Carbide Bars - Technical Info

Boring & Profiling Tools Speeds & Feeds

Material	Grades	Speed Uncoated SFM	Speed AltiN Coated SFM	Feed IPR	Tool Diameter (Max FPR) .060-.080 Max DOC	.090-.125 Max DOC	.180-.220 Max DOC	.250-.312 Max DOC	.375 + Max DOC
P - Steels									
High Strength Tool Steel	A2, D2, P20, H11, H13, S2, 01	75-175	175-300	.0005-.005	.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	.0005-.007	.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	.0005-.007	.0006	.0007	.0010	.0019	.0026
M - Stainless Steels									
Austenitic	301-304L, 310, 316L, 321, 347	75-175	75-350	.0005-.005	.0006	.0007	.0010	.0019	.0026
Martensitic	403, 410, 416, 420, 430, 431, 440	75-210	130-420	.0005-.005	.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-.005	.0005	.0006	.0008	.0016	.0023
K - Cast Irons									
Ductile	A536, J434, 60-40-18	120-350	200-550	.0005-.0010	.0010	.0012	.0017	.0031	.0044
Gray	A48, A436, A319, Class 20, G4000	120-350	200-550	.0005-.0010	.0010	.0012	.0017	.0031	.0044
Malleable	A220, A602, J158	120-350	200-550	.0005-.0010	.0010	.0012	.0017	.0031	.0044
N - Non-Ferrous									
Aluminum Alloys	2014, 2024, 6061, 7075	75-250	250-750	.0005-.0015	.0022	.0026	.0037	.0065	.0085
Aluminum High Silicon	A380, A390	75-250	250-750	.0005-.0015	.0022	.0026	.0037	.0065	.0085
Brass/Bronze	Aluminum Bronze, Low Silicon Bronze	250-300	250-650	.001-.010	.0018	.0021	.0030	.0053	.0079
Composites	G-10, Fiberglass, Graphite, Graphite Epoxy, Plastics	250-300	250-650	.001-.010	.0018	.0021	.0030	.0053	.0079
Copper	101-707, 834-97	75-250	250-750	.0005-.0015	.0022	.0026	.0037	.0065	.0085
Magnesium		75-250	250-750	.0005-.0015	.0022	.0026	.0037	.0065	.0085
S - High Temp Alloys									
Cobalt Base	Stellite, HS-21, Haynes 25/188, X40, L605	50-130	130-300	.0005-.004	.0004	.0005	.0007	.0013	.0017
Iron Base	Incoloy 800-802, Multmet N-155, Timkin 16-25-6, Carpenter 22-b3	50-100	100-200	.0005-.005	.0004	.0004	.0006	.0011	.0016
Nickel Base	Inconel 625/718, Inco 700, 713C, 718, Monel 400-401, 404, K401, Rene, Rene 41 & 95 Hastelloy, Waspoloy, Udimet 500 & 700	50-130	130-300	.0005-.004	.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-.005	.0005	.0006	.0008	.0016	.0022

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

These tools can be found on pages 500, 501, 504, 506-517, 537-541.

Boring & Profiling 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
Corner Breaking	Cutting Conditions	Check for excessive speed and feed and depth of cut
	Part	Check the entry hole size
	Tool	Select a tool with a corner radius.
Chatter	Boring Bar	Select the largest bar possible
	Setup	Position the tool above center. Reduce the overhang ratio. Clamping length should be 3x the boring bar diameter. Change the speed to break up harmonics and reduce chatter.
Rough Finish	Built up Edge	See Solution for Built Up Edge.
	Cutting Conditions	Check (IPR) for excessive feed rate
Excessive Flank Wear	Cutting Conditions	Check for excessive speed and feed
	Part	Make sure workhardening did not occur from prior operation
	Tool	Use a coated tool
Smaller Taper in Back	Chip Packing	Boring Bar may be too large which will not allow chips to evacuate. This causes the bar to deflect away from bore.
	Program	If taper is consistant, change program to compensate for the taper
Larger Taper in Back	Built Up Edge	A built up edge will cause the hole to become larger until the edge breaks off then the hole will become smaller.
	Cutting Forces	Reduce Forces. Deflecting bar below center causes the hole to become larger.
	Program	If taper is consistant, change program to compensate for the taper

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