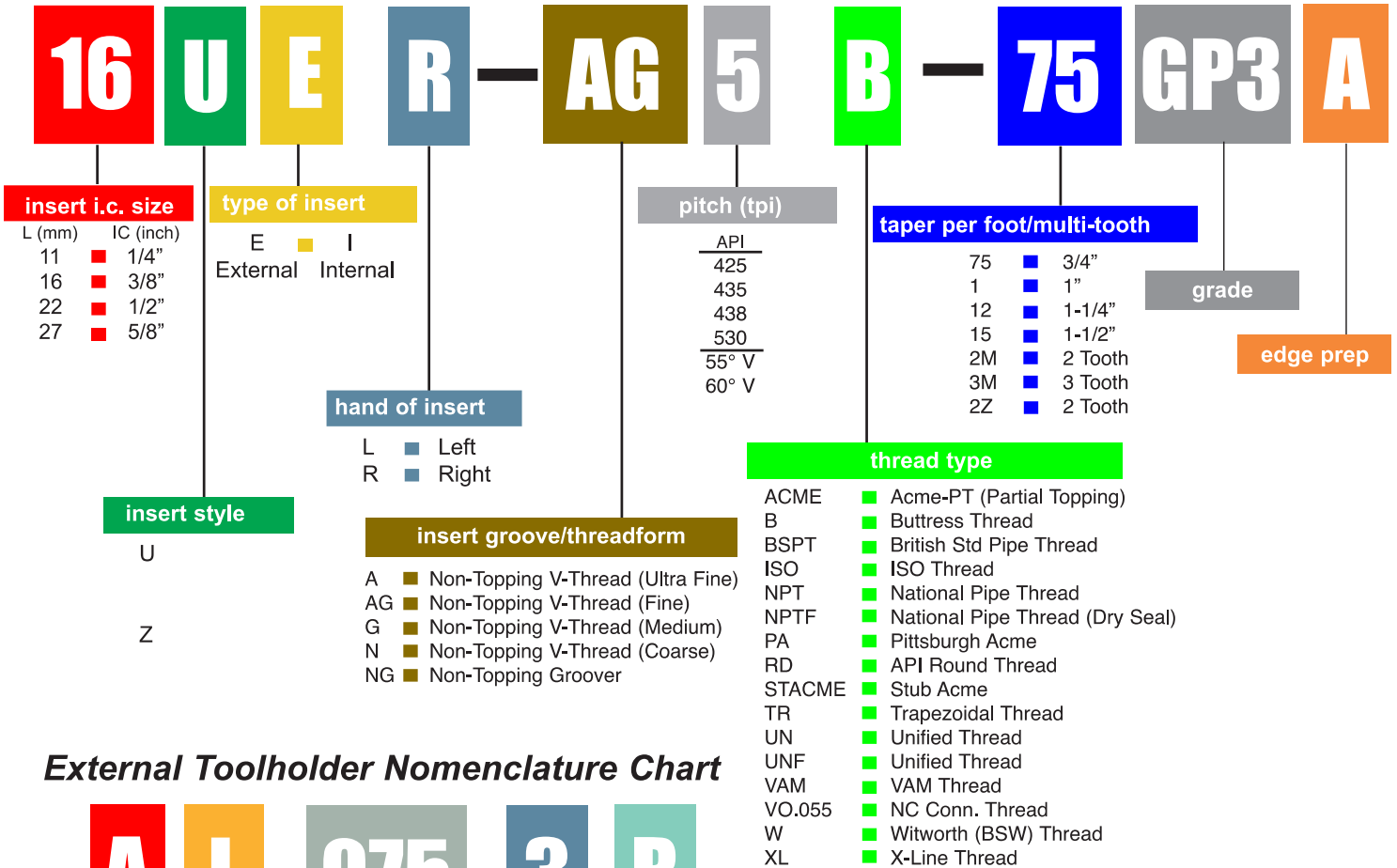


LAYDOWN

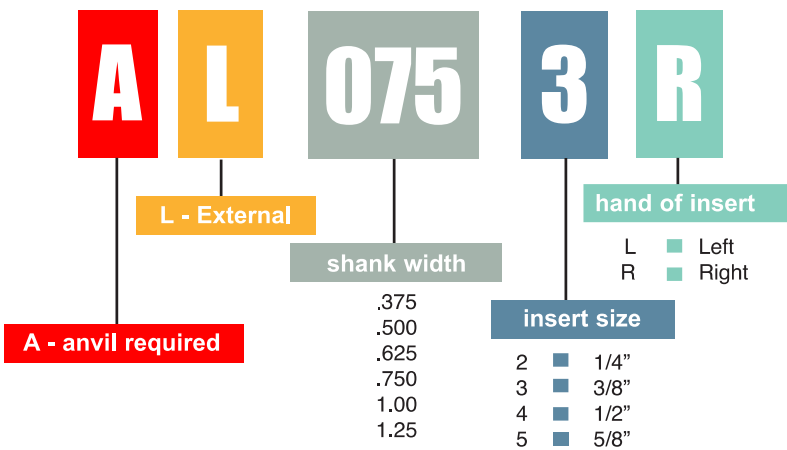
LAYDOWN



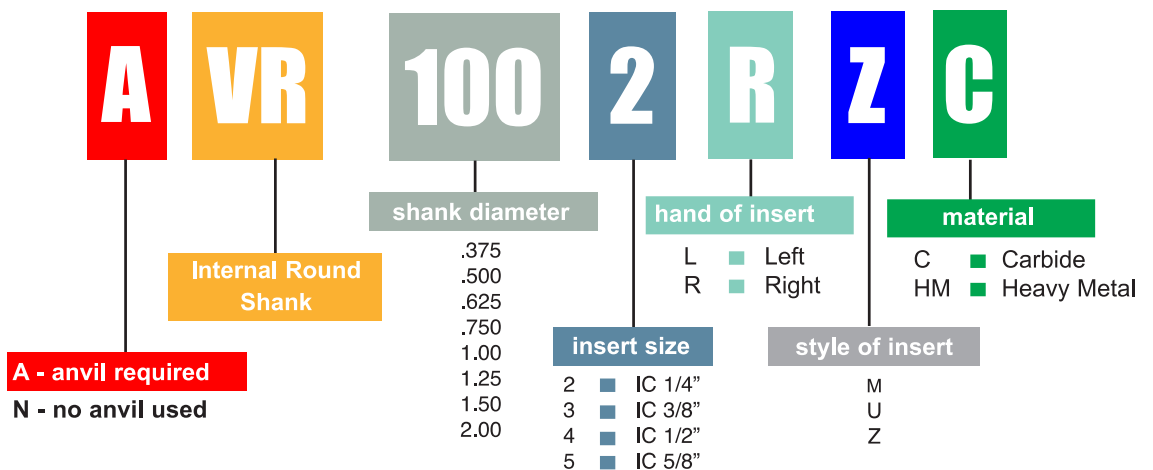
LT Style Laydown Insert Nomenclature Chart



External Toolholder Nomenclature Chart

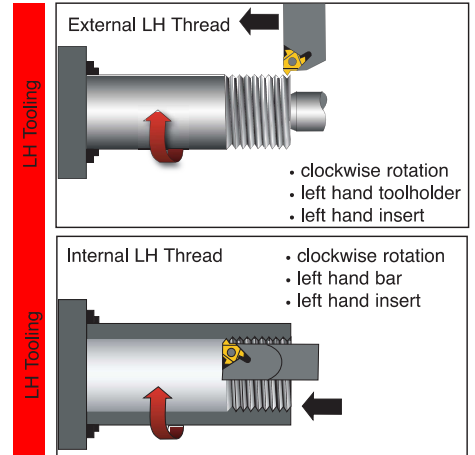
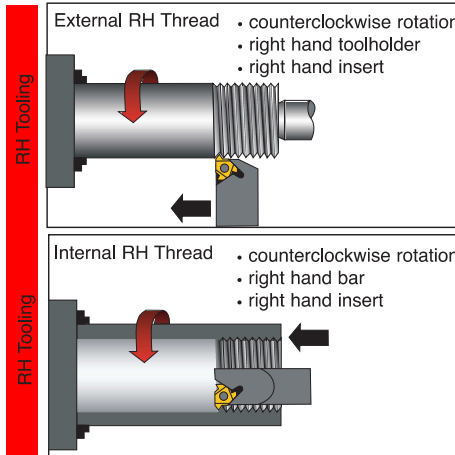
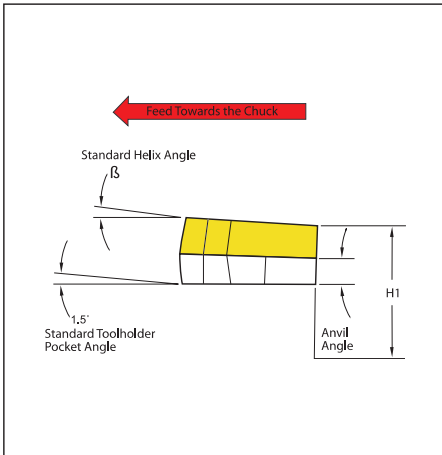


Internal Bar Nomenclature Chart

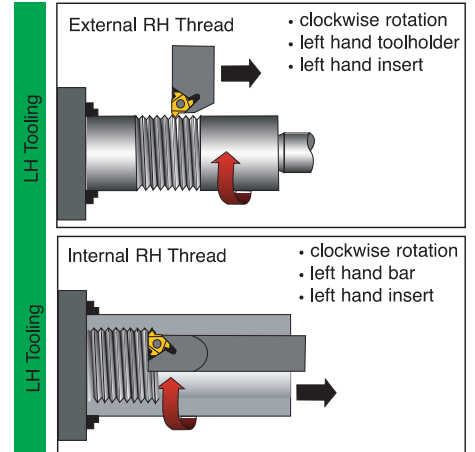
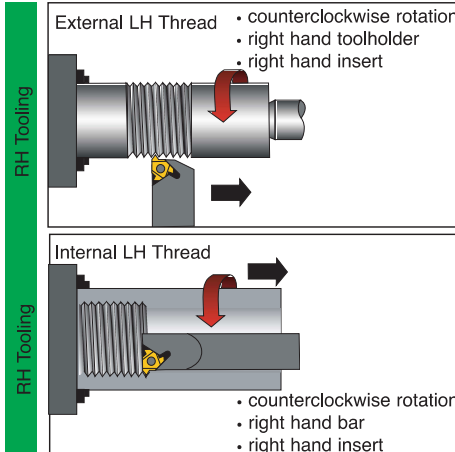
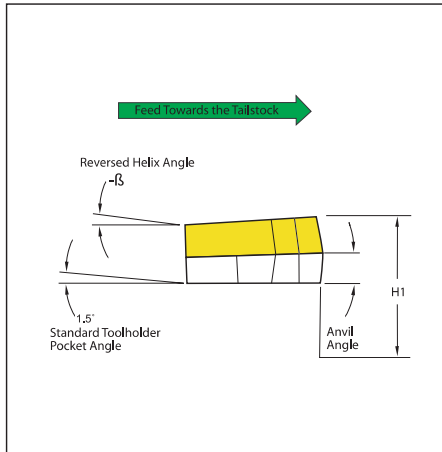




Feed direction towards the chuck



Feed direction towards the tailstock



SELECTION OF SHIMS

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

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

β = Thread lead angle

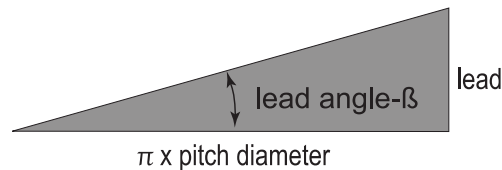
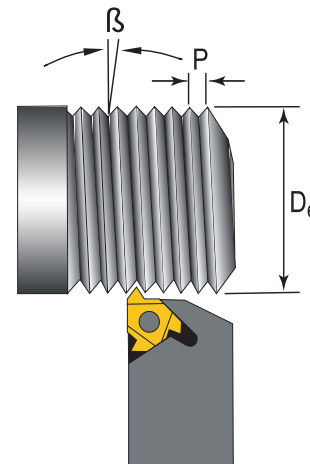
D_e = effective pitch diameter of thread
where $P = 1/\text{tpi}$

tpi = Threads per inch

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

P = pitch

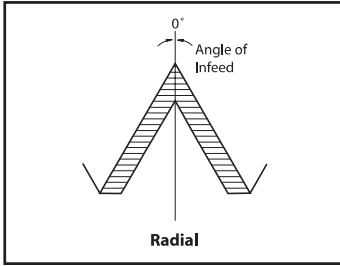
multiple-start, lead = $P \times S$





TECHNICAL

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.

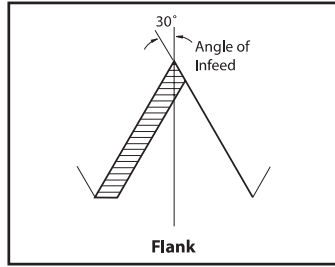
Disadvantage-

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.

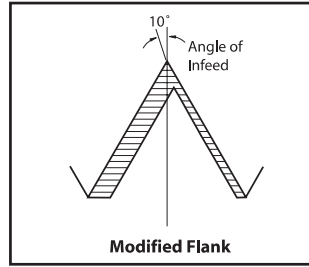


Advantage-

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

Disadvantage-

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

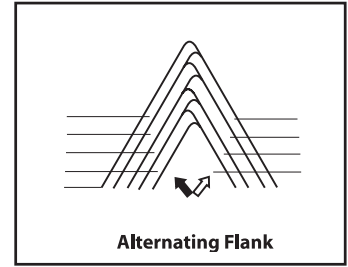


Advantage-

Tool cuts both sides of thread 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 0° 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.

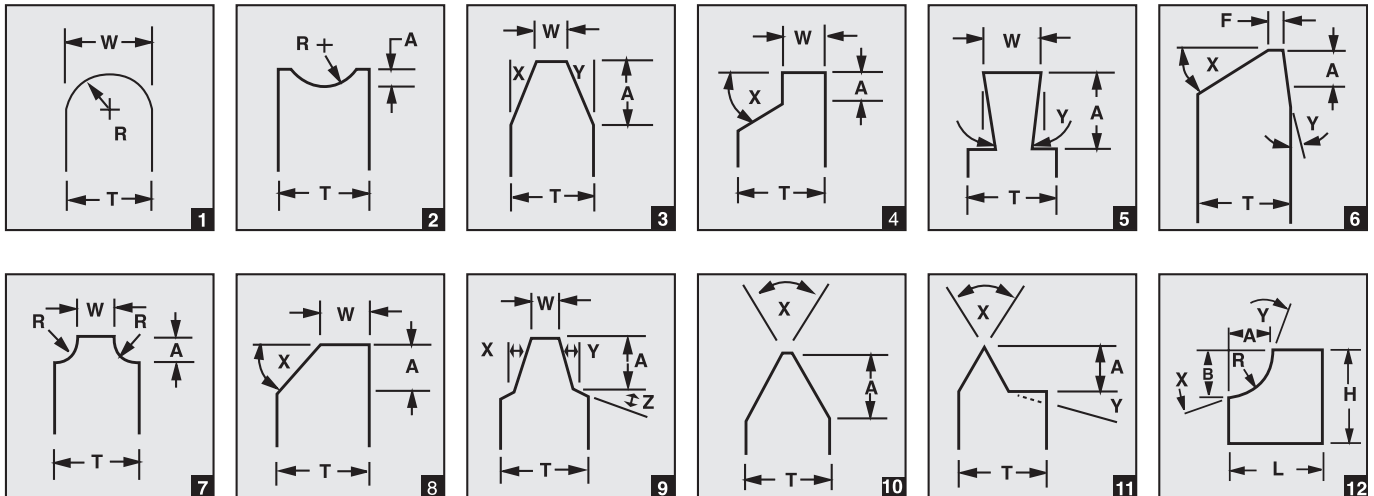
Disadvantage-

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

We welcome specials! Please call us with your specs.





Infeed Values for Threading Operations

External ISO Threads --- Recommendations for Steel Workpieces (<300BHN)

PITCH (mm)	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.75	0.5
# OF PASSES	Reduce cutting speed →														
1	0.016	0.017	0.016	0.015	0.013	0.013	0.011	0.011	0.010	0.009	0.009	0.007	0.007	0.007	0.004
2	0.017	0.016	0.015	0.013	0.013	0.012	0.010	0.010	0.009	0.008	0.008	0.007	0.007	0.006	0.004
3	0.014	0.013	0.013	0.011	0.010	0.010	0.008	0.008	0.007	0.006	0.007	0.006	0.005	0.004	0.003
4	0.012	0.011	0.011	0.009	0.009	0.008	0.007	0.007	0.006	0.006	0.006	0.005	0.004	0.003	0.003
5	0.011	0.009	0.009	0.009	0.007	0.007	0.006	0.006	0.006	0.005	0.005	0.004	0.003	0.020	0.014
6	0.009	0.009	0.009	0.008	0.007	0.007	0.006	0.005	0.005	0.004	0.003	0.003	0.026		
7	0.009	0.008	0.008	0.007	0.006	0.006	0.005	0.005	0.004	0.004	0.038	0.032			
8	0.008	0.007	0.007	0.007	0.006	0.006	0.005	0.004	0.003	0.003					
9	0.008	0.007	0.007	0.006	0.006	0.006	0.005	0.004	0.050	0.045					
10	0.007	0.007	0.007	0.006	0.005	0.005	0.004	0.003							
11	0.007	0.006	0.006	0.006	0.005	0.004	0.004	0.063							
12	0.006	0.006	0.006	0.005	0.005	0.003	0.003								
13	0.006	0.005	0.005	0.005	0.004	0.087	0.074								
14	0.006	0.005	0.004	0.004	0.003										
15	0.005	0.005	0.123	0.111	0.099										
16	0.004	0.004													
	0.147	0.135													

Infeed Values for Threading Operations

Internal ISO Threads --- Recommendations for Steel Workpieces (<300BHN)

PITCH (mm)	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0	1.75	1.5	1.25	1.0	0.75	0.5
# OF PASSES	Reduce cutting speed →														
1	0.018	0.015	0.015	0.014	0.013	0.012	0.011	0.011	0.010	0.009	0.008	0.008	0.007	0.007	0.004
2	0.016	0.014	0.014	0.013	0.012	0.011	0.009	0.009	0.009	0.008	0.008	0.007	0.006	0.005	0.004
3	0.014	0.012	0.012	0.011	0.009	0.009	0.008	0.007	0.007	0.006	0.006	0.005	0.004	0.004	0.003
4	0.011	0.010	0.010	0.009	0.008	0.008	0.006	0.006	0.006	0.005	0.004	0.004	0.004	0.003	0.003
5	0.009	0.009	0.009	0.008	0.007	0.007	0.006	0.006	0.005	0.004	0.004	0.004	0.003	0.019	0.014
6	0.009	0.008	0.009	0.007	0.006	0.006	0.006	0.005	0.004	0.004	0.003	0.003	0.024		
7	0.008	0.007	0.007	0.006	0.006	0.006	0.005	0.004	0.004	0.004	0.035	0.031			
8	0.007	0.007	0.006	0.006	0.006	0.006	0.004	0.004	0.003	0.003					
9	0.007	0.006	0.006	0.006	0.005	0.005	0.004	0.004	0.048	0.043					
10	0.006	0.006	0.006	0.006	0.005	0.004	0.004	0.003							
11	0.006	0.006	0.006	0.005	0.004	0.004	0.004	0.059							
12	0.006	0.006	0.006	0.005	0.004	0.003	0.003								
13	0.006	0.006	0.005	0.004	0.004	0.081	0.070								
14	0.006	0.005	0.004	0.004	0.003										
15	0.005	0.005	0.114	0.104	0.092										
16	0.004	0.004													
	0.136	0.126													



Infeed Values for Threading Operations

External UN Threads --- Recommendations for Steel Workpieces (<300BHN)

TPI	4	5	6	7	8*	9	10	11	12	13	14	16	18	20	24	28	32	36	40	44	48
THREAD DEPTH	4.008	3.205	2.672	2.291	2.004	1.781	1.603	1.458	1.336	1.232	1.146	1.001	0.889	0.800	0.668	0.572	0.500	0.445	0.399	0.363	0.333
# OF PASSES																					
1	0.897	0.757	0.630	0.541	0.500	0.445	0.429	0.399	0.386	0.361	0.345	0.318	0.315	0.302	0.300	0.284	0.249	0.221	0.198	0.185	0.165
2	0.371	0.310	0.267	0.224	0.208	0.185	0.178	0.168	0.163	0.145	0.150	0.137	0.135	0.124	0.122	0.117	0.107	0.091	0.081	0.071	0.069
3	0.287	0.239	0.198	0.196	0.160	0.142	0.135	0.122	0.122	0.112	0.109	0.099	0.099	0.099	0.099	0.091	0.079	0.071	0.071	0.056	0.051
4	0.241	0.201	0.170	0.150	0.135	0.119	0.114	0.104	0.107	0.094	0.091	0.086	0.084	0.081	0.079	0.079	0.066	0.061	0.051	0.051	0.048
5	0.213	0.178	0.147	0.127	0.119	0.107	0.099	0.091	0.091	0.084	0.081	0.074	0.074	0.071	0.069						
6	0.193	0.160	0.132	0.114	0.109	0.094	0.091	0.079	0.081	0.076	0.074	0.066	0.066	0.064							
7	0.178	0.147	0.122	0.104	0.099	0.086	0.079	0.071	0.074	0.069	0.066	0.061	0.061	0.058							
8	0.165	0.137	0.114	0.097	0.091	0.081	0.076	0.066	0.069	0.064	0.061	0.056	0.056								
9	0.155	0.130	0.107	0.091	0.086	0.076	0.074	0.064	0.066	0.061	0.058	0.053									
10	0.145	0.122	0.102	0.086	0.081	0.071	0.071	0.061	0.064	0.058	0.056	0.051									
11	0.137	0.114	0.097	0.081	0.079	0.069	0.069	0.058	0.058	0.056	0.053										
12	0.132	0.109	0.091	0.079	0.074	0.066	0.066	0.056	0.056	0.053											
13	0.124	0.107	0.089	0.076	0.069	0.064	0.064	0.053													
14	0.122	0.104	0.086	0.074	0.066	0.061	0.061	0.051													
15	0.117	0.102	0.084	0.071	0.064	0.058															
16	0.112	0.099	0.081	0.069	0.064	0.056															
17	0.109	0.097	0.079	0.066																	
18	0.107	0.094	0.076	0.064																	
19	0.104																				
20	0.099																				

Infeed Values for Threading Operations

Internal UN Threads --- Recommendations for Steel Workpieces (<300BHN)

TPI	4	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32	36	40	44	48
THREAD DEPTH	3.437	2.748	2.291	1.963	1.717	1.527	1.374	1.250	1.146	1.057	0.980	0.859	0.762	0.686	0.572	0.490	0.429	0.381	0.343	0.312	0.284
# OF PASSES																					
1	0.770	0.648	0.541	0.465	0.429	0.381	0.368	0.335	0.333	0.305	0.297	0.272	0.269	0.259	0.257	0.244	0.213	0.191	0.170	0.155	0.142
2	0.318	0.267	0.229	0.193	0.185	0.157	0.163	0.140	0.137	0.127	0.122	0.109	0.112	0.107	0.107	0.099	0.089	0.079	0.074	0.064	0.058
3	0.244	0.211	0.175	0.147	0.135	0.119	0.117	0.112	0.104	0.097	0.094	0.086	0.084	0.081	0.081	0.084	0.069	0.058	0.053	0.048	0.043
4	0.206	0.173	0.145	0.124	0.119	0.102	0.097	0.089	0.089	0.081	0.079	0.071	0.071	0.069	0.069	0.064	0.058	0.053	0.046	0.046	0.028
5	0.180	0.152	0.127	0.109	0.104	0.089	0.086	0.079	0.079	0.071	0.069	0.064	0.064	0.061	0.058						
6	0.163	0.137	0.114	0.099	0.091	0.081	0.079	0.071	0.071	0.064	0.064	0.074	0.058	0.056							
7	0.150	0.127	0.104	0.091	0.084	0.074	0.071	0.066	0.066	0.058	0.058	0.053	0.053	0.053							
8	1.397	0.117	0.097	0.084	0.076	0.069	0.066	0.061	0.061	0.056	0.053	0.051	0.074								
9	0.132	0.109	0.091	0.079	0.071	0.064	0.061	0.056	0.056	0.053	0.051	0.048									
10	0.124	0.104	0.086	0.074	0.069	0.061	0.058	0.053	0.053	0.051	0.048	0.046									
11	0.117	0.099	0.081	0.071	0.066	0.058	0.056	0.051	0.051	0.048	0.046										
12	0.112	0.094	0.079	0.069	0.064	0.056	0.053	0.048	0.048	0.046											
13	0.107	0.091	0.076	0.066	0.061	0.053	0.051	0.046													
14	0.104	0.089	0.074	0.064	0.058	0.051	0.048	0.043													
15	0.102	0.086	0.071	0.061	0.056	0.048															
16	0.099	0.084	0.069	0.058	0.053	0.048															
17	0.097	0.081	0.066	0.056																	
18	0.094	0.079	0.064	0.053																	
19	0.091																				
20	0.089																				



LAYDOWN

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	ER/NL	YE3-3P	YE3-2P	YE3-1P	YE3	YE3-1N	YE3-1.5N	YE3-2N	YE3-3N
	.63	EL/NR	YI3-3P	YI3-2P	YI3-1P	YI3	YI3-1N	YI3-1.5N	YI3-2N	YI3-3N
1/2"	.87	ER/NL	YE4-3P	YE4-2P	YE4-1P	YE4	YE4-1N	YE4-1.5N	YE4-2N	YE4-3N
	.87	EL/NR	YI4-3P	YI4-2P	YI4-1P	YI4	YI4-1N	YI4-1.5N	YI4-2N	YI4-3N
5/8"	1.06	ER/NL	YE5-3P	YE5-2P	YE5-1P	YE5	YE5-1N	YE5-1.5N	YE5-2N	YE5-3N
	1.06	EL/NR	YI5-3P	YI5-2P	YI5-1P	YI5	YI5-1N	YI5-1.5N	YI5-2N	YI5-3N
3/8"M	.63	ER/NL				YE3M	YE3M-1N	YE3M-1.5N	YE3M-2N	
	.63	EL/NR				YI3M	YI3M-1N	YI3M-1.5N		
1/2"M	.87	ER/NL				YE4M	YE4M-1N	YE4M-1.5N	YE4M-2N	
	.87	EL/NR				YI4M	YI4M-1N	YI4M-1.5N		
5/8"M	1.06	ER/NL				YE5M	YE5M-1N	YE5M-1.5N		
	1.06	EL/NR				YI5M	YI5M-1N	YI5M-1.5N		
1/2"Z	.87	EL/NR			YI4Z-1P					
1/2"U	.87	ER/NL	YE4U-3P	YE4U-2P	YE4U-1P	YE4U	YE4U-1N	YE4U-1.5N	YE4U-2N	YE4U-1N
	.87	EL/NR	YI4U-3P	YI4U-2P	YI4U-1P	YI4U	YI4U-1N	YI4U-1.5N	YI4U-2N	YI4U-1N

IC	L	TF #	Included Anvils
ANVIL KITS	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

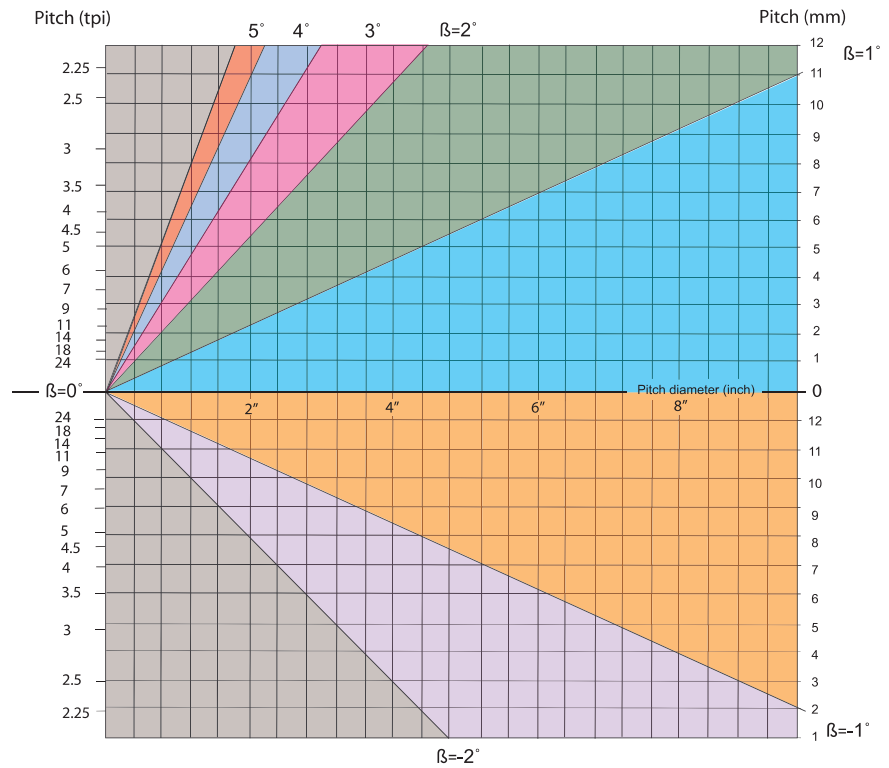
ANVIL FORMS	
1/2"	YE4-11.5NPT-2M YI4-11.5NPT-2M
5/8"	YE5-8NPT-2M, YE5-8RD-2M YI5-8NPT-2M, YI5-8RD-2M

Helix Angle Table (For Given Pitch and Diameter)

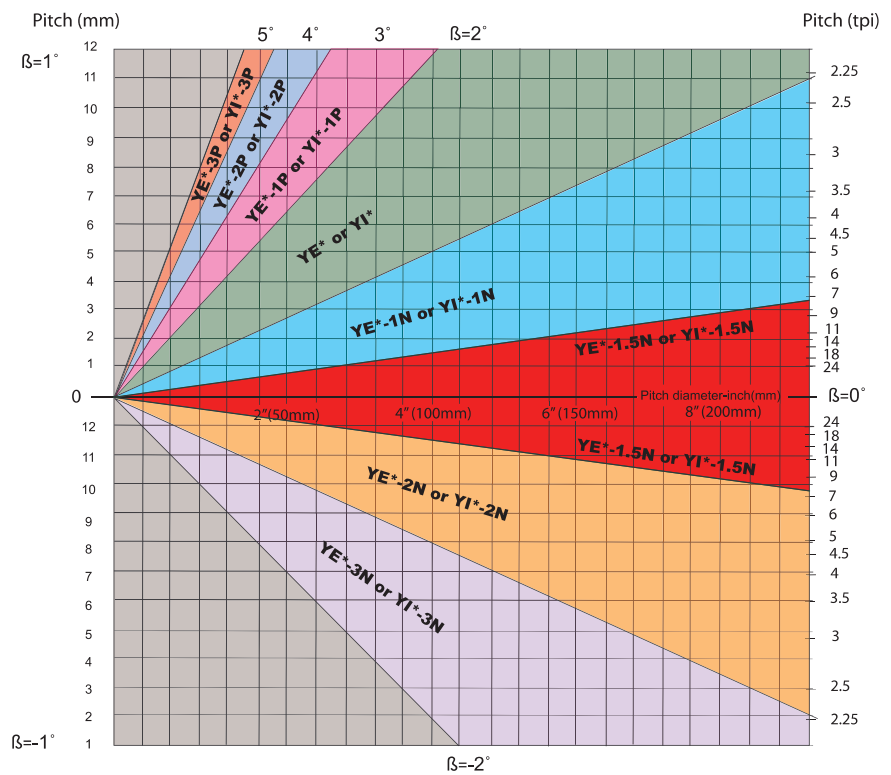
resultant helical angle	4.5°	3.5°	2.5°	1.5°	0.5°	0°	-0.5°	-1.5°
threads per inch	D I A M E T E R							
48			0.12 - 0.18	0.18 - 0.48	0.48 - 1.28	> 1.28	1.28 - 0.48	0.48 - 0.18
44		0.13 - 0.20	0.20 - 0.52	0.52 - 1.40	> 1.40	1.40 - 0.52	0.52 - 0.20	
40		0.11 - 0.14	0.14 - 0.22	0.22 - 0.57	0.57 - 1.52	> 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 - 0.84	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	> 6.08	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



Helix Angle Diagram



Helix Angle Diagram





Zenith

TOOL-FLO's
New Premium Coatings

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 capable 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 extremely 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 capable of handling interruptions. Works well in stainless 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, aerospace 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 extremely 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 applications.
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 capable of handling interruptions. 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.

COATINGS



Grade Name	ANSI range	ISO range	Coating	Description
ZA22	C1	K30	PVD AlTiN coated	PVD TiAlN grade with a tough, micro-grain substrate. Dry machining capable.
ZA26	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.
ZA3	C3	K15-K25 M05-M20	PVD AlTiN coated	PVD TiAlN grade. First choice for grooving in stainless steel, high-temperature alloys, aerospace materials, and non-ferrous materials. Excellent in standard steels at medium SFM. Dry machining capable.
ZA50	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.
ZS22	C1	K30	PVD AlTiN coated	PVD AlTiN grade with a tough, micro-grain substrate. Good in Laydown Threading in all materials. Dry machining capable.
ZS26	C1	K30-K40	PVD AlTiN coated	PVD AlTiN grade with extra lubricity, 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.
ZS3	C3	K15-K25 M05-M20	PVD AlTiN coated	PVD AlTiN grade 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.
ZS50	C5	P10-P35 M15-M30	PVD AlTiN coated	PVD AlTiN grade for grooving and threading in all standard steels and 400 series stainless. Application range is medium to high SFM. Dry machining capable.
ZL22	C1	K30	PVD AlTiN coated	PVD grade with a tough, micro-grain, unalloyed substrate. Good for turning at low to medium speeds, while capable of handling interruptions. Works well in high-temperature alloys and aluminum.
ZL26	C1	K30-K40	PVD AlTiN coated	PVD grade with a tough, micro-grain, unalloyed substrate. Rigid-Lok endmill grade. Good choice for aluminum, high-temperature alloys, and non-ferrous materials. Good in low to high SFM, will handle interruptions and high feed rates.
ZL3	C3	K15-K25 M05-M20	PVD AlTiN coated	PVD grade with a wear resistant micro-grain substrate. Excellent choice in high-temperature alloys, aerospace materials, and non-ferrous materials.
ZR22	C1	K30	PVD AlTiN coated	PVD AlTiN grade with a tough, micro-grain, unalloyed substrate. Good for threading at low to medium speeds, while capable of handling interruptions. Works well in stainless steel, high-temperature alloys, and standard steels at low to medium SFM.
ZR26	C1	K30-K40	PVD AlTiN coated	PVD AlTiN 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.
ZR3	C3	K15-K25 M05-M20	PVD AlTiN coated	PVD AlTiN grade with a wear resistant micro-grain substrate. Excellent choice in stainless steels, high-temperature alloys, aerospace materials, and non-ferrous materials. Good in standard steels at low to medium SFM.
ZR50	C5	P10-P35 M15-M30	PVD AlTiN coated	PVD AlTiN grade with a medium tough substrate and excellent wear properties. Great general purpose grade for steel applications.
ZU22	C1	K30	PVD AlTiN coated	PVD AlTiN grade with a tough, micro-grain, unalloyed substrate. Good for threading at low to medium speeds, while capable of handling interruptions. Works well in stainless steel, high-temperature alloys, and standard steels at low to medium SFM.
ZU26	C1	K30-K40	PVD AlTiN coated	PVD AlTiN 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.
ZU3	C3	K15-K25 M05-M20	PVD AlTiN coated	PVD AlTiN grade with a wear resistant micro-grain substrate. Excellent choice in stainless steels, high-temperature alloys, aerospace materials, and non-ferrous materials. Good in standard steels at low to medium SFM.
ZU50	C5	P10-P35 M15-M30	PVD AlTiN coated	PVD AlTiN grade with a medium tough substrate and excellent wear properties. Great general purpose grade for steel applications.
GPM6	C6/C7	P1-P10 K1-K10	PVD TiN coated Cermets	PVD TiN coated cermet grade. First choice for grooving in high-speed finishing of most carbon, alloy, and stainless steels. Performs very well in cast and ductile irons. Provides excellent workpiece finishes.
G50	C5	P10-P35 M15-M30	CVD coated	CVD TiN/TiC/TiN grade. API chaser grade for Q-Series material.
CB200	C8	K01	PCBN	PCBN tip brazed onto a carbide insert. High content CBN. First choice for cast iron and high-temperature alloys. Suited for roughing to finishing in hardened steels greater than 45 HRC, such as bearing steel, hot and cold work tool steels, high-speed steels, die steels, case hardened steels, nitrided irons, and some hard coatings.
CB400	C8		PCBN	PCBN tip brazed onto a carbide insert. Low content CBN. First choice for roughing to finishing of hardened steels 45 HRC and higher. Use on bearing steel, hot and cold work steels, die steels, case hardened steels, carburized and nitrided irons.
CB410	C8		PCBN	PCBN tip brazed onto a carbide insert. Low content CBN. First choice for roughing to finishing of hardened steels 45 HRC and higher. Use on bearing steel, hot and cold work steels, die steels, case hardened steels, carburized and nitrided irons.
PC33			PCD	PCD tip brazed onto a carbide insert. First choice for high silicone aluminum applications at high SFM. Use on all types of highly abrasive materials including non-ferrous metals and non-metallics. High SFM only!
DX200	C1-C2	K05-K15	PCD CVD coated	PCD CVD coated grade. Rigid-Lock insert grade. First choice at high SFM in non-metallic materials such as graphite, epoxy based resins, plastics and aluminum.