

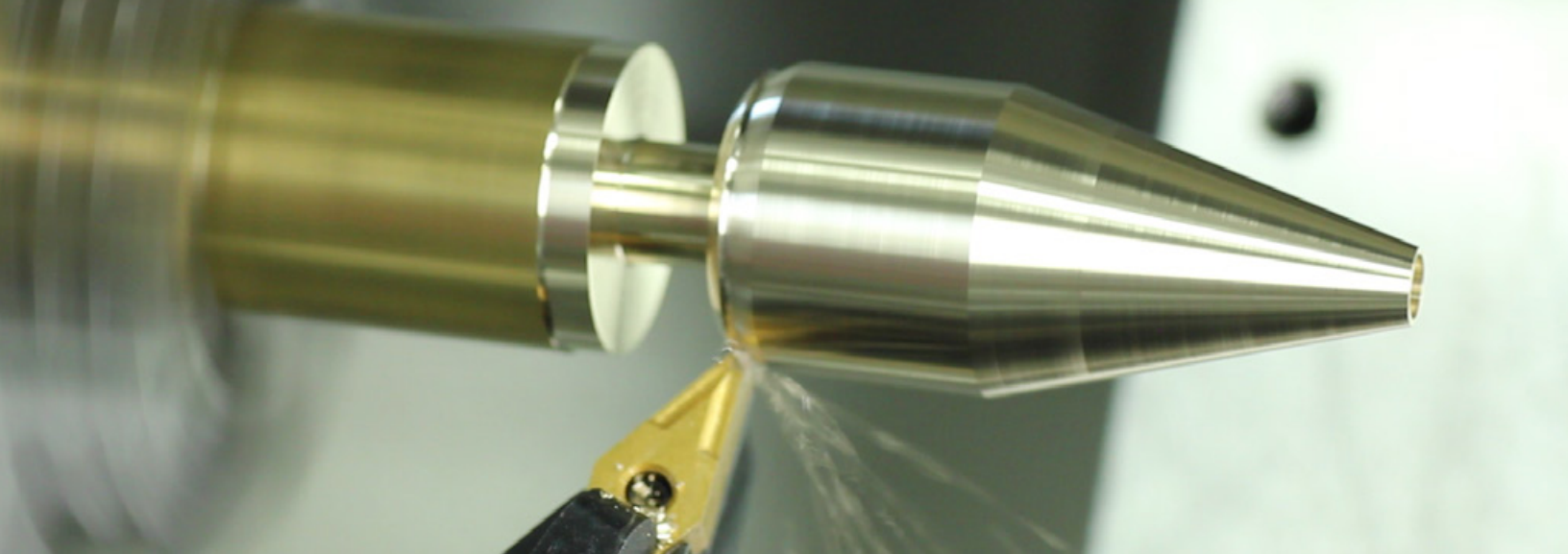
LATHE TOOLING GUIDE

A reference guide to understanding how cutting tools work and which inserts they pair with.

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Tormach® CNC Lathe Tooling

REFERENCE GUIDE

To make the most of a machine purchase, it's important to understand how cutting tools work and which inserts they pair with. Here is some background on lathe cutting tool and insert terminology:

ISO/ANSI Inserts

Like metric and imperial measurements standards, the U.S. has its own tool insert classification system; they are called American National Standards Institute (ANSI) designations. All of these ANSI classifications can be converted to the International Organization for Standardization (ISO) classifications, but this guide includes both for easier selection.

Cutting Tool Designations

Cutting tools are easily identified by their designation, which is universal between ISO and ANSI, and, in the machine shop, tool slang often refers to the insert shape, which is also available in the tool designation. Examples and explanations of designations are available at the start of each section.

Right-Hand vs. Left-Hand vs. Neutral

Right-hand tools are the most commonly used, because they can be used for most turning applications, including making shoulders on the front of the workpiece. Left-handed tools are typically chosen for back turning and making sharp shoulders on the back of the workpiece. Neutral tools are ideal for complex profiling, thanks to their narrow tips.

Insert Shapes

There are a variety of insert shapes available, but the general note is use wider inserts for simple geometry and roughing passes, since they have more durability than a more narrow cutting tool, which is needed for complicated or intricate parts.

Chip Load

Chip load refers to how far the cutter moves with each rotation of the spindle. All of the relevant information for this can be found in the insert's designation with the workpiece's material in mind.

We understand how confusing cutting tool selection can be for beginners, and our Wisconsin-based technical support team is ready to answer any lathe-related questions. For more information about these products or to view lathe tooling packages, visit: Tormach.com.

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TURNING TOOLS

UNDERSTANDING TURNING TOOL DESIGNATIONS

Example: **SCLCR 06-2J**

Turning tools are one of the most commonly used tools, and can be used for roughing, facing, profiling, and finishing work on the exterior of a part.

S CLAMPING SYSTEM		C INSERT SHAPE		L CLEARANCE ANGLE		C INSERT RAKE ANGLE		R HAND		06 SHANK HEIGHT		- 2 INSERT I.C.		J TOOL LENGTH	
S	Screw Clamp	C		B	Straight 15° ¹	B	5°	R	Right		06	0.375 In.	2	0.25 in.	
M	Multi-Lock	D		D	Straight 45° ¹	C	7°	N	Neutral				3	0.375 in.	
		R		F	Offset 0° ²	N	0°	L	Left	08	0.5 In.	4	0.5 in.	A	4 in.
		S		G	Offset 0° ¹					12	0.75 In.	6	0.75 in.	B	4.9 in.
		T		J	Offset -3° ¹									C	5 in.
		V		K	Offset 15° ²									J	3.5 in.
		W		L	Offset -5° ^{1,2}										
				M	Straight 50° ¹										
				S	Offset 45° ¹										
				V	Offset 17.5° ¹										

¹Side Cutting Edge

²End Cutting Edge

3/8-Inch Tools



The 3/8-inch tools are designed for use with the Tormach® RapidTurn®, since the tool holders require a tool with a 3/8-inch shank.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	INSERT SCREW SIZE	SCREW PN	WRENCH SIZE	WRENCH PN
35634	SCLCR 06-2J	Right	CC __ 2(1.5) _	M2.5	35658	T8	31239
35635	SCLCL 06-2J	Left	CC __ 2(1.5) _	M2.5	35658	T8	31239
35636	SCKCR 06-2J	Right	CC __ 2(1.5) _	M2.5	35658	T8	31239
35637	SCSCR 06-2J	Right	CC __ 2(1.5) _	M2.5	35658	T8	31239
35638	SCMCN 06-2J	Neutral	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
35639	SCBCR 06-2J	Right	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
36055	SDJCR-06-2J	Right	DC __ 2(1.5) _	M2.5	35658	T8	31239
36056	SDJCL-06-2J	Left	DC __ 2(1.5) _	M2.5	35658	T8	31239
36061	SRDCN-06-2J	Neutral	RC __ 0602 _	M2.5	35658	T8	31239
36057	SDNCN-06-2J	Neutral	DC __ 2(1.5) _	M2.5	35658	T8	31239

1/2-Inch Tools



The 1/2-inch tools are ideal for turning on a lathe with a gang toolholding system, since the tool holders are designed for 1/2-inch tools.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	INSERT SCREW SIZE	SCREW PN	WRENCH SIZE	WRENCH PN
35180	SDJCR 08-3A	Right	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
35642	SCLCR 08-3A	Right	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
35643	SCLCL 08-3A	Left	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
35644	SCKCR 08-3A	Right	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
35645	SCSCR 08-3A	Right	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
35646	SCMCN 08-3A	Neutral	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
35647	SCBCR 08-3A	Right	CC __ 2(1.5) _	M4 x 10 mm	35189	T15	31251
36017	SSDCN-08-3A	Neutral	SC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36021	SDJCR-08-3A	Right	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36022	SDJCL-08-3A	Left	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36023	SDNCN-08-3A	Neutral	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36024	SVJBR-08-2A	Right	V __ 22 _	M2.5	35658	T8	31239
36025	SVJBL-08-2A	Left	VB __ 22 _	M2.5	35658	T8	31239
36026	SVVBN-08-2A	Neutral	VB __ 22 _	M2.5	35658	T8	31239
36062	SRDCN-08-6A	Neutral	RC __ 0602 _	M2.5	35658	T8	31239

1/2-Inch Tools with Clamps



With a clamp insert holding system, the insert has more support for high horsepower machines, because there is more force holding it in place than with a screw clamping system.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	INSERT SCREW SIZE	SCREW PN	WRENCH SIZE	WRENCH PN
35181	MTGNR 08-2A	Right	TN __ 22 _	M4 x 10 mm	34410	M2.5 Hex	34415
35182	MTFNR 08-2A	Right	TN __ 22 _	M4 x 10 mm	34410	M2.5 Hex	34415
35183	MSDNN 08-3B	Neutral	SN __ 32 _	M4 x 10 mm	34410	M2.5 Hex	34415

3/4-Inch Tools



Tormach's 15L Slant-PRO CNC lathe has 3/4-inch Quick-Chance Tool Holders and 3/4-inch turret systems.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	INSERT SCREW SIZE	SCREW PN	WRENCH SIZE	WRENCH PN
35420	SCLCR 12-3C	Right	CC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
35421	STFCR 12-3C	Right	TC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
35650	SCLCR 12-4B	Right	CC __ 43 _	M5	35660	T20	31243
35651	SCLCL 12-4B	Left	CC __ 43 _	M5	35660	T20	31243
35652	SCKCR 12-4B	Right	CC __ 43 _	M5	35660	T20	31243
35653	SCSCR 12-4B	Right	CC __ 43 _	M5	35660	T20	31243
35654	SCMCN 12-4B	Neutral	CC __ 43 _	M5	35660	T20	31243
35655	SCBCR 12-4B	Right	CC __ 43 _	M5	35660	T20	31243
36018	SSDCN 12-4C	Neutral	SC __ 43 _	M5	35660	T20	31243
36052	SDJCR 12-3C	Right	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36053	SDJCL 12-3C	Left	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36054	SDNCN 12-3C	Neutral	DC __ 3(2.5) _	M4 x 10 mm	35189	T15	31251
36058	SVJBR 12-2C	Right	VB __ 22 _	M2.5	35658	T8	31239
36059	SVJBL 12-2C	Left	VB __ 22 _	M2.5	35658	T8	31239
36060	SVVBN 12-2C	Neutral	VB __ 22 _	M2.5	35658	T8	31239
36063	SRDCN 12-6C	Neutral	RC __ 0602 _	M2.5	35658	T8	31239

3/4-Inch Tools with Clamp



With a clamp insert holding system, the insert has more support because there is more force holding it in place than with a screw clamping system.



PN	DESIGNATION	HAND	COMPATIBLE INSERTS	INSERT SCREW SIZE	SCREW PN	WRENCH SIZE	WRENCH PN
33130	MCLNR 12-4C	Right	CN __ 43 _	M6 x 17 mm	34339	M4 Hex	34414
33131	MWLNR 12-4C	Right	WN __ 43 _	M6 x 17 mm	34339	M2.5 Hex	34415
33132	MTFNR 12-3C	Right	TN __ 33 _	M4 x 15 mm	34400	M2.5 Hex	34415
33133	MVJNR 12-3C	Right	VN __ 33 _	M4 x 15 mm	34400	M2.5 Hex	34414
33338	MCLNL 12-4C	Left	CN __ 43 _	M6 x 17 mm	34339	M4 Hex	34414
33339	MWLNL 12-4C	Left	WN __ 43 _	M6 x 17 mm	34339	M2.5 Hex	34415
33340	MTFNL 12-3C	Left	TN __ 33 _	M4 x 15 mm	34400	M2.5 Hex	34415
33341	MVJNL 12-3C	Left	VN __ 33 _	M4 x 15 mm	34400	M4 Hex	34414
33342	MVVNN 12-3C	Neutral	VN __ 33 _	M4 x 15 mm	34400	M4 Hex	34414

BORING BARS

UNDERSTANDING BORING BAR DESIGNATIONS

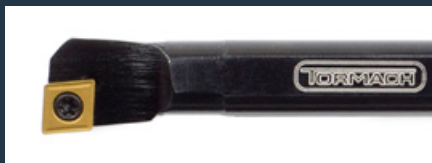
Example: **S06H-SCLCR-2**

Boring bars are easily recognized by their circular, bar design. They come in a variety of sizes, and help make an already existing hole bigger or to refine the finish of hole.

S SHANK		06 BAR DIAMETER		H TOOL LENGTH		S CLAMPING SYSTEM		C SHAPE		L CLEARANCE ANGLE		C RAKE ANGLE		R HAND		2 INSERT I.C.	
S	Steel	05	0.3125"	H	4 in.	D	Double Clamp	C		L	Offset -5° ^{1,2}	N	0°	L	Left	1.8	0.22 in.
		06	0.375"	M	6 in.	S	Screw Clamp	T		F	Offset 0° ²	B	5°	R	Right	2	0.25 in.
		08	0.5"	Q	7 in.							C	7°			3	0.375 in.
		10	0.625"	R	8 in.											4	0.5 in.
		12	0.75"	S	10 in.												

¹ Side Cutting Edge
² End Cutting Edge

Boring Bars



All 3/4-inch boring bars are compatible with 15L Slant-PRO™ gang tool holders. Smaller boring bars require a gang block bushing, which Tormach® sells in 1/4-inch, 5/16-inch, 3/8-inch, 1/2-inch, and 5/8-inch sizes.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	WRENCH SIZE	WRENCH PN	SCREW DESC.	SCREW PN
35632	S06H-SCLCR-2	Right	CC __ 2(1.5) _	T8	31239	M2.5	35658
35633	S06H-SCLCL-2	Left	CC __ 2(1.5) _	T8	31239	M2.5	35658
35640	S08M-SCLCR-2	Right	CC __ 3(2.5) _	T15	31251	M4 x 10 mm	35189
35641	S08M-SCLCL-2	Left	CC __ 2(1.5) _	T8	31239	M2.5	35658
35648	S12S-SCLCR-4	Right	CC __ 43 _	T20	31243	M5	35660
35649	S12S-SCLCL-4	Right	CC __ 43 _	T20	31243	M5	35660
36036	S12S-STFCR-3	Right	TC __ 3(2.5) _	T15	31251	M4 x 10 mm	35189
36037	S10R-STFCR-2	Right	TC __ 22 _	T8	31239	M2.5	35658
36038	S08Q-STFCR-2	Right	TC __ 22 _	T8	31239	M2.5	35658
36039	S06M-STFCR-2	Right	TC __ 22 _	T8	31239	M2.5	35658
36040	S05H-STFCR-2	Right	TC __ 22 _	T8	31239	M2.5	35658
37121	S12S-STFCL-3	Left	TC __ 3(2.5) _	T15	31251	M4 x 10 mm	35189
37122	S10R-STFCL-2	Left	TC __ 22 _	T8	31239	M2.5	35658
37123	S08Q-STFCL-2	Left	TC __ 22 _	T8	31239	M2.5	35658
37124	S06M-STFCL-2	Left	TC __ 22 _	T8	31239	M2.5	35658
37125	S05H-STFCL-2	Left	TC __ 22 _	T8	31239	M2.5	35658

Boring Bars, with Clamp



With a clamp insert holding system, the insert has more support for high horsepower machines, because there is more force holding it in place than with a screw clamping system.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	SCREW DESC.	SCREW PN	CLAMP PN	CLAMP WRENCH	CLAMP SCREW PN
33135	S12S-DCLNR-3	Right	CN __ 32 __	M5 x 8 mm	34401	34413	M3 Hex	34417
33356	S12S-DCLNL-3	Left	CN __ 32 __	M5 x 8 mm	34401	34413	M3 Hex	34417

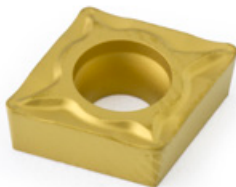
TURNING/BORING BAR INSERTS

UNDERSTANDING BORING BAR INSERT DESIGNATIONS

Example: **CCMT2(1.5)1**

Boring bars are easily recognized by their circular, bar design. They come in a variety of sizes, and help make an already existing hole bigger or to refine the finish of hole.

C INSERT SHAPE		C CLEARANCE ANGLE		M TOLERANCE			T CHIP BREAKER		2 CUTTING EDGE I.C./LENGTH		(1.5) THICKNESS		1 CORNER RADIUS		
C		B	5°	m	t	d	G		2	0.25 in.	1.5	0.094 in.	1	0.015 in.	
D		C	7°	G	±0.001	±0.005	±0.001	T		3	0.375 in.	2	0.125 in.	2	0.25 in.
R		N	0°	M	±0.003 to 0.007	±0.005	±0.002 to 0.005			4	0.5 in.	2.5	0.156 in.	3	0.375 in.
S											3	0.187 in.	4	0.5 in.	
T															
V															
W															



CC __ 2(1.5) _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
32419	CCMT	2(1.5)1	60204	General Purpose
34666	CCMT	2(1.5)1	60204	Steel
36065	CCGT	2(1.5)1	60204	Aluminum



CC __ 3(2.5) _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
35023	CCGT	3(2.5)1	09T304	Aluminum
36064	CCMT	3(2.5)2	09T308	Steel



CC __ 43 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
35026	CCGT	432	120408	Aluminum
35657	CCMT	431	120404	Steel



CN __ 32 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
33136	CNMG	322	090308	Steel



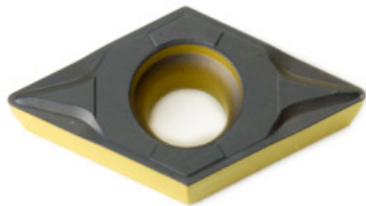
CN __ 43 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
33137	CNMG	432	120408	Steel



DC __ 2(1.5) _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
32420	DCMT	2(1.5)0	070202	General Purpose
36066	DCMT	2(1.5)1	070204	Steel, Stainless
36068	DCGT	2(1.5)1	070204	Aluminum



DC __ 3(2.5) _ Inserts (10-Packs)

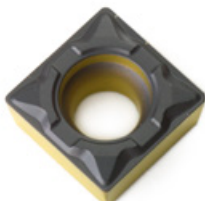
PN	Designation	ANSI	ISO	Materials
36067	DCMT	3(2.5)1	11T304	Steel
36069	DCGT	3(2.5)1	11T304	Aluminum



RC __ 2(1.5) _ Inserts (10-Packs)

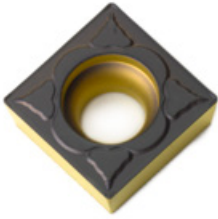
PN	Designation	ANSI	ISO	Materials
36072	RCMT	2(1.5)M0	0602M0	General Purpose Steel
39417	RCGT	2(1.5)M0	0602M0	Aluminum

Round inserts, compatible with certain toolholders, offer extra strength and are ideal for profiling large contours.



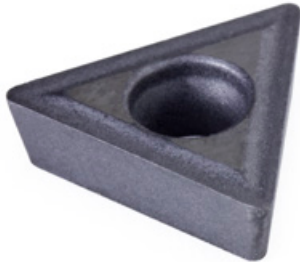
SC __ 3(2.5) _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
36074	SCMT	3(2.5)1	16T304	Steel
36076	SCGT	3(2.5)1	16T304	Aluminum



SC __ 43 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
36075	SCMT	431	120404	Steel
36077	SCGT	431	120404	Aluminum



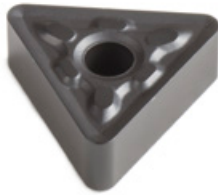
TC __ 22 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
31074	TCMT	221	110304	Steel
31075	TCMT	222	110308	High-temperature alloys
31076	TCMT	222	110308	Steel
36084	TCGT	221	110304	Aluminum



TC __ 3(2.5) _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
33353	TCMT	3(2.5)2	16T308	General Purpose
35019	TCGT	3(2.5)2	16T308	Aluminum
36080	TCMT	3(2.5)1	16T304	Steel



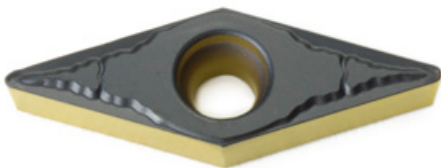
TN __ 22 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
35186	TNMG	222	110308	Steel



TN __ 33 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
33139	TNMG	332	160408	Steel



V __ 22 _ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
36070	VBMT	221	110304	Steel
36071	VCGT	221	110304	Aluminum



VN __ 33 __ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
33140	VNMG	332	160408	Steel



WN __ 43 __ Inserts (10-Packs)

PN	Designation	ANSI	ISO	Materials
33138	WNMG	432	080408	Steel

GROOVING/PARTING TOOLS

UNDERSTANDING GROOVING/PARTING TOOL DESIGNATIONS

Example: **SGTHR 19-4**

SGTH		R HAND		19 SHANK SIZE		-		4 TOOL WIDTH	
L	Left	9.5	9.5 mm	3	3 mm				
R	Right	12.7	12.7 mm	4	4 mm				
		19	19 mm						

Grooving Tools



Grooving tools can part, groove, and cut off workpieces while offering a consistent, smooth finish. Grooving tools are ideal for detailed exterior operations that turning tools do not have the clearance to perform.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS
33347	SGTHR 19-4	Right	GTN-4
33348	SGTHL 19-4	Left	GTN-4
37128	SGTHR 9.5-3	Right	GTN-3
37129	SGTHL 9.5-3	Left	GTN-3
37130	SGTHR 12.7-3	Right	GTN-3
37131	SGTHL 12.7-3	Left	GTN-3
37132	SGTHR 19-3	Right	GTN-3
37133	SGTHL 19-3	Left	GTN-3

Parting Tool Kit PN 33134



The Parting Tool Kit is ideal for parting workpieces with a large diameter. The kit includes one SLTBN 19-5 toolholder, two GTN-3 inserts (PN 34420), one NC1H 26-3 blade, and wrenches.

GROOVING/PARTING TOOLS



GTN-3 Inserts (10-Packs)

PN	Designation	Materials
34420	GTN-3	Steel



GTN-4 Inserts (10-Packs)

PN	Designation	Materials
32841	GTN-4	Steel

THREADING TOOLS

UNDERSTANDING THREADING TOOL DESIGNATIONS

Example: **SIR0375H11**

S CLAMPING SYSTEM		I APPLICATION		R HAND		0375 SHANK SIZE		H TOOL LENGTH		11 INSERT SIZE	
S	Clamp	E	External	R	Right					11	1/4 in.
M	Screw	I	Internal	L	Left					16	3/8 in.
		N	Neutral			0750	0.75 in.	H	4 inches		
						0375	0.375 in.	K	5 inches		
						0500	0.5 in.	P	7 Inches		

Threading Tools



Threading tools form threads on the outer or inner diameters of a part using a single-point tool. The relationship between the spindle speed and feed rate of the threading tool is critical to form good threads.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	WRENCH SIZE	WRENCH PN	SCREW DESC.	SCREW PN
33349	SIR0375H11	ID	11IRA60	M2.5	35658	T8	31239
35210	SER0500H11	OD	11ERAG60	M2.5	35658	T8	31239
35213	SEL0500H11	OD	11ELAG60	M2.5	35658	T8	31239
35214	SIL0375H11	ID	11ILA60	M2.5	35658	T8	31239

Threading Tools, with Clamp



With a clamp insert holding system, the insert has more support for high horsepower machines, because there is more force holding it in place than with a screw clamping system.

PN	DESIGNATION	HAND	COMPATIBLE INSERTS	SCREW DESC.	SCREW PN	CLAMP PN	CLAMP WRENCH	CLAMP SCREW PN
33144	CER0750K16	OD	16ERAG60	M5 × 8 mm	34401	34412	M3 Hex	34416
33145	CNR0750P16	ID	16IRAG60	M5 × 8 mm	34401	34412	M3 Hex	34416
34418	CEL0750K16	OD	16ELAG60	M5 × 8 mm	34401	34412	M3 Hex	34416
34419	CNL0750P16	ID	16ILAG60	M5 × 8 mm	34401	34412	M3 Hex	34416

THREADING TOOL INSERTS

UNDERSTANDING THREADING TOOL INSERT DESIGNATIONS

Example: **16ELAG60**

16 CLAMPING SYSTEM		E APPLICATION		L HAND		AG PITCH		60 THREAD STANDARD	
Length (in.)	I.C.	E	External	L	Left	A	48-16 TPI (0.5 - 1.5 mm)	60	Partial Profile 60°
11	1/4 in.	I	Internal	R	Right	AG	48-8 TPI (0.5 - 3 mm)		
16	3/8 in.					G	48-16 TPI (0.5 - 1.5 mm)		



16 __ AG60 Inserts (10-Packs)

PN	Designation	Materials
34421	16ELAG60	General Purpose
33158	16ERAG60	General Purpose
34422	16ILAG60	General Purpose
33159	16IRAG60	General Purpose



11 __ A60 Inserts (10-Packs)

PN	Designation	Materials
37288	11ELA60	General Purpose
37287	11ERA60	General Purpose
35582	11ILA60	General Purpose
33346	11IRA60	General Purpose