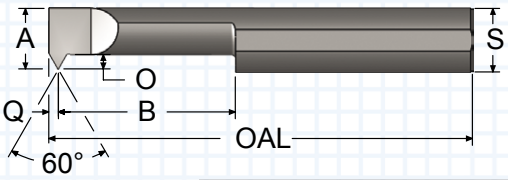
THREADING TOOLS - SOLID CARBIDE



- 60° thread form for cutting UN, ISO, and NPT threads
- ALTiN+ coating extends tool life
- Precision ground shank flat guarantees tool orientation

"A" MIN BORE	"B" MAX DEPTH	"O" MIN OFFSET	RECOM-MENDED TPI*	"Q" LENGTH	"S" SHANK DIA.	OAL	ORDER #		EDP #	
							UNCOATED	ALTiN+	UNCOATED	ALTiN+
0.040	0.080	0.013	56 to 80	0.009	0.125	1.50	TT040080	TT040080A	230001	230103
0.040	0.100	0.013	56 to 80	0.009	0.125	1.50	TT040100	TT040100A	230004	230106
0.040	0.130	0.013	56 to 80	0.009	0.125	1.50	TT040130	TT040130A	230007	230109
0.050	0.100	0.017	48 to 80	0.012	0.125	1.50	TT050100	TT050100A	230010	230112
0.050	0.150	0.017	48 to 80	0.012	0.125	1.50	TT050150	TT050150A	230013	230115
0.050	0.200	0.017	48 to 80	0.012	0.125	1.50	TT050200	TT050200A	230016	230118
0.060	0.150	0.020	40 to 80	0.014	0.125	1.50	TT060150	TT060150A	230019	230121
0.060	0.200	0.020	40 to 80	0.014	0.125	1.50	TT060200	TT060200A	230022	230124
0.060	0.250	0.020	40 to 80	0.014	0.125	1.50	TT060250	TT060250A	230025	230127
0.060	0.300	0.020	40 to 80	0.014	0.125	1.50	TT060300	TT060300A	230028	230130
0.075	0.200	0.020	36 to 72	0.014	0.125	1.50	TT075200	TT075200A	230031	230133
0.075	0.300	0.020	36 to 72	0.014	0.125	1.50	TT075300	TT075300A	230034	230136
0.075	0.400	0.020	36 to 72	0.014	0.125	1.50	TT075400	TT075400A	230037	230139
0.090	0.200	0.025	32 to 64	0.017	0.125	1.50	TT090200	TT090200A	230040	230142
0.090	0.300	0.025	32 to 64	0.017	0.125	1.50	TT090300	TT090300A	230043	230145
0.090	0.400	0.025	32 to 64	0.017	0.125	1.50	TT090400	TT090400A	230046	230148
0.090	0.500	0.025	32 to 64	0.017	0.125	1.50	TT090500	TT090500A	230049	230151
0.120	0.250	0.030	24 to 56	0.022	0.1875	2.00	TT120250	TT120250A	230154	230196
0.120	0.400	0.030	24 to 56	0.022	0.1875	2.00	TT120400	TT120400A	230157	230199
0.120	0.600	0.030	24 to 56	0.022	0.1875	2.00	TT120600	TT120600A	230160	230202
0.120	0.750	0.030	24 to 56	0.022	0.1875	2.00	TT120750	TT120750A	230163	230205
0.150	0.350	0.035	20 to 56	0.023	0.1875	2.00	TT150350	TT150350A	230166	230208
0.150	0.500	0.035	20 to 56	0.023	0.1875	2.00	TT150500	TT150500A	230169	230211
0.150	0.750	0.035	20 to 56	0.023	0.1875	2.00	TT150750	TT150750A	230172	230214
0.180	0.350	0.040	18 to 56	0.027	0.250	2.50	TT180350	TT180350A	230220	230271
0.180	0.500	0.040	18 to 56	0.027	0.250	2.50	TT180500	TT180500A	230223	230274
0.180	0.750	0.040	18 to 56	0.027	0.250	2.50	TT180750	TT180750A	230226	230277
0.180	1.000	0.040	18 to 56	0.027	0.250	2.50	TT1801000	TT1801000A	230217	230268
0.200	0.400	0.045	16 to 40	0.029	0.250	2.50	TT200400	TT200400A	230232	230283
0.200	0.600	0.045	16 to 40	0.029	0.250	2.50	TT200600	TT200600A	230235	230286
0.200	0.800	0.045	16 to 40	0.029	0.250	2.50	TT200800	TT200800A	230241	230292
0.200	1.000	0.045	16 to 40	0.029	0.250	2.50	TT2001000	TT2001000A	230229	230280
0.230	0.400	0.055	14 to 40	0.038	0.3125	2.50	TT230400	TT230400A	230304	230370
0.230	0.600	0.055	14 to 40	0.038	0.3125	2.50	TT230600	TT230600A	230307	230373
0.230	0.750	0.055	14 to 40	0.038	0.3125	2.50	TT230750	TT230750A	230310	230376
0.230	1.000	0.055	14 to 40	0.038	0.3125	2.50	TT2301000	TT2301000A	230295	230361
0.230	1.250	0.055	14 to 40	0.038	0.3125	2.50	TT2301250	TT2301250A	230298	230364
0.290	0.500	0.070	12 to 40	0.047	0.3125	2.50	TT290500	TT290500A	230325	230391
0.290	0.750	0.070	12 to 40	0.047	0.3125	2.50	TT290750	TT290750A	230328	230394
0.290	1.000	0.070	12 to 40	0.047	0.3125	2.50	TT2901000	TT2901000A	230313	230379
0.290	1.250	0.070	12 to 40	0.047	0.3125	2.50	TT2901250	TT2901250A	230316	230382
0.290	1.500	0.070	12 to 40	0.047	0.3125	2.50	TT2901500	TT2901500A	230319	230385
0.320	0.500	0.075	10 to 32	0.049	0.375	2.50	TT320500	TT320500A	230409	230469
0.320	0.750	0.075	10 to 32	0.049	0.375	2.50	TT320750	TT320750A	230412	230472
0.320	1.000	0.075	10 to 32	0.049	0.375	2.50	TT3201000	TT3201000A	230397	230457
0.320	1.250	0.075	10 to 32	0.049	0.375	2.50	TT3201250	TT3201250A	230400	230460
0.320	1.500	0.075	10 to 32	0.049	0.375	2.50	TT3201500	TT3201500A	230403	230463
0.360	0.500	0.080	8 to 32	0.057	0.375	2.50	TT360500	TT360500A	230424	230484
0.360	0.750	0.080	8 to 32	0.057	0.375	2.50	TT360750	TT360750A	230427	230487
0.360	1.000	0.080	8 to 32	0.057	0.375	2.50	TT3601000	TT3601000A	230415	230475
0.360	1.250	0.080	8 to 32	0.057	0.375	2.50	TT3601250	TT3601250A	230418	230478
0.360	1.500	0.080	8 to 32	0.057	0.375	2.50	TT3601500	TT3601500A	230421	230481
0.360	1.800	0.080	8 to 32	0.057	0.375	3.00	TT3601800	TT3601800A	230490	230496
0.490	0.750	0.120	8 to 32	0.077	0.500	3.00	TT490750	TT490750A	230505	230523
0.490	1.500	0.120	8 to 32	0.077	0.500	3.00	TT4901500	TT4901500A	230499	230517
0.490	2.000	0.120	8 to 32	0.077	0.500	3.00	TT4902000	TT4902000A	230502	230520

*TPI = Threads Per Inch

Scientific Cutting Tools, Inc.
www.sct-usa.com sales@sct-usa.com
(805) 584-9495 Fax: (805) 584-9629
(800) 383-2244 Fax: (888) 728-3295

SOLID CARBIDE BORING BAR FEED AND SPEED CHART

MATERIAL	HB/Rc	SPEED (SFM)		CUTTING CONDITIONS						
				FEED IPR	TOOL DIAMETER					
		UNCOATED	ALTiN+		.015-.045	.050-.100	.110-.160	.180-.230	.290-.320	.360+
					MAX DOC	MAX DOC	MAX DOC	MAX DOC	MAX DOC	MAX DOC
CAST IRON	160 HB	75-200	200-550	.0005-.010	0.006	0.008	0.010	0.014	0.020	0.031
CARBON STEEL	18 Rc	75-200	200-450	.0005-.007	0.003	0.005	0.006	0.008	0.012	0.017
ALLOY STEEL	20 Rc	75-200	200-425	.0005-.007	0.003	0.004	0.005	0.007	0.010	0.015
TOOL STEEL	25 Rc	75-175	175-300	.0005-.005	0.002	0.003	0.004	0.006	0.008	0.012
300 STAINLESS STEEL	150 HB	75-175	175-350	.0005-.005	0.003	0.003	0.004	0.006	0.008	0.013
400 STAINLESS STEEL	195 HB	75-210	130-420	.0005-.005	0.002	0.003	0.004	0.006	0.008	0.012
HIGH TEMP ALLOY (Ni & Co BASE)	20 Rc	50-130	130-300	.0005-.004	0.002	0.003	0.003	0.005	0.007	0.010
TITANIUM	25 Rc	50-120	120-275	.0005-.005	0.003	0.004	0.005	0.006	0.009	0.014
HEAT TREATED ALLOYS (38-45Rc)	40 Rc	50-100	100-200	.0005-.005	0.002	0.002	0.003	0.004	0.006	0.009
ALUMINUM	100 HB	75-250	250-750	.0005-.015	0.011	0.015	0.019	0.026	0.038	0.056
BRASS, ZINC	80 HB	75-300	250-650	.001-.010	0.009	0.012	0.015	0.021	0.030	0.045

SFM = Surface Feet Per Minute DOC = Depth of Cut IPR = Inches Per Revolution

Starting parameters only. Length-to-diameter ratios, setup, and machine rigidity may affect performance.

SFM = .262 × DIAMETER × RPM
RPM = 3.82 × SFM ÷ DIAMETER
IPM = FPT × Number of Teeth × RPM

Meters/Min = SFM × .3048
Millimeters/Rev = IPR x 25.40

SOLID CARBIDE BORING TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
RAPID FLANK WEAR	CUTTING CONDITIONS	Check for excessive speed and feed - See chart.
	TOOL	Select a coated tool.
	PART	Make sure prior operation did not work harden the metal.
BUILT-UP EDGE	TOOL	Select a coated tool.
	CUTTING FORCE	Check for excessive feed rate (IPR) - See chart.
	HEAT	Use the SCT coolant holder. If coolant is not available, use shop air and a coated tool.
CORNER BREAKAGE	CUTTING CONDITIONS	Check for excessive feed and speed and depth of cut - see chart.
	TOOL	Select a tool with a radius. A radius is stronger than a sharp corner.
	PART	Check the drilled hole.
SURFACE TOO ROUGH	CUTTING CONDITIONS	Check for excessive feed rate (IPR) - See chart.
	BUILT-UP EDGE	See above (Built-Up Edge).
CHATTER	SET UP	Set tool above center. Reduce the overhang ratio. Clamping length should be at least 3x the boring bar diameter. Change the speed of the machine. Speed change may break up harmonics and reduce chatter.
	BORING BAR	Select the largest diameter boring bar that will bore the required diameter.
TAPER SMALLER IN BACK	CHIP PACKING	If the boring bar is too large to allow chips to evacuate, then the chips may pack on the tool and cause the bar to deflect away from the bore.
	PROGRAM	If the taper is consistent, then the program can be altered to bore a taper in opposite direction resulting in a straight hole.
TAPER BIGGER IN BACK	CUTTING FORCES	Reduce forces. Deflecting bar below center causes hole to become larger.
	BUILT-UP EDGE	Built-up edge will cause the hole to become larger until the built edge breaks off, then the hole becomes smaller.
	PROGRAM	If taper is consistent, then the program can be altered to bore a taper in the opposite direction resulting in a straight hole.

Scientific Cutting Tools, Inc.
www.sct-usa.com sales@sct-usa.com
(805) 584-9495 Fax: (805) 584-9629
(800) 383-2244 Fax: (888) 728-3295

GROOVING TOOL FEED AND SPEED CHART

MATERIAL	HB/Rc	SPEED (SFM)		CUTTING CONDITIONS				
				TOOL DIAMETER				
		UNCOATED	ALTiN+	.060 -0.080	.090 -.120	.187	.250-.312	.375+
				MAX FPR	MAX FPR	MAX FPR	MAX FPR	MAX FPR
CAST IRON	160 HB	75-200	200-550	0.0010	0.0012	0.0017	0.0031	0.0044
CARBON STEEL	18 Rc	75-200	200-450	0.0007	0.0008	0.0011	0.0022	0.0030
ALLOY STEEL	20 Rc	75-200	200-425	0.0006	0.0007	0.0010	0.0019	0.0026
TOOL STEEL	25 Rc	75-175	175-300	0.0005	0.0006	0.0008	0.0015	0.0022
300 STAINLESS STEEL	150 HB	75-175	75-350	0.0006	0.0007	0.0010	0.0019	0.0026
400 STAINLESS STEEL	195 HB	75-210	130-420	0.0005	0.0006	0.0008	0.0016	0.0023
HIGH TEMP ALLOY (NICKEL & COBALT BASE)	20 Rc	50-130	130-300	0.0004	0.0005	0.0007	0.0013	0.0017
TITANIUM	25 Rc	50-120	120-275	0.0005	0.0006	0.0008	0.0016	0.0022
HEAT TREATED ALLOYS (38-45Rc)	40 Rc	50-100	100-200	0.0004	0.0004	0.0006	0.0011	0.0016
ALUMINUM	100 HB	75-250	250-750	0.0022	0.0026	0.0037	0.0065	0.0085
BRASS, ZINC	80 HB	250-300	250-650	0.0018	0.0021	0.0030	0.0053	0.0079

SFM = Surface Feet Per Minute FPR = Feed Per Revolution

Starting parameters only. Length-to-diameter ratios, setup, and machine rigidity may affect performance.

GROOVING TOOL TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
RAPID FLANK WEAR	CUTTING CONDITIONS	Check for excessive speed - see chart.
	TOOL	Select a coated tool.
	PART	Make sure prior operation did not work harden the material.
BUILT-UP EDGE	TOOL	Select a coated tool.
	CUTTING FORCE	Check for excessive speed rate (IPR) - see chart.
	HEAT	Use the SCT coolant holder. If coolant is not available, use shop air and a coated tool.
CHATTER	CUTTING CONDITIONS	Reduce RPM and increase feed rate within the feed and speed chart parameters.
	CLAMPING	Clamping length should be a minimum of 3x the shank diameter in the tool holder. Check tool holding rigidity.
	TOOL	Hone cutting edge. A light hone (0.0001-0.0003 inch) will help keep force constant.
TOOL BREAKAGE	CUTTING CONDITIONS	Check for excessive feed rate (IPR) - see chart.
	CHIP PACKING	Stagger - Peck grooving.

SINGLE POINT THREADING TECHNICAL CHART

MATERIAL	HB/Rc	SPEED (SFM)		FIRST PASS DEPTH					
				TOOL DIAMETER					
		UNCOATED	ALTiN+	.040-.050	.060-.092	.120-.152	.180-.232	.290-.362	.373+
CAST IRON	160 HB	75-200	200-550	0.003	0.004	0.005	0.007	0.008	0.009
CARBON STEEL	18 Rc	75-200	200-450	0.003	0.005	0.006	0.007	0.008	0.009
ALLOY STEEL	20 Rc	75-200	200-425	0.003	0.004	0.005	0.006	0.007	0.008
TOOL STEEL	25 Rc	75-175	175-300	0.002	0.003	0.004	0.005	0.006	0.007
300 STAINLESS STEEL	150 HB	75-175	175-350	0.003	0.003	0.004	0.005	0.006	0.007
400 STAINLESS STEEL	195 HB	75-210	130-420	0.003	0.004	0.005	0.006	0.006	0.007
HIGH TEMP ALLOY (NICKEL & COBALT BASE)	20 Rc	50-130	130-300	0.002	0.003	0.003	0.004	0.005	0.005
TITANIUM	25 Rc	50-100	120-275	0.003	0.003	0.004	0.005	0.006	0.007
HEAT TREATED ALLOYS (38-45Rc)	40 Rc	50-100	100-200	0.002	0.002	0.003	0.004	0.004	0.005
ALUMINUM	100 HB	75-250	200-750	0.004	0.005	0.007	0.008	0.010	0.011
BRASS, ZINC	80 HB	75-300	250-650	0.003	0.005	0.006	0.007	0.008	0.009

Parameters are a starting point based on machinability rating at hardness listed.
Check machinability rating of the material to be machined and adjust First Pass Depth.

Helpful Formulas and Information

$$\text{PITCH} = \frac{1}{\text{TPI}}$$

TPI = Threads Per Inch

ACME Thread Depth = Pitch × 0.5

Stub ACME Thread Depth = Pitch × 0.3

NPT Pipe Thread Depth = Pitch × 0.76

Internal 60° Thread Depth = Pitch × 0.54

Feed Rate = Pitch × Number of Thread Starts

Minimum Depth per Pass should not be less than 0.0003

Threads not ending in a relief need at least one thread pitch length of pullout

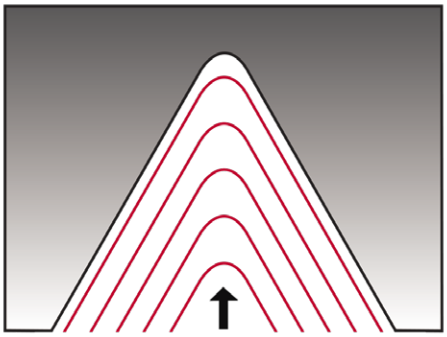
Make sure feed rate calculation does not exceed the maximum feed rate of the machine

Scientific Cutting Tools, Inc.
www.sct-usa.com sales@sct-usa.com
(805) 584-9495 Fax: (805) 584-9629
(800) 383-2244 Fax: (888) 728-3295

SINGLE POINT THREADING TROUBLESHOOTING

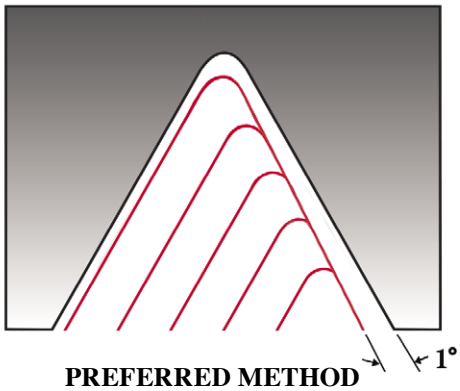
PROBLEM	CAUSE	SOLUTION
RAPID FLANK WEAR	CUTTING CONDITIONS	Check for excessive speed - see chart.
	PART	Make sure prior operation did not work harden the material.
	TOOL	Select a coated tool.
BUILT-UP EDGE	TOOL	Select a coated tool.
	CUTTING FORCE	Increase the number of passes.
	HEAT	Use the SCT coolant holder. If coolant is not available, use shop air and a coated tool.
CORNER BREAKAGE	CUTTING CONDITIONS	Reduce the depth-of-cut on the first pass.
	PROGRAM	If there is no thread relief, withdraw the tool on an angle.
	PART	End in thread relief.
CHIPS WRAPPING AROUND TOOL	TOOL	Use a tool that is at least 30% smaller than the hole diameter.

RADIAL INFEED



NOT RECOMMENDED

MODIFIED FLANK



PREFERRED METHOD

Radial Infeed is not recommended. Modified flank at 1° is recommended.

For unfavorable length-to-diameter ratios or difficult-to-machine materials, the number of passes will need to be increased up to 40% more.

Depth of cut per pass should not be less than 0.0003 inch.

SINGLE POINT CBN & PCD TECHNICAL & APPLICATION

PCD TIPPED TOOL INFORMATION

SCT PCD tools and inserts are excellent for continuous cutting of a wide range of non-ferrous and non-metal materials.
The products are precision ground for machining to sub-micron finishes with maximum tool life.
PCD allows for higher cutting speeds with longer tool life.

MATERIAL	BHN/Rc	SPEED RANGE (SFM)	FEED IPR	SINGLE POINT PCD TIPPED BARS			
				TOOL DIAMETER			
				.120-160	.180-.230	.290-.320	.360+
				MAX DOC	MAX DOC	MAX DOC	MAX DOC
LOW SILICON ALUMINUM	225-350 BHN	1000-5000	.001-.007	0.015	0.021	0.03	0.045
HIGH SILICON ALUMINUM	270-425 BHN	600-3000	.001-.007	0.015	0.021	0.03	0.045
METAL MATRIX COMPOSITIES	N/A	500-2000	.001-.007	0.008	0.012	0.02	0.03
COPPER ALLOYS, BRASS, BRONZE	80-120 BHN	750-3500	.001-.007	0.015	0.021	0.03	0.045
PRESINTERED TUNGSTEN CARBIDE	140-300 BHN	100-350	.001-.005	0.003	0.005	0.007	0.012
ACRYLICS	N/A	700-1500	.001-.007	0.015	0.021	0.03	0.045
FIBERGLASS	N/A	600-1000	.001-.007	0.012	0.02	0.03	0.045
GRAPHITES	N/A	600-1000	.001-.007	0.015	0.021	0.03	0.045
NYLON, PLASTIC	N/A	700-1500	.001-.007	0.015	0.021	0.03	0.045
HARD RUBBER	N/A	500-2500	.001-.007	0.015	0.021	0.03	0.045

As the DOC decreases the feed rate can increase DOC = Depth of Cut SFM = Surface Feet per Minute

APPLICATION GUIDELINES

- Make sure the machine and setup is rigid and solid. Chatter will cause chipping.
- Tool height when boring should be slightly above center. Tool deflection will put the tool on center.
- Do not stop the machine with the tool in cut. This will result in tool breakage.
- Use of coolant will reduce heat and improve surface finish.
- Do not contact the tool to a hard surface prior to the machining process- this will cause chipping.
- Higher speeds minimize tool buildup.
- Depth of cut should not exceed 70% of PCD tip length.

CBN TIPPED TOOL INFORMATION

SCT CBN tools and inserts are excellent for continuous cutting of a wide range of hardened steels, powdered metals, cast irons and super alloys. The products are precision ground with hones for machining to sub-micron finishes with maximum tool life.
CBN tipped tools and inserts can take the place of grinding.

MATERIAL	BHN/Rc	SPEED RANGE (SFM)	FEED IPR	SINGLE POINT CBN TIPPED BARS			
				TOOL DIAMETER			
				.120-160	.180-.230	290-.320	.360+
				MAX DOC	MAX DOC	MAX DOC	MAX DOC
HEAT TREATED ALLOY	45-60Rc	200-600	.001-.005	0.003	0.004	0.006	0.009
TOOL STEEL	45-60Rc	200-600	.001-.005	0.003	0.004	0.006	0.009
NODULAR IRON	N/A	600-1500	.001-.005	0.006	0.01	0.02	0.03
PEARLITIC IRON	220-240BHN	600-2500	.001-.007	0.006	0.01	0.02	0.03
WHITE/CHILLED IRON	54-60Rc	200-500	.001-.005	0.005	0.008	0.012	0.015
SUPER ALLOY Ni BASE	240-475 BHN	200-800	001-.005	0.003	0.004	0.006	0.025
COBOLT BASED ALLOY, STELLITE	45-55Rc	200-500	.001-.005	0.003	0.004	0.006	0.009
INCONELS	45-55Rc	200-500	.001-.005	0.003	0.004	0.006	0.009

As the DOC decreases the feed rate can increase DOC = Depth of Cut SFM = Surface Feet per Minute

APPLICATION GUIDELINES

- Make sure the machine and setup is rigid and solid. Chatter will cause chipping
- Tool height when boring should be slightly above center. Tool deflection will put the tool on center.
- Do not stop the machine with the tool in cut. This will result in tool breakage.
- Coolant use is not advised as it could cause thermal cracking.
- Do not contact the tool to a hard surface prior to the machining process. This will cause chipping.
- Depth of cut should not exceed 30% of CBN tip length.

Scientific Cutting Tools, Inc.
www.sct-usa.com sales@sct-usa.com
(805) 584-9495 Fax: (805) 584-9629
(800) 383-2244 Fax: (888) 728-3295