00
FMGA131010	10,0	76	30,0	10	73,94



HÉLICE A - SERIE LARGA



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13E
					MD €
FMGA1355E	5	80	38	5	56,34
FMGA1366E	6	85	40	6	62,22
FMGA1388E	8	90	38	8	79,98
FMGA1388EX	8	110	43	8	104,93
FMGA131010E	10	100	40	10	114,67
FMGA131010EL	10	120	60	10	148,64

HÉLICE B



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13HI
					MD €
FMGA1333HI	3	50	8	3	33,31
FMGA1344HI	4	64	12	4	33,31
FMGA1355HI	5	64	16	5	36,07
FMGA1366HI	6	64	20	6	54,45
FMGA1388HI	8	76	38	8	72,06
FMGA131010HI	10	76	35	10	88,08

HÉLICE C



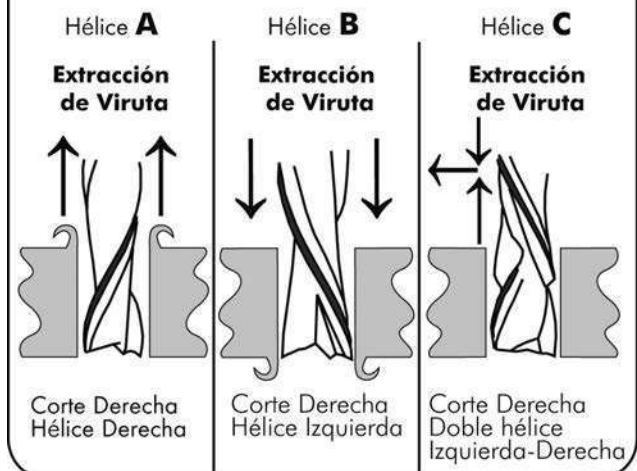
	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13CO
					MD €
FMGA1366CO	6	64	25	6	132,00
FMGA1388CO	8	64	25	8	182,53
FMGA131010CO	10	76	35	10	214,54
FMGA131212CO	12	76	35	12	284,62

CANAL RECTO



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13R
					MD €
FMGA1346R	4	64	16	6	48,81
FMGA1356R	5	64	20	6	48,81
FMGA1366R	6	64	25	6	56,83
FMGA1388R	8	64	25	8	84,06
FMGA131010R	10	88	35	10	110,02
FMGA131212R	12	88	35	12	158,79

TIPOS DE HÉLICES



VELOCIDADES DE CORTE

D1 mm	HSSCo		MD	
	Aluminio (R.P.M.)	PVC (R.P.M.)	Aluminio (R.P.M.)	PVC (R.P.M.)
3,00	12000	12000	19000	19000
4,00	11000	11000	18000	18000
5,00	10000	10000	18000	18000
6,00	10000	10000	17000	17000
7,00	9000	9000	17000	17000
8,00	9000	9000	16000	16000
9,00	9000	9000	16000	16000
10,00	9000	9000	16000	16000

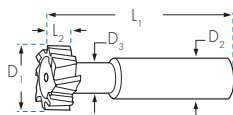
NOTA: Para la serie larga conviene reducir las RPM en un 15%

FRESAS PARA RANURAR

Fresas

Rosa

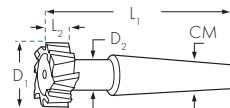
Ref. FF17

**RANURAR
EN "T"**
**DIN
851A**

**TOL D1
d11**
**TOL D2
h6**

FF17

D1 x L2 mm	D2 mm	D3 mm	Z	L1 mm	HSSCo €	TiAIN €
11,0x4,0	10	4	4	53,5	102,04	125,38
12,5x6,0	10	5	6	57,0	106,07	132,61
16,0x8,0	10	7	6	62,0	116,63	147,97
18,0x8,0	12	8	8	70,0	122,86	158,21
21,0x9,0	12	10	8	74,0	135,31	190,06
25,0x11,0	16	12	8	82,0	152,71	206,97
32,0x14,0	16	15	10	90,0	192,63	268,41
40,0x18,0	25	19	10	108,0	267,20	374,18
50,0x22,0	32	25	10	124,0	321,30	421,37
60,0x28,0	32	30	10	139,0	335,87	440,51
72,0x35,0	32	35	10	153,0	350,47	459,66

Ref. FF17C

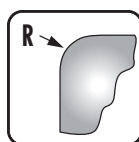
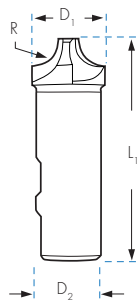
**RANURAR
EN "T"**
**DIN
851B**

**TOL D2
h12**

FF17C

D1 x L2 mm	CM	ROSCA	D2 mm	L1 mm	HSSCo €	TiAIN €
18,0x8,0	1	M6	8	70	133,86	165,98
21,0x9,0	2	M10	10	74	146,97	182,24
25,0x11,0	2	M10	12	82	153,22	190,00
32,0x14,0	2	M10	16	90	204,35	253,39
40,0x18,0	3	M12	20	108	258,35	320,35
50,0x22,0	4	M16	25	124	341,22	423,10
60,0x28,0	4	M16	31	139	451,47	559,82
72,0x35,0	5	M20	36	153	612,80	759,86

**FRESA DE 1/4 DE CÍRCULO PARA
REMATADO DE ARISTAS**

4 Z

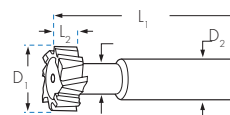
**HSSCo
8%**
**DIN
6518N**
WELDON


FF1/4R

	TOL H11 R	js 15 D1 mm	TOL h6 D2 mm	L1 mm	€
FF1/4R1	1,0	8	10	60	71,46
FF1/4R1.50	1,5	9	10	60	69,12
FF1/4R2	2,0	10	10	60	58,15
FF1/4R2.50	2,5	11	10	60	66,90
FF1/4R3	3,0	12	12	60	66,65
FF1/4R3.50	3,5	13	12	60	86,81
FF1/4R4	4,0	14	12	60	74,02
FF1/4R4.50	4,5	15	12	60	98,94
FF1/4R5	5,0	16	12	60	82,94
FF1/4R5.50	5,5	19	16	67	98,94
FF1/4R6	6,0	20	16	67	83,09
FF1/4R6.50	6,5	21	16	71	125,93
FF1/4R7	7,0	22	16	71	113,55
FF1/4R7.50	7,5	23	16	71	137,08
FF1/4R8	8,0	24	16	71	113,55
FF1/4R8.50	8,5	25	25	85	167,91
FF1/4R9	9,0	26	25	85	147,99
FF1/4R9.50	9,5	27	25	85	176,47
FF1/4R10	10,0	28	25	85	147,99
FF1/4R10.50	10,5	31	25	90	205,60
FF1/4R11	11,0	32	25	90	197,58
FF1/4R12	12,0	34	25	90	162,79
FF1/4R12.50	12,5	41	25	100	211,41
FF1/4R13	13,0	42	25	100	262,06
FF1/4R14	14,0	44	25	100	271,92
FF1/4R15	15,0	46	25	100	338,52
FF1/4R16	16,0	48	25	100	311,14
FF1/4R18	18,0	52	32	112	401,34
FF1/4R20	20,0	56	32	112	450,88

**FRESA PARA RANURAR
"WOODRUFF"**

Ref. FF16

**TIPO
WOODRUFF**
**DIN
850B**
**TOL D1
h12**
**TOL D2
h6**


FF16

D1 x L2 mm	D2 mm	Z	L1 mm	HSSCo €	TiAIN €
4,5x1,0	6	6	50	58,01	68,61
7,5x1,5	6	6	50	60,40	72,60
7,5x2,0	6	6	50	60,40	72,60
10,5x2,0	6	6	50	64,98	78,34
10,5x2,5	6	6	50	64,98	78,34
10,5x3,0	6	6	50	64,98	78,34
13,5x3,0	10	6	56	66,01	82,46
13,5x4,0	10	6	56	66,01	82,46
16,5x3,0	10	6	56	66,61	88,30
16,5x4,0	10	6	56	66,61	88,30
16,5x5,0	10	6	56	66,61	85,42
19,5x4,0	10	8	63	75,83	100,17
19,5x5,0	10	8	63	75,83	95,98
19,5x6,0	10	8	63	75,83	95,98
22,5x5,0	10	8	63	83,06	111,26
22,5x6,0	10	8	63	83,06	111,81
22,5x8,0	10	8	63	83,06	111,81
25,5x6,0	10	10	63	97,27	138,47
28,5x6,0	10	10	63	98,95	140,13
28,5x8,0	10	10	63	98,95	140,13
28,5x10,0	12	10	71	98,95	140,13
32,5x7,0	12	10	71	122,71	167,70
32,5x8,0	12	10	71	122,71	167,70
32,5x10,0	12	10	71	122,71	167,70
45,5x10,0	12	12	71	194,12	275,97

FRESAS CÓNICAS ANGULARES, CON MANGO CILÍNDRICO HSSCo



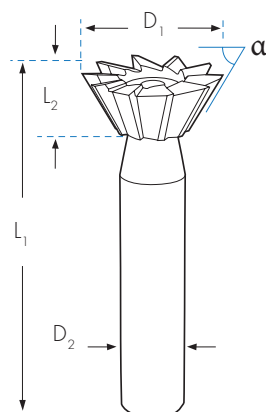
Ref. FF98
Ref. FF99

HSSCo

**DIN
1833A**

**TOL D1
js16**

**TOL D2
h6**



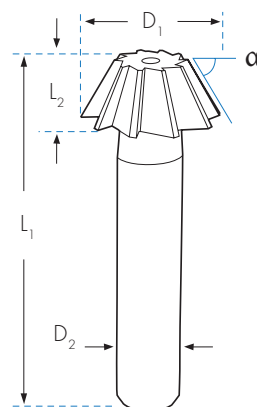
Ref. FF97
Ref. FF95

HSSCo

**DIN
1833B**

**TOL D1
js16**

**TOL D2
h6**



FF98

45°	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF981600	16	45°	12	60	4,0	8	103,15
FF982000	20	45°	12	63	5,0	10	109,37
FF982500	25	45°	12	67	6,3	12	133,76
FF983200	32	45°	16	71	8,0	14	149,25

FF97

45°	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF971600	16	45°	12	60	4,0	8	83,08
FF972000	20	45°	12	63	5,0	10	93,42
FF972500	25	45°	12	67	6,3	12	105,05
FF973200	32	45°	16	71	8,0	12	119,46

FF99

60°	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF991600	16	60°	12	60	6,3	8	103,15
FF992000	20	60°	12	63	8,0	10	109,37
FF992500	25	60°	12	67	10,0	12	133,76
FF993200	32	60°	16	71	12,5	14	149,25

FF95

60°	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF951600	16	60°	12	60	6,3	8	81,50
FF952000	20	60°	12	63	8,0	10	91,66
FF952500	25	60°	12	67	10,0	12	103,09
FF953200	32	60°	16	71	12,5	12	117,23

MEDIDAS ESPECIALES

FF99

FF991600-50	16	50°	12	60	5,0	8	115,84
FF992000-50	20	50°	12	63	6,3	10	123,48
FF992500-50	25	50°	12	67	8,0	12	152,57
FF991600-55	16	55°	12	60	5,6	8	115,84
FF992000-55	20	55°	12	63	7,1	10	123,48
FF992500-55	25	55°	12	67	9,0	12	152,57
FF991600-75	16	75°	12	60	8,0	8	115,84
FF992500-75	25	75°	12	67	10,0	12	152,57
FF991600-80	16	80°	12	60	8,0	8	115,84
FF992500-80	25	80°	12	67	10,0	12	152,57
FF991600-85	16	85°	12	60	8,0	8	115,84
FF992500-85	25	85°	12	67	10,0	12	152,57

MEDIDAS ESPECIALES

FF95

FF951600-50	16	50°	12	60	5,0	8	96,71
FF952000-50	20	50°	12	63	6,3	10	123,46
FF952500-50	25	50°	12	67	8,0	12	154,03
FF951600-55	16	55°	12	60	5,6	8	96,71
FF952000-55	20	55°	12	63	7,1	10	123,46
FF952500-55	25	55°	12	67	9,0	12	154,03
FF951600-75	16	75°	12	60	8,0	8	96,71
FF952500-75	25	75°	12	67	10,0	12	154,03

FRESAS FRONTALES CON MANGO CÓNICO SERIE CORTA

4-8 Z

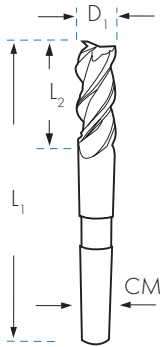
**INOX**

AI

27



SERIE CORTA



DIN 845B						FF09		FF35		FF39		FF10		FF46		FF48		DIN 326				FF55	
						MATERIAL		HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%							
						ACABADO		BRILLANTE		TiN		TiAlN		BRILLANTE		TiN						TiAlN	
						CALIDAD		★★		★★★		★★★		★★		★★★						★★★	
DESBASTE						TOL k10		TOL k10		TOL k10		TOL k12		TOL k12		TOL k12		TOL e8					
						€		€		€		€		€		€		€					
D1 mm	L1 mm	L2 mm	Z	CM	ROSCA	€	€	€	€	€	€	€	€	€	€	L1 mm	L2 mm	Z	€				
10,00	92	22	4	1	M6	54,10	75,12	77,36	80,25	100,25	103,17	83	13	2	68,02								
12,00	111	26	4	2	M6	71,52	91,75	96,17	81,79	102,37	106,33	86	16	2	70,62								
14,00	111	26	4	2	M10	79,24	100,47	106,28	92,92	114,38	119,94	101	16	2	73,27								
15,00	111	26	4	2	M10	85,03	109,97	115,27	116,08	139,85	146,65												
16,00	117	32	4	2	M10	78,89	104,29	109,31	95,84	121,23	125,92	104	19	2	80,06								
18,00	117	32	4	2	M10	83,80	108,85	114,08	105,18	129,82	136,15	104	19	2	83,92								
20,00	123	38	4	2	M10	93,48	122,57	128,48	115,68	144,36	151,39	107	22	2	88,07								
22,00	123	38	5	2	M10	105,72	133,35	141,06	127,35	155,13	162,66	107	22	2	103,72								
24,00	147	45	6	3	M12	159,89	183,45	195,88	177,56	203,61	213,49	128	26	2	134,20								
25,00	154	45	5	3	M12	144,32	177,50	187,83	177,61	210,88	221,13	128	26	2	141,05								
26,00	147	45	6	3	M12	145,73	184,31	187,83	195,11	226,97	238,04	128	26	2	134,62								
28,00	154	50	5	3	M12	145,73	184,31	187,83	195,16	226,97	238,04	128	26	2	163,49								
30,00	154	50	6	3	M12	161,03	211,77	215,79	229,15	271,06	284,26	128	26	2	179,98								
32,00	178	53	6	4	M16	211,53	271,73	276,91	271,72	335,30	351,59	157	32	2	198,17								
36,00	178	53	6	4	M16	240,94	300,96	309,73	299,55	363,96	381,66	157	32	2	252,77								
40,00	188	63	6	4	M16	290,28	361,20	371,69	418,46	492,58	516,52	163	38	2	291,31								
45,00	188	63	6	4	M16	373,86	457,73	470,90	475,63	544,65	571,13	163	38	2	420,73								
50,00	233	75	6	5	M20	450,38	528,94	544,19	504,42	593,88	622,73	203	45	2	528,55								
56,00	233	75	8	5	M20	621,31	688,07	707,89	718,26	767,60	804,91												
63,00	241	90	8	5	M20	780,05	835,87	859,94	902,14	936,56	982,06												

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

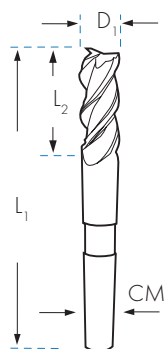
4-8 Z



INOX

AI

SERIE LARGA



DIN 845B/L						FF11						FF61		FF71		FF12		FF33		FF43			
						MATERIAL						HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%		HSSCo 8%	
						ACABADO						BRILLANTE		TiN		TiAlN		BRILLANTE		TiN		TiAlN	
						CALIDAD						★★		★★★		★★★		★★		★★★		★★★	
						DESABASTE																	
						TOL k10		TOL k10		TOL k10		TOL k12		TOL k12		TOL k12							
D1 mm	L1 mm	L2 mm	Z	CM	ROSCA	€		€		€		€		€		€		€		€			
10,00	115	45	4	1	M6	98,27		119,77		123,83		143,42		163,89		169,46							
12,00	138	53	4	2	M6	92,65		119,77		127,34		146,11		166,05		173,28							
14,00	138	53	4	2	M10	97,50		130,11		135,77		184,09		203,78		212,67							
15,00	138	53	4	2	M10	107,04		136,40		142,33		211,70		234,14		244,39							
16,00	148	63	4	2	M10	105,95		132,98		138,78		153,12		178,78		186,59							
18,00	148	63	4	2	M10	120,37		145,98		152,32		158,94		184,32		192,36							
20,00	160	75	4	2	M10	133,55		163,30		170,40		182,33		211,49		220,70							
22,00	160	75	5	2	M10	151,14		179,67		188,36		189,37		218,10		227,61							
24,00	192	90	5	3	M12	205,58		232,68		245,09		257,11		284,53		298,85							
25,00	184	80	5	3	M12	204,18		240,10		252,30		268,82		303,06		316,27							
26,00	192	90	5	3	M12	226,14		259,24		272,42		279,35		313,01		326,67							
28,00	192	90	5	3	M12	229,15		274,32		288,94		277,32		313,01		326,67							
30,00	192	90	5	3	M12	264,15		308,02		323,65		330,74		374,90		391,28							
32,00	229	100	6	4	M16	311,42		364,72		383,24		393,88		447,58		467,14							
36,00	231	106	6	4	M16	356,60		408,98		429,73		451,15		503,58		525,56							
40,00	250	125	6	4	M16	396,24		460,17		483,56		554,40		616,23		643,16							
45,00	250	125	6	4	M16	534,05		611,86		644,51		707,14		778,71		812,74							
50,00	268	110	6	5	M20	651,77		716,86		755,13		882,44		944,35		985,59							
56,00	308	150	8	5	M20	685,89		748,45		789,70		1.028,31		1.082,14		1.139,99							
63,00	338	180	8	5	M20	907,25		954,57		1.005,32		1.294,58		1.333,70		1.404,95							

JUEGOS DE FRESAS CON CORTE AL CENTRO EN ESTUCHES DE PLÁSTICO

2 Z



DIN 327



4 Z



DIN 844



REFERENCIA	PTF20	PTF60
Nº FRESAS	8	8
TIPO	Ref. FFO2	Ref. FF60
CALIDAD	HSSCo 8%	TiAIN
CONTENIDO Ø mm	6 8 10 12 2 2 2 2	6 8 10 12 2 2 2 2
P.V.P. €	146,30	231,97

REFERENCIA	PTF24	PTF64
Nº FRESAS	8	8
TIPO	Ref. FF18	Ref. FF20
CALIDAD	HSSCo 8%	TiAIN
CONTENIDO Ø mm	6 8 10 12 2 2 2 2	6 8 10 12 2 2 2 2
P.V.P. €	161,98	245,75

2 Z



DIN 327



4 Z



DIN 844



REFERENCIA	PTF21	PTF61
Nº FRESAS	6	6
TIPO	Ref. FFO2	Ref. FF60
CALIDAD	HSSCo 8%	TiAIN
CONTENIDO Ø mm	6-8-10-12-16-20	6-8-10-12-16-20
P.V.P. €	158,33	240,87

REFERENCIA	PTF25	PTF65
Nº FRESAS	6	6
TIPO	Ref. FF18	Ref. FF20
CALIDAD	HSSCo 8%	TiAIN
CONTENIDO Ø mm	6-8-10-12-16-20	6-8-10-12-16-20
P.V.P. €	176,81	255,01

2 Z



DIN 327



4 Z



DIN 844



REFERENCIA	PTF22	PTF62
Nº FRESAS	6	6
TIPO	Ref. FFO2	Ref. FF60
CALIDAD	HSSCo 8%	TiAIN
CONTENIDO Ø mm	4-5-6-8-10-12	4-5-6-8-10-12
P.V.P. €	100,33	161,35

REFERENCIA	PTF26	PTF66
Nº FRESAS	6	6
TIPO	Ref. FF18	Ref. FF20
CALIDAD	HSSCo 8%	TiAIN
CONTENIDO Ø mm	4-5-6-8-10-12	4-5-6-8-10-12
P.V.P. €	111,10	171,30

JUEGOS DE FRESAS CON CORTE AL CENTRO EN ESTUCHES METÁLICOS
2 Z

**DIN
327**

Ref. FF020787



Ref. FT020787



Ref. FF600787



REFERENCIA	FF010787	FF020787	FT020787	FF600787
Nº FRESAS	6	6	6	6
TIPO	Ref. FF01	Ref. FF02	Ref. FT02	Ref. FF60
CALIDAD	HSS	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	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	92,87	122,82	143,21	183,83

REFERENCIA	FF010447	FF020447	FT020447	FF600447
Nº FRESAS	6	6	6	6
TIPO	Ref. FF01	Ref. FF02	Ref. FT02	Ref. FF60
CALIDAD	HSS	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	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	138,91	184,22	214,83	266,73

REFERENCIA	FF010801	FF020801
Nº FRESAS	14	14
TIPO	Ref. FF01	Ref. FF02
CALIDAD	HSS	HSSCo 8%
CONTENIDO Ø mm	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	299,43*	393,46*

*Hasta fin de existencias

ESTUCHES METÁLICOS VACÍOS PARA FRESAS
2-4 Z

**DIN
327**

REFERENCIA	EV0787	EV0847
Nº FRESAS	6	6
CONTENIDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	28,95	32,36



JUEGOS DE FRESAS EN ESTUCHES METÁLICOS

Fresas

Rosa

4 Z

DIN
844

REFERENCIA	FF030787	FF040787	FT040787	FF540787
Nº FRESAS	6	6	6	6
TIPO	Ref. FF03	Ref. FF04	Ref. FT04	Ref. FF54
CALIDAD	HSS	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	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	91,34	120,46	141,13	183,82

REFERENCIA	FF030847	FF040847	FT040847	FF540847
Nº FRESAS	6	6	6	6
TIPO	Ref. FF03	Ref. FF04	Ref. FT04	Ref. FF54
CALIDAD	HSS	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	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	136,48	183,11	214,56	263,78



REFERENCIA	FF030764	FF040764
Nº FRESAS	14	14
TIPO	Ref. FF03	Ref. FF04
CALIDAD	HSS	HSSCo 8%
CONTENIDO Ø mm	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	290,36*	384,51*

*Hasta fin de existencias

4 Z

DIN
844

NR

REFERENCIA	FF250847	FT250847	FF270847
Nº FRESAS	6	6	6
TIPO	Ref. FF25	Ref. FT25	Ref. FF27
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. €	340,84	397,47	409,97

JUEGOS DE FRESAS EN ESTUCHES METÁLICOS

4 Z



DIN
844

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. €	128,25	149,56	193,77



Ref. FF180787

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. €	200,49	233,82	278,19



Ref. FF180847

REFERENCIA	FF180764
Nº FRESAS	14
TIPO	Ref. FF18
CALIDAD	HSSCo 8%
CONTENIDO Ø mm	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	416,79*



Ref. FF180764

*Hasta fin de existencias

EXPOSITOR DE METACRILATO

Ref. MF-01

MF-01

					Contenido: 163 Fresas															
Ref. FF13	1 Z	HSSCo	Al	SERIE CORTA	$\frac{\varnothing}{\text{Cant.}}$	$\frac{5 \times 8}{5}$	Mango	$\frac{6 \times 8}{5}$	Mango											
Ref. FF14	1 Z	HSSCo	Al	SERIE LARGA	$\frac{\varnothing}{\text{Cant.}}$	$\frac{5 \times 8}{5}$	Mango	$\frac{6 \times 8}{5}$	Mango											
Ref. FFO2	2 Z		HSSCo	DIN 327N		$\frac{\varnothing}{\text{Cant.}}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{5}{5}$	$\frac{6}{5}$	$\frac{7}{5}$	$\frac{8}{5}$	$\frac{9}{5}$	$\frac{10}{5}$	$\frac{12}{5}$	$\frac{14}{5}$	$\frac{16}{3}$		
Ref. FF18	4 Z		HSSCo	DIN 844N		$\frac{\varnothing}{\text{Cant.}}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{5}{5}$	$\frac{6}{5}$	$\frac{7}{5}$	$\frac{8}{5}$	$\frac{9}{5}$	$\frac{10}{5}$	$\frac{12}{5}$	$\frac{14}{5}$	$\frac{16}{3}$		
Ref. FF25	4 Z		HSSCo	DIN 844N			$\frac{\varnothing}{\text{Cant.}}$	$\frac{6}{3}$	$\frac{7}{3}$	$\frac{8}{3}$	$\frac{9}{3}$	$\frac{10}{3}$	$\frac{11}{3}$	$\frac{12}{3}$	$\frac{14}{3}$	$\frac{16}{3}$				



Dimensiones: ancho 245 x fondo 210 x alto 350 mm

NOTA: Composiciones especiales bajo demanda

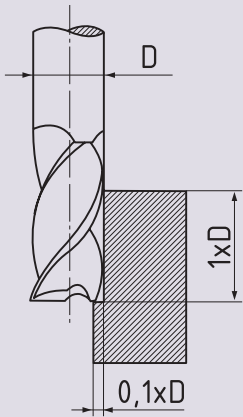
P.V.P. 4.142,69 €

PARÁMETROS DE CORTE ORIENTATIVOS FRESAS HSSCo 8%

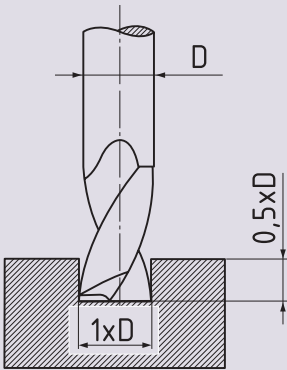
			DIÁMETRO Ø (mm)													
			2	4	6	8	10	12	18	22	26	30	32	36	40	
ACERO BLANDO 70 kg/mm²	V/C 39	RPM	6207	3104	2069	1552	1241	1035	690	564	477	414	388	345	310	
	AVANCE (mm/min)	2	50	56	74	84	82	81	80	81	76	68	68	62	60	
		Nº cortes	3	74	84	112	126	123	121	120	122	115	102	102	93	89
		4	99	112	149	168	164	161	160	163	153	136	137	124	119	
ACERO TRATADO 120 kg/mm²	V/C 20	RPM	3183	1592	1061	796	637	531	354	289	245	212	199	177	159	
	AVANCE (mm/min)	2	25	29	38	43	42	41	41	42	39	35	35	32	31	
		Nº cortes	3	38	43	57	64	63	62	62	63	59	52	53	48	46
		4	51	57	76	86	84	83	82	83	78	70	70	64	61	
INOXIDABLE	V/C 15	RPM	2387	1194	796	597	477	398	265	217	184	159	149	133	119	
	AVANCE (mm/min)	2	19	21	29	32	32	31	31	31	29	26	26	24	23	
		Nº cortes	3	29	32	43	48	47	47	46	47	44	39	39	36	34
		4	38	43	57	64	63	62	62	63	59	52	53	48	46	
ALUMINIO	V/C 230	RPM	36606	18303	12202	9151	7321	6101	4067	3328	2816	2440	2288	2034	1830	
	AVANCE (mm/min)	2	293	329	439	494	483	476	472	479	451	400	403	366	351	
		Nº cortes	3	439	494	659	741	725	714	708	719	676	600	604	549	527
		4	586	659	879	988	966	952	944	958	901	800	805	732	703	
TITANIO	V/C 12	RPM	1910	955	637	477	382	318	212	174	147	127	119	106	95	
	AVANCE (mm/min)	2	15	17	23	26	25	25	25	25	24	21	21	19	18	
		Nº cortes	3	23	26	34	39	38	37	37	38	35	31	32	29	28
		4	31	34	46	52	50	50	49	50	47	42	42	38	37	

* 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)

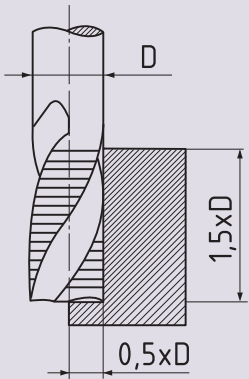
PROFUNDIDAD DE PASADA EN FUNCIÓN DE LA OPERACIÓN A REALIZAR



FRESADO LATERAL



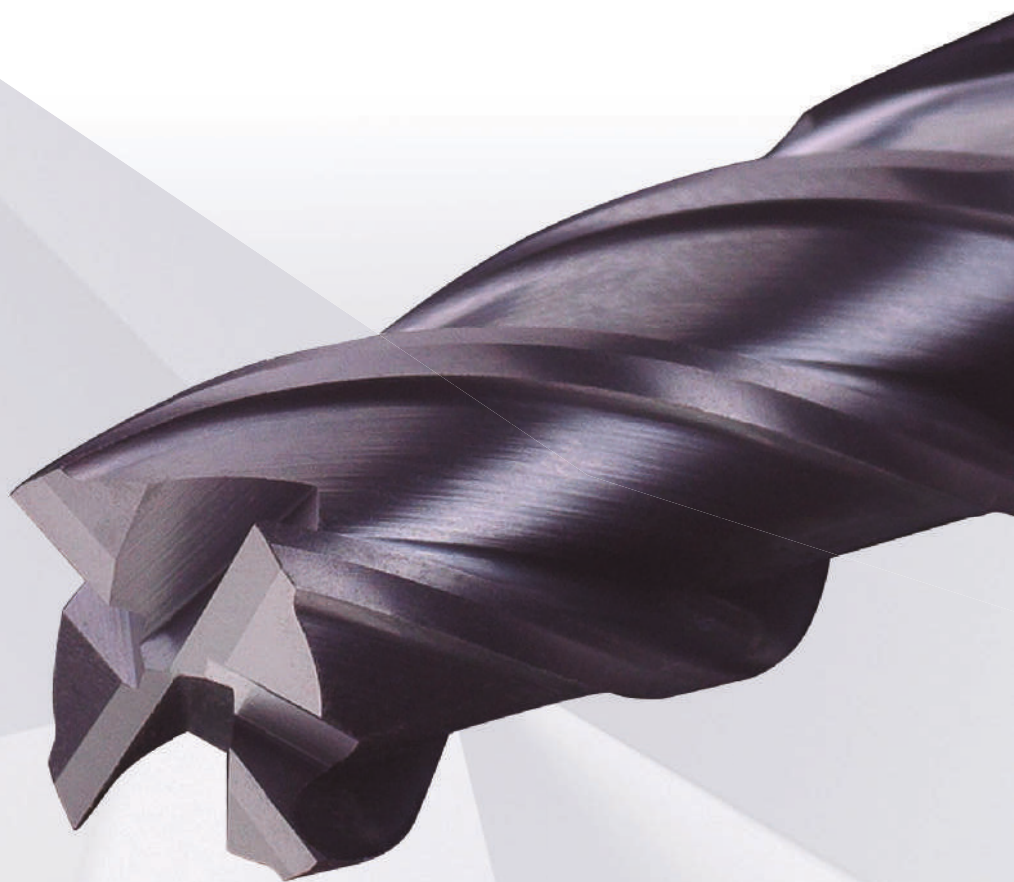
VACIADO



FRESADO BASTO

AIRALDE

FRESAS METAL DURO



BLUE-MASTER[®]
by CELESA

CUTTING TECHNOLOGIES

FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE CORTA, LARGA Y EXTRALARGA

Fresas
Rosa

INOX
Al
Ti

2 Z

CILÍNDRICO

3 Z

4 Z

SERIE CORTA

MATERIAL ACABADO CALIDAD				FMD2		FMD2TL		FMD63		FMD63TL		FMD48		FMD48TL	
				MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
				BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN
				★★	★★★	★★	★★★	★★	★★★	★★	★★★	★★	★★★	★★	★★★
				2Z	2Z	3Z	3Z	4Z	4Z	4Z	4Z	4Z	4Z	4Z	4Z
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	€	€	€	€	€	€	€
1,00	38	3	3	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28
1,50	38	4	3	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28
2,00	38	6	3	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28
2,50	38	8	3	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28	17,56	23,28
3,00	38	8	3	16,85	22,57	16,85	22,57	16,85	22,57	16,85	22,57	16,85	22,57	16,85	22,57
3,50	50	11	4	19,69	25,41	19,69	25,41	19,69	25,41	19,69	25,41	19,69	25,41	19,69	25,41
4,00	50	11	4	16,74	22,46	16,74	22,46	16,74	22,46	16,74	22,46	16,74	22,46	16,74	22,46
4,50	50	13	5	21,57	27,29	21,57	27,29	21,57	27,29	21,57	27,29	21,57	27,29	21,57	27,29
5,00	50	13	5	19,01	24,73	19,01	24,73	19,01	24,73	19,01	24,73	19,01	24,73	19,01	24,73
6,00	50	16	6	20,80	26,52	20,80	26,52	20,80	26,52	20,80	26,52	20,80	26,52	20,80	26,52
7,00	60	16	8	34,03	40,90	34,03	40,90	34,03	40,90	34,03	40,90	34,03	40,90	34,03	40,90
8,00	60	19	8	30,92	37,79	30,92	37,79	30,92	37,79	30,92	37,79	30,92	37,79	30,92	37,79
9,00	72	19	10	48,99	57,00	48,99	57,00	48,99	57,00	48,99	57,00	48,99	57,00	48,99	57,00
10,00	72	22	10	46,44	54,45	46,44	54,45	46,44	54,45	46,44	54,45	46,44	54,45	46,44	54,45
11,00	75	26	12	77,57	86,72	77,57	86,72	77,57	86,72	77,57	86,72	77,57	86,72	77,57	86,72
12,00	75	26	12	59,22	68,37	59,22	68,37	59,22	68,37	59,22	68,37	59,22	68,37	59,22	68,37
14,00	84	30	14	90,99	102,44	90,99	102,44	90,99	102,44	90,99	102,44	90,99	102,44	90,99	102,44
16,00	92	32	16	117,56	130,15	117,56	130,15	117,56	130,15	117,56	130,15	117,56	130,15	117,56	130,15
18,00	100	38	18	172,25	189,42	172,25	189,42	172,25	189,42	172,25	189,42	172,25	189,42	172,25	189,42
20,00	100	38	20	195,92	217,67	195,92	217,67	195,92	217,67	195,92	217,67	195,92	217,67	195,92	217,67
25,00	100	45	25	339,97	373,17							339,97	373,17		

SERIE LARGA

MATERIAL ACABADO CALIDAD				FMD54		FMD54TL		FMD58		FMD58TL	
				MD	MD	MD	MD	MD	MD	MD	MD
				BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN
				★★	★★★	★★	★★★	★★	★★★	★★	★★★
				2Z	2Z	4Z	4Z	4Z	4Z	4Z	4Z
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	€	€	€
3,00	60	15	3	18,65	25,52	18,65	25,52	18,65	25,52	18,65	25,52
4,00	80	20	4	19,66	26,52	19,66	26,52	19,66	26,52	19,66	26,52
5,00	80	25	5	24,47	31,34	24,47	31,34	24,47	31,34	24,47	31,34
6,00	80	25	6	34,51	41,37	34,51	41,37	34,51	41,37	34,51	41,37
8,00	90	35	8	39,29	48,45	39,29	48,45	39,29	48,45	39,29	48,45
10,00	100	45	10	55,52	64,68	55,52	64,68	55,52	64,68	55,52	64,68
12,00	100	50	12	75,79	87,24	75,79	87,24	75,79	87,24	75,79	87,24
14,00	150	65	14	124,71	139,59	124,71	139,59	124,71	139,59	124,71	139,59
16,00	150	65	16	136,63	151,51	136,63	151,51	136,63	151,51	136,63	151,51
18,00	150	65	18			197,33	217,93	197,33	217,93	197,33	217,93
20,00	150	70	20	242,37	265,27	242,37	265,27	242,37	265,27	242,37	265,27

SERIE EXTRA LARGA

MATERIAL ACABADO CALIDAD				FMD53		FMD53TL		FMD56		FMD56TL	
				MD	MD	MD	MD	MD	MD	MD	MD
				BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN
				★★	★★★	★★	★★★	★★	★★★	★★	★★★
				2Z	2Z	4Z	4Z	4Z	4Z	4Z	4Z
Ø mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	€	€	€
3,00	75	25	3	40,11	51,56	41,50	52,95	41,50	52,95	41,50	52,95
4,00	100	25	4	43,58	55,03	44,94	56,39	44,94	56,39	44,94	56,39
5,00	100	25	5	49,25	60,70	51,75	63,20	51,75	63,20	51,75	63,20
6,00	150	75	6	82,20	100,52	90,42	108,73	90,42	108,73	90,42	108,73
8,00	150	75	8	113,18	134,94	124,50	146,25	124,50	146,25	124,50	146,25
10,00	150	75	10	143,37	171,99	157,70	186,32	157,70	186,32	157,70	186,32
12,00	150	75	12	209,77	246,40	230,74	267,38	230,74	267,38	230,74	267,38
14,00	150	75	14	289,99	334,64	318,99	363,64	318,99	363,64	318,99	363,64
16,00	200	75	16	393,99	445,51	433,39	484,91	433,39	484,91	433,39	484,91
20,00	200	75	20	614,76	683,45	614,76	683,45	614,76	683,45	614,76	683,45

FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES SERIE CORTA, LARGA Y EXTRALARGA

INOX
Al
Ti

2Z


30° N

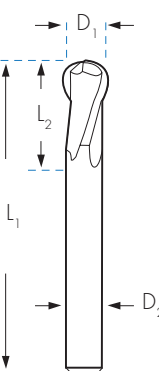

44 HRc


CILINDRICO

4Z



SERIE CORTA



TOL D1
+0 -0,05

TOL D2
h6



				FMD92	FMD92TL	FMD51	FMD51TL
MATERIAL ACABADO CALIDAD				MD	MD	MD	MD
				BRILLANTE	TiAIN	BRILLANTE	TiAIN
				★★	★★★	★★	★★★
				2Z	2Z	4Z	4Z
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€
1,00	38	2	3	21,07	26,79		
1,50	38	3	3	21,07	26,79		
2,00	38	4	3	21,07	26,79		
2,50	38	5	3	21,07	26,79		
3,00	38	6	3	21,07	26,79	23,18	29,47
4,00	50	8	4	24,01	29,73	26,41	32,70
5,00	50	10	5	25,40	31,13	27,94	34,24
6,00	50	12	6	29,89	35,62	32,89	39,18
8,00	60	15	8	36,90	43,77	46,14	54,72
10,00	75	20	10	55,45	63,46	69,30	79,33
12,00	75	20	12	68,89	78,05	86,11	97,56
14,00	90	25	14	101,98	113,43	127,48	141,79
16,00	100	25	16	129,03	141,62	161,29	177,03
18,00	100	30	18	191,84	209,01	239,80	261,27
20,00	100	30	20	198,88	220,63	248,59	275,79

SERIE LARGA

SERIE LARGA

				FMD57	FMD57TL
MATERIAL ACABADO CALIDAD				MD	MD
				BRILLANTE	TiAIN
				★★	★★★
				2Z	2Z
				€	€
D1 mm	L1 mm	L2 mm	D2 mm		
3,00	60	4	3	31,76	38,63
4,00	80	5	4	36,87	43,74
5,00	80	6	5	43,61	50,48
6,00	80	8	6	50,97	57,83
8,00	100	12	8	67,27	76,43
10,00	100	15	10	83,12	93,42
12,00	100	15	12	144,04	155,49
14,00	150	20	14	180,61	195,50
16,00	150	20	16	228,12	243,00
18,00	150	25	18	354,33	371,50
20,00	150	25	20	470,86	493,75

SERIE EXTRA LARGA

MATERIAL ACABADO CALIDAD				FMD55	FMD55TL
				MD	MD
				BRILLANTE	TiAIN
				★★	★★★
				2Z	2Z
D1 mm	L1 mm	L2 mm	D2 mm	€	€
3,00	75	6	3	38,07	49,52
4,00	100	6	4	43,91	55,36
5,00	100	6	5	53,07	64,52
6,00	100	15	6	66,69	78,14
8,00	150	25	8	89,59	106,76
10,00	150	25	10	126,22	143,39
12,00	150	25	12	200,75	232,80
14,00	200	50	14	246,54	283,18
16,00	200	50	16	331,26	371,33
18,00	200	75	18	486,54*	549,50*
20,00	200	75	20	629,64*	704,05*

CONDICIONES DE CORTE ORIENTATIVAS

		Ø2	Ø3	Ø4	Ø5	Ø6	Ø8	Ø10	Ø12	Ø14
	RPM	4000	2600	2000	1600	1300	1000	800	660	570
	AVANCE (mm/min)	50	55	55	55	55	55	55	55	55
INOX Ti	RPM	8000	5300	4000	3200	2600	2000	1600	1300	1100
	AVANCE (mm/min)	55	55	55	55	60	60	60	60	60
Al	RPM	16000	11000	8000	6400	5300	4000	3200	2600	2300
	AVANCE (mm/min)	290	290	290	290	290	290	290	290	300

* Para obtener parámetros de corte recomendados para fresas recubiertas de TiAlN, multiplicar valores del recuadro por el factor 1,3

*Hasta fin de existencias

FRESAS FRONTALES DE MD INTEGRAL DESBASTE FINO, MEDIO Y GRUESO

Fresas

Rosa



MD



30°



CILÍNDRICO

Ti

INC

Ni



MD



45°



CILÍNDRICO

INOX



50 HRc



FMD1					
D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
TOL D ₁ +0 -0,05	TOL D ₂ h6				
6	6	63	19	3	41,47*
8	8	63	19	3	44,52*
10	10	63	22	3	56,91*
12	12	75	25	4	71,87*
16	16	88	32	4	122,98*
20	20	100	38	4	143,95*

FMD3					
D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
TOL D ₁ +0 -0,05	TOL D ₂ h6				
6	6	50	16	4	34,47
8	8	60	19	3	46,71
10	10	75	22	4	71,88
12	12	75	26	4	98,66
16	16	92	32	4	224,45
20	20	100	38	4	336,35

*Hasta fin de existencias



MD



30°



CILÍNDRICO

Al

Cu



FMD6					
D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
TOL D ₁ +0 -0,05	TOL D ₂ h6				
6	6	63	19	3	41,47*
8	8	63	19	3	44,52*
10	10	63	22	3	56,91*
12	12	75	25	4	71,87*
16	16	88	32	4	122,98*
20	20	100	38	4	143,95*

*Hasta fin de existencias

FRESAS DE METAL DURO INTEGRAL ESPECIALES PARA INOXIDABLE Y ALEACIONES DE NIQUEL

INOX
Ni
Ti

44 HRC

CILÍNDRICO

2Z

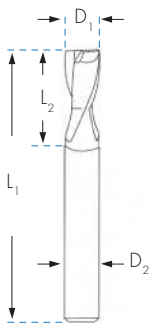
3Z

4Z

Muy recomendado para
mecanizado de inoxidable,
titanio y aleaciones de niquel.

Micro Grano MD

SERIE CORTA



TOL D1
+0 -0,05

TOL D2
h6



				FMT2	FMT63	FMT48
MATERIAL						
ACABADO				TiAlSiN	TiAlSiN	TiAlSiN
CALIDAD						
				2Z	3Z	4Z
D1	L1	L2	D2	€	€	€
1,00	38	3	3	44,09	44,09	44,09
1,50	38	4	3	43,05	43,05	43,05
2,00	38	6	3	34,26	34,26	34,26
2,50	38	8	3	33,48	33,48	33,48
3,00	38	8	3	28,84	28,84	28,84
3,50	50	11	4	35,39	35,39	35,39
4,00	50	11	4	32,88	32,88	32,88
4,50	50	13	5	42,06	42,06	42,06
5,00	50	13	5	41,55	41,55	41,55
6,00	50	16	6	46,84	46,84	46,84
7,00	60	16	8	65,33	65,33	65,33
8,00	60	19	8	55,44	55,44	55,44
9,00	72	19	10	79,49	79,49	79,49
10,00	72	22	10	88,38	88,38	88,38
11,00	75	26	12	117,57	117,57	117,57
12,00	75	26	12	109,32	109,32	109,32
14,00	84	30	14	162,50	162,50	162,50
16,00	92	32	16	210,50	210,50	210,50
18,00	100	38	18	292,51	292,51	292,51
20,00	100	38	20	333,49	333,49	333,49
25,00	100	38	25	547,40	547,40	547,40

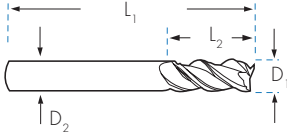
				FMT81
MATERIAL				
ACABADO				TiAlSiN
CALIDAD				
				4Z
D1	L1	L2	D2	€
1,00	38	3	3	
1,50	38	5	3	
2,00	38	6	3	
2,50	38	7	3	
3,00	38	12	3	
3,50	50	12	4	
4,00	50	14	4	
4,50	50	14	5	
5,00	50	16	5	45,71
6,00	63	19	6	51,53
7,00	63	19	8	
8,00	63	19	8	60,98
9,00	70	22	10	
10,00	70	22	10	97,21
11,00	75	25	11	
12,00	75	25	12	120,24
14,00	88	30	14	178,74
16,00	88	32	16	231,55
18,00	100	36	18	321,75
20,00	100	36	20	366,84
25,00	100	38	25	

				FMT92
MATERIAL				
ACABADO				TiAlSiN
CALIDAD				
				2Z
D1	L1	L2	D2	€
1,00	38	2	3	
1,50	38	3	3	
2,00	38	4	3	
2,50	38	5	3	
3,00	38	6	3	38,07
4,00	50	8	4	42,23
5,00	50	10	5	52,20
6,00	50	12	6	59,72
8,00	60	15	8	73,42
10,00	75	20	10	106,43
12,00	75	20	12	130,89
14,00	90	25	14	190,23
16,00	100	25	16	237,51
18,00	100	30	18	350,54
20,00	100	30	20	370,01

* **FMT81:** Fresa de 4 cortes, corte al centro, Hélice Variable con recubrimiento TiAlSiN. Su ángulo de Hélice Variable minimiza las vibraciones y junto con el recubrimiento TiAlSiN ofrece un espectacular rendimiento en el mecanizado.

CONDICIONES DE CORTE ORIENTATIVAS

		Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25
	RPM	5600	3640	2800	2240	1820	1400	1120	924	798	700	560	420
	AVANCE (mm/min)	70	77	77	77	77	77	77	77	77	91	91	70
INOX Ti	RPM	11200	7420	5600	4480	3640	2800	2240	1820	1540	1400	1120	840
	AVANCE (mm/min)	77	77	77	77	84	84	84	84	84	98	98	77
Ni	RPM	11200	7420	5600	4480	3640	2800	2240	1820	1540	1400	1120	840
	AVANCE (mm/min)	77	77	77	77	84	84	84	84	84	98	98	77



FRESA 2 LABIOS, SERIE CORTA, HÉLICE A 30°

INOX

Ref. FMG10

2 Z

MG MD

30°

CILÍNDRICO

TiAIN

INOX

45 HRC

Ti

INC

Micro Grano MD

SERIE CORTA

REVOLUCIONES Y AVANCES						FMG10					
R.P.M. rev./min	 AVANCE mm/min	R.P.M. rev./min	 AVANCE mm/min	R.P.M. rev./min	INOX AVANCE mm/min		TOL -0,03 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	€
21.500	170	12.900	101	10.750	84	FMG100100	1,0	6	40	2,5	37,13*
15.000	180	9.000	107	7.500	89	FMG100150	1,5	6	40	4,0	37,13*
11.560	190	7.560	120	6.300	90	FMG100200	2,0	6	50	6,0	37,13
8.920	210	5.560	140	4.620	120	FMG100300	3,0	6	50	8,0	37,13
7.560	300	4.620	180	3.880	150	FMG100400	4,0	6	50	11,0	37,13
6.300	320	3.780	190	3.160	160	FMG100500	5,0	6	50	12,0	37,13
5.560	350	3.360	220	2.840	180	FMG100600	6,0	6	50	12,0	37,13
4.880	385	2.940	220	2.470	180	FMG100700	7,0	8	60	16,0	51,11*
4.200	380	2.520	200	2.100	180	FMG100800	8,0	8	60	15,0	51,11
3.730	375	2.260	190	1.890	180	FMG100900	9,0	10	70	19,0	70,38*
3.260	330	2.000	160	1.680	160	FMG101000	10,0	10	72	20,0	70,38
2.740	280	1.680	130	1.360	130	FMG101200	12,0	12	75	24,0	99,41
2.470	265	1.520	125	1.210	125	FMG101400	14,0	14	85	26,0	115,25*
2.200	220	1.360	110	1.060	110	FMG101600	16,0	16	92	30,0	186,59
1.940	205	1.210	100	950	100	FMG101800	18,0	18	100	32,0	201,00*
1.680	170	1.060	80	840	80	FMG102000	20,0	20	105	38,0	222,00*
1.150	165	970	80	775	75	FMG102200	22,0	20	105	38,0	245,00*
1.360	130	840	70	680	60	FMG102500	25,0	25	120	45,0	289,00*

*Hasta fin de existencias



FRESA 3 LABIOS, SERIE CORTA, HÉLICE VARIABLE

INOX

Ref. FMD67

3 Z

MD

35°
38°

CILÍNDRICO

TiAlSiN

INOX

Ti

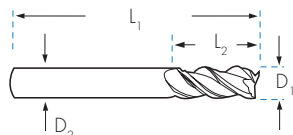
Ni

Micro Grano MD

SERIE CORTA

FMD67					
	TOL e8 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	€
FMD670300	3	6	50	8	31,40
FMD670400	4	6	50	11	31,40
FMD670500	5	6	50	13	31,40
FMD670600	6	6	50	16	31,40
FMD670800	8	8	60	19	39,60
FMD671000	10	10	73	22	58,50
FMD671200	12	12	75	26	79,80
FMD671600	16	16	92	32	155,40
FMD672000	20	20	100	38	229,20





FRESA 4 LABIOS, SERIE CORTA, HÉLICE VARIABLE

INOX Ref. FMG12 **4 Z** **MG MD** **WELDON** **TiAlSiN** **INOX** **45 HRc** **Ti** **INC** **Micro Grano MD**

SERIE CORTA

REVOLUCIONES Y AVANCES

R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min
11.560	280	7.560	170	6.300	140
10.240	300	6.560	185	5.460	155
8.920	320	5.560	200	4.620	170
7.560	570	4.620	350	3.880	280
6.300	600	3.780	360	3.160	300
5.560	660	3.360	410	2.840	330
4.880	685	2.940	420	2.470	340
4.200	710	2.520	380	2.100	350
3.730	660	2.260	340	1.890	325
3.260	610	2.000	300	1.680	300
2.740	520	1.680	250	1.360	240
2.470	465	1.520	225	1.210	220
2.200	410	1.360	200	1.060	200
1.940	365	1.210	180	950	175
1.680	320	1.060	160	840	150
1.360	250	840	130	680	130

	TOL -0,03	TOL h6	L1 mm	L2 mm	€
FMG120200	2,0	6	40	6	31,40*
FMG120250	2,5	6	40	8	31,40*
FMG120300	3,0	6	50	8	31,40
FMG120400	4,0	6	50	11	31,40
FMG120500	5,0	6	50	13	31,40
FMG120600	6,0	6	50	16	31,40
FMG120700	7,0	8	60	16	39,60*
FMG120800	8,0	8	60	19	39,60
FMG120900	9,0	10	70	19	58,50*
FMG121000	10,0	10	73	22	58,50
FMG121200	12,0	12	75	26	79,80
FMG121400	14,0	14	85	30	109,00
FMG121600	16,0	16	92	32	155,40
FMG121800	18,0	18	92	38	229,20
FMG122000	20,0	20	100	38	229,20
FMG122500	25,0	25	120	40	315,25*

*Hasta fin de existencias



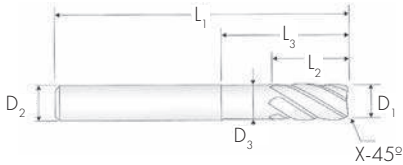
FRESA 6 LABIOS, SERIE CORTA, HÉLICE A 45°

INOX Ref. FMG14 **6 Z** **MG MD** **WELDON** **TiAlN** **INOX** **45 HRc** **Ti** **INC** **Micro Grano MD**

SERIE CORTA

R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min		TOL -0,03	TOL h6	L1 mm	L2 mm	€
8.900	2.670	5.760	1.555	4.850	1.310	2.100	370	FMG140300	3,0	3	38	8	23,59
7.560	2.260	4.800	1.440	4.100	1.230	1.800	325	FMG140400	4,0	4	50	11	26,10
6.300	2.090	4.050	1.215	3.700	1.180	1.580	300	FMG140500	5,0	5	50	13	33,00
5.560	2.000	3.880	1.370	3.370	1.100	1.350	280	FMG140600	6,0	6	50	16	33,86
4.200	2.000	2.940	1.370	2.490	1.100	1.000	280	FMG140800	8,0	8	60	19	47,36
3.360	2.000	2.320	1.370	1.920	1.100	440	280	FMG141000	10,0	10	75	22	66,05
2.840	1.680	2.000	1.160	1.610	1.000	400	250	FMG141200	12,0	12	75	26	96,71
2.470	1.470	1.740	1.020	1.380	885	355	220	FMG141400	14,0	14	90	32	124,83
2.100	1.260	1.480	880	1.160	770	310	190	FMG141600	16,0	16	100	32	170,32
1.890	1.130	1.320	785	1.030	695	280	170	FMG141800	18,0	18	100	38	197,69
1.680	1.010	1.160	690	900	920	250	155	FMG142000	20,0	20	100	38	246,63
1.500	900	1.100	600	850	540	220	135	FMG142500	25,0	25	100	38	420,39





FRESAS 4 LABIOS DE HÉLICE VARIABLE

INOX

Ref. FMG83

4 Z

DIN 6527

MG MD

WELDON

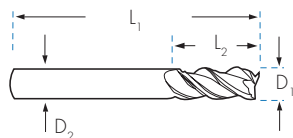
TiAIN

Micro Grano MD

REVOLUCIONES Y AVANCES

R.P.M. rev./min	INOX AISI 316L AVANCE mm/min	R.P.M. rev./min	INOX AISI 304 AVANCE mm/min		TOL -0,03	TOL h6	L1 mm	L2 mm	L3 mm	X-45°	FMG83 €
					D1 mm	D2 mm					
10.185	195	14.260	205	FMG830300	3,0	6	57	8	11	0,07	53,09
7.600	250	14.260	255	FMG830400	4,0	6	57	11	14	0,09	53,09
6.110	310	8.655	310	FMG830500	5,0	6	57	13	16	0,12	53,09
5.095	360	7.130	360	FMG830600	6,0	6	57	13	21	0,20	53,09
3.820	435	5.345	465	FMG830800	8,0	8	63	19	27	0,25	68,01
3.055	590	4.275	585	FMG831000	10,0	10	73	22	32	0,35	99,28
2.545	565	3.565	565	FMG831200	12,0	12	83	26	38	0,40	133,81
2.180	520	3.055	520	FMG831400	14,0	14	84	30	40	0,40	192,03
1.910	480	2.670	480	FMG831600	16,0	16	92	32	44	0,40	225,52
1.525	470	2.140	470	FMG832000	20,0	20	104	38	55	0,40	356,55





FRESA 3 A 4 LABIOS, SERIE CORTA, HÉLICE A 50°

INOX

Ref. FMG13

3-4 Z

MG MD

WELDON

TiAlN

INOX

45 HRc

Ti

INC

Micro Grano MD

SERIE CORTA

REVOLUCIONES Y AVANCES

R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min
5.560	310	3.360	200	2.840	160	1.280	40
4.200	310	2.520	180	2.100	160	920	40
3.260	310	2.000	140	1.680	140	740	40
2.740	250	1.680	120	1.370	120	620	30
2.200	200	1.360	100	1.050	100	460	25
1.940	175	1.210	85	950	85	410	20
1.680	150	1.060	70	840	70	350	20
1.360	115	840	60	670	60	300	15

	TOL -0,03	TOL h6	L1 mm	L2 mm	Z	€
	D1 mm	D2 mm				
FMG130600	6,0	6	50	13	3	40,38*
FMG130800	8,0	8	60	19	3	51,65*
FMG131000	10,0	10	70	22	3	76,30*
FMG131200	12,0	12	75	25	3	104,56*
FMG131600	16,0	16	90	32	3	173,27*
FMG131800	18,0	18	90	32	3	202,56*
FMG132000	20,0	20	100	28	4	229,72*
FMG132500	25,0	25	120	45	4	367,40*

*Hasta fin de existencias

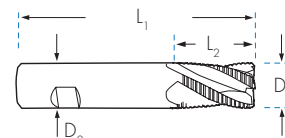


NOTA: En operaciones de fresado por una cara deberemos aumentar los avances señalados en un 30%, manteniendo las mismas revoluciones.

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias μm / Diámetro nominal en mm

	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL e8	- 14 - 28	- 20 - 38	- 25 - 47	- 32 - 59	- 40 - 73
TOL h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13



FRESAS 3 A 5 LABIOS, DESBASTE FINO

INOX

Ref. FMG15
Ref. FMG16



MG
MD



NF



TiAIN

INOX



Ti

INC

Micro Grano
MD

SERIE CORTA

REVOLUCIONES Y AVANCES

R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min
15.600	2.320	12.400	840	8.400	570	2.400	190
13.600	2.320	10.800	840	7.350	570	2.100	190
11.600	2.320	9.200	840	6.300	570	1.800	190
10.400	2.320	8.400	840	5.700	570	1.550	190
9.200	2.320	7.600	840	5.100	570	1.300	190
8.000	2.400	6.000	800	4.200	570	1.200	190
6.800	2.400	5.200	840	3.600	570	900	130
6.000	2.400	4.800	760	3.300	510	800	110
5.200	2.320	4.400	720	2.700	420	700	100
4.800	2.160	3.600	560	2.400	360	660	100
4.300	2.150	3.200	620	2.160	410	600	100

FMG15

	TOL h10	TOL h6	L1 mm	L2 mm	Z	€
	D1 mm	D2 mm				
FMG150600	6,0	6	54	7	3	38,45*
FMG150700	7,0	8	58	8	3	44,93*
FMG150800	8,0	8	58	9	3	44,93*
FMG150900	9,0	10	66	13	4	67,00*
FMG151000	10,0	10	66	14	4	67,00*
FMG151200	12,0	12	73	16	4	85,95*
FMG151400	14,0	14	75	18	4	104,25*
FMG151600	16,0	16	82	22	4	139,88*
FMG151800	18,0	18	84	24	4	179,17*
FMG152000	20,0	20	92	26	4	202,48*
FMG152500	25,0	25	110	25	5	315,43*



*Hasta fin de existencias

SERIE LARGA

REVOLUCIONES Y AVANCES

R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min
15.600	2.320	12.400	840	8.400	570	2.400	190
13.600	2.320	10.800	840	7.350	570	2.100	190
11.600	2.320	9.200	840	6.300	570	1.800	190
10.400	2.320	8.400	840	5.700	570	1.550	190
9.200	2.320	7.600	840	5.100	570	1.300	190
8.000	2.400	6.000	800	4.200	570	1.200	190
6.800	2.400	5.200	840	3.600	570	900	130
6.000	2.400	4.800	760	3.300	510	800	110
5.200	2.320	4.400	720	2.700	420	700	100
4.800	2.160	3.600	560	2.400	360	660	100
4.300	2.150	3.200	620	2.160	410	600	100

FMG16

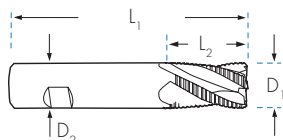
	TOL h10	TOL h6	L1 mm	L2 mm	Z	€
	D1 mm	D2 mm				
FMG160600	6,0	6	57	16	3	41,32*
FMG160700	7,0	8	63	16	3	48,29*
FMG160800	8,0	8	63	16	3	48,29*
FMG160900	9,0	9	72	19	4	72,02*
FMG161000	10,0	10	72	22	4	72,02*
FMG161200	12,0	12	83	26	4	92,41*
FMG161400	14,0	14	83	26	4	112,06*
FMG161600	16,0	16	92	32	4	150,39*
FMG161800	18,0	18	92	32	4	192,63*
FMG162000	20,0	20	104	38	4	217,71*
FMG162500	25,0	25	121	45	5	339,16*



*Hasta fin de existencias

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias μm / Diámetro nominal en mm					
	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL e8	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
TOL h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13



FRESA 4 A 6 LABIOS, SERIE CORTA, HÉLICE A 45°

INOX
Ref. FMG17

4-6 Z

MG MD

NF

TiAIN
INOX

INC

Micro Grano MD

SERIE CORTA

REVOLUCIONES Y AVANCES								FMG17						
 R.P.M. rev./min	AVANCE mm/min	 R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min		TOL h10	TOL h6				
									D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
15.600	2.320	12.400	840	8.400	570	2.400	190	FMG170600	6,0	6	54	7	4	38,45*
11.600	2.320	9.200	840	6.300	570	1.800	190	FMG170800	8,0	8	58	9	4	44,93*
9.200	2.320	7.600	840	5.100	570	1.300	190	FMG171000	10,0	10	66	14	4	67,00*
8.000	2.400	6.000	800	4.200	570	1.200	190	FMG171200	12,0	12	73	16	4	85,95*
6.000	2.400	4.800	760	3.300	510	800	110	FMG171600	16,0	16	82	22	5	139,88*
4.800	2.160	3.600	560	2.400	360	660	100	FMG172000	20,0	20	92	26	6	179,98*

*Hasta fin de existencias



FRESA 3 A 6 LABIOS, SERIE LARGA, HÉLICE A 45°

INOX
Ref. FMG18

3-6 Z

MG MD

NF

TiAIN
INOX

INC

Micro Grano MD

SERIE LARGA

REVOLUCIONES Y AVANCES								FMG18						
R.P.M. rev./min		R.P.M. rev./min		R.P.M. rev./min		R.P.M. rev./min								
	AVANCE mm/min		AVANCE mm/min		AVANCE mm/min		AVANCE mm/min		D1 mm	D2 mm				
20.100	4.600	18.400	1.700	12.600	1.040	3.800	399	FMG180400	4,0	6	57	11	3	40,12*
18.000	4.600	15.000	1.650	10.200	1.040	2.200	390	FMG180500	5,0	6	57	13	4	40,12*
15.600	2.320	12.400	840	8.400	570	2.400	190	FMG180600	6,0	6	57	16	4	40,12*
13.600	2.320	10.800	840	7.350	570	2.100	190	FMG180700	7,0	8	63	16	4	46,88*
11.600	2.320	9.200	840	6.300	570	1.800	190	FMG180800	8,0	8	63	16	4	46,88*
10.400	2.320	8.400	840	5.700	570	1.550	190	FMG180900	9,0	10	72	19	4	69,92*
9.200	2.320	7.600	840	5.100	570	1.300	190	FMG181000	10,0	10	72	22	4	69,92*
8.000	2.400	6.000	800	4.200	570	1.200	190	FMG181200	12,0	12	83	26	4	89,72*
6.800	2.400	5.200	840	3.600	570	900	130	FMG181400	14,0	14	83	26	5	108,80*
6.000	2.400	4.800	760	3.300	510	800	110	FMG181600	16,0	16	92	32	5	146,01*
4.800	2.160	3.600	560	2.400	360	660	100	FMG182000	20,0	20	104	38	6	234,85*
4.300	2.150	3.200	620	2.160	410	600	100	FMG182500	25,0	25	121	45	6	411,61*

*Hasta fin de existencias



Fresas

Rosa

FRESA 4 A 6 LABIOS, SERIE LARGA, HÉLICE A 45°

INOX

Ref. FMG19

4-6 Z



MG MD



NF

WELDON

TiAlN

INOX

INC

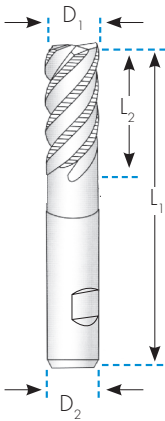
 45 HRC

Micro Grano MD

SERIE LARGA

FMG19								
	TOL h10	TOL h6						
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	Z	€
FMG190600	6,0	6	5,5	57	16	20	4	49,53*
FMG190800	8,0	8	7,5	63	16	26	4	57,90*
FMG191000	10,0	10	9,5	72	22	31	4	86,37*
FMG191200	12,0	12	11,5	83	26	37	4	110,82*
FMG191600	16,0	16	15,5	100	32	51	5	144,44*
FMG192000	20,0	20	19,2	110	38	59	6	232,18*

*Hasta fin de existencias



REVOLUCIONES Y AVANCES

 <30 HRC		 30-45 HRC		INOX		INC	
R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min
15.600	2.320	12.400	840	8.400	570	2.400	190
11.600	2.320	9.200	840	6.300	570	1.800	190
9.200	2.320	7.600	840	5.100	570	1.300	190
8.000	2.400	6.000	800	4.200	570	1.200	190
6.000	2.400	4.800	760	3.300	510	800	110
4.800	2.160	3.600	560	2.400	360	660	100

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias μm / Diámetro nominal en mm					
	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
TOL h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

FRESA 2 Y 3 LABIOS, SERIE CORTA, HÉLICE A 45°, PARA ALUMINIO

AI

MG MD

45° N

CILÍNDRICO

2 Z

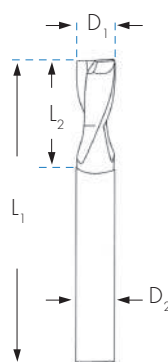
Ref. FMD59

3 Z

Ref. FMD33

Micro Grano MD

SERIE CORTA



REVOLUCIONES Y AVANCES

AI							FMD59	FMD33
R.P.M rev./min.	AVANCE 1 mm/min	AVANCE 2 mm/min	TOL -0,05 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	2 Z €	3 Z €
10.000	700	900	3,0	6,0	50	8	26,54	26,54
10.000	900	1.100	4,0	6,0	50	11	28,75	28,75
10.000	1.000	1.300	5,0	6,0	50	13	29,70	29,70
10.000	1.200	1.500	6,0	6,0	50	16	33,72	33,72
8.000	1.400	1.800	8,0	8,0	60	19	48,05	48,05
8.000	1.700	2.100	10,0	10,0	72	25	70,64	70,64
8.000	2.100	2.600	12,0	12,0	75	30	93,34	93,34
6.000	1.800	2.200	14,0	14,0	84	35	130,99	130,99
6.000	1.900	2.400	16,0	16,0	92	40	166,15	166,15
4.000	1.600	1.900	20,0	20,0	100	45	274,03	274,03

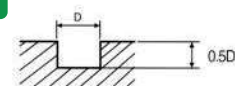
TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias μm / Diámetro nominal en mm

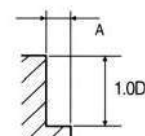
	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL	0	0	0	0	0
h10	- 40	- 48	- 58	- 70	- 84
TOL	0	0	0	0	0
h6	- 6	- 8	- 9	- 11	- 13

AI

AVANCE 1



AVANCE 2



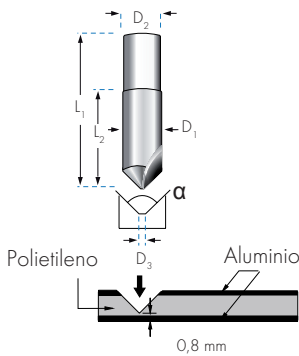
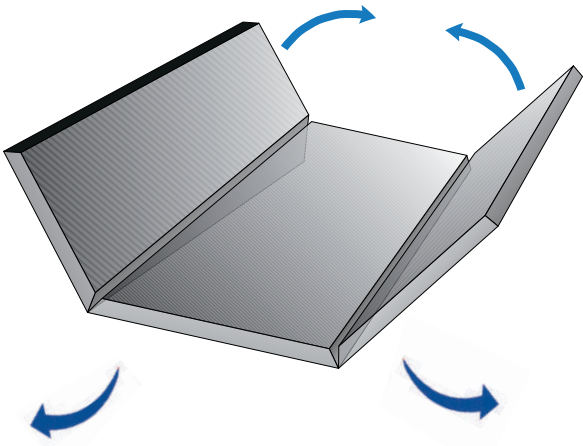
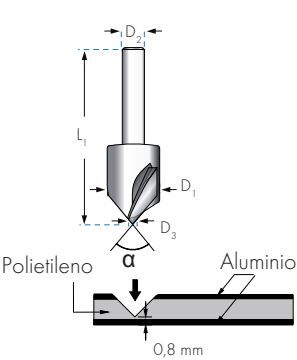
$$A: \phi 3 - \phi 10 = 0.25 \times D$$

$$\phi 12 - \phi 20 = 0.5 \times D$$



FRESAS ESPECIALES PARA ALUCOBOND

PMD			MDI		
Ref. FFALUC			Ref. FFALUC...MDI		



DE PLAQUITA SOLDADA

DE METAL DURO INTEGRAL

FFALUC						
	D1 mm	D2 mm	D3 mm	L1 mm	α	€
FFALUC1600	16,00	8	2,5	55	90º	226,48
FFALUC1800	18,00	8	2,5	55	90º	238,52
FFALUC2000	20,00	8	2,5	55	90º	254,32
FFALUC1600-135	16,00	8	2,3	55	135º	226,48
FFALUC1800-135	18,00	8	2,3	55	135º	238,52
FFALUC2000-135	20,00	8	2,3	55	135º	254,32

FFALUC...MDI							
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	α	€
FFALUC1400MDI	14,00	14	2,5	50	14	90º	135,48
FFALUC1600MDI	16,00	16	2,5	50	16	90º	154,18
FFALUC1800MDI	18,00	18	2,5	50	18	90º	177,86
FFALUC1400MDI-135	14,00	14	0,5	50	14	135º	135,48
FFALUC1600MDI-135	16,00	16	0,5	50	16	135º	154,18
FFALUC1800MDI-135	18,00	18	0,5	50	18	135º	177,86

FRESAS DE METAL DURO FRONTALES CON CUELLO



Ref. FMG74
Ref. FMG75
Ref. FMG76

2 Z



MG
MD

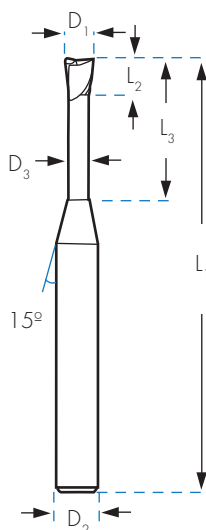


CILÍNDRICO

TiAIN



Micro Grano
MD



FMG74

	TOL -0,015	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG740050	0,5	4	0,45	45	0,7	8	101,06
FMG740100	1,0	4	0,95	55	1,5	20	103,69
FMG740150	1,5	4	1,45	55	2,3	20	93,60
FMG740200	2,0	4	1,95	55	3,0	20	89,82
FMG740300	3,0	6	2,85	60	4,5	20	116,16
FMG740400	4,0	6	3,85	60	6,0	20	116,16
FMG740500	5,0	6	4,85	60	7,5	20	116,16
FMG740600	6,0	6	5,85	80	9,0	20	116,16

FMG75

	TOL -0,015	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG750200	2,0	4	1,95	70	3,0	30	106,16
FMG750300	3,0	6	2,85	70	4,5	30	120,66
FMG750400	4,0	6	3,85	70	6,0	30	120,66
FMG750500	5,0	6	4,85	80	7,5	30	120,66
FMG750600	6,0	6	5,85	90	9,0	30	120,66

FMG76

	TOL -0,015	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG760400	4,0	6	3,85	90	6,0	40	132,68
FMG760500	5,0	6	4,85	80	7,5	40	132,68
FMG760600	6,0	6	5,85	100	9,0	40	132,68



FRESAS DE METAL DURO SEMIESFÉRICAS CON CUELLO

Fresas
Rosa



Ref. FMG77
Ref. FMG78
Ref. FMG79

2 Z



MG
MD

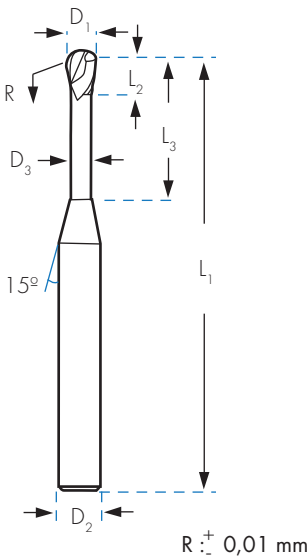


CILÍNDRICO

TiAIN



Micro Grano
MD



FMG77

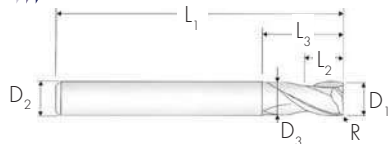
	TOL -0,02	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG770050	0,5	4	0,45	45	0,7	8	101,06
FMG770100	1,0	4	0,95	55	1,5	20	103,69
FMG770150	1,5	4	1,45	55	2,3	20	93,60
FMG770200	2,0	4	1,95	55	3,0	20	89,82
FMG770300	3,0	6	2,85	60	4,5	20	116,16
FMG770400	4,0	6	3,85	65	6,0	20	116,16
FMG770500	5,0	6	4,85	60	7,5	20	116,16
FMG770600	6,0	6	5,85	80	9,0	20	116,16

FMG78

	TOL -0,02	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG780200	2,0	4	1,95	70	3,0	30	106,16
FMG780300	3,0	6	2,85	70	4,5	30	120,66
FMG780400	4,0	6	3,85	70	6,0	30	120,66
FMG780500	5,0	6	4,85	80	7,5	30	120,66
FMG780600	6,0	6	5,85	90	9,0	30	120,66

FMG79

	TOL -0,02	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG790400	4,0	6	3,85	90	6,0	40	132,68
FMG790600	6,0	6	5,85	100	9,0	40	132,68



FRESA DE 2 LABIOS PARA ACEROS DE TEMPLE EXTREMO 70HRC



Ref. FMG01

2 Z



**MG
MD**



CILÍNDRICO

BLUE



**Micro Grano
MD**

REVOLUCIONES Y AVANCES

R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min
25.500	360	20.500	215	16.000	135	12.500	88
21.500	390	17.500	240	13.500	150	11.000	102
11.500	420	9.500	260	7.500	160	6.400	115
10.150	430	8.350	270	6.550	165	5.575	118
8.800	440	7.200	270	5.600	170	4.750	118
8.550	470	6.800	280	5.350	175	4.600	125
8.300	500	6.400	285	5.100	180	4.450	132
6.900	480	5.300	280	4.200	180	3.700	130
5.200	445	4.000	255	3.200	165	2.800	120
4.100	415	3.200	240	2.550	155	2.200	112
3.500	415	2.650	240	2.100	155	1.860	112
2.600	365	2.000	210	1.600	135	1.400	98
2.050	335	1.600	295	1.300	125	1.100	88

FMG01

	TOL Especial	TOL h6							
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	R	€	
FMG010100	1,0	3	-	40	1,5	-	0,1	29,23*	
FMG010150	1,5	3	-	40	2,2	-	0,1	29,23*	
FMG010300	3,0	6	2,9	45	4,0	7	0,1	38,73*	
FMG010350	3,5	6	3,3	45	5,0	9	0,1	38,73*	
FMG010400	4,0	6	3,8	45	5,0	9	0,1	38,73*	
FMG010450	4,5	6	4,3	45	6,0	10	0,1	38,73*	
FMG010500	5,0	6	4,8	50	6,0	11	0,2	38,73*	
FMG010600	6,0	6	5,8	50	7,0	14	0,2	38,73*	
FMG010800	8,0	8	7,8	60	9,0	18	0,2	48,97*	
FMG011000	10,0	10	9,7	75	12,0	25	0,2	73,20*	
FMG011200	12,0	12	11,7	75	15,0	30	0,3	100,94*	
FMG011600	16,0	16	15,7	90	18,0	38	0,3	168,29*	
FMG012000	20,0	20	19,7	100	24,0	45	0,3	222,60*	

*Hasta fin de existencias



FRESA DE 4 LABIOS PARA ACEROS DE TEMPLE EXTREMO 70HRC



Ref. FMG04

4 Z



**MG
MD**



CILÍNDRICO

BLUE



**Micro Grano
MD**

REVOLUCIONES Y AVANCES

R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min
25.500	710	20.500	430	16.000	270	12.500	175
21.500	775	17.500	475	13.500	295	11.000	200
17.500	840	14.500	520	11.000	320	9.500	230
14.500	840	12.000	520	9.250	320	7.950	230
11.500	840	9.500	520	7.500	320	6.400	230
10.150	860	8.350	530	6.550	328	5.575	240
8.800	880	7.200	540	5.600	335	4.750	240
8.550	940	6.800	560	5.350	353	4.600	255
8.300	1.000	6.400	580	5.100	370	4.450	270
6.900	950	5.300	560	4.200	350	3.700	260
5.200	900	4.000	520	3.200	330	2.800	240
4.100	840	3.200	480	2.550	310	2.200	220
3.500	840	2.650	480	2.100	300	1.860	220
2.600	730	2.000	420	1.600	270	1.400	200
2.050	650	1.600	380	1.300	250	1.100	180

FMG04

	TOL	TOL							€
	Especial	h6							
	D1	D2	D3	L1	L2	L3	R		
	mm	mm	mm	mm	mm	mm			
FMG040100	1,0	3	-	40	1,5	-	0,1	29,23*	
FMG040150	1,5	3	-	40	2,2	-	0,1	29,23*	
FMG040200	2,0	3	1,9	40	3,0	6	0,1	26,52*	
FMG040250	2,5	3	2,4	40	4,0	6	0,1	26,52*	
FMG040300	3,0	6	2,9	45	4,0	7	0,1	38,73*	
FMG040350	3,5	6	3,3	45	5,0	9	0,1	38,73*	
FMG040400	4,0	6	3,8	45	5,0	9	0,1	38,73*	
FMG040450	4,5	6	4,3	45	6,0	10	0,1	38,73*	
FMG040500	5,0	6	4,8	50	6,0	11	0,2	38,73*	
FMG040600	6,0	6	5,8	50	7,0	14	0,2	38,73*	
FMG040800	8,0	8	7,8	60	9,0	18	0,2	48,97*	
FMG041000	10,0	10	9,7	75	12,0	25	0,2	73,20*	
FMG041200	12,0	12	11,7	75	15,0	30	0,3	100,94*	
FMG041600	16,0	16	15,7	90	18,0	38	0,3	168,29*	
FMG042000	20,0	20	19,7	100	24,0	45	0,3	222,60*	

*Hasta fin de existencias





FRESA DE 2 LABIOS SEMIESFÉRICA PARA ACEROS DE TEMPLE EXTREMO 70HRc



Ref. FMG02

2 Z



MG MD

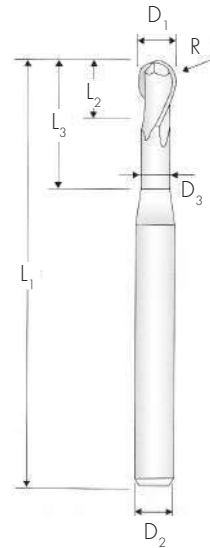


CILÍNDRICO

BLUE



Micro Grano MD



SERIE CORTA

REVOLUCIONES Y AVANCES

50-55 HRc		55-60 HRc		60-65 HRc		65-70 HRc	
R.P.M rev./min.	AVANCE mm/min	R.P.M rev./min.	AVANCE mm/min	R.P.M rev./min.	AVANCE mm/min	R.P.M rev./min.	AVANCE mm/min
57.000	4.000	54.000	3.400	51.000	2.700	48.000	2.300
52.750	4.000	50.000	3.300	46.000	2.700	43.000	2.300
48.500	4.000	44.500	3.275	41.500	2.750	38.250	2.300
40.000	4.000	35.000	3.150	32.000	2.800	28.500	2.300
26.500	4.000	23.500	3.150	21.000	2.800	19.000	2.300
20.000	4.000	17.500	3.150	16.000	2.800	14.500	2.300
15.000	3.750	13.500	3.050	11.500	2.550	10.500	2.100
11.000	3.100	10.000	2.500	8.800	2.150	8.000	1.750
10.000	2.900	9.000	2.325	7.900	2.000	7.250	1.650
9.000	2.700	8.000	2.150	7.000	1.850	6.500	1.550
8.250	2.500	7.300	2.025	6.400	1.750	5.900	1.465
7.500	2.400	6.600	1.900	5.800	1.650	5.300	1.380
5.600	1.900	5.000	1.550	4.400	1.250	4.000	1.050
5.000	1.800	4.500	1.450	3.950	1.125	3.600	950
4.000	1.600	3.600	1.275	3.150	900	2.875	750
3.600	1.500	3.200	1.200	2.800	800	2.550	660
-	-	-	-	-	-	-	-

FMG02

	TOL Especial	TOL h6						TOL R	€
		D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	R	
FMG020100		1,0	4	0,95	50	1,0	2,2	0,5	48,20*
FMG020120		1,2	4	1,10	50	1,2	2,6	0,6	48,20*
FMG020150		1,5	4	1,40	50	1,5	3,0	0,8	48,20*
FMG020200		2,0	4	1,90	50	2,0	4,0	1,0	45,77*
FMG020300		3,0	6	2,90	60	3,0	6,0	1,5	45,77*
FMG020400		4,0	6	3,30	70	4,0	8,0	2,0	47,83*
FMG020500		5,0	6	4,90	80	5,0	10,0	2,5	49,25*
FMG020600		6,0	6	5,90	90	6,0	12,0	3,0	52,81*
FMG020700		7,0	8	6,90	90	7,0	14,0	3,5	83,27*
FMG020800		8,0	8	7,90	100	8,0	16,0	4,0	82,41*
FMG020900		9,0	10	8,90	100	9,0	18,0	4,5	135,92*
FMG021000		10,0	10	9,90	100	10,0	20,0	5,0	135,92*
FMG021200		12,0	12	11,90	110	12,0	24,0	6,0	174,47*
FMG021400		14,0	14	13,80	110	14,0	28,0	7,0	176,50*
FMG021800		18,0	18	17,80	140	18,0	36,0	9,0	251,60*
FMG022000		20,0	20	19,80	160	20,0	40,0	10,0	356,56*
FMG022500		25,0	25	24,80	180	25,0	50,0	12,5	578,00*

*Hasta fin de existencias

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias μm / Diámetro nominal en mm

	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL Especial	0 - 12	0 - 12	0 - 15	0 - 15	0 - 15
TOL h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13
TOL R	0 - 5	0 - 10	0 - 10	0 - 10	0 - 10

FRESAS DE 6 LABIOS PARA ACEROS DE TEMPLE EXTREMO 70HRC



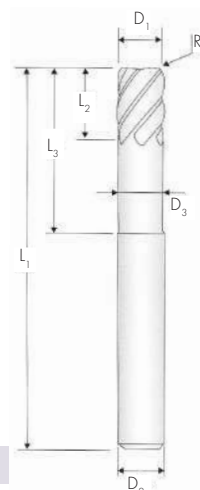
Ref. FMG06

6 Z

MG
MD

CILÍNDRICO

BLUE

Micro Grano
MD

SERIE CORTA

REVOLUCIONES Y AVANCES

50-55 HRc		55-60 HRc		60-65 HRc		65-70 HRc	
R.P.M rev./min.	AVANCE 1 mm/min	R.P.M rev./min.	AVANCE 1 mm/min	R.P.M rev./min.	AVANCE 1 mm/min	R.P.M rev./min.	AVANCE 1 mm/min
16.000	4.900	13.500	3.300	10.500	2.100	8.000	1.450
12.000	4.600	10.000	3.100	8.000	2.000	6.000	1.400
9.500	4.100	8.000	2.900	6.400	1.800	4.800	1.300
8.000	3.800	6.600	2.500	5.300	1.600	4.000	1.150

FMG06

	TOL Especial	TOL h6					TOL R	€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	R	
FMG060600	6,0	6	5,70	50	6	14	0,5	55,40*
FMG060800	8,0	8	7,65	60	8	24	0,5	66,09*
FMG061000	10,0	10	9,65	70	10	30	1,0	103,09*
FMG061200	12,0	12	11,60	75	12	30	1,0	123,14*

*Hasta fin de existencias

SERIE LARGA

REVOLUCIONES Y AVANCES

50-55 HRc		55-60 HRc		60-65 HRc		65-70 HRc	
R.P.M rev./min.	AVANCE 1 mm/min	R.P.M rev./min.	AVANCE 1 mm/min	R.P.M rev./min.	AVANCE 1 mm/min	R.P.M rev./min.	AVANCE 1 mm/min
16.000	4.900	13.500	3.300	10.500	2.100	8.000	1.450
12.000	4.600	10.000	3.100	8.000	2.000	6.000	1.400
9.500	4.100	8.000	2.900	6.400	1.800	4.800	1.300
9.500	4.100	8.000	2.900	6.400	1.800	4.800	1.300
8.000	3.800	6.600	2.500	5.300	1.600	4.000	1.150
8.000	3.800	6.600	2.500	5.300	1.600	4.000	1.150
6.000	3.400	5.000	2.300	4.000	1.250	3.000	870
6.000	3.400	5.000	2.300	4.000	1.250	3.000	870
4.800	3.200	4.000	2.100	3.200	1.020	2.400	690
4.800	3.200	4.000	2.100	3.200	1.020	2.400	690
4.800	3.200	4.000	2.100	3.200	1.020	2.400	690

FMG07

	TOL Especial	TOL h6					€
	D1 mm	D2 mm	L1 mm	L2 mm	R		
FMG070600	6,0	6	70	13	0,5		62,95*
FMG070800	8,0	8	90	19	0,5		78,90*
FMG071000	10,0	10	100	22	0,5		118,87*
FMG071001	10,0	10	100	22	1,0		133,13*
FMG071200	12,0	12	110	26	0,5		162,13*
FMG071201	12,0	12	110	26	1,0		181,58*
FMG071600	16,0	16	130	32	1,0		218,73*
FMG071601	16,0	16	130	32	1,5		238,88*
FMG072000	20,0	20	140	38	1,0		320,10*
FMG072001	20,0	20	140	38	1,5		349,68*
FMG072002	20,0	20	140	38	2,0		349,68*

*Hasta fin de existencias

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias μm / Diámetro nominal en mm

	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL Especial	0 - 12	0 - 12	0 - 15	0 - 15	0 - 15
TOL h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

**FRESAS PARA ACEROS DE TEMPLE EXTREMO 70HRC,
TECNOLOGÍA DE MICROFRESADO PIEZAS DE PRECISIÓN**



Ref. FMG09

2 Z



MG
MD



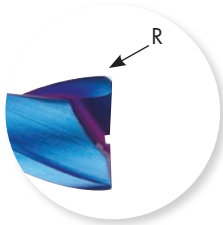
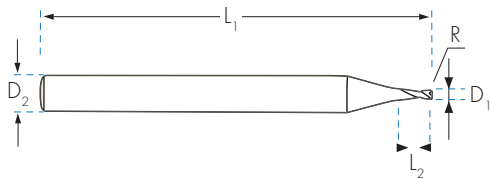
BLUE



TOL D1
-0,012

TOL D2
h6

Micro Grano
MD



FMG09						
	D1 mm	D2 mm	L1 mm	L2 mm	R	€
FMG090030	0,30	6	50	0,45	-	112,77
FMG090040	0,40	6	50	0,60	-	105,83
FMG090050	0,50	6	50	0,70	0,05	92,06
FMG090060	0,60	6	50	0,90	0,05	88,56
FMG090080	0,80	6	50	1,20	0,05	81,61
FMG090100	1,00	6	50	1,50	0,10	78,21
FMG090120	1,20	6	50	1,80	0,10	78,21
FMG090150	1,50	6	50	2,20	0,15	78,21
FMG090200	2,00	6	50	2,20	0,15	70,88



Ref. FMG08

2 Z



MG
MD



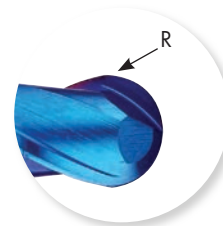
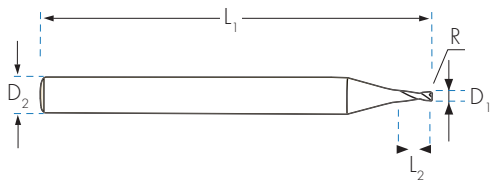
BLUE



TOL D1
-0,012

TOL D2
h6

Micro Grano
MD



FMG08						
	D1 mm	D2 mm	L1 mm	L2 mm	R	€
FMG080040	0,40	6	50	0,40	0,20	114,46
FMG080050	0,50	6	50	0,50	0,25	105,66
FMG080060	0,60	6	50	0,60	0,30	96,88
FMG080080	0,80	6	50	0,80	0,40	79,01
FMG080100	1,00	6	50	1,00	0,50	74,40
FMG080120	1,20	6	50	1,20	0,60	74,40
FMG080150	1,50	6	50	1,50	0,75	74,40
FMG080200	2,00	6	50	2,00	1,00	67,41

AIRALDE

DISCOS DE CORTE



BLUE-MASTER[®]
by *celesa*

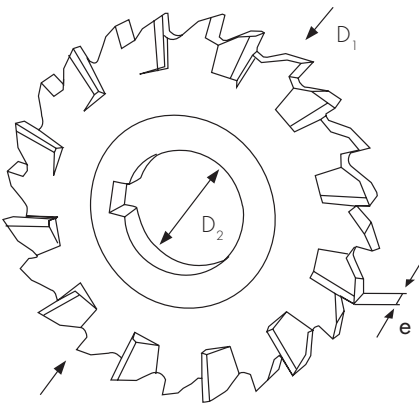
CUTTING TECHNOLOGIES

FRESA PARA RANURAR HSSCo DE 3 CORTES CON DIENTE CRUZADO



Ref. FF56

HSSCo **DIN 885A**



FF56				
D1 mm	e mm	D2 mm	Z	€
50	4,0	16	12	101,45
50	5,0	16	12	101,45
50	6,0	16	12	117,56
50	8,0	16	12	114,49
50	10,0	16	12	126,07
63	1,6	22	16	217,28
63	2,0	22	16	192,37
63	2,5	22	16	196,38
63	3,0	22	16	201,77
63	4,0	22	12	117,06
63	5,0	22	12	117,06
63	6,0	22	12	120,37
63	8,0	22	12	131,17
63	10,0	22	12	141,14
63	12,0	22	12	150,70
63	14,0	22	12	162,32
63	16,0	22	12	170,86
63	18,0	22	12	204,13
80	1,6	27	20	217,17
80	2,0	27	20	210,94
80	2,5	27	20	214,46
80	3,0	27	20	210,20
80	4,0	27	20	251,47
80	5,0	27	14	159,03
80	6,0	27	14	162,78
80	8,0	27	14	171,79
80	10,0	27	14	183,85
80	12,0	27	14	196,80
80	14,0	27	14	210,44
80	16,0	27	14	215,30
80	18,0	27	14	230,95
80	20,0	27	14	253,94

FF56				
D1 mm	e mm	D2 mm	Z	€
100	1,6	32	24	259,79
100	2,0	32	24	258,38
100	2,5	32	24	258,13
100	3,0	32	24	250,62
100	4,0	32	24	270,19
100	5,0	32	24	286,43
100	6,0	32	16	223,55
100	8,0	32	16	228,26
100	10,0	32	16	236,64
100	12,0	32	16	254,87
100	14,0	32	16	280,60
100	16,0	32	16	294,31
100	18,0	32	16	324,42
100	20,0	32	16	324,42
100	22,0	32	16	363,66
100	25,0	32	16	395,59
125	1,6	32	16	328,54
125	2,0	32	16	316,00
125	2,5	32	16	323,86
125	3,0	32	16	331,74
125	4,0	32	16	355,40
125	5,0	32	16	380,43
125	6,0	32	16	389,83
125	8,0	32	18	352,58
125	10,0	32	18	361,78
125	12,0	32	18	375,49
125	14,0	32	18	407,77
125	16,0	32	18	432,99
125	18,0	32	18	457,99
125	20,0	32	18	487,28
125	22,0	32	18	554,84
125	25,0	32	18	560,21
125	28,0	32	18	612,31

FF56				
D1 mm	e mm	D2 mm	Z	€
160	2,0	40	30	528,80
160	2,5	40	30	509,08
160	3,0	40	30	518,86
160	4,0	40	30	548,26
160	5,0	40	30	580,59
160	6,0	40	30	623,39
160	8,0	40	30	711,53
160	10,0	40	22	584,40
160	12,0	40	22	584,40
160	14,0	40	22	581,54
160	16,0	40	22	636,44
160	18,0	40	22	670,62
160	20,0	40	22	688,38
160	22,0	40	22	756,64
160	25,0	40	22	819,87
160	28,0	40	22	901,24
160	32,0	40	22	963,61
200	12,0	40	24	891,45
200	14,0	40	24	900,17
200	16,0	40	24	927,38
200	18,0	40	24	973,03
200	20,0	40	24	1.040,66
200	22,0	40	24	1.044,09
200	25,0	40	24	1.211,11
200	28,0	40	24	1.249,39
200	32,0	40	24	1.558,18

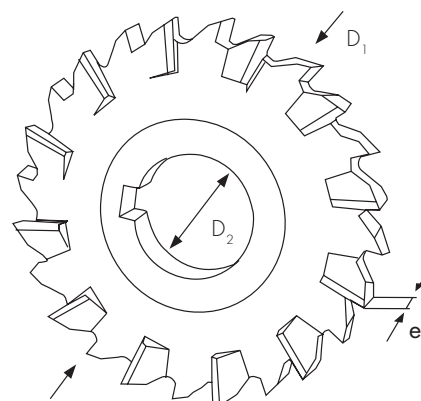
FRESA PARA RANURAR HSSCo DE 3 CORTES CON DIENTE RECTO



Ref. FF59

HSSCo

DIN
885B



FF59				
D1 mm	e mm	D2 mm	Z	€
50	4	16	16	101,13
50	5	16	16	101,13
50	6	16	16	117,21
50	8	16	16	114,15
50	10	16	16	125,70
63	4	22	18	117,82
63	5	22	18	117,82
63	6	22	18	119,38
63	8	22	18	129,79
63	10	22	18	139,66
63	12	22	18	149,59
63	14	22	18	161,10
63	16	22	18	170,40
63	18	22	18	203,52
80	5	27	20	158,48
80	6	27	20	162,66
80	8	27	20	171,65
80	10	27	20	183,24
80	12	27	20	196,19
80	14	27	20	209,81
80	16	27	20	215,26
80	18	27	20	230,91
80	20	27	20	253,89

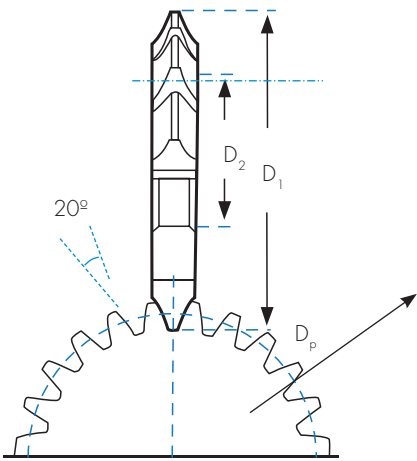
FF59				
D1 mm	e mm	D2 mm	Z	€
100	6	32	22	221,28
100	8	32	22	227,56
100	10	32	22	235,88
100	12	32	22	254,04
100	14	32	22	279,69
100	16	32	22	296,32
100	18	32	22	324,36
100	20	32	22	324,36
100	22	32	22	362,57
100	25	32	22	396,62
125	8	32	24	352,37
125	10	32	24	361,56
125	12	32	24	375,27
125	14	32	24	407,54
125	16	32	24	428,46
125	18	32	24	457,85
125	20	32	24	487,14
125	22	32	24	554,69
125	25	32	24	560,07
125	28	32	24	612,12

FF59				
D1 mm	e mm	D2 mm	Z	€
160	10	40	28	584,23
160	12	40	28	584,23
160	14	40	28	581,38
160	16	40	28	636,25
160	18	40	28	670,43
160	20	40	28	688,19
160	22	40	28	756,42
160	25	40	28	819,64
160	28	40	28	900,98
160	32	40	28	963,33
200	12	40	30	891,19
200	14	40	30	899,92
200	16	40	30	927,13
200	18	40	30	972,76
200	20	40	30	1.040,37
200	22	40	30	1.043,80
200	25	40	30	1.210,78
200	28	40	30	1.249,05
200	32	40	30	1.557,76

FRESA DE MÓDULO PARA TALLADO DE ENGRANAJES

HSS

Ref. 99RFM



MÓDULO FRESA	D ₁ mm	D ₂ mm	99RFM
			€
0,50	40	16	126,50
0,70	40	16	126,50
0,75	40	16	126,50
0,80	40	16	126,50
1,00	50	16	126,50
1,25	50	16	126,50
1,50	56	22	129,90
1,75	56	22	129,90
2,00	63	22	129,90
2,25	63	22	152,24
2,50	63	22	152,24
2,75	71	27	152,24
3,00	71	27	152,24
3,25	71	27	200,90
3,50	80	27	200,90
3,75	80	27	200,90
4,00	80	27	200,90
4,50	90	32	275,36
5,00	90	32	275,36
6,00	100	32	348,66
7,00	100	32	348,66

NÚMERO DE FRESA / DIENTES A TALLAR

Nº1	Nº2	Nº3	Nº4	Nº5	Nº6	Nº7	Nº8	Set
12-13	14-16	17-20	21-25	26-34	35-54	55-134	135-∞	12-∞

Mód. = $\frac{\varnothing_{Est}}{(Z+2)}$

NOTA: El precio depende del módulo, independientemente del nº de dientes a tallar.

FRESAS CILÍNDRICAS, FRONTALES CON CHAVETERO TRANSVERSAL HSSCo

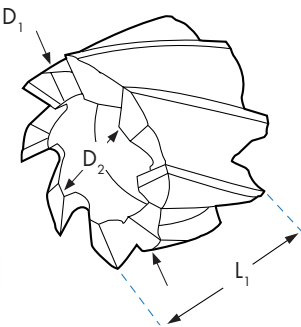
Ref. FF87

HSSCo

DIN
1880



ACABADO



Ref. FF88

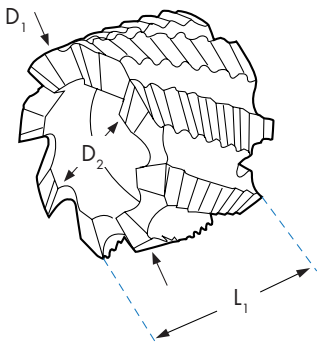
HSSCo

DIN
1880



NR

DESABASTE



D ₁ mm	D ₂ mm	L ₁ mm	Z	FF87
				€
40	16	32	8	133,41
50	22	36	8	183,56
63	27	40	8	250,82
80	27	45	10	355,01
100	32	50	12	571,53
125	40	56	14	917,83
160	50	63	16	1.640,35

D ₁ mm	D ₂ mm	L ₁ mm	Z	FF88
				€
40	16	32	6	193,22
50	22	36	6	239,94
63	27	40	8	317,91
80	27	45	8	467,27
100	32	50	10	770,93
125	40	56	12	1.307,90
160	50	63	14	2.269,40

FRESAS CILÍNDRICAS, FRONTALES CON CHAVETERO TRANSVERSAL HSSCo



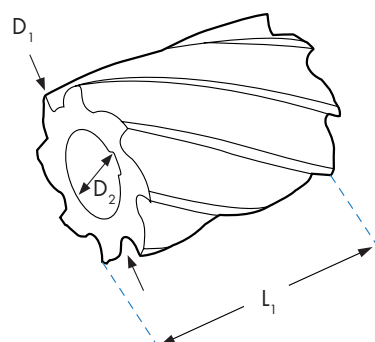
Ref. FF89

HSSCo

**DIN
884**



CILÍNDRICA PARA PLANEAR



FF89					
D1 mm	D2 mm	L1 mm	Z	€	
50	22	63	8	167,15*	
50	22	80	8	249,17*	
63	27	50	8	219,34*	
63	27	70	8	266,86*	
80	32	63	8	369,69*	
100	40	70	10	575,17*	

*Hasta fin de existencias

FRESAS CILÍNDRICAS, FRONTALES PARA PLANEAR CON MANGO

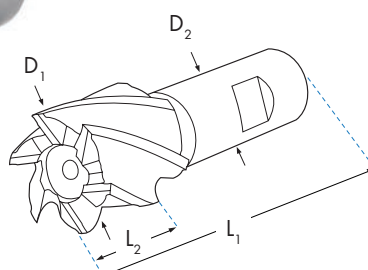


Ref. FMF87

**HSSCo
8%**



ACABADO



FMF87					
D1 mm	L2 mm	L1 mm	D2 mm	Z	€
30	30	90	20	6	194,48
35	30	90	20	6	223,19
40	32	95	25	8	278,17

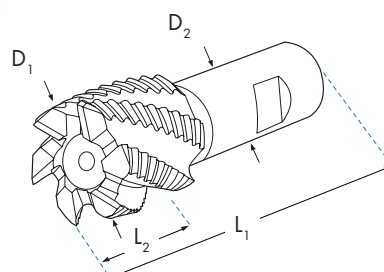


Ref. FMF88

**HSSCo
8%**



DESBASTE



FMF88					
D1 mm	L2 mm	L1 mm	D2 mm	Z	€
30	30	90	20	6	224,83
35	30	90	20	6	288,03
40	32	95	25	8	352,84

FRESAS ANGULARES ISÓSCELES HSSCo

Ref. FF77

HSSCo

DIN 847

45°

Ref. FF78

HSSCo

DIN 847

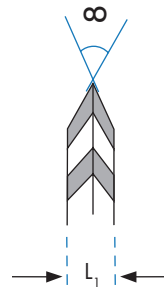
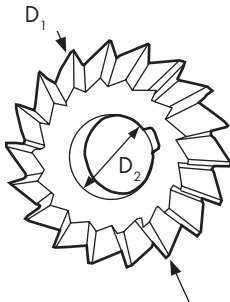
60°

Ref. FF79

HSSCo

DIN 847

90°



FF77						FF78						FF79					
D1 mm	D2 mm	L1 mm	∞	Z	€	D1 mm	D2 mm	L1 mm	∞	Z	€	D1 mm	D2 mm	L1 mm	∞	Z	€
50	16	8	45°	20	178,09	50	16	10	60°	18	181,59	50	16	14	90°	16	181,59
63	22	10	45°	22	211,83	63	22	14	60°	20	215,99	63	22	20	90°	18	215,99
80	27	12	45°	24	295,76	80	27	18	60°	22	301,55	80	27	22	90°	20	301,55
100	32	18	45°	26	369,75	100	32	25	60°	24	377,00	100	32	32	90°	22	377,00

FRESAS ANGULARES FRONTALES HSSCo

Ref. FF91

HSSCo

DIN 842

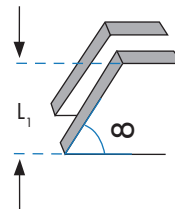
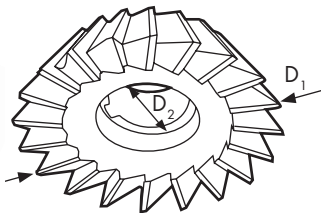
50°

Ref. FF90

HSSCo

DIN 842

60°



FF91						FF90					
D1 mm	D2 mm	L1 mm	∞	Z	€	D1 mm	D2 mm	L1 mm	∞	Z	€
40	10	13	50°	14	140,82	40	10	13	60°	14	138,08
50	13	16	50°	16	173,65	50	13	16	60°	16	170,28
63	16	20	50°	18	219,51	63	16	20	60°	18	215,25
80	22	25	50°	20	316,26	80	22	25	60°	20	310,13
100	27	32	50°	22	458,70	100	27	32	60°	22	449,78
125	32	40	50°	24	757,47	125	32	40	60°	24	742,79
160	40	50	50°	30	1.325,02	160	40	50	60°	30	1.299,30

AIRALDE

FRESAS LLAVES

BLUE-MASTER[®]
by CELESA

CUTTING TECHNOLOGIES

HERRAMIENTAS PARA CERRAJEROS
LA MAS AMPLIA GAMA DE HERRAMIENTAS DE CORTE PARA CERRAJERÍA

Ref. BC7

DIN 338

PMD

118°

30° "N"

BRILLANTE

FUNDICIÓN



		BC7			BC7B	
Ø mm	L ₁ x L ₂ mm	1U.	€/U.	BLISTER	1	€/U.
6,00	93 x 57	BC70600	22,13	BC70600B	1	26,13

Broca DIN 338 con punta de metal duro para METALES DUROS. Broca de ALTA DUREZA para taladrado de METALES DUROS en cerrajería. Encuéntrenla en la página 51.

Ref. BC5

DIN 338

HSSCo 5%

135°

30° "N"

DORADO

120 Kg/mm²



Broca fabricada en HSSCo según norma DIN 338 para metales de 120 Kg/mm² dureza. Broca de ALTA DUREZA para USOS GENERALES en cerrajería. Encuéntrenla en la página 50.

		BC5			BC5F			BC5B		
Ø mm	L ₁ x L ₂ mm	PETACA		€/U.	FUNDA		€	BLISTER		€
6,00	93 x 57	BC50600	10	4,83	BC50600F	1	5,39	BC50600B	1	6,25



Ref. BC98

DIN 338

PMD

135°

30° "N"

BRILLANTE

70 HRc



		BC98		BC98B	
Ø mm	L ₁ x L ₂ mm	1U.	€/U.	1U.	€/U.
6,00	93 x 57	BC980600	16,35	BC980600B	20,35

Broca DIN 338 con punta de metal duro para METALES MUY DUROS ó TEMPLADOS. Broca de ALTA DUREZA para taladrado de METALES MUY DUROS ó TEMPLADOS en cerrajería. Encuéntrenla en la página 51.

Ref. BC85

MD

TOL D1 h7

TOL D2 h6

140°

15° "H"

TiAIN

HARDOX 600

ALTA PRODUCCIÓN

70 HRc



		BC85		BC85B	
Ø mm	L ₁ x L ₂ mm	1U.	€/U.	1U.	€/U.
6,00	75 x 35	BC850600	80,37	BC850600B	85,37

Broca de metal duro integral para METALES TEMPLADOS, hasta dureza 70 HRc. Broca de MÁXIMA DUREZA para taladrado de METALES TEMPLADOS en cerrajería. Encuéntrenla en la página 70.

BROCA CUADRADA PARA TALADRAR BOMBILLOS



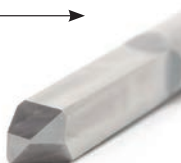
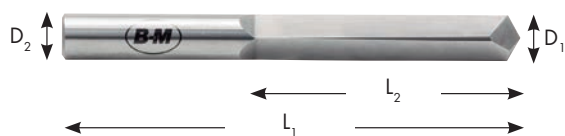
Ref. BCC06

MD



Broca de sección cuadrada fabricada en metal duro integral para TALADRO DE BOMBILLOS Y PITONES ANTI-DRILLING. LA BROCA Nº1 PARA TALADRO DE CILINDROS DE ALTA DUREZA en cerrajería.

* Para taladrar cilindros con pitones anti-drilling trabajar a 300RPM



D1 mm	D2 mm	L2 mm	L1 mm	1U.	€	1U.	€
6	6	33	60	BCC06X60MD	60,13	BCC06X60MDB	65,13

FRESA DE CERRAJERO ESPECIAL PARA FRESAR CILINDROS

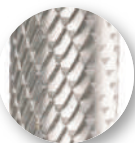
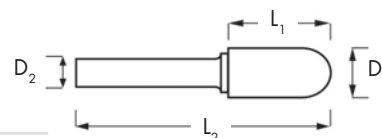
TIPO
C

MD



Fresas CERRAJERO, también conocidas como VAMPIRO, fabricadas en metal duro integral. Geometría semiesférica en longitudes totales de 60 mm a 150 mm.

La fresa ideal para FRESADO DE CILINDROS, seleccione entre la amplia gama de dimensiones la mas adecuada para su aplicación.



	D1 mm	D2 mm	L1 mm	L2 mm			1U. Caja		1U. Blister
3 mm. MANGO	3.0	3	25.0	60	HSS	Y548TG2	21,00	Y548TG2B	24,00
	3.0	3	25.0	60	Monobloc	C30325-6	42,00	C30325-6B	46,00
6 mm. MANGO	6.0	6	25.0	50	Monobloc	C60625-6	39,49	C60625-6B	43,49
	6.0	6	25.0	60	Monobloc	C60625-60-6	44,48	C60625-60-6B	48,48
	6.0	6	25.0	80	Monobloc	C60625-80-6	53,14	C60625-80-6B	57,14
	6.0	6	25.0	100	Monobloc	C60625-100-6	59,29	C60625-100-6B	63,29
	6.0	6	25.0	120	Monobloc	C60625-120-6	88,94	C60625-120-6B	92,94
	6.0	6	25.0	150	Monobloc	C60625-150-6	118,59	C60625-150-6B	122,59

*Monobloc: Integral de Metal Duro



CILÍNDRICA CON CORTE FRONTAL

TIPO
A/E

MD



Fresas ROTATIVAS de metal duro forma A/E (Cilíndrica frontal) y forma C (semi esférica)

La fresa ideal para FRESADO DE CILINDROS, seleccione entre la amplia gama de dimensiones la mas adecuada para su aplicación.

Encuéntrenla en las páginas 335.



D1 mm	L2 mm	D2 mm	L1 mm	Tipo		1U. Caja		1U. Blister
6.0	25.0	6	50	Monobloc	A60625-6E	35,21	A60625-6EB	39,21



FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA
FRESAS DE SERRETA O BICONICAS


Ref. FLLFP4



				mm mm mm β° Z mm							FLL
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	mm	mm	mm	mm	mm	mm	€	
FLLFP1 (FLL02)	FP1	OREGON	HSSV	25	10	10	100º	60	0,1	91,57	
FLLFP2W	FP2W	VIRGINIA	MD	40	10	6	70º	70	0,1	360,15	
FLLFP3 (FLL04)	FP3	KIS, SPRINT	HSSV	50	12	6	90º	80	0,15	111,45	
FLLFP4 (FLL06)	FP4	KIS	HSSV	53	12,7	6,35	45/15º	72	0,6	114,94	
FLLFP5	FP5	JMA	HSSV	57	12,7	5	90º	80	0,15	143,25	
FLLFP6 (FLL09)	FP6	KIS, SPRINT	HSSV	60	12,7	5	84º	140	0,1	111,45	
FLLFP11ECCO (FLL11)	FP11/ECCO-009	ECCO, ECCO-PLUS	HSSV	63	16	5	84º	80	1	106,62	
FLLFP11W	FP11W	ECCO, ECCO-PLUS	MD	63	16	5	84º	80	1	326,05	
FLLFP12	FP12	TUCSON	HSSV	63	16	5	80º	80	1,25	114,94	
FLLFP12W	FP12W	TUCSON	MD	63	16	5	80º	80	1,25	352,05	
FLLFP13	FP13	DALLAS	HSSV	63	16	5	84º	100	1	143,13	
FLLCU14	CU14	ECCO, ECCO-PLUS	HSSV	63	16	5	80º	80	1,25	140,26	
FLLFP16 (FLL13)	FP16	PROCEDURE	HSSV	70	16	5,25	76º	100	1	143,13	
FLLFP16W	FP16W	PROCEDURE	MD	70	16	5,25	76º	100	1	352,05	
SLLP01	FP24 DAKOTA = P01	DAKOTA, ERREBI SARATOGA, NEVADA, DENVER, TITAN, VIENNA	HSSV	80	16	5	84º	110	1	99,52	
SLLP01/120	FP24 DAKOTA=P01/120		HSSV	80	16	5	84º	120	1	101,41	
FLLFP24 (FLL16)	FP24 ERREBI		HSSV	80	16	5	84º	110	1,25	87,91	
FLLFP24W	FP24W ERREBI		MD	80	16	5	84º	110	1,25	326,05	
FLL99	FP24		HSSV	80	16	5	84º	110	0	101,57	



Ref.FLL99: Fresa de serreta 80x5x16 Z110 sin chaflán lateral.

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA
SIERRAS CIRCULARES DE CORTE LATERAL


Ref. FLLFP19



				  					FLL
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	mm	mm	mm	Z	€	
FLLFP7	FP7	ECCO BIT, DETROIT	HSSV	63	16	1,25	80	111,45	
FLLFP7W	FP7W	ECCO BIT, DETROIT	MD	63	16	1,25	80	284,38	
FLLFP8 (FLL19)	FP8	ECCO BIT, DETROIT	HSSV	63	16	1,4	80	79,50	
FLLFP17	FP17	TITAN BIT, SARATOGA, YAKARTA	HSSV	80	16	1,25	100	81,44	
FLLFP17W	FP17W	TITAN BIT, SARATOGA, YAKARTA	MD	80	16	1,25	100	298,78	
FLLFP18	FP18	ATLANTA, TOPEKA	HSSV	80	22	1,25	100	111,45	
FLLFP18W	FP18W	ATLANTA, TOPEKA	MD	80	22	1,25	100	298,78	
FLLFP19 (FLL21)	FP19	SARATOGA, YAKARTA, TITAN BIT, DAKOTA	HSSV	80	16	1,4	100	84,43	
FLLFP19W	FP19W	SARATOGA, YAKARTA, TITAN BIT, DAKOTA	MD	80	16	1,4	100	279,84	
FLLFP20 (FLL22)	FP20	ATLANTA, TOPEKA	HSSV	80	22	1,4	100	84,43	
FLLFP21 (FLL24)	FP21 / SLLSG2	ATLANTA, TOPEKA, DUPLEX, KANSAS	HSSV	80	22	1,5	100	86,77	
FLLFP21W	FP21W	ATLANTA, TOPEKA, DUPLEX, KANSAS	MD	80	22	1,5	100	304,62	

SIERRAS PARA LLAVES DE GORJAS

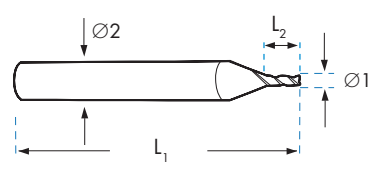

Ref. FLLFP22W



Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	mm mm mm mm MATERIAL Z					FLL
			€					
FLLFP9	FP9	ECCO BIT	HSSV	63	16	1	80	75,45
FLLFP10	FP10	ECCO FORD, ECCO ABBLOY, PASADENA, NEBRASCA	HSSV	63	16	2,4	80	75,45
FLLFP22	FP22	TITAN BIT, DAKOTA, SARATOGA	HSSV	80	16	1	100	80,48
FLLFP22W	FP22W	TITAN BIT, DAKOTA, SARATOGA	MD	80	16	1	100	275,42
FLLFP23	FP23	DUPLEX, ATLANTA, TOPEKA	HSSV	80	22	1	100	83,38
FLLFP23W	FP23W	DUPLEX, ATLANTA, TOPEKA	MD	80	22	1	100	275,42
FF68801416100CO	-	TITAN , DAKOTA, SARATOGA, YAKARTA	HSSCo	80	16	1,4	100	81,06
FLLFP26 (FLL23)	FP26	G, SENNA, DAKOTA, SARATOGA, YAKARTA	HSSV	80	16	1,5	100	84,54
FLLFP26W	FP26W	G, SENNA, DAKOTA, SARATOGA,	MD	80	16	1,5	100	279,28

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA

FRESAS PARA LLAVES DE REGATA

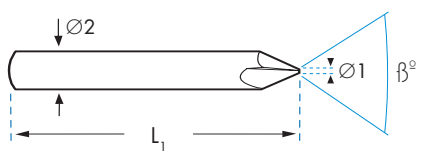


Ref. FLLF3



		TIPOS DE MÁQUINAS	MATERIAL	Ø ₁ mm	L ₁ mm	Ø ₂ mm	L ₂ mm	Z	FLL	
Ref. BM	Ref. JMA								€	
FLLF3Z3	(FLL32) ≈ F3	ALBANY ARIZONA COLUMBIA DAKAR DAKAR EXPRESS DAY T-COL DAYTONA X CODE	HSSCo	1,5	45	6	3	3	39,73	
FLLF3	(FLL44) F3		HSSCo	1,5	45	6	3	2	37,19	
FLLF3W	(FLL45) F3W		MD	1,5	45	6	3	2	120,90	
FLLF33	(FLL53) F33		HSSCo	2	45	6	4	3	35,90	
FLL11Z3	(FLL33) ≈ F11		HSSCo	2,5	45	6	5	3	35,90	
FLLF11	(FLL48) F11		HSSCo	2,5	45	6	5	2	32,13	
FLLF11W	(FLL49) F11W		MD	2,5	45	6	5	2	91,52	
FLLF17	(FLL34) F17		HSSCo	3	45	6	6	3	35,90	
FLLF8Z3	(FLL35) ≈ F8		HSSCo	4	45	6	6	3	41,79	
FLLF8	(FLL46) F8		HSSCo	4	45	6	7	2	37,19	
FLLF8W	(FLL47) F8W		MD	4	45	6	6	2	113,46	
FLLF77	(FLL36) -		HSSCo	5	45	6	7	3	41,79	
FLLF78	(FLL37) -		HSSCo	6	45	6	8	3	41,79	
FLLF78W	(FLL54) -		MD	6	45	6	8	3	91,52	
FLLF78WZ4	(FLL55) -		MD	6	45	6	8	4	91,52	

FRESAS DE PUNTEAR UNIVERSALES PARA MAQUINAS TIPO JMA Y SILCA



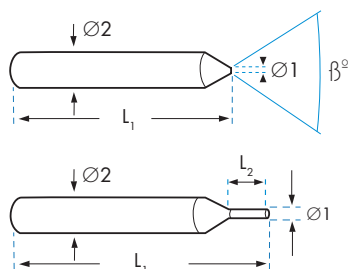
Ref. FLLF1



		TIPOS DE MÁQUINAS	MATERIAL	β°	Ø ₁ mm	L ₁ mm	Ø ₂ mm	Z	FLL	
Ref. BM	Ref. JMA								€	
FLLF82	-	ALBANY ARIZONA CAPRI COLUMBIA DAKAR DAKAR EXPRESS DAY T-COL DAYTONA X CODE	HSSCo	82°	0,9	45	6	2	24,48	
FLLF1	(FLL43) F1		HSSCo	90°	0,8	45	6	2	24,48	
FLLF1W	(FLL42) F1W		MD	90°	0,8	45	6	2	75,82	
FLLF5	(FLL52) F5		HSSCo	90°	0,9	45	6	2	24,48	
FLLF5W	(FLL42) F5W		MD	90°	0,9	45	6	2	75,82	
FLLF95	-		HSSCo	95°	0,9	45	6	2	24,48	
FLLF13	(FLL50) F13		HSSCo	100°	0,8	45	6	2	24,48	
FLLF13W	(FLL51) F13W		MD	100°	0,8	45	6	2	70,94	
FLLF105	-		HSSCo	105°	0,9	45	6	2	24,48	

PALPADORES PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA

PALPADORES



Ref. FLLP1



Ref. FLLP3



Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL		Ø1 mm	L1 mm	Ø2 mm	L2 mm	FLL	€
FLLP1	(PLL38)	P1	HSSV	90°	0,8	45	6	-		19,93
FLLP3	(PLL32)	P3	HSSV	-	1,5	45	6	4		35,25
FLLP5		P5	HSSV	90°	0,9	45	6	-		19,93
FLLP8	(PLL35)	P8	HSSV	-	4	45	6	7		35,25
FLLP11	(PLL33)	P11	HSSV	-	2,5	45	6	4		35,25
FLLP13	(PLL50)	P13	HSSV	100°	0,8	45	6	-		19,93
FLLP17	(PLL34)	P17	HSSV	-	3	45	6	6		35,25
FLLP52	(PLL52)	-	HSSV	90°	0,9	45	6	-		19,93
FLLP77	(PLL36)	-	HSSV	-	5	45	6	7		35,25
FLLP78	(PLL37)	-	HSSV	-	6	45	6	8		35,25

FRESAS KEY LINE

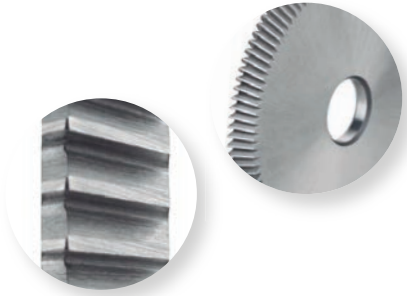
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL		Ø1 mm	L1 mm	Ø2 mm	L2 mm	€
V001	-	KEY LINE	MD	90°	0,4	32	4	-	139,40
V003	-		MD	-	2,5	32	4	5	139,40
V004	-		MD	82°	0,5	32	4	-	139,40
V007	-		MD	100°	0,4	32	4	-	139,40
V012	-		MD	-	1,5	32	4	4	171,40

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA

FRESAS DE SERRETA O BICÓNICAS



Ref. SLLP01



Ref. BM		Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL					Z		SLL
					mm	mm	mm	β°		mm	€
SLL01F	O1F	FUTURA PRO	MD	60,4	9,52	3,05	40	110	0	153,96	
SLLU01	U01	UNOCODE/ULTRACODE	HSSV	60,4	9,52	5,25	80	72	0,5	123,67	
SLLU01W	U01W	UNOCODE/ULTRACODE	MD	60,4	9,52	5,25	80	72	0,5	395,12	
SLLP21	P21	SILCA DELTA	HSSV	60,4	9,52	5,25	84	72	0,5	111,55	
SLLP01	P01	BRAVO / POKER / REKORD / BRAVO SUPER /SUPER MASTER	HSSV	80	16	5	84	110	1	99,52	
SLLP01/120	P01/120		HSSV	80	16	5	84	120	1	101,41	
SLLP01W	P01W		MD	80	16	5	84	110	1	326,05	

SIERRAS CIRCULARES DE CORTE LATERAL



Ref. SLLSG2



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL				Z	SLL €
SLLY2KW	Y2KW	DELTA	MD	63	16	1,35	80	298,78
SLLSG19	SG19	DELTA	HSSV	64,6	9,52	1,5	40	84,43
SLLSG19W	SG19W	DELTA	MD	64,6	9,52	1,5	40	284,38
SLLSG18	SG18	DELTA	HSSV	64,6	9,52	2,4	40	84,43
SLLSG18W	SG18W	DELTA	MD	64,6	9,52	2,4	40	284,38
SLLSG6	SG6	LANCER	HSSV	80	22	1,3	100	86,77
SLLSG6W	SG6W	LANCER	MD	80	22	1,3	100	298,78
SLLSG2	SG2	TARGA/TECH3/TECHNICA	HSSV	80	22	1,5	100	86,77
SLLSG2W	SG2W	TARGA/TECH3/TECHNICA	MD	80	22	1,5	100	298,78
SLLF5CL4-CAW	F5CL4-CAW	DELTA	MD	80	22	1,8	100	310,59

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA
SIERRAS PARA LLAVES DE GORJAS

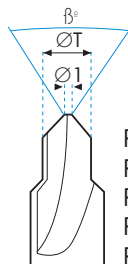
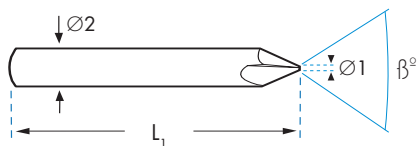
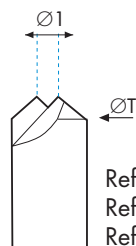

Ref. SLLSG7W



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	mm				Z	SLL €
									
SLLSG14W	SG14W	DELTA	MD	60,4	9,52	1,14	80		238,93
SLLGB1	GB1	ULTRACODE / UNOCODE	HSSV	60,4	9,52	1,7	66		87,65
SLL05	05	UNOCODE/ULTRACODE	HSSV	60,4	9,52	1,8	68		87,65
SLL05W	05W	UNOCODE/ULTRACODE	MD	60,4	9,52	1,8	68		250,75
SLLCU-15C	CU-15C	OPERA /TARGA	MD	63	16	1,5	80		326,61
SLLSG17	SG17	DELTA	HSSV	64,6	9,52	1,8	70		87,65
SLLSG17W	SG17W	DELTA	MD	64,6	9,52	1,8	70		275,42
SLLSG13	SG13	UNOCODE / DELTA	HSSV	64,6	9,52	2	70		87,65
SLLSG13W	SG13W	UNOCODE / DELTA	MD	64,6	9,52	2	70		326,61
SLL06	06	UNOCODE/ULTRACODE	HSSV	64,6	9,52	2,4	70		87,65
SLL06W	06W	UNOCODE/ULTRACODE	MD	64,6	9,52	2,4	70		266,31
SLLSG3	SG3	OPERA /TARGA/TECH3	HSSV	80	22	1	100		83,38
SLLSG3W	SG3W	OPERA /TARGA/TECH3	MD	80	22	1	100		275,42
SLLSG4	SG4	OPERA /TARGA/TECH3	HSSV	80	22	1,25	100		83,38
SLLSG4W	SG4W	OPERA /TARGA/TECH3	MD	80	22	1,25	100		275,42
SLLSG5	SG5	LANCER	HSSV	80	22	1,3	100		83,38
SLLSG5W	SG5W	LANCER	MD	80	22	1,3	100		275,42
SLLSG7	SG7	OPERA / TARGA	HSSV	80	22	1,4	100		83,38
SLLSG7M35	SG7M35	OPERA / TARGA	HSSCo	80	22	1,4	100		106,75
SLLSG7W	SG7W	LANCER	MD	80	22	1,4	100		275,42
SLLSG1	SG1	OPERA /TARGA/TECH3	HSSV	80	22	1,5	100		83,38
SLLSG1W	SG1W	OPERA /TARGA/TECH3	MD	80	22	1,5	100		275,42
SLLSG8	SG8	TECH3 / TECNICA	HSSV	80	22	1,75	100		83,38
SLLSG10	SG10	LANCER	HSSV	80	22	2	100		83,38
SLLSG10W	SG10W	LANCER/ OPERA /TARGA	MD	80	22	2	100		287,10
SLLSG11	SG11	SILCA GT40	HSSV	80	22	2,3	100		83,38
SLLSG12	SG12	TARGA/TECH3/TECNICA/OPERA	HSSV	80	22	2,5	100		83,38
SLLSG58400	SG58400	DELTA	MD	80	22	4	100		263,73
SLLPL1	PL1	PRIMA LASER	HSSV	100	22	1	100		143,87
SLLPL1W	PL1W	PRIMA LASER	MD	100	22	1	100		369,14
SLLPL1,25	PL1,25	PRIMA LASER	HSSV	100	22	1,25	100		143,87
SLLPL1,25W	PL1,25W	PRIMA LASER	MD	100	22	1,25	100		352,02
SLLPL1,5	PL1,5	PRIMA LASER	HSSV	100	22	1,5	100		143,87
SLLPL1,5W	PL1,5W	PRIMA LASER	MD	100	22	1,5	100		352,02
SLLPL1,7W	PL1,7W	PRIMA LASER	MD	100	22	1,7	100		362,81
SLLPL2	PL2.0	PRIMA LASER	HSSV	100	22	2	100		143,87
SLLPL2W	PL2.0W	PRIMA LASER	MD	100	22	2	100		362,81

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA
FRESAS DE PUNTEAR
MATRIX


Ref. SLLFIW


 Ref. SLLF19-CAZ1
 Ref. SLLF19
 Ref. SLLF43
 Ref. SLLF21
 Ref. SLLF25

 Ref. SLLF12B
 Ref. SLLF15
 Ref. SLLF37

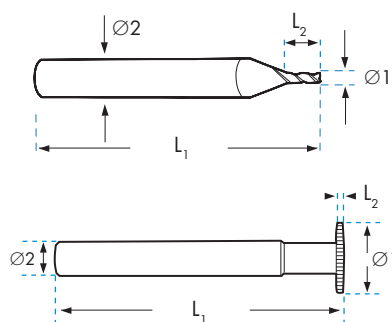

			TIPOS DE MÁQUINAS	MATERIAL		Ø1 mm	L1 mm	Ø2 mm	Z	SLL €
Ref. BM	Ref. SILCA	UNIV.								
SLLF1Z1	F1	FLLF1	MATRIX	HSSV	90°	0,7	48	6	1	55,77
SLLF1	F1	FLLF1	MATRIX	HSSV	90°	0,7	48	6	2	55,77
SLLF1W	F1W	FLLF1W	MATRIX	MD	90°	0,7	48	6	1	99,70
SLLF4	F4	FLLF1	MATRIX	HSSV	90°	0,4	48	6	1	55,77
SLLF5	F5	FLLF5	MATRIX	HSSV	90°	0,9	48	6	1	55,77
SLLF6	F6	FLLF105	MATRIX	HSSV	106°	1	48	6	1	55,77
SLLF7	F7	FLLF82	MATRIX	HSSV	72°	0,8	48	6	2	55,79
SLLF12A	F12A	FLLF13	MATRIX	HSSV	100°	0,4	48	6	1	55,77
SLLF12B	F12B	FLLF1	MATRIX	HSSV	90°	8 x 1,8*	48	6	2	55,77
SLLF13	F13	FLLF1	MATRIX	HSSV	90°	0,77	48	6	1	55,77
SLLF14	F14	FLLF5	MATRIX	HSSV	90°	0,9	48	6	1	55,77
SLLF15	F15	FLLF1	MATRIX	HSSV	90°	8 x 0,8*	48	6	1	63,91
SLLF19	F19	FLLF1	MATRIX	HSSCo	90°	2,2 x 0,6*	48	6	1	55,79
SLLF19-CAZ1	F19-CA	FLLF1W	MATRIX	MD	90°	2,2 x 0,6*	48	6	1	99,70
SLLF20	F20	FLLF1	MATRIX	HSSV	90°	0,45	48	6	2	55,77
SLLF21	F21	FLLF82	MATRIX	HSSCo	85°	3,2 x 0,8*	48	6	1	63,91
SLLF23	F23	FLLF1	MATRIX	HSSV	90°	1,5	48	6	2	63,91
SLLF24	F24	FLLF13	MATRIX	HSSV	100°	1,3	48	6	1	55,77
SLLF25	F25	FLLF1	MATRIX	HSSV	90°	3,5 x 0,65*	48	6	1	55,77
SLLF26	F26	FLLF82	MATRIX	HSSV	82°	0,8	48	6	1	55,77
SLLF27-CA	F27-CA	-	MATRIX	MD	60°	2,4 x 1,9*	48	6	1	133,19
SLLF28	F28	-	MATRIX	HSSV	76°	0,76	48	6	1	55,77
SLLF29	F29	-	MATRIX	HSSV	76°	1,9 x 0,76*	48	6	1	55,77
SLLF34	F34	-	MATRIX	HSSV	50°	1,5	48	6	1	55,77
SLLF34-CAZ1	F34-CA	-	MATRIX	MD	50°	1,5	48	6	1	99,70
SLLF37	F37	FLLF1	MATRIX	HSSV	90°	6 x 2,1*	48	6	2	63,91
SLLF39	F39	FLLF1	MATRIX	HSSV	90°	0,6	48	6	2	67,74
SLLF42	F42	FLLF13	MATRIX	HSSV	100°	0,7	48	6	1	55,77
SLLF43	F43	FLLF1	MATRIX	HSSCo	90°	1	48	6	1	55,77
SLLF45	F45	-	MATRIX	HSSV	130°	0,56	48	6	1	55,79
SLLF46	F46	FLLF13	MATRIX	HSSV	100°	0,65	48	6	1	55,79
SLLF49	F49	FLLF95	MATRIX	HSSV	95°	0,8	48	6	1	63,91
SLLF50	F50	FLLF13	MATRIX	HSSV	100°	0,5	48	6	1	63,91
SLLF52-CA	F52-CA	-	MATRIX	MD	54°	0,86	48	6	2	55,77
SLLF59	F59	FLLF1	MATRIX	HSSV	90°	0,8	48	6	2	55,77
SLL01D	01D	-	FUTURA PRO	MD	90°	0,4	30	6	2	62,62
SLL02D	02D	-	FUTURA PRO	MD	100°	0,4	30	6	2	62,62

* Ø1 x Ø1

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA

FRESAS PARA LLAVES DE REGATA

MATRIX



* Ref. SLLF62W



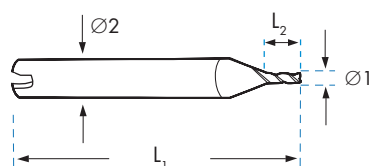
Ref. SLLF3



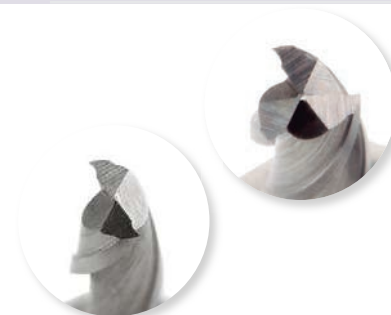
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø1 mm	L1 mm	Ø2 mm	L2 mm	Z	SLL	
									€	
SLLF3	F3	MATRIX	HSSV	1,5	48	6	2	3	55,77	
SLLF8	F8	MATRIX	HSSV	4	48	6	13	3	55,77	
SLLF11	F11	MATRIX	HSSV	2,5	48	6	7	3	55,77	
SLLF22	F22	MATRIX	HSSV	2,5	42	6	6	3	55,77	
SLLF30	F30	MATRIX	HSSV	3	48	6	6	3	55,77	
SLLF30Z2	F30	MATRIX	HSSV	3	48	6	6	2	65,55	
SLLF44	F44	MATRIX	HSSV	2	40	6	6	3	55,77	
SLLF62W*	F62W	MATRIX	MD	11,8	48	6	1	20	178,05	
SLL01L	01L	FUTURA PRO	MD	2,5	30	6	3	3	62,62	
SLL02L	02L	FUTURA PRO	MD	2	30	6	3	3	62,62	

FRESAS PARA LLAVES DE REGATA

QUATTROCODE / TRIAX-E



Ref. SLLW133



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø1 mm	L1 mm	Ø2 mm	L2 mm	Z	SLL	
									€	
SLLW101	W101	QUATTROCODE / TRIAX-E	MD	2,5	40	6	6	3	127,22	
SLLW114	W114	QUATTROCODE / TRIAX-E	MD	2	40	6	6	3	127,24	
SLLW117	W117	QUATTROCODE / TRIAX-E	MD	5	48	6	R1	4	103,26	
SLLW129	W129	QUATTROCODE / TRIAX-E	MD	3	40	6	6	3	127,22	
SLLW131	W131	QUATTROCODE / TRIAX-E	MD	6	40	6	5	3	93,91	
SLLW133	W133	QUATTROCODE / TRIAX-E	MD	1,5	40	6	3	3	138,94	
SLLW134	W134	QUATTROCODE / TRIAX-E	MD	4	40	6	7	3	127,24	
SLLW219	W219	QUATTROCODE / TRIAX-E	MD	1,2	40	6	2	3	127,22	
SLLW235	W235	QUATTROCODE / TRIAX-E	MD	1,1	40	6	2	3	127,19	
SLLW268	W268	QUATTROCODE / TRIAX-E	MD	1,5	40	6	6	2	127,31	

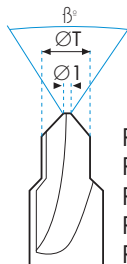
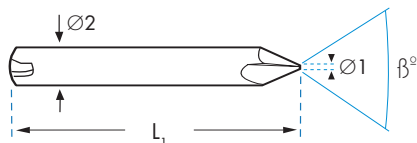
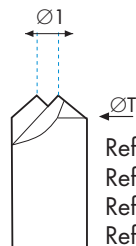
FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA

FRESAS DE PUNTEAR

QUATTROCODE / TRIAX-E

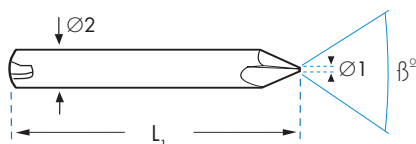


Ref. SLLW103


 Ref. SLLW115
 Ref. SLLW128
 Ref. SLLW135
 Ref. SLLW145
 Ref. SLLW210

 Ref. SLLW111
 Ref. SLLW126
 Ref. SLLW127
 Ref. SLLW139


Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	 β°	Ø1 mm	L1 mm	Ø2 mm	Z	SLL €
SLLW102	W102	QUATTROCODE / TRIAX-E	MD	106°	1	40	6	2	89,29
SLLW103	W103/W299	QUATTROCODE / TRIAX-E	MD	90°	0,8	40	6	2	89,29
SLLW104	W104	QUATTROCODE / TRIAX-E	MD	90°	1,2	40	6	2	89,29
SLLW105	W105	QUATTROCODE / TRIAX-E	MD	90°	0,7	40	6	2	89,29
SLLW106	W106	QUATTROCODE / TRIAX-E	MD	90°	0,6	40	6	2	89,29
SLLW107	W107	QUATTROCODE / TRIAX-E	MD	90°	0,9	40	6	2	89,29
SLLW108	W108	QUATTROCODE / TRIAX-E	MD	82°	0,9	40	6	2	89,29
SLLW109	W109	QUATTROCODE / TRIAX-E	MD	110°	0,4	40	6	2	89,29
SLLW110	W110	QUATTROCODE / TRIAX-E	MD	100°	0,6	40	6	2	89,29
SLLW111	W111	QUATTROCODE / TRIAX-E	MD	96°	8x2,75*	40	6	2	100,31
SLLW112	W112	QUATTROCODE / TRIAX-E	MD	60°/0°	1,5	40	6	2	89,87
SLLW113	W113	QUATTROCODE / TRIAX-E	MD	100°	0,76	40	6	2	89,29
SLLW115	W115	QUATTROCODE / TRIAX-E	MD	54°	4x0,86*	40	6	1	119,70
SLLW116	W116	QUATTROCODE / TRIAX-E	MD	90°	1	40	6	2	89,29
SLLW118	W118	QUATTROCODE / TRIAX-E	MD	120°	0,6	40	6	2	89,29
SLLW119	W119	QUATTROCODE / TRIAX-E	MD	85°	0,3	40	6	2	89,29
SLLW121	W121	QUATTROCODE / TRIAX-E	MD	86°	0,05	48	6	3	124,24
SLLW122	W122	QUATTROCODE / TRIAX-E	MD	90°	0,55	40	6	2	107,15
SLLW123	W123	QUATTROCODE / TRIAX-E	MD	76°	0,9	40	6	2	89,29
SLLW124	W124	QUATTROCODE / TRIAX-E	MD	90°	8x0,8*	48	6	3	171,16
SLLW126	W126	QUATTROCODE / TRIAX-E	MD	80°	3,3	48	6	2	107,15
SLLW127	W127	QUATTROCODE / TRIAX-E	MD	80°	2,1	48	6	2	107,15
SLLW128	W128	QUATTROCODE / TRIAX-E	MD	90°	4x0,55*	48	6	1	119,70
SLLW130	W130	QUATTROCODE / TRIAX-E	MD	90°	1,4	40	6	2	120,20
SLLW132	W132	QUATTROCODE / TRIAX-E	MD	60°	2	40	6	1	119,70
SLLW135	W135	QUATTROCODE / TRIAX-E	MD	90°	4x0,55*	40	6	2	119,63
SLLW136	W136	QUATTROCODE / TRIAX-E	MD	76°	2,23	40	6	1	119,70
SLLW138	W138	QUATTROCODE / TRIAX-E	MD	90°	4x0,7*	48	6	2	89,29
SLLW139	W139	QUATTROCODE / TRIAX-E	MD	60°/50°	0,9	40	6	2	133,19
SLLW142	W142	QUATTROCODE / TRIAX-E	MD	100°	1,2	40	6	2	89,29
SLLW145	W145	QUATTROCODE / TRIAX-E	MD	90°	3,2x0,8*	48	6	2	119,63
SLLW210	W210	QUATTROCODE / TRIAX-E	MD	90°	5x1,05*	40	6	3	179,16
SLLW213	W213	QUATTROCODE / TRIAX-E	MD	90°	0,95*	40	6	2	134,82
SLLW221	W221	QUATTROCODE / TRIAX-E	MD	90°	0,5	40	6	2	120,20
SLLW225	W225	QUATTROCODE / TRIAX-E	MD	90°	1	40	6	2	120,20
SLLW238	W238	QUATTROCODE / TRIAX-E	MD	90°	0,8	40	6	2	89,29
SLLW261	W261	QUATTROCODE / TRIAX-E	MD	1,1	3x1,5*	48	6	2	134,82
SLLW255	W255	QUATTROCODE / TRIAX-E	MD	90°	4x0,8*	48	6	2	120,20
SLLW293	W293	QUATTROCODE / TRIAX-E	MD	90°	0,85	40	6	2	120,20
SLLW299	W299	QUATTROCODE / TRIAX-E	MD	90°	3x0,80	40	6	2	89,93

* Ø_T x Ø₁

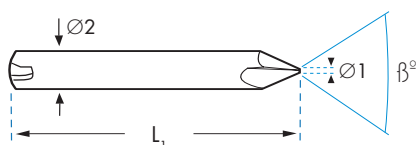
FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA
FRESAS DE PUNTEAR
QUATTROCODE / TRIAX-E


Ref. SLLW103Z1

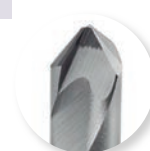


SLL

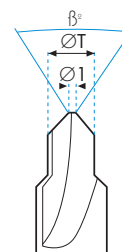
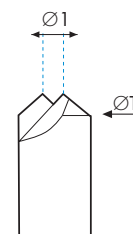
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	β°	$\varnothing_1$ mm	L1 mm	$\varnothing_2$ mm	Z	€
SLLW102Z1	W102 Z1	QUATTROCODE / TRIAX-E	MD	106°	1	40	6	2	89,87
SLLW103Z1	W103 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,8	40	6	2	89,87
SLLW104Z1	W104 Z1	QUATTROCODE / TRIAX-E	MD	90°	1,2	40	6	2	89,87
SLLW105Z1	W105 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,7	40	6	2	89,87
SLLW106Z1	W106 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,6	40	6	2	89,87
SLLW107Z1	W107 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,9	40	6	2	89,87
SLLW108Z1	W108 Z1	QUATTROCODE / TRIAX-E	MD	82°	0,9	40	6	2	89,87
SLLW109Z1	W109 Z1	QUATTROCODE / TRIAX-E	MD	110°	0,4	40	6	2	89,87
SLLW113Z1	W113 Z1	QUATTROCODE / TRIAX-E	MD	100°	0,76	40	6	2	89,87
SLLW116Z1	W116 Z1	QUATTROCODE / TRIAX-E	MD	90°	1	40	6	2	89,87
SLLW118Z1	W118 Z1	QUATTROCODE / TRIAX-E	MD	120°	0,6	40	6	2	89,87
SLLW119Z1	W119 Z1	QUATTROCODE / TRIAX-E	MD	85°	0,3	40	6	2	89,87
SLLW122Z1	W122 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,55	40	6	2	89,87
SLLW123Z1	W123 Z1	QUATTROCODE / TRIAX-E	MD	76°	0,9	40	6	2	89,87
SLLW146Z1	W146 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,25	40	6	1	89,87

FRESAS DE PUNTEAR


Ref. SLLH103



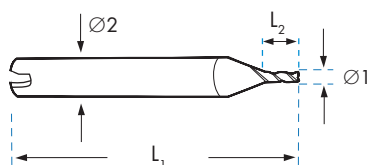
Ref. SLLH115


Ref. SLLH111
Ref. SLLH126
Ref. SLLH127


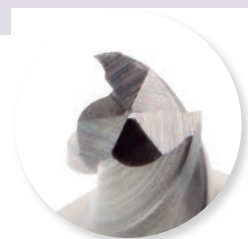
SLL

Ref. BM	Ref. SILCA	UNIV.	TIPOS DE MÁQUINAS	MATERIAL	β°	$\varnothing_1$ mm	L1 mm	$\varnothing_2$ mm	Z	€
SLLH103	H103	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,8	40	6	2	65,88
SLLH104	H104	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	1,2	40	6	2	58,85
SLLH105	H105	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,7	40	6	2	58,85
SLLH106	H106	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,6	40	6	2	55,77
SLLH107	H107	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,9	40	6	2	55,77
SLLH108	H108	FLLF82	QUATTROCODE / TRIAX-E	HSSV	82°	0,9	40	6	2	55,77
SLLH110	H110	FLLF13	QUATTROCODE / TRIAX-E	HSSV	100°	0,6	40	6	2	55,77
SLLH111	H111	FLLF95	QUATTROCODE / TRIAX-E	HSSV	96°	6,4x2,75*	40	6	2	55,77
SLLH112	H112	-	QUATTROCODE / TRIAX-E	HSSV	60°	1,5	40	6	2	55,77
SLLH113	H113	FLLF13	QUATTROCODE / TRIAX-E	HSSV	100°	0,76	40	6	2	55,77
SLLH115	H115	-	QUATTROCODE / TRIAX-E	HSSV	54°	4x0,86*	40	6	1	55,77
SLLH116	H116	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	1	40	6	2	73,62
SLLH118	H118	-	QUATTROCODE / TRIAX-E	HSSV	120°	0,6	40	6	1	55,77
SLLH119	H119	FLLF82	QUATTROCODE / TRIAX-E	HSSV	85°	0,3	40	6	2	55,77
SLLH122	H122	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,55	40	6	2	55,77
SLLH126	H126	FLLF85	QUATTROCODE / TRIAX-E	HSSV	80°	3,3*	48	6	2	83,24
SLLH127	H127	FLLF85	QUATTROCODE / TRIAX-E	HSSV	80°	2,1*	48	6	2	83,24
SLLH128	H128	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,75	48	6	2	55,77

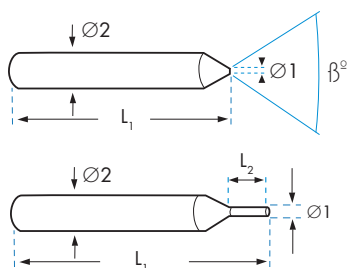
* $\varnothing_1 \times \varnothing_1$

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA
FRESAS PARA LLAVES DE REGATA


Ref. SLLH101



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø1 mm	L1 mm	Ø2 mm	L2 mm	Z	SLL	
									€	
SLLH101	H101	QUATTROCODE / TRIAX-E	HSSV	2,5	40	6	6	3	65,51	
SLLH114	H114	QUATTROCODE / TRIAX-E	HSSV	2	40	6	6	3	55,77	
SLLH117	H117	QUATTROCODE / TRIAX-E	HSSV	5	48	6	R1	4	67,66	
SLLH129	H129	QUATTROCODE / TRIAX-E	HSSV	3	40	6	6	3	55,77	
SLLH131	H131	QUATTROCODE / TRIAX-E	HSSV	6	40	6	5	3	73,62	

PALPADORES


Ref. SLLT1



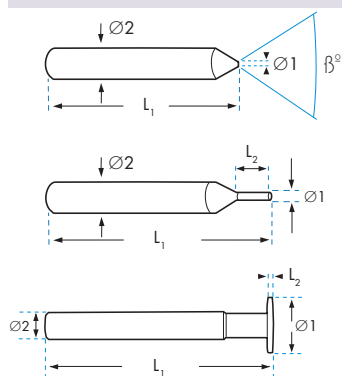
Ref. SLLT3



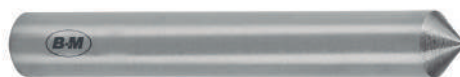
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	Ref. FRESA	MATERIAL	β°	Ø1 mm	L1 mm	Ø2 mm	L2 mm	ØT mm	SLL	
											€	
SLLT1	T1	MATRIX	F1	HSSV	90°	0,7	48	6	-	-	38,94	
SLLT2	T2	MATRIX	F2	HSSV	88°	1,6	48	6	-	-	43,86	
SLLT3	T3	MATRIX	F3	HSSV	-	1,5	48	6	3	-	43,86	
SLLT4	T4	MATRIX	F4	HSSV	90°	0,4	48	6	-	-	43,86	
SLLT5	T5	MATRIX	F5	HSSV	90°	0,9	48	6	-	-	43,86	
SLLT6	T6	MATRIX	F6	HSSV	106°	1	48	6	15	-	43,86	
SLLT7	T7	MATRIX	F7	HSSV	72°	0,8	48	6	2	-	43,86	
SLLT8	T8	MATRIX	F8	HSSV	-	4	48	6	12	-	43,86	
SLLT11	T11	MATRIX	F11	HSSV	-	2,5	48	6	6	-	43,86	
SLLT12A	T12A	MATRIX	F12A	HSSV	100°	0,4	48	6	-	-	43,86	
SLLT12B	T12B	MATRIX	F12B	HSSV	90°	2,8	48	6	-	-	43,86	
SLLT13	T13	MATRIX	F13	HSSV	90°	0,77	48	6	-	-	43,86	
SLLT14	T14	MATRIX	F14	HSSV	90°	0,9	48	6	-	-	43,86	
SLLT15	T15	MATRIX	F15	HSSV	90°	0,8	48	6	-	-	43,86	
SLLT19	T19	MATRIX	F19	HSSV	90°	2,2 x 0,6*	48	6	-	-	43,86	
SLLT20	T20	MATRIX	F20	HSSV	90°	0,45	48	6	-	-	43,86	
SLLT21	T21	MATRIX	F21	HSSV	85°	3,2 x 0,8*	48	6	-	-	43,86	
SLLT22	T22	MATRIX	F22	HSSV	-	2,5	42	6	6	-	43,86	
SLLT23	T23	MATRIX	F23	HSSV	90°	1,5	48	6	5	-	43,86	

FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA

PALPADORES



*Ref. SLLT62W



Ref. SLLT1



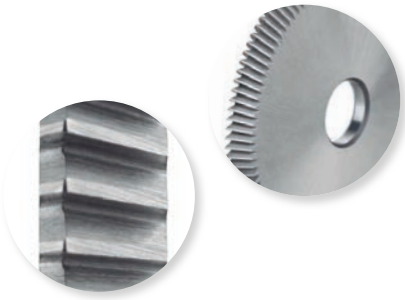
Ref. SLLT3



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	Ref. FRESA	MATERIAL	 β°	Ø1 mm	L1 mm	Ø2 mm	L2 mm	ØT mm	SLL	
											€	
SLLT24	T24	MATRIX	F24	HSSV	100°	1,3	48	6	-	-	43,86	
SLLT25	T25	MATRIX	F25	HSSV	90°	3,5 x 0,65*	48	6	-	-	43,86	
SLLT26	T26	MATRIX	F26	HSSV	82°	0,8	48	6	-	-	43,86	
SLLT27	T27	MATRIX	F27	HSSV	60°	1,28	48	6	-	-	49,51	
SLLT28	T28	MATRIX	F28	HSSV	76°	0,76	48	6	-	-	43,86	
SLLT29	T29	MATRIX	F29	HSSV	76°	1,9	48	6	-	-	43,86	
SLLT30	T30	MATRIX	F30	HSSV	-	3	48	6	10	-	43,86	
SLLT30-45	T30-45	MATRIX		HSSV	-	3	45	6	10	-	43,86	
SLLT33	T33	MATRIX	F33	HSSV	48°	1,4	48	6	-	-	65,39	
SLLT34	T34	MATRIX	F34	HSSV	50°	1,5	48	6	-	-	43,86	
SLLT37	T37	MATRIX	F37	HSSV	90°	2,1	48	6	-	-	43,86	
SLLT39	T39	MATRIX	F39	HSSV	90°	0,6	48	6	-	-	43,86	
SLLT40	T40	MATRIX	F40	HSSV	108°	0,4	48	6	-	-	43,86	
SLLT42	T42	MATRIX	F42	HSSV	100°	0,7	48	6	-	-	43,86	
SLLT43	T43	MATRIX	F43	HSSV	90°	1	48	6	-	-	43,86	
SLLT44	T44	MATRIX	F44	HSSV	-	2	48	6	8	-	43,86	
SLLT44-45	T44-45	MATRIX		HSSV	-	2	45	6	8	-	43,86	
SLLT46	T46	MATRIX	F46	HSSV	100°	0,65	48	6	-	-	43,86	
SLLT49	T49	MATRIX	F49	HSSV	95°	0,8	48	6	-	-	43,86	
SLLT50	T50	MATRIX	F50	HSSV	100°	0,5	48	6	-	-	43,86	
SLLT52	T52	MATRIX	F52	HSSV	54°	0,86	48	6	6	2	43,86	
SLLT54	T54	MATRIX	F54	HSSV	-	4	40	6	6,5	-	55,77	
SLLT55	T55	MATRIX	F55	HSSV	100°	1	48	6	4	-	43,86	
SLLT59	T59	MATRIX	F59	HSSV	90°	0,8	48	6	-	-	43,86	
SLLT62W*	T62W	MATRIX	F62W	MD	-	11,8	48	6	1	-	87,57	
SLLT63	T63	MATRIX	F63	HSSV	78°	0,5	48	6	4	3	43,86	
SLLT65	T65	MATRIX	F65	HSSV	90°	1,05	48	6	5	3	43,86	
SLLT101	T101	MATRIX		HSSV	-	2,5	40	6	6	-	43,86	
SLLT129	T129	MATRIX		HSSV	-	3	40	6	10	-	43,86	
SLLU101	U101	QUATTROCODE		MD	-	1,2	48	6	3	-	55,77	
SLLU101/H	U101/H	QUATTROCODE / TRIAX-E		MD	-	1,2	48	6	3	-	37,89	
SLLU102/65	U102/65	QUATTROCODE / TRIAX-E		MD	30°	0,2	48	6	9	2,6	59,57	
SLLU102TT	U102TT	QUATTROCODE / TRIAX-E		MD	30°	0,2	26	4	6	2	59,57	
SLLU103	U103	QUATTROCODE / TRIAX-E		MD	-	1	48	6	3	-	55,77	
SLLU103/H	U103/H	QUATTROCODE / TRIAX-E		MD	-	1	48	6	3	-	37,89	
SLLU103-TT	U103-TT	QUATTROCODE / TRIAX-E		MD	-	1	21	4	3	-	55,77	
SLLU103-TT/H	U103-TT/H	QUATTROCODE / TRIAX-E		MD	-	1	21	4	3	-	37,89	
SLLU111	U111	SILCA VIPER		MD	-	1	40	6	2,2	-	55,77	
SLLU111/H	U111/H	SILCA VIPER		MD	-	1	40	6	2,2	-	37,89	
SLLB3304	B3304	KEYLINE BIANCHI 994 LASER		MD	-	1	33	6	6	-	55,79	
SLLB3310	B3310	KEYLINE BIANCHI 994 LASER		MD	-	1	30	6	2,6	-	55,79	
SLLB3310M2	B3310	KEYLINE BIANCHI 994 LASER		HSSV	-	1	30	6	2,6	-	41,33	

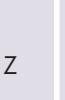
FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO FLORA, NOVACLAU, WALKIN

OTRAS FRESAS DE USO GENERAL



	Ref. BM	TIPOS DE MÁQUINAS	MATERIAL	 mm			Z	FLL	
				 mm	 mm	 mm		€	
SERRETA Ó BICÓNICAS	FLL01	FLORA	HSSV	23	10	5	36	98,40	
	FLL03	YALE	HSSV	40	8	5	80	106,76	
	FLL05	NOVACLAU	HSSV	52	16	5	110	126,06	
	FLL07	KIS	HSSV	53	12,7	6	80	140,26	
	FLL08	KIS	HSSV	55	12	6	80	140,26	
	FLL10	NOVACLAU	HSSV	61	12,7	6,5	140	142,81	
	FLL11	NOVACLAU	HSSV	62	16	5	80	140,03	
	FLL12	NOVACLAU	HSSV	63	16	5	140	140,03	
	FLL14	WALKIN	HSSV	70	15	6,5	150	148,26	
	FLL15	LINCE	HSSV	70	13	7	88	144,24	



	Ref. BM	TIPOS DE MÁQUINAS	MATERIAL	 mm			Z	FLL	
				 mm	 mm	 mm		€	
CORTE LATERAL	FLL17	JMA-NOVACLAU-WALKIN	HSSV	35	12	3,15	50	73,57	
	FLL18	JMA-NOVACLAU-WALKIN	HSSV	63	15	1,40	80	89,97	
	FLL20	JMA-NOVACLAU-WALKIN	HSSV	70	16	1,40	100	111,16	