

FRESAS



BLUE-MASTER[®]
by celesa

CUTTING TECHNOLOGIES

FRESAS FRONTAIS SÉRIE CURTA DE 2 NAVALHAS DIN 327 E DIN 844

Fresas

Rosa

2Z

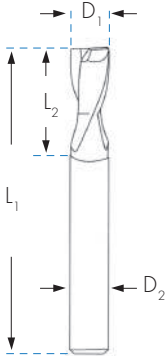
INOX

Al

TOL D2
h6

Ref. FFAL





SÉRIE CURTA



DIN 327	MATERIAL				FF01	FF02	FF60	FT02	FF92	FP05	FT12	FP08	FT01	DIN 844	FFAL
	ACABAMENTO				HSS	HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	ASP 60	ASP 60	ASP 60	ASP 60		HSSCo 8%
	QUALIDADE				BRILHANTE	BRILHANTE	TiAIN	TiAISIN	BRILHANTE	BRILHANTE	TiAISIN	BRILHANTE	TiAISIN		BRILHANTE
D1	L1	L2	D2	TOL e8	TOL e8	TOL e8	TOL e8	TOL h10	TOL e8	TOL e8	TOL h10	TOL h10	TOL e8	TOL e8	
mm	mm	mm	mm	€	€	€	€	€	€	€	€	€	€	€	
1,00	47	2,5	6							23,85	30,89	34,77	41,50		
2,00	48	4,0	6	10,84	13,73	22,52	26,26	27,95	20,12	27,46	30,69	37,73		16,61	
2,50	49	5,0	6	10,84*	13,73	22,52	26,26	29,73						16,94	
3,00	49	5,0	6	10,84	13,73	22,52	26,26	28,09	20,12	27,46	30,69	37,73		16,57	
3,50	50	6,0	6			14,91	23,68	27,59						17,58	
4,00	51	7,0	6	10,63	13,73	22,53	26,27	28,09	18,29	26,25	30,69	37,73		17,06	
4,50	52	8,0	6	10,63*	16,40	24,99	29,14	29,73						18,67	
5,00	52	8,0	6	10,63	13,73	22,53	26,27	28,09	18,29	26,25	30,69	37,73		17,06	
5,50	52	8,0	6			16,97	25,64	29,89						20,89	
6,00	52	8,0	6	10,63	13,73	22,53	26,27	28,09	18,29	26,25	30,69	37,73		18,49	
6,50	60	10,0	10	15,86*	22,21	32,13	37,46							27,33	
7,00	60	10,0	10	15,86	21,55	31,45	36,67	33,85	27,60	36,30	40,61	53,70		24,85	
7,50	61	11,0	10			21,35	31,24	36,43						29,13	
8,00	61	11,0	10	12,90	17,75	27,78	32,41	30,14	23,97	35,59	40,61	53,70		22,49	
8,50	61	11,0	10			23,98	34,75	40,52						30,71	
9,00	61	11,0	10	16,49	21,92	32,85	38,29	34,65	29,51	39,20	40,61	55,32		27,84	
9,50	63	13,0	10			23,46	34,00	39,63							
10,00	63	13,0	10	13,57	17,63	28,61	33,53	29,90	26,70	36,27	40,61	55,32		24,31	
10,50	70	13,0	12			28,18	42,80	49,21							
11,00	70	13,0	12			26,76	39,16	45,67	42,23					33,57	
12,00	73	16,0	12	17,73	23,62	35,86	41,81	39,86	34,07	46,81	55,30	70,30		30,49	
13,00	73	16,0	12			34,44	48,29	56,31	52,66					43,45	
14,00	73	16,0	12	25,22	34,44	48,29	56,31	52,66	41,53	57,40	62,49	77,79		42,65	
15,00	73	16,0	12			38,51	54,70	63,80	56,64					46,85	
16,00	79	19,0	16	26,33	34,09	50,20	58,55	57,54	51,99	68,04	73,07	90,77		45,64	
17,00	79	19,0	16			46,27	64,10	74,75						63,51	
18,00	79	19,0	16	34,49	46,27	64,16	74,83	70,08	65,84	81,15	92,62	139,90		57,01	
19,00	79	19,0	16			57,82	77,70	90,63						76,89	
20,00	88	22,0	16			54,73	74,77	87,20							
20,00	88	22,0	20	40,43	54,73	74,77	87,20	83,69	77,55	97,61	107,97	142,89		65,90	
22,00	88	22,0	20	55,46	72,29	99,09	115,54	109,52	98,77	136,91	128,22	164,10		91,74	
24,00	102	26,0	25	69,60	93,29	123,04	143,46	130,88						137,87	
25,00	102	26,0	25	69,62	90,88	117,98	137,58	120,27	131,86	164,96	168,08	207,67		116,77	
26,00	102	26,0	25			106,61	163,36	187,83						183,38	
28,00	102	26,0	25	87,21	114,76	153,09	179,38							142,09	
30,00	102	26,0	25	100,34	130,76	169,47	197,62	174,20						163,51	
32,00	112	32,0	32	104,05	134,32	172,58	201,25							173,18	
36,00	112	32,0	32	133,96	179,66	221,69	258,52								
40,00	130	38,0	40	162,87	220,62	274,10	319,64								

*Hasta fin de existencia

FRESAS FRONTAIS SÉRIE LONGA DE 2 NAVALHAS DIN 327 E DIN 844/L

2Z    **INOX** **Al** **TOL D2 h6** Ref. FFLAL 

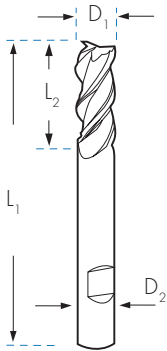
SÉRIE LONGA



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

FRESAS FRONTAIS SÉRIE CURTA DE 3 NAVALHAS DIN 844 E DIN 327
3Z

INOX
Al
**TOL D₂
h6**

SÉRIE CURTA


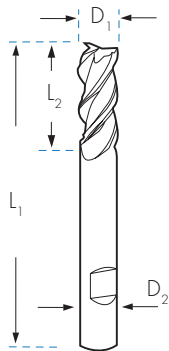
DIN 844				MATERIAL		ACABAMENTO		QUALIDADE		DESBASTE		DIN 327			ASP 60		ASP 60	
				HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	HSSCo 8%	BRILHANTE	TiAlN				TiAlSiN	BRILHANTE	TiAlSiN	★★
D ₁	L ₁	L ₂	D ₂	TOL k10	TOL k10	TOL k10	TOL k10	TOL k10	TOL k10	TOL k10	TOL k12	TOL k12	TOL k12	L ₁	L ₂	D ₂	TOL e8	TOL e8
mm	mm	mm	mm	€	€	€	€	€	€	€	€	€	€	mm	mm	mm	€	€
1,00	49	3	6											47	2,5	6	25,63	31,92
2,00	51	7	6	15,09	23,75	27,69								48	4,0	6	20,83	31,18
2,50	52	8	6	15,09	23,75	27,69								49	5,0	6		
3,00	52	8	6	15,05	23,75	27,69								49	5,0	6	20,83	31,18
3,50	55	11	6	15,55	24,19	28,36								50	6,0	6		
4,00	55	11	6	15,08	23,75	27,69								51	7,0	6	20,83	31,18
4,50	57	13	6	16,61	25,10	29,27								52	8,0	6		
5,00	57	13	6	15,08	23,86	27,83								52	8,0	6	20,83	31,18
5,50	57	13	6	20,50	32,65	38,07								52	8,0	6		
6,00	57	13	6	15,88	26,68	31,11	43,05	52,00	59,77					52	8,0	6	20,83	31,18
6,50	66	16	10	28,48	43,67	50,22								60	10,0	10		
7,00	66	16	10	22,19	32,07	37,55	50,92	62,07	71,37					60	10,0	10	28,04	38,00
7,50	69	19	10	28,69	44,13	50,75								61	11,0	10		
8,00	69	19	10	19,82	29,60	34,53	44,12	51,39	59,94					61	11,0	10	28,04	38,00
8,50	69	19	10	30,24	45,58	52,40								61	11,0	10		
9,00	69	19	10	24,75	35,50	41,39	52,36	61,46	71,67					61	11,0	10		
9,50	72	22	10	32,68	47,89	55,06								63	13,0	10		
10,00	72	22	10	21,47	32,13	37,46	44,39	54,63	63,69					63	13,0	10	29,72	39,31
11,00	79	22	12	34,10	50,71	58,31	64,06	73,80	86,08					70	13,0	12		
12,00	83	26	12	26,96	38,35	44,72	53,41	62,87	73,32					73	16,0	12	38,34	49,71
13,00	83	26	12	42,88	58,96	67,80	69,77	81,27	94,79					73	16,0	12		
14,00	83	26	12	36,73	50,30	58,66	60,95	71,71	83,63					73	16,0	12	49,67	60,54
15,00	83	26	12	44,06	61,19	70,37	77,14	84,44	93,08					73	16,0	12		
16,00	92	32	16	40,33	56,13	65,46	73,88	89,10	103,93					79	19,0	16	58,42	69,69
17,00	92	32	16	66,00	86,66	99,63								79	19,0	16		
18,00	92	32	16	50,67	68,54	79,93	80,84	98,09	114,39					79	19,0	16	71,89	85,24
19,00	92	31	16	80,71	99,70	114,65								79	19,0	16		
20,00	104	38	20	58,18	77,25	90,10	98,63	115,38	134,55					88	22,0	20	85,50	102,05
22,00	104	38	20	92,75	116,64	134,12								88	22,0	20	114,13	145,99
25,00	121	45	25	121,18	154,43	177,58	149,40	170,73	199,10					102	26,0	25	143,28	164,63
28,00	121	45	25	140,77	172,69	198,55								102	26,0	25		
30,00	121	45	25	173,17	202,82	233,20	185,79	219,21	255,64					102	26,0	25		
32,00	133	53	32	176,26	218,89	251,68								112	32,0	32		

FRESAS FRONTAIS SÉRIE LONGA DE 3 NAVALHAS DIN 844/L

3Z



SÉRIE LONGA



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

FRESAS FRONTAIS SÉRIE CURTA E LONGA VARIAS NAVALHAS DIN 844 E DIN 844/L

Fresas

Rosa

4-6 Z

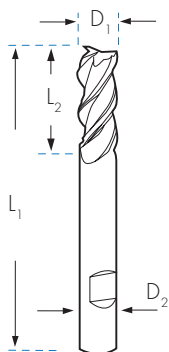


INOX

Al

TOL D1
k10TOL D2
h6

SÉRIE CURTA



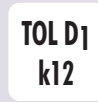
SÉRIE LONGA



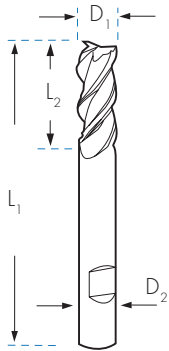
DIN 844					MATERIAL		ACABAMENTO		QUALIDADE		DIN 844/L								
D1	L1	L2	D2	Z	HSSCo 8%	HSSCo 8%	HSSCo 8%	ASP 60	ASP 60	D1	L1	L2	D2	Z	HSSCo 8%	HSSCo 8%	HSSCo 8%	ASP 60	ASP 60
					BRILHANTE	TiAIN	TiAlSiN	BRILHANTE	TiAlSiN	★★	★★★	★★★★	Premium Quality	Premium Quality	BRILHANTE	TiAIN	TiAlSiN	BRILHANTE	Premium Quality
€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€	€
1,00	49	3	6	4				28,42	33,75	52	7	6	4						
2,00	51	7	6	4	15,14	23,82	27,76	20,77	28,47	54	10	6	4	18,48	27,05	31,54	29,51		
2,50	52	8	6	4	15,14	23,82	27,76			56	12	6	4	18,38	27,05	31,54			
3,00	52	8	6	4	15,14	23,82	27,76	20,77	28,47	56	12	6	4	18,48	27,06	31,55	29,51		
3,50	55	11	6	4	15,59	24,26	28,30			59	15	6	4	24,29	32,80	38,24			
4,00	55	11	6	4	15,14	23,82	27,76	20,77	28,47	63	19	6	4	18,48	27,06	31,55	29,51		
4,50	57	13	6	4	16,64	25,15	29,32			63	19	6	4	24,29	32,80	38,24			
5,00	57	13	6	4	15,14	23,82	27,76	20,77	28,47	68	24	6	4	18,48	27,06	31,55	29,51		
5,50	57	13	6	4	24,20	32,65	38,07			68	24	6	4	24,13	32,80	38,24			
6,00	57	13	6	4	15,80	24,56	28,63	20,77	28,47	68	24	6	4	18,48	27,06	31,55	29,51		
6,50	66	16	10	4	24,15	33,99	39,63			80	30	10	4	28,04	37,62	43,88	44,02		
7,00	66	16	10	4	22,19	32,08	37,40	28,23	40,62	80	30	10	4						
7,50	69	16	10	4	28,60	38,18	44,53			88	38	10	4	25,47	33,90	39,53	44,02		
8,00	69	19	10	4	19,53	29,72	34,66	28,11	40,22	88	38	10	4						
8,50	69	19	10	4	29,82	40,38	47,10			88	38	10	4	29,02	39,52	46,09	44,02		
9,00	69	19	10	4	24,64	35,54	41,45	33,21	43,87	88	38	10	4						
9,50	69	19	10	4	31,55	42,01	48,98			88	38	10	4						
10,00	72	22	10	4	21,36	32,26	37,63	29,85	41,23	95	45	10	4	25,58	37,41	43,64	44,02		
11,00	79	22	12	4	29,71	41,98	48,96			102	45	12	4	36,34	49,30	57,51			
12,00	83	26	12	4	26,96	37,29	43,49	39,42	54,59	110	53	12	4	33,47	46,83	54,63	63,83		
13,00	83	26	12	4	38,03	51,87	60,49			110	53	12	4						
14,00	83	26	12	4	35,89	50,60	59,02	48,98	58,15	110	53	12	4	43,80	57,10	66,59	73,68		
15,00	83	26	12	4	40,99	56,55	65,95			110	53	12	4						
16,00	92	32	16	4	40,00	56,41	65,76	57,41	68,87	123	63	16	4	47,88	67,18	78,35	91,30		
17,00	92	32	16	4	49,84	67,54	78,76			123	63	16	4						
18,00	92	32	16	4	49,27	68,61	79,99	70,02	86,13	123	63	16	4	58,49	79,97	93,26	116,82		
19,00	92	31	16	4	58,36	77,64	90,52			123	63	16	4						
20,00	104	38	20	4	57,68	77,64	90,52	82,35	111,89	141	75	20	4	68,50	92,38	107,72	143,25		
22,00	104	38	20	4	80,07	107,61	125,50	108,50	131,97	141	75	20	5	94,99	121,75	141,99	160,68		
24,00	121	45	25	5	100,66	126,81	147,88			141	75	25	5						
25,00	121	45	25	5	96,22	126,21	147,19	140,00	174,02	166	90	25	5	125,94	155,49	181,31	233,41		
26,00	121	45	25	5	115,50	153,21	181,25			166	90	25	5						
28,00	121	45	25	5	114,53	153,55	185,20			166	90	25	5	140,87	184,97	215,69			
30,00	121	45	25	6	133,14	170,43	208,65			166	90	25	6	159,01	203,19	236,97			
32,00	133	53	32	6	136,51	174,36	213,46			186	106	32	6	160,30	204,63	238,62			
36,00	133	53	32	6	206,74	250,33	306,43			186	106	32	6	229,77	275,86	321,68			
40,00	155	63	32	6	248,54	304,43	372,66			217	125	32	6	254,67	328,90	385,37			

FRESAS FRONTAIS DE DESBASTE VARIAS NAVALHAS DIN 844 E DIN 844/L

4-6 Z



SÉRIE CURTA



SÉRIE LONGA

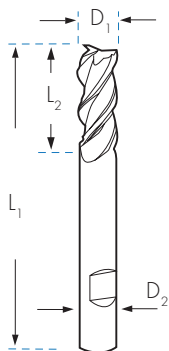


DIN 844		MATERIAL			ACABAMENTO			QUALIDADE			DESBASTE		
D1 mm	L1 mm	L2 mm	D2 mm	Z	€	€	€	NR	NR	NR	NR	NR	
6,00	57	13	6	4	38,75	46,78	54,55	★★	★★★	★★★★	NR	NR	
7,00	66	16	10	4	46,57	55,84	65,11	★★	★★★	★★★★	NR	NR	
8,00	69	19	10	4	40,45	49,72	57,98	★★	★★★	★★★★	NR	NR	
9,00	69	19	10	4	48,35	58,54	68,29	★★	★★★	★★★★	NR	NR	
10,00	72	22	10	4	40,13	49,24	57,41	★★	★★★	★★★★	NR	NR	
11,00	79	22	12	4	58,81	70,53	82,26	★★	★★★	★★★★	NR	NR	
12,00	83	26	12	4	48,47	60,03	69,99	★★	★★★	★★★★	NR	NR	
13,00	83	26	12	4	68,82	81,44	94,97	★★	★★★	★★★★	NR	NR	
14,00	83	26	12	4	56,27	69,62	81,19	★★	★★★	★★★★	NR	NR	
15,00	83	26	12	4	74,00	89,61	104,50	★★	★★★	★★★★	NR	NR	
16,00	92	32	16	4	66,75	82,04	95,68	★★	★★★	★★★★	NR	NR	
17,00	92	32	16	4	91,15	108,45	126,46	★★	★★★	★★★★	NR	NR	
18,00	92	32	16	4	72,79	90,39	105,40	★★	★★★	★★★★	NR	NR	
19,00	92	31	16	4	107,72	125,70	146,60	★★	★★★	★★★★	NR	NR	
20,00	104	38	20	4	91,21	110,41	128,76	★★	★★★	★★★★	NR	NR	
SEM CORTE AO CENTRO													
22,00	104	38	20	6	103,05	133,23							
24,00	121	45	25	6	129,80	157,99	176,31						
25,00	121	45	25	6	128,58	157,08	175,29						
26,00	121	45	25	6	148,90	192,21	214,48						
28,00	121	45	25	6	162,43	209,12	233,35						
30,00	121	45	25	6	174,49	228,89	255,41						
32,00	133	53	32	6	197,68	246,18	274,70						
36,00	133	53	32	6	234,29	283,68	316,57						
40,00	155	63	32	6	263,39	328,50	366,58						

DIN 844/L		MATERIAL			ACABAMENTO			QUALIDADE			DESBASTE		
L1 mm	L2 mm	D2 mm	Z	€	€	€	NR	NR	NR	NR	NR	NR	
68	24	6	4	54,92	62,12	72,79	★★	★★★	★★★★	NR	NR	NR	
80	30	10	4	56,62	70,97	82,76	★★	★★★	★★★★	NR	NR	NR	
88	38	10	4	56,80	65,68	76,59	★★	★★★	★★★★	NR	NR	NR	
88	38	10	4	62,28	71,96	83,91	★★	★★★	★★★★	NR	NR	NR	
95	45	10	4	49,47	61,17	71,34	★★	★★★	★★★★	NR	NR	NR	
102	45	12	4	80,96	92,77	108,20	★★	★★★	★★★★	NR	NR	NR	
110	53	12	4	61,11	73,93	86,22	★★	★★★	★★★★	NR	NR	NR	
110	53	12	4				★★	★★★	★★★★	NR	NR	NR	
110	53	12	4	70,61	83,53	97,43	★★	★★★	★★★★	NR	NR	NR	
110	53	12	4				★★	★★★	★★★★	NR	NR	NR	
123	63	16	4	82,65	101,37	118,20	★★	★★★	★★★★	NR	NR	NR	
123	63	16	4				★★	★★★	★★★★	NR	NR	NR	
123	63	16	4	96,53	118,53	138,22	★★	★★★	★★★★	NR	NR	NR	
123	63	16	4				★★	★★★	★★★★	NR	NR	NR	
141	75	20	4	117,48	139,73	162,94	★★	★★★	★★★★	NR	NR	NR	
141	75	20	6	132,33	178,49	199,18	★★	★★★	★★★★	NR	NR	NR	
141	75	25	6				★★	★★★	★★★★	NR	NR	NR	
166	90	25	6	167,11	211,45	235,96	★★	★★★	★★★★	NR	NR	NR	
166	90	25	6				★★	★★★	★★★★	NR	NR	NR	
166	90	25	6	188,45	243,10	271,27	★★	★★★	★★★★	NR	NR	NR	
166	90	25	6	244,33	290,38	324,05	★★	★★★	★★★★	NR	NR	NR	
186	106	32	6	255,55	296,87	331,28	★★	★★★	★★★★	NR	NR	NR	
186	106	32	6	306,86	354,51	395,59	★★	★★★	★★★★	NR	NR	NR	
217	125	40	6	362,81	441,25	492,40	★★	★★★	★★★★	NR	NR	NR	

FRESAS FRONTAIS, SEM CORTE AO CENTRO, VARIAS NAVALHAS DIN 844 E DIN 844/L
4-6 Z

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

SÉRIE CURTA
SÉRIE LONGA


DIN 844	MATERIAL				D1 mm	L1 mm	L2 mm	D2 mm	Z	MATERIAL				D1 mm	L1 mm	L2 mm	D2 mm	Z
	ACABAMENTO									ACABAMENTO								
	QUALIDADE									QUALIDADE								
	HSS	HSSCo 8%	HSSCo 8%	HSSCo 8%						HSSCo 8%	HSSCo 8%	HSSCo 8%						
	BRILHANTE	BRILHANTE	TiAIN	TiAlSiN						BRILHANTE	TiAIN	TiAlSiN						
	★	★★	★★★	★★★★						★★	★★★	★★★★						
	€	€	€	€						€	€	€						
2,00	51	7	6	4	10,85	14,22	22,88	26,70	54	10	6	4	17,78	27,52	32,24			
2,50	52	8	6	4	10,85	14,22	22,88	26,70	56	12	6	4	17,78	25,26	29,60			
3,00	52	8	6	4	10,85	14,22	22,88	26,70	56	12	6	4	17,78	28,62	33,54			
3,50	55	11	6	4	11,19	14,66	23,40	27,27	59	15	6	4	23,39	34,35	40,25			
4,00	55	11	6	4	10,85	14,22	22,97	26,77	63	19	6	4	17,78	28,62	33,54			
4,50	57	13	6	4	11,19	14,65	23,40	27,27	63	19	6	4	23,39	34,35	40,25			
5,00	57	13	6	4	10,85	14,22	22,97	26,77	68	24	6	4	17,78	28,62	33,54			
5,50	57	13	6	4	16,86	22,12	30,76	35,86	68	24	6	4	23,39	34,35	40,25			
6,00	57	13	6	4	10,85	14,22	22,96	26,75	68	24	6	4	17,78	28,62	33,54			
6,50	66	16	10	4	16,86*	22,12	31,83	37,13	68	24	6	4						
7,00	66	16	10	4	15,91	20,89	30,67	35,76	80	30	10	4	26,91	39,50	46,28			
7,50	69	16	10	4	19,94	26,13	35,65	41,58	80	30	10	4						
8,00	69	19	10	4	12,36	16,04	26,00	30,33	88	38	10	4	24,70	37,22	43,59			
8,50	69	19	10	4	20,78	27,30	37,77	44,04	88	38	10	4						
9,00	69	19	10	4	16,64	21,81	32,58	37,99	88	38	10	4	27,94	41,65	48,81			
9,50	72	22	10	4	22,56	28,84	39,66	46,26	88	38	10	4						
10,00	72	22	10	4	15,10	19,79	30,69	35,78	95	45	10	4	24,57	39,61	46,42			
11,00	79	22	12	4	20,81	27,30	39,59	46,17	102	45	12	4	33,61	49,98	58,58			
12,00	83	26	12	4	17,95	23,62	35,62	41,53	110	53	12	4	31,21	47,54	55,70			
13,00	83	26	12	4	26,76	35,24	48,52	56,57	110	53	12	4						
14,00	83	26	12	4	25,32	33,13	46,67	54,42	110	53	12	4	40,80	57,67	67,58			
15,00	83	26	12	4	28,86	37,82	53,75	62,67	110	53	12	4						
16,00	92	32	16	4	28,16	36,88	52,87	61,64	123	63	16	4	44,59	68,18	79,89			
17,00	92	32	16	4	34,69	45,66	63,21	73,71	123	63	16	4						
18,00	92	32	16	4	34,65	45,47	63,21	73,71	123	63	16	4	54,46	81,02	94,92			
19,00	92	31	16	4	41,04	53,50	72,52	84,59	123	63	16	4						
20,00	104	38	20	4	40,62	53,50	72,52	84,59	141	75	20	4	63,78	92,97	108,93			
22,00	104	38	20	5	56,39	74,25	100,38	117,07	141	75	20	5	88,45	122,20	143,19			
24,00	121	45	25	5	70,04	92,27	118,00	137,61	141	75	25	5						
25,00	121	45	25	5	69,81	92,27	118,00	137,61	166	90	25	5	117,32	156,46	183,32			
26,00	121	45	25	5	87,56	115,35	149,17	173,95	166	90	25	5						
28,00	121	45	25	5	87,56	115,35	153,20	178,64	166	90	25	5	143,39	192,67	225,76			
30,00	121	45	25	6	101,51	132,96	170,83	199,22	166	90	25	6	164,12	213,61	250,26			
32,00	133	53	32	6	104,40*	136,39	174,80	203,85	186	106	32	6	163,86	215,11	252,03			
36,00	133	53	32	6	136,62	179,93	218,88	255,24	186	106	32	6	233,70	295,56	346,31			
40,00	143	63	32	6	163,79	216,28	268,60	313,23	217	125	40	6	259,78	397,22	465,43			

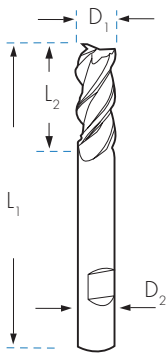
*Hasta fin de existencia

FRESAS FRONTAIS DE DESBASTE VARIAS NAVALHAS DIN 844 E DIN 844/L

3-5 Z  **30° N**  **WELDON**  **34 HRC** **INOX** **Al** **TOL D1 k12** **TOL D2 h6**

SÉRIE CURTA

SÉRIE LONGA



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

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

Fresas

Rosa

FRESAS FRONTAIS SÉRIE SUPER-CURTA E EXTRA-CURTA DE 3 NAVALHAS
3Z

INOX
Al
TOL D1
e8

TOL D2
h6

SÉRIE SUPER-CURTA
SÉRIE EXTRA-CURTA

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



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


3Z

DIN
844N

HSS
PM

Al
Cu
TOL D1
k10

TOL D2
h6

 Melhora a
 extração da
 limanha


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



*Até o fim das existências.

FRESAS DE METAL DURO PARA MATERIAIS COMPOSTOS: FIBRA DE CARBONO, PAINEL FENÓLICO, ETC...

MD



REVOLUÇÕES E AVANÇOS

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



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

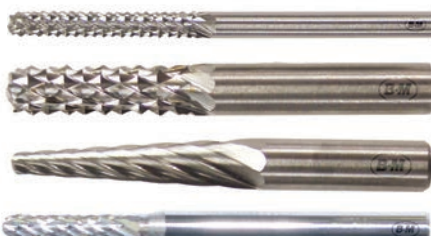
FRESAS DE METAL DURO PARA REPARAÇÃO DE FURROS DE PNEUS

MD



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

FRESAS DE METAL DURO ACESSÓRIOS TIPO ROTOZIP



Ref.: RR0317

Ref.: RR0635

Ref.: RR0435

Ref.: RR0247

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

*Até o fim das existências.

FRESAS DE 1 NAVALHA HSSCo

HSSCo

Al

PVC

TOL D1
k12TOL D2
h6

SÉRIE CURTA



FF13

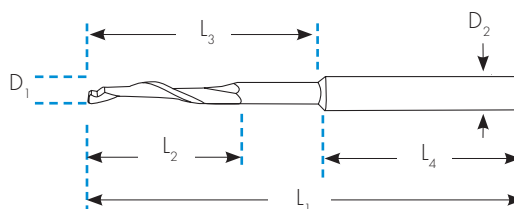
	D1 mm	L1 mm	L2 mm	D2 mm	HSSCo €	TiN €
FF1381	1,0	60	12	8	44,70	62,96
FF1382	2,0	60	12	8	44,70	62,96
FF1383	3,0	60	12	8	17,03	24,85
FF1384	4,0	60	12	8	17,03	24,85
FF1385	5,0	60	13	8	17,03	24,85
FF1386	6,0	60	16	8	17,97	25,75
FF1387	7,0	60	16	8	20,78	29,22
FF1388	8,0	80	16	8	20,78	29,22
FF131010	10,0	80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

SÉRIE LONGA



FF14

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



SÉRIE EXTRA-LONGA



FF14-E

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

ALUMÍNIO LACADO



FF50

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

MEDIDAS ESPECIAIS



FF14 Especiais

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

FF14 Especiais

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

FRESAS DE 1 NAVALHA DE METAL DURO

MD

Al

PVC

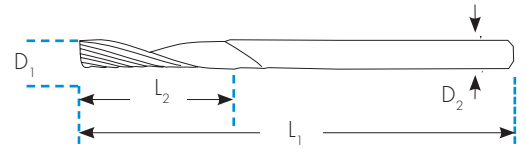
TOL
h10

TOL D2
h6

HÉLICE A - SÉRIE CURTA



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



HÉLICE A - SÉRIE LONGA



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

HÉLICE B



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

HÉLICE C



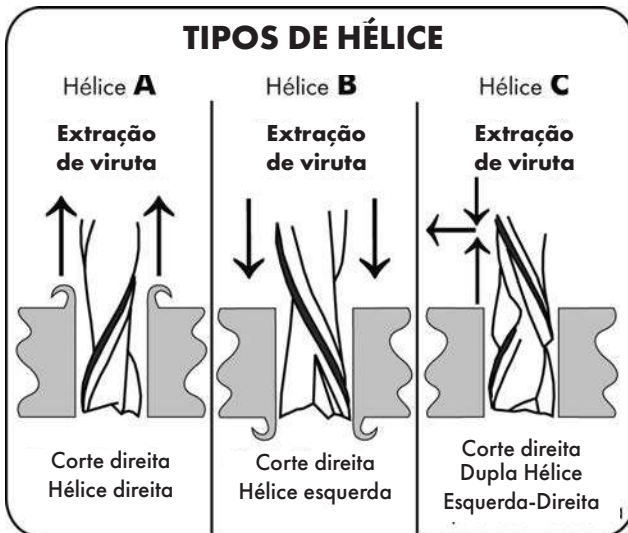
C	D1 mm	L1 mm	L2 mm	D2 mm	FMGA13CO	
					MD	€
FMGA1366CO	6	64	25	6	MD	132,00
FMGA1388CO	8	64	25	8	MD	182,53
FMGA131010CO	10	76	35	10	MD	214,54
FMGA131212CO	12	76	35	12	MD	284,62

CANAL RETO



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

TIPOS DE HÉLICE



VELOCIDADES DE CORTE

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

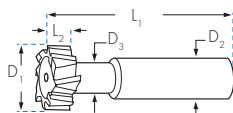
NOTA: para a serie longa convém reduzir as RPM num 15%.

FRESAS PARA FAZER RANHURA

Fresas

Rosa

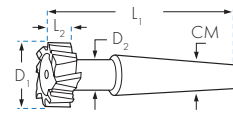
Ref. FF17

**RANHURAR
EN "T"**
**DIN
851A**

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

FF17

D1 x L2 mm	D2 mm	D3 mm	Z	L1 mm	FF17	
					HSSCo €	TiAIN €
11,0x4,0	10	4	4	53,5	102,04	125,38
12,5x6,0	10	5	6	57,0	106,07	132,61
16,0x8,0	10	7	6	62,0	116,63	147,97
18,0x8,0	12	8	8	70,0	122,86	158,21
21,0x9,0	12	10	8	74,0	135,31	190,06
25,0x11,0	16	12	8	82,0	152,71	206,97
32,0x14,0	16	15	10	90,0	192,63	268,41
40,0x18,0	25	19	10	108,0	267,20	374,18
50,0x22,0	32	25	10	124,0	321,30	421,37
60,0x28,0	32	30	10	139,0	335,87	440,51
72,0x35,0	32	35	10	153,0	350,47	459,66

Ref. FF17C

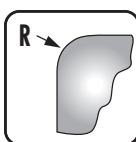
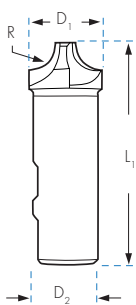
**RANHURAR
EN "T"**
**DIN
851B**

**TOL D2
h12**

FF17C

D1 x L2 mm	CM	ROSCA	D2 mm	L1 mm	FF17C	
					HSSCo €	TiAIN €
18,0x8,0	1	M6	8	70	133,86	165,98
21,0x9,0	2	M10	10	74	146,97	182,24
25,0x11,0	2	M10	12	82	153,22	190,00
32,0x14,0	2	M10	16	90	204,35	253,39
40,0x18,0	3	M12	20	108	258,35	320,35
50,0x22,0	4	M16	25	124	341,22	423,10
60,0x28,0	4	M16	31	139	451,47	559,82
72,0x35,0	5	M20	36	153	612,80	759,86

**FRESA DE 1/4 DE CIRCULO
PARA ARREIMATE DE ARESTAS**

4 Z

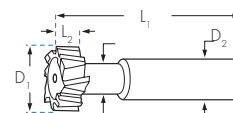
**HSSCo
8%**
**DIN
6518N**
WELDON


FF1/4R

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

**FRESA PARA FAZER RANHURA
"WOODRUFF"**

Ref. FF16

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


FF16

D1 x L2 mm	D2 mm	Z	L1 mm	FF16	
				HSSCo €	TiAIN €
4,5x1,0	6	6	50	58,01	68,61
7,5x1,5	6	6	50	60,40	72,60
7,5x2,0	6	6	50	60,40	72,60
10,5x2,0	6	6	50	64,98	78,34
10,5x2,5	6	6	50	64,98	78,34
10,5x3,0	6	6	50	64,98	78,34
13,5x3,0	10	6	56	66,01	82,46
13,5x4,0	10	6	56	66,01	82,46
16,5x3,0	10	6	56	66,61	88,30
16,5x4,0	10	6	56	66,61	88,30
16,5x5,0	10	6	56	66,61	85,42
19,5x4,0	10	8	63	75,83	100,17
19,5x5,0	10	8	63	75,83	95,98
19,5x6,0	10	8	63	75,83	95,98
22,5x5,0	10	8	63	83,06	111,26
22,5x6,0	10	8	63	83,06	111,81
22,5x8,0	10	8	63	83,06	111,81
25,5x6,0	10	10	63	97,27	138,47
28,5x6,0	10	10	63	98,95	140,13
28,5x8,0	10	10	63	98,95	140,13
28,5x10,0	12	10	71	98,95	140,13
32,5x7,0	12	10	71	122,71	167,70
32,5x8,0	12	10	71	122,71	167,70
32,5x10,0	12	10	71	122,71	167,70
45,5x10,0	12	12	71	194,12	275,97

FRESAS CÓNICAS ANGULARES HSSCo COM CABO CILÍNDRICO HSSCo



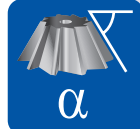
Ref. FF98
Ref. FF99

HSSCo

DIN 1833A

TOL D1 js16

TOL D2 h6



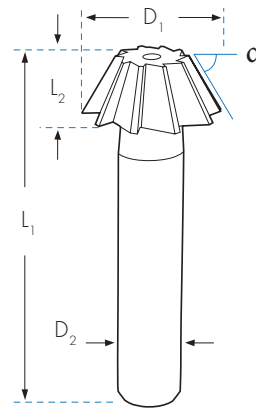
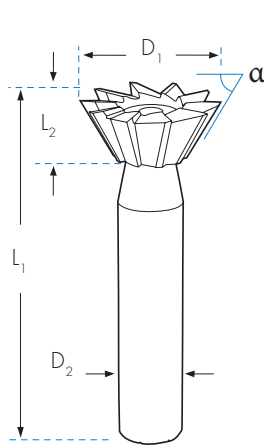
Ref. FF97
Ref. FF95

HSSCo

DIN 1833B

TOL D1 js16

TOL D2 h6



FF98

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

FF97

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

FF99

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

FF95

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

MEDIDAS ESPECIAIS

FF99

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

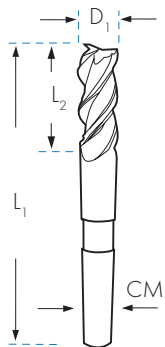
MEDIDAS ESPECIAIS

FF95

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

FRESAS FRONTAIS COM CABO CÔNICO SÉRIE CURTA
4-8 Z

INOX
Al
2 Z

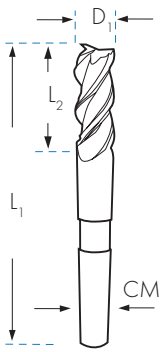
SÉRIE CURTA


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

FRESAS FRONTAIS COM CABO CÓNICO SÉRIE LONGA DIN 845B/L

4-8 Z   **30° N**  **CÓNICO**  **INOX**  **Al**

SÉRIE LONGA



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

JOGOS DE FRESAS COM CORTE AO CENTRO EM ESTOJOS DE PLÁSTICO

Fresas

Rosa

2Z**DIN 327****4Z****DIN 844**

REFERÊNCIA	PTF20	PTF60
Nº FRESAS	8	8
TIPO	Ref. FFO2	Ref. FF60
QUALIDADE	HSSCo 8%	TiAIN
CONTEÚDO Ø mm	<u>6</u> <u>8</u> <u>10</u> <u>12</u> 2 2 2 2	<u>6</u> <u>8</u> <u>10</u> <u>12</u> 2 2 2 2
P.V.P. €	146,30	231,97

REFERÊNCIA	PTF24	PTF64
Nº FRESAS	8	8
TIPO	Ref. FF18	Ref. FF20
QUALIDADE	HSSCo 8%	TiAIN
CONTEÚDO Ø mm	<u>6</u> <u>8</u> <u>10</u> <u>12</u> 2 2 2 2	<u>6</u> <u>8</u> <u>10</u> <u>12</u> 2 2 2 2
P.V.P. €	161,98	245,75

2Z**DIN 327****4Z****DIN 844**

REFERÊNCIA	PTF21	PTF61
Nº FRESAS	6	6
TIPO	Ref. FFO2	Ref. FF60
QUALIDADE	HSSCo 8%	TiAIN
CONTEÚDO Ø mm	<u>6-8-10-12-16-20</u>	<u>6-8-10-12-16-20</u>
P.V.P. €	158,33	240,87

REFERÊNCIA	PTF25	PTF65
Nº FRESAS	6	6
TIPO	Ref. FF18	Ref. FF20
QUALIDADE	HSSCo 8%	TiAIN
CONTEÚDO Ø mm	<u>6-8-10-12-16-20</u>	<u>6-8-10-12-16-20</u>
P.V.P. €	176,81	255,01

2Z**DIN 327****4Z****DIN 844**

REFERÊNCIA	PTF22	PTF62
Nº FRESAS	6	6
TIPO	Ref. FFO2	Ref. FF60
QUALIDADE	HSSCo 8%	TiAIN
CONTEÚDO Ø mm	<u>4-5-6-8-10-12</u>	<u>4-5-6-8-10-12</u>
P.V.P. €	100,33	161,35

REFERÊNCIA	PTF26	PTF66
Nº FRESAS	6	6
TIPO	Ref. FF18	Ref. FF20
QUALIDADE	HSSCo 8%	TiAIN
CONTEÚDO Ø mm	<u>4-5-6-8-10-12</u>	<u>4-5-6-8-10-12</u>
P.V.P. €	111,10	171,30

JOGOS DE FRESAS COM CORTE AO CENTRO EM ESTOJOS METÁLICOS

2 Z



DIN
327

Ref. FF020787



Ref. FT020787



Ref. FF600787



REFERÊNCIA	FF010787	FF020787	FT020787	FF600787
Nº FRESAS	6	6	6	6
TIPO	Ref. FFO1	Ref. FFO2	Ref. FTO2	Ref. FF60
QUALIDADE	HSS	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	92,87	122,82	143,21	183,83

REFERÊNCIA	FF010447	FF020447	FT020447	FF600447
Nº FRESAS	6	6	6	6
TIPO	Ref. FFO1	Ref. FFO2	Ref. FTO2	Ref. FF60
QUALIDADE	HSS	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	138,91	184,22	214,83	266,73

REFERÊNCIA	FF010801	FF020801
Nº FRESAS	14	14
TIPO	Ref. FFO1	Ref. FFO2
QUALIDADE	HSS	HSSCo 8%
CONTEÚDO Ø mm	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	299,43*	393,46*

*Até o fim das existências.

ESTOJOS METÁLICOS VAZIOS PARA FRESAS

2-4 Z



DIN
327



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

JOGOS DE FRESAS EM ESTOJOS METÁLICOS

Fresas

Rosa

4 Z

DIN
844

REFERÊNCIA	FF030787	FF040787	FT040787	FF540787
Nº FRESAS	6	6	6	6
TIPO	Ref. FF03	Ref. FFO4	Ref. FTO4	Ref. FF54
QUALIDADE	HSS	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	91,34	120,46	141,13	183,82

REFERÊNCIA	FF030847	FF040847	FT040847	FF540847
Nº FRESAS	6	6	6	6
TIPO	Ref. FF03	Ref. FFO4	Ref. FTO4	Ref. FF54
QUALIDADE	HSS	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	136,48	183,11	214,56	263,78



REFERÊNCIA	FF030764	FF040764
Nº FRESAS	14	14
TIPO	Ref. FF03	Ref. FFO4
QUALIDADE	HSS	HSSCo 8%
CONTEÚDO Ø mm	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20	3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 12 - 14 - 15 - 16 - 18 - 20
P.V.P. €	290,36*	384,51*

*Até o fim das existências.

4 Z

DIN
844

NR

REFERÊNCIA	FF250847	FT250847	FF270847
Nº FRESAS	6	6	6
TIPO	Ref. FF25	Ref. FT25	Ref. FF27
QUALIDADE	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	340,84	397,47	409,97

JOGOS DE FRESAS EM ESTOJOS METÁLICOS

4 Z  **DIN 844**

REFERÊNCIA	FF180787	FT180787	FF200787
Nº FRESAS	6	6	6
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
QUALIDADE	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12	4 - 5 - 6 - 8 - 10 - 12
P.V.P. €	128,25	149,56	193,77



Ref. FF180787

REFERÊNCIA	FF180847	FT180847	FF200847
Nº FRESAS	6	6	6
TIPO	Ref. FF18	Ref. FT18	Ref. FF20
QUALIDADE	HSSCo 8%	TiAlSiN	TiAlN
CONTEÚDO Ø mm	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20	6 - 8 - 10 - 12 - 16 - 20
P.V.P. €	200,49	233,82	278,19



Ref. FF180847

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







Ref. FF180764

*Até o fim das existências.

EXPOSITOR DE METACRILATO

Ref. MF-01

MF-01

						Conteúdo: 163 Fresas																
Ref. FF13	1 Z	HSSCo	Al	SÉRIE CURTA		Ø	5 x 8	Cabo	6 x 8	Cabo												
						Quant.	5		5													
Ref. FF14	1 Z	HSSCo	Al	SÉRIE LONGA		Ø	5 x 8	Cabo	6 x 8	Cabo												
						Quant.	5		5													
Ref. FF02	2 Z	HSSCo	DIN 327N			Ø	2	3	4	5	6	7	8	9	10	12	14	16				
						Quant.	5	5	5	5	5	5	5	5	5	5	5	3				
Ref. FF18	4 Z	HSSCo	DIN 844N			Ø	2	3	4	5	6	7	8	9	10	12	14	16				
						Quant.	5	5	5	5	5	5	5	5	5	5	5	3				
Ref. FF25	4 Z	HSSCo	DIN 844N			Ø	6	7	8	9	10	11	12	14	16							
						Quant.	3	3	3	3	3	3	3	3	3							



Dimensões: largo 245 x fundo 210 x altura 350 mm

NOTA: Composições especiais sob demanda.

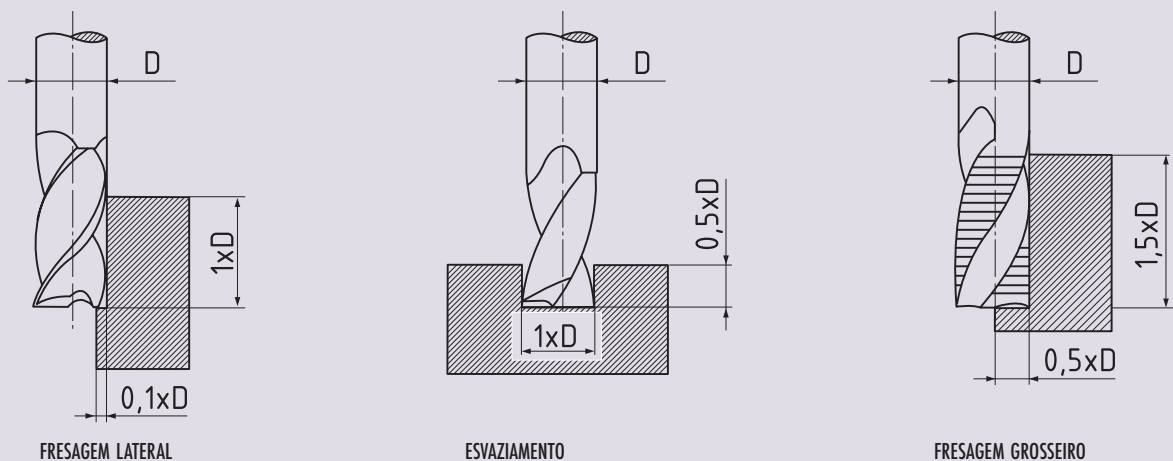
P.V.P. 4.142,69 €

PARÂMETROS DE CORTE ORIENTATIVOS FRESAS HSSCo 8%

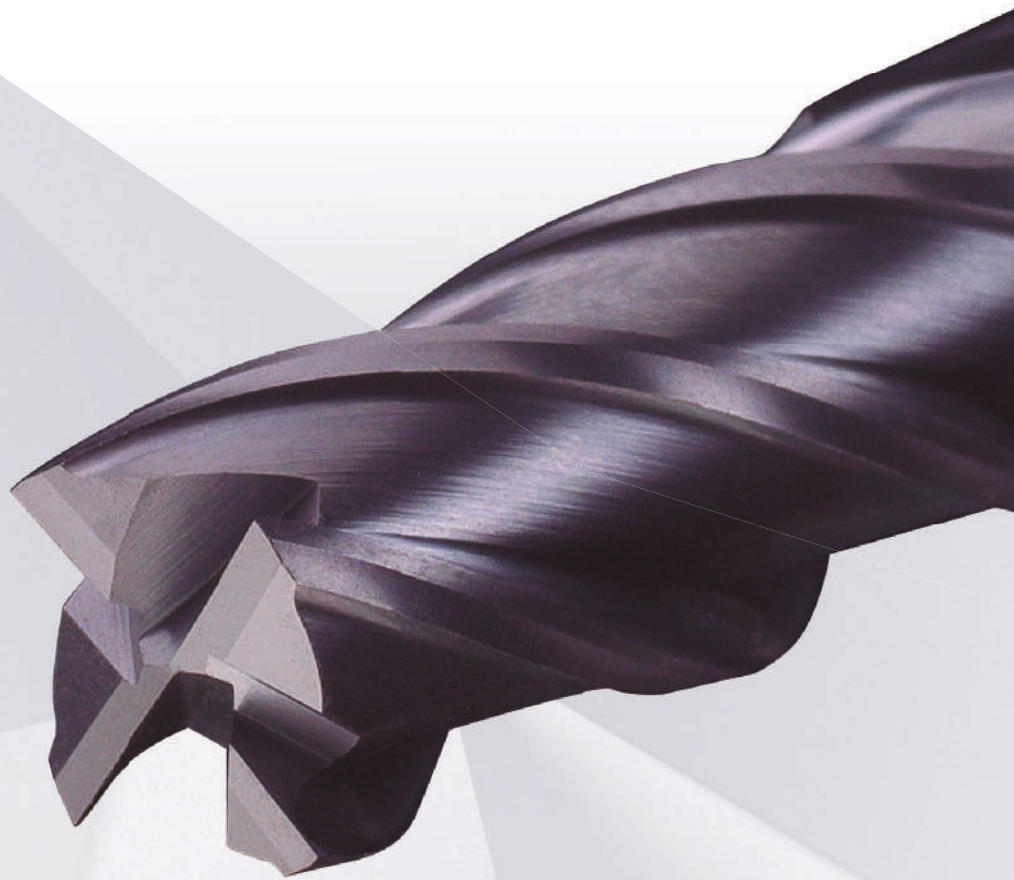
		DIÂMETRO Ø (mm)														
		2	4	6	8	10	12	18	22	26	30	32	36	40		
AÇO BAIXA LIGA 70 kg/mm ²	V/C 39 RPM	6207	3104	2069	1552	1241	1035	690	564	477	414	388	345	310		
	AVANÇO (mm/min)	Nº cortes	2	50	56	74	84	82	81	80	81	76	68	68	62	60
			3	74	84	112	126	123	121	120	122	115	102	102	93	89
			4	99	112	149	168	164	161	160	163	153	136	137	124	119
AÇO TRATADO 120 kg/mm ²	V/C 20 RPM	3183	1592	1061	796	637	531	354	289	245	212	199	177	159		
	AVANÇO (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
INOXIDÁVEL	V/C 15 RPM	2387	1194	796	597	477	398	265	217	184	159	149	133	119		
	AVANÇO (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
ALUMÍNIO	V/C 230 RPM	36606	18303	12202	9151	7321	6101	4067	3328	2816	2440	2288	2034	1830		
	AVANÇO (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
TITÂNIO	V/C 12 RPM	1910	955	637	477	382	318	212	174	147	127	119	106	95		
	AVANÇO (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 as fresas revestidas multiplique os parâmetros na tabela por 1,3 e para as fresas ASP 60 multiplique por 1,8.

* V/C: Velocidade de corte (m/min).

PROFUNDIDADE DE PASSADA EM FUNÇÃO DA OPERAÇÃO A REALIZAR


FRESAS DE METAL DURO



BLUE-MASTER[®]
by celesa

CUTTING TECHNOLOGIES

FRESAS FRONTAIS DE METAL DURO INTEGRAL PARA APLICAÇÕES GERAIS SÉRIE CURTA, LONGA E EXTRA-LONGA

Fresas Frontais de Metal Duro

Rosa

INOX
Al
Ti
2Z
3Z
4Z

SÉRIE CURTA



SÉRIE LONGA



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

				FMD54	FMD54TL	FMD58	FMD58TL
MATERIAL				MD	MD	MD	MD
ACABAMENTO				BRILHANTE	TiAIN	BRILHANTE	TiAIN
QUALIDADE				★★	★★★	★★	★★★
				2Z	2Z	4Z	4Z
D ₁ mm	L ₁ mm	L ₂ mm	D ₂ mm	€	€	€	€
3,00	60	15	3	18,65	25,52	18,65	25,52
4,00	80	20	4	19,66	26,52	19,66	26,52
5,00	80	25	5	24,47	31,34	24,47	31,34
6,00	80	25	6	34,51	41,37	34,51	41,37
8,00	90	35	8	39,29	48,45	39,29	48,45
10,00	100	45	10	55,52	64,68	55,52	64,68
12,00	100	50	12	75,79	87,24	75,79	87,24
14,00	150	65	14	124,71	139,59	124,71	139,59
16,00	150	65	16	136,63	151,51	136,63	151,51
18,00	150	65	18			197,33	217,93
20,00	150	70	20	242,37	265,27	242,37	265,27


SÉRIE EXTRA-LONGA

				FMD53	FMD53TL	FMD56	FMD56TL
MATERIAL				MD	MD	MD	MD
ACABAMENTO				BRILHANTE	TiAIN	BRILHANTE	TiAIN
QUALIDADE				★★	★★★	★★	★★★
				2Z	2Z	4Z	4Z
Ø mm	L ₁ mm	L ₂ mm	D ₂ mm	€	€	€	€
3,00	75	25	3	40,11	51,56	41,50	52,95
4,00	100	25	4	43,58	55,03	44,94	56,39
5,00	100	25	5	49,25	60,70	51,75	63,20
6,00	150	75	6	82,20	100,52	90,42	108,73
8,00	150	75	8	113,18	134,94	124,50	146,25
10,00	150	75	10	143,37	171,99	157,70	186,32
12,00	150	75	12	209,77	246,40	230,74	267,38
14,00	150	75	14	289,99	334,64	318,99	363,64
16,00	200	75	16	393,99	445,51	433,39	484,91
20,00	200	75	20	614,76	683,45	614,76	683,45

FRESAS FRONTAIS DE METAL DURO INTEGRAL PARA APLICAÇÕES GERAIS SÉRIE CURTA, LONGA E EXTRA-LONGA

INOX
Al
Ti

2Z




30° N

44 HRc

CILÍNDRICO

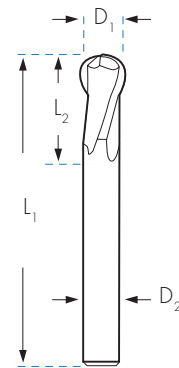
4Z



SÉRIE CURTA



SÉRIE LONGA




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

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

SÉRIE EXTRA-LONGA

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

CONDIÇÕES DE CORTE ORIENTATIVAS

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

* Para obter os parâmetros de corte recomendados para Fresas frontais com revestimento TiAlN, multiplicar os valores do quadro por 1,3.

* Até o fim das existências

FRESAS FRONTAIS DE MD INTEGRAL, DESBASTE FINO, MEIO E GROSSO


FMD1

D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
TOL D₁ +0 -0,05	TOL D₂ h6				
6	6	63	19	3	41,47*
8	8	63	19	3	44,52*
10	10	63	22	3	56,91*
12	12	75	25	4	71,87*
16	16	88	32	4	122,98*
20	20	100	38	4	143,95*

FMD3

D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
TOL D₁ +0 -0,05	TOL D₂ h6				
6	6	50	16	4	34,47
8	8	60	19	3	46,71
10	10	75	22	4	71,88
12	12	75	26	4	98,66
16	16	92	32	4	224,45
20	20	100	38	4	336,35

*Até o fim das existências.



FMD6

D ₁ mm	D ₂ mm	L ₁ mm	L ₂ mm	Z	€
TOL D₁ +0 -0,05	TOL D₂ h6				
6	6	63	19	3	41,47*
8	8	63	19	3	44,52*
10	10	63	22	3	56,91*
12	12	75	25	4	71,87*
16	16	88	32	4	122,98*
20	20	100	38	4	143,95*

*Até o fim das existências.

FRESAS FRONTAIS DE METAL DURO INTEGRAL ESPECIAIS PARA INOXIDÁVEL E LIGAS DE NÍQUEL

INOX
Ni
Ti

44
HRc

CILÍNDRICO

2Z

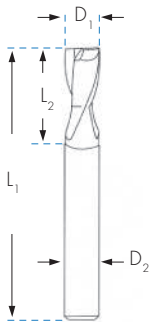
3Z

4Z

Muito recomendado para usinagem de inoxidável, titânio e ligas de níquel.

Micro Grão
MD

SÉRIE CURTA



TOL D1
+0 -0,05

TOL D2
h6

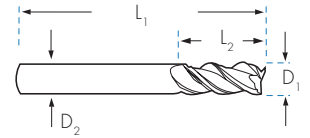


				FMT2	FMT63	FMT48					FMT81					FMT92		
				MD	MD	MD					MD					MD		
				TiAlSiN	TiAlSiN	TiAlSiN					TiAlSiN					TiAlSiN		
				Premium Quality	Premium Quality	Premium Quality					Premium Quality					Premium Quality		
				2Z	3Z	4Z					4Z					2Z		
D1	L1	L2	D2															
mm	mm	mm	mm	€	€	€	mm	mm	mm	mm	€	mm	mm	mm	mm	€		
1,00	38	3	3	44,09	44,09	44,09	1,00	38	3	3		1,00	38	2	3			
1,50	38	4	3	43,05	43,05	43,05	1,50	38	5	3		1,50	38	3	3			
2,00	38	6	3	34,26	34,26	34,26	2,00	38	6	3		2,00	38	4	3			
2,50	38	8	3	33,48	33,48	33,48	2,50	38	7	3		2,50	38	5	3			
3,00	38	8	3	28,84	28,84	28,84	3,00	38	12	3		3,00	38	6	3	38,07		
3,50	50	11	4	35,39	35,39	35,39	3,50	50	12	4		3,50	50	8	4	42,23		
4,00	50	11	4	32,88	32,88	32,88	4,00	50	14	4		4,00	50	10	5	52,20		
4,50	50	13	5	42,06	42,06	42,06	4,50	50	14	5		4,50	50	12	6	59,72		
5,00	50	13	5	41,55	41,55	41,55	5,00	50	16	5	45,71	5,00	60	15	8	73,42		
6,00	50	16	6	46,84	46,84	46,84	6,00	63	19	6	51,53	6,00	75	20	10	106,43		
7,00	60	16	8	65,33	65,33	65,33	7,00	63	19	8		7,00	75	20	12	130,89		
8,00	60	19	8	55,44	55,44	55,44	8,00	63	19	8	60,98	8,00	90	25	14	190,23		
9,00	72	19	10	79,49	79,49	79,49	9,00	70	22	10		9,00	100	25	16	237,51		
10,00	72	22	10	88,38	88,38	88,38	10,00	70	22	10	97,21	10,00	100	30	18	350,54		
11,00	75	26	12	117,57	117,57	117,57	11,00	75	25	11		11,00	100	30	20	370,01		
12,00	75	26	12	109,32	109,32	109,32	12,00	75	25	12	120,24							
14,00	84	30	14	162,50	162,50	162,50	14,00	88	30	14	178,74							
16,00	92	32	16	210,50	210,50	210,50	16,00	88	32	16	231,55							
18,00	100	38	18	292,51	292,51	292,51	18,00	100	36	18	321,75							
20,00	100	38	20	333,49	333,49	333,49	20,00	100	36	20	366,84							
25,00	100	38	25	547,40	547,40	547,40	25,00	100	38	25								

* **FMT81:** fresa de 4 navalhas, corte ao centro, hélice variável com revestimento TiAlSiN. O seu ângulo de hélice minimiza as vibrações e junto com o revestimento TiAlSiN oferece um espetacular rendimento na usinagem.

CONDIÇÕES 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
	AVANÇO (mm/min)	70	77	77	77	77	77	77	77	77	91	91	70
INOX Ti	RPM	11200	7420	5600	4480	3640	2800	2240	1820	1540	1400	1120	840
	AVANÇO (mm/min)	77	77	77	77	84	84	84	84	84	98	98	77
Ni	RPM	11200	7420	5600	4480	3640	2800	2240	1820	1540	1400	1120	840
	AVANÇO (mm/min)	77	77	77	77	84	84	84	84	84	98	98	77



FRESA FRONTAL 2 NAVALHAS, SÉRIE CURTA, HÉLICE A 30°

INOX

Ref. FMG10

2 Z

MG
MD

30°



CILÍNDRICO

TiAIN

INOX

45
HRc

Ti

INC

Micro Grão
MD

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS

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

*Até o fim das existências.



FRESA FRONTAL 3 NAVALHAS, SÉRIE CURTA, HÉLICE VARIÁVEL

INOX

Ref. FMD67

3 Z



MD

35°
38°

CILÍNDRICO

TiAlSiN

INOX

Ti

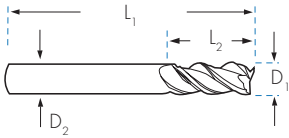
Ni

Micro Grão
MD

SÉRIE CURTA

	TOL	TOL	L ₁ mm	L ₂ mm	FMD67 €
	e8 D ₁ mm	h ₆ D ₂ mm			
FMD670300	3	6	50	8	31,40
FMD670400	4	6	50	11	31,40
FMD670500	5	6	50	13	31,40
FMD670600	6	6	50	16	31,40
FMD670800	8	8	60	19	39,60
FMD671000	10	10	73	22	58,50
FMD671200	12	12	75	26	79,80
FMD671600	16	16	92	32	155,40
FMD672000	20	20	100	38	229,20





FRESA FRONTAL 4 NAVALHAS, SÉRIE CURTA, HÉLICE VARIÁVEL

INOX Ref. FMG12 **4 Z** **MG MD** **35°/38°** **WELDON** **TiAlSiN** **INOX** **45 HRc** **Ti** **INC** **Micro Grão MD**

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS						FMG12					
R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	TOL -0,03 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	€	
											<30 HRc
11.560	280	7.560	170	6.300	140	FMG120200	2,0	6	40	6	31,40*
10.240	300	6.560	185	5.460	155	FMG120250	2,5	6	40	8	31,40*
8.920	320	5.560	200	4.620	170	FMG120300	3,0	6	50	8	31,40
7.560	570	4.620	350	3.880	280	FMG120400	4,0	6	50	11	31,40
6.300	600	3.780	360	3.160	300	FMG120500	5,0	6	50	13	31,40
5.560	660	3.360	410	2.840	330	FMG120600	6,0	6	50	16	31,40
4.880	685	2.940	420	2.470	340	FMG120700	7,0	8	60	16	39,60*
4.200	710	2.520	380	2.100	350	FMG120800	8,0	8	60	19	39,60
3.730	660	2.260	340	1.890	325	FMG120900	9,0	10	70	19	58,50*
3.260	610	2.000	300	1.680	300	FMG121000	10,0	10	73	22	58,50
2.740	520	1.680	250	1.360	240	FMG121200	12,0	12	75	26	79,80
2.470	465	1.520	225	1.210	220	FMG121400	14,0	14	85	30	109,00
2.200	410	1.360	200	1.060	200	FMG121600	16,0	16	92	32	155,40
1.940	365	1.210	180	950	175	FMG121800	18,0	18	92	38	229,20
1.680	320	1.060	160	840	150	FMG122000	20,0	20	100	38	229,20
1.360	250	840	130	680	130	FMG122500	25,0	25	120	40	315,25*

*Até o fim das existências.



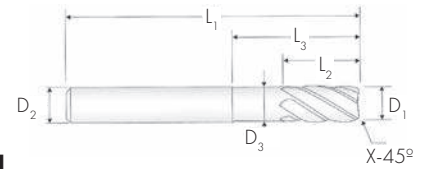
FRESA FRONTAL 6 NAVALHAS, SÉRIE CURTA, HÉLICE A 45°

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

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS								FMG14					
R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	TOL -0,03 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	€	
													<30 HRc
8.900	2.670	5.760	1.555	4.850	1.310	2.100	370	FMG140300	3,0	3	38	8	23,59
7.560	2.260	4.800	1.440	4.100	1.230	1.800	325	FMG140400	4,0	4	50	11	26,10
6.300	2.090	4.050	1.215	3.700	1.180	1.580	300	FMG140500	5,0	5	50	13	33,00
5.560	2.000	3.880	1.370	3.370	1.100	1.350	280	FMG140600	6,0	6	50	16	33,86
4.200	2.000	2.940	1.370	2.490	1.100	1.000	280	FMG140800	8,0	8	60	19	47,36
3.360	2.000	2.320	1.370	1.920	1.100	440	280	FMG141000	10,0	10	75	22	66,05
2.840	1.680	2.000	1.160	1.610	1.000	400	250	FMG141200	12,0	12	75	26	96,71
2.470	1.470	1.740	1.020	1.380	885	355	220	FMG141400	14,0	14	90	32	124,83
2.100	1.260	1.480	880	1.160	770	310	190	FMG141600	16,0	16	100	32	170,32
1.890	1.130	1.320	785	1.030	695	280	170	FMG141800	18,0	18	100	38	197,69
1.680	1.010	1.160	690	900	920	250	155	FMG142000	20,0	20	100	38	246,63
1.500	900	1.100	600	850	540	220	135	FMG142500	25,0	25	100	38	420,39





FRESA FRONTAL 4 NAVALHAS DE HÉLICE VARIÁVEL

INOX

Ref. FMG83

4 Z

DIN
6527MG
MD

WELDON

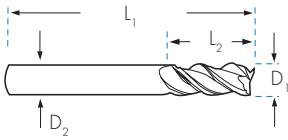
TiAIN

Micro Grão
MD

REVOLUÇÕES E AVANÇOS

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





FRESA FRONTAL 3 A 4 NAVALHAS, SÉRIE CURTA, HÉLICE A 50°

INOX Ref. FMG13

3-4 Z

MG MD

50°

WELDON

TiAlN

INOX

45 HRc

Ti

INC

Micro Grão MD

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS

<30 HRc		30-45 HRc		INOX		INC	
R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min
5.560	310	3.360	200	2.840	160	1.280	40
4.200	310	2.520	180	2.100	160	920	40
3.260	310	2.000	140	1.680	140	740	40
2.740	250	1.680	120	1.370	120	620	30
2.200	200	1.360	100	1.050	100	460	25
1.940	175	1.210	85	950	85	410	20
1.680	150	1.060	70	840	70	350	20
1.360	115	840	60	670	60	300	15

FMG13

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

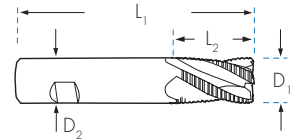


*Até o fim das existências.

NOTA: nas operações de fresagem por uma face deberemos aumentar os avanços num 30%, mantendo as revoluções.

TOLERÂNCIAS CONFORME DIN 7160 e 7161

Gama de tolerâncias μm / Diâmetro nominal em 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 FRONTAIS 3 A 5 NAVALHAS, DESBASTE FINO

INOX

Ref. FMG15
Ref. FMG16MG
MD

30°



NF



WELDON

TiAIN

INOX

45
HRc

Ti

INC

Micro Grão
MD

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS

R.P.M. rev./min	AVANÇO mm/min	 <30 HRc		 30-45 HRc		 INOX		 INC	
		R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min
15.600	2.320	12.400	840	8.400	570	2.400	190		
13.600	2.320	10.800	840	7.350	570	2.100	190		
11.600	2.320	9.200	840	6.300	570	1.800	190		
10.400	2.320	8.400	840	5.700	570	1.550	190		
9.200	2.320	7.600	840	5.100	570	1.300	190		
8.000	2.400	6.000	800	4.200	570	1.200	190		
6.800	2.400	5.200	840	3.600	570	900	130		
6.000	2.400	4.800	760	3.300	510	800	110		
5.200	2.320	4.400	720	2.700	420	700	100		
4.800	2.160	3.600	560	2.400	360	660	100		
4.300	2.150	3.200	620	2.160	410	600	100		

FMG15


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



*Até o fim das existências.

SÉRIE LONGA

REVOLUÇÕES E AVANÇOS

R.P.M. rev./min	AVANÇO mm/min	 <30 HRc		 30-45 HRc		 INOX		 INC	
		R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min
15.600	2.320	12.400	840	8.400	570	2.400	190		
13.600	2.320	10.800	840	7.350	570	2.100	190		
11.600	2.320	9.200	840	6.300	570	1.800	190		
10.400	2.320	8.400	840	5.700	570	1.550	190		
9.200	2.320	7.600	840	5.100	570	1.300	190		
8.000	2.400	6.000	800	4.200	570	1.200	190		
6.800	2.400	5.200	840	3.600	570	900	130		
6.000	2.400	4.800	760	3.300	510	800	110		
5.200	2.320	4.400	720	2.700	420	700	100		
4.800	2.160	3.600	560	2.400	360	660	100		
4.300	2.150	3.200	620	2.160	410	600	100		

FMG16

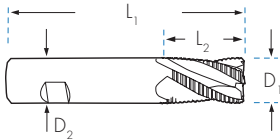
	TOL h10	TOL h6	L1 mm	L2 mm	Z	€
	D1 mm	D2 mm				
FMG160600	6,0	6	57	16	3	41,32*
FMG160700	7,0	8	63	16	3	48,29*
FMG160800	8,0	8	63	16	3	48,29*
FMG160900	9,0	9	72	19	4	72,02*
FMG161000	10,0	10	72	22	4	72,02*
FMG161200	12,0	12	83	26	4	92,41*
FMG161400	14,0	14	83	26	4	112,06*
FMG161600	16,0	16	92	32	4	150,39*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



*Até o fim das existências.

TOLERÂNCIAS CONFORME DIN 7160 e 7161

Gamma de tolerâncias μm / Diâmetro nominal em mm					
	de 1 a 3	de 3 a 6	de 6 a 10	de 10 a 18	de 18 a 30
TOL e8	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
TOL h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13



FRESA FRONTAL 4 A 6 NAVALHAS, SÉRIE CURTA, HÉLICE A 45°

INOX Ref. FMG17

4-6 Z

MG MD

45°

NF WELDON

TiAIN INOX

45 HRc

INC

Micro Grão MD

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS								FMG17						
R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	INOX		INC		TOL h10 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	Z	€	
				R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min							
15.600	2.320	12.400	840	8.400	570	2.400	190	FMG170600	6,0	6	54	7	4	38,45*
11.600	2.320	9.200	840	6.300	570	1.800	190	FMG170800	8,0	8	58	9	4	44,93*
9.200	2.320	7.600	840	5.100	570	1.300	190	FMG171000	10,0	10	66	14	4	67,00*
8.000	2.400	6.000	800	4.200	570	1.200	190	FMG171200	12,0	12	73	16	4	85,95*
6.000	2.400	4.800	760	3.300	510	800	110	FMG171600	16,0	16	82	22	5	139,88*
4.800	2.160	3.600	560	2.400	360	660	100	FMG172000	20,0	20	92	26	6	179,98*



*Até o fim das existências.

FRESA FRONTAL 3 A 6 NAVALHAS, SÉRIE LONGA, HÉLICE A 45°

INOX Ref. FMG18

3-6 Z

MG MD

45°

NF WELDON

TiAIN INOX

45 HRc

INC

Micro Grão MD

SÉRIE LONGA

REVOLUÇÕES E AVANÇOS								FMG18						
R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	INOX		INC		TOL h10 D1 mm	TOL h6 D2 mm	L1 mm	L2 mm	Z	€	
				R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min							
20.100	4.600	18.400	1.700	12.600	1.040	3.800	399	FMG180400	4,0	6	57	11	3	40,12*
18.000	4.600	15.000	1.650	10.200	1.040	2.200	390	FMG180500	5,0	6	57	13	4	40,12*
15.600	2.320	12.400	840	8.400	570	2.400	190	FMG180600	6,0	6	57	16	4	40,12*
13.600	2.320	10.800	840	7.350	570	2.100	190	FMG180700	7,0	8	63	16	4	46,88*
11.600	2.320	9.200	840	6.300	570	1.800	190	FMG180800	8,0	8	63	16	4	46,88*
10.400	2.320	8.400	840	5.700	570	1.550	190	FMG180900	9,0	10	72	19	4	69,92*
9.200	2.320	7.600	840	5.100	570	1.300	190	FMG181000	10,0	10	72	22	4	69,92*
8.000	2.400	6.000	800	4.200	570	1.200	190	FMG181200	12,0	12	83	26	4	89,72*
6.800	2.400	5.200	840	3.600	570	900	130	FMG181400	14,0	14	83	26	5	108,80*
6.000	2.400	4.800	760	3.300	510	800	110	FMG181600	16,0	16	92	32	5	146,01*
4.800	2.160	3.600	560	2.400	360	660	100	FMG182000	20,0	20	104	38	6	234,85*
4.300	2.150	3.200	620	2.160	410	600	100	FMG182500	25,0	25	121	45	6	411,61*



*Até o fim das existências.

FRESA FRONTAL 4 A 6 NAVALHAS, SÉRIE LONGA, HÉLICE A 45°

INOX

Ref. FMG19

4-6 Z

MG
MD

NF

WELDON

TiAlN

INOX

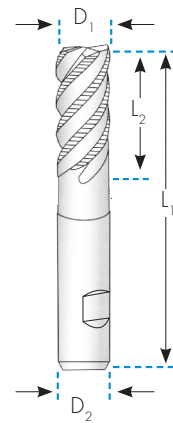
INC

Micro Grão
MD

SÉRIE LONGA

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

*Até o fim das existências.



REVOLUÇÕES E AVANÇOS

R.P.M. rev./min					INOX		INC	
	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO mm/min	R.P.M. rev./min	AVANÇO 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	

TOLERÂNCIAS CONFORME DIN 7160 e 7161

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

FRESA FRONTAL 2 E 3 NAVALHAS, SÉRIE CURTA, HÉLICE A 45°, PARA ALUMÍNIO

AI

MG
MD

45°
N

CILÍNDRICO

2Z

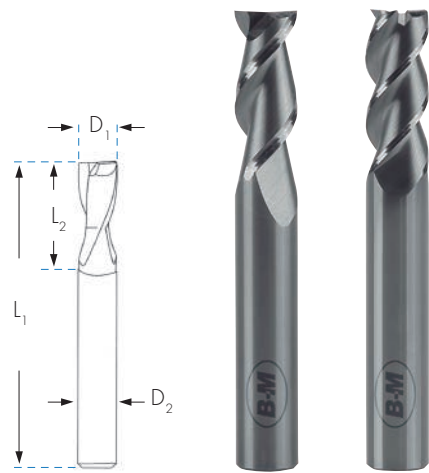
Ref. FMD59

3Z

Ref. FMD33

Micro Grão
MD

SÉRIE CURTA

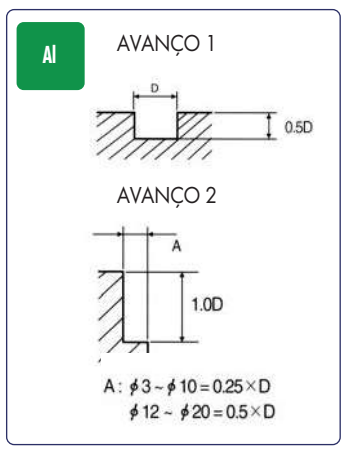


REVOLUÇÕES E AVANÇOS							FMD59	FMD33
			TOL -0,05	TOL h6			2Z	3Z
R.P.M. rev./min.	AVANÇO 1 mm/min	AVANÇO 2 mm/min	D1 mm	D2 mm	L1 mm	L2 mm	€	€
10.000	700	900	3,0	6,0	50	8	26,54	26,54
10.000	900	1.100	4,0	6,0	50	11	28,75	28,75
10.000	1.000	1.300	5,0	6,0	50	13	29,70	29,70
10.000	1.200	1.500	6,0	6,0	50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

TOLERÂNCIAS CONFORME DIN 7160 e 7161

Gama de tolerâncias μm / Diâmetro nominal em mm

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





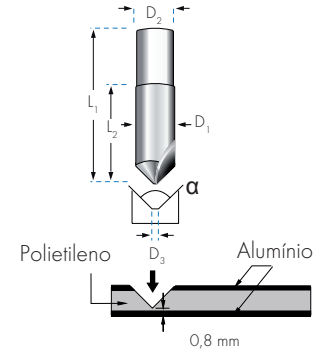
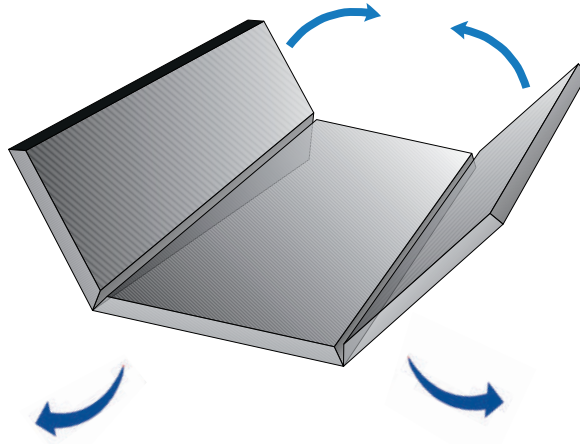
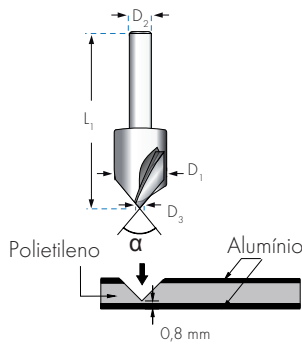
FRESAS FRONTAIS ESPECIAIS PARA ALUCOBOND

PMD

Ref. FFALUC

MDI

Ref. FFALUC...MDI



DE PASTILHA SOLDADA

DE METAL DURO INTEGRAL

	FFALUC					
	D ₁ mm	D ₂ mm	D ₃ mm	L ₁ mm	α	€
FFALUC1600	16,00	8	2,5	55	90°	226,48
FFALUC1800	18,00	8	2,5	55	90°	238,52
FFALUC2000	20,00	8	2,5	55	90°	254,32
FFALUC1600-135	16,00	8	2,3	55	135°	226,48
FFALUC1800-135	18,00	8	2,3	55	135°	238,52
FFALUC2000-135	20,00	8	2,3	55	135°	254,32

	FFALUC...MDI						
	D ₁ mm	D ₂ mm	D ₃ mm	L ₁ mm	L ₂ mm	α	€
FFALUC1400MDI	14,00	14	2,5	50	14	90°	135,48
FFALUC1600MDI	16,00	16	2,5	50	16	90°	154,18
FFALUC1800MDI	18,00	18	2,5	50	18	90°	177,86
FFALUC1400MDI-135	14,00	14	0,5	50	14	135°	135,48
FFALUC1600MDI-135	16,00	16	0,5	50	16	135°	154,18
FFALUC1800MDI-135	18,00	18	0,5	50	18	135°	177,86

FRESAS DE METAL DURO FRONTAIS COM COLARINHO



Ref. FMG74
Ref. FMG75
Ref. FMG76

2 Z



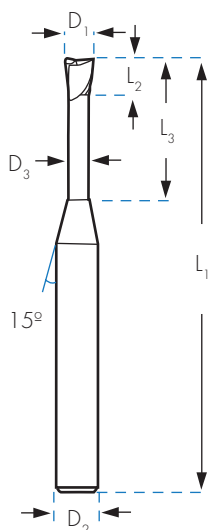
MG
MD



TiAIN



Micro Grão
MD



FMG74

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

FMG75

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

FMG76

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



FRESAS FRONTAIS DE METAL DURO BOLEADAS COM COLARINHO

Ref. FMG77
Ref. FMG78
Ref. FMG79

2 Z

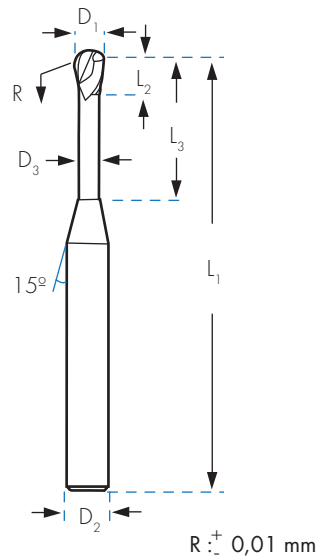
MG
MD

30°



CILÍNDRICO

TiAlN

50
HRcMicro Grão
MD

FMG77

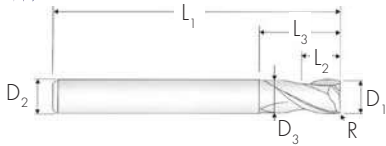
	TOL -0,02	TOL h6					€
	D1 mm	D2 mm	D3 mm	L1 mm	L2 mm	L3 mm	
FMG770050	0,5	4	0,45	45	0,7	8	101,06
FMG770100	1,0	4	0,95	55	1,5	20	103,69
FMG770150	1,5	4	1,45	55	2,3	20	93,60
FMG770200	2,0	4	1,95	55	3,0	20	89,82
FMG770300	3,0	6	2,85	60	4,5	20	116,16
FMG770400	4,0	6	3,85	65	6,0	20	116,16
FMG770500	5,0	6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

FMG78

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

FMG79

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



FRESA FRONTAL DE 2 NAVALHAS PARA AÇOS DE TÊMPERA EXTREMA 70 HRC



Ref. FMG01

2 Z



MG
MD



CILÍNDRICO

BLUE



Micro Grão
MD

REVOLUÇÕES E AVANÇOS

50-55 HRc		55-60 HRc		60-65 HRc		65-70 HRc	
R.P.M. rev./min.	AVANÇO mm/min	R.P.M. rev./min.	AVANÇO mm/min	R.P.M. rev./min.	AVANÇO mm/min	R.P.M. rev./min.	AVANÇO mm/min
25.500	360	20.500	215	16.000	135	12.500	88
21.500	390	17.500	240	13.500	150	11.000	102
11.500	420	9.500	260	7.500	160	6.400	115
10.150	430	8.350	270	6.550	165	5.575	118
8.800	440	7.200	270	5.600	170	4.750	118
8.550	470	6.800	280	5.350	175	4.600	125
8.300	500	6.400	285	5.100	180	4.450	132
6.900	480	5.300	280	4.200	180	3.700	130
5.200	445	4.000	255	3.200	165	2.800	120
4.100	415	3.200	240	2.550	155	2.200	112
3.500	415	2.650	240	2.100	155	1.860	112
2.600	365	2.000	210	1.600	135	1.400	98
2.050	335	1.600	295	1.300	125	1.100	88

FMG01

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



*Até o fim das existências.

FRESA FRONTAL DE 4 NAVALHAS PARA AÇOS DE TÊMPERA EXTREMA 70 HRC



Ref. FMG04

4 Z



MG
MD



CILÍNDRICO

BLUE



Micro Grão
MD

REVOLUÇÕES E AVANÇOS

50-55 HRc		55-60 HRc		60-65 HRc		65-70 HRc	
R.P.M. rev./min.	AVANÇO mm/min	R.P.M. rev./min.	AVANÇO mm/min	R.P.M. rev./min.	AVANÇO mm/min	R.P.M. rev./min.	AVANÇO mm/min
25.500	710	20.500	430	16.000	270	12.500	175
21.500	775	17.500	475	13.500	295	11.000	200
17.500	840	14.500	520	11.000	320	9.500	230
14.500	840	12.000	520	9.250	320	7.950	230
11.500	840	9.500	520	7.500	320	6.400	230
10.150	860	8.350	530	6.550	328	5.575	240
8.800	880	7.200	540	5.600	335	4.750	240
8.550	940	6.800	560	5.350	353	4.600	255
8.300	1.000	6.400	580	5.100	370	4.450	270
6.900	950	5.300	560	4.200	350	3.700	260
5.200	900	4.000	520	3.200	330	2.800	240
4.100	840	3.200	480	2.550	310	2.200	220
3.500	840	2.650	480	2.100	300	1.860	220
2.600	730	2.000	420	1.600	270	1.400	200
2.050	650	1.600	380	1.300	250	1.100	180

FMG04

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



*Até o fim das existências.



FRESA FRONTAL DE 2 NAVALHAS BOLEADA PARA AÇOS DE TÊMPERA EXTREMA 70 HRc



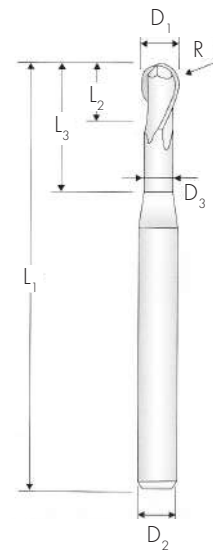
Ref. FMG02

2 Z

MG
MD

CILÍNDRICO

BLUE

Micro Grão
MD

SÉRIE CURTA

REVOLUÇÕES E AVANÇOS

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

FMG02

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

*Até o fim das existências.

TOLERÂNCIAS CONFORME DIN 7160 e 7161

Gama de tolerâncias μm / Diâmetro nominal em 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

FRESA FRONTAL DE 6 NAVALHAS PARA AÇOS DE TÊMPERA EXTREMA 70 HRC



Ref. FMG06

6 Z



MG MD

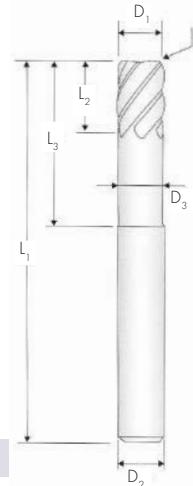


CILÍNDRICO

BLUE



Micro Grão MD



SÉRIE CURTA

FMG06

REVOLUÇÕES E AVANÇOS

50-55 HRc		55-60 HRc		60-65 HRc		65-70 HRc	
R.P.M rev./min.	AVANÇO mm/min	R.P.M rev./min.	AVANÇO mm/min	R.P.M rev./min.	AVANÇO mm/min	R.P.M rev./min.	AVANÇO 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

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

*Até o fim das existências.

SÉRIE LONGA

FMG07

REVOLUÇÕES E AVANÇOS

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

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

*Até o fim das existências.

TOLERÂNCIAS CONFORME DIN 7160 e 7161

Gama de tolerâncias μm / Diâmetro nominal em mm

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

FRESAS FRONTAIS PARA AÇOS DE TÊMPERA EXTREMA 70HRC,
TECNOLOGIA DE MICRO-FRESAGEM, PEÇAS DE PRECISÃO

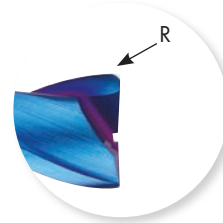
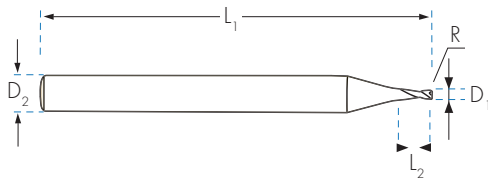
Ref. FMG09

2 Z

MG
MD

CILÍNDRICO

BLUE

TOL D1
-0,012TOL D2
h6Micro Grão
MD

FMG09

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



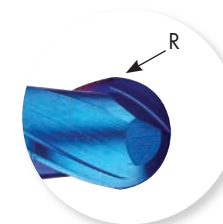
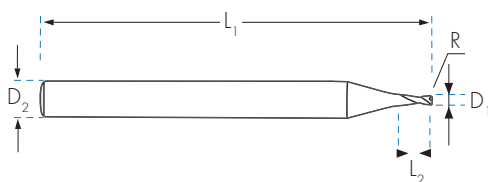
Ref. FMG08

2 Z

MG
MD

CILÍNDRICO

BLUE

TOL D1
-0,012TOL D2
h6Micro Grão
MD

FMG08

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

FRESAS COM FURO



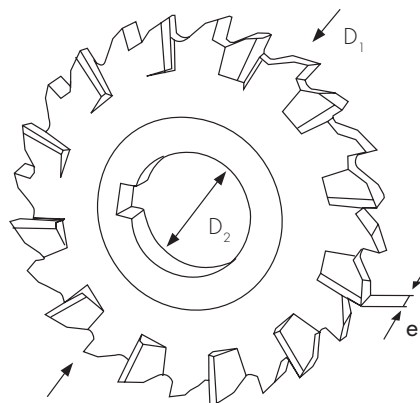
BLUE-MASTER[®]
by celesa

CUTTING TECHNOLOGIES

FRESA HSSCo DE 3 NAVALHAS PARA FAZER RANHURA COM DENTE CRUZADO


Ref. FF56

HSSCo

DIN
885A

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

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

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

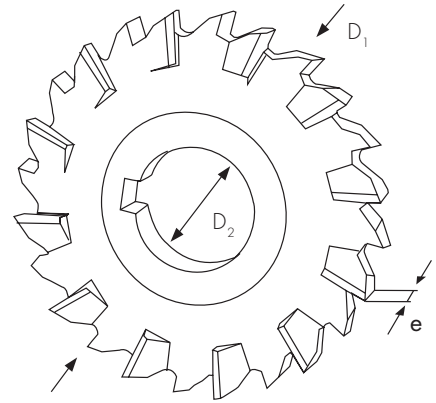
FRESA HSSCo DE 3 NAVALHAS PARA FAZER RANHURA COM DENTE RETO



Ref. FF59

HSSCo

**DIN
885B**



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

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

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

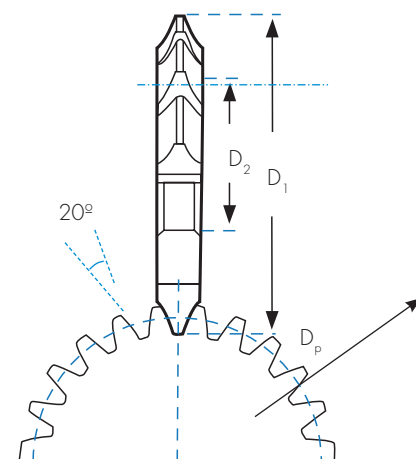
FRESA DE MÓDULO PARA ENGRANAGENS

Fresas

Rosa

HSS

Ref. 99RFM



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

NÚMERO DE FRESA / DENTES A TALHAR

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-∞

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

NOTA: o preço depende do módulo, independentemente do nº de dentes a talhar.

FRESAS CILÍNDRICAS, FRONTAIS COM CHAVETA TRANSVERSAL HSSCo

Ref. FF87

HSSCo

DIN
1880

ACABAMENTO

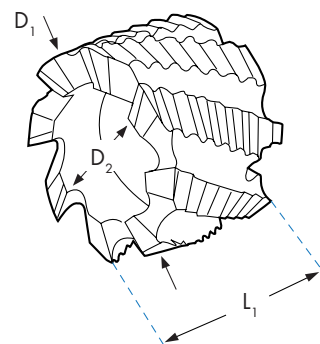
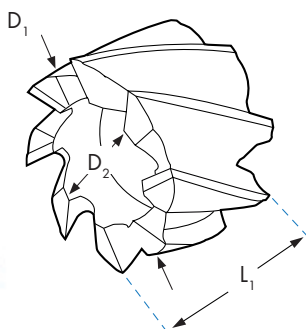
Ref. FF88

HSSCo

DIN
1880

NR

DESBASTE



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

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

FRESAS CILÍNDRICAS, FRONTAIS COM CHAVETA TRANSVERSAL HSSCo



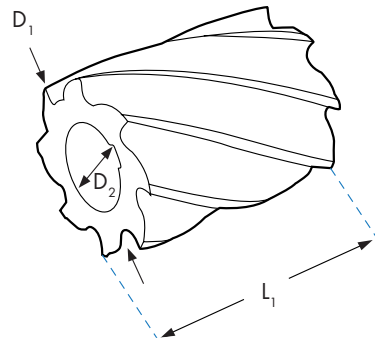
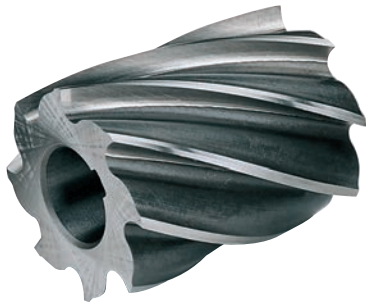
Ref. FF89

HSSCo

DIN 884



CILÍNDRICA PARA PLANEAR



					FF89
D ₁ mm	D ₂ mm	L ₁ mm	Z		€
50	22	63	8		167,15*
50	22	80	8		249,17*
63	27	50	8		219,34*
63	27	70	8		266,86*
80	32	63	8		369,69*
100	40	70	10		575,17*

*Até o fim das existências.

FRESAS CILÍNDRICAS, FRONTAIS, COM CABO, PARA PLANEAR

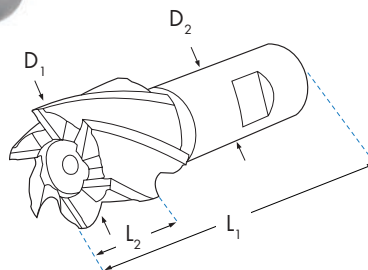


Ref. FMF87

HSSCo 8%



ACABAMENTO



					FMF87
D ₁ mm	L ₂ mm	L ₁ mm	D ₂ mm	Z	€
30	30	90	20	6	194,48
35	30	90	20	6	223,19
40	32	95	25	8	278,17

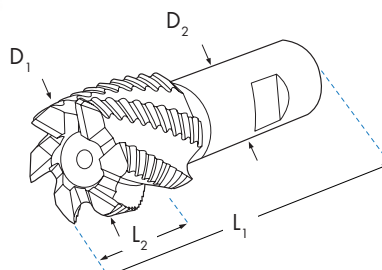


Ref. FMF88

HSSCo 8%



DESBASTE



					FMF88
D ₁ mm	L ₂ mm	L ₁ mm	D ₂ mm	Z	€
30	30	90	20	6	224,83
35	30	90	20	6	288,03
40	32	95	25	8	352,84

FRESAS ANGULARES ISÓSCELES HSSCo

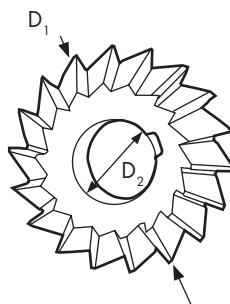
Ref. FF77

HSSCo

DIN
847

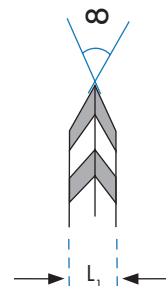
Ref. FF78

HSSCo

DIN
847

Ref. FF79

HSSCo

DIN
847

FF77

D ₁ mm	D ₂ mm	L ₁ mm	∞	Z	€
50	16	8	45°	20	178,09
63	22	10	45°	22	211,83
80	27	12	45°	24	295,76
100	32	18	45°	26	369,75

FF78

D ₁ mm	D ₂ mm	L ₁ mm	∞	Z	€
50	16	10	60°	18	181,59
63	22	14	60°	20	215,99
80	27	18	60°	22	301,55
100	32	25	60°	24	377,00

FF79

D ₁ mm	D ₂ mm	L ₁ mm	∞	Z	€
50	16	14	90°	16	181,59
63	22	20	90°	18	215,99
80	27	22	90°	20	301,55
100	32	32	90°	22	377,00

FRESAS ANGULARES FRONTAIS HSSCo

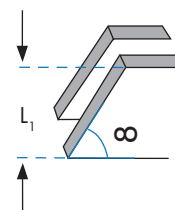
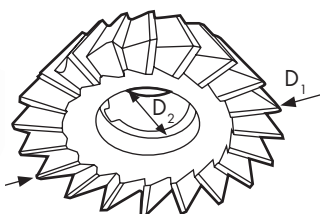
Ref. FF91

HSSCo

DIN
842

Ref. FF90

HSSCo

DIN
842

FF91

D ₁ mm	D ₂ mm	L ₁ mm	∞	Z	€
40	10	13	50°	14	140,82
50	13	16	50°	16	173,65
63	16	20	50°	18	219,51
80	22	25	50°	20	316,26
100	27	32	50°	22	458,70
125	32	40	50°	24	757,47
160	40	50	50°	30	1.325,02

FF90

D ₁ mm	D ₂ mm	L ₁ mm	∞	Z	€
40	10	13	60°	14	138,08
50	13	16	60°	16	170,28
63	16	20	60°	18	215,25
80	22	25	60°	20	310,13
100	27	32	60°	22	449,78
125	32	40	60°	24	742,79
160	40	50	60°	30	1.299,30

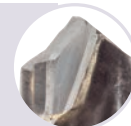


FRESAS PARA CHAVES

BLUE-MASTER[®]
by CELESA

CUTTING TECHNOLOGIES

FERRAMENTAS PARA CHAVEIROS
A GAMA MAIS AMPLA DE FERRAMENTAS PARA SERRALHERIA
DIN 338
PMD

BRILHANTE
FUNDAÇÃO


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

Broca DIN 338 com ponta de metal duro para METAIS DUROS. Broca de ALTA DUREZA para a furação de METAIS DUROS em serralheria. Encontre-a na página 51.

DIN 338
HSSCo 5%

DOURADO
120 Kg/mm²


Broca produzida em HSSCo conforme à norma DIN 338 para metais de 120 Kg/mm² de dureza. Broca de ALTA DUREZA para usos gerais em serralheria. Encontre-a na página 50.

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


DIN 338
PMD

BRILHANTE
70 HRc


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

Broca DIN 338 com ponta de metal duro para METAIS MUITO DUROS ou TEMPERADOS. Broca de ALTA DUREZA para a furação de METAIS MUITO DUROS ou TEMPERADOS em serralheria. Encontre-a na página 51.

MD
TOL D1 h7
TOL D2 h6

15° "H"
TiAIN
HARDOX 600
ALTA PRODUÇÃO
70 HRc


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

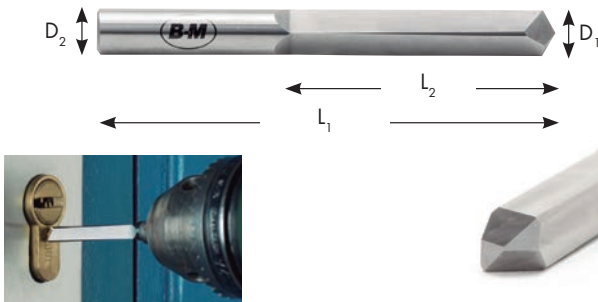
Broca de metal duro integral para METAIS TEMPERADOS, até dureza 70HRc. Broca de MÁXIMA DUREZA para a furação de METAIS TEMPERADOS em serralheria. Encontre-a na página 70.

BROCA QUADRADA PARA FURAR CANHÕES DE SEGURANÇA



Broca de seção quadrada produzida em metal duro integral para a FURAÇÃO DE CANHÕES E PIVOS ANTI-DRILLING. A BROCA Nº 1 PARA A FURAÇÃO DE CANHÕES DE ALTA DUREZA em serralheria.

* Para furar os canhões com pivos "anti-drilling" trabalhar a 300RPM.



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

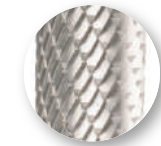
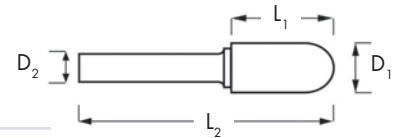
FRESA DE SERRALHEIRO PARA FRESAGEM DE CANHÕES DE SEGURANÇA

TIPO
C

MD



Fresa para o CHAVEIRO, também conhecida como VAMPIRO, produzida em metal duro integral. Geometria hemisférica em comprimentos totais de 60mm a 150mm. A fresa ideal para a FRESAGEM DE CANHÕES, selecione, da ampla gama de dimensões, a mais adequada para a sua aplicação.



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



FRESA CILÍNDRICA COM CORTE FRONTAL

TIPO
A/E

MD

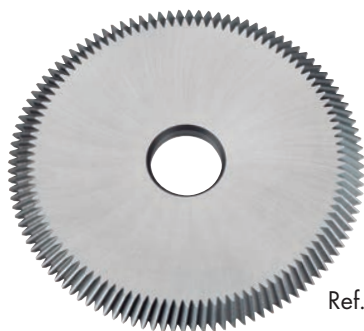


Fresas rotativas de metal duro forma A / E (Frente cilíndrica) e forma C (hemisférica). A fresa ideal para a FRESAGEM DE CANHÕES, selecione, da ampla gama de dimensões, a mais adequada para a sua aplicação. Encontre-as na páginas 335.

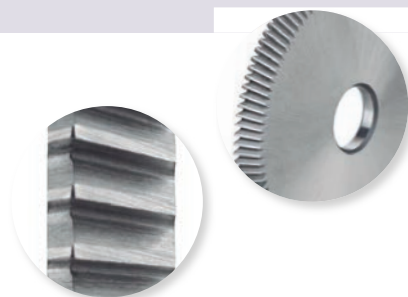


	D1 mm	L2 mm	D2 mm	L1 mm		1U.		1U.	
6 mm. CABO	6.0	25.0	6	50	Monobloc	A60625-6E	35,21	A60625-6EB	39,21



FRESAS PARA MÁQUINAS DE FAZER CHAVES JMA
FRESAS DE SERRETA O BICONICAS


Ref. FLLFP4



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



Ref.FLL99: Fresa de serreta 80x5x16 Z110 sem chanfro lateral.




FRESAS PARA MÁQUINAS DE FAZER CHAVES JMA

SERRAS CIRCULARES DE CORTE LATERAL



Ref. FLLFP19



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

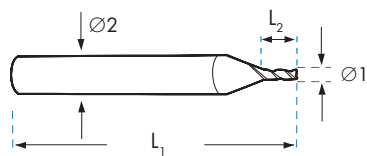
SERRAS PARA CHAVES DE PALHETÃO



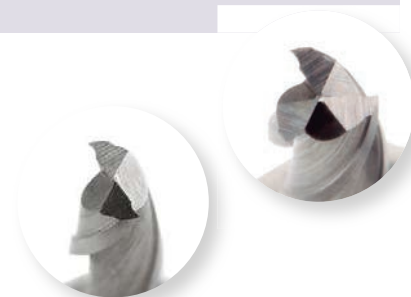
Ref. FLLFP22W



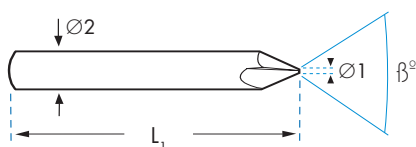
Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	mm			Z	FLL	€
									
FLLFP9	FP9	ECCO BIT	HSSV	63	16	1	80	75,45	
FLLFP10	FP10	ECCO FORD, ECCO ABBLOY, PASADENA, NEBRASCA	HSSV	63	16	2,4	80	75,45	
FLLFP22	FP22	TITAN BIT, DAKOTA, SARATOGA	HSSV	80	16	1	100	80,48	
FLLFP22W	FP22W	TITAN BIT, DAKOTA, SARATOGA	MD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

FRESAS PARA MÁQUINAS DE FAZER CHAVES JMA
FRESAS PARA CHAVES DE REGATA


Ref. FLLF3



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

FRESAS PARA FAZER O PONTO UNIVERSAIS PARA MAQUINAS TIPO JMA E SILCA


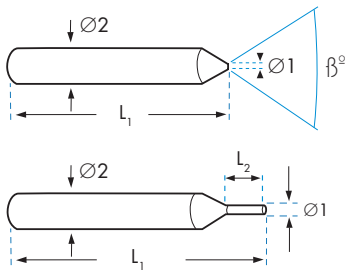
Ref. FLLF1



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

APALPADORES PARA MÁQUINAS DE FAZER CHAVES JMA

APALPADORES



Ref. FLLP1



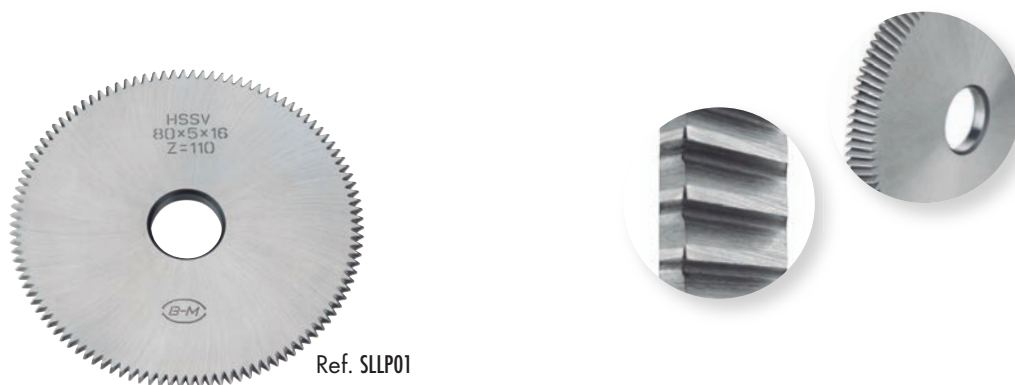
Ref. FLLP3



Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	β°	\varnothing_1 mm	L ₁ mm	\varnothing_2 mm	L ₂ mm	€
FLLP1	(PLL38)	P1	HSSV	90°	0,8	45	6	-	19,93
FLLP3	(PLL32)	P3	HSSV	-	1,5	45	6	4	35,25
FLLP5		P5	HSSV	90°	0,9	45	6	-	19,93
FLLP8	(PLL35)	P8	HSSV	-	4	45	6	7	35,25
FLLP11	(PLL33)	P11	HSSV	-	2,5	45	6	4	35,25
FLLP13	(PLL50)	P13	HSSV	100°	0,8	45	6	-	19,93
FLLP17	(PLL34)	P17	HSSV	-	3	45	6	6	35,25
FLLP52	(PLL52)	-	HSSV	90°	0,9	45	6	-	19,93
FLLP77	(PLL36)	-	HSSV	-	5	45	6	7	35,25
FLLP78	(PLL37)	-	HSSV	-	6	45	6	8	35,25

FRESAS KEY LINE

Ref. BM	Ref. JMA	TIPOS DE MÁQUINAS	MATERIAL	β°	\varnothing_1 mm	L ₁ mm	\varnothing_2 mm	L ₂ mm	€
V001	-	KEY LINE	MD	90°	0,4	32	4	-	139,40
V003	-		MD	-	2,5	32	4	5	139,40
V004	-		MD	82°	0,5	32	4	-	139,40
V007	-		MD	100°	0,4	32	4	-	139,40
V012	-		MD	-	1,5	32	4	4	171,40

FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA
FRESAS DE SERRETA OU BICÓNICAS


Ref. SLLP01

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

SERRAS CIRCULARES DE CORTE LATERAL


Ref. SLLSG2

Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	mm		mm	Z	SLL	€
				mm	mm				
SLLY2KW	Y2KW	DELTA	MD	63	16	1,35	80		298,78
SLLSG19	SG19	DELTA	HSSV	64,6	9,52	1,5	40		84,43
SLLSG19W	SG19W	DELTA	MD	64,6	9,52	1,5	40		284,38
SLLSG18	SG18	DELTA	HSSV	64,6	9,52	2,4	40		84,43
SLLSG18W	SG18W	DELTA	MD	64,6	9,52	2,4	40		284,38
SLLSG6	SG6	LANCER	HSSV	80	22	1,3	100		86,77
SLLSG6W	SG6W	LANCER	MD	80	22	1,3	100		298,78
SLLSG2	SG2	TARGA/TECH3/TECHNICA	HSSV	80	22	1,5	100		86,77
SLLSG2W	SG2W	TARGA/TECH3/TECHNICA	MD	80	22	1,5	100		298,78
SLLFSCL4-CAW	FSCL4-CAW	DELTA	MD	80	22	1,8	100		310,59

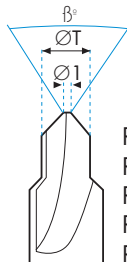
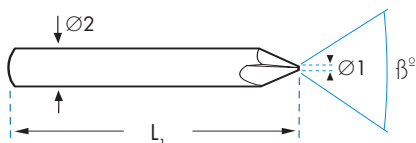
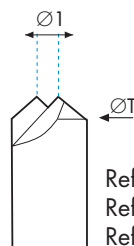
FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA
SERRAS PARA CHAVES DE PALHETÃO



Ref. SLLSG7W

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

FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA
FRESAS PARA FAZER O PONTO
MATRIX


Ref. SLLFIW


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

 Ref. SLLF12B
 Ref. SLLF15
 Ref. SLLF37

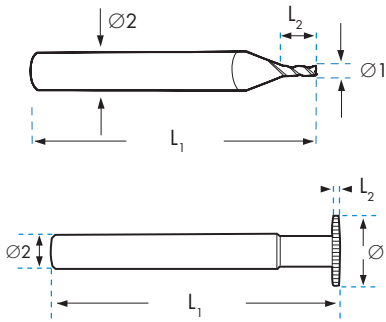

Ref. BM	Ref. SILCA	UNIV.	TIPOS DE MÁQUINAS	MATERIAL	 β°	Ø1 mm	L1 mm	Ø2 mm	Z	SLL
										€
SLLF1Z1	F1	FLLF1	MATRIX	HSSV	90°	0,7	48	6	1	55,77
SLLF1	F1	FLLF1	MATRIX	HSSV	90°	0,7	48	6	2	55,77
SLLF1W	F1W	FLLF1W	MATRIX	MD	90°	0,7	48	6	1	99,70
SLLF4	F4	FLLF1	MATRIX	HSSV	90°	0,4	48	6	1	55,77
SLLF5	F5	FLLF5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

* Ø1 x Ø1

FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA

FRESAS PARA CHAVES DE REGATA

MATRIX



Ref. SLLF3

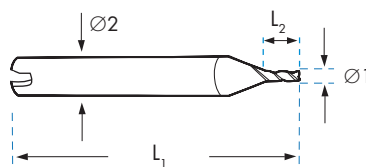


* Ref. SLLF62W

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

FRESAS PARA CHAVES DE REGATA

QUATTROCODE / TRIAX-E



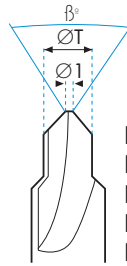
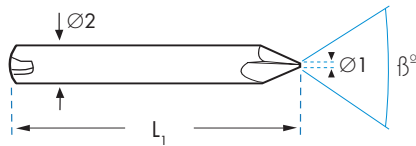
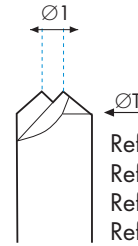
Ref. SLLW133



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

FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA
FRESAS PARA FAZER O PONTO
QUATTROCODE /TRIAX-E


Ref. SLLW103


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

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

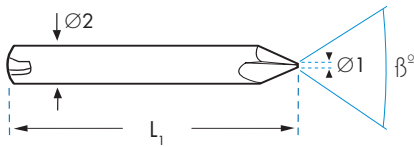

Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	β°	\varnothing_1 mm	L_1 mm	\varnothing_2 mm	Z	SLL	€
SLLW102	W102	QUATTROCODE /TRIAX-E	MD	106°	1	40	6	2		89,29
SLLW103	W103/W299	QUATTROCODE /TRIAX-E	MD	90°	0,8	40	6	2		89,29
SLLW104	W104	QUATTROCODE /TRIAX-E	MD	90°	1,2	40	6	2		89,29
SLLW105	W105	QUATTROCODE /TRIAX-E	MD	90°	0,7	40	6	2		89,29
SLLW106	W106	QUATTROCODE /TRIAX-E	MD	90°	0,6	40	6	2		89,29
SLLW107	W107	QUATTROCODE /TRIAX-E	MD	90°	0,9	40	6	2		89,29
SLLW108	W108	QUATTROCODE /TRIAX-E	MD	82°	0,9	40	6	2		89,29
SLLW109	W109	QUATTROCODE /TRIAX-E	MD	110°	0,4	40	6	2		89,29
SLLW110	W110	QUATTROCODE /TRIAX-E	MD	100°	0,6	40	6	2		89,29
SLLW111	W111	QUATTROCODE /TRIAX-E	MD	96°	8x2,75*	40	6	2		100,31
SLLW112	W112	QUATTROCODE /TRIAX-E	MD	60°/0°	1,5	40	6	2		89,87
SLLW113	W113	QUATTROCODE /TRIAX-E	MD	100°	0,76	40	6	2		89,29
SLLW115	W115	QUATTROCODE /TRIAX-E	MD	54°	4x0,86*	40	6	1		119,70
SLLW116	W116	QUATTROCODE /TRIAX-E	MD	90°	1	40	6	2		89,29
SLLW118	W118	QUATTROCODE /TRIAX-E	MD	120°	0,6	40	6	2		89,29
SLLW119	W119	QUATTROCODE /TRIAX-E	MD	85°	0,3	40	6	2		89,29
SLLW121	W121	QUATTROCODE /TRIAX-E	MD	86°	0,05	48	6	3		124,24
SLLW122	W122	QUATTROCODE /TRIAX-E	MD	90°	0,55	40	6	2		107,15
SLLW123	W123	QUATTROCODE /TRIAX-E	MD	76°	0,9	40	6	2		89,29
SLLW124	W124	QUATTROCODE /TRIAX-E	MD	90°	8x0,8*	48	6	3		171,16
SLLW126	W126	QUATTROCODE /TRIAX-E	MD	80°	3,3	48	6	2		107,15
SLLW127	W127	QUATTROCODE /TRIAX-E	MD	80°	2,1	48	6	2		107,15
SLLW128	W128	QUATTROCODE /TRIAX-E	MD	90°	4x0,55*	48	6	1		119,70
SLLW130	W130	QUATTROCODE /TRIAX-E	MD	90°	1,4	40	6	2		120,20
SLLW132	W132	QUATTROCODE /TRIAX-E	MD	60°	2	40	6	1		119,70
SLLW135	W135	QUATTROCODE /TRIAX-E	MD	90°	4x0,55*	40	6	2		119,63
SLLW136	W136	QUATTROCODE /TRIAX-E	MD	76°	2,23	40	6	1		119,70
SLLW138	W138	QUATTROCODE /TRIAX-E	MD	90°	4x0,7*	48	6	2		89,29
SLLW139	W139	QUATTROCODE /TRIAX-E	MD	60°/50°	0,9	40	6	2		133,19
SLLW142	W142	QUATTROCODE /TRIAX-E	MD	100°	1,2	40	6	2		89,29
SLLW145	W145	QUATTROCODE /TRIAX-E	MD	90°	3,2x0,8*	48	6	2		119,63
SLLW210	W210	QUATTROCODE /TRIAX-E	MD	90°	5x1,05*	40	6	3		179,16
SLLW213	W213	QUATTROCODE /TRIAX-E	MD	90°	0,95*	40	6	2		134,82
SLLW221	W221	QUATTROCODE /TRIAX-E	MD	90°	0,5	40	6	2		120,20
SLLW225	W225	QUATTROCODE /TRIAX-E	MD	90°	1	40	6	2		120,20
SLLW238	W238	QUATTROCODE /TRIAX-E	MD	90°	0,8	40	6	2		89,29
SLLW261	W261	QUATTROCODE /TRIAX-E	MD	1,1	3x1,5*	48	6	2		134,82
SLLW255	W255	QUATTROCODE /TRIAX-E	MD	90°	4x0,8*	48	6	2		120,20
SLLW293	W293	QUATTROCODE /TRIAX-E	MD	90°	0,85	40	6	2		120,20
SLLW299	W299	QUATTROCODE /TRIAX-E	MD	90°	3x0,80	40	6	2		89,93

 * $\varnothing_1 \times \varnothing_1$

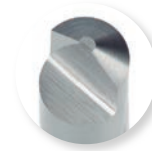
FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA

FRESAS PARA FAZER O PONTO

QUATTROCODE / TRIAX-E



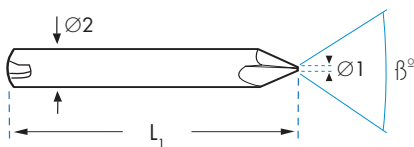
Ref. SLLW103Z1



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

SLL

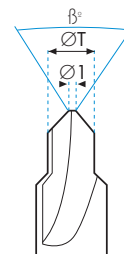
FRESAS PARA FAZER O PONTO



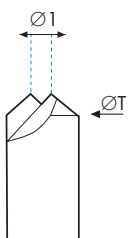
Ref. SLLH103



Ref. SLLH115



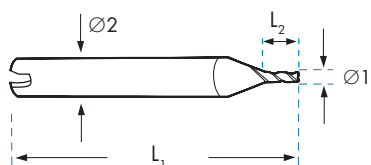
Ref. SLLH111
Ref. SLLH126
Ref. SLLH127



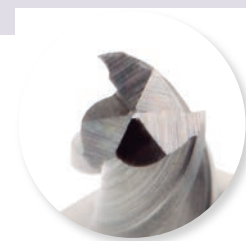
Ref. BM	Ref. SILCA	UNIV.	TIPOS DE MÁQUINAS	MATERIAL	β°	\varnothing_1 mm	L1 mm	\varnothing_2 mm	Z	€
SLLH103	H103	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,8	40	6	2	65,88
SLLH104	H104	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	1,2	40	6	2	58,85
SLLH105	H105	FLLF1	QUATTROCODE / TRIAX-E	HSSV	90°	0,7	40	6	2	58,85
SLLH106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

SLL

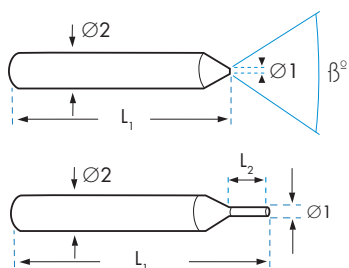
* $\varnothing_1 \times \varnothing_1$

FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA
FRESAS PARA CHAVES DE REGATA


Ref. SLLH101



Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	MATERIAL	Ø ₁ mm	L ₁ mm	Ø ₂ mm	L ₂ mm	Z	€	SLL
SLLH101	H101	QUATTROCODE / TRIAX-E	HSSV	2,5	40	6	6	3	65,51	
SLLH114	H114	QUATTROCODE / TRIAX-E	HSSV	2	40	6	6	3	55,77	
SLLH117	H117	QUATTROCODE / TRIAX-E	HSSV	5	48	6	R1	4	67,66	
SLLH129	H129	QUATTROCODE / TRIAX-E	HSSV	3	40	6	6	3	55,77	
SLLH131	H131	QUATTROCODE / TRIAX-E	HSSV	6	40	6	5	3	73,62	

APALPADORES


Ref. SLLT1



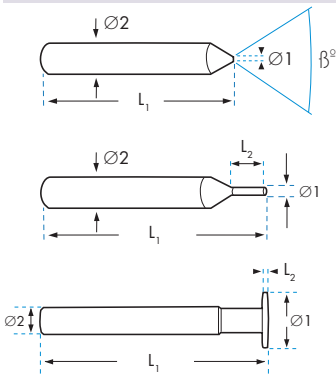
Ref. SLLT3



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

FRESAS PARA MÁQUINAS DE FAZER CHAVES SILCA

APALPADORES



*Ref. SLLT62W



Ref. SLLT1



Ref. SLLT3

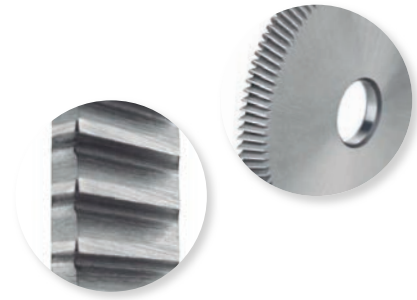


Fresas

Rosa

Ref. BM	Ref. SILCA	TIPOS DE MÁQUINAS	Ref. FRESA	MATERIAL	β°	\varnothing_1 mm	L1 mm	\varnothing_2 mm	L2 mm	\varnothing_T mm	€
SLLT24	T24	MATRIX	F24	HSSV	100°	1,3	48	6	-	-	43,86
SLLT25	T25	MATRIX	F25	HSSV	90°	3,5 x 0,65*	48	6	-	-	43,86
SLLT26	T26	MATRIX	F26	HSSV	82°	0,8	48	6	-	-	43,86
SLLT27	T27	MATRIX	F27	HSSV	60°	1,28	48	6	-	-	49,51
SLLT28	T28	MATRIX	F28	HSSV	76°	0,76	48	6	-	-	43,86
SLLT29	T29	MATRIX	F29	HSSV	76°	1,9	48	6	-	-	43,86
SLLT30	T30	MATRIX	F30	HSSV	-	3	48	6	10	-	43,86
SLLT30-45	T30-45	MATRIX		HSSV	-	3	45	6	10	-	43,86
SLLT33	T33	MATRIX	F33	HSSV	48°	1,4	48	6	-	-	65,39
SLLT34	T34	MATRIX	F34	HSSV	50°	1,5	48	6	-	-	43,86
SLLT37	T37	MATRIX	F37	HSSV	90°	2,1	48	6	-	-	43,86
SLLT39	T39	MATRIX	F39	HSSV	90°	0,6	48	6	-	-	43,86
SLLT40	T40	MATRIX	F40	HSSV	108°	0,4	48	6	-	-	43,86
SLLT42	T42	MATRIX	F42	HSSV	100°	0,7	48	6	-	-	43,86
SLLT43	T43	MATRIX	F43	HSSV	90°	1	48	6	-	-	43,86
SLLT44	T44	MATRIX	F44	HSSV	-	2	48	6	8	-	43,86
SLLT44-45	T44-45	MATRIX		HSSV	-	2	45	6	8	-	43,86
SLLT46	T46	MATRIX	F46	HSSV	100°	0,65	48	6	-	-	43,86
SLLT49	T49	MATRIX	F49	HSSV	95°	0,8	48	6	-	-	43,86
SLLT50	T50	MATRIX	F50	HSSV	100°	0,5	48	6	-	-	43,86
SLLT52	T52	MATRIX	F52	HSSV	54°	0,86	48	6	6	2	43,86
SLLT54	T54	MATRIX	F54	HSSV	-	4	40	6	6,5	-	55,77
SLLT55	T55	MATRIX	F55	HSSV	100°	1	48	6	4	-	43,86
SLLT59	T59	MATRIX	F59	HSSV	90°	0,8	48	6	-	-	43,86
SLLT62W*	T62W	MATRIX	F62W	MD	-	11,8	48	6	1	-	87,57
SLLT63	T63	MATRIX	F63	HSSV	78°	0,5	48	6	4	3	43,86
SLLT65	T65	MATRIX	F65	HSSV	90°	1,05	48	6	5	3	43,86
SLLT101	T101	MATRIX		HSSV	-	2,5	40	6	6	-	43,86
SLLT129	T129	MATRIX		HSSV	-	3	40	6	10	-	43,86
SLLU101	U101	QUATTROCODE		MD	-	1,2	48	6	3	-	55,77
SLLU101/H	U101/H	QUATTROCODE /TRIAX-E		MD	-	1,2	48	6	3	-	37,89
SLLU102/65	U102/65	QUATTROCODE /TRIAX-E		MD	30°	0,2	48	6	9	2,6	59,57
SLLU102TT	U102TT	QUATTROCODE /TRIAX-E		MD	30°	0,2	26	4	6	2	59,57
SLLU103	U103	QUATTROCODE /TRIAX-E		MD	-	1	48	6	3	-	55,77
SLLU103/H	U103/H	QUATTROCODE /TRIAX-E		MD	-	1	48	6	3	-	37,89
SLLU103-TT	U103-TT	QUATTROCODE /TRIAX-E		MD	-	1	21	4	3	-	55,77
SLLU103-TT/H	U103-TT/H	QUATTROCODE /TRIAX-E		MD	-	1	21	4	3	-	37,89
SLLU111	U111	SILCA VIPER		MD	-	1	40	6	2,2	-	55,77
SLLU111/H	U111/H	SILCA VIPER		MD	-	1	40	6	2,2	-	37,89
SLLB3304	B3304	KEYLINE BIANCHI 994 LASER		MD	-	1	33	6	6	-	55,79
SLLB3310	B3310	KEYLINE BIANCHI 994 LASER		MD	-	1	30	6	2,6	-	55,79
SLLB3310M2	B3310	KEYLINE BIANCHI 994 LASER		HSSV	-	1	30	6	2,6	-	41,33

SLL

FRESAS PARA MÁQUINAS DE FAZER CHAVES FLORA, NOVACLAU, WALKIN
OUTRAS FRESAS DE UTILIZAÇÃO GERAL

SERRETA OU BICÓNICAS

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


CORTE LATERAL

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