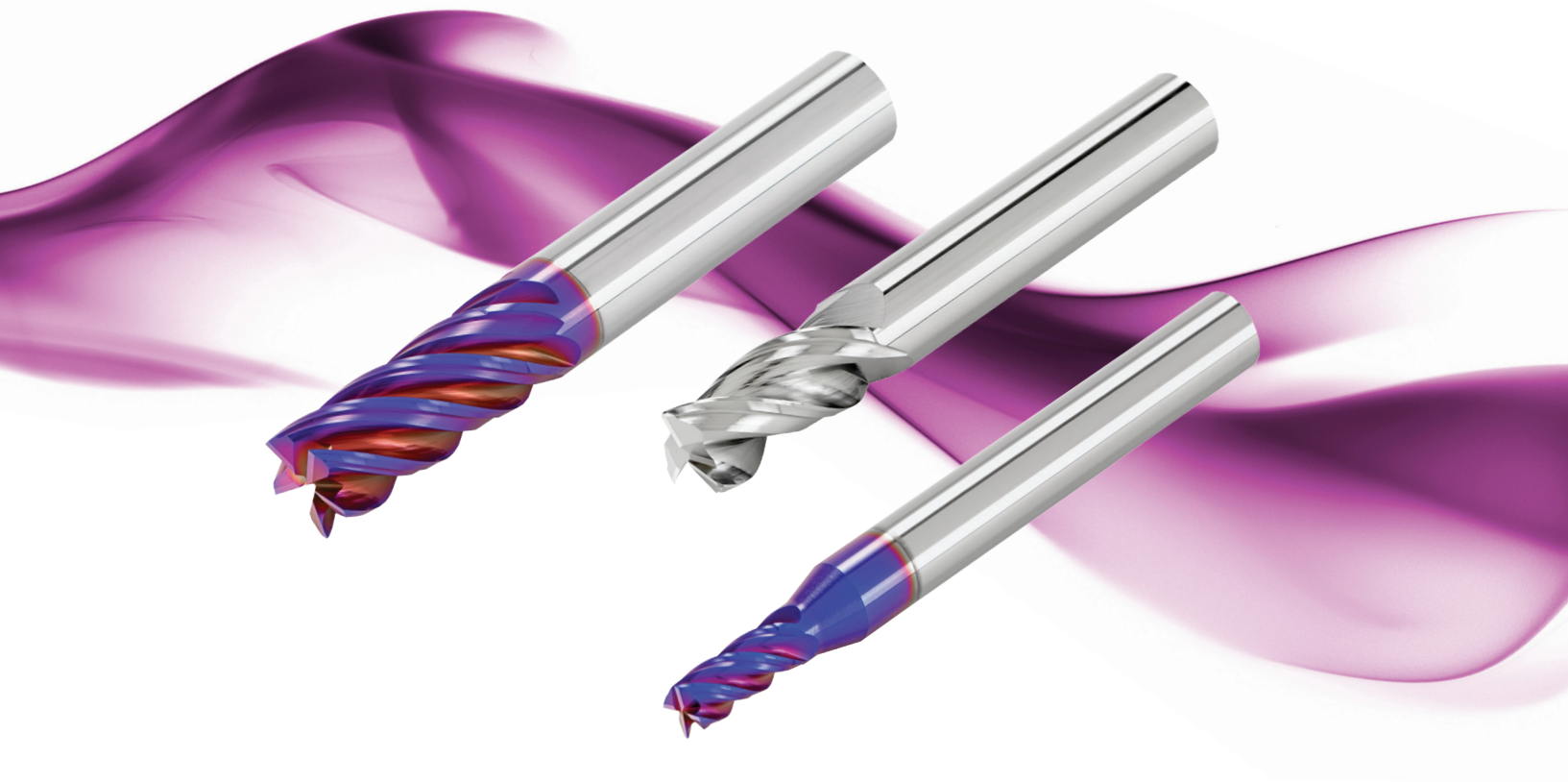




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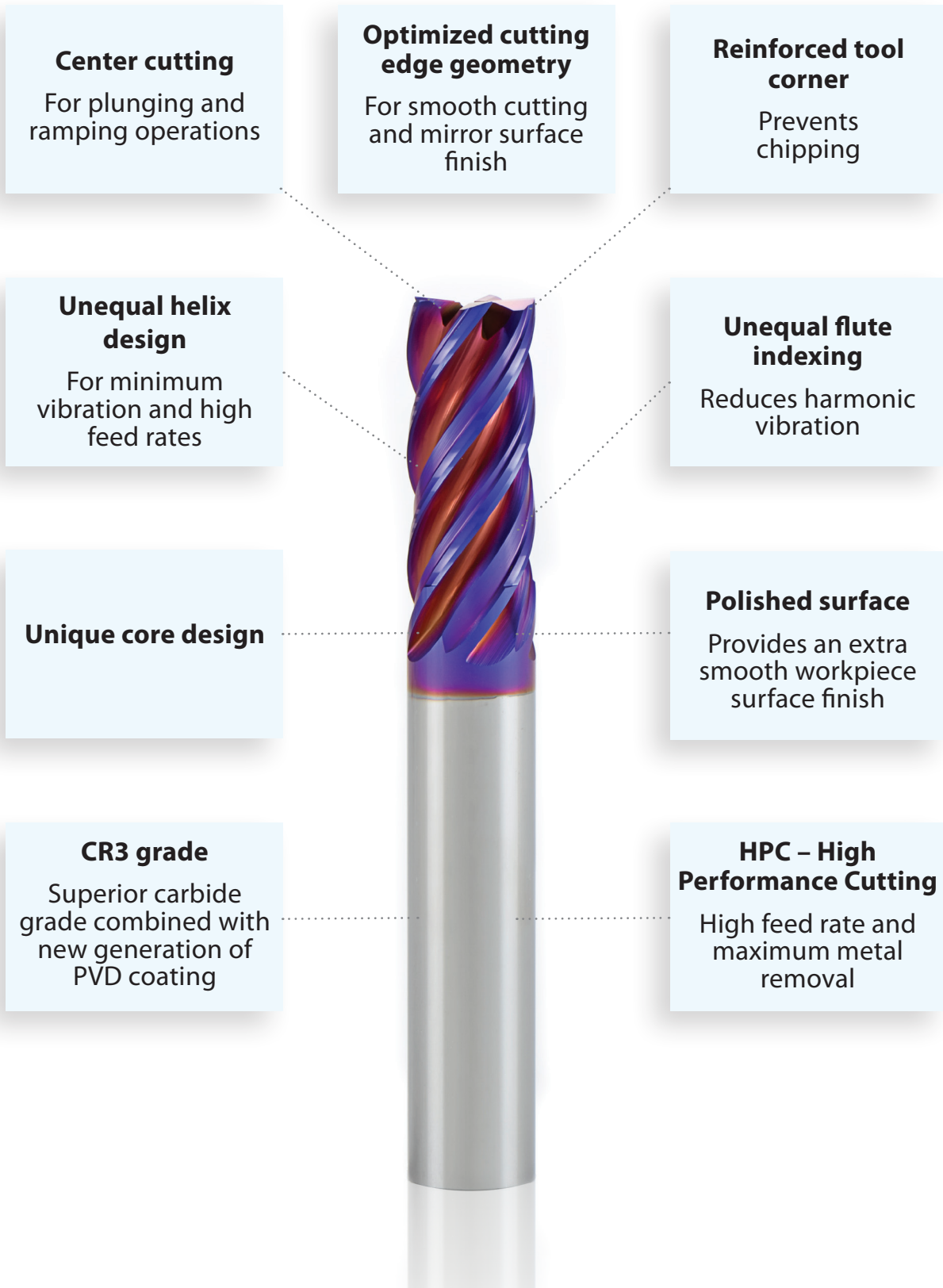
CR-SUPERCUT End-Mills



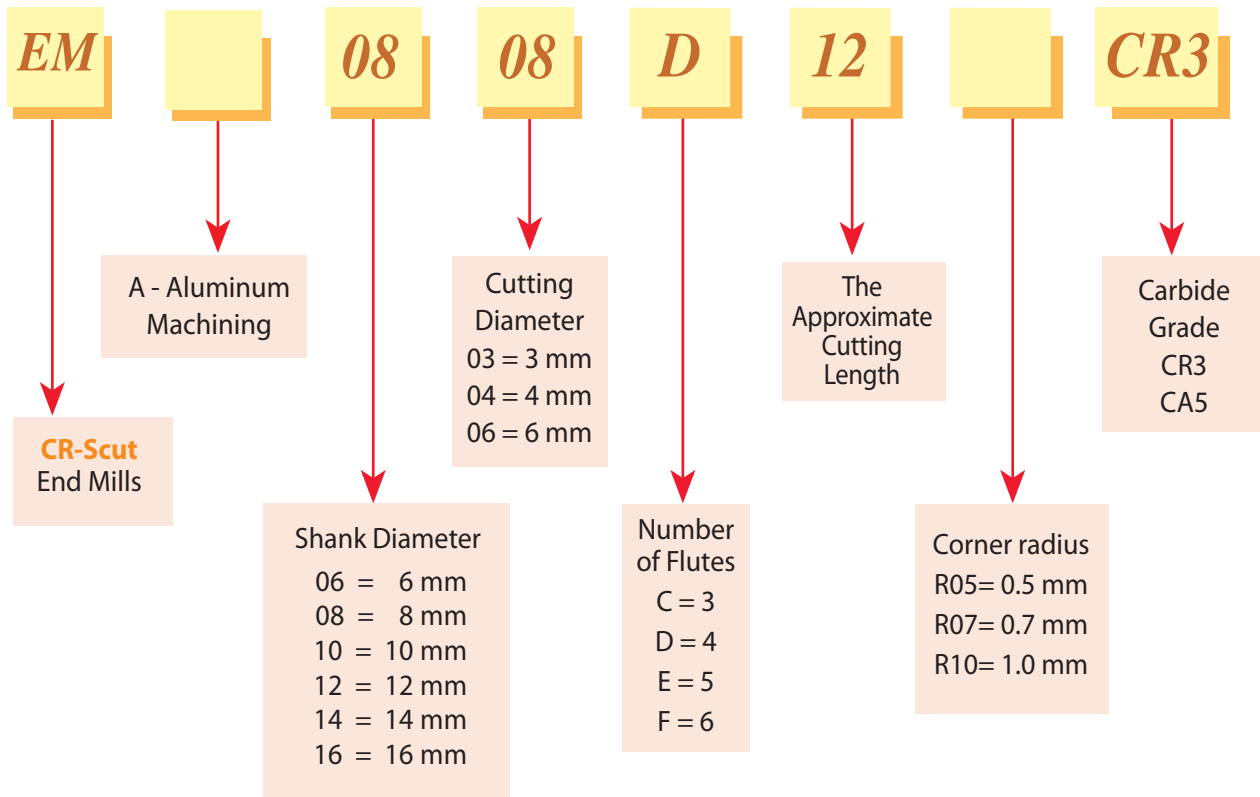
Metric 2019 - 20

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End-Mills Features



Product Identification Ordering Codes



CR-Supercut End-Mills *High Performance Solid Carbide End-Mills*



High Performance CR-Supercut End-mills, designed for high feed machining and high metal removal for a wide range of materials. Innovative tool geometry delivers high performance with low vibration machining in one pass. One tool for semi-finishing and fine-finishing operation with sharp corner or radii.

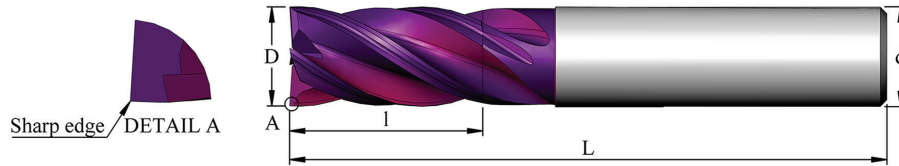
- High Performance Cutting (HPC)
- Center cutting
- Low vibration machining
- High metal removal rates in Slotting, Shouldering and Helical Plunging operations.
- 3-6 flutes

Carbide grade: CR3

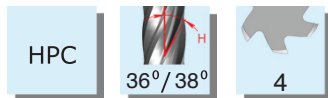
Ultra-Fine carbide grade with high hardness and toughness provides high cutting edge stability and wear resistance. **A New Generation** of PVD Coating for High-Performance Cutting Applications.

High Performance Solid Carbide End-Mills

Solid Carbide End-Mills 4 flutes



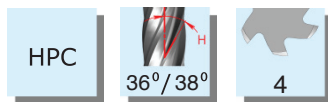
Short Design



P	M	K	N	S	H
●	●	●	○	○	≤50 HRc

Ordering Code	d	D	No. of Flutes	I	L
EM 0604 D08	6	4	4	8	57
EM 0605 D10	6	5	4	10	57
EM 0606 D10	6	6	4	10	57
EM 0808 D12	8	8	4	12	63
EM 1010 D14	10	10	4	14	72
EM 1212 D16	12	12	4	16	73
EM 1414 D18	14	14	4	18	75
EM 1616 D24	16	16	4	24	82
EM 2020 D30	20	20	4	30	92

Long Design

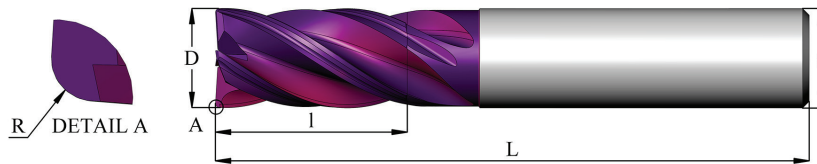


P	M	K	N	S	H
●	●	●	○	○	≤50 HRc

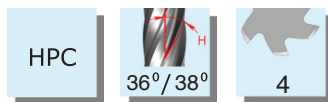
Ordering Code	d	D	No. of Flutes	I	L
EM 0603 D08	6	3	4	8	57
EM 0604 D11	6	4	4	11	57
EM 0605 D13	6	5	4	13	57
EM 0606 D16	6	6	4	16	57
EM 0808 D19	8	8	4	19	63
EM 1010 D22	10	10	4	22	72
EM 1212 D26	12	12	4	26	83
EM 1414 D26	14	14	4	26	85
EM 1616 D32	16	16	4	32	92
EM 2020 D38	20	20	4	38	104

● First choice ○ Alternative

Solid Carbide End-Mills 4 flutes with corner radius



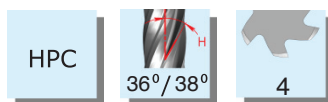
Short Design



P	M	K	N	S	H
●	●	●	○	○	≤50 HRc

Ordering Code	d	D	No. of Flutes	R	I	L
EM 0808 D12 R05	8	8	4	0.5	12	63
EM 1010 D14 R05	10	10	4	0.5	14	72
EM 1212 D16 R07	12	12	4	0.7	16	73
EM 1414 D18 R07	14	14	4	0.7	18	75
EM 1616 D24 R10	16	16	4	1.0	24	82
EM 2020 D30 R10	20	20	4	1.0	30	92

Long Design

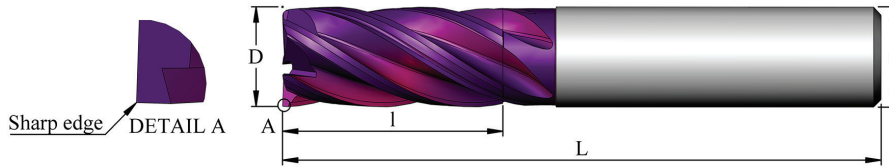


P	M	K	N	S	H
●	●	●	○	○	≤50 HRc

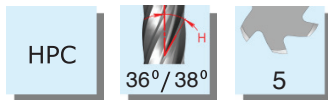
Ordering Code	d	D	No. of Flutes	R	I	L
EM 0603 D08 R03	6	3	4	0.3	8	57
EM 0604 D11 R03	6	4	4	0.3	11	57
EM 0605 D13 R03	6	5	4	0.3	13	57
EM 0606 D16 R05	6	6	4	0.5	16	57
EM 0808 D19 R05	8	8	4	0.5	19	63
EM 1010 D22 R05	10	10	4	0.5	22	72
EM 1212 D26 R07	12	12	4	0.7	26	83
EM 1414 D26 R07	14	14	4	0.7	26	85
EM 1616 D32 R10	16	16	4	1.0	32	92
EM 2020 D38 R10	20	20	4	1.0	38	104

● First choice ○ Alternative

Solid Carbide End-Mills 5 flutes



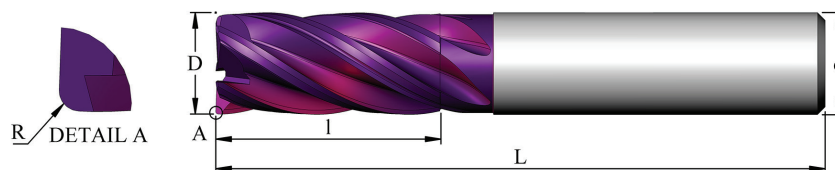
Long Design



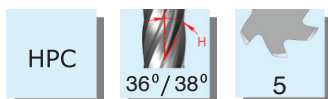
P	M	K	N	S	H
●	●	●	○	○	≤50 HRc

Ordering Code	d	D	No. of Flutes	I	L
EM 0606 E13	6	6	5	13	57
EM 0808 E19	8	8	5	19	63
EM 1010 E22	10	10	5	22	72
EM 1212 E26	12	12	5	26	83
EM 1414 E26	14	14	5	26	85
EM 1616 E32	16	16	5	32	92
EM 2020 E38	20	20	5	38	104

Solid Carbide End-Mills 5 flutes with corner radius



Long Design

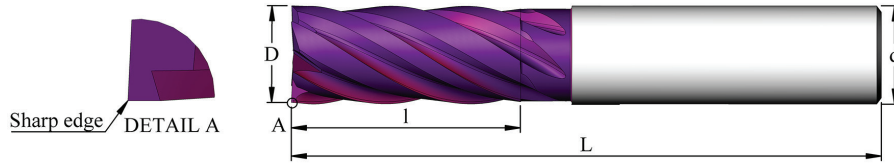


P	M	K	N	S	H
●	●	●	○	○	≤50 HRc

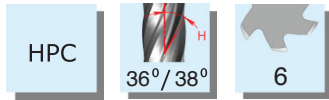
Ordering Code	d	D	No. of Flutes	R	I	L
EM 0606 E13 R05	6	6	5	0.5	13	57
EM 0808 E19 R05	8	8	5	0.5	19	63
EM 1010 E22 R05	10	10	5	0.5	22	72
EM 1212 E26 R07	12	12	5	0.7	26	83
EM 1414 E26 R07	14	14	5	0.7	26	85
EM 1616 E32 R10	16	16	5	1.0	32	92
EM 2020 E38 R10	20	20	5	1.0	38	104

● First choice ○ Alternative

Solid Carbide End-Mills 6 flutes



Extra-long Design

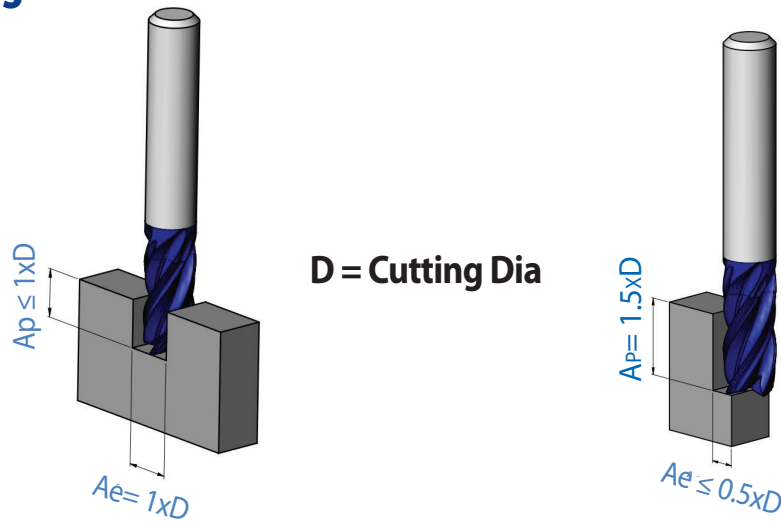


P	M	K	N	S	H
●	●	●		●	≤50 HRc

Ordering Code	d	D	No. of Flutes	l	L
EM 0606 F18	6	6	6	18	57
EM 0808 F24	8	8	6	24	63
EM 1010 F30	10	10	6	30	80
EM 1212 F36	12	12	6	36	83
EM 1414 F42	14	14	6	42	100
EM 1616 F48	16	16	6	48	105
EM 2020 F60	20	20	6	60	150

● First choice ○ Alternative

Cutting Conditions



4 fluted end-mills

ISO	Materials Class	Vc [m/min]	Fz [mm/tooth]									
			Cutting Diameter									
			Ø3	Ø4	Ø5	Ø6	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
P	Low & Medium Carbon Steels <0.55%C	120-160	0.006	0.020	0.020	0.030	0.040	0.047	0.056	0.059	0.064	0.078
	High Carbon Steels ≥0.55%C	120-160	0.006	0.020	0.020	0.030	0.040	0.047	0.056	0.059	0.064	0.078
	Alloy Steels, Treated Steels	100-140	0.005	0.010	0.015	0.020	0.030	0.039	0.047	0.049	0.053	0.065
M	Stainless Steel-Free Cutting	80-140	0.005	0.015	0.020	0.020	0.030	0.040	0.047	0.049	0.053	0.065
	Stainless Steel-Austenitic	70-130	0.004	0.010	0.015	0.020	0.022	0.034	0.04	0.043	0.045	0.055
	Cast Steels	70-130	0.004	0.010	0.015	0.020	0.022	0.034	0.04	0.043	0.045	0.055
K	Cast Iron	80-140	0.005	0.015	0.020	0.023	0.027	0.039	0.047	0.049	0.053	0.065
N	Aluminum ≤12%Si, Copper	240-300	0.036	0.040	0.048	0.052	0.056	0.065	0.074	0.078	0.083	0.093
	Aluminum >12%Si	240-300	0.036	0.040	0.048	0.052	0.056	0.065	0.074	0.078	0.083	0.093
	Synthetics, duroplastics, thermoplastics	250-320	0.030	0.054	0.069	0.085	0.100	0.115	0.135	0.115	0.120	0.135
S	Heat-resistant alloys	20-40	0.005	0.008	0.013	0.018	0.031	0.048	0.056	0.060	0.064	0.077
	Titanium alloys	80-100	0.005	0.008	0.013	0.018	0.031	0.048	0.056	0.060	0.064	0.077
H	Hardened Steel <50 HRc	40-70	0.007	0.010	0.013	0.017	0.020	0.023	0.025	0.026	0.027	0.028

For hard or tough materials, reduce the Ap by 20%-30% →

5 fluted end-mills

ISO	Materials Class	Vc [m/min]	Fz [mm/tooth]						
			Cutting Diameter						
			Ø6	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
P	Low & Medium Carbon Steels <0.55%C	120-160	0.034	0.040	0.050	0.063	0.069	0.076	0.089
	High Carbon Steels ≥0.55%C	120-160	0.034	0.040	0.050	0.063	0.069	0.076	0.089
	Alloy Steels, Treated Steels	100-140	0.034	0.038	0.050	0.063	0.069	0.076	0.089
M	Stainless Steel-Free Cutting	80-140	0.030	0.032	0.045	0.063	0.065	0.069	0.076
	Stainless Steel-Austenitic	70-130	0.030	0.032	0.045	0.063	0.065	0.069	0.076
	Cast Steels	70-130	0.030	0.032	0.045	0.063	0.065	0.069	0.076
S	Heat-resistant alloys	20-40	0.018	0.031	0.048	0.056	0.060	0.064	0.077
	Titanium alloys	80-100	0.018	0.031	0.048	0.056	0.060	0.064	0.077
H	Hardened Steel <50 HRc	40-70	0.020	0.020	0.025	0.027	0.030	0.035	0.040

For hard or tough materials, reduce the Ap by 20%-30%

6 fluted end-mills

ISO	Materials Class	Vc [m/min]	Fz [mm/tooth]						
			Cutting Diameter						
			Ø6	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
P	Low & Medium Carbon Steels <0.55%C	120-160	0.040	0.045	0.055	0.068	0.075	0.081	0.089
	High Carbon Steels ≥0.55%C	120-160	0.040	0.045	0.055	0.068	0.075	0.081	0.089
	Alloy Steels, Treated Steels	100-140	0.040	0.045	0.055	0.068	0.075	0.081	0.089
M	Stainless Steel-Free Cutting	80-140	0.035	0.037	0.050	0.068	0.070	0.074	0.081
	Stainless Steel-Austenitic	70-130	0.035	0.037	0.050	0.068	0.070	0.074	0.081
	Cast Steels	70-130	0.035	0.037	0.050	0.068	0.070	0.074	0.081
S	Heat-resistant alloys	20-40	0.018	0.031	0.048	0.056	0.060	0.064	0.077
	Titanium alloys	80-100	0.018	0.031	0.048	0.056	0.060	0.064	0.077
H	Hardened Steel <50 HRc	40-70	0.023	0.025	0.030	0.033	0.036	0.040	0.045

For hard or tough materials, reduce the Ap by 20%-30%

CR-Supercut End-Mills

High Performance Solid Carbide End-Mills for Aluminum machining

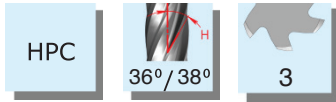
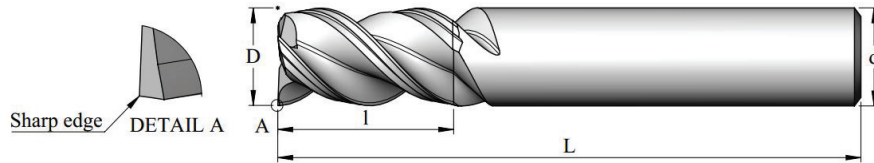


- High Performance Cutting (HPC)
- Center cutting
- Low vibration machining
- High metal removal rates in Slotting, Shouldering and Helical Plunging operations.
- Smooth polished flutes, more flute space and open flute design for better chip flow away from cutting area.
- 3 flutes

Carbide Grade: CA5

Ultra-Fine carbide grade with high hardness and toughness provides high cutting edge stability and wear resistance.

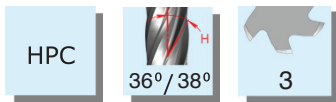
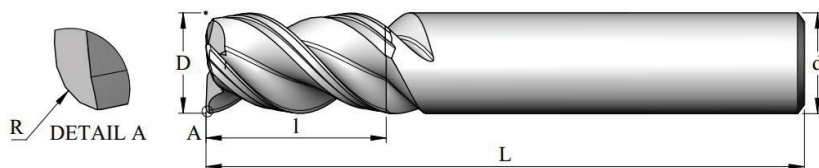
Solid Carbide End-Mills 3 flutes



P	M	K	N	S	H
			●		

Ordering Code	d	D	No. of Flutes	l	L
EMA 0303 C12	3	3	3	12	38
EMA 0404 C12	4	4	3	12	50
EMA 0505 C14	5	5	3	14	50
EMA 0606 C16	6	6	3	16	50
EMA 0808 C20	8	8	3	20	63
EMA 1010 C22	10	10	3	22	72
EMA 1212 C25	12	12	3	25	83
EMA 1414 C32	14	14	3	32	85
EMA 1616 C32	16	16	3	32	92
EMA 2020 C38	20	20	3	38	104

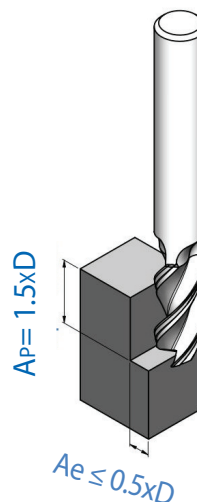
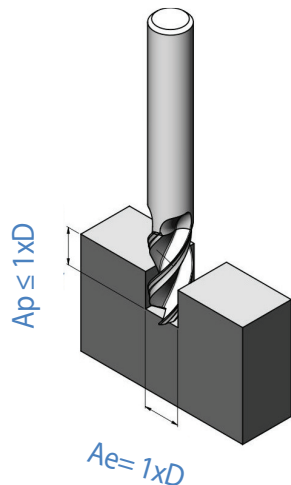
Solid Carbide End-Mills 3 flutes with corner radius



P	M	K	N	S	H
			●		

Ordering Code	d	D	No. of Flutes	R	l	L
EMA 0303 C12 R03	3	3	3	0.3	12	38
EMA 0404 C12 R03	4	4	3	0.3	12	50
EMA 0505 C14 R03	5	5	3	0.3	14	50
EMA 0606 C16 R05	6	6	3	0.5	16	50
EMA 0808 C20 R05	8	8	3	0.5	20	63
EMA 1010 C22 R05	10	10	3	0.5	22	72
EMA 1212 C25 R07	12	12	3	0.7	25	83
EMA 1414 C32 R07	14	14	3	0.7	32	85
EMA 1616 C32 R10	16	16	3	1.0	32	92
EMA 2020 C38 R10	20	20	3	1.0	38	104

Cutting Conditions

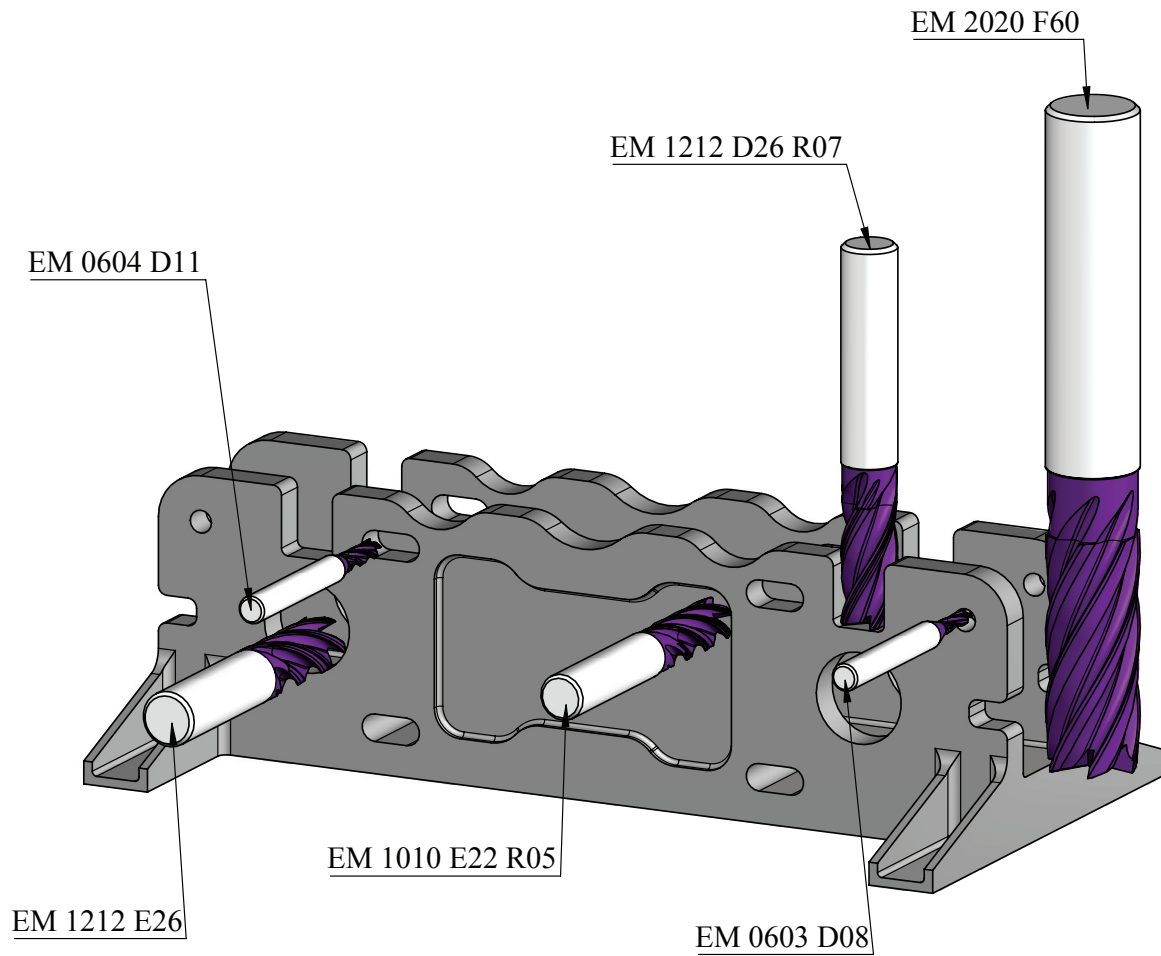


Cutting conditions for side milling

ISO	Materials Class	Vc [m/min]	Fz [mm/tooth]									
			Cutting Diameter									
			Ø3	Ø4	Ø5	Ø6	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
	Aluminum ≤12%Si, Copper	500-1000	0.025	0.035	0.045	0.055	0.070	0.090	0.105	0.125	0.145	0.180
N	Aluminum >12%Si	500-1000	0.020	0.030	0.038	0.049	0.063	0.081	0.096	0.115	0.130	0.160
	Synthetics, duroplastics, thermoplastics	500-1000	0.025	0.035	0.045	0.055	0.070	0.090	0.105	0.125	0.145	0.180

For slotting, reduce the Fz by 15%-25% depending on the application

Application Example





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