

U. S. DEPARTMENT OF COMMERCE

JESSE H. JONES, Secretary

NATIONAL BUREAU OF STANDARDS

LYMAN J. BRIGGS, Director

SCREW THREADS AND TAP-DRILL SIZES

COMMERCIAL STANDARD CS24-43

(Revision and consolidation of CS24-30 and CS25-30)

Effective Date for New Production from February 10, 1943



**A RECORDED VOLUNTARY STANDARD
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PROMULGATION
of
COMMERCIAL STANDARD CS24-43
for
SCREW THREADS AND TAP-DRILL SIZES
(Revision and consolidation of CS24-30 and CS25-30)

At the request of the National Screw Thread Commission, American National screw-thread tables for shop use were circulated January 23, 1930, as recommended commercial standards to producers, distributors, and users for a written acceptance. They were subsequently accepted in writing by the industry and published under the titles, American National Standard Screw Threads, Coarse and Fine-Thread Series, Commercial Standard CS24-30; and American National Special Screw Threads, Commercial Standard CS25-30.

On July 28, 1942, on the recommendation of the Interdepartmental Screw Thread Committee, and with the endorsement of the standing committee, a consolidation and revision of CS24-30 and CS25-30, under the title of Recommended Commercial Standard for Screw Threads and Tap-Drill Sizes, was circulated for acceptance. Those concerned have since accepted and approved the standard as shown herein for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from February 10, 1943.

Promulgation recommended.

I. J. Fairchild,
Chief, Division of Trade Standards.

Promulgated.

Lyman J. Briggs,
Director, National Bureau of Standards.

Promulgation approved.

Jesse H. Jones,
Secretary of Commerce.

ERRATA SHEET
SCREW THREADS AND TAP-DRILL SIZES

COMMERCIAL STANDARD CS24-43

PAGE	LINE	NOW READS	SHOULD READ
21	8 OF LAST COLUMN	.3086	.4086
23	8 OF COLUMN 3	5.305	.5305
26	20 OF COLUMN 1	1 1/8	1 7/8
26	4 FROM BOTTOM, COL. 1	5 1/14	5 1/4
27	2 OF COLUMN 1	3/16	13/16
27	4 OF COLUMN 1	5/16	15/16
27	14 OF COLUMN 5	1.4183	1.4813
31	7 OF COLUMN 3	0.0006	0.0056
31	11 OF COLUMN 1	MIN. 6	MIN. 5
35	HEADING, COLUMN 3	17/16	1 7/16
35	HEADING, COLUMN 9	13/16	1 13/16
35	13 OF COLUMN 10	1.8150	1.8153
45	2 FROM BOTTOM, COL. 1	5/16 F	5/16
46	3 FROM BOTTOM, COL. 6	9/32 IN.	1 9/32 IN.
46	2 FROM BOTTOM, COL. 6	19/64 IN.	1 19/64 IN.
46	3 FROM BOTTOM, COL. 8	8	87



SCREW THREADS AND TAP-DRILL SIZES

(Revision and Consolidation of CS24-30 and CS25-30)

COMMERCIAL STANDARD CS24-43

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PURPOSE

1. The purpose of this standard is to make available for convenient shop use and acceptance inspection the essential specifications, definitions, and dimensional data on screw threads and tap drills, which are recorded more completely in "Screw Thread Standards for Federal Services, 1942," National Bureau of Standards Handbook H28.

SCOPE

2. This standard covers the predominating sizes of American National Screw Threads in the following series and fits, with the corresponding tap-drill sizes:

Coarse-thread series, sizes No. 1 (0.073") to 4", classes 1, 2, 3, and 4 fits.

Fine-thread series, sizes No. 0 (0.060") to 1½", classes 1, 2, 3, and 4 fits.

8-pitch-thread series, sizes 1" to 6", classes 2 and 3 fits.
 12-pitch-thread series, sizes $\frac{1}{2}$ " to 6", classes 2 and 3 fits.
 16-pitch-thread series, sizes $\frac{3}{4}$ " to 4", classes 2 and 3 fits.
 Extra-fine-thread series, sizes $\frac{1}{4}$ " to 2", classes 2 and 3 fits.
 Tap drills for No. 1 to $3\frac{3}{4}$ " coarse-thread series.
 Tap drills for No. 0 to $1\frac{1}{2}$ " fine-thread series.
 Tap drills for 1" to $3\frac{1}{2}$ " 8-pitch-thread series.
 Tap drills for $\frac{1}{2}$ " to $3\frac{1}{2}$ " 12-pitch-thread series.
 Tap drills for $\frac{3}{4}$ " to $3\frac{1}{2}$ " 16-pitch-thread series.
 Tap drills for $\frac{1}{4}$ " to 2" extra-fine-thread series.

DEFINITIONS

3. *Terms relating to screw threads and illustrations of terminology.*

3a. *Numbering of tables and figures.*—Since most of the figures and tables herein are identical with those in National Bureau of Standards Handbook H28, they are numbered identically for convenient cross reference, even though this results in some numerical discontinuity in this standard. Figures 1, 2, 3, and 10 illustrate the terms and symbols as defined.

3b. *Screw thread.*—A ridge of uniform section in the form of a helix on the external or internal surface of a cylinder, or in the form of a conical spiral on the external or internal surface of a cone.

3c. *External and internal threads.*¹—An external thread is a thread on the outside of a member. Example: A threaded plug.

An internal thread is a thread on the inside of a member. Example: A threaded hole.

3d. *Major diameter.*—The largest diameter of the thread of the screw or nut. The term "major diameter" replaces the term "outside diameter" as applied to the thread of a screw and also the term "full diameter" as applied to the thread of a nut.

3e. *Minor diameter.*—The smallest diameter of the thread of the screw or nut. The term "minor diameter" replaces the term "core diameter" as applied to the thread of a screw and also the term "inside diameter" as applied to the thread of a nut.

3f. *Pitch diameter.*—On a straight screw thread, the diameter of an imaginary cylinder, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cylinder. On a taper screw thread, the diameter, at a given distance from a reference plane perpendicular to the axis of an imaginary cone, the surface of which would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cone.

3g. *Pitch.*—The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the axis.

$$\text{The pitch, in inches,} = \frac{1}{\text{Number of threads per inch}}.$$

3h. *Lead.*—The distance a screw thread advances axially in one turn. On a single-thread screw the lead and pitch are identical; on

¹ These terms are here defined because of possible confusion arising from the fact that an "internal member" has an "external thread," and vice versa. For the sake of brevity, an external thread is hereinafter referred to as a "screw," and an internal thread as a "nut."

a double-thread screw the lead is twice the pitch; on a triple-thread screw the lead is three times the pitch, etc.

3i. *Angle of thread*.—The angle included between the sides of the thread measured in an axial plane.

3j. *Half angle of thread*.—The angle included between a side of the thread and the normal to the axis, measured in an axial plane.

3k. *Helix angle*.—The angle made by the helix, or conical spiral, of the thread at the pitch diameter with a plane perpendicular to the axis.

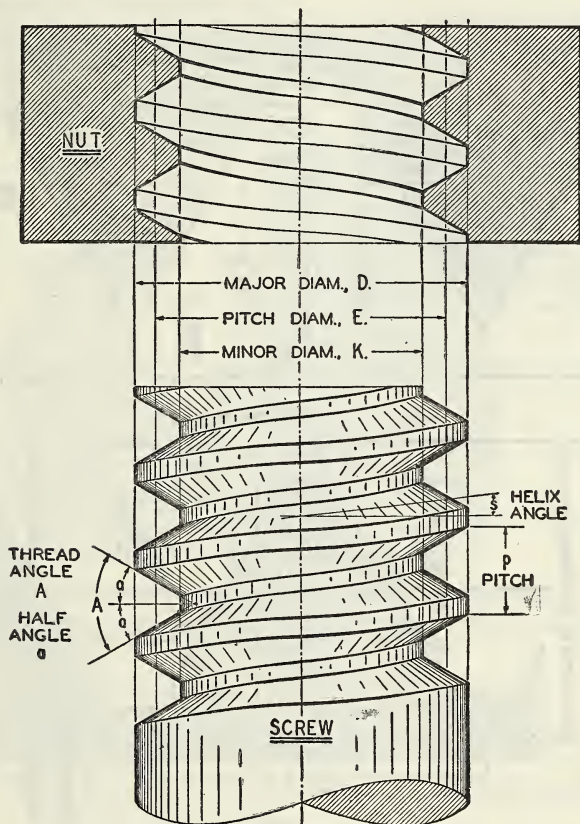


FIGURE 1.—Screw-thread notation.

3l. *Crest*.—The surface of the thread corresponding to the major diameter of the screw and the minor diameter of the nut.

3m. *Root*.—The surface of the thread corresponding to the minor diameter of the screw and the major diameter of the nut.

3n. *Side or flank*.—The surface of the thread which connects the crest with the root.

3o. *Axis of a screw*.—The longitudinal central line through the screw.

3p. *Base of thread*.—The bottom section of the thread; the greatest section between the two adjacent roots.

3q. *Depth of thread*.—The distance between the crest and the base of the thread measured normal to the axis.

3r. *Number of threads*.—Number of threads in 1 inch of length.

3s. *Length of engagement*.—The length of contact between two mated parts, measured axially.

3t. *Depth of engagement*.—The depth of thread contact of two mated parts, measured radially.

3u. *Pitch line*.—An element of the imaginary cylinder or cone specified in definition 3f.

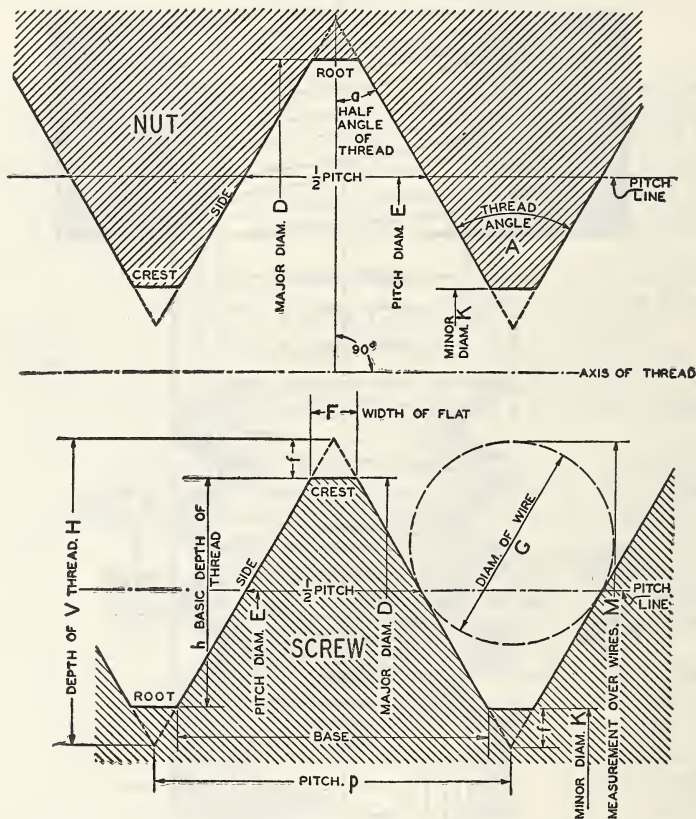


FIGURE. 2—Screw-thread notation.

3v. *Thickness of thread*.—The distance between the adjacent sides of the thread measured along or parallel to the pitch line.

3w. *Mean area*.—The term “mean area of a screw”, when used in specifications and for other purposes, designates the cross-sectional area computed from the mean of the basic pitch and minor diameters.

4. *Terms relating to classes of fit and tolerances*.

4a. *Allowance*.—An intentional difference in the dimensions of mating parts. It is the minimum clearance or the maximum interference which is intended between mating parts. It represents the

condition of the tightest permissible fit, or the largest internal member mated with the smallest external member.

Example:

One-half inch, class 1 fit, American National coarse-thread series:

Minimum pitch diameter of nut.....	0.4500
Maximum pitch diameter of screw.....	.4478

Allowance (positive).....	0.0022
---------------------------	--------

One-half inch, class 4 fit, American National coarse thread series:

Minimum pitch diameter of nut.....	0.4500
Maximum pitch diameter of screw.....	.4504

Allowance (negative).....	0.0004
---------------------------	--------

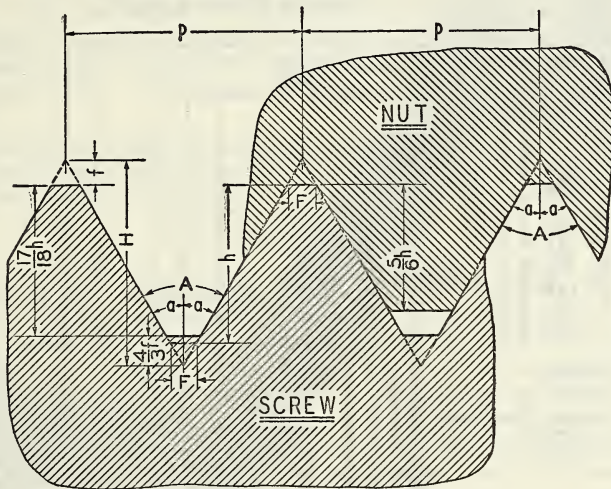


FIGURE 3.—American National form of thread.

NOTE.—No allowance is shown. This condition exists in classes 2 and 3 fits, where both the minimum nut and the maximum screw are basic.

NOTATION

$A = 60^\circ$	
$a = 30^\circ$	
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
$\frac{5}{16}h = 0.541266$	p = maximum depth of engagement
$\frac{1}{2}\frac{5}{16}h = 0.613435$	p
$F = 0.125000$	p = width of flat at crest and root of American National form
$f = 0.108253$	p
$= \frac{1}{8}H$	} = depth of truncation
$= \frac{1}{8}h$	

4b. *Tolerance*.—The amount of variation permitted in the size of a part. Example:

One-half-inch screw, class 1 fit, American National coarse-thread series:

Maximum pitch diameter.....	0.4478
Minimum pitch diameter.....	.4404

Tolerance.....	0.0074
----------------	--------

4c. *Basic size*.—The theoretical, or nominal, standard size from which all variations are made.

4d. *Crest clearance*.—Defined on a screw form as the space between the crest of a thread and the root of its mating thread.

4e. *Finish*.—The character of the surface on a screw thread or other product.

4f. *Fit*.—The relation between two mating parts with reference to the conditions of assembly, for example, classes 1, 2, 3, and 4. Each fit has its proper place, and none should be regarded as superior or

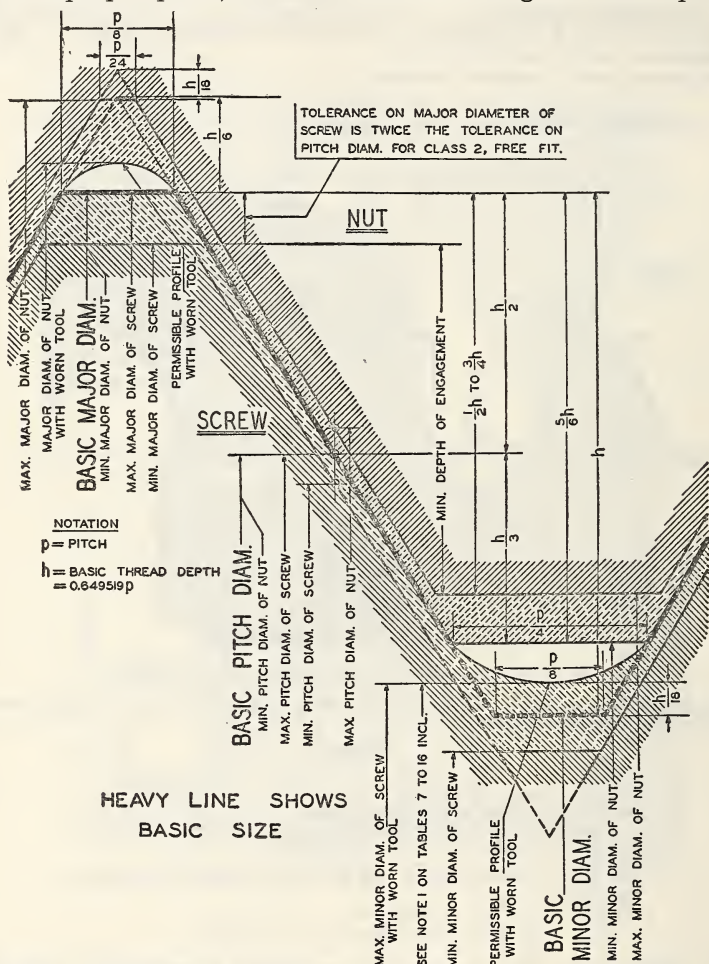


FIGURE 10.—Illustration of tolerances and crest clearances for class 3 fit.

inferior, provided that there is compliance with specification requirements under which it is manufactured and sold.

Class 1 fit includes screw-thread work in which the threads must assemble easily, and where an allowance is required to permit ready assembly, even when the threads are slightly bruised or dirty.

Class 2 fit represents a high quality of commercial screw-thread product and is recommended for the major portion of interchangeable screw-thread work, finished and semifinished bolts and nuts, machine screws, etc., where no allowance is required.

Class 3 fit is the same in every particular as class 2 fit except that the tolerances are smaller. The class 3 fit is intended to apply to interchangeable screw-thread work requiring the smallest practicable tolerances. Tapped holes within class 3 tolerances are difficult and expensive to produce commercially.

Class 4 fit is designed for screw-thread work where extremely close tolerances are required. In the manufacture of screw-thread products to this class of fit, it will be necessary to use precision tools, gages made to special tolerances, and other refinements. This class of fit should, therefore, be used only in cases where the requirements of the mechanism being produced are exacting, or where there are special conditions which make this class of fit necessary. In order to ensure assembly with the degree of tightness desired, it may be necessary, in some cases, to select the parts when the product is being assembled.

4g. *Neutral zone*.—A positive allowance. (See Allowance, par. 4a.)

4h. *Limits*.—The extreme permissible dimensions of a part.
Example:

One-half-inch screw, class 1 fit, American National coarse-thread series:

Maximum pitch diameter.....	0.4478	These are the limits
Minimum pitch diameter.....	.4404	

SYMBOLS

5. Symbols for designating screw-thread standards and thread dimensions are a necessity in commercial and engineering practice. The standardization of such symbols yields the usual advantages of standardization. Those listed below have been in customary use for many years, and their general use in standards, specifications, and textbooks is recommended.

6. *Identification symbols*.—These are for use on correspondence, drawings, shop and storeroom cards, specifications for parts, taps, dies, gages, etc., and on tools and gages.

6a. The method of designating a screw thread by means of symbols is by the use of the initial letters of the thread series preceded by the diameter in inches (or the screw number) and number of threads per inch, all in Arabic characters, and followed by the classification of fit in Arabic numerals. If the thread is left hand, the symbol "LH" shall follow the class of fit. No symbol is used to distinguish right-hand threads. The number of threads per inch shall be indicated in all cases, irrespective of whether it is the standard number of threads for that particular size of threaded part or special. For screw threads of American National form but of special diameters, pitches, and lengths of engagement, the symbol "NS" shall be used. Examples:

American National coarse-thread series:

	Mark
To specify a threaded part 1 inch in diameter, 8 threads per inch, class 1 fit.....	1"—8NC—1
Threaded part 1 inch in diameter, 8 threads per inch, class 2 fit, left hand.....	1"—8NC—2LH

American National fine-thread series:

Threaded part 1 inch in diameter, 14 threads per inch, class 4 fit.....	1"—14NF—4
Threaded part $\frac{3}{8}$ inch in diameter, 18 threads per inch, class 5 fit.....	$\frac{3}{8}$ "—18NF—5
Threaded part, $\frac{1}{8}$ inch in diameter, 44 threads per inch, class 2 fit.....	5—44NF—2

	Mark
American National 8-, 12-, or 16-pitch-thread series:	
Threaded part 1 inch in diameter, 12 threads per inch, class 3 fit.....	1"—12N—3
Threaded part 1½ inches in diameter, 8 threads per inch, class 2 fit, left hand.....	1½"—8N—2LH
American National extra-fine-thread series:	
Threaded part 1 inch in diameter, 20 threads per inch, class 3 fit.....	1"—20NEF—3
American National form, special pitch:	
Threaded part 1 inch in diameter, 18 threads per inch, class 2 fit.....	1"—18NS—2
Threaded part 1¼ inches in diameter, 20 threads per inch, class 3 fit, left hand.....	1¼"—20NS—3LH

SPECIFICATIONS

7. *American National form of thread.*—The form of thread profile specified herein, known previously as the "United States Standard or Sellers' profile", is adopted and shall hereafter be known as the "American National form of thread".²

7a. *Angle of thread.*—The basic angle of thread (A , fig. 3) between the sides of the thread measured in an axial plane is 60° . The line bisecting this 60° angle is perpendicular to the axis of the screw thread.

7b. *Flat at crest and root.*—The flat at the root and crest of the basic thread form is $\frac{1}{8} \times p$, or $0.125 \times p$.

7c. *Depth of thread.*—The depth of the basic thread form is

$$h = 0.649519 \times p, \text{ or } h = \frac{0.649519}{n},$$

where

p = pitch in inches.

n = number of threads per inch.

h = basic depth of thread.

7d. *Clearance at minor diameter.*—A clearance shall be provided at the minor diameter of the nut by removing from the crest of the basic thread form an amount such as to provide a depth of thread not less than 53 to 75 percent (depending on the size), and not more than 83½ percent of the basic thread depth.

7e. *Clearance at major diameter.*—A clearance shall be provided at the major diameter of the nut by making the thread form such that the width of flat shall be less than $\frac{1}{8} \times p$, but not less than $\frac{1}{4} \times p$.

7f. *Thread series.*—The present coarse-thread and fine-thread series are maintained, the coarse-thread series being the "United States standard" threads, supplemented in the sizes below one-fourth inch by sizes taken from the standard established by the American Society of Mechanical Engineers (ASME). The fine-thread series is composed of standards that have been found necessary and consists of sizes taken from the standards of the Society of Automotive Engineers (SAE) and the fine-thread series of the ASME.

7g. There are indicated in figure 3 the relations as specified herein for the American National form of thread for the minimum nut and maximum screw, classes 2 and 3 fits.

² This standard, in substantially the same form, has been adopted by the American Standards Association. It is published, in part, as ASA B1. 1—1935, Screw Threads, by the ASME, 29 West 39th Street, New York, N. Y.

AMERICAN NATIONAL COARSE-THREAD SERIES

8a. The American National coarse-thread series, as specified in table 1, 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. Limiting dimensions and tolerances for classes 1, 2, 3, and 4 fits are specified in table 15.

TABLE 1.—American National coarse-thread series

Identification		Basic diameters					Thread data				
Sizes	Threads per inch, <i>n</i>	Major diameter, <i>D</i>	Pitch diameter, <i>E</i>	Minor diameter, <i>K</i>	Metric equivalent of major diameter	Pitch, <i>p</i>	Depth of thread, <i>h</i>	Basic width of flat at major diameter of nut, <i>p/24</i>	Helix angle at basic pitch diameter, <i>s</i>	Basic area of section at root of thread, $\frac{\pi K^2}{4}$	
1	64	.073	.0629	.0527	1.854	.01562	.01015	.00195	.00065	.0022	
2	56	.086	.0744	.0628	2.184	.01786	.01160	.00223	.00074	.0031	
3	48	.099	.0855	.0719	2.515	.02083	.01353	.00260	.00087	.0041	
4	40	.112	.0958	.0795	2.845	.02500	.01624	.00312	.00104	.0050	
5	40	.125	.1088	.0925	3.175	.02500	.01624	.00312	.00104	.0067	
6	32	.138	.1177	.0974	3.505	.03125	.02030	.00391	.00130	.0075	
8	32	.164	.1437	.1234	4.166	.03125	.02030	.00391	.00130	.0120	
10	24	.190	.1629	.1359	4.826	.04167	.02706	.00521	.00174	.0145	
12	24	.216	.1889	.1619	5.486	.04167	.02706	.00521	.00174	.0206	
1/4	20	.2500	.2175	.1850	6.350	.05000	.03248	.00625	.00208	.0269	
5/16	18	.3125	.2764	.2403	7.938	.05556	.03608	.00694	.00231	.0454	
3/8	16	.3750	.3344	.2938	9.525	.06250	.04059	.00781	.00260	.0678	
7/16	14	.4375	.3911	.3447	11.113	.07143	.04639	.00893	.00298	.0933	
1/2	13	.5000	.4500	.4001	12.700	.07692	.04996	.00962	.00321	.1257	
9/16	12	.5625	.5084	.4542	14.288	.08333	.05413	.01042	.00347	.1620	
5/8	11	.6250	.5660	.5069	15.875	.09091	.05905	.01136	.00379	.2018	
3/4	10	.7500	.6850	.6201	19.050	.10000	.06495	.01250	.00417	.3020	
7/8	9	.8750	.8028	.7307	22.225	.11111	.07217	.01389	.00463	.4193	
1	8	1.0000	.9188	.8376	25.400	.12500	.08119	.01562	.00521	.5510	

1 7/8	---	7	1. 1250	1. 0322	. 9394	28. 575	. 14286	. 09279	. 01786	. 00595	2	31	. 6931
1 7/4	---	7	1. 2500	1. 1572	1. 0644	31. 750	. 14286	. 09279	. 01786	. 00595	2	15	. 8898
1 3/4	---	6	1. 3750	1. 2667	1. 1555	34. 925	. 16667	. 10825	. 02083	. 00694	2	24	1. 0541
1 3/2	---	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	---	4	3. 0000	2. 8376	2. 6752	76. 200	. 25000	. 16238	. 03125	. 01042	1	36	5. 6209
3 1/4	---	4	3. 2500	3. 0876	2. 9252	82. 550	. 25000	. 16238	. 03125	. 01042	1	29	6. 7205
3 1/2	---	4	3. 5000	3. 3376	3. 1752	88. 900	. 25000	. 16238	. 03125	. 01042	1	22	7. 9183
3 3/4	---	4	3. 7500	3. 5876	3. 4252	95. 250	. 25000	. 16238	. 03125	. 01042	1	16	9. 2143
4	---	4	4. 0000	3. 8376	3. 6752	101. 600	. 25000	. 16238	. 03125	. 01042	1	11	10. 6084

AMERICAN NATIONAL FINE-THREAD SERIES

8b. The American National fine-thread series as specified in table 2 is recommended for general use in automotive and aircraft work, and where special conditions require a fine thread. Limiting dimensions and tolerances for classes 1, 2, 3, and 4 fits are specified in table 16.

TABLE 2.—American National fine-thread series

Identification		Basic diameters			Thread data						
Sizes	Threads per inch, n	Major di- ameter, D	Pitch di- ameter, E	Minor di- ameter, 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, $p/2\frac{1}{2}$	Helix angle at basic pitch diameter, δ	Basic area of section at root of thread, $\frac{\pi K^2}{4}$
		Inches	Inches	Inches	mm	Inch	Inch	Inch	Inch	Deg.	Sq. in.
0	80	0.060	0.0519	0.0438	1.524	0.01250	0.00812	0.00156	0.00052	4	0.0015
1	72	0.073	0.0640	0.0550	1.854	0.01389	0.00902	0.00174	0.00058	3	0.0024
2	64	0.086	0.0759	0.0657	2.184	0.01562	0.01015	0.00195	0.00065	3	0.0034
3	56	0.099	0.0874	0.0758	2.515	0.01786	0.01160	0.00223	0.00074	3	0.0045
4	48	0.112	0.0985	0.0849	2.845	0.02083	0.01353	0.00260	0.00087	3	0.0057
5	44	0.125	0.1102	0.0955	3.175	0.02273	0.01476	0.00284	0.00095	3	0.0072
6	40	0.138	0.1218	0.1055	3.505	0.02500	0.01624	0.00312	0.00104	3	0.0087
8	36	0.164	0.1460	0.1279	4.166	0.02778	0.01804	0.00347	0.00116	3	0.0128
10	32	0.190	0.1697	0.1494	4.826	0.03125	0.02030	0.00391	0.00130	3	0.0175
12	28	0.216	0.1928	0.1696	5.486	0.03571	0.02320	0.00446	0.00149	3	0.0226
1/4	28	0.2500	0.2268	0.2036	6.350	0.03571	0.02320	0.00446	0.00149	2	0.0326
5/16	24	0.3125	0.2854	0.2584	7.938	0.04167	0.02706	0.00521	0.00174	2	0.0524
3/8	24	0.3750	0.3479	0.3209	9.525	0.04167	0.02706	0.00521	0.00174	2	0.0809
7/16	20	0.4375	0.4050	0.3725	11.113	0.05000	0.03248	0.00625	0.00208	2	0.1090
1/2	20	0.5000	0.4675	0.4350	12.700	0.05000	0.03248	0.00625	0.00208	1	0.1486
9/16	18	0.5625	0.5264	0.4903	14.288	0.05556	0.03608	0.00694	0.00231	1	0.1888
5/8	18	0.6250	0.5889	0.5528	15.875	0.05556	0.03608	0.00694	0.00231	1	0.2400
3/4	16	0.7500	0.7094	0.6688	19.050	0.06250	0.04059	0.00781	0.00260	1	0.3513
7/8	14	0.8750	0.8286	0.7822	22.225	0.07143	0.04639	0.00893	0.00298	1	0.4805
1	14	1.0000	0.9536	0.9072	25.400	0.07143	0.04639	0.00893	0.00298	1	0.6464
1 1/8	12	1.1250	1.0709	1.0167	28.575	0.08333	0.05413	0.01042	0.00347	1	0.8118
1 1/4	12	1.2500	1.1959	1.1417	31.750	0.08333	0.05413	0.01042	0.00347	1	1.0238
1 3/8	12	1.3750	1.3209	1.2667	34.925	0.08333	0.05413	0.01042	0.00347	1	1.2602
1 1/2	12	1.5000	1.4459	1.3917	38.100	0.08333	0.05413	0.01042	0.00347	1	1.5212

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

Machine screw number or nominal size												
1	2	3	4	5	6	8	10	12	14	16		
Threads per inch												
64	56	48	40	40	32	32	24	24	20	18		
<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		
0.0723	0.0852	0.0981	0.1110	0.1240	0.1369	0.1629	0.1887	0.2147	0.2485	0.3109		
0.0671	0.0796	0.0919	0.1042	0.1172	0.1293	0.1553	0.1795	0.2055	0.2383	0.2995		
0.0052	0.0056	0.0062	0.0068	0.0068	0.0076	0.0076	0.0092	0.0092	0.0102	0.0114		
0.0730	0.0860	0.0990	0.1120	0.1250	0.1380	0.1640	0.1900	0.2160	0.2500	0.3125		
0.0692	0.0820	0.0946	0.1072	0.1202	0.1326	0.1586	0.1834	0.2094	0.2428	0.3043		
0.0038	0.0040	0.0044	0.0048	0.0048	0.0054	0.0054	0.0066	0.0066	0.0072	0.0082		
0.0730	0.0860	0.0990	0.1120	0.1250	0.1380	0.1640	0.1900	0.2160	0.2500	0.3125		
0.0678	0.0804	0.0928	0.1052	0.1182	0.1304	0.1564	0.1808	0.2068	0.2398	0.3011		
0.0052	0.0056	0.0062	0.0068	0.0068	0.0076	0.0076	0.0092	0.0092	0.0102	0.0114		
0.0531	0.0633	0.0725	0.0803	0.0933	0.0986	0.1246	0.1376	0.1636	0.1872	0.2427		
0.0538	0.0641	0.0734	0.0813	0.0943	0.0997	0.1257	0.1389	0.1649	0.1887	0.2443		
0.0622	0.0736	0.0846	0.0948	0.1078	0.1166	0.1426	0.1616	0.1876	0.2160	0.2748		
0.0596	0.0708	0.0815	0.0914	0.1044	0.1128	0.1388	0.1570	0.1830	0.2109	0.2691		
0.0026	0.0028	0.0031	0.0034	0.0034	0.0038	0.0038	0.0046	0.0046	0.0051	0.0057		
0.0629	0.0744	0.0855	0.0958	0.1088	0.1177	0.1437	0.1629	0.1889	0.2175	0.2764		
0.0610	0.0724	0.0833	0.0934	0.1064	0.1150	0.1410	0.1596	0.1856	0.2139	0.2723		
0.0019	0.0020	0.0022	0.0024	0.0024	0.0027	0.0027	0.0033	0.0033	0.0036	0.0041		

Class 3, pitch diameter	Max.	.0629	.0744	.0855	.0958	.1088	.1177	.1437	.1629	.1889	.2175	.2764
	Min.	.0615	.0729	.0839	.0941	.1071	.1158	.1418	.1605	.1865	.2149	.2734
	Tol.	.0014	.0015	.0016	.0017	.0017	.0019	.0019	.0024	.0024	.0026	.0030
Class 4, pitch diameter	Max.	-----	-----	-----	-----	-----	-----	-----	-----	-----	.2178	.2767
	Min.	-----	-----	-----	-----	-----	-----	-----	-----	-----	.2165	.2752
	Tol.	-----	-----	-----	-----	-----	-----	-----	-----	-----	.0013	.0015
NUTS AND TAPPED HOLES												
Classes 1, 2, 3, and 4, major diameter		Min. ²	0.0730	0.0860	0.0990	0.1120	0.1250	0.1640	0.1900	0.2160	0.2500	0.3125
Classes 1, 2, 3, and 4, minor diameter	Max. ³	.0623	.0737	.0841	.0938	.1062	.1145	.1384	.1559	.1801	.2060	.2630
	Min.	.0561	.0667	.0764	.0849	.0979	.1042	.1302	.1449	.1709	.1959	.2524
	Tol.	.0062	.0070	.0077	.0089	.0083	.0103	.0082	.0110	.0092	.0101	.0106
Classes 1, 2, 3, and 4, pitch diameter		Min.	.0629	.0744	.0855	.0958	.1088	.1437	.1629	.1889	.2175	.2764
Class 1, pitch diameter	Max. ⁴	.0655	.0772	.0886	.0992	.1122	.1215	.1475	.1675	.1935	.2226	.2821
	Tol.	.0026	.0028	.0031	.0034	.0034	.0038	.0038	.0046	.0046	.0051	.0057
Class 2, pitch diameter	Max. ⁴	.0648	.0764	.0877	.0982	.1112	.1204	.1464	.1662	.1922	.2211	.2805
	Tol.	.0019	.0020	.0022	.0024	.0024	.0027	.0027	.0033	.0033	.0036	.0041
Class 3, pitch diameter	Max. ⁴	.0643	.0759	.0871	.0975	.1105	.1196	.1456	.1653	.1913	.2201	.2794
	Tol.	.0014	.0015	.0016	.0017	.0017	.0019	.0019	.0024	.0024	.0026	.0030
Class 4, pitch diameter	Max. ⁴	-----	-----	-----	-----	-----	-----	-----	-----	-----	.2188	.2779
	Tol.	-----	-----	-----	-----	-----	-----	-----	-----	-----	.0013	.0015

See footnotes at end of table.

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

Dimensions and tolerances		Machine screw number or nominal size										
		3/8	7/16	1/2	9/16	5/8	3/4	1	1 1/8	1 1/4	1 3/8	
		Threads per inch										
		16	14	13	12	11	10	9	8	7	7	6
		Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inches	Inches	Inches
BOLTS AND SCREWS	{Max--- Min--- Tol.---	0.3732	0.4354	0.4978	0.5601	0.6224	0.7472	0.8719	0.9966	1.1211	1.2461	1.3706
		.3606	.4214	.4830	.5443	.6054	.7288	.8519	.9744	1.0963	1.2213	1.3416
		.0126	.0140	.0148	.0158	.0170	.0184	.0200	.0222	0.0248	0.0248	0.0290
Class 1, major diameter	{Max--- Min--- Tol.---	.3750	.4375	.5000	.5625	.6250	.7500	.8750	1.0000	1.1250	1.2500	1.3750
		.3660	.4277	.4896	.5513	.6132	.7372	.8610	0.9848	1.1080	1.2330	1.3548
		.0090	.0098	.0104	.0112	.0118	.0128	.0140	.0152	0.0170	0.0170	0.0202
Classes 2, 3, and 4, major diameter	{Max--- Min--- Tol.---	.3750	.4375	.5000	.5625	.6250	.7500	.8750	1.0000	1.1250	1.2500	1.3750
		.3624	.4235	.4852	.5467	.6080	.7316	.8550	0.9778	1.1002	1.2252	1.3460
		.0126	.0140	.0148	.0158	.0170	.0184	.0200	.0222	0.0248	0.0248	0.0290
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)	{Max--- Min--- Tol.---	.2965	.3478	.4034	.4579	.5109	.6245	.7356	.8432	.9458	1.0708	1.1661
		.2983	.3499	.4056	.4603	.5135	.6273	.7387	.8466	.9497	1.0747	1.1705
		.3326	.3890	.4478	.5060	.5634	.6822	.7997	.9154	1.0283	1.1533	1.2623
Class 1, pitch diameter	{Max--- Min--- Tol.---	.3263	.3820	.4404	.4981	.5549	.6730	.7897	.9043	1.0159	1.1409	1.2478
		.0063	.0070	.0074	.0079	.0085	.0092	.0100	.0111	0.0124	0.0124	0.0145
		.3344	.3911	.4500	.5084	.5660	.6850	.8028	.9188	1.0322	1.1572	1.2667
Class 2, pitch diameter	{Max--- Min--- Tol.---	.3299	.3862	.4448	.5028	.5601	.6786	.7958	.9112	1.0237	1.1487	1.2566
		.0045	.0049	.0052	.0056	.0059	.0064	.0070	.0076	0.0085	0.0085	0.0101

Class 3, pitch diameter	{Max	.3344	.3911	.4500	.5084	.5660	.6850	.8028	.9188	1.0322	1.1572	1.2667
	{Min	.3312	.3875	.4463	.5044	.5618	.6805	.7979	.9134	1.0263	1.1513	1.2596
	{Tol	.0032	.0036	.0037	.0040	.0042	.0045	.0049	.0054	0.0059	0.0059	0.0071
Class 4, pitch diameter	{Max	.3348	.3915	.4504	.5089	.5665	.6856	.8034	.9195	1.0330	1.1580	1.2676
	{Min	.3332	.3897	.4485	.5069	.5644	.6833	.8010	.9168	1.0300	1.1550	1.2640
	{Tol	.0016	.0018	.0019	.0020	.0021	.0023	.0024	.0027	0.0030	0.0030	0.0036
NUTS AND TAPPED HOLES												
Classes 1, 2, 3, and 4, major diameter	Min ²	0.3750	0.4375	0.5000	0.5625	0.6250	0.7500	0.8750	1.0000	1.1250	1.2500	1.3750
Classes 1, 2, 3, and 4, minor diameter	{Max ³	.3184	.3721	.4290	.4850	.5397	.6553	.7689	0.8795	0.9858	1.1108	1.2126
	{Min	.3073	.3602	.4167	.4723	.5266	.6417	.7547	.8647	.9704	1.0954	1.1946
	{Tol	.0111	.0119	.0123	.0127	.0131	.0136	.0142	.0148	.0154	0.0154	0.0180
Classes 1, 2, 3, and 4, pitch diameter	Min	.3344	.3911	.4500	.5084	.5660	.6850	.8028	.9188	1.0322	1.1572	1.2667
Class 1, pitch diameter	{Max ⁴	.3407	.3981	.4574	.5163	.5745	.6942	.8128	.9299	1.0446	1.1696	1.2812
	{Tol	.0063	.0070	.0074	.0079	.0085	.0092	.0100	.0111	0.0124	0.0124	0.0145
Class 2, pitch diameter	{Max ⁴	.3389	.3960	.4552	.5140	.5719	.6914	.8098	.9264	1.0407	1.1657	1.2768
	{Tol	.0045	.0049	.0052	.0056	.0059	.0064	.0070	.0076	0.0085	0.0085	0.0101
Class 3, pitch diameter	{Max ⁴	.3376	.3947	.4537	.5124	.5702	.6895	.8077	.9242	1.0381	1.1631	1.2738
	{Tol	.0032	.0036	.0037	.0040	.0042	.0045	.0049	.0054	0.0059	0.0059	0.0071
Class 4, pitch diameter	{Max ⁴	.3360	.3929	.4519	.5104	.5681	.6873	.8052	.9215	1.0352	1.1602	1.2703
	{Tol	.0016	.0018	.0019	.0020	.0021	.0023	.0024	.0027	0.0030	0.0030	0.0036

See footnotes at end of table.

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

	Size									
	Threads per inch									
	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4
Dimensions and tolerances										
BOLTS AND SCREWS										
Class 1, major diameter {Max--- Min--- Tol-----}	Inches 1.4956 1.4666 0.0290	Inches 1.7448 1.7110 0.0338	Inches 1.9943 1.9575 0.0368	Inches 2.2443 2.2075 0.0368	Inches 2.4936 2.4528 0.0408	Inches 2.7436 2.7028 0.0408	Inches 2.9936 2.9528 0.0408	Inches 3.2436 3.2028 0.0408	Inches 3.4936 3.4528 0.0408	Inches 3.7436 3.7028 0.0408
Classes 2, 3, and 4, {Max--- major diameter {Min--- Tol-----}	Inches 1.5000 1.4798 0.0202	Inches 1.7500 1.7268 0.0232	Inches 2.0000 1.9746 0.0254	Inches 2.2500 2.2246 0.0254	Inches 2.5000 2.4720 0.0280	Inches 2.7500 2.7220 0.0280	Inches 3.0000 2.9720 0.0280	Inches 3.2500 3.2220 0.0280	Inches 3.5000 3.4720 0.0280	Inches 3.7500 3.7220 0.0280
Class 2, major diameter {Max--- of (threaded parts Min--- of unfinished, hot-rolled material) Tol-----}	Inches 1.5000 1.4710 0.0290	Inches 1.7500 1.7162 0.0338	Inches 2.0000 1.9632 0.0368	Inches 2.2500 2.2132 0.0368	Inches 2.5000 2.4592 0.0408	Inches 2.7500 2.7092 0.0408	Inches 3.0000 2.9592 0.0408	Inches 3.2500 3.2092 0.0408	Inches 3.5000 3.4592 0.0408	Inches 3.7500 3.7092 0.0408
Class 1 minor diameter {Max. 1--- Classes 2, 3, and 4, minor diameter {Min. 1--- Tol-----}	Inches 1.2911 1.2955	Inches 1.4994 1.5046	Inches 1.7217 1.7274	Inches 1.9717 1.9774	Inches 2.1869 2.1933	Inches 2.4369 2.4433	Inches 2.6869 2.6933	Inches 2.9369 2.9433	Inches 3.1869 3.1933	Inches 3.4369 3.4433
Class 1, pitch diameter {Max--- Min--- Tol-----}	Inches 1.3873 1.3728 0.0145	Inches 1.6149 1.5980 0.0169	Inches 1.8500 1.8316 0.0184	Inches 2.1000 2.0816 0.0184	Inches 2.3312 2.3108 0.0204	Inches 2.5812 2.5608 0.0204	Inches 2.8312 2.8108 0.0204	Inches 3.0812 3.0608 0.0204	Inches 3.3312 3.3108 0.0204	Inches 3.5812 3.5608 0.0204
Class 2, pitch diameter {Max--- Min--- Tol-----}	Inches 1.3917 1.3816 0.0101	Inches 1.6201 1.6085 0.0116	Inches 1.8557 1.8430 0.0127	Inches 2.1057 2.0930 0.0127	Inches 2.3376 2.3236 0.0140	Inches 2.5876 2.5736 0.0140	Inches 2.8376 2.8236 0.0140	Inches 3.0876 3.0736 0.0140	Inches 3.3376 3.3236 0.0140	Inches 3.5876 3.5736 0.0140

Class 3, pitch diameter- { Max.--- Min.--- Tol.---	1. 3917	1. 6201	1. 8557	2. 1057	2. 3376	2. 5876	2. 8376	3. 0876	3. 3376	3. 5876	3. 8376
	1. 3846	1. 6119	1. 8468	2. 0968	2. 3279	2. 5779	2. 8279	3. 0779	3. 3279	3. 5779	3. 8279
	0. 0071	0. 0082	0. 0089	0. 0089	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097
Class 4, pitch diameter- { Max.--- Min.--- Tol.---	1. 3926	1. 6211	1. 8568	2. 1068	2. 3389	2. 5889	2. 8389	3. 0889	3. 3389	3. 5889	3. 8389
	1. 3890	1. 6170	1. 8524	2. 1024	2. 3341	2. 5841	2. 8341	3. 0841	3. 3341	3. 5841	3. 8341
	0. 0036	0. 0041	0. 0044	0. 0044	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048
NUTS AND TAPPED HOLES											
Classes 1, 2, 3, and 4, major diameter----- Min. ²	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500	3. 0000	3. 2500	3. 5000	3. 7500	4. 0000
	1. 3376	1. 5551	1. 7835	2. 0335	2. 2564	2. 5064	2. 7564	3. 0064	3. 2564	3. 5064	3. 7564
Classes 1, 2, 3, and 4, minor diameter----- Tol.---	1. 3196	1. 5335	1. 7594	2. 0094	2. 2294	2. 4794	2. 7294	2. 9794	3. 2294	3. 4794	3. 7294
	0. 0180	0. 0216	0. 0241	0. 0241	0. 0270	0. 0270	0. 0270	0. 0270	0. 0270	0. 0270	0. 0270
	1. 3917	1. 6201	1. 8557	2. 1057	2. 3376	2. 5876	2. 8376	3. 0876	3. 3376	3. 5876	3. 8376
Class 1, pitch diameter- { Max. ⁴ --- Tol.---	1. 4062	1. 6370	1. 8741	2. 1241	2. 3580	2. 6080	2. 8580	3. 1080	3. 3580	3. 6080	3. 8580
	0. 0145	0. 0169	0. 0184	0. 0184	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204	0. 0204
Class 2, pitch diameter- { Max. ⁴ --- Tol.---	1. 4018	1. 6317	1. 8684	2. 1184	2. 3516	2. 6016	2. 8516	3. 1016	3. 3516	3. 6016	3. 8516
	0. 0101	0. 0116	0. 0127	0. 0127	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140	0. 0140
Class 3, pitch diameter- { Max. ⁴ --- Tol.---	1. 3988	1. 6283	1. 8646	2. 1146	2. 3473	2. 5973	2. 8473	3. 0973	3. 3473	3. 5973	3. 8473
	0. 0071	0. 0082	0. 0089	0. 0089	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097	0. 0097
Class 4, pitch diameter- { Max. ⁴ --- Tol.---	1. 3953	1. 6242	1. 8601	2. 1101	2. 3424	2. 5924	2. 8424	3. 0924	3. 3424	3. 5924	3. 8424
	0. 0036	0. 0041	0. 0044	0. 0044	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048	0. 0048

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 $\frac{1}{16}Xp$, and may be determined by subtracting the basic thread depth, h (or $0.6495p$), from the minimum pitch diameter of the screw.

² Dimensions for the minimum major diameter of the nut shall be that corresponding to the basic flat ($\frac{1}{16}Xp$) 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 $\frac{1}{16}Xp$, and may be determined by adding $\frac{1}{16}Xh$ (or $0.7939p$) to the maximum pitch diameter of the nut.

³ Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

⁴ These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

NUTS AND TAPPED HOLES

Classes 1, 2, 3, and 4, major diam-----	Min. ² ----	.0600	.0730	.0860	.0990	.1120	.1250	.1380	.1640	.1900	.2160	.2500	.3125	.3750	.4375
Classes 1, 2, 3, and 4, minor diam-----	{Max. ³ ----- Min----- Tol-----}	.0514 .0465 .0049	.0634 .0580 .0054	.0746 .0691 .0055	.0856 .0797 .0059	.0960 .0894 .0066	.1068 .1004 .0064	.1179 .1109 .0070	.1402 .1339 .0063	.1624 .1562 .0062	.1835 .1773 .0062	.2173 .2113 .0060	.2739 .2674 .0065	.3364 .3299 .0065	.3906 .3834 .0072
Classes 1, 2, 3, and 4, pitch diam-----	Min-----	.0519	.0640	.0759	.0874	.0985	.1102	.1218	.1460	.1697	.1928	.2268	.2854	.3479	.4050
Class 1, pitch diam-----	{Max. ⁴ ----- Tol-----}	.0543 .0024	.0665 .0025	.0785 .0026	.0902 .0028	.1016 .0031	.1134 .0032	.1252 .0034	.1496 .0036	.1735 .0038	.1971 .0043	.2311 .0043	.2900 .0046	.3525 .0046	.4101 .0051
Class 2, pitch diam-----	{Max. ⁴ ----- Tol-----}	.0536 .0017	.0658 .0018	.0778 .0019	.0894 .0020	.1007 .0022	.1125 .0023	.1242 .0024	.1485 .0025	.1724 .0027	.1959 .0031	.2299 .0031	.2887 .0033	.3512 .0033	.3086 .0036
Class 3, pitch diam-----	{Max. ⁴ ----- Tol-----}	.0532 .0013	.0653 .0013	.0773 .0014	.0889 .0015	.1001 .0016	.1118 .0016	.1235 .0017	.1478 .0018	.1716 .0019	.1950 .0022	.2290 .0022	.2878 .0024	.3503 .0024	.4076 .0026
Class 4, pitch diam-----	{Max. ⁴ ----- Tol-----}	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	.2279 .0011	.2866 .0012	.3491 .0012	.4063 .0013

See footnotes at end of table.

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

Dimensions and tolerances	Size									
	Threads per inch									
	½	⅝	¾	⅞	1	1 ¼	1 ½	1 ¾	2	2 ½
BOLTS AND SCREWS										
	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inches
	0.4985	0.5609	0.6234	0.7482	0.8729	0.9979	1.1226	1.2476	1.3726	1.4976
	0.4883	0.5495	0.6120	0.7356	0.8589	0.9839	1.1068	1.2318	1.3568	1.4818
Class 1, major diam.	0.0102	0.0114	0.0114	0.0126	0.0140	0.0140	0.0158	0.0158	0.0158	0.0158
Classes 2, 3, and 4, major diam.										
	0.5000	0.5625	0.6250	0.7500	0.8750	1.0000	1.1250	1.2500	1.3750	1.5000
	0.4928	0.5543	0.6168	0.7410	0.8652	0.9902	1.1138	1.2388	1.3638	1.4888
	0.0072	0.0082	0.0082	0.0090	0.0098	0.0098	0.0112	0.0112	0.0112	0.0112
Class 1, minor diam.	0.4372	0.4927	0.5552	0.6715	0.7853	0.9103	1.0204	1.1454	1.2704	1.3954
Classes 2, 3, and 4, minor diam.	0.4387	0.4943	0.5568	0.6733	0.7874	0.9124	1.0228	1.1478	1.2728	1.3978
Class 1, pitch diam.										
	0.4660	0.5248	0.5873	0.7076	0.8265	0.9515	1.0685	1.1935	1.3185	1.4435
	0.4609	0.5191	0.5816	0.7013	0.8195	0.9445	1.0606	1.1856	1.3106	1.4356
	0.0051	0.0057	0.0057	0.0063	0.0070	0.0070	0.0079	0.0079	0.0079	0.0079
Class 2, pitch diam.										
	0.4675	0.5264	0.5889	0.7094	0.8286	0.9536	1.0709	1.1959	1.3209	1.4459
	0.4639	0.5237	0.5848	0.7049	0.8237	0.9487	1.0653	1.1903	1.3153	1.4403
	0.0036	0.0041	0.0041	0.0045	0.0049	0.0049	0.0056	0.0056	0.0056	0.0056
Class 3, pitch diam.										
	0.4675	0.5264	0.5889	0.7094	0.8286	0.9536	1.0709	1.1959	1.3209	1.4459
	0.4649	0.5234	0.5859	0.7082	0.8250	0.9500	1.0669	1.1919	1.3169	1.4419
	0.0026	0.0030	0.0030	0.0032	0.0036	0.0036	0.0040	0.0040	0.0040	0.0040
Class 4, pitch diam.										
	0.4678	0.5267	0.5892	0.7098	0.8290	0.9540	1.0714	1.1964	1.3214	1.4464
	0.4665	0.5252	0.5877	0.7082	0.8272	0.9522	1.0694	1.1944	1.3194	1.4444
	0.0013	0.0015	0.0015	0.0016	0.0018	0.0018	0.0020	0.0020	0.0020	0.0020

NUTS AND TAPPED HOLES

Classes 1, 2, 3, and 4, major diam	Min. ²	.5000	.5625	.6250	.7500	.8750	1.0000	1.1250	1.2500	1.3750	1.5000
Classes 1, 2, 3, and 4, minor diam	{Max. ²	.4531	.5100	.5725	.6903	.8062	0.9312	1.0438	1.1688	1.2938	1.4188
	{Min.	.4459	.5024	.5649	.6823	.7977	.9227	1.0348	1.1598	1.2848	1.4098
	{Tol.	.0072	.0076	.0076	.0080	.0085	.0085	0.0090	0.0090	0.0090	0.0090
Classes 1, 2, 3, and 4, pitch diam	Min.	.4675	.5264	.5889	.7094	.8286	.9536	1.0709	1.1959	1.3209	1.4459
Class 1, pitch diam	{Max. ⁴	.4726	.5321	.5946	.7157	.8356	.9606	1.0788	1.2038	1.3288	1.4538
	{Tol.	.0051	.0057	.0057	.0063	.0070	.0070	0.0079	0.0079	0.0079	0.0079
Class 2, pitch diam	{Max. ⁴	.4711	5.305	.5930	.7139	.8335	.9585	1.0765	1.2015	1.3265	1.4515
	{Tol.	.0036	.0041	.0041	.0045	.0049	.0049	0.0056	0.0056	0.0056	0.0056
Class 3, pitch diam	{Max. ⁴	.4701	.5294	.5919	.7126	.8322	.9572	1.0749	1.1999	1.3249	1.4499
	{Tol.	.0026	.0030	.0030	.0032	.0036	.0036	0.0040	0.0040	0.0040	0.0040
Class 4 pitch diam	{Max. ⁴	.4688	.5279	.5904	.7110	.8304	.9554	1.0729	1.1979	1.3229	1.4479
	{Tol.	.0013	.0015	.0015	.0016	.0018	.0018	0.0020	0.0020	0.0020	0.0020

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 $\frac{1}{8}Xp$, and may be determined by subtracting the basic thread depth, h (or $0.6495p$), from the minimum pitch diameter of the screw.

² Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{8}Xp$) 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 $\frac{1}{24}Xp$, and may be determined by adding $1\frac{1}{2}Xh$ (or $0.7939p$) to the maximum pitch diameter of the nut.

³ Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

⁴ These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

UNIFORM-PITCH SCREW-THREAD SERIES FOR HIGH-PRESSURE FASTENINGS, BOILER APPLICATIONS, MACHINERY COMPONENTS, ETC.³**FORM OF THREAD**

9. The American National form of thread profile as specified in paragraphs 7 to 7f shall be used.

THREAD SERIES

9a. Where special threads are required, it is sometimes essential to select a certain pitch as standard for a range of sizes. Also, in general practice, where the pitch of a special thread is optional, the uniform use of a selected pitch is advantageous. For such applications 8, 12, and 16 threads per inch are widely used.

AMERICAN NATIONAL 8-PITCH-THREAD SERIES

9b. In table 26 are specified the nominal sizes and basic dimensions of the "American National 8-pitch-thread series." Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 29.

Bolts for high-pressure pipe flanges, cylinder-head studs, and similar fastenings against pressure require that an initial tension be set up in the fastening, by elastic deformation of the fastening and the components held together, such that the joint will not open up when the steam or other pressure is applied. To secure a proper initial tension it is not practicable that the pitch should increase with the diameter of the thread, as the torque required to assemble the fastening would be excessive. Accordingly, for such purposes the 8-pitch thread has come into general use.

AMERICAN NATIONAL 12-PITCH-THREAD SERIES

9c. The nominal sizes and basic dimensions of the "American National 12-pitch-thread series" are specified in table 27. Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 30.

Sizes of 12-pitch threads from one-half inch to and including one and three-fourths inches are used in boiler practice, which requires that worn stud holes be retapped with a tap of the next larger size, the increment being one-sixteenth inch throughout most of the range. Die-head chasers for sizes up to 3 inches are stocked by manufacturers.⁴

The 12-pitch threads are also widely used in machine construction, as for thin nuts on shafts and sleeves. From the standpoints of good design and simplification of practice, it is desirable to limit shoulder diameters to $\frac{1}{8}$ -inch steps. The 12 pitch is the coarsest in general use that will permit a threaded collar which screws onto a threaded shoulder to slip over a shaft, the difference in diameter between shoulder and shaft being one-eighth inch.

³ This standard, in substantially the same form, has been adopted by the American Standards Association. It is published as ASA B1.1-1935 "Screw Threads" by the ASME, 29 West 39th St., New York, N. Y.

⁴ See U. S. Department of Commerce Simplified Practice Recommendation R51-29, Die Head Chasers.

AMERICAN NATIONAL 16-PITCH-THREAD SERIES

9d. The nominal sizes and basic dimensions of the "American National 16-pitch-thread series" are specified in table 28. Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 31.

The 16-pitch series is a uniform pitch series for such applications as require a relatively fine thread. It is intended primarily for use on threaded adjusting collars and bearing-retaining nuts.

TABLE 26.—American National 8-pitch thread series

[Pitch, $p=0.12500$ inch; depth of thread, $h=0.08119$ inch; basic width of flat, $p/8=0.01562$ inch; minimum width of flat at major diameter of nut, $p/24=0.00521$ inch.]

Identification		Basic diameters			Thread data		
Sizes	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Helix angle at basic pitch diameter, s	Basic area of section at root of thread, $\frac{\pi K^2}{4}$
<i>Inches</i>		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>mm</i>	<i>deg min</i>	<i>Square inches</i>
1 ¹ -----	8	1.0000	0.9188	0.8376	25.400	2 29	0.5510
1 ¹ / ₈ -----	8	1.1250	1.0438	.9626	28.575	2 11	.7277
1 ¹ / ₄ -----	8	1.2500	1.1688	1.0876	31.750	1 57	.9290
1 ³ / ₈ -----	8	1.3750	1.2938	1.2126	34.925	1 46	1.1548
1 ¹ / ₂ -----	8	1.5000	1.4188	1.3376	38.100	1 36	1.4052
1 ⁵ / ₈ -----	8	1.6250	1.5438	1.4626	41.275	1 29	1.6801
1 ³ / ₄ -----	8	1.7500	1.6688	1.5876	44.450	1 22	1.9796
1 ⁷ / ₈ -----	8	1.8750	1.7938	1.7126	47.625	1 16	2.3036
2-----	8	2.0000	1.9188	1.8376	50.800	1 11	2.6521
2 ¹ / ₈ -----	8	2.1250	2.0438	1.9626	53.975	1 7	3.0252
2 ¹ / ₄ -----	8	2.2500	2.1688	2.0876	57.150	1 3	3.4228
2 ¹ / ₂ -----	8	2.5000	2.4188	2.3376	63.500	0 57	4.2917
2 ³ / ₄ -----	8	2.7500	2.6688	2.5876	69.850	0 51	5.2588
3-----	8	3.0000	2.9188	2.8376	76.200	0 47	6.3240
3 ¹ / ₄ -----	8	3.2500	3.1688	3.0876	82.550	0 43	7.4874
3 ¹ / ₂ -----	8	3.5000	3.4188	3.3376	88.900	0 40	8.7490
3 ³ / ₄ -----	8	3.7500	3.6688	3.5876	95.250	0 37	10.1088
4-----	8	4.0000	3.9188	3.8376	101.600	0 35	11.5667
4 ¹ / ₄ -----	8	4.2500	4.1688	4.0876	107.950	0 33	13.1228
4 ¹ / ₂ -----	8	4.5000	4.4188	4.3376	114.300	0 31	14.7771
4 ³ / ₄ -----	8	4.7500	4.6688	4.5876	120.650	0 29	16.5295
5-----	8	5.0000	4.9188	4.8376	127.000	0 28	18.3802
5 ¹ / ₄ -----	8	5.2500	5.1688	5.0876	133.350	0 26	20.3290
5 ¹ / ₂ -----	8	5.5000	5.4188	5.3376	139.700	0 25	22.3760
5 ³ / ₄ -----	8	5.7500	5.6688	5.5876	146.050	0 24	24.5211
6-----	8	6.0000	5.9188	5.8376	152.400	0 23	26.7645

¹ Standard size of the American National coarse-thread series.

TABLE 27.—American National 12-pitch thread series

[Pitch, $p=0.08333$ inch; depth of thread, $h=0.05413$ inch; basic width of flat, $p/8=0.01042$ inch; minimum width of flat at major diameter of nut, $p/24=0.00347$ inch.]

Identification		Basic diameters			Thread data		
Sizes	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Helix angle at basic pitch diameter, s	Basic area of section at root of thread, $\frac{\pi K^2}{4}$
Inches		Inches	Inches	Inches	mm	deg min	Square inches
$\frac{1}{2}$ -----	12	0.5000	0.4459	0.3917	12.700	3 24	0.1205
$\frac{3}{16}$ ¹ -----	12	.5625	.5084	.4542	14.288	2 59	.1620
$\frac{5}{16}$ -----	12	.6250	.5709	.5167	15.875	2 40	.2097
$\frac{1}{4}$ ¹ -----	12	.6875	.6334	.5792	17.463	2 24	.2635
$\frac{3}{4}$ -----	12	.7500	.6959	.6417	19.050	2 11	.3234
$\frac{1}{2}$ ² -----	12	.8125	.7584	.7042	20.638	2 0	.3895
$\frac{7}{8}$ -----	12	.8750	.8209	.7667	22.225	1 51	.4617
$\frac{1}{2}$ ² -----	12	.9375	.8834	.8292	23.813	1 43	.5400
1-----	12	1.0000	.9459	.8917	25.400	1 36	.6245
$1\frac{1}{16}$ -----	12	1.0625	1.0084	.9542	26.988	1 30	.7151
$1\frac{1}{8}$ ² -----	12	1.1250	1.0709	1.0167	28.575	1 25	.8118
$1\frac{3}{16}$ -----	12	1.1875	1.1334	1.0792	30.163	1 20	.9147
$1\frac{1}{4}$ ² -----	12	1.2500	1.1959	1.1417	31.750	1 16	1.0237
$1\frac{5}{16}$ -----	12	1.3125	1.2584	1.2042	33.338	1 12	1.1389
$1\frac{3}{8}$ ² -----	12	1.3750	1.3209	1.2667	34.925	1 9	1.2602
$1\frac{7}{16}$ -----	12	1.4375	1.3834	1.3292	36.513	1 6	1.3876
$1\frac{1}{2}$ ² -----	12	1.5000	1.4459	1.3917	38.100	1 3	1.5212
$1\frac{9}{16}$ -----	12	1.6250	1.5709	1.5167	41.275	0 58	1.8067
$1\frac{3}{4}$ -----	12	1.7500	1.6959	1.6417	44.450	0 54	2.1168
$1\frac{7}{8}$ -----	12	1.8750	1.8209	1.7667	47.625	0 50	2.4514
2-----	12	2.0000	1.9459	1.8917	50.800	0 47	2.8106
$2\frac{1}{16}$ -----	12	2.1250	2.0709	2.0167	53.975	0 44	3.1943
$2\frac{1}{4}$ -----	12	2.2500	2.1959	2.1417	57.150	0 42	3.6025
$2\frac{3}{8}$ -----	12	2.3750	2.3209	2.2667	60.325	0 39	4.0353
$2\frac{1}{2}$ -----	12	2.5000	2.4459	2.3917	63.500	0 37	4.4927
$2\frac{5}{8}$ -----	12	2.6250	2.5709	2.5167	66.675	0 35	4.9745
$2\frac{3}{4}$ -----	12	2.7500	2.6959	2.6417	69.850	0 34	5.4810
$2\frac{7}{8}$ -----	12	2.8750	2.8209	2.7667	73.025	0 32	6.0119
3-----	12	3.0000	2.9459	2.8917	76.200	0 31	6.5674
$3\frac{1}{8}$ -----	12	3.1250	3.0709	3.0167	79.375	0 30	7.1475
$3\frac{1}{4}$ -----	12	3.2500	3.1959	3.1417	82.550	0 29	7.7521
$3\frac{3}{8}$ -----	12	3.3750	3.3209	3.2667	85.725	0 27	8.3812
$3\frac{1}{2}$ -----	12	3.5000	3.4459	3.3917	88.900	0 26	9.0349
$3\frac{5}{8}$ -----	12	3.6250	3.5709	3.5167	92.075	0 26	9.7132
$3\frac{3}{4}$ -----	12	3.7500	3.6959	3.6417	95.250	0 25	10.4159
$3\frac{7}{8}$ -----	12	3.8750	3.8209	3.7667	98.425	0 24	11.1433
4-----	12	4.0000	3.9459	3.8917	101.600	0 23	11.8951
$4\frac{1}{4}$ -----	12	4.2500	4.1959	4.1417	107.950	0 22	13.4725
$4\frac{1}{2}$ -----	12	4.5000	4.4459	4.3917	114.300	0 21	15.1480
$4\frac{3}{4}$ -----	12	4.7500	4.6959	4.6417	120.650	0 19	16.9217
5-----	12	5.0000	4.9459	4.8917	127.000	0 18	18.7936
$5\frac{1}{4}$ -----	12	5.2500	5.1959	5.1417	133.350	0 18	20.7636
$5\frac{1}{2}$ -----	12	5.5000	5.4459	5.3917	139.700	0 17	22.8319
$5\frac{3}{4}$ -----	12	5.7500	5.6959	5.6417	146.050	0 16	24.9983
6-----	12	6.0000	5.9459	5.8917	152.400	0 15	27.2628

¹ Standard size of the American National coarse-thread series.² Standard size of the American National fine-thread series.

TABLE 28.—American National 16-pitch thread series

[Pitch, $p=0.06250$ inch; depth of thread, $h=0.04059$ inch; basic width of flat, $p/8=0.00781$ inch; minimum width of flat at major diameter of nut, $p/24=0.00260$ inch]

Identification		Basic diameters			Thread data			
Sizes	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Helix angle at basic pitch diameter, s		Basic area of section at root of thread, $\frac{\pi K^2}{4}$
Inches		Inches	Inches	Inches	mm	deg	min	Square inches
$\frac{3}{4}$ 1-----	16	0.7500	0.7094	0.6688	19.050	1	36	0.3513
$\frac{3}{16}$ -----	16	.8125	.7719	.7313	20.638	1	29	.4200
$\frac{7}{8}$ -----	16	.8750	.8344	.7938	22.225	1	22	.4949
$\frac{5}{16}$ -----	16	.9375	.8969	.8563	23.813	1	16	.5759
1-----	16	1.0000	.9594	.9188	25.400	1	11	.6630
$1\frac{1}{16}$ -----	16	1.0625	1.0219	.9813	26.988	1	7	.7563
$1\frac{1}{8}$ -----	16	1.1250	1.0844	1.0438	28.575	1	3	.8557
$1\frac{1}{4}$ -----	16	1.1875	1.1469	1.1063	30.163	1	0	.9612
$1\frac{3}{4}$ -----	16	1.2500	1.2094	1.1688	31.750	0	57	1.0729
$1\frac{5}{16}$ -----	16	1.3125	1.2719	1.2313	33.338	0	54	1.1907
$1\frac{3}{8}$ -----	16	1.3750	1.3344	1.2938	34.925	0	51	1.3147
$1\frac{7}{16}$ -----	16	1.4375	1.3969	1.3563	36.513	0	49	1.4448
$1\frac{1}{2}$ -----	16	1.5000	1.4594	1.4188	38.100	0	47	1.5810
$1\frac{9}{16}$ -----	16	1.5625	1.5219	1.4813	39.688	0	45	1.7234
$1\frac{5}{8}$ -----	16	1.6250	1.5844	1.5438	41.275	0	43	1.8719
$1\frac{11}{16}$ -----	16	1.6875	1.6469	1.6063	42.863	0	42	2.0265
$1\frac{3}{4}$ -----	16	1.7500	1.7094	1.6688	44.450	0	40	2.1873
$1\frac{13}{16}$ -----	16	1.8125	1.7719	1.7313	46.038	0	39	2.3542
$1\frac{7}{8}$ -----	16	1.8750	1.8344	1.7938	47.625	0	37	2.5272
$1\frac{15}{16}$ -----	16	1.9375	1.8969	1.8563	49.213	0	36	2.7064
2-----	16	2.0000	1.9594	1.9188	50.800	0	35	2.8917
$2\frac{1}{16}$ -----	16	2.0625	2.0219	1.9813	52.388	0	34	3.0831
$2\frac{1}{8}$ -----	16	2.1250	2.0844	2.0438	53.975	0	33	3.2807
$2\frac{3}{16}$ -----	16	2.1875	2.1469	2.1063	55.563	0	32	3.4844
$2\frac{1}{4}$ -----	16	2.2500	2.2094	2.1688	57.150	0	31	3.6943
$2\frac{5}{16}$ -----	16	2.3125	2.2719	2.2313	58.738	0	30	3.9103
$2\frac{3}{8}$ -----	16	2.3750	2.3344	2.2938	60.325	0	29	4.1324
$2\frac{7}{16}$ -----	16	2.4375	2.3969	2.3563	61.913	0	29	4.3606
$2\frac{1}{2}$ -----	16	2.5000	2.4594	2.4188	63.500	0	28	4.5950
$2\frac{5}{8}$ -----	16	2.6250	2.5844	2.5438	66.675	0	26	5.0822
$2\frac{3}{4}$ -----	16	2.7500	2.7094	2.6688	69.850	0	25	5.5940
$2\frac{7}{8}$ -----	16	2.8750	2.8344	2.7938	73.025	0	24	6.1303
3-----	16	3.0000	2.9594	2.9188	76.200	0	23	6.6911
$3\frac{1}{8}$ -----	16	3.1250	3.0844	3.0438	79.375	0	22	7.2765
$3\frac{1}{4}$ -----	16	3.2500	3.2094	3.1688	82.550	0	21	7.8864
$3\frac{3}{8}$ -----	16	3.3750	3.3344	3.2938	85.725	0	21	8.5209
$3\frac{1}{2}$ -----	16	3.5000	3.4594	3.4188	88.900	0	20	9.1799
$3\frac{5}{8}$ -----	16	3.6250	3.5844	3.5438	92.075	0	19	9.8634
$3\frac{3}{4}$ -----	16	3.7500	3.7094	3.6688	95.250	0	18	10.5715
$3\frac{7}{8}$ -----	16	3.8750	3.8344	3.7938	98.425	0	18	11.3042
4-----	16	4.0000	3.9594	3.9188	101.600	0	17	12.0614

¹ Standard size of the American National fine-thread series;

TABLE 29.—Limiting dimensions and tolerances, classes 2 and 3 fits, American National 8-pitch thread series

	Size (inches)									
	1 ²	1½	1¼	1⅜	1½	1⅝	1¾	1⅞	2	2½
BOLTS AND SCREWS	Inch	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	1.0000	1.1250	1.2500	1.3750	1.5000	1.6250	1.7500	1.8750	2.0000	2.2500
	0.9848	1.1098	1.2348	1.3598	1.4848	1.6098	1.7348	1.8598	1.9848	2.2348
	.0152	.0152	.0152	.0152	.0152	.0152	.0152	.0152	.0152	.0152
Classes 2 and 3, major diameter	{Max. --- Min. --- Tol. ---}									
Classes 2 and 3, minor diameter	Max. ³ ---	.8466	.9716	1.0966	1.2216	1.3466	1.4716	1.5966	1.7216	1.8466
Class 2, pitch diameter (for general use)	{Max. --- Min. --- Tol. ---}	.9188	1.0438	1.1688	1.2938	1.4188	1.5438	1.6688	1.7938	1.9188
Class 3, pitch diameter	{Max. --- Min. --- Tol. ---}	.9134	1.0383	1.1630	1.2877	1.4125	1.5373	1.6620	1.7868	1.9115
NUTS AND TAPPED HOLES		.0054	.0055	.0058	.0061	.0063	.0065	.0068	.0070	.0073
Classes 2 and 3, major diameter	Min. ⁴ ---	1.0000	1.1250	1.2500	1.3750	1.5000	1.6250	1.7500	1.8750	2.0000
Classes 2 and 3, minor diameter	{Min. --- Max. ⁵ --- Tol. ---}	0.8647	0.9897	1.1147	1.2397	1.3647	1.4897	1.6147	1.7397	1.8647
Classes 2 and 3, pitch diameter	Min. ---	.8795	1.0045	1.1295	1.2545	1.3795	1.5045	1.6295	1.7545	1.8795
Class 2, pitch diameter (for general use)	{Max. ⁶ --- Tol. ---}	.0148	.0148	.0148	.0148	.0148	.0148	.0148	.0148	.0148
Class 3, pitch diameter	{Max. ⁶ --- Tol. ---}	.9188	1.0438	1.1688	1.2938	1.4188	1.5438	1.6688	1.7938	1.9188
		.9264	1.0517	1.1771	1.3024	1.4278	1.5531	1.6785	1.8038	1.9292
		.0076	.0079	.0083	.0086	.0090	.0093	.0097	.0100	.0104
		.9242	1.0493	1.1746	1.2999	1.4251	1.5503	1.6756	1.8008	1.9261
		.0054	.0055	.0058	.0061	.0063	.0065	.0068	.0070	.0073

Dimensions and tolerances ¹	Size (inches)										
	3	3¼	3½	3¾	4	4¼	4½	4¾	5	5¼	5½
BOLTS AND SCREWS											
Classes 2 and 3, major diameter	Max.---	3.0000	3.2500	3.5000	3.7500	4.0000	4.2500	4.5000	4.7500	5.0000	5.2500
	Min.---	2.9848	3.2348	3.4848	3.7348	3.9848	4.2348	4.4848	4.7348	4.9848	5.2348
	Tol.---	0.0152	0.0152	0.0152	0.0152	0.0152	0.0152	0.0152	0.0152	0.0152	0.0152
Classes 2 and 3, minor diameter	Max. ³ ---	2.8466	3.0966	3.3466	3.5966	3.8466	4.0966	4.3466	4.5966	4.8466	5.0966
	Min.---	2.9188	3.1688	3.4188	3.6688	3.9188	4.1688	4.4188	4.6688	4.9188	5.1688
	Tol.---	2.9058	3.1556	3.4055	3.6554	3.9053	4.1551	4.4050	4.6549	4.9048	5.1547
Class 2, pitch diameter (for general use)	Max.---	0.0130	0.0132	0.0133	0.0134	0.0135	0.0137	0.0138	0.0139	0.0140	0.0141
	Min.---	2.9188	3.1688	3.4188	3.6688	3.9188	4.1688	4.4188	4.6688	4.9188	5.1688
	Tol.---	2.9096	3.1595	3.4095	3.6594	3.9093	4.1592	4.4091	4.6590	4.9089	5.1589
Class 3, pitch diameter	Max.---	0.0092	0.0093	0.0093	0.0094	0.0095	0.0096	0.0097	0.0098	0.0099	0.0100
	Min.---	3.0000	3.2500	3.5000	3.7500	4.0000	4.2500	4.5000	4.7500	5.0000	5.2500
	Tol.---	2.8647	3.1147	3.3647	3.6147	3.8647	4.1147	4.3647	4.6147	4.8647	5.1147
Classes 2 and 3, minor diameter	Max. ⁵ ---	2.8795	3.1295	3.3795	3.6295	3.8795	4.1295	4.3795	4.6295	4.8795	5.1295
	Min.---	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
	Tol.---	2.9188	3.1688	3.4188	3.6688	3.9188	4.1688	4.4188	4.6688	4.9188	5.1688
Class 2, pitch diameter (for general use)	Max. ⁶ ---	2.9318	3.1820	3.4321	3.6822	3.9323	4.1825	4.4326	4.6827	4.9328	5.1829
	Min.---	0.0130	0.0132	0.0133	0.0134	0.0135	0.0137	0.0138	0.0139	0.0140	0.0141
	Tol.---	2.9280	3.1781	3.4281	3.6782	3.9283	4.1784	4.4285	4.6786	4.9287	5.1787
Class 3, pitch diameter	Max. ⁶ ---	0.0092	0.0093	0.0093	0.0094	0.0095	0.0096	0.0097	0.0098	0.0099	0.0100
	Min.---	3.0000	3.2500	3.5000	3.7500	4.0000	4.2500	4.5000	4.7500	5.0000	5.2500
	Tol.---	2.8647	3.1147	3.3647	3.6147	3.8647	4.1147	4.3647	4.6147	4.8647	5.1147

¹ Pitch diameter tolerances include errors of lead and angle. The class 2 tolerances are based on the formulas in table 116 and a length of engagement equal to the basic major diameter for sizes from 1½ to 3 inches, inclusive, and a length of engagement of 3 inches for sizes over the 3-inch. The class 3 tolerances are 70 percent of the class 2 tolerances. The 1-inch size being in the American National coarse-thread series, the tolerances for this size correspond to that series.

² Standard size screw and nut of the American National coarse-thread series.

³ Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worn tool are 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 ¼Xp, and may be determined by subtracting 0.0812 inch from the minimum pitch diameter of the screw.

⁴ Dimensions for the minimum major diameter of the nut correspond to the basic flat (¼Xp), 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 ¼Xp, and may be determined by adding 0.0992 inch to the maximum pitch diameter of the nut.

⁵ Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

⁶ These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

Dimensions and tolerances ¹	Size (inches)												
	1½	1½	1½	1¾	1¾	2	2½	2½	2¾	2¾	2¾	3	3½
BOLTS AND SCREWS	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	1. 4375	1. 5000	1. 6250	1. 7500	1. 8750	2. 0000	2. 1250	2. 2500	2. 3750	2. 5000	2. 6250	2. 7500	2. 8750
	1. 4263	1. 4888	1. 6138	1. 7388	1. 8638	1. 9888	2. 1138	2. 2388	2. 3638	2. 4888	2. 6138	2. 7388	2. 8638
	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112	0. 0112
Classes 2 and 3, major diam.	{Max. 1250 Min. 1138 Tol. 0.0112}												
Classes 2 and 3, minor diam.	{Max. 0228 Min. 0112 Tol. 0.0112}												
Class 2, pitch diam. (for general use)	{Max. 0709 Min. 0668 Tol. 0.0041}												
Class 3, pitch diam.	{Max. 0709 Min. 0668 Tol. 0.0041}												
NUTS AND TAPPED HOLES	{Max. 0709 Min. 0668 Tol. 0.0041}												
Classes 2 and 3, major diam.	{Max. 1250 Min. 1138 Tol. 0.0112}												
Classes 2 and 3, minor diam.	{Max. 0228 Min. 0112 Tol. 0.0112}												
Classes 2 and 3, pitch diam.	{Max. 0709 Min. 0668 Tol. 0.0041}												
Class 2, pitch diam. (for general use)	{Max. 0709 Min. 0668 Tol. 0.0041}												
Class 3, pitch diam.	{Max. 0709 Min. 0668 Tol. 0.0041}												

See footnotes at end of table.

TABLE 30.—Limiting dimensions and tolerances, classes 2 and 3 fits, American National 12 pitch-thread series—Continued

Dimensions and tolerances ¹	Size (inches)														
	3¼	3⅜	3½	3⅝	3¾	3⅞	4	4¼	4½	4¾	5	5¼	5½	5¾	6
BOLTS AND SCREWS	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	3.2500	3.3750	3.5000	3.6250	3.7500	3.8750	4.0000	4.2500	4.5000	4.7500	5.0000	5.2500	5.5000	5.7500	6.0000
	3.2388	3.3638	3.4888	3.6138	3.7388	3.8638	3.9888	4.2388	4.4888	4.7388	4.9888	5.2388	5.4888	5.7388	5.9888
	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112	0.0112
Classes 2 and 3, minor diam.	3.1478	3.2728	3.3978	3.5228	3.6478	3.7728	3.8978	4.1478	4.3978	4.6478	4.8978	5.1478	5.3978	5.6478	5.8978
	3.1959	3.3209	3.4459	3.5709	3.6959	3.8209	3.9459	4.1959	4.4459	4.6959	4.9459	5.1959	5.4459	5.6959	5.9459
Class 2, pitch diam (for general use)	3.1884	3.3133	3.4383	3.5632	3.6881	3.8131	3.9380	4.1879	4.4378	4.6876	4.9375	5.1874	5.4373	5.6872	5.9371
	0.0075	0.0076	0.0076	0.0077	0.0078	0.0078	0.0079	0.0080	0.0081	0.0083	0.0084	0.0085	0.0086	0.0087	0.0088
	3.1959	3.3209	3.4459	3.5709	3.6959	3.8209	3.9459	4.1959	4.4459	4.6959	4.9459	5.1959	5.4459	5.6959	5.9459
Class 3, pitch diam.	3.1907	3.3156	3.4406	3.5655	3.6905	3.8154	3.9404	4.1903	4.4402	4.6901	4.9400	5.1900	5.4399	5.6898	5.9397
	0.0052	0.0053	0.0053	0.0054	0.0054	0.0055	0.0055	0.0056	0.0057	0.0058	0.0059	0.0059	0.0060	0.0061	0.0062
	3.1959	3.3209	3.4459	3.5709	3.6959	3.8209	3.9459	4.1959	4.4459	4.6959	4.9459	5.1959	5.4459	5.6959	5.9459

NUTS AND TAPPED HOLES

Classes 2 and 3, major diam-----	Min. ¹ -----	3. 2500	3. 3750	3. 5000	3. 6250	3. 7500	3. 8750	4. 0000	4. 2500	4. 5000	4. 7500	5. 0000	5. 2500	5. 5000	5. 7500	6. 0000
Class 2 and 3, { Min-----	{ Max-----	3. 1598	3. 2848	3. 4098	3. 5348	3. 6598	3. 7848	3. 9098	4. 1598	4. 4098	4. 6598	4. 9098	5. 1598	5. 4098	5. 6598	5. 9098
Class 2 and 3, { Max-----		3. 1688	3. 2938	3. 4188	3. 5438	3. 6688	3. 7938	3. 9188	4. 1688	4. 4188	4. 6688	4. 9188	5. 1688	5. 4188	5. 6688	5. 9188
minor diam-----		0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Classes 2 and 3, pitch diam-----	Min-----	3. 1959	3. 3209	3. 4459	3. 5709	3. 6959	3. 8209	3. 9459	4. 1959	4. 4459	4. 6959	4. 9459	5. 1959	5. 4459	5. 6959	5. 9459
Class 2, pitch { Max. ² -----	{ Tol-----	3. 2034	3. 3285	3. 4535	3. 5786	3. 7037	3. 8287	3. 9538	4. 2039	4. 4540	4. 7042	4. 9543	5. 2044	5. 4545	5. 7046	5. 9547
diam (for gen-eral use)		0. 0075	0. 0076	0. 0076	0. 0077	0. 0078	0. 0078	0. 0079	0. 0080	0. 0081	0. 0083	0. 0084	0. 0085	0. 0086	0. 0087	0. 0088
Class 3, pitch { Max. ³ -----	{ Tol-----	3. 2011	3. 3262	3. 4512	3. 5763	3. 7013	3. 8264	3. 9514	4. 2015	4. 4516	4. 7017	4. 9518	5. 2018	5. 4519	5. 7020	5. 9521
diam-----		0. 0052	0. 0053	0. 0053	0. 0054	0. 0054	0. 0055	0. 0055	0. 0056	0. 0057	0. 0058	0. 0059	0. 0059	0. 0060	0. 0061	0. 0062

¹ Pitch-diameter tolerances include errors of lead and angle. The class 2 tolerances for sizes above 1½ inches are based on the formulas in table 116 and a length of engagement of 6 threads or ½ inch. The class 3 tolerances are 70 percent of the class 2 tolerances. For lengths of engagement of 1 inch, 0.0010 inch may be added to these tolerances. As certain sizes up to 1½ inches are included in the American National coarse- or fine-thread series, the tolerances to and including 1½ inches correspond to those series.

² Standard-size screw and nut of the American National coarse-thread series.

³ 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 mini-

mum minor diameter of the screw shall be that corresponding to a flat at the minor diameter of the minimum screw equal to ⅓Xp, and may be determined by subtracting 0.0541 inch from the minimum pitch diameter of the screw.

⁴ Dimensions for the minimum major diameter of the nut correspond to the basic flat (⅓Xp) 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 ⅓Xp, and may be determined by adding 0.0662 inch to the maximum pitch diameter of the nut.

⁵ These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

TABLE 31.—Limiting dimensions and tolerances, classes 2 and 3 *fit*, American National 16-pitch-thread series

Dimensions and tolerances ¹	Size (inches)									
	$\frac{3}{4}$ 2	$1\frac{1}{16}$	$\frac{7}{8}$	$1\frac{1}{8}$	1	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{3}{16}$	$1\frac{1}{4}$	$1\frac{5}{16}$
Bolts and Screws										
Major diameter	Inch	Inch	Inch	Inch	Inch	Inches	Inches	Inches	Inches	Inches
	0.7500	0.8125	0.8750	0.9375	1.0000	1.0625	1.1250	1.1875	1.2500	1.3125
	Max. 7410	8035	8660	9285	9910	1.0535	1.1160	1.1785	1.2410	1.3035
Minor diameter	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
	Max. 2	7358	7983	8608	9233	9858	1.0483	1.1108	1.1733	1.2358
	Class 2, pitch diameter (for general use)	7094	8344	8969	9594	1.0219	1.0844	1.1469	1.2094	1.2719
Class 3, pitch diameter	7049	7668	8293	8917	9542	1.0166	1.0790	1.1415	1.2039	1.2664
	0.0045	0.0051	0.0051	0.0052	0.0052	0.0053	0.0054	0.0054	0.0055	0.0055
	Max. 7094	7719	8344	8969	9594	1.0219	1.0844	1.1469	1.2094	1.2719
Nuts and Tapped Holes	7062	7684	8308	8933	9557	1.0182	1.0806	1.1431	1.2056	1.2680
	0.0032	0.0035	0.0036	0.0036	0.0037	0.0037	0.0038	0.0038	0.0038	0.0039
	Major diameter	7500	8750	9375	1.0000	1.0625	1.1250	1.1875	1.2500	1.3125
Minor diameter	6823	7448	8073	8698	9323	0.9948	1.0573	1.1198	1.1823	1.2448
	Min. 6903	7528	8153	8778	9403	1.0028	1.0653	1.1278	1.1903	1.2528
	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Class 2, pitch diameter (for general use)	7094	7719	8344	8969	9594	1.0219	1.0844	1.1469	1.2094	1.2719
	Min. 7139	7770	8395	9021	9646	1.0272	1.0898	1.1523	1.2149	1.2774
	0.0045	0.0051	0.0051	0.0052	0.0052	0.0053	0.0054	0.0054	0.0055	0.0055
Class 3, pitch diameter	7094	7719	8344	8969	9594	1.0219	1.0844	1.1469	1.2094	1.2719
	Min. 7126	7754	8380	9005	9631	1.0256	1.0882	1.1507	1.2132	1.2758
	0.0032	0.0035	0.0036	0.0036	0.0037	0.0037	0.0038	0.0038	0.0038	0.0039

Dimensions and tolerances ¹	Size (inches)									
	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	1 11/16	1 3/4	1 13/16	1 7/8	1 15/16
BOLTS AND SCREWS										
Major diameter	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	1. 3750	1. 5000	1. 5625	1. 6250	1. 6875	1. 7500	1. 8125	1. 8750	1. 9375	
	1. 3660	1. 4910	1. 5535	1. 6160	1. 6785	1. 7410	1. 8035	1. 8660	1. 9285	
	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090	0. 0090
Minor diameter	1. 2983	1. 4233	1. 4858	1. 5483	1. 6108	1. 6733	1. 7358	1. 7983	1. 8608	
Class 2, pitch diameter (for general use)	1. 3344	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969	
	1. 3288	1. 4537	1. 5161	1. 5786	1. 6411	1. 7035	1. 7660	1. 8284	1. 8909	
	0. 0056	0. 0057	0. 0058	0. 0058	0. 0058	0. 0059	0. 0059	0. 0060	0. 0060	
Class 3, pitch diameter	1. 3344	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969	
	1. 3305	1. 4554	1. 5179	1. 5803	1. 6428	1. 7053	1. 7677	1. 8302	1. 8927	
	0. 0039	0. 0040	0. 0040	0. 0041	0. 0041	0. 0041	0. 0042	0. 0042	0. 0042	
NUTS AND TAPPED HOLES										
Major diameter	1. 3750	1. 5000	1. 5625	1. 6250	1. 6875	1. 7500	1. 8125	1. 8750	1. 9375	
Minor diameter	1. 3073	1. 4323	1. 4948	1. 5573	1. 6198	1. 6823	1. 7448	1. 8073	1. 8698	
	1. 3153	1. 4403	1. 5028	1. 5653	1. 6278	1. 6903	1. 7528	1. 8150	1. 8778	
	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	0. 0080	
Class 2, pitch diameter (for general use)	1. 3344	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969	
	1. 3400	1. 4651	1. 5277	1. 5902	1. 6527	1. 7153	1. 7778	1. 8404	1. 9029	
	0. 0056	0. 0057	0. 0058	0. 0058	0. 0058	0. 0059	0. 0059	0. 0060	0. 0060	
Class 3, pitch diameter	1. 3344	1. 4594	1. 5219	1. 5844	1. 6469	1. 7094	1. 7719	1. 8344	1. 8969	
	1. 3383	1. 4634	1. 5259	1. 5885	1. 6510	1. 7135	1. 7761	1. 8386	1. 9011	
	0. 0039	0. 0040	0. 0040	0. 0041	0. 0041	0. 0041	0. 0042	0. 0042	0. 0042	

See footnotes at end of table.

TABLE 31.—Limiting dimensions and tolerances, classes 2 and 3 fit, American National 16-pitch thread series—Continued

Dimensions and tolerances ¹	Size (inches)									
	2	2 1/16	2 1/8	2 3/16	2 1/4	2 5/16	2 3/8	2 7/16	2 1/2	2 5/8
BOLTS AND SCREWS										
Major diameter	Inches	2.0000	2.0625	2.1250	2.1875	2.2500	2.3125	2.3750	2.4375	2.5000
	{Max	1.9910	2.0535	2.1160	2.1785	2.2410	2.3035	2.3660	2.4285	2.4910
	{Min	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Minor diameter	Inches	1.9233	1.9858	2.0483	2.1108	2.1733	2.2358	2.2983	2.3608	2.4233
	{Max	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594
	{Min	1.9533	2.0158	2.0782	2.1407	2.2032	2.2656	2.3281	2.3905	2.4530
Class 2, pitch diameter (for general use)	Inches	0.0061	0.0061	0.0062	0.0062	0.0062	0.0063	0.0063	0.0064	0.0064
	{Max	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594
	{Min	1.9551	2.0176	2.0801	2.1426	2.2050	2.2675	2.3300	2.3924	2.4549
Class 3, pitch diameter	Inches	0.0043	0.0043	0.0043	0.0043	0.0044	0.0044	0.0044	0.0045	0.0045
	{Max	2.0000	2.0625	2.1250	2.1875	2.2500	2.3125	2.3750	2.4375	2.5000
	{Min	1.9323	1.9948	2.0573	2.1198	2.1823	2.2448	2.3073	2.3698	2.4323
Minor diameter	Inches	1.9403	2.0028	2.0653	2.1278	2.1903	2.2528	2.3153	2.3778	2.4403
	{Max	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
	{Min	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594
Class 2, pitch diameter (for general use)	Inches	1.9655	2.0280	2.0906	2.1531	2.2156	2.2782	2.3407	2.4033	2.4658
	{Max	0.0061	0.0061	0.0062	0.0062	0.0062	0.0063	0.0063	0.0064	0.0064
	{Min	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594
Class 3, pitch diameter	Inches	1.9637	2.0262	2.0887	2.1512	2.2138	2.2763	2.3388	2.4014	2.4639
	{Max	0.0043	0.0043	0.0043	0.0043	0.0044	0.0044	0.0044	0.0045	0.0045
	{Min	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594

NUTS AND TAPPED HOLES

Major diameter	Min	2.0000	2.0625	2.1250	2.1875	2.2500	2.3125	2.3750	2.4375	2.5000
	{Max	1.9323	1.9948	2.0573	2.1198	2.1823	2.2448	2.3073	2.3698	2.4323
	{Min	1.9403	2.0028	2.0653	2.1278	2.1903	2.2528	2.3153	2.3778	2.4403
Minor diameter	Min	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
	{Max	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594
	{Min	1.9655	2.0280	2.0906	2.1531	2.2156	2.2782	2.3407	2.4033	2.4658
Class 2, pitch diameter (for general use)	Min	0.0061	0.0061	0.0062	0.0062	0.0062	0.0063	0.0063	0.0064	0.0064
	{Max	1.9594	2.0219	2.0844	2.1469	2.2094	2.2719	2.3344	2.3969	2.4594
	{Min	1.9637	2.0262	2.0887	2.1512	2.2138	2.2763	2.3388	2.4014	2.4639
Class 3, pitch diameter	Min	0.0043	0.0043	0.0043	0.0043	0.0044	0.0044	0.0044	0.0045	0.0045
	{Max	2.0000	2.0625	2.1250	2.1875	2.2500	2.3125	2.3750	2.4375	2.5000
	{Min	1.9323	1.9948	2.0573	2.1198	2.1823	2.2448	2.3073	2.3698	2.4323

Dimensions and tolerances ¹		Size (inches)									
		2¼	2½	3	3½	3¾	3⅞	3⅞	3¾	3½	4
BOLTS AND SCREWS											
Major diameter	Max	2.7500	2.8750	3.0000	3.1250	3.2500	3.3750	3.5000	3.6250	3.7500	3.8750
	Min	2.7410	2.8660	2.9910	3.1160	3.2410	3.3660	3.4910	3.6160	3.7410	3.8660
	Tol	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Minor diameter	Max. ²	2.6733	2.7983	2.9233	3.0483	3.1733	3.2983	3.4233	3.5483	3.6733	3.7983
Class 2, pitch diameter (for general use)	Max	2.7094	2.8344	2.9594	3.0844	3.2094	3.3344	3.4594	3.5844	3.7094	3.8344
	Min	2.7028	2.8278	2.9527	3.0776	3.2025	3.3275	3.4524	3.5773	3.7023	3.8272
	Tol	0.0066	0.0066	0.0067	0.0068	0.0069	0.0069	0.0070	0.0071	0.0071	0.0072
Class 3, pitch diameter	Max	2.7094	2.8344	2.9594	3.0844	3.2094	3.3344	3.4594	3.5844	3.7094	3.8344
	Min	2.7048	2.8298	2.9547	3.0797	3.2046	3.3296	3.4545	3.5795	3.7044	3.8294
	Tol	0.0046	0.0046	0.0047	0.0047	0.0048	0.0048	0.0049	0.0049	0.0050	0.0051
NUTS AND TAPPED HOLES											
Major diameter	Min. ⁴	2.7500	2.8750	3.0000	3.1250	3.2500	3.3750	3.5000	3.6250	3.7500	3.8750
Minor diameter	Min	2.6823	2.8073	2.9323	3.0573	3.1823	3.3073	3.4323	3.5573	3.6823	3.8073
	Max. ⁵	2.6903	2.8153	2.9403	3.0653	3.1903	3.3153	3.4403	3.5653	3.6903	3.8153
	Tol	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Class 2, pitch diameter (for general use)	Min	2.7094	2.8344	2.9594	3.0844	3.2094	3.3344	3.4594	3.5844	3.7094	3.8344
	Max	2.7160	2.8410	2.9661	3.0912	3.2163	3.3413	3.4664	3.5915	3.7165	3.8416
	Tol	0.0066	0.0066	0.0067	0.0068	0.0069	0.0069	0.0070	0.0071	0.0071	0.0072
Class 3, pitch diameter	Min	2.7094	2.8344	2.9594	3.0844	3.2094	3.3344	3.4594	3.5844	3.7094	3.8344
	Max	2.7140	2.8390	2.9641	3.0891	3.2142	3.3392	3.4643	3.5893	3.7144	3.8394
	Tol	0.0046	0.0046	0.0047	0.0047	0.0048	0.0048	0.0049	0.0049	0.0050	0.0051

¹ Pitch-diameter tolerances include errors of lead and angle. The class 2 tolerances are based on formulas in table 116 and a length of engagement of 6 threads or ⅝ inch. The class 3 tolerances are 70 percent of the class 2 tolerances. The ⅜-inch size being in the American National fine-thread series, the tolerance for this size corresponds to that series.

² Standard-size screw and nut of the American National fine-thread series.

³ 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 ⅙Xp, and may be determined by subtracting 0.0406 inch from the minimum pitch diameter of the screw.

⁴ Dimensions for the minimum major diameter of the nut correspond to the basic flat (⅙Xp) 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 ⅙Xp, and may be determined by adding 0.0406 inch to the maximum pitch diameter of the nut.

⁵ Present Army Ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H23 in the maximum minor diameters of nuts.

AMERICAN NATIONAL EXTRA-FINE-THREAD SERIES**FORM OF THREAD**

10. The American National form of thread profile as specified in paragraphs 7 to 7f shall be used.

THREAD SERIES

10a. The American National extra-fine-thread series is intended for special uses where (1) thin-walled material is to be threaded, (2) thread depth of nuts clearing ferrules, coupling flanges, etc., must be held to a minimum, and (3) a maximum practicable number of threads are required within a given thread length. This thread series is the same as the SAE extra-fine-thread series, but it includes additional sizes. The nominal sizes and basic dimensions are specified in table 34. Limiting dimensions and tolerances for classes 2 and 3 fits are specified in table 35.

TABLE 34.—American National extra-fine-thread series

Identification		Basic diameters				Thread data					
Size	Threads per inch	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Pitch, p	Depth of thread, h	Basic width of flat at major diameter of nut, $p/8$	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, $\pi K^2/4$
Inches		Inches	Inches	Inches	mm	Inch	Inch	Inch	Inch	deg	Sq. in.
$\frac{1}{4}$ ----	32	0.2500	0.2297	0.2094	6.350	0.03125	0.02030	0.00391	0.00130	2	0.0344
$\frac{5}{16}$ ----	32	0.3125	0.2922	0.2719	7.938	0.03125	0.02030	0.00391	0.00130	1	0.0581
$\frac{3}{8}$ ----	32	0.3750	0.3547	0.3344	9.525	0.03125	0.02030	0.00391	0.00130	36	0.0878
$\frac{7}{16}$ ----	28	0.4375	0.4143	0.3911	11.113	0.03571	0.02320	0.00446	0.00149	1	0.1201
$\frac{1}{2}$ ----	28	0.5000	0.4768	0.4536	12.700	0.03571	0.02320	0.00446	0.00149	1	0.1616
$\frac{9}{16}$ ----	24	0.5625	0.5354	0.5084	14.288	0.04167	0.02706	0.00521	0.00174	1	0.2030
$\frac{5}{8}$ ----	24	0.6250	0.5979	0.5709	15.875	0.04167	0.02706	0.00521	0.00174	1	0.2560
$\frac{11}{16}$ ----	24	0.6875	0.6604	0.6334	17.463	0.04167	0.02706	0.00521	0.00174	1	0.3151
$\frac{3}{4}$ ----	20	0.7500	0.7175	0.6850	19.050	0.05000	0.03248	0.00625	0.00208	1	0.3685
$\frac{13}{16}$ ----	20	0.8125	0.7800	0.7475	20.638	0.05000	0.03248	0.00625	0.00208	1	0.4388
$\frac{7}{8}$ ----	20	0.8750	0.8425	0.8100	22.225	0.05000	0.03248	0.00625	0.00208	1	0.5153
$\frac{15}{16}$ ----	20	0.9375	0.9050	0.8725	23.813	0.05000	0.03248	0.00625	0.00208	0	0.5979
1----	20	1.0000	0.9675	0.9350	25.400	0.05000	0.03248	0.00625	0.00208	0	0.6866
$\frac{1}{16}$ ----	18	1.0625	1.0264	0.9903	26.988	0.05556	0.03608	0.00694	0.00231	0	0.7702
$\frac{1}{8}$ ----	18	1.1250	1.0889	1.0528	28.575	0.05556	0.03608	0.00694	0.00231	0	0.8705
$\frac{1}{4}$ ----	18	1.1875	1.1514	1.1153	30.163	0.05556	0.03608	0.00694	0.00231	0	0.9770
$\frac{3}{8}$ ----	18	1.2500	1.2139	1.1778	31.750	0.05556	0.03608	0.00694	0.00231	0	1.0895
$\frac{1}{2}$ ----	18	1.3125	1.2764	1.2403	33.338	0.05556	0.03608	0.00694	0.00231	0	1.2082
$\frac{5}{8}$ ----	18	1.3750	1.3389	1.3028	34.925	0.05556	0.03608	0.00694	0.00231	0	1.3330
$\frac{3}{4}$ ----	18	1.4375	1.4014	1.3653	36.513	0.05556	0.03608	0.00694	0.00231	0	1.4640
$\frac{15}{16}$ ----	18	1.5000	1.4639	1.4278	38.100	0.05556	0.03608	0.00694	0.00231	0	1.6011
1----	18	1.5625	1.5264	1.4903	39.688	0.05556	0.03608	0.00694	0.00231	0	1.7444
$\frac{1}{8}$ ----	18	1.6250	1.5889	1.5528	41.275	0.05556	0.03608	0.00694	0.00231	0	1.8937
$\frac{1}{4}$ ----	18	1.6875	1.6514	1.6153	42.863	0.05556	0.03608	0.00694	0.00231	0	2.0493
$\frac{3}{8}$ ----	16	1.7500	1.7094	1.6688	44.450	0.06250	0.04059	0.00781	0.00260	0	2.1873
2----	16	2.0000	1.9594	1.9188	50.800	0.06250	0.04059	0.00781	0.00260	0	2.8917

TABLE 35.—Limiting dimensions and tolerances, classes 2 and 3 fits, American National extra-fine thread series

Dimensions and tolerances ¹	Size (inch)												
	¼	⅝	¾	⅞	1½	1⅞	2¼	2½	3¼	3⅝	4	4½	1
	Threads per inch												
BOLTS AND SCREWS	32	32	32	28	28	24	24	24	20	20	20	20	20
	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch
	0.2500	0.3125	0.3750	0.4375	0.5000	0.5625	0.6250	0.6875	0.7500	0.8125	0.8750	0.9375	1.0000
	0.2446	0.3071	0.3696	0.4313	0.4938	0.5559	0.6184	0.6809	0.7428	0.8053	0.8678	0.9303	0.9928
Classes 2 and 3, major diameter	0.0054	0.0054	0.0054	0.0062	0.0062	0.0066	0.0066	0.0066	0.0072	0.0072	0.0072	0.0072	0.0072
Classes 2 and 3, minor diameter	0.2117	0.2742	0.3367	0.3937	0.4562	0.5114	0.5739	0.6364	0.6887	0.7512	0.8137	0.8762	0.9387
Class 2, pitch	0.2297	0.2922	0.3547	0.4143	0.4768	0.5354	0.5979	0.6604	0.7175	0.7800	0.8425	0.9050	0.9675
diameter	0.2265	0.2889	0.3513	0.4107	0.4731	0.5314	0.5938	0.6563	0.7129	0.7754	0.8378	0.9003	0.9627
	0.0032	0.0033	0.0034	0.0036	0.0037	0.0040	0.0041	0.0041	0.0046	0.0046	0.0047	0.0047	0.0048
Class 3, pitch	0.2297	0.2922	0.3547	0.4143	0.4768	0.5354	0.5979	0.6604	0.7175	0.7800	0.8425	0.9050	0.9675
diameter	0.2275	0.2899	0.3523	0.4118	0.4742	0.5326	0.5950	0.6575	0.7143	0.7768	0.8392	0.9017	0.9641
	0.0022	0.0023	0.0024	0.0025	0.0026	0.0028	0.0029	0.0029	0.0032	0.0032	0.0033	0.0033	0.0034
NUTS AND TAPPED HOLES													
Classes 2 and 3, major diameter	0.2500	0.3125	0.3750	0.4375	0.5000	0.5625	0.6250	0.6875	0.7500	0.8125	0.8750	0.9370	1.0000
Classes 2 and 3, minor diameter	0.2162	0.2787	0.3412	0.3988	0.4613	0.5174	0.5799	0.6424	0.6959	0.7584	0.8209	0.8834	0.9459
	0.2208	0.2833	0.3458	0.4041	0.4666	0.5235	0.5860	0.6485	0.7027	0.7652	0.8277	0.8902	0.9527
	0.0046	0.0046	0.0046	0.0053	0.0053	0.0061	0.0061	0.0061	0.0068	0.0068	0.0068	0.0068	0.0068
Class 2, pitch di-	0.2297	0.2922	0.3547	0.4143	0.4768	0.5354	0.5979	0.6604	0.7175	0.7800	0.8425	0.9050	0.9675
ameter	0.2329	0.2955	0.3581	0.4179	0.4805	0.5394	0.6020	0.6645	0.7221	0.7846	0.8472	0.9097	0.9723
	0.0032	0.0033	0.0034	0.0036	0.0037	0.0040	0.0041	0.0041	0.0046	0.0046	0.0047	0.0047	0.0048
Class 3, pitch di-	0.2297	0.2922	0.3547	0.4143	0.4768	0.5354	0.5979	0.6604	0.7175	0.7800	0.8425	0.9050	0.9675
ameter	0.2319	0.2945	0.3571	0.4168	0.4794	0.5382	0.6008	0.6633	0.7207	0.7832	0.8458	0.9083	0.9709
	0.0022	0.0023	0.0024	0.0025	0.0026	0.0028	0.0029	0.0029	0.0032	0.0032	0.0033	0.0033	0.0034

Dimensions and tolerances ¹	Size (inches)											
	1½	1¼	1⅜	1½	1⅞	1¾	1½	1⅞	1⅞	1⅞	1⅞	16
	Threads per inch											
BOLTS AND SCREWS	18	18	18	18	18	18	18	18	18	18	18	16
	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
	1.0625	1.1250	1.1875	1.2500	1.3125	1.3750	1.4375	1.5000	1.5625	1.6250	1.6875	1.7500
	1.0543	1.1168	1.1793	1.2418	1.3043	1.3668	1.4293	1.4918	1.5543	1.6168	1.6793	1.7410
Classes 2 and 3, major diameter—	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0082	0.0090
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Classes 2 and 3, minor diameter—	0.9943	1.0568	1.1193	1.1818	1.2443	1.3068	1.3693	1.4318	1.4943	1.5568	1.6193	1.6733
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Class 2, pitch di- ameter—	1.0264	1.0889	1.1514	1.2139	1.2764	1.3389	1.4014	1.4639	1.5264	1.5889	1.6514	1.7094
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Class 3, pitch di- ameter—	1.0264	1.0889	1.1514	1.2139	1.2764	1.3389	1.4014	1.4639	1.5264	1.5889	1.6514	1.7094
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
NUTS AND TAPPED HOLES	1.0228	1.0853	1.1478	1.2102	1.2727	1.3351	1.3976	1.4601	1.5225	1.5850	1.6475	1.7053
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Classes 2 and 3, major diameter—	1.0625	1.1250	1.1875	1.2500	1.3125	1.3750	1.4375	1.5000	1.5625	1.6250	1.6875	1.7500
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Classes 2 and 3, minor diameter—	1.0024	1.0649	1.1274	1.1899	1.2524	1.3149	1.3774	1.4399	1.5024	1.5649	1.6274	1.6823
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Class 2, pitch di- ameter—	1.0264	1.0889	1.1514	1.2139	1.2764	1.3389	1.4014	1.4639	1.5264	1.5889	1.6514	1.7094
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.
Class 3, pitch di- ameter—	1.0264	1.0889	1.1514	1.2139	1.2764	1.3389	1.4014	1.4639	1.5264	1.5889	1.6514	1.7094
	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²	Max. ²
	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴	Min. ⁴
	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.	Tol.

¹ Pitch diameter tolerances include errors of lead and angle. The class 2 tolerances are based on the formulas in table 116 and a length of engagement of 6 threads. The class 3 tolerances are 70 percent of the class 2 tolerances.

² Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worm tool 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 $\frac{1}{2} \times p$, and may be determined by subtracting the basic thread depth, h (or $0.6495 p$), from the minimum pitch diameter of the screw.

³ Dimensions for the minimum major diameter of the nut correspond to the basic flat ($\frac{1}{2} \times p$), 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 $\frac{1}{2} \times p$, and may be determined by adding $\frac{1}{2} \times h$ (or $0.7939 p$) to the maximum pitch diameter of the nut.

⁴ These dimensions are the minimum metal or "not go" size. The "go" or basic size is the one that should be placed on the component drawing with the tolerance.

SIZES OF TAP DRILLS

11. The essential requirement of a tap drill is that the hole produced by it shall be such that, when tapped with a screw thread, the minor diameter of the tapped hole shall be within the specified limits. It should be noted that the minor diameters of the tapped holes are the same for classes 1 to 4, inclusive.

11a. If the drill is too large, the minor diameter of the tapped hole will also be too large, and the thread in the nut will be too shallow, that is, too small a percentage of a full thread. As an extreme case, the threads in the tapped hole will engage only the tops of the threads on a screw of correct size, and under stress the threads of the screw will strip and the full strength of the fastening will not be developed.

11b. If, on the other hand, the tap drill is too small, the tap will be forced to cut a thread of full depth, and in the extreme case to act as a reamer also. This will result in excessive power consumption and tap breakage, and will also make the minor diameter of the tapped hole dependent upon the minor diameter of the tap. This is undesirable, since the minor diameter of the tap is not, in general, held to the same close limits as the other tap elements, and as a result the minor diameter of a hole tapped under these conditions may be in error even though the tap is otherwise correct.

11c. It is a well-known fact that the size of the hole produced by a tap drill depends to some extent upon the method of grinding the drill, the material drilled, the lubricant used, and the alinement, speed, and feed of operation. This being true, it is apparent that fixing the diameter of the tap drill does not completely fix the diameter of the drilled hole. The most that can be accomplished is to fix the drill diameters between certain limits and to depend upon correct grinding, lubrication, and operation to keep the diameter of the holes within prescribed limits.

11d. There are listed in tables 122 and 123 from Handbook H28, and in the additional tables 123 (A) through 123 (D), all drill sizes regularly carried in stock, both English and metric, which fall between the limiting dimensions of the minor diameter of the threaded hole for the American National coarse-, fine-, extra-fine-, and the 8-, 12-, and 16-pitch-thread series. There are several thread sizes, however, for which there are no stock drills falling within the minor diameter limits, and for these the nearest drills outside of the maximum and minimum limits are listed in italics. If the material to be tapped is such that there is considerable "spin-up" on minor diameter during tapping, then the larger of the two drills listed for a given size should be selected. If the material is cast iron or other material with little or no "spin-up", then the smaller of the two drills listed should be chosen. It will usually cut oversize by a sufficient amount to bring the minor diameter above the minimum limit.

TABLE 122.—*Sizes of tap drills*

[American National coarse-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum ¹	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
1	64	0. 0527	0. 0623	0. 0561	{ 1.45 mm----- 1.50 mm----- 1.55 mm-----	0. 0571 . 0591 . 0610	78 68 59
2	56	. 0628	. 0737	. 0667	{ #51----- #50----- #49-----	. 0670 . 0700 . 0730	82 69 56
3	48	. 0719	. 0841	. 0764	{ $\frac{5}{64}$ in----- #46----- 2.10 mm-----	. 0781 . 0810 . 0827	77 67 60
4	40	. 0795	. 0938	. 0849	{ #44----- #43----- 2.30 mm----- $\frac{3}{32}$ in-----	. 0860 . 0890 . 0906 . 0937	80 71 66 56
5	40	. 0925	. 1062	. 0979	{ #39----- #38 ³ ----- 2.60 mm----- #37-----	. 0995 . 1015 . 1024 . 1040	79 72 70 65
6	32	. 0974	. 1145	. 1042	{ #36----- $\frac{7}{64}$ in----- #33-----	. 1065 . 1094 . 1130	78 70 62
8	32	. 1234	. 1384	. 1302	{ 3.40 mm----- #29----- 3.50 mm-----	. 1339 . 1360 . 1378	74 69 65
10	24	. 1359	. 1559	. 1449	{ #26----- #24-----	. 1470 . 1520	79 70
12	24	. 1619	. 1801	. 1709	{ $\frac{11}{64}$ in----- #17----- #16----- #15-----	. 1719 . 1730 . 1770 . 1800	82 79 72 67
$\frac{1}{4}$	20	. 1850	. 2060	. 1959	{ #9----- #8----- $\frac{13}{64}$ in-----	. 1960 . 1990 . 2031	83 79 72
$\frac{5}{16}$	18	. 2403	. 2630	. 2524	{ F----- G-----	. 2570 . 2610	77 71
$\frac{3}{8}$	16	. 2938	. 3184	. 3073	{ $\frac{5}{16}$ in----- O-----	. 3125 . 3160	77 73
$\frac{7}{16}$	14	. 3447	. 3721	. 3602	U-----	. 3680	75
$\frac{1}{2}$	13	. 4001	. 4290	. 4167	$2\frac{7}{64}$ in-----	. 4219	78
$\frac{9}{16}$	12	. 4542	. 4850	. 4723	$3\frac{1}{64}$ in-----	. 4844	72

¹ Present Army Ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

³ See footnote at end of table 123 (D).

TABLE 122.—*Sizes of tap drills—Continued*

[American National coarse-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum ¹	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
$\frac{5}{8}$	11	. 5069	. 5397	. 5266	$\left\{ \begin{array}{l} 17\frac{1}{32} \text{ in} \text{-----} \\ 13.5 \text{ mm} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} . 5312 \\ . 5315 \end{array} \right.$	$\left. \begin{array}{l} 79 \\ 79 \end{array} \right.$
$\frac{3}{4}$	10	. 6201	. 6553	. 6417	16.5 mm-----	. 6496	77
$\frac{7}{8}$	9	. 7307	. 7689	. 7547	$\left\{ \begin{array}{l} 49\frac{3}{64} \text{ in} \text{-----} \\ 19.5 \text{ mm} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} . 7656 \\ . 7677 \end{array} \right.$	$\left. \begin{array}{l} 76 \\ 74 \end{array} \right.$
1	8	. 8376	. 8795	. 8647	$\left\{ \begin{array}{l} 22 \text{ mm} \text{-----} \\ \frac{7}{8} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} . 8661 \\ . 8750 \end{array} \right.$	$\left. \begin{array}{l} 82 \\ 77 \end{array} \right.$
$1\frac{1}{8}$	7	. 9394	. 9858	. 9704	$\left\{ \begin{array}{l} 25 \text{ mm} \text{-----} \\ 63\frac{3}{64} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} . 9842 \\ . 9844 \end{array} \right.$	$\left. \begin{array}{l} 76 \\ 76 \end{array} \right.$
$1\frac{1}{4}$	7	1. 0644	1. 1108	1. 0954	$\left\{ \begin{array}{l} 28 \text{ mm} \text{-----} \\ 1\frac{1}{64} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 1. 1024 \\ 1. 1094 \end{array} \right.$	$\left. \begin{array}{l} 80 \\ 76 \end{array} \right.$
$1\frac{3}{8}$	6	1. 1585	1. 2126	1. 1946	$\left\{ \begin{array}{l} 30.5 \text{ mm} \text{-----} \\ 1\frac{13}{64} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 1. 2008 \\ 1. 2031 \end{array} \right.$	$\left. \begin{array}{l} 80 \\ 79 \end{array} \right.$
$1\frac{1}{2}$	6	1. 2835	1. 3376	1. 3196	$1\frac{1}{64} \text{ in} \text{-----}$	1. 3281	79
$1\frac{3}{4}$	5	1. 4902	1. 5551	1. 5335	$\left\{ \begin{array}{l} 39 \text{ mm} \text{-----} \\ 1\frac{35}{64} \text{ in} \text{-----} \\ 39.5 \text{ mm} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 1. 5354 \\ 1. 5469 \\ 1. 5551 \end{array} \right.$	$\left. \begin{array}{l} 83 \\ 78 \\ 75 \end{array} \right.$
2	$4\frac{1}{2}$	1. 7113	1. 7835	1. 7594	$\left\{ \begin{array}{l} 1\frac{49}{64} \text{ in} \text{-----} \\ 45 \text{ mm} \text{-----} \\ 1\frac{25}{32} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 1. 7656 \\ 1. 7716 \\ 1. 7812 \end{array} \right.$	$\left. \begin{array}{l} 81 \\ 79 \\ 76 \end{array} \right.$
$2\frac{1}{4}$	$4\frac{1}{2}$	1. 9613	2. 0335	2. 0094	$\left\{ \begin{array}{l} 2\frac{1}{64} \text{ in} \text{-----} \\ 51.5 \text{ mm} \text{-----} \\ 2\frac{1}{32} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 2. 0156 \\ 2. 0276 \\ 2. 0312 \end{array} \right.$	$\left. \begin{array}{l} 81 \\ 77 \\ 76 \end{array} \right.$
$2\frac{1}{2}$	4	2. 1752	2. 2564	2. 2294	$\left\{ \begin{array}{l} 2\frac{15}{64} \text{ in} \text{-----} \\ 57 \text{ mm} \text{-----} \\ 2\frac{1}{4} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 2. 2344 \\ 2. 2441 \\ 2. 2500 \end{array} \right.$	$\left. \begin{array}{l} 82 \\ 79 \\ 77 \end{array} \right.$
$2\frac{3}{4}$	4	2. 4252	2. 5064	2. 4794	$\left\{ \begin{array}{l} 63 \text{ mm} \text{-----} \\ 2\frac{31}{64} \text{ in} \text{-----} \\ 63.5 \text{ mm} \text{-----} \\ 2\frac{1}{2} \text{ in} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 2. 4803 \\ 2. 4844 \\ 2. 5000 \\ 2. 5000 \end{array} \right.$	$\left. \begin{array}{l} 83 \\ 82 \\ 77 \\ 77 \end{array} \right.$
3	4	2. 6752	2. 7564	2. 7294	$\left\{ \begin{array}{l} 2\frac{47}{64} \text{ in} \text{-----} \\ 69.5 \text{ mm} \text{-----} \\ 2\frac{3}{4} \text{ in} \text{-----} \\ 70 \text{ mm} \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 2. 7344 \\ 2. 7362 \\ 2. 7500 \\ 2. 7559 \end{array} \right.$	$\left. \begin{array}{l} 82 \\ 81 \\ 77 \\ 75 \end{array} \right.$
$3\frac{1}{4}$	4	2. 9252	3. 0064	2. 9794	$\left\{ \begin{array}{l} 2\frac{63}{64} \text{ in} \text{-----} \\ 76 \text{ mm} \text{-----} \\ 3 \text{-----} \end{array} \right.$	$\left. \begin{array}{l} 2. 9844 \\ 2. 9921 \\ 3. 0000 \end{array} \right.$	$\left. \begin{array}{l} 82 \\ 79 \\ 77 \end{array} \right.$
$3\frac{1}{2}$	4	3. 1752	3. 2564	3. 2294	$3\frac{1}{4} \text{ in} \text{-----}$	3. 2500	77
$3\frac{3}{4}$	4	3. 4252	3. 5064	3. 4794	$3\frac{1}{2} \text{ in} \text{-----}$	3. 5000	77

TABLE 123.—*Sizes of tap drills*[American National fine-thread series]¹

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum ²	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
0--	80	0. 0438	0. 0514	0. 0465	{ $\frac{3}{64}$ in----- 1.25 mm-----	0. 0469 . 0492	81 67
1--	72	. 0550	. 0634	. 0580	{1.50 mm----- 1.55 mm-----	. 0591 . 0610	77 67
2--	64	. 0657	. 0746	. 0691	{#50----- #49-----	. 0700 . 0730	79 64
3--	56	. 0758	. 0856	. 0797	{#46----- 2.10 mm----- #44-----	. 0810 . 0827 . 0860	78 70 56
4--	48	. 0849	. 0960	. 0894	{2.30 mm----- $\frac{3}{32}$ in----- #41-----	. 0906 . 0937 . 0960	79 68 59
5--	44	. 0955	. 1068	. 1004	{2.60 mm----- #37----- #36-----	. 1024 . 1040 . 1065	77 71 63
6--	40	. 1055	. 1179	. 1109	{#33----- #32-----	. 1130 . 1160	77 68
8--	36	. 1279	. 1402	. 1339	{3.40 mm----- #29----- 3.50 mm----- $\frac{9}{64}$ in-----	. 1339 . 1360 . 1378 . 1406	83 78 73 65
10--	32	. 1494	. 1624	. 1562	{ $\frac{5}{32}$ in----- #21 ³ ----- #20----- #19-----	. 1562 . 1590 . 1610 . 1660	83 76 71 59
12--	28	. 1696	. 1835	. 1773	{#15----- 4.70 mm #13-- $\frac{3}{16}$ in-----	. 1800 . 1850 . 1875	78 67 61
$\frac{1}{4}$ --	28	. 2036	. 2173	. 2113	#3-----	. 2130	80
$\frac{5}{16}$ f--	24	. 2584	. 2739	. 2674	{ $\frac{17}{64}$ in----- I-----	. 2656 . 2720	87 75
$\frac{3}{8}$ --	24	. 3209	. 3364	. 3299	Q-----	. 3320	79

¹ Drill sizes up to $\frac{1}{2}$ inch are in agreement with ASA B5.12—1940, Twist Drills, Straight Shank, published by the ASME, 29 West 39th Street, New York, N. Y.² Present Army Ordnance practice follows NBS Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.³ See footnote at end of table 123 (D).

TABLE 123.—*Sizes of tap drills*—Continued

[American National fine-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills corresponding to 100 percent to 50 percent of basic thread depth		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
$\frac{7}{16}$ --	20	0. 3725	0. 3906	0. 3834	{ W----- 25/64 in-----	0. 3860 . 3906	79 72
$\frac{1}{2}$ --	20	. 4350	. 4531	. 4459	29/64 in-----	. 4531	72
$\frac{9}{16}$ --	18	. 4903	. 5100	. 5024	0.5062-----	. 5062	78
$\frac{5}{8}$ --	18	. 5528	. 5725	. 5649	14.5 mm-----	. 5709	75
$\frac{3}{4}$ --	16	. 6688	. 6903	. 6823	{ 11/16 in----- 17.5 mm-----	. 6875 . 6890	77 75
$\frac{7}{8}$ --	14	. 7822	. 8062	. 7977	{ 5/8 in----- 20.5 mm-----	. 7969 . 8071	84 73
1--	14	. 9072	. 9312	. 9227	23.5 mm-----	. 9252	81
1 1/8--	12	1. 0167	1. 0438	1. 0348	26.5 mm-----	1. 0433	75
1 1/4--	12	1. 1417	1. 1688	1. 1598	29.5 mm-----	1. 1614	82
1 3/8--	12	1. 2667	1. 2938	1. 2848	{ 9/32 in----- 1 9/64 in-----	1. 2812 1. 2969	8 72
1 1/2--	12	1. 3917	1. 4188	1. 4098	36 mm-----	1. 4173	76

TABLE 123 (A).—*Sizes of tap drills*

[American National 8-pitch-thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum ¹	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
1	8	<i>Inch</i> 0. 8376	<i>Inch</i> 0. 8795	<i>Inch</i> 0. 8647	{22 mm-----	<i>Inch</i> 0. 8661	82
					{ $\frac{7}{8}$ in-----	. 8750	77
1 $\frac{1}{8}$	8	. 9626	1. 0045	. 9897	{1 in-----	1. 0000	77
					{25.5 mm-----	1. 0039	75
1 $\frac{1}{4}$	8	1. 0876	1. 1295	1. 1147	{28.5 mm-----	1. 1220	79
					{1 $\frac{1}{8}$ in-----	1. 1250	77
1 $\frac{3}{8}$	8	1. 2126	1. 2545	1. 2397	{31.5 mm-----	1. 2402	83
					{1 $\frac{1}{4}$ in-----	1. 2500	77
1 $\frac{1}{2}$	8	1. 3376	1. 3795	1. 3647	{1 $\frac{3}{8}$ in-----	1. 3750	77
					{35 mm-----	1. 3780	75
1 $\frac{5}{8}$	8	1. 4626	1. 5045	1. 4897	{38 mm-----	1. 4961	79
					{1 $\frac{1}{2}$ in-----	1. 5000	77
1 $\frac{3}{4}$	8	1. 5876	1. 6295	1. 6147	1 $\frac{7}{8}$ in-----	1. 6250	77
1 $\frac{7}{8}$	8	1. 7126	1. 7545	1. 7397	{1 $\frac{3}{4}$ in-----	1. 7500	77
					{44.5 mm-----	1. 7520	76
2	8	1. 8376	1. 8795	1. 8647	{47.5 mm-----	1. 8701	80
					{1 $\frac{7}{8}$ in-----	1. 8750	77
2 $\frac{1}{8}$	8	1. 9626	2. 0045	1. 9897	2 in-----	2. 0000	77
2 $\frac{1}{4}$	8	2. 0876	2. 1295	2. 1147	{2 $\frac{1}{8}$ in-----	2. 1250	77
					{54 mm-----	2. 1260	76
2 $\frac{1}{2}$	8	2. 3376	2. 3795	2. 3647	2 $\frac{3}{8}$ in-----	2. 3750	77
2 $\frac{3}{4}$	8	2. 5876	2. 6295	2. 6147	{66.5 mm-----	2. 6181	81
					{2 $\frac{3}{8}$ in-----	2. 6250	77
3	8	2. 8376	2. 8795	2. 8647	{73 mm-----	2. 8740	78
					{2 $\frac{7}{8}$ in-----	2. 8750	77
3 $\frac{1}{4}$	8	3. 0876	3. 1295	3. 1147	3 $\frac{1}{8}$ in-----	3. 1250	77
3 $\frac{1}{2}$	8	3. 3376	3. 3795	3. 3647	3 $\frac{3}{8}$ in-----	3. 3750	77

¹ Present Army Ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

Table 123 (B).—*Sizes of tap drills*

[American National 12-pitch thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth ¹		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
$\frac{1}{2}$ ----	12	0. 3917	0. 4225	0. 4098	{ <i>Z</i> ³ ----- 10.5 mm ³ ----- 27/64 in.-----	0. 4130 . 4134 . 4219	80 80 72
$\frac{9}{16}$ ----	12	. 4542	. 4850	. 4723	{ 12 mm ³ ----- 31/64 in.-----	. 4724 . 4844	83 72
$\frac{5}{8}$ ----	12	. 5167	. 5438	. 5348	{ 13.5 mm----- 35/64 in.-----	. 5315 . 5469	86 72
$\frac{11}{16}$ ----	12	. 5792	. 6063	. 5973	{ 19/32 in.----- 39/64 in.-----	. 5938 . 6094	87 72
$\frac{3}{4}$ ----	12	. 6417	. 6688	. 6598	{ 21/32 in.----- 17 mm-----	. 6562 . 6693	87 75
$\frac{13}{16}$ ----	12	. 7042	. 7313	. 7223	18.5 mm-----	. 7283	78
$\frac{7}{8}$ ----	12	. 7667	. 7938	. 7848	20 mm-----	. 7874	81
$\frac{15}{16}$ ----	12	. 8292	. 8563	. 8473	{ 21.5 mm----- 55/64 in.-----	. 8465 . 8594	84 72
1-----	12	. 8917	. 9188	. 9098	{ 29/32 in.----- 59/64 in.-----	. 9062 . 9219	87 72
$1\frac{1}{16}$ ----	12	. 9542	. 9813	. 9723	{ 31/32 in.----- 25 mm-----	. 9687 . 9843	87 72
$1\frac{1}{8}$ ----	12	1. 0167	1. 0438	1. 0348	26.5 mm-----	1. 0433	75
$1\frac{3}{16}$ ----	12	1. 0792	1. 1063	1. 0973	28 mm-----	1. 1024	79
$1\frac{1}{4}$ ----	12	1. 1417	1. 1688	1. 1598	29.5 mm-----	1. 1614	82
$1\frac{5}{16}$ ----	12	1. 2042	1. 2313	1. 2223	{ 31 mm----- 1 15/64 in.-----	1. 2205 1. 2344	85 72
$1\frac{3}{8}$ ----	12	1. 2667	1. 2938	1. 2848	{ 1 9/32 in.----- 1 19/64 in.-----	1. 2812 1. 2969	87 72
$1\frac{7}{16}$ ----	12	1. 3292	1. 3563	1. 3473	{ 1 11/32 in.----- 34.5 mm-----	1. 3438 1. 3583	87 73

¹ Sizes in italics are not within the specified limits for minor diameter of nut.³ See footnote at end of table 123 (D).

Table 123 (B).—*Sizes of tap drills*—Continued

[American National 12-pitch thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth ¹		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
1½-----	12	<i>1. 3917</i>	<i>1. 4188</i>	<i>1. 4098</i>	36 mm-----	<i>1. 4173</i>	76
1⅝-----	12	1. 5167	1. 5438	1. 5348	39 mm-----	1. 5354	83
1¾-----	12	1. 6417	1. 6688	1. 6598	{1 21/32 in----- 1 43/64 in-----	<i>1. 6562</i> <i>1. 6719</i>	87 72
1⅞-----	12	1. 7667	1. 7938	1. 7848	45.5 mm-----	1. 7913	77
2-----	12	1. 8917	1. 9188	1. 9098	{48.5 mm----- 1 59/64 in-----	<i>1. 9094</i> <i>1. 9219</i>	84 72
2⅛-----	12	2. 0167	2. 0438	2. 0348	{2 1/32 in----- 2 3/64 in-----	<i>2. 0312</i> <i>2. 0469</i>	87 72
2¼-----	12	2. 1417	2. 1688	2. 1598	55 mm-----	2. 1654	78
2⅜-----	12	2. 2667	2. 2938	2. 2848	{58 mm----- 2 19/64 in-----	<i>2. 2835</i> <i>2. 2969</i>	85 72
2½-----	12	2. 3917	2. 4188	2. 4098	{2 13/32 in----- 61.5 mm-----	<i>2. 4062</i> <i>2. 4213</i>	87 73
2⅝-----	12	2. 5167	2. 5438	2. 5348	64.5 mm-----	2. 5394	79
2¾-----	12	2. 6417	2. 6688	2. 6598	{67.5 mm----- 2 43/64 in-----	<i>2. 6575</i> <i>2. 6719</i>	85 72
2⅞-----	12	2. 7667	2. 7938	2. 7848	{2 25/32 in----- 71 mm-----	<i>2. 7812</i> <i>2. 7953</i>	87 74
3-----	12	2. 8917	2. 9188	2. 9098	74 mm-----	2. 9134	80
3⅛-----	12	3. 0167	3. 0438	3. 0348	{3 1/32 in----- 3 1/16 in-----	<i>3. 0312</i> <i>3. 0625</i>	87 58
3¼-----	12	3. 1417	3. 1688	3. 1598	{3 5/32 in----- 3 3/16 in-----	<i>3. 1562</i> <i>3. 1875</i>	87 58
3⅜-----	12	3. 2667	3. 2938	3. 2848	{3 9/32 in----- 3 5/16 in-----	<i>3. 2812</i> <i>3. 3125</i>	87 58
3½-----	12	3. 3917	3. 4188	3. 4098	3 7/16 in-----	3. 4375	58

¹ Sizes in italics are not within the specified limits for minor diameter of nut.

TABLE 123 (C).—*Sizes of tap drills*

[American National 16-pitch-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum ¹	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
$\frac{3}{4}$ ----	16	0. 6688	0. 6903	0. 6823	$\left\{ \begin{array}{l} \frac{11}{16} \text{ in.} \\ 17.5 \text{ mm.} \end{array} \right.$	$\left\{ \begin{array}{l} 0. 6875 \\ . 6890 \end{array} \right.$	$\left\{ \begin{array}{l} 77 \\ 75 \end{array} \right.$
$\frac{13}{16}$ ----	16	. 7313	. 7528	. 7448	$\left\{ \begin{array}{l} 19 \text{ mm.} \\ \frac{3}{4} \text{ in.} \end{array} \right.$	$\left\{ \begin{array}{l} . 7480 \\ . 7500 \end{array} \right.$	$\left\{ \begin{array}{l} 79 \\ 77 \end{array} \right.$
$\frac{7}{8}$ ----	16	. 7938	. 8153	. 8073	$\frac{13}{16} \text{ in.}$. 8125	77
$\frac{15}{16}$ ----	16	. 8563	. 8778	. 8698	$\frac{7}{8} \text{ in.}$. 8750	77
1-----	16	. 9188	. 9403	. 9323	$\frac{15}{16} \text{ in.}$. 9375	77
$1\frac{1}{16}$ ----	16	. 9813	1. 0028	. 9948	1 in.	1. 0000	77
$1\frac{1}{8}$ ----	16	1. 0438	1. 0653	1. 0573	$\left\{ \begin{array}{l} 1\frac{1}{16} \text{ in.} \\ 27 \text{ mm.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. 0625 \\ 1. 0630 \end{array} \right.$	$\left\{ \begin{array}{l} 77 \\ 76 \end{array} \right.$
$1\frac{3}{16}$ ----	16	1. 1063	1. 1278	1. 1198	$\left\{ \begin{array}{l} 28.5 \text{ mm.} \\ 1\frac{1}{8} \text{ in.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. 1220 \\ 1. 1250 \end{array} \right.$	$\left\{ \begin{array}{l} 81 \\ 77 \end{array} \right.$
$1\frac{1}{4}$ ----	16	1. 1688	1. 1903	1. 1823	$1\frac{3}{16} \text{ in.}$	1. 1875	77
$1\frac{5}{16}$ ----	16	1. 2313	1. 2528	1. 2448	$1\frac{1}{4} \text{ in.}$	1. 2500	77
$1\frac{3}{8}$ ----	16	1. 2938	1. 3153	1. 3073	$1\frac{5}{16} \text{ in.}$	1. 3125	77
$1\frac{7}{16}$ ----	16	1. 3563	1. 3778	1. 3698	$1\frac{3}{8} \text{ in.}$	1. 3750	77
$1\frac{1}{2}$ ----	16	1. 4188	1. 4403	1. 4323	$\left\{ \begin{array}{l} 36.5 \text{ mm.} \\ 1\frac{1}{2} \text{ in.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. 4370 \\ 1. 4375 \end{array} \right.$	$\left\{ \begin{array}{l} 78 \\ 77 \end{array} \right.$
$1\frac{9}{16}$ ----	16	1. 4813	1. 5028	1. 4948	$\left\{ \begin{array}{l} 38 \text{ mm.} \\ 1\frac{1}{2} \text{ in.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. 4961 \\ 1. 5000 \end{array} \right.$	$\left\{ \begin{array}{l} 82 \\ 77 \end{array} \right.$
$1\frac{5}{8}$ ----	16	1. 5438	1. 5653	1. 5573	$1\frac{9}{16} \text{ in.}$	1. 5625	77
$1\frac{11}{16}$ ----	16	1. 6063	1. 6278	1. 6198	$1\frac{5}{8} \text{ in.}$	1. 6250	77
$1\frac{3}{4}$ ----	16	1. 6688	1. 6903	1. 6823	$1\frac{11}{16} \text{ in.}$	1. 6875	77
$1\frac{13}{16}$ ----	16	1. 7313	1. 7528	1. 7448	$\left\{ \begin{array}{l} 1\frac{3}{4} \text{ in.} \\ 44.5 \text{ mm.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. 7500 \\ 1. 7520 \end{array} \right.$	$\left\{ \begin{array}{l} 77 \\ 75 \end{array} \right.$

¹ Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.

TABLE 123 (C).—*Sizes of tap drills—Continued*

[American National 16-pitch-thread series]

Size of thread	Threads per in.	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
1 $\frac{7}{8}$ ----	16	1. 7938	1. 8153	1. 8073	{46 mm----- 1 $\frac{3}{16}$ in-----	1. 8110 1. 8125	79 77
1 $\frac{15}{16}$ ----	16	1. 8563	1. 8778	1. 8698	{47.5 mm----- 1 $\frac{7}{8}$ in-----	1. 8701 1. 8750	83 77
2-----	16	1. 9188	1. 9403	1. 9323	1 $\frac{5}{16}$ in-----	1. 9375	77
2 $\frac{1}{16}$ ----	16	1. 9813	2. 0028	1. 9948	2 in-----	2. 0000	77
2 $\frac{1}{8}$ ----	16	2. 0438	2. 0653	2. 0573	2 $\frac{1}{16}$ in-----	2. 0625	77
2 $\frac{3}{16}$ ----	16	2. 1063	2. 1278	2. 1198	{2 $\frac{7}{8}$ in----- 54 mm-----	2. 1250 2. 1260	77 76
2 $\frac{1}{4}$ ----	16	2. 1688	2. 1903	2. 1823	{55.5 mm----- 2 $\frac{3}{16}$ in-----	2. 1850 2. 1875	80 77
2 $\frac{5}{16}$ ----	16	2. 2313	2. 2528	2. 2448	2 $\frac{1}{4}$ in-----	2. 2500	77
2 $\frac{3}{8}$ ----	16	2. 2938	2. 3153	2. 3073	2 $\frac{5}{16}$ in-----	2. 3125	77
2 $\frac{7}{16}$ ----	16	2. 3563	2. 3778	2. 3698	2 $\frac{3}{8}$ in-----	2. 3750	77
2 $\frac{1}{2}$ ----	16	2. 4188	2. 4403	2. 4323	2 $\frac{7}{16}$ in-----	2. 4375	77
2 $\frac{5}{8}$ ----	16	2. 5438	2. 5653	2. 5573	{65 mm----- 2 $\frac{3}{16}$ in-----	2. 5590 2. 5625	81 77
2 $\frac{3}{4}$ ----	16	2. 6688	2. 6903	2. 6823	2 $\frac{11}{16}$ in-----	2. 6875	77
2 $\frac{7}{8}$ ----	16	2. 7938	2. 8153	2. 8073	{2 $\frac{13}{16}$ in----- 71.5 mm-----	2. 8125 2. 8150	77 74
3-----	16	2. 9188	2. 9403	2. 9323	{74.5 mm----- 2 $\frac{15}{16}$ in-----	2. 9331 2. 9375	82 77
3 $\frac{1}{8}$ ----	16	3. 0438	3. 0653	3. 0573	3 $\frac{1}{16}$ in-----	3. 0625	77
3 $\frac{1}{4}$ ----	16	3. 1688	3. 1903	3. 1823	3 $\frac{3}{16}$ in-----	3. 1875	77
3 $\frac{3}{8}$ ----	16	3. 2938	3. 3153	3. 3073	3 $\frac{5}{16}$ in-----	3. 3125	77
3 $\frac{1}{2}$ ----	16	3. 4188	3. 4403	3. 4323	3 $\frac{7}{16}$ in-----	3. 4375	77

TABLE 123 (D).—*Sizes of tap drills*

[American National extra-fine-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth ¹		
		Basic	Maximum ²	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
		<i>Inch</i>	<i>Inch</i>	<i>Inch</i>		<i>Inch</i>	
$\frac{1}{4}$ ----	32	0. 2094	0. 2208	0. 2162	{ 5.5 mm. ³ ----- $\frac{7}{32}$ in----- 5.6 mm. ³ -----	0. 2165 . 2188 . 2205	83 77 73
$\frac{5}{16}$ ----	32	. 2719	. 2833	. 2787	{ 7.1 mm. ³ ----- K ³ ----- $\frac{9}{32}$ in-----	. 2795 . 2810 . 2812	81 77 77
$\frac{3}{8}$ ----	32	. 3344	. 3458	. 3412	{ 8.7 mm. ³ ----- $\frac{11}{32}$ in----- 8.75 mm. ³ -----	. 3425 . 3438 . 3445	80 77 75
$\frac{7}{16}$ ----	28	. 3911	. 4041	. 3988	{ X----- Y ³ -----	. 3970 . 4040	87 72
$\frac{1}{2}$ ----	28	. 4536	. 4666	. 4613	{ $\frac{29}{64}$ in----- $\frac{15}{32}$ in-----	. 4531 . 4687	101 67
$\frac{9}{16}$ ----	24	. 5084	. 5235	. 5174	{ $\frac{33}{64}$ in----- $\frac{17}{32}$ in-----	. 5156 . 5312	87 58
$\frac{5}{8}$ ----	24	. 5709	. 5860	. 5799	{ $\frac{37}{64}$ in----- 15 mm-----	. 5781 . 5906	87 64
$1\frac{1}{16}$ ----	24	. 6334	. 6485	. 6424	{ $\frac{41}{64}$ in----- 16.5 mm-----	. 6406 . 6496	87 70
$\frac{3}{4}$ ----	20	. 6850	. 7027	. 6959	{ 17.5 mm----- $\frac{45}{64}$ in-----	. 6890 . 7031	94 72
$1\frac{3}{16}$ ----	20	. 7475	. 7652	. 7584	{ $\frac{3}{4}$ in----- $\frac{49}{64}$ in-----	. 7500 . 7656	96 72
$\frac{7}{8}$ ----	20	. 8100	. 8277	. 8209	21 mm-----	. 8268	74
$1\frac{5}{16}$ ----	20	. 8725	. 8902	. 8834	22.5 mm-----	. 8858	80
1-----	20	. 9350	. 9527	. 9459	{ 24 mm----- $\frac{61}{64}$ in-----	. 9449 . 9531	85 72
$1\frac{1}{2}$ ----	18	. 9903	1. 0099	1. 0024	25.5 mm-----	1. 0040	81
$1\frac{3}{8}$ ----	18	1. 0528	1. 0724	1. 0649	{ 27 mm----- $\frac{15}{64}$ in-----	1. 0630 1. 0781	86 65
$1\frac{3}{16}$ ----	18	1. 1153	1. 1349	1. 1274	{ $1\frac{1}{8}$ in----- $1\frac{9}{64}$ in-----	1. 1250. 1. 1406	87 65
$1\frac{1}{4}$ ----	18	1. 1778	1. 1974	1. 1899	{ $1\frac{1}{16}$ in----- 30.5 mm-----	1. 1875 1. 2008	87 68

¹ Sizes in italics are not within the specified limits for minor diameter of nut.² Present Army ordnance practice follows Handbook H25 and the mimeographed Supplement to Handbook H28 in the maximum minor diameters of nuts.³ These sizes are not included as standard in American Standard B 5.12-1940 for Twist Drills, Straight Shank, but are listed in the appendix thereto.

TABLE 123 (D).—*Sizes of tap drills*—Continued

[American National extra-fine-thread series]

Size of thread	Threads per inch	Minor diameter of nut			Stock drills and corresponding percentage of basic thread depth		
		Basic	Maximum	Minimum	Nominal size	Diameter	Percentage of depth of basic thread
1 $\frac{5}{16}$ ---	18	<i>Inch</i> 1. 2403	<i>Inch</i> 1. 2599	<i>Inch</i> 1. 2524	32 mm-----	<i>Inch</i> 1. 2598	73
1 $\frac{3}{8}$ ----	18	1. 3028	1. 3224	1. 3149	33.5 mm-----	1. 3189	78
1 $\frac{1}{2}$ ----	18	1. 3653	1. 3849	1. 3774	35 mm-----	1. 3780	82
1 $\frac{1}{2}$ ----	18	1. 4278	1. 4474	1. 4399	{ 1 $\frac{1}{16}$ in----- 1 $\frac{29}{64}$ in-----	1. 4375 1. 4531	87 65
1 $\frac{3}{4}$ ----	18	1. 4903	1. 5099	1. 5024	{ 1 $\frac{1}{2}$ in----- 1 $\frac{33}{64}$ in-----	1. 5000 1. 5156	87 65
1 $\frac{3}{8}$ ----	18	1. 5528	1. 5724	1. 5649	{ 1 $\frac{1}{8}$ in----- 40 mm-----	1. 5625 1. 5748	87 70
1 $\frac{11}{16}$ ---	18	1. 6153	1. 6349	1. 6274	41.5 mm-----	1. 6339	74
1 $\frac{3}{4}$ ----	16	1. 6688	1. 6903	1. 6823	1 $\frac{11}{16}$ in-----	1. 6875	77
2-----	16	1. 9188	1. 9403	1. 9323	1 $\frac{15}{16}$ in-----	1. 9375	77

LABELING

12. Where the dimensions are to be guaranteed, the following form of statement on labels, invoices, catalogues, etc., is recommended:

The ----- guarantees that for the respective classes of fit as identified or labeled, these screw threads conform to Commercial Standard CS24-43 as issued by the National Bureau of Standards of the U. S. Department of Commerce.

EFFECTIVE DATE

The standard is effective for new production from February 10, 1943.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Most organizations nominated their own representatives. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the committee.

Manufacturers:

CARL W. BETTCHER (Chairman), Eastern Machine Screw Corporation, New Haven, Conn.

J. J. TOMALIS, American Screw Co., 21 Stevens Street, Providence, R. I.

GEORGE S. CASE, Lamson & Sessions Co., 1975 W. 85th Street, Cleveland, Ohio.
 J. S. DAVEY, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
 J. H. EDMONDS, Lebanon Plant, Bethlehem Steel Co., Lebanon, Pa.
 H. C. ERDMAN, National Screw & Mfg. Co., 2440 E. 75th St., Cleveland, Ohio
 W. C. STEWART, American Institute, Bolt, Nut and Rivet Mfrs., 1550 Hanna Bldg., Cleveland, Ohio.
 F. P. TISCH, Pheoll Mfg. Co., 5700 Roosevelt Road, Chicago, Ill.
 CHARLES C. WINTER, Winter Bros. Co., Wrentham, Mass.

Distributors:

G. CHESTON CAREY, Carey Machinery & Supply Co., 119 E. Lombard Street, Baltimore, Md.
 H. H. SMITH, Strong, Carlisle & Hammond Co., 1392 W. 3d Street, Cleveland, Ohio.

Consumers:

W. B. BARTH, General Motors Corporation, Standards Section, 15-158 General Motors Bldg., Detroit, Mich.
 Lt. Col. HARRY B. HAMBLETON, Office of Chief of Ordnance, War Department, Washington, D. C.
 A. M. HOUSER, Crane Company, 836 S. Michigan Ave., Chicago, Ill.
 L. A. WENN, International Business Machines Co., North Street, Endicott, N. Y.
 H. W. SAMSON, Standards Department, General Electric Co., Schenectady, N. Y.
 Lt. Comdr. J. W. HUCKERT, USN, Naval Gun Factory, U. S. Navy Yard, Washington, D. C.

Laboratories:

H. W. BEARCE, Interdepartmental Screw Thread Committee, National Bureau of Standards, Washington, D. C.
 EARLE BUCKINGHAM, Massachusetts Institute of Technology, Cambridge, Mass.

HISTORY OF PROJECT

In the United States the standardization of screw threads was begun with the appointment of a special committee by the Franklin Institute on April 21, 1861, for the investigation of a proper system of screw threads, bolt heads, and nuts. From this beginning there was developed a system variously known as the Franklin Institute thread, the Sellers thread, or the United States thread. Later a system having finer pitches was recommended by the Society of Automotive Engineers, and a machine-screw-thread series providing smaller sizes of screws than the United States series was recommended by the American Society of Mechanical Engineers.

On July 18, 1918, the Congress authorized the appointment of the National Screw Thread Commission, consisting of nine members, to "ascertain and establish standards for screw threads" which when "accepted and approved shall be adopted and used in the several manufacturing plants under the control of the War and Navy Departments, and, so far as practicable, in all specifications for screw threads in proposals for manufactured articles, parts, or materials to be used under the direction of these departments." The National Screw Thread Commission issued printed reports in 1921, 1924, 1928, and 1933, based upon a long series of hearings and investigations both in the United States and abroad.

While the recommendations of the NSTC are mandatory upon the War and Navy Departments, and, as far as practicable, apply also to purchases by all Government departments, it seemed desirable to determine the extent to which these standards were being applied within the industries concerned. Accordingly, on May 8, 1929, the

National Screw Thread Commission requested the cooperation of the National Bureau of Standards to determine the extent of adoption and use of the NSTC recommendations in industry.

The hearing of the NSTC having performed all the essential functions of the general conferences normally required as a part of the procedure leading to the establishment of commercial standards, and the recommendations of the NSTC having attained national recognition and a large following, it seemed logical to proceed directly with the circulation of the essential screw-thread tables and tolerances to industry for written acceptance. This was done and resulted in the impressive roster of organizations, listed on page V of CS24-30 and CS25-30, which indicated in writing their intention of making the American National Standard Screw Threads, as set forth in CS24-30 and CS25-30, their standard of practice, effective from July 1, 1930.

First revision and consolidation.—On March 25, 1942, the Interdepartmental Screw Thread Committee,⁵ recognizing that the Commercial Standards CS24-30 and CS25-30 had been rendered obsolete by revisions since their publication, requested the development of revised and additional standards in line with the generally accepted commercial practice recorded in National Bureau of Standards Handbook H28.

The National Bureau of Standards established a standing committee representing manufacturers, distributors, consumers, and laboratories, which reviewed, revised, and approved for circulation within the industry the Recommended Commercial Standard for Screw Threads and Tap Drill Sizes prepared by the Bureau.

Upon written acceptance by a predominant majority of users, distributors, and producers, as listed herein, announcement was made on November 10, 1942, that the standard would become effective for new production from February 10, 1943.

⁵ The National Screw Thread Commission was abolished by Executive Order dated June 10, 1933. The Interdepartmental Screw Thread Committee was established September 14, 1939, by the Departments of War, Navy, and Commerce to promote uniformity in screw-thread standards in the Departments concerned.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date _____

Division of Trade Standards,
National Bureau of Standards,
Washington, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS24-43 as our standard of practice in the

Production ¹ Distribution ¹ Use ¹ Testing ¹
of screw threads and tap-drill sizes.

We will assist in securing its general recognition and use, and will cooperate with the standing committee to effect revisions of the standard when necessary.

Signature of individual officer _____
(in ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____
(Fill in exactly as it should be listed)

Street address _____

City and State _____

¹ Please designate which group you represent by drawing lines through the other three. Please file separate acceptances for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade papers, colleges, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations and individuals listed below have accepted these dimensions as their standard of practice in the production, distribution, and use of screw threads and tap-drill sizes. Such endorsement does not signify that they may not find it necessary to deviate from the standard, nor that producers so listed guarantee all of their products in this field to conform with the requirements of this standard. Therefore specific evidence of conformity should be obtained where required.

ASSOCIATIONS

Allied Building Metal Industries, New York, N. Y.
 American Association of Engineers, Chicago, Ill.
 American Institute of Bolt, Nut, & Rivet Manufacturers, Cleveland, Ohio.
 American Railway Engineering Association, Chicago, Ill. (In Principle.)
 American Supply & Machinery Manufacturers' Association, Inc., Pittsburgh, Pa. (In Principle.)
 Associated General Contractors of America, Inc., Washington, D. C.
 Manufacturers Standardization Society of the Valve & Fittings Industry, New York, N. Y.
 National Association Master Plumbers, New York, N. Y.
 National Retail Hardware Association, Indianapolis, Ind.
 National Screw Machine Products Association, Cleveland, Ohio.
 Southern Hardware Jobbers Association, Atlanta, Ga.
 Southern Supply & Machinery Distributors' Association, Inc., Atlanta, Ga.

FIRMS

Accurate Tool Co., Detroit, Mich.
 Acme Machine Tool Co., The, Cincinnati, Ohio.
 Adams Co., The, Dubuque, Iowa.
 Aero Supply Manufacturing Co., Inc., Corry, Pa.
 Aircooled Motors Corporation, Syracuse, N. Y.
 Ajax Bolt & Screw Co., Detroit, Mich.
 Allen Manufacturing Co., The, Hartford, Conn.
 Almond Manufacturing Co., T. R., Ashburnham, Mass.

Aluminum & Brass Co., Lockport, N. Y.
 Aluminum Company of America, Pittsburgh, Pa.
 American Bridge Co., Pittsburgh, Pa.
 American Locomotive Co., Schenectady, N. Y.
 American Manganese Bronze Co., Holmesburg, Philadelphia, Pa.
 American Seating Co., Grand Rapids, Mich.
 American Screw Co., Providence, R. I.
 Armstrong Manufacturing Co., The, Bridgeport, Conn.
 Arrow Automatic Products Corporation, New York, N. Y.
 Atlantic Machine Screw Co., S. Boston, Mass.
 Atlas Bolt & Screw Co., The, Cleveland, Ohio.
 Atlas Copper & Brass Manufacturing Co., Chicago, Ill.
 Autocar Co., Ardmore, Pa.
 Automatic Machinery Manufacturing Corporation, Bridgeport, Conn.
 Automatic Products Co., Milwaukee, Wis.
 Autoscrew Co., New York, N. Y.
 Avey Drilling Machine Co., The, Covington, Ky.
 Babson-Dow Manufacturing Co., Roxbury, (Boston) Mass.
 Baldwin Locomotive Works, The, Philadelphia, Pa.
 Bard Manufacturing Co., Royersford, Pa.
 Bath & Co., John, Worcester, Mass.
 Bausch & Lomb Optical Co., Rochester, N. Y.
 Bausch Machine Tool Co., Springfield, Mass.
 Bayonne Bolt Corporation, Bayonne, N. J.
 Beard Tool Co., L. O., Lancaster, Pa.

- Bell Co., Inc., The David, Buffalo, N. Y.
 Bethlehem Steel Co., Lebanon, Pa.
 Bicknell Manufacturing Co., Rockland, Maine
 Biglow & Co., Inc., L. C., New York, N. Y.
 Billings & Spencer Co., The, Hartford, Conn.
 Bommer Spring Hinge Co., Brooklyn, N. Y.
 Boston Machine Works Co., Lynn, Mass.
 Botwinik Brothers, Inc., Hamden, New Haven, Conn.
 Brightman Nut & Manufacturing Co., Sandusky, Ohio.
 Brill Co., The J. G., Philadelphia, Pa.
 Brown Bag Filling Machine Co., The, Fitchburg, Mass.
 Brown & Sharpe Manufacturing Co., Providence, R. I.
 Brown-Wales Co., Boston, Mass.
 Buckeye Traction Ditcher Co., The, Findlay, Ohio.
 Buda Co., The, Harvey, Ill.
 Buerk Tool Works, Buffalo, N. Y.
 Buffalo Bolt Co., North Tonawanda, N. Y.
 Camden Forge Co., Camden, N. J.
 Cap Screw & Nut Co. of America, Inc., New York, N. Y.
 Carey Machinery & Supply Co., Baltimore, Md.
 Central Screw Co., Chicago, Ill.
 Chain Belt Co., Milwaukee, Wis.
 Chatillon & Sons, John, New York, N. Y.
 Chicago, Rock Island & Pacific Railway Co., Chicago, Ill.
 Chicago Screw Co., The, Chicago, Ill.
 Chrysler Corporation, Detroit, Mich.
 Cincinnati Planer Co., The, Cincinnati, Ohio.
 City Engineering Co., The, Dayton, Ohio.
 Clark, Jas., Jr., Paterson, N. J.
 Clark Bros. Bolt Co., Milldale, Conn.
 Clark Metal Products, Inc., Bridgeport, Conn.
 Clendenin Bros. Inc., Baltimore, Md.
 Cleveland Automatic Machine Co., The, Cleveland, Ohio.
 Cleveland Cap Screw Co., The, Cleveland, Ohio.
 Cleveland Die & Manufacturing Co., The, Cleveland, Ohio.
 Columbus Bolt Works Co., The, Columbus, Ohio.
 Commonwealth Brass Corporation, Detroit, Mich.
 Comtor Co., The, Waltham, Mass.
 Connecticut Tool & Engineering Co., Bridgeport, Conn.
 Continental Screw Co., New Bedford, Mass.
 Cox & Sons Co., The, Bridgeton, N. J.
 Crane Co., Chicago, Ill.
 Curtis Screw Co., Inc., Buffalo, N. Y.
 Dallett Co., The, Philadelphia, Pa.
 Dardelet Threadlock Corporation, Detroit, Mich.
 Davis & Hemphill, Elkridge, Md.
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 Detroit Nut Co., Inc., Detroit, Mich.
 Detroit Plating Industries, Detroit, Mich.
 Detroit Tap & Tool Co., Detroit, Mich.
 Doehler Die Casting Co., Batavia, N. Y.
 Dravo Corporation Engineering Works Division, Pittsburgh, Pa.
 Eastern Machine Screw Corporation, The, New Haven, Conn.
 Eastman Kodak Co., Hawk-Eye Division, Rochester, N. Y.
 Eastwood-Nealley Corp., Belleville, N. J.
 Economy Engineering Co., The, Wiloughby, Ohio.
 Ekstrom, Carlson & Co., Rockford, Ill.
 Electric Boat Co., Groton, Conn.
 Elterich Co., Chas., New York, N. Y. (In Principle.)
 Emery Industries, Inc., Cincinnati, Ohio.
 Engineers Club of Philadelphia, Pa., Philadelphia, Pa. (In Principle.)
 Erie Bolt & Nut Co., Erie, Pa.
 Essley Machinery Co., The E. L., Chicago, Ill. (In Principle.)
 Fairbanks, Morse & Co., Beloit, Wis.
 Federal Products Corporation, Providence, R. I.
 Federal Screw Works, Detroit, Mich.
 Ferry Cap & Set Screw Co., The, Cleveland, Ohio.
 Firestone Steel Products Co., Akron, Ohio.
 Firestone Tire & Rubber Co., Akron, Ohio.
 Flannery Bolt Co., Bridgeville, Pa.
 Fox Munitions Corporation, Philadelphia, Pa.
 Foxboro Co., The, Foxboro, Mass.
 General Engineering Works, Chicago, Ill.
 General Electric Co., Schenectady, N. Y.
 General Manufacturing Co., The, Waterbury, Conn.
 General Motors Corporation, Detroit, Mich.
 Geometric Tool Co., The, New Haven, Conn.
 Gibbs & Cox, Inc., New York, N. Y.
 Gisholt Machine Co., Madison, Wis.
 Globe Products Co., The, Cleveland, Ohio.
 Grabler Manufacturing Co., The, Cleveland, Ohio.
 Grant Manufacturing & Machine Co., The, Bridgeport, Conn.
 Graves Elevator Co., Inc., Rochester, N. Y.
 Greenfield Tap & Die Corporation, Greenfield, Mass.
 Greenlee Bros. & Co., Rockford, Ill.

- Grimm Hardware Co., Inc., W. H., Chicago, Ill.
 Gurley, W. & L. E., Troy, N. Y.
 Haines Gauge Co., Inc., Philadelphia, Pa.
 Hardware Products Co., Inc., Boston, Mass.
 Harper Co., The H. M., Chicago, Ill.
 Hartford Machine Screw Co., Hartford, Conn.
 Hassall, Inc., John, Brooklyn, N. Y.
 Haynes Stellite Co., Kokomo, Ind.
 Hodell Chain Co., The, Cleveland, Ohio.
 Hood Co., R. H., Philadelphia, Pa.
 Hooper Co., Inc., F. X., Glenarm, Md.
 Hudson Motor Car Co., U. S. Naval Ordnance Plant, Center Line, Mich.
 Illinois Iron & Bolt Co., Carpentersville, Ill.
 Imsande Screw Products Co., Cincinnati, Ohio.
 Indicating Calipers Corporation, New York, N. Y.
 International Business Machines Corporation, Endicott, N. Y.
 International Harvester Co., Chicago, Ill.
 International Machine Tool Corporation, Foster Division, Elkhart, Ind.
 International-Stacey Corporation, International-Derrick & Equipment Division, Columbus, Ohio.
 Isaacson Iron Works, Seattle, Wash.
 Iverson & Laux, Inc., Chicago, Ill.
 Jacobs Aircraft Engine Co., Plant No. 1, Pottstown, Pa.
 Jeffrey Manufacturing Co., The, Columbus, Ohio.
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 Los Angeles Testing Laboratory, Los Angeles, Calif.
- Lundberg Screw Products Co., Lansing, Mich.
 Machined Products Co., Louisville, Ky.
 MacLean-Fogg Lock Nut Co., Chicago, Ill.
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 Mann & Co., Hutchinson, Kans.
 Maryland Bolt & Nut Co., The, Baltimore, Md.
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 Merrill Brothers, Maspeth, N. Y.
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 Milled Screw Products Co., Chicago, Ill.
 Milton Manufacturing Co., The, Milton, Pa.
 Mitchell Engineering Co., The, Springfield, Ohio.
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 Moore, Inc., George W., Boston, Mass.
 Morrow Screw & Nut Co., Ltd., Ingersoll, Ontario, Canada.
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 Mueller Co., Decatur, Ill.
 Murehey Machine & Tool Co., Detroit, Mich.
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 National Acme Co., The, Cleveland, Ohio.
 National Brass Co., Grand Rapids, Mich.
 National Lock Co., Rockford, Ill.
 National Machine Products Co., Detroit, Mich.
 National Screw & Manufacturing Co., The, Cleveland, Ohio.
 New Britain Machine Co., The, New Britain, Conn.
 New York Air Brake Co., The, Watertown, N. Y.
 New York Central System, New York, N. Y.
 Nilson Machine Co., The A. H., Bridgeport, Conn.
 North & Judd Manufacturing Co., New Britain, Conn.
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 Northwest Bolt & Nut Co., Seattle, Wash.
 Ohio Brass Co., The, Mansfield, Ohio.
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 Osgood Engineering Co., Boston, Mass.
 Ottemiller Co., The Wm. H., York, Pa.
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 Packard Motor Car Co., Detroit, Mich.
 Palnut Co., The, Irvington, N. J.
 Parker Wire Goods Co., Worcester, Mass.

- Pawtucket Manufacturing Co., Pawtucket, R. I.
 Peck, Stow & Wilcox Co., Southington, Conn.
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 Perry Fay Co., Elyria, Ohio.
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 Rausch Nut & Manufacturing Co., The, Cleveland, Ohio.
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 Reed & Prince Manufacturing Co., Worcester, Mass.
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 Triplex Screw Co., Cleveland, Ohio.
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 Union Twist Drill Co., Butterfield Division, Derby Line, Vt.
 Union Twist Drill Co., S. W. Card Manufacturing Division, Mansfield, Mass.
 United Drill & Tool Corporation, Whitman & Barnes Division, Detroit, Mich.
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 Van Keuren Co., The, Watertown, Mass.
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 Virginia Polytechnic Institute, Blacksburg, Va.

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Western Automatic Machine Screw Co., The, Elyria, Ohio.	
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Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.	
Williams & Co., J. H., Buffalo, N. Y.	

U. S. GOVERNMENT

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Panama Canal, The, Mechanical Division, Balboa, C. Z.
Treasury Department, Washington, D. C.
Veterans Administration, Washington, D. C.

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COMMERCIAL STANDARDS

CS No.	Item	CS No.	Item
0-40.	Commercial standards and their value to business (third edition).	58-36.	Woven elastic fabrics for use in overalls (overall elastic webbing).
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33-32.	Knit underwear (exclusive of rayon).	91-41.	Factory-fitted Douglas fir entrance doors.
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50-34.	Binders board for bookbinding and other purposes.		
51-35.	Marking articles made of silver in combination with gold.		
52-35.	Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).		
53-35.	Colors and finishes for cast stone.		
54-35.	Mattresses for hospitals.		
55-35.	Mattresses for institutions.		
56-41.	Oak flooring (second edition).		
57-40.	Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).		

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington D. C.

