Lathe RPM Starting Points by Material (Carbide Tooling)

Formula: RPM = (SFM × 4) ÷ Diameter (inches)

Material	SFM	0.25"	0.50"	1.00"	1.50"	2.00"	2.50"	3.00"
Aluminum 6061	900	14400	7200	3600	2400	1800	1440	1200
Aluminum 7075	750	12000	6000	3000	2000	1500	1200	1000
Brass (Free Cutting)	600	9600	4800	2400	1600	1200	960	800
Bronze (Phosphor)	300	4800	2400	1200	800	600	480	400
Bronze (Aluminum)	450	7200	3600	1800	1200	900	720	600
Copper	450	7200	3600	1800	1200	900	720	600
Mild Steel (1018)	300	4800	2400	1200	800	600	480	400
Mild Steel (1045)	270	4320	2160	1080	720	540	432	360
Tool Steel (O1)	180	2880	1440	720	480	360	288	240
Tool Steel (A2)	150	2400	1200	600	400	300	240	200
Stainless (304)	240	3840	1920	960	640	480	384	320
Stainless (316)	210	3360	1680	840	560	420	336	280
Cast Iron (Gray)	150	2400	1200	600	400	300	240	200
Cast Iron (Ductile)	180	2880	1440	720	480	360	288	240
Titanium	180	2880	1440	720	480	360	288	240
Plastics (Delrin)	1200	19200	9600	4800	3200	2400	1920	1600
Plastics (Nylon)	900	14400	7200	3600	2400	1800	1440	1200
Plastics (Acrylic)	600	9600	4800	2400	1600	1200	960	800

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.