



MATERIAL GROUP	HRc		Size (mm)									
			3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0	
<b>P</b>	11 12	< 30	$v_c$ (m/min)	35	40	40	40	40	40	40	30	45
			$n$	3500	3000	2400	2000	1540	1300	1100	950	750
			$f_z$	0.023	0.027	0.035	0.043	0.058	0.073	0.091	0.105	0.140
			$f$ (mm/min)	160	160	170	170	180	190	200	200	210
	13 14	30-40	$v_c$ (m/min)	30	30	30	30	30	35	35	20	40
			$n$	2000	2500	2000	1600	1200	1100	900	700	600
			$f_z$	0.023	0.028	0.035	0.044	0.06	0.068	0.083	0.114	0.133
			$f$ (mm/min)	140	140	140	140	145	145	150	160	160
<b>M</b>	21 22	$v_c$ (m/min)	25	25	30	25	25	25	30	15	35	
		$n$	2400	2000	1760	1400	1000	870	730	550	530	
		$f_z$	0.021	0.025	0.03	0.038	0.55	0.063	0.079	0.109	0.123	
		$f$ (mm/min)	100	100	105	105	110	110	115	120	130	
<b>N</b>	71 72 73	$v_c$ (m/min)	105	115	110	105	110	125	130	85	140	
		$n$	11000	9000	6900	5600	4400	4000	3500	2750	2200	
		$f_z$	0.025	0.032	0.045	0.057	0.075	0.085	0.1	0.135	0.175	
		$f$ (mm/min)	550	580	620	640	660	680	700	740	770	
<b>S</b>	41 42 43	$v_c$ (m/min)	25	25	30	25	25	25	30	15	35	
		$n$	2400	2000	1760	1400	1000	870	730	550	530	
		$f_z$	0.021	0.025	0.03	0.038	0.55	0.063	0.079	0.109	0.123	
		$f$ (mm/min)	100	100	105	105	110	110	115	120	130	



$v_c$  - cutting speed (m/min)  
 $n$  - RPM (rev/min)  
 $f_z$  - feed rate (mm/tooth)  
 $f$  - feed rate (mm/rev)  
 $z$  - No. of teeth  
 $a_p$  - axial depth of cut  
 $a_e$  - radial depth of cut

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.



MATERIAL GROUP	HRc		Size (mm)									
			3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0	
<b>P</b>	11 12	< 30	$v_c$ (m/min)	35	40	40	40	40	40	40	45	45
			$n$	3900	3200	2500	2000	1540	1300	1100	900	700
			$f_z$	0.008	0.01	0.013	0.018	0.024	0.031	0.041	0.05	0.064
			$f$ (mm/min)	65	65	65	70	75	80	90	90	90
	13 14	30-40	$v_c$ (m/min)	30	35	35	35	35	40	40	40	40
			$n$	3300	2800	2200	1800	1300	1200	1000	770	600
			$f_z$	0.008	0.009	0.013	0.017	0.025	0.027	0.035	0.045	0.058
<b>M</b>	21 22		$v_c$ (m/min)	25	25	30	25	30	30	30	35	30
			$n$	2400	2000	1760	1400	1100	1000	840	660	440
			$f_z$	0.008	0.01	0.013	0.018	0.025	0.028	0.036	0.045	0.068
			$f$ (mm/min)	40	40	45	50	55	55	60	60	60
<b>N</b>	71 72 73		$v_c$ (m/min)	130	150	150	145	145	160	165	165	165
			$n$	14000	12000	9500	7700	5800	5100	4400	3300	2640
			$f_z$	0.008	0.01	0.013	0.019	0.03	0.037	0.045	0.05	0.064
			$f$ (mm/min)	230	240	250	300	350	280	400	330	340
<b>S</b>	41 42 43		$v_c$ (m/min)	25	25	30	25	30	30	30	35	30
			$n$	2400	2000	1760	1400	1100	1000	840	660	440
			$f_z$	0.008	0.01	0.013	0.018	0.025	0.028	0.036	0.045	0.068
			$f$ (mm/min)	40	40	45	50	55	55	60	60	60



$v_c$  - cutting speed (m/min)  
 $n$  - RPM (rev/min)  
 $f_z$  - feed rate (mm/tooth)  
 $f$  - feed rate (mm/rev)  
 $z$  - No. of teeth  
 $a_p$  - axial depth of cut  
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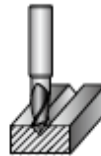
To calculate RPM from cutting speed:  $n = \frac{v_c \times 1000}{\pi \times \phi}$

To calculate cutting speed from RPM:  $v_c = \frac{n \times \pi \times \phi}{1000}$

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MATERIAL GROUP	HRc		Size (mm)									
			3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0	
<b>P</b>	11 12	< 30	$v_c$ (m/min)	40	40	40	40	40	40	40	45	45
			$n$	4000	3300	2500	2000	1540	1300	1000	900	700
			$f_z$	0.004	0.005	0.006	0.008	0.011	0.013	0.02	0.022	0.029
			$f$ (mm/min)	30	30	30	30	35	35	40	40	40
	13 14	30-40	$v_c$ (m/min)	30	35	35	35	35	40	40	40	40
			$n$	3300	2800	2200	1800	1300	1200	1000	770	600
<b>M</b>	21 22		$f_z$	0.004	0.004	0.006	0.008	0.013	0.015	0.018	0.023	0.029
			$f$ (mm/min)	25	25	25	30	35	35	35	35	35
			$v_c$ (m/min)	25	25	30	25	30	30	20	35	30
			$n$	2400	2000	1760	1400	1100	1000	840	660	440
<b>N</b>	71 72 73		$f_z$	0.004	0.005	0.006	0.007	0.009	0.01	0.012	0.019	0.028
			$f$ (mm/min)	20	20	20	20	20	20	20	25	25
			$v_c$ (m/min)	130	150	150	145	145	155	165	165	165
			$n$	14000	11800	9500	7700	5800	5000	4400	3300	2600
<b>S</b>	41 42 43		$f_z$	0.008	0.01	0.013	0.016	0.022	0.026	0.03	0.041	0.052
			$f$ (mm/min)	220	230	240	250	260	260	260	270	270
			$v_c$ (m/min)	25	25	30	25	30	30	20	35	30
			$n$	2400	2000	1760	1400	1100	1000	840	660	440
			$f_z$	0.004	0.005	0.006	0.007	0.009	0.01	0.012	0.019	0.028
			$f$ (mm/min)	20	20	20	20	20	20	20	25	25



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 $n$  - RPM (rev/min)  
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$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

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