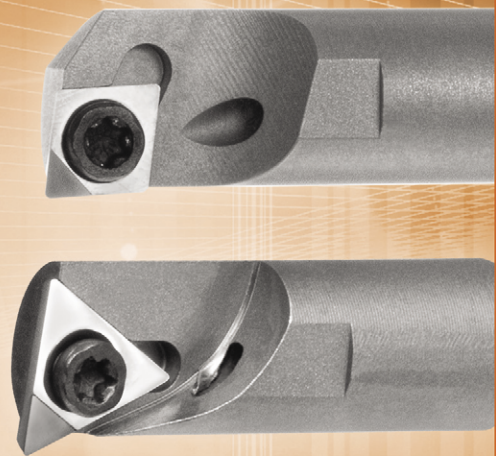
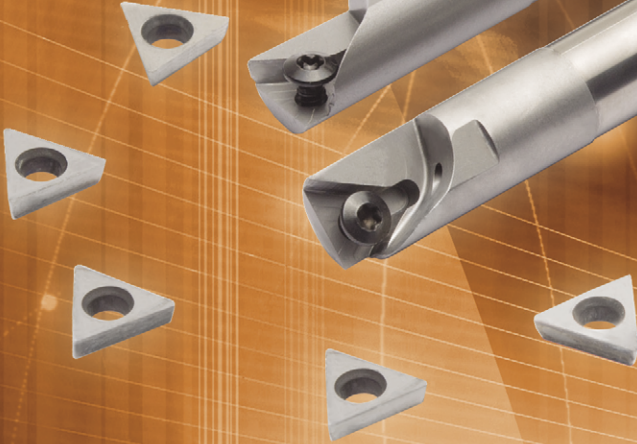
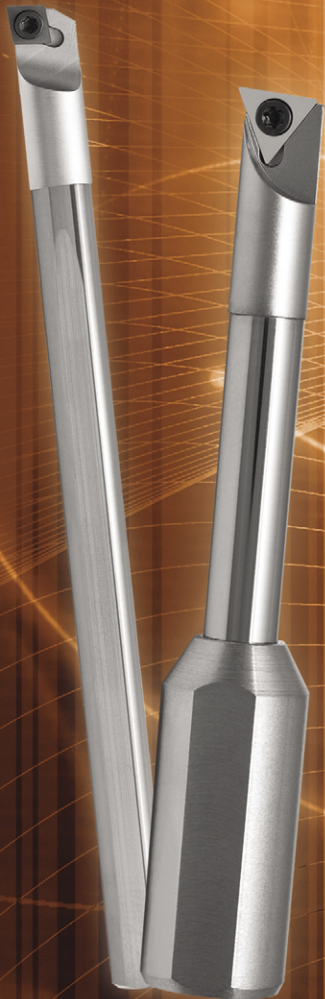




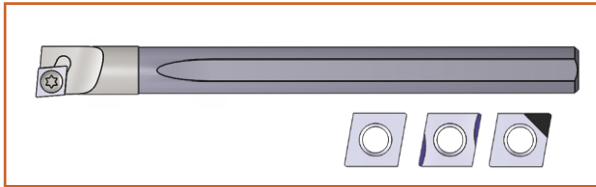
INDEXABLE TOOLING



Right Hand Indexable Bars
Left Hand Indexable Bars
Diamond Shaped Inserts
Triangle Shaped Inserts
Chip Control Inserts
CBN/PCD Inserts
Coolant Through Bars

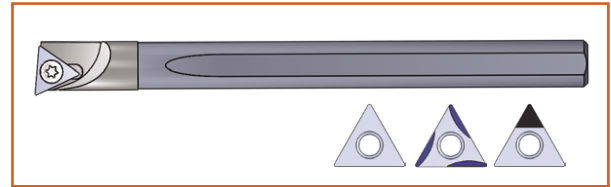
INDEXABLE BORING PRODUCT OVERVIEW

SCT indexable boring bars consist of micro grain carbide shanks with heat-treated steel heads. Select tools are crafted with a unique top cut which strengthens the pocket by 40% and directs chips away from the cut zone. Bars are stocked with or without flats and are available with or without coolant holes. Inserts are available uncoated or in ALTiN+ coating and are available as diamond-shaped or triangle-shaped. Other insert options include PCD-tipped or CBN-tipped inserts. Right-handed bars are compatible with chip control inserts. Technical information is available on pages 86-88.



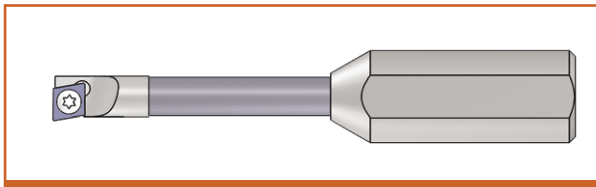
DIAMOND INSERT INDEXABLE BARS

- 3/16" Right or Left-Hand Bars.... p.75
- 1/4" Right or Left-Hand Bars..... p.76
- 5/16" Right or Left-Hand Bars.... p.78
- 3/8" Right or Left-Hand Bars..... p.80
- 1/2" Right or Left-Hand Bars..... p.82



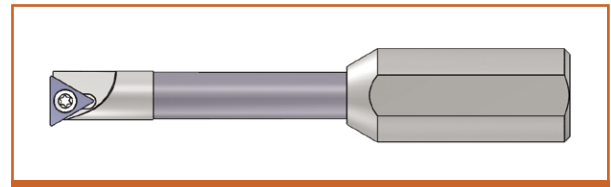
TRIANGLE INSERT INDEXABLE BARS

- 1/4" Right or Left-Hand Bars..... p.77
- 5/16" Right or Left-Hand Bars.... p.79
- 3/8" Right or Left-Hand Bars..... p.81
- 1/2" Right or Left-Hand Bars..... p.83



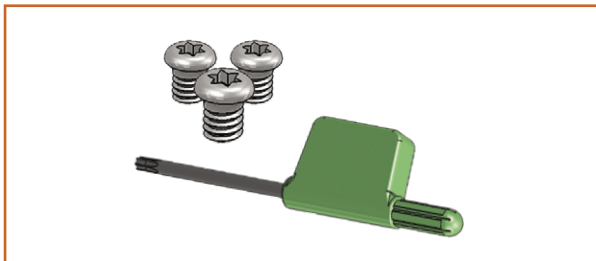
DIAMOND INSERT STEP BARS

- Diamond Right-Hand Step Bars.... p.84



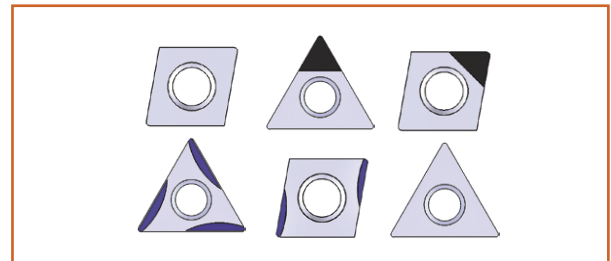
TRIANGLE INSERT STEP BARS

- Triangle Right-Hand Step Bars.... p.85



INDEXABLE BAR ACCESORIES

- Screws and Keys..... p.84



CARBIDE INSERTS

Inserts and compatible bars are listed on the same page for your convenience. Flat top or chip control inserts are sold in packs of five. PCD or CBN inserts are sold individually.

INDEXABLE BORING TECHNICAL INFORMATION PAGES 86-88

INDEXABLE BORING BAR FEED AND SPEED CHART

MATERIAL	HB/Rc	SPEED RANGE (SFM)		CUTTING CONDITIONS		
		UNCOATED	ALTiN+	MAX DOC ACD & ATD	MAX DOC ATP & ACP	FEED IPR
CAST IRON	160 HB	75-200	200-550	0.020	0.060	.0005-.010
CARBON STEEL	18 Rc	75-200	200-450	0.018	0.060	.0005-.010
ALLOY STEEL	20 Rc	75-200	200-425	0.015	0.060	.0005-.010
TOOL STEEL	25 Rc	75-175	175-300	0.010	0.030	.0005-.010
300 STAINLESS STEEL	150 HB	75-175	175-350	0.015	0.028	.0005-.010
400 STAINLESS STEEL	195 HB	75-210	130-420	0.012	0.028	.0005-.010
HIGH TEMP ALLOY (Ni & Co BASE)	20 Rc	50-130	130-300	0.008	0.020	.0005-.010
TITANIUM	25 Rc	50-120	120-275	0.009	0.022	.0005-.010
HEAT TREATED ALLOYS (38-45Rc)	40 Rc	50-100	100-200	0.005	0.010	.0005-.005
ALUMINUM	100 HB	75-250	250-750	0.025	0.095	.0005-.010
BRASS, ZINC	80 HB	75-300	250-650	0.023	0.090	.0005-.010

SFM = Surface Feet per Minute

Starting parameters only. Length to diameter ratios, setup, and machine rigidity may affect performance. The max Depth Of Cut (DOC) acceptable at the minimum Inches Per Revolution (IPR).

SELECTING AN INDEXABLE BORING BAR

1	From the part or print, verify the diameter of hole to be machined. Select the boring bar that has a minimum bore diameter smaller than the diameter to be machined.
2	Check machine for shank size needed. If the shank needs to be larger, consider a step bar.
3	Match the operation needed on the part with the necessary lead angle. Select 0° lead to bore to a shoulder. Select 5° lead to bore and face a shoulder.
4	Choose from flat top or chip control insert based on application and material being machined.
5	Choose from .003", .007", or .015" radius based on finish required and part specifications for corner radius.

SELECTING AN INDEXABLE INSERT GRADE

UNCOATED	is a submicron premium carbide grade for machining steel and non-ferrous materials.
ALTiN+	is a premium coated grade for steel, cast irons and high temperature alloys at highest SFM.
CBN	are ideal for hardened steel (45+ RC) and cast iron.
PCD	are ideal for non-ferrous materials.

INDEXABLE BORING BAR TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
RAPID FLANK WEAR	CUTTING CONDITIONS	Reduce the cutting speed.
	INSERT	Select a coated grade.
	HEAT	Use the SCT coolant holder. If coolant is not available, use shop air and a coated tool. Use a coolant through boring bar.
BUILT-UP EDGE	INSERT	Select a coated grade.
	CUTTING FORCE	Use chip control insert to free up cut.
	HEAT	Use coolant through boring bar or holder. If coolant is not available, use shop air and a coated tool. Use coolant through boring bar.
INSERT BREAKAGE	CUTTING CONDITIONS	Reduce depth of cut. Reduce feed rate.
	INSERT	Select a larger corner radius
	PART	Check the drilled hole to make sure the full diameter of the drill is deeper than the programmed bore depth.
SURFACE TOO ROUGH	CUTTING CONDITIONS	Reduce feed rate. The rate is too great for the nose radius.
	INSERT	Select a larger corner radius. The feed rate (IPR) should not be greater than 1/2 the nose radius.
CHATTER	SETUP	Set insert above center. Change the speed of the machine. The overhang ratio should be less than 8x bar diameter for carbide. Clamping length should be at least 3x the boring bar diameter.
	BORING BAR	Select the largest diameter bar that will bore the required diameter.
TAPER BIGGER IN BACK	CUTTING FORCES	Forces may deflect bar below center causing the hole to become larger.
	BUILT-UP EDGE	A built-up edge will cause the hole to become large until the built-up edge breaks off, then hole will be smaller.
	PROGRAM	If the taper is consistent (not from chip packing) then the program can be altered to bore a taper in opposite direction resulting in a straight hole.
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 insert and cause the bar to deflect away from the bore.
	PROGRAM	If the taper is consistent (not from chip packing) then the program can be altered to bore a taper in opposite direction resulting in a straight hole.

CBN & PCD INSERTS TECHNICAL INFORMATION

PCD TIPPED INSERT FEED AND SPEED

MATERIAL	BHN/Rc	SPEED RANGE (SFM)	FEED IPR	PCD TIPPED INSERTS	
				TOOL DIA. .220-.363	TOOL DIA. .421-.560
				MAX DOC	MAX DOC
LOW SILICON ALUMINUM	225-350 BHN	1000-5000	.001-.007	0.025	0.08
HIGH SILICON ALUMINUM	270-425 BHN	600-3000	.001-.007	0.025	0.08
METAL MATRIX COMPOSITIES	N/A	500-2000	.001-.007	0.015	0.035
COPPER ALLOYS, BRASS, BRONZE	80-120 BHN	750-3500	.001-.007	0.025	0.08
PRESINTERED TUNGSTEN CARBIDE	140-300 BHN	100-350	.001-.005	0.007	0.012
ACRYLICS	N/A	700-1500	.001-.007	0.025	0.08
FIBERGLASS	N/A	600-1000	.001-.007	0.02	0.06
GRAPHITES	N/A	600-1000	.001-.007	0.025	0.08
NYLON, PLASTIC	N/A	700-1500	.001-.007	0.025	0.08
HARD RUBBER	N/A	500-2500	.001-.007	0.025	0.08

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.

SFM = Surface Feet per Minute DOC= Depth of Cut

AS THE DOC DECREASES THE FEED RATE CAN INCREASE

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.

CBN TIPPED INSERT FEED AND SPEED

MATERIAL	BHN/Rc	SPEED RANGE (SFM)	FEED IPR	CBN TIPPED INSERTS	
				TOOL DIA. .220-.363	TOOL DIA. .421-.560
				MAX DOC	MAX DOC
HEAT TREATED ALLOY	45-60Rc	200-600	.001-.005	0.01	0.04
TOOL STEEL	45-60Rc	200-600	.001-.005	0.01	0.04
NODULAR IRON	N/A	600-1500	.001-.005	0.009	0.035
PEARLITIC IRON	220-240 BHN	600-2500	.001-.007	0.009	0.035
WHITE/CHILLED IRON	54-60Rc	200-500	.001-.005	0.008	0.035
SUPER ALLOY Ni BASE	240-475 BHN	200-800	.001-.005	0.008	0.035
COBALT BASED ALLOY, STELLITE	45-55Rc	200-500	.001-.005	0.008	0.035
INCONELS	45-55Rc	200-500	.001-.005	0.008	0.035

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.

SFM = Surface Feet per Minute DOC= Depth of Cut

AS THE DOC DECREASES THE FEED RATE CAN INCREASE

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.