Grooving Tools Speeds & Feeds

Material	Grades	Speed		Tool Diameter (Max FPR)				
		Uncoated	AltiN Coated	.060-.080	.090-.125	.180-.220	.250-.312	.375 +
		SFM	SFM	Max FPR	Max FPR	Max FPR	Max FPR	Max FPR
P - Steels								
High Strength Tool Steel	A2, D2, P20, H11, H13, S2, 01	75-175	175-300	.0005	.0006	.0008	.0015	.0022
Low Carbon	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	75-200	200-450	.0007	.0008	.0011	.0022	.0030
Medium Carbon	1040-1095, 1140-1151, 1330-1345, 1520-1572, 4023-4063, 4120-4161, 4330-4340, 4620-4640, 8620-8660, 8740-8750, 6150, 51000, 52100	75-200	200-425	.0006	.0007	.0010	.0019	.0026
M - Stainless Steels								
Austenitic	301-304L, 310, 316L, 321, 347	75-175	75-350	.0006	.0007	.0010	.0019	.0026
Martensitic	403, 410, 416, 420, 430, 431, 440	75-210	130-420	.0005	.0006	.0008	.0016	.0023
Precipitation Hardening	12/8, 15/5, 17/4, AM-350/355/363, PH13-8MO, PH14-8/MO	75-230	130-600	.0005	.0006	.0008	.0016	.0023
K - Cast Irons								
Ductile	A536, J434, 60-40-18	120-350	200-550	.0010	.0012	.0017	.0031	.0044
Gray	A48, A436, A319, Class 20, G4000	120-350	200-550	.0010	.0012	.0017	.0031	.0044
Malleable	A220, A602, J158	120-350	200-550	.0010	.0012	.0017	.0031	.0044
N - Non-Ferrous								
Aluminum Alloys	2014, 2024, 6061, 7075	75-250	250-750	.0022	.0026	.0037	.0065	.0085
Aluminum High Silicon	A380, A390	75-250	250-750	.0022	.0026	.0037	.0065	.0085
Brass/Bronze	Aluminum Bronze, Low Silicon Bronze	250-300	250-650	.0018	.0021	.0030	.0053	.0079
Composites	G-10, Fiberglass, Graphite, Graphite Epoxy, Plastics	250-300	250-650	.0018	.0021	.0030	.0053	.0079
Copper	101-707, 834-97	75-250	250-750	.0022	.0026	.0037	.0065	.0085
Magnesium		75-250	250-750	.0022	.0026	.0037	.0065	.0085
S - High Temp Alloys								
Cobalt Base	Stellite, HS-21, Haynes 25/188, X40, L605	50-130	130-300	.0004	.0005	.0007	.0013	.0017
Iron Base	Incoloy 800-802, Multmet N-155, Timkin 16-25-6, Carpenter 22-b3	50-100	100-200	.0004	.0004	.0006	.0011	.0016
Nickel Base	Inconel 625/718, Inco 700, 713C, 718, Monel 400-401, 404, K401, Rene, Rene 41 & 95 Hastel-loy, Waspoloy, Udimet 500 & 700	50-130	130-300	.0004	.0005	.0007	.0013	.0017
Titanium	Commercially Pure, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si, Ti-8Al-1Mo, Ti-8Al-4Mo	50-120	120-275	.0005	.0006	.0008	.0016	.0022

NOTE: Speeds and Feeds listed are estimated and will vary by application.

These tools can be found on pages 502, 503, 518-532.

Grooving Tools Troubleshooting

Problems	Causes	Solutions
Built Up Edge	Cutting Forces	Check (IPR) for excessive feed rate
	Heat	Use coolant or air blast and a coated tool
	Tool	Use a coated tool
Tool Breakage	Cutting Conditions	Check (IPR) for excessive feed rate
	Chip Packing	Stagger - Peck Grooving
Chatter	Clamping	Clamping length should be 3x the grooving bar diameter. Check the tool-holder for rigidity.
	Cutting Conditions	Reduce RPM and Increase Feed Rates
	Tool	Add a (.0001-.0003) hone to the cutting edge to keep forces consistent.
Excessive Flank Wear	Cutting Conditions	Check for excessive speed
	Part	Make sure workhardening did not occur from prior operation
	Tool	Use a coated tool