



THREAD LIMITS

Unified Thread, Machine Screw Size - Ground Thread

Size	Thread per Inch			Major Diameter (Inches)			Pitch Diameter Limits (Inches)								
	UNC	UNF	UNS	Basic	Min.	Max.	Basic Pitch Dia.	H1 Limit		H2 Limit		H3 Limit		H7 Limit	
								Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
#0	—	80	—	.0600	.0605	.0615	.0519	.0519	.0524	.0524	.0529	—	—	—	—
#1	64	—	—	.0730	.0735	.0745	.0629	.0629	.0634	.0634	.0639	—	—	—	—
	—	72	—	.0730	.0735	.0745	.0640	.0640	.0645	.0645	.0650	—	—	—	—
#2	56	—	—	.0860	.0865	.0875	.0744	.0744	.0749	.0749	.0754	—	—	—	—
	—	64	—	.0860	.0865	.0875	.0759	—	—	.0764	.0769	—	—	—	—
#3	48	—	—	.0990	.0100	.1010	.0855	.0855	.0860	.0860	.0865	—	—	—	—
	—	56	—	.0990	.0995	.1005	.0874	.0874	.0879	.0879	.0884	—	—	—	—
#4	—	—	36	.1120	.1135	.1145	.0940	—	—	.0945	.0950	—	—	—	—
	40	—	—	.1120	.1135	.1145	.0958	.0958	.0963	.0963	.0968	—	—	—	—
#5	—	48	—	.1120	.1130	.1140	.0985	.0985	.0990	.0990	.0995	—	—	—	—
	40	—	—	.1250	.1265	.1275	.1088	.1088	.1093	.1093	.1098	—	—	—	—
#6	—	44	—	.1250	.1260	.1270	.1102	—	—	.1107	.1112	—	—	—	—
	32	—	—	.1380	.1400	.1410	.1177	.1177	.1182	.1182	.1187	.1187	.1192	.1207	.1212
#8	—	40	—	.1380	.1395	.1405	.1218	.1218	.1223	.1223	.1228	—	—	—	—
	32	—	—	.1640	.1660	.1670	.1437	.1437	.1442	.1442	.1447	.1447	.1452	.1467	.1472
#10	—	36	—	.1640	.1655	.1665	.1460	—	—	.1465	.1470	—	—	—	—
	24	—	—	.1900	.1930	.1940	.1629	.1629	.1634	.1634	.1639	.1639	.1644	.1659	.1664
#12	—	32	—	.1900	.1920	.1930	.1697	.1697	.1702	.1702	.1707	.1707	.1712	.1727	.1732
	24	—	—	.2160	.2190	.2200	.1889	—	—	—	—	.1899	.1904	—	—
#12	—	28	—	.2160	.2185	.2195	.1928	—	—	—	—	.1938	.1943	—	—

Lead Tolerance

A maximum lead deviation of plus or minus .0005" within any two threads not farther apart than 1" is permitted

Pitch Diameter Limits

H1 = Basic to basic plus .0005"

H2 = Basic plus .0005" to basic plus .001"

H3 = Basic plus .001" to basic plus .0015"

H7 = Basic plus .003" to basic plus .0035"

Angle Tolerance

24 to 80 threads per inch incl. = 30 plus or minus in 1/2 angle.

Unified Thread, Machine Screw Size - Ground Thread

Size	Thread per Inch			Major Diameter (Inches)			Pitch Diameter Limits (Inches)												
	UNC	UNF	UNS	Basic	Min.	Max.	Basic Pitch Dia.	H1 Limit		H2 Limit		H3 Limit		H4 Limit		H5 Limit		H6 Limit	
								Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	20	–	–	.2500	.2540	.2550	.2175	.2175	.2180	.2180	.2185	.2185	.2190	–	–	.2195	.2200	–	–
	–	28	–	.2500	.2525	.2535	.2268	.2268	.2273	.2273	.2278	.2278	.2283	.2283	.2288	–	–	–	–
5/16	18	–	–	.3125	.3170	.3180	.2764	.2764	.2769	.2769	.2774	.2774	.2779	–	–	.2784	.2789	–	–
	–	24	–	.3125	.3155	.3165	.2854	.2854	.2859	.2859	.2864	.2864	.2869	.2869	.2874	–	–	–	–
3/8	16	–	–	.3750	.3800	.3810	.3344	.3344	.3349	.3349	.3354	.3354	.3359	–	–	.3364	.3369	–	–
	–	24	–	.3750	.3780	.3790	.3479	.3479	.3484	.3484	.3489	.3489	.3494	.3494	.3499	–	–	–	–
7/16	14	–	–	.4375	.4435	.4445	.3911	–	–	.3916	.3921	.3921	.3926	–	–	.3931	.3936	–	–
	–	20	–	.4375	.4415	.4425	.4050	–	–	–	–	.4060	.4065	–	–	.4070	.4075	–	–
1/2	13	–	–	.5000	.5065	.5075	.4500	.4500	.4505	.4505	.4510	.4510	.4515	–	–	.4520	.4525	–	–
	–	20	–	.5000	.5040	.5050	.4675	.4675	.4680	.4680	.4685	.4685	.4690	–	–	.4695	.4700	–	–
9/16	12	–	–	.5625	.5690	.5700	.5084	–	–	.5089	.5094	.5094	.5099	–	–	.5104	.5109	–	–
	–	18	–	.5625	.5670	.5680	.5264	–	–	.5269	.5274	.5274	.5279	–	–	.5284	.5289	–	–
5/8	11	–	–	.6250	.6320	.6330	.5660	–	–	.5665	.5670	.5670	.5675	–	–	.5680	.5685	–	–
	–	18	–	.6250	.6295	.6305	.5889	–	–	.5894	.5899	.5899	.5904	–	–	.5909	.5914	–	–
11/16	–	–	11	.6875	.6945	.6955	.6285	–	–	–	–	.6295	.6300	–	–	–	–	–	–
	–	–	16	.6875	.6925	.6935	.6469	–	–	.6855	.6860	.6479	.6484	–	–	–	–	–	–
3/4	10	–	–	.7500	.7525	.7590	.6850	.6850	.6855	.7099	.7104	.6860	.6865	–	–	.6870	.6875	–	–
	–	16	–	.7500	.7550	.7560	.7094	.7094	.7099	–	–	.7104	.7109	–	–	.7114	.7119	.8053	–
7/8	9	–	–	.8750	.8835	.8850	.8028	–	–	.8291	.8296	–	–	.8043	.8048	–	–	.8311	.8058
	–	14	–	.8750	.8810	.8820	.8286	–	–	.9193	.9198	–	–	.8301	.8306	–	–	.9213	.8318
1	8	–	–	1.0000	1.0095	1.0110	.9188	–	–	–	–	–	–	.9203	.9208	–	–	–	.9218
	–	12	–	1.0000	1.0065	1.0075	.9459	–	–	–	–	–	–	.9474	.9479	–	–	–	–
	–	–	14	1.0000	1.0060	1.0070	.9536	–	–	–	–	–	–	.9551	.9556	–	–	–	–

Lead Tolerance

A maximum lead deviation of plus or minus .0005" within any two threads not farther apart than 1" is permitted

Pitch Diameter Limits

H1 = Basic to basic plus .0005"

H2 = Basic plus .0005" to basic plus .001"

H3 = Basic plus .001" to basic plus .0015"

H4 = Basic plus .0015" to basic plus .0020"

H5 = Basic plus .0020" to basic plus .0025"

H6 = Basic plus .0025" to basic plus .0030"

Angle Tolerance

Threads per Inch	Deviation in Half Angle
6 to 9 Incl.	25' Plus or Minus
10 to 28 Incl.	30' Plus or Minus


Metric Thread - Ground Thread

Size	Pitch		Major Diameter (Inches)			Pitch Diameter Limits (Inches)										
	Coarse	Fine	Basic	Min.	Max.	Basic Pitch Dia.	D2 Limit		D3 Limit		D4 Limit		D5 Limit		D6 Limit	
							Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
M2	0.4	—	.0787	.0801	.0811	.0685	.0690	.0696	.0695	.0701	.0700	.0706	—	—	—	—
M2.2	0.45	—	.0866	.0881	.0891	.0751	.0756	.0762	.0761	.0767	.0766	.0772	—	—	—	—
M2.3	0.4	—	.0906	.0919	.0929	.0803	.0808	.0814	.0813	.0819	.0818	.0824	—	—	—	—
M2.6	0.45	—	.1024	.1038	.1048	.0909	.0913	.0919	.0918	.0924	.0923	.0929	—	—	—	—
M3	0.5	—	.1181	.1198	.1208	.1053	.1058	.1064	.1063	.1069	.1068	.1074	.1073	.1079	—	—
	—	0.35	.1181	.1193	.1203	.1092	.1096	.1102	.1101	.1107	.1106	.1112	.1111	.1117	—	—
M3.5	0.6	—	.1378	.1397	.1407	.1225	.1227	.1235	.1232	.1240	.1237	.1245	.1242	.1250	—	—
	—	0.35	.1378	.1389	.1399	.1289	.1293	.1299	.1298	.1304	.1303	.1309	.1308	.1314	—	—
M4	0.7	—	.1575	.1597	.1613	.1396	.1398	.1406	.1403	.1411	.1408	.1416	.1413	.1421	—	—
	—	0.5	.1575	.1591	.1601	.1447	.1451	.1457	.1456	.1462	.1461	.1467	.1466	.1472	—	—
M5	0.8	—	.1969	.1994	.2010	.1764	.1766	.1774	.1771	.1779	.1776	.1784	.1781	.1789	—	—
	—	0.5	.1969	.1985	.1995	.1841	.1845	.1851	.1850	.1856	.1855	.1861	.1861	.1866	—	—
M6	1	—	.2362	.2395	.2411	.2106	.2107	.2117	.2112	.2122	.2117	.2127	.2122	.2132	.2127	.2137
	—	0.75	.2362	.2387	.2403	.2170	.2173	.2181	.2178	.2186	.2183	.2191	.2188	.2196	.2193	.2201
M7	1	—	.2756	.2788	.2804	.2500	.2501	.2511	.2506	.2516	.2511	.2521	.2516	.2526	.2521	.2531
	—	0.75	.2756	.2780	.2796	.2564	.2565	.2575	.2570	.2580	.2575	.2585	.2580	.2590	.2585	.2595
M8	1.25	—	.3150	.3189	.3214	.2830	.2828	.2840	.2833	.2845	.2838	.2850	.2843	.2855	.2848	.2860
	—	1	.3150	.3182	.3198	.2894	.2894	.2904	.2899	.2909	.2904	.2914	.2909	.2919	.2914	.2924
	1.5	—	.3937	.3984	.4009	.3553	.3552	.3564	.3557	.3569	.3562	.3574	.3567	.3579	.3572	.3584
M10	—	1.25	.3937	.3976	.4001	.3617	.3616	.3628	.3621	.3633	.3626	.3638	.3631	.3643	.3636	.3648
	—	1	.3937	.3969	.3985	.3681	.3682	.3692	.3687	.3697	.3692	.3702	.3697	.3707	.3702	.3712
M12	1.75	—	.4724	.4780	.4805	.4277	.4275	.4287	.4280	.4292	.4285	.4297	.4290	.4302	.4295	.4307
	—	1.5	.4724	.4772	.4797	.4341	.4339	.4351	.4344	.4356	.4349	.4361	.4354	.4366	.4359	.4371
M12	—	1.25	.4724	.4764	.4789	.4405	.4403	.4415	.4408	.4420	.4413	.4425	.4418	.4430	.4423	.4435

Lead Tolerance

The tap major and pitch diameter conversions have been rounded upward.

A maximum lead deviation of +/- .0005" within any two threads not further apart than 1" is permitted

Angle Tolerance

Pitch(mm)	Deviation in Half Angle
Over 0.25 to 2.5 Incl.	30' Plus or Minus
Over 2.5 to 4.0 Incl.	25' Plus or Minus

Metric Thread - Ground Thread

Size	Pitch		Major Diameter (Inches)			Pitch Diameter Limits (Inches)								
	Coarse	Fine	Basic	Min.	Max.	Basic Pitch Dia.	D2 Limit		D3 Limit		D4 Limit		D5 Limit	
							Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
M14	2	–	.5512	.5575	.5600	.5000	.5015	.5031	.5020	.5036	.5025	.5041	–	–
	–	1.5	.5512	.5559	.5584	.5128	.5147	.5159	.5152	.5164	.5157	.5169	–	–
	–	1.25	.5512	.5551	.5576	.5192	.5211	.5223	.5216	.5228	.5221	.5233	–	–
M16	2	–	.6299	.6363	.6388	.5788	.5802	.5818	.5807	.5823	.5812	.5828	–	–
	–	1.5	.6299	.6347	.6372	.5916	.5934	.5946	.5939	.5951	.5944	.5956	–	–
M18	2.5	–	.7087	.7166	.7191	.6448	.6462	.6478	.6467	.6483	.6472	.6488	–	–
	–	2	.7087	.7150	.7175	.6576	.6590	.6606	.6595	.6611	.6600	.6616	–	–
	–	1.5	.7087	.7134	.7159	.6703	.6722	.6734	.6727	.6739	.6732	.6744	–	–
M20	2.5	–	.7874	.7953	.7976	.7235	.7249	.7265	.7254	.7270	.7259	.7275	–	–
	–	2	.7874	.7937	.7962	.7363	.7377	.7393	.7382	.7398	.7387	.7403	–	–
	–	1.5	.7874	.7921	.7946	.7490	.7509	.7521	.7514	.7526	.7519	.7531	–	–
	–	1	.7874	.7906	.7922	.7618	.7639	.7649	.7644	.7654	.7649	.7659	–	–
M22	2.5	–	.8661	.8741	.8766	.8022	.8037	.8053	.8042	.8058	.8047	.8063	–	–
	–	2	.8661	.8725	.8750	.8150	.8164	.8180	.8169	.8185	.8174	.8190	–	–
	–	1.5	.8661	.8709	.8734	.8278	.8296	.8308	.8301	.8313	.8306	.8318	–	–
	–	1	.8661	.8694	.8710	.8406	.8426	.8436	.8431	.8441	.8436	.8446	–	–
M24	3	–	.9449	.9544	.9583	.8682	.8696	.8712	.8701	.8717	.8706	.8722	.8711	.8727
	–	2	.9449	.9512	.9537	.8938	.8952	.8968	.8957	.8973	.8962	.8978	–	–
	–	1.5	.9449	.9496	.9521	.9065	.9084	.9096	.9089	.9101	.9094	.9106	–	–
	–	1	.9449	.9481	.9497	.9193	.9214	.9224	.9219	.9229	.9224	.9234	–	–
M27	3	–	1.0630	1.0725	1.0764	.9863	.9873	.9893	.9878	.9898	.9883	.9903	.9888	.9908
	–	2	1.0630	1.0693	1.0718	1.0118	1.0133	1.0149	1.0138	1.0154	1.0143	1.0159	–	–
	–	1.5	1.0630	1.0677	1.0702	1.0246	1.0265	1.0277	1.0270	1.0282	1.0275	1.0287	–	–
	–	1	1.0630	1.0662	1.0678	1.0374	1.0393	1.0405	1.0398	1.0410	1.0403	1.0415	–	–
M28	–	2	1.1024	1.1087	1.1112	1.0512	1.0527	1.0543	1.0532	1.0548	1.0537	1.0553	–	–
	–	1.5	1.1024	1.1071	1.1096	1.0640	1.0659	1.0671	1.0664	1.0676	1.0669	1.0681	–	–
	–	1	1.1024	1.1056	1.1072	1.0768	1.0786	1.0798	1.0791	1.0803	1.0796	1.0808	–	–
M30	3.5	–	1.1811	1.1921	1.1961	1.0916	1.0926	1.0946	1.0931	1.0951	1.0936	1.0956	1.0941	1.0961
	–	3	1.1811	1.1906	1.1945	1.1044	1.1054	1.1074	1.1059	1.1079	1.1064	1.1084	1.1069	1.1089
	–	2	1.1811	1.1874	1.1899	1.1300	1.1314	1.1330	1.1319	1.1335	1.1324	1.1340	–	–
	–	1.5	1.1811	1.1858	1.1883	1.1427	1.1446	1.1458	1.1451	1.1463	1.1456	1.1468	–	–
M33	3.5	–	1.2992	1.3103	1.3142	1.2097	1.2108	1.2128	1.2113	1.2133	1.2118	1.2138	1.2123	1.2143
	–	3	1.2992	1.3088	1.3127	1.2225	1.2235	1.2255	1.2240	1.2260	1.2245	1.2265	1.2250	1.2270
	–	2	1.2992	1.3056	1.3081	1.2481	1.2495	1.2511	1.2500	1.2516	1.2505	1.2521	–	–
	–	1.5	1.2992	1.3040	1.3065	1.2609	1.2627	1.2639	1.2632	1.2644	1.2637	1.2649	–	–


Pipe Tap (Limit)

Nominal Size Inches	Threads per Inch	Projection* Inches	Projection Tolerance + or -	Taper per Foot Limits		Reference Dimensions	
				Min.	Max.	Length [L ₁]	Tap Drill Size** NPT, ANPT, NPTF
1/16	27	.312	.063	.719	.781	.160	C
1/8	27	.312	.063	.719	.781	.1615	Q
1/8	18	.459	.063	.719	.781	.2278	7/16
3/8	18	.454	.063	.719	.781	.240	9/16
1/2	14	.579	.063	.719	.781	.320	45/64
3/4	14	.565	.063	.719	.781	.339	29/32
1	11-1/2	.678	.094	.719	.781	.400	1-9/64
1-1/4	11-1/2	.686	.094	.719	.781	.420	1-31/64
1-1/2	11-1/2	.699	.094	.719	.781	.420	1-23/32
2	11-1/2	.667	.094	.719	.781	.436	2-3/16
2-1/2	8	.925	.094	.734	.781	.682	2-39/64
3	8	.925	.094	.734	.781	.766	3-15/64
3-1/2	8	.938	.125	.734	.781	.821	...
4	8	.950	.125	.734	.781	.844	...

* Distance small end of tap projects through L1 Taper Thread Ring Gage.

** Recommended size given permit direct tapping without reaming the hole, but only give a full thread for approx. the L1 length.

