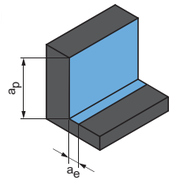
Cutting data recommendations for shoulder milling cutters

Feed and cutting speed

Finishing



a_p = 1.5xD
a_e = 0.1xD

OptiMill-Uni-HPC-Finish | SCM370, 830

MMG*			Workpiece material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/ min]	f_z [mm]							
					MQL/Air	Dry	Coolant		Diameter of milling cutter [mm]							
									4.00	6.00	8.00	10.00	12.00	16.00	20.00	25.00
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	✓	✓	✓	**385**	0.042	0.06	0.077	0.093	0.106	0.13	0.149	0.166
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	✓	✓	✓	**315**	0.039	0.056	0.072	0.086	0.099	0.121	0.139	0.155
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	✓	✓	✓	**350**	0.042	0.06	0.077	0.093	0.106	0.13	0.149	0.166
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	✓		✓	**245**	0.035	0.05	0.064	0.077	0.089	0.108	0.124	0.138
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	✓	✓	✓	**225**	0.041	0.058	0.075	0.089	0.103	0.126	0.144	0.16
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000	✓		✓	**210**	0.039	0.055	0.071	0.085	0.097	0.119	0.136	0.152
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500	✓		✓	**190**	0.036	0.052	0.067	0.08	0.092	0.113	0.129	0.144
	P4	P4.1	Stainless steels, ferritic and martensitic		✓		✓	**155**	0.028	0.04	0.052	0.062	0.071	0.087	0.099	0.11
	P5	P5.1	Cast steel				✓	**235**	0.041	0.058	0.075	0.089	0.103	0.126	0.144	0.16
	P6	P6.1	Stainless cast steel, ferritic and martensitic				✓	**155**	0.02	0.028	0.036	0.043	0.05	0.061	0.069	0.077
M	M1	M1.1	Stainless steels, austenitic	< 700	✓		✓	**130**	0.025	0.035	0.045	0.054	0.062	0.076	0.087	0.097
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000			✓	**120**	0.02	0.029	0.037	0.045	0.051	0.063	0.072	0.08
	M2	M2.1	Stainless/heat-resistant cast steel, austenitic	< 700	✓		✓	**145**	0.027	0.038	0.049	0.059	0.067	0.082	0.094	0.105
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000			✓	**130**	0.021	0.03	0.039	0.046	0.053	0.065	0.074	0.083
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓	**520**	0.07	0.101	0.129	0.154	0.177	0.216	0.248	0.276
	K2	K2.1	Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓	**475**	0.06	0.086	0.109	0.131	0.151	0.184	0.21	0.235
		K2.2	Cast iron with spheroidal graphite, GJS	≤ 800	✓	✓	✓	**390**	0.049	0.071	0.09	0.108	0.124	0.152	0.173	0.193
		K2.3	Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓	**215**	0.028	0.04	0.052	0.062	0.071	0.087	0.099	0.11
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓	**345**	0.049	0.071	0.09	0.108	0.124	0.152	0.173	0.193
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓	**325**	0.042	0.06	0.077	0.093	0.106	0.13	0.149	0.166
S	S1	S1.1	Titanium, titanium alloys	< 400			✓	**135**	0,021	0,030	0,038	0,046	0,052	0,064	0,073	0,082
	S2	S2.1	Titanium, titanium alloys	< 1200			✓	**120**	0,017	0,024	0,031	0,037	0,043	0,052	0,060	0,067
		S2.2	Titanium, titanium alloys	> 1200			✓	**80**	0,015	0,022	0,028	0,033	0,038	0,047	0,053	0,059

Version with chamfer
Factors for tool lengths 3xD/4xD/5xD ***

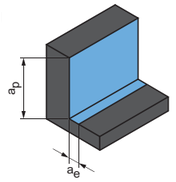
Max. machining depth a_p	a_e max.	Correction factors	
		v_c	f_z
3xD	0,1xD	0,9	0,9
4xD	0,05xD	0,9	0,7
5xD	0,05xD	0,8	0,6

Version with sharp edge
Factors for tool lengths 3xD/4xD/5xD ***

Max. machining depth a_p	a_e max.	Correction factors	
		v_c	f_z
3xD	0,05xD	0,9	0,9
4xD	0,03xD	0,9	0,7
5xD	0,03xD	0,8	0,6

* MAPAL machining groups
** If the alloy parts Cr, Mo, Ni, V, W in total > 8%, then select the next highest MAPAL machining group.
*** In order to achieve very good surface results, the feed rate must be reduced further.
The specified machining values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Finishing



a_p = 0.94xD
a_e = 0.1xD

CPMill-Uni-HPC-Finish | CPM130

MMG*			Workpiece material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/min]	f_z [mm]					
					MQL/Air	Dry	Coolant		Diameter of milling cutter [mm]					
									8.00	10.00	12.00	16.00	20.00	25.00
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	✓	✓	✓	**385**	0.057	0.069	0.079	0.096	0.11	0.123
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	✓	✓	✓	**315**	0.054	0.064	0.074	0.09	0.103	0.115
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	✓	✓	✓	**350**	0.057	0.069	0.079	0.096	0.11	0.123
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	✓		✓	**245**	0.048	0.057	0.066	0.08	0.092	0.103
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	✓	✓	✓	**225**	0.055	0.066	0.076	0.093	0.107	0.119
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000	✓		✓	**210**	0.053	0.063	0.072	0.088	0.101	0.113
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500	✓		✓	**190**	0.05	0.06	0.068	0.084	0.096	0.107
	P5	P5.1	Cast steel				✓	**235**	0.055	0.066	0.076	0.093	0.107	0.119
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓	**520**	0.096	0.114	0.132	0.161	0.184	0.205
	K2	K2.1	Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓	**475**	0.081	0.097	0.112	0.137	0.156	0.174
		K2.2	Cast iron with spheroidal graphite, GJS	≤ 800	✓	✓	✓	**390**	0.067	0.08	0.092	0.113	0.129	0.144
		K2.3	Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓	**215**	0.038	0.046	0.053	0.064	0.074	0.082
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓	**345**	0.067	0.08	0.092	0.113	0.129	0.144
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓	**325**	0.057	0.069	0.079	0.096	0.11	0.123

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** If the alloy parts Cr, Mo, Ni, V, W in total > 8%, then select the next highest MAPAL machining group.
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