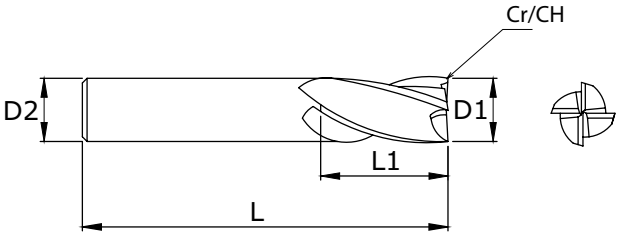
4 Flute

Centre cutting high performance end mill for roughing & finishing

Carbide | REG | 35/38° | 6535 HA | Cr Base



P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

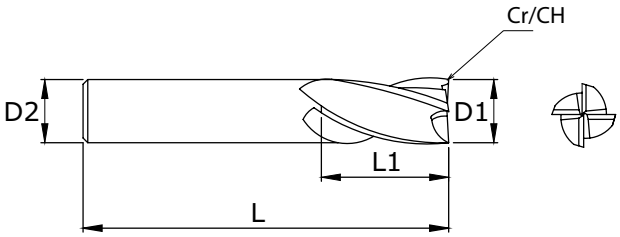
ØD1 (mm)	L1 (mm)	L (mm)	ØD2 (mm)	Cr (mm)	CH (mm)	EDP No
3	6	38	3			FBK0503876
4	11	55	6	0.20		FBK0508737
4	11	55	6		0.40	FBK0508921
4	11	55	6			FBK0508738
4	14	51	4			FBK0503954
4	20	51	4			FBK0503955
5	20	51	5			FBK0503956
6	13	57	6	0.20		FBK0508739
6	13	57	6		0.40	FBK0508922
6	13	57	6			FBK0508740
6	20	64	6			FBK0503484
8	19	63	8	0.20		FBK0508741
8	19	63	8		0.40	FBK0508923
8	19	63	8			FBK0508742
8	20	64	8			FBK0503485
10	22	72	10	0.30		FBK0508743
10	22	72	10		0.50	FBK0508924
10	22	72	10			FBK0508744
10	25	70	10			FBK0503486
12	26	83	12	0.30		FBK0508745
12	26	83	12		0.50	FBK0508925
12	26	83	12			FBK0508746
12	25	76	12			FBK0503487
14	30	89	14			FBK0503488
16	32	92	16	0.30		FBK0508747

Application data on page no 2.124

4 Flute

Centre cutting high performance end mill for roughing & finishing

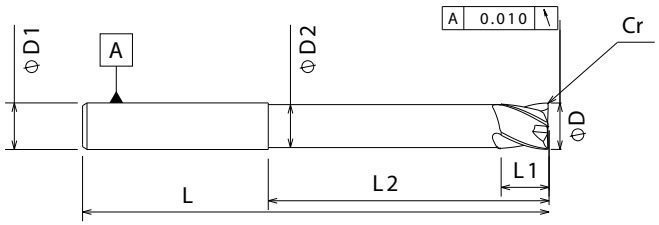
Carbide | REG | 35/38° | 6535 HA | Cr Base



P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

Ø D1 (mm)	L1 (mm)	L (mm)	Ø D2 (mm)	Cr (mm)	CH (mm)	EDP No
16	32	92	16		0.50	
16	32	92	16			FBK0508748
16	30	89	16			FBK0503489
20	38	104	20	0.30		FBK0508749
20	38	104	20		0.50	FBK0508927
20	38	104	20			FBK0508750
20	35	102	20			FBK0503490



P0-P6
K1-K3
S1-S4
M1-M3

NF177TR

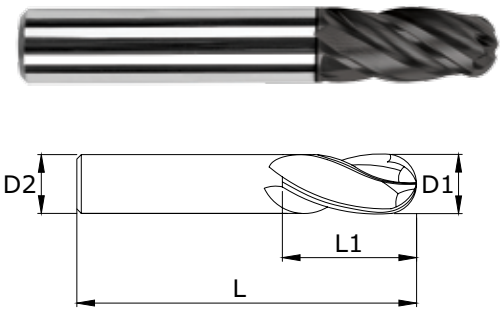
Ø D (mm)	L1 (mm)	Ø D2 (mm)	L2 (mm)	L (mm)	Ø D1 (mm)	Ø Cr (mm)	EDP No
6	12	5.5	42	100	6	0.4	FBK0508731
8	16	7.3	62	100	8	0.4	FBK0508732
10	20	9.1	60	100	10	0.5	FBK0508733
12	24	11.0	73	125	12	0.5	FBK0508734
16	32	14.56	100	150	16	0.5	FBK0508735
20	40	18.2	100	175	20	0.5	FBK0508736

Application data on page no 2.124

4 Flute

Centre cutting high performance ball nose end mill for roughing & finishing

Carbide | REG | 35/38° | 6535 HA | Cr Base



P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

Ø D1 (mm)	L1 (mm)	L (mm)	Ø D2 (mm)	EDP No
4	15	64	6	FBK0503888
6	16	64	6	FBK0503889
8	20	64	8	FBK0503890
10	20	70	10	FBK0503891
12	25	76	12	FBK0503892
16	30	89	16	FBK0503893
18	35	102	18	FBK0503894

Application data on page no 2.124

Cutting speed chart

Series F177TR/F179TR METRIC

Workpiece Material Group		Example	Coolant			Slotting		1 x Diameter Axial Depth Small Radial Depth Profiling > Largest Radial Depth						
			Max	Air	MIST	25% Axial	50% Axial	1% of Dia	5% of Dia	10% of Dia	15% of Dia	20% of Dia	30% of Dia	50% of Dia
														
			Type			Vc (m/min)								
Steel	P	Free Machining	•	•	•	150	150	730	685	620	565	500	380	150
		Low Carbon	•	•	•	150	150	730	685	620	565	500	380	150
		Medium Carbon	•	•	•	90	90	335	310	290	260	240	180	90
		Alloys Steels	•	•	•	75	75	150	140	130	130	120	105	75
		High Strength Alloys	•	•	•	75	75	150	140	130	130	120	105	75
		Structural Steels	•	•	•	150	150	730	685	620	565	500	380	150
		Die/Tool Steels	•	•	•	60	60	120	115	115	110	110	90	60
Stainless Steel	M	Free Machining	•	X	o	90	90	150	145	140	130	130	115	90
		Moderate Stainless	•	X	o	75	75	150	115	115	105	105	95	75
		Difficult Stainless	•	X	o	60	60	105	100	95	90	90	75	60
		PH Stainless	•	X	o	40	40	75	75	75	70	70	60	40
		Cobalt Chrome Alloys	•	X	o	45	45	75	75	75	70	70	60	45
		Duplex (22%)	•	X	o	40	40	75	75	75	70	70	60	40
		Super Duplex (25%)	•	X	o	30	30	60	60	55	55	50	45	30
Special Alloys	S	High Temp Alloys	•	X	X	45	45	75	75	75	70	60	55	45
		Titanium Alloys	•	X	X	55	55	125	120	115	105	100	80	55
Cast Iron	K	Gray Cast Iron	•	o	o	120	120	450	430	400	360	335	250	120
		SG Iron	•	o	o	105	105	365	345	320	295	275	215	105
		Ductile Cast Iron	•	o	o	90	90	150	145	140	130	130	115	90
		Malleable Iron	•	o	o	90	90	120	115	110	105	105	100	90

•	Preferred	X	Possible	o	Not Possible

If axial depth is less than the ball diameter, the speed is figured using the effective cutting diameter.

Feed rate chart

Series F177TR/F179TR METRIC

Workpiece Material Group		Example	Tool Diameter (mm)									
			1	3	4	6	8	10	12	16	18	25
			mm/Tooth									
Steels	P	Free Machining, Low Carbon, Medium Carbon, Alloys Steels, High Strength Alloys, Structural Steels, Die/Tool Steels	0.005	0.01	0.017	.025 - .040	.033 - .053	0.04	0.066	.066 - .083	.078 - .088	.088 - .129
Stainless Steels	M	Free Machining, Moderate Stainless, Difficult Stainless, PH Stainless, Cobalt Chrome Alloys, Duplex (22%), Super Duplex (25%)	0.005	0.01	0.017	.025 - .040	.033 - .053	0.04	0.066	.066 - .083	.078 - .088	.088 - .129
Special Alloys	S	High Temp Alloys, Titanium Alloys	0.002	0.005	0.02	.012 - .020	.017 - .027	.017 - .033	.025 - .040	.025 - .043	.027 - .045	.030 - .050
Cast Iron	K	Gray Cast Iron, SG Iron, Ductile Cast Iron, Malleable Iron	0.005	0.01	0.017	.017 - .040	.025 - .055	.038 - .071	.045 - .083	.060 - .088	.071 - .099	.060 - .127

Example: Profile Milling

1) Select material from chart
2) Select tool size
3) Select feed per tooth
4) Figure percentage of cutter diameter radial cut depth
5) Select chip load factor for radial depth
6) Select chip load factor x Feed per tooth
7) Answer: New feed per tooth
8) New feed per tooth x Number of teeth x RPM = mm/min (millimetres per minute)

Example: Slotting

1) Select material from chart
2) Select tool size
3) Select feed per chart
4) Multiply Feed per tooth x Number of teeth x RPM
5) Answer: mm/min (Millimetres Per Minute)

Spindle Max.

Should the calculated Spindle Speed be more than your actual Spindle Max., Use the Formula given below:

$$\frac{\text{Calculated Feed x Spindle Max.}}{\text{Calculated Speed}}$$

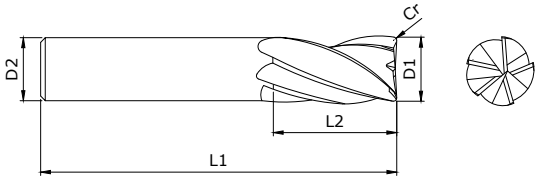
During Profile Milling less than 50% of the cutter diameter's Radial depth,the actual chipload at the cutting edge is less than the programmed chip load. Below are Chip Load factors depending on Radial Depth Percentage. Multiply your inches per tooth by the factor before figuring your IPM.

Radial Depth in Percentage of Cutter Diameter	Increase Chip Load Factor
50%	1
30%	1.1
20%	1.2
15%	1.4
10%	1.8
5%	2.3
1%	5

5 Flute

Centre cutting high performance end mill for roughing & finishing

Carbide | REG | 35/38° | 6535 HA | Cr Base



P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

Ø D1 (mm)	L2 (mm)	L1 (mm)	Ø D2 (mm)	Ø Cr (mm)	EDP No
4	11	55	6	0.25	FBK0508717
4	11	55	6		FBK0508718
6	13	57	6	0.40	FBK0508719
6	13	57	6		FBK0508720
6	20	64	6		FBK0503491
8	19	63	8	0.50	FBK0508721
8	19	63	8		FBK0508722
8	20	64	8		FBK0503492
10	22	72	10	0.50	FBK0508723
10	22	72	10		FBK0508724
10	25	70	10		FBK0503493
12	26	83	12	0.75	FBK0508725
12	26	83	12		FBK0508726
12	25	76	12		FBK0503494
14	30	89	14		FBK0503495
16	32	92	16	0.75	FBK0508727
16	32	92	16		FBK0508728
16	30	89	16		FBK0503496
20	38	104	20	0.75	FBK0508729
20	38	104	20		FBK0508730
20	35	102	20		FBK0503497

Application data on page no 2.126

Cutting speed chart

Series F178TR METRIC

Workpiece Material Group		Example	Coolant: Max	Coolant: Air	Coolant: MMS	1 x Diameter Axial Depth, Small Radial Depth Profiling > Largest Radial Depth: 1% of Dia	5% of Dia	10% of Dia	15% of Dia	20% of Dia	30% of Dia	50% of Dia
			Type			Vc (m/min)						
Steel	P	Free Machining	•	•	•	730	685	620	565	500	380	150
		Low Carbon	•	•	•	730	685	620	565	500	380	150
		Medium Carbon	•	•	•	335	310	290	260	240	180	90
		Alloys Steels	•	•	•	150	140	130	130	120	105	75
		High Strength Alloys	•	•	•	150	140	130	130	120	105	75
		Structural Steels	•	•	•	730	685	620	565	500	380	150
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Stainless Steel	M	Free Machining	•	X	o	150	145	140	135	130	115	90
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		Difficult Stainless	•	X	o	105	100	95	90	90	75	60
		PH Stainless	•	X	o	75	75	75	70	70	60	40
		Cobalt Chrome Alloys	•	X	o	75	75	75	70	70	60	45
		Duplex (22%)	•	X	o	75	75	75	70	70	60	40
		Super Duplex (25%)	•	X	o	60	60	55	55	50	45	30
Special Alloys	S	High Temp Alloys	•	X	X	75	75	75	70	60	55	45
		Titanium Alloys	•	X	X	125	120	115	105	100	80	55
Cast Iron	K	Gray Cast Iron	•	o	o	450	430	400	360	335	250	120
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		Ductile Cast Iron	•	o	o	150	145	140	130	130	115	90
		Malleable Iron	•	o	o	120	115	110	105	105	100	90

•	Preferred	X	Possible	o	Not Possible

If axial depth is less than the ball diameter, the speed is figured using the effective cutting diameter.

Feed rate chart

Series F178TR METRIC

Workpiece Material Group		Example	Tool Diameter (mm): 1	3	4	6	8	10	12	16	18	25
			mm/Tooth									
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Cast Iron	K	Gray Cast Iron, SG Iron, Ductile Cast Iron, Malleable Iron	0.005	0.01	0.017	.017 - .040	.025 - .055	.038 - .071	.045 - .083	.060 - .088	.071 - .099	.060 - .127

Example: Profile Milling

1) Select material from chart
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6) Select chip load factor x Feed per tooth
7) Answer: New feed per tooth
8) New feed per tooth x Number of teeth x RPM = mm/min (millimetres per minute)

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1%	5