

Speeds and Feeds



METRIC

N - Low SI Aluminum		N - Brass and Copper		K - Cast Iron		P - Steel	
230-300 SMPM		70-150 SMPM		70-120 SMPM		120-180 SMPM	
Neck Dia	Chip Load (MMPT)	Neck Dia	Chip Load (MMPT)	Neck Dia	Chip Load (MMPT)	Neck Dia	Chip Load (MMPT)
1.73	0.015	1.73	0.014	1.73	0.014	1.73	0.005
1.85	0.020	1.85	0.018	1.85	0.018	1.85	0.007
2.41	0.023	2.41	0.021	2.41	0.021	2.41	0.008
3.18	0.031	3.18	0.028	3.18	0.028	3.18	0.011
4.75	0.047	4.75	0.042	4.75	0.042	4.75	0.017
6.35	0.063	6.35	0.056	6.35	0.056	6.35	0.022
7.92	0.078	7.92	0.070	7.92	0.070	7.92	0.027
9.53	0.094	9.53	0.084	9.53	0.084	9.53	0.033
M - Stainless Steels		S - Super Alloys		S - Titanium		H - Hardened Steel (>48 Rc)	
60-135 SMPM		20-30 SMPM		30-45 SMPM		25-30 SMPM	
Neck Dia	Chip Load (MMPT)	Neck Dia	Chip Load (MMPT)	Neck Dia	Chip Load (MMPT)	Neck Dia	Chip Load (MMPT)
1.73	0.005	1.73	0.003	1.73	0.003	1.73	0.003
1.85	0.007	1.85	0.004	1.85	0.004	1.85	0.003
2.41	0.008	2.41	0.005	2.41	0.005	2.41	0.004
3.18	0.011	3.18	0.007	3.18	0.007	3.18	0.006
4.75	0.017	4.75	0.010	4.75	0.010	4.75	0.008
6.35	0.022	6.35	0.014	6.35	0.014	6.35	0.011
7.92	0.027	7.92	0.017	7.92	0.017	7.92	0.014
9.53	0.033	9.53	0.021	9.53	0.021	9.53	0.017



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 (cm 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	(cm ³ /min)
a_e	Radial depth of cut	mm
a_p	Axial depth of cut	mm
Z	Number of teeth/flutes	