

# Lathe RPM Starting Points by Material (HSS Tooling)

Formula:  $RPM = (SFM \times 4) \div \text{Diameter (inches)}$

Material	SFM	0.25"	0.50"	1.00"	1.50"	2.00"	2.50"	3.00"
Aluminum 6061	300	4800	2400	1200	800	600	480	400
Aluminum 7075	250	4000	2000	1000	667	500	400	333
Brass (Free Cutting)	200	3200	1600	800	533	400	320	267
Bronze (Phosphor)	100	1600	800	400	267	200	160	133
Bronze (Aluminum)	150	2400	1200	600	400	300	240	200
Copper	150	2400	1200	600	400	300	240	200
Mild Steel (1018)	100	1600	800	400	267	200	160	133
Mild Steel (1045)	90	1440	720	360	240	180	144	120
Tool Steel (O1)	60	960	480	240	160	120	96	80
Tool Steel (A2)	50	800	400	200	133	100	80	67
Stainless (304)	80	1280	640	320	213	160	128	107
Stainless (316)	70	1120	560	280	187	140	112	93
Cast Iron (Gray)	50	800	400	200	133	100	80	67
Cast Iron (Ductile)	60	960	480	240	160	120	96	80
Titanium	60	960	480	240	160	120	96	80
Plastics (Delrin)	400	6400	3200	1600	1067	800	640	533
Plastics (Nylon)	300	4800	2400	1200	800	600	480	400
Plastics (Acrylic)	200	3200	1600	800	533	400	320	267

**Practical Note:** Often your lathe/chuck rating or balance limits will cap you well below the listed RPMs on small diameters. If your max safe speed is, say, 4,000 RPM, just run the max and adjust feed/DOC for chip control. Also tweak SFM based on insert grade, nose radius, chipbreaker, coolant, and rigidity.