

FRESAS DE METAL DURO

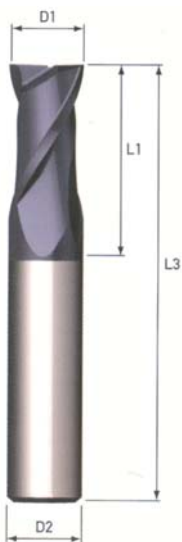
PROMOCIÓN

FRESAS DE METAL DURO



AYMA

HERRAMIENTAS, S.A.



SERIE
CORTA



30°

2
LABIOS

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
2,0	P5424020 TiAIN	P5416020 TiAIN	2,0	6	6	50	10,45
3,0	P5424030 TiAIN	P5416030 TiAIN	3,0	6	6	50	10,45
4,0	P5424040 TiAIN	P5416040 TiAIN	4,0	6	8	50	10,45
5,0	P5424050 TiAIN	P5416050 TiAIN	5,0	6	8	50	10,45
6,0	P5424060 TiAIN	P5416060 TiAIN	6,0	6	16	50	10,45
8,0	P5424080 TiAIN	P5416080 TiAIN	8,0	8	20	60	15,65
10,0	P5424100 TiAIN	P5416100 TiAIN	10,0	10	22	70	23,38
12,0	P5424120 TiAIN	P5416120 TiAIN	12,0	12	22	70	32,75
16,0	P5424160 TiAIN	P5416160 TiAIN	16,0	16	25	75	53,20
20,0	P5424200 TiAIN	P5416200 TiAIN	20,0	20	32	100	95,73



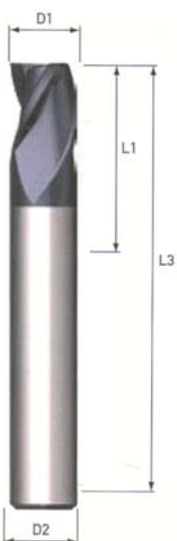
SERIE
CORTA



45°

3
LABIOS

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0	P8447030 TiAIN	P5447030 TiAIN	3,0	6	7	57	13,80
4,0	P8447040 TiAIN	P5447040 TiAIN	4,0	6	8	57	13,80
5,0	P8447050 TiAIN	P5447050 TiAIN	5,0	6	10	57	13,80
6,0	P8447060 TiAIN	P5447060 TiAIN	6,0	6	10	57	13,80
8,0	P8447080 TiAIN	P5447080 TiAIN	8,0	8	16	63	17,50
10,0	P8447100 TiAIN	P5447100 TiAIN	10,0	10	19	72	25,44
12,0	P8447120 TiAIN	P5447120 TiAIN	12,0	12	22	83	35,57
16,0	P8447160 TiAIN	P5447160 TiAIN	16,0	16	26	92	60,53
20,0	P8447200 TiAIN	P5447200 TiAIN	20,0	20	32	104	98,16



SERIE
LARGA



30°

3
LABIOS

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0	P5425030 TiAIN	P5417030 TiAIN	3,0	6	6	50	10,45
4,0	P5425040 TiAIN	P5417040 TiAIN	4,0	6	8	50	10,45
5,0	P5425050 TiAIN	P5417050 TiAIN	5,0	6	8	50	10,45
6,0	P5425060 TiAIN	P5417060 TiAIN	6,0	6	16	50	10,45
8,0	P5425080 TiAIN	P5417080 TiAIN	8,0	8	20	60	15,65
10,0	P5425100 TiAIN	P5417100 TiAIN	10,0	10	22	70	23,38
12,0	P5425120 TiAIN	P5417120 TiAIN	12,0	12	22	70	32,75
16,0	P5425160 TiAIN	P5417160 TiAIN	16,0	16	25	75	53,20
20,0	P5425200 TiAIN	P5417200 TiAIN	20,0	20	32	100	95,73



**SERIE
EXTRA LARGA**



30°

**4
LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0		P5827030 TiAIN	3,0	6	12	50	12,60
4,0		P5827040 TiAIN	4,0	6	15	50	12,60
5,0		P5827050 TiAIN	5,0	6	20	60	12,60
6,0		P5827060 TiAIN	6,0	6	20	60	12,60
8,0		P5827080 TiAIN	8,0	8	25	70	26,46
10,0		P5827100 TiAIN	10,0	10	30	90	29,40
12,0		P5827120 TiAIN	12,0	12	30	90	38,35
16,0		P5827160 TiAIN	16,0	16	50	110	60,90
20,0		P5827200 TiAIN	20,0	20	55	110	106,47



**SERIE
LARGA**



30°

**4
LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0	P5540030 TiAIN	P5449030 TiAIN	3,0	6	8	57	15,50
4,0	P5540040 TiAIN	P5449040 TiAIN	4,0	6	11	57	15,50
5,0	P5540050 TiAIN	P5449050 TiAIN	5,0	6	13	57	15,50
6,0	P5540060 TiAIN	P5449060 TiAIN	6,0	6	13	57	15,50
8,0	P5540080 TiAIN	P5449080 TiAIN	8,0	8	19	63	19,50
10,0	P5540100 TiAIN	P5449100 TiAIN	10,0	10	22	72	25,40
12,0	P5540120 TiAIN	P5449120 TiAIN	12,0	12	26	83	37,75
16,0	P5540160 TiAIN	P5449160 TiAIN	16,0	16	32	92	65,30
20,0	P5540200 TiAIN	P5449200 TiAIN	20,0	20	38	104	103,26



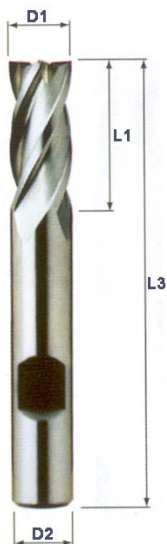
**SERIE
CORTA**



30°

**4
LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0	P5432030 TiAIN		3,0	3	12	32	8,30
4,0	P5432040 TiAIN		4,0	4	12	40	8,30
5,0	P5432050 TiAIN		5,0	5	14	50	8,30
6,0	P5432060 TiAIN	P5595060 TiAIN	6,0	6	16	50	10,29
8,0	P5432080 TiAIN	P5595080 TiAIN	8,0	8	20	60	15,86
10,0	P5432100 TiAIN	P5595100 TiAIN	10,0	10	22	70	22,05
12,0	P5432120 TiAIN	P5595120 TiAIN	12,0	12	22	70	28,77
16,0	P5432160 TiAIN	P5595160 TiAIN	16,0	16	25	75	46,62
20,0	P5432200 TiAIN	P5595200 TiAIN	20,0	20	32	100	79,91



SERIE LARGA



38°

4 LABIOS

SIN RECUBRIMIENTO

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
4,0		P5995040	4,0	6	15	62	23,84
5,0		P5995050	5,0	6	18	62	23,84
6,0		P5995060	6,0	6	18	62	23,84
8,0		P5995080	8,0	8	24	68	31,58
10,0		P5995100	10,0	10	30	80	32,87
12,0		P5995120	12,0	12	36	93	49,96
16,0		P5995160	16,0	16	48	108	77,18
20,0		P5995200	20,0	20	60	126	127,22

SERIE CORTA / LARGA



30°

2 LABIOS



	Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
SERIE CORTA	6,0	P5624060 TiAIN	P5650060 TiAIN	6,0	6	7	51	13,15
	8,0	P5624080 TiAIN	P5650080 TiAIN	8,0	8	9	59	18,40
	10,0	P5624100 TiAIN	P5650100 TiAIN	10,0	10	10	60	24,97
	12,0	P5624120 TiAIN	P5650120 TiAIN	12,0	12	14	71	35,04
	16,0	P5624160 TiAIN	P5650160 TiAIN	16,0	16	16	76	47,02
	20,0	P5624200 TiAIN	P5650200 TiAIN	20,0	20	20	82	87,41
SERIE LARGA	1,0	P5438010C	P5438010 TiAIN	1,0	3	6	38	11,87
	2,0	P5438020C	P5438020 TiAIN	2,0	3	6	38	11,87
	3,0	P5438030C	P5438030 TiAIN	3,0	6	7	57	11,87
	4,0	P5438040C	P5438040 TiAIN	4,0	6	8	57	11,87
	5,0	P5438050C	P5438050 TiAIN	5,0	6	10	57	11,87
	6,0	P5438060C	P5438060 TiAIN	6,0	6	10	57	11,87
	8,0	P5438080C	P5438080 TiAIN	8,0	8	16	63	20,19
	10,0	P5438100C	P5438100 TiAIN	10,0	10	19	72	28,56
	12,0	P5438120C	P5438120 TiAIN	12,0	12	22	83	40,45



**SEMI-DESBASTE
EXCELENTE ACABADO**

**CORTE
DIFERENCIAL**

**SERIE
LARGA**



**4
LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
4,0	P5993040 TiAIN	P5994040 TiAIN	4,0	6	11	57	21,30
5,0	P5993050 TiAIN	P5994050 TiAIN	5,0	6	13	57	21,30
6,0	P5993060 TiAIN	P5994060 TiAIN	6,0	6	16	57	21,30
8,0	P5993080 TiAIN	P5994080 TiAIN	8,0	8	16	63	30,21
10,0	P5993100 TiAIN	P5994100 TiAIN	10,0	10	22	72	39,15
12,0	P5993120 TiAIN	P5994120 TiAIN	12,0	12	26	83	51,81
16,0	P5993160 TiAIN	P5994160 TiAIN	16,0	16	32	92	81,23
20,0	P5993200 TiAIN	P5994200 TiAIN	20,0	20	38	104	128,45



DESBASTE



**SERIE
LARGA**



45°

**3 - 4 - 5 - 6
LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	Z	€
4,0	P5919040 TiAIN	P5920040 TiAIN	4,0	6	11	57	3	22,32
5,0	P5919050 TiAIN	P5920050 TiAIN	5,0	6	13	57	4	22,32
6,0	P5919060 TiAIN	P5920060 TiAIN	6,0	6	16	57	4	22,32
8,0	P5919080 TiAIN	P5920080 TiAIN	8,0	8	16	63	4	28,96
10,0	P5919100 TiAIN	P5920100 TiAIN	10,0	10	22	72	4	41,72
12,0	P5919120 TiAIN	P5920120 TiAIN	12,0	12	26	83	4	50,48
16,0	P5919160 TiAIN	P5920160 TiAIN	16,0	16	32	92	5	95,12
20,0	P5919200 TiAIN	P5920200 TiAIN	20,0	20	38	104	6	135,60



DESBASTE



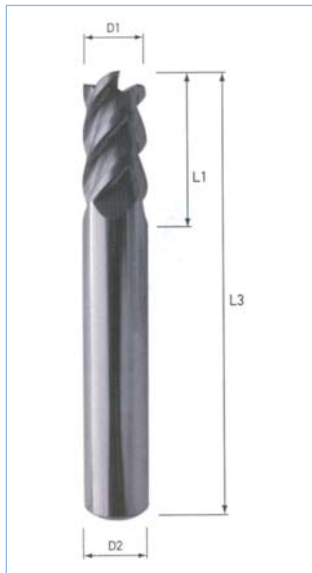
**SERIE
LARGA**



20°

**3 - 4
LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	Z	€
6,0	P5814060 TiAIN	P5824060 TiAIN	6,0	6	16	57	3	26,09
8,0	P5814080 TiAIN	P5824080 TiAIN	8,0	8	16	63	3	29,35
10,0	P5814100 TiAIN	P5824100 TiAIN	10,0	10	22	72	4	43,84
12,0	P5814120 TiAIN	P5824120 TiAIN	12,0	12	26	83	4	55,19
16,0	P5814160 TiAIN	P5824160 TiAIN	16,0	16	32	92	4	87,41
20,0	P5814200 TiAIN	P5824200 TiAIN	20,0	20	38	104	4	139,08



SERIE LARGA  **45°** **4 LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0	P5447030 4Z TiAlN		3,0	6	8	57	13,79
4,0	P5447040 4Z TiAlN		4,0	6	11	57	13,79
5,0	P5447050 4Z TiAlN		5,0	6	13	57	13,79
6,0	P5447060 4Z TiAlN		6,0	6	13	57	13,79
8,0	P5447080 4Z TiAlN		8,0	8	19	63	19,52
10,0	P5447100 4Z TiAlN		10,0	10	22	72	29,33
12,0	P5447120 4Z TiAlN		12,0	12	26	83	39,52
16,0	P5447160 4Z TiAlN		16,0	16	32	92	68,64
20,0	P5447200 4Z TiAlN		20,0	20	38	104	109,31



SERIE LARGA  **45°** **6-8 LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	Z	€
6,0	P5812060 TiAlN	P5822060 TiAlN	6,0	6	13	57	6	19,82
8,0	P5812080 TiAlN	P5822080 TiAlN	8,0	8	19	63	6	24,20
10,0	P5812100 TiAlN	P5822100 TiAlN	10,0	10	22	72	6	36,30
12,0	P5812120 TiAlN	P5822120 TiAlN	12,0	12	26	83	6	48,82
16,0	P5812160 TiAlN	P5822160 TiAlN	16,0	16	32	92	6	79,10
20,0	P5812200 TiAlN	P5822200 TiAlN	20,0	20	38	104	8	128,92



 **SEMI-DESBASTE ALTA PRODUCTIVIDAD** **SERIE CORTA** **HÉLICE PROGRESIVA 35° - 38°**  **4 LABIOS**

Ø	REFERENCIA Mango cilíndrico	REFERENCIA Mango weldon	D1	D2	L1	L3	€
3,0	P5990030 TiAlN	P5991030 TiAlN	3,0	6	8	57	17,70
4,0	P5990040 TiAlN	P5991040 TiAlN	4,0	6	11	57	17,70
5,0	P5990050 TiAlN	P5991050 TiAlN	5,0	6	13	57	17,70
6,0	P5990060 TiAlN	P5991060 TiAlN	6,0	6	13	57	17,70
8,0	P5990080 TiAlN	P5991080 TiAlN	8,0	8	19	63	23,10
10,0	P5990100 TiAlN	P5991100 TiAlN	10,0	10	22	72	31,06
12,0	P5990120 TiAlN	P5991120 TiAlN	12,0	12	26	83	41,04
16,0	P5990160 TiAlN	P5991160 TiAlN	16,0	16	32	92	70,90
20,0	P5990200 TiAlN	P5991200 TiAlN	20,0	20	38	104	108,06

FORMULAS

$$n = V_c \times 1000 / D_c \times \pi$$

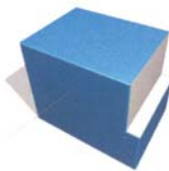
$$V_c = D_c \times \pi \times n / 1000$$

$$f_z = v_f / z \times n$$

$$v_f = f_z \times z \times n$$

$$Q = a_e \times a_p \times v_f$$

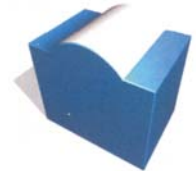
CANTEADO



CAJEADO



CONTORNEADO



VELOCIDAD DE CORTE (m/min)

MATERIAL	METAL DURO (TiAIN)	
	Vc	
	min	max
Acero no aleado < 600 N/mm ²	250	325
Acero no aleado < 800 N/mm ²	210	300
Acero aleado 800 N/mm ² - 1000 N/mm ²	177	250
Acero aleado 1000 N/mm ² - 1400 N/mm ²	125	210
Acero aleado 1400 N/mm ² - 1600 N/mm ²	80	150
Acero inoxidable ferrítico / martensítico - Blando	120	175
Acero inoxidable ferrítico / martensítico - Duro	80	110
Fundición - Blanda	210	250
Fundición - Dura	140	175
Aluminio Si<2% - Blanda	400	600
Aluminio Si 2-10% - Duro	200	250
Cobre / Aleación de cobre - Blanda	400	600
Latón - Blando	200	250

AVANCES (mm/diente)

Ø	CANTEADO						CAJEADO				CONTORNEADO			
	Desbaste		Semi acabado		Acabado		Desbaste		Semi Acabado		Semi desbaste		Acabado	
	$a_e = 0,5 \times Dc$ $a_p = 1,0 \times Dc$		$a_e = 0,25 \times Dc$ $a_p = 1,0 \times Dc$		$a_e = 0,125 \times Dc$ $a_p = 1,0 \times Dc$		$a_e = 0,5 \times Dc$ $a_p = 1,0 \times Dc$		$a_e = 0,25 \times Dc$ $a_p = 1,0 \times Dc$		$a_e = 0,25 \times Dc$ $a_p = 1,0 \times Dc$		$a_e = 0,125 \times Dc$ $a_p = 1,0 \times Dc$	
fz	fz		fz		fz		fz		fz		fz		fz	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max
1	0,010	0,020	0,020	0,030	0,005	0,020	0,010	0,025	0,008	0,012	0,015	0,025	0,015	0,025
2	0,010	0,020	0,020	0,030	0,005	0,020	0,010	0,035	0,008	0,012	0,025	0,035	0,025	0,035
3	0,020	0,030	0,030	0,040	0,010	0,030	0,020	0,035	0,012	0,020	0,025	0,040	0,025	0,040
4	0,020	0,030	0,030	0,040	0,010	0,030	0,020	0,035	0,012	0,020	0,030	0,045	0,030	0,045
5	0,030	0,050	0,040	0,050	0,010	0,040	0,030	0,055	0,016	0,030	0,035	0,050	0,035	0,050
6	0,030	0,060	0,040	0,070	0,020	0,050	0,030	0,065	0,016	0,030	0,040	0,055	0,040	0,055
8	0,040	0,080	0,050	0,090	0,020	0,060	0,040	0,085	0,024	0,040	0,050	0,065	0,050	0,065
10	0,040	0,080	0,050	0,090	0,020	0,060	0,040	0,085	0,024	0,040	0,055	0,080	0,055	0,080
12	0,050	0,090	0,050	0,100	0,030	0,080	0,050	0,095	0,030	0,050	0,065	0,090	0,065	0,090
14	0,050	0,090	0,050	0,100	0,030	0,080	0,050	0,095	0,030	0,050	0,070	0,110	0,070	0,110
16	0,060	0,100	0,060	0,110	0,030	0,100	0,060	0,105	0,032	0,060	0,075	0,120	0,075	0,120
18	0,060	0,100	0,060	0,110	0,030	0,100	0,060	0,105	0,032	0,060	0,080	0,140	0,080	0,140
20	0,070	0,120	0,070	0,130	0,040	0,120	0,070	0,125	0,036	0,060	0,090	0,160	0,090	0,160

ÁLAVA

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