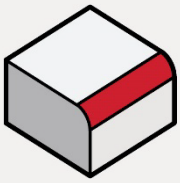
Speeds and Feeds



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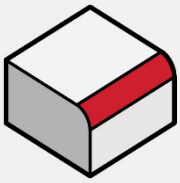
ISO	VDI 3323	Material Description	Parameter	Recommended Cutting Values								
				8	10	12	14	16	20	24	28	34
P	1	Non-alloy steel	m/min	20	20	20	20	20	20	20	20	20
			RPM	800	640	530	460	400	320	270	230	190
			mm/tooth	.0170	.0200	.0210	.0240	.0290	.0320	.0370	.0410	.0490
			mm/min	54	51	45	45	46	41	40	38	37
	2		m/min	15	15	15	15	15	15	15	15	15
			RPM	600	480	400	340	300	240	200	170	140
			mm/tooth	.0150	.0160	.0190	.0230	.0290	.0330	.0390	.0400	.0480
			mm/min	36	31	30	31	35	32	31	27	27
	3		m/min	11	11	11	11	11	11	9	9	9
			RPM	400	320	270	230	200	160	130	110	90
			mm/tooth	.0180	.0200	.0230	.0230	.0300	.0340	.0400	.0520	.0500
			mm/min	29	25	25	21	24	22	21	23	18
	4		m/min	11	11	11	11	11	11	9	9	9
			RPM	400	320	270	230	200	160	130	110	90
			mm/tooth	.0180	.0200	.0230	.0230	.0300	.0340	.0400	.0520	.0500
			mm/min	29	25	25	21	24	22	21	23	18
	6	Low alloy steel	m/min	15	15	15	15	15	15	15	15	15
			RPM	600	480	400	340	300	240	200	170	140
			mm/tooth	.0150	.0160	.0190	.0230	.0290	.0330	.0390	.0400	.0480
			mm/min	36	31	30	31	35	32	31	27	27
	7		m/min	11	11	11	11	11	11	9	9	9
			RPM	400	320	270	230	200	160	130	110	90
			mm/tooth	.0180	.0200	.0230	.0230	.0300	.0340	.0400	.0520	.0500
			mm/min	29	25	25	21	24	22	21	23	18
	8		m/min	11	11	11	11	11	11	9	9	9
			RPM	400	320	270	230	200	160	130	110	90
			mm/tooth	.0180	.0200	.0230	.0230	.0300	.0340	.0400	.0520	.0500
			mm/min	29	25	25	21	24	22	21	23	18
	10	High alloyed steel, and tool steel	m/min	15	15	15	15	15	15	15	15	15
			RPM	600	480	400	340	300	240	200	170	140
			mm/tooth	.0150	.0160	.0190	.0230	.0290	.0330	.0390	.0400	.0480
			mm/min	36	31	30	31	35	32	31	27	27
	11.1		m/min	11	11	11	11	11	11	9	9	9
			RPM	400	320	270	230	200	160	130	110	90
			mm/tooth	.0180	.0200	.0230	.0230	.0300	.0340	.0400	.0520	.0500
			mm/min	29	25	25	21	24	22	21	23	18

Speeds and Feeds



N	21	Aluminum-wrought alloy	m/min	90	90	90	90	79	90	90	85	85
			RPM	3580	2870	2390	2050	1590	1430	1190	970	800
			mm/tooth	.0180	.0200	.0220	.0250	.0310	.0340	.0380	.0450	.0500
			mm/min	258	229	210	205	197	195	181	174	159
	22		m/min	90	90	90	90	79	90	90	85	85
			RPM	3580	2870	2390	2050	1590	1430	1190	970	800
			mm/tooth	.0180	.0200	.0220	.0250	.0310	.0340	.0380	.0450	.0500
			mm/min	258	229	210	205	197	195	181	174	159
	23	Aluminum-cast, alloyed	m/min	90	90	90	90	79	90	90	85	85
			RPM	3580	2870	2390	2050	1590	1430	1190	970	800
			mm/tooth	.0180	.0200	.0220	.0250	.0310	.0340	.0380	.0450	.0500
			mm/min	258	229	210	205	197	195	181	174	159
	24		m/min	90	90	90	90	79	90	90	85	85
			RPM	3580	2870	2390	2050	1590	1430	1190	970	800
			mm/tooth	.0180	.0200	.0220	.0250	.0310	.0340	.0380	.0450	.0500
			mm/min	258	229	210	205	197	195	181	174	159
	25		m/min	90	90	90	90	79	90	90	85	85
			RPM	3580	2870	2390	2050	1590	1430	1190	970	800
			mm/tooth	.0180	.0200	.0220	.0250	.0310	.0340	.0380	.0450	.0500
			mm/min	258	229	210	205	197	195	181	174	159

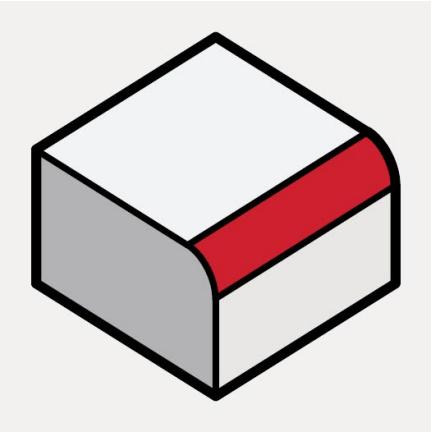
Technical Details

Feed Rate, Per Revolution (in/min)

$$v_f = f_n \cdot n$$

Feed Rate, Per Tooth (in/min)

$$v_f = f_z \cdot n \cdot Z$$



Feed Per Revolution (in/rev)

$$f_n = \frac{v_f}{n}$$

Feed Per Tooth (in)

$$f_z = \frac{v_f}{n \cdot Z}$$

Cutting Speed (ft/min)

$$v_c = \frac{\pi \cdot D_{tool} \cdot n}{12}$$

Spindle Speed (rev/min)

$$n = \frac{v_c \cdot 12}{\pi \cdot D_{tool}}$$

Material Removal Rate (in^3/min)

$$MMR = a_p \cdot a_e \cdot v_f$$

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