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AMERICAN NATIONAL SCREW THREAD TABLES FOR SHOP USE

I. Standard Threads
(Coarse and Fine Thread Series)

MISCELLANEOUS PUBLICATION OF THE BUREAU OF STANDARDS, No. 98

UNITED STATES DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary

BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

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[Recommended Commercial Standard]

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I. STANDARD THREADS (COARSE AND FINE THREAD SERIES)

ABSTRACT

This publication makes available for convenient use six of the most essential tables of dimensions of fastening screws as published in the 1928 Report of the National Screw Thread Commission (Sec. III and Appendix 4), Bureau of Standards Miscellaneous Publication No. 89.¹ These tables cover the basic sizes, limiting dimensions, tolerances, and tap-drill sizes for the American National coarse and fine thread series.

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FIGURE 3.—American National form of thread

NOTE: No allowance is shown. This condition exists in class 2, free fit, and class 3, medium fit, where both the minimum nut and the maximum screw are basic.

NOTATION

n = number of threads per inch
 $H = 0.866025 p$, depth of 60° sharp V thread
 $h = 0.649519 p$, depth of American National form of thread
 $5/6 h = 0.541266 p$, maximum depth of engagement
 $F = 0.125000 p$, width of flat at crest and root of American National form
 $f = 0.108253 p$
 $= 1/8 H$
 $= 1/8 h$

¹ The complete report may be procured from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., at 50 cents per copy.

FIGURE 7.—Illustration of tolerances and crest clearances for class 2, free fit

I. AMERICAN NATIONAL COARSE-THREAD SERIES

The American National coarse-thread series is recommended for general use in engineering work, in machine construction where conditions are favorable to the use of bolts, screws, and other threaded components where quick and easy assembly of the parts is desired, and for all work where conditions do not require the use of fine-pitch threads.

TABLE 1.—American National coarse-thread series

Identification		Basic diameters			Thread data						
Sizes	Threads per inch n	Major diameter D	Pitch diameter E	Minor diameter K	Metric equivalent of major diameter	Pitch p	Depth of thread h	Basic width of flat $p/8$	Minimum width of flat at major diameter of nut $p/24$	Helix angle at basic pitch diameter s	Basic area of section at root of thread $\frac{\pi K^2}{4}$
1	2	3	4	5	6	7	8	9	10	11	12
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>mm</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	$^{\circ}$ $'$	<i>Sq. in.</i>
1-----	64	0.073	0.0629	0.0527	1.854	0.01562	0.01015	0.00195	0.00065	4 31	0.0022
2-----	56	.086	.0744	.0628	2.184	.01786	.01160	.00223	.00074	4 22	.0031
3-----	48	.099	.0855	.0719	2.515	.02083	.01353	.00260	.00087	4 26	.0041
4-----	40	.112	.0958	.0795	2.845	.02500	.01624	.00312	.00104	4 45	.0050
5-----	40	.125	.1088	.0925	3.175	.02500	.01624	.00312	.00104	4 11	.0067
6-----	32	.138	.1177	.0974	3.505	.03125	.02030	.00391	.00130	4 50	.0075
8-----	32	.164	.1437	.1234	4.166	.03125	.02030	.00391	.00130	3 58	.0120
10-----	24	.190	.1629	.1359	4.826	.04167	.02706	.00521	.00174	4 39	.0145
12-----	24	.216	.1889	.1619	5.486	.04167	.02706	.00521	.00174	4 1	.0206
1/4-----	20	.2500	.2175	.1850	6.350	.05000	.03248	.00625	.00208	4 11	.0269
5/16-----	18	.3125	.2764	.2403	7.938	.05556	.03608	.00694	.00231	3 40	.0454
3/8-----	16	.3750	.3344	.2938	9.525	.06250	.04059	.00781	.00260	3 24	.0678
7/16-----	14	.4375	.3911	.3447	11.113	.07143	.04639	.00893	.00298	3 20	.0933
1/2-----	13	.5000	.4500	.4001	12.700	.07692	.04996	.00962	.00321	3 7	.1257
5/8-----	12	.5625	.5084	.4542	14.288	.08333	.05413	.01042	.00347	2 59	.1620
3/4-----	11	.6250	.5660	.5069	15.875	.09091	.05905	.01136	.00379	2 56	.2018
7/8-----	10	.7500	.6850	.6201	19.050	.10000	.06495	.01250	.00417	2 40	.3020
1-----	9	.8750	.8028	.7307	22.225	.11111	.07217	.01389	.00463	2 31	.4193
1-----	8	1.0000	.9188	.8376	25.400	.12500	.08119	.01562	.00521	2 29	.5510
1 1/8-----	7	1.1250	1.0322	.9394	28.575	.14286	.09279	.01786	.00595	2 31	.6931
1 1/4-----	7	1.2500	1.1572	1.0644	31.750	.14286	.09279	.01786	.00595	2 15	.8898
1 1/2-----	6	1.5000	1.3917	1.2835	38.100	.16667	.10825	.02083	.00694	2 11	1.2938
1 3/4-----	5	1.7500	1.6201	1.4902	44.450	.20000	.12990	.02500	.00833	2 15	1.7441
2-----	4 1/2	2.0000	1.8557	1.7113	50.800	.22222	.14434	.02778	.00926	2 11	2.3001
2 1/4-----	4 1/2	2.2500	2.1057	1.9613	57.150	.22222	.14434	.02778	.00926	1 55	3.0212
2 1/2-----	4	2.5000	2.3376	2.1752	63.500	.25000	.16238	.03125	.01042	1 57	3.7161
2 3/4-----	4	2.7500	2.5876	2.4252	69.850	.25000	.16238	.03125	.01042	1 46	4.6194
3 ¹ -----	4	3.0000	2.8376	2.6752	76.200	.25000	.16238	.03125	.01042	1 36	5.6209
3-----	3 1/2	3.0000	2.8144	2.6288	76.200	.28571	.18558	.03571	.01190	1 51	5.4276

¹ Optional. Standard for marine work.

TABLE 15.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series

1	Machine screw number						
	1	2	3	4	5	6	8
	Threads per inch						
	64	56	48	40	40	32	32
1	2	3	4	5	6	7	8
BOLTS AND SCREWS							
Class 1, major diameter	Inch	Inch	Inch	Inch	Inch	Inch	Inch
	Max--	0. 0723	0. 0852	0. 0981	0. 1110	0. 1240	0. 1369
	Min--	. 0671	. 0796	. 0919	. 1042	. 1172	. 1293
Classes 2, 3, and 4, major diameter	Tol--	. 0052	. 0056	. 0062	. 0068	. 0068	. 0076
	Max--	. 0730	. 0860	. 0990	. 1120	. 1250	. 1380
	Min--	. 0692	. 0820	. 0946	. 1072	. 1202	. 1326
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)	Tol--	. 0038	. 0040	. 0044	. 0048	. 0048	. 0054
	Max--	. 0730	. 0860	. 0990	. 1120	. 1250	. 1380
	Min--	. 0678	. 0804	. 0928	. 1052	. 1182	. 1304
Class 1, minor diameter	Tol--	. 0052	. 0056	. 0062	. 0068	. 0068	. 0076
	Max. ¹	. 0531	. 0633	. 0725	. 0803	. 0933	. 0986
	Max. ¹	. 0538	. 0641	. 0734	. 0813	. 0943	. 0997
Class 1, loose fit, pitch diameter	Max--	. 0622	. 0736	. 0846	. 0948	. 1078	. 1166
	Min--	. 0596	. 0708	. 0815	. 0914	. 1044	. 1128
	Tol--	. 0026	. 0028	. 0031	. 0034	. 0034	. 0038
Class 2, free fit, pitch diameter	Max--	. 0629	. 0744	. 0855	. 0958	. 1088	. 1177
	Min--	. 0610	. 0724	. 0833	. 0934	. 1064	. 1150
	Tol--	. 0019	. 0020	. 0022	. 0024	. 0024	. 0027
Class 3, medium fit, pitch diameter	Max--	. 0629	. 0744	. 0855	. 0958	. 1088	. 1177
	Min--	. 0615	. 0729	. 0839	. 0941	. 1071	. 1158
	Tol--	. 0014	. 0015	. 0016	. 0017	. 0017	. 0019
Class 4, close fit, pitch diameter	Max--	. 0630	. 0746	. 0857	. 0960	. 1090	. 1179
	Min--	. 0623	. 0739	. 0849	. 0951	. 1081	. 1169
	Tol--	. 0007	. 0007	. 0008	. 0009	. 0009	. 0010
NUTS AND TAPPED HOLES							
Classes 1, 2, 3, and 4, major diameter	Min. ²	. 0730	. 0860	. 0990	. 1120	. 1250	. 1380
Classes 1, 2, 3, and 4, minor diameter	Max--	. 0604	. 0715	. 0820	. 0913	. 1043	. 1118
	Min--	. 0561	. 0667	. 0764	. 0849	. 0979	. 1042
	Tol--	. 0043	. 0048	. 0056	. 0064	. 0064	. 0076
Classes 1, 2, 3, and 4, pitch diameter	Min--	. 0629	. 0744	. 0855	. 0958	. 1088	. 1177
Class 1, loose fit, pitch diameter	Max--	. 0655	. 0772	. 0886	. 0992	. 1122	. 1215
	Tol--	. 0026	. 0028	. 0031	. 0034	. 0034	. 0038
Class 2, free fit, pitch diameter	Max--	. 0648	. 0764	. 0877	. 0982	. 1112	. 1204
	Tol--	. 0019	. 0020	. 0022	. 0024	. 0024	. 0027
Class 3, medium fit, pitch diameter	Max--	. 0643	. 0759	. 0871	. 0975	. 1105	. 1196
	Tol--	. 0014	. 0015	. 0016	. 0017	. 0017	. 0019
Class 4, close fit, pitch diameter	Max--	. 0636	. 0751	. 0863	. 0967	. 1097	. 1187
	Tol--	. 0007	. 0007	. 0008	. 0009	. 0009	. 0010

¹ See footnote 1 on page 12. ² See footnote 2 on page 12.

TABLE 15.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series—Continued

	Machine screw number or nominal size						
	10	12	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$
	Threads per inch						
	24	24	20	18	16	14	13
1	9	10	11	12	13	14	15
BOLTS AND SCREWS							
Class 1, major diameter-----	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>
	{Max--	0. 1887	0. 2147	0. 2485	0. 3109	0. 3732	0. 4354
	{Min--	. 1795	. 2055	. 2383	. 2995	. 3606	. 4214
Classes 2, 3, and 4, major diameter-----	{Max--	. 1900	. 2160	. 2500	. 3125	. 3750	. 4375
	{Min--	. 1834	. 2094	. 2428	. 3043	. 3660	. 4277
	{Tol---	. 0066	. 0066	. 0072	. 0082	. 0090	. 0098
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)-----	{Max--	. 1900	. 2160	. 2500	. 3125	. 3750	. 4375
	{Min--	. 1808	. 2068	. 2398	. 3011	. 3624	. 4235
	{Tol---	. 0092	. 0092	. 0102	. 0114	. 0126	. 0140
Class 1, minor diameter-----	Max. ¹	. 1376	. 1636	. 1872	. 2427	. 2965	. 3478
Classes 2, 3, and 4, minor diameter-----	Max. ¹	. 1389	. 1649	. 1887	. 2443	. 2983	. 3499
Class 1, loose fit, pitch diameter-----	{Max--	. 1616	. 1876	. 2160	. 2748	. 3326	. 3890
	{Min--	. 1570	. 1830	. 2109	. 2691	. 3263	. 3820
	{Tol---	. 0046	. 0046	. 0051	. 0057	. 0063	. 0070
Class 2, free fit, pitch diameter-----	{Max--	. 1629	. 1889	. 2175	. 2764	. 3344	. 3911
	{Min--	. 1596	. 1856	. 2139	. 2723	. 3299	. 3862
	{Tol---	. 0033	. 0033	. 0036	. 0041	. 0045	. 0049
Class 3, medium fit, pitch diameter-----	{Max--	. 1629	. 1889	. 2175	. 2764	. 3344	. 3911
	{Min--	. 1605	. 1865	. 2149	. 2734	. 3312	. 3875
	{Tol---	. 0024	. 0024	. 0026	. 0030	. 0032	. 0036
Class 4, close fit, pitch diameter-----	{Max--	. 1632	. 1892	. 2178	. 2767	. 3348	. 3915
	{Min--	. 1620	. 1880	. 2165	. 2752	. 3332	. 3897
	{Tol---	. 0012	. 0012	. 0013	. 0015	. 0016	. 0018
NUTS AND TAPPED HOLES							
Classes 1, 2, 3, and 4, major diameter-----	Min. ²	. 1900	. 2160	. 2500	. 3125	. 3750	. 4375
Classes 1, 2, 3, and 4, minor diameter-----	{Max--	. 1541	. 1801	. 2060	. 2630	. 3184	. 3721
	{Min--	. 1449	. 1709	. 1959	. 2524	. 3073	. 3602
	{Tol---	. 0092	. 0092	. 0101	. 0106	. 0111	. 0119
Classes 1, 2, 3, and 4, pitch diameter-----	Min--	. 1629	. 1889	. 2175	. 2764	. 3344	. 3911
Class 1, loose fit, pitch diameter-----	{Max--	. 1675	. 1935	. 2226	. 2821	. 3407	. 3981
	{Tol---	. 0046	. 0046	. 0051	. 0057	. 0063	. 0070
Class 2, free fit, pitch diameter-----	{Max--	. 1662	. 1922	. 2211	. 2805	. 3389	. 3960
	{Tol---	. 0033	. 0033	. 0036	. 0041	. 0045	. 0049
Class 3, medium fit, pitch diameter-----	{Max--	. 1653	. 1913	. 2201	. 2794	. 3376	. 3947
	{Tol---	. 0024	. 0024	. 0026	. 0030	. 0032	. 0036
Class 4, close fit, pitch diameter-----	{Max--	. 1641	. 1901	. 2188	. 2779	. 3360	. 3929
	{Tol---	. 0012	. 0012	. 0013	. 0015	. 0016	. 0018

¹ See footnote 1 on page 12.

² See footnote 2 on page 12.

TABLE 15.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series—Continued

1	Sizes							
	⅜	½	¾	1	1 ⅛	1 ¼	1 ½	
	Threads per inch							
	12	11	10	9	8	7	7	6
1	16	17	18	19	20	21	22	23
BOLTS AND SCREWS								
Class 1, major diameter	Inch	Inch	Inch	Inch	Inch	Inches	Inches	Inches
	Max--	0. 5601	0. 6224	0. 7472	0. 8719	0. 9966	1. 1211	1. 2461
	Min--	. 5443	. 6054	. 7288	. 8519	. 9744	1. 0963	1. 2213
	Tol--	. 0158	. 0170	. 0184	. 0200	. 0222	. 0248	. 0290
Classes 2, 3, and 4, major diameter	Max--	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500
	Min--	. 5513	. 6132	. 7372	. 8610	. 9848	1. 1080	1. 2330
	Tol--	. 0112	. 0118	. 0128	. 0140	. 0152	. 0170	. 0202
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)	Max--	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 2500	1. 5000
	Min--	. 5467	. 6080	. 7316	. 8550	. 9778	1. 1002	1. 2252
	Tol--	. 0158	. 0170	. 0184	. 0200	. 0222	. 0248	. 0290
Class 1, minor diameter	Max. ¹	. 4579	. 5109	. 6245	. 7356	. 8432	. 9458	1. 0708
	Max. ¹	. 4603	. 5135	. 6273	. 7387	. 8466	. 9497	1. 0747
	Max. ¹	. 4603	. 5135	. 6273	. 7387	. 8466	. 9497	1. 0747
Class 1, loose fit, pitch diameter	Max--	. 5060	. 5634	. 6822	. 7997	. 9154	1. 0283	1. 1533
	Min--	. 4981	. 5549	. 6730	. 7897	. 9043	1. 0159	1. 1409
	Tol--	. 0079	. 0085	. 0092	. 0100	. 0111	. 0124	. 0145
Class 2, free fit, pitch diameter	Max--	. 5084	. 5660	. 6850	. 8028	. 9188	1. 0322	1. 1572
	Min--	. 5028	. 5601	. 6786	. 7958	. 9112	1. 0237	1. 1487
	Tol--	. 0056	. 0059	. 0064	. 0070	. 0076	. 0085	. 0101
Class 3, medium fit, pitch diameter	Max--	. 5084	. 5660	. 6850	. 8028	. 9188	1. 0322	1. 1572
	Min--	. 5044	. 5618	. 6805	. 7979	. 9134	1. 0263	1. 1513
	Tol--	. 0040	. 0042	. 0045	. 0049	. 0054	. 0059	. 0071
Class 4, close fit, pitch diameter	Max--	. 5089	. 5665	. 6856	. 8034	. 9195	1. 0330	1. 1580
	Min--	. 5069	. 5644	. 6833	. 8010	. 9168	1. 0300	1. 1550
	Tol--	. 0020	. 0021	. 0023	. 0024	. 0027	. 0030	. 0036
NUTS AND TAPPED HOLES								
Classes 1, 2, 3, and 4, major diameter	Min. ²	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500
	Min. ²	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500
Classes 1, 2, 3, and 4, minor diameter	Max--	. 4850	. 5397	. 6553	. 7689	. 8795	. 9858	1. 1108
	Min--	. 4723	. 5266	. 6417	. 7547	. 8647	. 9704	1. 0954
	Tol--	. 0127	. 0131	. 0136	. 0142	. 0148	. 0154	. 0180
Classes 1, 2, 3, and 4, pitch diameter	Min--	. 5084	. 5660	. 6850	. 8028	. 9188	1. 0322	1. 1572
	Min--	. 5084	. 5660	. 6850	. 8028	. 9188	1. 0322	1. 1572
Class 1, loose fit, pitch diameter	Max--	. 5163	. 5745	. 6942	. 8128	. 9299	1. 0446	1. 1696
	Tol--	. 0079	. 0085	. 0092	. 0100	. 0111	. 0124	. 0145
Class 2, free fit, pitch diameter	Max--	. 5140	. 5719	. 6914	. 8098	. 9264	1. 0407	1. 1657
	Tol--	. 0056	. 0059	. 0064	. 0070	. 0076	. 0085	. 0101
Class 3, medium fit, pitch diameter	Max--	. 5124	. 5702	. 6895	. 8077	. 9242	1. 0381	1. 1631
	Tol--	. 0040	. 0042	. 0045	. 0049	. 0054	. 0059	. 0071
Class 4, close fit, pitch diameter	Max--	. 5104	. 5681	. 6873	. 8052	. 9215	1. 0352	1. 1602
	Tol--	. 0020	. 0021	. 0023	. 0024	. 0027	. 0030	. 0036

¹ See footnote 1 on page 12.

² See footnote 2 on page 12.

TABLE 15.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National coarse-thread series—Continued

	Sizes						
	1¾	2	2¼	2½	2¾	3	3
	Threads per inch						
	5	4½	4½	4	4	4	3½
1	24	25	26	27	28	29	30
BOLTS AND SCREWS							
	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
Class 1, major diameter-----	{ Max-- 1.7448	1.9943	2.2443	2.4936	2.7436	2.9936	2.9927
	{ Min-- 1.7110	1.9575	2.2075	2.4528	2.7028	2.9528	2.9469
	{ Tol-- .0338	.0368	.0368	.0408	.0408	.0408	.0458
Classes 2, 3, and 4, major diameter-----	{ Max-- 1.7500	2.0000	2.2500	2.5000	2.7500	3.0000	3.0000
	{ Min-- 1.7268	1.9746	2.2246	2.4720	2.7220	2.9720	2.9686
	{ Tol-- .0232	.0254	.0254	.0280	.0280	.0280	.0314
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)-----	{ Max-- 1.7500	2.0000	2.2500	2.5000	2.7500	3.0000	3.0000
	{ Min-- 1.7162	1.9632	2.2132	2.4592	2.7092	2.9592	2.9542
	{ Tol-- .0338	.0368	.0368	.0408	.0408	.0408	.0458
Class 1, minor diameter-----	Max. ¹ 1.4994	1.7217	1.9717	2.1869	2.4369	2.6869	2.6421
Classes 2, 3, and 4, minor diameter-----	Max. ¹ 1.5046	1.7274	1.9774	2.1933	2.4433	2.6933	2.6494
Class 1, loose fit, pitch diameter-----	{ Max-- 1.6149	1.8500	2.1000	2.3312	2.5812	2.8312	2.8071
	{ Min-- 1.5980	1.8316	2.0816	2.3108	2.5608	2.8108	2.7842
	{ Tol-- .0169	.0184	.0184	.0204	.0204	.0204	.0229
Class 2, free fit, pitch diameter-----	{ Max-- 1.6201	1.8557	2.1057	2.3376	2.5876	2.8376	2.8144
	{ Min-- 1.6085	1.8430	2.0930	2.3236	2.5736	2.8236	2.7987
	{ Tol-- .0116	.0127	.0127	.0140	.0140	.0140	.0157
Class 3, medium fit, pitch diameter-----	{ Max-- 1.6201	1.8557	2.1057	2.3376	2.5876	2.8376	2.8144
	{ Min-- 1.6119	1.8468	2.0968	2.3279	2.5779	2.8279	2.8037
	{ Tol-- .0082	.0089	.0089	.0097	.0097	.0097	.0107
Class 4, close fit, pitch diameter-----	{ Max-- 1.6211	1.8568	2.1068	2.3389	2.5889	2.8389	2.8160
	{ Min-- 1.6170	1.8524	2.1024	2.3341	2.5841	2.8341	2.8107
	{ Tol-- .0041	.0044	.0044	.0048	.0048	.0048	.0053
NUTS AND TAPPED HOLES							
Classes 1, 2, 3, and 4, major diameter-----	Min. ² 1.7500	2.0000	2.2500	2.5000	2.7500	3.0000	3.0000
Classes 1, 2, 3, and 4, minor diameter-----	{ Max-- 1.5551	1.7835	2.0335	2.2564	2.5064	2.7564	2.7216
	{ Min-- 1.5335	1.7594	2.0094	2.2294	2.4794	2.7294	2.6907
	{ Tol-- .0216	.0241	.0241	.0270	.0270	.0270	.0309
Classes 1, 2, 3, and 4, pitch diameter-----	Min-- 1.6201	1.8557	2.1057	2.3376	2.5876	2.8376	2.8144
Class 1, loose fit, pitch diameter-----	{ Max-- 1.6370	1.8741	2.1241	2.3580	2.6080	2.8580	2.8373
	{ Tol-- .0169	.0184	.0184	.0204	.0204	.0204	.0229
Class 2, free fit, pitch diameter-----	{ Max-- 1.6317	1.8684	2.1184	2.3516	2.6016	2.8516	2.8301
	{ Tol-- .0116	.0127	.0127	.0140	.0140	.0140	.0157
Class 3, medium fit, pitch diameter-----	{ Max-- 1.6283	1.8646	2.1146	2.3473	2.5973	2.8473	2.8251
	{ Tol-- .0082	.0089	.0089	.0097	.0097	.0097	.0107
Class 4, close fit, pitch diameter-----	{ Max-- 1.6242	1.8601	2.1101	2.3424	2.5924	2.8424	2.8197
	{ Tol-- .0041	.0044	.0044	.0048	.0048	.0048	.0053

¹ See footnote 1 on page 12.

² See footnote 2 on page 12.

II. AMERICAN NATIONAL FINE-THREAD SERIES

The American National fine-thread series is recommended for general use in automotive and aircraft work, for use where the design requires both strength and reduction in weight, and where special conditions require a fine thread.

TABLE 2.—American National fine-thread series

Identification		Basic diameters			Thread data						
Sizes	Threads per inch n	Major diameter D	Pitch diameter E	Minor diameter K	Metric equivalent of major diameter	Pitch p	Depth of thread h	Basic width of flat $p/8$	Minimum width of flat at major diameter of nut $p/24$	Helix angle at basic pitch diameter s	Basic area of section at root of thread $\frac{\pi K^2}{4}$
1	2	3	4	5	6	7	8	9	10	11	12
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>mm</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	$^{\circ}$	<i>Sq. in.</i>
0-----	80	0.060	0.0519	0.0438	1.524	0.01250	0.00812	0.00156	0.00052	4 23	0.0015
1-----	72	.073	.0640	.0550	1.854	.01389	.00902	.00174	.00058	3 57	.0024
2-----	64	.086	.0759	.0657	2.184	.01562	.01015	.00195	.00065	3 45	.0034
3-----	56	.099	.0874	.0758	2.515	.01786	.01160	.00223	.00074	3 43	.0045
4-----	48	.112	.0985	.0849	2.845	.02083	.01353	.00260	.00087	3 51	.0057
5-----	44	.125	.1102	.0955	3.175	.02273	.01476	.00284	.00095	3 45	.0072
6-----	40	.138	.1218	.1055	3.505	.02500	.01624	.00312	.00104	3 44	.0087
8-----	36	.164	.1460	.1279	4.166	.02778	.01804	.00347	.00116	3 28	.0128
10-----	32	.190	.1697	.1494	4.826	.03125	.02030	.00391	.00130	3 21	.0175
12-----	28	.216	.1928	.1696	5.486	.03571	.02320	.00446	.00149	3 22	.0226
1/4-----	28	.2500	.2268	.2036	6.350	.03571	.02320	.00446	.00149	2 52	.0326
5/16-----	24	.3125	.2854	.2584	7.938	.04167	.02706	.00521	.00174	2 40	.0524
3/8-----	24	.3750	.3479	.3209	9.525	.04167	.02706	.00521	.00174	2 11	.0809
7/16-----	20	.4375	.4050	.3725	11.113	.05000	.03248	.00625	.00208	2 15	.1090
1/2-----	20	.5000	.4675	.4350	12.700	.05000	.03248	.00625	.00208	1 57	.1486
9/16-----	18	.5625	.5264	.4903	14.288	.05556	.03608	.00694	.00231	1 55	.1888
5/8-----	18	.6250	.5889	.5528	15.875	.05556	.03608	.00694	.00231	1 43	.2400
3/4-----	16	.7500	.7094	.6688	19.050	.06250	.04059	.00781	.00260	1 36	.3513
7/8-----	14	.8750	.8286	.7822	22.225	.07143	.04639	.00893	.00298	1 34	.4805
1-----	14	1.0000	.9536	.9072	25.400	.07143	.04639	.00893	.00298	1 22	.6464
1 1/8-----	12	1.1250	1.0709	1.0167	28.575	.08333	.05413	.01042	.00347	1 25	.8118
1 1/4-----	12	1.2500	1.1959	1.1417	31.750	.08333	.05413	.01042	.00347	1 16	1.0238
1 1/2-----	12	1.5000	1.4459	1.3917	38.100	.08333	.05413	.01042	.00347	1 3	1.5212
1 3/4-----	10	1.7500	1.6850	1.6201	44.450	.10000	.06495	.01250	.00417	1 5	2.0615
2-----	10	2.0000	1.9350	1.8701	50.800	.10000	.06495	.01250	.00417	0 57	2.7468
2 1/4-----	8	2.2500	2.1688	2.0876	57.150	.12500	.08119	.01562	.00521	1 3	3.4228
2 1/2-----	8	2.5000	2.4188	2.3376	63.500	.12500	.08119	.01562	.00521	0 57	4.2917
2 3/4-----	8	2.7500	2.6688	2.5876	69.850	.12500	.08119	.01562	.00521	0 51	5.2588
3-----	8	3.0000	2.9188	2.8376	76.200	.12500	.08119	.01562	.00521	0 47	6.3240

TABLE 16.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National fine-thread series

	Machine screw number						
	0	1	3	3	4	5	6
	Threads per inch						
	80	72	64	56	48	44	40
1	2	3	4	5	6	7	8
BOLTS AND SCREWS							
Class 1, major diameter-----	<i>Inch</i> Max---	0. 0593	0. 0723	0. 0853	0. 0982	0. 1111	0. 1241
	Min---	. 0545	. 0673	. 0801	. 0926	. 1049	. 1177
	Tol---	. 0048	. 0050	. 0052	. 0056	. 0062	. 0064
Classes 2, 3, and 4, major diameter---	Max---	. 0600	. 0730	. 0860	. 0990	. 1120	. 1250
	Min---	. 0566	. 0694	. 0822	. 0950	. 1076	. 1204
	Tol---	. 0034	. 0036	. 0038	. 0040	. 0044	. 0046
Class 1, minor diameter-----	Max. ¹	. 0440	. 0553	. 0661	. 0763	. 0855	. 0962
Classes 2, 3, and 4, minor diameter---	Max. ¹	. 0447	. 0560	. 0668	. 0771	. 0864	. 0971
Class 1, pitch diameter-----	Max---	. 0512	. 0633	. 0752	. 0866	. 0976	. 1093
	Min---	. 0488	. 0608	. 0726	. 0838	. 0945	. 1061
	Tol---	. 0024	. 0025	. 0026	. 0028	. 0031	. 0032
Class 2, pitch diameter-----	Max---	. 0519	. 0640	. 0759	. 0874	. 0985	. 1102
	Min---	. 0502	. 0622	. 0740	. 0854	. 0963	. 1079
	Tol---	. 0017	. 0018	. 0019	. 0020	. 0022	. 0023
Class 3, pitch diameter-----	Max---	. 0519	. 0640	. 0759	. 0874	. 0985	. 1102
	Min---	. 0506	. 0627	. 0745	. 0859	. 0969	. 1086
	Tol---	. 0013	. 0013	. 0014	. 0015	. 0016	. 0016
Class 4, pitch diameter-----	Max---	. 0520	. 0641	. 0760	. 0876	. 0987	. 1104
	Min---	. 0514	. 0634	. 0753	. 0869	. 0979	. 1096
	Tol---	. 0006	. 0007	. 0007	. 0007	. 0008	. 0008
NUTS AND TAPPED HOLES							
Classes 1, 2, 3, and 4, major diameter. Min. ² --		. 0600	. 0730	. 0860	. 0990	. 1120	. 1250
Classes 1, 2, 3, and 4, minor diameter--	Max---	. 0492	. 0610	. 0724	. 0834	. 0937	. 1049
	Min---	. 0465	. 0580	. 0691	. 0797	. 0894	. 1004
	Tol---	. 0027	. 0030	. 0033	. 0037	. 0043	. 0049
Classes 1, 2, 3, and 4, pitch diameter. Min---		. 0519	. 0640	. 0759	. 0874	. 0985	. 1102
Class 1, pitch diameter-----	Max---	. 0543	. 0665	. 0785	. 0902	. 1016	. 1134
	Tol---	. 0024	. 0025	. 0026	. 0028	. 0031	. 0032
Class 2, pitch diameter-----	Max---	. 0536	. 0658	. 0778	. 0894	. 1007	. 1125
	Tol---	. 0017	. 0018	. 0019	. 0020	. 0022	. 0023
Class 3, pitch diameter-----	Max---	. 0532	. 0653	. 0773	. 0889	. 1001	. 1118
	Tol---	. 0013	. 0013	. 0014	. 0015	. 0016	. 0016
Class 4, pitch diameter-----	Max---	. 0525	. 0647	. 0766	. 0881	. 0993	. 1110
	Tol---	. 0006	. 0007	. 0007	. 0007	. 0008	. 0008

¹ See footnote 1 on page 12.

² See footnote 2 on page 12.

TABLE 16.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National fine-thread series—Continued*

	Machine screw number or nominal size						
	8	10	12	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$
	Threads per inch						
	36	32	28	28	24	24	20
1	9	10	11	12	13	14	15
BOLTS AND SCREWS							
Class 1, major diameter-----	<i>Inch</i> Max--	0. 1629	0. 1889	0. 2148	0. 2488	0. 3112	0. 3737
	Min--	. 1557	. 1813	. 2062	. 2402	. 3020	. 3645
	Tol--	. 0072	. 0076	. 0086	. 0086	. 0092	. 0102
Classes 2, 3, and 4, major diameter--	Max--	. 1640	. 1900	. 2160	. 2500	. 3125	. 3750
	Min--	. 1590	. 1846	. 2098	. 2438	. 3059	. 3684
	Tol--	. 0050	. 0054	. 0062	. 0062	. 0066	. 0066
Class 1, minor diameter-----	Max. ¹ --	. 1288	. 1506	. 1710	. 2050	. 2601	. 3226
Classes 2, 3, and 4, minor diameter	Max. ¹ --	. 1299	. 1517	. 1722	. 2062	. 2614	. 3239
Class 1, pitch diameter-----	Max--	. 1449	. 1686	. 1916	. 2256	. 2841	. 3466
	Min--	. 1413	. 1648	. 1873	. 2213	. 2795	. 3420
	Tol--	. 0036	. 0038	. 0043	. 0043	. 0046	. 0046
Class 2, pitch diameter-----	Max--	. 1460	. 1697	. 1928	. 2268	. 2854	. 3479
	Min--	. 1435	. 1670	. 1897	. 2237	. 2821	. 3446
	Tol--	. 0025	. 0027	. 0031	. 0031	. 0033	. 0033
Class 3, pitch diameter-----	Max--	. 1460	. 1697	. 1928	. 2268	. 2854	. 3479
	Min--	. 1442	. 1678	. 1906	. 2246	. 2830	. 3455
	Tol--	. 0018	. 0019	. 0022	. 0022	. 0024	. 0024
Class 4, pitch diameter-----	Max--	. 1462	. 1699	. 1930	. 2270	. 2857	. 3482
	Min--	. 1453	. 1689	. 1919	. 2259	. 2845	. 3470
	Tol--	. 0009	. 0010	. 0011	. 0011	. 0012	. 0012
NUTS AND TAPPED HOLES							
Classes 1, 2, 3, and 4, major diameter	Min. ² --	. 1640	. 1900	. 2160	. 2500	. 3125	. 3750
Classes 1, 2, 3, and 4, minor diameter	Max--	. 1391	. 1618	. 1833	. 2173	. 2739	. 3364
	Min--	. 1339	. 1562	. 1773	. 2113	. 2674	. 3299
	Tol--	. 0052	. 0056	. 0060	. 0060	. 0065	. 0065
Classes 1, 2, 3, and 4, pitch diameter	Min--	. 1460	. 1697	. 1928	. 2268	. 2854	. 3479
Class 1, pitch diameter-----	Max--	. 1496	. 1735	. 1971	. 2311	. 2900	. 3525
	Tol--	. 0036	. 0038	. 0043	. 0043	. 0046	. 0046
Class 2, pitch diameter-----	Max--	. 1485	. 1724	. 1959	. 2299	. 2887	. 3512
	Tol--	. 0025	. 0027	. 0031	. 0031	. 0033	. 0033
Class 3, pitch diameter-----	Max--	. 1478	. 1716	. 1950	. 2290	. 2878	. 3503
	Tol--	. 0018	. 0019	. 0022	. 0022	. 0024	. 0024
Class 4, pitch diameter-----	Max--	. 1469	. 1707	. 1939	. 2279	. 2866	. 3491
	Tol--	. 0009	. 0010	. 0011	. 0011	. 0012	. 0012

¹ See footnote 1 on page 12.² See footnote 2 on page 12.

TABLE 16.—*Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National fine-thread series—Continued*

	Sizes							
	½	¾	⅝	¾	⅞	1	1½	1¾
	Threads per inch							
	20	18	18	16	14	14	12	12
1	16	17	18	19	20	21	22	23
BOLTS AND SCREWS								
Class 1, major diameter---	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inches</i>	<i>Inches</i>
	{ Max--- 0. 4985	{ Max--- 0. 5609	{ Max--- 0. 6234	{ Max--- 0. 7482	{ Max--- 0. 8729	{ Max--- 0. 9979	{ Max--- 1. 1226	{ Max--- 1. 2476
	{ Min--- . 4883	{ Min--- . 5495	{ Min--- . 6120	{ Min--- . 7356	{ Min--- . 8589	{ Min--- . 9839	{ Min--- 1. 1068	{ Min--- 1. 2318
Class 1, major diameter---	{ Tol--- . 0102	{ Tol--- . 0114	{ Tol--- . 0114	{ Tol--- . 0126	{ Tol--- . 0140	{ Tol--- . 0140	{ Tol--- . 0158	{ Tol--- . 0158
Classes 2, 3, and 4, major di- ameter-----	{ Max--- . 5000	{ Max--- . 5625	{ Max--- . 6250	{ Max--- . 7500	{ Max--- . 8750	{ Max--- 1. 0000	{ Max--- 1. 1250	{ Max--- 1. 2500
	{ Min--- . 4928	{ Min--- . 5543	{ Min--- . 6168	{ Min--- . 7410	{ Min--- . 8652	{ Min--- . 9902	{ Min--- 1. 1138	{ Min--- 1. 2388
	{ Tol--- . 0072	{ Tol--- . 0082	{ Tol--- . 0082	{ Tol--- . 0090	{ Tol--- . 0098	{ Tol--- . 0098	{ Tol--- . 0112	{ Tol--- . 0112
Class 1, minor diameter---Max. ¹ ---	. 4372	. 4927	. 5552	. 6715	. 7853	. 9103	1. 0204	1. 1454
Classes 2, 3, and 4, minor di- ameter-----Max. ¹ ---	. 4387	. 4943	. 5568	. 6733	. 7874	. 9124	1. 0228	1. 1478
Class 1, pitch diameter---	{ Max--- . 4660	{ Max--- . 5248	{ Max--- . 5873	{ Max--- . 7076	{ Max--- . 8265	{ Max--- . 9515	{ Max--- 1. 0685	{ Max--- 1. 1935
	{ Min--- . 4609	{ Min--- . 5191	{ Min--- . 5816	{ Min--- . 7013	{ Min--- . 8195	{ Min--- . 9445	{ Min--- 1. 0606	{ Min--- 1. 1856
	{ Tol--- . 0051	{ Tol--- . 0057	{ Tol--- . 0057	{ Tol--- . 0063	{ Tol--- . 0070	{ Tol--- . 0070	{ Tol--- . 0079	{ Tol--- . 0079
Class 2, pitch diameter---	{ Max--- . 4675	{ Max--- . 5264	{ Max--- . 5889	{ Max--- . 7094	{ Max--- . 8286	{ Max--- . 9536	{ Max--- 1. 0709	{ Max--- 1. 1959
	{ Min--- . 4639	{ Min--- . 5223	{ Min--- . 5848	{ Min--- . 7049	{ Min--- . 8237	{ Min--- . 9487	{ Min--- 1. 0653	{ Min--- 1. 1903
	{ Tol--- . 0036	{ Tol--- . 0041	{ Tol--- . 0041	{ Tol--- . 0045	{ Tol--- . 0049	{ Tol--- . 0049	{ Tol--- . 0056	{ Tol--- . 0056
Class 3, pitch diameter---	{ Max--- . 4675	{ Max--- . 5264	{ Max--- . 5889	{ Max--- . 7094	{ Max--- . 8286	{ Max--- . 9536	{ Max--- 1. 0709	{ Max--- 1. 1959
	{ Min--- . 4649	{ Min--- . 5234	{ Min--- . 5859	{ Min--- . 7062	{ Min--- . 8250	{ Min--- . 9500	{ Min--- 1. 0669	{ Min--- 1. 1919
	{ Tol--- . 0026	{ Tol--- . 0030	{ Tol--- . 0030	{ Tol--- . 0032	{ Tol--- . 0036	{ Tol--- . 0036	{ Tol--- . 0040	{ Tol--- . 0040
Class 4, pitch diameter---	{ Max--- . 4678	{ Max--- . 5267	{ Max--- . 5892	{ Max--- . 7098	{ Max--- . 8290	{ Max--- . 9540	{ Max--- 1. 0714	{ Max--- 1. 1964
	{ Min--- . 4665	{ Min--- . 5252	{ Min--- . 5877	{ Min--- . 7082	{ Min--- . 8272	{ Min--- . 9522	{ Min--- 1. 0694	{ Min--- 1. 1944
	{ Tol--- . 0013	{ Tol--- . 0015	{ Tol--- . 0015	{ Tol--- . 0016	{ Tol--- . 0018	{ Tol--- . 0018	{ Tol--- . 0020	{ Tol--- . 0020
NUTS AND TAPPED HOLES								
Classes 1, 2, 3, and 4, major diameter-----Min. ² ---	. 5000	. 5625	. 6250	. 7500	. 8750	1. 0000	1. 1250	1. 2500
Classes 1, 2, 3, and 4, minor diameter-----	{ Max--- . 4531	{ Max--- . 5100	{ Max--- . 5725	{ Max--- . 6903	{ Max--- . 8062	{ Max--- . 9312	{ Max--- 1. 0438	{ Max--- 1. 1688
	{ Min--- . 4459	{ Min--- . 5024	{ Min--- . 5649	{ Min--- . 6823	{ Min--- . 7977	{ Min--- . 9227	{ Min--- 1. 0348	{ Min--- 1. 1598
	{ Tol--- . 0072	{ Tol--- . 0076	{ Tol--- . 0076	{ Tol--- . 0080	{ Tol--- . 0085	{ Tol--- . 0085	{ Tol--- . 0090	{ Tol--- . 0090
Classes 1, 2, 3, and 4, pitch diameter-----Min.---	. 4675	. 5264	. 5889	. 7094	. 8286	. 9536	1. 0709	1. 1959
Class 1, pitch diameter---	{ Max--- . 4726	{ Max--- . 5321	{ Max--- . 5946	{ Max--- . 7157	{ Max--- . 8356	{ Max--- . 9606	{ Max--- 1. 0788	{ Max--- 1. 2038
	{ Tol--- . 0051	{ Tol--- . 0057	{ Tol--- . 0057	{ Tol--- . 0063	{ Tol--- . 0070	{ Tol--- . 0070	{ Tol--- . 0079	{ Tol--- . 0079
	{ Tol--- . 0051	{ Tol--- . 0057	{ Tol--- . 0057	{ Tol--- . 0063	{ Tol--- . 0070	{ Tol--- . 0070	{ Tol--- . 0079	{ Tol--- . 0079
Class 2, pitch diameter---	{ Max--- . 4711	{ Max--- . 5305	{ Max--- . 5930	{ Max--- . 7139	{ Max--- . 8335	{ Max--- . 9585	{ Max--- 1. 0765	{ Max--- 1. 2015
	{ Tol--- . 0036	{ Tol--- . 0041	{ Tol--- . 0041	{ Tol--- . 0045	{ Tol--- . 0049	{ Tol--- . 0049	{ Tol--- . 0056	{ Tol--- . 0056
	{ Tol--- . 0036	{ Tol--- . 0041	{ Tol--- . 0041	{ Tol--- . 0045	{ Tol--- . 0049	{ Tol--- . 0049	{ Tol--- . 0056	{ Tol--- . 0056
Class 3, pitch diameter---	{ Max--- . 4701	{ Max--- . 5294	{ Max--- . 5919	{ Max--- . 7126	{ Max--- . 8322	{ Max--- . 9572	{ Max--- 1. 0749	{ Max--- 1. 1999
	{ Tol--- . 0026	{ Tol--- . 0030	{ Tol--- . 0030	{ Tol--- . 0032	{ Tol--- . 0036	{ Tol--- . 0036	{ Tol--- . 0040	{ Tol--- . 0040
	{ Tol--- . 0026	{ Tol--- . 0030	{ Tol--- . 0030	{ Tol--- . 0032	{ Tol--- . 0036	{ Tol--- . 0036	{ Tol--- . 0040	{ Tol--- . 0040
Class 4, pitch diameter---	{ Max--- . 4688	{ Max--- . 5279	{ Max--- . 5904	{ Max--- . 7110	{ Max--- . 8304	{ Max--- . 9554	{ Max--- 1. 0729	{ Max--- 1. 1979
	{ Tol--- . 0013	{ Tol--- . 0015	{ Tol--- . 0015	{ Tol--- . 0016	{ Tol--- . 0018	{ Tol--- . 0018	{ Tol--- . 0020	{ Tol--- . 0020
	{ Tol--- . 0013	{ Tol--- . 0015	{ Tol--- . 0015	{ Tol--- . 0016	{ Tol--- . 0018	{ Tol--- . 0018	{ Tol--- . 0020	{ Tol--- . 0020

¹ See footnote 1 on page 12.

² See footnote 2 on page 12.

TABLE 16.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National fine-thread series—Con.

	Sizes						
	1½	1¾	2	2¼	2½	2¾	3
	Threads per inch						
	12	10	10	8	8	8	8
1	24	25	26	27	28	29	30
BOLTS AND SCREWS							
Class 1, major diameter	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	{Max---	1. 4976	1. 7472	1. 9972	2. 2466	2. 4966	2. 7466
	{Min---	1. 4818	1. 7288	1. 9788	2. 2244	2. 4744	2. 7244
Classes 2, 3, and 4, major diameter	{Tol---	. 0158	. 0184	. 0184	. 0222	. 0222	. 0222
	{Max---	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500
	{Min---	1. 4888	1. 7372	1. 9872	2. 2348	2. 4848	2. 7348
Class 1, minor diameter	{Tol---	. 0112	. 0128	. 0128	. 0152	. 0152	. 0152
	Max. ¹ ---	1. 3954	1. 6245	1. 8745	2. 0932	2. 3432	2. 5932
	Max. ¹ ---	1. 3978	1. 6273	1. 8773	2. 0966	2. 3466	2. 5966
Class 1, pitch diameter	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	{Max---	1. 4435	1. 6822	1. 9322	2. 1654	2. 4154	2. 6654
	{Min---	1. 4356	1. 6690	1. 9190	2. 1509	2. 4009	2. 6509
Class 2, pitch diameter	{Tol---	. 0079	. 0132	. 0132	. 0145	. 0145	. 0145
	{Max---	1. 4459	1. 6850	1. 9350	2. 1688	2. 4188	2. 6688
	{Min---	1. 4403	1. 6750	1. 9250	2. 1578	2. 4078	2. 6578
Class 3, pitch diameter	{Tol---	. 0056	. 0100	. 0100	. 0110	. 0110	. 0110
	{Max---	1. 4459	1. 6850	1. 9350	2. 1688	2. 4188	2. 6688
	{Min---	1. 4419	1. 6766	1. 9266	2. 1596	2. 4096	2. 6596
Class 4, pitch diameter	{Tol---	. 0040	. 0084	. 0084	. 0092	. 0092	. 0092
	{Max---	1. 4464	1. 6856	1. 9356	2. 1695	2. 4195	2. 6695
	{Min---	1. 4444	1. 6814	1. 9314	2. 1649	2. 4149	2. 6649
NUTS AND TAPPED HOLES	{Tol---	. 0020	. 0042	. 0042	. 0046	. 0046	. 0046
	Min. ² ---	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500
	Min. ² ---	1. 4188	1. 6525	1. 9025	2. 1282	2. 3782	2. 6282
Classes 1, 2, 3, and 4, minor diameter	{Tol---	. 0090	. 0108	. 0108	. 0135	. 0135	. 0135
	{Max---	1. 4538	1. 6982	1. 9482	2. 1833	2. 4333	2. 6833
	{Min---	1. 4515	1. 6950	1. 9450	2. 1798	2. 4298	2. 6798
Class 1, pitch diameter	{Tol---	. 0079	. 0132	. 0132	. 0145	. 0145	. 0145
	{Max---	1. 4459	1. 6850	1. 9350	2. 1688	2. 4188	2. 6688
	{Min---	1. 4403	1. 6750	1. 9250	2. 1578	2. 4078	2. 6578
Class 2, pitch diameter	{Tol---	. 0056	. 0100	. 0100	. 0110	. 0110	. 0110
	{Max---	1. 4459	1. 6850	1. 9350	2. 1688	2. 4188	2. 6688
	{Min---	1. 4419	1. 6766	1. 9266	2. 1596	2. 4096	2. 6596
Class 3, pitch diameter	{Tol---	. 0040	. 0084	. 0084	. 0092	. 0092	. 0092
	{Max---	1. 4479	1. 6892	1. 9392	2. 1734	2. 4234	2. 6734
	{Min---	1. 4459	1. 6850	1. 9350	2. 1688	2. 4188	2. 6688
Class 4, pitch diameter	{Tol---	. 0020	. 0042	. 0042	. 0046	. 0046	. 0046

¹ Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to 1/8 X p, and may be determined by subtracting the basic thread depth, h (or 0.6495 p), from the minimum pitch diameter of the screw.

² Dimensions for the minimum major diameter of the nut correspond to the basic flat (1/8 X p) and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the nut shall be that corresponding to a flat at the major diameter of the maximum nut equal to 1/4 X p, and may be determined by adding 1 3/8 X h (or 0.7939 p) to the maximum pitch diameter of the nut.

III. APPENDIX

TAP DRILL SIZES

TABLE 107.—*Sizes of tap drills, American National coarse-thread series*

Size of thread	Threads per inch	Minor diameter of nut			Stock drills within limits on minor diameter of nut					
		Basic	Maximum	Minimum	Numbered and fractional-inch sizes			Metric sizes		
					Nominal size	Diameter	Per cent of depth of basic thread	Nominal size	Diameter	Per cent of depth of basic thread
1	2	3	4	5	6	7	8	9	10	11
1-----	64	<i>Inch</i> 0. 0527	<i>Inch</i> 0. 0604	<i>Inch</i> 0. 0561	No. 53-----	<i>Inch</i> 0. 0595	67	<i>mm</i> 1. 5	<i>Inch</i> 0. 0591	68
2-----	56	. 0628	. 0715	. 0667	{ No. 51----- No. 50-----	. 0670 . 0700	82 69	1. 7 1. 75 1. 8	. 0669 . 0689 . 0709	82 74 65
3-----	48	. 0719	. 0820	. 0764	{ ⁵ / ₆₄ inch----- No. 47----- No. 46----- No. 45-----	. 0781 . 0785 . 0810 . 0820	77 76 67 63	2. 0	. 0787	75
4-----	40	. 0795	. 0913	. 0849	{ No. 44----- No. 43-----	. 0860 . 0890	80 71	2. 2 2. 25 2. 3	. 0866 . 0886 . 0906	78 72 66
5-----	40	. 0925	. 1043	. 0979	{ No. 40----- No. 39----- No. 38----- No. 37-----	. 0980 . 0995 . 1015 . 1040	83 79 72 65	2. 5 2. 6	. 0984 . 1024	82 70
6-----	32	. 0974	. 1118	. 1042	{ No. 36----- ⁷ / ₆₄ inch----- No. 35----- No. 34-----	. 1065 . 1094 . 1100 . 1110	78 70 69 67	2. 7 2. 75 2. 8	. 1063 . 1083 . 1102	78 73 68
8-----	32	. 1234	. 1378	. 1302	{ No. 29-----	. 1360	69	3. 4 3. 5	. 1339 . 1378	74 65
10-----	24	. 1359	. 1541	. 1449	{ No. 26----- No. 25----- No. 24----- No. 23-----	. 1470 . 1495 . 1520 . 1540	79 75 70 67	3. 7 3. 75 3. 8 3. 9	. 1457 . 1476 . 1496 . 1535	82 78 75 67
12-----	24	. 1619	. 1801	. 1709	{ ¹¹ / ₆₄ inch----- No. 17----- No. 16----- No. 15-----	. 1719 . 1730 . 1770 . 1800	81 79 72 67	4. 4 4. 5	. 1732 . 1772	79 72
¼-----	20	. 1850	. 2060	. 1959	{ No. 9----- No. 8----- No. 7----- ¹³ / ₆₄ inch----- No. 6----- No. 5-----	. 1960 . 1990 . 2010 . 2031 . 2040 . 2055	83 79 75 72 71 69	5. 0 5. 1 5. 2	. 1968 . 2008 . 2047	82 76 70
⅜-----	18	. 2403	. 2630	. 2524	{ F----- G-----	. 2570 . 2610	77 71	6. 5 6. 6	. 2559 . 2598	78 73
½-----	16	. 2938	. 3184	. 3073	{ ⁵ / ₁₆ inch----- O-----	. 3125 . 3160	77 73	7. 9 8. 0	. 3110 . 3150	79 74
⅞-----	14	. 3447	. 3721	. 3602	{ U-----	. 3680	75	9. 2 9. 25 9. 3 9. 4	. 3622 . 3642 . 3661 . 3701	81 79 77 73

TABLE 107.—*Sizes of tap drills, American National coarse-thread series—Continued*

Size of thread	Threads per inch	Minor diameter of nut			Stock drills within limits on minor diameter of nut					
		Basic	Maximum	Minimum	Numbered and fractional-inch sizes			Metric sizes		
					Nominal size	Diameter	Per cent of depth of basic thread	Nominal size	Diameter	Per cent of depth of basic thread
1	2	3	4	5	6	7	8	9	10	11
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		<i>Inches</i>		<i>mm</i>	<i>Inches</i>	
$\frac{1}{2}$ -----	13	0. 4001	0. 4290	0. 4167	$\frac{27}{64}$ inch-----	0. 4219	78			
$\frac{9}{16}$ -----	12	. 4542	. 4850	. 4723	$\frac{31}{64}$ inch-----	. 4844	72	12. 0	0. 4724	83
$\frac{7}{8}$ -----	11	. 5069	. 5397	. 5266	$\frac{17}{32}$ inch-----	. 5312	79	13. 5	. 5315	79
$\frac{3}{4}$ -----	10	. 6201	. 6553	. 6417				16. 5	. 6496	77
$\frac{7}{8}$ -----	9	. 7307	. 7689	. 7547	$\frac{49}{64}$ inch-----	. 7656	76	19. 5	. 7677	74
1-----	8	. 8376	. 8795	. 8647	$\frac{7}{8}$ inch-----	. 8750	77	22. 0	. 8661	82
$1\frac{1}{8}$ -----	7	. 9394	. 9858	. 9704	$\frac{63}{64}$ inch-----	. 9844	76	25. 0	. 9842	76
$1\frac{1}{4}$ -----	7	1. 0644	1. 1108	1. 0954	$1\frac{1}{64}$ inches----	1. 1094	76	28. 0	1. 1024	80
$1\frac{1}{2}$ -----	6	1. 2835	1. 3376	1. 3196	$1\frac{21}{64}$ inches----	1. 3281	79			
$1\frac{3}{4}$ -----	5	1. 4902	1. 5551	1. 5335	$\{1\frac{35}{64}$ inches----	1. 5469	78	39. 0	1. 5354	83
								39. 5	1. 5551	75
2-----	$4\frac{1}{2}$	1. 7113	1. 7835	1. 7594	$\{1\frac{49}{64}$ inches----	1. 7656	81	45. 0	1. 7716	79
					$\{1\frac{25}{32}$ inches----	1. 7812	76			
$2\frac{1}{4}$ -----	$4\frac{1}{2}$	1. 9613	2. 0335	2. 0094	$\{2\frac{1}{64}$ inches----	2. 0156	81	51. 5	2. 0276	77
					$\{2\frac{1}{32}$ inches----	2. 0312	76			
$2\frac{1}{2}$ -----	4	2. 1752	2. 2564	2. 2294	$\{2\frac{15}{64}$ inches----	2. 2344	82	57. 0	2. 2441	79
					$\{2\frac{1}{4}$ inches----	2. 2500	77			
$2\frac{3}{4}$ -----	4	2. 4252	2. 5064	2. 4794	$\{2\frac{31}{64}$ inches----	2. 4844	82	63. 0	2. 4803	83
					$\{2\frac{1}{2}$ inches----	2. 5000	77	63. 5	2. 5000	77
3-----	4	2. 6752	2. 7564	2. 7294	$\{2\frac{47}{64}$ inches----	2. 7344	82	69. 5	2. 7362	81
					$\{2\frac{3}{4}$ inches----	2. 7500	77	70. 0	2. 7559	75
$3\frac{1}{2}$ -----	$3\frac{1}{2}$	2. 6288	2. 7216	2. 6907	$\{2\frac{45}{64}$ inches----	2. 7031	80	68. 5	2. 6968	82
					$\{2\frac{23}{32}$ inches----	2. 7188	76	69. 0	2. 7165	76

TABLE 108.—*Sizes of tap drills, American National fine-thread series*

Size of thread	Threads per inch	Minor diameter of nut			Stock drills within limits on minor diameter of nut					
		Basic	Maximum	Minimum	Numbered and fractional-inch sizes			Metric sizes		
					Nominal size	Diameter	Per cent of depth of basic thread	Nominal size	Diameter	Per cent of depth of basic thread
1	2	3	4	5	6	7	8	9	10	11
0-----	80	<i>Inches</i> 0. 0438	<i>Inches</i> 0. 0492	<i>Inches</i> 0. 0465	{No. 56----- 3/64 inch-----	<i>Inches</i> 0. 0465 . 0469	83 81	<i>mm</i> 1. 2 1. 25	<i>Inches</i> 0. 0472 . 0492	79 67
1-----	72	. 0550	. 0610	. 0580	No. 53-----	. 0595	75	1. 5	. 0591	77
2-----	64	. 0657	. 0724	. 0691	No. 50-----	. 0700	79	1. 8	. 0709	74
3-----	56	. 0758	. 0834	. 0797	{No. 46----- No. 45-----	. 0810 . 0820	78 73	2. 1	. 0827	70
4-----	48	. 0849	. 0937	. 0894	{3/32 inch----- No. 42-----	. 0938 . 0935	67 68	2. 3	. 0906	79
5-----	44	. 0955	. 1049	. 1004	{No. 38----- No. 37-----	. 1015 . 1040	80 71	2. 6	. 1024	77
6-----	40	. 1055	. 1158	. 1109	{No. 34----- No. 33-----	. 1110 . 1130	83 77	2. 9	. 1142	73
8-----	36	. 1279	. 1391	. 1339	{No. 29----- -----	. 1360	78	3. 4 3. 5	. 1339 . 1378	83 73
10-----	32	. 1494	. 1618	. 1562	{5/32 inch----- No. 22----- No. 21----- No. 20-----	. 1562 . 1570 . 1590 . 1610	83 81 76 71	4. 0 4. 1	. 1575 . 1614	80 70
12-----	28	. 1696	. 1833	. 1773	{No. 15----- No. 14-----	. 1800 . 1820	78 73	4. 6	. 1811	75
1/4-----	28	. 2036	. 2173	. 2113	{No. 3----- -----	. 2130	80	5. 4 5. 5	. 2126 . 2165	81 72
5/16-----	24	. 2584	. 2739	. 2647	{I----- -----	. 2720	75	6. 8 6. 9	. 2677 . 2717	83 75
3/8-----	24	. 3209	. 3364	. 3299	{Q----- -----	. 3320	79	8. 4 8. 5	. 3307 . 3346	82 75
7/16-----	20	. 3725	. 3906	. 3834	{W----- 25/64 inch-----	. 3860 . 3906	79 72	9. 75 9. 8 9. 9	. 3839 . 3858 . 3898	83 80 73
1/2-----	20	. 4350	. 4531	. 4459	29/64 inch-----	. 4531	72	11. 5	. 4528	73
9/16-----	18	. 4903	. 5100	. 5024	-----	. 5062	78	14. 5	. 5709	75
5/8-----	18	. 5528	. 5725	. 5649	-----	-----	-----	17. 5	. 6890	75
3/4-----	16	. 6638	. 6903	. 6823	1 1/16 inch-----	. 6875	77	-----	-----	-----
7/8-----	14	. 7822	. 8062	. 7977	(1)	(1)	(1)	(1)	(1)	(1)
1-----	14	. 9072	. 9312	. 9227	-----	-----	-----	23. 5	. 9252	81
1 1/8-----	12	1. 0167	1. 0438	1. 0348	-----	-----	-----	26. 5	1. 0433	75
1 1/4-----	12	1. 1417	1. 1688	1. 1598	-----	-----	-----	29. 5	1. 1614	82
1 1/2-----	12	1. 3917	1. 4188	1. 4098	-----	-----	-----	36. 0	1. 4173	76
1 3/4-----	10	1. 6201	1. 6525	1. 6417	(1)	(1)	(1)	(1)	(1)	(1)
2-----	10	1. 8701	1. 9025	1. 8917	(1)	(1)	(1)	(1)	(1)	(1)
2 1/4-----	8	2. 0876	2. 1282	2. 1147	2 5/8 inches-----	2. 1250	77	54. 0	2. 1260	76
2 1/2-----	8	2. 3376	2. 3782	2. 3647	2 3/4 inches-----	2. 3750	77	-----	-----	-----
2 3/4-----	8	2. 5876	2. 6282	2. 6147	2 3/4 inches-----	2. 6250	77	66. 5	2. 6181	81
3-----	8	2. 8376	2. 8782	2. 8647	2 3/4 inches-----	2. 8750	77	73. 0	2. 8740	78

¹ No standard size.