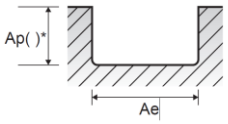
Speeds and Feeds

1) Select your material in the ISO colored chart with respect to material description.
2) Start with a middle/average value for spindle speed, n (RPM) and feed rate, V_f (mm/min). Adjust the spindle speed and/or feed rate based on your cutting conditions.

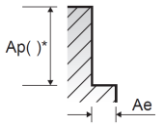
End Mill Series – FPCHH

Material			Recommended Cutting Values – Side Cutting				Tool Diameter (mm)								
Group		Material Description	Width of Cut, a_e	Depth of Cut, a_p	Parameter	4	6	8	10	12	14	16	20	25
ISO	VDI 3323													
P	1-4	Non-Alloy Steel	0.3D	1.5D	Vc, SMM	294	292	289	302	299	302	294	302	338
					Fz, MMPT	0.050	0.067	0.063	0.075	0.088	0.100	0.112	0.113	0.100
					n, RPM	15597	11618	9199	8011	6798	6008	5199	4806	4304
					Vf, MMPM	2340	2335	2318	2403	2393	2403	2329	2173	2152
	5		0.3D	1.5D	Vc, SMM	234	231	239	226	229	241	249	226	251
					Fz, MMPT	0.023	0.030	0.028	0.033	0.040	0.040	0.041	0.039	0.039
					n, RPM	12414	9191	7608	5995	5207	4795	4403	3597	3196
					Vf, MMPM	857	827	852	791	833	767	722	561	623
	6-7	Low Alloy Steel	0.3D	1.5D	Vc, SMM	294	292	289	302	299	302	294	302	338
					Fz, MMPT	0.050	0.067	0.063	0.075	0.088	0.100	0.112	0.113	0.100
					n, RPM	15597	11618	9199	8011	6798	6008	5199	4806	4304
					Vf, MMPM	2340	2335	2318	2403	2393	2403	2329	2173	2152
	8-9		0.3D	1.5D	Vc, SMM	234	231	239	226	229	241	249	226	251
					Fz, MMPT	0.023	0.030	0.028	0.033	0.040	0.040	0.041	0.039	0.039
					n, RPM	12414	9191	7608	5995	5207	4795	4403	3597	3196
					Vf, MMPM	857	827	852	791	833	767	722	561	623
	10	High Alloy Steel, and Tool Steel	0.3D	1.5D	Vc, SMM	294	292	289	302	299	302	294	302	338
					Fz, MMPT	0.050	0.067	0.063	0.075	0.088	0.100	0.112	0.113	0.100
					n, RPM	15597	11618	9199	8011	6798	6008	5199	4806	4304
					Vf, MMPM	2340	2335	2318	2403	2393	2403	2329	2173	2152
	11.1		0.3D	1.5D	Vc, SMM	234	231	239	226	229	241	249	226	251
					Fz, MMPT	0.023	0.030	0.028	0.033	0.040	0.040	0.041	0.039	0.039
					n, RPM	12414	9191	7608	5995	5207	4795	4403	3597	3196
					Vf, MMPM	857	827	852	791	833	767	722	561	623
	11.2		0.3D	1.5D	Vc, SMM	234	231	239	226	229	241	249	226	251
					Fz, MMPT	0.023	0.030	0.028	0.033	0.040	0.040	0.041	0.039	0.039
					n, RPM	12414	9191	7608	5995	5207	4795	4403	3597	3196
					Vf, MMPM	857	827	852	791	833	767	722	561	623

NOTE: All cutting data are target values.
Maximum recommended depth shown.
Above recommendations are based on ideal conditions. Adjust parameters accordingly for smaller taper machining centers or less rigid conditions.



Slotting



Side Cutting

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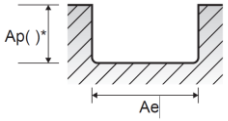
Speeds and Feeds

1) Select your material in the ISO colored chart with respect to material description.
2) Start with a middle/average value for spindle speed, n (RPM) and feed rate, V_f (mm/min). Adjust the spindle speed and/or feed rate based on your cutting conditions.

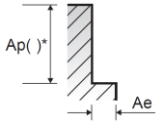
End Mill Series – FPCHH

Material			Recommended Cutting Values – Side Cutting										
Group		Material Description	Width of Cut, a_e	Depth of Cut, a_p	Parameter	Tool Diameter (mm)								
ISO	VDI 3323					4	6	8	10	12	14	16	20	25
M	14.1	Stainless Steel	Ø4~10:0.15D Ø12~16:0.10D Ø18~25:0.05D	1.5D	Vc, SMM	158	158	160	158	158	166	153	151	170
					Fz, MMPT	0.023	0.030	0.028	0.034	0.040	0.039	0.039	0.038	0.038
					n, RPM	8382	6287	5093	4191	3592	3302	2706	2403	2165
					Vf, MMPM	578	566	570	570	575	515	422	365	411
S	31-35	Heat Resistant Super Alloys	0.05D	1.0D	Vc, SMM	45	45	41	45	40	40	40	41	47
					Fz, MMPT	0.026	0.033	0.037	0.040	0.036	0.034	0.036	0.038	0.037
					n, RPM	2387	1790	1305	1194	909	796	707	653	598
					Vf, MMPM	186	177	193	191	131	108	102	99	111
	36-37	Titanium Alloys	Ø4~10:0.15D Ø12~16:0.10D Ø18~25:0.05D	1.0D	Vc, SMM	158	158	160	158	158	166	153	151	170
					Fz, MMPT	0.023	0.030	0.028	0.034	0.040	0.039	0.039	0.038	0.038
					n, RPM	8382	6287	5093	4191	3592	3302	2706	2403	2165
					Vf, MMPM	578	566	570	570	575	515	422	365	411
H	40	Chilled Cast Iron	0.3D	1.5D	Vc, SMM	234	231	239	226	229	241	249	226	251
					Fz, MMPT	0.023	0.030	0.028	0.033	0.040	0.040	0.041	0.039	0.039
					n, RPM	12414	9191	7608	5995	5207	4795	4403	3597	3196
					Vf, MMPM	857	827	852	791	833	767	722	561	623

NOTE: All cutting data are target values.
Maximum recommended depth shown.
Above recommendations are based on ideal conditions. Adjust parameters accordingly for smaller taper machining centers or less rigid conditions.



Slotting



Side Cutting

Speeds and Feeds

Feed Rate, Per Revolution (mm/min)
$v_f = f_n \cdot n$

Feed Rate, Per Tooth (mm/min)
$v_f = f_z \cdot n \cdot Z$

Feed Per Revolution (mm/rev)
$f_n = \frac{v_f}{n}$

Feed Per Tooth (mm)
$f_z = \frac{v_f}{n \cdot Z}$

Cutting Speed (m/min)
$v_c = \frac{\pi \cdot D_{tool} \cdot n}{1000}$

Spindle Speed (rev/min)
$n = \frac{v_c \cdot 1000}{\pi \cdot D_{tool}}$

Material Removal Rate (mm^3/min)
$MMR = \frac{a_p \cdot a_e \cdot v_f}{1000}$

Metric

Symbol	Definition	Unit
v_f	Feed rate	*mm/min*
f_n	Feed per revolution	*mm/rev*
f_z	Feed per tooth	*mm*
v_c	Cutting speed	*m/min (SMM)*
n	Spindle speed	*rev/min (RPM)*
D_{tool}	Tool cutting diameter	*mm*
MMR	Material removal rate	*(mm^3/min)*
a_e	Radial depth of cut	*mm*
a_p	Axial depth of cut	*mm*
Z	Number of teeth/flutes	