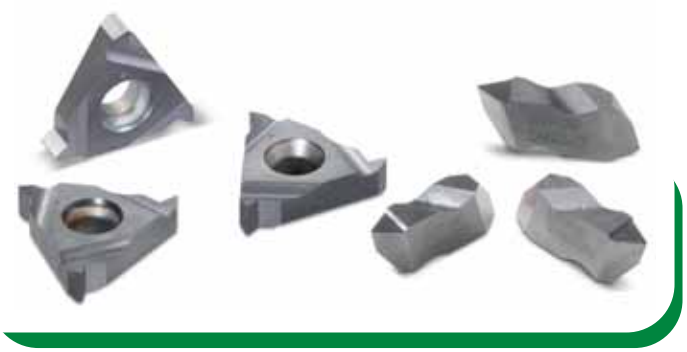
Threading



WIDIA™ Threading Systems

The WIDIA line offers two standard tooling systems, the TopThread™ and Laydown Threading, to address all of your demanding threading operation requirements. Simply choose the system that best suits your specific needs and applications!

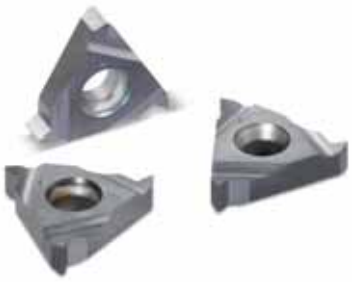
TopThread

With the largest selection of insert geometries and carbide grades available on the market today, the TopThread system is the best choice for coarse pitch and multi-tooth threading applications.

- Rigid insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Simple design does not require shim selection for thread helix angles.
- Excellent choice for heavy-duty applications like Acme, Buttress, and Round threads machining.
- Use the same toolholders and boring bars for threading and grooving inserts.
- Ideal for special insert shapes and toolholders.

Reduce your cost per part with the addition of the third cutting edge with the Laydown Threading platform.

Eliminate the need for shims with the rigid Top Clamp design.

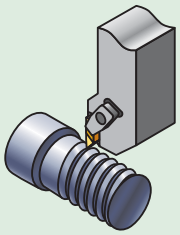


Laydown Threading

The Laydown Threading design is specially engineered to enable single-point threading in small diameter bores.

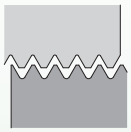
- Extensive selection of metric (ISO) and common European thread forms.
- Inserts available in PVD-coated carbide grades for high-performance applications.
- Low-profile design enables unrestricted chip flow.
- Three cutting edges per insert for superior, consistent results.

TopThread External Threading



Square Shank Toolholder Sizes:
- Inch — .375"–1.5"
- Metric — 10,0mm–32,0mm

Fine Pitch

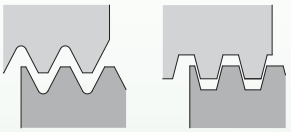


Cresting (Full Profile):
UN maximum TPI of 32
ISO minimum pitch of 1,5mm

Partial Profile — Flat Top (NTF and NTK):
UN maximum TPI of 44
ISO minimum pitch of 0,6mm

Partial Profile — Chip Control (NT-K):
UN maximum TPI of 36
ISO minimum pitch of 0,7mm

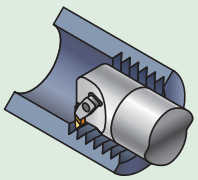
Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 7
ISO maximum pitch of 3,0mm

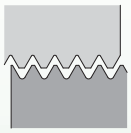
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

TopThread Internal Threading



Boring Bar Diameters:
- Inch — .312"–2.5"
- Metric — 10,0mm–50,0mm
- Minimum bore — .440" (11,5mm)
- Steel

Fine Pitch

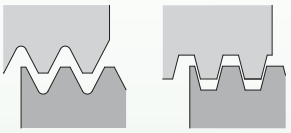


Cresting (Full Profile):
UN maximum TPI of 16
ISO minimum pitch of 1,5mm

Partial Profile — Flat Top (NT-1L, NTF and NTK):
UN maximum TPI of 24
ISO minimum pitch of 1,0mm

Partial Profile — Chip Control (NT-K):
UN maximum TPI of 20
ISO minimum pitch of 1,25mm

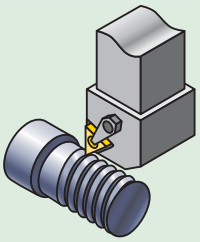
Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 8
ISO maximum pitch of 3,0mm

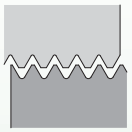
Partial Profile — Flat Top and Chip Control (NT-C and NT-CK):
UN minimum TPI of 4.5
ISO maximum pitch of 5,5mm

Laydown External Threading



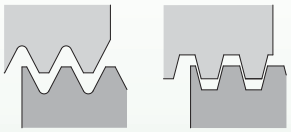
Square Shank Toolholder Sizes:
- Inch — .500"–1.25" available
- Metric — 8,0mm–40,0mm available

Fine Pitch



Cresting (Full Profile) and Partial Profile:
UN maximum TPI of 48
ISO minimum pitch of 0,5mm

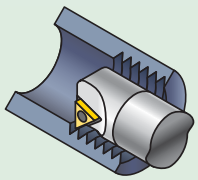
Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 8
ISO maximum pitch of 5,0mm

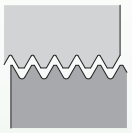
Partial Profile:
UN minimum TPI of 5
ISO maximum pitch of 5,0mm

Laydown Internal Threading



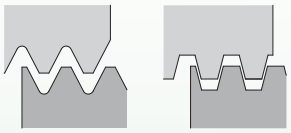
Boring Bar Diameters:
- Inch — .375"–1.25"
- Metric — 12,0mm–50,0mm
- Minimum bore — .500" (13,0mm)
- Steel and carbide

Fine Pitch



Cresting (Full Profile) and Partial Profile:
UN maximum TPI of 48
ISO minimum pitch of 0,5mm

Coarse Pitch/Heavy Duty



Cresting (Full Profile):
UN minimum TPI of 8
ISO maximum pitch of 5,0mm

Partial Profile:
UN minimum TPI of 5
ISO maximum pitch of 5,0mm

WIDIA TopThread™

Threading operations place extraordinary demands upon carbide inserts. Extreme tangential forces converge on the very small insert nose radius. In addition, thread pitch often requires a high feed rate (compared to regular turning operations), the insert cutting edge requires clearance, and high heat is generated in the cut. The WIDIA TopThread system is the best way to address these problems.

A superior choice for heavy-duty applications like machining Acme, Buttress, and API threads, the WIDIA TopThread system is the best solution for coarse pitch and multi-tooth threading applications.

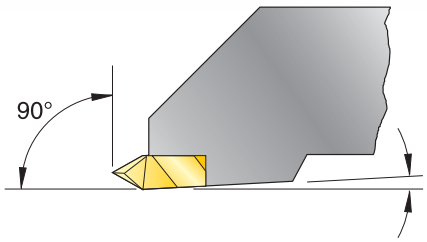
TopThread Insert Technology

TopThread insert technology brings superior chip control to your threading operations. Unlike competitors' designs, the WIDIA recessed chip groove, when used according to our recommendations, will break the chip in most applications, bringing you better tool life and lower cutting pressures.

- Reduced inconsistencies and better workpiece finish.
- Superior chip control reduces the danger to operators.
- Increased productivity in all of your threading operations.
- Carbide grades are available for outstanding performance.
- Excellent choice for special thread forms and toolholder designs.

The versatility of the TopThread steel enables you to use both threading and grooving inserts in the same toolholder.

TopThread™ inserts are available in TN6010 & TN6025 grades to withstand the unusually harsh demands placed on the cutting edge of the threading insert.



NOTE: Holders are designed to locate inserts inclined to 3° to provide back clearance down open side.

The Simple Solution

With the WIDIA TopThread solution, there is no need to worry about costly setup mistakes. TopThread insert selection is easy, quick, and enables accurate indexing to keep your machine spindle turning.

- Rigid design for increased insert stability during high feed rate applications.
- Good quality threads, minimised insert breakage, and improved tool life and surface finishes.
- Locking forces in three directions for superior resistance to thrust and tangential force.
- Unique 3° insert relief angle for back clearance.
- Available in partial profile inserts for 60° thread forms.

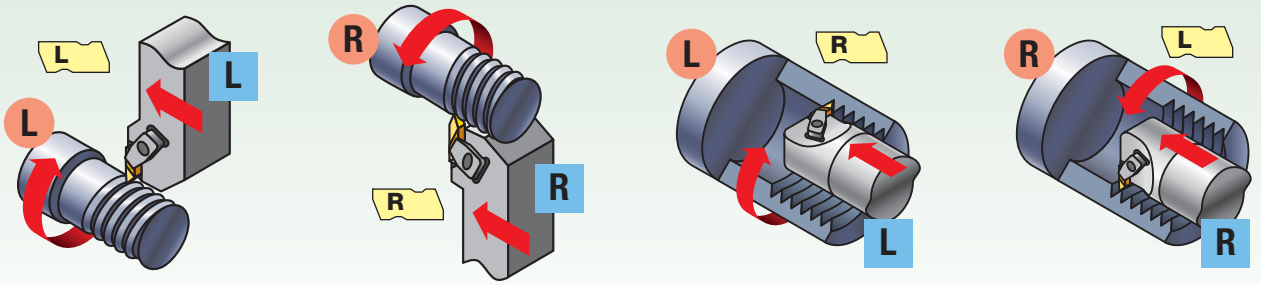
Step 1 • Select Threading Method and Hand of Tooling

Required Information:

- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.

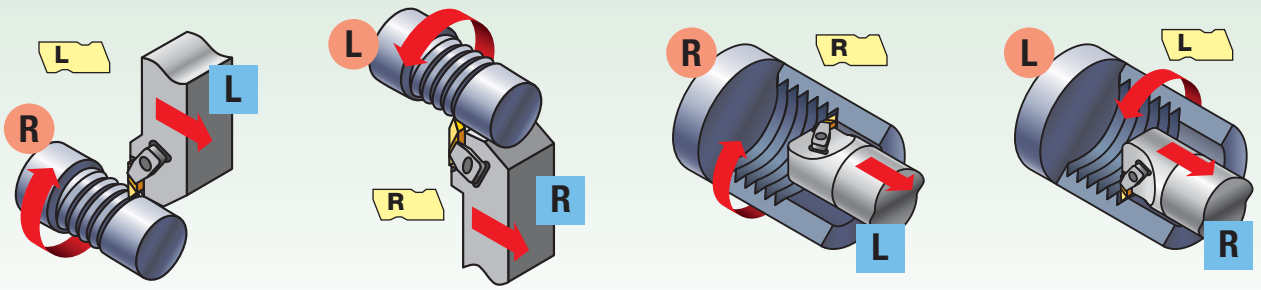
hand of thread | hand of toolholder | hand of insert

Feed direction toward the chuck • standard helix



external left-hand thread | external right-hand thread | internal left-hand thread | internal right-hand thread

Feed direction away from the chuck • reverse helix



external right-hand thread | external left-hand thread | internal right-hand thread | internal left-hand thread

Step 2 • Select Holder from Catalog Page

The insert size must match the gage insert size of your toolholder selection:

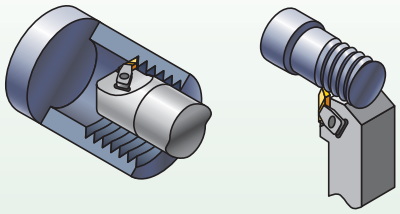
Required Information:

- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

catalog number	gage insert
NSR-163D	N.3R
NSR-164D	N.4R

NOTE: TopThread toolholders and boring bars are listed with a gage insert to indicate the size and hand required. They are compatible with both grooving and threading inserts of the same size.

Select the appropriate holder for the insert size and hand:



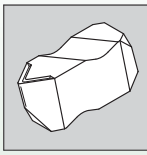
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values.

See the Technical section on pages E73–E79 of this catalog.

For internal threading, minimum bore varies depending on thread type. See page E80 for details.

Step 3 • Choose Insert for Application

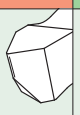
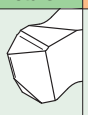
- See threading insert overview on page E10.
- Select cresting inserts for fully controlled thread form including diameter control. Cresting inserts eliminate the need for deburring.
- Non-cresting partial profile inserts can cut a variety of thread pitches. Chip control is only available with partial profile inserts.
- Note insert size for toolholder selection.



insert size	catalog number	TN6025	TN6010
2	NT-2RK	●	●
3	NT-3RK	●	●
4	NT-4RK	●	●

Step 4 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min (SFM)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	chip control or neutral 	chip control or positive 	neutral 	positive 	positive 
optimum cutting conditions	**TN6010** 50–230 m/min 160–750 SFM	**TN6010** 50–185 m/min 160–600 SFM	**TN6010** 70–210 m/min 230–700 SFM	—	**TN6010** 20–120 m/min 65–400 SFM
first choice	**TN6025** 40–200 m/min 130–650 SFM	**TN6025** 40–135 m/min 130–450 SFM	**TN6025** 60–145 m/min 200–475 SFM	**TN6025** 50–360 m/min 160–1150 SFM	**TN6025** 10–100 m/min 35–330 SFM

** NOTE: Also available as an optimum cutting tool for steel and stainless steel or partial profile threading. Increase speed by 15% over the recommendations above.*

Examples:

Chip Control: NT-K or NT-CK (partial profile only)

Neutral: NT, NT-C, NTF, NTC, NJ, NJF, NDC-V, NA, NDC, NTB-A/B

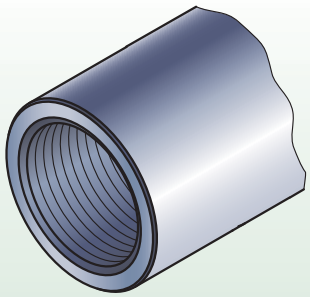
Positive: NTP, NTK, NJP, NJK

TopThread Threading Example:

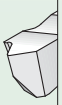
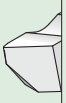
application: 8 TPI Acme internal right-hand thread
material: alloy steel
workpiece diameter: 4.5" (114,3mm)
good cutting conditions
feed towards the chuck

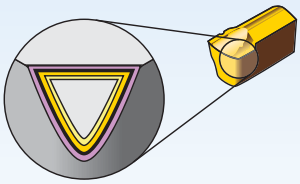
Recommendation:

insert: NA3L8
grade: TN6010
insert size: 3
boring bar: A40NER3
gage insert: N.3L
speed: 150 m/min (500 SFM)
infeed passes*: 12 passes



** Infeed recommendations provided in technical data section on pages E75–E79.*

style			thread profile	standard	tolerance class	cresting	application	page(s)
chip control — K	neutral	positive						
NT-K 	NT 	NTP 	Partial Profile 60º	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**E25–E26**
NT-CK 			Partial Profile 60º — coarse pitch	—	—	N	Coarse pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**E27**
	NTF 	NTK 	Partial Profile 60º — fine pitch	—	—	N	Fine pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches — able to thread close to shoulders.	**E27–E28**
	NTC 		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**E29**
		NJP 	UNJ	SAEA588791	3A/3B	N	Controlled root radius on external threads for military and aerospace industries.	**E30**
		NJK 	UNJ — fine pitch	SAEA588790	3A/3B	N	Controlled root radius on external threads for military and aerospace industries — able to thread close to shoulders.	**E30**
	NDC-V 		NPT	ANSI/ACME B1.201: 1983	Standard NPT	Y	National Pipe Thread standard forms for pipe fittings.	**E31**
	NDC-V-M 		NPT — multi-tooth	ANSI/ACME B1.201: 1983	Standard NPT	Y	High-productivity multi-tooth threading inserts for NPT threads.	**E31**
	NWC 		Whitworth, BSW, BSP	BS 84:1956, ISO 228/1: 1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	**E32**
	NDC-RD 		API Round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing and line pipe in the oil and gas industry, including 8 and 10 round forms.	**E32**
	NA 		Acme	ANSI B1.5:1988	3G	N	29° truncated thread form for motion applications in a wide variety of industries.	**E33**
	NAS 		Stub Acme	ANSI B1.8:1988	2G	N	Shallow depth 29° truncated thread form for motion applications in a wide variety of industries.	**E34**
	NTB-B 		American Buttress — 45° clearance flank leading (Pull)	ANSI B1.9:1973	Class 2	N	Sawtooth form for axial load bearing applications in a variety of industries — use the “B” style when the 45° clearance flank is the leading edge.	**E34**



Coatings provide high-speed capability and are engineered for finishing to light roughing.

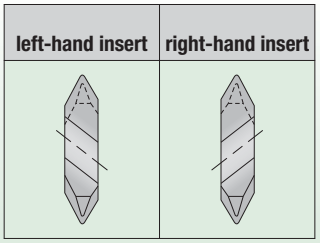
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multi-layer coating provides better wear resistance.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

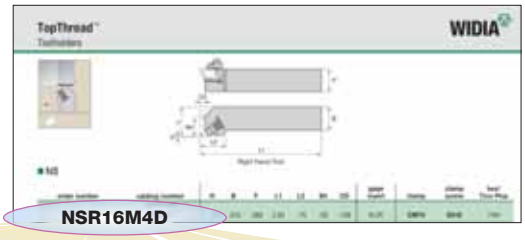
Grade

Coating	Grade Description	05	10	15	20	25	30	35	40	45
TN6010 / HC-P10	PVD-TiAlN multi-layer coated carbide. For finishing and general machining of steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at high cutting speeds under stable conditions.	P	P	P	P					
		M	M	M	M					
		K	K	K	K					
		N	N	N	N					
		S	S	S	S					
TN6025 / HC-P25	PVD-TiAlN multi-layer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness is required.				P	P	P			
					M	M	M			
					K	K	K			
					N	N	N			
					S	S	S			
THM / HW-K15	Uncoated carbide for light and medium machining. For cast iron, all non-ferrous metals, and non-metals. Also capable of machining hardened materials at low cutting speeds.	K	K	K	K					
		N	N	N	N					
		S	S	S	S					
		H	H	H	H					

- All TopThread inserts are precision-ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopThread inserts can be used in either toolholders or boring bars.
- All non-cresting-type threading inserts can be used for either external or internal applications. All cresting-type inserts are designated specifically for external or internal use.
- Right-hand TopThread toolholders use right-hand inserts. Left-hand TopThread toolholders use left-hand inserts.
- Right-hand TopThread boring bars use left-hand inserts. Left-hand TopThread boring bars use right-hand inserts.
- See this page for carbide grade selection and more technical information.



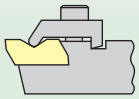
TopThread Holder Identification System



N	S	R		16	M	4	D
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Tool Length	Insert Size	Qualified Surface and Length

N — Insert Holding Method

N — TopThread*

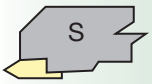


*Proprietary standard only.

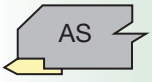
S — Insert Mounting Location

End mount

Side mount, offset

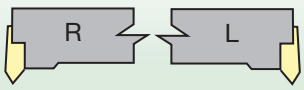


Side mount, no offset

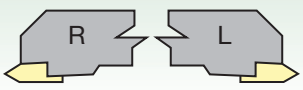


R — Hand of Tool

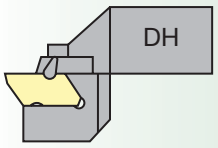
End mount



Side mount



Drop Head



16 — Shank Size

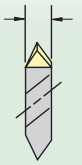
Inch:
Indicates the holder cross section. For shanks 5/8" square and larger, it represents the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

M — Tool Length

L1	ISO
32	A
40	B
50	C
60	D
70	E
80	F
90	G
100	H
110	J
125	K
140	L
150	M
160	N
170	P
180	Q
200	R
250	S
300	T
350	U
400	V
450	W
500	Y
special length	x

4 — Insert Size

W1



insert size	W1
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

D — Qualified Surface and Length

A – qualified back and end, 4" (101,60mm) long

B – qualified back and end, 4.5" (114,30mm) long

C – qualified back and end, 5" (127,00mm) long

D – qualified back and end, 6" (152,40mm) long

E – qualified back and end, 7" (177,80mm) long

V – qualified back and end, 3.5" (88,90mm) long*

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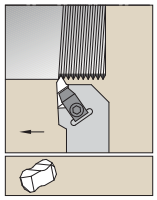
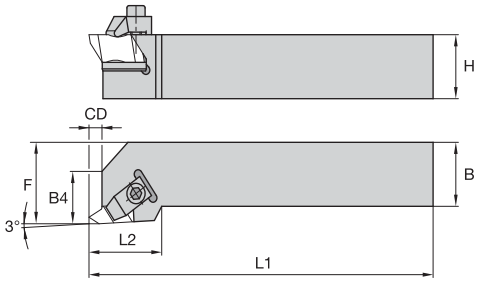


See page E10 for inserts.

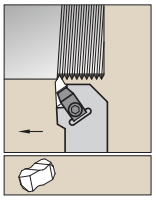


Right Hand Tool

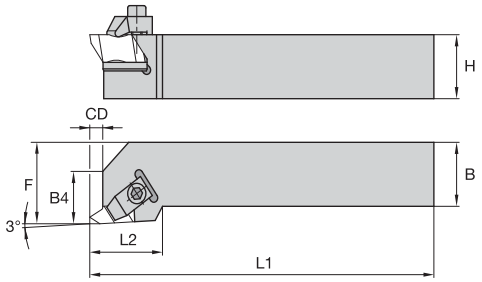
NS

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand											
3632147	**NSR062**	.375	.375	.562	2.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639035	**NSR082V**	.500	.500	.750	3.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639044	**NSR102B**	.625	.625	.875	4.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639026	**NSR122B**	.750	.750	1.000	4.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639025	**NSR162C**	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639027	**NSR123A**	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3639023	**NSR123B**	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3638592	**NSR163C**	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3638591	**NSR163D**	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3639028	**NSR203D**	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637506	**NSR243D**	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637535	**NSR243E**	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637496	**NSR853D**	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637509	**NSR205D**	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	**CM80**	**S352**	1/4
3637540	**NSR245D**	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	**CM80**	**S352**	1/4
	Left hand											
3632161	**NSL062**	.375	.375	.562	2.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3637485	**NSL082V**	.500	.500	.750	3.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3637510	**NSL102B**	.625	.625	.875	4.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3632145	**NSL122B**	.750	.750	1.000	4.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3632138	**NSL162C**	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3632152	**NSL123A**	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639032	**NSL123B**	.750	.750	1.000	4.50	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639029	**NSL163C**	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639024	**NSL163D**	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639037	**NSL203D**	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637515	**NSL243D**	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637548	**NSL243E**	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637508	**NSL853D**	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637536	**NSL205D**	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5L	**CM81**	**S352**	1/4

NOTE: F dimension shown over N-style gage insert.



See page E10 for inserts.

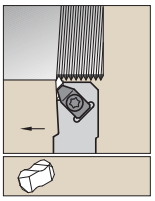


Right Hand Tool

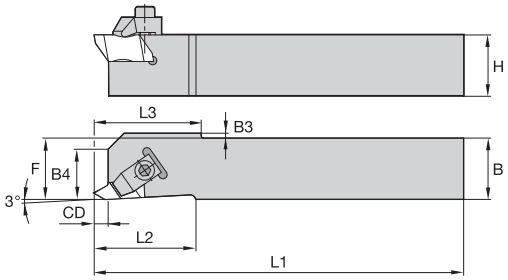
NS (with shim)

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	shim	shim screw	clamp	clamp screw	hex/ Torx Plus
	Right hand													
3639031	**NSR164C**	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3639033	**NSR164D**	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3637526	**NSR854D**	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3637529	**NSR204C**	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3639034	**NSR204D**	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3637534	**NSR864E**	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3637484	**NSR244D**	1.500	1.500	2.000	6.00	1.50	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3637501	**NSR244E**	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4R	**SM420**	**SL344**	**CM72LP**	**S2112**	25 IP
3632153	**NSR166D**	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6R	**SM416**	**S111**	**CM120**	**S412**	5/32
3637472	**NSR206D**	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6R	**SM416**	**S111**	**CM120**	**S412**	5/32
3637520	**NSR246D**	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6R	**SM416**	**S111**	**CM120**	**S412**	5/32
3637539	**NSR168D**	1.000	1.000	1.250	6.00	1.25	.72	.225	N.8R	**SM419**	**S112**	**CM144**	**S422**	3/16
	Left hand													
3632151	**NSL164C**	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3639040	**NSL164D**	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3637541	**NSL854D**	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3641699	**NSL204C**	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3639036	**NSL204D**	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3641700	**NSL864E**	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3637505	**NSL244D**	1.500	1.500	2.000	6.00	1.50	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3637533	**NSL244E**	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4L	**SM420**	**SL344**	**CM73LP**	**S2112**	25 IP
3637487	**NSL166D**	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6L	**SM416**	**S111**	**CM121**	**S412**	5/32
3637507	**NSL206D**	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6L	**SM416**	**S111**	**CM121**	**S412**	5/32
3637546	**NSL246D**	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6L	**SM416**	**S111**	**CM121**	**S412**	5/32

NOTE: F dimension shown over N-style gage insert.



See page E10 for inserts.

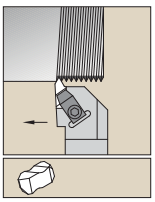


Right Hand Tool

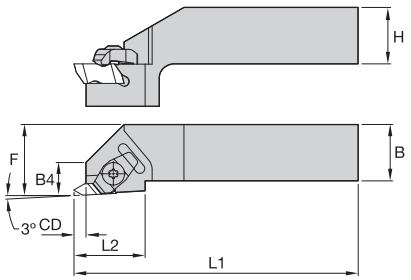
NAS

order number	catalog number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand													
3632140	**NASR062D**	.375	.375	.375	6.00	.75	.35	.138	.070	.88	N.2R	**CM182**	**S310**	7/64
3636529	**NASR082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R	**CM182**	**S310**	7/64
3639039	**NASR102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R	**CM74**	**S310**	7/64
3639042	**NASR083D**	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3R	**CM184LP**	**S2112**	25 IP
3636532	**NASR103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R	**CM184LP**	**S2112**	25 IP
	Left hand													
3637531	**NASL062D**	.375	.375	.375	6.00	.75	.35	.138	.070	.88	N.2L	**CM183**	**S310**	7/64
3636534	**NASL082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L	**CM183**	**S310**	7/64
3637489	**NASL102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2L	**CM75**	**S310**	7/64
3637497	**NASL083D**	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3L	**CM185**	**S412**	25 IP
3636524	**NASL103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L	**CM185LP**	**S2112**	25 IP

NOTE: F dimension shown over N-style gage insert.



See page E10 for inserts.

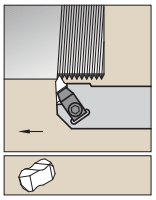


Right Hand Tool

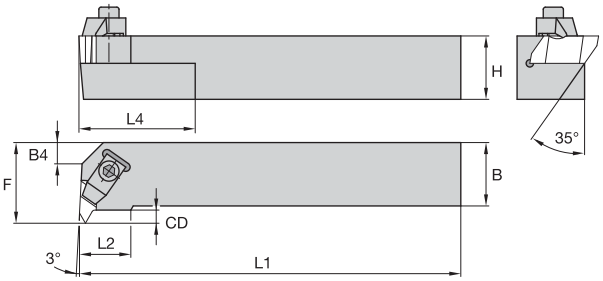
NS-DH

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus	jack screw
	Right hand												
3637547	**NSRDH122B**	.750	.750	1.000	4.50	.75	.40	.138	N.2R	**CM74**	**S310**	7/64	**—**
3637499	**NSRDH163C**	1.000	1.000	1.250	5.00	1.25	.58	.210	N.3R	**CM72LP**	**S2112**	25 IP	**—**
3637528	**NSRDH163D**	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R	**CM72LP**	**S2112**	25 IP	**—**
3637511	**NSRDH203D**	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3R	**CM72LP**	**S2112**	25 IP	**S965**
3637530	**NSRDH204D**	1.250	1.250	1.500	6.00	1.38	.62	.294	N.4R	**CM72LP**	**S2112**	25 IP	**S965**
	Left hand												
3637518	**NSLDH203D**	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3L	**CM73LP**	**S2112**	25 IP	**S965**

NOTE: F dimension shown over N-style gage insert.



See page E10 for inserts.

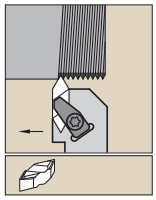


Right Hand Tool

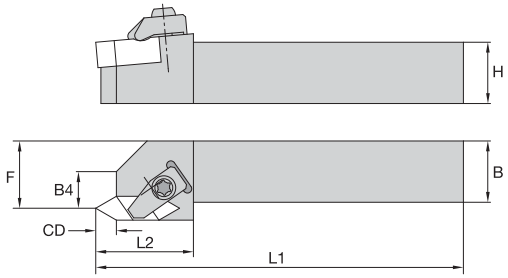
NE

order number	catalog number	H	B	F	L1	L2	L4	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand												
3637521	**NER062**	.375	.375	.750	2.50	.50	.50	—	.138	N.2L	**CM75**	**S310**	7/64
3637494	**NER082V**	.500	.500	.750	3.50	.50	1.00	—	.138	N.2L	**CM75**	**S310**	7/64
3637517	**NER102B**	.625	.625	.750	4.50	—	1.00	—	.138	N.2L	**CM75**	**S310**	7/64
3632156	**NER122B**	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2L	**CM75**	**S310**	7/64
3637486	**NER162C**	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2L	**CM75**	**S310**	7/64
3632133	**NER123B**	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639038	**NER163C**	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639030	**NER163D**	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3632150	**NER203D**	1.250	1.250	1.500	6.00	.75	2.00	.26	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637524	**NER243D**	1.500	1.500	2.000	6.00	.75	2.00	.76	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637523	**NER853D**	1.250	1.000	1.250	6.00	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637492	**NER164C**	1.000	1.000	1.375	5.00	.75	2.00	—	.294	N.4L	**CM73LP**	**S2112**	25 IP
3639043	**NER164D**	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4L	**CM73LP**	**S2112**	25 IP
3632157	**NER204D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4L	**CM73LP**	**S2112**	25 IP
3637522	**NER244D**	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4L	**CM73LP**	**S2112**	25 IP
3637542	**NER205D**	1.250	1.250	2.000	6.00	1.44	2.00	—	.415	N.5L	**CM81**	**S352**	1/4
3637544	**NER206D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.300	N.6L	**CM121**	**S412**	5/32
	Left hand												
3637525	**NEL062**	.375	.375	.750	2.50	.50	.50	—	.138	N.2R	**CM74**	**S310**	7/64
3632158	**NEL082V**	.500	.500	.750	3.50	.50	1.00	—	.138	N.2R	**CM74**	**S310**	7/64
3637532	**NEL102B**	.625	.625	.750	4.50	—	1.00	—	.138	N.2R	**CM74**	**S310**	7/64
3637503	**NEL122B**	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2R	**CM74**	**S310**	7/64
3637500	**NEL162C**	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2R	**CM74**	**S310**	7/64
3632144	**NEL123B**	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3632155	**NEL163C**	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3639041	**NEL163D**	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3632154	**NEL203D**	1.250	1.250	1.500	6.00	.75	2.00	.26	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637537	**NEL243D**	1.500	1.500	2.000	6.00	.75	2.00	.76	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637538	**NEL853D**	1.250	1.000	1.250	6.00	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637493	**NEL164C**	1.000	1.000	1.375	5.00	.75	2.00	—	.294	N.4R	**CM72LP**	**S2112**	25 IP
3632162	**NEL164D**	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4R	**CM72LP**	**S2112**	25 IP
3632159	**NEL204D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4R	**CM72LP**	**S2112**	25 IP
3637543	**NEL244D**	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4R	**CM72LP**	**S2112**	25 IP
3637549	**NEL205D**	1.250	1.250	2.000	6.00	1.44	2.00	—	.415	N.5R	**CM80**	**S352**	1/4
3641697	**NEL206D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.300	N.6R	**CM120**	**S412**	5/32

NOTE: F dimension shown over N-style gage insert.



See page E10 for inserts.



Right Hand Tool

NSU

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand											
3641698	**NSUR124C**	.750	.750	.875	5.00	1.25	.50	.240	NTU4R	**CM72LP**	**S2112**	25 IP
3637545	**NSUR164D**	1.000	1.000	1.125	6.00	1.25	.50	.240	NTU4R	**CM72LP**	**S2112**	25 IP
	Left hand											
3641702	**NSUL124C**	.750	.750	.875	5.00	1.25	.50	.240	NTU4L	**CM73LP**	**S2112**	25 IP
3641701	**NSUL164D**	1.000	1.000	1.125	6.00	1.25	.50	.240	NTU4L	**CM73LP**	**S2112**	25 IP

NOTE: F dimension shown over N-style gage insert.
NSU toolholders only for NTU4 threading inserts.

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WIDIA™
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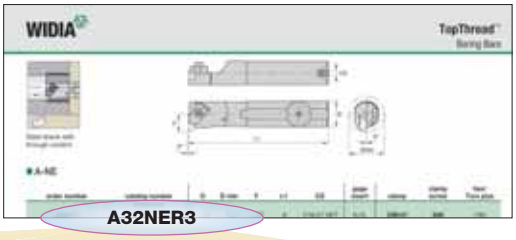
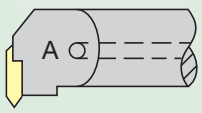
TopThread
Boring Bar Identification System



A	32	N	E	R	3
Bar Type	Bar Diameter	Insert Holding Method	Insert Location	Hand of Tool	Insert Size

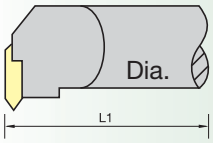
A — Bar Type

Steel with coolant



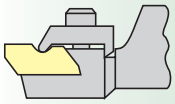
32 — Bar Diameter

A two-digit number that indicates the bar diameter in 1/16" increments.



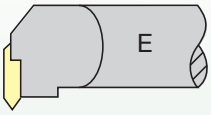
N — Insert Holding Method

N* — TopThread



E — Insert Location

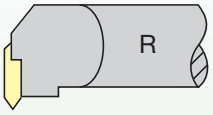
End mount



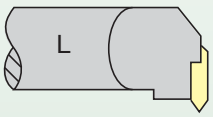
Side mount

R — Hand of Tool

Right hand



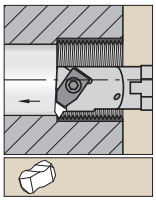
Left hand



3 — Insert Size

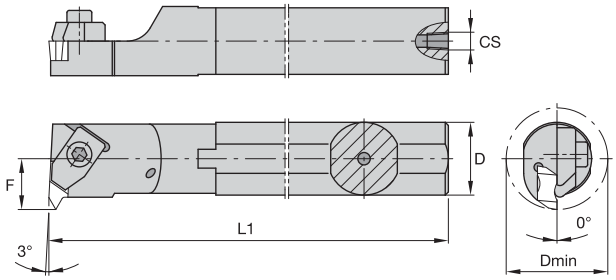
W1

insert size	W1
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"



Steel shank with
through coolant.

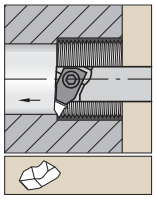
See page E10 for inserts.



A-NE

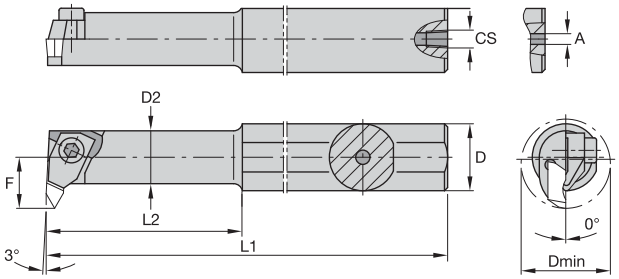
order number	catalog number	D	D min	F	L1	CS	gage insert	clamp	clamp screw	hex/ Torx plus
	Right hand									
3632117	**A08NER2**	.500	.730	.437	8	1/16-27 NPT	N.2L	**CM147**	**S39**	7/64
3632114	**A10NER2**	.625	1.000	.500	10	1/8-27 NPT	N.2L	**CM75**	**S310**	7/64
3632118	**A12NER2**	.750	1.125	.562	10	1/8-27 NPT	N.2L	**CM75**	**S310**	7/64
3632130	**A16NER2**	1.000	1.375	.688	12	1/4-18 NPT	N.2L	**CM75**	**S310**	7/64
3632113	**A16NER3**	1.000	1.375	.688	12	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632116	**A20NER3**	1.250	1.750	.875	14	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632115	**A24NER3**	1.500	2.000	1.000	14	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632132	**A28NER3**	1.750	2.250	1.125	14	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632122	**A32NER3**	2.000	2.500	1.250	16	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632146	**A40NER3**	2.500	3.000	1.500	16	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632123	**A28NER4**	1.750	2.500	1.250	14	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3632125	**A32NER4**	2.000	2.750	1.375	16	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3632136	**A40NER4**	2.500	3.250	1.625	16	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3637514	**A32NER5**	2.000	2.812	1.406	16	1/4-18 NPT	N.5L	**CM81**	**S352**	1/4
3632143	**A32NER6**	2.000	2.750	1.375	16	1/4-18 NPT	N.6L	**CM121**	**S412**	5/32
3637498	**A40NER6**	2.500	3.250	1.625	16	1/4-18 NPT	N.6L	**CM121**	**S412**	5/32
	Left hand									
3632131	**A08NEL2**	.500	.730	.437	8	1/16-27 NPT	N.2R	**CM146**	**S39**	7/64
3632127	**A10NEL2**	.625	1.000	.500	10	1/8-27 NPT	N.2R	**CM74**	**S310**	7/64
3632126	**A12NEL2**	.750	1.125	.562	10	1/8-27 NPT	N.2R	**CM74**	**S310**	7/64
3632142	**A16NEL2**	1.000	1.375	.688	12	1/4-18 NPT	N.2R	**CM74**	**S310**	7/64
3632120	**A16NEL3**	1.000	1.375	.688	12	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632124	**A20NEL3**	1.250	1.750	.875	14	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632128	**A24NEL3**	1.500	2.000	1.000	14	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637490	**A28NEL3**	1.750	2.250	1.125	14	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632139	**A32NEL3**	2.000	2.500	1.250	16	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637504	**A40NEL3**	2.500	3.000	1.500	16	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632141	**A28NEL4**	1.750	2.500	1.250	14	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3632149	**A32NEL4**	2.000	2.750	1.375	16	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3637491	**A40NEL4**	2.500	3.250	1.625	16	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3637527	**A32NEL5**	2.000	2.812	1.406	16	1/4-18 NPT	N.5R	**CM80**	**S352**	1/4
3637512	**A32NEL6**	2.000	2.750	1.375	16	1/4-18 NPT	N.6R	**CM120**	**S412**	5/32

NOTE: F dimension shown over N-style gage insert.



Necked steel shank
with through coolant.

See page E10 for inserts.



Right Hand Tool

A-NE-1

order number	catalog number	D	D min	D2	L1	L2	F	A	CS	gage insert	clamp	clamp screw	hex
	Right hand												
3632121	**A06NER1**	.375	.440	.312	6	1.25	.258	.125	—	N.1L	**CM109**	**S304**	5/64
3632119	**A08NER1**	.500	.440	.312	8	1.25	.258	—	1/16-27 NPT	N.1L	**CM109**	**S304**	5/64
3632148	**A10NER1**	.625	.800	—	10	—	.406	—	1/8-27 NPT	N.1L	**CM109**	**S304**	5/64

NOTE: F dimension shown over N-style gage insert.

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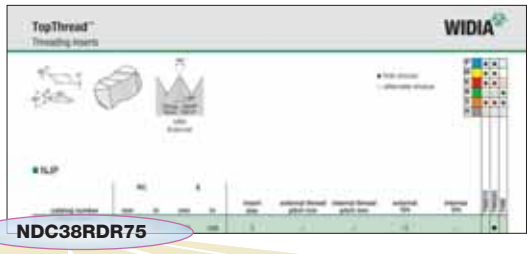
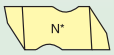
TopThread Insert Identification System



N	D	C	3	8RD	R	75	
Type of Insert	Insert Style	Additional Information	Insert Size	Industry Thread Identification	Hand of Insert	Definition of Insert	Additional Information

N — Type of Insert

N — TopThread*



*Proprietary standard only.

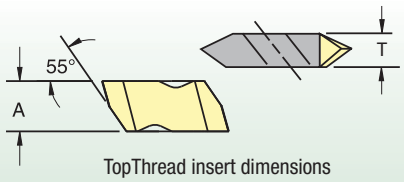
D — Insert Style

- A — Acme
- D — API or NPT
- J — UNJ thread
- T — 60° V thread
- W — 55° V Whitworth

C — Additional Information

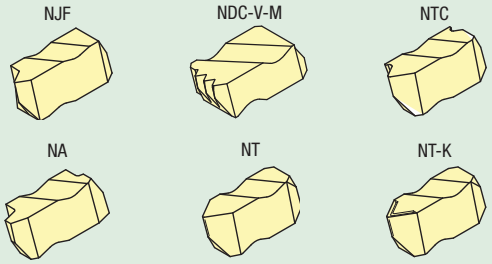
- B — Buttress
- F — Fine pitch
- S — Stub Acme
- C — Cresting
- P — Positive rake
- K — Fine pitch, positive

3 — Insert Size



TopThread insert dimensions

insert size	A inch	A mm	T inch	T mm
1	.100	2,54	.100	2,54
2	.219	5,56	.150	3,81
3	.344	8,74	.195	4,95
4	.453	11,51	.255	6,48
5	.688	17,48	.380	9,65
6	.453	11,51	.383	9,73
8	.312	7,93	.438	11,13



8RD — Industry Thread Identification

Indicates API or drilling industry form designation (e.g., 10RD, 8RD, .038)

or

controlled root radius threading inserts indicate the root radius in .001" increments (NJ, NJF, NJP, NJK)

or

M indicates metric ISO thread

R — Hand of Insert

R — Right hand

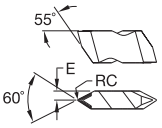
L — Left hand

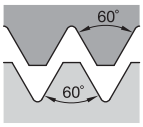
75 — Definition of Insert

- Threads per inch or pitch (for metric)
- "A" or "B" type Buttress insert
- Taper per foot — API threads

Additional Information

- I — Internal thread
- E — External thread (used only if internal and external thread forms are different)
- M — Multiple tooth
- K — Standard chip control
- C — Coarse pitch
- D — Dryseal





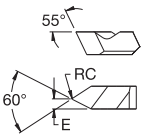
Partial Profile 60°

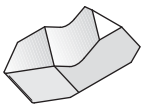
● first choice
○ alternate choice

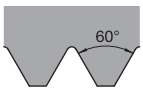
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NT-K

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand												
NT2RK	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3RK	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NT4RK	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12		●	
Left hand												
NT2LK	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3LK	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	



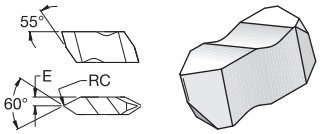


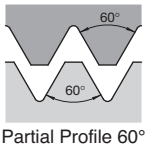


Partial Profile 60°
Internal

■ NT-1L

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
Left hand												
NT1L	0,08	.003	1,09	.043	1	–	1,00–2,00	–	12–24	●	●	





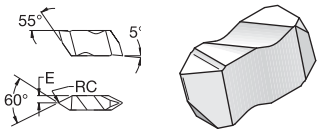
Partial Profile 60°

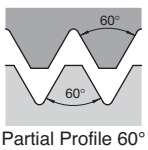
● first choice
○ alternate choice

P	●	●		
M	●	●		
K	●	●	○	
N	○	○	●	
S	●	●	●	
H	○			

NT

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand												
NT2R	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3R	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NT4R	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12	●	●	
Left hand												
NT2L	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20	●	●	
NT3L	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12	●	●	
NT4L	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12		●	

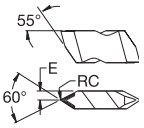


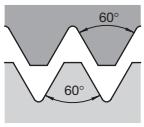


Partial Profile 60°

NTP

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI
Right hand									
NTP2R	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20
NTP3R	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12
NTP4R	0,17	.007	3,25	.128	4	1,25–6,25	2,00–6,25	4–20	4–12
Left hand									
NTP2L	0,10	.004	1,91	.075	2	0,70–3,00	1,25–3,50	8–36	7–20
NTP3L	0,17	.007	2,49	.098	3	1,25–4,00	2,00–5,00	6–20	5–12





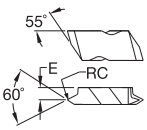
Partial Profile 60°

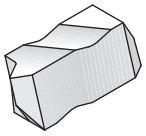
● first choice
○ alternate choice

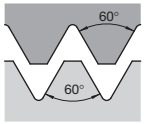
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

■ NT-CK

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand												
NT3RCK	0,34	.014	2,46	.097	3	2,50–4,00	4,00	6–11	6	●	●	



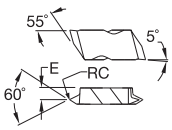


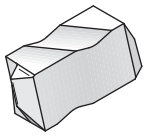


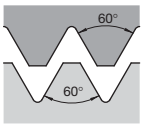
Partial Profile 60°

■ NTF

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
Right hand												
NTF2R	0,08	.003	2,79	.110	2	0,60–1,75	1,00–2,00	14–44	12–24	●	●	
NTF3R	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	
Left hand												
NTF3L	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	







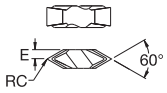
Partial Profile 60°

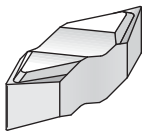
● first choice
○ alternate choice

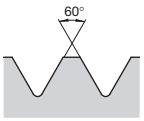
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NTK

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand NTK2R	0,08	.003	2,79	.110	2	0,60–1,75	1,00–2,00	14–44	12–24	●	●	
NTK3R Left hand	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24	●	●	
NTK3L	0,08	.003	3,58	.141	3	0,60–2,50	1,00–2,50	10–44	9–24		●	



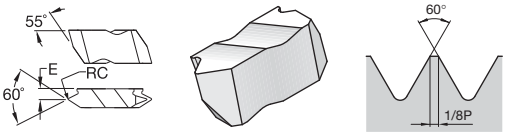




Partial Profile 60°
External

NTU

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI			
Right hand NTU4R	0,11	.005	3,18	.125	4U	1,25–6,25	–	4–20	–		●	
Left hand NTU4L	0,11	.005	3,18	.125	4U	1,25–6,25	–	4–20	–		●	



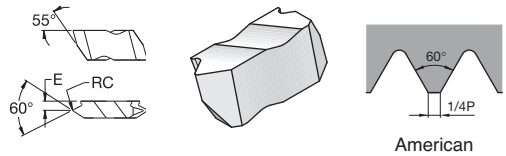
American
UN-External

● first choice
○ alternate choice

		TN6010	TN6025	THM
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

NTC-E

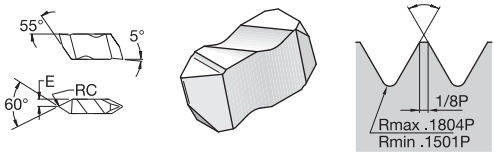
catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand												
NTC3R16E	0,19	.008	3,76	.148	3	–	–	16	–	●	●	
NTC3R14E	0,22	.009	3,76	.148	3	–	–	14	–	●		
NTC3R12E	0,25	.010	3,76	.148	3	–	–	12	–	●	●	



American
UN-Internal

NTC-I

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Left hand												
NTC3L12I	0,10	.004	3,76	.148	3	–	–	–	12		●	



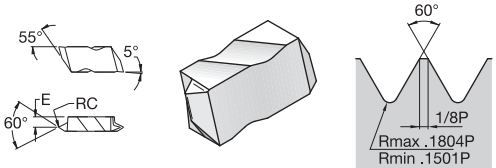
UNJ
External

● first choice
○ alternate choice

P	●	●		
M	●	●		
K	●	●	○	
N	○	○	●	
S	●	●	●	
H	○			

■ NJP

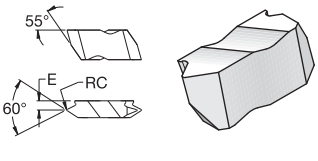
catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand												
NJP3014R12	0,33	.013	2,49	.098	3	–	–	12	–		●	



UNJ
External

■ NJK

catalog number	RC mm	RC in	E mm	E in	insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
Right hand												
NJK3008R20	0,20	.008	3,58	.141	3	–	–	20	–	●		



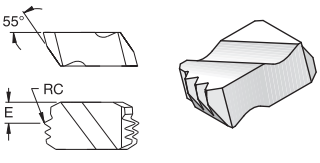
NPT

● first choice
○ alternate choice

P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NDC-V

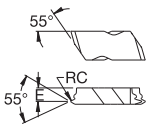
catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Right hand NDC3115VR75	0,10	.004	3,66	.144	3	11.5	.750	●		

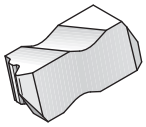


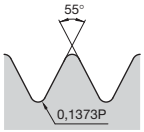
NPT

■ NDC-V-M

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Right hand NDC8115VR75M	0,10	.004	2,59	.102	8	11.5	.750	●		
NDC88VR75M	0,13	.005	2,41	.095	8	8	.750	●		







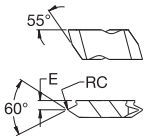
Whitworth BSW,
BSP-External

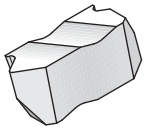
● first choice
○ alternate choice

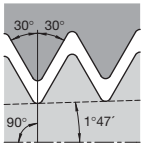
	TN6010	TN6025	THM
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NWC-E

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Right hand NWC3R14E	0,24	.009	3,43	.135	3	14	–		●	
NWC3R11E	0,30	.012	3,43	.135	3	11	–		●	



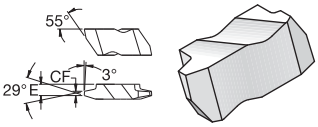


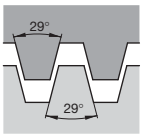


API
Round

NDC-RD

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Right hand NDC38RDR75	0,43	.017	3,18	.125	3	8	.750		●	
Left hand NDC310RDL75	0,36	.014	3,18	.125	3	10	.750		●	
NDC38RDL75	0,43	.017	3,18	.125	3	8	.750		●	





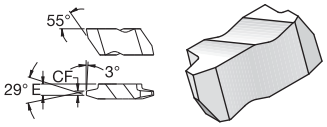
ACME

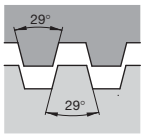
● first choice
○ alternate choice

		TN6010	TN6025	THM
P		●	●	
M		●	●	
K		●	●	○
N		○	○	●
S		●	●	●
H		○		

NA

catalog number	RC mm	RC in	CF mm	CF in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Right hand												
NA3R8	–	–	1,04	.041	3,79	.149	3	8	–		●	
NA3R6	–	–	1,44	.057	3,79	.149	3	6	–		●	
NA3R4	–	–	2,22	.088	3,38	.133	3	4	–		●	
NA4R4	–	–	2,22	.088	5,13	.202	4	4	–		●	
NA6R3	–	–	3,01	.118	7,19	.283	6	3	–		●	
NA6R2	–	–	4,58	.180	7,19	.283	6	2	–		●	
Left hand												
NA3L8	–	–	1,04	.041	3,79	.149	3	8	–		●	
NA3L6	–	–	1,44	.057	3,79	.149	3	6	–		●	
NA3L4	–	–	2,22	.088	3,38	.133	3	4	–		●	
NA4L4	–	–	2,22	.088	5,13	.202	4	4	–		●	
NA6L3	–	–	3,01	.118	7,19	.283	6	3	–		●	
NA6L2	–	–	4,58	.180	7,19	.283	6	2	–		●	





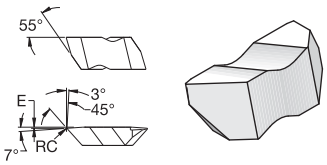
Stub ACME

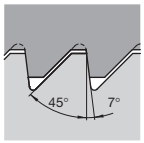
● first choice
○ alternate choice

	TN6010	TN6025	THM
P	●	●	
M	●	●	
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

NAS

catalog number	RC mm	RC in	CF mm	CF in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Right hand												
NAS3R8	–	–	1,21	.048	3,79	.149	3	8	–		●	
Left hand												
NAS3L12	–	–	0,83	.033	3,79	.149	3	12	–		●	
NAS3L8	–	–	1,21	.048	3,79	.149	3	8	–		●	
NAS3L6	–	–	1,66	.065	3,79	.149	3	6	–		●	





American
Buttress-Pull

NTB-B

catalog number	RC mm	RC in	E mm	E in	insert size	TPI	TPF	TN6010	TN6025	THM
Left hand										
NTB3LB	0,17	.007	0,31	.012	3	8–16	–		●	

ANSI ISO 513	VDI 3323						
Material Group		Cutting Speed • vc SFM					
		min	Start	max	min	Start	max
P			TN6010			TN6025	
	1	455	**570**	685	425	**455**	490
	2	425	**520**	620	390	**520**	655
	3	360	**455**	555	325	**425**	520
	4	390	**490**	590	390	**490**	590
	5	325	**425**	520	325	**425**	520
	6	390	**490**	590	390	**490**	590
	7	325	**425**	520	295	**410**	520
	8	295	**390**	490	260	**360**	455
	9	195	**295**	390	195	**260**	325
	10	295	**340**	390	260	**310**	360
	11	160	**210**	260	160	**210**	260
	12	390	**505**	620	390	**455**	520
	13.1	295	**390**	490	260	**340**	425
	13.2	145	**195**	245	130	**180**	210
M			TN6010			TN6025	
	14.1	295	**390**	490	195	**245**	295
	14.2	245	**325**	390	160	**195**	245
	14.3	180	**245**	310	130	**160**	180
	14.4	145	**195**	245	95	**130**	145
K			TN6010			TN6025	
	15	455	**555**	655	225	**295**	325
	16	325	**425**	520	160	**210**	260
	17	390	**490**	590	195	**225**	260
	18	295	**390**	490	130	**180**	225
	19	490	**590**	685	260	**310**	360
	20	360	**455**	555	195	**245**	295
N			TN6010			TN6025	
	21	1965	**2460**	2950	1965	**2460**	2950
	22	1640	**2130**	2620	1640	**2130**	2620
	23	1965	**2460**	2950	1965	**2460**	2950
	24	1640	**2130**	2620	1640	**2130**	2620
	25	750	**980**	1210	750	**980**	1210
	26	490	**655**	820	490	**655**	820
	27	490	**655**	820	490	**655**	820
	28	360	**455**	555	360	**455**	555
	29	195	**260**	325	195	**260**	325
	30	260	**325**	390	260	**325**	390
S			TN6010			TN6025	
	31	120	**145**	180	85	**120**	145
	32	95	**115**	145	65	**95**	115
	33	75	**90**	115	55	**75**	90
	34	45	**55**	80	35	**45**	55
	35	50	**55**	80	35	**50**	55
	36	195	**235**	260	135	**195**	235
	37	95	**115**	145	65	**95**	115

The WIDIA™ high-performance carbide grades, coupled with our rigid TopThread clamping design, offer the metal working industry optimum threading productivity.

When WIDIA's large inventory of standard products does not completely satisfy your productivity requirements, consider having TopThread inserts custom ground to meet your unique application needs.

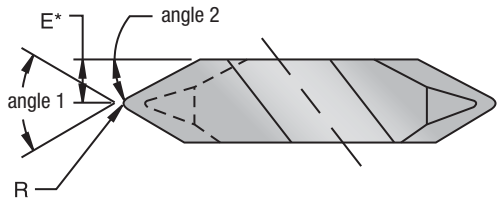
The large variety of TopThread blank sizes allows maximum flexibility in threading endform design, especially for extra wide or oil field applications.

Common examples of special forms are shown here. Please contact your local WIDIA representative for recommendations on satisfying your special threading needs.

Features and Benefits:

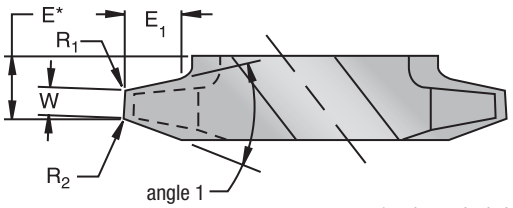
- Quotes are handled quickly and efficiently using state-of-the-art CAD design software and electronic database software.
- Our Carbide Custom Solutions Design Team is your link to one of the industry's largest electronic databases. They can solve your most challenging design problems.
- Where necessary or required, concept drawings are available to facilitate your engineering development.
- A large number of high-performance carbide grades are available to optimize your productivity. The option of producing standard insert styles in non-standard carbide grades allows you to optimize tool life performance.

style C2 RH shown



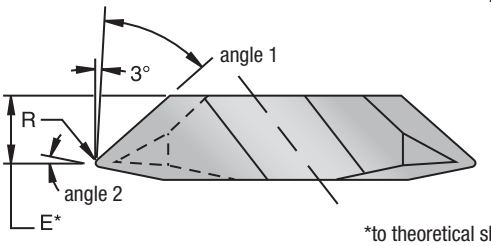
*to theoretical sharp point

style C3 RH shown



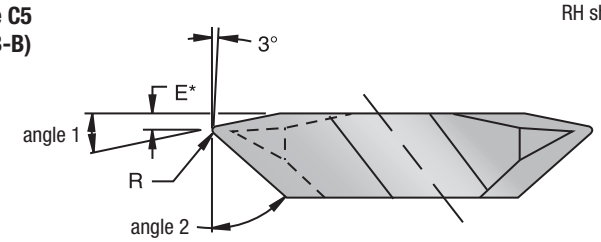
*to theoretical sharp point

style C4 (NTB-A) RH shown



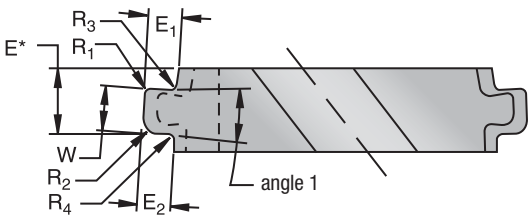
*to theoretical sharp point

style C5 (NTB-B) RH shown



*to theoretical sharp point

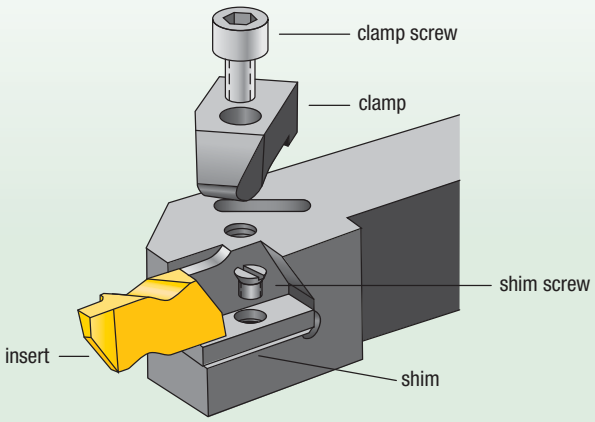
style C6 RH shown



*to theoretical sharp point

NOTE: Right-hand inserts shown; left-hand inserts are also available.

TopThread and TopGroove Toolholders and Boring Bars



insert size and style	clamp	clamp screw	shim	shim screw
NG-1L	CM-109	S-304	–	–
NG-2R	CM-182	S-310	–	–
NG-2L	CM-183	S-310	–	–
NG-2R	CM-74	S-310	–	–
NG-2L	CM-75	S-310	–	–
NG-3R	CM-184	S-412	–	–
NG-3L	CM-185	S-412	–	–
NG-3R	CM-72	S-412	–	–
NG-3L	CM-73	S-412	–	–
NG-3R*	CM-78	S-412	–	–
NG-3L*	CM-70	S-412	–	–
NG-4R	CM-72	S-412	SM-420	SL-344
NG-4L	CM-73	S-412	SM-420	SL-344
NG-5R	CM-80	S-352	–	–
NG-5L	CM-81	S-352	–	–
NG-6R	CM-120	S-412	SM-416	S-111
NG-6L	CM-121	S-412	SM-416	S-111
NG-8R	CM-144	S-422	SM-419	S-112
NG-8L	CM-145	S-422	SM-419	S-112
NG-8R**	CM-144	S-422	SM-427	S-111
NG-8L**	CM-145	S-422	SM-427	S-111
TopGroove relief grooving				
NU-3125R	CM-72	S-412	–	–
NU-3125L	CM-73	S-412	–	–
NU-3125R**	CM-72	S-618	–	–
NU-3125L**	CM-73	S-618	–	–
Utility threading				
NTU-4R	CM-72	S-412	–	–
NTU-4L	CM-73	S-412	–	–

**25,0mm diameter boring head.*

***Boring head.*

WIDIA™ Laydown Threading

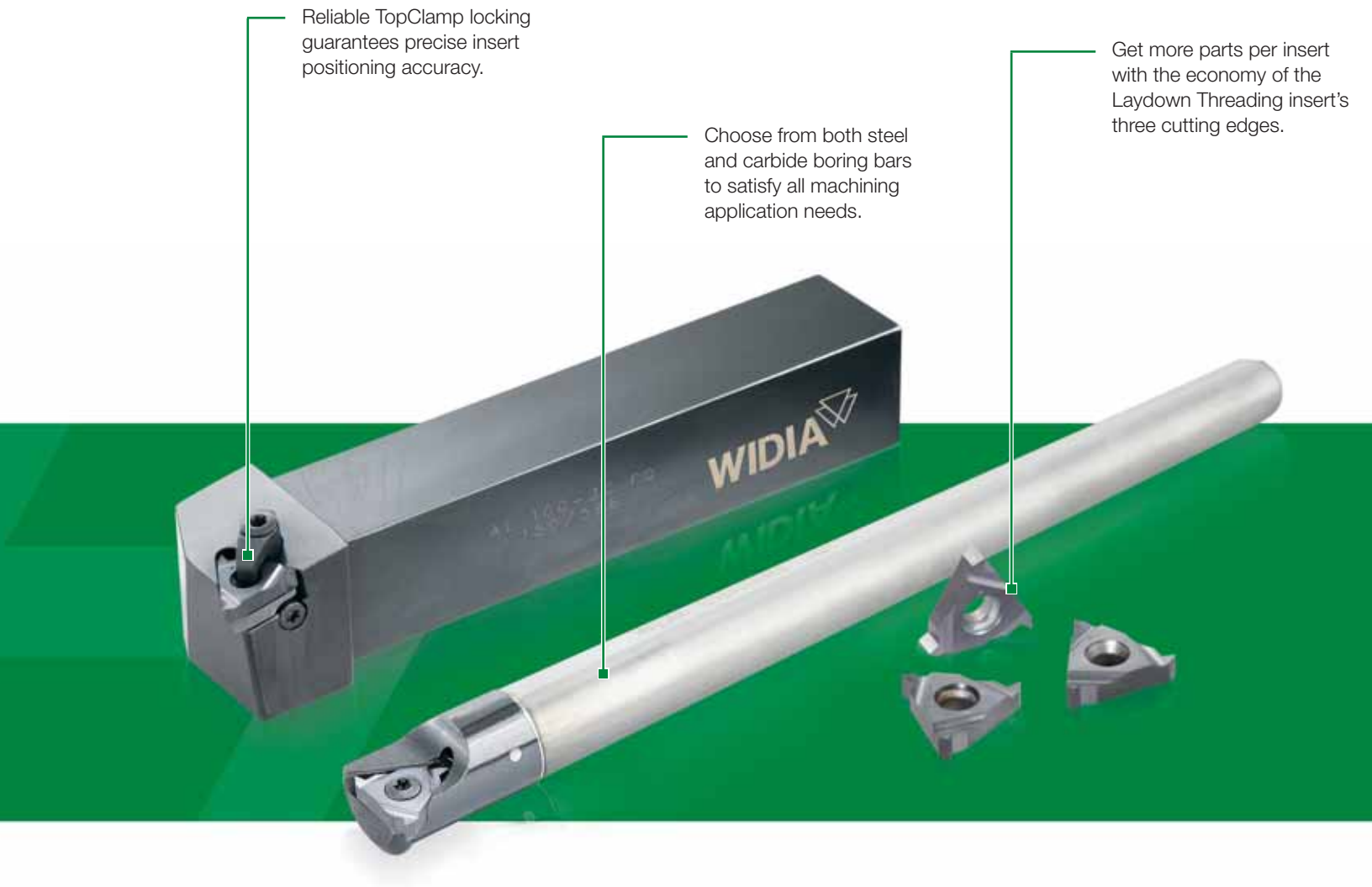
For increased reliability and productivity, look no further than the WIDIA Laydown Threading System for all of your ID and OD threading applications. With variable shim angles and the proper cutting geometry, the Laydown Threading system maximizes tool life and improves thread quality.

This specially engineered system meets all modern production standards. With an extensive range of inserts and toolholders available, the Laydown Threading platform is ideal for all of your threading requirements.

Laydown Insert Technology

Laydown insert technology, with its wide range of available tools and inserts, guarantees increased tool life, minimized built-up edges, and precise cuts of most common materials.

- TN6025 premium PVD TiAlN-coated grade outperforms conventional PVD grades by up to 30%.
- Enables superior chip control and reduced cutting forces.
- Partial and full profile insert options available for all common thread forms.



The Laydown Threading Solution

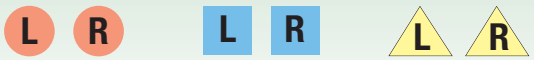
With the WIDIA™ Laydown Threading System, you experience reliable countersunk screw locking for unhindered chip flow and precise insert positioning accuracy.

- Four insert sizes available to cover a wide range of thread-making operations.
- Ideal for fine-pitch threads, high-helix/multi-start threads, and single-point threading in small-diameter bores.
- Maximized tool life and low-profile design for unhindered chip flow and superior performance.

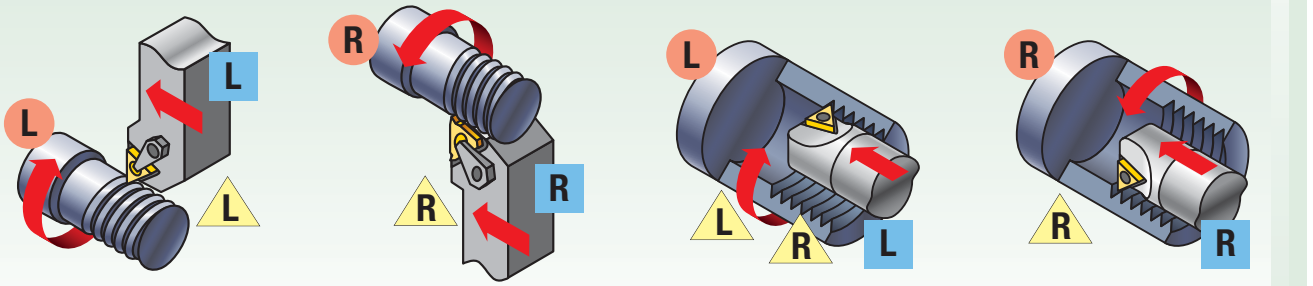
Step 1 • Select Threading Method and Hand of Tooling

Required Information:

- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.

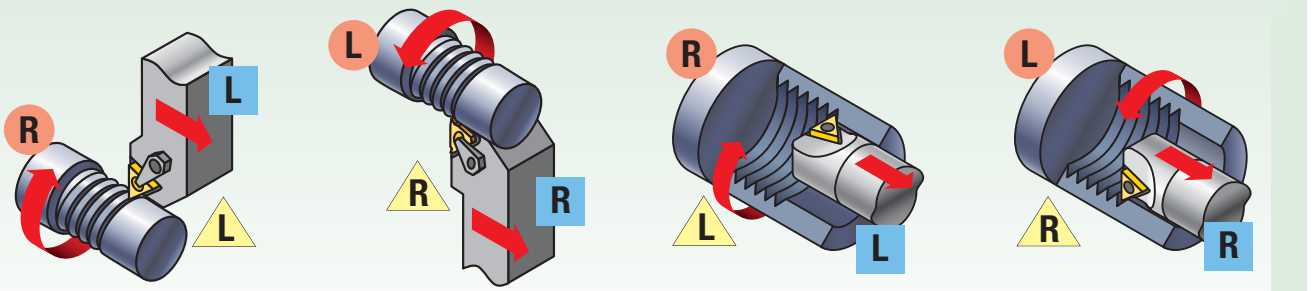


Feed direction toward the chuck • standard helix



external left-hand thread | external right-hand thread | internal left-hand thread | internal right-hand thread

Feed direction away from the chuck • reverse helix



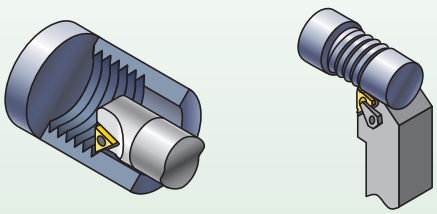
external right-hand thread | external left-hand thread | internal right-hand thread | internal left-hand thread

Step 2 • Select Holder from Catalog Page

Required Information:

- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

Select the appropriate holder for the insert size and hand:



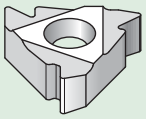
The insert size must match the gage insert size of your toolholder selection:

catalog number	gage insert	minimum bore diameter	shim
S0812LSER2	2IRA60	650"	—
S2020LSER3	3IR...	1.45"	SM-YI3

Step 3 • Choose Insert for Application

- Select cresting inserts for fully controlled thread form including diameter.
- Cresting inserts eliminate the need for deburring and are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Note insert size for toolholder selection.

See threading insert overview on page E42.



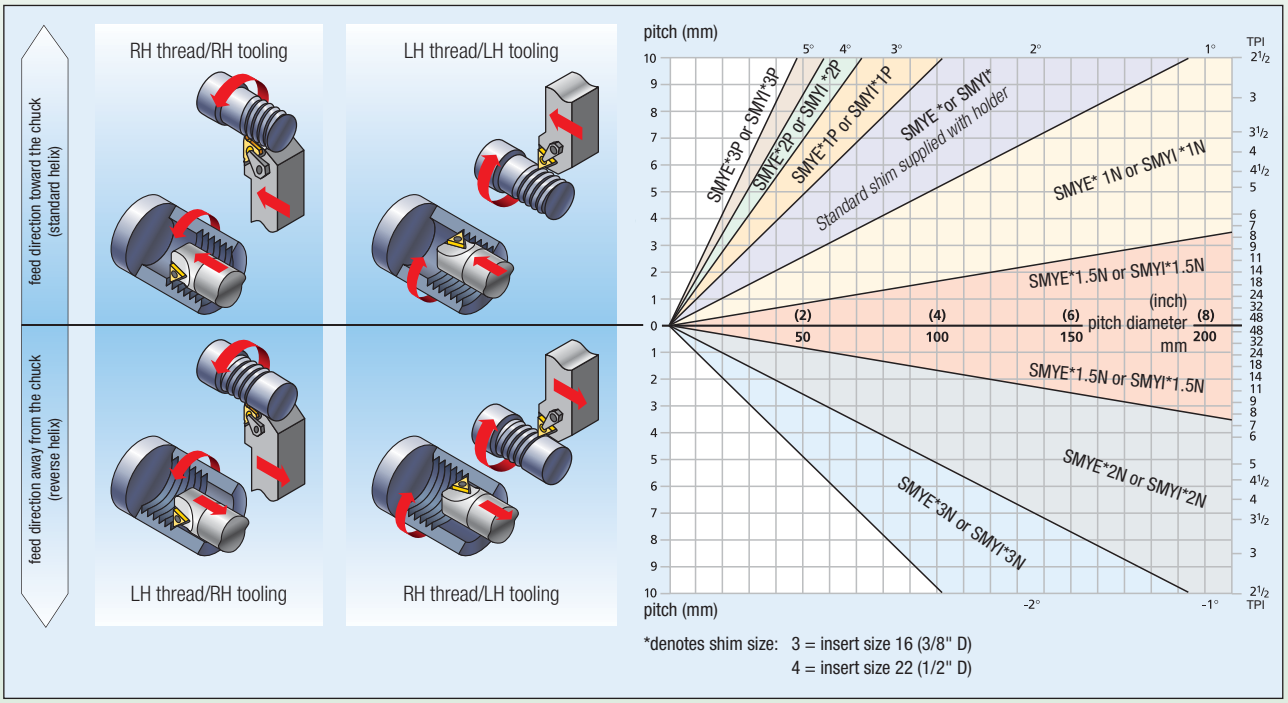
insert size	catalog number	TN6025
11	2IRA60	●
16	3IRAG60	●

Step 4 • Select Appropriate Shim

Required Information:

- Thread form (TPI or pitch).
- Pitch diameter.
- Helix method (hand of tool, feed direction, hand of thread).

Select the proper shim: SMYE... for external RH or internal LH
SMYI... for internal RH or external LH



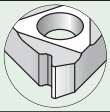
*denotes shim size: 3 = insert size 16 (3/8" D)
4 = insert size 22 (1/2" D)

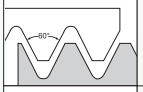
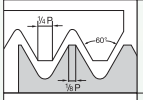
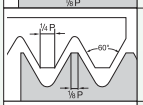
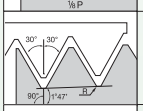
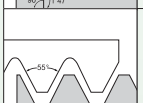
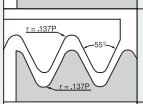
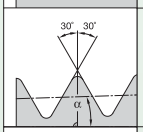
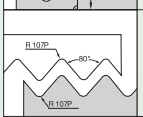
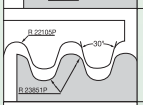
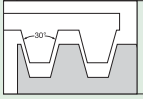
If recommended shim is different from shim supplied with toolholder, order shim separately.

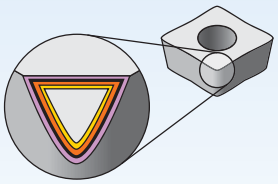
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values. See the Technical Section on pages E72–E79. Also see detailed shim selection information on page E89–E90.

Step 5 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min (sfm)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
Insert Style	 Precision Ground				
First Choice	**TN6025** 40–200 (130–650)	**TN6025** 40–135 (130–450)	**TN6025** 60–145 (200–475)	**TN6025** 50–360 (160–1150)	**TN6025** 10–100 (35–330)

style			thread profile	standard	tolerance class	cresting	application	page(s)
	flat top							
	60		Partial profile 60º	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	**E51–E53**
	ISO		Metric ISO	ISO R262, DIN 13	6g/6H	Y	Widely used metric 60° V-form for all industries.	**E54–E55**
	UN		American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	**E56–E57**
	NPT		NPT	ANSI/ASME B1.20.1S1983	Standard NPT	N	National Pipe Thread standard 60° thread form for pipe fittings.	**E58**
	55		Partial profile 55º	—	—	N	General use for 55° thread forms such as Whitworth, BSW, and BSP where non-cresting inserts are desired to cut a variety of pitches.	**E59**
	W		Whitworth, BSW, BSF, BSP	BS 84:1956, ISO 228/1:1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	**E60–E61**
	APIRD		API round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	**E61–E62**
	PG		PG	DIN 404B0		Y	80° steel conduit thread.	**E62–E63**
	RD		Round	DIN 405	7e/7H	Y	Round thread form for tube fittings in the chemical and food industries.	**E63–E64**
	TR		Trapez	DIN 103	7e/7H	N	30° truncated metric thread form for motion applications.	**E64–E65**



Coatings provide high-speed capability and are engineered for finishing to light roughing.

- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multi-layer coating provides better wear resistance.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

Grade	Coating	Grade Description	05	10	15	20	25	30	35	40	45
TN6025	HC-P25	PVD-TiAlN Nano-multi-layer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness is required.									

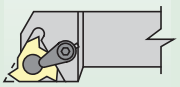
Laydown Threading Thread Form Guide

- All Laydown Threading inserts are precision ground to provide accurate thread forms and indexing.
- Both cresting and non-cresting partial profile inserts are specifically designed for either external or internal threading operations.
- Cresting inserts provide a fully controlled thread form including diameter for a given pitch. The need for deburring is eliminated and the inserts are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Right-hand Laydown Threading toolholders use right-hand inserts. Left-hand Laydown Threading toolholders use left-hand inserts.
- Right-hand Laydown Threading boring bars use right-hand inserts. Left-hand Laydown Threading boring bars use left-hand inserts.

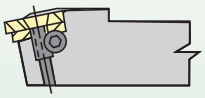
Laydown Threading
Toolholder Identification System

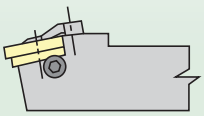
L — Insert Style

L —
Laydown triangle



S —
Insert screw or clamp only

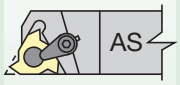




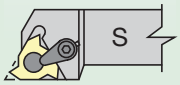
S — Insert Holding Method

AS — Tool Style

Straight shank

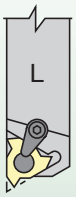


Off-set shank

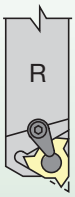


R — Hand of Tool

Left hand



Right hand



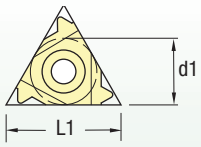
Drop Head

16 — Shank Size

Inch:
This shows a two-digit number that indicates the holder cross section. For shanks 5/8" square and over, the number will represent the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section will be preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width, and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

3 — Insert Size

Size equals number of 1/8" increments of IC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0
5	27	5/8	27,0

D — Qualified Surface and Length

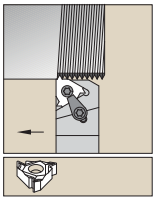
C —
qualified back and end, 5" long

D —
qualified back and end, 6" long

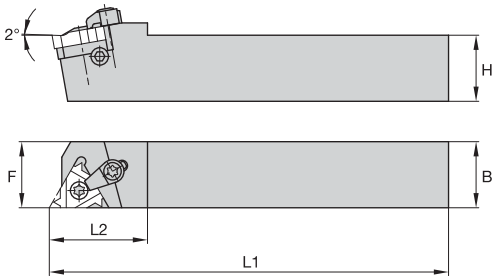
E —
qualified back and end, 7" long

T —
qualified back and end, 3.25" long

Q —
qualified metric holder



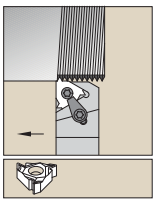
See page E42 for inserts.



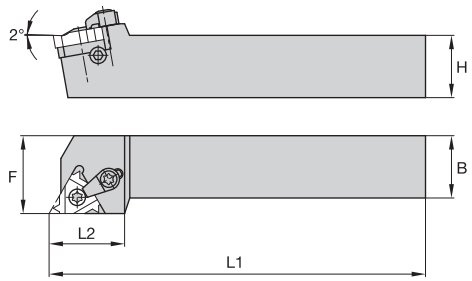
Right Hand Tool

LSAS

order number	catalog number	H	B	F	L1	L2	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	Right hand													
2968567	**LSASR83**	.500	.500	.500	3.25	.87	3	**SMYE3**	**SSY3T**	T10	**—**	—	**SSA3T**	T10
2968583	**LSASR103**	.625	.625	.630	5.00	1.20	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968584	**LSASR123**	.750	.750	.750	5.00	1.20	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968585	**LSASR163**	1.000	1.000	1.000	6.00	1.20	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968587	**LSASR203**	1.250	1.250	1.250	7.00	1.18	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968586	**LSASR164**	1.000	1.000	1.000	6.00	1.42	4	**SMYE4**	**SSY4T**	T20	**CKC4**	T20	**SSA4T**	T20
	Left hand													
2968572	**LSASL83**	.500	.500	.500	3.25	.87	3	**SMYI3**	**SSY3T**	T10	**—**	—	**SSA3T**	T10
2968568	**LSASL103**	.625	.625	.630	5.00	1.20	3	**SMYI3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968569	**LSASL123**	.750	.750	.750	5.00	1.20	3	**SMYI3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968570	**LSASL163**	1.000	1.000	1.000	6.00	1.20	3	**SMYI3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968571	**LSASL164**	1.000	1.000	1.000	6.00	1.42	4	**SMYI4**	**SSY4T**	T20	**CKC4**	T20	**SSA4T**	T20



See page E42 for inserts.

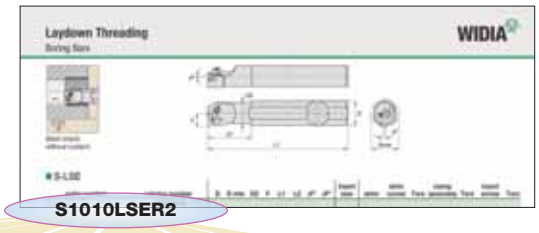


Right Hand Tool

LSS

order number	catalog number	H	B	F	L1	L2	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	Right hand													
2968591	**LSSR123D**	.750	.750	1.000	6.00	1.00	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968592	**LSSR163D**	1.000	1.000	1.250	6.00	1.00	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968594	**LSSR203D**	1.250	1.250	1.500	6.00	1.00	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968593	**LSSR164D**	1.000	1.000	1.250	6.00	1.20	4	**SMYE4**	**SSY4T**	T20	**CKC4**	T20	**SSA4T**	T20
	Left hand													
2968588	**LSSL123D**	.750	.750	1.000	6.00	1.00	3	**SMYI3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968589	**LSSL163D**	1.000	1.000	1.250	6.00	1.00	3	**SMYI3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
2968590	**LSSL164D**	1.000	1.000	1.250	6.00	1.20	4	**SMYI4**	**SSY4T**	T20	**CKC4**	T20	**SSA4T**	T20

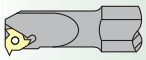
Laydown Threading
Boring Bar Identification System



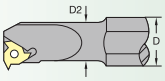
S	10	10	L	S	E	R	2
Bar Type	Primary Necked Shank Bar Diameter	Secondary (mounting) Bar Diameter	Insert Style	Insert Holding Method	Bar Style	Hand of Tool	Insert Size

E — Carbide with coolant

S — Steel shank without coolant

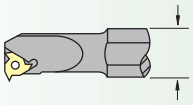


Indicates the primary bar diameter in 1/16" increments.

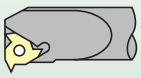


NOTE: Boring bars with primary bar diameters larger than 5/8" are supplied with clamp and insert screw. Secure the insert with either the clamp or insert screw. **Do not use both.**

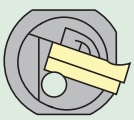
Indicates the secondary bar diameter in 1/16" increments.



L — Laydown triangle

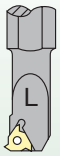


S — Insert screw or clamp only



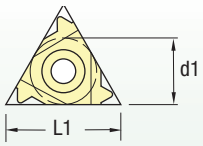
End cutting edge mount

Left hand



Right hand

Size equals number of 1/8" increments of IC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0

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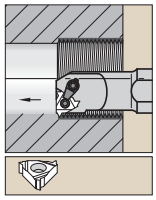
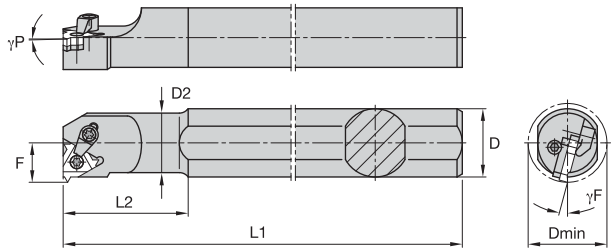


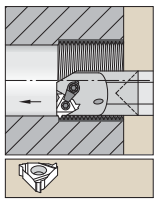
Steel shank without coolant.
See page E42 for inserts.



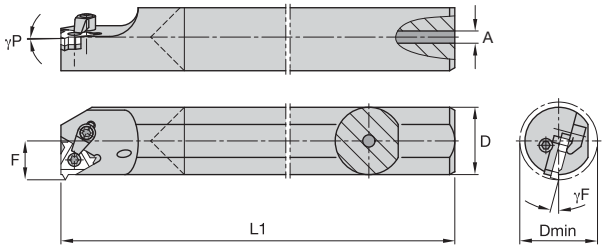
S-LSE

order number	catalog number	D	D min	D2	F	L1	L2	γF°	γP°	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	right hand																
2968597	**S0612LSER2**	.750	.500	.375	.28	7.00	1.00	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2968599	**S0812LSER2**	.750	.650	.500	.34	7.00	1.25	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2968601	**S1012LSER3**	.750	.800	.625	.46	7.00	1.50	-15.0	-1.5	3	**–**	**–**	–	–	–	**SN3TPKG**	T10
2968763	**S1212LSER3**	.750	.900	–	.51	7.00	1.57	-15.0	-1.5	3	**SMYI3**	**SSY3T**	T10	CKC3	**T15**	**SSA3T**	T10
2968765	**S1620LSER3**	1.250	1.200	1.000	.65	10.00	2.50	-15.0	-1.5	3	**SMYI3**	**SSY3T**	T10	CKC3	**T15**	**SSA3T**	T10
2968595	**S2020LSER3**	1.250	1.450	–	.77	10.00	2.03	-15.0	-1.5	3	**SMYI3**	**SSY3T**	T10	CKC3	**T15**	**SSA3T**	T10
	left hand																
2968596	**S0612LSEL2**	.750	.500	.375	.28	7.00	1.00	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2968598	**S0812LSEL2**	.750	.650	.500	.34	7.00	1.25	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2968600	**S1012LSEL3**	.750	.800	.625	.46	7.00	1.50	-15.0	-1.5	3	**–**	**–**	–	–	–	**SN3TPKG**	T10
2968602	**S1212LSEL3**	.750	.900	–	.51	7.00	1.57	-15.0	-1.5	3	**SMYE3**	**SSY3T**	T10	CKC3	**T15**	**SSA3T**	T10
2968764	**S1620LSEL3**	1.250	1.200	1.000	.65	10.00	2.50	-15.0	-1.5	3	**SMYE3**	**SSY3T**	T10	CKC3	**T15**	**SSA3T**	T10

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.



Carbide shank with through coolant.
See page E42 for inserts.



Right Hand Tool

E-LSE

order number	catalog number	D	D min	F	L1	A	γF°	γP°	insert size	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
	Right hand															
2892518	**E06LSER2**	.375	.500	.280	6.00	.13	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2892520	**E08LSER2**	.500	.650	.350	8.00	.19	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2892522	**E10LSER3**	.625	.800	.460	10.00	.22	-15.0	-1.5	3	**–**	**–**	–	–	–	**SN3TPKG**	T10
2892554	**E12LSER3**	.750	.900	.510	10.00	.22	-15.0	-1.5	3	**SMYI3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10
	Left hand															
2892519	**E06LSEL2**	.375	.500	.280	6.00	.13	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2892521	**E08LSEL2**	.500	.650	.350	8.00	.19	-15.0	-1.5	2	**–**	**–**	–	–	–	**SSN2T**	T8
2892553	**E10LSEL3**	.625	.800	.460	10.00	.22	-15.0	-1.5	3	**–**	**–**	–	–	–	**SN3TPKG**	T10
2892555	**E12LSEL3**	.750	.900	.510	10.00	.22	-15.0	-1.5	3	**SMYE3**	**SSY3T**	T10	**CKC3**	T15	**SSA3T**	T10

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.

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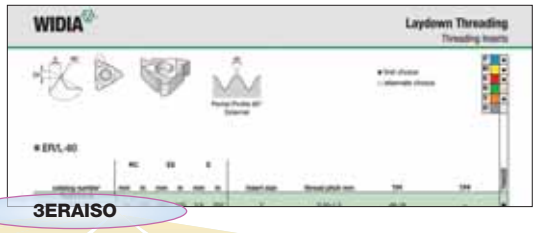
Laydown Threading
Insert Identification System



3	E	R	A	ISO	
Insert Size	Insert Type	Hand of Insert	Thread Pitch	Thread Profile	Number of Teeth

Insert Type

E — External thread

I — Internal thread

UE — External thread

UI — Internal thread

VE — External thread

VI — Internal thread

Hand of Insert

R — Right-hand thread

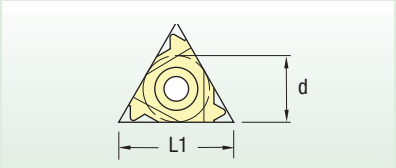
L — Left-hand thread

Number of Teeth

Single tooth profile — No symbol

Multi-tooth profile — Number of teeth (cutting edge and symbol)

Multi-tooth profile with two teeth — 2M



symbol	d	L1
2	0.250	11
3	0.375	16
4	0.500	22
5	0.625	27

Partial profile inserts

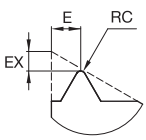
symbol	inch	mm
A	48–16	0,5–1,5
AG	48–8	0,5–3,0
G	14–8	1,7–3,0
N	7–5	3,5–5,0
Q	4–5	5,5–6,0

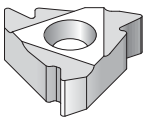
Full profile inserts

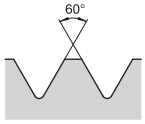
symbol	inch	mm
Actual TPI	48–8	0,5–0,4

Thread Profile

55	Partial Profile 55°
60	Partial Profile 60°
ISO	ISO Metric 60°
TR	ISO Trapezoidal
UN	ISO Inch/American UN 60°
UNJ	Controlled Root Radius 60°
ACME	American ACME
W	Whitworth 55°
BSPT	British Standard Pipe Thread 55°
NPT	American National Pipe Thread 60°
BUT	API Buttress Casing
EL	API Extreme Line
RD	Round
PG	Steel Conduit
APIRD	API Round
API	American Petroleum Institute
H-90	Hughes Oil Pipe
VAM	French Oil Pipe







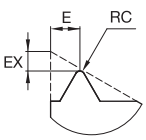
Partial Profile 60°
External

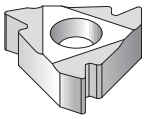
● first choice
○ alternate choice

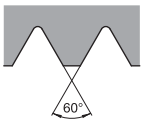
P	●
M	●
K	●
N	○
S	●
H	

ER/L-60

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand											
2ERA60	0,05	.002	0,9	.035	0,8	.032	2	0,50–1,5	48–16	–	●
3ERA60	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3ERAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3ERG60	0,28	.011	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●
4ERN60	0,53	.021	1,7	.067	2,5	.098	4	3,5–5,0	7–5	–	●
5ERQ60	0,64	.025	2,1	.083	3,1	.122	5	5,5–6,0	4.5–4	–	●
Left hand											
3ELA60	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3ELAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3ELG60	0,28	.011	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●
4ELN60	0,53	.021	1,7	.067	2,5	.098	4	3,5–5,0	7–5	–	●







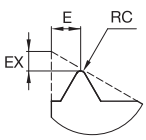
Partial Profile 60°
Internal

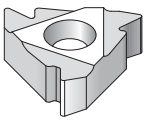
● first choice
○ alternate choice

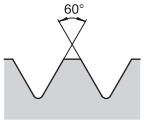
P	●
M	●
K	●
N	○
S	●
H	

IR/L-60

	RC		EX		E						TN6025
catalog number	mm	in	mm	in	mm	in	insert size	thread pitch mm	TPI	TPF	
Right hand											
2IRA60	0,05	.002	0,8	.031	0,9	.035	2	0,50–1,5	48–16	–	●
3IRA60	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3IRAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3IRG60	0,15	.006	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●
4IRN60	0,31	.012	1,7	.067	2,5	.098	4	3,5–5,0	7–5	–	●
5IRQ60	0,30	.012	1,8	.071	2,7	.106	5	5,5–6,0	4.5–4	–	●
Left hand											
2ILA60	0,05	.002	0,8	.031	0,9	.035	2	0,50–1,5	48–16	–	●
3ILA60	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3ILAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3ILG60	0,15	.006	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●
4ILN60	0,31	.012	1,7	.067	2,5	.098	4	3,5–5,0	7–5	–	●







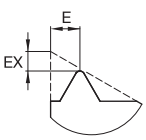
Partial Profile 60°
External

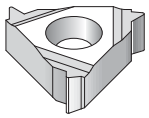
● first choice
○ alternate choice

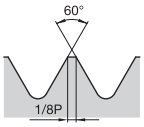
P	●	●
M	●	●
K	●	●
N	○	○
S	●	●
H		

ER-60

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	PN120	TTS
Right hand												
44315900	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–8	–	●	●
44315901	0,28	.011	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●	●







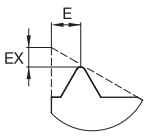
ISO
Metric-External

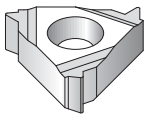
● first choice
○ alternate choice

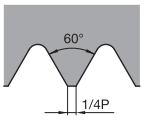
P	●
M	●
K	●
N	○
S	●
H	

ER/L-ISO

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand									
2ER175ISO	1,1	.043	0,8	.032	2	1,75	–	–	●
2ER15ISO	1,0	.039	0,8	.032	2	1,5	–	–	●
3ER30ISO	1,2	.047	1,6	.063	3	3,0	–	–	●
3ER25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3ER20ISO	1,0	.039	1,3	.051	3	2,0	–	–	●
3ER175ISO	0,9	.035	1,2	.047	3	1,75	–	–	●
3ER15ISO	0,8	.031	1,0	.039	3	1,5	–	–	●
3ER125ISO	0,8	.031	0,9	.035	3	1,25	–	–	●
3ER10ISO	0,7	.027	0,7	.027	3	1,0	–	–	●
3ER08ISO	0,6	.024	0,6	.024	3	0,80	–	–	●
3ER075ISO	0,6	.024	0,6	.024	3	0,75	–	–	●
3ER07ISO	0,6	.024	0,6	.024	3	0,70	–	–	●
3ER05ISO	0,6	.024	0,4	.016	3	0,50	–	–	●
3ER035ISO	0,4	.016	0,8	.032	3	0,35	–	–	●
4ER50ISO	1,7	.067	2,5	.098	4	5,0	–	–	●
4ER35ISO	1,6	.063	2,3	.090	4	4,5	–	–	●
4ER45ISO	1,7	.067	2,4	.094	4	4,5	–	–	●
4ER40ISO	1,6	.063	2,3	.090	4	4,0	–	–	●
5ER60ISO	2,9	.114	2,0	.079	5	6,0	–	–	●
5ER55ISO	2,7	.106	1,9	.075	5	5,5	–	–	●
Left hand									
3EL30ISO	1,2	.047	1,6	.063	3	3,0	–	–	●
3EL25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3EL20ISO	1,3	.051	1,0	.039	3	2,0	–	–	●
3EL175ISO	0,9	.035	1,2	.047	3	1,75	–	–	●
3EL15ISO	0,8	.031	1,0	.039	3	1,5	–	–	●
3EL125ISO	0,8	.031	0,9	.035	3	1,25	–	–	●
3EL10ISO	0,7	.027	0,7	.027	3	1,0	–	–	●
3EL075ISO	0,6	.024	0,6	.024	3	0,75	–	–	●
3EL05ISO	0,6	.024	0,4	.016	3	0,50	–	–	●
4EL40ISO	1,6	.063	2,3	.090	4	4,0	–	–	●
4EL35ISO	1,6	.063	2,3	.090	4	3,5	–	–	●







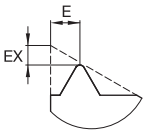
ISO
Metric-Internal

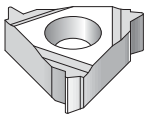
● first choice
○ alternate choice

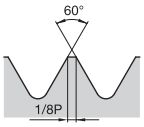
P	●
M	●
K	●
N	○
S	●
H	

IR/L-ISO

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand									
2IR20ISO	0,9	.032	1,1	.043	2	2,0	–	–	●
2IR175ISO	0,9	.032	1,1	.043	2	1,75	–	–	●
2IR15ISO	0,8	.032	1,0	.039	2	1,5	–	–	●
2IR125ISO	0,6	.024	0,7	.028	2	1,25	–	–	●
2IR10ISO	0,6	.024	0,7	.028	2	1,0	–	–	●
2IR08ISO	0,6	.024	0,6	.024	2	0,80	–	–	●
2IR075ISO	0,6	.024	0,3	.012	2	0,75	–	–	●
2IR05ISO	0,6	.024	0,6	.024	2	0,50	–	–	●
3IR30ISO	1,1	.043	1,5	.059	3	3,0	–	–	●
3IR25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3IR20ISO	1,0	.039	1,3	.051	3	2,0	–	–	●
3IR175ISO	0,9	.035	1,2	.047	3	1,75	–	–	●
3IR15ISO	0,8	.032	1,0	.039	3	1,5	–	–	●
3IR125ISO	0,8	.032	0,9	.035	3	1,25	–	–	●
3IR10ISO	0,6	.024	0,7	.028	3	1,0	–	–	●
3IR08ISO	0,6	.024	0,6	.024	3	0,80	–	–	●
3IR075ISO	0,6	.024	0,6	.024	3	0,75	–	–	●
3IR05ISO	0,6	.024	0,6	.024	3	0,50	–	–	●
4IR50ISO	1,6	.063	2,3	.091	4	5,0	–	–	●
4IR45ISO	1,6	.063	2,4	.095	4	4,5	–	–	●
4IR40ISO	1,6	.063	2,3	.091	4	4,0	–	–	●
4IR35ISO	1,6	.063	2,3	.091	4	3,5	–	–	●
5IR60ISO	1,8	.071	2,5	.098	5	6,0	–	–	●
Left hand									
2IL20ISO	0,9	.035	1,1	.043	2	2,0	–	–	●
2IL15ISO	0,8	.032	1,0	.039	2	1,5	–	–	●
2IL125ISO	0,8	.031	0,9	.035	2	1,25	–	–	●
2IL10ISO	0,6	.024	0,7	.027	2	1,0	–	–	●
2IL075ISO	0,6	.024	0,6	.024	2	0,75	–	–	●
2IL05ISO	0,6	.024	0,4	.016	2	0,50	–	–	●
3IL30ISO	1,1	.043	1,5	.059	3	3,0	–	–	●
3IL25ISO	1,1	.043	1,5	.059	3	2,5	–	–	●
3IL20ISO	1,0	.039	1,3	.051	3	2,0	–	–	●
3IL15ISO	0,8	.032	1,0	.039	3	1,5	–	–	●
3IL10ISO	0,6	.024	0,7	.028	3	1,0	–	–	●
3IL075ISO	0,6	.024	0,6	.024	3	0,75	–	–	●
3IL05ISO	0,6	.024	0,4	.016	3	0,50	–	–	●
4IL50ISO	1,6	.063	2,3	.090	4	5,0	–	–	●
4IL40ISO	1,6	.063	2,3	.090	4	4,0	–	–	●
4IL35ISO	1,6	.063	2,3	.090	4	3,5	–	–	●
5IL60ISO	1,8	.071	2,5	.098	5	6,0	–	–	●
5IL55ISO	1,6	.063	2,3	.091	5	5,5	–	–	●







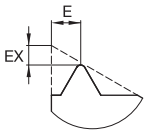
American
UN-External

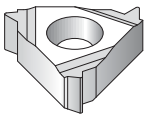
● first choice
○ alternate choice

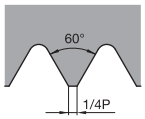
P	●
M	●
K	●
N	○
S	●
H	

ER/L-UN

	EX		E						TN6025
catalog number	mm	in	mm	in	insert size	thread pitch mm	TPI	TPF	
Right hand									
3ER8UN	1,2	.047	1,6	.063	3	–	8	–	●
3ER48UN	0,6	.024	0,6	.024	3	–	48	–	●
3ER40UN	0,6	.024	0,6	.024	3	–	40	–	●
3ER36UN	0,6	.024	0,6	.024	3	–	36	–	●
3ER32UN	0,6	.024	0,6	.024	3	–	32	–	●
3ER28UN	0,6	.024	0,7	.028	3	–	28	–	●
3ER27UN	0,8	.032	0,7	.028	3	–	27	–	●
3ER24UN	0,7	.028	0,8	.032	3	–	24	–	●
3ER20UN	0,8	.032	0,9	.035	3	–	20	–	●
3ER18UN	0,8	.032	1,0	.039	3	–	18	–	●
3ER16UN	0,9	.035	1,1	.043	3	–	16	–	●
3ER14UN	1,0	.039	1,2	.047	3	–	14	–	●
3ER13UN	1,3	.051	1,0	.039	3	–	13	–	●
3ER12UN	1,1	.043	1,4	.055	3	–	12	–	●
3ER11UN	1,1	.043	1,5	.059	3	–	11	–	●
3ER10UN	1,1	.043	1,5	.059	3	–	10	–	●
Left hand									
3EL8UN	1,2	.047	1,6	.063	3	–	8	–	●
3EL16UN	0,9	.035	1,1	.043	3	–	16	–	●
3EL12UN	1,1	.043	1,4	.055	3	–	12	–	●
3EL10UN	1,1	.043	1,5	.059	3	–	10	–	●







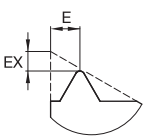
American
UN-Internal

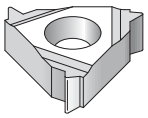
● first choice
○ alternate choice

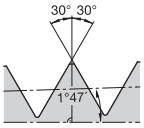
P	●
M	●
K	●
N	○
S	●
H	

■ IR/L-UN

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand									
2IR32UN	0,6	.024	0,6	.024	2	–	32	–	●
2IR27UN	0,8	.032	0,7	.028	2	–	28	–	●
2IR28UN	0,6	.024	0,7	.027	2	–	28	–	●
2IR24UN	0,7	.027	0,8	.031	2	–	24	–	●
2IR20UN	0,8	.032	0,9	.035	2	–	20	–	●
2IR18UN	0,8	.031	1,0	.039	2	–	18	–	●
2IR16UN	0,9	.035	1,1	.043	2	–	16	–	●
3IR8UN	1,1	.043	1,5	.059	3	–	8	–	●
3IR36UN	0,6	.024	0,6	.024	3	–	36	–	●
3IR32UN	0,6	.024	0,6	.024	3	–	32	–	●
3IR28UN	0,6	.024	0,7	.027	3	–	28	–	●
3IR24UN	0,7	.028	0,8	.032	3	–	24	–	●
3IR20UN	0,8	.032	0,9	.035	3	–	20	–	●
3IR18UN	0,8	.032	1,0	.039	3	–	18	–	●
3IR16UN	0,9	.035	1,1	.043	3	–	16	–	●
3IR14UN	0,9	.035	1,2	.047	3	–	14	–	●
3IR12UN	1,1	.043	1,4	.055	3	–	12	–	●
3IR11UN	1,1	.043	1,5	.059	3	–	11	–	●
3IR10UN	1,1	.043	1,5	.059	3	–	10	–	●
Left hand									
2IL32UN	0,6	.024	0,6	.024	2	–	32	–	●
3IL8UN	1,1	.043	1,5	.059	3	–	8	–	●
3IL12UN	1,1	.043	1,4	.055	3	–	12	–	●







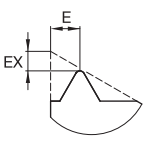
NPT-External

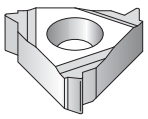
● first choice
○ alternate choice

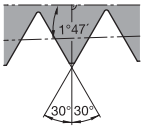
P	●
M	●
K	●
N	○
S	●
H	

ER/L-NPT

	EX		E						TN6025
catalog number	mm	in	mm	in	insert size	thread pitch mm	TPI	TPF	
Right hand									
3ER27NPT	0,7	.028	0,8	.032	3	–	27	.75	●
3ER18NPT	0,8	.032	1,0	.039	3	–	18	.75	●
3ER14NPT	0,9	.035	1,2	.047	3	–	14	.75	●
3ER115NPT	1,1	.043	1,5	.059	3	–	11.5	.75	●
3ER8NPT	1,3	.051	1,8	.071	3	–	8	.75	●
Left hand									
3EL27NPT	0,7	.027	0,8	.031	3	–	27	.75	●
3EL18NPT	0,8	.031	1,0	.039	3	–	18	.75	●
3EL115NPT	1,1	.043	1,5	.059	3	–	11.5	.75	●
3EL8NPT	1,3	.051	1,8	.071	3	–	8	.75	●



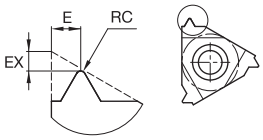


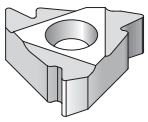


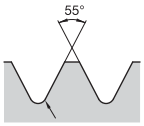
NPT-Internal

IR/L-NPT

	EX		E					
catalog number	mm	in	mm	in	insert size	thread pitch mm	TPI	TPF	
Right hand									
3IR27NPT	0,7	.027	0,8	.031	3	–	27	.75	●
3IR18NPT	0,8	.031	1,0	.039	3	–	18	.75	●
3IR14NPT	0,9	.035	1,2	.047	3	–	14	.75	●
3IR115NPT	1,1	.043	1,5	.059	3	–	11.5	.75	●
3IR8NPT	1,3	.051	1,8	.071	3	–	8	.75	●
Left hand									
3IL14NPT	0,9	.035	1,2	.047	3	–	14	.75	●







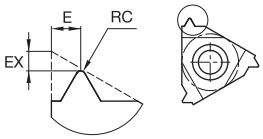
Partial Profile 55°
External

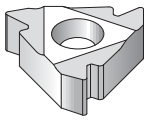
● first choice
○ alternate choice

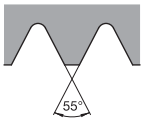
P	●
M	●
K	●
N	○
S	●
H	

ER/L-55

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand											
3ERAG55	0,08	.003	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3ERA55	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3ERG55	0,20	.008	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●
4ERN55	0,43	.017	1,7	.067	2,5	.098	4	3,5–5,0	7–5	–	●
Left hand											
3ELG55	0,20	.008	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●



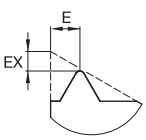


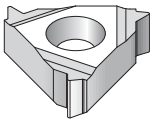


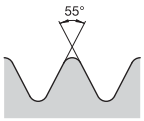
Partial Profile 55°
Internal

IR/L-55

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
Right hand											
2IRA55	0,05	.002	0,8	.031	0,9	.035	2	0,50–1,5	48–16	–	●
3IRAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3IRA55	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3IRG55	0,21	.008	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●
4IRN55	0,43	.017	1,7	.067	2,5	.098	4	3,5–5,0	7–5	–	●
Left hand											
3ILAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50–3,0	48–8	–	●
3ILA55	0,05	.002	0,8	.031	0,9	.035	3	0,50–1,5	48–16	–	●
3ILG55	0,21	.008	1,2	.047	1,7	.067	3	1,75–3,0	14–8	–	●







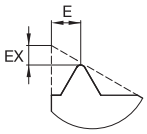
Whitworth BSW,
BSF, BSP-External

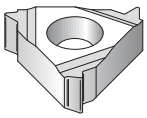
● first choice
○ alternate choice

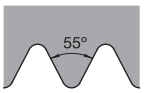
P	●
M	●
K	●
N	○
S	●
H	

ER/L-W

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand									
3ER36W	0,6	.024	0,6	.024	3	–	36	–	●
3ER32W	0,6	.024	0,6	.024	3	–	32	–	●
3ER28W	0,6	.024	0,7	.028	3	–	28	–	●
3ER26W	0,8	.032	0,7	.028	3	–	26	–	●
3ER24W	0,7	.028	0,8	.032	3	–	24	–	●
3ER20W	0,8	.032	0,9	.035	3	–	20	–	●
3ER19W	0,8	.032	1,0	.039	3	–	19	–	●
3ER18W	0,8	.031	1,0	.039	3	–	18	–	●
3ER16W	0,9	.035	1,1	.043	3	–	16	–	●
3ER14W	1,0	.039	1,2	.047	3	–	14	–	●
3ER12W	1,1	.043	1,4	.055	3	–	12	–	●
3ER11W	1,1	.043	1,5	.059	3	–	11	–	●
3ER10W	1,1	.043	1,5	.059	3	–	10	–	●
3ER9W	1,2	.047	1,7	.067	3	–	9	–	●
3ER8W	1,2	.047	1,5	.059	3	–	8	–	●
4ER7W	1,6	.063	2,3	.090	4	–	7	–	●
4ER6W	1,6	.063	2,3	.091	4	–	6	–	●
Left hand									
3EL11W	1,1	.043	1,5	.059	3	–	11	–	●
3EL8W	1,2	.047	1,5	.059	3	–	8	–	●







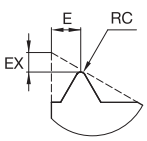
Whitworth BSW,
BSF, BSP-Internal

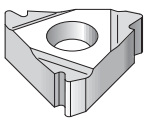
● first choice
○ alternate choice

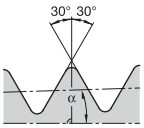
P	●
M	●
K	●
N	○
S	●
H	

IR/L-W

catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand									
2IR19W	0,8	.032	1,0	.039	2	–	19	–	●
2IR18W	1,0	.039	0,8	.032	2	–	18	–	●
2IR16W	1,1	.043	0,9	.035	2	–	16	–	●
2IR14W	0,9	.035	1,1	.043	2	–	14	–	●
3IR19W	0,8	.032	0,9	.035	3	–	19	–	●
3IR18W	0,8	.031	1,0	.039	3	–	18	–	●
3IR16W	0,9	.035	1,1	.043	3	–	16	–	●
3IR14W	1,0	.039	1,2	.047	3	–	14	–	●
3IR12W	1,1	.043	1,4	.055	3	–	12	–	●
3IR11W	1,1	.043	1,5	.059	3	–	11	–	●
3IR8W	1,2	.047	1,5	.059	3	–	8	–	●
4IR7W	1,6	.063	2,3	.090	4	–	7	–	●
4IR6W	1,6	.063	2,3	.090	4	–	6	–	●
Left hand									
2IL19W	0,8	.031	1,0	.039	2	–	19	–	●
2IL14W	0,9	.035	1,1	.043	2	–	14	–	●
3IL14W	1,0	.039	1,2	.047	3	–	14	–	●
3IL11W	1,1	.043	1,5	.059	3	–	11	–	●



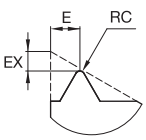


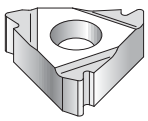


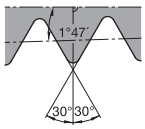
API Round-External
α=1/2 arctan (TPF/12)

ER-APIRD

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
3ER10APIRD	0,34	.013	1,2	.047	1,4	.055	3	–	10	.75	●
3ER8APIRD	0,40	.016	1,3	.051	1,5	.059	3	–	8	.75	●







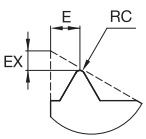
API
Round-Internal

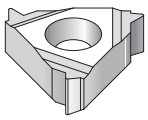
● first choice
○ alternate choice

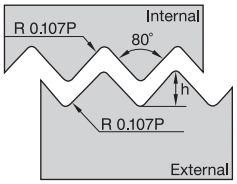
P	●
M	●
K	●
N	○
S	●
H	

IR-APIRD

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand											
3IR10APIRD	0,34	.013	1,2	.047	1,4	.055	3	–	10	.75	●
3IR8APIRD	0,40	.016	1,3	.051	1,5	.059	3	–	8	.75	●

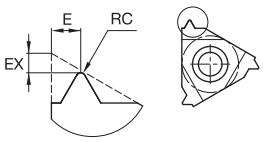


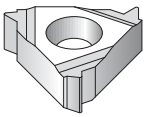


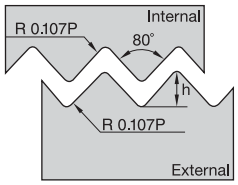


ER-PG

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
Right hand											
3ER20PG	0,07	.003	0,9	.035	0,8	.032	3	–	20	–	●
3ER18PG	0,09	.004	1,0	.039	0,8	.032	3	–	18	–	●
3ER16PG	0,11	.004	1,1	.043	0,9	.035	3	–	16	–	●





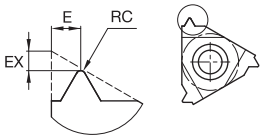


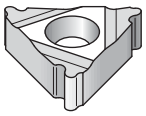
● first choice
○ alternate choice

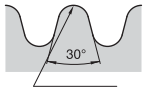
P	●
M	●
K	●
N	○
S	●
H	

IR-PG

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand											
2IR18PG	0,09	.004	1,0	.039	0,8	.032	2	–	18	–	●
3IR18PG	0,09	.004	0,1	.039	0,8	.032	3	–	18	–	●
3IR16PG	0,11	.004	1,1	.043	0,8	.032	3	–	16	–	●



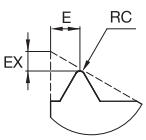


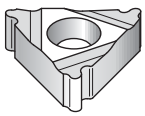


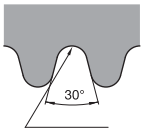
Round
External

ER-RD

catalog number	RC mm	RC in	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	
Right hand											
3ER10RD	0,61	.024	1,1	.043	1,2	.047	3	–	10	–	●
3ER8RD	0,76	.030	1,4	.055	1,3	.051	3	–	8	–	●
4ER6RD	1,01	.040	1,5	.059	1,7	.067	4	–	6	–	●
4ER4RD	1,52	.060	2,3	.091	2,2	.087	4	–	4	–	●
Left hand											
3EL8RD	0,76	.030	1,4	.055	1,3	.051	3	–	8	–	●







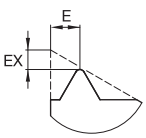
R = .221P
Round-Internal

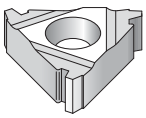
● first choice
○ alternate choice

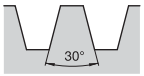
P	●
M	●
K	●
N	○
S	●
H	

IR/L-RD

	RC		EX		E						TN6025
catalog number	mm	in	mm	in	mm	in	insert size	thread pitch mm	TPI	TPF	
Right hand											
3IR10RD	0,70	.028	1,1	.043	1,2	.047	3	–	10	–	●
3IR8RD	0,70	.028	1,4	.055	1,4	.055	3	–	8	–	●
3IR6RD	0,94	.037	1,5	.059	1,4	.055	3	–	6	–	●
4IR6RD	0,93	.037	1,5	.059	1,7	.067	4	–	6	–	●
4IR4RD	1,40	.055	2,3	.091	2,2	.087	4	–	4	–	●
Left hand											
3IL8RD	0,06	.022	1,4	.055	1,4	.055	3	–	8	–	●



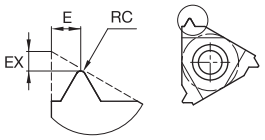


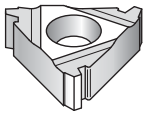


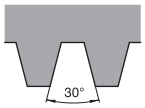
Trapez-External

ER/L-TR

	EX		E					
catalog number	mm	in	mm	in	insert size	thread pitch mm	TPI	TPF	
Right hand									
3ER3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
3ER2TR	1,1	.043	1,3	.051	3	2,0	–	–	●
3ER15TR	1,0	.039	1,1	.043	3	1,5	–	–	●
4ER5TR	2,1	.083	2,5	.098	4	5,0	–	–	●
4ER4TR	1,7	.067	1,9	.075	4	4,0	–	–	●
5ER6TR	2,3	.091	2,7	.106	5	6,0	–	–	●
Left hand									
3EL3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
3EL2TR	1,1	.043	1,3	.051	3	2,0	–	–	●
4EL4TR	1,7	.067	1,9	.075	4	4,0	–	–	●
5EL6TR	2,3	.091	2,7	.106	5	6,0	–	–	●







Trapez-Internal

● first choice
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	

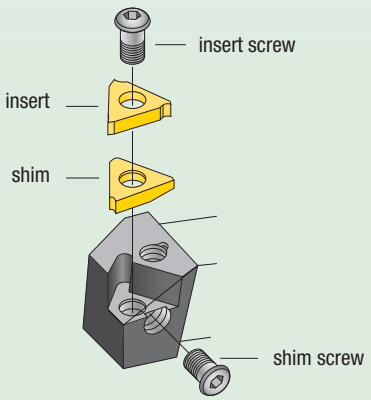
IR/L-TR

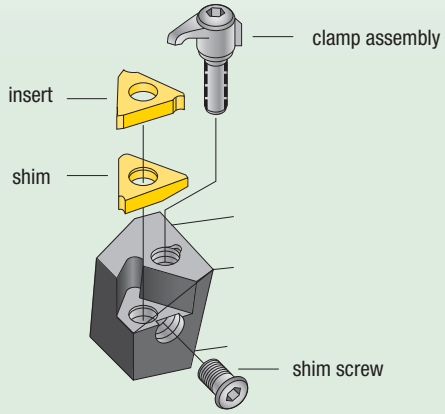
catalog number	EX mm	EX in	E mm	E in	insert size	thread pitch mm	TPI	TPF	TN6025
Right hand									
3IR3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
3IR15TR	1,0	.039	1,1	.043	3	1,5	–	–	●
4IR5TR	2,1	.083	2,5	.098	4	5,0	–	–	●
4IR4TR	1,7	.067	1,9	.075	4	4,0	–	–	●
5IR6TR	2,3	.091	2,7	.106	5	6,0	–	–	●
Left hand									
3IL3TR	1,3	.051	1,5	.059	3	3,0	–	–	●
4IL5TR	2,1	.083	2,5	.098	4	5,0	–	–	●

Laydown Threading Toolholders

In all cases, the proper shim selection is important.

WIDIA™ toolholders are supplied with a shim for a 1.5° lead angle. Change the shim if your thread is more than 1° different. For more details on proper shim selections see pages E88–E89.





insert size and style	insert screw	shim	shim screw and washer	clamp assembly
3ER	S-SA3T	SM-YIE3	S-SY3T	CK-C3
3EL	S-SA3T	SM-YI3	S-SY3T	CK-C3
4ER	S-SA4T	SM-YIE4	S-SY4T	CK-C4
4EL	S-SA4T	SM-YI4	S-SY4T	CK-C4
Laydown Threading boring bars				
2IR	S-SN2T	–	–	–
2IL	S-SN2T	–	–	–
3IR	S-SA3T	SM-YI3	S-SY3T	CK-C3
3IL	S-SA3T	SM-YIE3	S-SY3T	CK-C3
4IR	S-SA4T	SM-YI4	S-SY4T	CK-C4
4IL	S-SA4T	SM-YIE4	S-SY4T	CK-C4

SM	-	Y	E	3	-	2P
Shim		Y-shim for Laydown standard inserts	E — External I — Internal	IC — 1/8"		Shim Angle

2P	2° positive
1P	1° positive
—	0°
1N	1° negative
2N	2° negative
3N	3° negative

resultant angle		3.5°	2.5°	1.5°	0.5°	-0.5°	-1.5°
insert size (IC)	toolholder	shim ordering code					
3/8"	ex. RH/in. LH ex. LH/in. RH	SM-YE3-2P SM-YI3-2P	SM-YE3-1P SM-YI3-1P	SM-YE3 SM-YI3	SM-YE3-1N SM-YI3-1N	SM-YE3-2N SM-YI3-2N	SM-YE3-3N SM-YI3-3N
1/2"	ex. RH/in. LH ex. LH/in. RH	SM-YE4-2P SM-YI4-2P	SM-YE4-1P SM-YI4-1P	SM-YE4 SM-YI4	SM-YE4-1N SM-YI4-1N	SM-YE4-2N SM-YI4-2N	SM-YE4-3N SM-YI4-3N

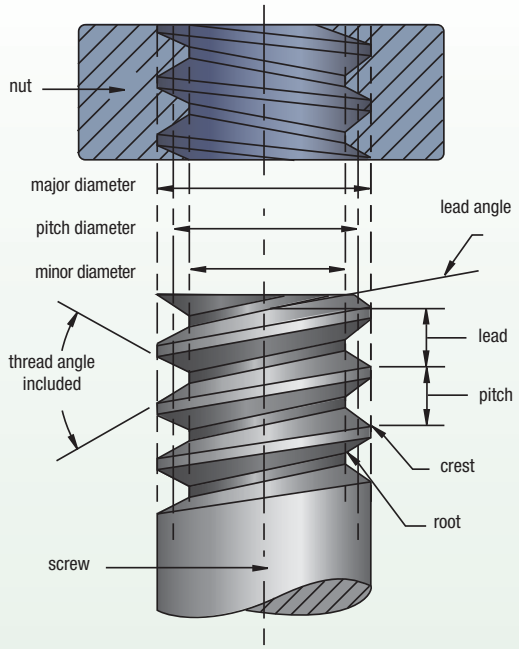
Slanted Shim Kit

Since you might occasionally need different shims than those supplied with our standard toolholders, we strongly recommend that shim kits be readily available in every tool shop.

insert size	shim size (D)	ordering code	contains slanted shims
3x	3/8"	ABY3	SM-YE3-2P, 1P, 1N, 2N, 3N SM-YI3-2P, 1P, 1N, 2N, 3N
4x	1/2"	ABY4	SM-YE4-2P, 1P, 1N, 2N, 3N SM-YI4-2P, 1P, 1N, 2N, 3N

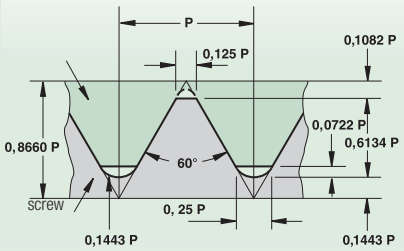
Screw Thread Definitions

1. Major diameter — The largest diameter of a straight screw thread. This applies to both internal and external threads.
2. Pitch diameter — On a straight thread, it is the diameter which passes through the thread profiles at such points which make the thread width of the groove equal to one-half of the basic pitch. On a "perfect thread," this occurs at the point where the widths of the thread and groove are equal.
3. Thread angle (included) — The included angle between the individual flanks of the thread form.
4. Minor diameter — The smallest diameter of a straight screw thread. This applies to both internal and external threads.
5. Lead angle — On a straight thread, the lead angle is the angle created by the helix of the thread at the pitch diameter with a plane perpendicular to the axis.
6. Lead — The distance a screw thread advances axially in one revolution. On a single start, the pitch and lead are identical. The lead is equal to the pitch times the number of starts.
7. Pitch — The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the thread axis.
8. Crest — The outer most surface of the thread form which joins the flanks.
9. Root — The inner most surface of the thread form which joins the flanks.



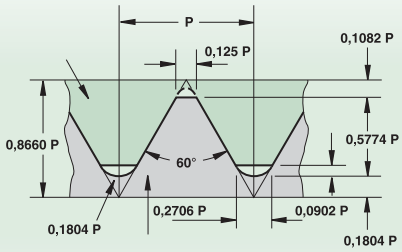
NOTE: Threads per inch (TPI) not shown:
The number of threads per inch measured axially.
The terms pitch and TPI are often used interchangeably. TPI=1/pitch

ISO M (Metric) and UN (Unified National)



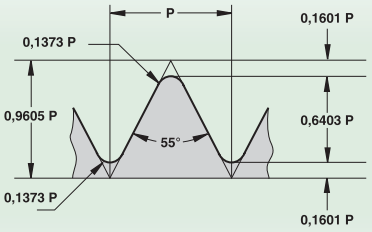
Use: All branches of mechanical industry.

UNJ (controlled root radius)



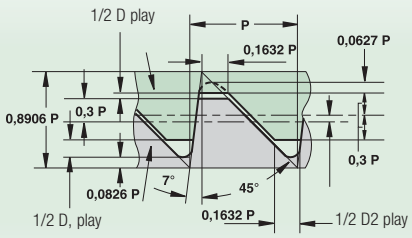
Use: Aircraft and space industry.

Whitworth (BSW)



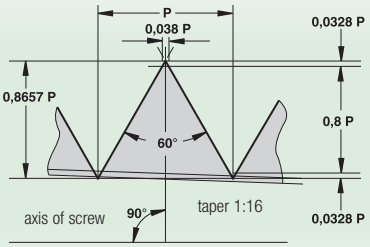
Use: Fittings and pipe couplings for gas, water, and sewer lines (replaced by ISO).

American Buttress



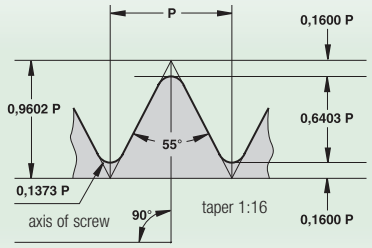
Use: Fittings and pipe couplings.

NPT (American National Pipe Thread)



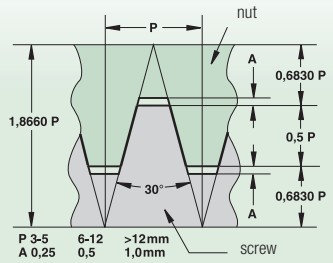
Use: Fittings and pipe couplings.

BSPT (British Standard Pipe Thread)



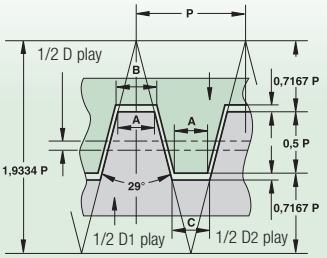
Use: Pipe thread for steam, gas, and water lines.

TR DIN 103



Use: Mechanical industry for motion transmission screws.

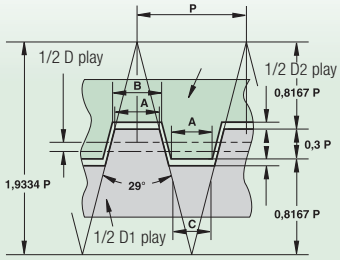
Acme



A = 0,0307 P
B = 0,3707 P—x D play
C = 0,3707 P—(D1 play—D2 play)

Use: Acme-General is used in mechanical industry for motion transmission screws.

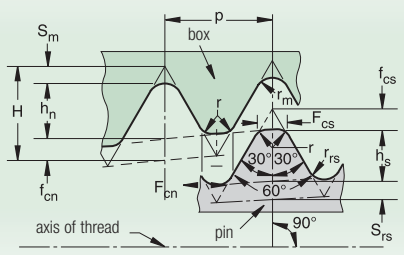
Acme, truncated (Stub)



A = 0,4224 P
B = 0,4224 P—x D play
C = 0,4224 P—(D1 play—D2 play)

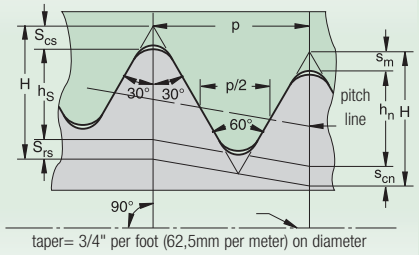
Use: Where normal Acme is too deep.

API Rotary Shoulder Connection



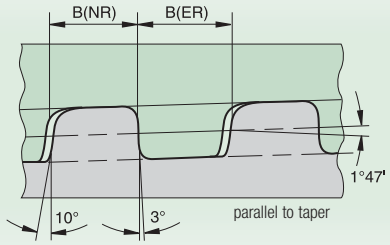
NOTE: Taper shown exaggerated.

API Casing and Tubing Round Thread Form



NOTE: Taper shown exaggerated.

API Buttress

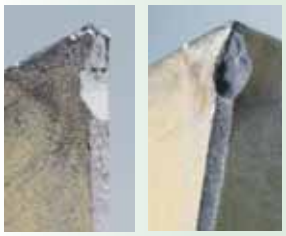


Suggested Grades and Speeds for Threading Various Workpiece Materials

workpiece group	workpiece material	recommendations surface speed – SFM			
		uncoated	PVD coated		CVD coated
		THM	TN6010	TN6025	TN7110
free-machining carbon steel	10L18, 10L45, 1213, 12L13, 12L14, 1140, 1141, 11L44, 1151, 10L50	—	300–650	150–650	525–980
plain carbon steel	10063, 1008, 1010, 1015, 1018, 1020, 1025, 1026, 1108, 1117	—	250–650	150–575	500–920
alloy steels/tool steels 150–325 HB (up to 35 HRC)	1042, 1045, 1070, 1080, 1085, 1090, 1095, 1541, 1561, 1572, 5140, 8620, W1, O1, S1, P20, H13, D2, A6, H13, L6	—	250–650	125–550	300–920
alloy steels/tool steels 330–450 HB (36–47 HRC)		—	200–525	—	260–560
martensitic/ferritic stainless/precipitation hardening	416, 420F, 440F, 405, 409, 429, 430, 434, 436, 442, PH	—	150–525	100–400	215–780
austenitic stainless steel	201, 202, 301, 302, 303, 304, 304, 305, 321, 347, 348, 310, 314, 316, 316L, 330	200–350	200–650	150–450	—
gray cast iron 135–270 HB	class 20, 30, 35, 45	200–300	200–775	150–400	525–980
gray cast iron 275–450 HB	class 50, 55, 60	150–250	150–575	50–250	390–920
alloy/ductile iron	A536, J434C, 60-40-18, 80-55-06, 100-70-03	150–250	150–650	100–525	590–985
free-machining aluminum alloys	2024-T4, 2014-T6, 6061-T6 2011-T3, 3003-H18, A2, Alcan, Alcoa 510, Duralumin	400–800	400–1200	—	—
high-silicon aluminum alloys	A380, A390, A380-1, A390-1, A380-2	—	—	—	—
copper/zinc/brass		250–600	250–1000	150–775	—
non-metallics	Graphite, Nylon, Plastics, Rubbers, Phenolics, Carbon	400–1500	400–1300	150–1000	—
high-temperature alloys 125–269 HB (up to 27 HRC)	Nickel 200, Monel, R405, Monel K500, INCONEL 600, INCONEL 625/901x750/718, Waspaloy, Hastelloy C	80–120	80–400	40–250	—
high-temperature alloys 260–450 HB (26–47 HRC)	Rene 95, Waspaloy A286, Incoloy 800, Haynes 188, Stellite F, Haynes 25	80–100	100–250	20–200	—
titanium alloys	Ti-6Al-4V, TI-5Al-2.5Sn	110–180	110–325	—	—

NOTE: When workpiece hardness levels are at the top of a range, starting SFM should be at the lower end. Regularly inspect insert clamps for worn flats.

Edge preparation:
Uncoated — sharp
PVD coated — light hone except positive top rake, top rake-sharp

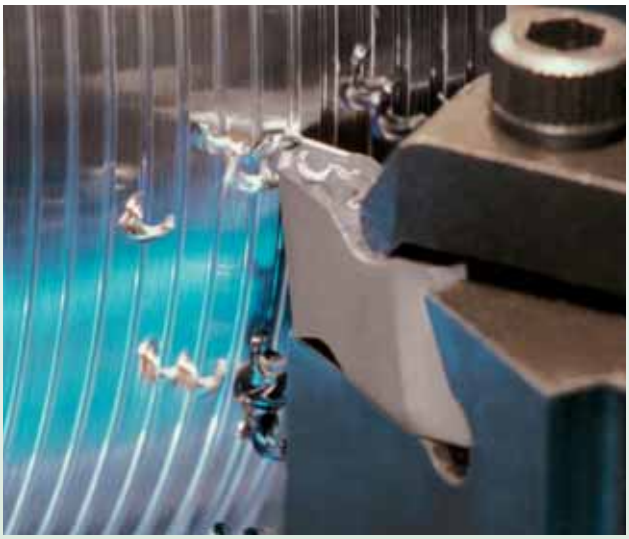
problem	cause	possible solution
thread with torn finish 	• Burrs. • Torn finish. • Steps.	• Use positive rake or full profile insert. • Increase coolant concentration. • Alter infeed. • Increases SFM. • Check machine “Z” travel axis. • Check insert form. • Check for correct shim in LT system.
chatter 	• Poor rigidity. • Incorrect speed. • Insert movement. • Improper infeed. • Off centerline. • Wrong edge prep.	• Minimize tool overhang. • Check for workpiece deflection. • Adjust SFM. • Check insert and clamp. • Use modified feed angle. • Verify that tool cutting position is at workpiece centerline. • Adjust hone level by ordering special insert.
built-up edge 	• Speed too low. • Insufficient coolant. • Chip load. • Wrong edge prep.	• Increase SFM. • Increase coolant concentration and/or flow. • Adjust infeed angle. • Increase depth of cut per pass. • Adjust hone level by ordering special insert.
deformation 	• Wrong grade. • Speed too high. • Improper infeed angle. • Insufficient coolant.	• Use a more wear-resistant grade (e.g., TN6010). • Reduce SFM. • Alter infeed method/angle. • Increase coolant flow.
chipping 	• Improper infeed. • Chip load. • Wrong grade. • Incorrect speed. • Poor rigidity. • Wrong edge prep.	• Alter infeed to modified flank. • Increase or decrease number of passes. • Eliminate spring passes. • Use tougher grade (e.g., TN6025). • Increase SFM if chipping on trailing edge. • Decrease SFM if chipping on leading edge. • Minimize tool overhang. • Check for insert movement/check clamp. • Check for possible part deflection. • Adjust hone size by ordering special insert.
broken nose 	• Heavy chip load. • Small nose radius. • Wrong grade. • Improper infeed. • Wrong edge prep.	• Decrease chip load. • Use large nose radius if allowable. • Use tougher grade (e.g., TN6025). • Alter infeed to modified flank. • Adjust hone size by ordering special insert.
flank wear 	• Wrong grade. • Insufficient coolant. • Off centerline.	• Use a more wear-resistant grade (e.g., TN6025). • Increase coolant flow. • Check the centerline height of the tool. (The smaller the diameter, the more critical the need for centerline accuracy.)

problem	possible solution															
	increase SFM	reduce SFM	increase chip load	decrease chip load where failure occurs	use tougher carbide grade	use harder carbide grade	apply coolant	use coated carbide	use topping insert	change infeed angle	check for insert movement and reseat	reduce tool overhang	reselect shim	apply chipbreaker style	reduce doc	adjust center height	begin cutting threads .472" before workpiece
chatter	●			●							●	●				●	
burr on crest	●								●								
short tool life		●	●	●		●		●									
chipped leading edge			●	●	●												
chipped trailing edge					●					●							
broken nose (first pass)	●														●	●	
broken nose (after first pass)				●	●					●			●				
built-up on cutting edge	●		●				●	●									
premature topping													●				
splitting threads																	●
poor chip evacuation														●			

WIDIA™ insert technology brings chip control to your threading operations with the TopThread™ platform. The patented WIDIA recessed chip groove, when used according to our recommendations, breaks the chip in most applications. Our positive rake design lowers cutting pressures, which in turn lowers damaging heat generation thus providing better tool life. Long, stringy chips no longer mar the workpiece surface finish. The danger to operators when removing long chips from the workpiece and chuck is eliminated. All of these benefits combine to improve the productivity of your threading operations.

The Last Pass

Some CNC controls require the last pass to be at a 0° infeed angle because the chip will not break on the last pass. On most carbon and alloy steels, the last pass can remain at .005" (0,127mm) depth of cut and produce an acceptable finish. For some materials, a .001" (0,025mm) to .003" (0,076mm) (spring) pass may be used to improve surface finish, however, chip breaking action may be compromised.

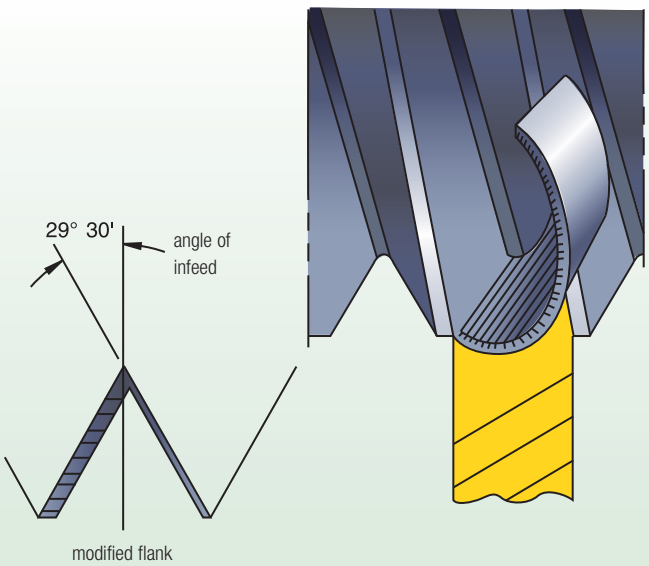


Machine Programming

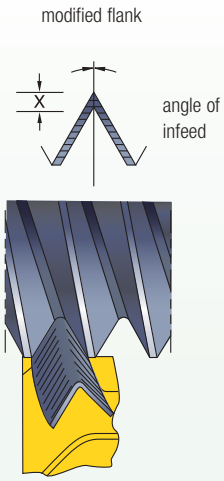
Modern CNC controls allow the programmer to easily adjust infeed angle, the number of passes, and depth of cut for each pass. The chip control threading insert performs best at an infeed angle of 29° 30', although 15° to 30° is acceptable. Also, it is important to maintain a minimum of .005" (0,127mm) depth of cut on every pass. In most applications, use of CNC canned cycles produce only marginally successful results. Custom written programs are better and are recommended.

Infeed Angle

In order to effectively and consistently break the chip, it is important to use an infeed angle between 28° and 29° 30'. Do not apply chip control inserts at infeed angles less than 15°.



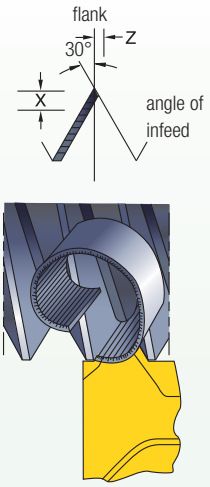
Radial



Advantage —
- Cutting on both sides of the thread form places all of the cutting edge in the cut and protects edge from chipping.
- Even wear on the insert.

Disadvantage —
- Tool develops a channel chip that may be difficult to handle.
- Tip chipping occurs when cutting high-tensile materials.
- Burr condition is increased.
- Entire cutting edge is engaged at finish of thread, causing increased tendency to chatter.

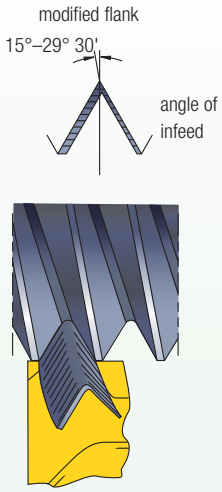
Flank



Advantage —
- Cutting with the leading edge of the threading tool gives the chip a definite flow out of the thread form area. This reduces the burr problem on the trailing edge of the tool. To avoid bad surface finish, chipping, or excessive flank wear due to rubbing of the trailing edge, the infeed angle should be 3° to 5° smaller than the angle of the thread. This is a type of modified flank.

Disadvantage —
- Trailing edge of threading insert may drag or rub and tends to chip.
- Torn or poor surface finish threads result when cutting soft, gummy materials like low-carbon steels, aluminum, and stainless steels.

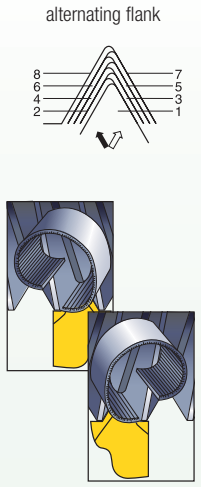
Modified flank



Advantage —
- Tool cuts both sides of thread form, so it is protected from chipping similar to 0° infeed. Channel-type chip develops, but uneven chip thickness helps remove the chip similar to flank infeed.
- This is the preferred method, especially when used with a chip control insert.
- Combined radial and/or alternating flank infeed.
- Results in good tool life, with wear evenly distributed over both flanks.

Disadvantage —
- Similar disadvantages as with 0° infeed, although reduced somewhat in magnitude as cutting forces are better equalized and chip flow is much less of a problem.

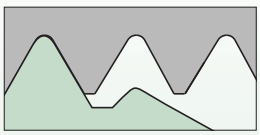
Alternating flank



Advantage —
- Increased tool life because both edges are used equally. NOTE: Some machine tools may require special programming techniques to achieve this method of infeed.

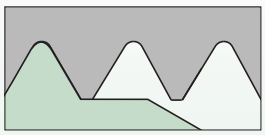
Disadvantage —
- Difficult to cut on conventional machinery.

Partial Profile



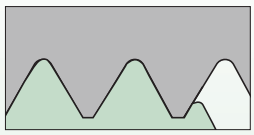
Tooth profile with universal profile shape:
- 55° or 60° without cutting edges for the tooth tapers.
- Reduced inventory.
- For various pitches in a limited range.
- Preferably one time production.
- Outside/core diameters must be accurately pre-turned.

Full Profile



Tooth profile with full profile shape including tooth height:
- For burr-free, precise threads in the specified pitch.
- General application.
- Machining allowance for outside/core diameter around 0.004"–0.006".

Multi-Tooth Profile



Multi-tooth full profile generally with 2–3 teeth:
- Highly productive threading with fewer passes and longer tool life.
- Requires a rigid setup and long thread runout.
- Minimum clearance width approximately 1.25 x E as per indexable insert dimensions table.

Formulas

inch formula		
to find	**given**	**formula**
SFM	D (inch) RPM	$SFM = \frac{\pi \times D}{12"} \times RPM$
RPM	D (inch) SFM	$RPM = \frac{SFM \times 12"}{D \times \pi}$

metric formula		
to find	**given**	**formula**
m/min	D (mm) RPM	$m/min = \frac{\pi \times D}{1000} \times RPM$
RPM	D (mm) m/min	$RPM = \frac{m/min \times 1000}{D \times \pi}$

Legend

IPM = inch per minute
SFM = surface feet per minute
m/min = meters per minute
RPM = revolutions per minute
D = part diameter
π = 3.1416

Maximum Cutting Speeds

Maximum cutting speed is often limited by the maximum travel speed (IPM or mm/min) of the tool allowed by the machine. Check your maximum speed with the following formulas:

inch formula: maximum cutting speed (SFM) = part diameter (inch) x 3.14 x TPI x $\frac{\text{max IPM}}{12"}$

metric formula: maximum cutting speed (m/min) = part diameter (mm) x 3.14 x (1/pitch) x $\frac{\text{max mm/min}}{1000,0\text{mm}}$

Recommendation for Threading Infeed Passes

TPI	48–32	28–24	20–16	14–12	11.5–9	8–6	5–4	3–2
metric pitch (mm)	0,50–0,75	0,80–1,0	1,25–1,5	1,75–2,0	2,5–3,0	3,5–4,0	4,5–6,0	8,0
Thread Type	**recommended number of passes**							
Common V-thread forms ISO, UN, UNJ, NPT, Whitworth, BSPT, API Rotary Shoulder	4–5	5–6	6–8	8–10	9–12	12–15	14–16	15–25
Acme, Trapez, Round, API Round	—	—	5–6	7–8	10–11	12–13	13–15	18–20
Stub Acme, API Buttress	—	—	5	5–6	7–8	8–10	10–12	14–16
American Buttress	—	—	7–8	9–10	11–12	13–15	17–19	22–24

Maintain minimum .002" (0,05mm) infeed on last passes to avoid workhardening and excessive abrasion of the threading tool.

Constant Volume Infeed Values for Threading Operations

In most applications, use of CNC canned cycles produces only marginally successful results. This is the case as these programs do not satisfy the .002" (0,05mm) minimum depth of cut specification recommended.

Example:
Infeed per pass formula: accumulated depth = initial doc x √ # pass
For example, an 8-pitch external thread has a depth of .0789" (2,0mm).
25% of .0789" (2,0mm) = approximately .0197" (0,50mm)
(This is the infeed/doc for the first pass.)

.0197" (0,500mm) x √ 2 = .0278" (0,708mm)
.0278" (0,708) - .0197" (0,500mm) = .0082" (0,207mm)
(This is the infeed/doc for the second pass.)

.0197" (0,500mm) x √ 3 = .0341" (0,867mm)
.0341" (0,867mm) - .0278" (0,708mm) = .0063" (0,159mm)
(This is the infeed/doc for the third pass.)

.0197" (0,500mm) x √ 4 = .0394" (1,001mm)
.0394" (1,001mm) - .0341" (0,867mm) = .0053" (0,134mm)
(This is the infeed/doc for the fourth pass.)

Using Radial Infeed

Bending stress on the cutting edge caused by V-shaped chips from long-chippping steel workpiece materials.

High cutting forces with small cutting thicknesses require sharp edges with high strength.

Its application is recommended for tough and hard, wear-resistant carbides with good resistance to thermal and mechanical shocks.

Using Flank Infeed

Lower bending stress and stabilized cutting edges produce more favorable chip shapes and larger cutting thicknesses.

Carbides with high hardness, good wear resistance, and temperature stability are advantageous.

When turning short threads with short engagement times, there is a good resistance to thermal and mechanical shocks.

Guidelines for Infeeds
How to determine the number and the size of passes

The number of passes “s” per thread is decisive for successful threading and crest turning. The following tables give standard values for the application condition when machining steel. The proper number of passes must be determined empirically.

If insert breakage occurs, the number of passes must be increased. With increased wear, we recommend decreasing the number of passes.
The chip thickness should not be less than .0019" (0,05mm). The allowance at the diameter should not exceed .0078" (0,2mm).

Metric ISO, External Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
depth h1	.012	.018	.024	.030	.036	.042	.048	.060	.072	.085	.097	.109	.121
number of passes	4	4	5	6	6	8	8	10	12	14	15	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.005/-	.007/-	.008/-	.008/-	.01/-	.009/-	.01/-	.009/-	.009/-	.008/-	.008/-	.009/-	.009/-
2	.003/.002	.005/.003	.006/.003	.006/.004	.008/.004	.008/.004	.009/.005	.01/.006	.011/.006	.012/.007	.013/.007	.014/.008	.015/.009
3	.002/.001	.004/.002	.004/.002	.005/.003	.006/.003	.006/.039	.007/.004	.007/.004	.008/.005	.009/.005	.01/.006	.011/.006	.012/.007
4	.002/.001	.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005	.01/.006
5			.003/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/.003	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005
6				.003/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/0.003	.006/.003	.007/.004	.007/.004	.008/.005
7						.004/.002	.004/.002	.005/.003	.005/0.003	.005/.003	.006/.004	.007/.004	.007/.004
8						.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004
9								.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.004
10								.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004
11									.004/.002	.004/.002	.005/.003	.005/.003	.006/.003
12									.004/.002	.004/.002	.005/.003	.005/.003	.006/.003
13										.004/.002	.004/.003	.005/.003	.005/.003
14										.004/.002	.004/.002	.005/.003	.005/.003
15											.004/.002	.005/.003	.005/.003
16													.005/.003

Metric ISO, Internal Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
depth h1	.011	.016	.021	.027	.032	.037	.043	.053	.064	.075	.085	.096	.107
number of passes	4	4	5	6	6	8	8	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.004/-	.006/-	.007/-	.008/-	.009/-	.008/-	.01/-	.01/-	.01/-	.011/-	.01/-	.011/-	.011/-
2	.003/.002	.004/.002	.005/.003	.005/.003	.006/.004	.007/.004	.007/.004	.008/.005	.01/.006	.011/.006	.011/.007	.012/.007	.013/.008
3	.002/.001	.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.005	.009/.005	.009/.005	.01/.006
4	.002/.001	.003/.001	.003/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005
5			.003/.002	.003/.002	.037/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004	.006/.004	.007/.004	.008/.004
6				.003/.002	.003/.002	.003/.002	.004/.002	.004/.002	.005/.003	.006/.003	.006/.003	.006/.004	.007/.004
7						.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004
8						.003/.002	.003/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003
9								.003/.002	.004/.002	.004/.003	.005/.003	.005/.003	.005/.003
10								.003/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003
11									.004/.002	.004/.002	.004/.002	.005/.003	.005/.003
12										.004/.002	.004/.002	.005/.003	.005/.003
13											.004/.002	.004/.002	.005/.003
14											.004/.002	.004/.002	.004/.003
15												.004/.002	.004/.002
16													.004/.002

UN Thread, External Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
depth	.026	.031	.034	.038	.044	.051	.056	.061	.068	.077	.088	.102	.123
number of passes	5	6	6	7	9	9	10	11	12	13	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.008/-	.008/-	.009/-	.009/-	.008/-	.009/-	.009/-	.008/-	.008/-	.008/-	.008/-	.009/-	.009/-
2	.006/.003	.006/.004	.007/.004	.007/.004	.007/.004	.009/.005	.009/.005	.009/.005	.01/.006	.011/.006	.012/.007	.014/.008	.016/.009
3	.004/.003	.005/.003	.005/.003	.006/.003	.006/.003	.007/.004	.007/.004	.007/.004	.008/.004	.008/.005	.009/.005	.01/.006	.012/.007
4	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.003	.006/.004	.006/.004	.007/.004	.008/.004	.009/.005	.01/.006
5	.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.004	.009/.005
6		.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.005
7				.004/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004
8					.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.007/.004
9					.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/.003	.006/.004
10							.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004
11								.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.006/.003
12									.004/.002	.004/.002	.004/.002	.005/.003	.006/.003
13										.004/.002	.004/.002	.005/.003	.005/.003
14											.004/.002	.004/.003	.005/.003
15												.004/.002	.005/.003
16													.005/.003

UN Thread, Internal Thread Cutting

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
depth	.023	.027	.030	.034	.039	.045	.049	.054	.060	0.68	.077	.090	.108
number of passes	5	6	6	7	8	9	9	10	11	12	13	14	15
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.008/-	.008/-	.009/-	.009/-	.009/-	.009/-	.01/-	.01/-	.01/-	.01/-	.01/-	.011/-	.012/-
2	.005/.003	.009/.003	.006/.004	.006/.004	.007/.004	.007/.004	.008/.005	.009/.005	.009/.005	.01/.006	.011/.006	.012/.007	.014/.008
3	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.007/.004	.007/.004	.008/.005	.009/.005	.011/.006
4	.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.003	.006/.004	.007/.004	.008/.004	.009/.005
5	.003/.002	.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004	.008/.005
6			.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.004/.003	.005/.003	.005/.003	.006/.003	.006/.004	.007/.004
7				.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.003	.007/.004
8					.003/.002	.003/.002	.004/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003	.006/.004
9						.003/.002	.003/.002	.004/.002	.004/0.002	.004/.002	.004/.003	.005/.003	.006/.003
10								.003/.002	.004/.002	.004/.002	.004/.002	.005/.003	.005/.003
11									.003/.002	.004/.002	.004/.002	.004/.003	.005/.003
12										.003/.002	.004/.002	.004/.002	.005/.003
13											.004/.002	.004/.002	.005/.003
14												.004/.002	.005/.003
15													.004/.003

NPT Thread, External, and Internal Machining

pitch, Gg/Z	27.0	18.0	14.0	11.5	8.0
depth	.003	.044	.057	.070	.100
number of passes	6	8	10	12	14
	values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	.007/-	.009/-	.009/-	.009/-	.01/-
2	.006/.003	.007/.004	.008/.005	.008/.005	.01/.006
3	.005/.003	.006/.003	.007/.004	.007/.004	.01/.006
4	.004/.002	.006/.003	.006/.003	.007/.004	.009/.005
5	.004/.002	.005/.003	.006/.003	.006/.004	.008/.005
6	.003/.002	.005/.003	.005/.003	.006/.003	.008/.004
7		.004/.002	.005/.003	.005/.003	.007/.004
8		.003/.002	.004/.002	.005/.003	.007/.004
9			.004/.002	.005/.003	.007/.004
10			.004/.002	.004/.002	.006/.004
11				.004/.002	.006/.003
12				.004/.002	.005/.003
13					.004/.002
14					.004/.002

BSPT Thread, External, and Internal Machining

pitch, Gg/Z	28	19	14	11
depth	.023	.034	.046	BSPT thread
number of passes	5	6	8	10
	values for flank infeed (X/Z)			
order of passes	X/Z	X/Z	X/Z	X/Z
1	.007/-	.009/-	.009/-	.008/-
2	.005/.003	.007/.004	.008/.004	.01/.005
3	.004/.002	.005/.003	.006/.003	.007/.004
4	.003/.002	.005/.002	.005/.003	.006/.003
5	.003/.002	.004/.002	.005/.002	.005/.003
6		.004/.002	.004/.002	.005/.003
7			.004/.002	.005/.002
8			.004/.002	.004/.002
9				.004/.002
10				.004/.002

Trapezoid Thread to DIN 103, External, and Internal Machining

pitch	1.5	2.0	3.0	4.0	5.0
depth	.004	.049	.069	.089	.108
number of passes	6	8	10	12	14
	values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	.009/-	.01/-	.01/-	.01/-	.011/-
2	.007/.002	.009/.002	.01/.003	.011/.003	.012/.003
3	.005/.001	.007/.002	.009/.002	.01/.003	.011/.003
4	.005/.001	.006/.002	.008/.002	.009/.002	.01/.003
5	.004/.001	.005/.001	.007/.002	.008/.002	.009/.002
6	.004/.001	.004/.001	.006/.002	.007/.002	.008/.002
7		.004/.001	.006/.002	.007/.002	.008/.002
8		.004/.001	.004/.001	.006/.002	.007/.002
9			.005/.001	.006/.002	.007/.002
10			.004/.001	.005/.001	.006/.002
11				.005/.001	.006/.001
12				.004/.001	.005/.001
13					.005/.001
14					.004/.001

Round Thread to DIN 405, External, and Internal Machining

pitch, Gg/Z	10	8	6
depth	.052	.064	.085
number of passes	8	10	12
	values for flank infeed (X/Z)		
order of passes	X/Z	X/Z	X/Z
1	.008/-	.009/-	.008/-
2	.008/.002	.008/.002	.01/.003
3	.008/.002	.008/.002	.001/.003
4	.007/.002	.007/.002	.009/.002
5	.006/.002	.007/.002	.008/.002
6	.006/.001	.006/.002	.008/.021
7	.005/.001	.006/.002	.007/.002
8	.004/.001	.005/.001	.006/.002
9		.004/.001	.006/.001
10		.006/.001	.005/.001
11			.004/.001
12			.003/.001

Whitworth, External, and Internal Thread Cutting

pitch, TPI	28	20	19	16	14	12	11	10	9	8	7	6	5
depth	.023	.032	.032	.034	.040	.053	.058	.064	.071	.080	.091	.107	0.128
number of passes	5	6	6	8	8	9	9	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	.007/-	.008/-	.009/-	.008/-	.009/-	.009/-	.01/-	.009/-	.009/-	.01/-	.008/-	.008/-	.008/-
2	.005/.003	.007/.004	.007/-	.007/.004	.008/.004	.009/.005	.01/5.236	.01/.005	.011/.006	.012/.006	.013/.007	.014/.007	.017/.009
3	.004/.002	.005/.003	.005/.003	.006/.003	.006/.003	.007/.004	.008/.004	.008/.004	.009/.004	.009/.005	.01/.005	.011/.006	.013/.007
4	.003/.002	.004/.002	.005/.002	.005/.002	.005/.003	.006/.003	.006/.003	.007/.004	.007/.004	.008/.004	.008/.004	.009/.005	.011/.006
5	.003/.002	.004/.002	.004/.002	.006/.002	.005/.002	.005/.003	.006/.003	.006/.003	.006/.003	.007/.004	.007/.004	.008/.004	.009/.005
6		.004/.002	.004/.002	.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003	.006/.003	.007/.003	.007/.004	.009/.004
7				.003/.002	.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003	.006/.003	.007/.004	.008/.004
8				.003/.002	.004/.002	.004/.002	.004/.002	.005/.002	.005/0	.005/.003	.006/.003	.006/.003	.007/.004
9						.038/.002	.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003	.007/.004
10								.004/.002	.004/.002	.005/.002	.005/.003	.005/.003	.006/.003
11									.004/.002	.004/.002	.005/.002	.005/.003	.006/.003
12										.004/.002	.004/.002	.005/.003	.006/.003
13											.004/.002	.005/.003	.006/.003
14											.004/.002	.005/.002	.005/.003
15												.005/.002	.005/.003
16													.005/.003

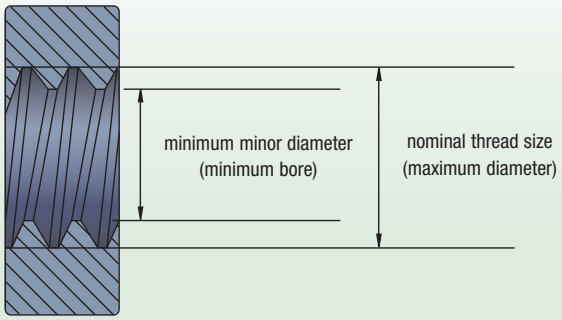
Multi-Tooth Threads, Internal

	ISO metric						ISO UN					Whitworth	NPT		
type	3M	2M	3M	2M	3M	2M	2M	3M	2M	3M	2M	2M	2M	3M	2M
pitch (mm)	1.0	1.5	1.5	2.0	2.0	3.0	—	—	—	—	—	—	—	—	—
TPI	—	—	—	—	—	—	16	16	12	12	8	11	11.5	11.5	8
total depth	.024	.033	.033	.460	.460	.070	.037	.037	.490	.490	.740	.620	.690	.690	.100
1	.013	.015	.020	.020	.028	.022	.017	.022	.022	.030	.023	.029	.023	.032	.035
2	.011	.010	.013	.015	.018	.019	.012	.015	.016	.019	.020	.019	.020	.022	.025
3	—	.008	—	.011	—	.017	.008	—	.011	—	.017	.014	.014	.015	.022
4	—	—	—	—	—	.012	—	—	—	—	.014	—	.012	—	.018

Recommendations for Steel Workpieces (<300 BHN)

			total depth — on radius		
catalog number	insert size	TPI profile	1st pass	2nd pass	3rd pass
NTC-8R/L8EM	8	8 UN	.048	.064	.079
NTC-8R/L8IM	8	8 UN	.047	.061	.074
NTC-8R/L10EM	8	10 UN	.036	.050	.063
NTC-8R/L10IM	8	10 UN	.035	.048	.060
NTC-8R/L12EM	8	12 UN	.030	.041	.052
NTC-8R/L12IM	8	12 UN	.030	.037	.047
NTC-8R/L14EM	8	14 UN	.027	.037	.044
NTC-8R/L14IM	8	14 UN	.024	.031	.041
NTC-8R/L16EM	8	16 UN	.023	.032	.038
NTC-8R/L16IM	8	16 UN	.020	.027	.037
NTC-8R/L18EM	8	18 UN	.019	.026	.034
NTC-8R/L18IM	8	18 UN	.019	.024	.033
NDC-68RDR/L-75M	8	8 round	.058	.065	.073
NDC-61RDR/L-75M	8	10 round	.044	.051	.057
NDC-88RDRD/L-75M	8	8 round	.051	.069	.073
NDC-88VR/L-75M	8	8 NPT	.040	.068	.096
NDC-8115VR/L-75M	8	11.5 NPT	.038	.054	.067
NDN-814VR/L-75M	8	14 NPT	.038	.048	.054

The following charts list the largest thread pitch that can be applied on internal applications using TopThread threading inserts for 60° V-threading and Acme threading.



Inch-Sized 60° V-Threading Limits

internal threading limitations
NT-1, NT-2 V-threading inserts

TPI	nominal thread size		minimum minor diameter (inch)	
	NT-1	NT-2	NT-1	NT-2
6	1-7/8	—	1.695	—
7	1-3/4	—	1.595	—
8	1-5/8	—	1.490	—
9	1-9/16	—	1.442	—
10	1-1/2	15/16	1.392	.830
11	1-7/16	15/16	1.339	.830
11-1/2	1-3/8	15/16	1.281	.830
12	1-3/8	9/16	1.285	.472
13	1-5/16	9/16	1.229	.472
14	1-1/4	9/16	1.173	.472
16	1-1/4	9/16	1.182	.472
18	1-1/8	9/16	1.065	.472
20	1-1/8	1/2	1.071	.440
24*	1-1/16	1/2	1.017	.440

*Twenty-four threads per inch and finer can be cut with an NT-2 insert provided the minor diameter is 1.000" or larger (.440" or larger with NT-1).

internal threading limitations
NT-3 and- 4 V-threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4**	3	2.729
4-1/2**	2-7/8	2.634
5	2-3/4	2.534
6	2-1/2	2.320
7	2-1/4	2.095
8	2	1.865
9	1-15/16	1.817
10	1-7/8	1.767
11	1-13/16	1.714
11-1/2	1-3/4	1.656
12	1-3/4	1.660
13	1-5/8	1.542
14	1-9/16	1.485
16*	1-7/16	1.370

*Sixteen threads per inch and finer can be cut provided minor diameter is 1.370" or larger.
**NT-4 insert only.

Metric-sized 60° V-Threading Limits

internal threading limitations
NT-1, NT-2 60° V-threading inserts

TPI	nominal thread size		minimum thread diameter (mm)	
	NT-1	NT-2	NT-1	NT-2
4,00	M48 x 4.00	—	43,67	—
3,00	M42 x 3.00	—	38,75	—
2,50	M39 x 2.50	M24 x 2,50	36,29	21,29
2,00	M33 x 2.00	M15 x 2,00	30,84	12,84
1,75	M32 x 1.75	M15 x 1,75	30,11	13,11
1,50	M32 x 1.50	M15 x 1,50	30,38	13,38
1,25	M29 x 1.29	M14 x 1,25	27,65	12,65
1,00*	M27 x 1.00	M14 x 1,00	25,92	12,92
0,75	M22 x 0.75	M12 x 0,75	21,19	11,19

*Thread pitch of 1,0mm and less can be cut with an NT-2 insert provided the core thread diameter is 25,0mm or larger (11,0mm or larger with NT-1).

internal threading limitations
NT-3 and NT-4 60° V-threading inserts

TP	nominal thread size	minimum thread diameter (mm)
6,00**	M76 x 6.00	69,50
5,50**	M73 x 5.50	67,05
5,00	M70 x 5.00	64,59
4,00	M64 x 4.00	59,67
3,00	M52 x 3.00	48,75
2,50	M48 x 2.50	45,29
2,00	M42 x 2.00	39,84
1,75	M40 x 1.75	38,11
1,50*	M38 x 1.50	36,38

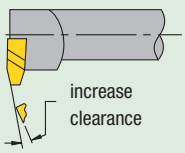
*Thread pitch of 1,5mm and less can be cut provided core thread diameter is 35,0mm or larger.
**NT-4-insert only.

Acme Threading Limits

internal threading limitations
NA and NAS-2, -3, -4, and -6 Acme threading inserts

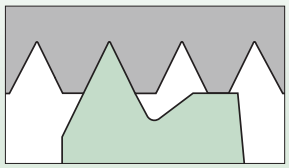
TPI	nominal thread size	minimum thread diameter	
		NT-1	NT-2
2**	5	4.500	114.3
2-1/2**	4-1/2	4.100	104.1
3**	4	3.665	93.1
4	3-1/2	3.250	82.6
5	3	2.800	71.1
6	2-1/2	2.333	59.3
8	2-1/4	2.125	54.0
10	2	1.900	48.3
12	1-3/4	1.667	42.4
14	1-5/8	1.554	39.5
16*	1-1/2	1.438	36.5

*Sixteen threads per inch and finer can be cut provided minor diameter is 36,5mm (1.438") or larger.
**NA-6 insert only.



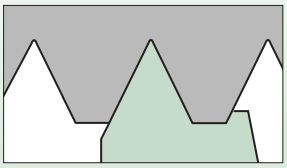
Additional secondary clearance can be ground on leading edge of insert to provide sufficient helical clearance for machining coarser threads and multiple start threads. Modified standard inserts may be furnished for machining threads outside of the limits shown.

60° V-Thread Crest Turning Application Data



feed direction

NTC crest turning insert for 12 threads per inch and finer (P ≤ 2,0mm)



feed direction

NTC crest turning insert for 11 threads per inch and coarser (P ≥ 3,0mm)

NOTE: NTC inserts automatically control root to crest dimensions. Therefore, in setting up threading operations with NTC inserts, check the OD or ID at the thread crest for correct dimensions.

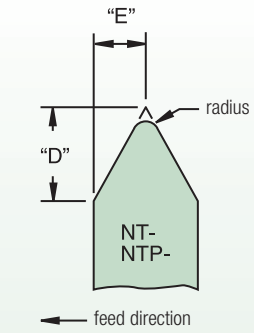
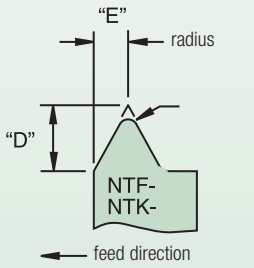
60° V-Thread Crest Turning Application Data

insert catalog number	nose radius on insert (inch)	thread radius per MIL-S-8879A (inch)
NJ-3014R/L12 NJK-3008R/L20	.0125/.0135 .0075/.0085	.0125/.0150 .0075/.0090

"J" thread note for catalog

The controlled root radius thread form (SAE8879C) is defined for the external thread only. To machine the corresponding internal thread, choose any insert that will cut a unified class 2B thread, then bore the minor diameter to size. Refer to SAE8879C and MIL-S-8879C and SAEAS8879D for the correct "J" thread minor diameter values.

60° V-Thread Application Data

insert description	insert	D** (inch)	E** (inch)	recommended TPI		recommended TP	
				external	internal	external	internal
	NT-1	.075	.044	—	24–12	—	1,00–2,00
	NT-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-2-K	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NTF-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTK-2	.062	.040	44–14	24–12	0,60–1,75	1,00–2,00
	NTP-2	.113	.075	36–8	20–7	0,70–3,00	1,25–3,50
	NT-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-K	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-3-C	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NT-3-CK	.148	.097	11–6	6 (only)	2,50–4,00	4,00 (only)
	NTF-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTK-3	.083	.054	44–10	24–9	0,60–2,50	1,00–2,50
	NTP-3	.148	.097	20–6	12–5	1,25–4,00	2,00–5,00
	NT-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NT-4-K	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25
	NTP-4	.196	.127	20–4	12–4	1,25–6,25	2,00–6,25

**Based on maximum insert radius size and class 2A and 2B thread specifications.*

***For metric D and E dimensions, multiply by 25,4.*

API Thread Forms • Insert Applications Chart for API Rotary Shouldered Connections

thread form	WIDIA™ insert		tool joint application	minimum box size*
	cresting	non-cresting		
V-.038R 2" TPF 4 TPI	NDC-4038R/L2 4-E/IR4API382	ND-3038R/L	2-3/8 API internal flush 2-7/8 API internal flush 3-1/2 API internal flush 4 API internal flush 4-1/2 API internal flush 5-1/2 API internal flush 6-5/8 API internal flush 4 API full hole API #23, API #26, API #31, API #35, API #38, API #40, API #44, API #46, API #50	API #31 2-7/8 IF
V-.038R 3" TPF 4 TPI	NDC-4038R/L3 4-E/IR4API383	ND-3038R/L	API #56 API #61 API #70 API #77	API #56
V-.050 2" TPF 4 TPI	NDC-4050R/L2 4-E/IRAPI502	ND-4050R/L	5-1/2 API full hole 6-5/8 API regular 6-5/8 API full hole	5-1/2 API full hole
V-.050 3" TPF 4 TPI	NDC-4050R/L3 4-E/IR4API503	ND-4050R/L	5-1/2 API regular 7-5/8 API regular 8-5/8 API regular	5-1/2 API regular
V-.040 3" TPF 5 TPI	NDC-3040R/L3 NDC-4040R/L3 4-E/IR5API403	ND-3040R/L ND-4040R/L	2-3/8 API regular 2-7/8 API regular 3-1/2 API regular 4-1/2 API regular	3-1/2 API regular

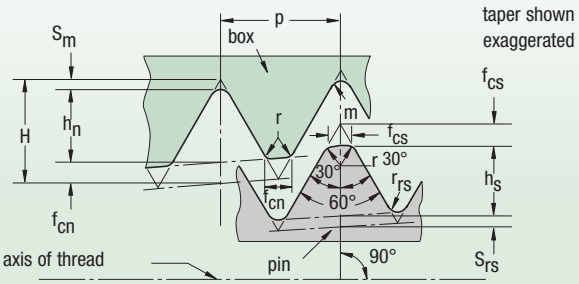
*Minimum box size that can be threaded with a standard TopThread insert due to minimum bore equipment.

API Thread Forms
Product Thread Dimensions • Rotary Shouldered Connections (Inch)

threadform	taper inch per ft.	thread height, not truncated H	thread height, truncated $h_n=h_s$	root truncation $S_m=S_{rs}$ $f_m=f_{rs}$	crest truncation $f_{cn}=f_{cs}$	width of flat		root radius $r_m=r_{rs}$	radius at thread corners r	pitch p
						crest $f_{cn}=f_{cs}$	crest $f_m=f_{rs}$			
V-.038R	2	.216005	.121844	.038000	.056161	.065	—	.038	.015	.250
V-.038R	3	.215379	.121381	.038000	.055998	.065	—	.038	.015	
V-.040	3	.172303	.117842	.020000	.034461	.040	—	.020	.015	.250
V-.050	3	.215379	.147303	.025000	.043076	.050	—	.025	.015	
V-.050	2	.216005	.147804	.025000	.043201	.050	—	.025	.015	.250

NOTE: All dimensions in inches.

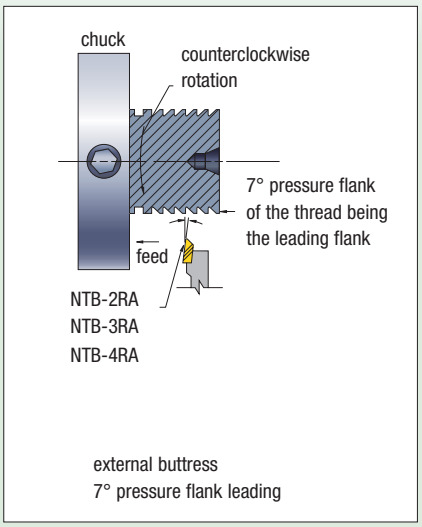
V-.040 and V-.050 Product Thread Form

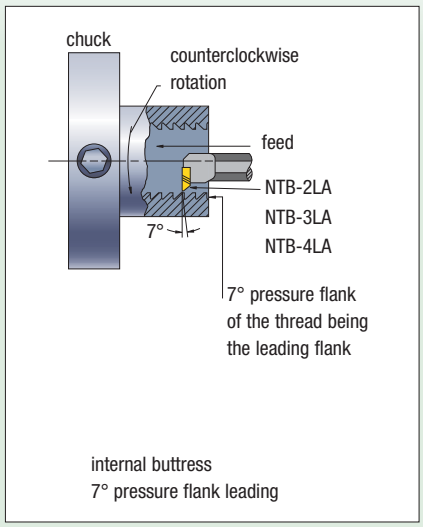


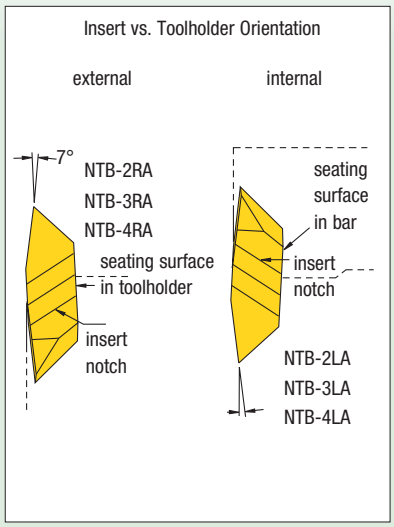
Casing and Tubing Round Thread (Height Dimensions)

thread element		10 TPI p=.1000	8 TPI p=.1250
H	=.866p	.08660	.10825
$H_s = h_n$	=.626p-.007	.05560	.07125
$S_{rs} = S_m$	=.120p+.002	.01400	.01700
$S_{cs} = S_{cn}$	=.120p+.005	.01700	.02000

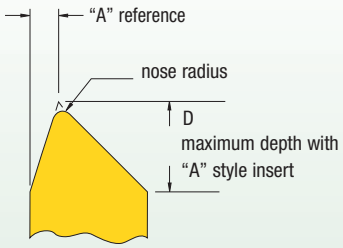
American Buttress (7° Pressure Flank Leading) NTB-A Inserts • Push Type







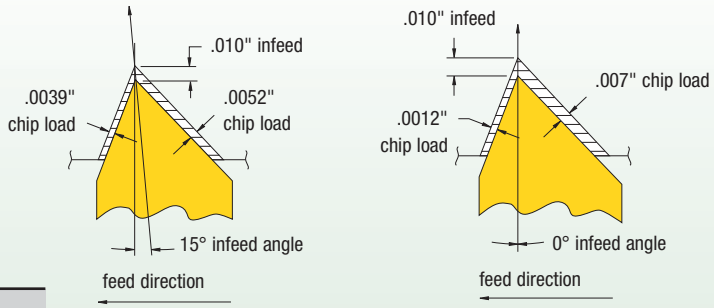
Reference Dimensions



insert	D (inch)	"A" ref. (inch)	nose radius (inch)	pitch based on maximum radius
NTB-2A	.133	.024	.002–.004	16–20 TPI
NTB-3A	.171	.031	.005–.008	8–16 TPI
NTB-4A	.218	.049	.008–.012	4–6 TPI

NOTE: For balanced chip load, 15° infeed angle is suggested.

Infeed Angle vs. Chip Load: 7° Pressure Flank Leading



NTB-A insert

Internal Threading Limitations

internal threading limitations
NTB-2A Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations
NTB-3 and NTB-4A Buttress threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4*	2-1/2	2.200
5	2-1/4	2.010
6	2	1.800
8	1-3/4	1.600
10	1-5/8	1.505
12**	1-1/2	1.400

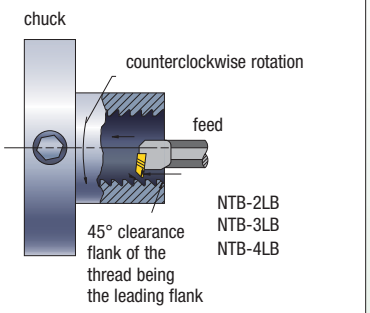
*NTB-4A insert only.
**Can cut 16 or 20 threads per inch provided minor diameter is 1.375" or larger.

Threads per Inch vs. Maximum Root Radius Chart (Inch)

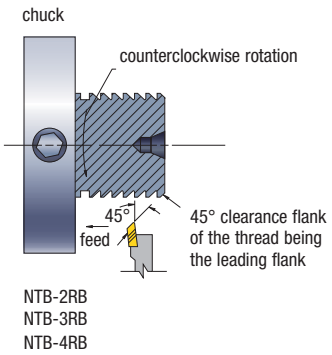
TPI	20	16	12	10	8	6	5	4	3	2-1/2	2	1-1/2	1-1/4	1
maximum root radius	0036	.0045	.0059	.0071	.0089	.0119	.0143	.0179	.0238	.0286	.0375	.0476	.0572	.0714

NOTE: Special Buttress forms are available upon request.

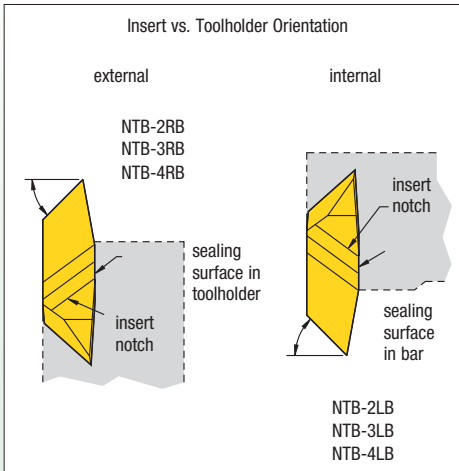
American Buttress (45° Clearance Flank Leading): NTB-B Inserts • PULL-type



Internal Buttress
45° clearance flank leading

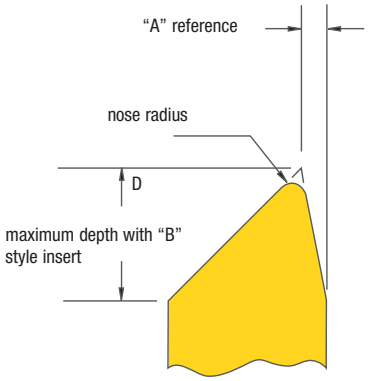


External Buttress
45° clearance flank leading

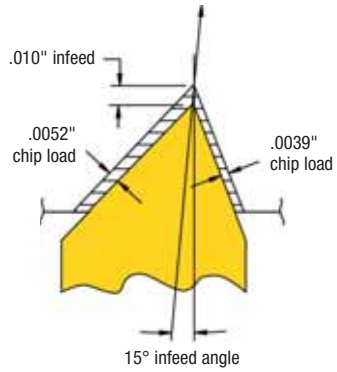


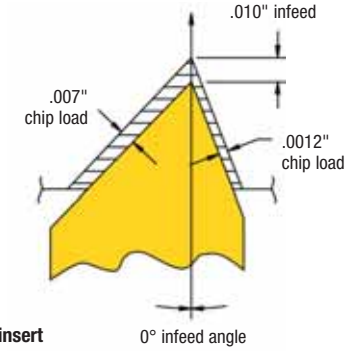
45° clearance flank leading

Reference Dimensions



Infeed Angle vs. Chip Load: 45° Clearance Flank Leading





NTB-B insert

insert	D (inch)	"A" reference (inch)	nose radius (inch)	pitch based on maximum radius
NTB-3B	.171	.031	.005–.004	8–16 TPI

NOTE: For balanced chip load, a reverse 15° infeed angle is suggested.

Internal Threading Limitations

internal threading limitations NTB-2B Buttress threading inserts		
TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations NTB-3 and NTB-4B Buttress threading inserts		
TPI	nominal thread size	minimum minor diameter (inch)
4*	2-7/8	2.575
5	2-3/4	2.510
6	2-3/8	2.175
8	2-1/8	1.975
10	1-7/8	1.755
12	1-5/8	1.525
16	1-1/2	1.407
20	1-7/16	1.378

*NTB-4B insert only.

WIN WITH WIDIA™

WIDIA™

TopThread™ System

A superior choice for heavy-duty applications like machining Acme, Buttress, and API threads. The WIDIA TopThread system is the best solution for coarse pitch and multi-tooth threading applications. With unmatched tooling technology, you can trust WIDIA TopThread tools for all of your threading and grooving needs.

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- Minimizes built-up edges, reduces cutting forces, and precisely cuts most common materials.
- Ensures accurate, high-quality threads. Excellent for internal threading operations.

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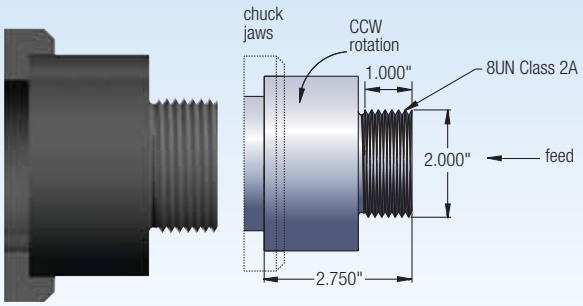
Required Information

From Part Drawing:

material: 316SS, 200 HB
thread form: 8UN Class 2A
operation: external threading
pitch diameter: 2.00" x 1.00" deep

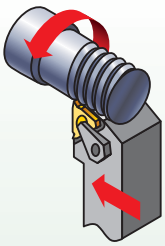
From Machine Set-Up Data:

tooling: .750" x .750"
spindle rotation: counterclockwise
feed: toward chuck



Steps for a Successful Threading Operation

Step 1 • Determine Threading Method



Need to Know:

- Operation (external).
- Spindle rotation (CCW).
  Counterclockwise rotation.
- Feed direction (toward chuck).
- Right-hand toolholder.
- Right-hand insert (ER).
- Standard helix method.

Step 2 • Select Insert

Need to Know:

- Thread form (8 UN Class 2A).
- Hand of insert (right hand — ER).

Choose the High-Performance Solution

catalog number	insert size	TN6025
3ER8UN	3"	●

High-Performance Selection

NOTE: Use insert with largest IC available.

insert: 3ER8UN
grade: TN6025
speed: 500 SFM

Step 3 • Select the Grade and Speed

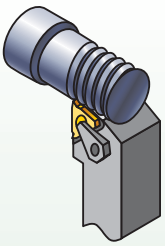
Need to Know:

- Workpiece material (316SS-200HB).
- Operation (external).

Options: Grade and Speed Selection Guidelines

threading operation	stainless steel
external	general purpose and high performance
	TN6025
	150–450 SFM

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (external).
- Pitch diameter to determine minimum bore diameter (N/A).
- Type of tooling — toolholder, boring bar (toolholder).
- Hand of tool (right hand).
- Insert size (3/8").

Options:

catalog number	insert size	shim
LSASR-123	3"	SM-YE3

First choice: LSASR-123 holder

Step 5• Select Shim

Need to Know:

- Thread form — TPI or pitch (8 TPI).
- Pitch diameter (2").
- Helix method (standard).
  See LT shim selection chart.

Select SM-YE3 shim

NOTE: The SM-YE3 shim is supplied with the selected toolholder.

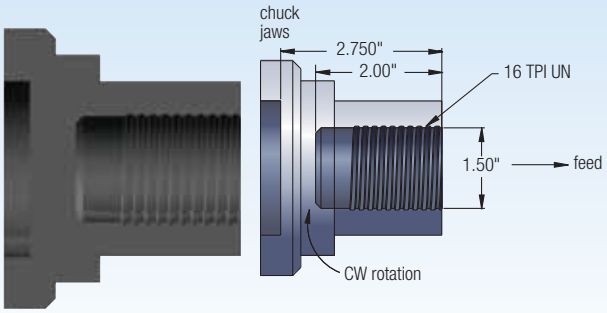
Required Information

From Part Drawing:

material: 4140 steel
thread form: 16 TPI UN
operation: internal threading
pitch diameter: 1.5" x 2" deep

From Machine Set-Up Data:

tooling: .075" boring bar
spindle rotation: clockwise
feed: away from chuck

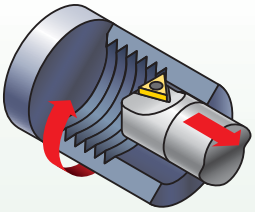


Steps for a Successful Threading Operation

Step 1 • Determine Threading Method

Need to Know:

- Operation (internal).
- Spindle rotation (CW).
  Clockwise rotation.
- Feed direction (away from chuck).
- Left-hand toolholder.
- Left-hand insert (NL).
- Reverse helix method.



Step 2 • Select Insert

Need to Know:

- Thread form (16UN Class 2A).
- Hand of insert (left hand — NL).

Choose the High-Performance Solution

catalog number	insert size	TN6025
2ILA60	2"	●
3ILA60	3"	●

High-Performance Selection

NOTE: Use insert with largest possible IC to go into the bore.

insert: 3ILA60
grade: TN6025
speed: 450 SFM

Step 3 • Select the Grade and Speed

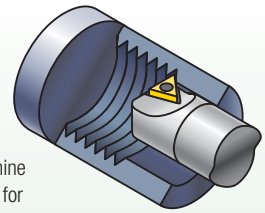
Need to Know:

- Workpiece material (4010 steel).
- Operation (internal).

Options: Grade and Speed Selection Guidelines

threading operation	steel
internal	general purpose and high performance
	TN6025
	100–550 SFM

Step 4 • Select Toolholder



Need to Know:

- External or internal operation (internal).
- Pitch diameter to determine minimum bore diameter for internal operations (1.5").
- Type of tooling — toolholder, boring bar (boring bar).
- Hand of tool (left hand).
- Insert size (3/8").

Options:

catalog number	insert size	minimum bore diameter	shim
S1212-LSEL3	3"	.90	SM-YE3
S0812-LSEL2	2"	.65	—

First choice: S1212-LSEL3 bar

Step 5 • Select Shim

Need to Know:

- Thread form — TPI or pitch (16 TPI).
- Pitch diameter (1.5").
- Helix method (reverse).
  See LT shim selection chart.

Select SM-YE3-2N shim

NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YE3-2N.

Laydown Threading Shim Selection Guidelines

The following questions must be answered before a successful threading operation can begin:

A — Select your method of thread cutting:
- machining toward the chuck (standard helix)
- machining away from the chuck (reverse helix)

B — Select lead angle and choose shim.

C — Select insert and toolholder size.

D — Select insert grade.

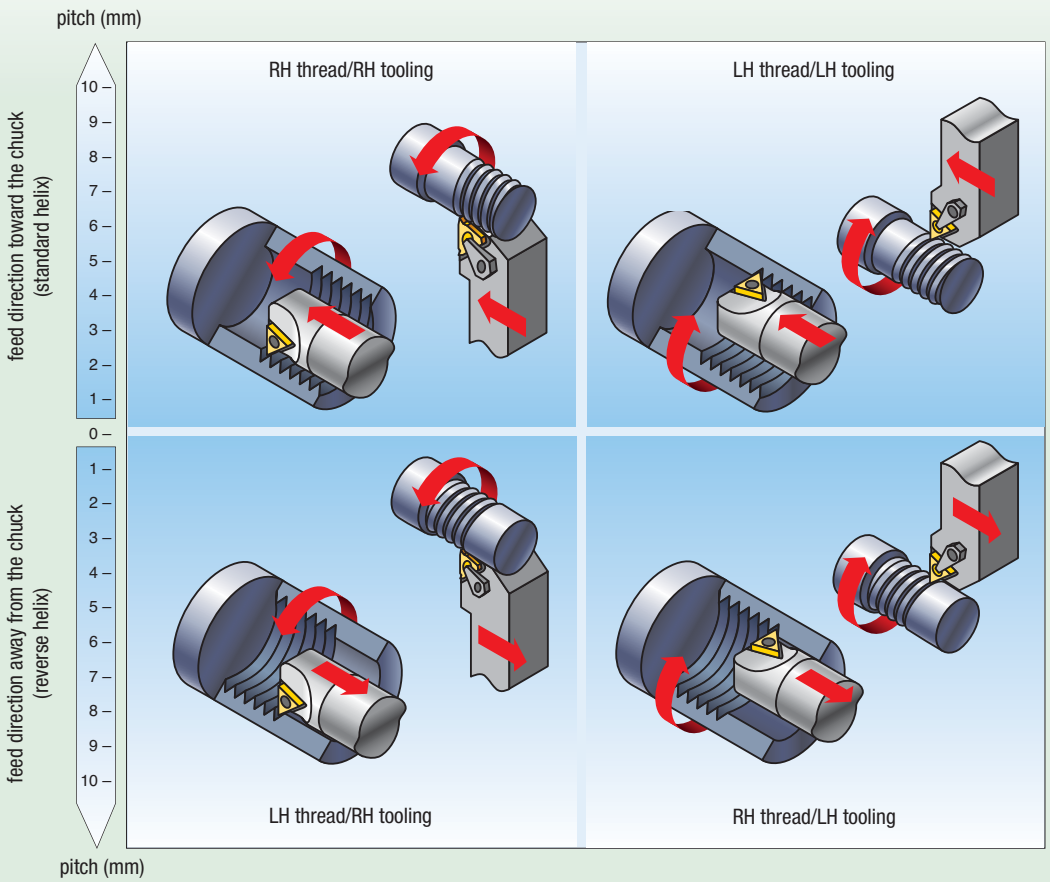
E — Select speed.

F — Select number of thread passes.

G — Select infeed method.

NOTE: When considering method of thread cutting, the part's shape and stability and the flow of chips are determining factors in your decision.

Laydown Selection Chart



NOTE: For multi-start threads, use the lead value instead of the pitch.

Diagram of Thread Lead Angles

To calculate the lead angle of a given thread, use this formula:

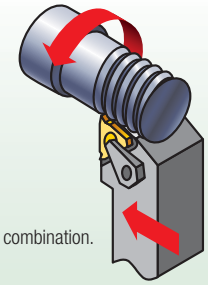
$$\beta = \text{Arctan}\ \frac{P \bullet S}{\pi\ D_e}$$

ß = thread lead angle
De = effective pitch diameter of thread wear
P = 1/TPI
TPI = threads per inch
S = number of starts
single-start, lead = pitch
multiple-start, lead = pitch (x) number of starts

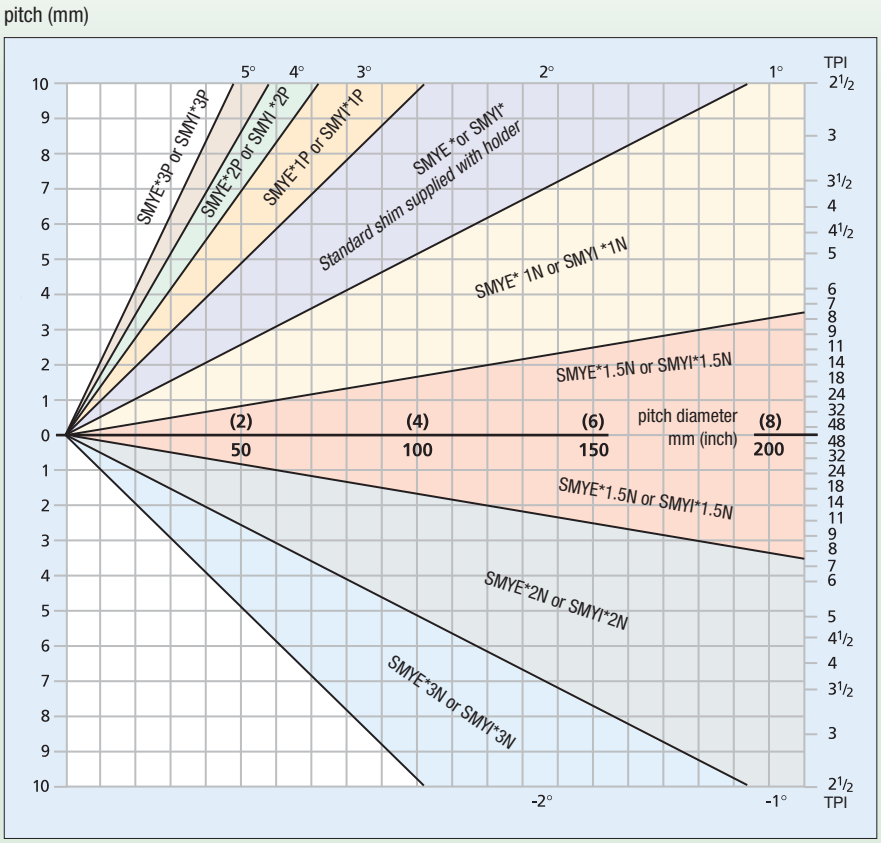
NOTE: Arctan equals Tan^{-1} (see chart below for approximate lead angles).

All toolholders are designed with an inclination angle = 1.5°. When turning standard threads with a lead angle of 1–2°, this guarantees adequate clearance at the flanks of the insert's thread tooth. The thread lead angle and the required inclination angle of the insert are given by ß.

Cutting edge height is constant at every shim and insert combination. All toolholders are supplied with 1-1/2° lead angle.



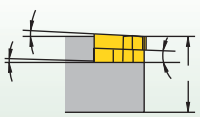
Laydown Selection Chart



*denotes shim size: 3 = insert size 16 (3/8" D)
4 = insert size 22 (1/2" D)

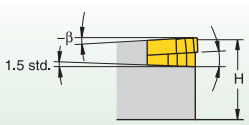
standard helix method:

Used when RH thread is cut with RH tool or LH thread with LH tool.



reverse helix method:

Used when RH thread is cut with LH tool or when LH thread is cut with RH tool.



Laydown Threading Shim Selection Table • Inch

	toolholder		shim ordering code (inch)							
insert size	external	internal				standard				
3 (3/8")	RH	LH	SM–YE3–3P	SM–YE3–2P	SM–YE3–1P	SM–YE3	SM–YE3–1N	SM–YE3–1.5N	SM–YE3–2N	SM–YE3–3N
3 (3/8")	LH	RH	SM–YI3–3P	SM–YI3–2P	SM–YI3–1P	SM–YI3	SM–YI3–1N	SM–YI3–1.5N	SM–YI3–2N	SM–YI3–3N
4 (1/2")	RH	LH	SM–YE4–3P	SM–YE4–2P	SM–YE4–1P	SM–YE4	SM–YE4–1N	SM–YE4–1.5N	SM–YE4–2N	SM–YE4–3N
4 (1/2")	LH	RH	SM–YI4–3P	SM–YI4–2P	SM–YI4–1P	SM–YI4	SM–YI4–1N	SM–YI4–1.5N	SM–YI4–2N	SM–YI4–3N
TPI		pitch (mm)	pitch diameter (inch)							
72		–	–	–	–	0.12–0.31	0.32–0.84	>0.84	0.84–0.32	0.31–0.12
–		0,35	–	–	–	0.12–0.3	0.31–0.84	>0.84	0.84–0.31	0.3–0.12
64		–	–	–	–	0.14–0.35	0.36–0.95	>0.95	0.95–0.36	0.35–0.14
–		0,40	–	–	–	0.14–0.35	0.36–0.96	>0.96	0.96–0.36	0.35–0.14
56		0,45	–	–	–	0.16–0.4	0.41–1.09	>1.09	1.09–0.41	0.4–0.16
–		0,50	–	–	0.11–0.16	0.17–0.44	0.45–1.2	>1.20	1.2–0.45	0.44–0.17
48		–	–	–	0.12–0.17	0.18–0.46	0.47–1.27	>1.27	1.27–0.47	0.46–0.18
44		–	–	–	0.13–0.19	0.2–0.51	0.52–1.38	>1.38	1.38–0.52	0.51–0.2
–		0,60	–	0.1–0.12	0.13–0.2	0.21–0.53	0.54–1.44	>1.44	1.44–0.54	0.53–0.21
40		–	–	0.11–0.13	0.14–0.21	0.22–0.56	0.57–1.52	>1.52	1.52–0.57	0.56–0.22
–		0,70	–	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.68	>1.68	1.68–0.63	0.62–0.24
36		–	–	0.12–0.15	0.16–0.23	0.24–0.62	0.63–1.69	>1.69	1.69–0.63	0.62–0.24
–		0,75	0.11–0.12	0.13–0.16	0.17–0.25	0.26–0.66	0.67–1.8	>1.80	1.8–0.67	0.66–0.26
32		–	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.7	0.71–1.9	>1.90	1.9–0.71	0.7–0.27
–		0,80	0.12–0.13	0.14–0.17	0.18–0.26	0.27–0.71	0.72–1.91	>1.91	1.91–0.72	0.71–0.27
28		–	0.14–0.14	0.15–0.19	0.2–0.3	0.31–0.8	0.81–2.17	>2.17	2.17–0.81	0.8–0.31
27		–	0.14–0.15	0.16–0.2	0.21–0.31	0.32–0.83	0.84–2.25	>2.25	2.25–0.84	0.83–0.32
–		1,00	0.15–0.16	0.17–0.21	0.22–0.33	0.34–0.89	0.9–2.39	>2.39	2.39–0.9	0.89–0.34
24		–	0.16–0.17	0.18–0.23	0.24–0.35	0.36–0.94	0.95–2.53	>2.53	2.53–0.95	0.94–0.36
–		1,25	0.19–0.2	0.21–0.27	0.28–0.42	0.43–1.11	1.12–2.99	>2.99	2.99–1.12	1.11–0.43
20		–	0.19–0.21	0.22–0.27	0.28–0.42	0.43–1.13	1.14–3.04	>3.04	3.04–1.14	1.13–0.43
18		–	0.21–0.23	0.24–0.31	0.32–0.47	0.48–1.26	1.277–3.38	>3.38	3.38–1.27	1.26–0.48
–		1,50	0.22–0.25	0.26–0.33	0.34–0.5	0.51–1.34	1.35–3.59	>3.59	3.59–1.35	1.34–0.51
16		–	0.24–0.26	0.27–0.35	0.36–0.53	0.54–1.41	1.42–3.8	>3.80	3.8–1.42	1.41–0.54
–		1,75	0.26–0.29	0.3–0.38	0.39–0.59	0.6–1.56	1.57–4.19	>4.19	4.19–1.57	1.56–0.6
14		–	0.27–0.3	0.31–0.4	0.41–0.61	0.62–1.62	1.63–4.34	>4.34	4.34–1.63	1.62–0.62
13		–	0.29–0.32	0.33–0.43	0.44–0.66	0.67–1.74	1.75–4.68	>4.68	4.68–1.75	1.74–0.67
–		2,00	0.3–0.33	0.34–0.44	0.45–0.67	0.68–1.78	1.79–4.79	>4.79	4.79–1.79	1.78–0.68
12		–	0.32–0.35	0.36–0.46	0.47–0.71	0.72–1.89	1.9–5.07	>5.07	5.07–1.9	1.89–0.72
11.5		–	0.33–0.37	0.38–0.49	0.5–0.74	0.75–1.97	1.98–5.29	>5.29	5.29–1.98	1.97–0.75
11		–	0.34–0.38	0.39–0.51	0.52–0.78	0.79–2.06	2.07–5.53	>5.53	5.53–2.07	2.06–0.79
–		2,50	0.37–0.42	0.43–0.55	0.56–0.84	0.85–2.23	2.24–5.98	>5.98	5.98–2.24	2.23–0.85
10		–	0.38–0.42	0.43–0.56	0.57–0.86	0.87–2.27	2.28–6.08	>6.08	6.08–2.28	2.27–0.87
9		–	0.42–0.47	0.48–0.62	0.63–0.95	0.96–2.52	2.53–6.75	>6.75	6.75–2.53	2.52–0.96
–		3,00	0.45–0.5	0.51–0.66	0.67–1.02	1.03–2.68	2.69–7.18	>7.18	7.18–2.69	2.68–1.03
8		–	0.47–0.53	0.54–0.7	0.71–1.08	1.09–2.84	2.85–7.6	>7.60	7.6–2.85	2.84–1.09
–		3,50	0.52–0.59	0.6–0.77	0.78–1.19	1.2–3.13	3.14–8.38	>8.38	8.38–3.14	3.13–1.2
7		–	0.524–0.61	0.62–0.8	0.81–1.23	1.24–3.25	3.26–8.68	>8.68	8.68–3.26	3.25–1.24
–		4,00	0.6–0.67	0.68–0.89	0.9–1.36	1.37–3.58	3.59–9.57	>9.57	9.57–3.59	3.58–1.37
6		–	0.63–0.71	0.72–0.94	0.95–1.44	1.45–3.79	3.8–10.13	>10.13	10.13–3.8	3.79–1.45
–		5,00	0.75–0.84	0.85–1.11	1.12–1.7	1.71–4.48	4.49–11.97	>11.97	11.97–4.49	4.48–1.71
5		–	0.76–0.86	0.87–1.13	1.14–1.73	1.74–4.55	4.56–12.16	>12.16	12.16–4.56	4.55–1.74
4.5		–	0.84–0.95	0.96–1.26	1.27–1.92	1.93–5.06	5.07–13.51	>13.51	13.51–5.07	5.06–1.93
–		6,00	0.9–1.01	1.02–1.33	1.34–2.04	2.05–5.37	5.38–14.36	>14.36	14.36–5.38	5.37–2.05
4		–	0.95–1.07	1.08–1.41	1.42–2.16	2.17–5.69	5.7–15.2	>15.20	15.2–5.7	5.69–2.17
inclination angle			4.5	3.5	2.5	1.5	0.5	0.0	-0.5	-1.5
			standard helix (feed toward the chuck)						reverse helix (feed away from the chuck)	

1. Select TPI or pitch from the left-hand columns.

2. Follow row to specified pitch diameter and the correct feed direction.

3. Follow the column to the top for the required shim based on the toolholder and insert size.

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