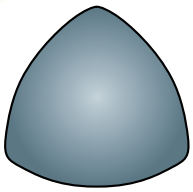
TAPTITE 2000® Fasteners

infastech™
Our Technology, Your Success

Unique Design Increases Performance

TAPTITE 2000® fasteners are designed to provide the benefits of previous TAPTITE® fastener products with an innovative new thread design – the Radius Profile™ Thread. The proven trilobular™ principle is maintained while incorporating this beneficial thread design. The result is a new generation of TAPTITE® fasteners, providing excellent mechanical, assembly, and ergonomic characteristics surpassed by no other technology. TAPTITE 2000 fasteners afford end-users with enhanced opportunities to reduce the overall cost of assembly.



Trilobular Cross Section

Features and Benefits

Trilobular™ Configuration

- Reduces friction
- Increases prevailing torque
- Resists loosening caused by vibration
- Lower end load requirements

Radius Profile™ Thread

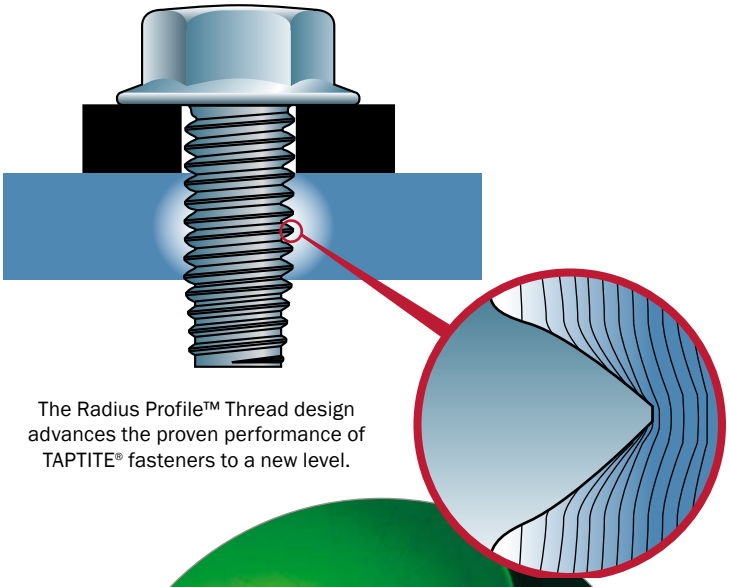
- Lowers thread forming torque without sacrificing performance
- Higher, more uniform drive-to-fail ratio
- Increased drive-to-strip ratio
- Resist internal thread stripping
- Excellent axial alignment

Roll Forms Own Work-hardened Mating Threads

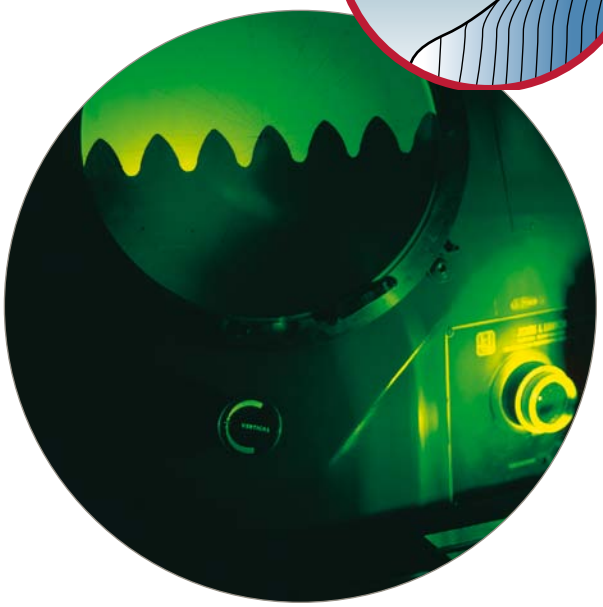
- Results in higher strength internal threads due to the cold flow/work hardening that occurs during the forming of the nut thread

Available with TORX PLUS® Drive System

- Significantly extends tool life
- Ideal drive system for maximum torque transfer



The Radius Profile™ Thread design advances the proven performance of TAPTITE® fasteners to a new level.



Built On Proven Performance

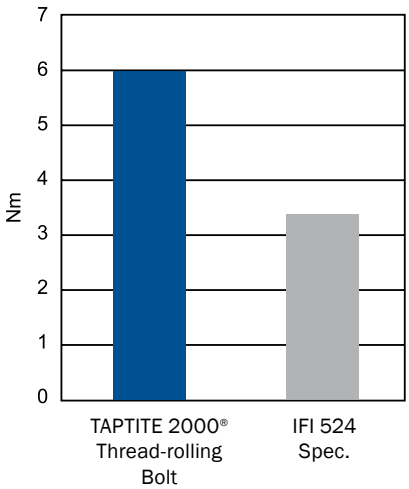
TAPTITE® fasteners have been used in a variety of industries since its inception over forty years ago. Built upon those years of experience with the proven performance features of TAPTITE®, TAPTITE® II, and Duo-TAPTITE® fasteners, the TAPTITE 2000® design combines all these previous benefits with an even lower thread-forming torque. The result is optimal joint performance in a wide range of applications.

Application Comparison

	TAPTITE® II Fasteners	Duo-TAPTITE® Fasteners	TAPTITE 2000® Fasteners
Lowest thread-forming torque			x
Positioning applications	x		x
Structural applications		x	x
High torque-tension applications		x	x
High strip-out requirement		x	x
Automation capability		x	x
Nut member greater than 1.5 x screw dia.	x		x
Nut member less than 0.3 x screw dia.		x	x
Adaptability to different point styles	x		x
High axial alignment required		x	x

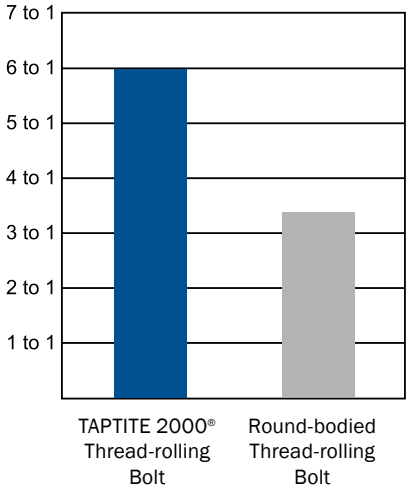
Trilobular™ Taptite 2000® Fasteners vs. Other Thread-Rolling Fasteners

Prevailing Torque



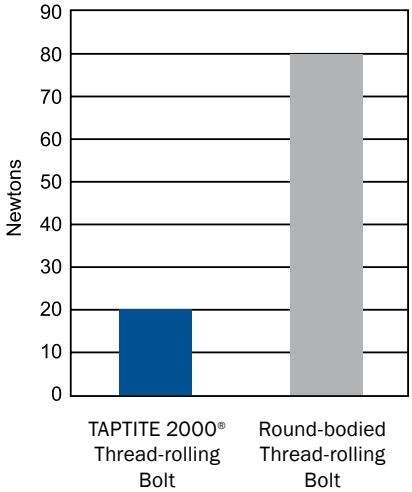
The Trilobular™ shape of TAPTITE 2000 provides high prevailing torque. Graph shows comparison of a TAPTITE 2000 fastener with IFI-524 locking screw specification.

Higher Drive-to-Fail Ratio



The higher, more uniform drive-to-fail ratio of TAPTITE 2000 bolts provide a built-in safety factor against over-torquing.

Lower Starting End Load



TAPTITE 2000 fasteners require a low axial end load to initiate thread forming.

Design Specifications

Design Specifications for TAPTITE 2000® Fasteners

Diameters: M1.6 – M16 (#2 – 5/8")

Head Styles: Pan, hex washer, flat, oval, round washer, button head, fillister and specials

Drive Systems: Any drive system, including the TORX PLUS® Drive System

Point Styles: Standard TAPTITE® point, CA™ point, or "SP"™ point

Specials: Shoulder screws, double-end studs, collar studs, sems; others may be available

Materials: Low carbon steel, medium carbon steel, alloy steel, stainless steel; others may be available

Heat Treat: Camcore® fasteners, case hardening or through hardening (see details below)

Please contact an Infastech applications engineer for information on specials and assistance in selecting the optimal fastener for your application.

TAPTITE 2000® Heat Treatment

Camcore® Fasteners: When tapping into high strength steel or in structural applications, a Camcore fastener is recommended. Camcore fasteners are made from high strength alloy steel which is through hardened to HRC 33-39 and tempered. The fastener lead threads are induction hardened to a minimum of HRC 45 by a secondary induction treatment. When combined with non-electroplated finishes, resistance to stress corrosion cracking is improved.

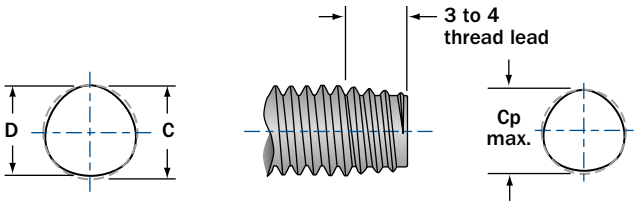
Case Hardening: Case hardening is the standard heat treatment for all TAPTITE 2000 screws in sizes M5 (#12) and smaller. This process raises the surface hardness to a level higher than the core hardness.

Through Hardening: Through hardening, which increases toughness and ductility, is the preferred treatment for TAPTITE 2000 fasteners used in aluminum applications.

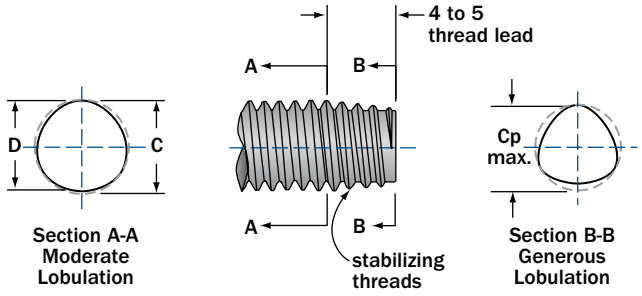
TORX PLUS® Drive System

TAPTITE 2000 fastener performance is improved with the TORX PLUS Drive System. Its 0° drive angle provides a more efficient transfer of torque, improving driveability. Its reduced drive tool tolerance and broad engagement area increases tool bit fatigue life, so drive tools last longer. Many styles are available, including internal, external, low-profile external, tamper-resistant, and dual drives. The AUTOSERT® feature, which allows for high RPM engagement in internal drives, can be included.

Dimensional Data



For M5 (#12) and smaller Taptite 2000® fasteners have a special point design featuring a long lead (3-5 threads) for low thread-forming torque.



Larger sizes, M6 (#12) and larger, have stabilizing threads to aid alignment and ease starting.

Metric Data

Screw Size	Screw Body Dimensions		Point
	C Nominal	D Nominal	Cp Max.
M1.6 x 0.35	1.60	1.56	1.40
M2.0 x 0.40	2.00	1.96	1.77
M2.5 x 0.45	2.50	2.45	2.25
M3 x 0.5	3.00	2.95	2.71
M3.5 x 0.6	3.50	3.44	3.17
M4 x 0.7	4.00	3.93	3.60
M5 x 0.8	5.00	4.92	4.55
M6 x 1.0	6.00	5.90	5.38
M8 x 1.25	8.00	7.87	7.23
M10 x 1.5	10.00	9.85	9.08
M12 x 1.75	12.00	11.82	10.92
M14 x 2.0	14.00	13.80	12.77
M16 x 2.0	16.00	15.80	14.76

Length Tolerance

Metric per ANSI B18.6.7M

Nominal Screw Length	Tolerance on Length
to 3mm inclusive	±0.2mm
over 3 to 10mm inclusive	±0.3mm
over 10 to 16mm inclusive	±0.4mm
over 16 to 50mm inclusive	±0.5mm
over 50mm	±1.0mm

Inch Data

Screw Size	Screw Body Dimensions		Point
	C Nominal	D Nominal	Cp Max.
2-56	0.086	0.084	0.077
3-48	0.099	0.097	0.088
4-40	0.112	0.110	0.098
5-40	0.125	0.123	0.111
6-32	0.138	0.135	0.121
8-32	0.164	0.161	0.147
10-24	0.190	0.186	0.167
10-32	0.190	0.187	0.174
12-24	0.216	0.212	0.193
1/4-20	0.250	0.245	0.220
5/16-18	0.313	0.307	0.279
3/8-16	0.375	0.369	0.337
7/16-14	0.438	0.431	0.394
7/16-20	0.438	0.433	0.407
1/2-13	0.500	0.492	0.453
9/16-12	0.563	0.555	0.511
5/8-11	0.625	0.616	0.569

Length Tolerance

Inch per ANSI B18.6.3

Nominal Screw Length	Nominal Screw Size	
	#4 – #12	1/4" – 1/2"
	Tolerance on Length	
To 1/2" inclusive	+0, – .020"	+0, – .030"
Over 1/2" to 1" inclusive	+0, – .030"	+0, – .030"
Over 1" to 2" inclusive	+0, – .060"	+0, – .060"
Over 2"	+0, – .090"	+0, – .090"

TAPTITE 2000® Standard Fasteners

Recommended Pilot Hole Sizes in Steel Nut Members – Metric Sizes (mm)

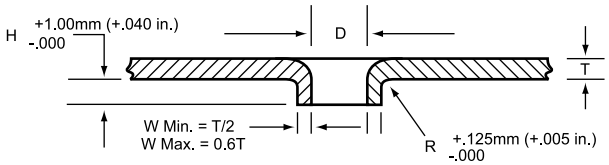
App.	Light			Medium-Light			Medium-Heavy			Full Strength			Extended		
Duty Class	0.3 Dia. of Material			0.5 Dia. of Material			0.75 Dia.s of Material			1.0 Dia. of Material			1.25 Dia. of Material		
Percent. of Thread	90%			80%			70%			65%			60%		
Nominal Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size
M2.5 x 0.45	0.5 - 0.9	2.24	2.25	0.9 - 1.5	2.27	#43 2.26	1.5 - 2.1	2.3	2.3	2.1 - 2.7	2.31	2.3	2.7 - 3.5	2.32	2.3
M3 x 0.5	0.5 - 1.1	2.71	#36 2.71	1.1 - 1.7	2.74	2.75	1.7 - 2.7	2.77	7/64	2.7 - 3.3	2.79	7/64	3.3 - 4.0	2.8	2.8
M3.5 x 0.6	0.6 - 1.4	3.15	1/8 3.18	1.4 - 2.0	3.19	3.2	2.0 - 2.9	3.23	3.25	2.9 - 3.8	3.25	3.25	3.8 - 4.5	3.27	#30
M4 x 0.7	0.8 - 1.4	3.59	3.6	1.4 - 2.4	3.64	#27 3.66	2.4 - 3.3	3.68	3.7	3.3 - 4.4	3.7	3.7	4.4 - 5.5	3.73	#26
M4.5 x 0.75	0.9 - 1.7	4.06	#21 4.04	1.7 - 2.7	4.11	4.1	2.7 - 3.9	4.16	4.2	3.9 - 4.9	4.18	4.2	4.9 - 6.4	4.21	4.2
M5 x 0.8	1.0 - 2.1	4.53	4.5	2.1 - 2.9	4.58	4.57	2.9 - 4.4	4.64	#14 4.62	4.4 - 5.9	4.66	4.65	5.9 - 7.1	4.69	4.7
M6 x 1.0	1.2 - 2.4	5.42	#3 5.41	2.4 - 3.6	5.48	5.5	3.6 - 4.9	5.55	7/32 5.56	4.9 - 6.9	5.58	5.6	6.9 - 8.1	5.61	5.6
M7 x 1.0	1.4 - 2.4	6.42	6.4	2.4 - 4.4	6.48	6.5	4.4 - 6.5	6.55	F 6.53	6.5 - 7.7	6.58	6.6	7.7 - 9.5	6.61	6.6
M8 x 1.25	1.6 - 3.1	7.27	7.25	3.1 - 4.9	7.35	L 7.37	4.6 - 6.9	7.43	7.4	6.9 - 8.9	7.47	M 7.49	8.9 - 10.9	7.51	7.5
M10 x 1.5	1.9 - 3.9	9.12	23/64 9.1	3.9 - 5.9	9.22	9.25	5.9 - 8.3	9.32	9.3	8.3 - 10.9	9.37	U 9.35	10.9 - 12.9	9.41	9.4
M12 x 1.75	2.4 - 4.9	10.98	11.0	4.9 - 7.4	11.09	7/16 11.11	7.4 - 10.5	11.2	7/16 11.11	10.5 - 14.5	11.26	11.3	14.5 - 17.0	11.31	11.3

Recommended Pilot Hole Sizes in Steel Nut Members – Inch Sizes (in)

App.	Light			Medium-Light			Medium-Heavy			Full Strength			Extended		
Duty Class	0.3 Dia. of Material			0.5 Dia. of Material			0.75 Dia. of Material			1.0 Dia. of Material			1.25 Dia. of Material		
Percent. of Thread	90%			80%			70%			65%			60%		
Nominal Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size	Material Thckns.	Pilot Hole	Drill Size
2-56	.017-.034	0.0756	1.9mm 0.0748	.034-.052	0.0767	1.95mm 0.0763	.052-.073	0.0779	5/64 0.0781	.073-.095	0.0785	#47 0.0785	.095-.169	0.0790	2mm 0.0787
3-48	020-.040	0.8680	2.2mm 0.0866	.040-.059	0.0882	#43 0.089	.059-.084	0.0895	#43 0.089	.084-.110	0.0902	2.3mm 0.0906	.110-.141	0.0909	2.3mm 0.0906
4-40	.022-.045	0.0974	#40	.045-.067	0.0990	#39	.067-.095	0.1006	#39 0.0995	.095-.126	0.1014	#38 0.1015	.126-.157	0.1023	2.6mm
5-40	.025-.051	0.1104	2.8mm	.051-.075	0.1120	#33	.075-.106	0.1136	#33 0.113	.106-.141	0.1144	2.9mm 0.1142	.141-.175	0.1153	2.9mm 0.1142
6-32	.028-.066	0.1197	#31 0.120	.066-.083	0.1218	3.1mm 0.122	.083-.117	0.1238	1/8 0.125	.117-.152	0.1248	1/8 0.125	.152-.193	0.1258	3.2mm 0.126
8-32	.033-.066	0.1457	3.7mm 0.1457	.066-.098	0.1478	3.75mm 0.1476	.098-.141	0.1498	3.8mm 0.1496	.141-1.80	0.1508	3.8mm 0.1491	.180-.230	0.1518	#24 0.152
10-24	.038-.079	0.1656	#19 0.166	.079-.114	0.1683	#18 0.1695	.114-.162	0.1710	11/64 0.1719	.162-.209	0.1724	11/64 0.1719	.209-.266	0.1738	4.4mm 0.1732
10-32	.038-.079	0.1717	11/64 0.1719	.079-.114	0.1738	#17 0.173	.114-.162	.01758	#16 0.177	.162-.209	0.1768	#16 0.177	.209-.266	0.1778	4.5mm 0.1772
12-24	.043-.086	0.1916	#11 0.191	.086-.130	0.1943	#9 0.196	.130-.184	0.1970	5mm 0.1969	.184-.238	0.1984	#8 0.199	.238-.302	0.1998	5.1mm 0.2008
1/4-20	.050-.100	0.2208	#2 0.221	.100-.150	0.2240	5.7mm 0.2244	.150-.213	0.2273	#1 0.228	.213-.275	0.2289	5.8mm 0.2283	.275-.350	0.2309	5.8mm 0.2283
5/16-18	.062-.126	0.2800	7.1mm 0.2795	.126-.188	0.2836	7.2mm 0.2835	.188-.266	0.2872	7.3mm 0.2874	.266-.345	0.2890	L 0.29	.345-.438	0.2908	7.4mm 0.2913
3/8-16	.075-.150	0.3384	8.6mm 0.3386	.150-.225	0.3425	8.7mm 0.3425	.225-.319	0.3466	8.8mm 0.3465	.319-.413	0.3486	Size 0.348	.413-.525	0.3506	8.9mm 0.3504
7/16-14	.087-.174	0.3957	X 0.397	.174-.262	0.4004	X 0.397	.262-.371	.04050	Y 0.404	.371-.481	0.4073	13/32 0.4063	.481-.612	0.4096	13/32 0.4063
1/2-13	.100-.200	0.4550	29/64 0.4531	.200-.300	0.4600	29/64 0.4531	.300-.425	0.4650	15/32 0.4688	.425-.550	0.4675	15/32 0.4688	.550 -.700	0.4700	15/32 0.468

APPLICATION DUTY CLASS – A general term used here to group material thickness in terms of screw diameters. For example, the average material thickness listed under "medium-heavy" equals 75% of the screw diameter.

Recommended Extruded Pilot Hole Sizes in Light-Gage Steel



Hole Size Dia. (D) Per Material Thickness – Metric Sizes (mm)

Screw Size	Material Thickness				
	0.50 – 0.69	0.70 – 0.99	1.00 – 1.49	1.50 – 2.49	2.50 – 3.00
M2.5 x 0.45	2.22	2.23	2.24	–	–
M3 x 0.5	2.70	2.71	2.72	–	–
M4 x 0.7	3.57	3.59	3.61	3.64	–
M5 x 0.8	–	4.53	4.56	4.59	–
M6 x 1.0	–	5.42	5.45	5.48	5.51
M8 x 1.25	–	–	7.27	7.31	7.35

Extruded Hole Thicknesses – Metric Sizes (mm)

Metric Hole Dia. D	Approximate Material Thickness "T"									
	0.6 – 1.0		1.0 – 1.2		1.2 – 2.0		2.0 – 2.5		2.5 – 3.0	
	H	R	H	R	H	R	H	R	H	R
2.00 – 2.55	1.00	0.13	1.00	0.13	1.00	0.15	1.10	0.25	–	–
2.56 – 3.20	1.20	0.13	1.20	0.13	1.20	0.15	1.30	0.25	1.35	0.25
3.21 – 3.80	1.35	0.13	1.35	0.13	1.35	0.15	1.50	0.25	1.60	0.25
3.81 – 4.60	–	–	1.50	0.13	1.55	0.15	1.80	0.25	1.90	0.25
4.61 – 5.60	–	–	1.80	0.13	1.80	0.15	2.30	0.25	2.40	0.25
5.61 – 6.60	–	–	–	–	1.90	0.15	2.55	0.25	2.65	0.25
6.61 – 7.60	–	–	–	–	2.10	0.15	2.95	0.25	3.20	0.25

Hole Size Diameter (D) Per Material Thickness – Inch Sizes (in)

Screw Size	Material Thickness				
	020 – .029	.030 – .039	.040 – .059	.060 – .099	.100 – .130
4-40	0.097	0.097	0.098	–	–
6-32	0.119	0.120	0.121	0.122	–
8-32	0.145	0.146	0.147	0.148	–
10-24	0.164	0.166	0.168	0.170	0.170
10-32	0.171	0.172	0.173	0.174	0.174
1/4-20	–	0.221	0.223	0.225	0.225
5/16-18	–	–	0.282	0.285	0.285

Extruded Hole Thicknesses – Inch Sizes (in)

Inch Hole Dia. (D)	Approximate Material Thickness "T"									
	0.020 – 0.035		0.035 – 0.050		0.050 – 0.075		0.075 – 0.100		0.100 – 0.125	
	H	R	H	R	H	R	H	R	H	R
.081 – .100	0.040	0.005	0.040	0.005	0.040	0.006	0.043	0.010	–	–
.101 – .125	0.047	0.005	0.047	0.005	0.047	0.006	0.052	0.010	0.054	0.010
.126 – .150	0.053	0.005	0.053	0.005	0.053	0.006	0.060	0.010	0.063	0.010
.151 – .180	–	–	0.060	0.005	0.060	0.006	0.070	0.010	0.075	0.010
.181 – .220	–	–	0.070	0.005	0.070	0.006	0.090	0.010	0.095	0.010
.221 – .260	–	–	–	–	0.075	0.006	0.100	0.010	0.105	0.010
.261 – .300	–	–	–	–	0.083	0.006	0.116	0.010	0.125	0.010

Extruding holes for fasteners in light-gage steel **nearly doubles the length of thread engagement** over the original material thickness.

TAPTITE 2000® fasteners **develop almost twice the failure torque** in extruded holes, providing maximum joint integrity.

Example: The chart shows that for a M4 x 0.7 screw in a material thickness of 0.75mm the suggested hole diameter is 3.59mm. The corresponding "H" dimension is the 1.35mm minimum, making the total length of engagement 2.1mm minimum.

TAPTITE 2000® Standard Fasteners

Hole Sizes Per Percentage of Thread Engagement – Metric Sizes (mm)

Nominal Screw Size	Percent Thread Engagement													
	100	95	90(1)	85(1)	80	75	70	65	60	55	50	45	40	35
M2.5 x 0.45	2.21	2.22	2.24	2.25	2.27	2.28	2.29	2.31	2.32	2.34	2.35	2.37	2.38	2.40
M3 x 0.5	2.67	2.69	2.71	2.72	2.74	2.76	2.77	2.79	2.80	2.82	2.84	2.85	2.87	2.90
M3.5 x 0.6	3.11	3.13	3.15	3.17	3.19	3.21	3.23	3.25	3.27	3.29	3.30	3.32	3.34	3.36
M4 x 0.7	3.54	3.57	3.59	3.61	3.64	3.66	3.68	3.70	3.73	3.75	3.77	3.79	3.80	3.84
M4.5 x 0.75	4.01	4.04	4.06	4.09	4.11	4.13	4.16	4.18	4.21	4.23	4.26	4.28	4.30	4.33
M5 x 0.8	4.48	4.51	4.53	4.56	4.58	4.61	4.64	4.66	4.69	4.71	4.74	4.77	4.79	4.82
M6 x 1.0	5.35	5.38	5.42	5.45	5.48	5.51	5.54	5.58	5.61	5.64	5.67	5.71	5.74	5.77
M7 x 1.0	6.35	6.38	6.42	6.45	6.48	6.51	6.54	6.58	6.61	6.64	6.67	6.71	6.74	6.77
M8 x 1.25	7.19	7.23	7.27	7.31	7.35	7.39	7.43	7.47	7.51	7.55	7.59	7.63	7.67	7.72
M10 x 1.5	9.03	9.07	9.12	9.17	9.22	9.27	9.32	9.37	9.41	9.46	9.51	9.56	9.61	9.66
M12 x 1.75	10.86	10.92	10.98	11.30	11.09	11.15	11.20	11.26	11.31	11.37	11.43	11.49	11.55	11.60

Hole Sizes Per Percentage of Thread Engagement – Inch Sizes (in)

Nominal Screw Size	Percent Thread Engagement													
	100	95	90(1)	85(1)	80	75	70	65	60	55	50	45	40	35
2-56	0.0744	0.0750	0.0756	0.0761	0.0767	0.0773	0.0779	0.0785	0.0790	0.0796	0.0802	0.0808	0.0814	0.0819
3-48	0.0855	0.0861	0.0868	0.0875	0.0882	0.0888	0.0895	0.0902	0.0909	0.0916	0.0922	0.0929	0.0936	0.0943
4-40	0.0958	0.0966	0.0974	0.0982	0.0990	0.0998	0.1006	0.1014	0.1023	0.1031	0.1039	0.1047	0.1055	0.1063
5-40	0.1088	0.1096	0.1104	0.1112	0.1120	0.1128	0.1136	0.1144	0.1153	0.1161	0.1169	0.1177	0.1185	0.1193
6-32	0.1177	0.1187	0.1197	0.1207	0.1218	0.1228	0.1238	0.1248	0.1258	0.1268	0.1278	0.1289	0.1299	0.1309
8-32	0.1437	0.1447	0.1457	0.1467	0.1478	0.1488	0.1498	0.1508	0.1518	0.1528	0.1538	0.1549	0.1559	0.1569
10-24	0.1629	0.1643	0.1656	0.1670	0.1683	0.1697	0.1710	0.1724	0.1738	0.1751	0.1765	0.1778	0.1792	0.1805
10-32	0.1697	0.1707	0.1717	0.1727	0.1738	0.1748	0.1758	0.1768	0.1778	0.1788	0.1798	0.1809	0.1819	0.1829
12-24	0.1889	0.1903	0.1916	0.1930	0.1943	0.1957	0.1970	0.1984	0.1998	0.2011	0.2025	0.2038	0.2052	0.2065
1/4-20	0.2175	0.2191	0.2208	0.2224	0.2240	0.2256	0.2273	0.2289	0.2305	0.2321	0.2338	0.2354	0.2370	0.2386
5/16-18	0.2764	0.2782	0.2800	0.2818	0.2836	0.2854	0.2872	0.2890	0.2908	0.2926	0.2944	0.2963	0.2981	0.2999
3/8-16	0.3344	0.3364	0.3384	0.3405	0.3425	0.3445	0.3466	0.3486	0.3506	0.3527	0.3547	0.3567	0.3588	0.3608
7/16-14	0.3911	0.3934	0.3957	0.3980	0.4004	0.4027	0.4050	0.4073	0.4096	0.4120	0.4143	0.4166	0.4189	0.4213
1/2-13	0.4500	0.4525	0.4550	0.4575	0.4600	0.4625	0.4650	0.4675	0.4700	0.4725	0.4750	0.4775	0.4800	0.4825

NOTE: Nominal screw diameters are used when calculating hole sizes and are based on the U.S. basic thread depth of 0.6495 times the pitch. Hole data accuracy decreases for engagements less than 70%. This is because the above data is based on a linear relation between hole size and percentage of thread engagement.

Hole Size = D – (0.6495 x P x %). In this equation, D is equal to the nominal screw diameter.

(1) Pilot holes listed under the 90% and 85% thread engagement columns are recommended for single punch extruded holes.

Typical tolerance for the pilot hole range is -10% to +5% from the nominal percent thread engagement.

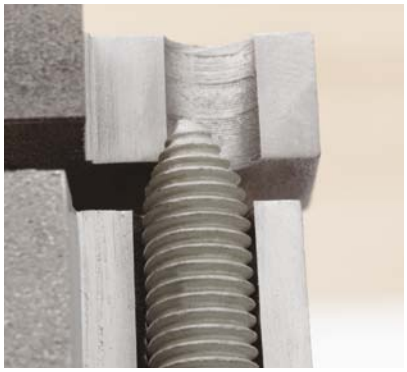
Example: for a M12 TAPTITE 2000® fastener using a single punch extruded hole, the nominal hole size is 85% thread engagement or 11.30mm, bounded by a tolerance window of 11.15mm (75% thread engagement) to 10.98mm (90% thread engagement.

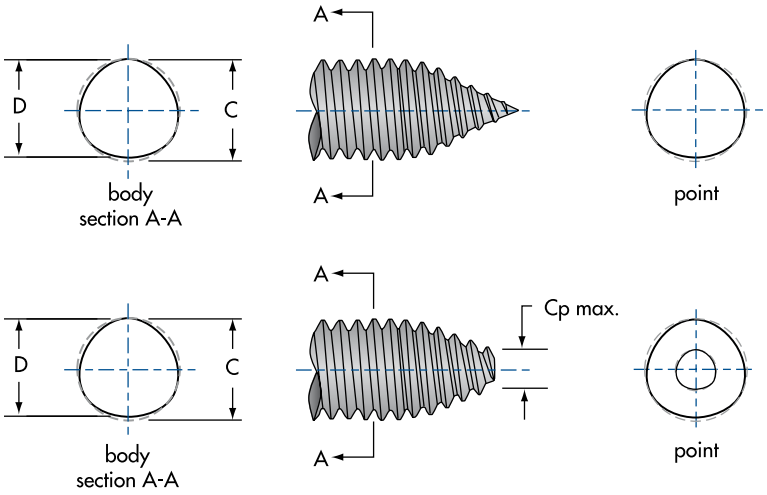
PROPER DESIGN

Due to the variability of materials such as cast iron and powdered metals, please contact an Infastech applications engineer for proper hole size recommendations to ensure proper fastener performance.

Taptite 2000® CA™ Point Fasteners

TAPTITE 2000 CA fasteners have a gimlet point for use where clearance holes and pilot holes do not align. The CA point is also good for rapid hole finding, floating nut members or difficult access applications.

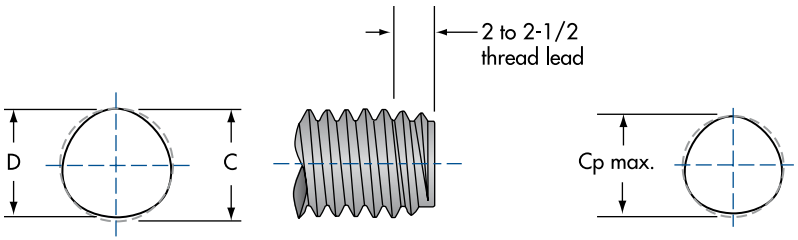




The CA point can be supplied with a sharp point or a slightly truncated blunt point, which is desirable for situations when the sharp point could be a potential hazard to wires, components or assembly line and service personnel.

Taptite 2000® "SP"™ (Short Point) Fasteners

TAPTITE 2000 "SP" fasteners have a shorter point than standard TAPTITE 2000 fasteners to maximize full thread engagement in blind holes, particularly in non-ferrous materials such as aluminum.



The short point of the TAPTITE 2000 "SP" fastener maximizes the amount of full thread engagement in blind holes. Increasing the full thread engagement is often critical in shallow depth holes. In many cases the failure mode can can be shifted from internal thread stripping to fastener fracture, which is typically desired in castings. In deeper holes, the shorter "SP" point may allow use of a shorter fastener, saving weight and cost.

TAPTITE 2000® SP™ Fasteners

Recommended Pilot Hole Sizes for Aluminum or Zinc Alloy Die Castings for TAPTITE 2000® SP™ Fasteners

The minimum length of thread engagement should be equal to twice the diameter of the screw (to approach utilizing available screw strength). To ensure optimum performance, the hole diameter should provide for 65% to 75% thread engagement.

Metric Sizes (mm)

Screw Size	Hole Diameter as Cast				F Hole Dia. as Drilled	L Length of Thread Engagement	H Boss Dia	Distance to Edge for No Measurable Distortion
	Top A		Bottom B					
	Max.	Min.	Max.	Min.			Min.	Min.
M2 x 0.40	1.91	1.83	1.81	1.73	1.82	4.00	3.32	1.0
M2.5 x 0.45	2.39	2.31	2.28	2.20	2.29	5.00	4.15	1.2
M3 x 0.5	2.90	2.82	2.76	2.68	2.77	6.00	4.98	1.3
M3.5 x 0.6	3.31	3.23	3.21	3.13	3.23	7.00	5.81	1.6
M4 x 0.7	3.82	3.74	3.64	3.56	3.68	8.00	6.64	1.8
M5 x 0.8	4.80	4.72	4.58	4.50	4.64	10.00	8.30	2.1
M6 x 1.0	5.74	5.66	5.48	5.40	5.54	12.00	9.96	2.6
M7 x 1.0	6.78	6.70	6.48	6.40	6.54	14.00	11.62	2.6
M8 x 1.25	7.69	7.61	7.35	7.27	7.43	16.00	13.28	3.3
M10 x 1.5	9.64	9.56	9.22	9.14	9.32	20.00	16.60	3.9
M12 x 1.75	11.59	11.51	11.09	11.01	11.20	24.00	19.92	4.6

Inch Sizes (in)

Screw Size	Hole Diameter as Cast				F Hole Dia as Drilled	L Length of Thread Engagement	H Boss Dia.	Distance to Edge for No Measurable Distortion
	Top A		Bottom B					
	Max.	Min.	Max.	Min.			Min.	Min.
2-56	0.081	0.078	0.077	0.074	0.0779	0.172	0.197	0.046
3-48	0.093	0.090	0.088	0.085	0.0895	0.198	0.208	0.054
4-40	0.105	0.102	0.099	0.096	0.1006	0.224	0.220	0.065
5-40	0.118	0.115	0.112	0.109	0.1136	0.250	0.232	0.065
6-32	0.128	0.125	0.122	0.119	0.1238	0.276	0.242	0.081
8-32	0.155	0.152	0.148	0.145	0.1498	0.328	0.272	0.081
10-24	0.177	0.174	0.168	0.165	0.1710	0.380	0.315	0.108
10-32	0.182	0.179	0.174	0.171	0.1758	0.380	0.315	0.081
12-24	0.203	0.200	0.194	0.191	0.1970	0.432	0.359	0.108
1/4-20	0.235	0.232	0.224	0.221	0.2273	0.500	0.415	0.130
5/16-18	0.297	0.294	0.284	0.281	0.2872	0.625	0.519	0.144
3/8-16	0.359	0.356	0.343	0.340	0.3466	0.750	0.623	0.162
7/16-14	0.419	0.416	0.400	0.397	0.4050	0.875	0.726	0.186
1/2-13	0.481	0.478	0.460	0.457	0.4650	1.000	0.830	0.200

Lower In-Place Costs

Through the elimination of tapping operations and their optimal performance, TAPTITE 2000® fasteners can lower your installed costs. Have you considered these design and assembly issues that TAPTITE 2000® fasteners can eliminate or improve?

Savings Through Elimination of Tapping Operations

Advantage	Est. Cost Savings
___ Direct labor for tapping operations	
___ Indirect labor for tapping operations	
___ Taps	
___ Jogs and fixtures	
___ Tapping lubricants	
___ Gauges	
___ Set-up time of tapping equipment	
___ Downtime on automated equipment due to tapping station malfunction	
___ Downtime to replace broken taps	
___ Low machine efficiency from loading, galling and binding of taps	
___ Cleaning of oil and chips	
___ Inspection for class of fit	
___ Loss or repair of tapped assemblies due to under- or over-sized tapped threads	
___ Loss or repair of tapped assemblies due to tap breakage	
___ Moving components to and from tapping department	
___ Use of drilling and tapping stations for other needed operations	
___ Improved cycle time on multi-operation equipment	
___ Elimination of cross-threading into pre-tapped holes	
___ Elimination of tapped holes clogged with paint or other foreign materials	
___ Reduction of drilling operations – holes can be cored or punched during part blanking	
___ Allows largest diameter punch in each screw size for less breakage and longer life	
___ Can thread directly into less expensive untapped tubular rivets and bushings	
Total savings from elimination of tapping operations	

Savings Through Increased Performance of Taptite 2000® Fasteners

Advantage	Est. Cost Savings
___ Uniform driving torque, low end load requirements, and high drive-to-fail ratios	
___ Reduced assembly problems from stripped threads and unseated fasteners	
___ Lowered tool costs from extended driver, bit and socket life	
___ Reduced operator fatigue	
___ Eliminated use of waxes or lubricants	
___ Superior vibration resistance and excellent torque-tension relationship	
___ Smaller diameter or fewer screws can be used	
___ Can replace threaded inserts	
___ Can be used as an adjusting or calibrating screw	
___ Can be made captive without costly secondary operations	
___ Elimination of lock nuts, washers and other secondary locking devices	
___ Reduced need for weld and clinch nuts by utilizing extruded holes	
___ Greater use of die casting and other soft materials	
___ Improved quality and joint integrity	
___ Short point available	
___ Shorter holes can be used where hole length is restricted	
Total savings from improved performance of TAPTITE 2000® fasteners	

Overall Savings

Total savings from elimination of tapping operations _____

Total savings from improved performance of TAPTITE 2000® fasteners _____

Total savings _____

Number of gained advantages _____

The information in this manual is not to be considered a specification.

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