CARBOLINE

Premium Cutting Tools, Inc.

CARBOLINE

Carboline has been providing the metal cutting industry with Premium Cutting Tools since 1979. Continuously owned and operated by the Richter family, the 3rd generation is in training and looking forward to providing you with the best threading and grooving solutions the industry has to offer for many years to come. With 35 years of experience grinding standards, specials and proprietary threads, we know how important it is that you receive your inserts when you need them. Our goal is customer satisfaction, and to that end, we go to great lengths to help you get your finished product shipped out on time.

This catalog has nearly 2000 items with EDP numbers and grade recommendations for your ordering convenience. In addition to our standards, we have many thousands of modified standards and specials with proven custom cutting grades for special and niche applications. Please ask **sales@carbolineusa.com** how you can get your inserts by the date you need them. Let our experts help you design your next cutting application.

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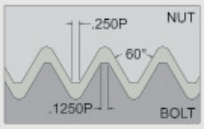
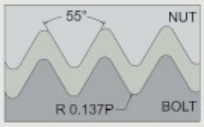
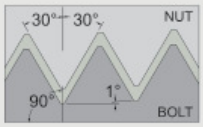
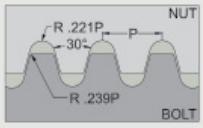
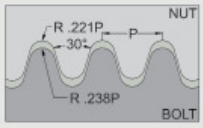
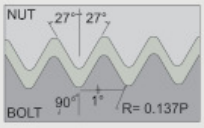
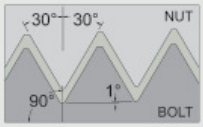
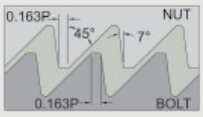
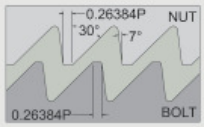
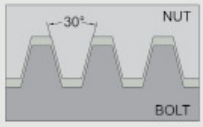
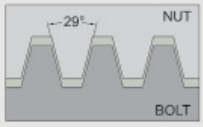
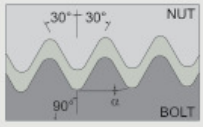
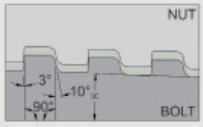
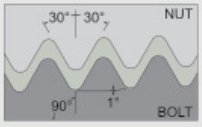
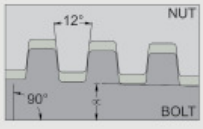
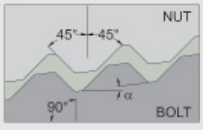
Industry Standard Threads

Thread Type	ISO Metric	American UN	Whitworth	American NPT
Profiles				
Thread Use	General Purpose		Pipe fittings for gas, water and sewer	

Thread Type	Round	Round	BSPT	American NPTF
Profiles				
Thread Use	Pipe fittings for food service applications		Pipe fittings for steam, gas and water	

Thread Type	American Buttress	Metric Buttress	UNJ
Profiles			
Thread Use	Pipe fittings for steam, gas and water		Aerospace applications	

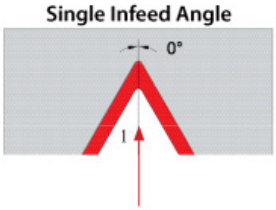
Thread Type	30° Trapez ACME	ACME	Stub ACME
Profiles			
Thread Use	Motion transmissions			

Thread Type	API Round	Buttress	Rotary Shoulder
Profiles			
Thread Type	X-Line	Hughes H90	
Profiles			
Thread Use	Oil and gas		

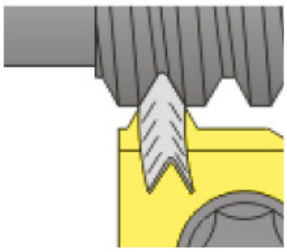
Thread Cutting Methods

In-feed Angle & Cutting Directions (——►) Shown below

Single Infeed Angle



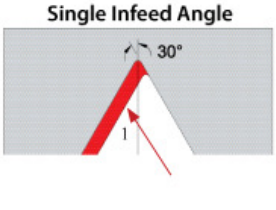
Radial Infeed
(Cut both sides simultaneously)



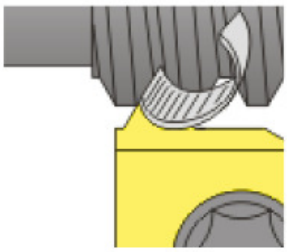
Pros:
- Most commonly used. Often only choice in mechanical operations
- Edge is protected from chipping since all of the cutting edge is located within the cut

Cons:
- Channel chip is created that may be difficult to control
- Burr condition is increased
- Tends to chatter

Single Infeed Angle



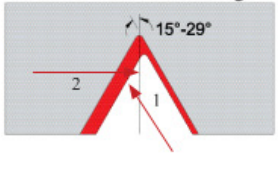
Flank Infeed
(Cut one side only)



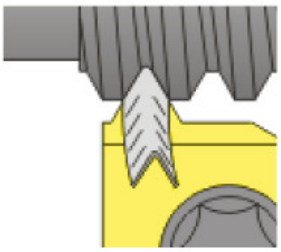
Pros:
- Leading edge of insert is used to make the cut resulting in better chip flow
- Reduced Burring

Cons:
- Trail edge of insert is prone to chipping
- Poor choice for soft materials like aluminum, stainless steel or low carbon steel

Infeed & Crossfeed Angle



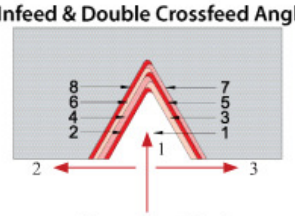
Modified Flank
(Cut one side only & finish opposite)



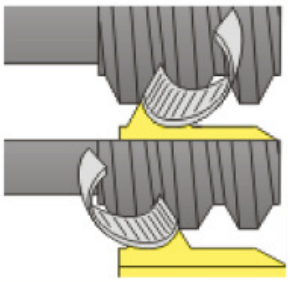
Pros:
- Edge is protected from chipping since all of the cutting edge is located in the cut

Cons:
- Channel chip is created that may be difficult to control
- Burr condition is increased
- Tends to chatter

Infeed & Double Crossfeed Angle



Alternating Flank
(Multicut)



Pros:
- Mainly used for large profiles
- Increased Tool Life
- Insert wears evenly

Cons:
- **Difficult to achieve manually**
- **Requires special programs on CNC machines**

Infeed Values for Threading

Threading Formulas

a_p	= Depth of cut (doc)	Inch/mm	P	= Pass number	Inch/mm
a_1	= Infeed 1	Inch/mm	$l_\#$	= Infeed per pass	Inch/mm
$a_\#$	= Accumulated depth per pass	Inch/mm	Note: # = Infeed pass number 2, 3, 4, etc		

Infeed for Pass 1 25% of Total

$$a_1 = \frac{a_p}{4}$$

Example: Determine the first pass infeed(a_1) for a thread with a total depth(a_p) of 0.132 inches.

$$a_1 = \frac{0.132}{4} = 0.033 \text{ in}$$

Accumulated Infeed for Additional Passes

$$a_\# = a_1 \times \sqrt{P}$$

Example: Determine the accumulated infeed($a_\#$) for the fourth pass(P) on a thread with a total depth(a_p) of 0.132 inches and a first pass infeed(a_1) of 0.033 inches.

$a_4 = 0.033 \times \sqrt{4} = 0.066$ in

Infeed per Individual Pass

$$l_p = a_\# - a_{\#-1}$$

Example: Determine the infeed for third pass of a threading operation with an accumulated infeed for the third pass($a_\#$) of 0.0572 and an accumulated infeed of 0.0467 for the second pass($a_{\#-1}$).

lp = 0.0572 - 0.0467 = 0.0105

Multi-Tooth Applications

- As a rule of thumb, divide the total number of infeed passes required for a single tooth insert by the number of teeth on a multi-tooth insert to find total infeed passes needed.
- Find accumulated infeed depths for multiples of the tooth number (For 3 teeth find a_p for passes 1, 3, 6, 9, etc)

Recommended Infeed Values for External UN Threads - Steel

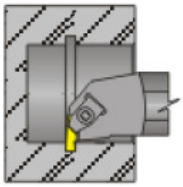
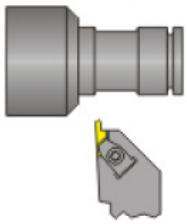
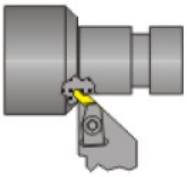
No. Of Passes	TPI																				
	4	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32	36	40	44	48
1	.0353	.0298	.0248	.0213	.0197	.0175	.0169	.0157	.0152	.0142	.0136	.0125	.0124	.0119	.0118	.0112	.0098	.0087	.0078	.0073	.0065
2	.0146	.0122	.0105	.0088	.0082	.0073	.0070	.0066	.0064	.0057	.0059	.0054	.0053	.0049	.0048	.0046	.0042	.0036	.0032	.0028	.0027
3	.0113	.0094	.0078	.0077	.0063	.0056	.0053	.0048	.0048	.0044	.0043	.0039	.0039	.0039	.0039	.0036	.0031	.0028	.0028	.0022	.0020
4	.0095	.0079	.0067	.0059	.0053	.0047	.0045	.0041	.0042	.0037	.0036	.0034	.0033	.0032	.0031	.0031	.0026	.0024	.0020	.0020	.0019
5	.0084	.0070	.0058	.0050	.0047	.0042	.0039	.0036	.0036	.0033	.0032	.0029	.0029	.0028	.0027						
6	.0076	.0063	.0052	.0045	.0043	.0037	.0036	.0031	.0032	.0030	.0029	.0026	.0026	.0025							
7	.0070	.0058	.0048	.0041	.0039	.0034	.0031	.0028	.0029	.0027	.0026	.0024	.0024	.0023							
8	.0065	.0054	.0045	.0038	.0036	.0032	.0030	.0026	.0027	.0025	.0024	.0022	.0022								
9	.0061	.0051	.0042	.0036	.0034	.0030	.0029	.0025	.0026	.0024	.0023	.0021									
10	.0057	.0048	.0040	.0034	.0032	.0028	.0028	.0024	.0025	.0023	.0022	.0020									
11	.0054	.0045	.0038	.0032	.0031	.0027	.0027	.0023	.0023	.0022	.0021										
12	.0052	.0043	.0036	.0031	.0029	.0026	.0026	.0022	.0022	.0021											
13	.0049	.0042	.0035	.0030	.0027	.0025	.0025	.0021													
14	.0048	.0041	.0034	.0029	.0026	.0024	.0024	.0020													
15	.0046	.0040	.0033	.0028	.0025	.0023															
16	.0044	.0039	.0032	.0027	.0025	.0022															
17	.0043	.0038	.0031	.0026																	
18	.0042	.0037	.0030	.0025																	
19	.0041																				
20	.0039																				

Recommended Infeed Values for Internal UN Threads - Steel

No. Of Passes	TPI																				
	4	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32	36	40	44	48
1	.0303	.0255	.0213	.0183	.0169	.0150	.0145	.0132	.0131	.0120	.0117	.0107	.0106	.0102	.0101	.0096	.0084	.0075	.0067	.0061	.0056
2	.0125	.0105	.0090	.0076	.0073	.0062	.0064	.0055	.0054	.0050	.0048	.0043	.0044	.0042	.0042	.0039	.0035	.0031	.0029	.0025	.0023
3	.0096	.0083	.0069	.0058	.0053	.0047	.0046	.0044	.0041	.0038	.0037	.0034	.0033	.0032	.0032	.0033	.0027	.0023	.0021	.0019	.0017
4	.0081	.0068	.0057	.0049	.0047	.0040	.0038	.0035	.0035	.0032	.0031	.0028	.0028	.0027	.0027	.0025	.0023	.0021	.0018	.0018	.0011
5	.0071	.0060	.0050	.0043	.0041	.0035	.0034	.0031	.0031	.0028	.0027	.0025	.0025	.0024	.0023						
6	.0064	.0054	.0045	.0039	.0036	.0032	.0031	.0028	.0028	.0025	.0025	.0029	.0023	.0022							
7	.0059	.0050	.0041	.0036	.0033	.0029	.0028	.0026	.0026	.0023	.0023	.0021	.0021	.0021							
8	.0055	.0046	.0038	.0033	.0030	.0027	.0026	.0024	.0024	.0022	.0021	.0020	.0029								
9	.0052	.0043	.0036	.0031	.0028	.0025	.0024	.0022	.0022	.0021	.0020	.0019									
10	.0049	.0041	.0034	.0029	.0027	.0024	.0023	.0022	.0022	.0020	.0019	.0018									
11	.0046	.0039	.0032	.0028	.0026	.0023	.0022	.0020	.0020	.0019	.0018										
12	.0044	.0037	.0031	.0027	.0025	.0022	.0021	.0019	.0019	.0018											
13	.0042	.0036	.0030	.0026	.0024	.0021	.0020	.0018													
14	.0041	.0035	.0029	.0025	.0023	.0020	.0019	.0017													
15	.0040	.0034	.0028	.0024	.0022	.0019															
16	.0039	.0033	.0027	.0023	.0021	.0019															
17	.0038	.0032	.0026	.0022																	
18	.0037	.0031	.0025	.0021																	
19	.0036																				
20	.0035																				

Note: Information provided in these charts and found using the formulas on the preceding page are to be used as a starting point only and may need to be adjusted to accommodate actual working conditions.

Grooving Methods

Internal Grooving	Profiling	Undercutting
		

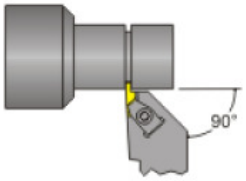
Grooving

Always make sure that the toolholder is held at a 90° angle to the material being turned.

Insert center height should be kept at the center line of the workpiece to .005 above the centerline

For best results keep the fade rate between .003 and .012 ipr

Dwell tool in bottom of cut no more than three revolutions.

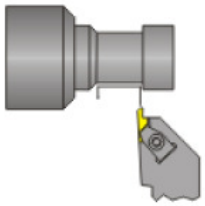


Back Turning

Insert center height should be kept at the center line of the workpiece to .005 above the centerline

For best results keep the fade rate between .003 and .012 ipr

Maximum depth of cut should be kept below .110 for .250 IC inserts and .150 for .375 IC inserts



Wide Grooves

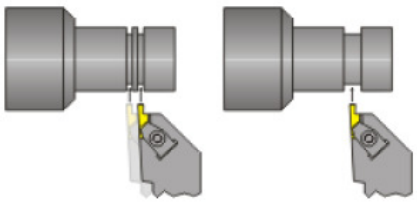
Plunge both sides of the groove width first.

Plunge the center area to clean out the remaining material.

If angled walls are required for the groove, perform as a final operation.

For best results keep the fade rate between .003 and .012 ipr

See profiling to finish the groove.

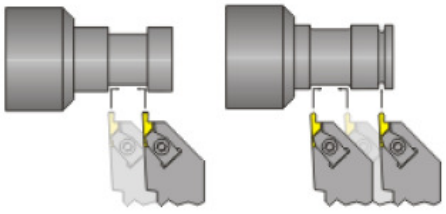


Profiling

Rough the profile as if cutting a wide groove.

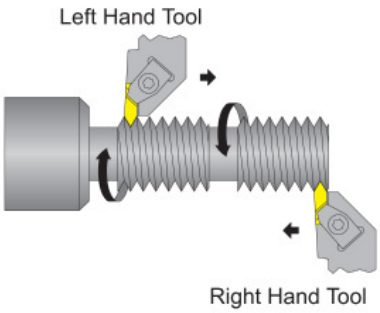
Plunge from each end and turn to the center of the profile in order to ensure wall perpendicularity

If using a radius insert, depth of cut should not exceed the insert radius size.

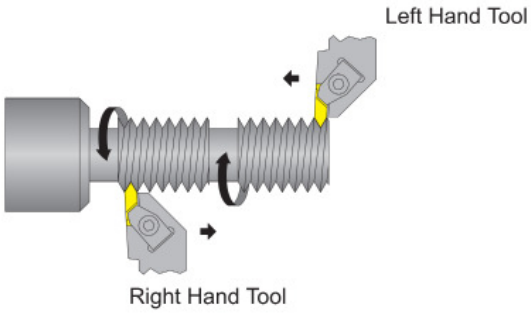


Toolholder Threading Method

EXTERNAL RIGHT HAND THREAD

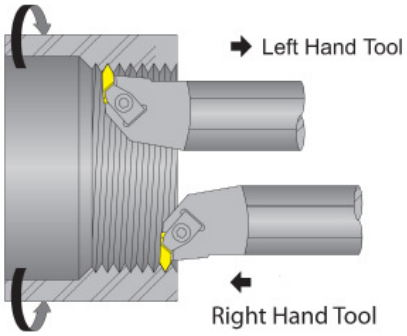


EXTERNAL LEFT HAND THREAD

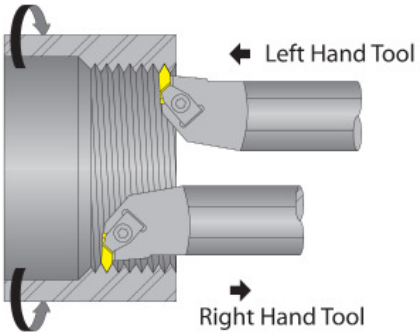


Threading Bar Threading Method

INTERNAL RIGHT HAND THREAD

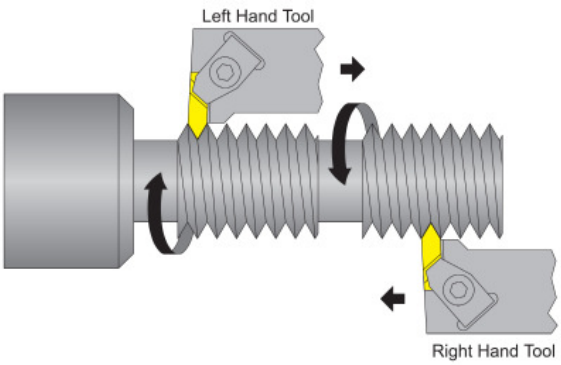


INTERNAL LEFT HAND THREAD

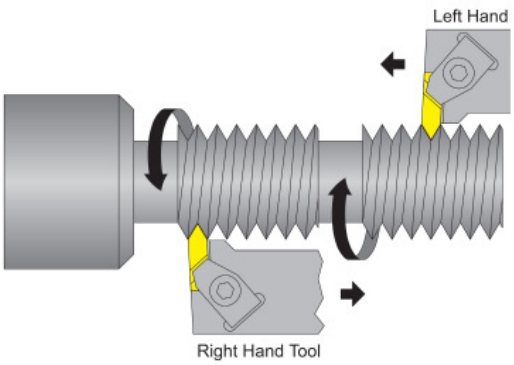


Gangtool Threading Method

EXTERNAL RIGHT HAND THREAD

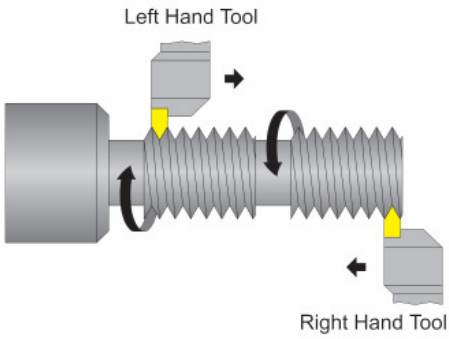


EXTERNAL LEFT HAND THREAD

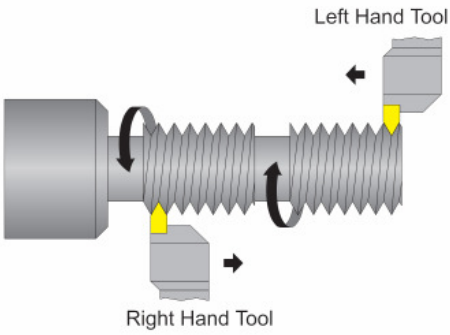


On Edge Toolholder Threading Method

EXTERNAL RIGHT HAND THREAD

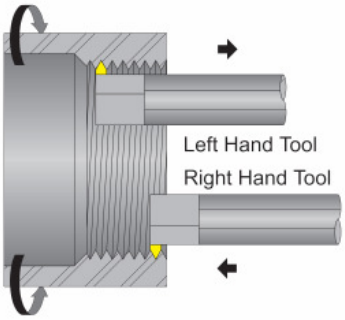


EXTERNAL LEFT HAND THREAD

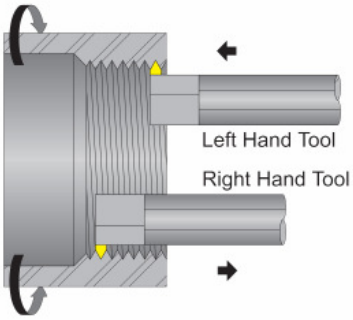


On Edge Threading Bar Threading Method

INTERNAL RIGHT HAND THREAD

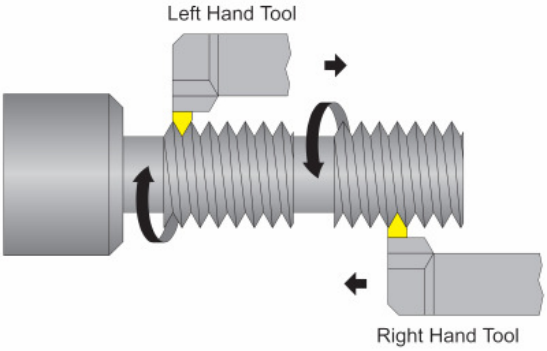


INTERNAL LEFT HAND THREAD

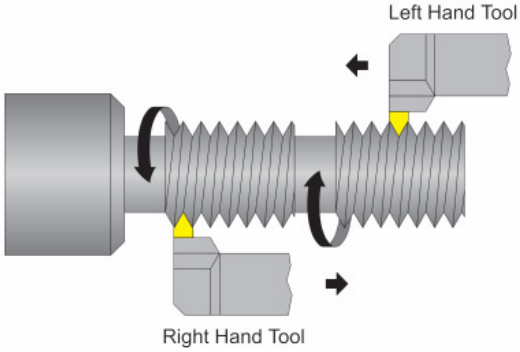


On Edge Gangtool Threading Method

EXTERNAL RIGHT HAND THREAD

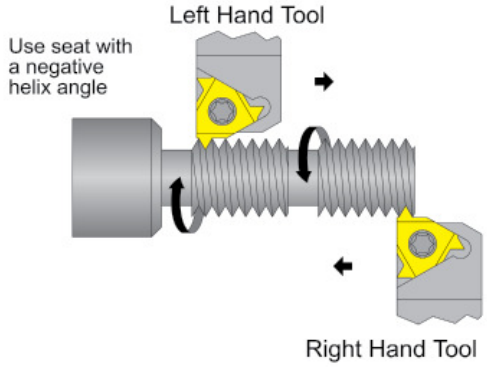


EXTERNAL LEFT HAND THREAD

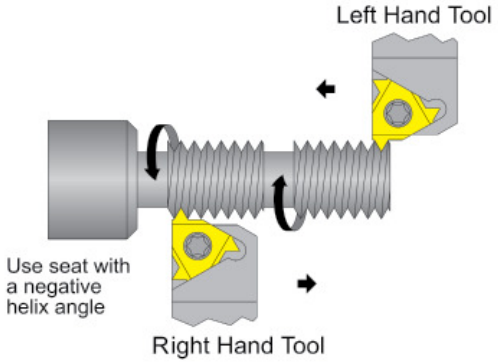


Laydown Toolholder Threading Method

EXTERNAL RIGHT HAND THREAD

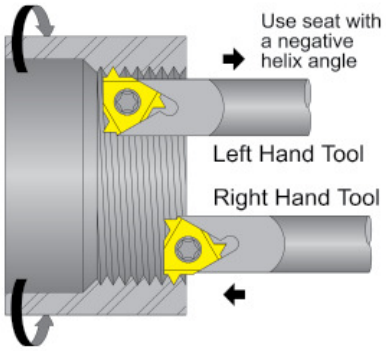


EXTERNAL LEFT HAND THREAD

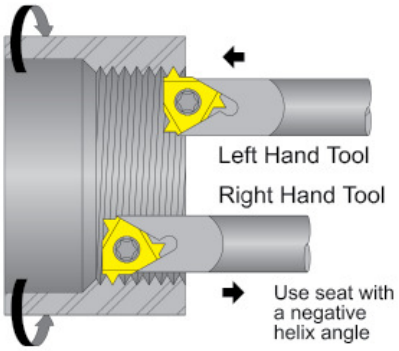


Laydown Threading Bar Threading Method

INTERNAL RIGHT HAND THREAD



INTERNAL LEFT HAND THREAD



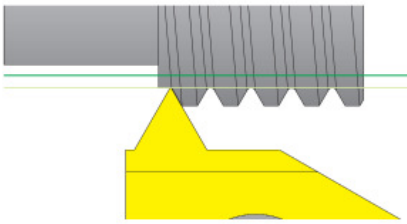
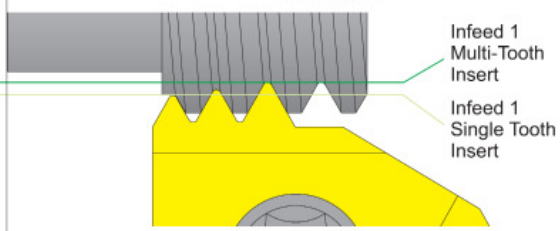
Trouble Shooting			
Problem		Cause	Solution
	**Edge Wear**	• Cutting speed too high • Infeed depth too shallow • Insert is above center line	• Increase feeds • Adjust center heights • Reduce speed • Use insert with more wear resistant grade
	**Heat Deformation**	• Cutting temperature too high • Pressure too high • Not enough coolant	• Reduce speed • Reduce feed • Reduce the largest infeed depth • Increase coolant flow
	**Chipping**	• Excessive load • Infeed depths too shallow	• Change edge preparation • Check rigidity of the insert • Reduce speed • Use insert with a more wear resistance grade
	**Built-up Edge**	• Cutting temperature too low • Low cutting speed • Negative cutting geometry	• Increase feed • Increase speed • Apply coolant at a constant rate
	**Insert Breakage**	• Grade too brittle • Excessive load • Weak insert geometry • Insert too small	• Reduce depth of cut • Reduce speed and feed • Apply coolant at a constant rate • Check ridigity of the insert • Use stronger insert geometry

Threading Problems & Solutions			
Torn Thread Finish	Shallow Thread Finish	Poor Surface Quality	Chatter
1. Use full profile insert 2. Check for insert wear 3. Modify infeed 4. Increase coolant flow and pressure	1. Adjust tool center height 2. Check part diameter 3. Index the insert	1. Increase cutting speed 2. Adjust tool center height 3. Use alternate infeed angle	1. Use minimum tool overhang 2. Adjust tool center height 3. Check for deflection 4. Check for insert, toolholder, and material rigidity

Full Profile vs Partial Profile for Laydown Threading

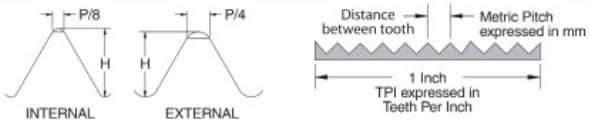
Full Profile	Partial Profile
	
• Threads remain concentric since both the major and minor diameters are machined at the same time • Final pass machines the thread crest- No Deburring! • Thread dimensions match industry standard • Fewer passes required- saves time and improves productivity • Stronger insert for longer tool life	• A variety of pitches may be created by a single insert • Provides for creating thread forms that are not industry standard • Requires a separate finishing pass to machine the thread crest and deburr the thread

Single Tooth vs Multi-Tooth for Laydown Threading

Single Tooth		Multi-Tooth	
			
Pros	**Cons**	**Pros**	**Cons**
• Available in either full or partial inserts for greater variety of thread pitch option • Good chip control	• A large number of passes is required to machine a full depth thread	• Multiple teeth require a smaller number of passes to create a full depth thread • Increased tool life • Better productivity	• Large clearance is needed to accommodate the full row of teeth • Extremely high cutting forces result from the large insert engagement length

Special Considerations for Laydown Threading

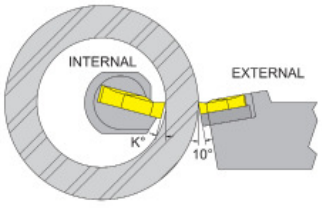
Thread Compatability
Internal and external threads can have different variables, such as depth and radii. This can lead to the incompatability of the threads.



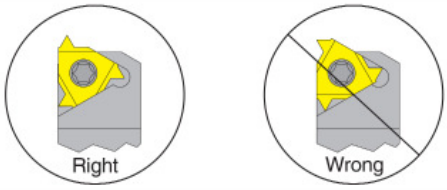
Thread Cutting Rake
The rake standard external threading toolholders is 10° and the rake for standard internal threading bars is as follows:

Insert Size: 16, 22 = 15° Insert Size: 27 = 10°

This difference in the rake angle for the internal and external threading tools allow for the radial clearance.



Insert Configuration
Inserts and threading tools should always match. The insert for an internal right hand boring bar must be an internal right hand insert.



API REGUAR SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
2-3/8 REG	V-0.040	5	3	530
2-7/8 REG	V-0.040	5	3	530
3-1/2 REG	V-0.040	5	3	530
4-1/2 REG	V-0.040	5	3	530
5-1/2 REG	V-0.050	4	3	435
6-5/8 REG	V-0.050	4	2	425
7-5/8 REG	V-0.050	4	3	435
8-5/8 REG	V-0.050	4	3	435

API INTERNAL FLUSH SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
2-3/8 IF	V-0.038	4	2	428
2-7/8 IF	V-0.038	4	2	428
3-1/2 IF	V-0.038	4	2	428
4 IF	V-0.038	4	2	428
5-1/2 IF	V-0.038	4	2	428

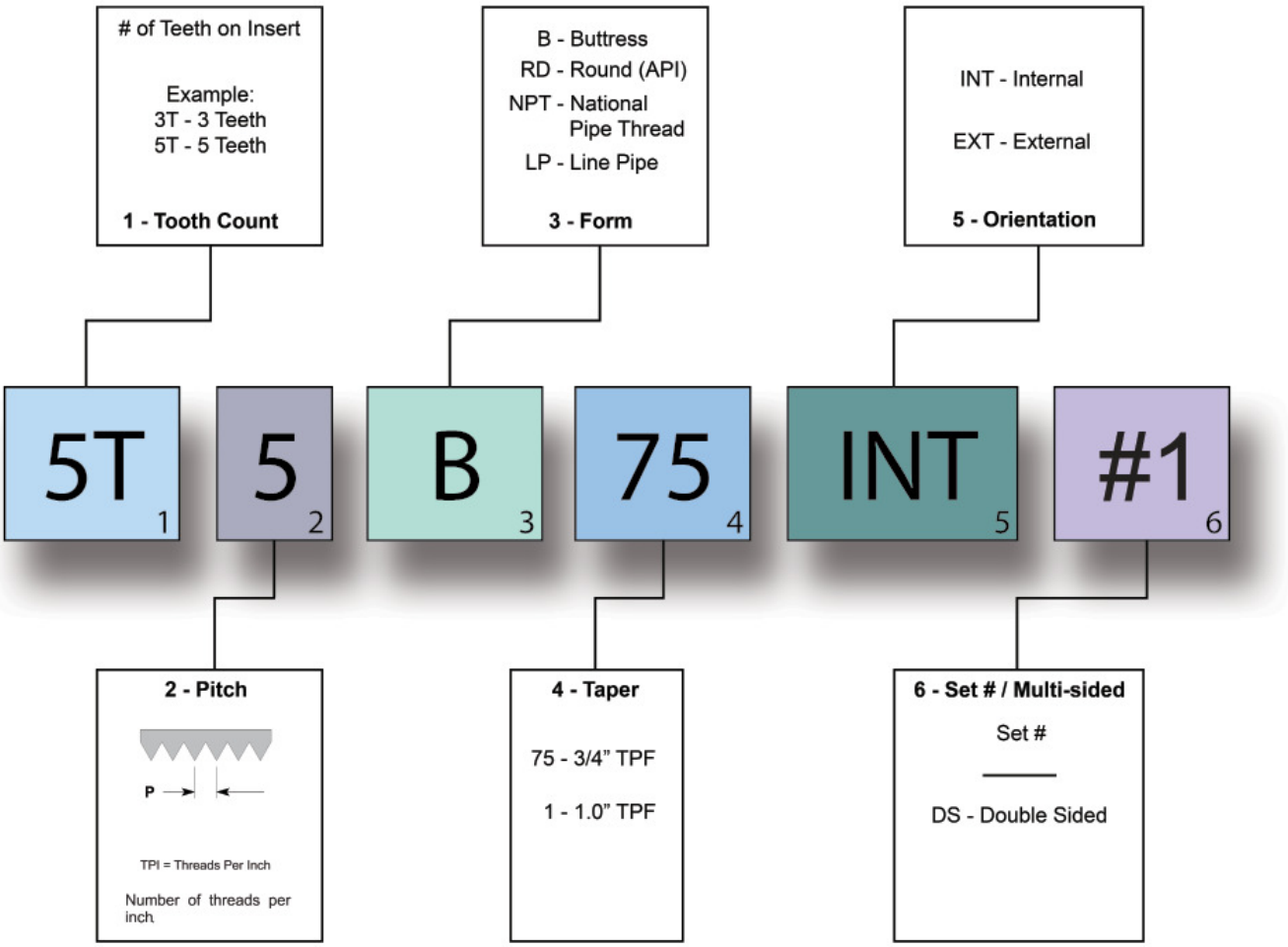
API FULL HOLE SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
3-1/2 FH	V-0.040	5	3	530
4 FH	V-0.038	4	2	428
4-1/2 FH	V-0.040	5	3	530
5-1/2 FH	V-0.050	4	2	425
6-5/8 FH	V-0.050	4	2	425

API NC SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
NC10	V-0.055	6	1-1/2	V0.055
NC12	V-0.055	6	1-1/2	V0.055
NC13	V-0.055	6	1-1/2	V0.055
NC16	V-0.055	6	1-1/2	V0.055
NC23	V-0.038	4	2	428
NC26	V-0.038	4	2	428
NC31	V-0.038	4	2	428
NC35	V-0.038	4	2	428
NC38	V-0.038	4	2	428
NC40	V-0.038	4	2	428
NC44	V-0.038	4	2	428
NC46	V-0.038	4	2	428
NC50	V-0.038	4	2	428
NC56	V-0.038	4	3	438
NC61	V-0.038	4	3	438
NC70	V-0.038	4	3	438
NC71	V-0.038	4	3	438

API THREAD FORM SPECIFICATIONS						
Thread Form	TPI	TPF	Width Crest	Flat Root	Root Radius	Cat. No.
V-0.038	4	2	0.065	-	0.038	428
V-0.038	4	3	0.065	-	0.038	438
V-0.040	5	3	0.040	-	0.020	530
V-0.050	4	3	0.050	-	0.025	435
V-0.050	4	2	0.050	-	0.025	425
V-0.076	4	1-1/2	0.076	0.067	-	4PAC
V-0.055	6	1-1/2	0.055	0.047	-	V0.055

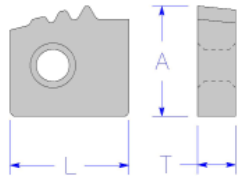
ACME TABLE				
	STANDARD		STUB	
Pitch	Width	Depth	Width	Depth
16	.0206	.0362	.0238	.0238
14	.0239	.0407	.0276	.0264
12	.0283	.0467	.0326	.0300
10	.0319	.0600	.0370	.0400
9	.0360	.0656	.0417	.0433
8	.0411	.0725	.0476	.0475
7	.0478	.0814	.0551	.0529
6	.0566	.0933	.0652	.0600
5	.0689	.1100	.0793	.0700
4	.0875	.1350	.1004	.0850
3-1/2	.1007	.1529	.1155	.0957
3	.1184	.1767	.1356	.1100
2-1/2	.1431	.2100	.1638	.1300
2	.1802	.2600	.2060	.1600
1-1/2	.2419	.3433	.2764	.2100
1-1/3	.2728	.3850	.3116	.2350
1	.3655	.5100	.4172	.3100

Notes:

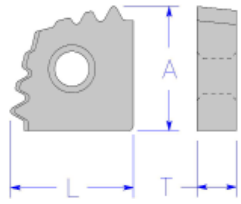


Threading Grade Descriptions	
Grade	**Description**
514	Tough general purpose TiN coated steel cutting for lower speeds
624	AlTiN coated for heat protection in higher speeds
6249	Premium substrate - extra wear resistant - AlTiN coated for heat protection in higher speeds
684	CVD TiN/TiC/TiN coated for extra wear resistance in hard steels
6849	Premium substrate - long lasting - CVD TiN/TiC/TiN coated wear resistance in hard steels

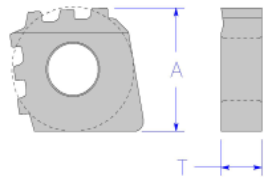
EXTERNAL ROUND	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	3T8RD75E	40252	3	8	3/4	.625	.204	.595
	3T8RD75E #1	49052	3	8	3/4	.625	.204	.579
	3T8RD75E #2	49062	3	8	3/4	.625	.204	.588
	3T8RD75E #3	49072	3	8	3/4	.625	.204	.592
	3T10RD75E	76252	3	10	3/4	.625	.204	.625
	3T10RD75E #1	48102	3	10	3/4	.625	.204	.564
	3T10RD75E #2	48112	3	10	3/4	.625	.204	.572
	3T10RD75E #3	48122	3	10	3/4	.625	.204	.577



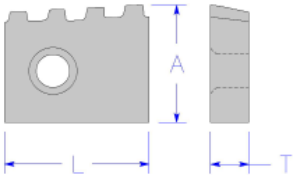
EXTERNAL DOUBLE SIDED	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	3T8RD75EDS	54612	3	8	3/4	.625	.204	.625
	3T10RD75EDS	55432	3	10	3/4	.625	.204	.625



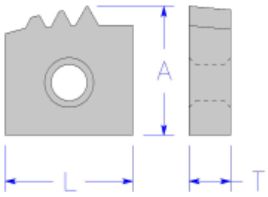
CNMA DOUBLE SIDED	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	CNMA 53 3T8RD75EDS	48022	3	8	3/4	N/A	.190	.620
	CNMA 53 3T10RD75EDS	48032	3	10	3/4	N/A	.190	.620
	CNMA 64 3T5B75EDS	54602	3	5	3/4	N/A	.250	.745



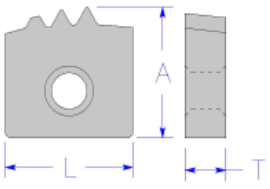
EXTERNAL BUTTRESS	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	4T5B75E	52442	4	5	3/4	.750	.204	.625
	3T5B75E #1	56832	3	5	3/4	.670	.204	.564
	3T5B75E #2	56842	3	5	3/4	.670	.204	.572
	3T5B75E #3	56852	3	5	3/4	.670	.204	.577
	4T5B1E	56692	4	5	1	.750	.204	.625



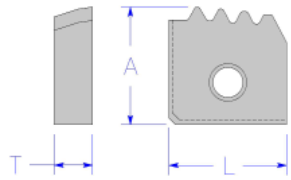
EXTERNAL LINEPIPE	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	3T8PLP EXT	70542	3	8	3/4	.625	.204	.625
	4T8PLP EXT	56072	4	8	3/4	.625	.204	.625
	6T11.5P EXT .066D	82722	6	11.5	3/4	.625	.204	.625



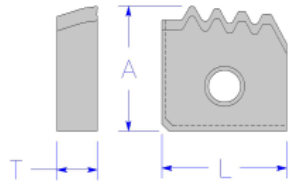
EXTERNAL WATERWELL	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	3T8P EXT .0915D	40782	3	8	3/4	.625	.204	.625
	3T8P EXT .0865D	40792	3	8	3/4	.625	.204	.625
	3T8P EXT .0885D	50482	3	8	3/4	.625	.204	.625



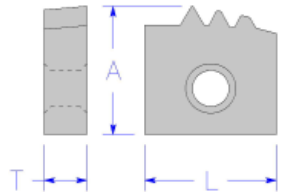
INTERNAL ROUND	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	4T8RD75I	46261	4	8	3/4	.625	.204	.625
	7T8RD75I	40821	7	8	3/4	1.000	.204	.625
	3T10RD75I	77911	3	10	3/4	.625	.204	.625
	9T10RD75I	84631	9	10	3/4	1.000	.204	.625



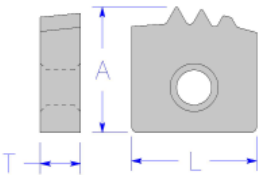
INTERNAL ROUND W/CB	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	4T8RD75I	85001	4	8	3/4	.625	.204	.625
	7T8RD75I	85011	7	8	3/4	1.000	.204	.625



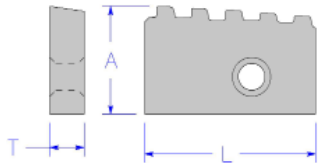
INTERNAL LINEPIPE	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	3T8NPT INT	84201	3	8	3/4	.625	.204	.625
	7T8NPT INT	84211	7	8	3/4	1.000	.204	.625
	4T11.5P INT	84221	4	11.5	3/4	.625	.204	.625
	7T8P11.5P INT	84231	7	11.5	3/4	1.000	.204	.625



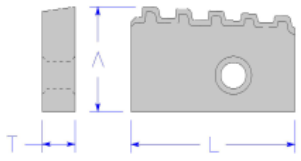
INTERNAL WATERWELL	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	3T8P INT .0885	50481	3	8	3/4	.625	.204	.625

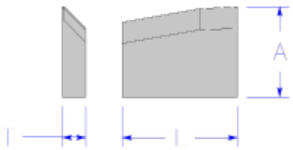


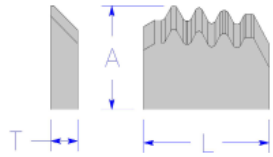
INTERNAL BUTTRESS	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	1T5B75I	56471	1	5	3/4	.625	.204	.625
	2T5B75I	56481	2	5	3/4	.625	.204	.625
	4T5B75I	70851	4	5	3/4	.800	.204	.625
	5T5B75I	45451	5	5	3/4	1.000	.204	.625
	3T5B1I	48041	3	5	1	.800	.204	.625
	4T5B1I	48051	4	5	1	1.000	.204	.625
	5T5B1I	48061	5	5	1	1.000	.204	.625
	4T8B75I	53731	4	8	3/4	.625	.204	.625

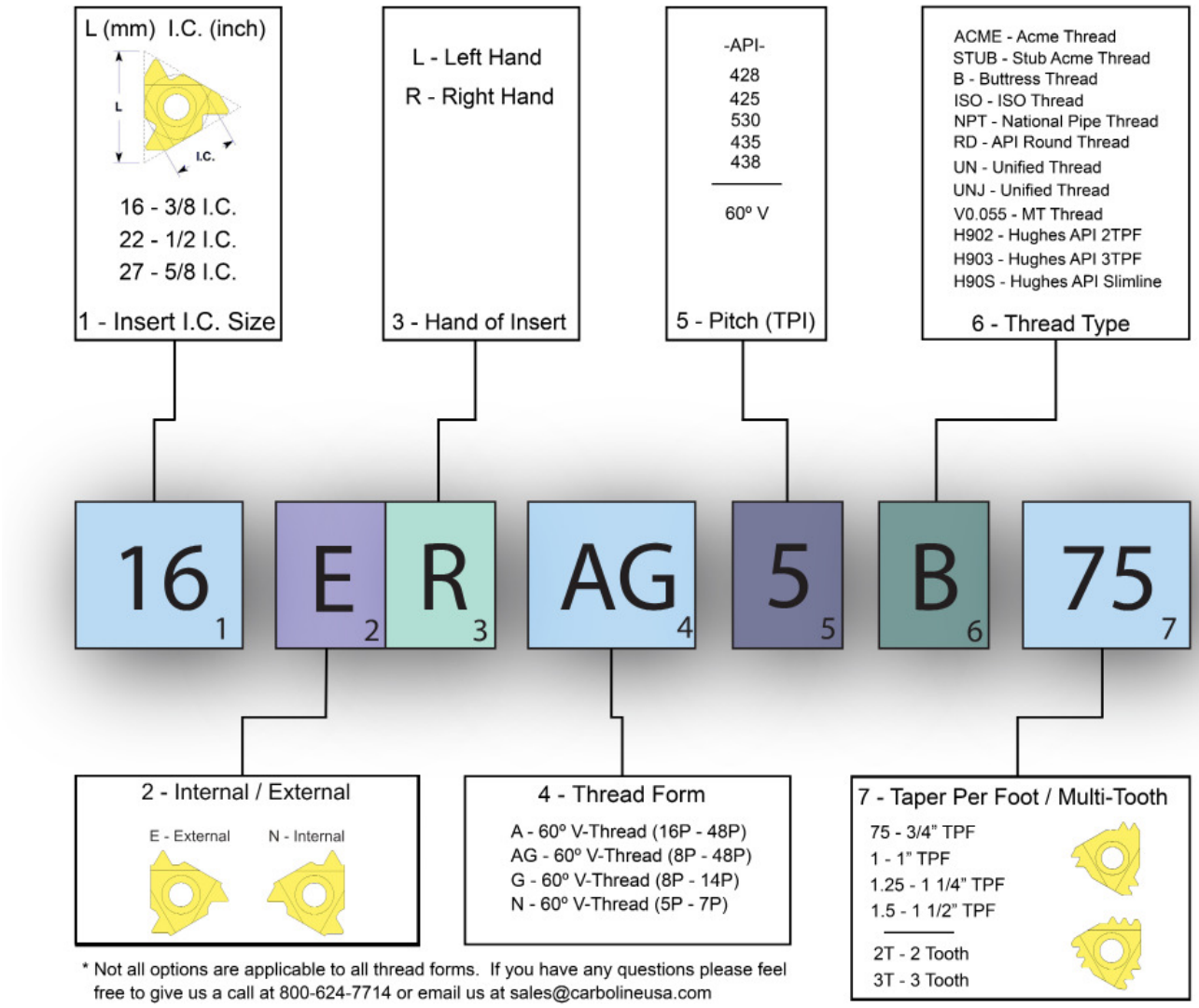


INTERNAL BUTTRESS W/CB	DESCRIPTION	EDP	# TEETH	PITCH	TPF	L	T	A
	5T5B75I	84751	5	5	3/4	1.000	.204	.625



CHIPBREAKERS	DESCRIPTION	EDP	ANGLE	L	T	A	USED WITH
	5/8 EXTERNAL	46322	3º	5/8	.125	.480	
	5/8 EXTERNAL MOD	50452	3º X 10º	5/8	.125	.480	
	3/4 EXTERNAL	76322	3º	4/5	.125	.500	
	5/8 INTERNAL	78771	3º	5/8	.125	.470	
	1 INCH INTERNAL	77401	3º	1	.125	.470	
	5/8 NEUTRAL	82660	0º	5/8	.125	.420	SPECIALS

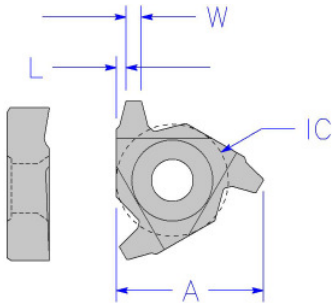
WITH FORM	DESCRIPTION	EDP	ANGLE	L	T	A	USED WITH
	4T8RD75ICB	78941	FORMED	5/8	.125	.515	4T8RD75I
	5T5B75ICB	84761	FORMED	1	.125	.515	5T5B75I



* Not all options are applicable to all thread forms. If you have any questions please feel free to give us a call at 800-624-7714 or email us at sales@carbolineusa.com

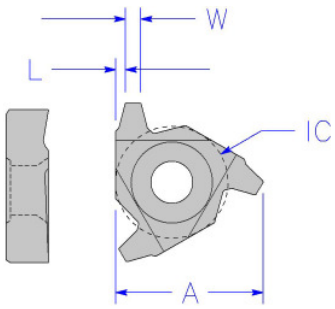
Laydown

Threading Grade Descriptions			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at slower speeds	Item specific
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at medium speeds	**Standard**
221	AlTiN coated tough submicron chip resistant	Ductile iron, stainless steel, nickel-based & high-temp alloys at high speeds	Item specific
231	TiAlN coated tough submicron chip resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium speeds	**Standard**
232	TiAlN coated tough submicron - chip, wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium speeds	Item specific
613	TiN coated premium substrate for threading	4140 and similar steels at slow to medium speeds	**Standard**
623	AlTiN coated premium substrate for threading	All steels at high speeds - maximum heat protection	Item specific
633	TiAlN coated premium substrate for threading	All steels at high speeds - medium heat protection	Item specific

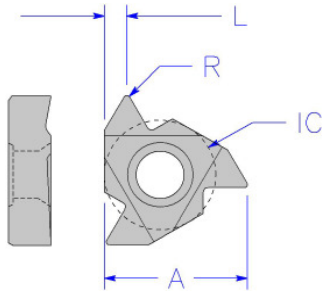


LAYDOWN ACME THREADING	DESCRIPTION	EDP	PITCH	WIDTH	IC	A	L
	16ER 16P ACME	35002	16	.0206	.375	.491	.036
	16EL 16P ACME	37502	16	.0206	.375	.491	.036
	16ER 14P ACME	35012	14	.0239	.375	.491	.036
	16EL 14P ACME	37512	14	.0239	.375	.491	.036
	16ER 12P ACME	35022	12	.0283	.375	.491	.036
	16EL 12P ACME	37522	12	.0283	.375	.491	.036
	16ER 10P ACME	35032	10	.0319	.375	.491	.036
	16EL 10P ACME	37532	10	.0319	.375	.491	.036
	16ER 8P ACME	35042	8	.0411	.375	.491	.036
	16EL 8P ACME	37542	8	.0411	.375	.491	.036
	22ER 6P ACME	35052	6	.0566	.500	.657	.043
	22EL 6P ACME	37552	6	.0566	.500	.657	.043
	22ER 5P ACME	35062	5	.0689	.500	.657	.043
	22EL 5P ACME	37562	5	.0689	.500	.657	.043
	27ER 4P ACME	35072	4	.0875	.625	.833	.050
	27EL 4P ACME	37572	4	.0875	.625	.833	.050
	16NR 16P ACME	35101	16	.0206	.375	.491	.036
	16NL 16P ACME	37601	16	.0206	.375	.491	.036
	16NR 14P ACME	35111	14	.0239	.375	.491	.036
	16NL 14P ACME	37611	14	.0239	.375	.491	.036
	16NR 12P ACME	35121	12	.0283	.375	.491	.036
	16NL 12P ACME	37621	12	.0283	.375	.491	.036
	16NR 10P ACME	35131	10	.0319	.375	.491	.036
	16NL 10P ACME	37631	10	.0319	.375	.491	.036
	16NR 8P ACME	35141	8	.0411	.375	.491	.036
	16NL 8P ACME	37641	8	.0411	.375	.491	.036
	22NR 6P ACME	35151	6	.0566	.500	.657	.043
	22NL 6P ACME	37651	6	.0566	.500	.657	.043
	22NR 5P ACME	35161	5	.0689	.500	.657	.043
	22NL 5P ACME	37661	5	.0689	.500	.657	.043
	27NR 4P ACME	35171	4	.0875	.625	.833	.050
	27NL 4P ACME	37671	4	.0875	.625	.833	.050

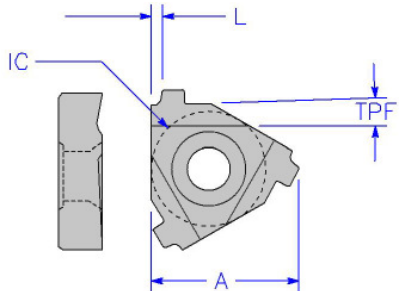
Laydown holders and bars on pages 110-114.

LAYDOWN STUB ACME THREADING	DESCRIPTION	EDP	PITCH	WIDTH	IC	A	L
	16ER 16P STUB	35202	16	.0238	.375	.4 91	.036
	16EL 16P STUB	37702	16	.0238	.375	.491	.036
	16ER 14P STUB	35212	14	.0276	.375	.491	.036
	16EL 14P STUB	37712	14	.0276	.375	.491	.036
	16ER 12P STUB	35222	12	.0326	.375	.491	.036
	16EL 12P STUB	37722	12	.0326	.375	.491	.036
	16ER 10P STUB	35232	10	.0370	.375	.491	.036
	16EL 10P STUB	37732	10	.0370	.375	.491	.036
	16ER 8P STUB	35242	8	.0476	.375	.491	.036
	16EL 8P STUB	37742	8	.0476	.375	.491	.036
	22ER 6P STUB	35252	6	.0652	.500	.657	.043
	22EL 6P STUB	37752	6	.0652	.500	.657	.043
	22ER 5P STUB	35262	5	.0793	.500	.657	.043
	22EL 5P STUB	37762	5	.0793	.500	.657	.043
	27ER 4P STUB	35272	4	.1004	.625	.833	.050
	27EL 4P STUB	37772	4	.1004	.625	.833	.050
	16NR 16P STUB	35301	16	.0238	.375	.491	.036
	16NL 16P STUB	37801	16	.0238	.375	.491	.036
	16NR 14P STUB	35311	14	.0276	.375	.491	.036
	16NL 14P STUB	37811	14	.0276	.375	.491	.036
	16NR 12P STUB	35321	12	.0326	.375	.491	.036
	16NL 12P STUB	37821	12	.0326	.375	.491	.036
	16NR 10P STUB	35331	10	.0370	.375	.491	.036
	16NL 10P STUB	37831	10	.0370	.375	.491	.036
	16NR 8P STUB	35341	8	.0476	.375	.491	.036
	16NL 8P STUB	37841	8	.0476	.375	.491	.036
	22NR 6P STUB	35351	6	.0652	.500	.657	.043
	22NL 6P STUB	37851	6	.0652	.500	.657	.043
	22NR 5P STUB	35361	5	.0793	.500	.657	.043
	22NL 5P STUB	37861	5	.0793	.500	.657	.043
	27NR 4P STUB	35371	4	.1004	.625	.833	.050
	27NL 4P STUB	37871	4	.1004	.625	.833	.050

Laydown holders and bars on pages 110-114.

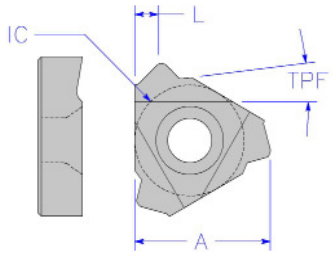
LAYDOWN 60° THREADING	DESCRIPTION	EDP	PITCH	R	IC	A	L
	16ER A60	35402	16-48	.003	.375	.517	.040
	16EL A60	37902	16-48	.003	.375	.517	.040
	16ER AG60	35412	8-48	.003	.375	.492	.060
	16EL AG60	37912	8-48	.003	.375	.492	.060
	16ER G60	35422	8-14	.007	.375	.485	.070
	16EL G60	37922	8-14	.007	.375	.485	.070
	22ER N60	35432	5-7	.015	.500	.641	.100
	22EL N60	37932	5-7	.015	.500	.641	.100
	27ER K60	35442	4.5-4	.028	.625	.817	.110
	27EL K60	37942	4.5-4	.028	.625	.817	.110
	16NR A60	35501	16-48	.003	.375	.517	.040
	16NL A60	38001	16-48	.003	.375	.517	.040
	16NR AG60	35511	8-48	.003	.375	.492	.060
	16NL AG60	38011	8-48	.003	.375	.492	.060
	16NR G60	35521	8-14	.007	.375	.485	.070
	16NL G60	38021	8-14	.007	.375	.485	.070
	22NR N60	35531	5-7	.010	.500	.641	.100
	22NL N60	38031	5-7	.010	.500	.641	.100
	27NR K60	35541	4-4.5	.015	.625	.815	.110
	27NL K60	38041	4-4.5	.015	.625	.815	.110

Laydown holders and bars on pages 110-114.

LAYDOWN API BUTTRESS	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	16ER 8B75	59482	8	0.75	.375	.458	.069
	22ER 8B75	35602	8	0.75	.500	.649	.069
	22ER 5B75	58012	5	0.75	.500	.645	.048
	22ER 5B1	69842	5	1	.500	.645	.048
	16NR 8B75	59491	8	0.75	.375	.458	.069
	22NR 8B75	35611	8	0.75	.500	.649	.069
	22NR 5B75	59471	5	0.75	.500	.644	.040
	22NR 5B1	69881	5	1	.500	.644	.040

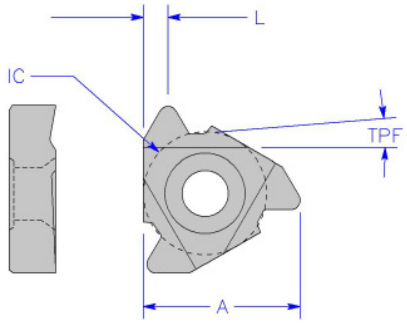
Laydown holders and bars on pages 110-114.

LAYDOWN API HUGHES THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	27ER H902	54432	3.5	2	.625	.775	.134
	27ER H903	65822	3.5	3	.625	.775	.134
	27ER H90S	59572	3	1.25	.625	.765	.114
	27NR H902	54431	3.5	2	.625	.775	.134
	27NR H903	65821	3.5	3	.625	.775	.134
	27NR H90S	59571	3	1.25	.625	.765	.114



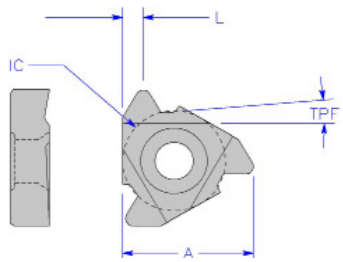
Laydown holders and bars on pages 110-114.

LAYDOWN API ROTARY THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	22ER 425	35702	4	2	.500	.635	.110
	22ER 428	35712	4	2	.500	.635	.110
	22ER 435	35722	4	3	.500	.635	.110
	22ER 438	35732	4	3	.500	.635	.110
	22ER 530	35742	5	3	.500	.635	.100
	22ER PAC	35752	4	1.5	.500	.624	.100
	22NR 425	35761	4	2	.500	.635	.110
	22NR 428	35771	4	2	.500	.635	.110
	22NR 435	35781	4	3	.500	.635	.110
	22NR 438	35791	4	3	.500	.635	.110
	22NR 530	35801	5	3	.500	.635	.100
	22NR PAC	35811	4	1.5	.500	.624	.100



Laydown holders and bars on pages 110-114.

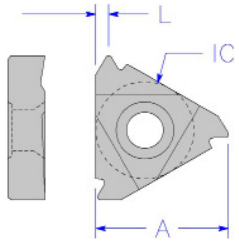
LAYDOWN API ROTARY THREADING



DESCRIPTION	EDP	PITCH	TPF	IC	A	L
27ER 425	66132	4	2	.625	.775	.126
27ER 428	66112	4	2	.625	.775	.126
27ER 435	66142	4	3	.625	.775	.126
27ER 438	66122	4	3	.625	.775	.126
27ER 530	66152	5	3	.625	.775	.126
27ER PAC	74312	4	1.5	.625	.809	.100
27NR 425	66131	4	2	.625	.775	.126
27NR 428	66111	4	2	.625	.775	.126
27NR 435	66141	4	3	.625	.775	.126
27NR 438	66121	4	3	.625	.775	.126
27NR 530	66151	5	3	.625	.775	.126
27NR PAC	74311	4	1.5	.625	.809	.100

Laydown holders and bars on pages 110-114.

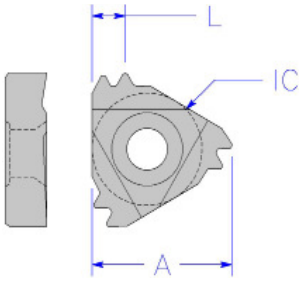
LAYDOWN API ROUND THREADING



DESCRIPTION	EDP	PITCH	TPF	IC	A	L
16ER 8RD	69862	8	0.75	.375	.487	.060
16ER 10RD	74942	10	0.75	.375	.487	.060
16NR 8RD	74931	8	0.75	.375	.487	.060
16NR 10RD	61811	10	0.75	.375	.487	.060
22ER 8RD	65402	8	0.75	.500	.676	.065
22ER 10RD	65412	10	0.75	.500	.676	.065
22NR 8RD	60921	8	0.75	.500	.676	.065
22NR 10RD	65421	10	0.75	.500	.676	.065
27ER 8RD	84482	8	0.75	.625	.843	.060
27ER 10RD	84492	10	0.75	.625	.843	.060
27NR 8RD	61351	8	0.75	.625	.843	.060
27NR 10RD	66911	10	0.75	.625	.843	.060

Laydown holders and bars on pages 110-114.

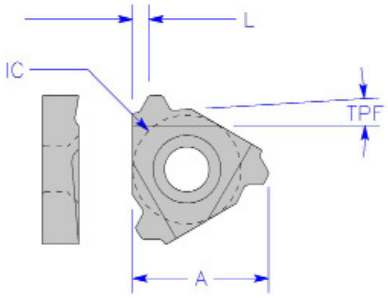
LAYDOWN API ROUND THREADING



DESCRIPTION	EDP	PITCH	TPF	IC	A	L
22ER 2T 8RD	36702	8	0.75	.500	.623	.180
22NR 2T 8RD	36711	8	0.75	.500	.623	.180
27ER 2T 8RD	77832	8	0.75	.625	.816	.170
27ER 3T 8RD	76582	8	0.75	.625	.740	.300
27NR 2T 8RD	77841	8	0.75	.625	.816	.170
27NR 3T 8RD	66821	8	0.75	.625	.740	.300
22ER 2T 10RD	36722	10	0.75	.500	.648	.135
22NR 2T 10RD	36731	10	0.75	.500	.648	.135
27ER 2T 10RD	72722	10	0.75	.625	.836	.135
27ER 3T 10RD	84502	10	0.75	.625	.740	.300
27NR 2T 10RD	84451	10	0.75	.625	.836	.135
27NR 3T 10RD	84511	10	0.75	.625	.740	.300

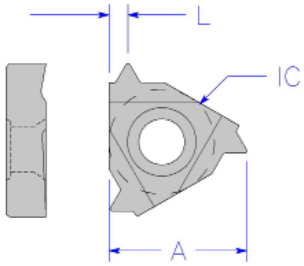
Laydown holders and bars on pages 110-114.

LAYDOWN V055 THREADING

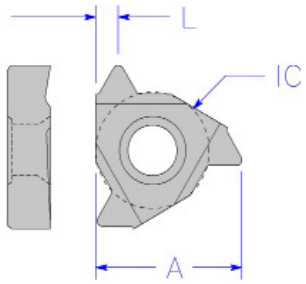


DESCRIPTION	EDP	PITCH	TPF	IC	A	L
16ER V0.055	63832	6	1.5	.375	.472	.055
22ER V0.055	34502	6	1.5	.500	.660	.055
16NR V0.055	46691	6	1.5	.375	.472	.055
22NR V0.055	34501	6	1.5	.500	.660	.055

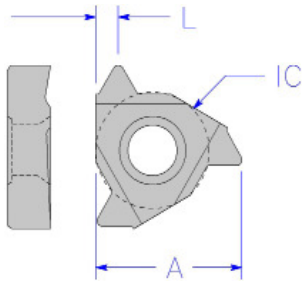
Laydown holders and bars on pages 110-114.

LAYDOWN ISO THREADING	DESCRIPTION	EDP	PITCH	IC	A	L
	16ER .75 ISO	38102	0.75	0.375	.521	.031
	16ER 1.0 ISO	38112	1	0.375	.521	.031
	16ER 1.5 ISO	38122	1.5	0.375	.521	.031
	16ER 2.0 ISO	38132	2	0.375	.496	.057
	16ER 2.5 ISO	38142	2.5	0.375	.496	.057
	16ER 3.0 ISO	38152	3	0.375	.496	.057
	22ER 3.5 ISO	38162	3.5	0.500	.644	.096
	22ER 4.0 ISO	38172	4	0.500	.644	.096
	22ER 5.0 ISO	38182	5	0.500	.644	.096
	27ER 5.5 ISO	38192	5.5	0.625	.817	.111
	27ER 6.0 ISO	38202	6	0.625	.817	.111
	16NR .75 ISO	38251	0.75	0.375	.521	.031
	16NR 1.0 ISO	38261	1	0.375	.521	.031
	16NR 1.5 ISO	38271	1.5	0.375	.521	.031
	16NR 2.0 ISO	38281	2	0.375	.496	.057
	16NR 2.5 ISO	38291	2.5	0.375	.496	.057
	16NR 3.0 ISO	38301	3	0.375	.496	.057
	22NR 3.5 ISO	38311	3.5	0.500	.644	.096
	22NR 4.0 ISO	38321	4	0.500	.644	.096
	22NR 5.0 ISO	38331	5	0.500	.644	.096
	27NR 5.5 ISO	38341	5.5	0.625	.817	.111
	27NR 6.0 ISO	38351	6	0.625	.817	.111

Laydown holders and bars on pages 110-114.

LAYDOWN UN THREADING	DESCRIPTION	EDP	PITCH	IC	A	L
	16ER 32UN	18002	32	.375	.494	.060
	16EL 32UN	18012	32	.375	.494	.060
	16ER 28UN	18022	28	.375	.494	.060
	16EL 28UN	18032	28	.375	.494	.060
	16ER 24UN	18042	24	.375	.494	.060
	16EL 24UN	18052	24	.375	.494	.060
	16ER 20UN	18062	20	.375	.494	.060
	16EL 20UN	18072	20	.375	.494	.060
	16ER 18UN	18082	18	.375	.494	.060
	16EL 18UN	18092	18	.375	.494	.060
	16ER 16UN	18102	16	.375	.494	.060
	16EL 16UN	18112	16	.375	.494	.060
	16ER 14UN	18122	14	.375	.494	.060
	16EL 14UN	18132	14	.375	.494	.060
	16ER 13UN	18142	13	.375	.494	.060
	16EL 13UN	18152	13	.375	.494	.060
	16ER 12UN	18162	12	.375	.494	.060
	16EL 12UN	18172	12	.375	.494	.060
	16ER 11UN	18182	11	.375	.494	.060
	16EL 11UN	18192	11	.375	.494	.060
	16ER 10UN	18202	10	.375	.494	.060
	16EL 10UN	18212	10	.375	.494	.060
	16ER 9UN	18222	9	.375	.494	.060
	16EL 9UN	18232	9	.375	.494	.060
	16ER 8UN	18242	8	.375	.494	.060
	16EL 8UN	18252	8	.375	.494	.060

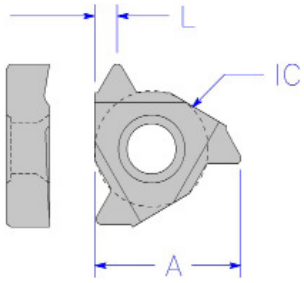
Laydown holders and bars on pages 110-114.



LAYDOWN UN THREADING CONTINUED	DESCRIPTION	EDP	PITCH	IC	A	L
	16NR 32UN	18401	32	.375	.494	.060
	16NL 32UN	18411	32	.375	.494	.060
	16NR 28UN	18421	28	.375	.494	.060
	16NL 28UN	18431	28	.375	.494	.060
	16NR 24UN	18441	24	.375	.494	.060
	16NL 24UN	18451	24	.375	.494	.060
	16NR 20UN	18461	20	.375	.494	.060
	16NL 20UN	18471	20	.375	.494	.060
	16NR 18UN	18481	18	.375	.494	.060
	16NL 18UN	18491	18	.375	.494	.060
	16NR 16UN	18501	16	.375	.494	.060
	16NL 16UN	18511	16	.375	.494	.060
	16NR 14UN	18521	14	.375	.494	.060
	16NL 14UN	18531	14	.375	.494	.060
	16NR 13UN	18541	13	.375	.494	.060
	16NL 13UN	18551	13	.375	.494	.060
	16NR 12UN	18561	12	.375	.494	.060
	16NL 12UN	18571	12	.375	.494	.060
	16NR 11UN	18581	11	.375	.494	.060
	16NL 11UN	18591	11	.375	.494	.060
	16NR 10UN	18601	10	.375	.494	.060
	16NL 10UN	18611	10	.375	.494	.060
	16NR 9UN	18621	9	.375	.494	.060
	16NL 9UN	18631	9	.375	.494	.060
	16NR 8UN	18641	8	.375	.494	.060
	16NL 8UN	18651	8	.375	.494	.060

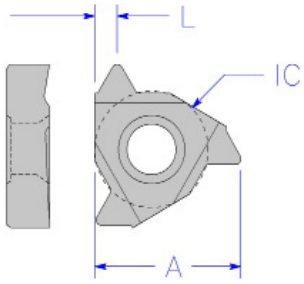
Laydown holders and bars on pages 110-114.

LAYDOWN UN THREADING CONTINUED	DESCRIPTION	EDP	PITCH	IC	A	L
	22ER 7UN	18262	7	.500	.650	.090
	22EL 7UN	18272	7	.500	.650	.090
	22ER 6UN	18282	6	.500	.650	.090
	22EL 6UN	18292	6	.500	.650	.090
	22ER 5UN	18302	5	.500	.646	.098
	22EL 5UN	18312	5	.500	.646	.098
	27ER 4.5UN	18322	4.5	.625	.802	.126
	27EL 4.5UN	18332	4.5	.625	.802	.126
	27ER 4UN	18342	4	.625	.802	.126
	27EL 4UN	18352	4	.625	.802	.126

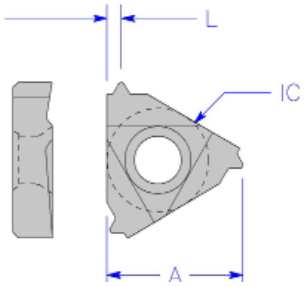


Laydown holders and bars on pages 110-114.

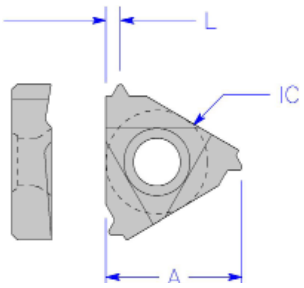
LAYDOWN UN THREADING CONTINUED	DESCRIPTION	EDP	PITCH	IC	A	L
	22NR 7UN	18661	7	.500	.650	.090
	22NL 7UN	18671	7	.500	.650	.090
	22NR 6UN	18681	6	.500	.650	.090
	22NL 6UN	18691	6	.500	.650	.090
	22NR 5UN	18701	5	.500	.646	.098
	22NL 5UN	18711	5	.500	.646	.098
	27NR 4.5UN	18721	4.5	.625	.802	.126
	27NL 4.5UN	18731	4.5	.625	.802	.126
	27NR 4UN	18741	4	.625	.802	.126
	27NL 4UN	18751	4	.625	.802	.126



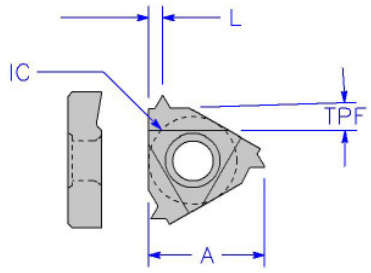
Laydown holders and bars on pages 110-114.

LAYDOWN UNJ THREADING	DESCRIPTION	EDP	PITCH	IC	A	L
	16ER 32UNJ	18802	32	.375	.494	.060
	16EL 32UNJ	18812	32	.375	.494	.060
	16ER 28UNJ	18822	28	.375	.494	.060
	16EL 28UNJ	18832	28	.375	.494	.060
	16ER 24UNJ	18842	24	.375	.494	.060
	16EL 24UNJ	18852	24	.375	.494	.060
	16ER 20UNJ	18862	20	.375	.494	.060
	16EL 20UNJ	18872	20	.375	.494	.060
	16ER 18UNJ	18882	18	.375	.494	.060
	16EL 18UNJ	18892	18	.375	.494	.060
	16ER 16UNJ	18902	16	.375	.494	.060
	16EL 16UNJ	18912	16	.375	.494	.060
	16ER 14UNJ	18922	14	.375	.494	.060
	16EL 14UNJ	18932	14	.375	.494	.060
	16ER 12UNJ	18942	12	.375	.494	.060
	16EL 12UNJ	18952	12	.375	.494	.060
	16ER 10UNJ	18962	10	.375	.494	.060
	16EL 10UNJ	18972	10	.375	.494	.060

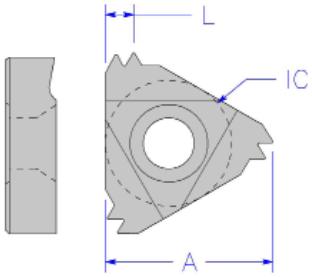
Laydown holders and bars on pages 110-114.

LAYDOWN UNJ THREADING CONTINUED	DESCRIPTION	EDP	PITCH	IC	A	L
	16NR 32UNJ	19001	32	.375	.494	.060
	16NL 32UNJ	19011	32	.375	.494	.060
	16NR 28UNJ	19021	28	.375	.494	.060
	16NL 28UNJ	19031	28	.375	.494	.060
	16NR 24UNJ	19041	24	.375	.494	.060
	16NL 24UNJ	19051	24	.375	.494	.060
	16NR 20UNJ	19061	20	.375	.494	.060
	16NL 20UNJ	19071	20	.375	.494	.060
	16NR 18UNJ	19081	18	.375	.494	.060
	16NL 18UNJ	19091	18	.375	.494	.060
	16NR 16UNJ	19101	16	.375	.494	.060
	16NL 16UNJ	19111	16	.375	.494	.060
	16NR 14UNJ	19121	14	.375	.494	.060
	16NL 14UNJ	19131	14	.375	.494	.060
	16NR 12UNJ	19141	12	.375	.494	.060
	16NL 12UNJ	19151	12	.375	.494	.060
	16NR 10UNJ	19161	10	.375	.494	.060
	16NL 10UNJ	19171	10	.375	.494	.060

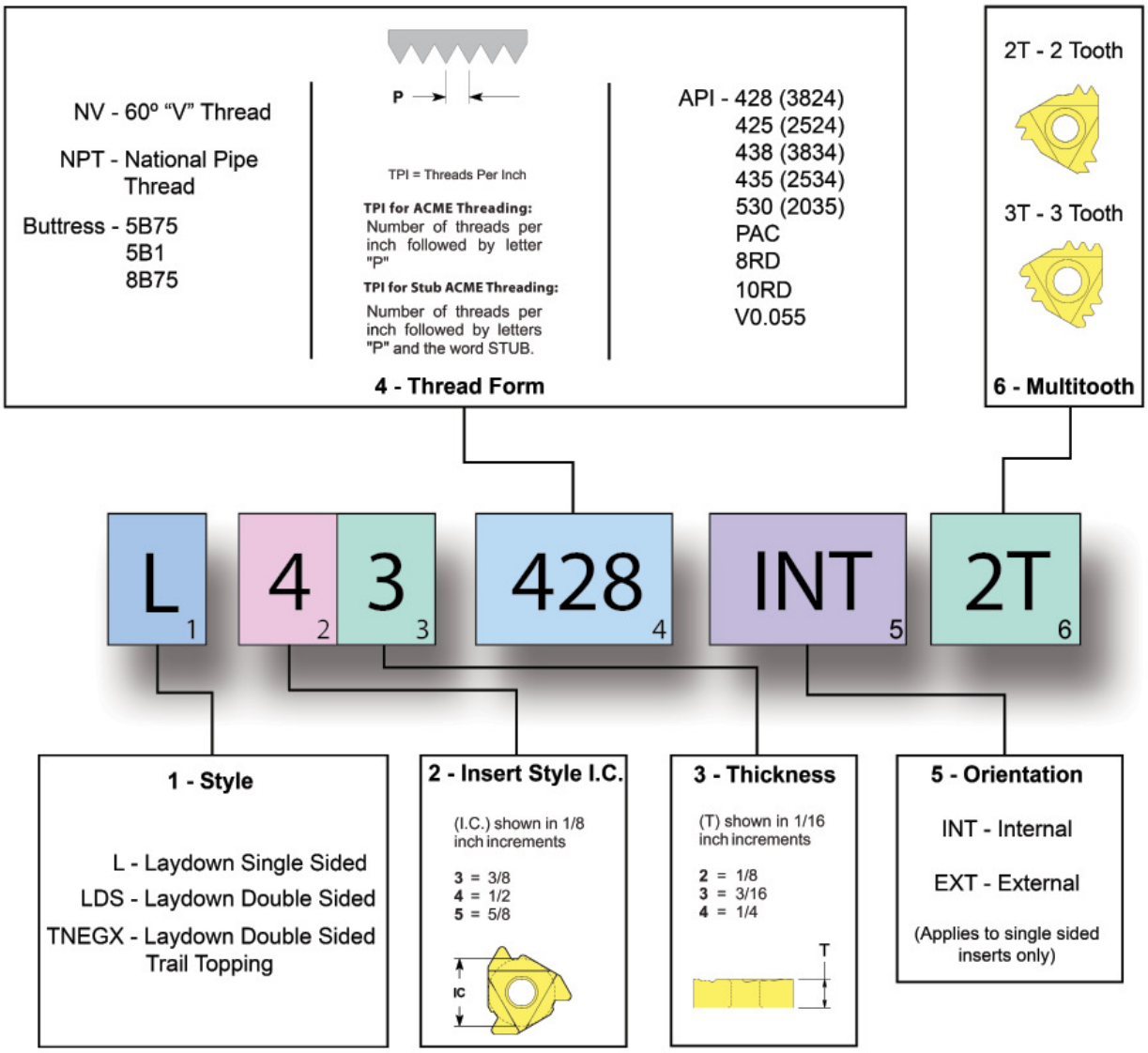
Laydown holders and bars on pages 110-114.

LAYDOWN NPT THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	16ER 18NPT	19202	18	.750	.375	.523	.031
	16EL 18NPT	19212	18	.750	.375	.523	.031
	16ER 14NPT	19222	14	.750	.375	.494	.060
	16EL 14NPT	19232	14	.750	.375	.494	.060
	16ER 11.5NPT	19242	11.5	.750	.375	.494	.060
	16EL 11.5NPT	19252	11.5	.750	.375	.494	.060
	16ER 8NPT	19262	8	.750	.375	.487	.068
	16EL 8NPT	19272	8	.750	.375	.487	.068
	16NR 18NPT	19281	18	.750	.375	.523	.031
	16NL 18NPT	19291	18	.750	.375	.523	.031
	16NR 14NPT	19301	14	.750	.375	.494	.060
	16NL 14NPT	19311	14	.750	.375	.494	.060
	16NR 11.5NPT	19321	11.5	.750	.375	.494	.060
	16NL 11.5NPT	19331	11.5	.750	.375	.494	.060
	16NR 8NPT	19341	8	.750	.375	.487	.068
	16NL 8NPT	19351	8	.750	.375	.487	.068

Laydown holders and bars on pages 110-114.

LAYDOWN NPT MULTI-TOOTH THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	22ER 18NPT 2T	19402	18	.750	.500	.681	.080
	22ER 14NPT 2T	19412	14	.750	.500	.656	.112
	27ER 11.5NPT 2T	19452	11.5	.750	.625	.827	.139
	27ER 11.5NPT 3T	19462	11.5	.750	.625	.781	.222
	27ER 8NPT 2T	19472	8	.750	.625	.788	.189
	22NR 18NPT 2T	19481	18	.750	.500	.681	.080
	22NR 14NPT 2T	19491	14	.750	.500	.656	.112
	27NR 11.5NPT 2T	19531	11.5	.750	.625	.827	.139
	27NR 11.5NPT 3T	19541	11.5	.750	.625	.781	.222
	27NR 8NPT 2T	19551	8	.750	.625	.788	.189

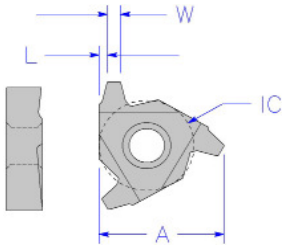
Laydown holders and bars on pages 110-114.

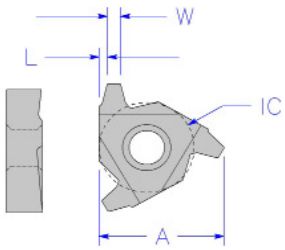


Laydown 7°

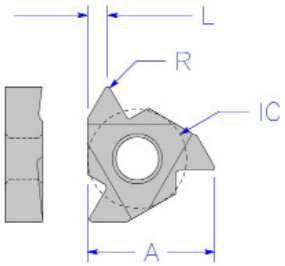
Threading Grade Descriptions			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at slower speeds	Item specific
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at medium speeds	**Standard**
221	AlTiN coated tough submicron chip resistant	Ductile iron, stainless steel, nickel-based & high-temp alloys at high speeds	Item specific
231	TiAlN coated tough submicron chip resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium speeds	**Standard**
232	TiAlN coated tough submicron - chip, wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium speeds	Item specific
613	TiN coated premium substrate for threading	4140 and similar steels at slow to medium speeds	**Standard**
623	AlTiN coated premium substrate for threading	All steels at high speeds - maximum heat protection	Item specific
633	TiAlN coated premium substrate for threading	All steels at high speeds - medium heat protection	Item specific

Laydown 7°

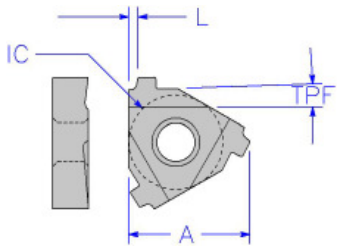
LAYDOWN ACME THREADING	DESCRIPTION	EDP	PITCH	WIDTH	IC	A	L
	L32 16P ACME EXT	34602	16	.0206	.375	.491	.036
	L32 14P ACME EXT	34622	14	.0239	.375	.491	.036
	L32 12P ACME EXT	34642	12	.0283	.375	.491	.036
	L32 10P ACME EXT	34662	10	.0319	.375	.491	.036
	L32 8P ACME EXT	34682	8	.0411	.375	.491	.036
	L43 6P ACME EXT	34712	6	.0566	.500	.657	.043
	L43 5P ACME EXT	34732	5	.0689	.500	.657	.043
	L54 4P ACME EXT	34762	4	.0875	.625	.833	.050
	L32 16P ACME INT	34611	16	.0206	.375	.491	.036
	L32 14P ACME INT	34631	14	.0239	.375	.491	.036
	L32 12P ACME INT	34651	12	.0283	.375	.491	.036
	L32 10P ACME INT	34671	10	.0319	.375	.491	.036
	L32 8P ACME INT	34691	8	.0411	.375	.491	.036
	L43 6P ACME INT	34721	6	.0566	.500	.657	.043
	L43 5P ACME INT	34741	5	.0689	.500	.657	.043
	L54 4P ACME INT	34771	4	.0875	.625	.833	.050

LAYDOWN STUB ACME THREADING	DESCRIPTION	EDP	PITCH	WIDTH	IC	A	L
	L32 16P STUB EXT	34802	16	.0238	.375	.491	.036
	L32 14P STUB EXT	34822	14	.0276	.375	.491	.036
	L32 12P STUB EXT	34842	12	.0326	.375	.491	.036
	L32 10P STUB EXT	34862	10	.0370	.375	.491	.036
	L32 8P STUB EXT	34882	8	.0476	.375	.491	.036
	L43 6P STUB EXT	34912	6	.0652	.500	.657	.043
	L43 5P STUB EXT	34932	5	.0793	.500	.657	.043
	L54 4P STUB EXT	34962	4	.1004	.625	.833	.050
	L32 16P STUB INT	34811	16	.0238	.375	.491	.036
	L32 14P STUB INT	34831	14	.0276	.375	.491	.036
	L32 12P STUB INT	34851	12	.0326	.375	.491	.036
	L32 10P STUB INT	34871	10	.0370	.375	.491	.036
	L32 8P STUB INT	34891	8	.0476	.375	.491	.036
	L43 6P STUB INT	34921	6	.0652	.500	.657	.043
	L43 5P STUB INT	34941	5	.0793	.500	.657	.043
	L54 4P STUB INT	34971	4	.1004	.625	.833	.050

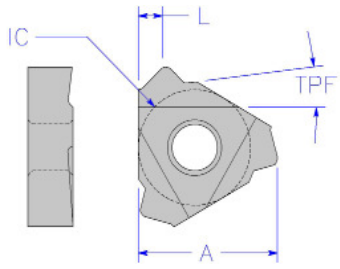
Laydown holders and bars on pages 110-114.

LAYDOWN 60° THREADING	DESCRIPTION	EDP	PITCH	R	IC	A	L
	L32 NV .003R EXT	36202	8-36	.003	.375	.492	.060
	L43 NV .004R EXT	36232	8-32	.004	.500	.665	.075
	L43 NV .006R EXT	36252	6-24	.006	.500	.665	.075
	L43 NV .008R EXT	36272	18	.008	.500	.665	.075
	L43 NV .010R EXT	36292	14	.010	.500	.665	.075
	L43 NV .012R EXT	36312	12	.012	.500	.665	.075
	L43 NV .014R EXT	36332	10	.014	.500	.665	.075
	L53 NV .006R EXT	36362	4-24	.006	.625	.827	.100
	L53 NV .020R EXT	36382	7	.020	.625	.827	.100
	L53 NV .025R EXT	36402	6	.025	.625	.813	.115
	L53 NV .038R EXT	36422	4	.038	.625	.813	.115
	L32 NV .003R INT	36211	8-36	.003	.375	.492	.060
	L43 NV .004R INT	36241	6-20	.004	.500	.665	.075
	L43 NV .006R INT	36261	6-14	.006	.500	.665	.075
	L43 NV .008R INT	36281	9	.008	.500	.665	.075
	L43 NV .010R INT	36301	7	.010	.500	.665	.075
	L43 NV .012R INT	36321	6	.012	.500	.665	.075
	L43 NV .014R INT	36341	5	.014	.500	.665	.075
	L53 NV .006R INT	36371	4-14	.006	.625	.827	.100
	L53 NV .020R INT	36391	3-4	.020	.625	.827	.100
	L53 NV .025R INT	36411	3-4	.025	.625	.813	.115
	L53 NV .038R INT	36431	4	.038	.625	.813	.115

Laydown holders and bars on pages 110-114.

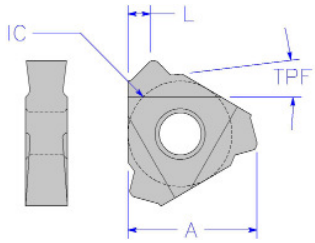
LAYDOWN API BUTTRESS	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L32 8B75 EXT	36502	8	0.75	.375	.458	.069
	L43 8B75 EXT	36532	8	0.75	.500	.649	.069
	L43 5B75EXT	36552	5	0.75	.500	.645	.048
	L43 5B1 EXT	36572	5	1	.500	.645	.048
	L53 5B75 EXT	36602	5	0.75	.625	.821	.052
	L53 5B1 EXT	36622	5	1	.625	.821	.052
	L54 5B75 EXT	36652	5	0.75	.625	.821	.052
	L54 5B1 EXT	36672	5	1	.625	.821	.052
	L32 8B75 INT	36511	8	0.75	.375	.458	.069
	L43 8B75 INT	36541	8	0.75	.500	.649	.069
	L43 5B75INT	36561	5	0.75	.500	.645	.048
	L43 5B1 INT	36581	5	1	.500	.645	.048
	L53 5B75 INT	36611	5	0.75	.625	.821	.052
	L53 5B1 INT	36631	5	1	.625	.821	.052
	L54 5B75 INT	36661	5	0.75	.625	.821	.052
	L54 5B1 INT	36681	5	1	.625	.821	.052

Laydown holders and bars on pages 110-114.

LAYDOWN API HUGHES THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L53 H902 EXT	84692	3.5	2	.625	.775	.134
	L53 H903 EXT	76422	3.5	3	.625	.775	.134
	L53 H90S EXT	76412	3	1.25	.625	.765	.114
	L54 H902 EXT	36772	3.5	2	.625	.775	.134
	L54 H903 EXT	36792	3.5	3	.625	.775	.134
	L54 H90S EXT	36812	3	1.25	.625	.765	.114
	L53 H902 INT	78321	3.5	2	.625	.775	.134
	L53 H903 INT	76421	3.5	3	.625	.775	.134
	L53 H90S INT	76411	3	1.25	.625	.765	.114
	L54 H902 INT	36781	3.5	2	.625	.775	.134
	L54 H903 INT	36801	3.5	3	.625	.775	.134
	L54 H90S INT	36821	3	1.25	.625	.765	.114

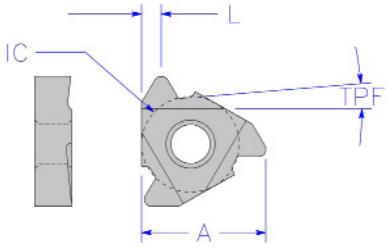
Laydown holders and bars on pages 110-114.

LAYDOWN API HUGHES THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	LDS 54 H902	51840	3.5	2	.625	.775	.134
	LDS 54 H903	47730	3.5	3	.625	.775	.134
	LDS 54 H90S	36870	3	1.25	.625	.765	.114

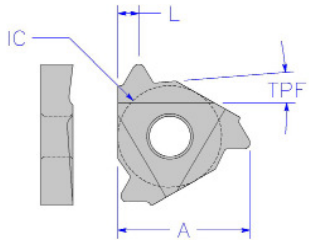


Laydown holders and bars on pages 110-114.

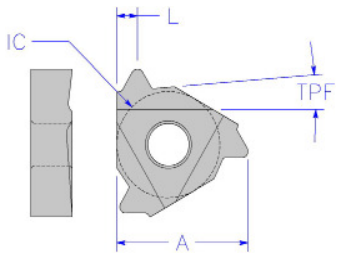
LAYDOWN API ROTARY THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L43 425 EXT	83792	4	2	.500	.635	.110
	L43 428 EXT	83782	4	2	.500	.635	.110
	L43 435 EXT	83812	4	3	.500	.635	.110
	L43 438 EXT	83822	4	3	.500	.635	.110
	L43 530 EXT	83802	5	3	.500	.635	.100
	L43 PAC EXT	37002	4	1.5	.500	.624	.080
	L43 425 INT	83791	4	2	.500	.635	.110
	L43 428 INT	83781	4	2	.500	.635	.110
	L43 435 INT	83811	4	3	.500	.635	.110
	L43 438 INT	83821	4	3	.500	.635	.110
	L43 530 INT	83801	5	3	.500	.635	.100
	L43 PAC INT	37011	4	1.5	.500	.624	.080



Laydown holders and bars on pages 110-114.

LAYDOWN API ROTARY THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L53 425 EXT	70212	4	2	.625	.795	.125
	L53 428 EXT	70192	4	2	.625	.795	.125
	L53 435 EXT	70222	4	3	.625	.795	.125
	L53 438 EXT	70202	4	3	.625	.795	.125
	L53 530 EXT	70232	5	3	.625	.795	.125
	L53 PAC EXT	37022	4	1.5	.625	.809	.085
	L53 425 INT	70211	4	2	.625	.795	.125
	L53 428 INT	70191	4	2	.625	.795	.125
	L53 435 INT	70221	4	3	.625	.795	.125
	L53 438 INT	70201	4	3	.625	.795	.125
	L53 530 INT	70231	5	3	.625	.795	.125
	L53 PAC INT	37031	4	1.5	.625	.809	.085

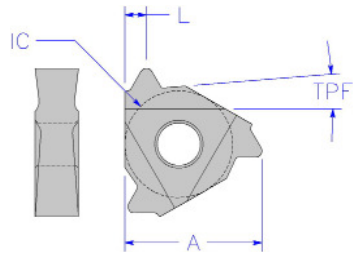
Laydown holders and bars on pages 110-114.

LAYDOWN API ROTARY THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L54 425 EXT	70162	4	2	.625	.795	.125
	L54 428 EXT	70142	4	2	.625	.795	.125
	L54 435 EXT	70172	4	3	.625	.795	.125
	L54 438 EXT	70152	4	3	.625	.795	.125
	L54 530 EXT	70182	5	3	.625	.795	.125
	L54 PAC EXT	37042	4	1.5	.625	.809	.085
	L54 425 INT	70161	4	2	.625	.795	.125
	L54 428 INT	70141	4	2	.625	.795	.125
	L54 435 INT	70171	4	3	.625	.795	.125
	L54 438 INT	70151	4	3	.625	.795	.125
	L54 530 INT	70181	5	3	.625	.795	.125
	L54 PAC INT	37051	4	1.5	.625	.809	.085

Laydown holders and bars on pages 110-114.

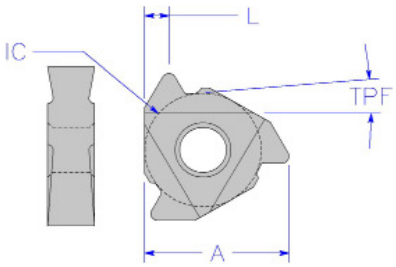
LAYDOWN API ROTARY THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	LDS 54 425	36120	4	2	.625	.792	.136
	LDS 54 428	36100	4	2	.625	.792	.136
	LDS 54 435	36130	4	3	.625	.792	.136
	LDS 54 438	36110	4	3	.625	.792	.136
	LDS 54 530	36140	5	3	.625	.792	.136
	LDS 54 PAC	55250	4	1.5	.625	.809	.085

Laydown holders and bars on pages 110-114.

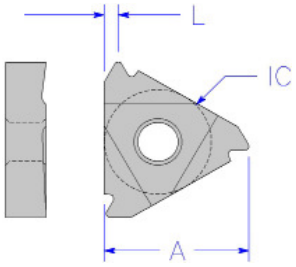


LAYDOWN API ROTARY THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	TNEGX 54 2524	54390	4	2	.625	.775	.130
	TNEGX 54 3824	54370	4	2	.625	.775	.130
	TNEGX 54 2534	54400	4	3	.625	.775	.130
	TNEGX 54 3834	54380	4	3	.625	.775	.130
	TNEGX 54 2035	54410	5	3	.625	.775	.130

Laydown holders and bars on pages 110-114.

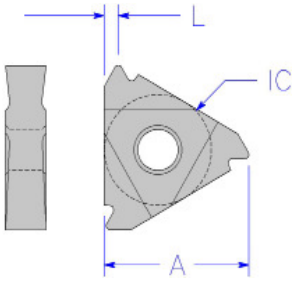


LAYDOWN API ROUND THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L32 8RD EXT	55172	8	0.75	.375	.487	.060
	L32 10RD EXT	55352	10	0.75	.375	.487	.060
	L43 8RD EXT	42902	8	0.75	.500	.676	.065
	L43 10RD EXT	73822	10	0.75	.500	.676	.065
	L54 8RD EXT	36902	8	0.75	.625	.843	.060
	L54 10RD EXT	36922	10	0.75	.625	.843	.060
	L32 8RD INT	55171	8	0.75	.375	.487	.060
	L32 10RD INT	55351	10	0.75	.375	.487	.060
	L43 8RD INT	42901	8	0.75	.500	.676	.065
	L43 10RD INT	73821	10	0.75	.500	.676	.065
	L54 8RD INT	36911	8	0.75	.625	.843	.060
	L54 10RD INT	36931	10	0.75	.625	.843	.060



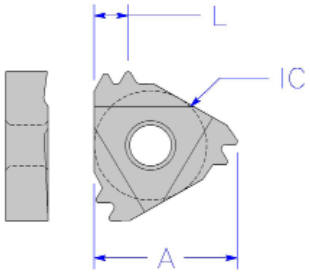
Laydown holders and bars on pages 110-114.

LAYDOWN API ROUND THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	LDS 43 8RD	36950	8	0.75	.500	.676	.065
	LDS 43 10RD	36960	10	0.75	.500	.676	.065
	LDS 54 8RD	36970	8	0.75	.625	.843	.060
	LDS 54 10RD	36980	10	0.75	.625	.843	.060



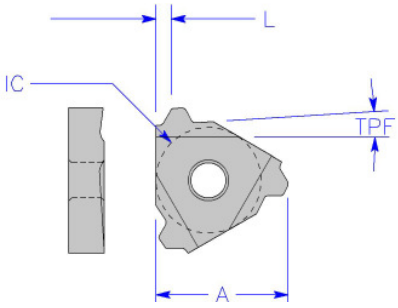
Laydown holders and bars on pages 110-114.

LAYDOWN MULTI-TOOTH API ROUND THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L54 2T 8RD EXT	37102	8	0.75	.625	.816	.170
	L54 3T 8RD EXT	37122	8	0.75	.625	.740	.300
	L54 2T 10RD EXT	37142	10	0.75	.625	.836	.135
	L54 3T 10RD EXT	37162	10	0.75	.625	.740	.300
	L54 2T 8RD INT	37111	8	0.75	.625	.816	.170
	L54 3T 8RD INT	37131	8	0.75	.625	.740	.300
	L54 2T 10RD INT	37151	10	0.75	.625	.836	.135
	L54 3T 10RD INT	37171	10	0.75	.625	.740	.300

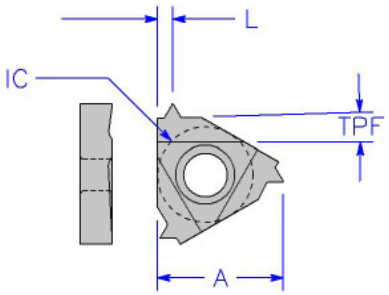


Laydown holders and bars on pages 110-114.

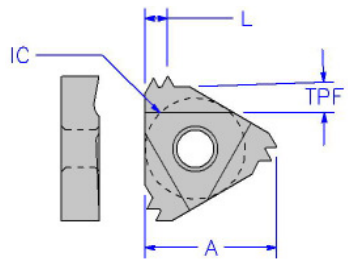
LAYDOWN V055 THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L32 V0.055 EXT	34542	6	1.5	.375	.472	.055
	L43 V0.055 EXT	34562	6	1.5	.500	.660	.055
	L32 V0.055 INT	34551	6	1.5	.375	.472	.055
	L43 V0.055 INT	34571	6	1.5	.500	.660	.055



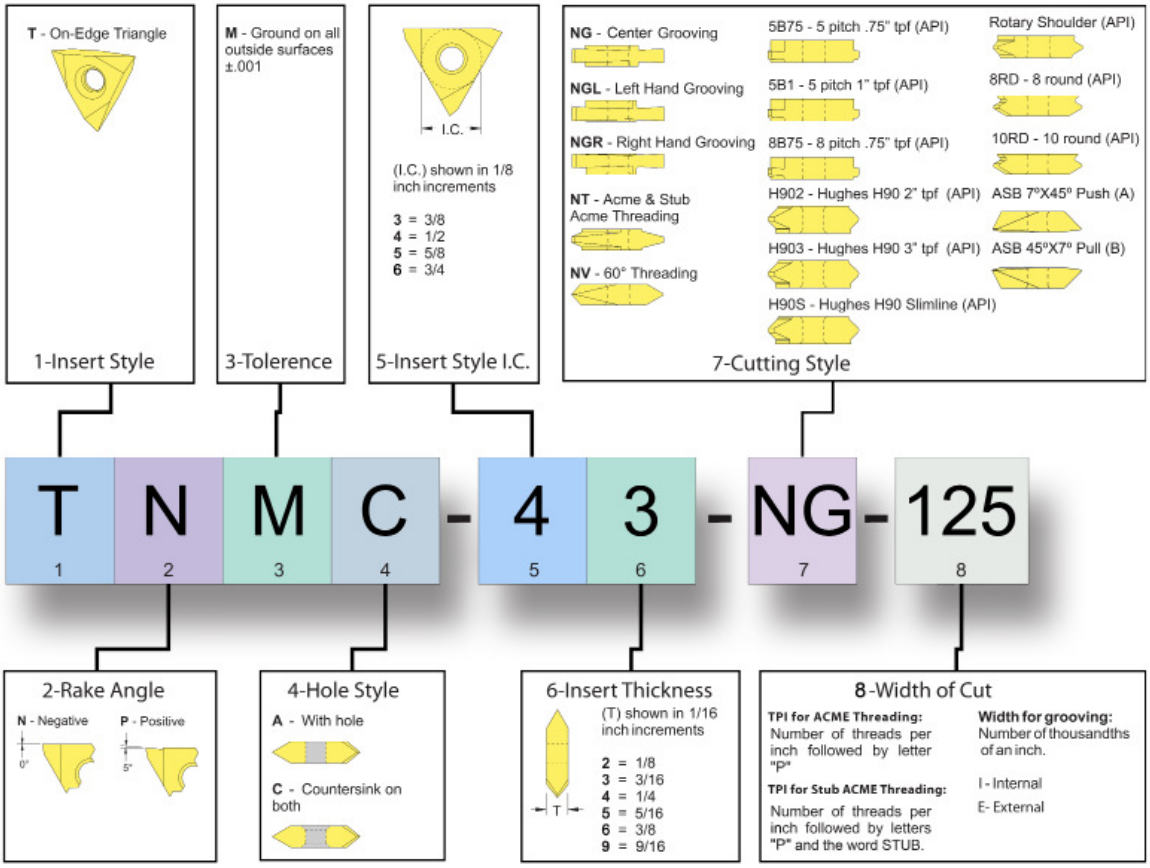
Laydown holders and bars on pages 110-114.

LAYDOWN NPT THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L32 18NPT EXT	37202	18	0.75	.375	.523	.031
	L32 14NPT EXT	37222	14	0.75	.375	.494	.060
	L32 11.5NPT EXT	37242	11.5	0.75	.375	.494	.060
	L32 8NPT EXT	37262	8	0.75	.375	.494	.060
	L32 18NPT INT	37211	18	0.75	.375	.523	.031
	L32 14NPT INT	37231	14	0.75	.375	.494	.060
	L32 11.5NPT INT	37251	11.5	0.75	.375	.494	.060
	L32 8NPT INT	37271	8	0.75	.375	.494	.060

Laydown holders and bars on pages 110-114.

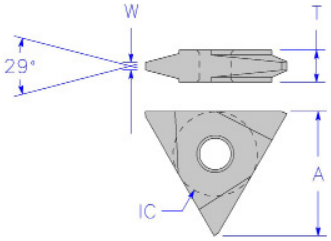
LAYDOWN MULTI-TOOTH NPT THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	A	L
	L43 18NPT 2T EXT	37302	18	0.75	.500	.681	.080
	L43 14NPT 2T EXT	37322	14	0.75	.500	.656	.112
	L54 11.5NPT 2T EXT	37402	11.5	0.75	.625	.827	.139
	L54 11.5NPT 3T EXT	37422	11.5	0.75	.625	.781	.222
	L54 8NPT 2T EXT	37442	8	0.75	.625	.788	.189
	L43 18NPT 2T INT	37311	18	0.75	.500	.681	.080
	L43 14NPT 2T INT	37331	14	0.75	.500	.656	.112
	L54 11.5NPT 2T INT	37411	11.5	0.75	.625	.827	.139
	L54 11.5NPT 3T INT	37431	11.5	0.75	.625	.781	.222
	L54 8NPT 2T INT	37451	8	0.75	.625	.788	.189

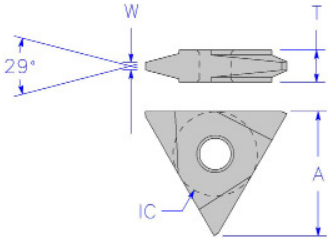
Laydown holders and bars on pages 110-114.

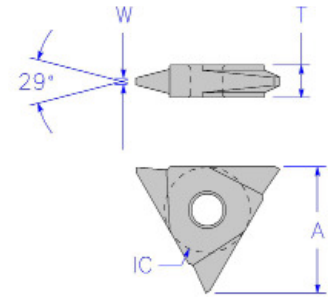


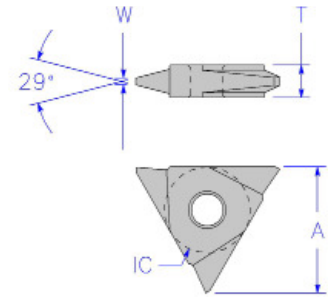
Threading			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at slower speeds	Item specific
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at medium speeds	**Standard**
221	AlTiN coated tough submicron chip resistant	Ductile iron, stainless steel, nickel-based & high-temp alloys at high speeds	Item specific
231	TiAlN coated tough submicron chip resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium speeds	**Standard**
232	TiAlN coated tough submicron - chip, wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium speeds	Item specific
613	TiN coated premium substrate for threading	4140 and similar steels at slow to medium speeds	**Standard**
623	AlTiN coated premium substrate for threading	All steels at high speeds - maximum heat protection	Item specific
633	TiAlN coated premium substrate for threading	All steels at high speeds - medium heat protection	Item specific

Grooving			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron	Non-ferrous, stainless steel alloys composites aluminum at slower speeds	Item specific
210	TiN coated tough submicron	Non-ferrous, stainless steel alloys composites aluminum at medium speeds	Item specific
230	TiAlN coated tough submicron - great combi-nation	Non-ferrous, stainless steel, nickel-based & high-temp alloys at high speeds - most popular grooving grade	**Standard**
612	TiN coated medium tough - long lasting, smooth cutting	4140 and similar steels at slow to medium speeds - most common steel cutting grade	**Standard**
632	TiAlN coated medium tough - long lasting heat resistant	All steels at high speeds - medium heat protection	Item specific

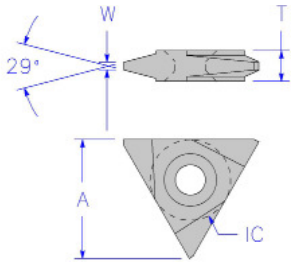
TNMA 32 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 32 NT 6P	20000	6	.0566	.375	.127	.550
	TNMA 32 NT 8P	20010	8	.0411	.375	.127	.550
	TNMA 32 NT 10P	20020	10	.0319	.375	.127	.550
	TNMA 32 NT 12P	20030	12	.0283	.375	.127	.550
	TNMA 32 NT 14P	20040	14	.0239	.375	.127	.550
	TNMA 32 NT 16P	20050	16	.0206	.375	.127	.550

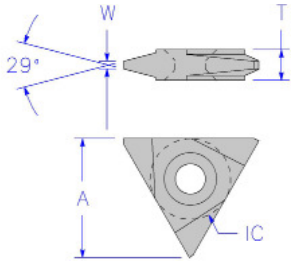
TNMA 32 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 32 NT 6P STUB	20100	6	.0652	.375	.127	.550
	TNMA 32 NT 8P STUB	20110	8	.0476	.375	.127	.550
	TNMA 32 NT 10P STUB	20120	10	.037	.375	.127	.550
	TNMA 32 NT 12P STUB	20130	12	.0326	.375	.127	.550
	TNMA 32 NT 14P STUB	20140	14	.0276	.375	.127	.550
	TNMA 32 NT 16P STUB	20150	16	.0238	.375	.127	.550

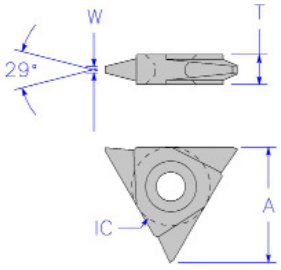
TPMA 32 ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMA 32 NT 6P	20200	6	.0566	.375	.127	.550
	TPMA 32 NT 8P	20210	8	.0411	.375	.127	.550
	TPMA 32 NT 10P	20220	10	.0319	.375	.127	.550
	TPMA 32 NT 12P	20230	12	.0283	.375	.127	.550
	TPMA 32 NT 14P	20240	14	.0239	.375	.127	.550
	TPMA 32 NT 16P	20250	16	.0206	.375	.127	.550

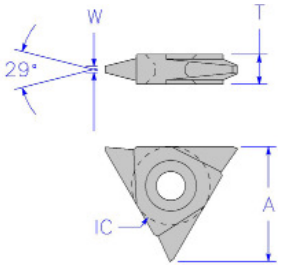
TPMA 32 STUB ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMA 32 NT 6P STUB	20300	6	.0652	.375	.127	.550
	TPMA 32 NT 8P STUB	20310	8	.0476	.375	.127	.550
	TPMA 32 NT 10P STUB	20320	10	.037	.375	.127	.550
	TPMA 32 NT 12P STUB	20330	12	.0326	.375	.127	.550
	TPMA 32 NT 14P STUB	20340	14	.0276	.375	.127	.550
	TPMA 32 NT 16P STUB	20350	16	.0238	.375	.127	.550

TNMA holders and bars on page 107 & 109.

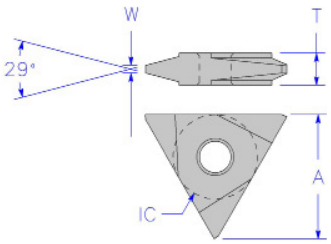
TNMC 32 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMC 32 NT 6P	20400	6	.0566	.375	.127	.550
	TNMC 32 NT 8P	20410	8	.0411	.375	.127	.550
	TNMC 32 NT 10P	20420	10	.0319	.375	.127	.550
	TNMC 32 NT 12P	20430	12	.0283	.375	.127	.550
	TNMC 32 NT 14P	20440	14	.0239	.375	.127	.550
	TNMC 32 NT 16P	20450	16	.0206	.375	.127	.550

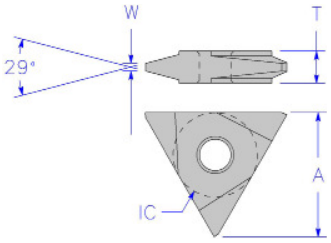
TNMC 32 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMC 32 NT 6P STUB	20500	6	.0652	.375	.127	.550
	TNMC 32 NT 8P STUB	20510	8	.0476	.375	.127	.550
	TNMC 32 NT 10P STUB	20520	10	.037	.375	.127	.550
	TNMC 32 NT 12P STUB	20530	12	.0326	.375	.127	.550
	TNMC 32 NT 14P STUB	20540	14	.0276	.375	.127	.550
	TNMC 32 NT 16P STUB	20550	16	.0238	.375	.127	.550

TPMC 32 ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMC 32 NT 6P	20600	6	.0566	.375	.127	.550
	TPMC 32 NT 8P	20610	8	.0411	.375	.127	.550
	TPMC 32 NT 10P	20620	10	.0319	.375	.127	.550
	TPMC 32 NT 12P	20630	12	.0283	.375	.127	.550
	TPMC 32 NT 14P	20640	14	.0239	.375	.127	.550
	TPMC 32 NT 16P	20650	16	.0206	.375	.127	.550

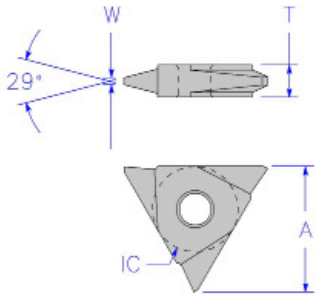
TPMC 32 STUB ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMC 32 NT 6P STUB	20700	6	.0652	.375	.127	.550
	TPMC 32 NT 8P STUB	20710	8	.0476	.375	.127	.550
	TPMC 32 NT 10P STUB	20720	10	.037	.375	.127	.550
	TPMC 32 NT 12P STUB	20730	12	.0326	.375	.127	.550
	TPMC 32 NT 14P STUB	20740	14	.0276	.375	.127	.550
	TPMC 32 NT 16P STUB	20750	16	.0238	.375	.127	.550

TNMC holders and bars on pages 108-109.

TNMA 43 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 43 NT 4P	20800	4	.0875	.500	.190	.737
	TNMA 43 NT 5P	20810	5	.0689	.500	.190	.737
	TNMA 43 NT 6P	20820	6	.0566	.500	.190	.737
	TNMA 43 NT 8P	20830	8	.0411	.500	.190	.737
	TNMA 43 NT 10P	20840	10	.0319	.500	.190	.737
	TNMA 43 NT 12P	20850	12	.0283	.500	.190	.737
	TNMA 43 NT 14P	20860	14	.0239	.500	.190	.737
	TNMA 43 NT 16P	20870	16	.0206	.500	.190	.737

TNMA 43 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 43 NT 4P STUB	20900	4	.1004	.500	.190	.737
	TNMA 43 NT 5P STUB	20910	5	.0793	.500	.190	.737
	TNMA 43 NT 6P STUB	20920	6	.0652	.500	.190	.737
	TNMA 43 NT 8P STUB	20930	8	.0476	.500	.190	.737
	TNMA 43 NT 10P STUB	20940	10	.037	.500	.190	.737
	TNMA 43 NT 12P STUB	20950	12	.0326	.500	.190	.737
	TNMA 43 NT 14P STUB	20960	14	.0276	.500	.190	.737
	TNMA 43 NT 16P STUB	20970	16	.0238	.500	.190	.737

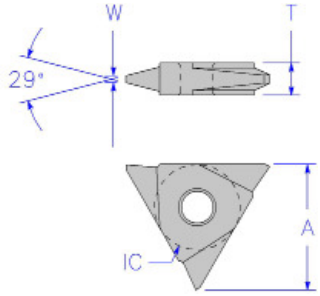
On Edge

TPMA 43 ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMA 43 NT 4P	21000	4	.0875	.500	.190	.737
	TPMA 43 NT 5P	21010	5	.0689	.500	.190	.737
	TPMA 43 NT 6P	21020	6	.0566	.500	.190	.737
	TPMA 43 NT 8P	21030	8	.0411	.500	.190	.737
	TPMA 43 NT 10P	21040	10	.0319	.500	.190	.737
	TPMA 43 NT 12P	21050	12	.0283	.500	.190	.737
	TPMA 43 NT 14P	21060	14	.0239	.500	.190	.737
	TPMA 43 NT 16P	21070	16	.0206	.500	.190	.737

TNMA holders and bars on page 107 & 109.

TPMA 43 STUB ACME

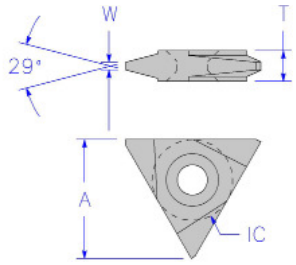
5º POSITIVE RAKE



DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TPMA 43 NT 4P STUB	21100	4	.1004	.500	.190	.737
TPMA 43 NT 5P STUB	21110	5	.0793	.500	.190	.737
TPMA 43 NT 6P STUB	21120	6	.0652	.500	.190	.737
TPMA 43 NT 8P STUB	21130	8	.0476	.500	.190	.737
TPMA 43 NT 10P STUB	21140	10	.037	.500	.190	.737
TPMA 43 NT 12P STUB	21150	12	.0326	.500	.190	.737
TPMA 43 NT 14P STUB	21160	14	.0276	.500	.190	.737
TPMA 43 NT 16P STUB	21170	16	.0238	.500	.190	.737

TNMA holders and bars on page 107 & 109.

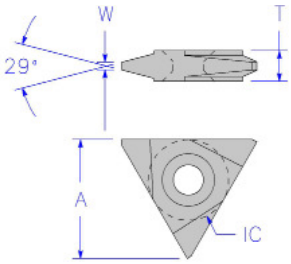
TNMC 43 ACME



DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TNMC 43 NT 4P	21200	4	.0875	.500	.190	.737
TNMC 43 NT 5P	21210	5	.0689	.500	.190	.737
TNMC 43 NT 6P	21220	6	.0566	.500	.190	.737
TNMC 43 NT 8P	21230	8	.0411	.500	.190	.737
TNMC 43 NT 10P	21240	10	.0319	.500	.190	.737
TNMC 43 NT 12P	21250	12	.0283	.500	.190	.737
TNMC 43 NT 14P	21260	14	.0239	.500	.190	.737
TNMC 43 NT 16P	21270	16	.0206	.500	.190	.737

TNMC holders and bars on pages 108-109.

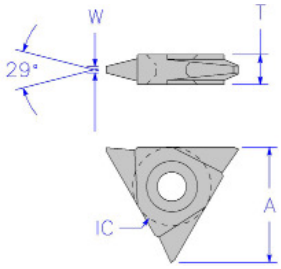
TNMC 43 STUB ACME



DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TNMC 43 NT 4P STUB	21300	4	.1004	.500	.190	.737
TNMC 43 NT 5P STUB	21310	5	.0793	.500	.190	.737
TNMC 43 NT 6P STUB	21320	6	.0652	.500	.190	.737
TNMC 43 NT 8P STUB	21330	8	.0476	.500	.190	.737
TNMC 43 NT 10P STUB	21340	10	.037	.500	.190	.737
TNMC 43 NT 12P STUB	21350	12	.0326	.500	.190	.737
TNMC 43 NT 14P STUB	21360	14	.0276	.500	.190	.737
TNMC 43 NT 16P STUB	21370	16	.0238	.500	.190	.737

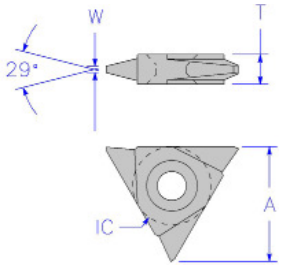
TNMC holders and bars on pages 108-109.

TPMC 43 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
5° POSITIVE RAKE	TPMC 43 NT 4P	21400	4	.0875	.500	.190	.737
	TPMC 43 NT 5P	21410	5	.0689	.500	.190	.737
	TPMC 43 NT 6P	21420	6	.0566	.500	.190	.737
	TPMC 43 NT 8P	21430	8	.0411	.500	.190	.737
	TPMC 43 NT 10P	21440	10	.0319	.500	.190	.737
	TPMC 43 NT 12P	21450	12	.0283	.500	.190	.737
	TPMC 43 NT 14P	21460	14	.0239	.500	.190	.737
	TPMC 43 NT 16P	21470	16	.0206	.500	.190	.737



TNMC holders and bars on pages 108-109.

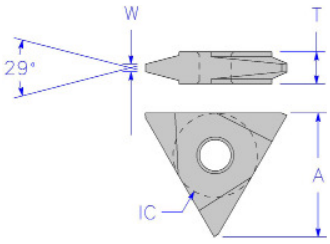
TPMC 43 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
5° POSITIVE RAKE	TPMC 43 NT 4P STUB	21500	4	.1004	.500	.190	.737
	TPMC 43 NT 5P STUB	21510	5	.0793	.500	.190	.737
	TPMC 43 NT 6P STUB	21520	6	.0652	.500	.190	.737
	TPMC 43 NT 8P STUB	21530	8	.0476	.500	.190	.737
	TPMC 43 NT 10P STUB	21540	10	.037	.500	.190	.737
	TPMC 43 NT 12P STUB	21550	12	.0326	.500	.190	.737
	TPMC 43 NT 14P STUB	21560	14	.0276	.500	.190	.737
	TPMC 43 NT 16P STUB	21570	16	.0238	.500	.190	.737



TNMC holders and bars on pages 108-109.

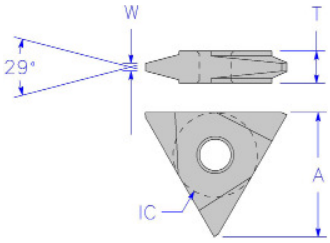
On Edge

TNMA 54 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 54 NT 3P	21600	3	.1184	.625	.252	.925
	TNMA 54 NT 3.5P	21610	3.5	.1007	.625	.252	.925
	TNMA 54 NT 4P	21620	4	.0875	.625	.252	.925
	TNMA 54 NT 5P	21630	5	.0689	.625	.252	.925
	TNMA 54 NT 6P	21640	6	.0566	.625	.252	.925
	TNMA 54 NT 8P	21650	8	.0411	.625	.252	.925



TNMA holders and bars on page 107 & 109.

TNMA 54 STUB ACME

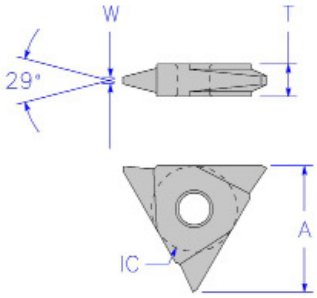


DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TNMA 54 NT 3P STUB	21700	3	.1356	.625	.252	.925
TNMA 54 NT 3.5P STUB	21710	3.5	.1155	.625	.252	.925
TNMA 54 NT 4P STUB	21720	4	.1004	.625	.252	.925
TNMA 54 NT 5P STUB	21730	5	.0793	.625	.252	.925
TNMA 54 NT 6P STUB	21740	6	.0652	.625	.252	.925
TNMA 54 NT 8P STUB	21750	8	.0476	.625	.252	.925

TNMA holders and bars on page 107 & 109.

TPMA 54 ACME

5° POSITIVE RAKE

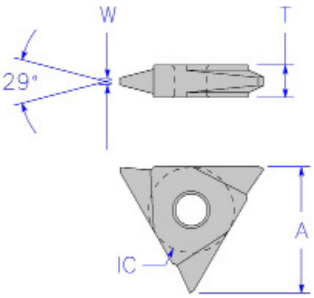


DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TPMA 54 NT 3P	21800	3	.1184	.625	.252	.925
TPMA 54 NT 3.5P	21810	3.5	.1007	.625	.252	.925
TPMA 54 NT 4P	21820	4	.0875	.625	.252	.925
TPMA 54 NT 5P	21830	5	.0689	.625	.252	.925
TPMA 54 NT 6P	21840	6	.0566	.625	.252	.925
TPMA 54 NT 8P	21850	8	.0411	.625	.252	.925

TNMA holders and bars on page 107 & 109.

TPMA 54 STUB ACME

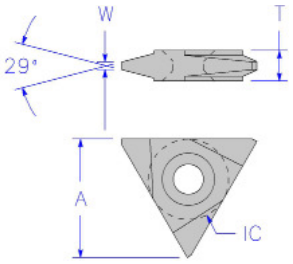
5° POSITIVE RAKE



DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TPMA 54 NT 3P STUB	21900	3	.1356	.625	.252	.925
TPMA 54 NT 3.5P STUB	21910	3.5	.1155	.625	.252	.925
TPMA 54 NT 4P STUB	21920	4	.1004	.625	.252	.925
TPMA 54 NT 5P STUB	21930	5	.0793	.625	.252	.925
TPMA 54 NT 6P STUB	21940	6	.0652	.625	.252	.925
TPMA 54 NT 8P STUB	21950	8	.0476	.625	.252	.925

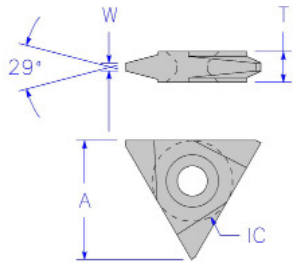
TNMA holders and bars on page 107 & 109.

TNMC 54 ACME

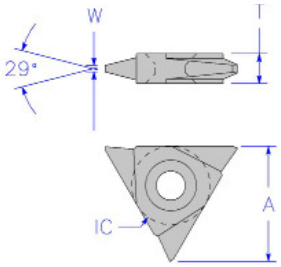


DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
TNMC 54 NT 3P	22000	3	.1184	.625	.252	.925
TNMC 54 NT 3.5P	22010	3.5	.1007	.625	.252	.925
TNMC 54 NT 4P	22020	4	.0875	.625	.252	.925
TNMC 54 NT 5P	22030	5	.0689	.625	.252	.925
TNMC 54 NT 6P	22040	6	.0566	.625	.252	.925
TNMC 54 NT 8P	22050	8	.0411	.625	.252	.925

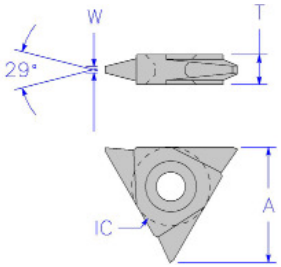
TNMC holders and bars on pages 108-109.

TNMC 54 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMC 54 NT 3P STUB	22100	3	.1356	.625	.252	.925
	TNMC 54 NT 3.5P STUB	22110	3.5	.1155	.625	.252	.925
	TNMC 54 NT 4P STUB	22120	4	.1004	.625	.252	.925
	TNMC 54 NT 5P STUB	22130	5	.0793	.625	.252	.925
	TNMC 54 NT 6P STUB	22140	6	.0652	.625	.252	.925
	TNMC 54 NT 8P STUB	22150	8	.0476	.625	.252	.925

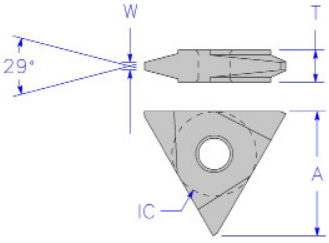
TNMC holders and bars on pages 108-109.

TPMC 54 ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMC 54 NT 3P	22200	3	.1184	.625	.252	.925
	TPMC 54 NT 3.5P	22210	3.5	.1007	.625	.252	.925
	TPMC 54 NT 4P	22220	4	.0875	.625	.252	.925
	TPMC 54 NT 5P	22230	5	.0689	.625	.252	.925
	TPMC 54 NT 6P	22240	6	.0566	.625	.252	.925
	TPMC 54 NT 8P	22250	8	.0411	.625	.252	.925

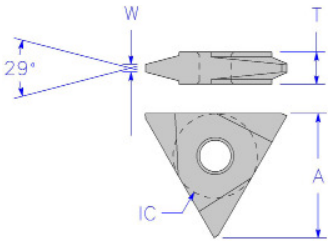
TNMC holders and bars on pages 108-109.

TPMC 54 STUB ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMC 54 NT 3P STUB	22300	3	.1356	.625	.252	.925
	TPMC 54 NT 3.5P STUB	22310	3.5	.1155	.625	.252	.925
	TPMC 54 NT 4P STUB	22320	4	.1004	.625	.252	.925
	TPMC 54 NT 5P STUB	22330	5	.0793	.625	.252	.925
	TPMC 54 NT 6P STUB	22340	6	.0652	.625	.252	.925
	TPMC 54 NT 8P STUB	22350	8	.0476	.625	.252	.925

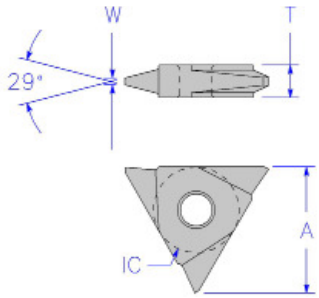
TNMC holders and bars on pages 108-109.

TNMA 66 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 66 NT 2P	22400	2	.1802	.750	.377	1.112
	TNMA 66 NT 2.5P	22410	2.5	.1431	.750	.377	1.112
	TNMA 66 NT 3P	22420	3	.1184	.750	.377	1.112
	TNMA 66 NT 3.5P	22430	3.5	.1007	.750	.377	1.112

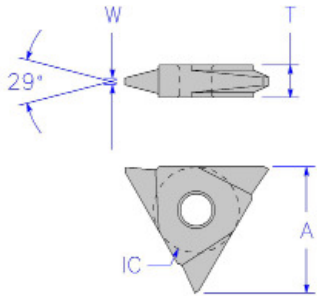
TNMA holders and bars on page 107 & 109.

TNMA 66 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMA 66 NT 2P STUB	22450	2	.206	.750	.377	1.112
	TNMA 66 NT 2.5P STUB	22460	2.5	.1638	.750	.377	1.112
	TNMA 66 NT 3P STUB	22470	3	.1356	.750	.377	1.112
	TNMA 66 NT 3.5P STUB	22480	3.5	.1155	.750	.377	1.112

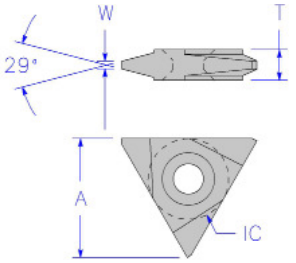
TNMA holders and bars on page 107 & 109.

TPMA 66 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
5° POSITIVE RAKE	TPMA 66 NT 2P	22500	2	.1802	.750	.377	1.112
	TPMA 66 NT 2.5P	22510	2.5	.1431	.750	.377	1.112
	TPMA 66 NT 3P	22520	3	.1184	.750	.377	1.112
	TPMA 66 NT 3.5P	22530	3.5	.1007	.750	.377	1.112

TNMA holders and bars on page 107 & 109.

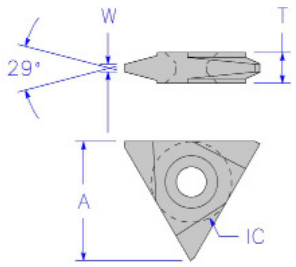
TPMA 66 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
5° POSITIVE RAKE	TPMA 66 NT 2P STUB	22550	2	.206	.750	.377	1.112
	TPMA 66 NT 2.5P STUB	22560	2.5	.1638	.750	.377	1.112
	TPMA 66 NT 3P STUB	22570	3	.1356	.750	.377	1.112
	TPMA 66 NT 3.5P STUB	22580	3.5	.1155	.750	.377	1.112

TNMA holders and bars on page 107 & 109.

TNMC 66 ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMC 66 NT 2P	22600	2	.1802	.750	.377	1.112
	TNMC 66 NT 2.5P	22610	2.5	.1431	.750	.377	1.112
	TNMC 66 NT 3P	22620	3	.1184	.750	.377	1.112
	TNMC 66 NT 3.5P	22630	3.5	.1007	.750	.377	1.112

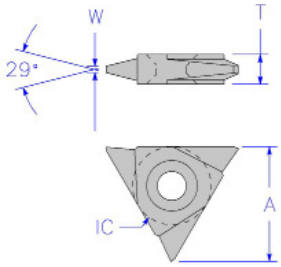
TNMC holders and bars on pages 108-109.

TNMC 66 STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TNMC 66 NT 2P STUB	22650	2	.206	.750	.377	1.112
	TNMC 66 NT 2.5P STUB	22660	2.5	.1638	.750	.377	1.112
	TNMC 66 NT 3P STUB	22670	3	.1356	.750	.377	1.112
	TNMC 66 NT 3.5P STUB	22680	3.5	.1155	.750	.377	1.112



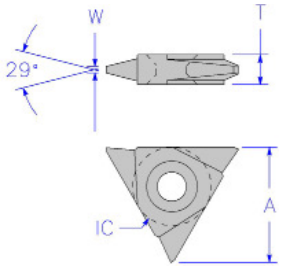
TNMC holders and bars on pages 108-109.

TPMC 66 ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMC 66 NT 2P	22700	2	.1802	.750	.377	1.112
	TPMC 66 NT 2.5P	22710	2.5	.1431	.750	.377	1.112
	TPMC 66 NT 3P	22720	3	.1184	.750	.377	1.112
	TPMC 66 NT 3.5P	22730	3.5	.1007	.750	.377	1.112



TNMC holders and bars on pages 108-109.

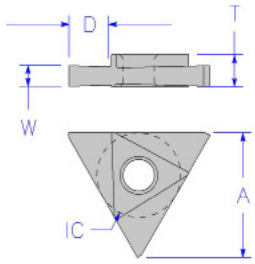
TPMC 66 STUB ACME 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	WIDTH	IC	T	A
	TPMC 66 NT 2P STUB	22750	2	.206	.750	.377	1.112
	TPMC 66 NT 2.5P STUB	22760	2.5	.1638	.750	.377	1.112
	TPMC 66 NT 3P STUB	22770	3	.1356	.750	.377	1.112
	TPMC 66 NT 3.5P STUB	22780	3.5	.1155	.750	.377	1.112



TNMC holders and bars on pages 108-109.

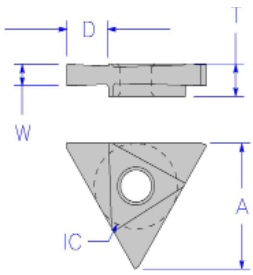
On Edge

TNMA 32 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 32 NGR .031W	22800	.031	.080	.375	.127	.550
	TNMA 32 NGR .047W	22810	.047	.100	.375	.127	.550
	TNMA 32 NGR .0625W	22820	.0625	.156	.375	.127	.550
	TNMA 32 NGR .094W	22830	.094	.156	.375	.127	.550



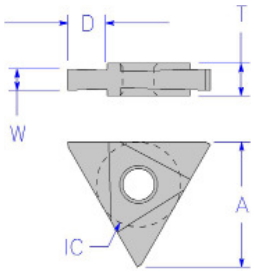
TNMA holders and bars on page 107 & 109.

TNMA 32 NGL



DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TNMA 32 NGL .031W	22900	.031	.080	.375	.127	.550
TNMA 32 NGL .047W	22910	.047	.100	.375	.127	.550
TNMA 32 NGL .0625W	22920	.0625	.156	.375	.127	.550
TNMA 32 NGL .094W	22930	.094	.156	.375	.127	.550

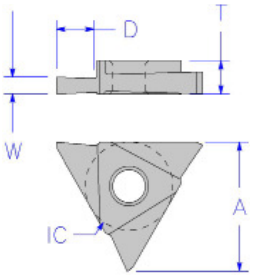
TNMA 32 NGC



DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TNMA 32 NGC .031W	23000	.031	.080	.375	.127	.550
TNMA 32 NGC .047W	23010	.047	.100	.375	.127	.550
TNMA 32 NGC .0625W	23020	.0625	.156	.375	.127	.550
TNMA 32 NGC .094W	23030	.094	.156	.375	.127	.550
TNMA 32 NGC .125W	23040	.125	.156	.375	.127	.550

TPMA 32 NGR

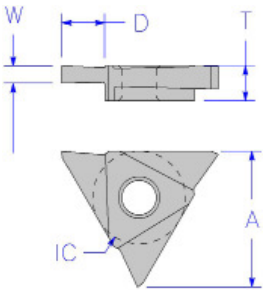
5º POSITIVE RAKE



DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TPMA 32 NGR .031W	23100	.031	.080	.375	.127	.550
TPMA 32 NGR .047W	23110	.047	.100	.375	.127	.550
TPMA 32 NGR .0625W	23120	.0625	.156	.375	.127	.550
TPMA 32 NGR .094W	23130	.094	.156	.375	.127	.550

TPMA 32 NGL

5º POSITIVE RAKE

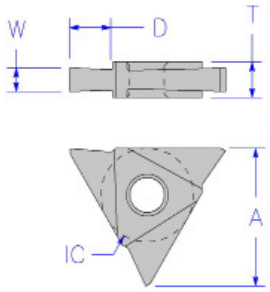


DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TPMA 32 NGL .031W	23200	.031	.080	.375	.127	.550
TPMA 32 NGL .047W	23210	.047	.100	.375	.127	.550
TPMA 32 NGL .0625W	23220	.0625	.156	.375	.127	.550
TPMA 32 NGL .094W	23230	.094	.156	.375	.127	.550

TNMA holders and bars on page 107 & 109.

TPMA 32 NGC

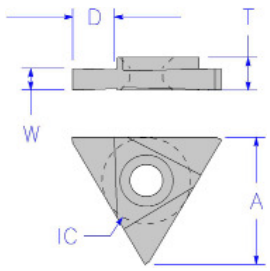
5º POSITIVE RAKE



DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TPMA 32 NGC .031W	23300	.031	.080	.375	.127	.550
TPMA 32 NGC .047W	23310	.047	.100	.375	.127	.550
TPMA 32 NGC .0625W	23320	.0625	.156	.375	.127	.550
TPMA 32 NGC .094W	23330	.094	.156	.375	.127	.550
TPMA 32 NGC .125W	23340	.125	.156	.375	.127	.550

TNMA holders and bars on page 107 & 109.

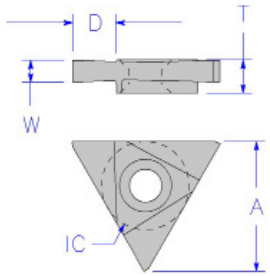
TNMC 32 NGR



DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TNMC 32 NGR .031W	23400	.031	.080	.375	.127	.550
TNMC 32 NGR .047W	23410	.047	.100	.375	.127	.550
TNMC 32 NGR .0625W	23420	.0625	.156	.375	.127	.550
TNMC 32 NGR .094W	23430	.094	.156	.375	.127	.550

TNMC holders and bars on pages 108-109.

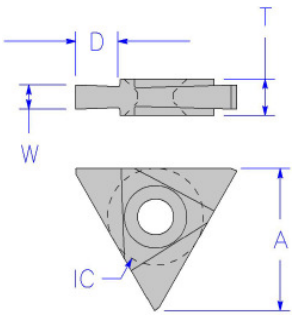
TNMC 32 NGL



DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TNMC 32 NGL .031W	23500	.031	.080	.375	.127	.550
TNMC 32 NGL .047W	23510	.047	.100	.375	.127	.550
TNMC 32 NGL .0625W	23520	.0625	.156	.375	.127	.550
TNMC 32 NGL .094W	23530	.094	.156	.375	.127	.550

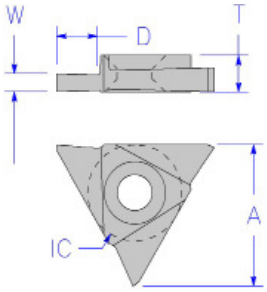
TNMC holders and bars on pages 108-109.

TNMC 32 NGC

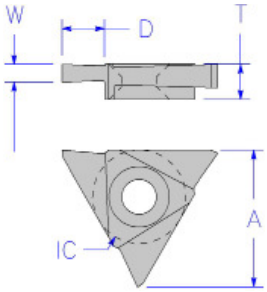


DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
TNMC 32 NGC .031W	23600	.031	.080	.375	.127	.550
TNMC 32 NGC .047W	23610	.047	.100	.375	.127	.550
TNMC 32 NGC .0625W	23620	.0625	.156	.375	.127	.550
TNMC 32 NGC .094W	23630	.094	.156	.375	.127	.550
TNMC 32 NGC .125W	23640	.125	.156	.375	.127	.550

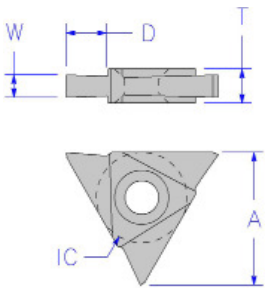
TNMC holders and bars on pages 108-109.

TPMC 32 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5º POSITIVE RAKE	TPMC 32 NGR .031W	23700	.031	.080	.375	.127	.550
	TPMC 32 NGR .047W	23710	.047	.100	.375	.127	.550
	TPMC 32 NGR .0625W	23720	.0625	.156	.375	.127	.550
	TPMC 32 NGR .094W	23730	.094	.156	.375	.127	.550

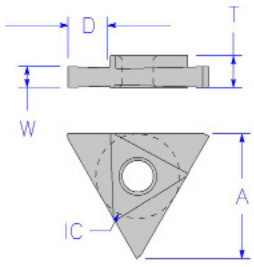
TNMC holders and bars on pages 108-109.

TPMC 32 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5º POSITIVE RAKE	TPMC 32 NGL .031W	23800	.031	.080	.375	.127	.550
	TPMC 32 NGL .047W	23810	.047	.100	.375	.127	.550
	TPMC 32 NGL .0625W	23820	.0625	.156	.375	.127	.550
	TPMC 32 NGL .094W	23830	.094	.156	.375	.127	.550

TNMC holders and bars on pages 108-109.

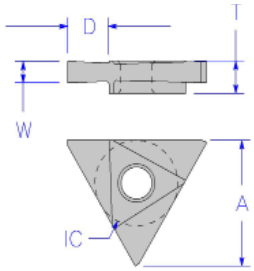
TPMC 32 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5º POSITIVE RAKE	TPMC 32 NGC .031W	23900	.031	.080	.375	.127	.550
	TPMC 32 NGC .047W	23910	.047	.100	.375	.127	.550
	TPMC 32 NGC .0625W	23920	.0625	.156	.375	.127	.550
	TPMC 32 NGC .094W	23930	.094	.156	.375	.127	.550
	TPMC 32 NGC .125W	23940	.125	.156	.375	.127	.550

TNMC holders and bars on pages 108-109.

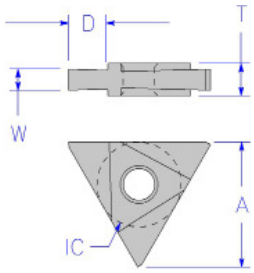
TNMA 43 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 43 NGR .031W	24000	.031	.080	.500	.190	.737
	TNMA 43 NGR .047W	24010	.047	.100	.500	.190	.737
	TNMA 43 NGR .0625W	24020	.0625	.156	.500	.190	.737
	TNMA 43 NGR .094W	24030	.094	.187	.500	.190	.737
	TNMA 43 NGR .125W	24040	.125	.234	.500	.190	.737
	TNMA 43 NGR .156W	24050	.156	.234	.500	.190	.737

TNMA holders and bars on page 107 & 109.

TNMA 43 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 43 NGL .031W	24100	.031	.080	.500	.190	.737
	TNMA 43 NGL .047W	24110	.047	.100	.500	.190	.737
	TNMA 43 NGL .0625W	24120	.0625	.156	.500	.190	.737
	TNMA 43 NGL .094W	24130	.094	.187	.500	.190	.737
	TNMA 43 NGL .125W	24140	.125	.234	.500	.190	.737
	TNMA 43 NGL .156W	24150	.156	.234	.500	.190	.737



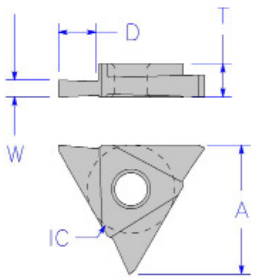
TNMA 43 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 43 NGC .031W	24200	.031	.080	.500	.190	.737
	TNMA 43 NGC .047W	24210	.047	.100	.500	.190	.737
	TNMA 43 NGC .0625W	24220	.0625	.156	.500	.190	.737
	TNMA 43 NGC .094W	24230	.094	.187	.500	.190	.737
	TNMA 43 NGC .125W	24240	.125	.234	.500	.190	.737
	TNMA 43 NGC .156W	24250	.156	.234	.500	.190	.737
	TNMA 43 NGC .1875W	24260	.1875	.234	.500	.190	.737



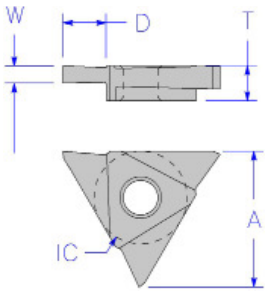
On Edge

TPMA 43 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 43 NGR .031W	24300	.031	.080	.500	.190	.737
	TPMA 43 NGR .047W	24310	.047	.100	.500	.190	.737
	TPMA 43 NGR .0625W	24320	.0625	.156	.500	.190	.737
	TPMA 43 NGR .094W	24330	.094	.187	.500	.190	.737
	TPMA 43 NGR .125W	24340	.125	.234	.500	.190	.737
	TPMA 43 NGR .156W	24350	.156	.234	.500	.190	.737

TNMA holders and bars on page 107 & 109.

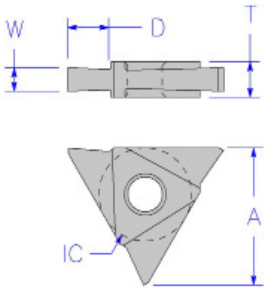


TPMA 43 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 43 NGL .031W	24400	.031	.080	.500	.190	.737
	TPMA 43 NGL .047W	24410	.047	.100	.500	.190	.737
	TPMA 43 NGL .0625W	24420	.0625	.156	.500	.190	.737
	TPMA 43 NGL .094W	24430	.094	.187	.500	.190	.737
	TPMA 43 NGL .125W	24440	.125	.234	.500	.190	.737
	TPMA 43 NGL .156W	24450	.156	.234	.500	.190	.737



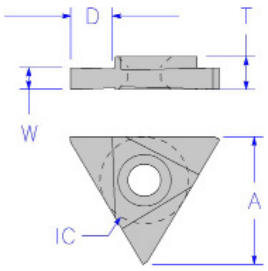
TNMA holders and bars on page 107 & 109.

TPMA 43 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 43 NGC .031W	24500	.031	.080	.500	.190	.737
	TPMA 43 NGC .047W	24510	.047	.100	.500	.190	.737
	TPMA 43 NGC .0625W	24520	.0625	.156	.500	.190	.737
	TPMA 43 NGC .094W	24530	.094	.187	.500	.190	.737
	TPMA 43 NGC .125W	24540	.125	.234	.500	.190	.737
	TPMA 43 NGC .156W	24550	.156	.234	.500	.190	.737
	TPMA 43 NGC .1875W	24560	.1875	.234	.500	.190	.737

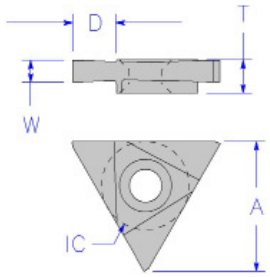


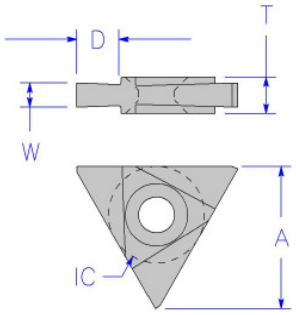
TNMA holders and bars on page 107 & 109.

TNMC 43 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 43 NGR .031W	24600	.031	.080	.500	.190	.737
	TNMC 43 NGR .047W	24610	.047	.100	.500	.190	.737
	TNMC 43 NGR .0625W	24620	.0625	.156	.500	.190	.737
	TNMC 43 NGR .094W	24630	.094	.187	.500	.190	.737
	TNMC 43 NGR .125W	24640	.125	.234	.500	.190	.737
	TNMC 43 NGR .156W	24650	.156	.234	.500	.190	.737

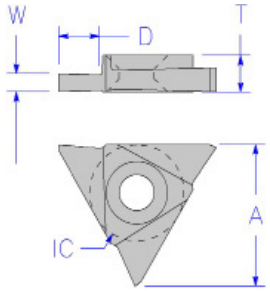


TNMC holders and bars on pages 108-109.

TNMC 43 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 43 NGL .031W	24700	.031	.080	.500	.190	.737
	TNMC 43 NGL .047W	24710	.047	.100	.500	.190	.737
	TNMC 43 NGL .0625W	24720	.0625	.156	.500	.190	.737
	TNMC 43 NGL .094W	24730	.094	.187	.500	.190	.737
	TNMC 43 NGL .125W	24740	.125	.234	.500	.190	.737
	TNMC 43 NGL .156W	24750	.156	.234	.500	.190	.737

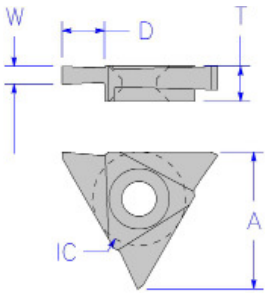
TNMC 43 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 43 NGC .031W	24800	.031	.080	.500	.190	.737
	TNMC 43 NGC .047W	24810	.047	.100	.500	.190	.737
	TNMC 43 NGC .0625W	24820	.0625	.156	.500	.190	.737
	TNMC 43 NGC .094W	24830	.094	.187	.500	.190	.737
	TNMC 43 NGC .125W	24840	.125	.234	.500	.190	.737
	TNMC 43 NGC .156W	24850	.156	.234	.500	.190	.737
	TNMC 43 NGC .1875W	24860	.1875	.234	.500	.190	.737

On Edge

TPMC 43 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TPMC 43 NGR .031W	24900	.031	.080	.500	.190	.737
	TPMC 43 NGR .047W	24910	.047	.100	.500	.190	.737
	TPMC 43 NGR .0625W	24920	.0625	.156	.500	.190	.737
	TPMC 43 NGR .094W	24930	.094	.187	.500	.190	.737
	TPMC 43 NGR .125W	24940	.125	.234	.500	.190	.737
	TPMC 43 NGR .156W	24950	.156	.234	.500	.190	.737

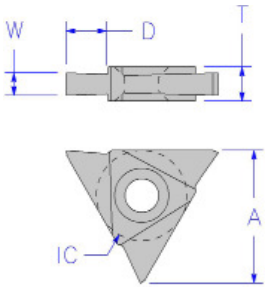
TNMC holders and bars on pages 108-109.

TPMC 43 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 43 NGL .031W	25000	.031	.080	.500	.190	.737
	TPMC 43 NGL .047W	25010	.047	.100	.500	.190	.737
	TPMC 43 NGL .0625W	25020	.0625	.156	.500	.190	.737
	TPMC 43 NGL .094W	25030	.094	.187	.500	.190	.737
	TPMC 43 NGL .125W	25040	.125	.234	.500	.190	.737
	TPMC 43 NGL .156W	25050	.156	.234	.500	.190	.737



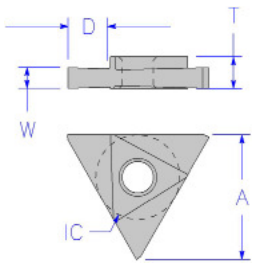
TNMC holders and bars on pages 108-109.

TPMC 43 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 43 NGC .031W	25100	.031	.080	.500	.190	.737
	TPMC 43 NGC .047W	25110	.047	.100	.500	.190	.737
	TPMC 43 NGC .0625W	25120	.0625	.156	.500	.190	.737
	TPMC 43 NGC .094W	25130	.094	.187	.500	.190	.737
	TPMC 43 NGC .125W	25140	.125	.234	.500	.190	.737
	TPMC 43 NGC .156W	25150	.156	.234	.500	.190	.737
	TPMC 43 NGC .1875W	25160	.1875	.234	.500	.190	.737

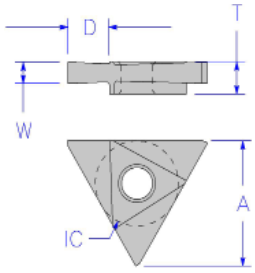


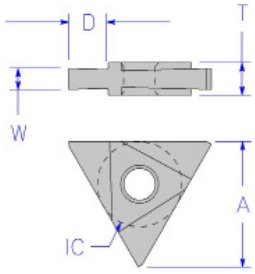
TNMC holders and bars on pages 108-109.

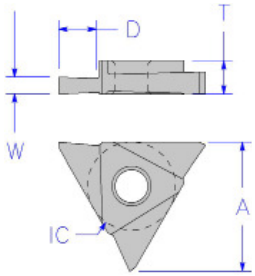
TNMA 54 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 54 NGR .0625W	25200	.0625	.156	.625	.252	.925
	TNMA 54 NGR .094W	25210	.094	.187	.625	.252	.925
	TNMA 54 NGR .125W	25220	.125	.296	.625	.252	.925
	TNMA 54 NGR .156W	25230	.156	.296	.625	.252	.925
	TNMA 54 NGR .1875W	25240	.1875	.296	.625	.252	.925

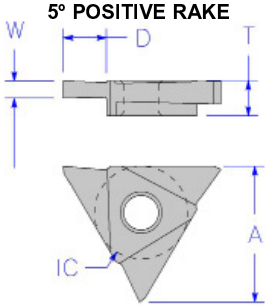


TNMA holders and bars on page 107 & 109.

TNMA 54 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 54 NGL .0625W	25300	.0625	.156	.625	.252	.925
	TNMA 54 NGL .094W	25310	.094	.187	.625	.252	.925
	TNMA 54 NGL .125W	25320	.125	.296	.625	.252	.925
	TNMA 54 NGL .156W	25330	.156	.296	.625	.252	.925
	TNMA 54 NGL .1875W	25340	.1875	.296	.625	.252	.925

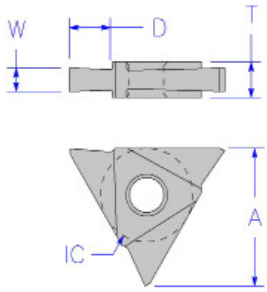
TNMA 54 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 54 NGC .0625W	25400	.0625	.156	.625	.252	.925
	TNMA 54 NGC .094W	25410	.094	.187	.625	.252	.925
	TNMA 54 NGC .125W	25420	.125	.296	.625	.252	.925
	TNMA 54 NGC .156W	25430	.156	.296	.625	.252	.925
	TNMA 54 NGC .1875W	25440	.1875	.296	.625	.252	.925
	TNMA 54 NGC .250W	25450	.250	.296	.625	.252	.925

TPMA 54 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 54 NGR .0625W	25500	.0625	.156	.625	.252	.925
	TPMA 54 NGR .094W	25510	.094	.187	.625	.252	.925
	TPMA 54 NGR .125W	25520	.125	.296	.625	.252	.925
	TPMA 54 NGR .156W	25530	.156	.296	.625	.252	.925
	TPMA 54 NGR .1875W	25540	.1875	.296	.625	.252	.925

TPMA 54 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 54 NGL .0625W	25600	.0625	.156	.625	.252	.925
	TPMA 54 NGL .094W	25610	.094	.187	.625	.252	.925
	TPMA 54 NGL .125W	25620	.125	.296	.625	.252	.925
	TPMA 54 NGL .156W	25630	.156	.296	.625	.252	.925
	TPMA 54 NGL .1875W	25640	.1875	.296	.625	.252	.925

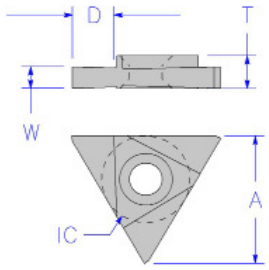
TNMA holders and bars on page 107 & 109.

TPMA 54 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 54 NGC .0625W	25700	.0625	.156	.625	.252	.925
	TPMA 54 NGC .094W	25710	.094	.187	.625	.252	.925
	TPMA 54 NGC .125W	25720	.125	.296	.625	.252	.925
	TPMA 54 NGC .156W	25730	.156	.296	.625	.252	.925
	TPMA 54 NGC .1875W	25740	.1875	.296	.625	.252	.925
	TPMA 54 NGC .250W	25750	.250	.296	.625	.252	.925



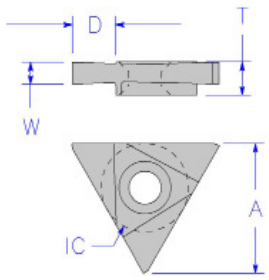
TNMA holders and bars on page 107 & 109.

TNMC 54 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 54 NGR .0625W	25800	.0625	.156	.625	.252	.925
	TNMC 54 NGR .094W	25810	.094	.187	.625	.252	.925
	TNMC 54 NGR .125W	25820	.125	.296	.625	.252	.925
	TNMC 54 NGR .156W	25830	.156	.296	.625	.252	.925
	TNMC 54 NGR .1875W	25840	.1875	.296	.625	.252	.925



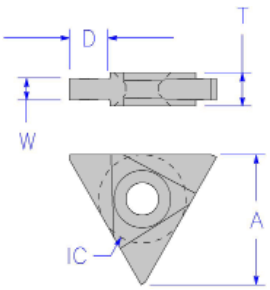
TNMC holders and bars on pages 108-109.

TNMC 54 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 54 NGL .0625W	25900	.0625	.156	.625	.252	.925
	TNMC 54 NGL .094W	25910	.094	.187	.625	.252	.925
	TNMC 54 NGL .125W	25920	.125	.296	.625	.252	.925
	TNMC 54 NGL .156W	25930	.156	.296	.625	.252	.925
	TNMC 54 NGL .1875W	25940	.1875	.296	.625	.252	.925



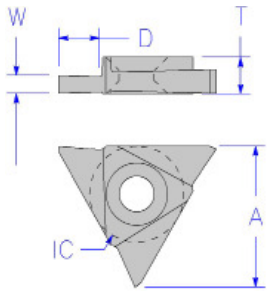
TNMC holders and bars on pages 108-109.

TNMC 54 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 54 NGC .0625W	26000	.0625	.156	.625	.252	.925
	TNMC 54 NGC .094W	26010	.094	.187	.625	.252	.925
	TNMC 54 NGC .125W	26020	.125	.296	.625	.252	.925
	TNMC 54 NGC .156W	26030	.156	.296	.625	.252	.925
	TNMC 54 NGC .1875W	26040	.1875	.296	.625	.252	.925
	TNMC 54 NGC .250W	26050	.250	.296	.625	.252	.925



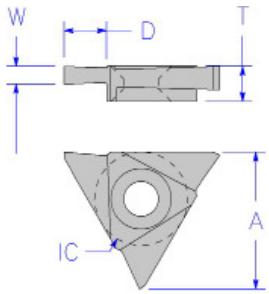
TNMC holders and bars on pages 108-109.

TPMC 54 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 54 NGR .0625W	26100	.0625	.156	.625	.252	.925
	TPMC 54 NGR .094W	26110	.094	.187	.625	.252	.925
	TPMC 54 NGR .125W	26120	.125	.296	.625	.252	.925
	TPMC 54 NGR .156W	26130	.156	.296	.625	.252	.925
	TPMC 54 NGR .1875W	26140	.1875	.296	.625	.252	.925



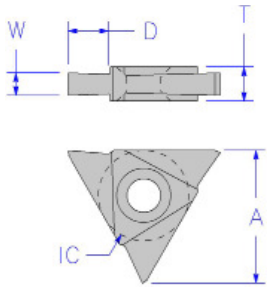
TNMC holders and bars on pages 108-109.

TPMC 54 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 54 NGL .0625W	26200	.0625	.156	.625	.252	.925
	TPMC 54 NGL .094W	26210	.094	.187	.625	.252	.925
	TPMC 54 NGL .125W	26220	.125	.296	.625	.252	.925
	TPMC 54 NGL .156W	26230	.156	.296	.625	.252	.925
	TPMC 54 NGL .1875W	26240	.1875	.296	.625	.252	.925



TNMC holders and bars on pages 108-109.

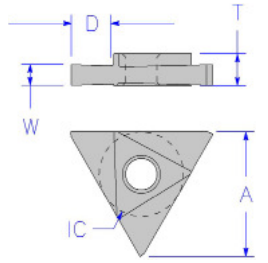
TPMC 54 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 54 NGC .0625W	26300	.0625	.156	.625	.252	.925
	TPMC 54 NGC .094W	26310	.094	.187	.625	.252	.925
	TPMC 54 NGC .125W	26320	.125	.296	.625	.252	.925
	TPMC 54 NGC .156W	26330	.156	.296	.625	.252	.925
	TPMC 54 NGC .1875W	26340	.1875	.296	.625	.252	.925
	TPMC 54 NGC .250W	26350	.250	.296	.625	.252	.925



TNMC holders and bars on pages 108-109.

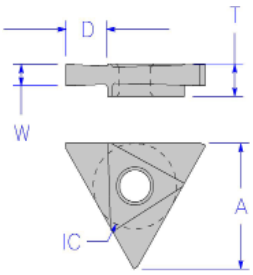
On Edge

TNMA 66 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 66 NGR .1875W	26400	.1875	.296	.750	.377	1.112
	TNMA 66 NGR .250W	26410	.250	.375	.750	.377	1.112

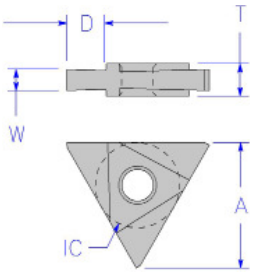


TNMA holders and bars on page 107 & 109.

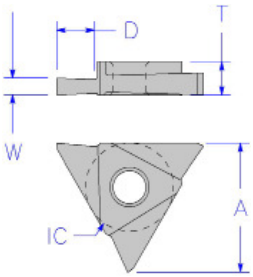
TNMA 66 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 66 NGL .1875W	26450	.1875	.296	.750	.377	1.112
	TNMA 66 NGL .250W	26460	.250	.375	.750	.377	1.112



TNMA 66 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMA 66 NGC .1875W	26500	.1875	.296	.750	.377	1.112
	TNMA 66 NGC .250W	26510	.250	.375	.750	.377	1.112
	TNMA 66 NGC .375W	26520	.375	.375	.750	.377	1.112

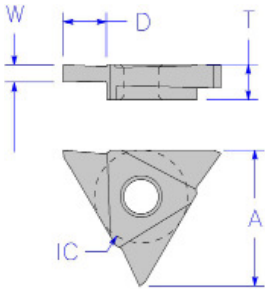


TPMA 66 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 66 NGR .1875W	26550	.1875	.296	.750	.377	1.112
	TPMA 66 NGR .250W	26560	.250	.375	.750	.377	1.112



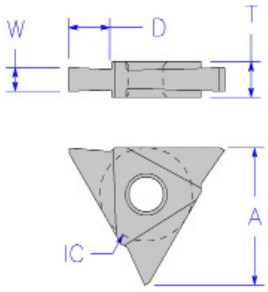
TPMA 66 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 66 NGL .1875W	26600	.1875	.296	.750	.377	1.112
	TPMA 66 NGL .250W	26610	.250	.375	.750	.377	1.112

TNMA holders and bars on page 107 & 109.



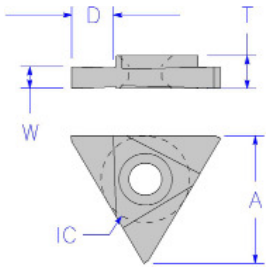
TPMA 66 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMA 66 NGC .1875W	26650	.1875	.296	.750	.377	1.112
	TPMA 66 NGC .250W	26660	.250	.375	.750	.377	1.112
	TPMA 66 NGC .375W	26670	.375	.375	.750	.377	1.112

TNMA holders and bars on page 107 & 109.



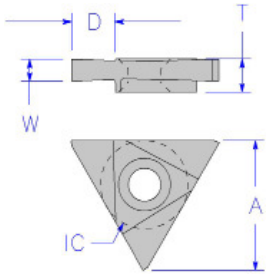
TNMC 66 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 66 NGR .1875W	26700	.1875	.296	.750	.377	1.112
	TNMC 66 NGR .250W	26710	.250	.375	.750	.377	1.112

TNMC holders and bars on pages 108-109.



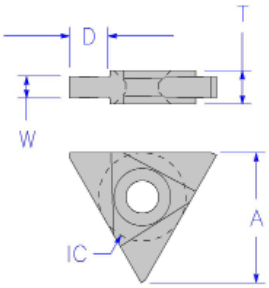
TNMC 66 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 66 NGL .1875W	26750	.1875	.296	.750	.377	1.112
	TNMC 66 NGL .250W	26760	.250	.375	.750	.377	1.112

TNMC holders and bars on pages 108-109.

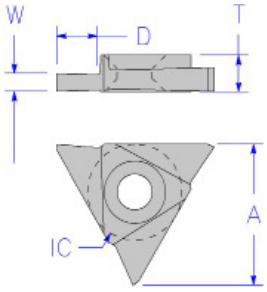


TNMC 66 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
	TNMC 66 NGC .1875W	26800	.1875	.296	.750	.377	1.112
	TNMC 66 NGC .250W	26810	.250	.375	.750	.377	1.112
	TNMC 66 NGC .375W	26820	.375	.375	.750	.377	1.112

TNMC holders and bars on pages 108-109.

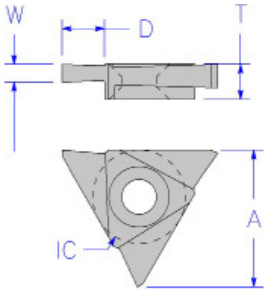


TPMC 66 NGR	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 66 NGR .1875W	26850	.1875	.296	.750	.377	1.112
	TPMC 66 NGR .250W	26860	.250	.375	.750	.377	1.112



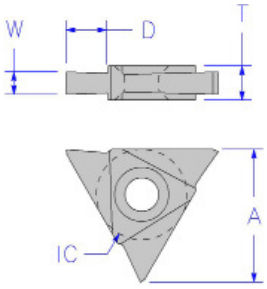
TNMC holders and bars on pages 108-109.

TPMC 66 NGL	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 66 NGL .1875W	26900	.1875	.296	.750	.377	1.112
	TPMC 66 NGL .250W	26910	.250	.375	.750	.377	1.112



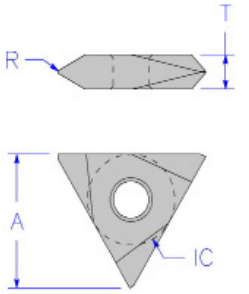
TNMC holders and bars on pages 108-109.

TPMC 66 NGC	DESCRIPTION	EDP	WIDTH	DEPTH	IC	T	A
5° POSITIVE RAKE	TPMC 66 NGC .1875W	26950	.1875	.296	.750	.377	1.112
	TPMC 66 NGC .250W	26960	.250	.375	.750	.377	1.112
	TPMC 66 NGC .375W	26970	.375	.375	.750	.377	1.112



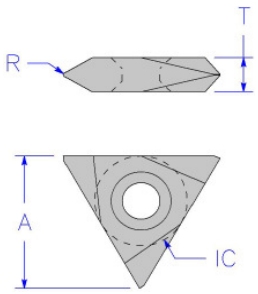
TNMC holders and bars on pages 108-109.

TNMA NV 60° V-Threading	DESCRIPTION	EDP	PITCH	R	IC	T	A
	TNMA 32 NV	33000	8-36	.003	.375	.127	.550
	TNMA 43 NV	33010	5-24	.004	.500	.190	.737
	TNMA 43 NV .010R	33020	4-20	.010	.500	.190	.737
	TNMA 54 NV	33030	4-20	.008	.625	.252	.925
	TNMA 54 NV .010R	33040	4-20	.010	.625	.252	.925
	TNMA 54 NV .020R	33050	4-12	.020	.625	.252	.925
	TNMA 54 NV .025R	33060	4-8	.025	.625	.252	.925
	TNMA 54 NV .038R	33070	4-6	.038	.625	.252	.925
	TNMA 66 NV	33080	3-12	.009	.750	.377	1.112



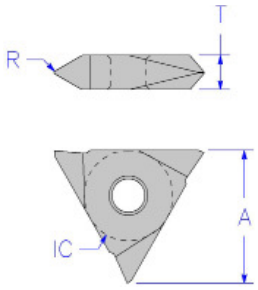
TNMA holders and bars on page 107 & 109.

TNMC NV 60° V-Threading	DESCRIPTION	EDP	PITCH	R	IC	T	A
	TNMC 32 NV	33200	8-36	.003	.375	.127	.550
	TNMC 43 NV	33210	5-24	.004	.500	.190	.737
	TNMC 43 NV .010R	33220	4-20	.010	.500	.190	.737
	TNMC 54 NV	33230	4-20	.008	.625	.252	.925
	TNMC 54 NV .010R	33240	4-20	.010	.625	.252	.925
	TNMC 54 NV .020R	33250	4-12	.020	.625	.252	.925
	TNMC 54 NV .025R	33260	4-8	.025	.625	.252	.925
	TNMC 54 NV .038R	33270	4-6	.038	.625	.252	.925
	TNMC 66 NV	33280	3-12	.009	.750	.377	1.112



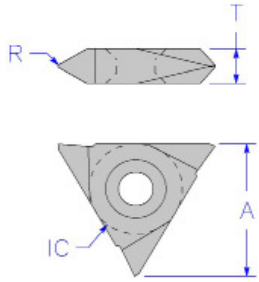
TNMC holders and bars on pages 108-109.

TPMA NV 60° V-Threading 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	R	IC	T	A
	TPMA 32 NV	33400	8-36	.003	.375	.127	.550
	TPMA 43 NV	33410	5-24	.004	.500	.190	.737
	TPMA 43 NV .010R	33420	4-20	.010	.500	.190	.737
	TPMA 54 NV	33430	4-20	.008	.625	.252	.925
	TPMA 54 NV .010R	33440	4-20	.010	.625	.252	.925
	TPMA 54 NV .020R	33450	4-12	.020	.625	.252	.925
	TPMA 54 NV .025R	33460	4-8	.025	.625	.252	.925
	TPMA 54 NV .038R	33470	4-6	.038	.625	.252	.925
	TPMA 66 NV	33480	3-12	.009	.750	.377	1.112



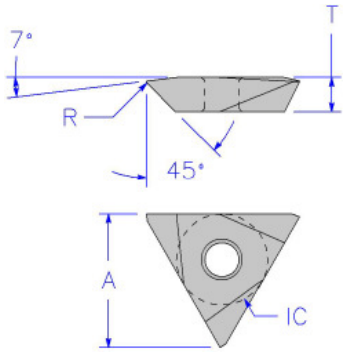
TNMA holders and bars on page 107 & 109.

TPMC NV 60° V-Threading 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	R	IC	T	A
	TPMC 32 NV	33600	8-36	.003	.375	.127	.550
	TPMC 43 NV	33610	5-24	.004	.500	.190	.737
	TPMC 43 NV .010R	33620	4-20	.010	.500	.190	.737
	TPMC 54 NV	33630	4-20	.008	.625	.252	.925
	TPMC 54 NV .010R	33640	4-20	.010	.625	.252	.925
	TPMC 54 NV .020R	33650	4-12	.020	.625	.252	.925
	TPMC 54 NV .025R	33660	4-8	.025	.625	.252	.925
	TPMC 54 NV .038R	33670	4-6	.038	.625	.252	.925
	TPMC 66 NV	33680	3-12	.009	.750	.377	1.112



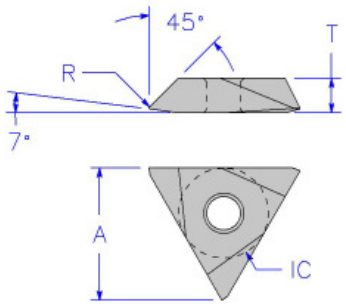
TNMC holders and bars on pages 108-109.

TNMA / TNMC AMERICAN STANDARD BUTTRESS	DESCRIPTION	EDP	PITCH	R	IC	T	A
7° LEADING PUSH BUTTRESS	TNMA 43 7° X 45° INT A **(SHOWN)**	33700	8-12	.006	.500	.190	.737
	TNMA 43 7° X 45° EXT A	33710	8-12	.006	.500	.190	.737
	TNMA 54 7° X 45° INT A	33720	4-6	.010	.625	.252	.925
	TNMA 54 7° X 45° EXT A	33730	4-6	.010	.625	.252	.925
	TNMC 43 7° X 45° INT A	33740	8-12	.006	.500	.190	.737
	TNMC 43 7° X 45° EXT A	33750	8-12	.006	.500	.190	.737
	TNMC 54 7° X 45° INT A	33760	4-6	.010	.625	.252	.925
	TNMC 54 7° X 45° EXT A	33770	4-6	.010	.625	.252	.925



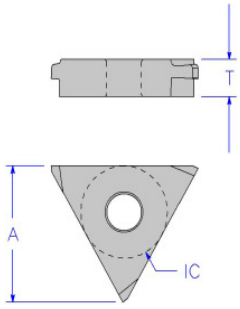
TNMA holders and bars on page 107 & 109. TNMC holders and bars on pages 108-109.

TNMA / TNMC AMERICAN STANDARD BUTTRESS	DESCRIPTION	EDP	PITCH	R	IC	T	A
45° LEADING PULL BUTTRESS	TNMA 43 45° X 7° INT B **(SHOWN)**	33800	8-12	.006	.500	.190	.737
	TNMA 43 45° X 7° EXT B	33810	8-12	.006	.500	.190	.737
	TNMA 54 45° X 7° INT B	33820	4-6	.010	.625	.252	.925
	TNMA 54 45° X 7° EXT B	33830	4-6	.010	.625	.252	.925
	TNMC 43 45° X 7° INT B	33840	8-12	.006	.500	.190	.737
	TNMC 43 45° X 7° EXT B	33850	8-12	.006	.500	.190	.737
	TNMC 54 45° X 7° INT B	33860	4-6	.010	.625	.252	.925
	TNMC 54 45° X 7° EXT B	33870	4-6	.010	.625	.252	.925



TNMA holders and bars on page 107 & 109. TNMC holders and bars on pages 108-109.

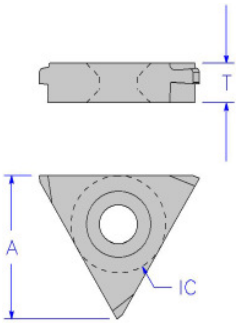
TNMA API BUTTRESS	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMA 43 8B75 INT	39901	8	3/4	.500	.190	.737
	TNMA 43 8B75 EXT	39912	8	3/4	.500	.190	.737
	TNMA 54 5B75 INT	47531	5	3/4	.625	.252	.925
	TNMA 54 5B75 EXT	48422	5	3/4	.625	.252	.925
	TNMA 54 5B1 INT	39941	5	1	.625	.252	.925
	TNMA 54 5B1 EXT	39952	5	1	.625	.252	.925



TNMA holders and bars on page 107 & 109.

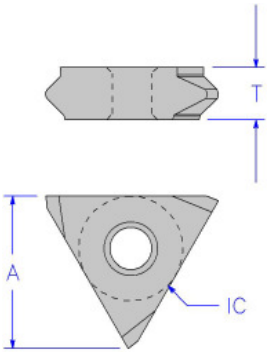
On Edge

TNMC API BUTTRESS	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMC 43 8B75 INT	39921	8	3/4	.500	.190	.737
	TNMC 43 8B75 EXT	39932	8	3/4	.500	.190	.737
	TNMC 54 5B75 INT	56521	5	3/4	.625	.252	.925
	TNMC 54 5B75 EXT	66842	5	3/4	.625	.252	.925
	TNMC 54 5B1 INT	44821	5	1	.625	.252	.925
	TNMC 54 5B1 EXT	45622	5	1	.625	.252	.925



TNMC holders and bars on pages 108-109.

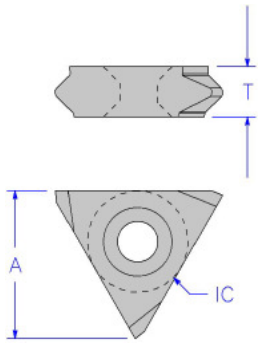
TNMA API HUGHES H90 THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMA 55 H902 INT	47551	3.5	2	.625	.315	.925
	TNMA 55 H902 EXT	47552	3.5	2	.625	.315	.925
	TNMA 55 H903 INT	74041	3.5	3	.625	.315	.925
	TNMA 55 H903 EXT	74042	3.5	3	.625	.315	.925
	TNMA 55 H90S INT	74051	3	1 1/4	.625	.315	.925
	TNMA 55 H90S EXT	74052	3	1 1/4	.625	.315	.925



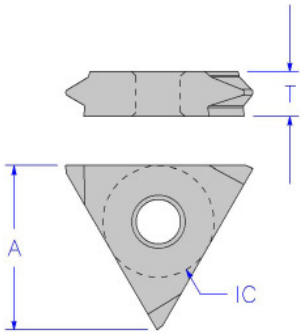
TNMA holders and bars on page 107 & 109.

On Edge

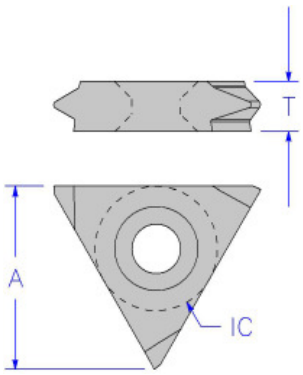
TNMC API HUGHES H90 THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMC 55 H902 INT	74061	3.5	2	.625	.315	.925
	TNMC 55 H902 EXT	74062	3.5	2	.625	.315	.925
	TNMC 55 H903 INT	71151	3.5	3	.625	.315	.925
	TNMC 55 H903 EXT	71152	3.5	3	.625	.315	.925
	TNMC 55 H90S INT	62871	3	1 1/4	.625	.315	.925
	TNMC 55 H90S EXT	62872	3	1 1/4	.625	.315	.925



TNMC holders and bars on pages 108-109.

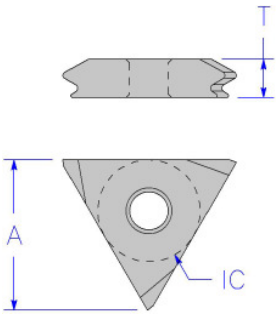
TNMA API THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMA 54 530 INT	34001	5	3	.625	.252	.925
	TNMA 54 530 EXT	34002	5	3	.625	.252	.925
	TNMA 55 425 INT	34011	4	2	.625	.315	.925
	TNMA 55 425 EXT	34012	4	2	.625	.315	.925
	TNMA 55 428 INT	34021	4	2	.625	.315	.925
	TNMA 55 428 EXT	34022	4	2	.625	.315	.925
	TNMA 55 435 INT	34031	4	3	.625	.315	.925
	TNMA 55 435 EXT	34032	4	3	.625	.315	.925
	TNMA 55 438 INT	34041	4	3	.625	.315	.925
	TNMA 55 438 EXT	34042	4	3	.625	.315	.925
	TNMA 55 4PAC INT	34051	4	1.5	.625	.315	.925
	TNMA 55 4PAC EXT	34052	4	1.5	.625	.315	.925

TNMA holders and bars on page 107 & 109.

TNMC API THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMC 54 530 INT	34061	5	3	.625	.252	.925
	TNMC 54 530 EXT	34062	5	3	.625	.252	.925
	TNMC 55 425 INT	34071	4	2	.625	.315	.925
	TNMC 55 425 EXT	34072	4	2	.625	.315	.925
	TNMC 55 428 INT	34081	4	2	.625	.315	.925
	TNMC 55 428 EXT	34082	4	2	.625	.315	.925
	TNMC 55 435 INT	34091	4	3	.625	.315	.925
	TNMC 55 435 EXT	34092	4	3	.625	.315	.925
	TNMC 55 438 INT	34101	4	3	.625	.315	.925
	TNMC 55 438 EXT	34102	4	3	.625	.315	.925
	TNMC 55 4PAC INT	34111	4	1.5	.625	.315	.925
	TNMC 55 4PAC EXT	34112	4	1.5	.625	.315	.925

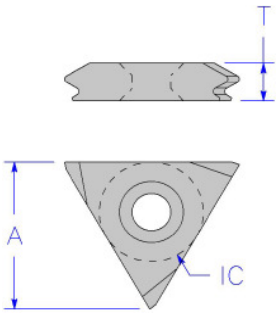
TNMC holders and bars on pages 108-109.

TNMA API ROUND THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMA 43 8RD INT	41841	8	3/4	.500	.190	.737
	TNMA 43 8RD EXT	41842	8	3/4	.500	.190	.737
	TNMA 43 10RD INT	74101	10	3/4	.500	.190	.737
	TNMA 43 10RD EXT	74102	10	3/4	.500	.190	.737
	TNMA 54 8RD INT	58671	8	3/4	.625	.252	.925
	TNMA 54 8RD EXT	58672	8	3/4	.625	.252	.925
	TNMA 54 10RD INT	65781	10	3/4	.625	.252	.925
	TNMA 54 10RD EXT	65782	10	3/4	.625	.252	.925

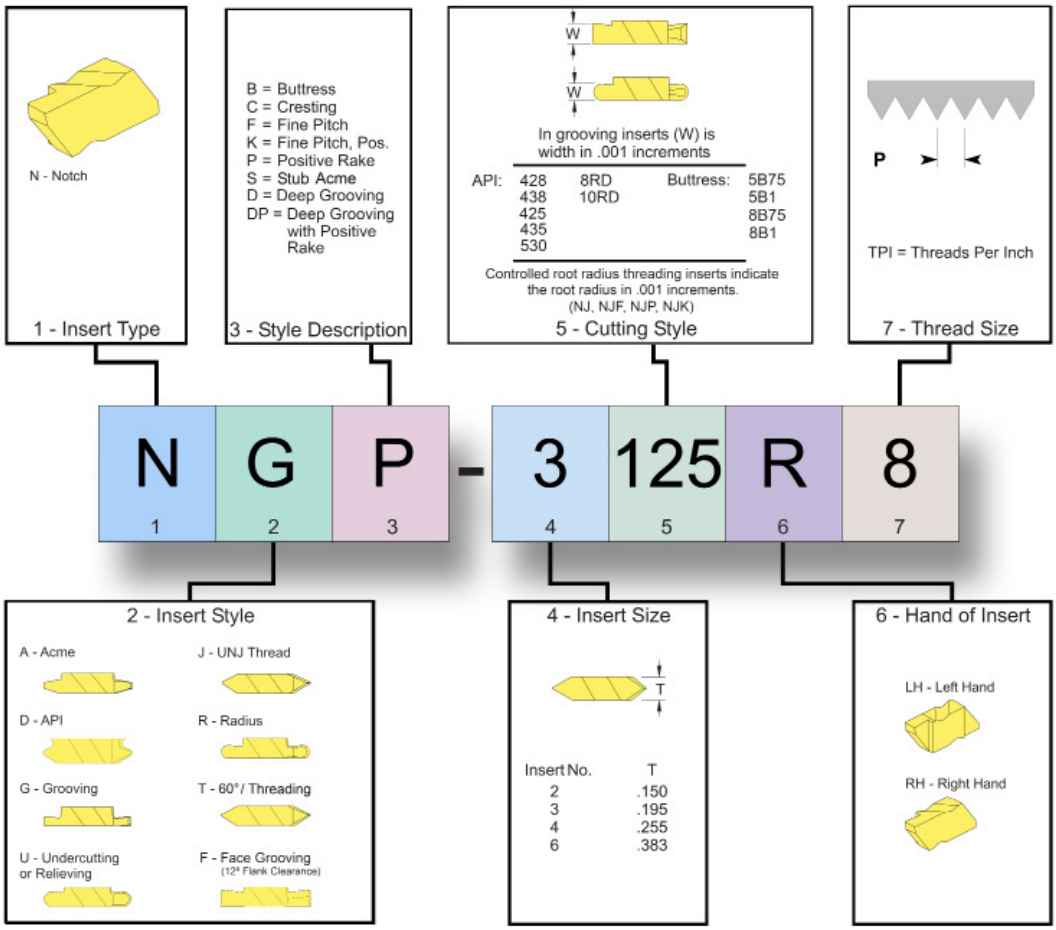


TNMA holders and bars on page 107 & 109.

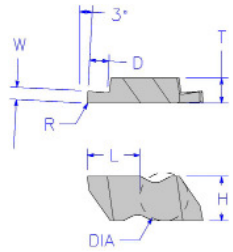
TNMC API ROUND THREADING	DESCRIPTION	EDP	PITCH	TPF	IC	T	A
	TNMC 43 8RD INT	62961	8	3/4	.500	.190	.737
	TNMC 43 8RD EXT	62962	8	3/4	.500	.190	.737
	TNMC 43 10RD INT	64461	10	3/4	.500	.190	.737
	TNMC 43 10RD EXT	64462	10	3/4	.500	.190	.737
	TNMC 54 8RD INT	66831	8	3/4	.625	.252	.925
	TNMC 54 8RD EXT	66832	8	3/4	.625	.252	.925
	TNMC 54 10RD INT	74121	10	3/4	.625	.252	.925
	TNMC 54 10RD EXT	74122	10	3/4	.625	.252	.925



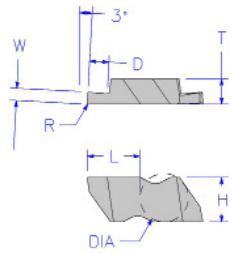
TNMC holders and bars on pages 108-109.



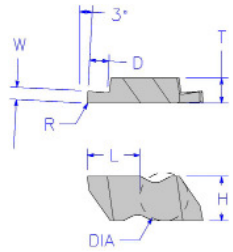
Threading Grade Descriptions			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at slower speeds	Item specific
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at medium speeds	Item specific
220	AlTiN coated tough submicron - wear & heat resistant	Ductile iron, stainless steel, nickel-based & high-temp alloys at high speeds	Item specific
230	TiAlN coated tough submicron - wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium to high speed	**Standard**
232	TiAlN coated tough submicron - chip, wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium to high speed premium thread forms	Item specific
613	TiN coated premium substrate for threading	4140 and similar steels at slow to medium speeds - most popular threading grade	**Standard**
623	AlTiN coated premium substrate for threading	All steels at high speeds - maximum heat protection	Item specific
633	TiAlN coated premium substrate for threading	All steels at high speeds - medium heat protection	Item specific
Grooving Grade Descriptions			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys composites aluminum at slower speeds	Item specific
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys composites aluminum at medium speeds	**Standard**
230	TiAlN coated tough submicron - wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at high speeds - most popular grooving grade	**Standard**
612	TiN coated medium tough - long lasting, smooth cutting	4140 and similar steels medium speeds - most common steel cutting grade	**Standard**
632	TiAlN coated medium tough - long lasting heat resistant	All steels at high speeds - medium heat protection	Item specific

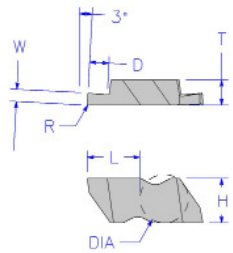
#2 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NG2031R	27003	.031	.004	.075	.150	.219	.270	.188
	NG2031L	27004	.031	.004	.075	.150	.219	.270	.188
	NG2047R	27013	.047	.004	.090	.150	.219	.270	.188
	NG2047L	27014	.047	.004	.090	.150	.219	.270	.188
	NG2062R	27023	.062	.008	.110	.150	.219	.270	.188
	NG2062L	27024	.062	.008	.110	.150	.219	.270	.188
	NG2094R	27033	.094	.008	.110	.150	.219	.270	.188
	NG2094L	27034	.094	.008	.110	.150	.219	.270	.188
	NG2125R	27043	.125	.008	.110	.150	.219	.270	.188
	NG2125L	27044	.125	.008	.110	.150	.219	.270	.188

Top Notch holders and bars on pages 115-117.

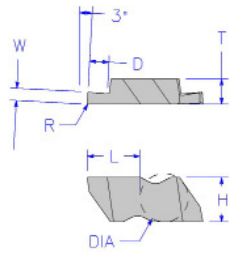
#3 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NG3031R	27103	.031	.004	.075	.195	.344	.405	.375
	NG3031L	27104	.031	.004	.075	.195	.344	.405	.375
	NG3047R	27113	.047	.004	.100	.195	.344	.405	.375
	NG3047L	27114	.047	.004	.100	.195	.344	.405	.375
	NG3062R	27123	.062	.008	.150	.195	.344	.405	.375
	NG3062L	27124	.062	.008	.150	.195	.344	.405	.375
	NG3072R	27133	.072	.008	.120	.195	.344	.405	.375
	NG3072L	27134	.072	.008	.120	.195	.344	.405	.375
	NG3078R	27143	.078	.008	.120	.195	.344	.405	.375
	NG3078L	27144	.078	.008	.120	.195	.344	.405	.375
	NG3088R	27153	.088	.008	.120	.195	.344	.405	.375
	NG3088L	27154	.088	.008	.120	.195	.344	.405	.375
	NG3094R	27163	.094	.008	.150	.195	.344	.405	.375
	NG3094L	27164	.094	.008	.150	.195	.344	.405	.375
	NG3097R	27173	.097	.008	.150	.195	.344	.405	.375
	NG3097L	27174	.097	.008	.150	.195	.344	.405	.375

Top Notch holders and bars on pages 115-117.

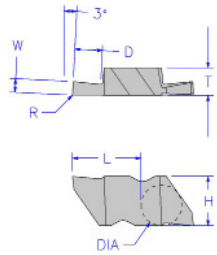
#3 TOP NOTCH GROOVING CONTINUED	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NG3105R	27183	.105	.008	.150	.195	.344	.405	.375
	NG3105L	27184	.105	.008	.150	.195	.344	.405	.375
	NG3110R	27193	.110	.008	.150	.195	.344	.405	.375
	NG3110L	27194	.110	.008	.150	.195	.344	.405	.375
	NG3125R	27203	.125	.008	.190	.195	.344	.405	.375
	NG3125L	27204	.125	.008	.190	.195	.344	.405	.375
	NG3142R	27213	.142	.008	.190	.195	.344	.405	.375
	NG3142L	27214	.142	.008	.190	.195	.344	.405	.375
	NG3156R	27223	.156	.008	.190	.195	.344	.405	.375
	NG3156L	27224	.156	.008	.190	.195	.344	.405	.375
	NG3178R	27233	.178	.008	.190	.195	.344	.405	.375
	NG3178L	27234	.178	.008	.190	.195	.344	.405	.375
	NG3185R	27243	.185	.022	.190	.195	.344	.405	.375
	NG3185L	27244	.185	.022	.190	.195	.344	.405	.375
	NG3189R	27253	.189	.022	.190	.195	.344	.405	.375
	NG3189L	27254	.189	.022	.190	.195	.344	.405	.375
	NG3250R	27263	.250	.022	.190	.195	.344	.405	.375
	NG3250L	27264	.250	.022	.190	.195	.344	.405	.375

#4 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NG4125R	27313	.125	.008	.250	.255	.453	.636	.375
	NG4125L	27314	.125	.008	.250	.255	.453	.636	.375
	NG4189R	27323	.189	.022	.250	.255	.453	.636	.375
	NG4189L	27324	.189	.022	.250	.255	.453	.636	.375
	NG4250R	27343	.250	.022	.250	.255	.453	.636	.375
	NG4250L	27344	.250	.022	.250	.255	.453	.636	.375
	NG4312R	27353	.312	.032	.250	.255	.453	.636	.375
	NG4312L	27354	.312	.032	.250	.255	.453	.636	.375

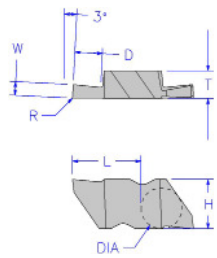
Top Notch holders and bars on pages 115-117.

#6 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NG6281R	27403	.281	.032	.250	.383	.453	.636	.375
	NG6281L	27404	.281	.032	.250	.383	.453	.636	.375
	NG6312R	27413	.312	.032	.250	.383	.453	.636	.375
	NG6312L	27414	.312	.032	.250	.383	.453	.636	.375
	NG6375R	27423	.375	.032	.250	.383	.453	.636	.375
	NG6375L	27424	.375	.032	.250	.383	.453	.636	.375

#2 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NGP2031R	27503	.031	.004	.075	.150	.219	.270	.188
	NGP2031L	27504	.031	.004	.075	.150	.219	.270	.188
	NGP2047R	27513	.047	.004	.090	.150	.219	.270	.188
	NGP2047L	27514	.047	.004	.090	.150	.219	.270	.188
	NGP2062R	27523	.062	.008	.110	.150	.219	.270	.188
	NGP2062L	27524	.062	.008	.110	.150	.219	.270	.188
	NGP2094R	27533	.094	.008	.110	.150	.219	.270	.188
	NGP2094L	27534	.094	.008	.110	.150	.219	.270	.188
	NGP2125R	27543	.125	.008	.110	.150	.219	.270	.188
	NGP2125L	27544	.125	.008	.110	.150	.219	.270	.188



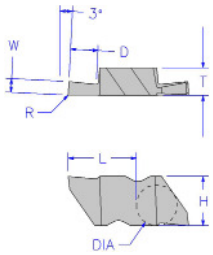
#3 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NGP3031R	27603	.031	.004	.075	.195	.344	.405	.375
	NGP3031L	27604	.031	.004	.075	.195	.344	.405	.375
	NGP3047R	27613	.047	.004	.100	.195	.344	.405	.375
	NGP3047L	27614	.047	.004	.100	.195	.344	.405	.375
	NGP3062R	27623	.062	.008	.150	.195	.344	.405	.375
	NGP3062L	27624	.062	.008	.150	.195	.344	.405	.375
	NGP3072R	27633	.072	.008	.120	.195	.344	.405	.375
	NGP3072L	27634	.072	.008	.120	.195	.344	.405	.375



Top Notch

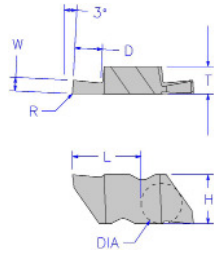
Top Notch holders and bars on pages 115-117.

#3 TOP NOTCH GROOVING CONTINUED	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NGP3078R	27643	.078	.008	.120	.195	.344	.405	.375
	NGP3078L	27644	.078	.008	.120	.195	.344	.405	.375
	NGP3088R	27653	.088	.008	.120	.195	.344	.405	.375
	NGP3088L	27654	.088	.008	.120	.195	.344	.405	.375
	NGP3094R	27663	.094	.008	.150	.195	.344	.405	.375
	NGP3094L	27664	.094	.008	.150	.195	.344	.405	.375
	NGP3097R	27673	.097	.008	.150	.195	.344	.405	.375
	NGP3097L	27674	.097	.008	.150	.195	.344	.405	.375
	NGP3105R	27683	.105	.008	.150	.195	.344	.405	.375
	NGP3105L	27684	.105	.008	.150	.195	.344	.405	.375
	NGP3110R	27693	.110	.008	.150	.195	.344	.405	.375
	NGP3110L	27694	.110	.008	.150	.195	.344	.405	.375
	NGP3125R	27703	.125	.008	.190	.195	.344	.405	.375
	NGP3125L	27704	.125	.008	.190	.195	.344	.405	.375
	NGP3142R	27713	.142	.008	.190	.195	.344	.405	.375
	NGP3142L	27714	.142	.008	.190	.195	.344	.405	.375
	NGP3156R	27723	.156	.008	.190	.195	.344	.405	.375
	NGP3156L	27724	.156	.008	.190	.195	.344	.405	.375
	NGP3178R	27733	.178	.008	.190	.195	.344	.405	.375
	NGP3178L	27734	.178	.008	.190	.195	.344	.405	.375
	NGP3185R	27743	.185	.022	.190	.195	.344	.405	.375
	NGP3185L	27744	.185	.022	.190	.195	.344	.405	.375
	NGP3189R	27753	.189	.022	.190	.195	.344	.405	.375
	NGP3189L	27754	.189	.022	.190	.195	.344	.405	.375
	NGP3250R	27763	.250	.022	.190	.195	.344	.405	.375
	NGP3250L	27764	.250	.022	.190	.195	.344	.405	.375

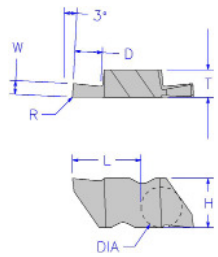


Top Notch holders and bars on pages 115-117.

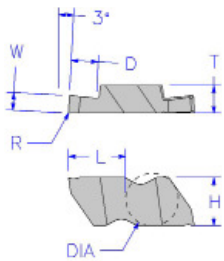
#4 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NGP4125R	27803	.125	.008	.250	.255	.453	.636	.375
	NGP4125L	27804	.125	.008	.250	.255	.453	.636	.375
	NGP4189R	27813	.189	.022	.250	.255	.453	.636	.375
	NGP4189L	27814	.189	.022	.250	.255	.453	.636	.375
	NGP4250R	27833	.250	.022	.250	.255	.453	.636	.375
	NGP4250L	27834	.250	.022	.250	.255	.453	.636	.375
	NGP4312R	27843	.312	.032	.250	.255	.453	.636	.375
	NGP4312L	27844	.312	.032	.250	.255	.453	.636	.375



#6 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NGP6281R	27903	.281	.032	.250	.383	.453	.636	.375
	NGP6281L	27904	.281	.032	.250	.383	.453	.636	.375
	NGP6312R	27913	.312	.032	.250	.383	.453	.636	.375
	NGP6312L	27914	.312	.032	.250	.383	.453	.636	.375
	NGP6375R	27923	.375	.032	.250	.383	.453	.636	.375
	NGP6375L	27924	.375	.032	.250	.383	.453	.636	.375



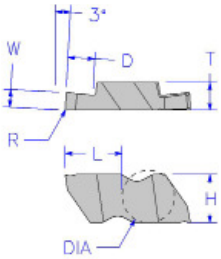
#2 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
K-STYLE CHIP CURLER	NG2031RK	28003	.031	.004	.075	.150	.219	.270	.188
	NG2031LK	28004	.031	.004	.075	.150	.219	.270	.188
	NG2047RK	28013	.047	.004	.090	.150	.219	.270	.188
	NG2047LK	28014	.047	.004	.090	.150	.219	.270	.188
	NG2062RK	28023	.062	.008	.110	.150	.219	.270	.188
	NG2062LK	28024	.062	.008	.110	.150	.219	.270	.188
	NG2094RK	28033	.094	.008	.110	.150	.219	.270	.188
	NG2094LK	28034	.094	.008	.110	.150	.219	.270	.188
	NG2125RK	28043	.125	.008	.110	.150	.219	.270	.188
	NG2125LK	28044	.125	.008	.110	.150	.219	.270	.188



Top Notch

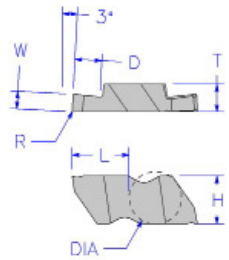
Top Notch holders and bars on pages 115-117.

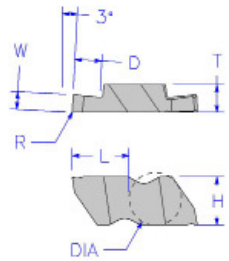
#3 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
K-STYLE CHIP CURLER	NG3031RK	28103	.031	.004	.075	.195	.344	.405	.375
	NG3031LK	28104	.031	.004	.075	.195	.344	.405	.375
	NG3047RK	28113	.047	.004	.100	.195	.344	.405	.375
	NG3047LK	28114	.047	.004	.100	.195	.344	.405	.375
	NG3062RK	28123	.062	.008	.150	.195	.344	.405	.375
	NG3062LK	28124	.062	.008	.150	.195	.344	.405	.375
	NG3072RK	28133	.072	.008	.120	.195	.344	.405	.375
	NG3072LK	28134	.072	.008	.120	.195	.344	.405	.375
	NG3078RK	28143	.078	.008	.120	.195	.344	.405	.375
	NG3078LK	28144	.078	.008	.120	.195	.344	.405	.375
	NG3088RK	28153	.088	.008	.120	.195	.344	.405	.375
	NG3088LK	28154	.088	.008	.120	.195	.344	.405	.375
	NG3094RK	28163	.094	.008	.150	.195	.344	.405	.375
	NG3094LK	28164	.094	.008	.150	.195	.344	.405	.375
	NG3097RK	28173	.097	.008	.150	.195	.344	.405	.375
	NG3097LK	28174	.097	.008	.150	.195	.344	.405	.375
	NG3105RK	28183	.105	.008	.150	.195	.344	.405	.375
	NG3105LK	28184	.105	.008	.150	.195	.344	.405	.375
	NG3110RK	28193	.110	.008	.150	.195	.344	.405	.375
	NG3110LK	28194	.110	.008	.150	.195	.344	.405	.375
	NG3125RK	28203	.125	.008	.190	.195	.344	.405	.375
	NG3125LK	28204	.125	.008	.190	.195	.344	.405	.375
	NG3142RK	28213	.142	.008	.190	.195	.344	.405	.375
	NG3142LK	28214	.142	.008	.190	.195	.344	.405	.375
	NG3156RK	28223	.156	.008	.190	.195	.344	.405	.375
	NG3156LK	28224	.156	.008	.190	.195	.344	.405	.375
	NG3178RK	28233	.178	.008	.190	.195	.344	.405	.375
	NG3178LK	28234	.178	.008	.190	.195	.344	.405	.375
	NG3185RK	28243	.185	.022	.190	.195	.344	.405	.375
	NG3185LK	28244	.185	.022	.190	.195	.344	.405	.375
	NG3189RK	28253	.189	.022	.190	.195	.344	.405	.375
	NG3189LK	28254	.189	.022	.190	.195	.344	.405	.375
	NG3250RK	28263	.250	.022	.190	.195	.344	.405	.375
	NG3250LK	28264	.250	.022	.190	.195	.344	.405	.375

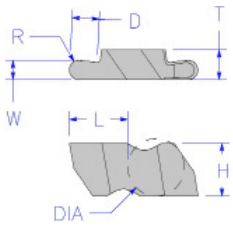


Top Notch

Top Notch holders and bars on pages 115-117.

#4 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
K-STYLE CHIP CURLER	NG4125RK	28303	.125	.008	.250	.255	.453	.636	.375
	NG4125LK	28304	.125	.008	.250	.255	.453	.636	.375
	NG4189RK	28313	.189	.022	.250	.255	.453	.636	.375
	NG4189LK	28314	.189	.022	.250	.255	.453	.636	.375
	NG4250RK	28333	.250	.022	.250	.255	.453	.636	.375
	NG4250LK	28334	.250	.022	.250	.255	.453	.636	.375
	NG4312RK	28343	.312	.032	.250	.255	.453	.636	.375
	NG4312LK	28344	.312	.032	.250	.255	.453	.636	.375

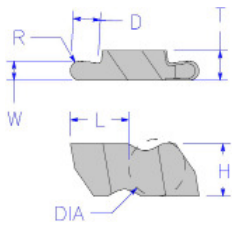
#6 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
K-STYLE CHIP CURLER	NG6281RK	28403	.281	.032	.250	.383	.453	.636	.375
	NG6281LK	28404	.281	.032	.250	.383	.453	.636	.375
	NG6312RK	28413	.312	.032	.250	.383	.453	.636	.375
	NG6312LK	28414	.312	.032	.250	.383	.453	.636	.375
	NG6375RK	28423	.375	.032	.250	.383	.453	.636	.375
	NG6375LK	28424	.375	.032	.250	.383	.453	.636	.375

#2 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
FULL NOSE RADIUS	NR2031R	28503	.062	.031	.110	.150	.219	.268	.188
	NR2031L	28504	.062	.031	.110	.150	.219	.268	.188
	NR2047R	28513	.094	.047	.110	.150	.219	.268	.188
	NR2047L	28514	.094	.047	.110	.150	.219	.268	.188
	NR2062R	28523	.125	.062	.110	.150	.219	.267	.188
	NR2062L	28524	.125	.062	.110	.150	.219	.267	.188

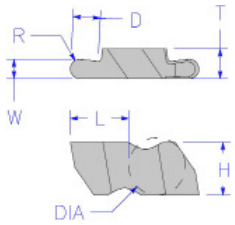
Top Notch

Top Notch holders and bars on pages 115-117.

#3 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
FULL NOSE RADIUS	NR3031R	28603	.062	.031	.125	.195	.344	.403	.375
	NR3031L	28604	.062	.031	.125	.195	.344	.403	.375
	NR3047R	28613	.094	.047	.180	.195	.344	.403	.375
	NR3047L	28614	.094	.047	.180	.195	.344	.403	.375
	NR3062R	28623	.125	.062	.180	.195	.344	.402	.375
	NR3062L	28624	.125	.062	.180	.195	.344	.402	.375
	NR3078R	28633	.156	.078	.180	.195	.344	.401	.375
	NR3078L	28634	.156	.078	.180	.195	.344	.401	.375
	NR3094R	28643	.188	.094	.180	.195	.344	.400	.375
	NR3094L	28644	.188	.094	.180	.195	.344	.400	.375

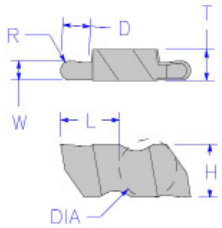


#4 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
FULL NOSE RADIUS	NR4062R	28703	.125	.062	.250	.255	.453	.633	.375
	NR4062L	28704	.125	.062	.250	.255	.453	.633	.375
	NR4094R	28713	.189	.094	.250	.255	.453	.631	.375
	NR4094L	28714	.189	.094	.250	.255	.453	.631	.375
	NR4125R	28723	.250	.125	.250	.255	.453	.629	.375
	NR4125L	28724	.250	.125	.250	.255	.453	.629	.375

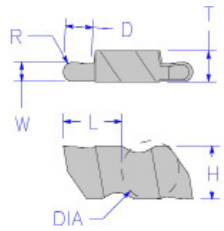


#2 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
FULL NOSE RADIUS 5° POSITIVE RAKE	NRP2031R	28803	.062	.031	.110	.150	.219	.268	.188
	NRP2031L	28804	.062	.031	.110	.150	.219	.268	.188
	NRP2047R	28813	.094	.047	.110	.150	.219	.268	.188
	NRP2047L	28814	.094	.047	.110	.150	.219	.268	.188
	NRP2062R	28823	.125	.062	.110	.150	.219	.267	.188
	NRP2062L	28824	.125	.062	.110	.150	.219	.267	.188

Top Notch holders and bars on pages 115-117.

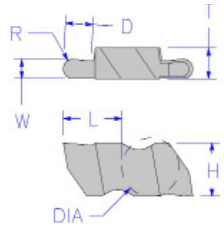


#3 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
FULL NOSE RADIUS 5° POSITIVE RAKE	NRP3031R	28903	.062	.031	.125	.195	.344	.403	.375
	NRP3031L	28904	.062	.031	.125	.195	.344	.403	.375
	NRP3047R	28913	.094	.047	.180	.195	.344	.403	.375
	NRP3047L	28914	.094	.047	.180	.195	.344	.403	.375
	NRP3062R	28923	.125	.062	.180	.195	.344	.402	.375
	NRP3062L	28924	.125	.062	.180	.195	.344	.402	.375
	NRP3078R	28933	.156	.078	.180	.195	.344	.401	.375
	NRP3078L	28934	.156	.078	.180	.195	.344	.401	.375
	NRP3094R	28943	.188	.094	.180	.195	.344	.400	.375
	NRP3094L	28944	.188	.094	.180	.195	.344	.400	.375

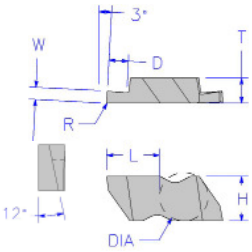


#4 TOP NOTCH GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
FULL NOSE RADIUS 5° POSITIVE RAKE	NRP4062R	29003	.125	.062	.250	.255	.453	.633	.375
	NRP4062L	29004	.125	.062	.250	.255	.453	.633	.375
	NRP4094R	29013	.189	.094	.250	.255	.453	.631	.375
	NRP4094L	29014	.189	.094	.250	.255	.453	.631	.375
	NRP4125R	29023	.250	.125	.250	.255	.453	.629	.375
	NRP4125L	29024	.250	.125	.250	.255	.453	.629	.375

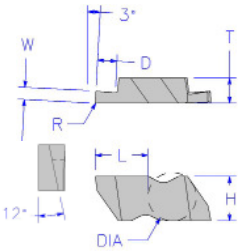
Top Notch holders and bars on pages 115-117.



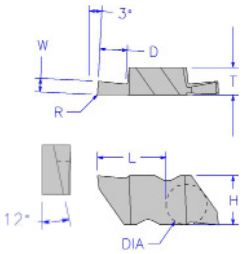
TOP NOTCH FACE GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NF3031R	29103	.031	.004	.075	.195	.344	.405	.375
	NF3031L	29104	.031	.004	.075	.195	.344	.405	.375
	NF3047R	29113	.047	.004	.100	.195	.344	.405	.375
	NF3047L	29114	.047	.004	.100	.195	.344	.405	.375
	NF3062R	29123	.062	.008	.120	.195	.344	.405	.375
	NF3062L	29124	.062	.008	.120	.195	.344	.405	.375
	NF3094R	29133	.094	.008	.150	.195	.344	.405	.375
	NF3094L	29134	.094	.008	.150	.195	.344	.405	.375
	NF3125R	29143	.125	.008	.190	.195	.344	.405	.375
	NF3125L	29144	.125	.008	.190	.195	.344	.405	.375
	NF3189R	29153	.189	.022	.190	.195	.344	.405	.375
	NF3189L	29154	.189	.022	.190	.195	.344	.405	.375



Top Notch holders and bars on pages 115-117.

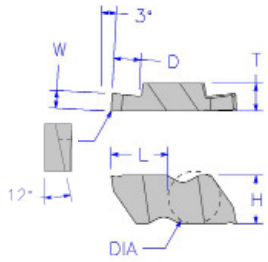
TOP NOTCH FACE GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NF4125R	29203	.125	.008	.250	.255	.453	.636	.375
	NF4125L	29204	.125	.008	.250	.255	.453	.636	.375
	NF4189R	29213	.189	.022	.250	.255	.453	.636	.375
	NF4189L	29214	.189	.022	.250	.255	.453	.636	.375
	NF4250R	29223	.250	.022	.250	.255	.453	.636	.375
	NF4250L	29224	.250	.022	.250	.255	.453	.636	.375
	NF6312R	29233	.312	.032	.250	.383	.453	.636	.375
	NF6312L	29234	.312	.032	.250	.383	.453	.636	.375
	NF6375R	29243	.375	.032	.250	.383	.453	.636	.375
	NF6375L	29244	.375	.032	.250	.383	.453	.636	.375

Top Notch holders and bars on pages 115-117.

TOP NOTCH FACE GROOVING 5° POSITIVE RAKE	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NFP3031R	29303	.031	.004	.075	.195	.344	.405	.375
	NFP3031L	29304	.031	.004	.075	.195	.344	.405	.375
	NFP3047R	29313	.047	.004	.100	.195	.344	.405	.375
	NFP3047L	29314	.047	.004	.100	.195	.344	.405	.375
	NFP3062R	29323	.062	.008	.120	.195	.344	.405	.375
	NFP3062L	29324	.062	.008	.120	.195	.344	.405	.375
	NFP3094R	29333	.094	.008	.150	.195	.344	.405	.375
	NFP3094L	29334	.094	.008	.150	.195	.344	.405	.375
	NFP3125R	29343	.125	.008	.190	.195	.344	.405	.375
	NFP3125L	29344	.125	.008	.190	.195	.344	.405	.375
	NFP3189R	29353	.189	.022	.190	.195	.344	.405	.375
	NFP3189L	29354	.189	.022	.190	.195	.344	.405	.375

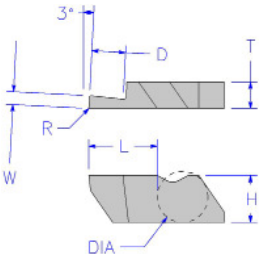
Top Notch holders and bars on pages 115-117.

TOP NOTCH FACE GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
K-STYLE CHIP CURLER	NF3031RK	29403	.031	.004	.075	.195	.344	.405	.375
	NF3031LK	29404	.031	.004	.075	.195	.344	.405	.375
	NF3047RK	29413	.047	.004	.100	.195	.344	.405	.375
	NF3047LK	29414	.047	.004	.100	.195	.344	.405	.375
	NF3062RK	29423	.062	.008	.120	.195	.344	.405	.375
	NF3062LK	29424	.062	.008	.120	.195	.344	.405	.375
	NF3094RK	29433	.094	.008	.150	.195	.344	.405	.375
	NF3094LK	29434	.094	.008	.150	.195	.344	.405	.375
	NF3125RK	29443	.125	.008	.190	.195	.344	.405	.375
	NF3125LK	29444	.125	.008	.190	.195	.344	.405	.375
	NF3189RK	29453	.189	.022	.190	.195	.344	.405	.375
	NF3189LK	29454	.189	.022	.190	.195	.344	.405	.375



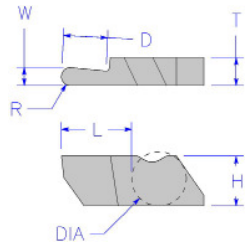
Top Notch holders and bars on pages 115-117.

TOP NOTCH DEEP GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
SINGLE ENDED	NGD3062R	29503	.062	.008	.250	.195	.344	.505	.375
	NGD3062L	29504	.062	.008	.250	.195	.344	.505	.375
	NGD3094R	29513	.094	.008	.250	.195	.344	.505	.375
	NGD3094L	29514	.094	.008	.250	.195	.344	.505	.375
	NGD3125R	29523	.125	.008	.250	.195	.344	.505	.375
	NGD3125L	29524	.125	.008	.250	.195	.344	.505	.375
	NGD3189R	29533	.189	.022	.300	.195	.344	.505	.375
	NGD3189L	29534	.189	.022	.300	.195	.344	.505	.375
	NGD4125R	29543	.125	.008	.250	.255	.453	.886	.375
	NGD4125L	29544	.125	.008	.250	.255	.453	.886	.375
	NGD4189R	29553	.189	.022	.400	.255	.453	.886	.375
	NGD4189L	29554	.189	.022	.400	.255	.453	.886	.375
	NGD4250R	29563	.250	.022	.500	.255	.453	.886	.375
	NGD4250L	29564	.250	.022	.500	.255	.453	.886	.375

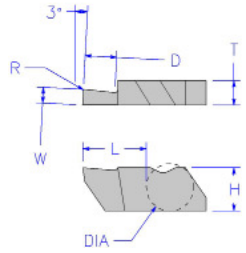


Top Notch holders and bars on pages 115-117.

TOP NOTCH DEEP GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
SINGLE ENDED FULL NOSE RADIUS	NRD3031R	29603	.062	.031	.250	.195	.344	.505	.375
	NRD3031L	29604	.062	.031	.250	.195	.344	.505	.375
	NRD3062R	29613	.125	.062	.300	.195	.344	.505	.375
	NRD3062L	29614	.125	.062	.300	.195	.344	.505	.375
	NRD3094R	29623	.188	.094	.300	.195	.344	.505	.375
	NRD3094L	29624	.188	.094	.300	.195	.344	.505	.375
	NRD4094R	29633	.188	.094	.400	.255	.453	.886	.375
	NRD4094L	29634	.188	.094	.400	.255	.453	.886	.375
	NRD4125R	29643	.250	.125	.500	.255	.453	.886	.375
	NRD4125L	29644	.250	.125	.500	.255	.453	.886	.375

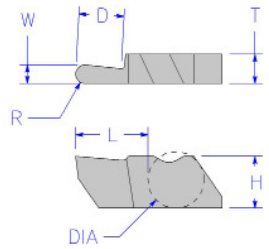


TOP NOTCH DEEP GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
SINGLE ENDED 5° POSITIVE RAKE	NGDP3062R	29703	.062	.008	.250	.195	.344	.505	.375
	NGDP3062L	29704	.062	.008	.250	.195	.344	.505	.375
	NGDP3094R	29713	.094	.008	.250	.195	.344	.505	.375
	NGDP3094L	29714	.094	.008	.250	.195	.344	.505	.375
	NGDP3125R	29723	.125	.008	.250	.195	.344	.505	.375
	NGDP3125L	29724	.125	.008	.250	.195	.344	.505	.375
	NGDP3189R	29733	.189	.022	.300	.195	.344	.505	.375
	NGDP3189L	29734	.189	.022	.300	.195	.344	.505	.375
	NGDP4125R	29743	.125	.008	.250	.255	.453	.886	.375
	NGDP4125L	29744	.125	.008	.250	.255	.453	.886	.375
	NGDP4189R	29753	.189	.022	.400	.255	.453	.886	.375
	NGDP4189L	29754	.189	.022	.400	.255	.453	.886	.375
	NGDP4250R	29763	.250	.022	.500	.255	.453	.886	.375
	NGDP4250L	29764	.250	.022	.500	.255	.453	.886	.375

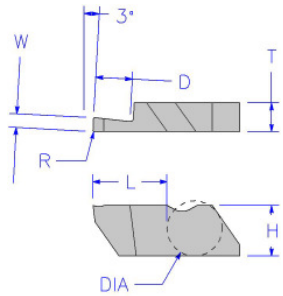


Top Notch holders and bars on pages 115-117.

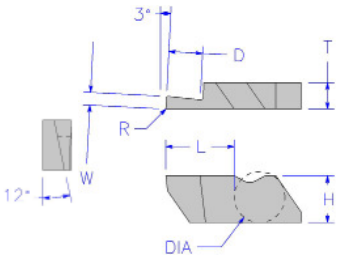
TOP NOTCH DEEP GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
SINGLE ENDED FULL NOSE RADIUS 5° POSITIVE RAKE	NRDP3031R	29803	.062	.031	.250	.195	.344	.505	.375
	NRDP3031L	29804	.062	.031	.250	.195	.344	.505	.375
	NRDP3062R	29813	.125	.062	.250	.195	.344	.505	.375
	NRDP3062L	29814	.125	.062	.250	.195	.344	.505	.375
	NRDP3094R	29823	.188	.094	.300	.195	.344	.505	.375
	NRDP3094L	29824	.188	.094	.300	.195	.344	.505	.375
	NRDP4094R	29833	.188	.094	.400	.255	.453	.886	.375
	NRDP4094L	29834	.188	.094	.400	.255	.453	.886	.375
	NRDP4125R	29843	.250	.125	.500	.255	.453	.886	.375
	NRDP4125L	29844	.250	.125	.500	.255	.453	.886	.375

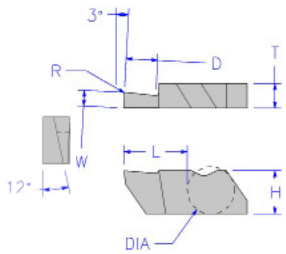


TOP NOTCH DEEP GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
SINGLE ENDED K-STYLE CHIP CURLER	NGD3062RK	32603	.062	.008	.250	.195	.344	.505	.375
	NGD3062LK	32604	.062	.008	.250	.195	.344	.505	.375
	NGD3094RK	32613	.094	.008	.250	.195	.344	.505	.375
	NGD3094LK	32614	.094	.008	.250	.195	.344	.505	.375
	NGD3125RK	32623	.125	.008	.250	.195	.344	.505	.375
	NGD3125LK	32624	.125	.008	.250	.195	.344	.505	.375
	NGD3189RK	32633	.189	.022	.300	.195	.344	.505	.375
	NGD3189LK	32634	.189	.022	.300	.195	.344	.505	.375
	NGD4125RK	32643	.125	.008	.250	.255	.453	.886	.375
	NGD4125LK	32644	.125	.008	.250	.255	.453	.886	.375
	NGD4189RK	32653	.189	.022	.400	.255	.453	.886	.375
	NGD4189LK	32654	.189	.022	.400	.255	.453	.886	.375
	NGD4250RK	32663	.250	.022	.500	.255	.453	.886	.375
	NGD4250LK	32664	.250	.022	.500	.255	.453	.886	.375



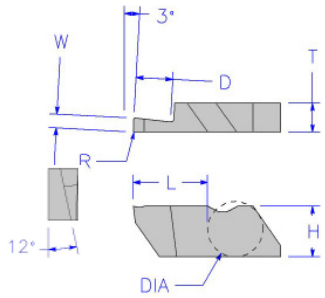
Top Notch holders and bars on pages 115-117.

TOP NOTCH DEEP FACE GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NFD3062R	32703	.062	.008	.250	.195	.344	.505	.375
	NFD3062L	32704	.062	.008	.250	.195	.344	.505	.375
	NFD3094R	32713	.094	.008	.250	.195	.344	.505	.375
	NFD3094L	32714	.094	.008	.250	.195	.344	.505	.375
	NFD3125R	32723	.125	.008	.250	.195	.344	.505	.375
	NFD3125L	32724	.125	.008	.250	.195	.344	.505	.375
	NFD3189R	32733	.189	.022	.300	.195	.344	.505	.375
	NFD3189L	32734	.189	.022	.300	.195	.344	.505	.375
	NFD4125R	32743	.125	.008	.250	.255	.453	.886	.375
	NFD4125L	32744	.125	.008	.250	.255	.453	.886	.375
	NFD4189R	32753	.189	.022	.400	.255	.453	.886	.375
	NFD4189L	32754	.189	.022	.400	.255	.453	.886	.375
	NFD4250R	32763	.250	.022	.500	.255	.453	.886	.375
	NFD4250L	32764	.250	.022	.500	.255	.453	.886	.375

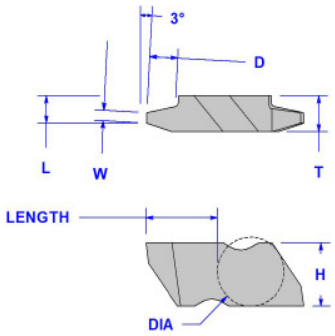
TOP NOTCH DEEP FACE GROOVING 5° POSITIVE RAKE	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
	NFDP3062R	32803	.062	.008	.250	.195	.344	.505	.375
	NFDP3062L	32804	.062	.008	.250	.195	.344	.505	.375
	NFDP3094R	30813	.094	.008	.250	.195	.344	.505	.375
	NFDP3094L	32814	.094	.008	.250	.195	.344	.505	.375
	NFDP3125R	32823	.125	.008	.250	.195	.344	.505	.375
	NFDP3125L	32824	.125	.008	.250	.195	.344	.505	.375
	NFDP3189R	32833	.189	.022	.300	.195	.344	.505	.375
	NFDP3189L	32834	.189	.022	.300	.195	.344	.505	.375
	NFDP4125R	32843	.125	.008	.250	.255	.453	.886	.375
	NFDP4125L	32844	.125	.008	.250	.255	.453	.886	.375
	NFDP4189R	32853	.189	.022	.400	.255	.453	.886	.375
	NFDP4189L	32854	.189	.022	.400	.255	.453	.886	.375
	NFDP4250R	32863	.250	.022	.500	.255	.453	.886	.375
	NFDP4250L	32864	.250	.022	.500	.255	.453	.886	.375

Top Notch holders and bars on pages 115-117.

TOP NOTCH DEEP FACE GROOVING	DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
K-STYLE CHIP CURLER	NFD3062RK	32903	.062	.008	.250	.195	.344	.505	.375
	NFD3062LK	32904	.062	.008	.250	.195	.344	.505	.375
	NFD3094RK	32913	.094	.008	.250	.195	.344	.505	.375
	NFD3094LK	32914	.094	.008	.250	.195	.344	.505	.375
	NFD3125RK	32923	.125	.008	.250	.195	.344	.505	.375
	NFD3125LK	32924	.125	.008	.250	.195	.344	.505	.375
	NFD3189RK	32933	.189	.022	.300	.195	.344	.505	.375
	NFD3189LK	32934	.189	.022	.300	.195	.344	.505	.375
	NFD4125RK	32943	.125	.008	.250	.255	.453	.886	.375
	NFD4125LK	32944	.125	.008	.250	.255	.453	.886	.375
	NFD4189RK	32953	.189	.022	.400	.255	.453	.886	.375
	NFD4189LK	32954	.189	.022	.400	.255	.453	.886	.375
	NFD4250RK	32963	.250	.022	.500	.255	.453	.886	.375
	NFD4250LK	32964	.250	.022	.500	.255	.453	.886	.375

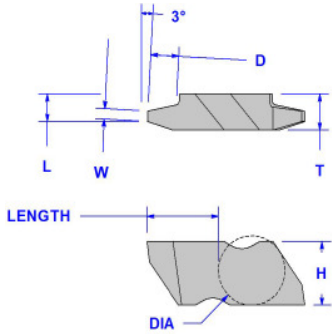


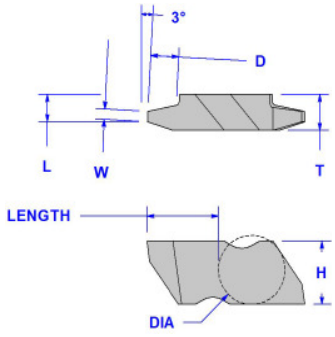
TOP NOTCH 29° ACME THREADING	DESCRIPTION	EDP	TPI	W	L	D	T	H	GAGE LENGTH	GAGE DIA.
	NA3R16	29903	16	.0206	.149	.175	.195	.344	.405	.375
	NA3L16	29904	16	.0206	.149	.175	.195	.344	.405	.375
	NA3R14	29913	14	.0239	.149	.175	.195	.344	.405	.375
	NA3L14	29214	14	.0239	.149	.175	.195	.344	.405	.375
	NA3R12	29223	12	.0283	.149	.175	.195	.344	.405	.375
	NA3L12	29224	12	.0283	.149	.175	.195	.344	.405	.375
	NA3R10	29933	10	.0319	.149	.175	.195	.344	.405	.375
	NA3L10	29934	10	.0319	.149	.175	.195	.344	.405	.375
	NA3R8	29943	8	.0411	.149	.175	.195	.344	.405	.375
	NA3L8	29944	8	.0411	.149	.175	.195	.344	.405	.375
	NA3R6	29953	6	.0566	.149	.175	.195	.344	.405	.375
	NA3L6	29954	6	.0566	.149	.175	.195	.344	.405	.375
	NA3R5	29963	5	.0689	.149	.175	.195	.344	.405	.375
	NA3L5	29964	5	.0689	.149	.175	.195	.344	.405	.375
	NA3R4	29973	4	.0875	.133	.200	.195	.344	.405	.375
	NA3L4	29974	4	.0875	.133	.200	.195	.344	.405	.375
	NA4R8	29983	8	.0411	.202	.200	.255	.453	.636	.375
	NA4L8	29984	8	.0411	.202	.200	.255	.453	.636	.375



Top Notch

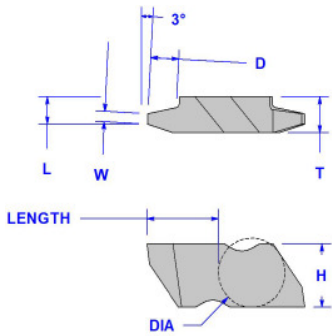
Top Notch holders and bars on pages 115-117.

TOP NOTCH 29° ACME THREADING CONTINUED	DESCRIPTION	EDP	TPI	W	L	D	T	H	GAGE LENGTH	GAGE DIA.
	NA4R6	29993	6	.0566	.202	.200	.255	.453	.636	.375
	NA4L6	29994	6	.0566	.202	.200	.255	.453	.636	.375
	NA4R5	30003	5	.0689	.202	.200	.255	.453	.636	.375
	NA4L5	30004	5	.0689	.202	.200	.255	.453	.636	.375
	NA4R4	30013	4	.0875	.202	.200	.255	.453	.636	.375
	NA4L4	30014	4	.0875	.202	.200	.255	.453	.636	.375
	NA4R3.5	30023	3.5	.1007	.202	.200	.255	.453	.636	.375
	NA4L3.5	30024	3.5	.1007	.202	.200	.255	.453	.636	.375
	NA4R3	30033	3	.1184	.202	.200	.255	.453	.636	.375
	NA4L3	30034	3	.1184	.202	.200	.255	.453	.636	.375
	NA6R3	30043	3	.1184	.283	.300	.383	.453	.636	.375
	NA6L3	30044	3	.1184	.283	.300	.383	.453	.636	.375
	NA6R2.5	30053	2.5	.1431	.283	.300	.383	.453	.636	.375
	NA6L2.5	30054	2.5	.1431	.283	.300	.383	.453	.636	.375
	NA6R2	30063	2	.1802	.283	.300	.383	.453	.636	.375
	NA6L2	30064	2	.1802	.283	.300	.383	.453	.636	.375

TOP NOTCH 29° STUB ACME THREADING	DESCRIPTION	EDP	TPI	W	L	D	T	H	GAGE LENGTH	GAGE DIA.
	NAS3R16	30103	16	.0238	.149	.175	.195	.344	.405	.375
	NAS3L16	30104	16	.0238	.149	.175	.195	.344	.405	.375
	NAS3R14	30113	14	.0276	.149	.175	.195	.344	.405	.375
	NAS3L14	30114	14	.0276	.149	.175	.195	.344	.405	.375
	NAS3R12	30123	12	.0326	.149	.175	.195	.344	.405	.375
	NAS3L12	30124	12	.0326	.149	.175	.195	.344	.405	.375
	NAS3R10	30133	10	.0370	.149	.175	.195	.344	.405	.375
	NAS3L10	30134	10	.0370	.149	.175	.195	.344	.405	.375
	NAS3R8	30143	8	.0417	.149	.175	.195	.344	.405	.375
	NAS3L8	30144	8	.0417	.149	.175	.195	.344	.405	.375
	NAS3R6	30153	6	.0652	.149	.175	.195	.344	.405	.375
	NAS3L6	30154	6	.0652	.149	.175	.195	.344	.405	.375
	NAS3R5	30163	5	.0793	.149	.175	.195	.344	.405	.375
	NAS3L5	30164	5	.0793	.149	.175	.195	.344	.405	.375
	NAS3R4	30173	4	.1004	.133	.200	.195	.344	.405	.375
	NAS3L4	30174	4	.1004	.133	.200	.195	.344	.405	.375

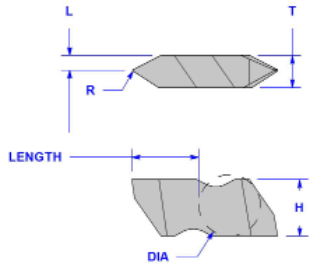
Top Notch holders and bars on pages 115-117.

TOP NOTCH 29° STUB ACME THREADING CONTINUED



DESCRIPTION	EDP	TPI	W	L	D	T	H	GAGE LENGTH	GAGE DIA.
NAS4R8	30183	8	.0417	.202	.200	.255	.453	.636	.375
NAS4L8	30184	8	.0417	.202	.200	.255	.453	.636	.375
NAS4R6	30193	6	.0652	.202	.200	.255	.453	.636	.375
NAS4L6	30194	6	.0652	.202	.200	.255	.453	.636	.375
NAS4R5	30203	5	.0793	.202	.200	.255	.453	.636	.375
NAS4L5	30204	5	.0793	.202	.200	.255	.453	.636	.375
NAS4R4	30213	4	.1004	.202	.200	.255	.453	.636	.375
NAS4L4	30214	4	.1004	.202	.200	.255	.453	.636	.375
NAS4R3.5	30223	3.5	.1155	.202	.200	.255	.453	.636	.375
NAS4L3.5	30224	3.5	.1155	.202	.200	.255	.453	.636	.375
NAS4R3	30233	3	.1356	.202	.200	.255	.453	.636	.375
NAS4L3	30234	3	.1356	.202	.200	.255	.453	.636	.375
NAS6R3	30243	3	.1356	.283	.300	.383	.453	.636	.375
NAS6L3	30244	3	.1356	.283	.300	.383	.453	.636	.375
NAS6R2.5	30253	2.5	.1638	.283	.300	.383	.453	.636	.375
NAS6L2.5	30254	2.5	.1638	.283	.300	.383	.453	.636	.375
NAS6R2	30263	2	.2060	.283	.300	.383	.453	.636	.375
NAS6L2	30264	2	.2060	.283	.300	.383	.453	.636	.375

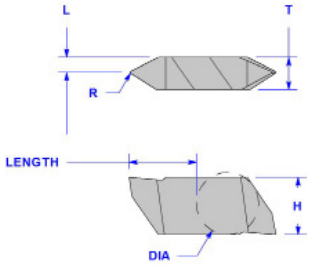
TOP NOTCH 60° V-THREADING



DESCRIPTION	EDP	R	L	T	H	GAGE LENGTH	GAGE DIA.
NT2R	30303	.004R	.075	.150	.219	.270	.1875
NT2L	30304	.004R	.075	.150	.219	.270	.1875
NT3R	30313	.005R	.098	.195	.344	.405	.375
NT3L	30314	.005R	.098	.195	.344	.405	.375
NT3R-8	30323	.008R	.098	.195	.344	.405	.375
NT3L-8	30324	.008R	.098	.195	.344	.405	.375
NT3R-10	30333	.010R	.098	.195	.344	.405	.375
NT3L-10	30334	.010R	.098	.195	.344	.405	.375
NT4R	30343	.007R	.128	.255	.453	.636	.375
NT4L	30344	.007R	.128	.255	.453	.636	.375

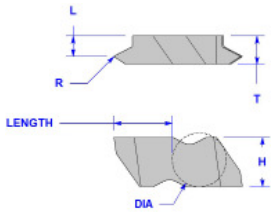
Top Notch holders and bars on pages 115-117.

TOP NOTCH 60° V-THREADING	DESCRIPTION	EDP	R	L	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NTP2R	30403	.004R	.075	.150	.219	.270	.188
	NTP2L	30404	.004R	.075	.150	.219	.270	.188
	NTP3R	30413	.005R	.098	.195	.344	.405	.375
	NTP3L	30414	.005R	.098	.195	.344	.405	.375
	NTP3R-8	30423	.008R	.098	.195	.344	.405	.375
	NTP3L-8	30424	.008R	.098	.195	.344	.405	.375
	NTP3R-10	30433	.010R	.098	.195	.344	.405	.375
	NTP3L-10	30434	.010R	.098	.195	.344	.405	.375
	NTP4R	30443	.007R	.128	.255	.453	.636	.375
	NTP4L	30444	.007R	.128	.255	.453	.636	.375



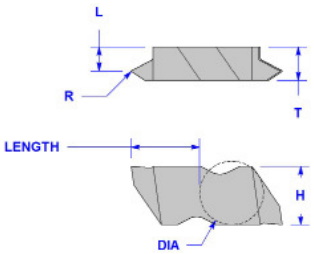
Top Notch holders and bars on pages 115-117.

TOP NOTCH 60° V-THREADING	DESCRIPTION	EDP	R	L	T	H	GAGE LENGTH	GAGE DIA.
FINE PITCH	NTF2R	30503	.004R	.110	.150	.219	.270	.188
	NTF2L	30504	.004R	.110	.150	.219	.270	.188
	NTF3R	30513	.004R	.141	.195	.344	.405	.375
	NTF3L	30514	.004R	.141	.195	.344	.405	.375
	NTF4R	30523	.004R	.201	.255	.453	.636	.375
	NTF4L	30524	.004R	.201	.255	.453	.636	.375



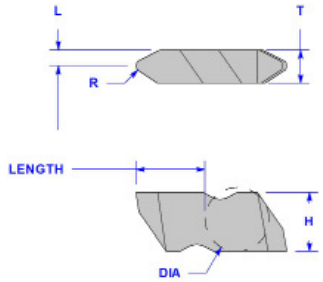
Top Notch holders and bars on pages 115-117.

TOP NOTCH 60° V-THREADING	DESCRIPTION	EDP	R	L	T	H	GAGE LENGTH	GAGE DIA.
5° POSITIVE RAKE	NTK2R	30603	.004R	.110	.150	.219	.270	.188
	NTK2L	30604	.004R	.110	.150	.219	.270	.188
	NTK3R	30613	.004R	.141	.195	.344	.405	.375
	NTK3L	30614	.004R	.141	.195	.344	.405	.375
	NTK4R	30623	.004R	.201	.255	.453	.636	.375
	NTK4L	30624	.004R	.201	.255	.453	.636	.375



Top Notch holders and bars on pages 115-117.

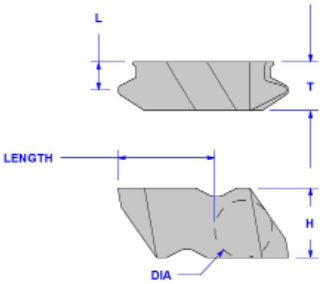
TOP NOTCH NON-TOPPING API THREADING



DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
ND3038R	30703	4	.036	.082	.195	.344	.399	.375
ND3038L	30704	4	.036	.082	.195	.344	.399	.375
ND3040R	30713	5	.018	.082	.255	.344	.399	.375
ND3040L	30714	5	.018	.082	.255	.344	.399	.375
ND4038R	30723	4	.036	.128	.255	.453	.629	.375
ND4038L	30724	4	.036	.128	.255	.453	.629	.375
ND4040R	30733	5	.018	.128	.255	.453	.629	.375
ND4040L	30734	5	.018	.128	.255	.453	.629	.375
ND4050R	30743	4	.023	.128	.255	.453	.629	.375
ND4050L	30744	4	.023	.128	.255	.453	.629	.375

Top Notch holders and bars on pages 115-117.

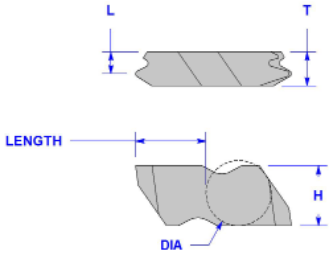
TOP NOTCH API ROTARY SHOULDER CONNECTION THREADING



DESCRIPTION	EDP	PITCH	TPF	L	T	H	GAGE LENGTH	GAGE DIA.
NDC3-530R	30803	5	3	.147	.255	.344	.403	.375
NDC3-530L	30804	5	3	.147	.255	.344	.403	.375
NDC4-425R	30813	4	2	.183	.312	.453	.632	.375
NDC4-425L	30814	4	2	.183	.312	.453	.632	.375
NDC4-428R	30823	4	2	.183	.312	.453	.632	.375
NDC4-428L	30824	4	2	.183	.312	.453	.632	.375
NDC4-435R	30833	4	3	.183	.312	.453	.632	.375
NDC4-435L	30834	4	3	.183	.312	.453	.632	.375
NDC4-438R	30843	4	3	.183	.312	.453	.632	.375
NDC4-438L	30844	4	3	.183	.312	.453	.632	.375

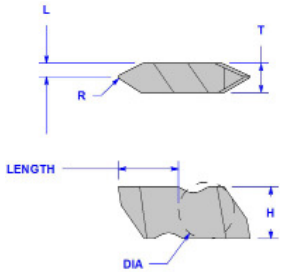
Top Notch holders and bars on pages 115-117.

TOP NOTCH API ROUND THREADING

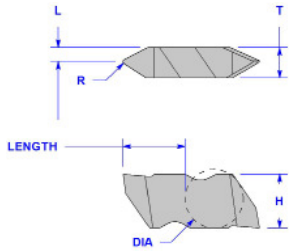


DESCRIPTION	EDP	PITCH	TPF	L	T	H	GAGE LENGTH	GAGE DIA.
NDC3-8RD75R	30853	8	3/4	.125	.195	.344	.403	.375
NDC3-8RD75L	30854	8	3/4	.125	.195	.344	.403	.375
NDC3-10RD75R	30863	10	3/4	.125	.195	.344	.403	.375
NDC3-10RD75L	30864	10	3/4	.125	.195	.344	.403	.375

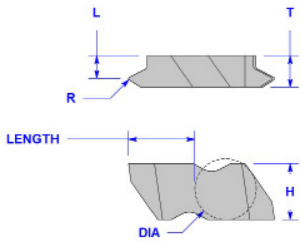
Top Notch holders and bars on pages 115-117.

TOP NOTCH UNJ THREADING	DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
	NJ3010R16	30903	16	.010	.098	.195	.344	.400	.375
	NJ3010L16	30904	16	.010	.098	.195	.344	.400	.375
	NJ3014R12	30913	12	.013	.098	.195	.344	.400	.375
	NJ3014L12	30914	12	.013	.098	.195	.344	.400	.375
	NJ3020R8	30923	8	.020	.098	.195	.344	.400	.375
	NJ3020L8	30924	8	.020	.098	.195	.344	.400	.375

Top Notch holders and bars on pages 115-117.

TOP NOTCH UNJ THREADING 5° POSITIVE RAKE	DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
	NJP3010R16	31003	16	.010	.098	.195	.344	.400	.375
	NJP3010L16	31004	16	.010	.098	.195	.344	.400	.375
	NJP3014R12	31013	12	.013	.098	.195	.344	.400	.375
	NJP3014L12	31014	12	.013	.098	.195	.344	.400	.375
	NJP3020R8	31023	8	.020	.098	.195	.344	.400	.375
	NJP3020L8	31024	8	.020	.098	.195	.344	.400	.375

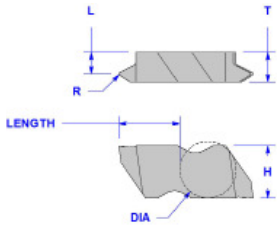
Top Notch holders and bars on pages 115-117.

TOP NOTCH UNJ THREADING FINE PITCH	DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
	NJF3005R32	31103	32	.005	.141	.195	.344	.402	.375
	NJF3005L32	31104	32	.005	.141	.195	.344	.402	.375
	NJF3006R28	31113	28	.006	.141	.195	.344	.402	.375
	NJF3006L28	31114	28	.006	.141	.195	.344	.402	.375
	NJF3007R24	31123	24	.007	.141	.195	.344	.402	.375
	NJF3007L24	31124	24	.007	.141	.195	.344	.402	.375
	NJF3008R20	31133	20	.008	.141	.195	.344	.402	.375
	NJF3008L20	31134	20	.008	.141	.195	.344	.402	.375
	NJF3009R18	31143	18	.009	.141	.195	.344	.402	.375
	NJF3009L18	31144	18	.009	.141	.195	.344	.402	.375
	NJF3010R16	31153	16	.010	.141	.195	.344	.402	.375
	NJF3010L16	31154	16	.010	.141	.195	.344	.402	.375
	NJF3012R14	31163	14	.011	.141	.195	.344	.402	.375
	NJF3012L14	31164	14	.011	.141	.195	.344	.402	.375

Top Notch holders and bars on pages 115-117.

TOP NOTCH UNJ THREADING

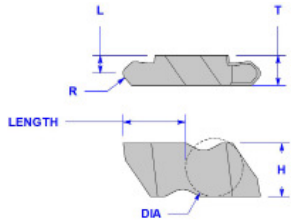
5° POSITIVE RAKE



DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
NJK3005R32	31203	32	.005	.141	.195	.344	.402	.375
NJK3005L32	31204	32	.005	.141	.195	.344	.402	.375
NJK3006R28	31213	28	.006	.141	.195	.344	.402	.375
NJK3006L28	31214	28	.006	.141	.195	.344	.402	.375
NJK3007R24	31223	24	.007	.141	.195	.344	.402	.375
NJK3007L24	31224	24	.007	.141	.195	.344	.402	.375
NJK3008R20	31233	20	.008	.141	.195	.344	.402	.375
NJK3008L20	31234	20	.008	.141	.195	.344	.402	.375
NJK3009R18	31243	18	.009	.141	.195	.344	.402	.375
NJK3009L18	31244	18	.009	.141	.195	.344	.402	.375
NJK3010R16	31253	16	.010	.141	.195	.344	.402	.375
NJK3010L16	31254	16	.010	.141	.195	.344	.402	.375
NJK3012R14	31263	14	.011	.141	.195	.344	.402	.375
NJK3012L14	31264	14	.011	.141	.195	.344	.402	.375

Top Notch holders and bars on pages 115-117.

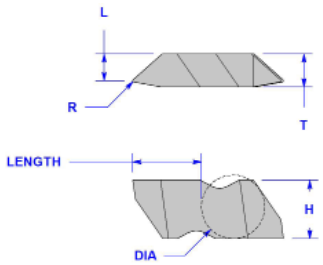
TOP NOTCH UNDERCUTTING



DESCRIPTION	EDP	W	R	D	T	H	GAGE LENGTH	GAGE DIA.
NU3094R	31303	.094	.020	.125	.195	.344	.505	.375
NU3094L	31304	.094	.020	.125	.195	.344	.505	.375
NU3125R	31313	.125	.047	.188	.195	.344	.505	.375
NU3125L	31314	.125	.047	.188	.195	.344	.505	.375
NU3156R	31323	.156	.047	.188	.195	.344	.505	.375
NU3156L	31324	.156	.047	.188	.195	.344	.505	.375

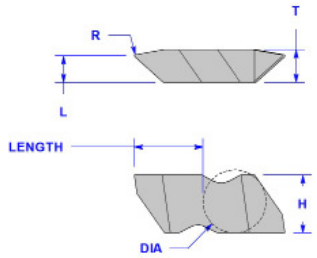
Top Notch holders and bars on pages 115-117.

TOP NOTCH ASB 7° LEADING

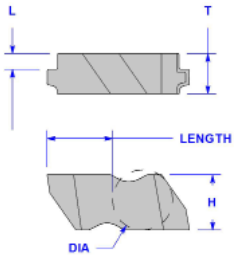


DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
NTB2RA	31403	16-20	.003	.126	.150	.219	.269	.188
NTB2LA	31404	16-20	.003	.126	.150	.219	.269	.188
NTB3RA	31413	8-12	.006	.165	.195	.344	.403	.375
NTB3LA	31414	8-12	.006	.165	.195	.344	.403	.375
NTB4RA	31423	4-6	.010	.206	.255	.453	.633	.375
NTB4LA	31424	4-6	.010	.206	.255	.453	.633	.375

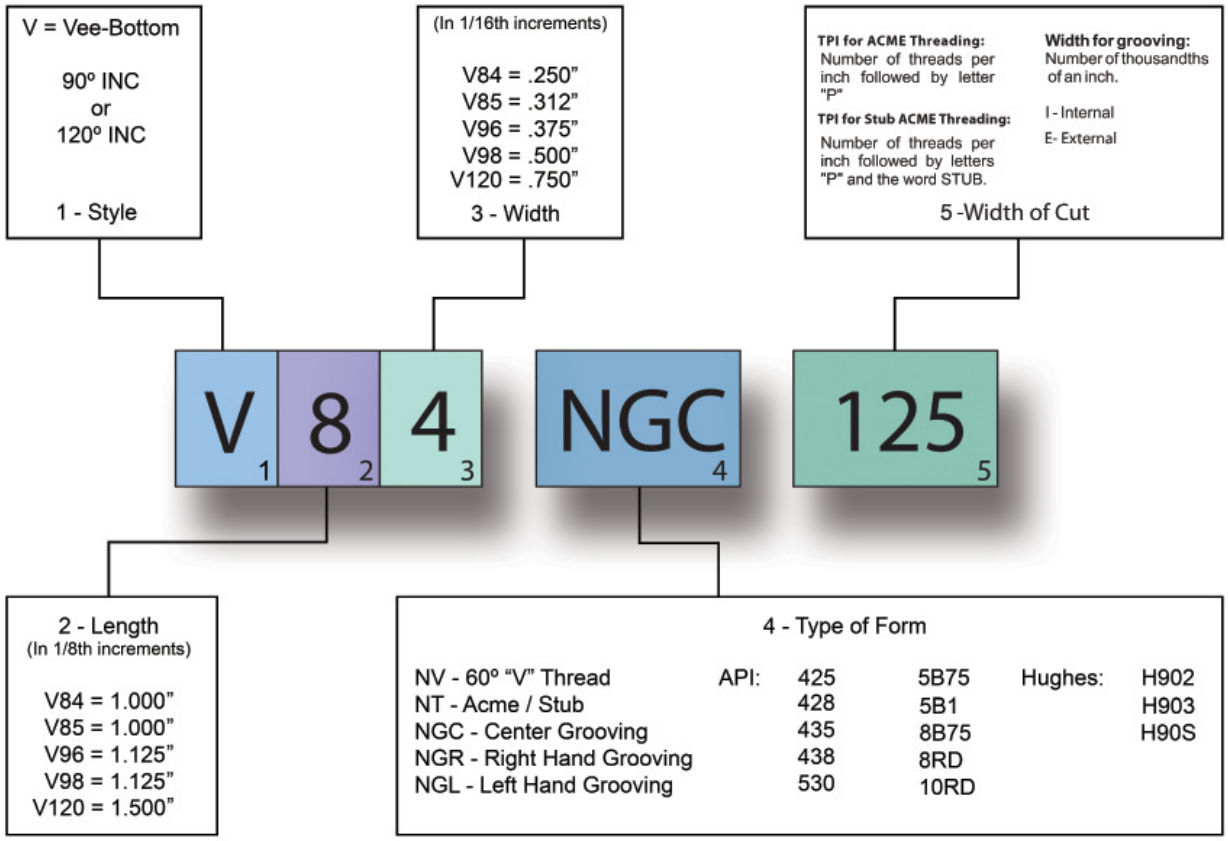
Top Notch holders and bars on pages 115-117.

TOP NOTCH ASB 45° LEADING	DESCRIPTION	EDP	PITCH	R	L	T	H	GAGE LENGTH	GAGE DIA.
	NTB2RB	31433	16-20	.003	.010	.150	.219	.269	.188
	NTB2LB	31434	16-20	.003	.010	.150	.219	.269	.188
	NTB3RB	31443	8-12	.006	.012	.195	.344	.403	.375
	NTB3LB	31444	8-12	.006	.012	.195	.344	.403	.375
	NTB4RB	31453	4-6	.010	.016	.255	.453	.633	.375
	NTB4LB	31454	4-6	.010	.016	.255	.453	.633	.375

Top Notch holders and bars on pages 115-117.

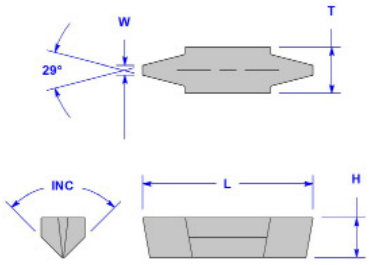
TOP NOTCH API BUTTRESS THREADING	DESCRIPTION	EDP	PITCH	TPF	L	T	H	GAGE LENGTH	GAGE DIA.
	NDC3-5B75R	31503	5	3/4	.100	.250	.344	.403	.375
	NDC3-5B75L	31504	5	3/4	.100	.250	.344	.403	.375
	NDC3-5B1R	31513	5	1	.100	.250	.344	.403	.375
	NDC3-5B1L	31514	5	1	.100	.250	.344	.403	.375
	NDC4-5B75R	31523	5	3/4	.100	.255	.453	.632	.375
	NDC4-5B75L	31524	5	3/4	.100	.255	.453	.632	.375
	NDC4-5B1R	31533	5	1	.100	.255	.453	.632	.375
	NDC4-5B1L	31534	5	1	.100	.255	.453	.632	.375

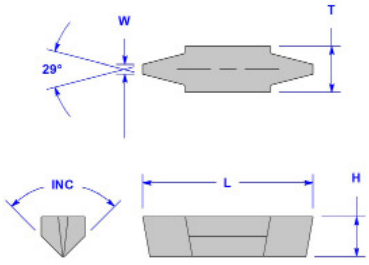
Top Notch holders and bars on pages 115-117.



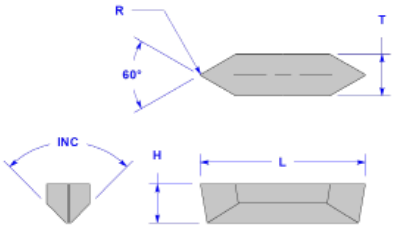
Threading Grade Descriptions			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at slower speeds	**Standard**
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys, aluminum & composites at medium speeds	Item specific
230	TiAlN coated tough submicron - wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at medium to high speed	**Standard**
613	TiN coated premium substrate for threading	4140 and similar steels at slow to medium speeds - most popular threading grade	**Standard**
623	AlTiN coated premium substrate for threading	All steels at high speeds - maximum heat protection	Item specific
633	TiAlN coated premium substrate for threading	All steels at high speeds - medium heat protection - Best premium threading grade	Item specific

Grooving Grade Descriptions			
Grade	**Description**	**Uses**	**Stock**
200	Uncoated tough submicron - wear resistant	Non-ferrous, stainless steel alloys composites aluminum at slower speeds	**Standard**
210	TiN coated tough submicron - wear resistant	Non-ferrous, stainless steel alloys composites aluminum at medium speeds	Item specific
230	TiAlN coated tough submicron - wear & heat resistant	Non-ferrous, stainless steel, nickel-based & high-temp alloys at high speeds - most popular grooving grade	**Standard**
612	TiN coated medium tough - long lasting, smooth cutting	4140 and similar steels at medium speeds - most popular grooving grade	**Standard**
632	TiAlN coated medium tough - long lasting heat resistant	All steels at high speeds - best heat protection	Item specific

V-BOTTOM ACME	DESCRIPTION	EDP	PITCH	WIDTH	T	L	H	INC
	V84 NT 16P	31600	16	.0206	.250	1.000	.250	90°
	V84 NT 14P	31610	14	.0239	.250	1.000	.250	90°
	V84 NT 12P	31620	12	.0283	.250	1.000	.250	90°
	V84 NT 10P	31630	10	.0319	.250	1.000	.250	90°
	V84 NT 8P	31640	8	.0411	.250	1.000	.250	90°
	V84 NT 6P	31650	6	.0566	.250	1.000	.250	90°
	V84 NT 5P	31660	5	.0689	.250	1.000	.250	90°
	V84 NT 4P	31670	4	.0875	.250	1.000	.250	90°
	V84 NT 3.5P	31680	3.5	.1007	.250	1.000	.250	90°
	V84 NT 3P	31690	3	.1184	.250	1.000	.250	90°
	V85 NT 2.5P	31700	2.5	.1431	.312	1.000	.250	90°
	V85 NT 2P	31710	2	.1802	.312	1.000	.250	90°
	V98 NT 1.5P	31720	1.5	.2419	.500	1.125	.350	90°
	V120 NT 1.5P	31740	1.5	.2419	.750	1.5	.375	120°
	V120 NT 1P	31750	1	.3655	.750	1.5	.375	120°

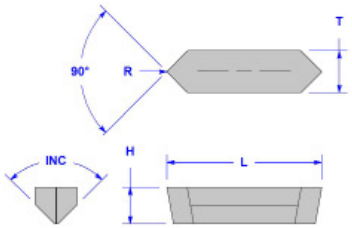
V-BOTTOM STUB ACME	DESCRIPTION	EDP	PITCH	WIDTH	T	L	H	INC
	V84 NT 16P STUB	31800	16	.0238	.250	1.000	.250	90°
	V84 NT 14P STUB	31810	14	.0276	.250	1.000	.250	90°
	V84 NT 12P STUB	31820	12	.0326	.250	1.000	.250	90°
	V84 NT 10P STUB	31830	10	.0370	.250	1.000	.250	90°
	V84 NT 8P STUB	31840	8	.0476	.250	1.000	.250	90°
	V84 NT 6P STUB	31850	6	.0652	.250	1.000	.250	90°
	V84 NT 5P STUB	31860	5	.0793	.250	1.000	.250	90°
	V84 NT 4P STUB	31870	4	.1004	.250	1.000	.250	90°
	V84 NT 3.5P STUB	31880	3.5	.1155	.250	1.000	.250	90°
	V84 NT 3P STUB	31890	3	.1356	.250	1.000	.250	90°
	V85 NT 2.5P STUB	31900	2.5	.1638	.312	1.000	.250	90°
	V85 NT 2P STUB	31910	2	.2060	.312	1.000	.250	90°
	V98 NT 1.5P STUB	31920	1.5	.2764	.500	1.125	.350	90°
	V120 NT 1.5P STUB	31940	1.5	.2764	.750	1.5	.375	120°
	V120 NT 1P STUB	31950	1	.4172	.750	1.5	.375	120°

V-BOTTOM 60° V-THREADING



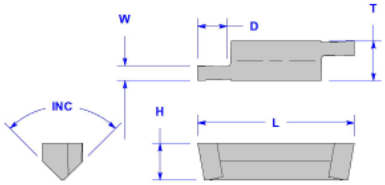
DESCRIPTION	EDP	PITCH	R	T	L	H	INC
V84 NV	32000	5-20	.005	.250	1.000	.250	90°
V84 NV .010R	32010	4-20	.010	.250	1.000	.250	90°
V84 NV .020R	32020	4-12	.020	.250	1.000	.250	90°
V84 NV .025R	32030	4-8	.025	.250	1.000	.250	90°
V84 NV .038R	32040	4-6	.038	.250	1.000	.250	90°
V85 NV	32050	5-20	.005	.312	1.000	.250	90°
V85 NV .038R	32060	4-6	.038	.312	1.000	.250	90°

V-BOTTOM 90° V-THREADING



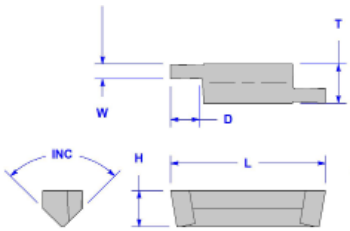
DESCRIPTION	EDP	R	D	T	L	H	INC
V84 NV 90	32500	.005	.125	.250	1.000	.250	90°
V84 NV 90 .010R	32510	.010	.120	.250	1.000	.250	90°
V84 NV 90 .090W (BPV)	32520	.090W	.080	.250	1.000	.250	90°
V85 NV 90	32530	.005	.155	.312	1.000	.250	90°
V85 NV 90 .010R	32540	.010	.150	.312	1.000	.250	90°
V85 NV 90 .090W (BPV)	32550	.090W	.110	.312	1.000	.250	90°

V-BOTTOM RH GROOVING



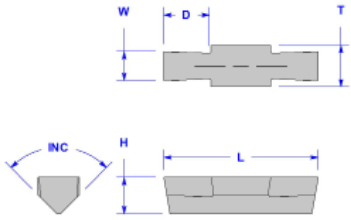
DESCRIPTION	EDP	W	D	T	L	H	INC
V84 NGR .031W	32103	.031	.100	.250	1.000	.250	90°
V84 NGR .047W	32113	.047	.125	.250	1.000	.250	90°
V84 NGR .062W	32123	.0625	.156	.250	1.000	.250	90°
V84 NGR .094W	32133	.094	.250	.250	1.000	.250	90°
V84 NGR .125W	32143	.125	.250	.250	1.000	.250	90°
V84 NGR .150W	32153	.150	.296	.250	1.000	.250	90°
V84 NGR .187W	32163	.1875	.296	.250	1.000	.250	90°

V-BOTTOM LH GROOVING



DESCRIPTION	EDP	W	D	T	L	H	INC
V84 NGL .031W	32204	.031	.100	.250	1.000	.250	90°
V84 NGL .047W	32214	.047	.125	.250	1.000	.250	90°
V84 NGL .062W	32224	.0625	.156	.250	1.000	.250	90°
V84 NGL .094W	32234	.094	.250	.250	1.000	.250	90°
V84 NGL .125W	32244	.125	.250	.250	1.000	.250	90°
V84 NGL .150W	32254	.150	.296	.250	1.000	.250	90°
V84 NGL .187W	32254	.1875	.296	.250	1.000	.250	90°

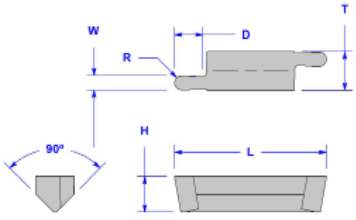
V-BOTTOM CENTERED GROOVING



DESCRIPTION	EDP	W	D	T	L	H	INC
V84 NGC .031W	32300	.031	.100	.250	1.000	.250	90°
V84 NGC .047W	32310	.047	.125	.250	1.000	.250	90°
V84 NGC .062W	32320	.0625	.156	.250	1.000	.250	90°
V84 NGC .094W	32330	.094	.250	.250	1.000	.250	90°
V84 NGC .125W	32340	.125	.250	.250	1.000	.250	90°
V84 NGC .150W	32350	.150	.296	.250	1.000	.250	90°
V84 NGC .187W	32360	.1875	.296	.250	1.000	.250	90°
V84 NGC .250W	32370	.250	.296	.250	1.000	.250	90°
V85 NGC .312W	32380	.312	.312	.312	1.000	.250	90°
V96 NGC .375W	32390	.375	.375	.375	1.250	.375	90°
V98 NGC .500W	32400	.500	.500	.500	1.250	.375	90°
V120 NGC .625W	32410	.625	.750	.750	1.250	.375	120°
V120 NGC .750W	32420	.750	.750	.750	1.250	.375	120°

V-BOTTOM RH GROOVING

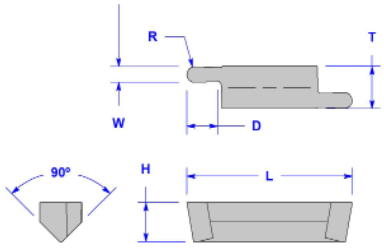
FULL NOSE RADIUS



DESCRIPTION	EDP	W	R	D	T	L	H
V84 NGR .047W-FNR	34203	.047	.0235	.125	.250	1.000	.250
V84 NGR .062W-FNR	34213	.0625	.031	.156	.250	1.000	.250
V84 NGR .094W-FNR	34223	.094	.047	.187	.250	1.000	.250
V84 NGR .125W-FNR	34233	.125	.0625	.187	.250	1.000	.250
V84 NGR .150W-FNR	34243	.150	.075	.296	.250	1.000	.250
V84 NGR .188W-FNR	34253	.1875	.094	.296	.250	1.000	.250

V-BOTTOM LH GROOVING

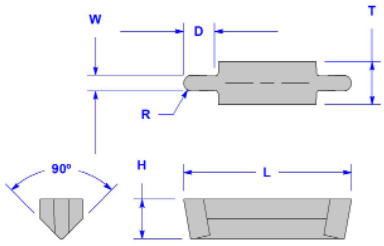
FULL NOSE RADIUS



DESCRIPTION	EDP	W	R	D	T	L	H
V84 NGL .047W-FNR	34304	.047	.0235	.125	.250	1.000	.250
V84 NGL .062W-FNR	34314	.0625	.031	.156	.250	1.000	.250
V84 NGL .094W-FNR	34324	.094	.047	.187	.250	1.000	.250
V84 NGL .125W-FNR	34334	.125	.0625	.187	.250	1.000	.250
V84 NGL .150W-FNR	34344	.150	.075	.296	.250	1.000	.250
V84 NGL .188W-FNR	34354	.1875	.094	.296	.250	1.000	.250

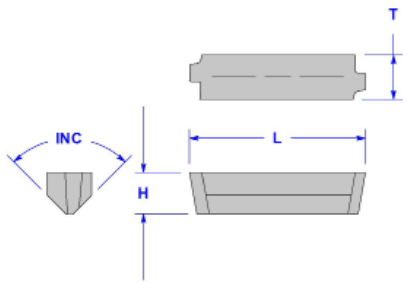
V-BOTTOM CENTERED GROOVING

FULL NOSE RADIUS



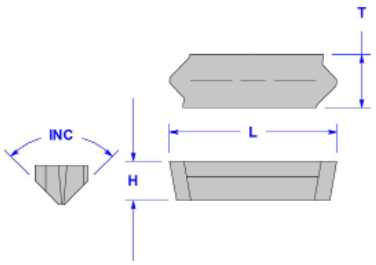
DESCRIPTION	EDP	W	R	D	T	L	H
V84 NGC .047W-FNR	34400	.047	.0235	.125	.250	1.000	.250
V84 NGC .062W-FNR	34410	.0625	.031	.156	.250	1.000	.250
V84 NGC .094W-FNR	34420	.094	.047	.187	.250	1.000	.250
V84 NGC .125W-FNR	34430	.125	.0625	.187	.250	1.000	.250
V84 NGC .150W-FNR	34440	.150	.075	.296	.250	1.000	.250
V84 NGC .188W-FNR	34450	.1875	.094	.296	.250	1.000	.250
V84 NGC .250W-FNR	34460	.250	.125	.296	.250	1.000	.250
V85 NGC .312W-FNR	34470	.312	.156	.296	.312	1.000	.250

V-BOTTOM API BUTTRESS THREADING



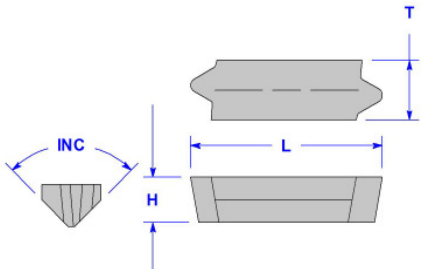
DESCRIPTION	EDP	PITCH	TPF	T	L	H	INC
V84 5B75 INT	42751	5	3/4	.250	1.000	.250	90°
V84 5B75 EXT	42742	5	3/4	.250	1.000	.250	90°
V84 5B1 INT	54361	5	1	.250	1.000	.250	90°
V84 5B1 EXT	54352	5	1	.250	1.000	.250	90°
V84 8B75 INT	74131	8	3/4	.250	1.000	.250	90°
V84 8B75 EXT	74132	8	3/4	.250	1.000	.250	90°

V-BOTTOM API HUGHES THREADING



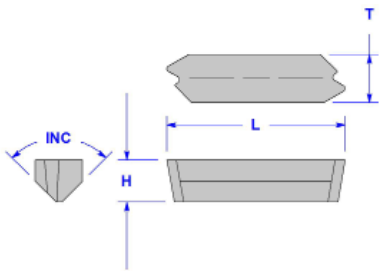
DESCRIPTION	EDP	PITCH	TPF	T	L	H	INC
V85 H902 INT	44121	3.5	2	.312	1.000	.250	90°
V85 H902 EXT	44122	3.5	2	.312	1.000	.250	90°
V85 H903 INT	43511	3.5	3	.312	1.000	.250	90°
V85 H903 EXT	43512	3.5	3	.312	1.000	.250	90°
V85 H90S INT	49541	3	1 1/4	.312	1.000	.250	90°
V85 H90S EXT	49542	3	1 1/4	.312	1.000	.250	90°

V-BOTTOM API ROTARY SHOULDER THREADING

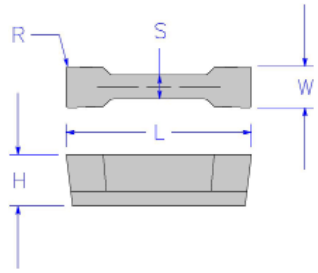


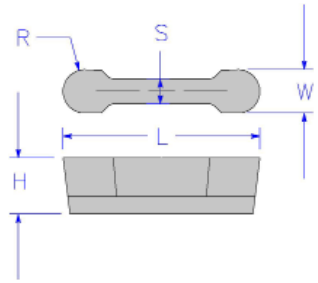
DESCRIPTION	EDP	PITCH	TPF	T	L	H	INC
V85 425 INT	56711	4	2	.312	1.000	.250	90°
V85 425 EXT	56712	4	2	.312	1.000	.250	90°
V85 428 INT	56701	4	2	.312	1.000	.250	90°
V85 428 EXT	56702	4	2	.312	1.000	.250	90°
V85 435 INT	56731	4	3	.312	1.000	.250	90°
V85 435 EXT	56732	4	3	.312	1.000	.250	90°
V85 438 INT	56741	4	3	.312	1.000	.250	90°
V85 438 EXT	56742	4	3	.312	1.000	.250	90°
V85 530 INT	56721	5	3	.312	1.000	.250	90°
V85 530 EXT	56722	5	3	.312	1.000	.250	90°
V85 4P PAC INT	40581	4	1 1/2	.312	1.000	.250	90°
V85 4P PAC EXT	40582	4	1 1/2	.312	1.000	.250	90°

V-BOTTOM API ROUND THREADING

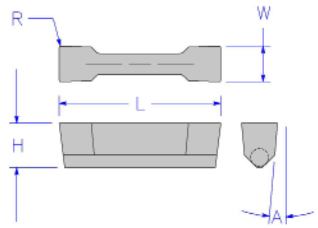


DESCRIPTION	EDP	PITCH	TPF	T	L	H	INC
V84 8RD INT	49001	8	3/4	.250	1.000	.250	90°
V84 8RD EXT	49002	8	3/4	.250	1.000	.250	90°
V84 10RD INT	41801	10	3/4	.250	1.000	.250	90°
V84 10RD EXT	41802	10	3/4	.250	1.000	.250	90°

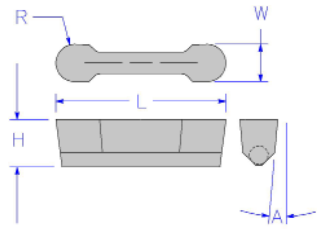
V-BOTTOM DOG BONE	DESCRIPTION	EDP	W	R	S	L	H
	VDB 125 A015	44860	.125	.015	.106	1.125	.250
	VDB 156 A015	46530	.156	.015	.106	1.125	.250
	VDB 188 A015	43580	.188	.015	.144	1.125	.250
	VDB 218 A015	85070	.218	.015	.144	1.125	.250
	VDB 250 A015	75610	.250	.015	.144	1.125	.250
	VDB 250 B015	42640	.250	.015	.144	1.125	.337
	VDB 250 B030	57760	.250	.030	.144	1.125	.337
	VDB 281 B015	45220	.281	.015	.202	1.125	.337
	VDB 281 B030	85080	.281	.030	.202	1.125	.337
	VDB 312 B015	85090	.312	.015	.202	1.125	.337
	VDB 312 B030	46230	.312	.030	.202	1.125	.337
	VDB 375 B015	43830	.375	.015	.276	1.125	.337
	VDB 375 B030	85100	.375	.030	.276	1.125	.337

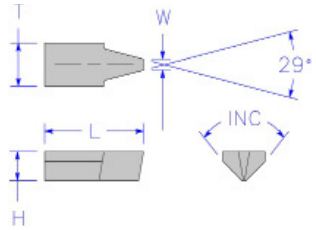
V-BOTTOM DOG BONE FULL NOSE RADIUS	DESCRIPTION	EDP	W	R	S	L	H
	VDB 125 RA - FNR	46510	.125	.0625	.106	1.125	.250
	VDB 156 RA - FNR	51480	.156	.078	.106	1.125	.250
	VDB 188 RA - FNR	45410	.188	.094	.144	1.125	.250
	VDB 218 RA - FNR	59260	.218	.109	.144	1.125	.250
	VDB 250 RA - FNR	75620	.250	.125	.144	1.125	.250
	VDB 250 RB - FNR	50630	.250	.125	.144	1.125	.337
	VDB 281 RB - FNR	41040	.281	.1405	.202	1.125	.337
	VDB 312 RB - FNR	70020	.312	.156	.202	1.125	.337
	VDB 375 RB - FNR	85110	.375	.1875	.276	1.125	.337

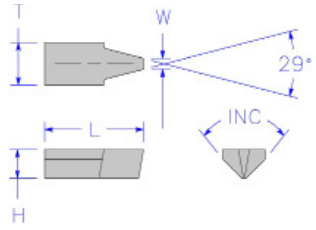
V-BOTTOM DOG BONE	DESCRIPTION	EDP	W	R	A	L	H
DEEP GROOVING	GC4125	41510	.125	.012	4°	1.000	.188
	GC4187	42090	.187	.012	5°	1.000	.328
	GC4250	41930	.250	.012	5°	1.000	.328
	GC4312	85120	.312	.012	5°	1.000	.328
	GC4375	42310	.375	.012	5°	1.000	.328
	GC6187	41530	.187	.012	5°	1.500	.328
	GC6250	43020	.250	.012	5°	1.500	.328
	GC6312	85130	.312	.012	5°	1.500	.328



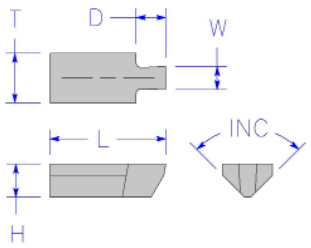
V-BOTTOM DOG BONE	DESCRIPTION	EDP	W	R	A	L	H
FULL NOSE RADIUS	GR4125	41960	.125	.0625	4°	1.000	.188
DEEP GROOVING	GR4187	85140	.187	.094	5°	1.000	.328
	GR4250	43000	.250	.125	5°	1.000	.328



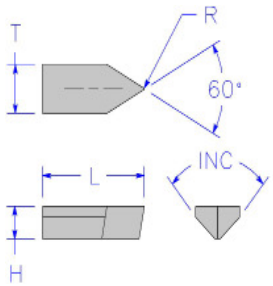
MLPE ACME THREADING	DESCRIPTION	EDP	PITCH	WIDTH	T	L	H	INC
	MLPE 2532 NT 16P	17300	16	.0206	.250	.500	.150	90°
	MLPE 2532 NT 14P	17310	14	.0239	.250	.500	.150	90°
	MLPE 2532 NT 12P	17320	12	.0283	.250	.500	.150	90°
	MLPE 2532 NT 10P	17330	10	.0319	.250	.500	.150	90°
	MLPE 2532 NT 8P	17340	8	.0411	.250	.500	.150	90°
	MLPE 2532 NT 6P	17350	6	.0566	.250	.500	.150	90°
	MLPE 2532 NT 5P	17360	5	.0689	.250	.500	.150	90°
	MLPE 2532 NT 4P	17370	4	.0875	.250	.500	.150	90°
	MLPE 3425 NT 16P	17380	16	.0206	.250	.625	.188	90°
	MLPE 3425 NT 14P	17390	14	.0239	.250	.625	.188	90°
	MLPE 3425 NT 12P	17400	12	.0283	.250	.625	.188	90°
	MLPE 3425 NT 10P	17410	10	.0319	.250	.625	.188	90°
	MLPE 3425 NT 8P	17420	8	.0411	.250	.625	.188	90°
	MLPE 3425 NT 6P	17430	6	.0566	.250	.625	.188	90°
	MLPE 3425 NT 5P	17440	5	.0689	.250	.625	.188	90°
	MLPE 3425 NT 4P	17450	4	.0875	.250	.625	.188	90°
	MLPE 3425 NT 3P	17460	3	.1184	.250	.625	.188	90°

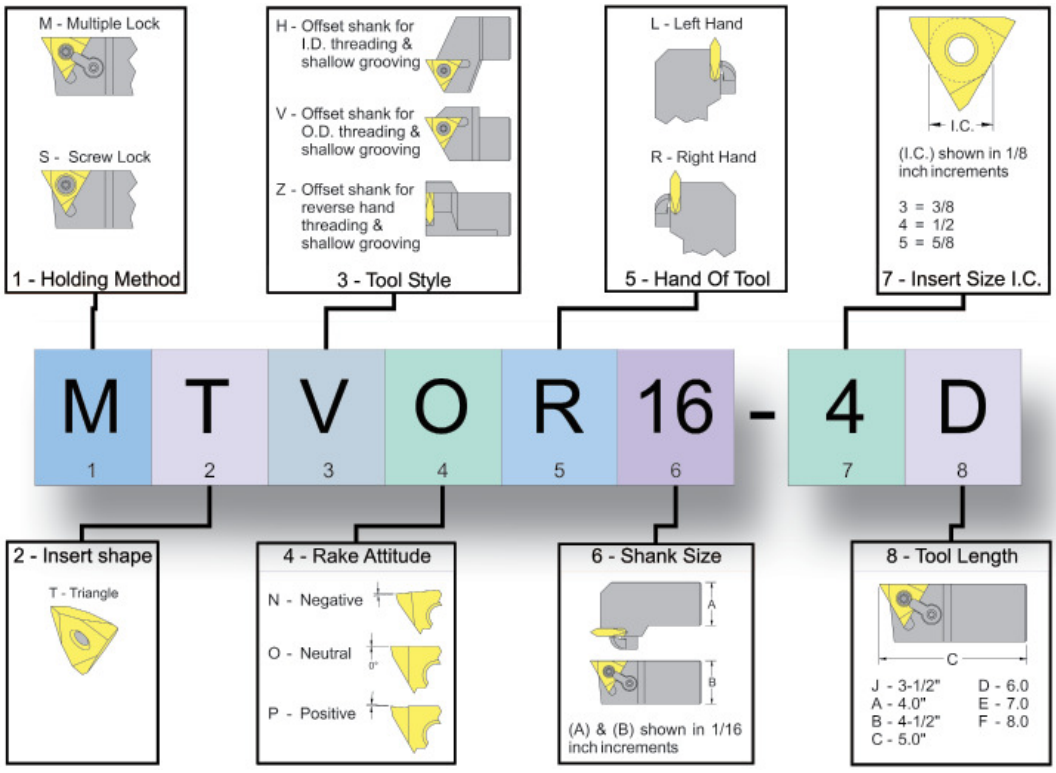
MLPE STUB ACME THREADING	DESCRIPTION	EDP	PITCH	WIDTH	T	L	H	INC
	MLPE 2532 NT 16P STUB	17500	16	.0238	.250	.500	.150	90°
	MLPE 2532 NT 14P STUB	17510	14	.0276	.250	.500	.150	90°
	MLPE 2532 NT 12P STUB	17520	12	.0326	.250	.500	.150	90°
	MLPE 2532 NT 10P STUB	17530	10	.037	.250	.500	.150	90°
	MLPE 2532 NT 8P STUB	17540	8	.0476	.250	.500	.150	90°
	MLPE 2532 NT 6P STUB	17550	6	.0652	.250	.500	.150	90°
	MLPE 2532 NT 5P STUB	17560	5	.0793	.250	.500	.150	90°
	MLPE 2532 NT 4P STUB	17570	4	.1004	.250	.500	.150	90°
	MLPE 3425 NT 16P STUB	17580	16	.0238	.250	.625	.188	90°
	MLPE 3425 NT 14P STUB	17590	14	.0276	.250	.625	.188	90°
	MLPE 3425 NT 12P STUB	17600	12	.0326	.250	.625	.188	90°
	MLPE 3425 NT 10P STUB	17610	10	.037	.250	.625	.188	90°
	MLPE 3425 NT 8P STUB	17620	8	.0476	.250	.625	.188	90°
	MLPE 3425 NT 6P STUB	17630	6	.0652	.250	.625	.188	90°
	MLPE 3425 NT 5P STUB	17640	5	.0793	.250	.625	.188	90°
	MLPE 3425 NT 4P STUB	17650	4	.1004	.250	.625	.188	90°
	MLPE 3425 NT 3P STUB	17660	3	.1356	.250	.625	.188	90°

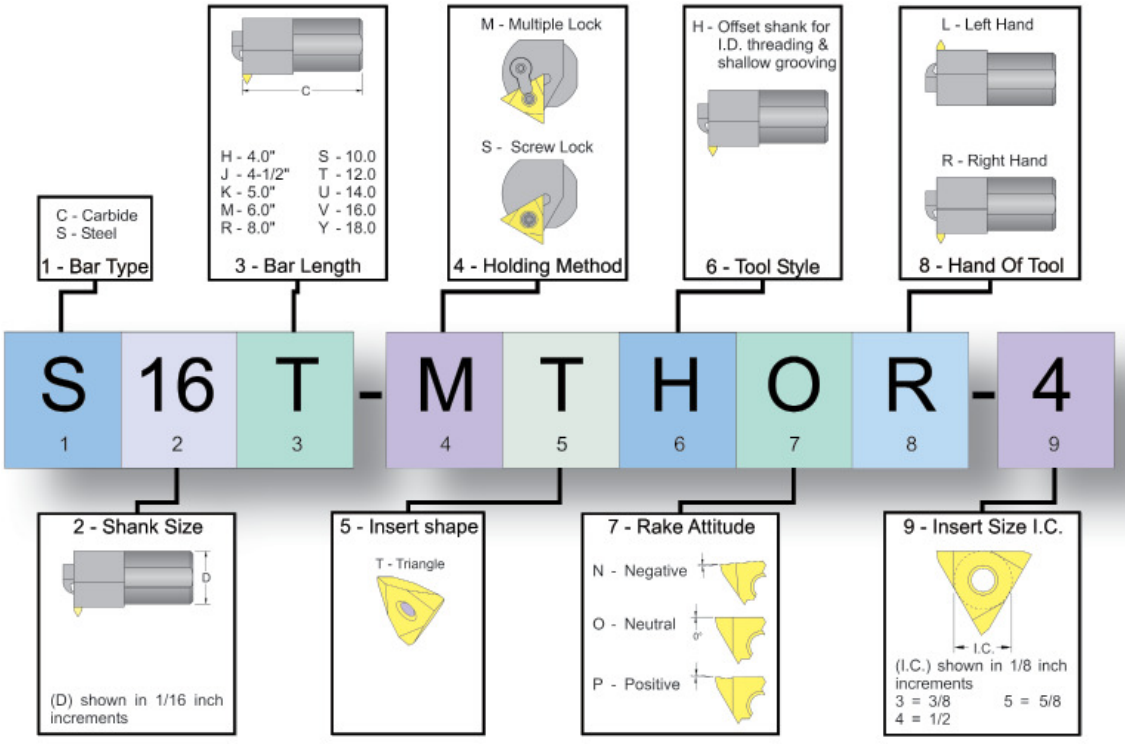
MLPE GROOVING	DESCRIPTION	EDP	W	D	T	L	H	INC
	MLPE 1251 NGC .062	17700	.062	.085	.160	.340	.115	90°
	MLPE 1251 NGC .094	17710	.094	.085	.160	.340	.115	90°
	MLPE 1251 NGC .125	17720	.125	.085	.160	.340	.115	90°
	MLPE 1251 NGC .156	17730	.156	.085	.160	.340	.115	90°
	MLPE 2532 NGC .062	17740	.062	.120	.160	.500	.150	90°
	MLPE 2532 NGC .094	17750	.094	.150	.160	.500	.150	90°
	MLPE 2532 NGC .125	17760	.125	.150	.160	.500	.150	90°
	MLPE 2532 NGC .156	17770	.156	.150	.160	.500	.150	90°
	MLPE 2532 NGC .188	17780	.188	.150	.160	.500	.150	90°
	MLPE 3425 NGC .062	17790	.062	.120	.250	.625	.188	90°
	MLPE 3425 NGC .094	17800	.094	.150	.250	.625	.188	90°
	MLPE 3425 NGC .125	17810	.125	.150	.250	.625	.188	90°
	MLPE 3425 NGC .156	17820	.156	.150	.250	.625	.188	90°
	MLPE 3425 NGC .188	17830	.188	.150	.250	.625	.188	90°
	MLPE 3425 NGC .250	17840	.250	.150	.250	.625	.188	90°
	MLPE 2532 NGR .125	17853	.125	.150	.160	.500	.150	90°
	MLPE 2532 NGR .156	17863	.156	.150	.160	.500	.150	90°
	MLPE 2532 NGR .188	17873	.188	.150	.160	.500	.150	90°
	MLPE 3425 NGR .125	17883	.125	.150	.250	.625	.188	90°
	MLPE 3425 NGR .156	17893	.156	.150	.250	.625	.188	90°
	MLPE 3425 NGR .188	17903	.188	.150	.250	.625	.188	90°
	MLPE 2532 NGL .125	17914	.125	.150	.160	.500	.150	90°
	MLPE 2532 NGL .156	17924	.156	.150	.160	.500	.150	90°
	MLPE 2532 NGL .188	17934	.188	.150	.160	.500	.150	90°
	MLPE 3425 NGL .125	17944	.125	.150	.250	.625	.188	90°
	MLPE 3425 NGL .156	17954	.156	.150	.250	.625	.188	90°
	MLPE 3425 NGL .188	17964	.188	.150	.250	.625	.188	90°



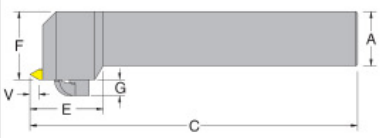
MLPE 60° V-THREADING	DESCRIPTION	EDP	PITCH	R	T	L	H	INC
	MLPE 1251 NV	50280	8-48	.003	.188	.340	.115	90°
	MLPE 2532 NV	50270	8-48	.003	.188	.500	.150	90°
	MLPE 3425 NV	43270	8-48	.003	.250	.625	.188	90°



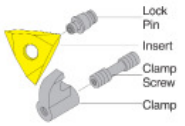

M - Multiple Lock
S - Screw Lock
1 - Holding Method
H - Offset shank for I.D. threading & shallow grooving
V - Offset shank for O.D. threading & shallow grooving
Z - Offset shank for reverse hand threading & shallow grooving
3 - Tool Style
L - Left Hand
R - Right Hand
5 - Hand Of Tool
I.C.
(I.C.) shown in 1/8 inch increments
3 = 3/8
4 = 1/2
5 = 5/8
7 - Insert Size I.C.
M T V O R 16 - 4 D
1 2 3 4 5 6 7 8
2 - Insert shape
T - Triangle
4 - Rake Attitude
N - Negative
O - Neutral
P - Positive
6 - Shank Size
A
B
(A) & (B) shown in 1/16 inch increments
8 - Tool Length
C
J - 3-1/2"
A - 4.0"
B - 4-1/2"
C - 5.0"
D - 6.0
E - 7.0
F - 8.0

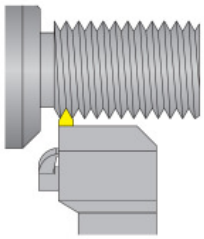

C - Carbide
S - Steel
1 - Bar Type
C
H - 4.0"
J - 4-1/2"
K - 5.0"
M - 6.0"
R - 8.0"
S - 10.0
T - 12.0
U - 14.0
V - 16.0
Y - 18.0
3 - Bar Length
M - Multiple Lock
S - Screw Lock
4 - Holding Method
H - Offset shank for I.D. threading & shallow grooving
6 - Tool Style
L - Left Hand
R - Right Hand
8 - Hand Of Tool
S 16 T - M T H O R - 4
1 2 3 4 5 6 7 8 9
2 - Shank Size
D
(D) shown in 1/16 inch increments
5 - Insert shape
T - Triangle
7 - Rake Attitude
N - Negative
O - Neutral
P - Positive
9 - Insert Size I.C.
I.C.
(I.C.) shown in 1/8 inch increments
3 = 3/8
4 = 1/2
5 = 5/8

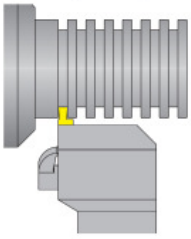
MTVO-A R/L Threading Toolholder- Style V - O.D. Threading and Shallow Grooving for triangle TNMA inserts



Right Hand Shown, Left Hand Opposite

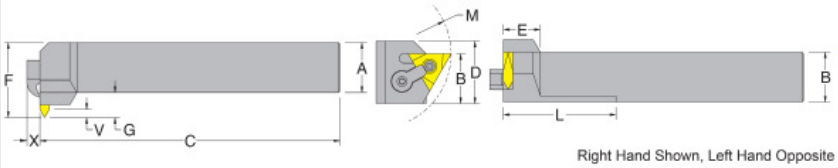


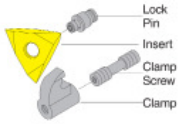




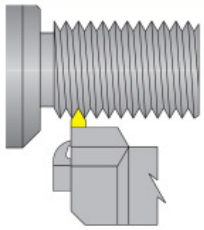
Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	Max. GRV Depth V	TNMA Gage Insert	Lock Pin	Clamp	Clamp Screw
MTVOR/L08-3A-A	58122	58123	0.500	0.500	4.000	1.020	0.625	0.250	0.150				
MTVOR/L08-3B-A	58126	58127	0.500	0.500	4.500	1.020	0.625	0.250	0.150				
MTVOR/L10-3B-A	58130	58131	0.625	0.625	4.500	1.020	0.750	0.250	0.150	322	NL-33	CL-6	XNS-36
MTVOR/L12-3B-A	58134	58135	0.750	0.750	4.500	1.020	0.875	0.250	0.150				
MTVOR/L16-3D-A	58138	58139	1.000	1.000	6.000	1.155	1.250	0.250	0.150				
MTVOR/L12-4B-A	58142	58143	0.750	0.750	4.500	1.250	0.875	0.250	0.230				
MTVOR/L16-4D-A	58146	58147	1.000	1.000	6.000	1.250	1.250	0.250	0.230	432	NL-44	CL-6	XNS-36
MTVOR/L20-4D-A	58150	58151	1.250	1.250	6.000	1.250	1.500	0.250	0.230				
MTVOR/L24-4E-A	58154	58155	1.500	1.500	7.000	1.250	1.750	0.250	0.230				
MTVOR/L16-5D-A	58158	58159	1.000	1.000	6.000	1.500	1.250	0.250	0.292	543	NL-56	CL-6	XNS-36
MTVOR/L20-5D-A	58162	58163	1.250	1.250	6.000	1.500	1.500	0.250	0.292				
MTVOR/L20-64D-A	58166	58167	1.250	1.250	6.000	1.750	1.500	0.316	0.360	643	NL-66	CL-12	XNS-59
MTVOR/L20-66D-A	58170	58171	1.250	1.250	6.000	1.750	1.500	0.316	0.360	663	NL-66L	CL-12	XNS-59

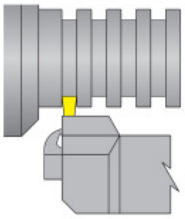
MTHO-A R/L Threading Toolholder- Style H - Gang Toolholder for Shallow Grooving or I.D. Threading for triangle TNMA inserts





Right Hand Shown, Left Hand Opposite

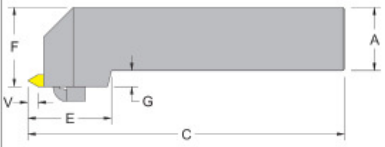




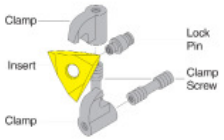
Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	X	L	Min. Bore M	Max. GRV Depth V Min. I.D.	Max. GRV Depth V O.D.	TNMA Gage Insert	Lock Pin	Clamp	Clamp Screw
MTHOR/L10-3B	58176	58177	0.625	0.625	4.500	0.875	1.000	0.375	0.250	-	2.0	.100	.125	322	NL-33	CL-5	XNS-35
MTHOR/L12-3B	58178	58179	0.750	0.750	4.500	0.875	1.125	0.375	0.250	1.50							
MTHOR/L12-4B	58180	58181	0.750	0.750	4.500	0.875	1.250	0.500	0.250	-							
MTHOR/L16-4D	58182	58183	1.000	1.000	6.000	0.875	1.500	0.500	0.250	2.00	3.0	.125	.194	432	NL-44	CL-6	XNS-36
MTHOR/L20-4D	58184	58185*	1.250	1.250	6.000	0.875	1.750	0.500	0.250	2.00							
MTHOR/L16-5D	58186	58187	1.000	1.000	6.000	1.000	1.500	0.625	0.250	2.50	3.0	.170	.242	543	NL-56	CL-6	XNS-36
MTHOR/L20-5D	58188	58189	1.250	1.250	6.000	1.000	1.750	0.625	0.250	2.50							

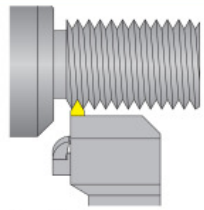
* Not standard stock item, call for lead time.

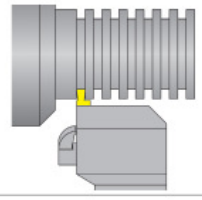
MTZO R/L Threading Toolholder- Style Z - Reverse Hand Threading for triangle TNMA inserts



Right Hand Shown, Left Hand Opposite



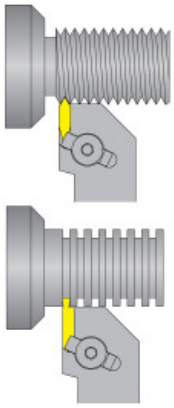




Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	Max. GRV Depth V	TNMA Gage Insert	Lock Pin	Clamp	Clamp Screw
MTZOR/L12-3B	58260	58261	0.750	0.750	4.500	1.000	1.000	0.250	0.150	322	NL-33	CL-6	XNS-36
MTZOR/L16-3D	58264*	58265*	1.000	1.000	6.000	1.000	1.250	0.250	0.150				
MTZOR/L16-4D	58268	58269	1.000	1.000	6.000	1.320	1.250	0.250	0.230	432	NL-44	CL-7	XNS-36
MTZOR/L20-4D	58272	58273	1.250	1.250	6.000	1.320	1.500	0.250	0.230				
MTZOR/L16-5D	58276*	58277*	1.000	1.000	6.000	1.500	1.250	0.250	0.292	543	NL-56	CL-7	XNS-36
MTZOR/L20-5D	58280*	58281*	1.250	1.250	6.000	1.500	1.500	0.250	0.292				
MTZOR/L20-66D	58284	58285	1.250	1.250	6.000	1.750	1.500	0.250	0.360	663	NL-66L	CL-30	XNS-510
MTZOR/L24-66E	58288	58289	1.500	1.500	7.000	1.750	2.000	0.500	0.360				

* Not standard stock item, call for lead time.

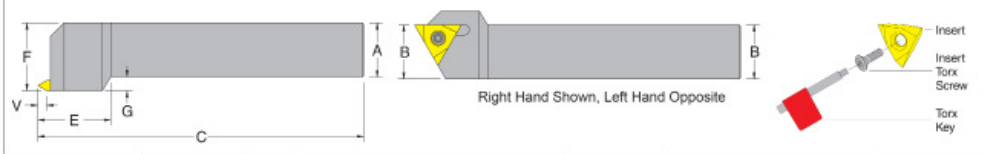
MTVO-CN R/L Threading Toolholder- Style V - O.D. Threading and Shallow Grooving for triangle TNMC inserts

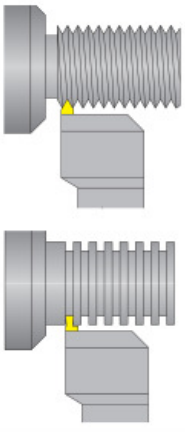


Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	Max. GRV Depth V	TNMC Gage Insert	Insert Torx Screw	Torx key	Clamp	Clamp Clip	Clamp Screw
MTVOR/L08-3A-CN	58012	58013	0.500	0.500	4.000	1.020	0.625	0.125	0.150						
MTVOR/L08-3B-CN	58016	58017	0.500	0.500	4.500	1.020	0.625	0.125	0.150						
MTVOR/L10-3B-CN	58020	58021	0.625	0.625	4.500	1.020	0.750	0.125	0.150	322	GTS-1M	T-10	HC-9	CL-9	CS-96
MTVOR/L12-3B-CN	58024	58025	0.750	0.750	4.500	1.020	0.875	0.125	0.150						
MTVOR/L16-3D-CN	58028	58029	1.000	1.000	6.000	1.155	1.250	0.250	0.150						
MTVOR/L12-4B-CN	58032	58033	0.750	0.750	4.500	1.250	0.875	0.125	0.230						
MTVOR/L16-4D-CN	58036	58037	1.000	1.000	6.000	1.250	1.250	0.250	0.230	432	GTS-2	T-20	HC-12	CL-12	CS-126
MTVOR/L20-4D-CN	58040	58041	1.250	1.250	6.000	1.250	1.500	0.250	0.230						
MTVOR/L24-4E-CN	58044	58045*	1.500	1.500	7.000	1.250	1.750	0.250	0.230						
MTVOR/L16-5D-CN	58048	58049	1.000	1.000	6.000	1.500	1.250	0.250	0.292	543	GTS-3	T-20	HC-12	CL-12	CS-126
MTVOR/L20-5D-CN	58052	58053	1.250	1.250	6.000	1.500	1.500	0.250	0.292						

* Not standard stock item, call for lead time.

STVO R/L Threading Toolholder- Style V - O.D. Threading and Shallow Grooving for triangle TNMC inserts

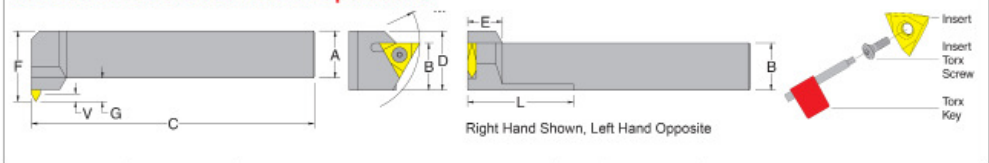


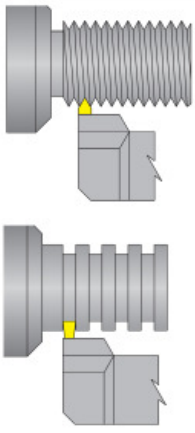


Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	Max. GRV Depth V	TNMC Gage Insert	Insert Torx Screw	Torx key
STVOR/L08-3A	58070	58071	0.500	0.500	4.000	1.000	0.625	0.125	0.150			
STVOR/L10-3B	58074	58075	0.625	0.625	4.500	1.000	0.750	0.125	0.150	322	GTS-1M	T-10
STVOR/L12-3B	58078	58079	0.750	0.750	4.500	1.000	0.875	0.125	0.150			
STVOR/L16-3D	58082	58083	1.000	1.000	6.000	1.250	1.250	0.250	0.150			
STVOR/L12-4B	58086	58087	0.750	0.750	4.500	1.250	0.875	0.125	0.230			
STVOR/L16-4D	58090	58091	1.000	1.000	6.000	1.430	1.250	0.250	0.230	432	GTS-2	T-20
STVOR/L20-4D	58094	58095	1.250	1.250	6.000	1.250	1.500	0.250	0.230			
STVOR/L24-4E	58098	58099	1.500	1.500	7.000	1.250	1.750	0.250	0.230			
STVOR/L16-5D	58102	58103	1.000	1.000	6.000	1.500	1.250	0.250	0.292	543	GTS-3	T-20
STVOR/L20-5D	58106	58107	1.250	1.250	6.000	1.500	1.500	0.250	0.292			
STVOR/L20-64D	58110	58111	1.250	1.250	6.000	1.750	1.500	0.250	0.360	643	GTS-4	T-30
STVOR/L20-66D	58114	58115	1.250	1.250	6.000	1.750	1.500	0.250	0.360	663	GTS-4	T-30

STHO R/L Threading Toolholder- Style H - Gang Toolholder for Shallow Grooving for I.D. Threading for triangle TNMC inserts

For Both Internal and External Operations

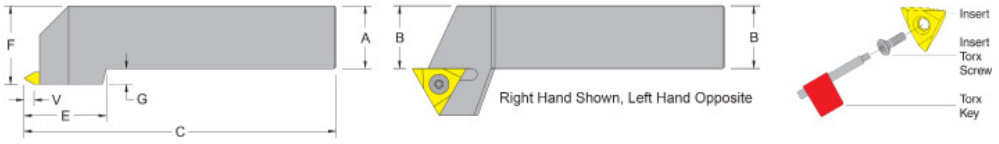


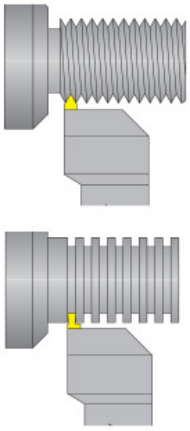


Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	L	Min. Bore M	Max. GRV Depth V Min. I.D.	Max. GRV Depth V O.D.	TNMC Gage Insert	Insert Torx Screw	Torx key
STHOR/L08-3B	58192	58193	0.500	0.500	4.500	0.875	0.875	0.375	-						
STHOR/L10-3B	58196	58197	0.625	0.625	4.500	0.875	1.000	0.375	-	2.0	0.100	0.125	322	GTS-1M	T-10
STHOR/L12-3B	58200	58201	0.750	0.750	4.500	0.875	1.125	0.375	1.500						
STHOR/L12-4B	58204	58205	0.750	0.750	4.500	0.875	1.250	0.500	-						
STHOR/L16-4D	58208	58209*	1.000	1.000	6.000	0.875	1.500	0.500	2.000	3.0	0.125	0.194	432	GTS-2	T-20
STHOR/L20-4D	58212	58213	1.250	1.250	6.000	0.875	1.750	0.500	2.000						
STHOR/L16-5D	58216	58217	1.000	1.000	6.000	1.000	1.750	0.625	2.500	3.0	0.170	0.242	543	GTS-3	T-20
STHOR/L20-5D	58220	58221	1.250	1.250	6.000	1.000	1.750	0.625	2.500						

* Not standard stock item, call for lead time.

STZO R/L Threading Toolholder-Style Z - Reverse Hand Threading for triangle TNMC inserts

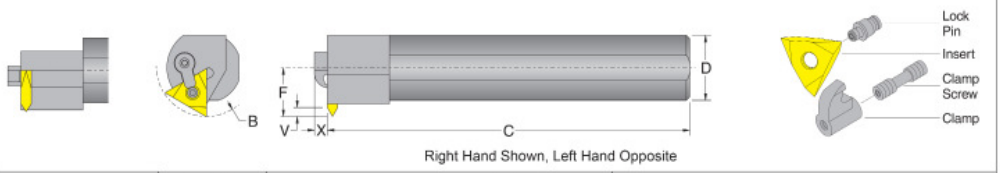


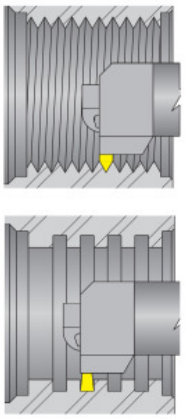


Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	Max. GRV Depth V	TNMC Gage Insert	Insert Torx Screw	Torx key
STZOR/L12-3B	58230	58231*	0.750	0.750	4.500	1.000	1.000	0.250	0.150	322	GTS-1M	T-10
STZOR/L16-3D	58234	58235	1.000	1.000	6.000	1.000	1.250	0.250	0.150			
STZOR/L16-4D	58238	58239	1.000	1.000	6.000	1.320	1.250	0.250	0.230	432	GTS-2	T-20
STZOR/L20-4D	58242	58243	1.250	1.250	6.000	1.320	1.500	0.250	0.230			
STZOR/L16-5D	58246	58247*	1.000	1.000	6.000	1.500	1.250	0.250	0.292	543	GTS-3	T-20
STZOR/L20-5D	58250*	58251	1.250	1.250	6.000	1.500	1.500	0.250	0.292			

* Not standard stock item, call for lead time.

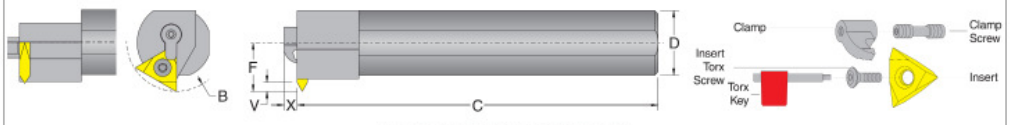
S-MTHO-A R/L Threading Bar- Style H - I.D. Threading and Shallow Grooving for triangle TNMA inserts

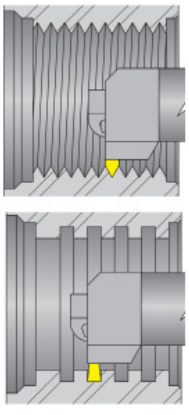




Description	Part No. 733101- R.H.	L.H.	Min. Bore B	C	D	F	Max. GRV Depth V	X	TNMA Gage Insert	Lock Pin	Clamp	Clamp Screw
S16T-MTHOR/L-3-A	58346	58347	1.388	12.00	1.000	0.687	0.120	0.250	322	NL-33	CL-5	XNS-36
S20U-MTHOR/L-3-A	58350	58351	1.656	14.00	1.250	0.828	0.120	0.250				
S20U-MTHOR/L-4-A	58354	58355	1.812	14.00	1.250	0.875	0.190	0.250	432	NL-44	CL-6	XNS-37
S24U-MTHOR/L-4-A	58358	58359	2.250	14.00	1.500	1.000	0.190	0.250				
S32V-MTHOR/L-4-A	58362	58363	3.000	16.00	2.000	1.328	0.190	0.250				
S32V-MTHOR/L-5-A	58366	58367	3.500	16.00	2.000	1.375	0.250	0.250	543	NL-56	CL-6	XNS-37
S40V-MTHOR/L-5-A	58370	58371	3.750	16.00	2.500	1.687	0.250	0.250				
S48Y-MTHOR/L-5-A	58374	58375	4.000	18.00	3.000	1.891	0.250	0.250				
S40V-MTHOR/L-66-A	58378	58379	4.000	16.00	2.500	1.750	0.312	0.312	663	NL-66L	CL-12	XNS-59
S48Y-MTHOR/L-66-A	58382	58383	4.500	18.00	3.000	2.000	0.312	0.312				

S-MTHO-C R/L Threading Bar- Style H - I.D. Threading and Shallow Grooving for triangle TNMC inserts



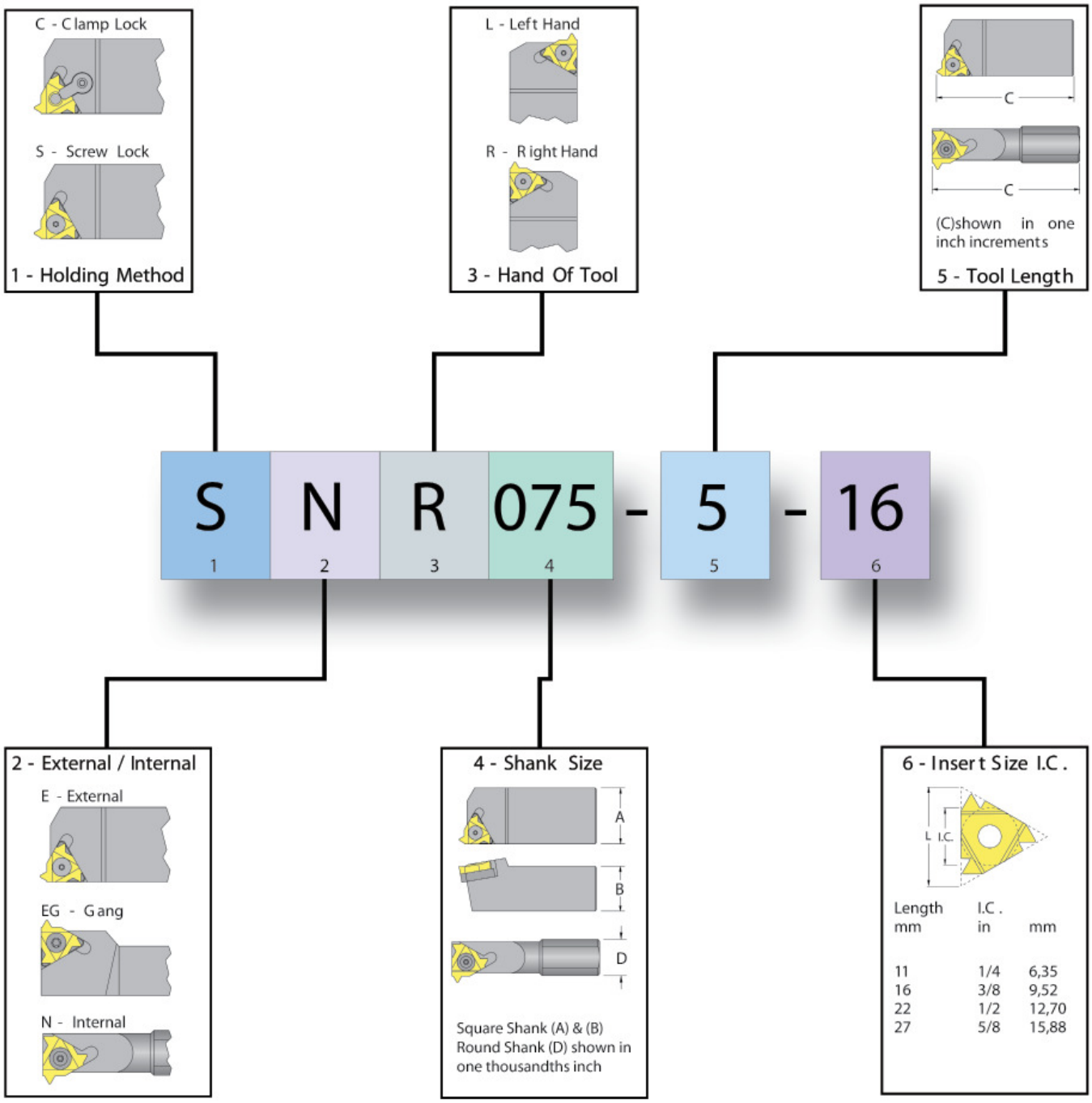


Description	Part No. 733101- R.H.	L.H.	Min. Bore B	C	D	F	Max. GRV Depth V	X	TNMC Gage Insert	Insert Torx Screw	Torx Key	Clamp	Clamp Screw
S16T-MTHOR/L-3-C	58300	58301	1.388	12.00	1.000	0.687	0.120	0.250	322	GTS-1M	T-10	CL-19	XNS-36
S20U-MTHOR/L-3-C	58304	58305	1.656	14.00	1.250	0.828	0.120	0.250					
S20U-MTHOR/L-4-C	58308	58309	1.812	14.00	1.250	0.875	0.190	0.250	432	GTS-2	T-20	CL-7	XNS-36
S24U-MTHOR/L-4-C	58312	58313	2.250	14.00	1.500	1.000	0.190	0.250					
S32V-MTHOR/L-4-C	58316	58317	3.000	16.00	2.000	1.328	0.190	0.250					
S32V-MTHOR/L-5-C	58320	58321	3.500	16.00	2.000	1.375	0.250	0.250	543	GTS-3	T-20	CL-20	XNS-47
S40V-MTHOR/L-5-C	58324	58325	3.750	16.00	2.500	1.687	0.250	0.250					
S48Y-MTHOR/L-5-C	58328*	58329*	4.000	18.00	3.000	1.891	0.250	0.250					
S40V-MTHOR/L-66-C	58332	58333	4.000	16.00	2.500	1.750	0.312	0.312	663	GTS-4	T-30	CL-12	XNS-59
S48Y-MTHOR/L-66-C	58336*	58337*	4.500	18.00	3.000	2.000	0.312	0.312					

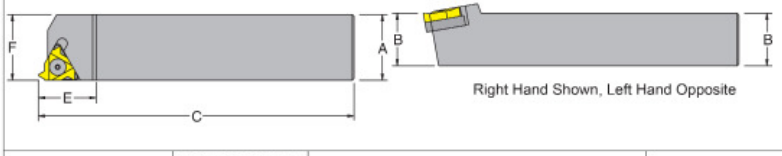
* Not standard stock item, call for lead time.

Laydown Holders

Laydown Toolholder Identification System



SE R/L Threading Toolholder- Style E- Laydown for LAYDOWN inserts



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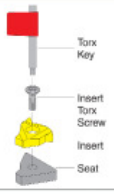
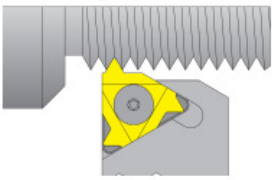


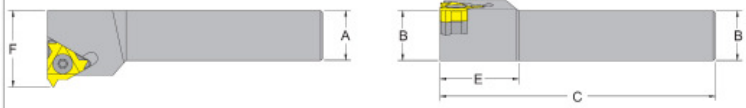
Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	Gage Insert	Shim Seat	Insert Torx crew	Torx Key
SER/L037-3-11	58420	58421	0.375	0.375	3.000	0.900	0.375	11-A60	-	TS-25.4-6M2	T-8
SER/L050-4-11	58424	58425	0.500	0.500	4.000	0.900	0.500				
SER/L062-4-16	58428	58429	0.625	0.625	4.000	0.900	0.625	16-G60	GXE-16	TS-16	T-10
SER/L075-5-16	58432	58433	0.750	0.750	5.000	0.900	0.750				
SER/L100-5-16	58436	58437	1.000	1.000	5.000	1.100	1.000				
SER/L100-6-22	58440*	58441	1.000	1.000	6.000	1.100	1.000	22-N60	NXE-22	TS-22	T-20
SER/L125-6-22	58444	58445	1.250	1.250	6.000	1.100	1.250				
SER/L100-6-27	58448	58449	1.000	1.000	6.000	1.300	1.000	27-Q60	VXE-27	TS-27	T-25
SER/L125-6-27	58452	58453	1.250	1.250	6.000	1.300	1.250				

* Not standard stock item, call for lead time.

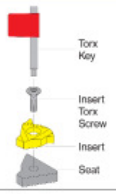


- Geometry of the insert seating: Helix angle 1-1/2°

SE Gang R/L Threading Toolholder- Style EG - Gang Toolholder for Gang Toolposts for LAYDOWN inserts

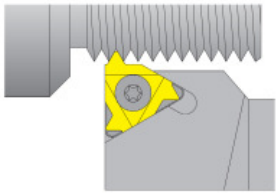


Right Hand Shown, Left Hand Opposite



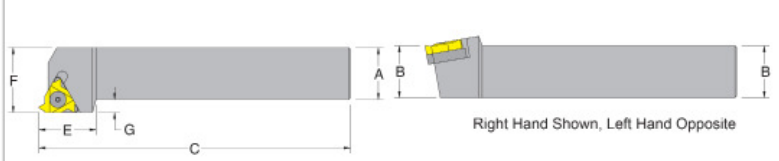
Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	Gage Insert	Shim Seat	Insert Torx crew	Torx Key
SEGR/L031-4-11	58462*	58463*	0.312	0.312	4.000	0.875	0.500	11-A60	-	TS-25.4-6M2	T-8
SEGR/L037-4-11	58466	58467	0.375	0.375	4.000	0.875	0.625				
SEGR/L050-5-16	58470	58471*	0.500	0.500	5.000	1.000	0.750	16-G60	GXE-16	TS-16	T-10
SEGR/L062-5-16	58474	58475	0.625	0.625	5.000	1.000	0.875				
SEGR/L075-5-16	58478	58479	0.750	0.750	5.000	1.000	1.000				

* Not standard stock item, call for lead time.

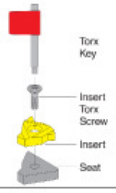


- Geometry of the insert seating: Helix angle 1-1/2°

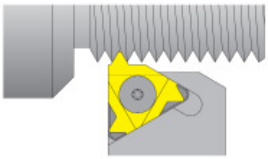
SE R/L Qualified Threading Toolholder- Style - Laydown Offset Head for LAYDOWN inserts



Right Hand Shown, Left Hand Opposite

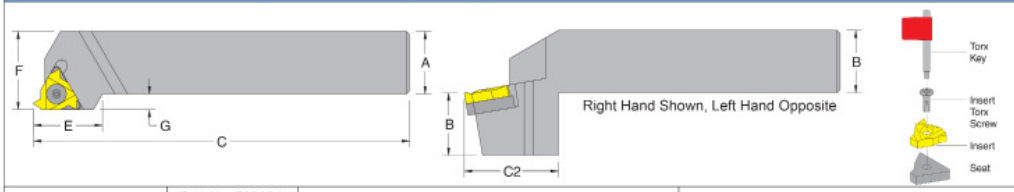


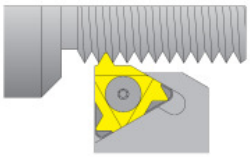
Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	G	Gage Insert	Shim Seat	Insert Torx crew	Torx Key
SER/L050-4-11Q	58488	58489	0.500	0.500	4.000	1.000	0.625	0.125	11-A60	-	TS-25.4-6M2	T-8
SER/L075-5-16Q	58492	58493	0.750	0.750	5.000	1.000	1.000	0.250	16-G60	GXE-16	TS-16	T-10
SER/L100-6-16Q	58496	58497	1.000	1.000	6.000	1.000	1.250	0.250				
SER/L125-6-16Q	58500	58501*	1.250	1.250	6.000	1.000	1.500	0.250				
SER/L100-6-22Q	58504	58505	1.000	1.000	6.000	1.000	1.250	0.250	22-N60	NXE-22	TS-22	T-20
SER/L125-6-22Q	58508	58509*	1.250	1.250	6.000	1.000	1.500	0.250				
SER/L125-6-27Q	58511*	58512	1.250	1.250	6.000	1.250	1.500	0.250	27-Q60	VXE-27	TS-27	T-25



- Geometry of the insert seating: Helix angle 1-1/2°

SE R/L Qualified Threading Toolholder- Style - Drop Head for LAYDOWN inserts



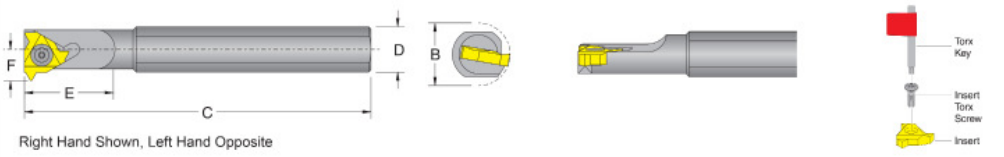


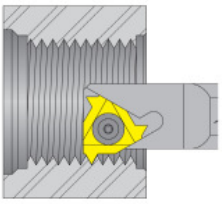
- Geometry of the insert seating: Helix angle 1-1/2°

Inch Description	Part No. 733101- R.H.	L.H.	A	B	C	C2	E	F	G	Gage Insert	Shim Seat	Insert Torx crew	Torx Key
SER/L075-6-16CQ	58522	58523	0.750	0.750	6.000	1.500	0.900	1.000	0.250	16-G60	GXE-16	TS-16	T-10
SER/L100-6-16CQ	58526	58527	1.000	1.000	6.000	1.500	0.900	1.250	0.250				
SER/L125-6-16CQ	58530	58531*	1.250	1.250	6.000	1.500	0.900	1.500	0.250				
SER/L150-6-16CQ	58534	58535*	1.500	1.500	6.000	1.500	0.900	1.750	0.250				
SER/L100-6-22CQ	58538*	58539*	1.000	1.000	6.000	1.500	1.100	1.250	0.250	22-N60	NXE-22	TS-22	T-20
SER/L125-6-22CQ	58542*	58543*	1.250	1.250	6.000	1.500	1.100	1.500	0.250				
SER/L150-6-22CQ	58546	58547*	1.500	1.500	6.000	1.500	1.100	1.750	0.250				

* Not standard stock item, call for lead time.

SN R/L Threading Bar- Style - Internal Small Shank Laydown Bar for LAYDOWN inserts



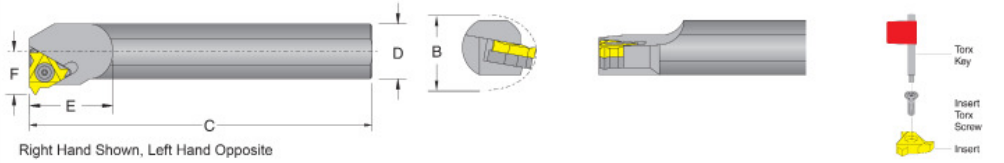


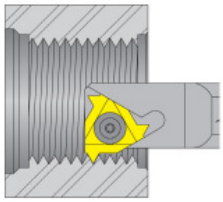
- Minimum threading dia. .500"
- Geometry of the insert seating: Helix angle 1-1/2°

Inch Description	Part No. 733101- R.H.	L.H.	Min.Bore B	C	D	E	F	Gage Insert	Insert Torx crew	Torx Key
SNR/L037-40-11	58600	58601	0.500	4.000	0.375	-	0.250	11-A60	TS-25.4-6M2	T-8
SNR/L050-55-11	58604	58605	0.600	5.500	0.500	1.250	0.315			
SNR/L062-60-16	58608	58609	0.750	6.000	0.625	1.500	0.406	16-G60	TS-16-01	T-10
SNR/L075-70-16	58612	58613*	0.950	7.000	0.750	2.000	0.492			
SNR/L100-80-16	58616	58617	1.150	8.000	1.000	2.500	0.650			
SNR/L075-70-22	58620	58621*	0.900	7.000	0.750	2.000	0.492	22-N60	TS-22	T-20
SNR/L100-80-22	58624	58625	1.500	8.000	1.000	2.500	0.840			

* Not standard stock item, call for lead time.

SN R/L Threading Bar- Style - Internal Laydown Bar for LAYDOWN inserts



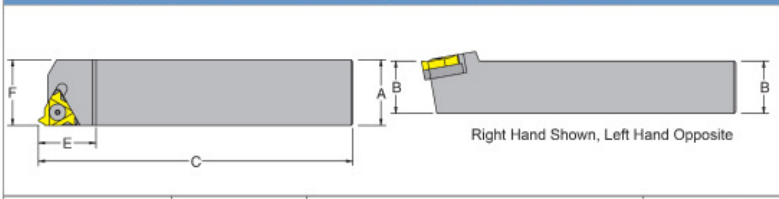


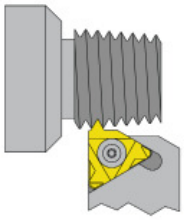
- Minimum threading dia. .950"
- Geometry of the insert seating: Helix angle 1-1/2°

Description	Part No. 733101- R.H.	L.H.	Min.Bore B	C	D	E	F	Gage Insert	Shim Seat	Insert Torx crew	Torx Key
SNR/L075-07-16	58636	58637*	0.950	7.00	0.750	2.000	0.520	16-G60	GXE-16	TS-16	T-10
SNR/L100-08-16	58640	58641*	1.150	8.00	1.000	2.500	0.650				
SNR/L125-10-16	58644	58645	1.400	10.00	1.250	2.500	0.780				
SNR/L150-12-16	58648	58649*	1.700	12.00	1.500	2.500	0.900				
SNR/L175-14-16	58652	58653	2.000	14.00	1.750	2.500	1.030				
SNR/L200-14-16	58656	58657	2.200	14.00	2.000	2.500	1.210				
SNR/L100-08-22	58660	58661	1.200	8.00	1.000	2.500	0.710	22-N60	NXE-22	TS-22	T-20
SNR/L125-10-22	58664	58665	1.500	10.00	1.250	2.500	0.840				
SNR/L150-12-22	58668	58669*	1.800	12.00	1.500	2.500	0.970				
SNR/L175-14-22	58672*	58673*	2.100	14.00	1.750	2.500	1.090				
SNR/L200-14-22	58676	58677	2.300	14.00	2.000	2.500	1.210				
SNR/L250-16-22	58680	58681	2.800	16.00	2.500	2.500	1.460				
SNR/L150-12-27	58684	58685	1.900	12.00	1.500	2.500	1.020	27-Q60	VXE-27	TS-27	T-25
SNR/L175-14-27	58688*	58689	2.200	14.00	1.750	2.500	1.150				
SNR/L250-16-27	58692	58693	2.900	16.00	2.500	3.000	1.520				

* Not standard stock item, call for lead time.

SE Threading Toolholder- Style - Laydown for LAYDOWN inserts



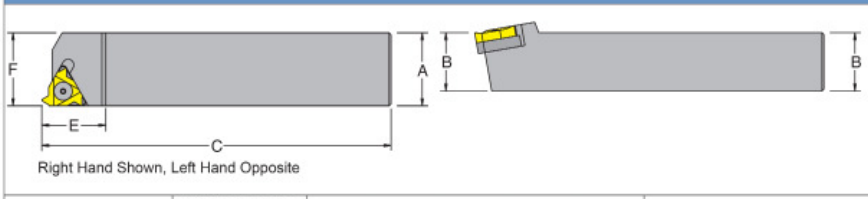


Inch Description	Part No. 733101- R.H.	A	B	C	E	F	Gage Insert	Seat	Insert Torx crew	Torx Key
SER100-5-16	58436	1.000	1.000	5.000	1.100	1.000	16-G60	GXE-16	TS-16	T-10
SER100-6-22	*58440	1.000	1.000	6.000	1.100	1.000	22-N60	NXE-22	TS-22	T-20

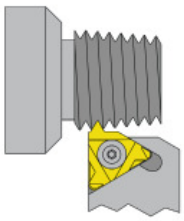
*NONSTOCK Item, call for lead time.

- Geometry of the insert seating: Helix angle 1-1/2°

SE API Threading Toolholder- Style External API Laydown Toolholder for LAYDOWN inserts



API External Threading

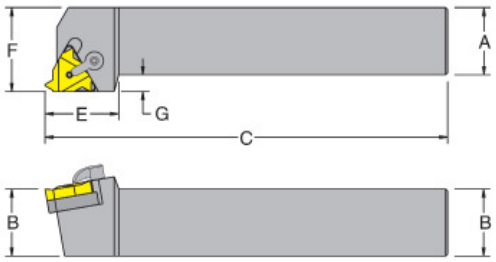


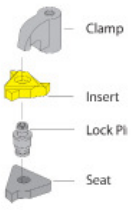
Inch Description	Part No. 733101- R.H.	A	B	C	E	F	Gage Insert	Seat	Insert Torx crew	Torx Key
SER100-T22API	*58720	1.250	1.000	6.00	1.300	1.250	22-N60	NXE-22	TS-22	T-20
SER125-T22API	*58724	1.500	1.250	6.00	1.300	1.500				
SER150-T27API	*58728	1.750	1.500	8.00	1.600	1.750	27-Q60	VXE-27	TS-27	T-25
SER200-T27API	58732	2.250	2.000	10.00	1.600	2.250				

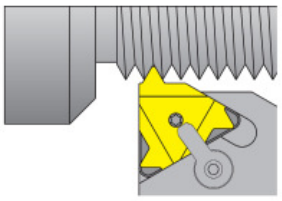
*NONSTOCK Item, call for lead time.

- Geometry of the insert seating: Helix angle 1-1/2°

MTVNR- L - API Threading Toolholder

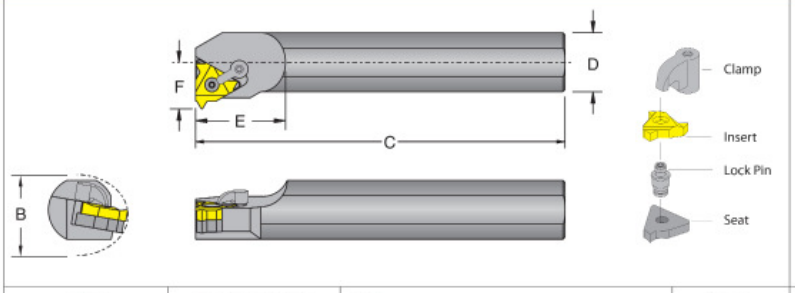


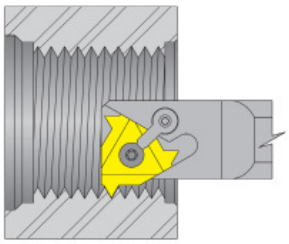




Inch Description	Part No. 733101- R.H.	A	B	C	E	F	Gage Insert	Seat	Lock Pin	Clamp	Clamp Screw
MTVNR-16-L43D	58290	1.00	1.00	6.00	1.27	1.250	L43	LS43	NL46	CL9	XNS59
MTVNR-20-L43D	58291	1.25	1.25	6.00	1.27	1.500					
MTVNR-16-L53D	58292	1.00	1.00	6.00	1.53	1.250	L53	LS53	NL58	CL12	XNS510
MTVNR-20-L53D	58293	1.25	1.25	6.00	1.53	1.500					
MTVNR-20-L54D	58294	1.25	1.25	6.00	1.53	1.500	L54	LS53	NL58	CL12	XNS510

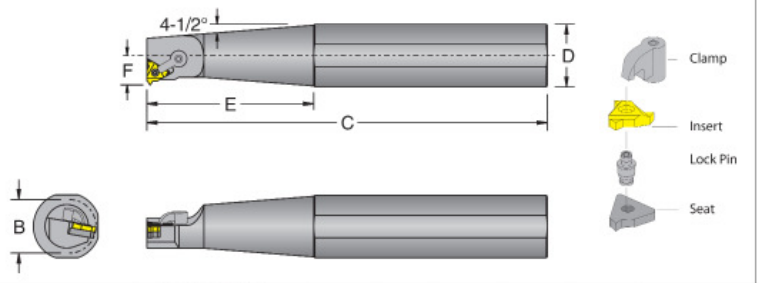
S_MTVNR- L - API Threading Bar

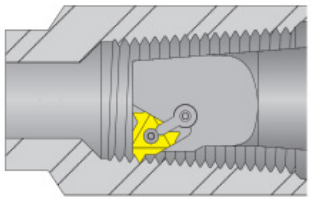




Inch Description	Part No. 733101- R.H.	Min. Bore	C	D	E	F	Gage Insert	Seat	Lock Pin	Clamp	Clamp Screw
S16S MTVNR-L43	58384	1.031	10.00	1.00	2.75	.564	L43	-	TS-1032-5M1	-	-
S20T MTVNR-L43	58385	1.250	12.00	1.25	2.75	.625		-	NL44	CL9	XNS59
S24U MTVNR-L43	58386	1.500	14.00	1.50	3.75	.750		-	NL44	CL9	XNS59
S32U MTVNR-L43	58287	2.000	14.00	2.00	3.75	1.00		LS43	NL46	CL9	XNS59
S24U MTVNR-L53	58288	1.500	14.00	1.50	3.75	0.75	L53	-	NL56	CL12	XNS510
S32U MTVNR-L53	58389	2.000	14.00	2.00	3.75	1.00		LS43	NL58	CL12	XNS510
S24U MTVNR-L54	58390	1.500	14.00	1.50	3.75	0.75	L 54	-	NL58	CL12	XNS510
S32U MTVNR-L54	58391	2.000	14.00	2.00	3.75	1.00					

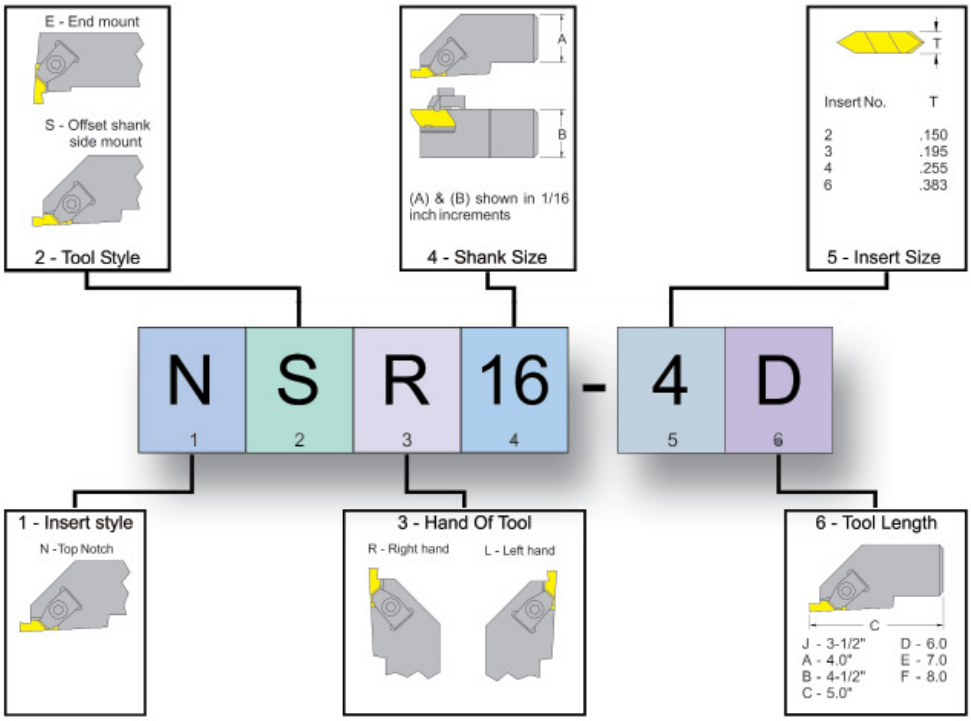
S_MTVNR- L - API Threading Bar



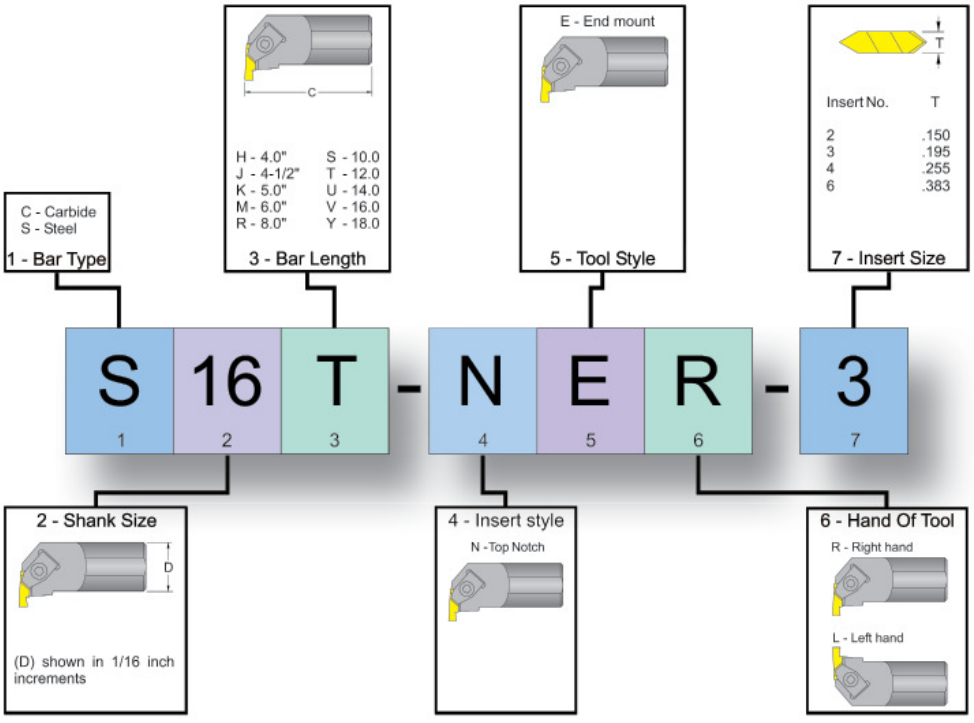


Inch Description	Part No. 733101- R.H.	Min. Bore	C	D	E	F	Gage Insert	Lock Pin	Clamp	Clamp Srew
S24U MTVNR-L43 API	58392	1.500	14.00	1.50	4.50	.750	L43	NL44	CL9	XNS59
S32U MTVNR-L43 API	58393	2.000	14.00	2.00	4.50	1.00				
S24V MTVNR-L53 API	58394	1.500	16.00	1.50	4.50	.750	L53	NL56	CL12	XNS510
S32V MTVNR-L53 API	58395	2.000	16.00	2.00	4.50	1.00				
S32V MTVNR-L54 API	58396	2.000	16.00	2.00	4.50	1.00	L54	NL56	CL12	XNS510

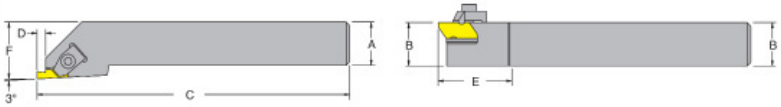
Square Shanks

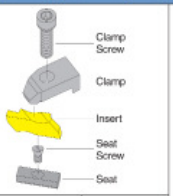


Boring Bars



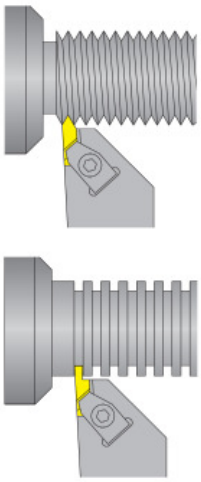
NS R/L Threading & Grooving Toolholder- Style - External Top Notch Toolholder for threading and grooving Top Notch inserts





Right Hand Shown, Left Hand Opposite

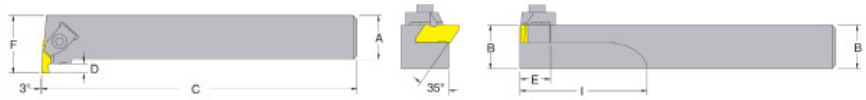
Inch Description	Part No. 733101- R.H.	L.H.	A	B	C	D	E	F	Gage Insert	Seat	Seat Screw	Clamp	Clamp Screw
NSR/L06-2	58770	58771	0.375	0.375	2.500	0.138	0.750	0.562	NG-2R* NG-2L**	-	-	CM-74* CM-75**	S-310
NSR/L08-2J	58774	58775	0.500	0.500	3.500	0.138	0.750	0.750					
NSR/L10-2B	58778	58779	0.625	0.625	4.500	0.138	0.750	0.875					
NSR/L12-2B	58782	58783	0.750	0.750	4.500	0.138	0.750	1.000					
NSR/L16-2C	58786	58787	1.000	1.000	5.000	0.138	0.750	1.250					
NSR/L12-3A	58790	58791	0.750	0.750	4.000	0.210	1.250	1.000	NG-3R* NG-3L**	-	-	CM-72* CM-73**	S-412
NSR/L12-3B	58794	58795	0.750	0.750	4.500	0.210	1.250	1.000					
NSR/L16-3C	58798	58799	1.000	1.000	5.000	0.210	1.250	1.250					
NSR/L16-3D	58802	58803	1.000	1.000	6.000	0.210	1.250	1.250					
NSR/L20-3D	58806	58807	1.250	1.250	6.000	0.210	1.250	1.500					
NSR/L16-4C	58810	58811	1.000	1.000	5.000	0.294	1.380	1.250	NG-4R* NG-4L**	SM-420	SL-344-X	CM-72* CM-73**	S-412
NSR/L16-4D	58814	58815	1.000	1.000	6.000	0.294	1.380	1.250					
NSR/L20-4C	58818	58819	1.250	1.250	5.000	0.294	1.380	1.500					
NSR/L20-4D	58822	58823	1.250	1.250	6.000	0.294	1.380	1.500					
NSR/L24-4D	*58826	58827	1.500	1.500	6.000	0.294	1.380	1.750					

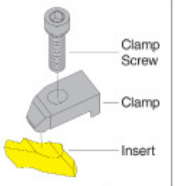


*Not standard stock item, call for lead time.

*For right hand tools. ** For left hand tools.

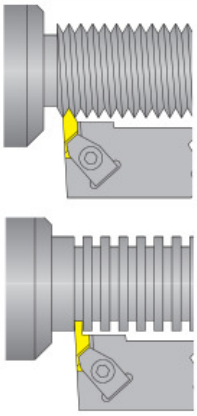
NE R/L Threading & Grooving Toolholder- Style - Gang External Top Notch Toolholder for threading and grooving Top Notch inserts





Right Hand Shown, Left Hand Opposite

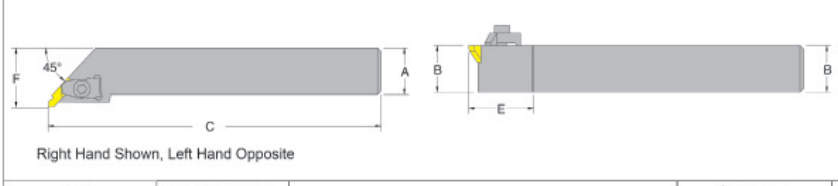
Inch Description	Part No. 733101- R.H.	L.H.	A	B	C	D	E	F	I	Gage Insert	Clamp	Clamp Screw
NER/L06-2	58900	58901	0.375	0.375	2.500	0.138	0.500	0.750	1.000	NG-2L* NG-2R**	CM-74* CM-75**	S-310
NER/L08-2J	58904	58905	0.500	0.500	3.500	0.138	0.500	0.750	1.000			
NER/L10-2B	58908	58909	0.625	0.625	4.500	0.138	-	0.750	1.000			
NER/L12-2B	58912	58913	0.750	0.750	4.500	0.138	0.500	1.000	1.000			
NER/L12-3B	58916	58917	0.750	0.750	4.500	0.210	0.750	1.125	2.000	NG-3L* NG-3R**	CM-72* CM-73**	S-412
NER/L16-3D	58920	58921	1.000	1.000	6.000	0.210	0.750	1.250	2.000			
NER/L20-3D	58924	*58925	1.250	1.250	6.000	0.210	0.750	1.500	2.000			
NER/L16-4D	58928	58929	1.000	1.000	6.000	0.294	0.750	1.375	2.000	NG-4L* NG-4R**	CM-72* CM-73**	S-412
NER/L20-4D	58932	58933	1.250	1.250	6.000	0.294	0.750	1.625	2.000			



*Not standard stock item, call for lead time.

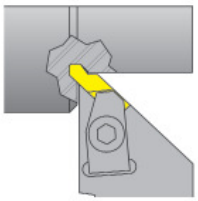
*For right hand tools. ** For left hand tools.

NR R/L Grooving Gang Toolholder- Style - Corner Grooving External Top Notch Toolholder for grooving Top Notch inserts



Right Hand Shown, Left Hand Opposite

For Corner Grooving

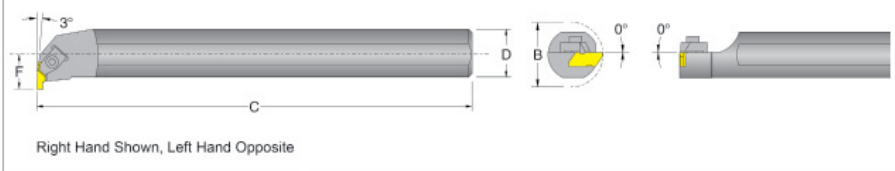


Inch Description	Part No. 733101- R.H.	L.H.	A	B	C	E	F	Gage Insert	Clamp	Clamp Screw
NRR/L12-3B	58942	*58943	0.750	0.750	4.500	1.250	1.000	*NG-3L **NG-3R	*CM-73 **CM-72	S-412
NRR/L16-3C	*58944	58945	1.000	1.000	5.000	1.250	1.250			
NRR/L16-3D	58946	*58947	1.000	1.000	6.000	1.250	1.250			
NRR/L20-3D	58948	58949	1.250	1.250	6.000	1.375	1.500			
NRR/L24-3D	58950	58951	1.500	1.500	6.000	1.375	2.000			

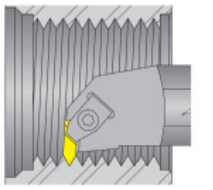
* Not standard stock item, call for lead time.

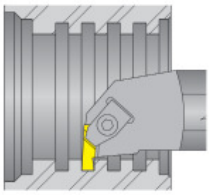
*For right hand tools. ** For left hand tools.

S-NE R/L Threading & Grooving Bar - Style - Internal Top Notch Bar for threading and grooving Top Notch inserts



Right Hand Shown, Left Hand Opposite



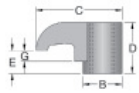


Inch Description	Part No. 733101- R.H.	L.H.	Min. Bore B	C	D	F	Gage Insert	Clamp	Clamp Screw
S10S-NER/L-2	58970	58971	1.000	10.00	0.625	0.500	*NG-2L **NG-2R	*CM-74 **CM-75	S-310
S12S-NER/L-2	58974	58975	1.125	10.00	0.750	0.562			
S16T-NER/L-3	58978	58979	1.375	12.00	1.000	0.688	*NG-3L **NG-3R	*CM-72 **CM-73	S-412
S20U-NER/L-3	58982	58983	1.750	14.00	1.250	0.875			
S24U-NER/L-3	58986	58987	2.000	14.00	1.500	1.000			
S28U-NER/L-3	58990	58991	2.250	14.00	1.750	1.125			
S28U-NER/L-4	58994	58995	2.500	14.00	1.750	1.250	*NG-4L **NG-4R	*CM-72 **CM-73	S-412
S32V-NER/L-4	58998	58999	2.750	16.00	2.000	1.375			

*For right hand tools. ** For left hand tools.

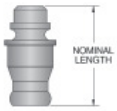
Parts

Finger Clamp



Desc.	Part No. 733101-	B	C	D	E	G	Thread	PKG.
CL-5	90680	.280	.52	.350	.102	-	10-32	
CL-6	90681	.310	.58	.440	.187	.094	10-32	
CL-7	90682	.310	.64	.310	.082	-	10-32	
CL-9	90683	.430	.75	.660	.344	.125	5/16-24	
CL-12	90684	.430	.88	.660	.344	.125	5/16-24	10
CL-19	90685	.310	.55	.310	.062	-	10-32	
CL-20	90686	.375	.73	.380	.125	-	1/4-28	
CL-24	90687	.491	1.0	.785	.453	.136	3/8-24	
CL-30	90688	.430	1.0	.660	.344	.125	5/16-24	

Negative Lock Pins



Desc.	Part No. 733101-	Insert I.C.	Nominal Length	Thread	Hex Wrench Size	PKG.
NL-23	90472	.250	.328	8-32	1/16	
NL-33	90473	.375	.344	10-32	5/64	
NL-33L	90474	.375	.406	10-32	5/64	
NL-34	90475	.375	.453	10-32	5/64	
NL-34L	90476	.375	.516	10-32	5/64	
NL-43	90477	.500	.420	10-32	5/64	
NL-44	90478	.500	.516	1/4-28	3/32	
NL-46	90479	.500	.672	1/4-28	3/32	
NL-46L	90480	.500	.730	1/4-28	3/32	
NL-56	90481	.625	.703	5/16-24	1/8	10
NL-57	90482	.625	.810	5/16-24	1/8	
NL-58	90483	.625	.859	5/16-24	1/8	
NL-58L	90484	.625	.890	5/16-24	1/8	
NL-66	90485	.750	.703	3/8-24	9/64	
NL-66L	90486	.750	.828	3/8-24	9/64	
NL-68	90487	.750	.859	3/8-24	9/64	
NL-68L	90488	.750	.953	3/8-24	9/64	
NL-808	90489	1.00	.940	7-16-20	5/32	
NL-810	90490	1.00	1.17	7-16-20	5/32	

Threading OnEdge Insert Torx Screw

Desc.	Part No.733101-	I.C.	Torx key	PKG.
GTS-1M	90964	.375	T-10	
GTS-2	90966	.500	T-20	10
GTS-3	90967	.625	T-20	
GTS-4	90968	.720	T-30	

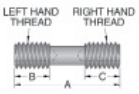
Boring Insert Torx Screw

Desc.	Part No. 733101-	I.C.	Torx key	PKG.
TS-06	91306	.1562	T-6	
TS-08	91308	.1875	T-6	
TS-25-45-6M2	90972	.2500	T-7	
TS-11	91310	.2500	T-8	
TS-16	91311	.3750	T-10	10
TS-16-01	91313	.3750	T-10	
TS-22	91312	.5000	T-20	
TS-1032-5M1	90960	.5000	T-20	
TS-27	91314	.6250	T-25	

Bridge Clamp Screw Clip

Desc.	Part No. 733101-	length	PKG.
CLP-12	90930	.422	10
CLP-9	90928	.312	

Finger Clamp Screws



Desc.	Part No. 733101-	A	B	C	Thread Size	Hex Wrench Size	PKG.
XNS-26	90900	0.750	.31	.31	8-32	5/64	
XNS-35	90901	0.625	.22	.22	10-32	3/32	
XNS-36	90902	0.750	.25	.25	10-32	3/32	
XNS-37	90903	0.840	.31	.31	10-32	3/32	
XNS-38	90904	1.000	.37	.37	10-32	3/32	
XNS-46	90905	0.750	.31	.31	1/4-28	1/8	
XNS-47	90906	0.875	.28	.28	1/4-28	1/8	10
XNS-48	90907	1.000	.37	.37	14/-28	1/8	
XNS-58	90910	1.000	.50	.28	5/16-24	5/32	
XNS-59	90911	1.125	.47	.41	5/16-24	5/32	
XNS-510	90908	1.250	.50	.50	5/16-24	5/32	
XNS-512	90909	1.500	.62	.62	5/16-24	5/32	
XNS-610	90912	1.250	.50	.50	3/8-24	3/16	

V-Bottom Clamp

Desc.	Part No. 733101-		PKG.
JSLC-HPV84-5	63880		1

V-Bottom Clamp Screw

Desc.	Part No. 733101-		PKG.
CS-M0616	63885		10

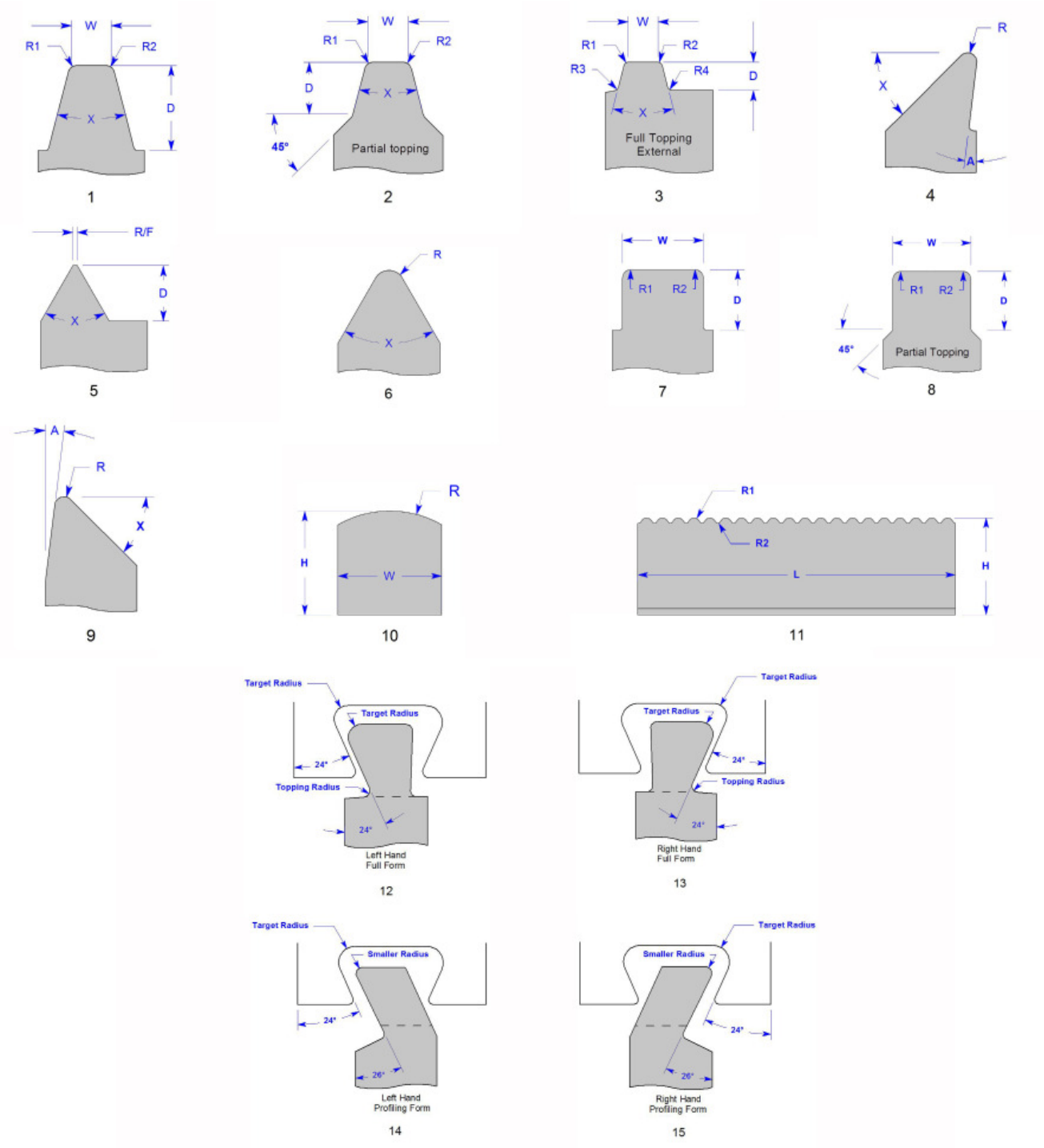
Bridge Clamp Screws

Desc.	Part No. 733101-	length	Thread	Hex Wrench Size	PKG.
CS-126	90925	.860	1/4-28	5/32	10
CS-96	90923	.840	10-32	1/8	

Torx Keys

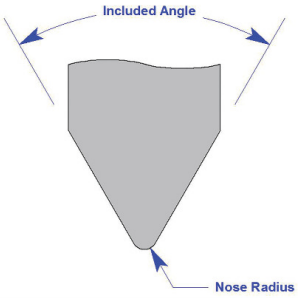
Desc.	Part No. 733101-	Desc.	Part No. 733101-
T-6	92001	T-15	92006
T-7	92002	T-20	92007
T-8	92003	T-25	92008
T-9	92004	T-30	92009
T-10	92005		

SOME OF THE GEOMETRIC FORMS AVAILABLE

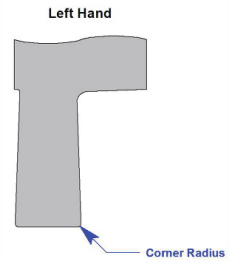


Terms

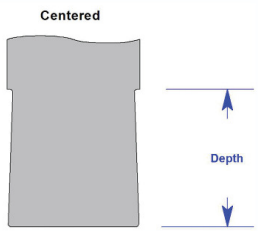
CARBOLINE GLOSSARY OF TERMS



A



B



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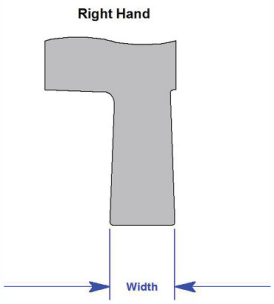

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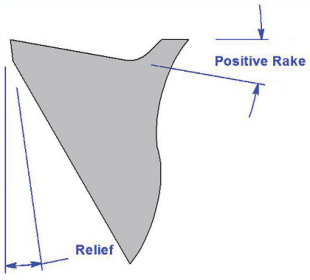

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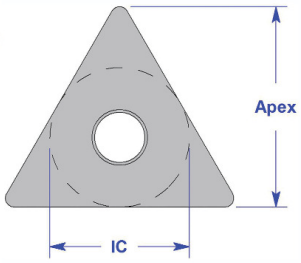

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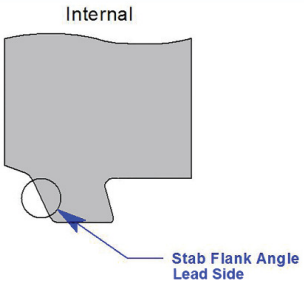

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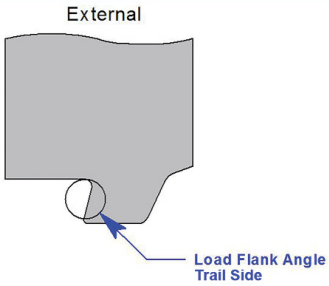
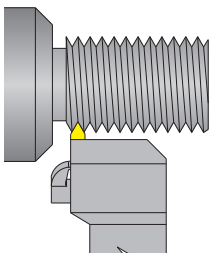


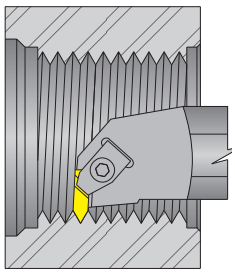
H

THREADING, GROOVING & API METHODS

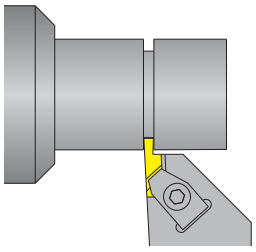
O.D Threading



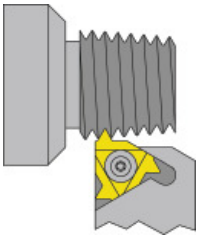
I.D. Threading



Grooving

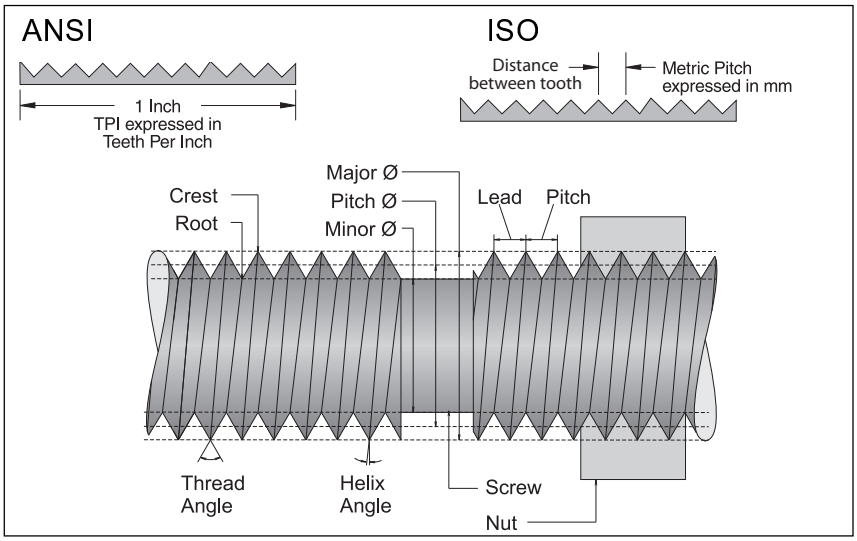


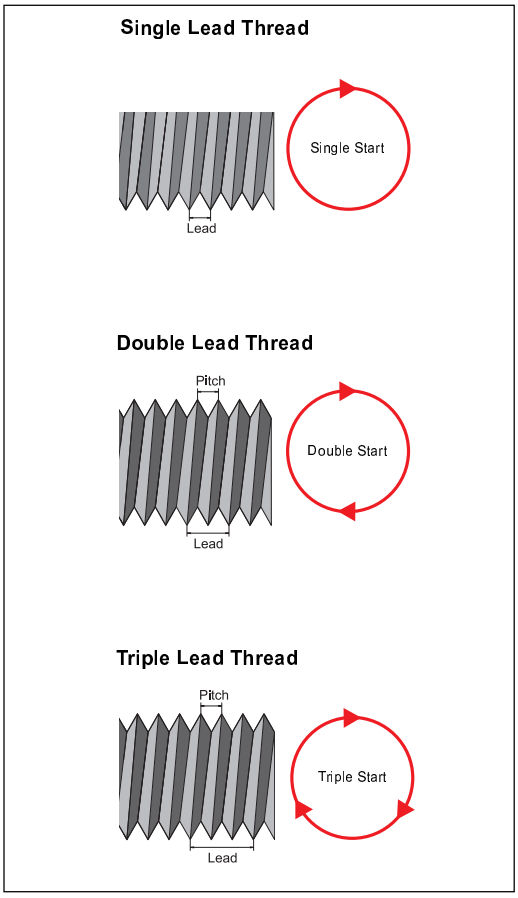
API



Terms

THREADING TERMINOLOGY





Thread Definitions

Crest - The outer most surface of the thread form which joins the flanks.

Helix Angle - The angle between the direction of the threads around a screw and a line running at a right angle to the shank.

Lead - The distance a thread will advance along its axis in one complete revolution.

Major Diameter - The largest diameter of a straight screw thread.

Minor Diameter - The smallest diameter of a screw thread. Also known as the "root diameter."

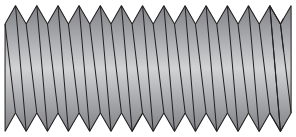
Pitch - The distance from any point on a thread to the corresponding point on the adjacent thread measured parallel to the axis.

Pitch Diameter - The diameter of a thread at an imaginary point where the width of the groove and the with of the thread are equal.

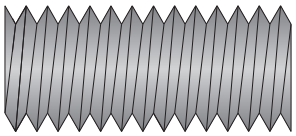
Root - The inner most surface of a thread form.

Thread Angle - The angle formed by the two sides of the thread (or their projections) with each other.

Right Hand Thread



Left Hand Thread



Notes:

API REGUAR SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
2-3/8 REG	V-0.040	5	3	530
2-7/8 REG	V-0.040	5	3	530
3-1/2 REG	V-0.040	5	3	530
4-1/2 REG	V-0.040	5	3	530
5-1/2 REG	V-0.050	4	3	435
6-5/8 REG	V-0.050	4	2	425
7-5/8 REG	V-0.050	4	3	435
8-5/8 REG	V-0.050	4	3	435

API INTERNAL FLUSH SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
2-3/8 IF	V-0.038	4	2	428
2-7/8 IF	V-0.038	4	2	428
3-1/2 IF	V-0.038	4	2	428
4 IF	V-0.038	4	2	428
5-1/2 IF	V-0.038	4	2	428

API FULL HOLE SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
3-1/2 FH	V-0.040	5	3	530
4 FH	V-0.038	4	2	428
4-1/2 FH	V-0.040	5	3	530
5-1/2 FH	V-0.050	4	2	425
6-5/8 FH	V-0.050	4	2	425

API NC SPECIFICATIONS				
Conn. No. or Size	Thread Form	TPI	TPF	Cat.No.
NC10	V-0.055	6	1-1/2	V0.055
NC12	V-0.055	6	1-1/2	V0.055
NC13	V-0.055	6	1-1/2	V0.055
NC16	V-0.055	6	1-1/2	V0.055
NC23	V-0.038	4	2	428
NC26	V-0.038	4	2	428
NC31	V-0.038	4	2	428
NC35	V-0.038	4	2	428
NC38	V-0.038	4	2	428
NC40	V-0.038	4	2	428
NC44	V-0.038	4	2	428
NC46	V-0.038	4	2	428
NC50	V-0.038	4	2	428
NC56	V-0.038	4	3	438
NC61	V-0.038	4	3	438
NC70	V-0.038	4	3	438
NC71	V-0.038	4	3	438

API THREAD FORM SPECIFICATIONS						
Thread Form	TPI	TPF	Width Crest	Flat Root	Root Radius	Cat. No.
V-0.038	4	2	0.065	-	0.038	428
V-0.038	4	3	0.065	-	0.038	438
V-0.040	5	3	0.040	-	0.020	530
V-0.050	4	3	0.050	-	0.025	435
V-0.050	4	2	0.050	-	0.025	425
V-0.076	4	1-1/2	0.076	0.067	-	4PAC
V-0.055	6	1-1/2	0.055	0.047	-	V0.055

ACME TABLE				
	STANDARD		STUB	
Pitch	Width	Depth	Width	Depth
16	.0206	.0362	.0238	.0238
14	.0239	.0407	.0276	.0264
12	.0283	.0467	.0326	.0300
10	.0319	.0600	.0370	.0400
9	.0360	.0656	.0417	.0433
8	.0411	.0725	.0476	.0475
7	.0478	.0814	.0551	.0529
6	.0566	.0933	.0652	.0600
5	.0689	.1100	.0793	.0700
4	.0875	.1350	.1004	.0850
3-1/2	.1007	.1529	.1155	.0957
3	.1184	.1767	.1356	.1100
2-1/2	.1431	.2100	.1638	.1300
2	.1802	.2600	.2060	.1600
1-1/2	.2419	.3433	.2764	.2100
1-1/3	.2728	.3850	.3116	.2350
1	.3655	.5100	.4172	.3100

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