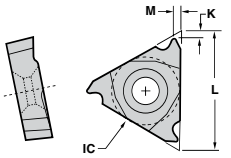
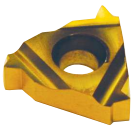
WHITWORTH



INT RH SHOWN

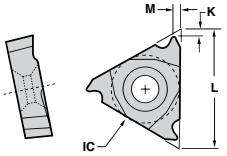


Description	EDP Code	TPI	IC	L	M	K	TiN Coated GP22	TiN Coated GP50	AlTiN Coated AC22	AlTiN Coated AC3	AlTiN Coated AC50
11IR 28W	4926028	28	1/4	.43 (11.00)	.03 (0.8)	.02 (0.50)		●			
11IRB 28W*	492B6028	28	1/4	.43 (11.00)	.03 (0.8)	.02 (0.50)			●		
11IR 24W	4926024	24	1/4	.43 (11.00)	.03 (0.8)	.03 (0.8)			●		
11IRB 24W*	492B6024	24	1/4	.43 (11.00)	.03 (0.8)	.03 (0.8)			●		
11IL 24W	5016024	24	1/4	.43 (11.00)	.03 (0.8)	.03 (0.8)			●		
11IR 20W	4926020	20	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)		●	●		
11IRB 20W*	4926020	20	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
11IR 19W	4926019	19	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)		●	●		
11IRB 19W*	4926019	19	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
11IR 18W	4926018	18	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)		●	●		
11IRB 18W*	492B6018	18	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
11IL 18W	5016018	18	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
11IR 16W	4926016	16	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)		●	●		
11IRB 16W*	492B6016	16	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
11IR 14W	4926014	14	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)		●	●		
11IRB 14W*	492B6014	14	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
11IL 14W	5016014	14	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)		●	●		
11IL 12W	5016012	12	1/4	.43 (11.00)	.04 (1.0)	.03 (0.8)			●		
16IR 28W	5026028	28	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●			
16IR 26W	5026020	26	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IR 24W	5026024	24	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IL 24W	5066624	24	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●			
16IR 22W	5026022	22	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16IR 20W	5026020	20	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IRB 20W*	502B6020	20	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16IL 20W	5066620	20	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IR 19W	5026019	19	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IRB 19W*	502B6019	19	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16IR 18W	5026018	18	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IL 18W	5066018	18	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16IR 16W	5026016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)		●	●		
16IRB 16W*	502B6016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)			●		
16IRM 16W#	502M6016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)			●		
16IR 14W	5026014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)	●	●	●		
16IR 14W 2M	5028014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16IRB 14W*	502B6014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16IRM 14W#	502M6014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16IL 14W	5066014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16IR 12W	5026012	12	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●	●		
16IL 12W	5066012	12	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)			●		
16IR 11W	5026011	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●	●		
16IRB 11W*	502B6011	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)			●		
16IRM 11W#	502M6011	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)			●		
16IL 11W	5026011	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●	●		
16IR 10W	5026010	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●	●		
16IRB 10W*	502B6010	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)			●		
16IL 10W	5066010	11	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●			
16IR 9W	5026009	9	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●			
16IR 8W	5026008	8	3/8	.63 (16.00)	.06 (1.5)	.04 (1.0)		●	●		
22IR 14W 3M	5126716	14	1/2	.87 (22.00)	.18 (4.5)	.11 (2.8)			●		
22IR 11W 2M	5126712	11	1/2	.87 (22.00)	.13 (3.4)	.09 (2.3)			●		
22IR 7W	5126007	7	1/2	.87 (22.00)	.09 (2.3)	.06 (1.6)	●		●		
22IR 6W	5126006	6	1/2	.87 (22.00)	.09 (2.3)	.06 (1.6)	●	●			
22IR 5W	5126005	5	1/2	.87 (22.00)	.094 (2.4)	.066 (1.7)		●			
22IL 5W	5167005	5	1/2	.87 (22.00)	.094 (2.4)	.066 (1.7)		●			
22IR 4W	5126004	4	1/2	.87 (22.00)	.094 (2.4)	.066 (1.7)		●			
27IR 4.5W	5220900	4.5	5/8	1.06 (27.00)	.11 (2.9)	.08 (2.0)		●			
27IR 4W	5242045	4	5/8	1.06 (27.00)	.11 (2.9)	.08 (2.0)			●		

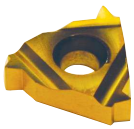
* With chipformer # Pressed to size

LAYDOWN

WHITWORTH



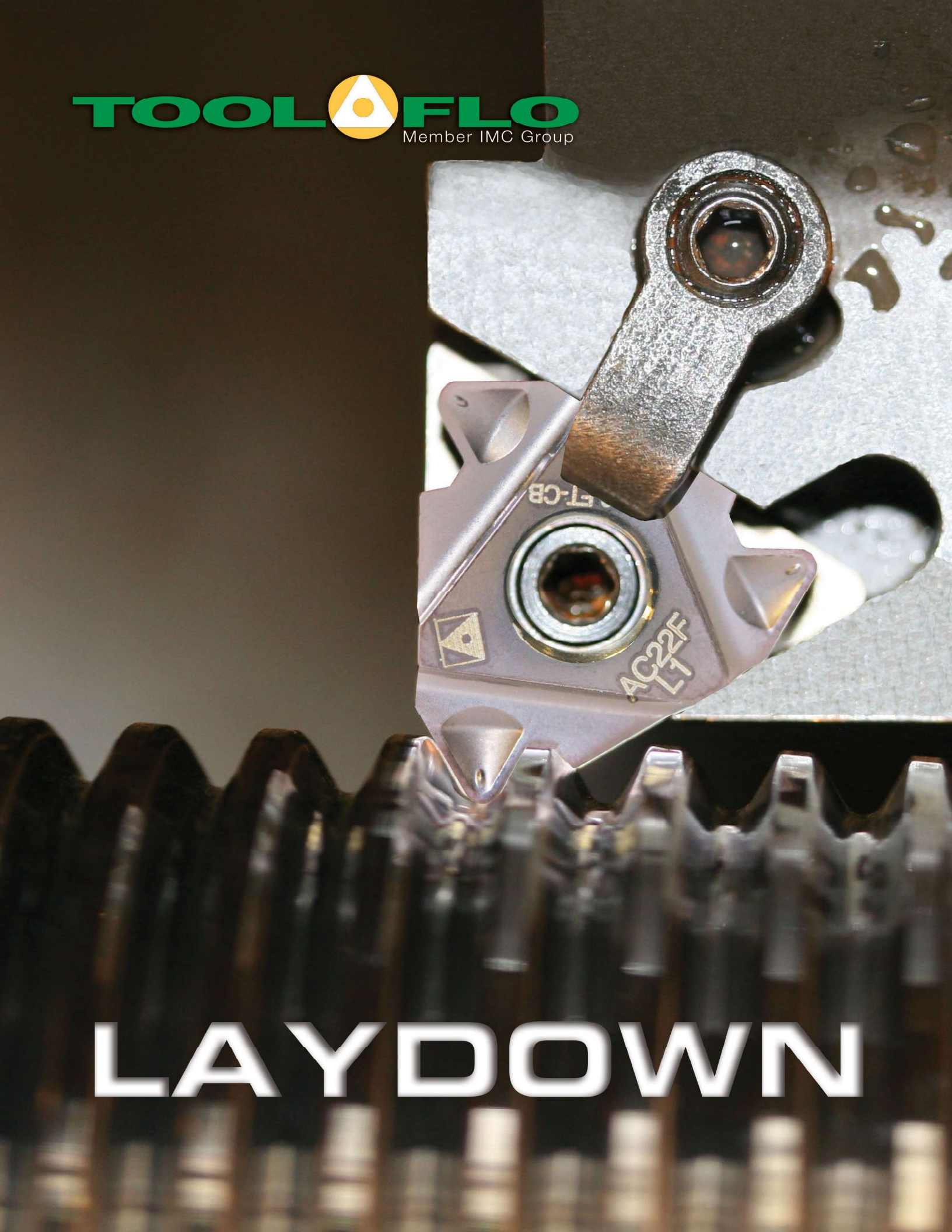
INT RH SHOWN



Description	EDP Code	TPI	IC	L	M	K	TiN Coated		AlTiN Coated		
							GP22	GP50	AC22	AC3	AC50
16ER 40W	5006040	40	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16ER 28W	5006028	26	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16EL 28W	5046028	28	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●			
16ER 26W	5006026	26	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16ER 24W	5006024	24	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16ER 22W	5006022	22	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16ER 20W	5006020	20	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16ER 19W	5006019	19	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16ERB 19W*	500B6019	19	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16ERM 19W#	500M6019	19	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16EL 19W	5046019	19	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)		●	●		
16ER 18W	5006018	18	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)	●	●	●		
16EL 18W	5046018	18	3/8	.63 (16.00)	.04 (1.0)	.03 (0.8)			●		
16ER 16W	5026016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)		●	●		
16ERB 16W*	500B6016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)			●		
16ERM 16W#	500M6016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)			●		
16EL 16W	5046016	16	3/8	.63 (16.00)	.04 (1.0)	.04 (1.0)			●		
16ER 14W	5006014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)	●	●	●		
16ER 14W 2M	5006014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16ERB 14W*	502B6014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16ERM 14W#	502M6014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)			●		
16EL 14W	5066014	14	3/8	.63 (16.00)	.05 (1.3)	.04 (1.0)		●	●		
16ER 12W	5006012	12	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)		●	●		
16EL 12W	5046012	12	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)			●		
16ER 11W	5006011	11	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)	●	●	●		
16ERB 11W*	500B6011	11	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)			●		
16ERM 11W#	500M6011	11	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)			●		
16EL 11W	5006011	11	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)		●	●		
16ER 10W	5006010	11	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)		●	●		
16ERB 10W*	500B6010	11	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)			●		
16ER 9W	5006009	9	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)		●			
16ER 8W	5006008	8	3/8	.63 (16.00)	.06 (1.6)	.04 (1.0)		●	●		
22ER 14W 3M	5106714	14	1/2	.87 (22.00)	.18 (4.5)	.11 (2.8)			●		
22ER 11W 2M	5106711	11	1/2	.87 (22.00)	13 (3.4)	.09 (2.3)			●		
22ER 7W	5106007	7	1/2	.87 (22.00)	.09 (2.3)	.06 (1.6)			●		
22ER 6W	5106006	6	1/2	.87 (22.00)	.09 (2.3)	.06 (1.6)	●	●	●		
22ER 5W	5106005	5	1/2	.87 (22.00)	.094 (2.4)	.066 (1.7)		●			
27ER 4W	5204204	4	5/8	1.06 (27.00)	.11 (2.9)	.08 (2.0)			●		

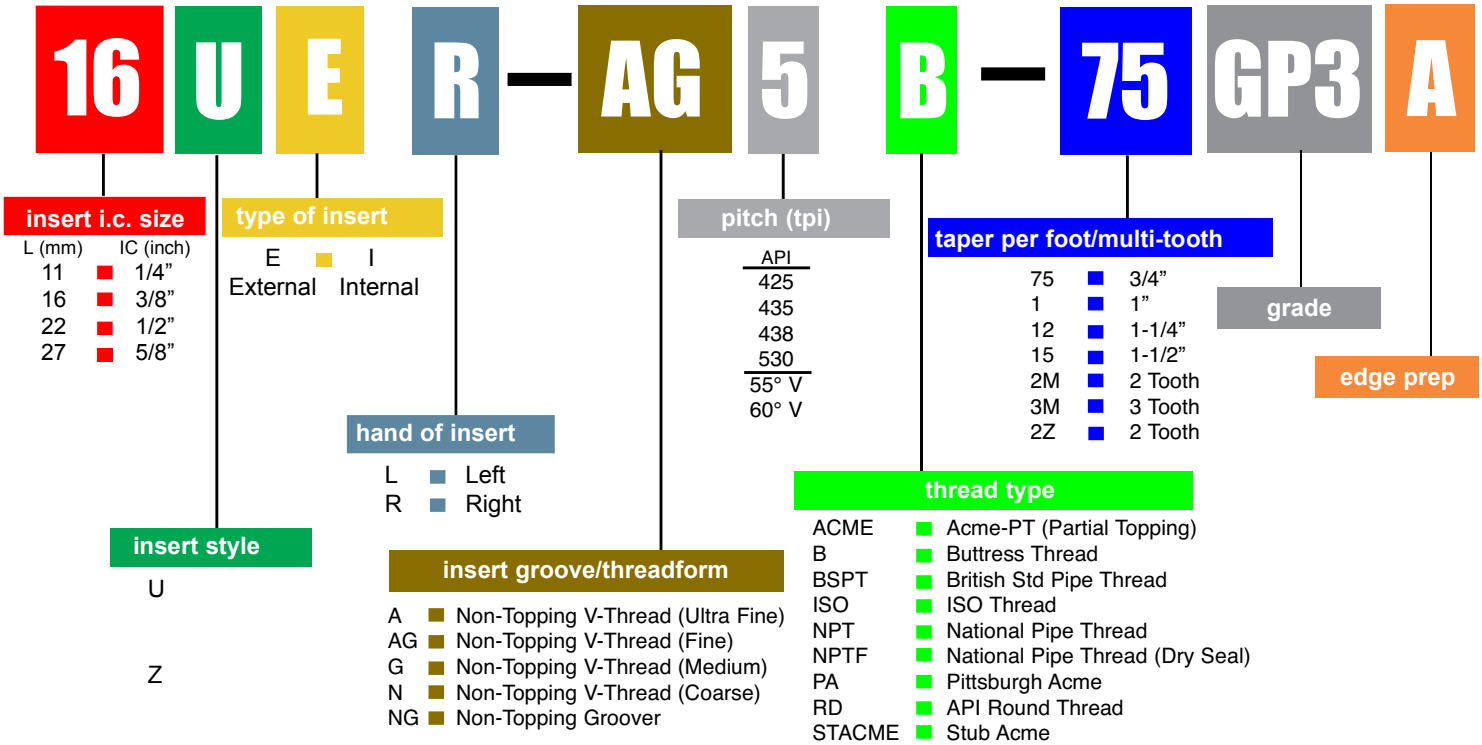
* With chipformer # Pressed to size

TOOLFLO
Member IMC Group

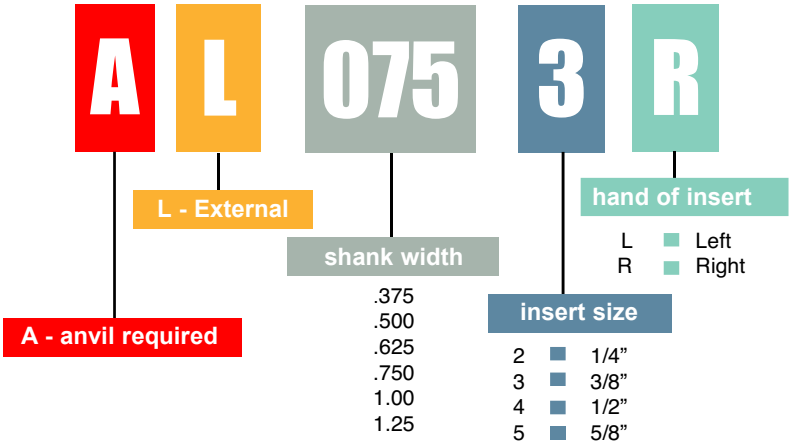


LAYDOWN

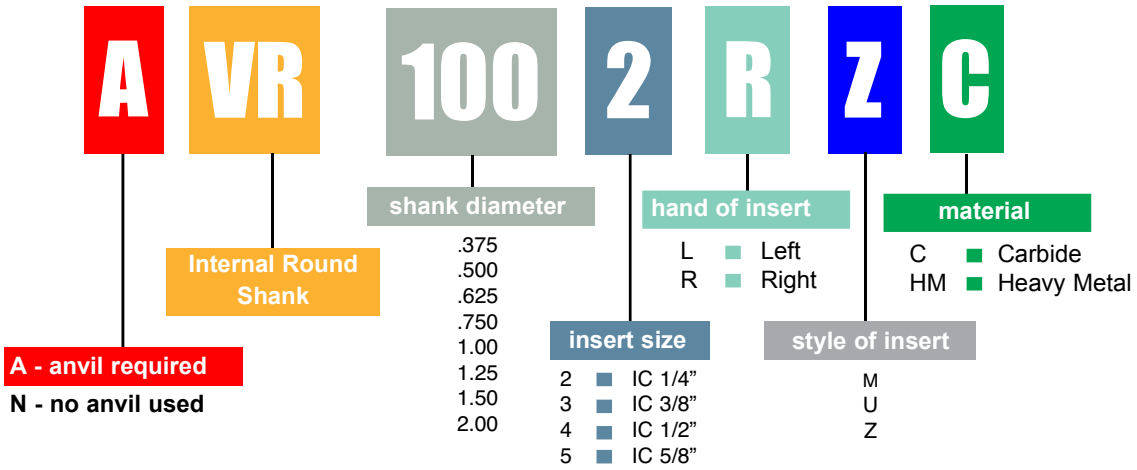
LT Style Laydown Insert Nomenclature Chart



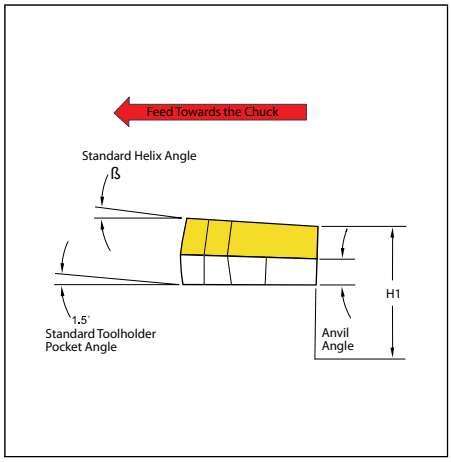
External Toolholder Nomenclature Chart



Internal Bar Nomenclature Chart

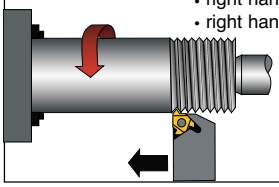


Feed direction towards the chuck

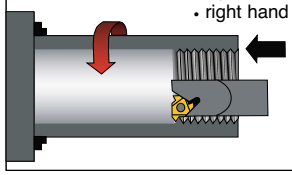


RH Tooling

External RH Thread
- counterclockwise rotation
- right hand toolholder
- right hand insert

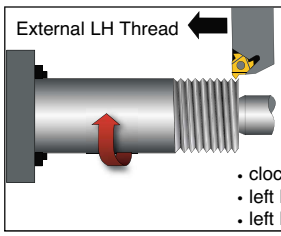


Internal RH Thread
- counterclockwise rotation
- right hand bar
- right hand insert

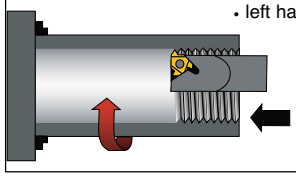


LH Tooling

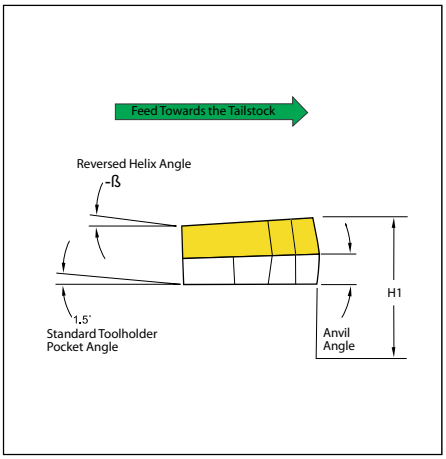
External LH Thread
- clockwise rotation
- left hand toolholder
- left hand insert



Internal LH Thread
- clockwise rotation
- left hand bar
- left hand insert

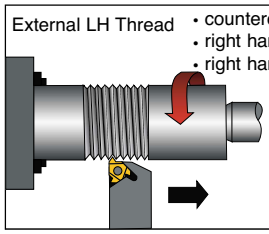


Feed direction towards the tailstock

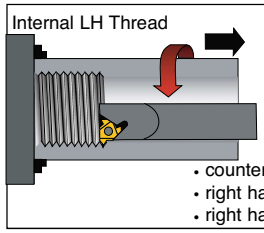


RH Tooling

External LH Thread
- counterclockwise rotation
- right hand toolholder
- right hand insert

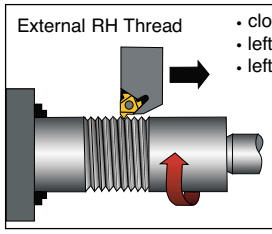


Internal LH Thread
- counterclockwise rotation
- right hand bar
- right hand insert

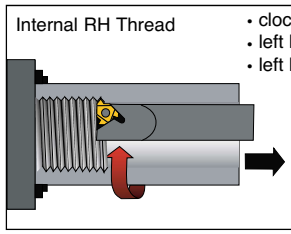


LH Tooling

External RH Thread
- clockwise rotation
- left hand toolholder
- left hand insert



Internal RH Thread
- clockwise rotation
- left hand bar
- left hand insert



SELECTION OF SHIMS

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

$$ß = \text{Arctan} \frac{P \times S}{\pi \ D_e}$$

ß = Thread lead angle

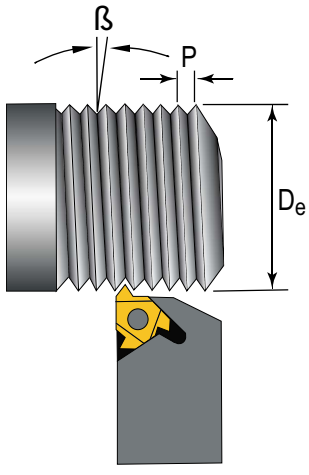
D_e = effective pitch diameter of thead where P = 1/tpi

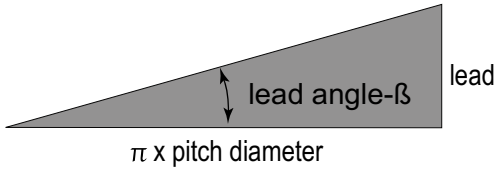
tpi = Threads per inch

S = number of starts (=1 for standard thread)

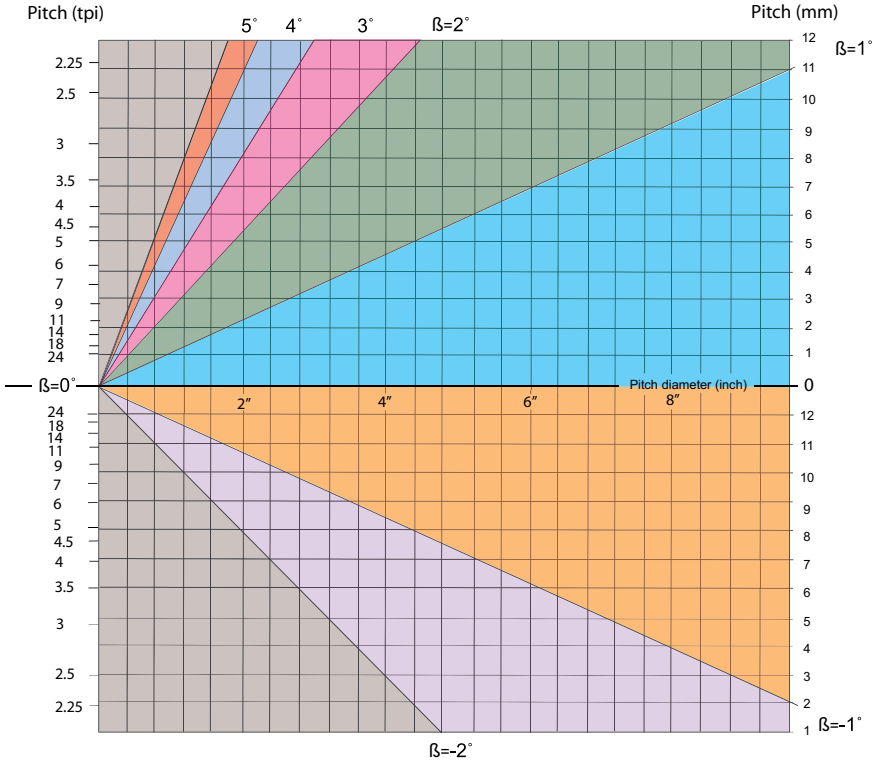
P = pitch

multiple-start, lead = P x S

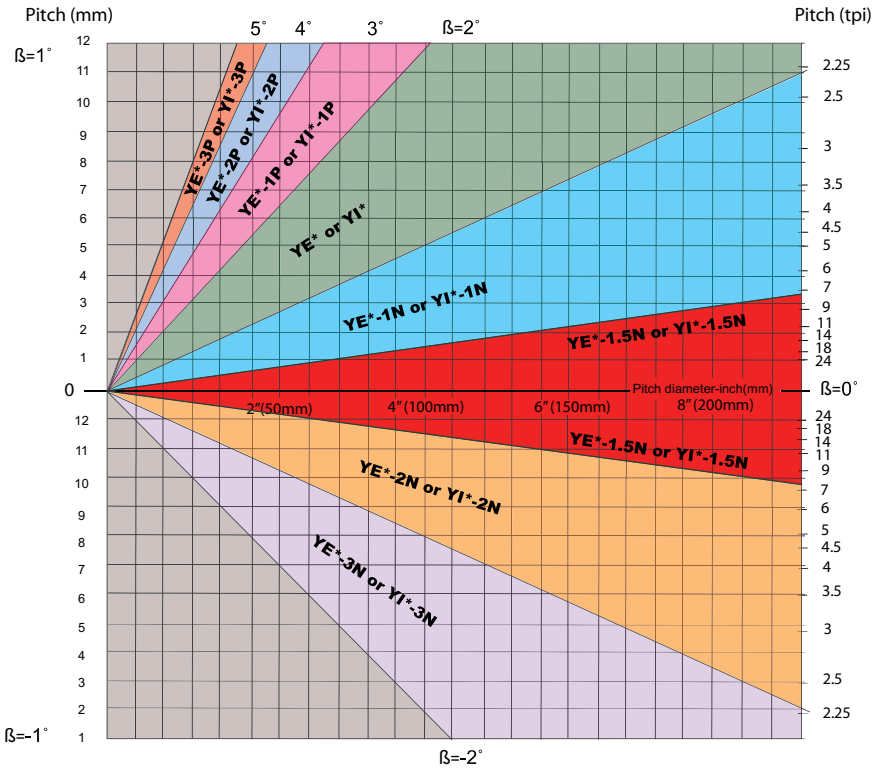




Helix Angle Diagram



Helix Angle Diagram



ANVILS

Resultant Helix Angle			4.5˚	3.5˚	2.5˚	1.5˚	0.5˚	0˚	-0.5˚	-1.5˚
IC	L	Holder	Anvil Description							
3/8”	.63 .63	ER/NL EL/NR	YE3-3P YI3-3P	YE3-2P YI3-2P	YE3-1P YI3-1P	YE3 YI3	YE3-1N YI3-1N	YE3-1.5N YI3-1.5N	YE3-2N YI3-2N	YE3-3N YI3-3N
1/2”	.87 .87	ER/NL EL/NR	YE4-3P YI4-3P	YE4-2P YI4-2P	YE4-1P YI4-1P	YE4 YI4	YE4-1N YI4-1N	YE4-1.5N YI4-1.5N	YE4-2N YI4-2N	YE4-3N YI4-3N
5/8”	1.06 1.06	ER/NL EL/NR	YE5-3P YI5-3P	YE5-2P YI5-2P	YE5-1P YI5-1P	YE5 YI5	YE5-1N YI5-1N	YE5-1.5N YI5-1.5N	YE5-2N YI5-2N	YE5-3N YI5-3N
3/8”M	.63 .63	ER/NL EL/NR				YE3M YI3M	YE3M-1N YI3M-1N	YE3M-1.5N YI3M-1.5N	YE3M-2N	
1/2”M	.87 .87	ER/NL EL/NR				YE4M YI4M	YE4M-1N YI4M-1N	YE4M-1.5N YI4M-1.5N	YE4M-2N	
5/8”M	1.06 1.06	ER/NL EL/NR				YE5M YI5M	YE5M-1N YI5M-1N	YE5M-1.5N YI5M-1.5N		
1/2”Z	.87	EL/NR			YI4Z-1P					
1/2”U	.87 .87	ER/NL EL/NR	YE4U-3P YI4U-3P	YE4U-2P YI4U-2P	YE4U-1P YI4U-1P	YE4U YI4U	YE4U-1N YI4U-1N	YE4U-1.5N YI4U-1.5N	YE4U-2N YI4U-2N	YE4U-1N YI4U-1N

ANVIL KITS

IC	L	TF #	Included Anvils
3/8”	.63	**KTY3**	YE3-2P, 1P, 1N, 2N, 3N
	.63		YI3-2P, 1P, 1N, 2N, 3N
1/2”	.87	**KTY4**	YE4-2P, 1P, 1N, 2N, 3N
	.87		YI4-2P, 1P, 1N, 2N, 3N
1/2”U	.87	**KTY4U**	YE4U-2P, 1P, 1N, 2N, 3N
	.87		YI4U-2P, 1P, 1N, 2N, 3N
5/8”	1.06	**KTYE5**	YE5-2P, 1P, 1N, 2N, 3N
	1.06	**KTYI5**	YI5-2P, 1P, 1N, 2N, 3N
5/8”U	1.06	**KTYE5U**	YE5U-2P, 1P, 1N, 2N, 3N
	1.06	**KTYI5U**	YI5U-2P, 1P, 1N, 2N, 3N

Standard Anvil		M Style Anvil		Z Style Anvil	
					
ER/NL	EL/NR	ER/NL	EL/NR	ER/NL	EL/NR

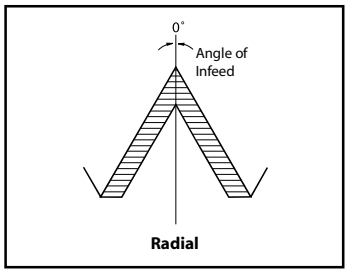
ANVIL FORMS

1/2”	YE4-11.5NPT-2M YI4-11.5NPT-2M
5/8”	YE5-8NPT-2M, YE5-8RD-2M YI5-8NPT-2M, YI5-8RD-2M

Helix Angle Table (For Given Pitch and Diameter)

resultant helical angle	4.5˚	3.5˚	2.5˚	1.5˚	0.5˚	0˚	-0.5˚	-1.5˚
threads per inch	D I A M E T E R							
48			0.12 - 0.18	0.18 - 0.48	0.48 - 1.28	> 1.28	1.28 - 0.48	0.48 - 0.18
44		0.13 - 0.20	0.20 - 0.52	0.52 - 1.40	> 1.40	1.40 - 0.52	0.52 - 0.20	
40		0.11 - 0.14	0.14 - 0.22	0.22 - 0.57	0.57 - 1.52	> 1.52	1.52 - 0.57	0.57 - 0.22
36		0.12 - 0.16	0.16 - 0.24	0.24 - 0.64	0.64 - 1.70	> 1.70	1.70 - 0.64	0.64 - 0.24
32	0.12 - 0.13	0.13 - 0.18	0.18 - 0.27	0.27 - 0.71	0.71 - 1.90	> 1.90	1.90 - 0.71	0.71 - 0.27
28	0.12 - 0.15	0.15 - 0.20	0.20 - 0.31	0.31 - 0.82	0.82 - 2.19	> 2.19	2.19 - 0.82	0.82 - 0.31
27	0.14 - 0.16	0.16 - 0.21	0.21 - 0.32	0.32 - 0.84	0.84 - 2.25	> 2.25	2.25 - 084	0.84 - 0.32
24	0.16 - 0.18	0.18 - 0.24	0.24 - 0.36	0.36 - 0.96	0.96 - 2.55	> 2.55	2.55 - 0.86	0.96 - 0.36
20	0.19 - 0.22	0.22 - 0.28	0.28 - 0.43	0.43 - 1.14	1.14 - 3.04	> 3.04	3.04 - 1.14	1.14 - 0.43
18	0.21 - 0.24	0.24 - 0.32	0.32 - 0.49	0.49 - 1.28	1.28 - 3.40	> 3.40	3.40 - 1.28	1.28 - 0.49
16	0.23 - 0.27	0.27 - 0.35	0.35 - 0.54	0.54 - 1.41	1.41 - 3.77	> 3.77	3.77 - 1.41	1.41 - 0.54
14	0.27 - 0.31	0.31 - 0.40	0.40 - 0.62	0.62 - 1.62	1.62 - 4.32	> 4.32	4.32 - 1.62	1.62 - 0.62
13	0.29 - 0.33	0.33 - 0.44	0.44 - 0.67	0.67 - 1.76	1.76 - 4.68	> 4.68	4.68 - 1.76	1.76 - 0.67
12	0.32 - 0.36	0.36 - 0.48	0.48 - 0.73	0.73 - 1.92	1.92 - 5.11	> 5.11	5.11 - 1.92	1.92 - 0.73
11.5	0.33 - 0.38	0.38 - 0.49	0.49 - 0.76	0.76 - 1.98	1.98 - 5.29	> 5.29	5.29 - 1.98	1.98 - 0.76
11	0.35 - 0.39	0.39 - 0.52	0.52 - 0.79	0.79 - 2.07	2.07 - 5.53	> 5.53	5.53 - 2.07	2.07 - 0.79
10	0.38 - 0.43	0.43 - 0.57	0.57 - 0.87	0.87 - 2.28	2.28 - 6.08	> 6.06	6.08 - 2.28	2.28 - 0.87
9	0.42 - 0.48	0.48 - 0.63	0.63 - 0.96	0.96 - 2.53	2.53 - 6.75	> 6.75	6.75 - 2.53	2.53 - 0.96
8	0.47 - 0.54	0.54 - 0.71	0.71 - 1.09	1.09 - 2.85	2.85 - 7.60	> 7.60	7.60 - 2.85	2.85 - 1.09
7	0.54 - 0.62	0.62 - 0.81	0.81 - 1.24	1.24 - 3.26	3.26 - 8.69	> 8.69	8.69 - 3.26	3.26 - 1.24
6	0.63 - 0.72	0.72 - 0.95	0.95 - 1.45	1.45 - 3.81	3.81 - 10.15	> 10.15	10.15 - 3.81	3.81 - 1.45
5	0.76 - 0.87	0.87 - 1.14	1.14 - 1.74	1.74 - 4.56	4.56 - 12.16	> 12.16	12.16 - 4.56	4.56 - 1.74
4.5	0.84 - 0.96	0.96 - 1.26	1.26 - 1.93	1.93 - 5.06	5.06 - 13.49	> 13.49	13.49 - 5.06	5.06 - 1.93
4	0.95 - 1.08	1.08 - 1.42	1.42 - 2.17	2.17 - 5.70	5.70 - 15.20	> 15.20	15.20 - 5.70	5.70 - 2.17

Optional Infeed Angles for Threading Applications



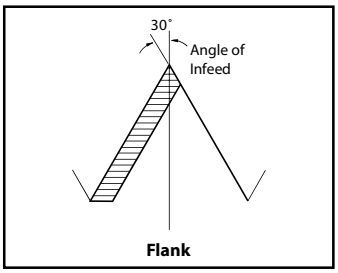
Advantage-
Cutting on both sides of the thread form places all of the cutting edge in the cut and protects edge from chipping.

Disadvantage-
Tool develops a channel chip which may be difficult to handle.

Tip chipping occurs when cutting high-tensile materials.

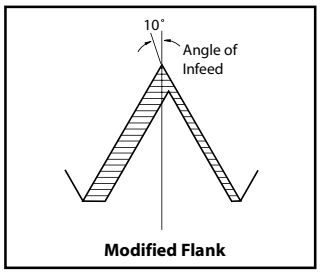
Burr condition is increased.

Entire cutting edge is engaged at finish of thread, causing increased tendency to chatter.



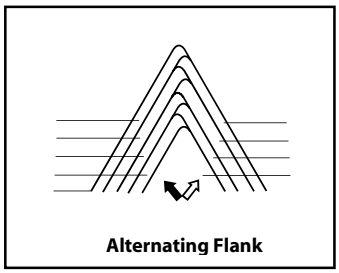
Advantage-
Cutting with the leading edge of the threading tool gives the chip a definate flow out of the thread form area. This reduces the burr problem on the trailing edge of the tool. To avoid bad surface finish, chipping, or excessive flank wear due to rubbing of the trailing edge, the infeed angle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

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



Advantage-
Tool cuts both sides of tread form and, therefore, is protected from chipping similar to 0˚ infeed. Channel-type chip develops but uneven chip thickness helps remove the chip similar to flank infeed.

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



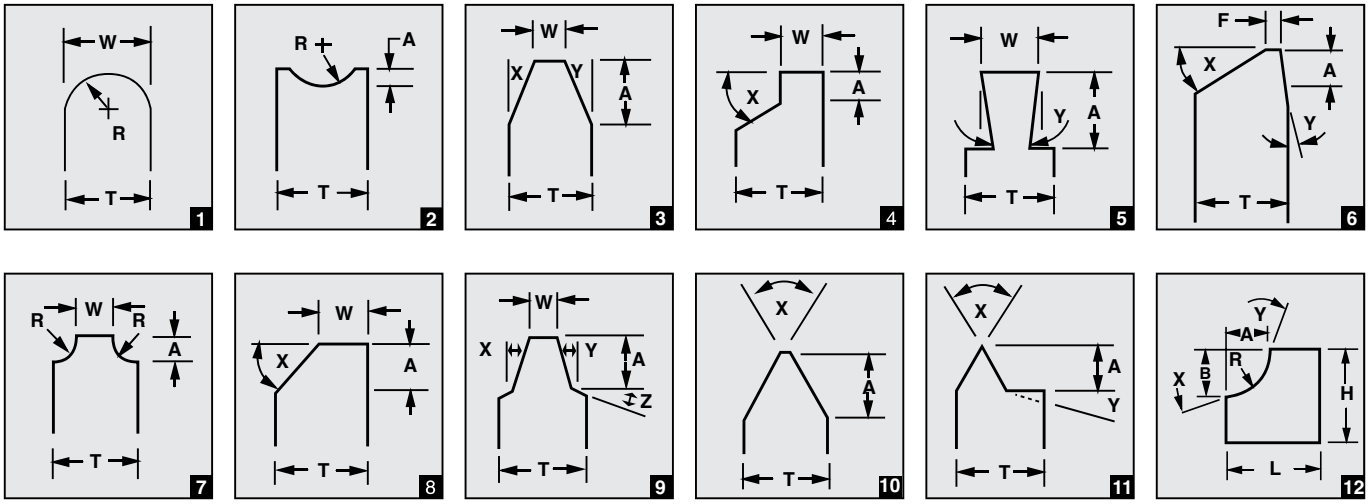
Advantage-
Increased tool life because both edges are used equally. NOTE: Some machine tools may require special programming techniques to achieve this method.

Disadvantage-
Difficult to cut on conventional machinery.

*For premium performance based upon optimal machining conditions, select the grade that will provide you with the highest allowable SFM for the material that is being machined. Optimum grades are in bold print. Grades are specific to certain insert styles. The grades listed below in bold print are stock within the style listed, see appropriate catalog page for precise stocking status.

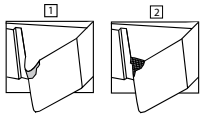
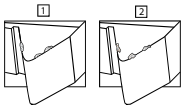
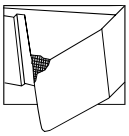
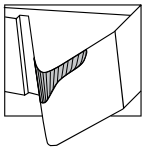
Bantam:	**C22**	Flo-Lock:	**C25**	Laydown:	**GP22**	Threadmill:	**C3**
	GP22		**GP4**		**GP3**		**GP3**
	GP4		**GP3**		**GP5**		GP22
	AC22		**GP4**		**GP50**		
			GP5		**AC22**	Turning:	**G525**
Ballnose:	**C26**		**GP50**		**AC50**	(Negative)	**AG525**
	ZS26		**AC22**		C22		**AG535**
	CB400		**AC3**				**AG615**
	DX200		**AC50**	Milling:	**GP5**		
			GPM6		C5H	Turning:	**AC3**
Chasers:	**G50**		**CB200**			(Positive)	**AC50**
	GP50		**CB400**	On Edge:	**GP22**		C3
	AC50		**PC33**		**GP3**		
	ZA50		C22		**GP54**	V-Bottom:	**GP3**
			C3		**GP50**	(V84/V85)	**GP50**
Cutoff:	**GP22**				**GPM6**		**AC50**
	AC22	Laydown:	**GP22**		**AC22**		C3
	AC50	(LT style)	**GP4**		**AC3**		
	C22		**GP50**		**AC50**	V-Bottom:	**C3**
			AC22		AC54	(VDB/VDG)	**GP3**
			AC50		C22		**AC3**
			C22		C25		**AC50**
					C3		**CB200/CB400**

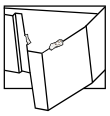
We welcome specials! Please call us with your specs.



Trouble Shooting & Optimizing Tool Life/ Threading Economy

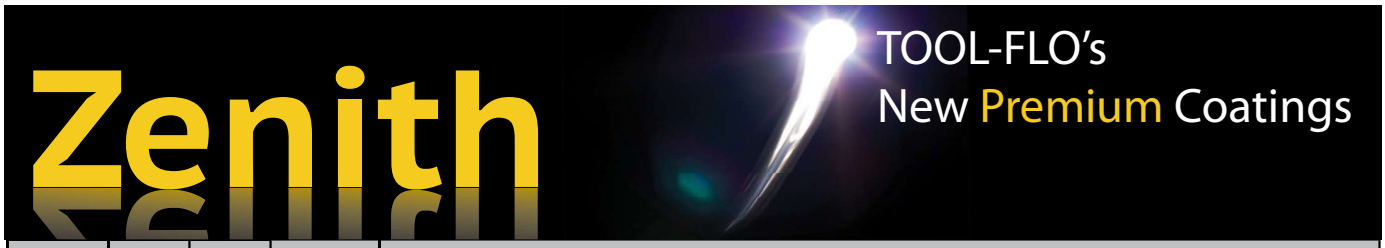
Modern PVD grades and insert geometries have done much to improve the productivity and reliability of thread turning. They have also helped to eliminate or minimize problems in threading. The following chart lists problems, in order of severity, which may still occur in modern threading.

Problem	Cause	Solution
Plastic Deformation  Starts as plastic deformation (1) which leads to plastic break (2)	Excessive temperature in the cutting area Unsuitable grade Inadequate coolant supply	Reduce cutting speed Increase number of infeeds Reduce the largest infeed depth Check diameter before threading Improve coolant supply Choose grade with better resistance to plastic deformation
Built-up Edge/ Edge Spalling  Built-up edge (1) and edge spalling (2) often occur in combination. Built-up edge accumulates and is then ripped away taking insert material with it	Cutting edge temperature too low Stainless material; CMC codes 05.2, 05.51, and 05.52 Low carbon steel Unsuitable grade	Increase cutting speed Choose an insert with good toughness, preferably PVD coated
Insert Breakage 	Wrong Diameter prior to threading operation Infeed series too tough Unsuitable grade Poor chip control Center height incorrect	Turn to correct diameter beforethreading--0.0012-0.0028 radially larger than maximum diameter for thread Increase number of infeeds Reduce size of the large infeeds Choose a tougher grade Change to “CB” geometry and use modified flank infeed Correct center height
Rapid Flank Wear 	Highly abrasive material Cutting speed too high Infeed depths too shallow Insert is above centerline	Choose a more wear resistant grade Reduce cutting speed Reduce number of infeeds Correct center height
Abnormal Flank Wear Poor Finish on One Flank of Thread	Incorrect method for flank infeed Insert’s inclination angle does not agree with thread’s lead angle	Change method of infeed Change shim to obtain correct angle of inclination
Vibration	Incorrect clamping work piece Incorrect set-up of the tool Incorrect cutting data Incorrect center height	Use softer jaws Minimize overhang of tool Check that the clamping sleeve for bars is not worn Increase cutting speed; if this does not help lower speed dramatically Use constant infeed series Try “CB” or “HCB” geometry Adjust the center height Use heavy metal, solid carbide or carbide cored bar.
Poor Surface Quality on Thread	Cutting speed too low The insert is above center Uncontrolled chips	Increase cutting speed Adjust center height Use “CB” or “HCB” geometry and modified flank infeed

Problem	Cause	Solution
Poor Chip Control	Incorrect method of infeed Wrong geometry	Modified Flank infeed 3Þ-5Þ “CB” or “HCB” geometry with modified flank infeed 1Þ
Shallow Profile	Wrong center height Insert breakage Excessive wear	Adjust the center height Change cutting edge
Incorrect Thread Profile	Unsuitable thread profile angle of thread and nose radius; external inserts used for internal operation and vice versa Wrong center height Holder not 90Þ to center line Pitch error in machine	Correct tool / insert combination Adjust the center height Adjust to 90Þ Correct in machine
Excessive Edge Pressure 	Work hardening material in combination with infeed depths which are too shallow Excessive pressure on cutting edge Profile with too small thread profile angle	Reduce the number of infeeds Change to “CB” or “HCB” geometry Use a tougher grade Use incremental flank infeed

ACME TABLE (Inch)

PITCH	REGULAR WIDTH	REGULAR DEPTH	STUB WIDTH	STUB 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



Grade Name	ANSI range	ISO range	Coating	Description
C2	C1-C2	K05-K15	Uncoated	Uncoated general purpose C2 grade. Good for all non-ferrous materials.
C22	C1	K30	Uncoated	Uncoated grade with a tough, micro-grain, unalloyed substrate. Good for threading at low to medium speeds, while capabale of handling interruptions. Works well in stainless steel, high-temperature alloys, and standard steels at low to medium SFM.
C25	C1-C2	K05-K10 M05-M10	Uncoated	Uncoated general purpose C2 grade. Good for all non-ferrous materials.
C26S	C1	K30-K40	Uncoated	Uncoated grade with a tough, fine grain, unalloyed substrate. Main uncoated grade for Rigid-lock endmill inserts. Edge is up-sharp for use in non-ferrous and composite applications.
C3	C3	K15-K25 M05-M20	Uncoated	Uncoated micro-grain C3 grade. Versatile grade that combines high hardness with toughness. Good for all non-ferrous, stainless steel, and nickel-based alloys at low to medium SFM.
GFI	C1-C5A	K30/P30	Uncoated	Uncoated extemely tough grade that perform well at very slow SFPM with minimal breakage or chipping.
C5	C5	P10-P35 M15-M30	Uncoated	Uncoated general purpose C5 grade. Good for all carbon/alloy steels at low to medium SFM.
C6	C6	P15-P20 M10-M20	Uncoated	Uncoated general purpose C5/C6 harder grade. Good for all carbon/alloy steels at low to medium SFM.
GP2	C1-C2	K05-K15	PVD TiN coated	PVD TiN coated grade. Works well in stainless steel, high-temperature alloys, and standard steels at low to medium SFM.
GP22	C1	K30	PVD TiN coated	PVD TiN grade with a tough, micro-grain substrate. Good for threading at low to medium speeds, while capabale of handling interruptions. Works well in stailess steel, high-temperature alloys, and standard steels at low to medium SFM.
GP25	C1-C2	K05-K10 M05-M10	PVD TiN coated	PVD TiN coated general purpose C2 grade. Good for all non-ferrous materials at low to medium SFM.
GP26	C1	K30-K40	PVD TiN coated	PVD TiN grade with a tough, micro-grain, unalloyed substrate. Rigid-Lok endmill grade. Good choice for steels, stainless, high-temperature alloys, and non-ferrous materials. Good in low to high SFM, will handle interruptions and high feed rates.
GP3	C3	K15-K25 M05-M20	PVD TiN coated	PVD TiN grade with a wear resistant micro-grain substrate. Excellent choice in stainless steels, high-temperature alloys, aero-space materials, and non-ferrous materials. Good in standard steels at low to medium SFM.
GP4	C1-C5A	K30/P30	PVD TiN coated	PVD TiN grade with our toughest substrate. **First choice** at low SFM (50-150) applications and heavy interruptions. Used in all applications where tool breakage is an issue.
GP44	C5A	P35-P50	PVD TiN coated	PVD TiN coated extemely tough sub-micron grade that perform well at very slow SFPM with minimal breakage or chipping.
GP5	C5	P10-P35 M15-M30	PVD TiN coated	PVD TiN grade with a medium tough substrate. Good general purpose grade for steel applications. Primary grade in LPGC and TPGC style inserts.
GP50	C5	P10-P35 M15-M30	PVD TiN coated	PVD TiN grade with a medium tough substrate and excellent wear properties. Great general purpose grade for steel applica-tions.
GP54	C5A	P35-P50	PVD TiN coated	PVD TiN grade with a tough substrate.
GP6	C6	P15-P20 M10-M20	PVD TiN coated	PVD TiN coated general purpose grade. Good for all carbon/alloy steels at medium SFM.
AC2	C1-C2	K05-K15	PVD AlTiN coated	PVD AlTiN coated grade with a tough, micro-grain, unalloyed substrate. Good for threading at low to medium speeds, while capabale of handling interrup-tions. Works well in stainless steel, high-temperature alloys, and standard steels at low to medium SFM.
AC22	C1	K30	PVD AlTiN coated	PVD TiAlN grade with a tough, micro-grain substrate. **First choice** in **Laydown Threading** in all materials. Dry machining capable.
AC25	C1-C2	K05-K10 M05-M10	PVD AlTiN coated	PVD AlTiN coated general purpose C2 grade. Good for all non-ferrous materials at medium to high SFM.
AC26	C1	K30-K40	PVD AlTiN coated	PVD TiAlN grade with a tough, fine grain, unalloyed substrate with excellent wear properties. **First choice** in **Rigid-Lock** inserts for steels, stainless, high-temp alloys, and non-ferrous materials. Performs very well at low to high SFM and will handle interruptions and high feed rates. Coating provides highest resistance to oxidation, physical abrasion, and chip welding. Dry machining capable.
AC3	C3	K15-K25 M05-M20	PVD AlTiN coated	PVD TiAlN grade. **First choice** for grooving and threading in stainless steel, high-temperature alloys, aerospace materials, and non-ferrous materials. Excellent in standard steels at medium SFM. Dry machining capable.
AC5	C5	P10-P35 M15-M30	PVD AlTiN coated	PVD AlTiN coated general purpose grade. Good for all carbon/alloy steels at medium to high SFM.
AC50	C5	P10-P35 M15-M30	PVD AlTiN coated	PVD TiAlN grade. **First choice** for grooving and threading in all standard steels and 400 series stainless. Application range is medium to high SFM. Dry machining capable.
AC54	C5A	P35-P50	PVD AlTiN coated	PVD AlTiN coated grade. Good for all carbon/alloy steels at medium SFM.
AC6	C6	P15-P20 M10-M20	PVD AlTiN coated	PVD AlTiN coated grade. Good for all carbon/alloy steels at medium SFM.