

# FRESAS



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

Frescos

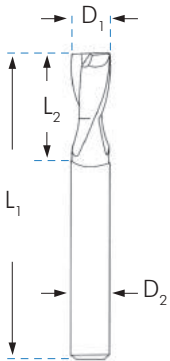
Roso

**2Z**



Ref. FFAL 45° W

SERIE CORTA



Consultar dimensiones DIN844 en páginas sucesivas

DIN 327				FF01	FF02	FF60	FT02	FF92	FP05	FT12	FP08	FT01	DIN 844	FFAL
MATERIAL				HSS	HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	ASP 60	ASP 60	ASP 60	ASP 60		HSSCo 8%
ACABADO				BRILLANTE	BRILLANTE	TiAIN	TiAISIN	BRILLANTE	BRILLANTE	TiAISIN	BRILLANTE	TiAISIN		BRILLANTE
CALIDAD				★	★★	★★★	★★★★	★★	Premium Quality	Premium Quality	Premium Quality	Premium Quality		Al
TOL e8				TOL e8	TOL e8	TOL e8	TOL e8	TOL h10	TOL e8	TOL e8	TOL h10	TOL h10		TOL e8
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	€	€	€	€	€	€
1,00	47	2,5	6						18,94	24,76	27,62	33,27		
2,00	48	4,0	6	8,85	11,21	18,39	21,05	22,83	15,98	22,01	24,38	30,25		13,57
2,50	49	5,0	6	8,85	11,21	18,39	21,05	24,29						13,47
3,00	49	5,0	6	8,85	11,21	18,39	21,05	22,95	15,98	22,01	24,38	30,25		13,17
3,50	50	6,0	6	9,07	12,17	19,34	22,12	24,29						13,98
4,00	51	7,0	6	8,68	11,21	18,40	21,06	22,95	14,53	21,04	24,38	30,25		13,57
4,50	52	8,0	6	9,82	13,40	20,41	23,36	24,29						14,84
5,00	52	8,0	6	8,68	11,21	18,40	21,06	22,95	14,53	21,04	24,38	30,25		13,57
5,50	52	8,0	6	10,67	13,86	20,94	23,96	24,29						16,61
6,00	52	8,0	6	8,68	11,21	18,40	21,06	22,95	14,53	21,04	24,38	30,25		14,70
6,50	60	10,0	10	13,70	18,14	26,24	30,03							21,73
7,00	60	10,0	10	12,96	17,60	25,69	29,40	27,65	21,92	29,10	32,26	43,05		19,76
7,50	61	11,0	10	13,43	17,44	25,52	29,21							23,16
8,00	61	11,0	10	10,54	14,50	22,69	25,98	24,62	19,04	28,53	32,26	43,05		17,88
8,50	61	11,0	10	15,08	19,59	28,38	32,49							24,42
9,00	61	11,0	10	13,47	17,91	26,83	30,70	28,30	23,44	31,43	32,26	44,35		22,14
9,50	63	13,0	10	14,74	19,16	27,77	31,77							
10,00	63	13,0	10	11,09	14,40	23,37	26,88	24,42	21,21	29,07	32,26	44,35		19,33
10,50	70	13,0	12		23,02	34,96	39,45							
11,00	70	13,0	12	16,92	21,86	31,99	36,61	34,49						26,69
12,00	73	16,0	12	14,48	19,29	29,29	33,52	32,56	27,06	37,52	43,92	56,36		24,24
13,00	73	16,0	12	21,77	28,13	39,44	45,14	43,01						34,55
14,00	73	16,0	12	20,60	28,13	39,44	45,14	43,01	32,98	46,01	49,64	62,36		33,91
15,00	73	16,0	12	23,48	31,46	44,68	51,15	46,26						37,25
16,00	79	19,0	16	21,51	27,84	41,01	46,94	47,00	41,29	54,54	58,04	72,77		36,29
17,00	79	19,0	16	28,17	37,79	52,35	59,92							50,49
18,00	79	19,0	16	28,17	37,79	52,41	59,99	57,24	52,29	65,05	73,57	112,15		45,33
19,00	79	19,0	16	34,56	47,22	63,47	72,65							61,13
20,00	88	22,0	16		44,70	61,07	69,90							
20,00	88	22,0	20	33,02	44,70	61,07	69,90	68,36	61,60	78,25	85,76	114,55		52,40
22,00	88	22,0	20	45,30	59,05	80,93	92,63	89,45	78,45	109,75	101,84	131,55		72,95
24,00	102	26,0	25	56,85	76,20	100,49	115,01	106,90						109,62
25,00	102	26,0	25	56,86	74,23	96,36	110,29	98,24	104,74	132,24	133,51	166,48		92,85
26,00	102	26,0	25		87,08	133,43	150,57							145,80
28,00	102	26,0	25	71,23	93,74	125,04	143,80							112,97
30,00	102	26,0	25	81,96	106,80	138,42	158,42	142,28						130,01
32,00	112	32,0	32	84,99	109,71	140,96	161,33							137,70
36,00	112	32,0	32	109,42	146,75	181,08	207,25							
40,00	130	38,0	40	133,03	180,20	223,88	256,24							

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

**2Z**



Ref. FFLAL



SERIE LARGA



\* Consultar fresas con mango roscado hasta fin de existencias.

DIN 327/L				FF06	FF67	FT06	FF15	FP21	DIN 844/L			FFLAL
MATERIAL				HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	ASP 60				HSSCo 8%
ACABADO				BRILLANTE	TiAIN	TiAISIN	BRILLANTE	BRILLANTE				BRILLANTE
CALIDAD				★★	★★★	★★★★	★★	Premium Quality				Al
				TOL e8	TOL e8	TOL e8	TOL h10	TOL h10				TOL e8
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€	€	€	L1 mm	L2 mm	D2 mm	€
2,00	54	7	6	12,35	19,50	22,31	25,10	28,63	54	10	6	19,90
2,50	56	8	6	12,43	19,50	22,31	25,13		56	12	6	
3,00	56	8	6	12,35	19,54	22,37	25,13	29,51	56	12	6	20,00
3,50	59	10	6	14,04	23,22	26,59			59	15	6	
4,00	63	11	6	12,42	19,54	22,37	25,13	29,51	63	19	6	20,13
4,50	63	11	6	14,04	19,96	22,85			63	19	6	
5,00	68	13	6	12,42	19,54	22,37	26,61	31,24	68	24	6	20,22
5,50	68	13	6	14,04	23,22	26,59			68	24	6	
6,00	68	13	6	12,42	19,54	22,37	24,04	28,22	68	24	6	20,99
6,50	80	16	10	23,29	38,10	43,00			68	24	6	
7,00	80	16	10	20,50	28,62	32,76	30,32	35,26	80	30	10	30,25
7,50	88	19	10						80	30	10	
8,00	88	19	10	18,04	26,13	29,93	30,32	35,60	88	38	10	28,69
8,50	88	19	10	27,62	37,58	43,01			88	38	10	
9,00	88	19	10	24,28	33,10	37,87	33,27	38,70	88	38	10	30,25
10,00	95	22	10	19,88	30,27	34,64	33,13	39,07	95	45	10	28,69
11,00	102	22	12	31,34	42,27	48,38	44,12		102	45	12	40,20
12,00	110	26	12	28,58	39,97	45,76	43,27	50,56	110	53	12	37,11
13,00	110	26	12						110	53	12	47,18
14,00	110	26	12	37,67	48,86	55,92	57,41	63,38	110	53	12	42,47
15,00	123	32	16						110	53	12	54,26
16,00	123	32	16	43,17	60,30	69,02	65,35	75,63	123	63	16	51,85
17,00	123	32	16						123	63	16	
18,00	123	32	16	49,33	70,77	80,99	78,53	90,88	123	63	16	64,17
20,00	141	38	20	56,73	77,64	88,86	85,15	98,53	141	75	20	76,54
22,00	141	38	20	77,77	105,35	120,57	105,54	122,16	141	75	20	
24,00	166	45	25	118,36	134,03	151,25	141,99		166	90	25	
25,00	166	45	25	111,57	141,76	162,25	129,81	150,23	166	90	25	
26,00	166	45	25	148,15	157,83	178,10			166	90	25	
28,00	166	45	25	135,20	172,59	197,54			166	90	25	
30,00	166	45	25	150,30	185,79	212,64	193,38		166	90	25	
32,00	186	53	32	207,94	242,19	277,19	251,97		186	106	32	
36,00	186	53	32	235,26	275,37	315,17			186	106	32	
40,00	196	63	32	308,28	372,05	425,83			196	125	40	



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

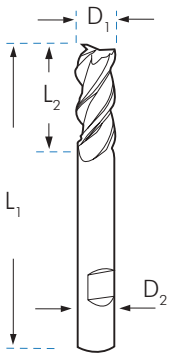
Fresas

Roso

**3Z**



SERIE CORTA



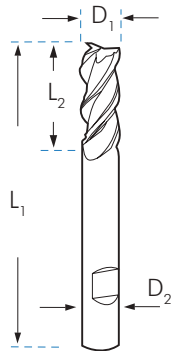
DIN 844				FF63	FF75	FT63	FF73	FF76	FT73	DIN 327			FP06	FT03
MATERIAL				HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%				ASP 60	ASP 60
ACABADO				BRILLANTE	TiAIN	TiAISIN	BRILLANTE	TiAIN	TiAISIN				BRILLANTE	TiAISIN
CALIDAD				★★	★★★	★★★★	★★	★★★	★★★★				Premium Quality	Premium Quality
DESBASTE				TOL k10	TOL k10	TOL k10	TOL k12	TOL k12	TOL k12				TOL e8	TOL e8
D1	L1	L2	D2	€	€	€	€	€	€	L1	L2	D2	€	€
mm	mm	mm	mm							mm	mm	mm		
1,00	49	3	6							47	2,5	6	19,48	24,48
2,00	51	7	6	12,33	19,40	22,20				48	4,0	6	15,82	23,91
2,50	52	8	6	12,33	19,40	22,20				49	5,0	6		
3,00	52	8	6	12,29	19,40	22,20				49	5,0	6	15,82	23,91
3,50	55	11	6	12,70	19,76	22,73				50	6,0	6		
4,00	55	11	6	12,32	19,40	22,20				51	7,0	6	15,82	23,91
4,50	57	13	6	13,57	20,50	23,47				52	8,0	6		
5,00	57	13	6	12,32	19,49	22,31				52	8,0	6	15,82	23,91
5,50	57	13	6	16,75	26,67	30,52				52	8,0	6		
6,00	57	13	6	12,97	21,79	24,94	35,17	42,47	47,92	52	8,0	6	15,82	23,91
6,50	66	16	10	23,26	35,67	40,26				60	10,0	10		
7,00	66	16	10	18,12	26,19	30,11	41,59	50,70	57,21	60	10,0	10	21,30	29,14
7,50	69	19	10	23,43	36,05	40,69				61	11,0	10		
8,00	69	19	10	16,19	24,18	27,68	36,04	41,98	48,05	61	11,0	10	21,30	29,14
8,50	69	19	10	24,70	37,23	42,01				61	11,0	10		
9,00	69	19	10	20,22	28,99	33,18	42,77	50,20	57,45	61	11,0	10	24,97	32,09
9,50	72	22	10	26,69	39,12	44,14				63	13,0	10		
10,00	72	22	10	17,54	26,24	30,03	36,25	44,62	51,06	63	13,0	10	22,58	30,14
11,00	79	22	12	27,85	41,42	46,75	52,33	60,28	69,00	70	13,0	12		
12,00	83	26	12	22,02	31,32	35,85	43,62	51,35	58,77	73	16,0	12	29,13	38,12
13,00	83	26	12	35,02	48,16	54,36	56,99	66,38	75,99	73	16,0	12		
14,00	83	26	12	30,00	41,09	47,03	49,78	58,57	67,05	73	16,0	12	37,74	46,42
15,00	83	26	12	35,98	49,98	56,41	63,01	68,97	74,62	73	16,0	12		
16,00	92	32	16	32,94	45,85	52,48	60,34	72,78	83,32	79	19,0	16	44,39	53,44
17,00	92	32	16	53,91	70,78	79,87				79	19,0	16		
18,00	92	32	16	41,38	55,98	64,07	66,03	80,12	91,70	79	19,0	16	54,62	65,36
19,00	92	31	16	65,92	81,44	91,91				79	19,0	16		
20,00	104	38	20	47,52	63,10	72,23	80,56	94,24	107,87	88	22,0	20	64,96	78,25
22,00	104	38	20	75,76	95,27	107,52				88	22,0	20	86,71	111,95
25,00	121	45	25	98,98	126,14	142,36	122,03	139,45	159,61	102	26,0	25	108,86	126,24
28,00	121	45	25	114,98	141,05	159,17				102	26,0	25		
30,00	121	45	25	141,45	165,66	186,95	151,75	179,05	204,94	102	26,0	25		
32,00	133	53	32	143,97	178,79	201,76				112	32,0	32		

**FRESAS FRONTALES SERIE LARGA DE 3 CORTES DIN 844/L**

**3Z**



SERIE LARGA



DIN 844/L				FF83	FF86	FT83
MATERIAL				HSSCo 8%	HSSCo 8%	HSSCo 8%
ACABADO				BRILLANTE	TiAIN	TiAlSiN
CALIDAD				★★	★★★	★★★★
D1 mm	L1 mm	L2 mm	D2 mm	€	€	€
1,00	52	7	6			
2,00	54	10	6	16,61	24,32	27,83
2,50	56	12	6	16,93	24,29	27,80
3,00	56	12	6	16,61	24,25	27,75
3,50	59	15	6	18,59	26,00	29,76
4,00	63	19	6	16,61	24,25	27,75
4,50	63	19	6	18,59	26,00	29,76
5,00	68	24	6	16,61	24,25	27,75
5,50	68	24	6	18,59	26,00	29,76
6,00	68	24	6	18,62	25,36	29,03
6,50	68	24	6			
7,00	80	30	10	25,21	33,95	38,86
7,50	80	30	10			
8,00	88	38	10	23,06	30,63	35,05
8,50	88	38	10			
9,00	88	38	10	28,07	36,33	41,59
9,50	88	38	10			
10,00	95	45	10	23,19	33,68	38,55
11,00	102	45	12	35,65	45,87	52,50
12,00	110	53	12	29,51	41,06	47,00
13,00	110	53	12			
14,00	110	53	12	38,43	50,21	57,47
15,00	110	53	12			
16,00	123	63	16	43,30	60,51	69,27
17,00	123	63	16			
18,00	123	63	16	52,47	71,54	81,88
19,00	123	63	16			
20,00	141	75	20	61,59	81,85	93,68
22,00	141	75	20	77,68	105,54	120,80
25,00	166	90	25	113,22	139,43	159,59
28,00	166	90	25	126,04	166,97	191,12
30,00	166	90	25	140,32	178,36	204,14
32,00	186	106	32	166,96	200,87	229,92

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

Frescos

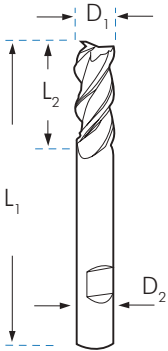
Roso

**4-6 Z**



**SERIE CORTA**

**SERIE LARGA**



DIN 844		MATERIAL	ACABADO	CALIDAD	FF18	FF20	FT18	FP07	FT09
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	€	€	€	€
1,00	49	3	6	4				21,59	25,88
2,00	51	7	6	4	12,36	19,45	22,26	15,78	21,83
2,50	52	8	6	4	12,36	19,45	22,26		
3,00	52	8	6	4	12,36	19,45	22,26	15,78	21,83
3,50	55	11	6	4	12,73	19,81	22,69		
4,00	55	11	6	4	12,36	19,45	22,26	15,78	21,83
4,50	57	13	6	4	13,59	20,54	23,50		
5,00	57	13	6	4	12,36	19,45	22,26	15,78	21,83
5,50	57	13	6	4	19,77	26,67	30,52		
6,00	57	13	6	4	12,90	20,06	22,95	15,78	21,83
6,50	66	16	10	4	19,72	27,76	31,77		
7,00	66	16	10	4	18,12	26,20	29,98	21,45	31,15
7,50	69	16	10	4	23,36	31,19	35,70		
8,00	69	19	10	4	15,95	24,28	27,79	21,35	30,84
8,50	69	19	10	4	24,36	32,98	37,76		
9,00	69	19	10	4	20,13	29,03	33,23	25,23	33,64
9,50	69	19	10	4	25,77	34,31	39,27		
10,00	72	22	10	4	17,45	26,35	30,17	22,68	31,61
11,00	79	22	12	4	24,27	34,29	39,25		
12,00	83	26	12	4	22,02	30,46	34,87	29,95	41,86
13,00	83	26	12	4	31,06	42,36	48,49		
14,00	83	26	12	4	29,32	41,33	47,31	38,91	46,61
15,00	83	26	12	4	33,48	46,19	52,87		
16,00	92	32	16	4	32,67	46,07	52,72	45,60	55,21
17,00	92	32	16	4	40,71	55,17	63,14		
18,00	92	32	16	4	40,24	56,04	64,13	55,61	69,05
19,00	92	31	16	4	47,66	63,41	72,57		
20,00	104	38	20	4	47,12	63,41	72,57	65,41	89,70
22,00	104	38	20	5	65,40	87,90	100,61	86,19	105,79
24,00	121	45	25	5	82,22	103,58	118,55		
25,00	121	45	25	5	78,59	103,09	118,00	111,20	139,51
26,00	121	45	25	5	94,34	125,14	145,30		
28,00	121	45	25	5	93,55	125,42	148,47		
30,00	121	45	25	6	108,75	139,21	167,27		
32,00	133	53	32	6	111,50	142,42	171,12		
36,00	133	53	32	6	148,60	179,93	216,17		
40,00	155	63	40	6	178,64	218,81	262,90		

DIN 844/L		MATERIAL	ACABADO	CALIDAD	FF21	FF23	FT21	FP20
L1 mm	L2 mm	D2 mm	Z	€	€	€	€	€
52	7	6	4					
54	10	6	4	15,09	22,09	25,28	23,44	
56	12	6	4	15,01	22,09	25,28		
56	12	6	4	15,09	22,10	25,29	23,44	
59	15	6	4	19,84	26,79	30,65		
63	19	6	4	15,09	22,10	25,29	23,44	
63	19	6	4	19,84	26,79	30,65		
68	24	6	4	15,09	22,10	25,29	23,44	
68	24	6	4	19,71	26,79	30,65		
68	24	6	4	15,09	22,10	25,29	23,44	
68	24	6	4					
80	30	10	4	22,90	30,73	35,18	34,97	
80	30	10	4					
88	38	10	4	20,80	27,69	31,69	34,97	
88	38	10	4					
88	38	10	4	23,70	32,28	36,95	34,97	
88	38	10	4					
95	45	10	4	20,89	30,56	34,98	34,97	
102	45	12	4	29,69	40,27	46,10		
110	53	12	4	27,34	38,25	43,79	50,70	
110	53	12	4					
110	53	12	4	35,78	46,64	53,39	58,52	
110	53	12	4					
123	63	16	4	39,11	54,87	62,81	72,52	
123	63	16	4					
123	63	16	4	47,77	65,32	74,76	92,79	
123	63	16	4					
141	75	20	4	55,95	75,45	86,36	113,79	
141	75	20	5	77,58	99,44	113,83	127,63	
141	75	25	5					
166	90	25	5	102,87	127,00	145,35	185,40	
166	90	25	5					
166	90	25	5	115,06	151,08	172,91		
166	90	25	6	129,87	165,97	189,97		
186	106	32	6	130,93	167,14	191,30		
186	106	32	6	187,67	225,32	257,88		
217	125	40	6	208,01	268,64	308,94		

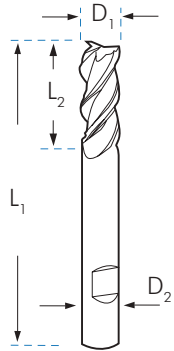
FRESAS FRONTALES DE DESBASTE VARIOS CORTES DIN 844 Y DIN 844/L

4-6 Z



SERIE CORTA

SERIE LARGA



DIN 844					FF25	FF27	FT25	FF100	DIN 844/L					FF29	FF31	FT29
MATERIAL					HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	MATERIAL					HSSCo 8%	HSSCo 8%	HSSCo 8%
ACABADO					BRILLANTE	TiAIN	TiAISIN	BRILLANTE	ACABADO					BRILLANTE	TiAIN	TiAISIN
CALIDAD					★★	★★★	★★★★	★★	CALIDAD					★★	★★★	★★★★
DESBASTE					NR	NR	NR	NF	DESBASTE					NR	NR	NR
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	€	€	€	L1 mm	L2 mm	D2 mm	Z	€	€	€	
2,00	51	7	6	3					54	10	6	3				
2,50	52	8	6	3					56	12	6	3				
3,00	52	8	6	3					56	12	6	3				
3,50	55	11	6	3					59	15	6	3				
4,00	55	11	6	3					63	19	6	3				
4,50	57	13	6	3					63	19	6	3				
5,00	57	13	6	3					68	24	6	3				
5,50	57	13	6	3					68	24	6	3				
6,00	57	13	6	3	31,65	38,21	43,73	34,46	68	24	6	3	44,86	50,74	58,35	
6,50	66	16	10	4					68	24	6	4				
7,00	66	16	10	3	38,04	45,61	52,20	41,11	80	30	10	3	50,87	57,97	66,35	
7,50	69	19	10	4					80	30	10	4				
8,00	69	19	10	3	33,04	40,61	46,48	35,96	88	38	10	3	46,40	53,65	61,40	
8,50	69	19	10	4					88	38	10	4				
9,00	69	19	10	3	39,49	47,82	54,74	42,69	88	38	10	3	50,87	58,78	67,27	
10,00	72	22	10	4	32,78	40,22	46,02	35,95	95	45	10	4	40,40	49,96	57,19	
11,00	79	22	12	4	48,03	57,61	65,94	52,67	102	45	12	4	66,13	75,78	86,74	
12,00	83	26	12	4	39,59	49,03	56,11	43,08	110	53	12	4	49,91	60,39	69,12	
13,00	83	26	12	4	56,21	66,52	76,14	61,21	110	53	12	4				
14,00	83	26	12	4	45,96	56,86	65,09	50,39	110	53	12	4	57,67	68,23	78,10	
15,00	83	26	12	4	60,44	73,19	83,77	66,24	110	53	12	4				
16,00	92	32	16	4	54,52	67,01	76,70	57,71	123	63	16	4	67,51	82,79	94,75	
17,00	92	32	16	4	74,45	88,58	101,38		123	63	16	4				
18,00	92	32	16	4	59,45	73,83	84,50	65,16	123	63	16	4	78,84	96,81	110,80	
19,00	92	31	16	4	87,99	102,67	117,52		123	63	16	4				
20,00	104	38	20	4	74,50	90,18	103,22	81,68	141	75	20	4	95,96	114,13	130,63	
SIN CORTE AL CENTRO					FF05	FF74	FT05	FF100	SIN CORTE AL CENTRO					FF08	FF58	FT08
22,00	104	38	20	6	84,17	108,82			141	75	20	6	108,09	145,79	159,67	
24,00	121	45	25	6	106,02	129,05	141,34		141	75	25	6				
25,00	121	45	25	6	105,02	128,30	140,52	117,03	166	90	25	6	136,50	172,71	189,16	
26,00	121	45	25	6	121,62	157,00	171,94		166	90	25	6				
28,00	121	45	25	6	121,62	156,58	171,49	133,00	166	90	25	6	153,93	198,56	217,47	
30,00	121	45	25	6	130,65	171,37	187,69	156,42	166	90	25	6	199,57	237,18	259,78	
32,00	133	53	32	6	148,01	184,32	201,87	161,88	186	106	32	6	208,73	242,48	265,57	
36,00	133	53	32	6	175,42	212,40	232,64		186	106	32	6	250,64	289,56	317,13	
40,00	155	63	32	6	197,21	245,95	269,38		217	125	40	6	296,34	360,41	394,74	



**FRESAS FRONTALES, SIN CORTE AL CENTRO, VARIOS CORTES DIN 844 Y DIN 844/L**

Fresos

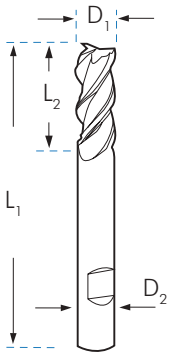
Roso

**4-6 Z**



SERIE CORTA

SERIE LARGA



DIN 844					FF03	FF04	FF54	FT04	DIN 844/L					FF07	FF57	FT07
MATERIAL					HSS	HSSCo 8%	HSSCo 8%	HSSCo 8%	MATERIAL					HSSCo 8%	HSSCo 8%	HSSCo 8%
ACABADO					BRILLANTE	BRILLANTE	TiAIN	TiAlSiN	ACABADO					BRILLANTE	TiAIN	TiAlSiN
CALIDAD					★	★★	★★★	★★★★	CALIDAD					★★	★★★	★★★★
D1	L1	L2	D2	Z	€	€	€	€	L1	L2	D2	Z	€	€	€	
mm	mm	mm	mm						mm	mm	mm					
2,00	51	7	6	4	8,86	11,62	18,69	21,40	54	10	6	4	14,52	22,48	25,85	
2,50	52	8	6	4	8,86	11,62	18,69	21,40	56	12	6	4	14,52	20,63	23,73	
3,00	52	8	6	4	8,86	11,62	18,69	21,40	56	12	6	4	14,52	23,38	26,89	
3,50	55	11	6	4	9,14	11,98	19,11	21,86	59	15	6	4	19,10	28,06	32,27	
4,00	55	11	6	4	8,86	11,62	18,76	21,46	63	19	6	4	14,52	23,38	26,89	
4,50	57	13	6	4	9,14	11,97	19,11	21,86	63	19	6	4	19,10	28,06	32,27	
5,00	57	13	6	4	8,86	11,62	18,76	21,46	68	24	6	4	14,52	23,38	26,89	
5,50	57	13	6	4	13,77	18,07	25,12	28,75	68	24	6	4	19,10	28,06	32,27	
6,00	57	13	6	4	8,86	11,62	18,75	21,45	68	24	6	4	14,52	23,38	26,89	
6,50	66	16	10	4	13,77	18,07	26,00	29,76	68	24	6	4				
7,00	66	16	10	4	12,99	17,06	25,05	28,67	80	30	10	4	21,98	32,26	37,10	
7,50	69	16	10	4	16,29	21,34	29,12	33,33	80	30	10	4				
8,00	69	19	10	4	10,10	13,10	21,24	24,31	88	38	10	4	20,17	30,40	34,95	
8,50	69	19	10	4	16,97	22,30	30,85	35,31	88	38	10	4				
9,00	69	19	10	4	13,59	17,82	26,61	30,46	88	38	10	4	22,82	34,02	39,13	
9,50	72	22	10	4	18,43	23,56	32,39	37,08	88	38	10	4				
10,00	72	22	10	4	12,34	16,16	25,07	28,69	95	45	10	4	20,07	32,35	37,21	
11,00	79	22	12	4	17,00	22,30	32,34	37,01	102	45	12	4	27,45	40,83	46,96	
12,00	83	26	12	4	14,66	19,29	29,09	33,29	110	53	12	4	25,49	38,83	44,66	
13,00	83	26	12	4	21,86	28,79	39,63	45,35	110	53	12	4				
14,00	83	26	12	4	20,68	27,06	38,12	43,62	110	53	12	4	33,32	47,11	54,18	
15,00	83	26	12	4	23,58	30,89	43,90	50,24	110	53	12	4				
16,00	92	32	16	4	23,00	30,13	43,18	49,42	123	63	16	4	36,42	55,69	64,05	
17,00	92	32	16	4	28,34	37,30	51,63	59,09	123	63	16	4				
18,00	92	32	16	4	28,30	37,14	51,63	59,09	123	63	16	4	44,48	66,17	76,09	
19,00	92	31	16	4	33,52	43,70	59,24	67,81	123	63	16	4				
20,00	104	38	20	4	33,18	43,70	59,24	67,81	141	75	20	4	52,09	75,94	87,33	
22,00	104	38	20	5	46,06	60,65	81,99	93,85	141	75	20	5	72,25	99,81	114,79	
24,00	121	45	25	5	57,21	75,36	96,38	110,32	141	75	25	5				
25,00	121	45	25	5	57,02	75,36	96,38	110,32	166	90	25	5	95,82	127,80	146,96	
26,00	121	45	25	5	71,52	94,21	121,84	139,45	166	90	25	5				
28,00	121	45	25	5	71,52	94,21	125,13	143,21	166	90	25	5	117,12	157,37	180,99	
30,00	121	45	25	6	82,91	108,60	139,53	159,71	166	90	25	6	134,05	174,47	200,63	
32,00	133	53	32	6	85,27	111,40	142,78	163,42	186	106	32	6	133,84	175,70	202,05	
36,00	133	53	32	6	111,59	146,96	178,78	204,62	186	106	32	6	190,88	241,41	277,63	
40,00	143	63	32	6	133,78	176,66	219,39	251,10	217	125	40	6	212,18	324,45	373,12	

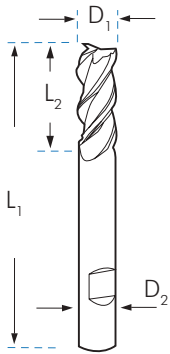


FRESAS FRONTALES DE DESBASTE VARIOS CORTES DIN 844 Y DIN 844/L

3-5 Z



SERIE CORTA



SERIE LARGA



DIN 844		MATERIAL	ACABADO	DESBASTE	CALIDAD	FP10	FT10	FP11	FT11	FP18
D1 mm	L1 mm	ASP 60	BRILLANTE	NF	Premium Quality	€	€	€	€	€
2,00	51	ASP 60	BRILLANTE	NF	Premium Quality					
2,50	52	ASP 60	TiAlSiN	NF	Premium Quality					
3,00	52	ASP 60	BRILLANTE	NR	Premium Quality					
3,50	55	ASP 60	TiAlSiN	NR	Premium Quality					
4,00	55	ASP 60	TiAlN	NR	Premium Quality					
4,50	57	ASP 60	BRILLANTE	NF	Premium Quality					
5,00	57	ASP 60	TiAlSiN	NF	Premium Quality					
5,50	57	ASP 60	BRILLANTE	NR	Premium Quality					
6,00	57	ASP 60	TiAlSiN	NR	Premium Quality	38,55	44,65	35,72	38,64	46,68
6,50	66	ASP 60	BRILLANTE	NF	Premium Quality					
7,00	66	ASP 60	TiAlSiN	NF	Premium Quality	49,43	54,32	44,85	51,51	66,27
7,50	69	ASP 60	BRILLANTE	NR	Premium Quality					
8,00	69	ASP 60	TiAlSiN	NR	Premium Quality	42,58	50,04	39,03	45,51	62,25
8,50	69	ASP 60	BRILLANTE	NF	Premium Quality					
9,00	69	ASP 60	TiAlSiN	NF	Premium Quality	51,28	56,67	46,65	53,86	68,01
9,50	72	ASP 60	BRILLANTE	NR	Premium Quality					
10,00	72	ASP 60	TiAlSiN	NR	Premium Quality	40,59	48,56	36,80	46,12	63,87
11,00	79	ASP 60	BRILLANTE	NF	Premium Quality					
12,00	83	ASP 60	TiAlSiN	NF	Premium Quality	53,40	61,04	48,69	56,23	77,95
13,00	83	ASP 60	BRILLANTE	NR	Premium Quality					
14,00	83	ASP 60	TiAlSiN	NR	Premium Quality	64,85	74,41	58,79	67,48	93,15
15,00	83	ASP 60	BRILLANTE	NF	Premium Quality					
16,00	92	ASP 60	TiAlSiN	NF	Premium Quality	79,49	88,47	72,48	82,42	107,42
17,00	92	ASP 60	BRILLANTE	NR	Premium Quality					
18,00	92	ASP 60	TiAlSiN	NR	Premium Quality	87,28	96,19	78,65	90,15	116,27
19,00	92	ASP 60	BRILLANTE	NF	Premium Quality					
20,00	104	ASP 60	TiAlSiN	NF	Premium Quality					
20,00	104	ASP 60	BRILLANTE	NR	Premium Quality	108,27	120,47	97,87	113,01	148,45
22,00	104	ASP 60	TiAlSiN	NR	Premium Quality	133,47	148,41	121,04	138,84	
22,00	121	ASP 60	BRILLANTE	NF	Premium Quality					
24,00	121	ASP 60	TiAlSiN	NF	Premium Quality					
25,00	121	ASP 60	BRILLANTE	NR	Premium Quality	158,22	177,43	143,51	164,33	231,69
26,00	121	ASP 60	TiAlSiN	NR	Premium Quality					
28,00	121	ASP 60	BRILLANTE	NF	Premium Quality					
30,00	121	ASP 60	TiAlSiN	NF	Premium Quality					
32,00	133	ASP 60	BRILLANTE	NR	Premium Quality					
36,00	133	ASP 60	TiAlSiN	NR	Premium Quality					
40,00	155	ASP 60	BRILLANTE	NF	Premium Quality					

DIN 844/L		MATERIAL	ACABADO	DESBASTE	CALIDAD	FP15	FT15	FP13	FT13
L1 mm	L2 mm	ASP 60	BRILLANTE	NF	Premium Quality	€	€	€	€
54	10	ASP 60	BRILLANTE	NF	Premium Quality				
56	12	ASP 60	TiAlSiN	NF	Premium Quality				
56	12	ASP 60	BRILLANTE	NR	Premium Quality				
59	15	ASP 60	TiAlSiN	NR	Premium Quality				
63	19	ASP 60	BRILLANTE	NF	Premium Quality				
63	19	ASP 60	TiAlSiN	NF	Premium Quality				
68	24	ASP 60	BRILLANTE	NR	Premium Quality				
68	24	ASP 60	TiAlSiN	NR	Premium Quality				
68	24	ASP 60	BRILLANTE	NF	Premium Quality	60,49	64,50	53,66	59,59
68	24	ASP 60	TiAlSiN	NF	Premium Quality				
80	30	ASP 60	BRILLANTE	NR	Premium Quality	68,38	78,57	62,10	73,19
80	30	ASP 60	TiAlSiN	NR	Premium Quality				
88	38	ASP 60	BRILLANTE	NF	Premium Quality	63,63	68,34	56,31	63,66
88	38	ASP 60	TiAlSiN	NF	Premium Quality				
88	38	ASP 60	BRILLANTE	NR	Premium Quality	67,11	77,51	62,10	73,66
88	38	ASP 60	TiAlSiN	NR	Premium Quality				
95	45	ASP 60	BRILLANTE	NF	Premium Quality	57,25	64,25	51,01	59,33
102	45	ASP 60	TiAlSiN	NF	Premium Quality				
110	53	ASP 60	BRILLANTE	NR	Premium Quality	72,55	79,98	64,07	73,22
110	53	ASP 60	TiAlSiN	NR	Premium Quality				
110	53	ASP 60	BRILLANTE	NF	Premium Quality	85,03	98,47	76,47	87,15
110	53	ASP 60	TiAlSiN	NF	Premium Quality				
123	63	ASP 60	BRILLANTE	NR	Premium Quality	101,71	112,75	90,75	104,04
123	63	ASP 60	TiAlSiN	NR	Premium Quality				
123	63	ASP 60	BRILLANTE	NF	Premium Quality	113,77	133,70	103,65	119,19
123	63	ASP 60	TiAlSiN	NF	Premium Quality				
141	75	ASP 60	BRILLANTE	NR	Premium Quality				
141	75	ASP 60	TiAlSiN	NR	Premium Quality	147,88	163,72	131,02	152,23
141	75	ASP 60	BRILLANTE	NF	Premium Quality	225,94	243,69	197,85	221,06
141	75	ASP 60	TiAlSiN	NF	Premium Quality				
141	75	ASP 60	BRILLANTE	NR	Premium Quality				
166	90	ASP 60	TiAlSiN	NF	Premium Quality	226,88	251,41	200,13	234,29
166	90	ASP 60	BRILLANTE	NF	Premium Quality				
166	90	ASP 60	TiAlSiN	NR	Premium Quality				
166	90	ASP 60	BRILLANTE	NF	Premium Quality				
186	106	ASP 60	TiAlSiN	NR	Premium Quality				
186	106	ASP 60	BRILLANTE	NF	Premium Quality				
217	125	ASP 60	TiAlSiN	NR	Premium Quality				

Fresas

Rosa

## FRESAS SERIE SUPER CORTA Y EXTRA CORTA DE 3 CORTES

3 Z



## SERIE SUPER CORTA



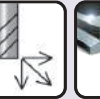
MATERIAL					FF51	
ACABADO					HSSCo 8%	
					BRILLANTE	
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	
1,00	34	2	6	3	11,82	
1,50	34	3	6	3	11,82	
2,00	35	4	6	3	11,81	
2,50	36	5	6	3	11,81	
3,00	36	5	6	3	11,81	
3,50	37	6	6	3	11,81	
4,00	38	7	6	3	11,81	
4,50	38	7	6	3	11,81	
5,00	39	8	6	3	11,81	
5,50	39	8	6	3	11,81	
6,00	39	8	6	3	11,81	
6,50	42	10	8	3	16,23	
7,00	42	10	8	3	16,23	
7,50	42	10	8	3	16,23	
8,00	43	11	8	3	16,23	
8,50	48	11	10	3	18,60	
9,00	48	11	10	3	18,60	
9,50	48	11	10	3	18,60	
10,00	50	13	10	3	18,60	

## SERIE EXTRA CORTA



MATERIAL					FF53	
ACABADO					HSSCo 8%	
					BRILLANTE	
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	
2,00	38	7	6	3	12,95	
2,50	39	8	6	3	12,95	
3,00	39	8	6	3	12,95	
3,50	41	10	6	3	12,95	
4,00	42	11	6	3	12,95	
4,50	42	11	6	3	12,95	
5,00	44	13	6	3	12,95	
5,50	44	13	6	3	12,95	
6,00	44	13	6	3	12,95	
6,50	48	16	8	3	17,82	
7,00	48	16	8	3	17,82	
8,00	51	19	8	3	17,82	
8,50	56	19	10	3	20,37	
9,00	56	19	10	3	20,37	
10,00	59	22	10	3	20,37	

3-4 Z



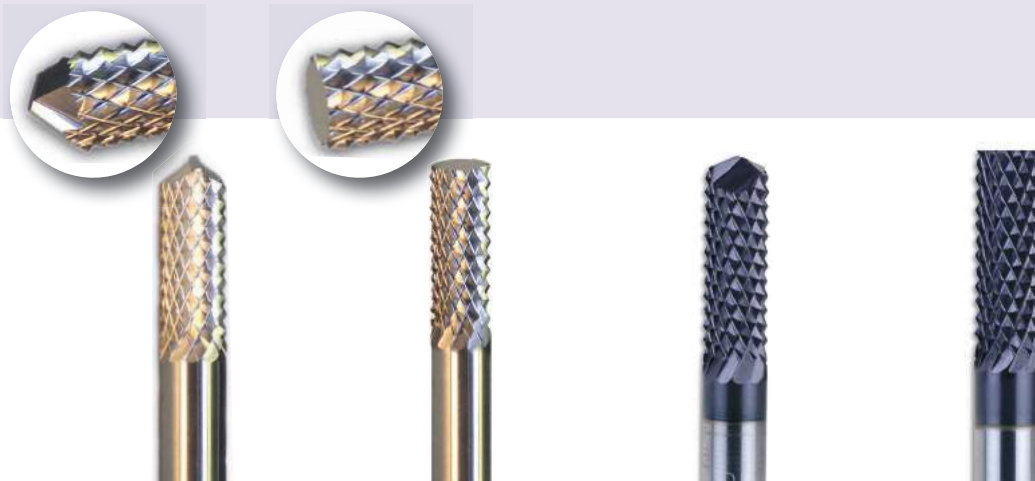
Mejora la extracción de viruta



	D1 mm	L1 mm	L2 mm	D2 mm	Z	FP22 €
FP220600	6,00	57	13	6	3	30,61
FP220700	7,00	66	16	10	3	41,35
FP220800	8,00	69	19	10	3	41,35
FP220900	9,00	69	19	10	3	41,35
FP221000	10,00	72	22	10	3	41,35
FP221200	12,00	83	26	12	3	56,92
FP221400	14,00	83	26	12	3	64,89
FP221500	15,00	83	26	12	3	79,26
FP221600	16,00	92	32	16	3	79,26
FP221800	18,00	92	32	16	3	111,11
FP222000	20,00	104	38	20	3	132,60
FP222500	25,00	121	45	25	4	

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

**MD**



D1 mm	L1 mm	L2 mm	D2 mm		RFC		RF		RFCTL		RFTL	
					€			TiAIN		TiAIN		
1,50	38	5	3,00	RFC0150	14,93	RF0150	14,15	RFC0150TL	22,56	RF0150TL	21,79	
2,00	38	10	3,00	RFC0200	14,93	RF0200	14,15	RFC0200TL	22,56	RF0200TL	21,79	
3,00	38	12	3,00	RFC0300	14,93	RF0300	14,15	RFC0300TL	22,56	RF0300TL	21,79	
5,00	50	16	5,00	RFC0500	29,63	RF0500	26,91	RFC0500TL	37,28	RF0500TL	34,55	
6,00	63	25	6,00	RFC0600	35,24	RF0600	31,95	RFC0600TL	44,52	RF0600TL	41,25	
6,35	75	30	6,35	RFC0635	39,12	RF0635	35,82	RFC0635TL	48,44	RF0635TL	45,12	
8,00	63	25	8,00	RFC0800	58,67	RF0800	53,26	RFC0800TL	67,45	RF0800TL	62,03	
10,00	63	25	10,00	RFC1000	74,53	RF1000	67,77	RFC1000TL	83,76	RF1000TL	76,99	
12,00	75	25	12,00	RFC1200	93,70	RF1200	85,21	RFC1200TL	105,12	RF1200TL	96,62	

**FRESA DE METAL DURO PARA REPARACIÓN DE PINCHAZOS**

**MD**



	D1 mm	L1 mm	L2 mm	D2 mm	RN €
RN0300	3,00	38	14	3	14,53
RN0600	6,00	75	50	6	35,06
RN0800	8,00	100	53	8	39,49
RN1000	10,00	100	75	10	61,97

**FRESAS DE METAL DURO ACCESORIOS TIPO ROTOZIP**



						RR €
		D1 mm	L1 mm	L2 mm	D2 mm	
RR0317	Cortador Azulejo	3,17	50	25	3,17	16,75
RR0635	Cortador Azulejo	6,35	50	25	6,35	28,08
RR0435	Trabajos en Yeso	6,35	52	32	6,35	35,14
RR0247	Argamasa	2,47	38	14	3,17	12,31
RR0535	Fresas para Chapa	6,35	50	10	6,35	30,51

**FRESAS DE 1 LABIO HSSCo**

HSSCo

Al

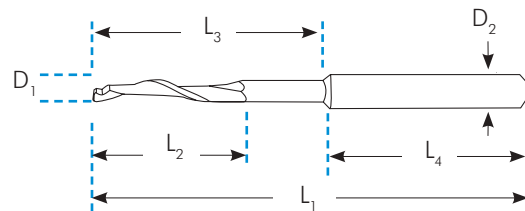
PVC

TOL D1  
k12TOL D2  
h6
**SERIE CORTA**


	D1 mm	L1 mm	L2 mm	D2 mm	FF13	
					HSSCo	TiN
					€	€
FF1381	1,0	60	12	8	34,58	50,48
FF1382	2,0	60	12	8	34,58	50,48
FF1383	3,0	60	12	8	13,65	19,92
FF1384	4,0	60	12	8	13,65	19,92
FF1385	5,0	60	13	8	13,65	19,92
FF1386	6,0	60	16	8	13,90	19,92
FF1387	7,0	60	16	8	16,66	23,42
FF1388	8,0	80	16	8	16,66	23,42
FF131010	10,0	80	15	10	17,83	23,42
FF1361	1,0	45	6	6	25,01	33,17
FF13615	1,5	45	6	6	25,01	33,17
FF1362	2,0	45	6	6	25,01	33,17
FF1363	3,0	60	12	6	12,95	18,17
FF1364	4,0	60	12	6	13,00	18,17
FF1365	5,0	60	12	6	13,00	18,17
FF1366	6,0	60	14	6	13,00	18,17

**SERIE LARGA**


	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	FF14	
						HSSCo	TiN
						€	€
FF1483	3	80	16	45	8	22,67	28,77
FF1484	4	80	16	45	8	19,30	25,55
FF1485	5	80	16	45	8	19,30	25,55
FF1486	6	90	16	45	8	19,30	25,55
FF1487	7	90	20	50	8	24,99	31,51
FF1488	8	100	30	70	8	22,59	29,05
FF1465	5	80	14	45	6	19,29	25,55
FF1466	6	80	14	45	6	19,30	25,55


**SERIE EXTRA LARGA**


	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	L4 mm	FF14-E	
							HSSCo	TiN
							€	€
FF14-E	5	100	30	55	8	45	18,25	24,52
FF14-EL	5	100	50	-	8	50	23,45	33,30

**ALUMINIO LACADO**


	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	FF50	
						HSSCo	TiN
						€	€
FF5084	4	80	16	35	8	18,17	24,79
FF5085	5	80	18	35	8	18,17	24,79

**MEDIDAS ESPECIALES**


	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	FF14 Especiales
						HSSCo
						€
FF148412020	4	120	20	-	8	20,18
FF14856018	5	60	18	-	8	16,63
FF14859025	5	90	25	-	8	21,70
FF148510025	5	100	25	-	8	20,17
FF148512014	5	120	14	-	8	20,17
FF14851001817	5	100	18	35	8	20,49
FF14851201461	5	120	14	75	8	27,60
FF14851201817	5	120	18	35	8	27,60
FF1486801421	6	80	14	35	8	22,87
FF14861001835	6	100	18	35	8	22,87
FF14861201461	6	120	14	75	8	33,07

	D1 mm	L1 mm	L2 mm	L3 mm	D2 mm	FF14 Especiales
						HSSCo
						€
FF14861003045	6	100	30	45	8	27,73
FF14861006040	6	100	60	-	8	35,61
FF14888025	8	80	25	-	8	17,26
FF148810014	8	100	14	-	8	19,09
FF148812014	8	120	14	-	8	19,46
FF14881201476	8	120	14	90	8	25,01
FF14898014	9	80	14	-	8	20,02
FF148108014	10	80	14	-	8	21,31
FF1410101003040	10	100	30	70	10	26,01
FF1410101201481	10	120	14	95	10	26,01
FF14101012014	10	120	14	-	10	22,33
FF148128014	12	80	14	-	8	24,17



**FRESAS DE 1 LABIO DE METAL DURO**

MD

Al


PVC

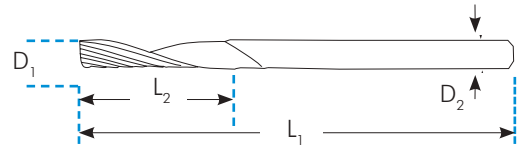
TOL  
h10

TOL D2  
h6

**HÉLICE A - SERIE CORTA**




	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13	
					MD	€
FMGA1331	1,0	35	4,5	3	MD	59,05
FMGA13315	1,5	50	6,0	3	MD	53,14
FMGA1322	2,0	40	10,0	2	MD	41,34
FMGA1333	3,0	40	12,0	3	MD	22,75
FMGA1336	3,0	64	12,0	6	MD	54,53
FMGA1338	3,0	64	12,0	8	MD	82,37
FMGA1344	4,0	50	16,0	4	MD	25,02
FMGA1346	4,0	64	16,0	6	MD	49,64
FMGA1348	4,0	64	16,0	8	MD	104,84
FMGA135550	5,0	50	16,0	5	MD	24,73
FMGA1355	5,0	64	16,0	5	MD	27,09
FMGA1356	5,0	64	16,0	6	MD	54,53
FMGA1358	5,0	64	16,0	8	MD	110,68
FMGA136650	6,0	50	16,0	6	MD	34,91
FMGA1366	6,0	64	20,0	6	MD	40,91
FMGA1368	6,0	64	20,0	8	MD	108,85
FMGA1378	7,0	64	20,0	8	MD	111,57
FMGA138816	8,0	66	16,0	8	MD	40,82
FMGA1388	8,0	76	38,0	8	MD	54,13
FMGA131010	10,0	76	30,0	10	MD	62,67




**HÉLICE A - SERIE LARGA**



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13E	
					MD	€
FMGA1355E	5	80	38	5	MD	100,28
FMGA1366E	6	85	40	6	MD	110,75
FMGA1388E	8	90	38	8	MD	118,63
FMGA1388EX	8	110	43	8	MD	198,70
FMGA131010E	10	100	40	10	MD	136,08
FMGA131010EL	10	120	60	10	MD	165,36


**HÉLICE B**



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13HI	
					MD	€
FMGA1333HI	3	50	8	3	MD	32,93
FMGA1344HI	4	64	12	4	MD	32,94
FMGA1355HI	5	64	16	5	MD	35,67
FMGA1366HI	6	64	20	6	MD	53,85
FMGA1388HI	8	76	38	8	MD	71,26
FMGA131010HI	10	76	35	10	MD	82,51


**HÉLICE C**



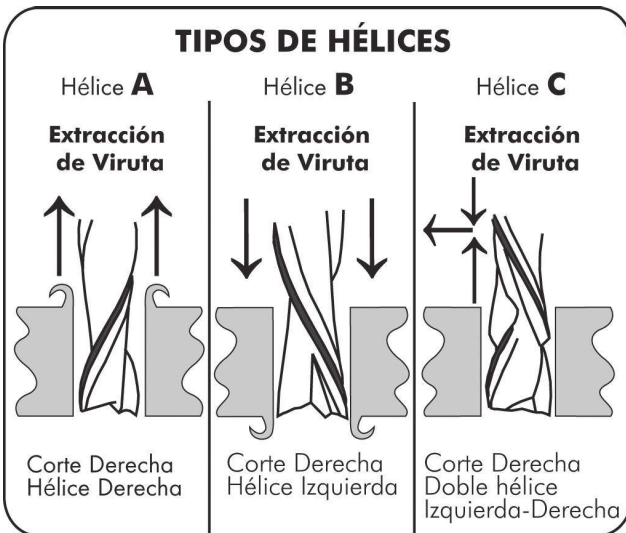
	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13CO	
					MD	€
FMGA1366CO	6	64	25	6	MD	111,89
FMGA1388CO	8	64	25	8	MD	154,72
FMGA131010CO	10	76	35	10	MD	181,85
FMGA131212CO	12	76	35	12	MD	241,25

**CANAL RECTO**



	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13R	
					MD	€
FMGA1346R	4	64	16	6	MD	37,78
FMGA1356R	5	64	20	6	MD	37,78
FMGA1366R	6	64	25	6	MD	47,27
FMGA1388R	8	64	25	8	MD	69,27
FMGA131010R	10	88	35	10	MD	90,66
FMGA131212R	12	88	35	12	MD	130,85

**TIPOS DE HÉLICES**



**VELOCIDADES DE CORTE**

D1 mm	HSSCo		MD	
	Aluminio (R.P.M.)	P.V.C. (R.P.M.)	Aluminio (R.P.M.)	P.V.C. (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

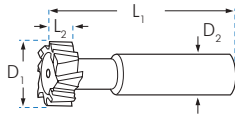
NOTA: Para la serie larga conviene reducir las RPM en un 15%

**FRESAS PARA RANURAR**

Ref. FF17

**RANURAR EN "T"**

**DIN 851A**



TOL D1  
d11

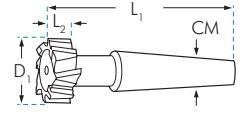
TOL D2  
h6

D1 x L2 mm		D2 mm	Z	L1 mm	FF17	
					HSSCo	TiAlN
					€	€
11,0x4,0	10	4	53,5	80,31	98,68	
12,5x6,0	10	6	57,0	83,49	104,37	
16,0x8,0	10	6	62,0	91,80	116,47	
18,0x8,0	12	8	70,0	96,70	124,53	
21,0x9,0	12	8	74,0	106,50	149,59	
25,0x11,0	16	8	82,0	120,20	162,90	
32,0x14,0	16	10	90,0	151,62	211,26	
40,0x18,0	25	10	108,0	210,31	294,51	
50,0x22,0	32	10	124,0	231,82	331,65	
60,0x28,0	32	10	139,0	242,33	346,72	
72,0x35,0	32	10	153,0	252,87	361,79	

Ref. FF17C

**RANURAR EN "T"**

**DIN 851B**



TOL D2  
h12

D1 x L2 mm		CM	ROSCA	L1 mm	FF17C	
					HSSCo	TiAlN
					€	€
11,0x4,0				53,5		
12,5x6,0				57,0		
16,0x8,0				62,0		
18,0x8,0	1	M6	70,0	105,36	130,64	
21,0x9,0	2	M10	74,0	115,68	143,44	
25,0x11,0	2	M10	82,0	120,60	149,55	
32,0x14,0	2	M10	90,0	160,84	199,44	
40,0x18,0	3	M12	108,0	203,34	252,15	
50,0x22,0	4	M16	124,0	268,57	333,02	
60,0x28,0	4	M16	139,0	355,35	440,63	
72,0x35,0	5	M20	153,0	482,33	598,08	

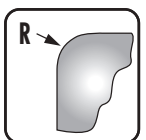
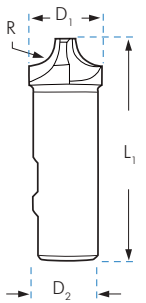
**FRESA DE 1/4 DE CÍRCULO PARA REMATADO DE ARISTAS**

**4 Z**

**HSSCo 8%**

**DIN 6518N**

**WELDON**



FF1/4R					
	TOL H11	js 15	TOL h6	L1	€
	R	D1 mm	D2 mm	mm	
FF1/4R1	1,0	8	10	60	50,91
FF1/4R1.50	1,5	9	10	60	48,37
FF1/4R2	2,0	10	10	60	40,69
FF1/4R2.50	2,5	11	10	60	46,81
FF1/4R3	3,0	12	12	60	46,64
FF1/4R3.50	3,5	13	12	60	60,75
FF1/4R4	4,0	14	12	60	51,79
FF1/4R4.50	4,5	15	12	60	70,49
FF1/4R5	5,0	16	12	60	59,09
FF1/4R5.50	5,5	19	16	67	70,49
FF1/4R6	6,0	20	16	67	59,20
FF1/4R6.50	6,5	21	16	71	89,72
FF1/4R7	7,0	22	16	71	80,90
FF1/4R7.50	7,5	23	16	71	97,66
FF1/4R8	8,0	24	16	71	80,90
FF1/4R8.50	8,5	25	25	85	119,63
FF1/4R9	9,0	26	25	85	105,44
FF1/4R9.50	9,5	27	25	85	125,73
FF1/4R10	10,0	28	25	85	105,44
FF1/4R10.50	10,5	31	25	90	146,48
FF1/4R11	11,0	32	25	90	140,77
FF1/4R12	12,0	34	25	90	115,98
FF1/4R12.50	12,5	41	25	100	150,62
FF1/4R13	13,0	42	25	100	186,70
FF1/4R14	14,0	44	25	100	193,73
FF1/4R15	15,0	46	25	100	241,18
FF1/4R16	16,0	48	25	100	221,67
FF1/4R18	18,0	52	32	112	285,93
FF1/4R20	20,0	56	32	112	321,23

**FRESA PARA RANURAR "WOODRUFF"**

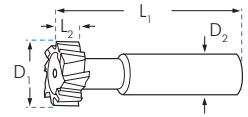
Ref. FF16

**TIPO WOODRUFF**

**DIN 850B**

**TOL D1 h12**

**TOL D2 h6**



D1 x L2 mm		D2 mm	Z	L1 mm	FF16	
					HSSCo	TiAlN
					€	€
4,5x1,0	6	6	50	43,67	51,65	
7,5x1,5	6	6	50	45,47	54,66	
7,5x2,0	6	6	50	45,47	54,66	
10,5x2,0	6	6	50	48,92	58,98	
10,5x2,5	6	6	50	48,92	58,98	
10,5x3,0	6	6	50	48,92	58,98	
13,5x3,0	10	6	56	49,70	62,08	
13,5x4,0	10	6	56	49,70	62,08	
16,5x3,0	10	6	56	50,15	66,48	
16,5x4,0	10	6	56	50,15	66,48	
16,5x5,0	10	6	56	50,15	64,31	
19,5x4,0	10	8	63	57,09	75,41	
19,5x5,0	10	8	63	57,09	72,26	
19,5x6,0	10	8	63	57,09	72,26	
22,5x5,0	10	8	63	62,54	83,77	
22,5x6,0	10	8	63	62,54	84,18	
22,5x8,0	10	8	63	62,54	84,18	
25,5x6,0	10	10	63	73,23	104,25	
28,5x6,0	10	10	63	74,49	105,50	
28,5x8,0	10	10	63	74,49	105,50	
28,5x10,0	12	10	71	74,49	105,50	
32,5x7,0	12	10	71	92,38	126,26	
32,5x8,0	12	10	71	92,38	126,26	
32,5x10,0	12	10	71	92,38	126,26	
45,5x10,0	12	12	71	146,15	207,77	

**FRESAS CÓNICAS ANGULARES, CON MANGO CILÍNDRICO HSSCo**



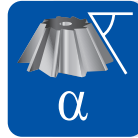
Ref. FF98  
Ref. FF99

**HSSCo**

**DIN 1833A**

**TOL D1 js16**

**TOL D2 h6**



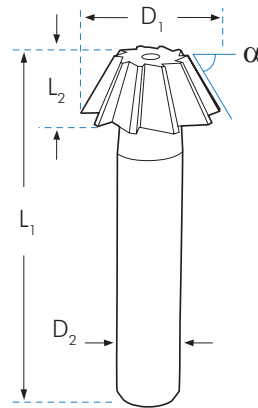
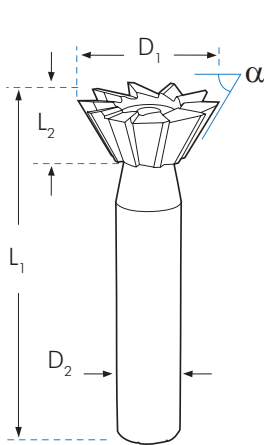
Ref. FF97  
Ref. FF95

**HSSCo**

**DIN 1833B**

**TOL D1 js16**

**TOL D2 h6**



							<b>FF98</b>
<b>45°</b>	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF981600	16	45°	12	60	4,0	8	81,22
FF982000	20	45°	12	63	5,0	10	86,11
FF982500	25	45°	12	67	6,3	12	105,30
FF983200	32	45°	16	71	8,0	14	117,50

							<b>FF97</b>
<b>45°</b>	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF971600	16	45°	12	60	4,0	8	65,39
FF972000	20	45°	12	63	5,0	10	73,53
FF972500	25	45°	12	67	6,3	12	82,68
FF973200	32	45°	16	71	8,0	12	94,03

							<b>FF99</b>
<b>60°</b>	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF991600	16	60°	12	60	6,3	8	81,19
FF992000	20	60°	12	63	8,0	10	86,09
FF992500	25	60°	12	67	10,0	12	105,28
FF993200	32	60°	16	71	12,5	14	117,47

							<b>FF95</b>
<b>60°</b>	D1 mm	α	D2 mm	L1 mm	L2 mm	Z	€
FF951600	16	60°	12	60	6,3	8	64,15
FF952000	20	60°	12	63	8,0	10	72,15
FF952500	25	60°	12	67	10,0	12	81,14
FF953200	32	60°	16	71	12,5	12	92,27

<b>MEDIDAS ESPECIALES</b>							<b>FF99</b>
FF991600-50	16	50°	12	60	5,0	8	91,18
FF992000-50	20	50°	12	63	6,3	10	97,19
FF992500-50	25	50°	12	67	8,0	12	120,09
FF991600-55	16	55°	12	60	5,6	8	91,18
FF992000-55	20	55°	12	63	7,1	10	97,19
FF992500-55	25	55°	12	67	9,0	12	120,09
FF991600-75	16	75°	12	60	8,0	8	91,18
FF992500-75	25	75°	12	67	10,0	12	120,09
FF991600-80	16	80°	12	60	8,0	8	91,18
FF992500-80	25	80°	12	67	10,0	12	120,09
FF991600-85	16	85°	12	60	8,0	8	91,18
FF992500-85	25	85°	12	67	10,0	12	120,09

<b>MEDIDAS ESPECIALES</b>							<b>FF95</b>
FF951600-50	16	50°	12	60	5,0	8	76,12
FF952000-50	20	50°	12	63	6,3	10	97,18
FF952500-50	25	50°	12	67	8,0	12	121,24
FF951600-55	16	55°	12	60	5,6	8	76,12
FF952000-55	20	55°	12	63	7,1	10	97,18
FF952500-55	25	55°	12	67	9,0	12	121,24
FF951600-75	16	75°	12	60	8,0	8	76,12
FF952500-75	25	75°	12	67	10,0	12	121,24

**FRESAS FRONTALES CON MANGO CÓNICO SERIE CORTA**

Fresos

Roso

4-8 Z

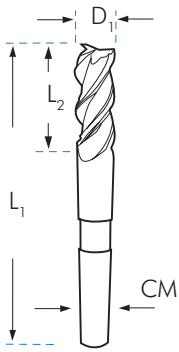
CÓNICO

INOX

Al

2 Z

SERIE CORTA



DIN 845B		MATERIAL					FF09						FF35			FF39			FF10			FF46			FF48			DIN 326		FF55	
		MATERIAL	ACABADO	CALIDAD	DESBASTE	TOL k10	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	L1 mm	L2 mm	Z	€				
D1 mm	L1 mm	L2 mm	Z	CM	ROSCA	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	L1 mm	L2 mm	Z	€						
10,00	92	22	4	1	M6	44,19	61,36	63,19	65,54	81,89	84,27	83	13	2	55,56																
12,00	111	26	4	2	M6	58,42	74,94	78,55	66,80	83,61	86,85	86	16	2	57,68																
14,00	111	26	4	2	M10	64,73	82,07	86,81	75,89	93,42	97,97	101	16	2	59,85																
15,00	111	26	4	2	M10	69,45	89,82	94,15	94,82	114,23	119,78																				
16,00	117	32	4	2	M10	64,44	85,18	89,28	78,28	99,02	102,85	104	19	2	65,39																
18,00	117	32	4	2	M10	68,45	88,90	93,18	85,91	106,04	111,20	104	19	2	68,54																
20,00	123	38	4	2	M10	76,35	100,12	104,94	94,48	117,92	123,66	107	22	2	71,93																
22,00	123	38	5	2	M10	86,35	108,92	115,22	104,02	126,71	132,86	107	22	2	84,72																
24,00	147	45	6	3	M12	130,59	149,84	159,99	145,03	166,31	174,38	128	26	2	109,61																
25,00	154	45	5	3	M12	117,88	144,98	153,41	145,07	172,25	180,62	128	26	2	115,21																
26,00	147	45	6	3	M12	119,03	150,54	153,41	159,36	185,39	194,43	128	26	2	120,95																
28,00	154	50	5	3	M12	119,03	150,54	153,41	159,41	185,39	194,43	128	26	2	133,54																
30,00	154	50	6	3	M12	131,53	172,97	176,25	187,17	221,40	232,18	128	26	2	147,01																
32,00	178	53	6	4	M16	172,78	221,95	226,18	221,94	273,87	287,18	157	32	2	161,86																
36,00	178	53	6	4	M16	196,80	245,82	252,98	244,67	297,28	311,73	157	32	2	206,46																
40,00	188	63	6	4	M16	237,10	295,02	303,59	341,80	402,34	421,89	163	38	2	237,94																
45,00	188	63	6	4	M16	305,36	373,87	384,63	388,49	444,87	466,50	163	38	2	343,65																
50,00	233	75	6	5	M20	367,87	432,03	444,49	412,00	485,08	508,64	203	45	2	431,72																
56,00	233	75	8	5	M20	507,48	562,01	578,20	586,67	626,97	657,45																				
63,00	241	90	8	5	M20	637,14	682,73	702,39	736,86	764,98	802,14																				

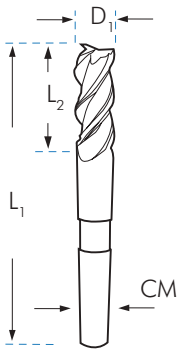


**FRESAS FRONTALES CON MANGO CÓNICO SERIE LARGA DIN 845B/L**

**4-8 Z**



SERIE LARGA



<b>DIN 845B/L</b>											
						MATERIAL		ACABADO		CALIDAD	
D1 mm	L1 mm	L2 mm	Z	CM	ROSCA	FF11	FF61	FF71	FF12	FF33	FF43
						€	€	€	€	€	€
10,00	115	45	4	1	M6	80,27	97,83	101,14	117,14	133,86	138,41
12,00	138	53	4	2	M6	75,68	97,83	104,01	119,34	135,62	141,54
14,00	138	53	4	2	M10	79,64	106,27	110,90	150,36	166,44	173,71
15,00	138	53	4	2	M10	87,43	111,41	116,25	172,91	191,24	199,61
16,00	148	63	4	2	M10	86,54	108,62	113,35	125,07	146,03	152,41
18,00	148	63	4	2	M10	98,32	119,24	124,41	129,82	150,55	157,12
20,00	160	75	4	2	M10	109,08	133,38	139,18	148,92	172,74	180,27
22,00	160	75	5	2	M10	123,45	146,76	153,85	154,67	178,14	185,91
24,00	192	90	5	3	M12	167,92	190,05	200,19	210,01	232,40	244,10
25,00	184	80	5	3	M12	166,77	196,11	206,07	219,57	247,54	258,33
26,00	192	90	5	3	M12	184,71	211,74	222,51	228,17	255,66	266,82
28,00	192	90	5	3	M12	187,17	224,06	236,00	226,51	255,66	266,82
30,00	192	90	5	3	M12	215,76	251,59	264,36	270,14	306,22	319,60
32,00	229	100	6	4	M16	254,37	297,90	313,03	321,72	365,58	381,55
36,00	231	106	6	4	M16	291,27	334,05	351,00	368,50	411,32	429,27
40,00	250	125	6	4	M16	323,65	375,87	394,97	452,83	503,33	525,33
45,00	250	125	6	4	M16	436,21	499,77	526,43	577,58	636,05	663,84
50,00	268	110	6	5	M20	532,36	585,53	616,78	720,77	771,34	805,02
56,00	308	150	8	5	M20	560,23	611,33	645,02	839,92	883,88	931,13
63,00	338	180	8	5	M20	741,03	779,69	821,14	1.057,40	1.089,35	1.147,56

Fresas

Rosa

**JUEGOS DE FRESAS CON CORTE AL CENTRO EN ESTUCHES DE PLÁSTICO**

Fresas

Rosas

2Z

DIN  
327

4Z

DIN  
844

REFERENCIA	PTF20				PTF60			
Nº FRESAS	8				8			
TIPO	Ref. FF02				Ref. FF60			
CALIDAD	<b>HSSCo 8%</b>				<b>TiAIN</b>			
CONTENIDO	6	8	10	12	6	8	10	12
Ø mm	2	2	2	2	2	2	2	2
P.V.P. €	119,50				189,47			

REFERENCIA	PTF24				PTF64			
Nº FRESAS	8				8			
TIPO	Ref. FF18				Ref. FF20			
CALIDAD	<b>HSSCo 8%</b>				<b>TiAIN</b>			
CONTENIDO	6	8	10	12	6	8	10	12
Ø mm	2	2	2	2	2	2	2	2
P.V.P. €	132,30				200,73			

2Z

DIN  
327

4Z

DIN  
844

REFERENCIA	PTF21				PTF61			
Nº FRESAS	6				6			
TIPO	Ref. FF02				Ref. FF60			
CALIDAD	<b>HSSCo 8%</b>				<b>TiAIN</b>			
CONTENIDO	6-8-10-12-16-20				6-8-10-12-16-20			
Ø mm								
P.V.P. €	129,33				196,74			

REFERENCIA	PTF25				PTF65			
Nº FRESAS	6				6			
TIPO	Ref. FF18				Ref. FF20			
CALIDAD	<b>HSSCo 8%</b>				<b>TiAIN</b>			
CONTENIDO	6-8-10-12-16-20				6-8-10-12-16-20			
Ø mm								
P.V.P. €	144,42				208,29			

2Z

DIN  
327

4Z

DIN  
844

REFERENCIA	PTF22				PTF62			
Nº FRESAS	6				6			
TIPO	Ref. FF02				Ref. FF60			
CALIDAD	<b>HSSCo 8%</b>				<b>TiAIN</b>			
CONTENIDO	4-5-6-8-10-12				4-5-6-8-10-12			
Ø mm								
P.V.P. €	81,95				131,79			

REFERENCIA	PTF26				PTF66			
Nº FRESAS	6				6			
TIPO	Ref. FF18				Ref. FF20			
CALIDAD	<b>HSSCo 8%</b>				<b>TiAIN</b>			
CONTENIDO	4-5-6-8-10-12				4-5-6-8-10-12			
Ø mm								
P.V.P. €	90,75				139,92			

**JUEGOS DE FRESAS CON CORTE AL CENTRO EN ESTUCHES METÁLICOS**

2Z



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. €	75,86	100,31	114,81	150,15

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. €	113,46	150,47	172,22	217,86

REFERENCIA	FF010801	FF020801	FT020801	FF600801
Nº FRESAS	14	14	14	14
TIPO	Ref. FF01	Ref. FF02	Ref. FT02	Ref. FF60
CALIDAD	HSS	HSSCo 8%	TiAlSiN	TiAlN
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	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. €	269,03	353,51	404,62	499,45

**ESTUCHES METÁLICOS VACÍOS PARA FRESAS**

2-4Z



DIN  
327

REFERENCIA	EV0787	EV0847	EV0764
Nº FRESAS	6	6	14
CONTENIDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	6 - 8 - 10 - 12 - 16 - 20	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	23,65	26,43	76,52



**JUEGOS DE FRESAS EN ESTUCHES METÁLICOS**

Fresas

Rosas

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. €	74,61	98,39	113,14	150,14

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. €	111,47	149,56	172,00	215,45



REFERENCIA	FF030764	FF040764	FT040764	FF540764
Nº FRESAS	14	14	14	14
TIPO	Ref. FF03	Ref. FF04	Ref. FT04	Ref. FF54
CALIDAD	HSS	HSSCo 8%	TiAlSiN	TiAlN
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	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. €	260,88	345,47	397,29	496,65

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. €	278,39	318,64	334,86



**JUEGOS DE FRESAS EN ESTUCHES METÁLICOS**

**4 Z**  **DIN 844**

REFERENCIA	<b>FF180787</b>	<b>FT180787</b>	<b>FF200787</b>
Nº FRESAS	6	6	6
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
CALIDAD	<b>HSSCo 8%</b>	<b>TiAlSiN</b>	<b>TiAlN</b>
CONTENIDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	104,75	119,89	158,27



Ref. FF180787

REFERENCIA	<b>FF180847</b>	<b>FT180847</b>	<b>FF200847</b>
Nº FRESAS	6	6	6
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
CALIDAD	<b>HSSCo 8%</b>	<b>TiAlSiN</b>	<b>TiAlN</b>
CONTENIDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	163,76	187,44	227,22










Ref. FF180847

REFERENCIA	<b>FF180764</b>	<b>FT180764</b>	<b>FF200764</b>
Nº FRESAS	14	14	14
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
CALIDAD	<b>HSSCo 8%</b>	<b>TiAlSiN</b>	<b>TiAlN</b>
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	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	374,47	428,60	517,41



Ref. FF180764

EXPOSITOR DE METACRILATO Ref. MF-01

Ref. <b>FF13</b>	<b>1 Z</b>	<b>HSSCo</b>	<b>Al</b>	<b>SERIE CORTA</b>	Contenido: 163 Fresas	Ø	5 x 8	Mango	6 x 8	Mango								
						Cant.	5		5									
Ref. <b>FF14</b>	<b>1 Z</b>	<b>HSSCo</b>	<b>Al</b>	<b>SERIE LARGA</b>		Ø	5 x 8	Mango	6 x 8	Mango								
						Cant.	5		5									
Ref. <b>FF02</b>	<b>2 Z</b>		<b>HSSCo</b>	<b>DIN 327N</b>		Ø	2	3	4	5	6	7	8	9	10	12	14	16
						Cant.	5	5	5	5	5	5	5	5	5	5	5	3
Ref. <b>FF18</b>	<b>4 Z</b>		<b>HSSCo</b>	<b>DIN 844N</b>		Ø	2	3	4	5	6	7	8	9	10	12	14	16
						Cant.	5	5	5	5	5	5	5	5	5	5	5	3
Ref. <b>FF25</b>	<b>4 Z</b>		<b>HSSCo</b>	<b>DIN 844N</b>			Ø	6	7	8	9	10	11	12	14	16		
							Cant.	3	3	3	3	3	3	3	3	3		



Dimensiones: ancho 245 x fondo 210 x alto 350 mm  
NOTA: Composiciones especiales bajo demanda

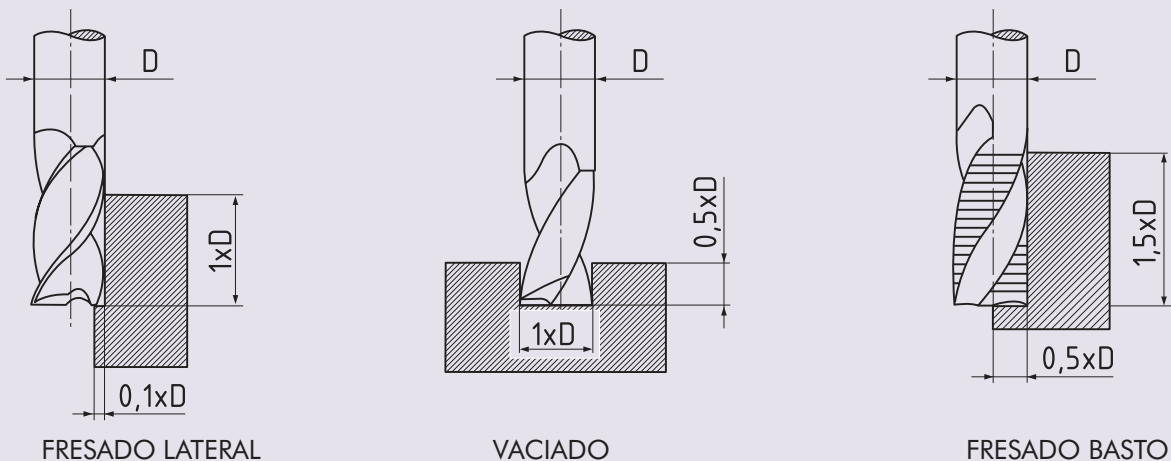
**P.V.P.: 3.098,22**

**PARÁMETROS DE CORTE ORIENTATIVOS FRESAS HSSCo8%**

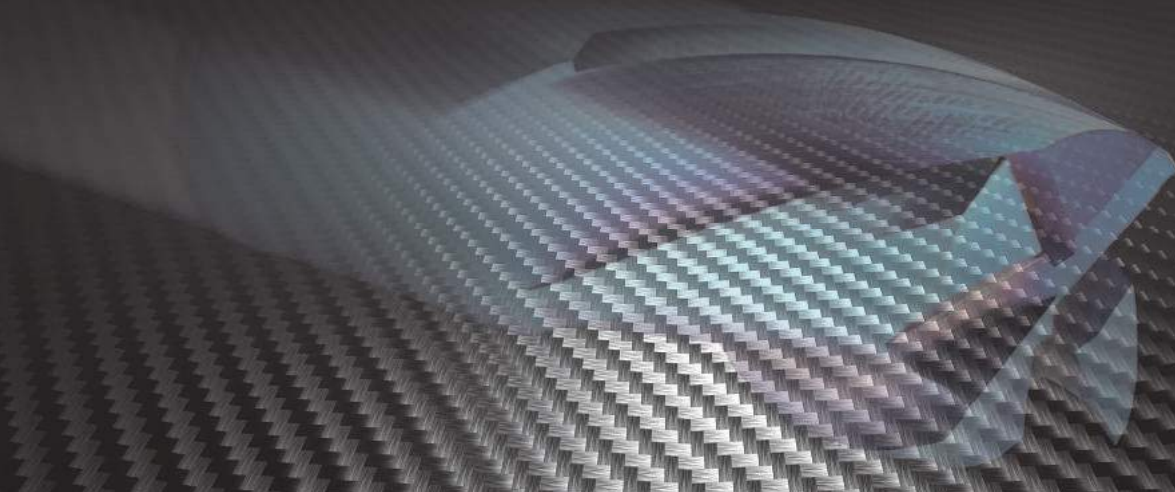
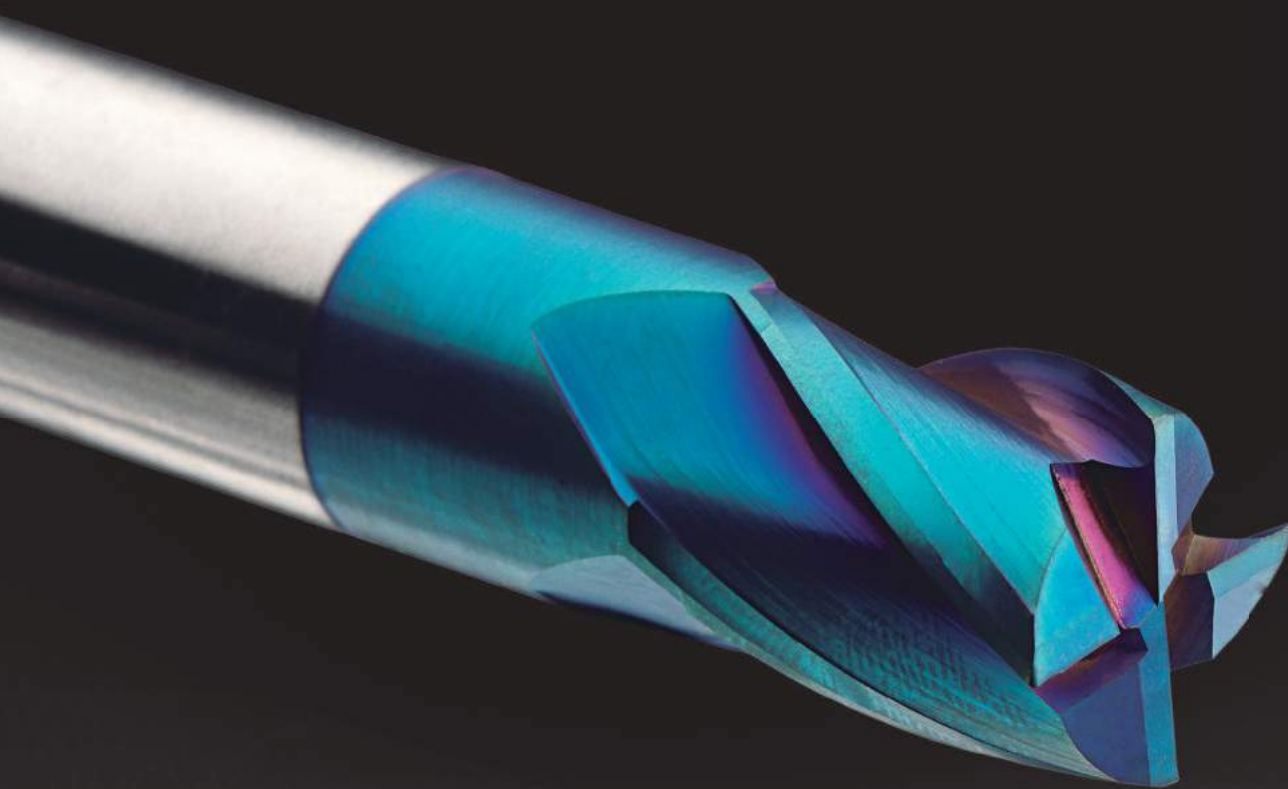
		DIÁMETRO Ø (mm)														
		2	4	6	8	10	12	18	22	26	30	32	36	40		
<b>ACERO BLANDO</b> 70 kg/mm <sup>2</sup>	<b>V/C 39 RPM</b>	<b>6207</b>	<b>3104</b>	<b>2069</b>	<b>1552</b>	<b>1241</b>	<b>1035</b>	<b>690</b>	<b>564</b>	<b>477</b>	<b>414</b>	<b>388</b>	<b>345</b>	<b>310</b>		
	<b>AVANCE</b> (mm/min)	Nº cortes	2	50	56	74	84	82	81	80	81	76	68	68	62	60
		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		
<b>ACERO TRATADO</b> 120 kg/mm <sup>2</sup>	<b>V/C 20 RPM</b>	<b>3183</b>	<b>1592</b>	<b>1061</b>	<b>796</b>	<b>637</b>	<b>531</b>	<b>354</b>	<b>289</b>	<b>245</b>	<b>212</b>	<b>199</b>	<b>177</b>	<b>159</b>		
	<b>AVANCE</b> (mm/min)	Nº cortes	2	25	29	38	43	42	41	41	42	39	35	35	32	31
		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		
<b>INOXIDABLE</b>	<b>V/C 15 RPM</b>	<b>2387</b>	<b>1194</b>	<b>796</b>	<b>597</b>	<b>477</b>	<b>398</b>	<b>265</b>	<b>217</b>	<b>184</b>	<b>159</b>	<b>149</b>	<b>133</b>	<b>119</b>		
	<b>AVANCE</b> (mm/min)	Nº cortes	2	19	21	29	32	32	31	31	31	29	26	26	24	23
		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		
<b>ALUMINIO</b>	<b>V/C 230 RPM</b>	<b>36606</b>	<b>18303</b>	<b>12202</b>	<b>9151</b>	<b>7321</b>	<b>6101</b>	<b>4067</b>	<b>3328</b>	<b>2816</b>	<b>2440</b>	<b>2288</b>	<b>2034</b>	<b>1830</b>		
	<b>AVANCE</b> (mm/min)	Nº cortes	2	293	329	439	494	483	476	472	479	451	400	403	366	351
		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		
<b>TITANIO</b>	<b>V/C 12 RPM</b>	<b>1910</b>	<b>955</b>	<b>637</b>	<b>477</b>	<b>382</b>	<b>318</b>	<b>212</b>	<b>174</b>	<b>147</b>	<b>127</b>	<b>119</b>	<b>106</b>	<b>95</b>		
	<b>AVANCE</b> (mm/min)	Nº cortes	2	15	17	23	26	25	25	25	25	24	21	21	19	18
		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 y/o ASP 60, multiplicar los parámetros de la tabla por el factor 1,3

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

**PROFUNDIDAD DE PASADA EN FUNCIÓN DE LA OPERACIÓN A REALIZAR**


# FRESAS METAL DURO



**FRESAS DE METAL DURO INTEGRAL PARA APLICACIONES GENERALES**

**SERIE CORTA**


				FMD2	FMD2TL	FMD92	FMD92TL	FMD63	FMD63TL	FMD48	FMD48TL	FMD51	FMD51TL
MATERIAL				MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
ACABADO				BRILLANTE	TiAlN	BRILLANTE	TiAlN	BRILLANTE	TiAlN	BRILLANTE	TiAlN	BRILLANTE	TiAlN
CALIDAD				★★	★★★	★★	★★★	★★	★★★	★★	★★★	★★	★★★
D1	L1	L2	D2	€	€	€	€	€	€	€	€	€	€
1,00	38	3	3	19,14	31,90			19,14	31,90	19,14	31,90		
1,50	38	5	3	18,67	31,14			18,67	31,14	18,67	31,14		
2,00	38	6	3	15,34	24,78			15,34	24,78	15,34	24,78		
2,50	38	7	3	15,34	24,22			15,34	24,22	15,34	24,22		
3,00	38	12	3	14,02	20,86	21,12	27,54	14,02	20,86	14,02	20,86	21,08	28,12
3,50	50	12	4	17,20	25,60			17,20	25,60	17,20	25,60		
4,00	50	14	4	16,25	23,78	23,48	30,55	16,25	23,78	16,25	23,78	25,35	33,09
4,50	50	14	5	18,84	30,43			18,84	30,43	18,84	30,43		
5,00	50	16	5	20,76	30,05	29,05	37,76	20,76	30,05	20,76	30,05	31,63	41,19
6,00	63	19	6	22,71	33,89	32,67	43,21	22,71	33,89	22,71	33,89	34,57	46,06
7,00	63	19	8	29,73	47,26	40,73	57,08	29,73	47,26	29,73	47,26	40,64	58,17
8,00	63	19	8	27,84	40,10	40,73	53,11	27,84	40,10	27,84	40,10	47,01	59,63
9,00	70	22	10	42,79	57,50	57,48	70,95	42,79	57,50	42,79	57,50	58,49	73,63
10,00	70	22	10	47,17	63,93	60,22	76,99	47,17	63,93	47,17	63,93	69,53	86,78
11,00	75	25	11	67,75	85,05	99,41	114,31	67,75	85,05	67,75	85,05		
12,00	75	25	12	59,46	79,08	76,76	94,69	59,46	79,08	59,46	79,08	91,22	111,39
14,00	88	30	14	91,36	117,55	111,44	137,62	91,36	117,55	91,36	117,55	128,66	155,60
16,00	88	32	16	120,81	152,28	136,98	171,82	120,81	152,28	120,81	152,28	155,06	190,88
18,00	100	36	18	177,01	211,60	219,34	253,58	177,01	211,60	177,01	211,60	229,85	270,48
20,00	100	36	20	201,34	241,25	222,17	267,67	201,34	241,25	201,34	241,25	256,50	303,29
25,00	100	38	25	258,24	395,99					258,24	395,99		

**CONDICIONES DE CORTE ORIENTATIVAS**

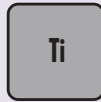
		Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25
	RPM	4000	2600	2000	1600	1300	1000	800	660	570	500	400	300
	AVANCE (mm/min)	50	55	55	55	55	55	55	55	55	65	65	65
	RPM	8000	5300	4000	3200	2600	2000	1600	1300	1100	1000	800	600
	AVANCE (mm/min)	55	55	55	55	60	60	60	60	60	70	70	70
	RPM	16000	11000	8000	6400	5300	4000	3200	2600	2300	2000	1600	1200
	AVANCE (mm/min)	290	290	290	290	290	290	290	290	300	300	300	300

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



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

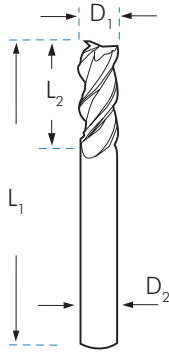
2Z



4Z



SERIE LARGA



				FMD54	FMD54TL	FMD57	FMD57TL	FMD58	FMD58TL
MATERIAL				MD	MD	MD	MD	MD	MD
ACABADO				BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN
CALIDAD				★★	★★★	★★	★★★	★★	★★★
D1	L1	L2	D2	€	€	€	€	€	€
3,00	65	25	3	26,94	40,53	30,24	43,83	26,42	40,01
4,00	65	25	4	27,45	42,12	37,97	53,07	27,45	42,12
5,00	75	25	5	32,43	49,77	43,41	61,24	32,43	49,77
6,00	100	38	6	45,01	62,52	52,67	70,17	41,67	59,18
8,00	100	38	8	58,76	79,85	71,23	92,73	61,70	82,79
10,00	100	38	10	79,73	102,73	88,29	111,95	83,60	104,05
12,00	100	50	12	125,85	162,15	143,76	181,09	129,48	159,48
14,00	125	56	14	150,55	188,79	179,28	217,88	150,56	188,80
16,00	150	75	16	196,68	237,00	223,75	264,08	204,55	244,87
18,00	150	75	18	244,88	317,87	330,57	405,64	256,58	319,44
20,00	150	75	20	319,16	410,39	445,28	539,13	319,16	410,39

SERIE EXTRA LARGA

				FMD53	FMD53TL	FMD55	FMD55TL	FMD56	FMD56TL
MATERIAL				MD	MD	MD	MD	MD	MD
ACABADO				BRILLANTE	TiAIN	BRILLANTE	TiAIN	BRILLANTE	TiAIN
CALIDAD				★★	★★★	★★	★★★	★★	★★★
Ø	L1	L2	D2	€	€	€	€	€	€
3,00	100	30	3	46,72	75,71	53,49	82,47	44,98	73,97
4,00	100	40	4	50,75	80,87	60,44	90,56	49,42	79,54
5,00	100	40	5	57,36	92,95	67,16	102,74	56,23	91,82
6,00	150	75	6	68,38	108,96	74,26	114,86	68,12	108,72
8,00	150	75	8	94,16	153,67	108,64	168,15	91,55	151,05
10,00	150	75	10	119,27	194,65	133,72	209,11	111,65	187,04
12,00	150	75	12	174,51	284,80	207,37	317,65	169,67	279,95
14,00	150	75	14	241,25	393,71	269,63	422,08	225,53	377,98
16,00	200	75	16	327,77	534,89	382,66	589,80	306,40	513,54
18,00	200	75	18	349,25	569,96	437,66	658,37	342,05	562,75
20,00	200	75	20	511,43	834,61	589,54	912,73	478,10	801,29

**FRESAS FRONTALES DE MD INTEGRAL DESBASTE FINO, MEDIO Y GRUESO**

Fresas

Rosa



					FMD1
D1 mm	D2 mm	L1 mm	L2 mm	Z	€
<b>TOL D1</b> +0 -0,05	<b>TOL D2</b> h6				
6	6	63	19	3	74,52
8	8	63	19	3	79,99
10	10	63	22	3	102,26
12	12	75	25	4	129,15
16	16	88	32	4	220,98
20	20	100	38	4	258,66

					FMD3
D1 mm	D2 mm	L1 mm	L2 mm	Z	€
<b>TOL D1</b> +0 -0,05	<b>TOL D2</b> h6				
6	6	63	19	3	74,52
8	8	63	19	3	79,99
10	10	63	22	3	102,26
12	12	75	25	4	129,15
16	16	88	32	4	220,98
20	20	100	38	4	258,66



					FMD6
D1 mm	D2 mm	L1 mm	L2 mm	Z	€
<b>TOL D1</b> +0 -0,05	<b>TOL D2</b> h6				
6	6	63	19	3	74,52
8	8	63	19	3	79,99
10	10	63	22	3	102,26
12	12	75	25	4	129,15
16	16	88	32	4	220,98
20	20	100	38	4	258,66

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

**INOX**  
**Ni**  
**Ti**

44 HRc

CILÍNDRICO

**2 Z**



**3 Z**



**4 Z**



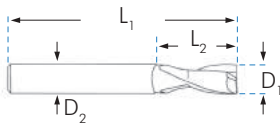
SERIE CORTA













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

TOL D<sub>1</sub>  
+0 -0,05

TOL D<sub>2</sub>  
h6






				FMT2	FMT92	FMT63	FMT48	FMT81
MATERIAL								
ACABADO				MD	MD	MD	MD	MD
CALIDAD				TiAlSiN	TiAlSiN	TiAlSiN	TiAlSiN	TiAlSiN
								
D <sub>1</sub> mm	L <sub>1</sub> mm	L <sub>2</sub> mm	D <sub>2</sub> mm	€	€	€	€	€
1,00	38	3	3	36,68		36,68	36,68	
1,50	38	5	3	35,81		35,81	35,81	
2,00	38	6	3	28,50		28,50	28,50	
2,50	38	7	3	27,85		27,85	27,85	
3,00	38	12	3	23,99	31,67	23,99	23,99	
3,50	50	12	4	29,44		29,44	29,44	
4,00	50	14	4	27,35	35,13	27,35	27,35	
4,50	50	14	5	34,99		34,99	34,99	
5,00	50	16	5	34,56	43,42	34,56	34,56	38,02
6,00	63	19	6	38,97	49,69	38,97	38,97	42,87
7,00	63	19	8	54,35	65,64	54,35	54,35	
8,00	63	19	8	46,12	61,08	46,12	46,12	50,73
9,00	70	22	10	66,13	81,59	66,13	66,13	
10,00	70	22	10	73,52	88,54	73,52	73,52	80,87
11,00	75	25	11	97,81	131,46	97,81	97,81	
12,00	75	25	12	90,94	108,89	90,94	90,94	100,03
14,00	88	30	14	135,18	158,26	135,18	135,18	148,70
16,00	88	32	16	175,12	197,59	175,12	175,12	192,63
18,00	100	36	18	243,34	291,62	243,34	243,34	267,67
20,00	100	36	20	277,44	307,82	277,44	277,44	305,18
25,00	100	38	25	455,39		455,39	455,39	



\* **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
	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
	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 35°

INOX

Ref. FMG10

2 Z

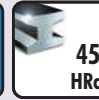


MG MD



TiAlN

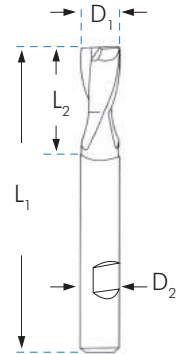
INOX



Ti

INC

SERIE CORTA

Micro  
Grano  
MD

					FMG10
	TOL -0,03	TOL h6			
	D1 mm	D2 mm	L1 mm	L2 mm	€
FMG100100	1,0	6	40	2,5	61,45
FMG100150	1,5	6	40	4,0	61,45
FMG100200	2,0	6	40	6,0	55,92
FMG100300	3,0	6	45	8,0	55,92
FMG100400	4,0	6	45	11,0	55,92
FMG100500	5,0	6	50	13,0	55,92
FMG100600	6,0	6	50	13,0	55,92
FMG100700	7,0	8	60	16,0	71,50
FMG100800	8,0	8	60	19,0	71,50
FMG100900	9,0	10	70	19,0	105,60
FMG101000	10,0	10	70	22,0	105,60
FMG101200	12,0	12	75	26,0	144,64
FMG101400	14,0	16	85	26,0	239,62
FMG101600	16,0	16	100	32,0	239,62
FMG101800	18,0	16	100	32,0	318,32
FMG102000	20,0	20	105	38,0	396,98
FMG102200	22,0	20	105	38,0	515,98
FMG102500	25,0	25	120	45,0	634,94

## REVOLUCIONES Y AVANCES

<30 HRc		30-45 HRc		INOX	
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	190	7.560	120	6.300	90
8.920	210	5.560	140	4.620	120
7.560	300	4.620	180	3.880	150
6.300	320	3.780	190	3.160	160
5.560	350	3.360	220	2.840	180
4.200	380	2.520	200	2.100	180
3.260	330	2.000	160	1.680	160
2.740	280	1.680	130	1.360	130
2.200	220	1.360	110	1.060	110
1.680	170	1.060	80	840	80
1.360	130	840	70	680	60

## FRESA 3 LABIOS, SERIE CORTA, HÉLICE A 45°

INOX

Ref. FMD67

3 Z



MD



CILÍNDRICO

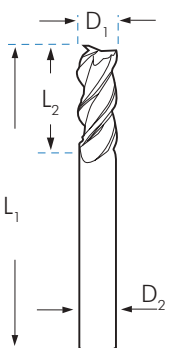
INOX

Ti

Ni

TiAlN

SERIE CORTA

Micro  
Grano  
MD

					FMD67
	TOL e8	TOL h6			TiAlN
	D1 mm	D2 mm	L1 mm	L2 mm	€
FMD670300	3	3	32	17	25,03
FMD670400	4	4	40	12	28,54
FMD670500	5	5	50	14	36,06
FMD670600	6	6	63	20	40,67
FMD670800	8	8	63	22	48,12
FMD671000	10	10	70	25	76,72
FMD671200	12	12	75	25	94,90
FMD671400	14	14	83	30	141,06
FMD671600	16	16	88	30	182,74
FMD671800	18	18	100	38	227,77
FMD672000	20	20	100	38	289,50




**FRESA 4 LABIOS, SERIE CORTA, HÉLICE A 35°**

**INOX** Ref. FMG12

4 Z



MG MD




35°



WELDON

TiAlN

INOX

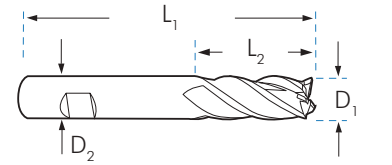


45 HRc



Ti

INC

SERIE CORTA




					FMG12
	TOL -0,03	TOL h6			€
	D1 mm	D2 mm	L1 mm	L2 mm	
FMG120200	2,0	6	40	6	55,92
FMG120250	2,5	6	40	8	55,92
FMG120300	3,0	6	45	8	55,92
FMG120400	4,0	6	45	11	55,92
FMG120500	5,0	6	50	13	55,92
FMG120600	6,0	6	50	13	55,92
FMG120700	7,0	8	60	16	71,50
FMG120800	8,0	8	60	19	71,50
FMG120900	9,0	10	70	19	105,60
FMG121000	10,0	10	70	22	105,60
FMG121200	12,0	12	75	26	144,64
FMG121400	14,0	16	85	26	239,62
FMG121600	16,0	16	100	32	239,62
FMG121800	18,0	16	100	32	318,32
FMG122000	20,0	20	105	38	396,98
FMG122200	22,0	20	105	38	515,98
FMG122500	25,0	25	120	40	634,94

REVOLUCIONES Y AVANCES					
				INOX	
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
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
4.200	710	2.520	380	2.100	350
3.260	610	2.000	300	1.680	300
2.740	520	1.680	250	1.360	240
2.200	410	1.360	200	1.060	200
1.680	320	1.060	160	840	150
1.360	250	840	130	680	130


**FRESA 6 Y 8 LABIOS, SERIE CORTA, HÉLICE A 45°**

**INOX** Ref. FMG14


6-8 Z



MG MD




45°



WELDON

TiAlN

INOX

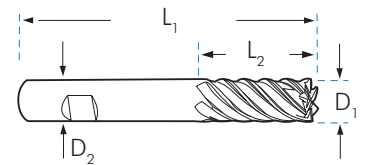




45 HRc

Ti

INC

SERIE CORTA



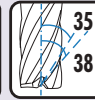
							FMG14					INOX		INC	
	TOL -0,03	TOL h6			Z	€	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	
	D1 mm	D2 mm	L1 mm	L2 mm											
FMG140600	6,0	6	57	13	6	67,27	5.560	2.000	3.880	1.370	3.370	1.100	1.350	280	
FMG140800	8,0	8	63	19	6	85,03	4.200	2.000	2.940	1.370	2.490	1.100	1.000	280	
FMG141000	10,0	10	72	22	6	121,23	3.360	2.000	2.320	1.370	1.920	1.100	440	280	
FMG141200	12,0	12	83	26	6	164,62	2.840	1.680	2.000	1.160	1.610	1.000	400	250	
FMG141400	14,0	14	83	26	6	215,86	2.470	1.470	1.740	1.020	1.380	885	355	220	
FMG141600	16,0	16	92	32	6	276,51	2.100	1.260	1.480	880	1.160	770	310	190	
FMG141800	18,0	18	92	32	8	338,96	1890	1130	1.320	785	1.030	695	280	170	
FMG142000	20,0	20	104	38	8	406,06	1680	1010	1.160	690	900	920	250	155	
FMG142500	25,0	25	104	44	8	750,97	1500	900	1.100	600	850	540	220	135	

## FRESAS 4 LABIOS DE HÉLICE VARIABLE

INOX

Ref. FMG81  
Ref. FMG82

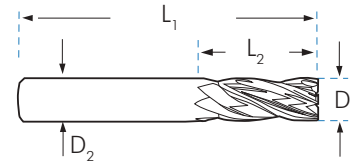
4 Z

DIN  
6527MG  
MD

TiAIN

INOX

SERIE CORTA

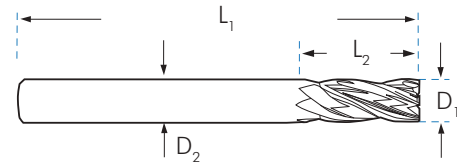
Micro  
Grano  
MD

	TOL				FMG81
	-0,03	h6			
	D1 mm	D2 mm	L1 mm	L2 mm	€
FMG810300	3,0	6	50	5	47,70
FMG810400	4,0	6	54	8	47,70
FMG810500	5,0	6	54	9	47,70
FMG810600	6,0	6	54	10	47,70
FMG810800	8,0	8	58	12	61,10
FMG811000	10,0	10	66	14	89,20
FMG811200	12,0	12	73	16	120,23
FMG811400	14,0	14	75	18	172,54
FMG811600	16,0	16	82	22	202,62
FMG811800	18,0	18	84	24	272,74
FMG812000	20,0	20	92	26	320,35

## REVOLUCIONES Y AVANCES

R.P.M. rev./min	INOX AISI 316L		R.P.M. rev./min	INOX AISI 304	
	AVANCE mm/min			AVANCE mm/min	
10.185	195		14.260	205	
7.600	250		14.260	255	
6.110	310		8.655	310	
5.095	360		7.130	360	
3.820	435		5.345	465	
3.055	590		4.275	585	
2.545	565		3.565	565	
2.180	520		3.055	520	
1.910	480		2.670	480	
1.695	475		2.375	475	
1.525	470		2.140	470	

SERIE LARGA

Micro  
Grano  
MD

	TOL				FMG82
	-0,03	h6			
	D1 mm	D2 mm	L1 mm	L2 mm	€
FMG820300	3,0	6	57	8	55,81
FMG820400	4,0	6	57	11	55,81
FMG820500	5,0	6	57	13	55,81
FMG820600	6,0	6	57	13	55,81
FMG820800	8,0	8	63	19	71,49
FMG821000	10,0	10	72	22	104,36
FMG821200	12,0	12	83	26	140,66
FMG821400	14,0	14	83	26	201,87
FMG821600	16,0	16	92	32	237,06
FMG821800	18,0	18	92	32	319,11
FMG822000	20,0	20	104	38	374,81

## REVOLUCIONES Y AVANCES

R.P.M. rev./min	INOX AISI 316L		R.P.M. rev./min	INOX AISI 304	
	AVANCE mm/min			AVANCE mm/min	
10.185	195		14.260	205	
7.600	250		14.260	255	
6.110	310		8.655	310	
5.095	360		7.130	360	
3.820	435		5.345	465	
3.055	590		4.275	585	
2.545	565		3.565	565	
2.180	520		3.055	520	
1.910	480		2.670	480	
1.695	475		2.375	475	
1.525	470		2.140	470	

## NUEVA FRESA DE HÉLICE VARIABLE

1. Geometría de labios especial. Su ángulo de hélice variable 35-38° elimina las vibraciones.
2. Excelente acabado de la pieza.
3. Velocidades de trabajo más altas. Máximo rendimiento.
4. Cortes más profundos.
5. Mayor velocidad de evacuación de viruta.

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

**INOX** Ref. FMG13

3-4 Z

MG MD

WELDON

TiAIN

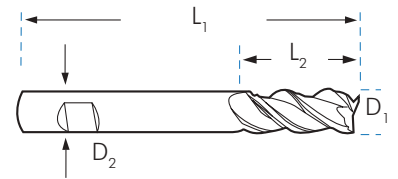
INOX

45 HRc

Ti

INC

SERIE CORTA



FMG13							REVOLUCIONES Y AVANCES							
TOL -0,03		TOL h6				€	<30 HRc		30-45 HRc		INOX		INC	
D1 mm	D2 mm	L1 mm	L2 mm	Z	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	
FMG130600	6,0	6	50	13	3	72,55	5.560	310	3.360	200	2.840	160	1.280	40
FMG130800	8,0	8	60	19	3	92,80	4.200	310	2.520	180	2.100	160	920	40
FMG131000	10,0	10	70	22	3	137,10	3.260	310	2.000	140	1.680	140	740	40
FMG131200	12,0	12	75	25	3	187,88	2.740	250	1.680	120	1.370	120	620	30
FMG131600	16,0	16	90	32	3	311,36	2.200	200	1.360	100	1.050	100	460	25
FMG131800	18,0	18	90	32	3	454,99	1.940	175	1.210	85	950	85	410	20
FMG132000	20,0	20	100	28	4	515,98	1.680	150	1.060	70	840	70	350	20
FMG132500	25,0	25	120	45	4	825,26	1.360	115	840	60	670	60	300	15

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  $\mu\text{m}$  / 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

3-5 Z



MG

MD



NF



TiAIN

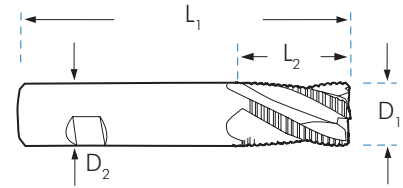
INOX



Ti

INC

SERIE CORTA

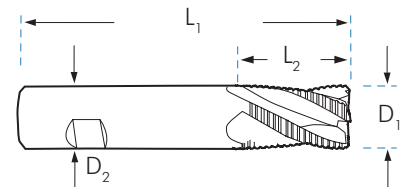
Micro  
Grano  
MD

## FMG15

## REVOLUCIONES Y AVANCES

	TOL		L1	L2	Z	€					INOX		INC	
	h10	h6					R.P.M.	AVANCE	R.P.M.	AVANCE	R.P.M.	AVANCE	R.P.M.	AVANCE
	D1	D2	mm	mm	mm		rev./min	mm/min	rev./min	mm/min	rev./min	mm/min	rev./min	mm/min
FMG150600	6,0	6	54	7	3	69,09	15.600	2.320	12.400	840	8.400	570	2.400	190
FMG150700	7,0	8	58	8	3	80,73	13.600	2.320	10.800	840	7.350	570	2.100	190
FMG150800	8,0	8	58	9	3	80,73	11.600	2.320	9.200	840	6.300	570	1.800	190
FMG150900	9,0	10	66	13	4	120,39	10.400	2.320	8.400	840	5.700	570	1.550	190
FMG151000	10,0	10	66	14	4	120,39	9.200	2.320	7.600	840	5.100	570	1.300	190
FMG151200	12,0	12	73	16	4	154,44	8.000	2.400	6.000	800	4.200	570	1.200	190
FMG151400	14,0	14	75	18	4	187,32	6.800	2.400	5.200	840	3.600	570	900	130
FMG151600	16,0	16	82	22	4	251,35	6.000	2.400	4.800	760	3.300	510	800	110
FMG151800	18,0	18	84	24	4	321,95	5.200	2.320	4.400	720	2.700	420	700	100
FMG152000	20,0	20	92	26	4	404,28	4.800	2.160	3.600	560	2.400	360	660	100
FMG152500	25,0	25	110	25	5	708,52	4.300	2.150	3.200	620	2.160	410	600	100

SERIE LARGA

Micro  
Grano  
MD

## FMG16

## REVOLUCIONES Y AVANCES

	TOL		L1	L2	Z	€					INOX		INC	
	h10	h6					R.P.M.	AVANCE	R.P.M.	AVANCE	R.P.M.	AVANCE	R.P.M.	AVANCE
	D1	D2	mm	mm	mm		rev./min	mm/min	rev./min	mm/min	rev./min	mm/min	rev./min	mm/min
FMG160600	6,0	6	57	16	3	74,24	15.600	2.320	12.400	840	8.400	570	2.400	190
FMG160700	7,0	8	63	16	3	86,77	13.600	2.320	10.800	840	7.350	570	2.100	190
FMG160800	8,0	8	63	16	3	86,77	11.600	2.320	9.200	840	6.300	570	1.800	190
FMG160900	9,0	9	72	19	4	129,41	10.400	2.320	8.400	840	5.700	570	1.550	190
FMG161000	10,0	10	72	22	4	129,41	9.200	2.320	7.600	840	5.100	570	1.300	190
FMG161200	12,0	12	83	26	4	166,05	8.000	2.400	6.000	800	4.200	570	1.200	190
FMG161400	14,0	14	83	26	4	201,37	6.800	2.400	5.200	840	3.600	570	900	130
FMG161600	16,0	16	92	32	4	270,24	6.000	2.400	4.800	760	3.300	510	800	110
FMG161800	18,0	18	92	32	4	346,15	5.200	2.320	4.400	720	2.700	420	700	100
FMG162000	20,0	20	104	38	4	434,67	4.800	2.160	3.600	560	2.400	360	660	100
FMG162500	25,0	25	121	45	5	761,82	4.300	2.150	3.200	620	2.160	410	600	100

## TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias  $\mu\text{m}$  / 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	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
e8	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

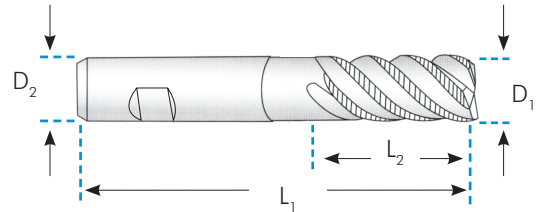


**FRESA 4 A 6 LABIOS, SERIE CORTA, HÉLICE A 45°**

**INOX** Ref. FMG17

4-6 Z   MG MD  NF  TiAlN **INOX** 45 HRc **INC**

SERIE CORTA



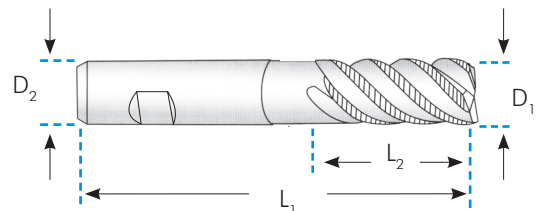
FMG17							REVOLUCIONES Y AVANCES							
TOL h10		TOL h6				€	<30 HRc		30-45 HRc		INOX		INC	
D1 mm	D2 mm	L1 mm	L2 mm	Z	R.P.M. rev./min		AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min	
FMG170600	6,0	6	54	7	4	69,09	15.600	2.320	12.400	840	8.400	570	2.400	190
FMG170800	8,0	8	58	9	4	80,73	11.600	2.320	9.200	840	6.300	570	1.800	190
FMG171000	10,0	10	66	14	4	120,39	9.200	2.320	7.600	840	5.100	570	1.300	190
FMG171200	12,0	12	73	16	4	154,44	8.000	2.400	6.000	800	4.200	570	1.200	190
FMG171600	16,0	16	82	22	5	251,35	6.000	2.400	4.800	760	3.300	510	800	110
FMG172000	20,0	20	92	26	6	404,28	4.800	2.160	3.600	560	2.400	360	660	100

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

**INOX** Ref. FMG18

3-6 Z   MG MD  NF  TiAlN **INOX** 45 HRc **INC**

SERIE LARGA



FMG18							REVOLUCIONES Y AVANCES							
TOL h10		TOL h6				€	<30 HRc		30-45 HRc		INOX		INC	
D1 mm	D2 mm	L1 mm	L2 mm	Z	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	
FMG180400	4,0	6	57	11	3	72,08	20.100	4.600	18.400	1.700	12.600	1.040	3.800	399
FMG180500	5,0	6	57	13	4	72,08	18.000	4.600	15.000	1.650	10.200	1.040	2.200	390
FMG180600	6,0	6	57	16	4	72,08	15.600	2.320	12.400	840	8.400	570	2.400	190
FMG180700	7,0	8	63	16	4	84,24	13.600	2.320	10.800	840	7.350	570	2.100	190
FMG180800	8,0	8	63	16	4	84,24	11.600	2.320	9.200	840	6.300	570	1.800	190
FMG180900	9,0	10	72	19	4	125,64	10.400	2.320	8.400	840	5.700	570	1.550	190
FMG181000	10,0	10	72	22	4	125,64	9.200	2.320	7.600	840	5.100	570	1.300	190
FMG181200	12,0	12	83	26	4	161,21	8.000	2.400	6.000	800	4.200	570	1.200	190
FMG181400	14,0	14	83	26	5	195,50	6.800	2.400	5.200	840	3.600	570	900	130
FMG181600	16,0	16	92	32	5	262,37	6.000	2.400	4.800	760	3.300	510	800	110
FMG182000	20,0	20	104	38	6	422,01	4.800	2.160	3.600	560	2.400	360	660	100
FMG182500	25,0	25	121	45	6	739,63	4.300	2.150	3.200	620	2.160	410	600	100

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

INOX

Ref. FMG19

4-6 Z

MG  
MD

NF

WELDON

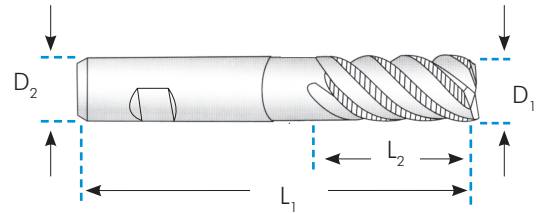
TiAlN

INOX

INC



SERIE LARGA

Micro  
Grano  
MD

## 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	88,99	
FMG190800	8,0	8	7,5	63	16	26	4	104,04	
FMG191000	10,0	10	9,5	72	22	31	4	155,20	
FMG191200	12,0	12	11,5	83	26	37	4	199,14	
FMG191600	16,0	16	15,5	100	32	51	5	324,43	
FMG192000	20,0	20	19,2	110	38	59	6	521,51	

## REVOLUCIONES Y AVANCES

						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 $\mu\text{m}$ / 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

## FRESAS DE METAL DURO INTEGRAL PARA MECANIZADO DE ALUMINIO EN GENERAL

**Al**



TOL D1  
-0,05

TOL D2  
h6

**2Z**

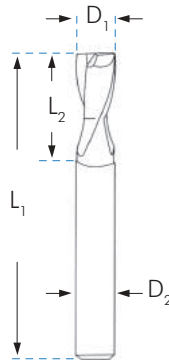


Ref. FM1AL  
Ref. FM2AL

**3Z**



Ref. FM3AL



				FM1AL	FM2AL					FM3AL
MATERIAL				MD	MD	MATERIAL				MD
ACABADO				BRILLANTE	BRILLANTE	ACABADO				BRILLANTE
CALIDAD				★★★★	★★★★	CALIDAD				★★★★
D1 mm	L1 mm	L2 mm	D2 mm	€	€	D1 mm	L1 mm	L2 mm	D2 mm	€
6,0	63	19	6	39,23	42,20	6,0	63	19	6	39,23
8,0	63	20	8	50,56	54,36	8,0	63	20	8	50,56
10,0	63	22	10	68,94	74,14	10,0	63	22	10	68,94
12,0	75	25	12	96,68	103,97	12,0	75	25	12	96,68
16,0	88	32	16	182,06	195,75	16,0	88	32	16	182,06
20,0	100	36	20	303,32	326,16	20,0	100	36	20	303,32

### CONDICIONES DE CORTE

			Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	
			2	3	4	5	6	8	10	12	14	16	20	25
<b>Al</b>	FM1AL	R.PM	22282	14854	11141	8913	7427	5570	4456	3714	3183	2785	2228	1783
		AVANCE mm/min	2670	1780	1340	1070	890	670	530	450	380	330	270	210
	FM2AL	R.PM	25465	16976	12732	10186	8488	6366	5093	4244	3638	3183	2546	2037
		AVANCE mm/min	3060	2040	1530	1220	1020	760	610	510	440	380	310	240
	FM3AL	R.PM	22282	14854	11141	8913	7427	5570	4456	3714	3183	2785	2228	1783
		AVANCE mm/min	4010	2670	2010	1600	1340	1000	800	670	570	500	400	320

**FRESA 2 LABIOS, SERIE CORTA, HÉLICE A 55°, PARA ALUMINIO**
**Al**

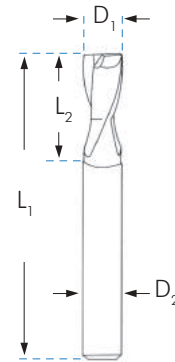
Ref. FMD59

**2 Z**

**MG  
MD**

**CILÍNDRICO**
**Cu**

SERIE CORTA

**Micro  
Grano  
MD**


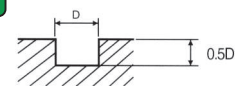
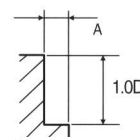
					FMD59	REVOLUCIONES Y AVANCES		
	TOL -0,05	TOL h6			€	Al		
	D1 mm	D2 mm	L1 mm	L2 mm		R.P.M rev./min.	AVANCE 1 mm/min	AVANCE 2 mm/min
FMD590300	3,0	3	38	12	25,75	10.000	700	900
FMD590400	4,0	4	50	14	27,90	10.000	900	1.100
FMD590500	5,0	5	50	19	31,26	10.000	1.000	1.300
FMD590600	6,0	6	63	19	35,49	10.000	1.200	1.500
FMD590800	8,0	8	63	19	46,64	8.000	1.400	1.800
FMD591000	10,0	10	70	22	68,56	8.000	1.700	2.100
FMD591200	12,0	12	83	25	90,60	8.000	2.100	2.600
FMD591400	14,0	14	83	30	127,14	6.000	1.800	2.200
FMD591600	16,0	16	88	32	161,26	6.000	1.900	2.400
FMD591800	18,0	18	88	32	208,65	4.000	1.400	1.800
FMD592000	20,0	20	100	38	265,96	4.000	1.600	1.900

**TOLERANCIAS SEGÚN DIN 7160 y 7161**

 Gama de tolerancias  $\mu\text{m}$  / 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	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
<b>h10</b>	0	0	0	0	0
	- 40	- 48	- 58	- 70	- 84
<b>h6</b>	0	0	0	0	0
	- 6	- 8	- 9	- 11	- 13

**Al**
**AVANCE 1**

**AVANCE 2**

 A:  $\phi 3 \sim \phi 10 = 0.25 \times D$   
 $\phi 12 \sim \phi 20 = 0.5 \times D$



FRESA 2 LABIOS, SERIE CORTA, HÉLICE A 25°, PARA ALUMINIO

Al

Ref. FMGA02

2 Z



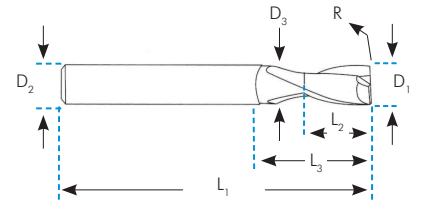
MG MD



TiAIN

Cu

SERIE CORTA



	TOL							FMGA02	
	-0,03	h6	D1	D2	D3	L1	L3	L2	R
FMGA020200	2,0	3	1,9	40	6	3	0,2	32,07	
FMGA020300	3,0	3	2,9	40	8	4	0,2	32,07	
FMGA020400	4,0	4	3,8	50	12	5	0,2	35,32	
FMGA020500	5,0	5	4,8	50	14	8	0,2	36,72	
FMGA020600	6,0	6	5,7	65	18	8	0,2	55,48	
FMGA020800	8,0	8	7,7	70	22	10	0,2	65,21	
FMGA021000	10,0	10	9,7	80	28	14	0,2	96,32	
FMGA021200	12,0	12	11,5	90	35	16	0,2	133,07	
FMGA021600	16,0	16	15,5	90	40	20	0,2	225,42	
FMGA022000	20,0	20	19,5	100	50	25	0,2	366,34	

REVOLUCIONES Y AVANCES

Al		
R.P.M	AVANCE 1	AVANCE 2
rev./min.	mm/min	mm/min
22.000	800	1.000
13.000	900	1.200
13.000	1.200	1.400
13.000	1.300	1.700
13.000	1.500	2.000
10.000	1.800	2.300
10.000	2.200	2.700
12.000	2.700	3.400
8.000	2.500	3.100
5.000	2.000	2.500

FRESA 2 LABIOS, SERIE CORTA, HÉLICE A 30°, PARA ALUMINIO

Al

Ref. FMGA03

2 Z



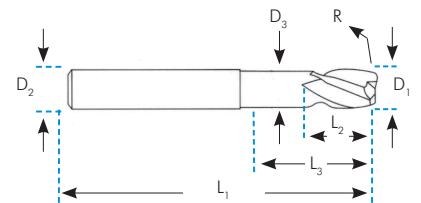
MG MD



TiAIN

Cu

SERIE CORTA



	TOL							FMGA03	
	-0,03	h6	D1	D2	D3	L1	L2	L3	R
FMGA030400	4,0	6	3,6	50	5	10	0,3	47,82	
FMGA030600	6,0	6	5,4	60	8	20	0,5	47,82	
FMGA030800	8,0	8	7,2	70	10	30	0,6	66,26	
FMGA031000	10,0	10	9,0	80	12	36	0,8	99,26	
FMGA031200	12,0	12	11,0	90	14	40	1,0	153,73	
FMGA031600	16,0	16	14,5	100	18	45	1,3	244,96	
FMGA032000	20,0	20	18,0	100	24	45	1,6	388,22	

REVOLUCIONES Y AVANCES

Al			Cu		
R.P.M	AVANCE 1	AVANCE 2	R.P.M	AVANCE 1	AVANCE 2
rev./min.	mm/min	mm/min	rev./min.	mm/min	mm/min
13.000	1.200	1.400	3.900	300	350
13.000	1.500	2.000	3.900	380	500
10.000	1.800	2.300	3.000	450	580
10.000	2.200	2.700	3.000	550	680
10.000	2.700	3.400	3.000	680	850
8.000	2.500	3.100	2.400	630	780
5.000	2.000	2.500	1.500	500	630

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias  $\mu\text{m}$  / 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 -0,03	- 14	- 20	- 25	- 32	- 40
TOL h6	- 28	- 38	- 47	- 59	- 73
TOL -0,03	0	0	0	0	0
TOL h6	- 6	- 8	- 9	- 11	- 13

**FRESA 3 LABIOS, SERIE CORTA, HÉLICE A 40°, PARA ALUMINIO CON PUNTA SEMIESFÉRICA**

**Al**

Ref. FMGA05

**3 Z**



**MG MD**

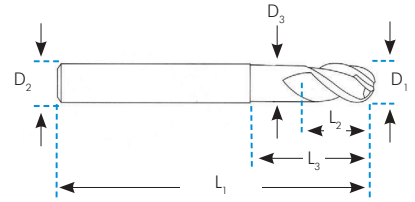


**CILÍNDRICO**

**TiAlN**

**Cu**

SERIE CORTA



							<b>FMGA05</b>
	TOL						
	-0,03	h6					
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	€
FMGA050200	2,0	6	1,9	60	3,0	5,0	57,64
FMGA050250	2,5	6	2,4	60	4,0	6,0	57,64
FMGA050300	3,0	6	2,8	60	4,5	6,5	57,64
FMGA050350	3,5	6	3,2	65	5,0	7,0	57,93
FMGA050400	4,0	6	3,7	65	6,0	8,0	57,93
FMGA050500	5,0	6	4,6	65	7,5	10,0	57,93
FMGA050600	6,0	6	5,6	75	9,0	12,0	57,93
FMGA050800	8,0	8	7,4	75	12,0	25,0	87,44
FMGA051000	10,0	10	9,4	80	15,0	30,0	129,29
FMGA051200	12,0	12	11,4	90	18,0	36,0	179,81
FMGA051600	16,0	16	15,4	100	24,0	40,0	262,29

**REVOLUCIONES Y AVANCES**

<b>Al</b>		<b>Cu</b>	
R.P.M. rev./min	AVANCE mm/min	R.P.M. rev./min	AVANCE mm/min
27.000	950	8.000	240
22.000	950	6.500	240
18.000	950	5.500	240
18.000	1.100	5.500	280
18.000	1.250	5.500	310
18.000	1.350	5.500	340
18.000	1.750	5.500	440
14.000	2.000	4.200	500
14.000	2.350	4.200	580
14.000	3.000	4.200	750
11.000	2.700	3.300	670

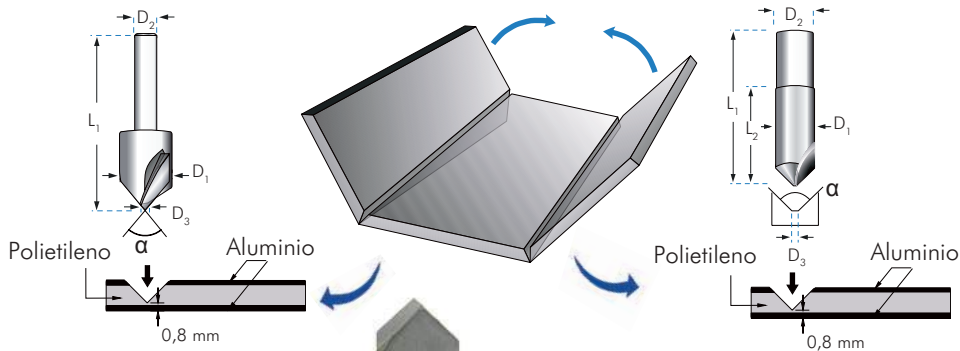
**FRESAS ESPECIALES PARA ALUCOBOND**

**PMD**

Ref. FFALUC

**MDI**

Ref. FFALUC...MDI



DE PLAQUITA SOLDADA

DE METAL DURO INTEGRAL

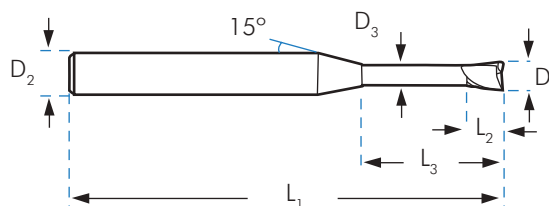
						<b>FFALUC</b>
	D1 mm	D2 mm	D3 mm	L1 mm	$\alpha$	€
FFALUC1600	16,00	8	2,5	55	90°	141,81
FFALUC1800	18,00	8	2,5	55	90°	143,63
FFALUC2000	20,00	8	2,5	55	90°	147,87
FFALUC1600-135	16,00	8	2,3	55	135°	171,93
FFALUC1800-135	18,00	8	2,3	55	135°	178,35
FFALUC2000-135	20,00	8	2,3	55	135°	204,17

							<b>FFALUC...MDI</b>
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	$\alpha$	€
FFALUC1400MDI	14,00	14	2,5	50	14	90°	147,71
FFALUC1600MDI	16,00	16	2,5	50	16	90°	176,75
FFALUC1800MDI	18,00	18	2,5	50	18	90°	255,43
FFALUC1400MDI-135	14,00	14	0,5	50	14	135°	147,71
FFALUC1600MDI-135	16,00	16	0,5	50	16	135°	176,75
FFALUC1800MDI-135	18,00	18	0,5	50	18	135°	255,43

FRESAS DE METAL DURO FRONTALES CON CUELLO



Ref. FMG74  
Ref. FMG75  
Ref. FMG76



							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	82,54
FMG740100	1,0	4	0,95	55	1,5	20	84,69
FMG740150	1,5	4	1,45	55	2,3	20	76,45
FMG740200	2,0	4	1,95	55	3,0	20	73,36
FMG740300	3,0	6	2,85	60	4,5	20	94,88
FMG740400	4,0	6	3,85	60	6,0	20	94,88
FMG740500	5,0	6	4,85	60	7,5	20	94,88
FMG740600	6,0	6	5,85	80	9,0	20	94,88

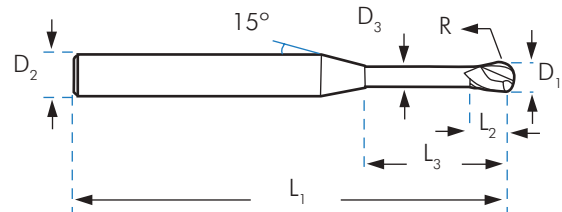
							FMG75
	TOL -0,015	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG750200	2,0	4	1,95	70	3,0	30	86,71
FMG750300	3,0	6	2,85	70	4,5	30	98,55
FMG750400	4,0	6	3,85	70	6,0	30	98,55
FMG750500	5,0	6	4,85	80	7,5	30	98,55
FMG750600	6,0	6	5,85	90	9,0	30	98,55

							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	108,37
FMG760500	5,0	6	4,85	80	7,5	40	108,37
FMG760600	6,0	6	5,85	100	9,0	40	108,37

## FRESAS DE METAL DURO SEMIESFÉRICAS CON CUELLO



Ref. FMG77  
Ref. FMG78  
Ref. FMG79



R :  $\pm 0,01$  mm

							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	82,54
FMG770100	1,0	4	0,95	55	1,5	20	84,69
FMG770150	1,5	4	1,45	55	2,3	20	76,45
FMG770200	2,0	4	1,95	55	3,0	20	73,36
FMG770300	3,0	6	2,85	60	4,5	20	94,88
FMG770400	4,0	6	3,85	65	6,0	20	94,88
FMG770500	5,0	6	4,85	60	7,5	20	94,88
FMG770600	6,0	6	5,85	80	9,0	20	94,88

							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	86,71
FMG780300	3,0	6	2,85	70	4,5	30	98,55
FMG780400	4,0	6	3,85	70	6,0	30	98,55
FMG780500	5,0	6	4,85	80	7,5	30	98,55
FMG780600	6,0	6	5,85	90	9,0	30	98,55

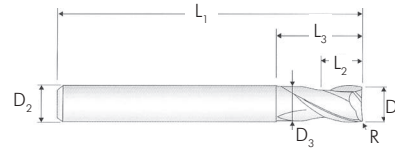
							FMG79
	TOL -0,02	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG790400	4,0	6	3,85	90	6,0	40	108,37
FMG790600	5,0	6	5,85	100	9,0	40	108,37

FRESA DE 2 LABIOS PARA ACEROS DE TEMPLE EXTREMO 70HRC



Ref. FMG01

2 Z MG MD 30° CILÍNDRICO BLUE 70 HRc



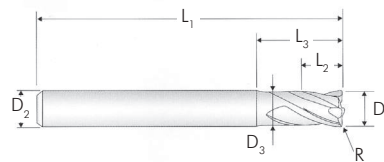
FMG01								REVOLUCIONES Y AVANCES								
TOL Especial	TOL h6							€	50-55 HRc	55-60 HRc	60-65 HRc	65-70 HRc				
D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	R	€	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	R.P.M. rev./min.	AVANCE mm/min	
FMG010100	1,0	3	-	40	1,5	-	0,1	52,52	25.500	360	20.500	215	16.000	135	12.500	88
FMG010150	1,5	3	-	40	2,2	-	0,1	52,52	21.500	390	17.500	240	13.500	150	11.000	102
FMG010200	2,0	3	1,9	40	3,0	6	0,1	47,65	17.500	420	14.500	260	11.000	160	9.500	115
FMG010250	2,5	3	2,4	40	4,0	6	0,1	47,65	14.500	420	12.000	260	9.250	160	7.950	115
FMG010300	3,0	6	2,9	45	4,0	7	0,1	69,59	11.500	420	9.500	260	7.500	160	6.400	115
FMG010350	3,5	6	3,3	45	5,0	9	0,1	69,59	10.150	430	8.350	270	6.550	165	5.575	118
FMG010400	4,0	6	3,8	45	5,0	9	0,1	69,59	8.800	440	7.200	270	5.600	170	4.750	118
FMG010450	4,5	6	4,3	45	6,0	10	0,1	69,59	8.550	470	6.800	280	5.350	175	4.600	125
FMG010500	5,0	6	4,8	50	6,0	11	0,2	69,59	8.300	500	6.400	285	5.100	180	4.450	132
FMG010600	6,0	6	5,8	50	7,0	14	0,2	69,59	6.900	480	5.300	280	4.200	180	3.700	130
FMG010800	8,0	8	7,8	60	9,0	18	0,2	88,00	5.200	445	4.000	255	3.200	165	2.800	120
FMG011000	10,0	10	9,7	75	12,0	25	0,2	131,53	4.100	415	3.200	240	2.550	155	2.200	112
FMG011200	12,0	12	11,7	75	15,0	30	0,3	181,38	3.500	415	2.650	240	2.100	155	1.860	112
FMG011600	16,0	16	15,7	90	18,0	38	0,3	302,40	2.600	365	2.000	210	1.600	135	1.400	98
FMG012000	20,0	20	19,7	100	24,0	45	0,3	500,01	2.050	335	1.600	295	1.300	125	1.100	88

FRESA DE 4 LABIOS PARA ACEROS DE TEMPLE EXTREMO 70HRC



Ref. FMG04

4 Z MG MD 30° CILÍNDRICO BLUE 70 HRc



FMG04								REVOLUCIONES Y AVANCES								
TOL Especial	TOL h6							€	50-55 HRc	55-60 HRc	60-65 HRc	65-70 HRc				
D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	R	€	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	
FMG040100	1,0	3	-	40	1,5	-	0,1	52,52	25.500	710	20.500	430	16.000	270	12.500	175
FMG040150	1,5	3	-	40	2,2	-	0,1	52,52	21.500	775	17.500	475	13.500	295	11.000	200
FMG040200	2,0	3	1,9	40	3,0	6	0,1	47,65	17.500	840	14.500	520	11.000	320	9.500	230
FMG040250	2,5	3	2,4	40	4,0	6	0,1	47,65	14.500	840	12.000	520	9.250	320	7.950	230
FMG040300	3,0	6	2,9	45	4,0	7	0,1	69,59	11.500	840	9.500	520	7.500	320	6.400	230
FMG040350	3,5	6	3,3	45	5,0	9	0,1	69,59	10.150	860	8.350	530	6.550	328	5.575	240
FMG040400	4,0	6	3,8	45	5,0	9	0,1	69,59	8.800	880	7.200	540	5.600	335	4.750	240
FMG040450	4,5	6	4,3	45	6,0	10	0,1	69,59	8.550	940	6.800	560	5.350	353	4.600	255
FMG040500	5,0	6	4,8	50	6,0	11	0,2	69,59	8.300	1.000	6.400	580	5.100	370	4.450	270
FMG040600	6,0	6	5,8	50	7,0	14	0,2	69,59	6.900	950	5.300	560	4.200	350	3.700	260
FMG040800	8,0	8	7,8	60	9,0	18	0,2	88,00	5.200	900	4.000	520	3.200	330	2.800	240
FMG041000	10,0	10	9,7	75	12,0	25	0,2	131,53	4.100	840	3.200	480	2.550	310	2.200	220
FMG041200	12,0	12	11,7	75	15,0	30	0,3	181,38	3.500	840	2.650	480	2.100	300	1.860	220
FMG041600	16,0	16	15,7	90	18,0	38	0,3	302,40	2.600	730	2.000	420	1.600	270	1.400	200
FMG042000	20,0	20	19,7	100	24,0	45	0,3	500,01	2.050	650	1.600	380	1.300	250	1.100	180



## FRESA DE 2 LABIOS SEMIESFÉRICA PARA ACEROS DE TEMPLE EXTREMO 70HRC



Ref. FMG02

2 Z

MG  
MD

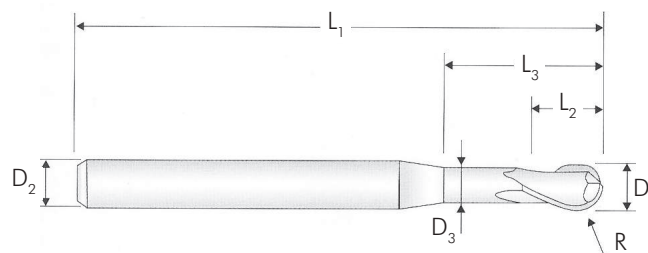
30°

CILÍNDRICO

BLUE

70  
HRc

SERIE CORTA

Micro  
Grano  
MD

FMG02								REVOLUCIONES Y AVANCES								
TOL Especial	TOL h6			TOL R			€	50-55 HRc	55-60 HRc	60-65 HRc	65-70 HRc					
	D1	D2	D3	L1	L2	L3	R	R.P.M.	AVANCE	R.P.M.	AVANCE	R.P.M.	AVANCE	R.P.M.	AVANCE	
	mm	mm	mm	mm	mm	mm	R	rev./min.	mm/min	rev./min.	mm/min	rev./min.	mm/min	rev./min.	mm/min	
FMG020100	1,0	4	0,95	50	1,0	2,2	0,5	86,60	57.000	4.000	54.000	3.400	51.000	2.700	48.000	2.300
FMG020120	1,2	4	1,10	50	1,2	2,6	0,6	86,60	52.750	4.000	50.000	3.300	46.000	2.700	43.000	2.300
FMG020150	1,5	4	1,40	50	1,5	3,0	0,8	86,60	48.500	4.000	44.500	3.275	41.500	2.750	38.250	2.300
FMG020200	2,0	4	1,90	50	2,0	4,0	1,0	82,25	40.000	4.000	35.000	3.150	32.000	2.800	28.500	2.300
FMG020300	3,0	6	2,90	60	3,0	6,0	1,5	82,25	26.500	4.000	23.500	3.150	21.000	2.800	19.000	2.300
FMG020400	4,0	6	3,30	70	4,0	8,0	2,0	85,94	20.000	4.000	17.500	3.150	16.000	2.800	14.500	2.300
FMG020500	5,0	6	4,90	80	5,0	10,0	2,5	88,50	15.000	3.750	13.500	3.050	11.500	2.550	10.500	2.100
FMG020600	6,0	6	5,90	90	6,0	12,0	3,0	94,90	11.000	3.100	10.000	2.500	8.800	2.150	8.000	1.750
FMG020700	7,0	8	6,90	90	7,0	14,0	3,5	149,62	10.000	2.900	9.000	2.325	7.900	2.000	7.250	1.650
FMG020800	8,0	8	7,90	100	8,0	16,0	4,0	148,09	9.000	2.700	8.000	2.150	7.000	1.850	6.500	1.550
FMG020900	9,0	10	8,90	100	9,0	18,0	4,5	244,24	8.250	2.500	7.300	2.025	6.400	1.750	5.900	1.465
FMG021000	10,0	10	9,90	100	10,0	20,0	5,0	244,24	7.500	2.400	6.600	1.900	5.800	1.650	5.300	1.380
FMG021200	12,0	12	11,90	110	12,0	24,0	6,0	313,51	5.600	1.900	5.000	1.550	4.400	1.250	4.000	1.050
FMG021400	14,0	14	13,80	110	14,0	28,0	7,0	396,46	5.000	1.800	4.500	1.450	3.950	1.125	3.600	950
FMG021600	16,0	16	15,80	140	16,0	32,0	8,0	523,36	4.500	1.700	4.000	1.350	3.500	1.000	3.200	850
FMG021800	18,0	18	17,80	140	18,0	36,0	9,0	565,13	4.000	1.600	3.600	1.275	3.150	900	2.875	750
FMG022000	20,0	20	19,80	160	20,0	40,0	10,0	800,91	3.600	1.500	3.200	1.200	2.800	800	2.550	660
FMG022500	25,0	25	24,80	180	25,0	50,0	12,5	1.298,28	-	-	-	-	-	-	-	-

## TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias  $\mu\text{m}$  / 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

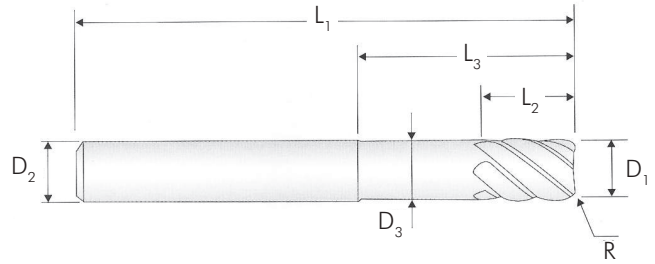
FRESAS DE 6 LABIOS PARA ACEROS DE TEMPLE EXTREMO 70HRc



Ref. FMG06



SERIE CORTA



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	99,55
FMG060800	8,0	8	7,65	60	8	24	0,5	118,75
FMG061000	10,0	10	9,65	70	10	30	1,0	185,25
FMG061200	12,0	12	11,60	75	12	30	1,0	221,27

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

SERIE LARGA

FMG07						
TOL Especial	TOL h6					€
	D1 mm	D2 mm	L1 mm	L2 mm	R	
FMG070600	6,0	6	70	13	0,5	113,11
FMG070800	8,0	8	90	19	0,5	141,77
FMG071000	10,0	10	100	22	0,5	213,60
FMG071001	10,0	10	100	22	1,0	213,60
FMG071200	12,0	12	110	26	0,5	291,34
FMG071201	12,0	12	110	26	1,0	291,34
FMG071600	16,0	16	130	32	1,0	491,31
FMG071601	16,0	16	130	32	1,5	536,58
FMG072000	20,0	20	140	38	1,0	785,45
FMG072001	20,0	20	140	38	1,5	719,01
FMG072002	20,0	20	140	38	2,0	785,45

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
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

TOLERANCIAS SEGÚN DIN 7160 y 7161

Gama de tolerancias  $\mu\text{m}$  / 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	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
	0	0	0	0	0
	- 12	- 12	- 15	- 15	- 15
TOL h6	0	0	0	0	0
	- 6	- 8	- 9	- 11	- 13

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

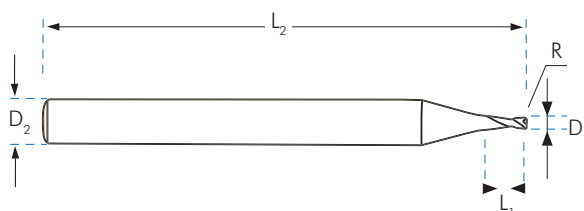
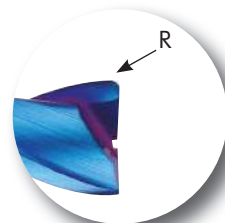
Ref. FMG09

2 Z

MG  
MD

CLÍNDRICO

BLUE

TOL D1  
-0,012TOL D2  
h6Micro  
Grano  
MD

	FMG09					
	D1 mm	D2 mm	L1 mm	L2 mm	R	€
FMG090030	0,30	6	50	0,45	-	92,11
FMG090040	0,40	6	50	0,60	-	86,44
FMG090050	0,50	6	50	0,70	0,05	75,19
FMG090060	0,60	6	50	0,90	0,05	72,34
FMG090080	0,80	6	50	1,20	0,05	66,66
FMG090100	1,00	6	50	1,50	0,10	63,88
FMG090120	1,20	6	50	1,80	0,10	63,88
FMG090150	1,50	6	50	2,20	0,15	63,88
FMG090200	2,00	6	50	2,20	0,15	57,90



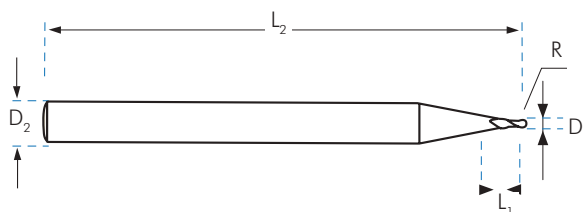
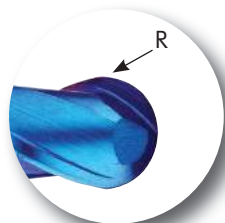
Ref. FMG08

2 Z

MG  
MD

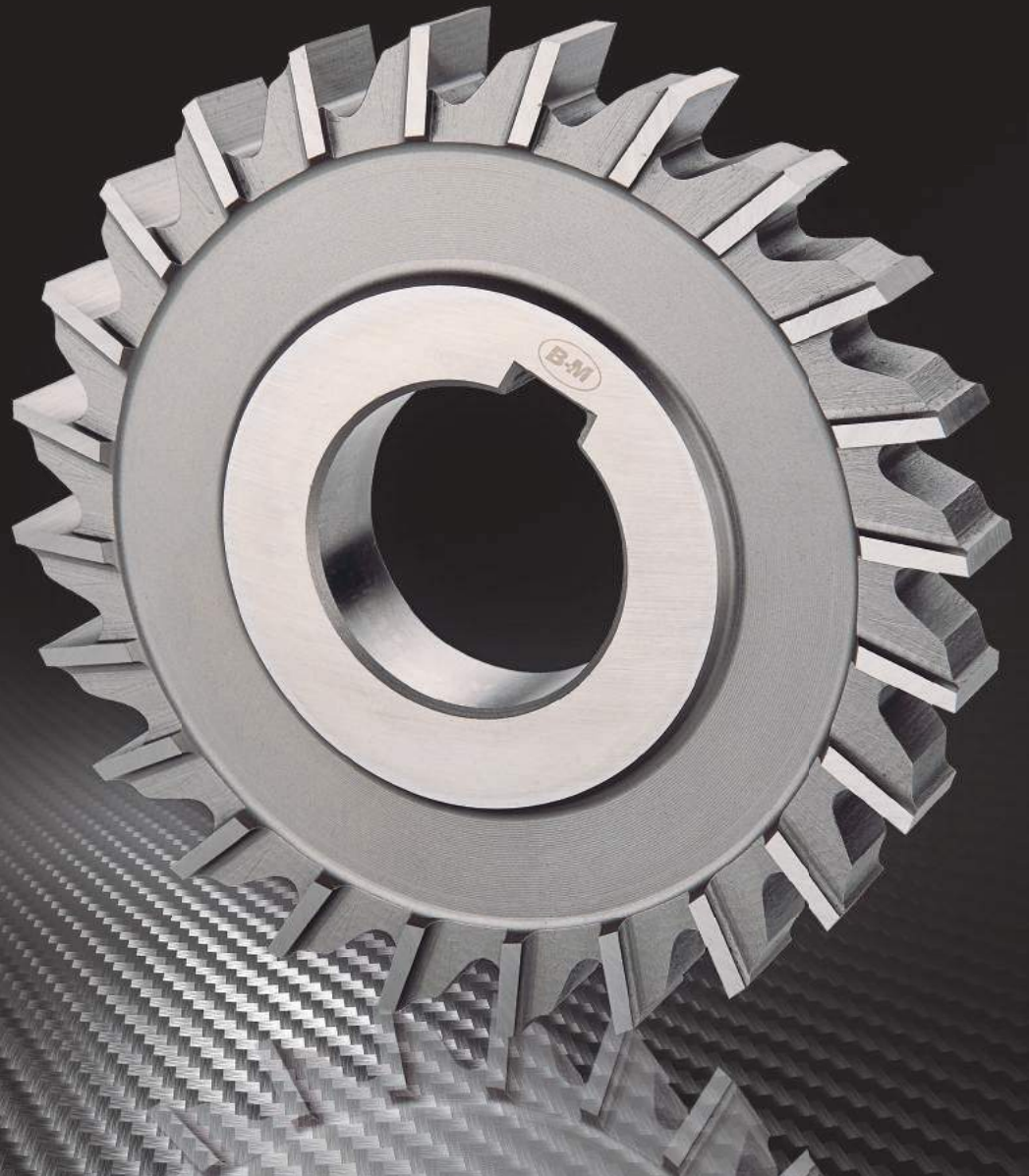
CLÍNDRICO

BLUE

TOL D1  
-0,012TOL D2  
h6Micro  
Grano  
MD

	FMG08					
	D1 mm	D2 mm	L1 mm	L2 mm	R	€
FMG080040	0,40	6	50	0,40	0,20	93,49
FMG080050	0,50	6	50	0,50	0,25	86,30
FMG080060	0,60	6	50	0,60	0,30	79,13
FMG080080	0,80	6	50	0,80	0,40	64,54
FMG080100	1,00	6	50	1,00	0,50	60,77
FMG080120	1,20	6	50	1,20	0,60	60,77
FMG080150	1,50	6	50	1,50	0,75	60,77
FMG080200	2,00	6	50	2,00	1,00	55,06

# FRESAS DE AGUJERO



**FRESA PARA RANURAR HSSCo DE 3 CORTES CON DIENTE CRUZADO**

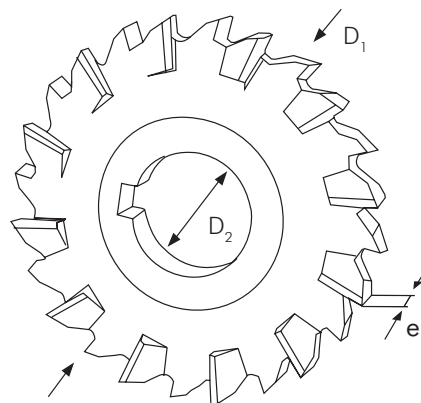
Frescos

Rosos



Ref. FF56

HSSCo

DIN  
885A

				FF56
D1 mm	e mm	D2 mm	Z	€
50	4,0	16	12	79,26
50	5,0	16	12	79,26
50	6,0	16	12	91,85
50	8,0	16	12	89,45
50	10,0	16	12	98,50
63	1,6	22	16	189,53
63	2,0	22	16	167,81
63	2,5	22	16	171,30
63	3,0	22	16	176,00
63	4,0	22	12	91,46
63	5,0	22	12	91,46
63	6,0	22	12	94,04
63	8,0	22	12	102,48
63	10,0	22	12	110,27
63	12,0	22	12	117,74
63	14,0	22	12	126,82
63	16,0	22	12	133,49
63	18,0	22	12	159,48
80	1,6	27	20	189,43
80	2,0	27	20	184,01
80	2,5	27	20	187,07
80	3,0	27	20	183,36
80	4,0	27	20	196,47
80	5,0	27	14	124,25
80	6,0	27	14	127,18
80	8,0	27	14	134,21
80	10,0	27	14	143,64
80	12,0	27	14	153,76
80	14,0	27	14	164,41
80	16,0	27	14	168,21
80	18,0	27	14	180,44
80	20,0	27	14	198,40

				FF56
D1 mm	e mm	D2 mm	Z	€
100	1,6	32	24	226,61
100	2,0	32	24	225,38
100	2,5	32	24	225,17
100	3,0	32	24	218,62
100	4,0	32	24	235,69
100	5,0	32	24	249,86
100	6,0	32	16	174,65
100	8,0	32	16	178,34
100	10,0	32	16	184,88
100	12,0	32	16	199,13
100	14,0	32	16	219,23
100	16,0	32	16	229,94
100	18,0	32	16	253,46
100	20,0	32	16	253,46
100	22,0	32	16	284,12
100	25,0	32	16	309,07
125	1,6	32	26	286,59
125	2,0	32	26	275,65
125	2,5	32	26	282,51
125	3,0	32	26	289,38
125	4,0	32	26	310,02
125	5,0	32	26	331,85
125	6,0	32	26	340,05
125	8,0	32	18	275,46
125	10,0	32	18	282,65
125	12,0	32	18	293,36
125	14,0	32	18	318,58
125	16,0	32	18	338,28
125	18,0	32	18	357,82
125	20,0	32	18	380,70
125	22,0	32	18	433,49
125	25,0	32	18	437,68
125	28,0	32	18	478,38

				FF56
D1 mm	e mm	D2 mm	Z	€
160	2,0	40	30	461,28
160	2,5	40	30	444,07
160	3,0	40	30	452,61
160	4,0	40	30	478,25
160	5,0	40	30	506,45
160	6,0	40	30	543,78
160	8,0	40	30	620,67
160	10,0	40	22	456,58
160	12,0	40	22	456,58
160	14,0	40	22	454,35
160	16,0	40	22	497,24
160	18,0	40	22	523,94
160	20,0	40	22	537,82
160	22,0	40	22	591,15
160	25,0	40	22	640,55
160	28,0	40	22	704,12
160	32,0	40	22	752,85
200	12,0	40	24	696,47
200	14,0	40	24	703,29
200	16,0	40	24	724,55
200	18,0	40	24	760,21
200	20,0	40	24	813,05
200	22,0	40	24	815,72
200	25,0	40	24	946,22
200	28,0	40	24	976,13
200	32,0	40	24	1217,38



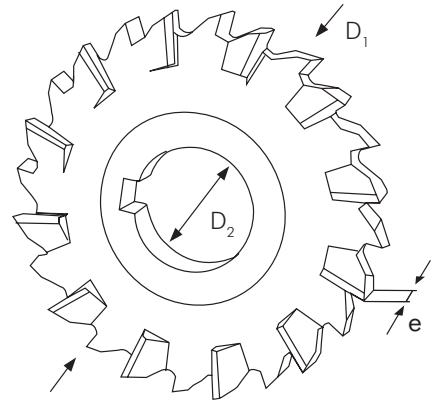
**FRESA PARA RANURAR HSSCo DE 3 CORTES CON DIENTE RECTO**



Ref. FF59

**HSSCo**

**DIN  
885B**



Fresas

Rosa

				FF59
D1 mm	e mm	D2 mm	Z	€
50	4	16	16	79,01
50	5	16	16	79,01
50	6	16	16	91,57
50	8	16	16	89,18
50	10	16	16	98,20
63	4	22	18	92,05
63	5	22	18	92,05
63	6	22	18	93,27
63	8	22	18	101,40
63	10	22	18	109,11
63	12	22	18	116,87
63	14	22	18	125,87
63	16	22	18	133,13
63	18	22	18	159,00
80	5	27	20	123,82
80	6	27	20	127,08
80	8	27	20	134,11
80	10	27	20	143,16
80	12	27	20	153,28
80	14	27	20	163,92
80	16	27	20	168,18
80	18	27	20	180,40
80	20	27	20	198,36

				FF59
D1 mm	e mm	D2 mm	Z	€
100	6	32	22	172,88
100	8	32	22	177,79
100	10	32	22	184,29
100	12	32	22	198,47
100	14	32	22	218,52
100	16	32	22	231,51
100	18	32	22	253,41
100	20	32	22	253,41
100	22	32	22	283,27
100	25	32	22	309,87
125	8	32	24	275,30
125	10	32	24	282,48
125	12	32	24	293,19
125	14	32	24	318,40
125	16	32	24	334,74
125	18	32	24	357,71
125	20	32	24	380,59
125	22	32	24	433,37
125	25	32	24	437,57
125	28	32	24	478,24

				FF59
D1 mm	e mm	D2 mm	Z	€
160	10	40	28	456,45
160	12	40	28	456,45
160	14	40	28	454,22
160	16	40	28	497,09
160	18	40	28	523,79
160	20	40	28	537,67
160	22	40	28	590,98
160	25	40	28	640,37
160	28	40	28	703,92
160	32	40	28	752,63
200	12	40	30	696,27
200	14	40	30	703,09
200	16	40	30	724,35
200	18	40	30	760,00
200	20	40	30	812,82
200	22	40	30	815,50
200	25	40	30	945,96
200	28	40	30	975,86
200	32	40	30	1217,04

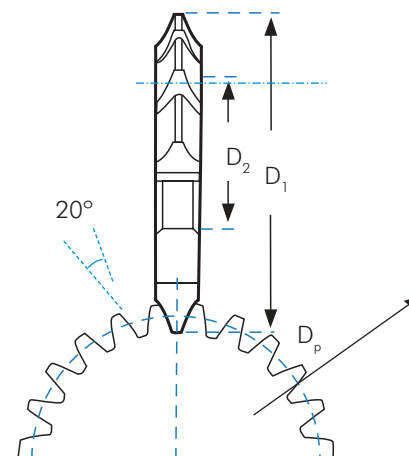
**FRESA DE MÓDULO PARA TALLADO DE ENGRANAJES**

Frescos

Rosa

**HSS**

Ref. 99RFM



$$\text{Mód.} = \frac{\varnothing\text{Ext}}{(Z+2)}$$

				<b>99RFM</b>
MÓDULO FRESA	D <sub>1</sub> mm	D <sub>2</sub> mm		€
0,50	40	16		81,85
0,70	40	16		81,85
0,75	40	16		81,85
0,80	40	16		81,85
1,00	50	16		81,85
1,25	50	16		81,85
1,50	56	22		81,85
1,75	56	22		81,85
2,00	63	22		81,85
2,25	63	22		95,93
2,50	63	22		95,93
2,75	71	27		95,93
3,00	71	27		95,93
3,25	71	27		126,59
3,50	80	27		126,59
3,75	80	27		126,59
4,00	80	27		126,59
4,50	90	32		173,51
5,00	90	32		173,51
6,00	100	32		219,70
7,00	100	32		219,70

**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-∞

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

**FRESAS CILÍNDRICAS, FRONTALES CON CHAVETERO TRANSVERSAL HSSCo**

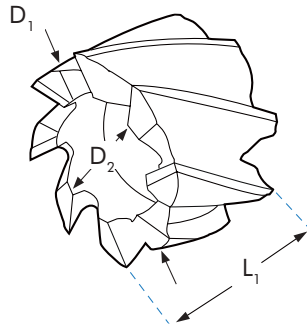


Ref. FF87

**HSSCo**

**DIN 1880**

ACABADO



				<b>FF87</b>
D1 mm	D2 mm	L1 mm	Z	€
40	16	32	8	104,23
50	22	36	8	143,41
63	27	40	8	195,96
80	27	45	10	277,36
100	32	50	12	446,52
125	40	56	14	717,08
160	50	63	16	1.281,57



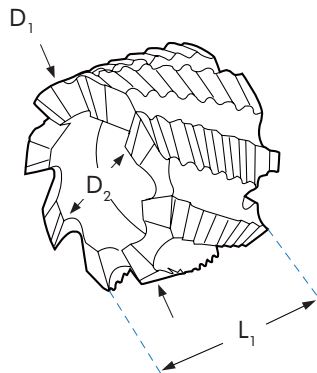
Ref. FF88

**HSSCo**

**DIN 1880**



DESBASTE



				<b>FF88</b>
D1 mm	D2 mm	L1 mm	Z	€
40	16	32	6	150,96
50	22	36	6	187,46
63	27	40	8	248,37
80	27	45	8	365,07
100	32	50	10	602,31
125	40	56	12	1.021,83
160	50	63	14	1.773,04

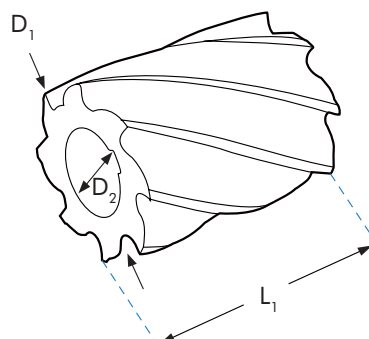


Ref. FF89

**HSSCo**

**DIN 884**

CILÍNDRICA PARA PLANEAR



				<b>FF89</b>
D1 mm	D2 mm	L1 mm	Z	€
50	22	40	8	122,56
50	22	63	8	130,59
50	22	80	8	194,67
63	27	50	8	171,37
63	27	70	8	208,49
80	32	63	8	288,83
80	32	100	8	424,60
100	40	70	10	449,37

**FRESAS CILÍNDRICAS, FRONTALES PARA PLANEAR CON MANGO**

Fresos

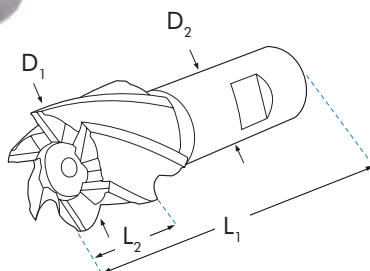
Rosos



Ref. FMF87

**HSSCo**  
**8%**

ACABADO



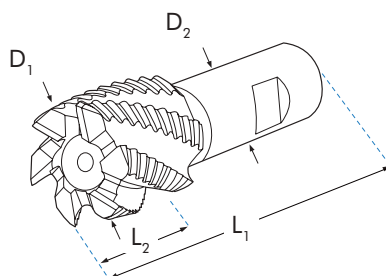
					<b>FMF87</b>
D <sub>1</sub> mm	L <sub>2</sub> mm	L <sub>1</sub> mm	D <sub>2</sub> mm	Z	€
30	30	90	20	6	151,94
35	30	90	20	6	174,38
40	32	95	25	8	217,33



Ref. FMF88

**HSSCo**  
**8%**


DESBASTE



					<b>FMF88</b>
D <sub>1</sub> mm	L <sub>2</sub> mm	L <sub>1</sub> mm	D <sub>2</sub> mm	Z	€
30	30	90	20	6	175,65
35	30	90	20	6	225,03
40	32	95	25	8	275,67

**FRESAS SEMICIRCULARES, ANGULARES ISÓSCELES HSSCo**

Fresas

Rosa

Ref. FF77

HSSCo

DIN 847

45°



Ref. FF78

HSSCo

DIN 847

60°

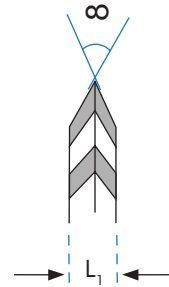
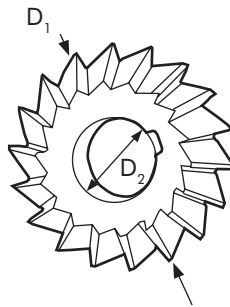


Ref. FF79

HSSCo

DIN 847

90°

					FF77							FF78							FF79	
D1	D2	L1	∞	Z	€	D1	D2	L1	∞	Z	€	D1	D2	L1	∞	Z	€			
mm	mm	mm				mm	mm	mm				mm	mm	mm						
50	16	8	45°	20	139,14	50	16	10	60°	18	141,87	50	16	14	90°	16	141,87			
63	22	10	45°	22	165,50	63	22	14	60°	20	168,75	63	22	20	90°	18	168,75			
80	27	12	45°	24	231,07	80	27	18	60°	22	235,60	80	27	22	90°	20	235,60			
100	32	18	45°	26	288,88	100	32	25	60°	24	294,55	100	32	32	90°	22	294,55			

Ref. FF91

HSSCo

DIN 842

50°

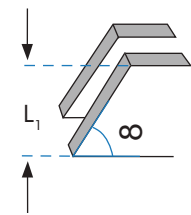
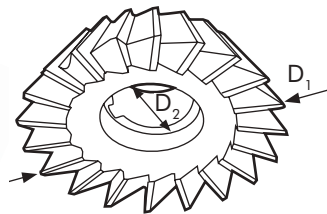


Ref. FF90

HSSCo

DIN 842

60°

D1	D2	L1	∞	Z	€
mm	mm	mm			
40	10	13	50°	14	110,02
50	13	16	50°	16	135,67
63	16	20	50°	18	171,50
80	22	25	50°	20	247,09
100	27	32	50°	22	358,37
125	32	40	50°	24	591,80
160	40	50	50°	30	1.035,21

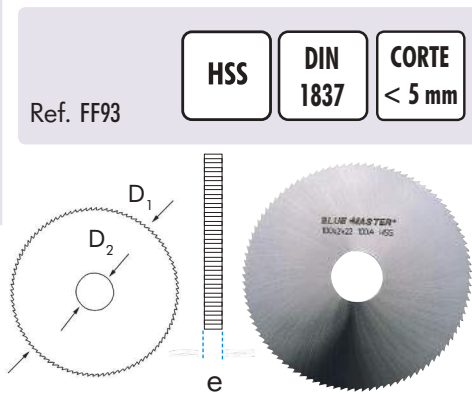
D1	D2	L1	∞	Z	€
mm	mm	mm			
40	10	13	60°	14	107,88
50	13	16	60°	16	133,04
63	16	20	60°	18	168,17
80	22	25	60°	20	242,30
100	27	32	60°	22	351,40
125	32	40	60°	24	580,32
160	40	50	60°	30	1.015,12



**SIERRA CIRCULAR PARA METAL, CORTE FINO hasta 5 mm**

Frescos

Rosos



Ref. FF93

HSS

DIN  
1837CORTE  
< 5 mm

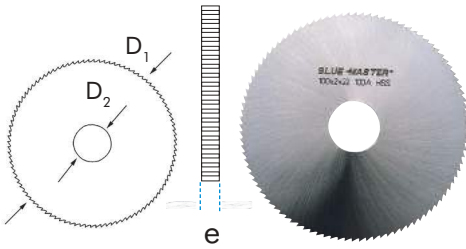
				FF93
D1 mm	e mm	D2 mm	Z	€
20	0,20	5	80	13,39
20	0,25	5	64	13,39
20	0,30	5	64	12,03
20	0,40	5	64	12,03
20	0,50	5	48	11,57
20	0,60	5	48	11,57
20	0,80	5	48	11,57
20	1,00	5	40	11,57
20	1,20	5	40	13,39
20	1,60	5	40	14,72
20	2,00	5	32	15,29
20	2,50	5	32	18,41
20	3,00	5	32	19,91
20	4,00	5	24	26,33
20	5,00	5	24	30,87
20	6,00	5	24	35,17
25	0,20	8	80	13,73
25	0,25	8	80	13,73
25	0,30	8	80	12,79
25	0,40	8	64	12,79
25	0,50	8	64	12,19
25	0,60	8	64	12,19
25	0,80	8	48	12,19
25	1,00	8	48	12,19
25	1,20	8	48	14,01
25	1,60	8	40	14,96
25	2,00	8	40	16,01
25	2,50	8	40	17,34
25	3,00	8	32	23,54
25	4,00	8	32	27,94
25	5,00	8	32	32,70
25	6,00	8	32	36,64
32	0,20	8	100	14,68
32	0,25	8	100	14,68
32	0,30	8	80	13,39
32	0,40	8	80	13,39
32	0,50	8	80	12,78
32	0,60	8	64	12,78
32	0,80	8	64	12,78
32	1,00	8	64	12,78
32	1,20	8	48	14,99
32	1,60	8	48	15,07
32	2,00	8	48	16,99
32	2,50	8	40	18,39
32	3,00	8	40	20,50
32	4,00	8	40	29,85
32	5,00	8	32	36,36
32	6,00	8	32	38,47

				FF93					FF93
D1 mm	e mm	D2 mm	Z	€	D1 mm	e mm	D2 mm	Z	€
40	0,20	10	128	15,87	100	0,50	22	160	28,37
40	0,25	10	100	15,87	100	0,60	22	160	26,03
40	0,30	10	100	15,28	100	0,80	22	128	26,03
40	0,40	10	100	15,28	100	1,00	22	128	26,03
40	0,50	10	80	14,28	100	1,20	22	128	27,06
40	0,60	10	80	14,28	100	1,60	22	100	32,54
40	0,80	10	80	14,28	100	2,00	22	100	35,88
40	1,00	10	64	14,28	100	2,50	22	100	40,32
40	1,20	10	64	15,36	100	3,00	22	80	43,67
40	1,60	10	64	16,30	100	4,00	22	80	59,48
40	2,00	10	48	17,65	100	5,00	22	80	66,49
40	2,50	10	48	19,71	100	6,00	22	64	77,74
40	3,00	10	48	23,29	125	0,60	22	160	42,37
40	4,00	10	40	27,01	125	0,80	22	160	39,64
40	5,00	10	40	40,94	125	1,00	22	160	39,64
40	6,00	10	40	44,96	125	1,20	22	128	39,64
50	0,20	13	128	21,62	125	1,60	22	128	41,46
50	0,25	13	128	18,94	125	2,00	22	128	43,85
50	0,30	13	128	17,22	125	2,50	22	100	46,43
50	0,40	13	100	17,22	125	3,00	22	100	51,63
50	0,50	13	100	16,30	125	4,00	22	100	77,12
50	0,60	13	100	16,30	125	5,00	22	80	90,18
50	0,80	13	80	16,30	125	6,00	22	80	100,64
50	1,00	13	80	16,30	160	1,00	32	160	60,75
50	1,20	13	80	17,22	160	1,20	32	160	55,76
50	1,60	13	64	18,77	160	1,60	32	160	57,59
50	2,00	13	64	20,27	160	2,00	32	128	59,48
50	2,50	13	64	21,71	160	2,50	32	128	66,23
50	3,00	13	48	24,85	160	3,00	32	128	75,22
50	4,00	13	48	28,76	160	4,00	32	100	106,18
50	5,00	13	48	38,10	160	5,00	32	100	126,08
50	6,00	13	40	50,92	160	6,00	32	100	143,79
63	0,25	16	160	23,08	200	1,00	32	200	80,36
63	0,30	16	128	19,61	200	1,20	32	200	80,36
63	0,40	16	128	19,61	200	1,60	32	160	79,73
63	0,50	16	128	18,85	200	2,00	32	160	84,43
63	0,60	16	100	18,85	200	2,50	32	160	96,25
63	0,80	16	100	18,85	200	3,00	32	128	107,74
63	1,00	16	100	18,85	200	4,00	32	128	152,70
63	1,20	16	80	19,48	200	5,00	32	128	181,44
63	1,60	16	80	21,75	200	6,00	32	100	208,43
63	2,00	16	80	23,43	250	1,60	32	200	114,80
63	2,50	16	64	24,72	250	2,00	32	200	117,00
63	3,00	16	64	27,42	250	2,50	32	160	133,75
63	4,00	16	64	34,51	250	3,00	32	160	147,54
63	5,00	16	48	43,67	250	4,00	32	160	213,91
63	6,00	16	48	48,81	250	5,00	32	128	254,93
80	0,30	22	160	25,82	250	6,00	32	128	302,06
80	0,40	22	160	25,82	315	2,50	40	200	209,52
80	0,50	22	128	22,43	315	3,00	40	200	235,20
80	0,60	22	128	22,43	315	4,00	40	160	303,82
80	0,80	22	128	22,43	315	5,00	40	160	371,91
80	1,00	22	100	22,43	315	6,00	40	160	440,02
80	1,20	22	100	23,12					
80	1,60	22	100	24,50					
80	2,00	22	80	26,97					
80	2,50	22	80	32,28					
80	3,00	22	80	35,20					
80	4,00	22	64	43,16					
80	5,00	22	64	53,00					
80	6,00	22	64	59,48					

**SIERRA CIRCULAR PARA METAL, CORTE GRUESO a partir de 5 mm**

Ref. FF94

<b>HSS</b>	<b>DIN 1838</b>	<b>CORTE &gt; 5 mm</b>
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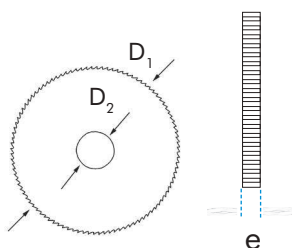


FF94					FF94					FF94				
D1 mm	e mm	D2 mm	Z	€	D1 mm	e mm	D2 mm	Z	€	D1 mm	e mm	D2 mm	Z	€
50	0,5	13	48	18,51	100	0,6	22	80	27,10	200	1,2	32	100	64,33
50	0,6	13	48	18,51	100	0,8	22	64	25,58	200	1,6	32	80	77,85
50	0,8	13	40	18,51	100	1,0	22	64	25,58	200	2,0	32	80	83,51
50	1,0	13	40	18,51	100	1,2	22	64	26,56	200	2,5	32	80	94,15
50	1,2	13	40	19,35	100	1,6	22	48	32,04	200	3,0	32	64	105,68
50	1,6	13	32	21,05	100	2,0	22	48	35,24	200	4,0	32	64	148,38
50	2,0	13	32	21,92	100	2,5	22	48	39,58	200	5,0	32	64	176,64
50	2,5	13	32	23,30	100	3,0	22	40	42,66	200	6,0	32	48	205,32
50	3,0	13	24	25,18	100	4,0	22	40	58,26	250	1,6	32	100	108,12
50	4,0	13	24	32,62	100	5,0	22	40	65,18	250	2,0	32	100	115,51
50	5,0	13	24	40,64	100	6,0	22	32	76,28	250	2,5	32	80	131,19
50	6,0	13	20	44,34	125	0,8	22	80	38,90	250	3,0	32	80	145,42
63	0,5	16	64	20,47	125	1,0	22	80	38,90	250	4,0	32	80	212,78
63	0,6	16	48	20,47	125	1,2	22	64	38,90	250	5,0	32	64	248,81
63	0,8	16	48	20,47	125	1,6	22	64	40,91	250	6,0	32	64	294,51
63	1,0	16	48	20,47	125	2,0	22	64	42,62	315	2,5	40	100	206,48
63	1,2	16	40	20,76	125	2,5	22	48	45,51	315	3,0	40	100	230,65
63	1,6	16	40	23,47	125	3,0	22	48	50,24	315	4,0	40	80	297,95
63	2,0	16	40	25,29	125	4,0	22	48	75,33	315	5,0	40	80	361,92
63	2,5	16	32	26,42	125	5,0	22	40	88,43	315	6,0	40	80	440,80
63	3,0	16	32	29,28	125	6,0	22	40	98,17					
63	4,0	16	32	35,42	160	1,0	32	80	54,98					
63	5,0	16	24	42,76	160	1,2	32	80	55,02					
63	6,0	16	24	47,90	160	1,6	32	80	56,84					
80	0,6	22	64	22,79	160	2,0	32	64	58,34					
80	0,8	22	64	22,79	160	2,5	32	64	64,92					
80	1,0	22	48	22,79	160	3,0	32	64	74,19					
80	1,2	22	48	23,51	160	4,0	32	48	103,84					
80	1,6	22	48	25,26	160	5,0	32	48	123,67					
80	2,0	22	40	26,57	160	6,0	32	48	139,78					
80	2,5	22	40	31,66										
80	3,0	22	40	34,52										
80	4,0	22	32	42,22										
80	5,0	22	32	51,80										
80	6,0	22	32	57,92										

**SIERRAS CIRCULARES PARA MÁQUINAS TRONZADORAS**

Frescos

Rosca



Ref. FF68



Ref. FF69

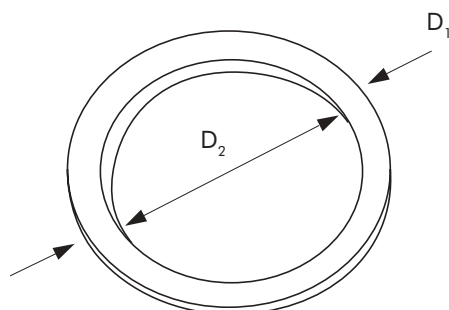


Ref. FF70

			FF68	FF69	FF70		
MATERIAL			HSS	HSSCo	HSS		
ACABADO			OX	BRILLANTE	TiN		
D1 mm	e mm	D2 mm	€	€	€	Z	
175	2,0	32	83,15	108,09	108,53	70	70/90/110/140/180
200	1,8/2"	32	85,55	116,57	127,04	70	80/100/128/160/200
225	1,6	32	94,55	122,90	136,65	90	90/120/140/180/220
225	2,0	32/40	89,90	116,87	131,68	90	
250	1,2	32/40	119,27	155,04	163,15	110	
250	1,6	32/40	103,24	134,20	150,78	110	90/100/128/160/200/250
250	2,0	32/40	101,88	132,46	148,59	90	
250	2,5	32/40	110,18	149,58	161,69	90	
275	1,6	32/40	136,33	177,24	185,00	110	
275	2,0	32/40	134,10	182,08	182,08	95	90/110/120/140/180/220/280
275	2,5	32/40	139,56	181,43	187,91	95	
300	2,0	32	164,81	214,25	222,16	95	
300	2,5	32	168,55	219,12	224,32	95	90/120/160/180/220/300
300	3,0	32	203,77	264,89	244,72	95	
315	2,0	32	179,79	233,74	242,54	100	
315	2,5	32	180,55	234,70	242,54	100	80/100/120/160/200/240/320
315	3,0	32	218,45	283,97	268,02	100	
350	2,5	32/40/50	230,73	299,96	308,82	120	90/110/120/140/160/180/220
350	3,0	32/40/50	259,20	336,96	335,02	120	280/350
370	3,0	50	326,61	424,62	415,15	120	90/110/120/140/160/200/220
400	3,0	40/50	380,56	494,74	466,14	120	
400	3,5	40/50	415,02	539,54	485,07	120	100/120/160/200/240/310
425	3,0	40/50	428,52	557,07	582,66	120	
425	3,5	40/50	468,96	609,66	600,15	120	110/160/220/260/320
450	3,0	40/50	557,36	724,56	672,98	120	
450	3,5	40/50	605,30	786,89	718,14	130	
450	4,0	40/50	636,76	827,80	764,75	130	110/130/160/200/260/310
500	3,5	40/50	779,10	1.012,83	954,11	130	
500	4,0	40/50	824,05	1.071,26	1.000,72	130	100/120/140/180/220/340
525	4,0	50	936,43	1.217,36	1.089,57	140	100/140/160/210/270/330
550	4,0	50	981,37	1.275,78	1.172,86	150/210	120/140/170/220/280/340

**CASQUILLOS**

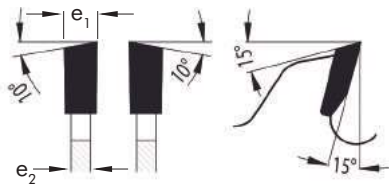
		CRS
D1 mm	D2 mm	€
32	20,0	11,72
32	25,4	11,72
40	25,4	11,72
40	32,0	11,72



**SIERRAS CIRCULARES CON DIENTES DE METAL DURO**

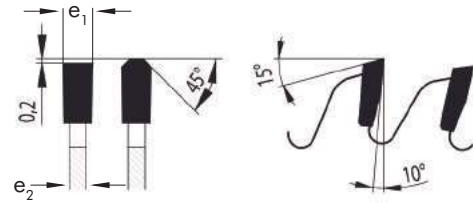
Ref. S1CM

SIERRA UNIVERSAL  
PARA CORTE TRANSVERSAL



Ref. S2CM

SIERRA PARA CORTE  
DE PANELES LAMINADOS



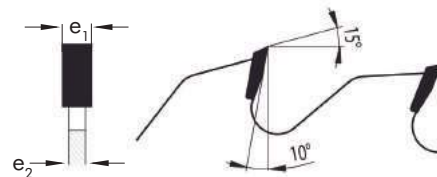
	S1CM					
	D1 mm	e1 mm	e2 mm	D2 mm	Z	€
S1CM160202516	160	2,5	1,6	20	16	41,53
S1CM160202524	160	2,5	1,6	20	24	47,94
S1CM160202536	160	2,5	1,6	20	36	53,91
S1CM160202548	160	2,5	1,6	20	48	62,39
S1CM180202528	180	2,5	1,6	20	28	56,18
S1CM180202556	180	2,5	1,6	20	56	70,63
S1CM200202524	200	2,5	1,6	20	24	52,04
S1CM200202532	200	2,5	1,6	20	32	60,32
S1CM250303240	250	3,2	2,2	30	40	83,06
S1CM250303248	250	3,2	2,2	30	48	89,42
S1CM250303260	250	3,2	2,2	30	60	91,30
S1CM250303264	250	3,2	2,2	30	64	93,57
S1CM250303272	250	3,2	2,2	30	72	101,85
S1CM250303280	250	3,2	2,2	30	80	110,09
S1CM300303248	300	3,2	2,2	30	48	97,70
S1CM300303264	300	3,2	2,2	30	64	110,09
S1CM300303272	300	3,2	2,2	30	72	114,23
S1CM300303296	300	3,2	2,2	30	96	128,73
S1CM315303248	315	3,2	2,2	30	48	110,09
S1CM350303654	350	3,6	2,5	30	54	124,59
S1CM350303672	350	3,6	2,5	30	72	135,09
S1CM350303684	350	3,6	2,5	30	84	141,31
S1CM3503036108	350	3,6	2,5	30	108	160,09
S1CM400303648	400	3,6	2,5	30	48	106,47
S1CM400303664	400	3,6	2,5	30	64	143,38
S1CM400303684	400	3,6	2,5	30	84	160,09
S1CM400303696	400	3,6	2,5	30	96	166,12
S1CM4003036120	400	3,6	2,5	30	120	176,62
S1CM45030456	450	4	2,8	30	56	126,85
S1CM45030472	450	4	2,8	30	72	176,62
S1CM50030464	500	4	2,8	30	64	155,76
S1CM50030484	500	4	2,8	30	84	207,65
S1CM600305290	600	5,2	3,5	30	90	502,65
S1CM70030460	700	4	3	30	60	373,15

	S2CM					
	D1 mm	e1 mm	e2 mm	D2 mm	Z	€
S2CM200303264	200	3,2	2,2	30	64	103,92
S2CM250303260	250	3,2	2,2	30	60	112,16
S2CM250303280	250	3,2	2,2	30	80	132,83
S2CM300303272	300	3,2	2,2	30	72	132,83
S2CM300303272HP*	300	3,2	2,2	30	72*	132,83
S2CM300303296	300	3,2	2,2	30	96	157,84
S2CM3503036108	350	3,6	2,5	30	108	178,70

\* Alto Rendimiento

Ref. S3CM

SIERRA PARA RANURAR



	S3CM					
	D1 mm	e1 mm	e2 mm	D2 mm	Z	€
S3CM150303512	150	3,5	2,5	30	12	53,38
S3CM15030412	150	4	2,5	30	12	55,26
S3CM15030512	150	5	3,5	30	12	57,33
S3CM15030612	150	6	3,5	30	12	57,33
S3CM18030416	180	4	2,5	30	16	63,12
S3CM18030516	180	5	3,5	30	16	65,18
S3CM18030616	180	6	3,5	30	16	67,06
S3CM20030432	200	4	2,5	30	32	83,78

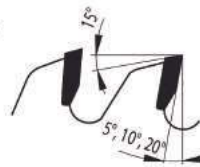
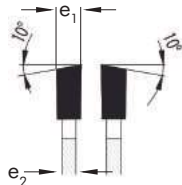


**SIERRAS CIRCULARES CON DIENTES DE METAL DURO**

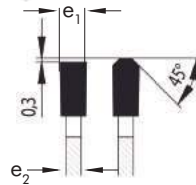
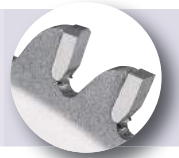
Frescos

Rosos

Ref. S4CM

HOJAS PARA SIERRA  
ELECTROPORTATIL

Ref. S5CM

SIERRA PARA PERFILES  
DE ALUMINIO Y PVC

						S4CM
	D1 mm	e1 mm	e2 mm	D2 mm	Z	€
S4CM127202610	127	2,6	1,6	20	10	29,67
S4CM127202620	127	2,6	1,6	20	20	41,53
S4CM127202636	127	2,6	1,6	20	36	49,62
S4CM130202610	130	2,6	1,6	20	10	31,55
S4CM130202620	130	2,6	1,6	20	20	41,53
S4CM130202636	130	2,6	1,6	20	36	51,31
S4CM140202610	140	2,6	1,6	20	10	31,55
S4CM140202620	140	2,6	1,6	20	20	43,41
S4CM140202642	140	2,6	1,6	20	42	54,11
S4CM150202612	150	2,6	1,6	20	12	35,51
S4CM150202624	150	2,6	1,6	20	24	43,41
S4CM150202640	150	2,6	1,6	20	40	55,99
S4CM150202648	150	2,6	1,6	20	48	62,78
S4CM160202612	160	2,6	1,6	20	12	35,51
S4CM160202624	160	2,6	1,6	20	24	43,41
S4CM160202640	160	2,6	1,6	20	40	58,82
S4CM160202648	160	2,6	1,6	20	48	63,30
S4CM170302612	170	2,6	1,6	30	12	37,58
S4CM170302624	170	2,6	1,6	30	24	45,48
S4CM170302640	170	2,6	1,6	30	40	56,18
S4CM170302654	170	2,6	1,6	30	54	69,33
S4CM180302612	180	2,6	1,6	30	12	37,58
S4CM180302624	180	2,6	1,6	30	24	45,48
S4CM180302640	180	2,6	1,6	30	40	57,33
S4CM180302656	180	2,6	1,6	30	56	71,40
S4CM184302612	184	2,6	1,6	30	12	37,58
S4CM184302624	184	2,6	1,6	30	24	45,48
S4CM184302640	184	2,6	1,6	30	40	59,21
S4CM184302656	184	2,6	1,6	30	56	71,21
S4CM190302614	190	2,6	1,6	30	14	41,53
S4CM190302624	190	2,6	1,6	30	24	47,36
S4CM190302630	190	2,6	1,6	30	30	53,38
S4CM190302640	190	2,6	1,6	30	40	63,12
S4CM190302656	190	2,6	1,6	30	56	71,40
S4CM200302816	200	2,8	1,8	30	16	45,48
S4CM200302830	200	2,8	1,8	30	30	57,33
S4CM200302840	200	2,8	1,8	30	40	67,06
S4CM200302864	200	2,8	1,8	30	64	88,50
S4CM210302818	210	2,8	1,8	30	18	49,43
S4CM210302832	210	2,8	1,8	30	32	59,21
S4CM210302840	210	2,8	1,8	30	40	77,04
S4CM210302864	210	2,8	1,8	30	64	93,37
S4CM216302824	216	2,8	1,8	30	24	59,21
S4CM216302848	216	2,8	1,8	30	48	77,04
S4CM216302864	216	2,8	1,8	30	64	93,37
S4CM230302820	230	2,8	1,8	30	20	51,31
S4CM230302834	230	2,8	1,8	30	34	65,18
S4CM230302848	230	2,8	1,8	30	48	78,92
S4CM230302864	230	2,8	1,8	30	64	93,37

						S5CM
	D1 mm	e1 mm	e2 mm	D2 mm	Z	€
S5CM160202848	160	2,8	2,2	20	48	65,80
S5CM190302856	190	2,8	2,2	30	56	75,18
S5CM200303260	200	3,2	2,5	30	60	92,19
S5CM250303280	250	3,2	2,5	30	80	127,91
S5CM260303280	260	3,2	2,5	30	80	130,39
S5CM300303296	300	3,2	2,5	30	96	150,37
S5CM330303296	330	3,2	2,5	30	96	166,90
S5CM3503036108	350	3,6	2,8	30	108	180,45
S5CM3803036110	380	3,6	2,8	30	110	194,06
S5CM4003036120	400	3,6	2,8	30	120	203,09

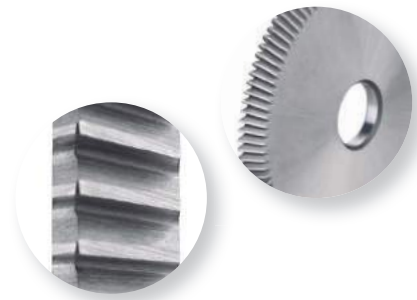


# FRESAS LLAVES



**FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA**
**FRESAS DE SERRETA O BICÓNICAS**


Ref. SLLP01



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	mm		mm	$\beta^\circ$	Z	mm	€
SLLU01	U01	UNOCODE/ULTRACODE	HSSV	60,4	9,52	5,25	80	72	0,5	111,11
SLLU01W	U01W	UNOCODE/ULTRACODE	MD	60,4	9,52	5,25	80	72	0,5	355,00
SLLP21	P21	SILCA DELTA	HSSV	60,4	9,52	5,25	84	72	0,5	95,45
SLLP01	P01	BRAVO / POKER / REKORD / BRAVO SUPER / SUPER MASTER	HSSV	80	16	5	84	110	1	75,22
SLLP01/120	P01/120		HSSV	80	16	5	84	120	1	99,36
SLLP01W	P01W		MD	80	16	5	84	110	1	278,99

**SIERRAS CIRCULARES DE CORTE LATERAL**


Ref. SLLSG2



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	mm		mm	Z	€
SLLY2KW	Y2KW	DELTA	MD	63	16	1,35	80	255,66
SLLSG19	SG19	DELTA	HSSV	64,6	9,52	1,5	40	72,25
SLLSG19W	SG19W	DELTA	MD	64,6	9,52	1,5	40	243,34
SLLSG18	SG18	DELTA	HSSV	64,6	9,52	2,4	40	72,25
SLLSG18W	SG18W	DELTA	MD	64,6	9,52	2,4	40	243,34
SLLSG6	SG6	LANCER	HSSV	80	22	1,3	100	74,25
SLLSG6W	SG6W	LANCER	MD	80	22	1,3	100	255,66
SLLSG2	SG2	TARGA/TECH3/TECNICA	HSSV	80	22	1,5	100	74,25
SLLSG2W	SG2W	TARGA/TECH3/TECNICA	MD	80	22	1,5	100	255,66
SLLFSL4-CAW	FSCL4-CAW	DELTA	MD	80	22	1,8	100	265,77

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

**SIERRAS PARA LLAVES DE GORJAS**



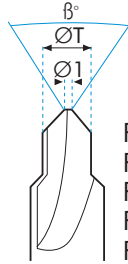
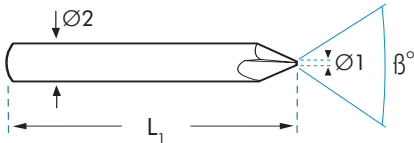
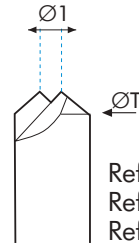
Ref. SLLSG7W


								SLL
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL				Z	€
				mm	mm	mm		
SLLSG14W	SG14W	DELTA	MD	60,4	9,52	1,14	80	204,45
SLLGB1	GB1	ULTRACODE / UNOCODE	HSSV	60,4	9,52	1,7	66	75,00
SLL05	05	UNOCODE/ULTRACODE	HSSV	60,4	9,52	1,8	68	75,00
SLL05W	05W	UNOCODE/ULTRACODE	MD	60,4	9,52	1,8	68	214,56
SLLCU-15C	CU-15C	OPERA /TARGA	MD	63	16	1,5	80	279,48
SLLSG17	SG17	DELTA	HSSV	64,6	9,52	1,8	70	75,00
SLLSG17W	SG17W	DELTA	MD	64,6	9,52	1,8	70	235,67
SLLSG13	SG13	UNOCODE / DELTA	HSSV	64,6	9,52	2	70	75,00
SLLSG13W	SG13W	UNOCODE / DELTA	MD	64,6	9,52	2	70	279,48
SLL06	06	UNOCODE/ULTRACODE	HSSV	64,6	9,52	2,4	70	75,00
SLL06W	06W	UNOCODE/ULTRACODE	MD	64,6	9,52	2,4	70	227,88
SLLSG3	SG3	OPERA /TARGA/TECH3	HSSV	80	22	1	100	71,35
SLLSG3W	SG3W	OPERA /TARGA/TECH3	MD	80	22	1	100	235,67
SLLSG4	SG4	OPERA /TARGA/TECH3	HSSV	80	22	1,25	100	71,35
SLLSG4W	SG4W	OPERA /TARGA/TECH3	MD	80	22	1,25	100	235,67
SLLSG5	SG5	LANCER	HSSV	80	22	1,3	100	71,35
SLLSG5W	SG5W	LANCER	MD	80	22	1,3	100	235,67
SLLSG7	SG7	OPERA / TARGA	HSSV	80	22	1,4	100	71,35
SLLSG7M35	SG7M35	OPERA / TARGA	HSSCo	80	22	1,4	100	91,35
SLLSG7W	SG7W	LANCER	MD	80	22	1,4	100	235,67
SLLSG1	SG1	OPERA /TARGA/TECH3	HSSV	80	22	1,5	100	71,35
SLLSG1W	SG1W	OPERA /TARGA/TECH3	MD	80	22	1,5	100	235,67
SLLSG8	SG8	TECH3 / TECHNICA	HSSV	80	22	1,75	100	71,35
SLLSG10	SG10	LANCER	HSSV	80	22	2	100	71,35
SLLSG10W	SG10W	LANCER/ OPERA /TARGA	MD	80	22	2	100	245,67
SLLSG11	SG11	SILCA GT40	HSSV	80	22	2,3	100	71,35
SLLSG12	SG12	TARGA/TECH3/TECHNICA/OPERA	HSSV	80	22	2,5	100	71,35
SLLSG58400	SG58400	DELTA	MD	80	22	4	100	225,67
SLLPL1	PL1	PRIMA LASER	HSSV	100	22	1	100	123,11
SLLPL1W	PL1W	PRIMA LASER	MD	100	22	1	100	315,87
SLLPL1,25	PL1,25	PRIMA LASER	HSSV	100	22	1,25	100	123,11
SLLPL1,25W	PL1,25W	PRIMA LASER	MD	100	22	1,25	100	301,22
SLLPL1,5	PL1,5	PRIMA LASER	HSSV	100	22	1,5	100	123,11
SLLPL1,5W	PL1,5W	PRIMA LASER	MD	100	22	1,5	100	301,22
SLLPL1,7W	PL1,7W	PRIMA LASER	MD	100	22	1,7	100	310,45
SLLPL2,0	PL2.0	PRIMA LASER	HSSV	100	22	2	100	123,11
SLLPL2,0W	PL2.0W	PRIMA LASER	MD	100	22	2	100	310,45



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


Ref. SLLF1W


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

 Ref. SLLF12B  
 Ref. SLLF15  
 Ref. SLLF37

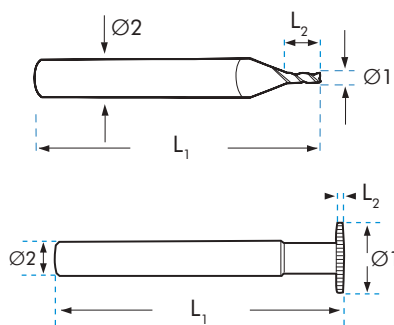

									SLL
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	 β°	Ø1 mm	L1 mm	Ø2 mm	Z	€
SLLF1Z1	F1	MATRIX	HSSV	90°	0,7	48	6	1	47,72
SLLF1	F1	MATRIX	HSSV	90°	0,7	48	6	2	47,72
SLLF1W	F1W	MATRIX	MD	90°	0,7	48	6	1	85,31
SLLF4	F4	MATRIX	HSSV	90°	0,4	48	6	1	47,72
SLLF5	F5	MATRIX	HSSV	90°	0,9	48	6	1	47,72
SLLF6	F6	MATRIX	HSSV	106°	1	48	6	1	47,72
SLLF7	F7	MATRIX	HSSV	72°	0,8	48	6	2	47,74
SLLF12A	F12A	MATRIX	HSSV	100°	0,4	48	6	1	47,72
SLLF12B	F12B	MATRIX	HSSV	90°	8 x 1,8*	48	6	2	47,72
SLLF13	F13	MATRIX	HSSV	90°	0,77	48	6	1	47,72
SLLF14	F14	MATRIX	HSSV	90°	0,9	48	6	1	47,72
SLLF15	F15	MATRIX	HSSV	90°	8 x 0,8*	48	6	1	54,69
SLLF19	F19	MATRIX	HSSCo	90°	2,2 x 0,6*	48	6	1	47,74
SLLF19-CAZ1	F19-CA	MATRIX	MD	90°	2,2 x 0,6*	48	6	1	85,31
SLLF20	F20	MATRIX	HSSV	90°	0,45	48	6	2	47,72
SLLF21	F21	MATRIX	HSSCo	85°	3,2 x 0,8*	48	6	1	54,69
SLLF23	F23	MATRIX	HSSV	90°	4 x 0,8	48	6	1	54,69
SLLF24	F24	MATRIX	HSSV	100°	1,3	48	6	1	47,72
SLLF25	F25	MATRIX	HSSV	90°	3,5 x 0,65*	48	6	1	47,72
SLLF26	F26	MATRIX	HSSV	82°	0,8	48	6	1	47,72
SLLF27-CA	F27-CA	MATRIX	MD	60°	2,4 x 1,9*	48	6	1	113,97
SLLF28	F28	MATRIX	HSSV	76°	0,76	48	6	1	47,72
SLLF29	F29	MATRIX	HSSV	76°	1,9 x 0,76*	48	6	1	47,72
SLLF34	F34	MATRIX	HSSV	50°	1,5	48	6	1	47,72
SLLF34-CAZ1	F34-CA	MATRIX	MD	50°	1,5	48	6	1	85,31
SLLF37	F37	MATRIX	HSSV	90°	6 x 2,1*	48	6	2	54,69
SLLF39	F39	MATRIX	HSSV	90°	0,6	48	6	2	57,96
SLLF42	F42	MATRIX	HSSV	100°	0,7	48	6	1	47,72
SLLF43	F43	MATRIX	HSSCo	90°	1	48	6	1	47,72
SLLF45	F45	MATRIX	HSSV	130°	0,56	48	6	1	47,74
SLLF46	F46	MATRIX	HSSV	100°	0,65	48	6	1	47,74
SLLF49	F49	MATRIX	HSSV	95°	0,8	48	6	1	54,69
SLLF50	F50	MATRIX	HSSV	100°	0,5	48	6	1	54,69
SLLF52-CA	F52-CA	MATRIX	MD	54°	0,86	48	6	2	47,72
SLLF59	F59	MATRIX	HSSV	90°	0,8	48	6	2	47,72

 \* Ø<sub>T</sub> x Ø<sub>1</sub>

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

**FRESAS PARA LLAVES DE REGATA**

**MATRIX**



\*Ref.SLLF62W



Ref. SLLF3



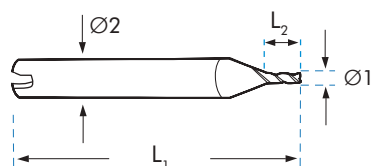
Fresos

Rosa

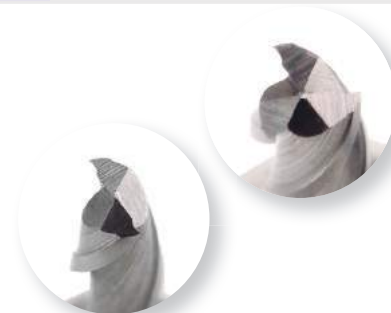
SLL									
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø1 mm	L1 mm	Ø2 mm	L2 mm	Z	€
SLLF3	F3	MATRIX	HSSV	1,5	48	6	2	3	47,72
SLLF8	F8	MATRIX	HSSV	4	48	6	13	3	47,72
SLLF11	F11	MATRIX	HSSV	2,5	48	6	7	3	47,72
SLLF22	F22	MATRIX	HSSV	2,5	42	6	6	3	47,72
SLLF30	F30	MATRIX	HSSV	3	48	6	6	3	47,72
SLLF30Z2	F30	MATRIX	HSSV	3	48	6	6	2	56,09
SLLF44	F44	MATRIX	HSSV	2	40	6	6	3	47,72
SLLF62W*	F62W	MATRIX	MD	11,8	48	6	1	20	152,35

**FRESAS PARA LLAVES DE REGATA**

**QUATTROCODE /TRIAX-E**



Ref. SLLW133

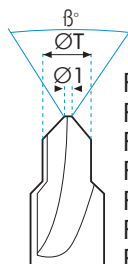
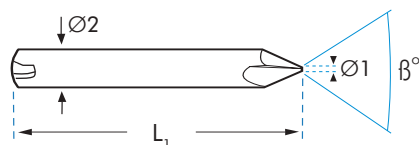
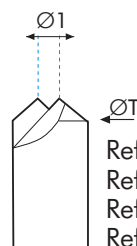


SLL									
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø1 mm	L1 mm	Ø2 mm	L2 mm	Z	€
SLLW101	W101	QUATTROCODE /TRIAX-E	MD	2,5	40	6	6	3	108,86
SLLW114	W114	QUATTROCODE /TRIAX-E	MD	2	40	6	6	3	108,88
SLLW117	W117	QUATTROCODE /TRIAX-E	MD	5	48	6	R1	4	88,36
SLLW129	W129	QUATTROCODE /TRIAX-E	MD	3	40	6	6	3	108,86
SLLW131	W131	QUATTROCODE /TRIAX-E	MD	6	40	6	5	3	80,36
SLLW133	W133	QUATTROCODE /TRIAX-E	MD	1,5	40	6	3	3	118,89
SLLW134	W134	QUATTROCODE /TRIAX-E	MD	4	40	6	7	3	108,88
SLLW219	W219	QUATTROCODE /TRIAX-E	MD	1,2	40	6	2	3	108,86
SLLW235	W235	QUATTROCODE /TRIAX-E	MD	1,1	40	6	2	3	108,83
SLLW268	W268	QUATTROCODE /TRIAX-E	MD	1,5	40	6	6	2	108,94



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


Ref. SLLW103


 Ref. SLLW112  
 Ref. SLLW115  
 Ref. SLLW128  
 Ref. SLLW135  
 Ref. SLLW145  
 Ref. SLLW210  
 Ref. SLLW213

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

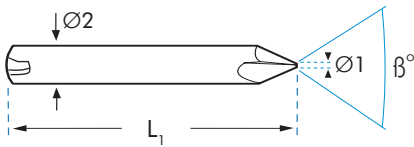

SLL									
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	$\beta^\circ$	$\varnothing_1$ mm	L <sub>1</sub> mm	$\varnothing_2$ mm	Z	€
SLLW102	W102	QUATTROCODE / TRIAX-E	MD	106°	1	40	6	2	76,41
SLLW103	W103	QUATTROCODE / TRIAX-E	MD	90°	0,8	40	6	2	76,41
SLLW104	W104	QUATTROCODE / TRIAX-E	MD	90°	1,2	40	6	2	76,41
SLLW105	W105	QUATTROCODE / TRIAX-E	MD	90°	0,7	40	6	2	76,41
SLLW106	W106	QUATTROCODE / TRIAX-E	MD	90°	0,6	40	6	2	76,41
SLLW107	W107	QUATTROCODE / TRIAX-E	MD	90°	0,9	40	6	2	76,41
SLLW108	W108	QUATTROCODE / TRIAX-E	MD	82°	0,9	40	6	2	76,41
SLLW109	W109	QUATTROCODE / TRIAX-E	MD	110°	0,4	40	6	2	76,41
SLLW110	W110	QUATTROCODE / TRIAX-E	MD	100°	0,6	40	6	2	76,41
SLLW111	W111	QUATTROCODE / TRIAX-E	MD	96°	8x2,75*	40	6	2	85,83
SLLW112	W112	QUATTROCODE / TRIAX-E	MD	60°/0°	1,5*	40	6	2	76,90
SLLW113	W113	QUATTROCODE / TRIAX-E	MD	100°	0,76	40	6	2	76,41
SLLW115	W115	QUATTROCODE / TRIAX-E	MD	54°	0,86*	40	6	1	102,43
SLLW116	W116	QUATTROCODE / TRIAX-E	MD	90°	1	40	6	2	76,41
SLLW118	W118	QUATTROCODE / TRIAX-E	MD	120°	0,6	40	6	2	76,41
SLLW119	W119	QUATTROCODE / TRIAX-E	MD	85°	0,3	40	6	2	76,41
SLLW121	W121	QUATTROCODE / TRIAX-E	MD	86°	0,05	48	6	3	106,31
SLLW122	W122	QUATTROCODE / TRIAX-E	MD	90°	0,55	40	6	2	91,69
SLLW123	W123	QUATTROCODE / TRIAX-E	MD	76°	0,9	40	6	2	76,41
SLLW124	W124	QUATTROCODE / TRIAX-E	MD	90°	8x0,8	48	6	3	146,46
SLLW126	W126	QUATTROCODE / TRIAX-E	MD	80°	3,3*	48	6	2	91,69
SLLW127	W127	QUATTROCODE / TRIAX-E	MD	80°	6x2,1*	48	6	2	91,69
SLLW128	W128	QUATTROCODE / TRIAX-E	MD	90°	0,75*	48	6	1	102,43
SLLW130	W130	QUATTROCODE / TRIAX-E	MD	90°	1,4	40	6	2	102,86
SLLW132	W132	QUATTROCODE / TRIAX-E	MD	60°	2	40	6	1	102,43
SLLW135	W135	QUATTROCODE / TRIAX-E	MD	90°	4x0,55*	40	6	2	102,36
SLLW136	W136	QUATTROCODE / TRIAX-E	MD	76°	2,23	40	6	1	102,43
SLLW138	W138	QUATTROCODE / TRIAX-E	MD	90°	4x0,7	48	6	2	76,41
SLLW139	W139	QUATTROCODE / TRIAX-E	MD	60°/50°	6x0,9*	40	6	2	113,97
SLLW142	W142	QUATTROCODE / TRIAX-E	MD	100°	1,2	40	6	2	76,41
SLLW145	W145	QUATTROCODE / TRIAX-E	MD	90°	3,2x0,8*	48	6	2	102,36
SLLW210	W210	QUATTROCODE / TRIAX-E	MD	90°	5x1,05*	40	6	3	153,31
SLLW213	W213	QUATTROCODE / TRIAX-E	MD	90°	0,95*	40	6	2	115,36
SLLW221	W221	QUATTROCODE / TRIAX-E	MD	90°	0,5	40	6	2	102,86
SLLW225	W225	QUATTROCODE / TRIAX-E	MD	90°	1	40	6	2	102,86
SLLW238	W238	QUATTROCODE / TRIAX-E	MD	90°	0,8	40	6	2	76,41
SLLW261	W261	QUATTROCODE / TRIAX-E	MD	1,1	1,5	48	6	2	115,36
SLLW255	W255	QUATTROCODE / TRIAX-E	MD	90°	4x0,8	48	6	2	102,86
SLLW293	W293	QUATTROCODE / TRIAX-E	MD	90°	0,85	40	6	2	102,86

 \*  $\varnothing_7 \times \varnothing_1$

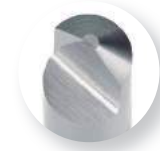
**FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO SILCA**

**FRESAS DE PUNTEAR**

**QUATTROCODE / TRIAX-E**

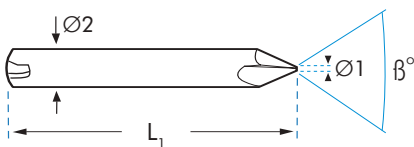


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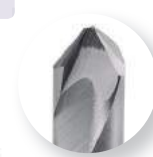


SLL									
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	$\beta^\circ$	$\varnothing_1$ mm	L1 mm	$\varnothing_2$ mm	Z	€
SLLW102Z1	W102 Z1	QUATTROCODE / TRIAX-E	MD	106°	1	40	6	2	76,90
SLLW103Z1	W103 Z1	QUATTROCODE / TRIAX-E	MD	90°	0,8	40	6	2	76,90
SLLW104Z1	W104 Z1	QUATTROCODE / TRIAX-E	MD	90°	1,2	40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

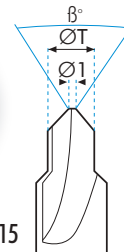
**FRESAS DE PUNTEAR**



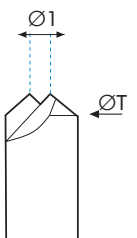
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Ref. SLLH115

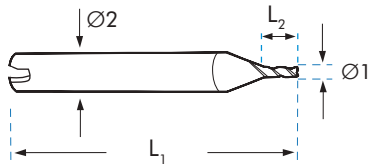


Ref. SLLH111  
Ref. SLLH126  
Ref. SLLH127



SLL									
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	$\beta^\circ$	$\varnothing_1$ mm	L1 mm	$\varnothing_2$ mm	Z	€
SLLH103	H103	QUATTROCODE / TRIAX-E	HSSV	90°	0,8	40	6	2	56,37
SLLH104	H104	QUATTROCODE / TRIAX-E	HSSV	90°	1,2	40	6	2	50,36
SLLH105	H105	QUATTROCODE / TRIAX-E	HSSV	90°	0,7	40	6	2	50,36
SLLH106	H106	QUATTROCODE / TRIAX-E	HSSV	90°	0,6	40	6	2	47,72
SLLH107	H107	QUATTROCODE / TRIAX-E	HSSV	90°	0,9	40	6	2	47,72
SLLH108	H108	QUATTROCODE / TRIAX-E	HSSV	82°	0,9	40	6	2	47,72
SLLH110	H110	QUATTROCODE / TRIAX-E	HSSV	100°	0,6	40	6	2	47,72
SLLH111	H111	QUATTROCODE / TRIAX-E	HSSV	96°	2,75*	40	6	2	47,72
SLLH112	H112	QUATTROCODE / TRIAX-E	HSSV	60°	1,5	40	6	2	47,72
SLLH113	H113	QUATTROCODE / TRIAX-E	HSSV	100°	0,76	40	6	2	47,72
SLLH115	H115	QUATTROCODE / TRIAX-E	HSSV	54°	0,86*	40	6	1	47,72
SLLH116	H116	QUATTROCODE / TRIAX-E	HSSV	90°	1	40	6	2	62,99
SLLH118	H118	QUATTROCODE / TRIAX-E	HSSV	120°	0,6	40	6	1	47,72
SLLH119	H119	QUATTROCODE / TRIAX-E	HSSV	85°	0,3	40	6	2	47,72
SLLH122	H122	QUATTROCODE / TRIAX-E	HSSV	90°	0,55	40	6	2	47,72
SLLH126	H126	QUATTROCODE / TRIAX-E	HSSV	80°	3,3*	48	6	2	71,23
SLLH127	H127	QUATTROCODE / TRIAX-E	HSSV	80°	2,1*	48	6	2	71,23
SLLH128	H128	QUATTROCODE / TRIAX-E	HSSV	90°	0,75	48	6	2	47,72

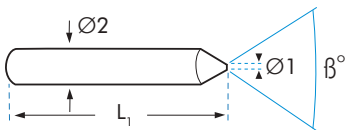
\*  $\varnothing_T \times \varnothing_1$

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


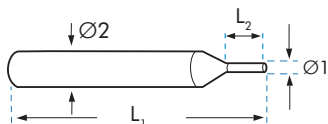
Ref. SLLH101



										SLL
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø1 mm	L1 mm	Ø2 mm	L2 mm	Z		€
SLLH101	H101	QUATTROCODE / TRIAX-E	HSSV	2,5	40	6	6	3		56,06
SLLH114	H114	QUATTROCODE / TRIAX-E	HSSV	2	40	6	6	3		47,72
SLLH117	H117	QUATTROCODE / TRIAX-E	HSSV	5	48	6	R1	4		57,90
SLLH129	H129	QUATTROCODE / TRIAX-E	HSSV	3	40	6	6	3		47,72
SLLH131	H131	QUATTROCODE / TRIAX-E	HSSV	6	40	6	5	3		62,99

**PALPADORES**


Ref. SLLT1



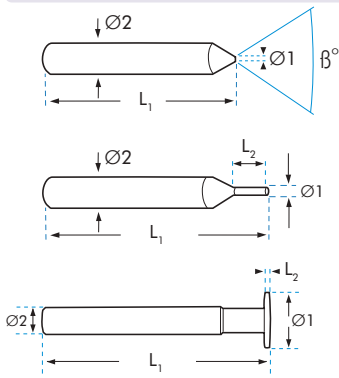
Ref. SLLT3



												SLL
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	Ref. FRESA	MATERIAL	β°	Ø1 mm	L1 mm	Ø2 mm	L2 mm	ØT mm		€
SLLT1	T1	MATRIX	F1	HSSV	90°	0,7	48	6	-	-		33,32
SLLT2	T2	MATRIX	F2	HSSV	88°	1,6	48	6	-	-		37,53
SLLT3	T3	MATRIX	F3	HSSV	-	1,5	48	6	3	-		37,53
SLLT4	T4	MATRIX	F4	HSSV	90°	0,4	48	6	-	-		37,53
SLLT5	T5	MATRIX	F5	HSSV	90°	0,9	48	6	-	-		37,53
SLLT6	T6	MATRIX	F6	HSSV	106°	1	48	6	15	-		37,53
SLLT7	T7	MATRIX	F7	HSSV	72°	0,8	48	6	2	-		37,53
SLLT8	T8	MATRIX	F8	HSSV	-	4	48	6	12	-		37,53
SLLT11	T11	MATRIX	F11	HSSV	-	2,5	48	6	6	-		37,53
SLLT12A	T12A	MATRIX	F12A	HSSV	100°	0,4	48	6	-	-		37,53
SLLT12B	T12B	MATRIX	F12B	HSSV	90°	8 x 1,8*	48	6	-	-		37,53
SLLT13	T13	MATRIX	F13	HSSV	90°	0,77	48	6	-	-		37,53
SLLT14	T14	MATRIX	F1	HSSV	90°	0,7	48	6	-	-		37,53
SLLT15	T15	MATRIX	F15	HSSV	90°	8 x 0,8	48	6	-	-		37,53
SLLT19	T19	MATRIX	F19	HSSV	90°	2,2 x 0,6*	48	6	-	-		37,53
SLLT20	T20	MATRIX	F20	HSSV	90°	0,45	48	6	-	-		37,53
SLLT21	T21	MATRIX	F21	HSSV	85°	3,2 x 0,8*	48	6	-	-		37,53
SLLT22	T22	MATRIX	F22	HSSV	-	2,5	42	6	6	-		37,53
SLLT23	T23	MATRIX	F23	HSSV	90°	4 x 0,8	48	6	5	-		37,53

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

**PALPADORES**



\*Ref. SLLT62W



Ref. SLLT1



Ref. SLLT3



Fresas

Rosa

											<b>SLL</b>
Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	Ref. FRESA	MATERIAL	β°	Ø1 mm	L1 mm	Ø2 mm	L2 mm	ØT mm	€
SLLT24	T24	MATRIX	F24	HSSV	100°	1,3	48	6	-	-	37,53
SLLT25	T25	MATRIX	F25	HSSV	90°	3,5 x 0,65*	48	6	-	-	37,53
SLLT26	T26	MATRIX	F26	HSSV	82°	0,8	48	6	-	-	37,53
SLLT27	T27	MATRIX	F27	HSSV	60°	1,28	48	6	-	-	42,36
SLLT28	T28	MATRIX	F28	HSSV	76°	0,76	48	6	-	-	37,53
SLLT29	T29	MATRIX	F29	HSSV	76°	1,9 x 0,76*	48	6	-	-	37,53
SLLT30	T30	MATRIX	F30	HSSV	-	3	48	6	10	-	37,53
SLLT30-45	T30-45	MATRIX		HSSV	-	3	45	6	10	-	37,53
SLLT33	T33	MATRIX	F33	HSSV	48°	1,4	48	6	-	-	55,96
SLLT34	T34	MATRIX	F34	HSSV	50°	1,5	48	6	-	-	37,53
SLLT37	T37	MATRIX	F37	HSSV	90°	6 x 2,1*	48	6	-	-	37,53
SLLT39	T39	MATRIX	F39	HSSV	90°	0,6	48	6	-	-	37,53
SLLT40	T40	MATRIX	F40	HSSV	108°	0,4	48	6	-	-	37,53
SLLT42	T42	MATRIX	F42	HSSV	100°	0,7	48	6	-	-	37,53
SLLT43	T43	MATRIX	F43	HSSV	90°	1	48	6	-	-	37,53
SLLT44	T44	MATRIX	F44	HSSV	-	2	48	6	8	-	37,53
SLLT44-45	T44-45	MATRIX		HSSV	-	2	45	6	8	-	37,53
SLLT46	T46	MATRIX	F46	HSSV	100°	0,65	48	6	-	-	37,53
SLLT49	T49	MATRIX	F49	HSSV	95°	0,8	48	6	-	-	37,53
SLLT50	T50	MATRIX	F50	HSSV	100°	0,5	48	6	-	-	37,53
SLLT52	T52	MATRIX	F52	HSSV	54°	0,86	48	6	6	2	37,53
SLLT54	T54	MATRIX	F54	HSSV	-	4	40	6	6,5	-	47,72
SLLT55	T55	MATRIX	F55	HSSV	100°	1	48	6	4	-	37,53
SLLT59	T59	MATRIX	F59	HSSV	90°	0,8	48	6	-	-	37,53
SLLT62W*	T62W	MATRIX	F62W	MD	-	11,8	48	6	1	-	74,93
SLLT63	T63	MATRIX	F63	HSSV	78°	0,5	48	6	4	3	37,53
SLLT65	T65	MATRIX	F65	HSSV	90°	1,05	48	6	5	3	37,53
SLLT101	T101	MATRIX		HSSV	-	2,5	40	6	6	-	37,53
SLLT129	T129	MATRIX		HSSV	-	3	40	6	10	-	37,53
SLLU101	U101	QUATTROCODE		MD	-	1,2	48	6	3	-	47,72
SLLU101/H	U101/H	QUATTROCODE /TRIAX-E		MD	-	1,2	48	6	3	-	32,43
SLLU101L	U101L	QUATTROCODE /TRIAX-E		MD	-	2	48	6	6	-	47,72
SLLU102/65	U102/65	QUATTROCODE /TRIAX-E		MD	30°	0,2	48	6	9	2,6	50,97
SLLU102TT	U102TT	QUATTROCODE /TRIAX-E		MD	30°	0,2	26	4	6	2	50,97
SLLU103	U103	QUATTROCODE /TRIAX-E		MD	-	1	48	6	3	-	47,72
SLLU103/H	U103/H	QUATTROCODE /TRIAX-E		MD	-	1	48	6	3	-	32,43
SLLU103-TT	U103-TT	QUATTROCODE /TRIAX-E		MD	-	1	21	4	3	-	47,72
SLLU103-TT/H	U103-TT/H	QUATTROCODE /TRIAX-E		MD	-	1	21	4	3	-	32,43
SLLU111	U111	SILCA VIPER		MD	-	1	40	6	2,2	-	47,72
SLLU111/H	U111/H	SILCA VIPER		MD	-	1	40	6	2,2	-	32,43
SLLB3304	B3304	KEYLINE BIANCHI 994 LASER		MD	-	1	33	6	6	-	47,74
SLLB3310	B3310	KEYLINE BIANCHI 994 LASER		MD	-	1	30	6	2,6	-	47,74
SLLB3310M2	B3310	KEYLINE BIANCHI 994 LASER		HSSV	-	1	30	6	2,6	-	35,36

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


Ref. FLLFP4



Fresos

Rosos

Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	mm		mm	β°	Z	mm	€
FLLFP1 (FLL02)	FP1	OREGON	HSSV	25	10	10	100°	60	0,1	78,36
FLLFP2W	FP2W	VIRGINIA	MD	40	10	6	70°	70	0,1	308,18
FLLFP3 (FLL04)	FP3	KIS, SPRINT	HSSV	50	12	6	90°	80	0,15	95,36
FLLFP4 (FLL06)	FP4	KIS	HSSV	53	12,7	6,35	45/15°	72	0,6	98,36
FLLFP5	FP5	JMA	HSSV	57	12,7	5	90°	80	0,15	122,58
FLLFP6 (FLL09)	FP6	KIS, SPRINT	HSSV	60	12,7	5	84°	140	0,1	95,36
FLLFP11ECCO (FLL11)	FP11/ECCO-009	ECCO, ECCO-PLUS	HSSV	63	16	5	84°	80	1	91,23
FLLFP11W	FP11W	ECCO, ECCO-PLUS	MD	63	16	5	84°	80	1	278,99
FLLFP12	FP12	TUCSON	HSSV	63	16	5	80°	80	1,25	98,36
FLLFP12W	FP12W	TUCSON	MD	63	16	5	80°	80	1,25	301,25
FLLFP13	FP13	DALLAS	HSSV	63	16	5	84°	100	1	122,47
FLLCU14	CU14	ECCO, ECCO-PLUS	HSSV	63	16	5	80°	80	1,25	120,02
FLLFP16 (FLL13)	FP16	PROCEDURE	HSSV	70	16	5,25	76°	100	1	122,47
FLLFP16W	FP16W	PROCEDURE	MD	70	16	5,25	76°	100	1	301,25
SLLP01	FP24 DAKOTA = P01	DAKOTA, ERREBI	HSSV	80	16	5	84°	110	1	75,22
FLLFP24 (FLL16)	FP24 ERREBI	SARATOGA, NEVADA, DENVER, TITAN, VIENNA	HSSV	80	16	5	84°	110	1,25	75,22
FLLFP24W	FP24W ERREBI	SARATOGA, NEVADA, DENVER, TITAN, VIENNA	MD	80	16	5	84°	110	1,25	278,99

FLL






**FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA**

**SIERRAS CIRCULARES DE CORTE LATERAL**



Ref. FLLFP19



								<b>FLL</b>	
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	 mm	 mm	 mm	Z	€	
FLLFP7	FP7	ECCO BIT, DETROIT	HSSV	63	16	1,25	80	95,36	
FLLFP7W	FP7W	ECCO BIT, DETROIT	MD	63	16	1,25	80	243,34	
FLLFP8 (FLL:19)	FP8	ECCO BIT, DETROIT	HSSV	63	16	1,4	80	60,02	
FLLFP17	FP17	TITAN BIT, SARATOGA, YAKARTA	HSSV	80	16	1,25	100	69,69	
FLLFP17W	FP17W	TITAN BIT, SARATOGA, YAKARTA	MD	80	16	1,25	100	255,66	
FLLFP18	FP18	ATLANTA, TOPEKA	HSSV	80	22	1,25	100	95,36	
FLLFP18W	FP18W	ATLANTA, TOPEKA	MD	80	22	1,25	100	255,66	
FLLFP19 (FLL:21)	FP19	SARATOGA, YAKARTA, TITAN BIT, DAKOTA	HSSV	80	16	1,4	100	72,25	
FLLFP19W	FP19W	SARATOGA, YAKARTA, TITAN BIT, DAKOTA	MD	80	16	1,4	100	239,45	
FLLFP20 (FLL:22)	FP20	ATLANTA, TOPEKA	HSSV	80	22	1,4	100	72,25	
FLLFP21 (FLL:24)	FP21	ATLANTA, TOPEKA, DUPLEX, KANSAS	HSSV	80	22	1,5	100	74,25	
FLLFP21W	FP21W	ATLANTA, TOPEKA, DUPLEX, KANSAS	MD	80	22	1,5	100	260,66	

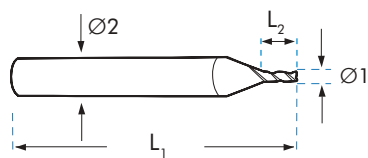
**SIERRAS PARA LLAVES DE GORJAS**



Ref. FLLFP22W



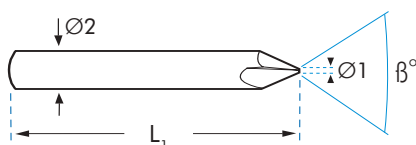
								<b>FLL</b>	
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	 mm	 mm	 mm	Z	€	
FLLFP9	FP9	ECCO BIT	HSSV	63	16	1	80	64,56	
FLLFP10	FP10	ECCO FORD, ECCO ABBLOY, PASADENA, NEBRASCA	HSSV	63	16	2,4	80	64,56	
FLLFP22	FP22	TITAN BIT, DAKOTA, SARATOGA	HSSV	80	16	1	100	68,87	
FLLFP22W	FP22W	TITAN BIT, DAKOTA, SARATOGA	MD	80	16	1	100	235,67	
FLLFP23	FP23	DUPLEX, ATLANTA, TOPEKA	HSSV	80	22	1	100	71,35	
FLLFP23W	FP23W	DUPLEX, ATLANTA, TOPEKA	MD	80	22	1	100	235,67	
FF68801416100CO	-	TITAN , DAKOTA, SARATOGA, YAKARTA	HSSCo	80	16	1,4	100	69,36	
FLLFP26 (FLL23)	FP26	G, SENNA, DAKOTA, SARATOGA, YAKARTA	HSSV	80	16	1,5	100	72,34	
FLLFP26W	FP26W	G, SENNA, DAKOTA, SARATOGA,	MD	80	16	1,5	100	238,98	

**FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA**
**FRESAS PARA LLAVES DE REGATA**


Ref. FLLF3



Ref. BM		Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	Ø <sub>1</sub> mm	L <sub>1</sub> mm	Ø <sub>2</sub> mm	L <sub>2</sub> mm	Z	FLL
										€
FLLF3Z3	(FLL32)	≈ F3	ALBANY ARIZONA COLUMBIA DAKAR DAKAR EXPRESS DAY T-COL DAYTONA X CODE	HSSCo 8%	1,5	45	6	3	3	34,00
FLLF3	(FLL44)	F3		HSSCo 8%	1,5	45	6	3	2	31,82
FLLF3W	(FLL45)	F3W		MD	1,5	45	6	3	2	103,45
FLLF33	(FLL53)	F33		HSSCo 8%	2	45	6	4	3	30,72
FLL11Z3	(FLL33)	≈ F11		HSSCo 8%	2,5	45	6	5	3	30,72
FLLF11	(FLL48)	F11		HSSCo 8%	2,5	45	6	5	2	27,49
FLLF11W	(FLL49)	F11W		MD	2,5	45	6	5	2	78,31
FLLF17	(FLL34)	F17		HSSCo 8%	3	45	6	6	3	30,72
FLLF8Z3	(FLL35)	≈ F8		HSSCo 8%	4	45	6	6	3	35,76
FLLF8	(FLL46)	F8		HSSCo 8%	4	45	6	7	2	31,82
FLLF8W	(FLL47)	F8W		MD	4	45	6	6	2	97,09
FLLF77	(FLL36)	-		HSSCo 8%	5	45	6	7	3	35,76
FLLF78	(FLL37)	-		HSSCo 8%	6	45	6	8	3	35,76
FLLF78W	(FLL54)	-		MD	6	45	6	8	3	78,31
FLLF78WZ4	(FLL55)	-		MD	6	45	6	8	4	78,31

**FRESAS DE PUNTEAR**


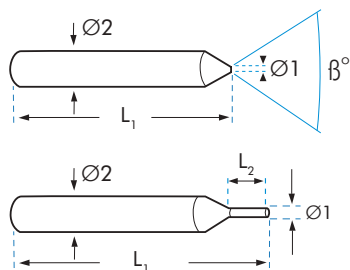
Ref. FLLF1



Ref. BM		Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	β°	Ø <sub>1</sub> mm	L <sub>1</sub> mm	Ø <sub>2</sub> mm	Z	FLL
										€
FLLF1	(FLL43)	F1	ALBANY ARIZONA CAPRI COLUMBIA DAKAR DAKAR EXPRESS DAY T-COL DAYTONA X CODE	HSSCo	90°	0,8	45	6	-	20,94
FLLF1W	(FLL42)	F1W		MD	90°	0,8	45	6	-	64,88
FLLF5	(FLL52)	F5		HSSCo	90°	0,9	45	6	-	20,94
FLLF5W	(FLL42)	F5W		MD	90°	0,9	45	6	-	64,88
FLLF13	(FLL50)	F13		HSSCo	100°	0,8	45	6	-	20,94
FLLF13W	(FLL51)	F13W		MD	100°	0,8	45	6	-	60,70

**PALPADORES PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO JMA**

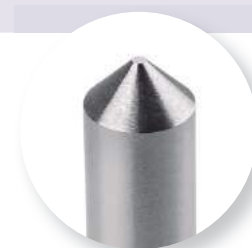
**PALPADORES**



Ref. FLLP1



Ref. FLLP3



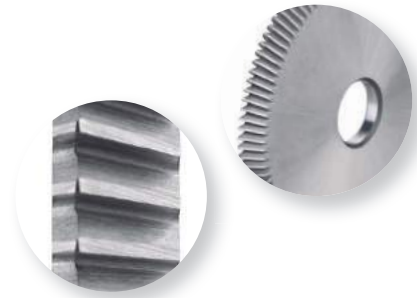
FLL										
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	$\beta^\circ$	$\varnothing_1$ mm	L <sub>1</sub> mm	$\varnothing_2$ mm	L <sub>2</sub> mm	€	
FLLP1	(PLL38)	P1	HSSV	90°	0,8	45	6	-	17,05	
FLLP3	(PLL32)	P3	HSSV	-	1,5	45	6	4	30,16	
FLLP5		P5	HSSV	90°	0,9	45	6	-	17,05	
FLLP8	(PLL35)	P8	HSSV	-	4	45	6	7	30,16	
FLLP11	(PLL33)	P11	HSSV	-	2,5	45	6	4	30,16	
FLLP13	(PLL50)	P13	HSSV	100°	0,8	45	6	-	17,05	
FLLP17	(PLL34)	P17	HSSV	-	3	45	6	6	30,16	
FLLP52	(PLL52)	-	HSSV	90°	0,9	45	6	-	17,05	
FLLP77	(PLL36)	-	HSSV	-	5	45	6	7	30,16	
FLLP78	(PLL37)	-	HSSV	-	6	45	6	8	30,16	

ALBANY  
ARIZONA  
CAPRI  
COLUMBIA  
DAKAR  
DAKAR EXPRESS  
DAY T-COL  
DAYTONA  
X CODE

**FRESAS PARA MÁQUINAS DUPLICADORAS DE LLAVES TIPO FLORA, NOVACLAU, WALKIN**
**OTRAS FRESAS DE USO GENERAL**

Frescos

Rosa



								<b>FLL</b>
Ref. BM	TIPOS DE MÁQUINAS	MATERIAL	mm		mm	Z	€	
FLL01	FLORA	HSSV	23	10	5	36	84,20	
FLL03	YALE	HSSV	40	8	5	80	91,36	
FLL05	NOVACLAU	HSSV	52	16	5	110	107,87	
FLL07	KIS	HSSV	53	12,7	6	80	120,02	
FLL08	KIS	HSSV	55	12	6	80	120,02	
FLL10	NOVACLAU	HSSV	61	12,7	6,5	140	122,20	
FLL11	NOVACLAU	HSSV	62	16	5	80	119,82	
FLL12	NOVACLAU	HSSV	63	16	5	140	119,82	
FLL14	WALKIN	HSSV	70	15	6,5	150	126,86	
FLL15	LINCE	HSSV	70	13	7	88	123,42	

**SERRETA Ó BICÓNICAS**


								<b>FLL</b>
Ref. BM	TIPOS DE MÁQUINAS	MATERIAL	mm		mm	Z	€	
FLL17	JMA-NOVACLAU-WALKIN	HSSV	35	12	3,15	50	62,96	
FLL18	JMA-NOVACLAU-WALKIN	HSSV	63	15	1,40	80	76,99	
FLL20	JMA-NOVACLAU-WALKIN	HSSV	70	16	1,40	100	95,12	

**CORTE LATERAL**