

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.

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					6	8	10	12	14	16	20	25
N	21	Aluminum-wrought alloy	0.5D	1.5D	V_c , SMM	136	130	152.4	180	157	175	137	160
					F_z , MMPT	.0356	.0559	.0610	.0711	.0965	.0965	.1549	.1778
					n, RPM	7200	5150	4850	4770	3570	3490	2180	2040
					V_f , MMPM	768	863	887	1018	1034	1011	1013	1088
					V_c , SMM	136	130	152.4	180	157	175	137	160
					F_z , MMPT	.0356	.0559	.0610	.0711	.0965	.0965	.1549	.1778
	22	Aluminum-wrought alloy	0.5D	1.5D	V_c , SMM	136	130	152.4	180	157	175	137	160
					F_z , MMPT	.0356	.0559	.0610	.0711	.0965	.0965	.1549	.1778
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	23	Aluminum-cast, alloyed	0.5D	1.5D	V_c , SMM	136	130	152.4	180	157	175	137	160
					F_z , MMPT	.0356	.0559	.0610	.0711	.0965	.0965	.1549	.1778
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	24	Aluminum-cast, alloyed	0.5D	1.5D	V_c , SMM	136	130	152.4	180	157	175	137	160
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NOTE: All cutting data are target values.

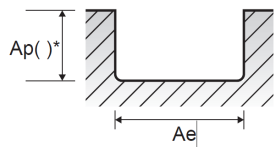
Maximum recommended depth shown.

Finish cuts typically require reduced feed rates and/or higher spindle speed, with a radial depth of cut, a_e of (2%)XD or less.

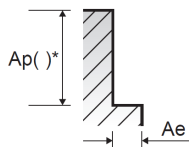
Reduce speed and feed recommendations for materials harder than listed.

Reduce cut depth and feed by 50% for long-flute or long-reach tools.

Above recommendations are based on ideal conditions. Adjust parameters accordingly for smaller taper machining centers or less rigid conditions.



Slotting



Side Cutting

Tech Tips: The tables above are based on common machining calculators.

We realize that shops may not have the RPM capability shown in the tables.

To adapt the tables to the machining conditions available, use the following calculation:

$$(\text{Recommended Feed MMPM} / \text{Recommended RPM}) \times \text{Available RPM} = \text{MMPM}$$



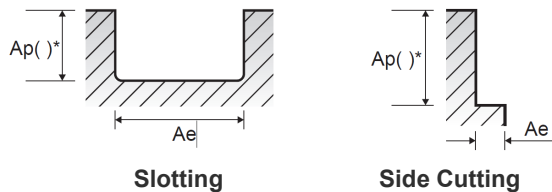
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 (Recommended Feed MMPPM / Recommended RPM) X Available RPM = MMPPM



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	