

SUGGESTED HOLE SIZES AT PERCENTAGES OF THREAD ENGAGEMENT

Inch Sizes	Norm Screw Size	PERCENT THREAD ENGAGEMENT PILOT HOLE SIZE													
		100	95	90(1)	85(1)	80	75	70	65	60	55	50	45	40	35
2-56		.0744	.0750	.0756	.0761	.0767	.0773	.0779	.0785	.0790	.0796	.0802	.0808	.0814	.0819
3-48		.0855	.0861	.0868	.0875	.0882	.0888	.0895	.0902	.0909	.0916	.0922	.0929	.0936	.0943
4-40		.0958	.0966	.0974	.0982	.0990	.0998	.1006	.1014	.1023	.1031	.1039	.1047	.1055	.1063
5-40		.1088	.1096	.1104	.1112	.1120	.1128	.1136	.1144	.1153	.1161	.1169	.1177	.1185	.1193
6-32		.1177	.1187	.1197	.1207	.1217	.1228	.1238	.1248	.1258	.1268	.1278	.1289	.1299	.1309
8-32		.1437	.1447	.1457	.1467	.1478	.1488	.1498	.1508	.1518	.1528	.1538	.1549	.1559	.1569
10-24		.1629	.1643	.1656	.1670	.1683	.1697	.1710	.1724	.1738	.1751	.1765	.1778	.1792	.1805
10-32		.1697	.1707	.1717	.1727	.1738	.1748	.1758	.1768	.1778	.1788	.1798	.1809	.1819	.1829
12-24		.1889	.1903	.1916	.1930	.1943	.1957	.1970	.1984	.1998	.2011	.2025	.2038	.2052	.2065
1/4-20		.2175	.2191	.2208	.2224	.2240	.2256	.2273	.2289	.2305	.2321	.2338	.2354	.2370	.2386
5/16-18		.2764	.2782	.2800	.2818	.2836	.2854	.2872	.2890	.2908	.2926	.2944	.2963	.2981	.2999
3/8-16		.3344	.3364	.3384	.3405	.3425	.3445	.3466	.3486	.3506	.3527	.3547	.3567	.3588	.3608
7/16-14		.3911	.3934	.3957	.3980	.4004	.4027	.4050	.4073	.4096	.4120	.4143	.4166	.4189	.4213
1/2-13		.4500	.4525	.4550	.4575	.4600	.4625	.4650	.4675	.4700	.4725	.4750	.4775	.4800	.4825

SUGGESTED THREAD ENGAGEMENT GUIDELINES

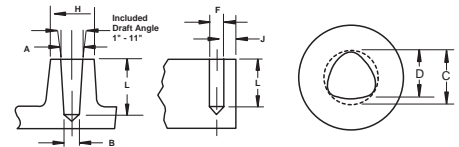
Powdered Metal or Cast Iron 50 – 65% Aluminum 70 – 80%
 Cold Rolled Steel 65 – 70% Thin Sheet Metals 80 – 95%

EXAMPLE: A 10-52 TAPTITE fastener with a 70% thread engagement requires a .1758 pilot hole.

Hole data accurately 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. Nominal screw diameters are used when calculating hole sizes. Hole sizes are based on the U.S. basic thread depth of .6495 times the pitch. Hole = D - (0.6495 x P x %). In this equation, D is equal to the nominal screw diameter. Pilot holes listed under the 90% and 85% thread engagement columns are recommended for single punch extruded holes. For pilot hole tolerance, +5% to -10% of the nominal value is recommended.

SUGGESTED HOLE SIZES FOR ALUMINUM OR ZINC DIE CASTING

In order to utilize as much available screw strength as possible, the minimum length of thread engagement should be equal to twice the diameter of the screw. For optimum performance, the hole diameter should provide 70% to 75% thread engagement.



Inch Sizes	HOLE DIA. AS CAST STD. TAPER				F Hole Diameter as Drilled	L Length of Thread Engagement	H Boss Diameter Dia. Min.	J Distance to Edge w/o Measurable Distortion Min.
	Top A		Bottom B					
	Screw Size	Max.	Min.	Max.				
2-56	.081	.078	.077	.074	.077	.172	.197	.046
3-48	.093	.090	.088	.085	.088	.198	.208	.054
4-40	.105	.102	.099	.096	.099	.224	.220	.065
5-40	.118	.115	.112	.109	.112	.250	.323	.065
6-32	.128	.125	.122	.119	.122	.276	.242	.081
8-32	.155	.152	.148	.145	.148	.328	.272	.081
10-24	.177	.174	.168	.165	.168	.380	.315	.108
10-32	.182	.179	.174	.171	.174	.380	.315	.108
12-24	.203	.200	.194	.191	.194	.432	.359	.108
1/4-20	.235	.232	.224	.221	.224	.500	.415	.230
5/16-18	.297	.294	.284	.281	.284	.625	.519	.144
3/8-16	.359	.356	.343	.340	.343	.750	.623	.162
7/16-14	.419	.416	.400	.397	.400	.875	.726	.186
1/2-13	.481	.478	.460	.457	.460	1.000	.830	.200

TYPICAL TORQUE PERFORMANCE - TAPTITE

In Cold Rolled Steel (R_b 75-90)

Inch Sizes	Plate Thickness (inch)	Hole Size (inch)	Nearest Drill Size	Thread Forming Torque (lbs./in.)	Prevailing First Removal Torque (lbs./in.)	Recom. Ass'y Torque (lbs./in.)	Failure Torque (lbs./in.)
2-56	.0469	.075	1.9mm	1-2	5-1	4	6.7*
	.0625	.076	#48	1-2	5-1	4	8-10*
	.0938	.079	#47	1-2	5-1	5	11-14*
3-48	.0625	.087	2.2mm	3-4	1-2	6	14-15*
	.0938	.089	#43	3-5	1-2	7	15-16*
	.1250	.090	#43	4-6	1-2	7	15-18*
4-40	.0312	.098	#40	2-3	1-2	6	8-11*
	.0625	.102	2.6mm	3-4	1-2	9	15-18*
	.0938	.102	2.6mm	3-4	1-2	11	22-27*
5-40	.0625	.111	#34	4-5	2-3	12	22-29*
	.0938	.113	#33	4-7	3-4	18	31-41*
	.1250	.116	#32	6-8	4-5	20	38-46*
6-32	.0625	.120	#31	4-7	3-4	14	25-30*
	.0938	.120	#31	6-9	3-5	20	35-45*
	.1250	.125	1/8	6-9	4-6	22	39-45*
8-32	.0938	.147	#26	10-13	5-7	30	65-75*
	.1250	.150	3.8mm	11-14	4-7	45	75-85*
	.1875	.150	3.8mm	16-20	8-11	45	75-95*
10-24	.0938	.172	11/64	14-18	5-8	35	65-80*
	.1250	.172	11/64	14-18	5-8	45	80-90*
	.1875	.172	11/64	17-22	9-13	55	100-115*
10-32	.0938	.173	#17	11-14	9-13	35	80-95*
	.1250	.177	#16	12-16	9-13	50	100-120*
	.1875	.177	#16	19-25	12-16	70	115-140*
12-24	.1250	.196	#9	19-24	9-12	65	95-115*
	.1875	.199	#8	21-26	9-13	75	135-155*
	.2500	.203	13/64	21-26	10-14	85	150-170*
1/4-20	.1250	.224	5.7mm	30-36	18-25	85	170-195*
	.1875	.224	5.7mm	45-55	25-35	125	205-235*
	.2500	.228	#1	55-65	25-35	125	205-235*
5/16-18	.1875	.281	K	75-85	40-50	160	380-410*
	.2500	.285	7.25mm	75-85	40-50	225	425-465*
	.3125	.285	7.25mm	80-90	55-65	250	450-500*
3/8-16	.2500	.348	S	90-100	45-55	350	825-875*
	.3125	.348	S	110-125	50-60	400	950-1000*
	.3750	.254	9mm	95-110	30-45	450	950-1000*
7/16-14	.3125	.404	Y	145-165	75-95	500	1000-1150*
	.3750	.406	13/32	145-170	60-90	600	1200-1350*
	.5000	.406	13/32	195-220	75-105	700	1400-1600*
1/2-13	.2500	.465	29/64	150-180	60-80	500	975-1075*
	.3750	.469	15/32	185-215	60-90	850	1600-1800*
	.5000	.469	15/32	235-275	75-105	1000	1900-2200*

TORQUE VALUES

The values shown are based on zinc plated hex washer head screws. This information is only an estimate of how variables, such as hole size, nut member thickness or fastener size, influence torque performance. It is important that proper testing is performed when designing an application.

- For each group of assembly variables, clamp load should be determined
- ◆ Indicates threads will most likely strip
- ✕ Indicates the fastener will most likely break