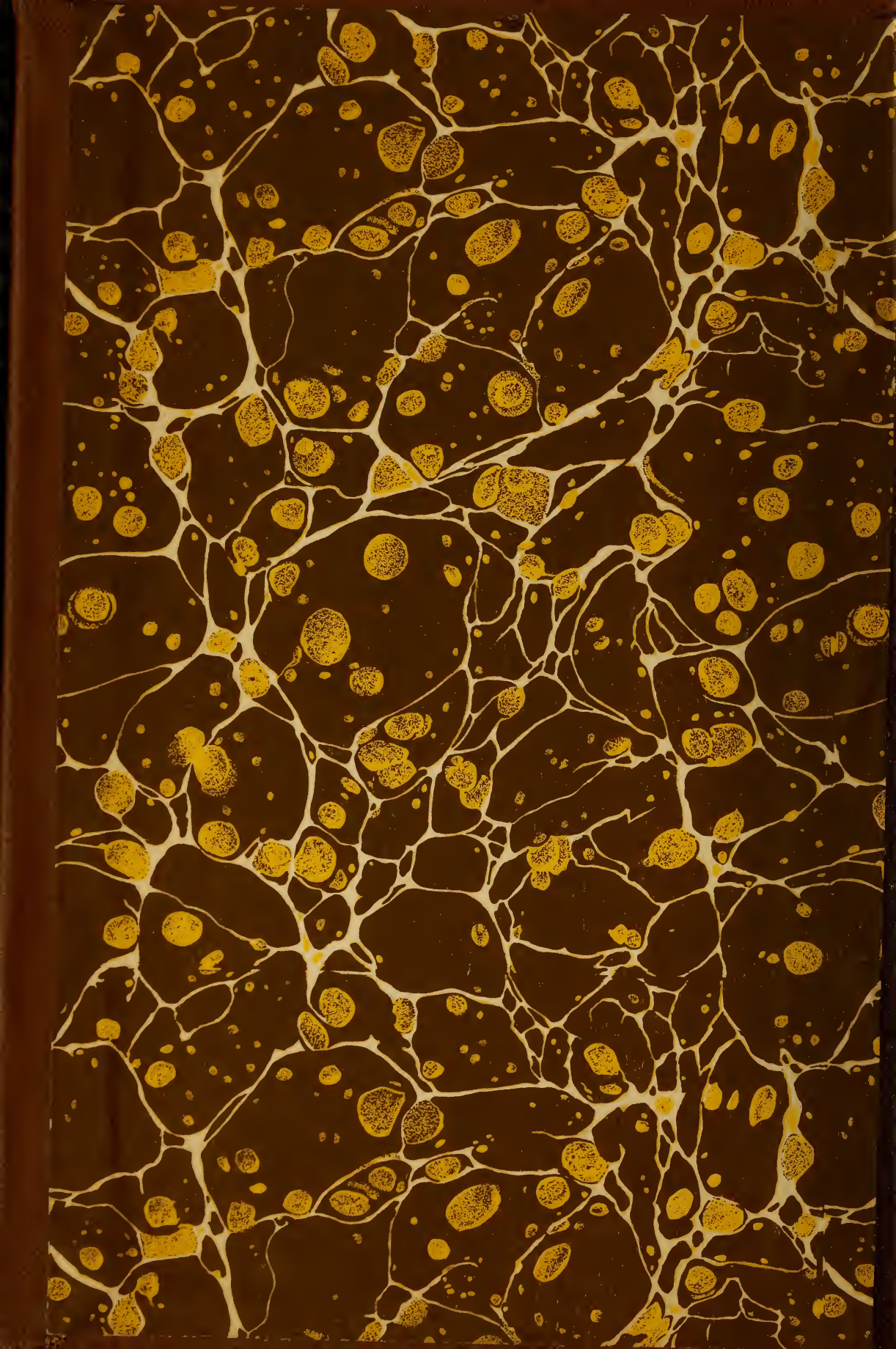
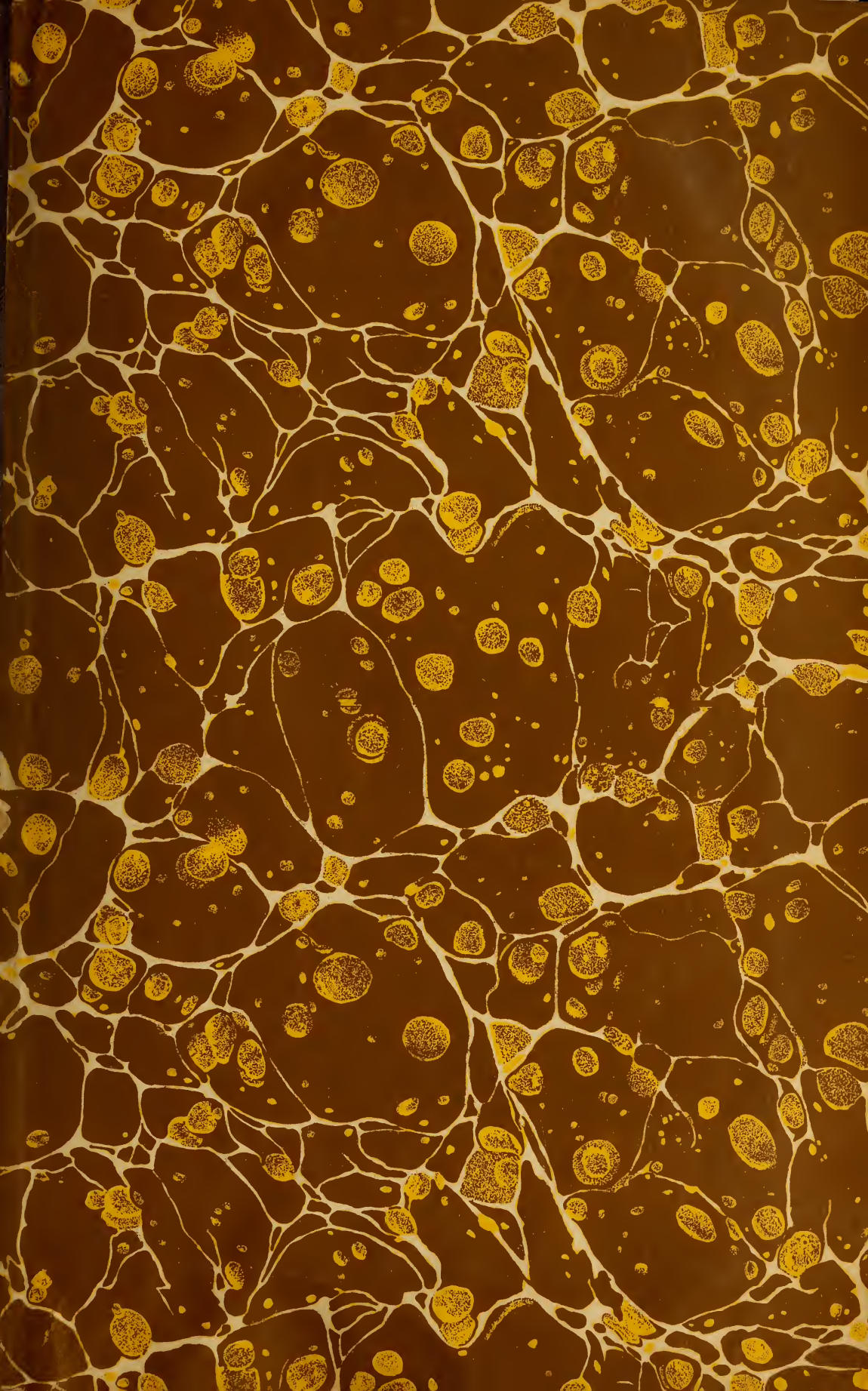


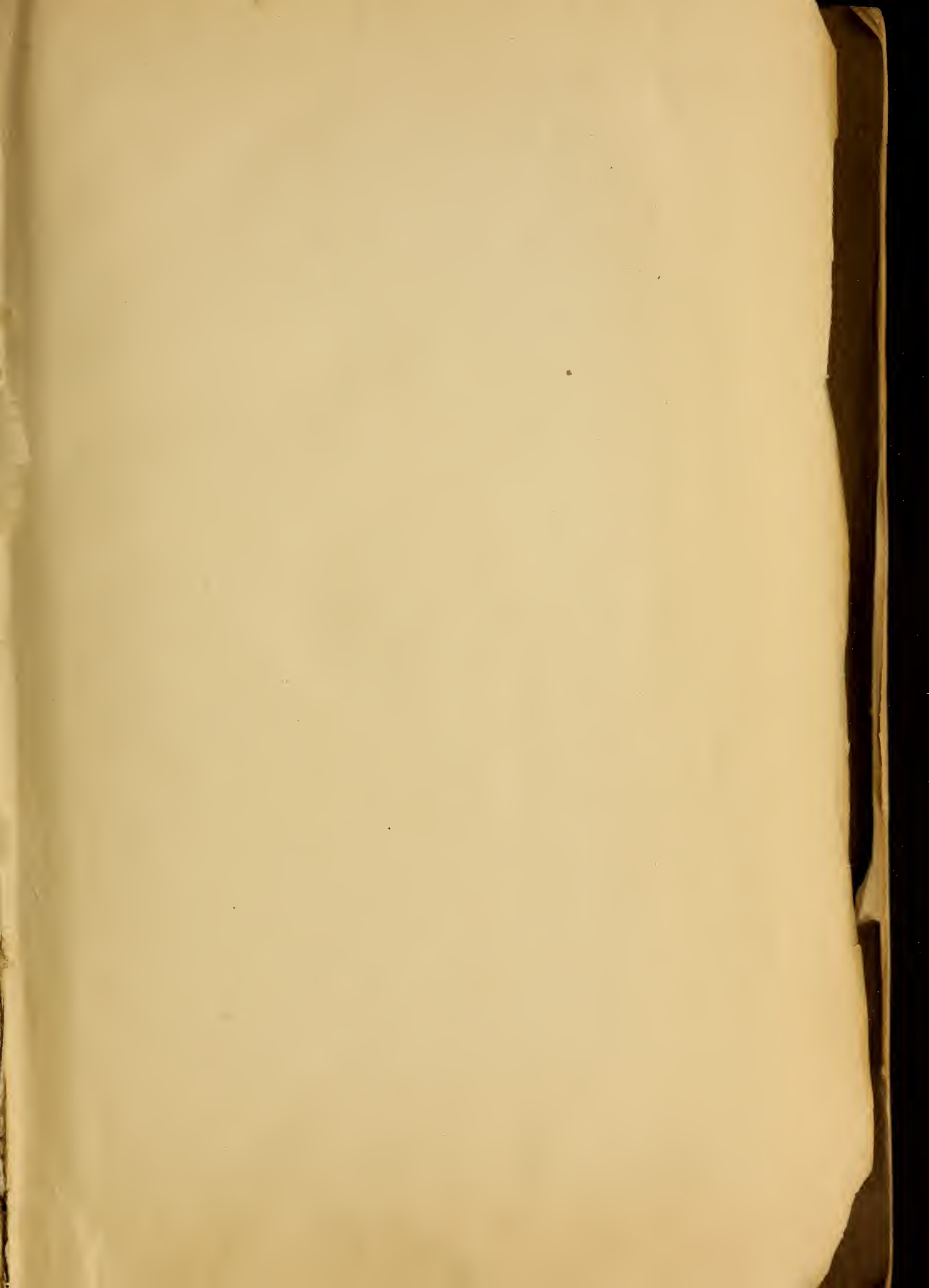
MISCELLANEOUS PUBLICATIONS
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UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS

AMERICAN NATIONAL
SCREW THREAD TABLES
FOR SHOP USE

II. Special Threads

MISCELLANEOUS PUBLICATION OF THE BUREAU OF STANDARDS, No. 99

E R R A T A

B. S. Misc. Pub. No. 99.

Page	Table	Column	Line (below heading)	Incorrect value	Correct value
4	88	7	2	.7493	.7943
5	88	16	12	1.3 09	1.3209
8	27	4th	7	.0080	.0086
10	28	5th	29	.0079	.0079
14	29	9th	20	.0199	.0179

PLANTAS

PLANTAS DE LA ZONA

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UNITED STATES DEPARTMENT OF COMMERCE

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BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

MISCELLANEOUS PUBLICATION OF THE BUREAU OF STANDARDS, No. 99

AMERICAN NATIONAL SCREW THREAD TABLES FOR SHOP USE

II. Special Threads

[Recommended Commercial Standard]

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AMERICAN NATIONAL SCREW-THREAD TABLES FOR SHOP USE

II. SPECIAL THREADS

ABSTRACT

This publication presents in compact form the tables of dimensions of special screw threads having the American National form of thread (60°), as published in the 1928 Report of the National Screw Thread Commission (Secs. IV and XD), Bureau of Standards Miscellaneous Publication, No. 89.¹ These tables cover the basic sizes, limiting dimensions, and tolerances for the American National 12-pitch thread series and other screw threads of special diameters, pitches, and lengths of engagement.

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I. AMERICAN NATIONAL 12-PITCH THREAD SERIES

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 the 12 pitch is widely used, particularly for two distinct purposes as given below, but for different reasons.

Sizes of 12-pitch threads from one-half inch to and including $1\frac{3}{4}$ inches are used in railroad 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.

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 maintain shoulder diameters to one-eighth-inch steps. The 12 pitch is the coarsest, for a thread of basic depth, which 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.

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

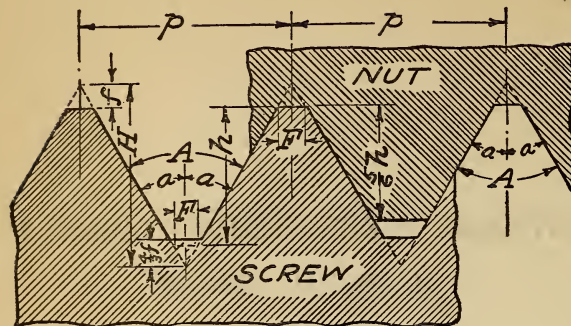


FIG. 3.—American National form of thread

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

NOTATION

n = number of threads per inch
 H = $0.866025 p$, depth of 60° sharp \vee thread
 h = $0.649519 p$, depth of American National form of thread
 $\frac{5}{8}h$ = $0.541266 p$, maximum depth of engagement

F = $0.125000 p$, width of flat at crest and root of American National form
 f = $0.108253 p$
 $= \frac{1}{8}H$
 $= \frac{1}{8}h$ } depth of truncation

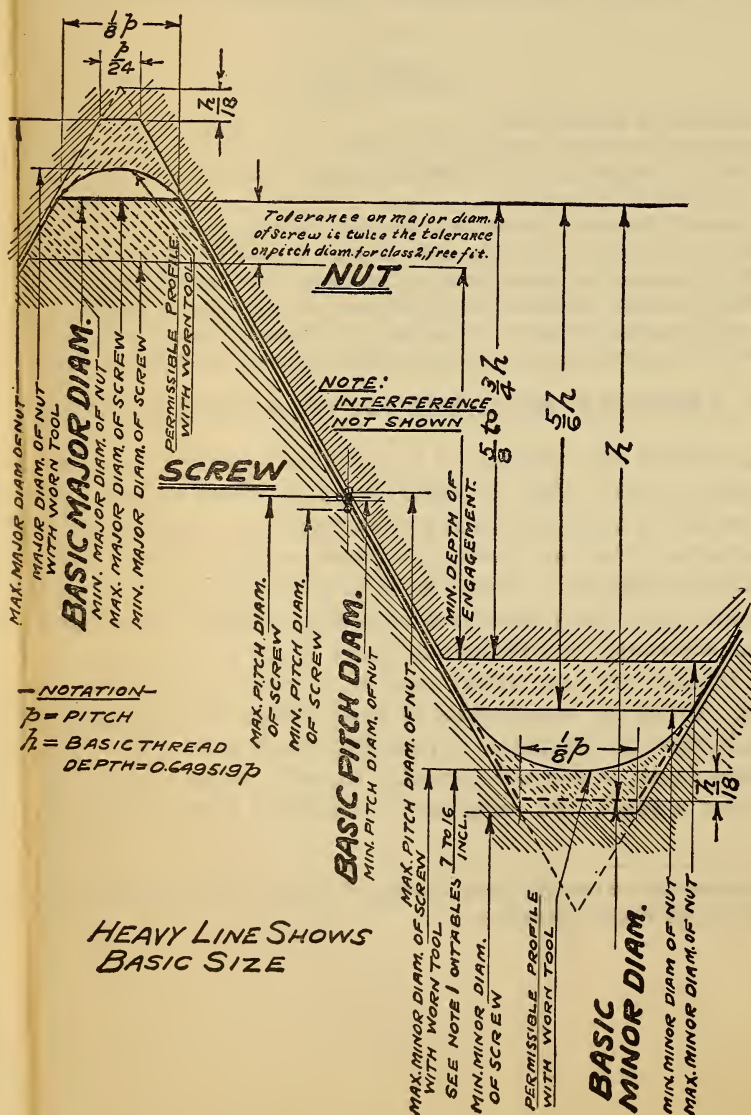


FIG. 10.—Illustration of tolerances and crest clearances for class 3, medium fit

TABLE 87.—American National 12-pitch thread series

Identification		Basic diameters			Metric equivalent of major diameter
Sizes	Threads per inch	Major diameter <i>D</i>	Pitch diameter <i>E</i>	Minor diameter <i>K</i>	
1	2	3	4	5	6
		<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>mm</i>
1/2	12	0.5000	0.4459	0.3917	12.700
5/16 ¹	12	.5625	.5084	.4542	14.288
3/8	12	.6250	.5709	.5167	15.875
11/16	12	.6875	.6334	.5792	17.463
3/4	12	.7500	.6959	.6417	19.050
13/16	12	.8125	.7584	.7042	20.638
7/8	12	.8750	.8209	.7667	22.225
15/16	12	.9375	.8834	.8292	23.813
1	12	1.0000	.9459	.8917	25.400
1 1/16	12	1.0625	1.0084	.9542	26.988
1 1/8 ²	12	1.1250	1.0709	1.0167	28.575
1 3/16	12	1.1875	1.1334	1.0792	30.163
1 1/4 ²	12	1.2500	1.1959	1.1417	31.750
1 5/16	12	1.3125	1.2584	1.2042	33.338
1 3/8	12	1.3750	1.3209	1.2667	34.925
1 1/2 ²	12	1.5000	1.4459	1.3917	38.100
1 3/4	12	1.7500	1.6959	1.6417	44.450
2	12	2.0000	1.9459	1.8917	50.800
2 1/4	12	2.2500	2.1959	2.1417	57.150
2 1/2	12	2.5000	2.4459	2.3917	63.500
2 3/4	12	2.7500	2.6959	2.6417	69.850
3	12	3.0000	2.9459	2.8917	76.200

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

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

TABLE 88.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National 12-pitch thread series

Dimensions and tolerances ¹	Size, (inches)								
	½	¾ ²	⅝	⅞	⅞	1⅞	1⅞	1⅞	
1	2	3	4	5	6	7	8	9	
BOLTS AND SCREWS									
Class 1, major diameter	Max. <i>Inch</i>	0.4976	0.5601	0.6226	0.6851	0.7476	0.8101	0.8726	0.9351
	Min.	.4818	.5443	.6068	.6693	.7318	.7943	.8568	.9193
	Tol.	.0158	.0158	.0158	.0158	.0158	.0158	.0158	.0158
Classes 2, 3, and 4, major diameter	Max.	.5000	.5625	.6250	.6875	.7500	.8125	.8750	.9375
	Min.	.4888	.5513	.6138	.6763	.7388	.8013	.8638	.9263
	Tol.	.0112	.0112	.0112	.0112	.0112	.0112	.0112	.0112
Class 1, minor diameter	Max. ⁴	.3954	.4579	.5204	.5829	.6454	.7079	.7704	.8329
	Classes 2, 3, and 4, minor diameter	Max. ⁴	.3978	.4603	.5228	.5853	.6478	.7103	.7728
Class 1, loose fit, pitch diameter	Max.	.4435	.5060	.5685	.6310	.6935	.7560	.8185	.8810
	Min.	.4356	.4981	.5606	.6231	.6856	.7481	.8106	.8731
	Tol.	.0079	.0079	.0079	.0079	.0079	.0079	.0079	.0079
Class 2, free fit, pitch diameter	Max.	.4459	.5084	.5709	.6334	.6959	.7584	.8209	.8834
	Min.	.4403	.5028	.5653	.6278	.6903	.7528	.8153	.8778
	Tol.	.0056	.0056	.0056	.0056	.0056	.0056	.0056	.0056
Class 3, medium fit, pitch diameter	Max.	.4459	.5084	.5709	.6334	.6959	.7584	.8209	.8834
	Min.	.4419	.5044	.5669	.6294	.6919	.7544	.8169	.8794
	Tol.	.0040	.0040	.0040	.0040	.0040	.0040	.0040	.0040
Class 4, close fit, pitch diameter	Max.	.4464	.5089	.5714	.6339	.6964	.7589	.8214	.8839
	Min.	.4444	.5069	.5694	.6319	.6944	.7569	.8194	.8819
	Tol.	.0020	.0020	.0020	.0020	.0020	.0020	.0020	.0020
NUTS AND TAPPED HOLES									
Classes 1, 2, 3, and 4, major diameter	Min. ⁵	.5000	.5625	.6250	.6875	.7500	.8125	.8750	.9375
	Classes 1, 2, 3, and 4, minor diameter	Max.	.4225	.4850	.5438	.6063	.6688	.7313	.7938
Classes 1, 2, 3, and 4, pitch diameter	Min.	.4098	.4723	.5348	.5973	.6598	.7223	.7848	.8473
	Tol.	.0127	.0127	.0090	.0090	.0090	.0090	.0090	.0090
	Min.	.4459	.5084	.5709	.6334	.6959	.7584	.8209	.8834
Class 1, pitch diameter	Max.	.4538	.5163	.5788	.6413	.7038	.7663	.8288	.8913
	Tol.	.0079	.0079	.0079	.0079	.0079	.0079	.0079	.0079
Class 2, pitch diameter	Max.	.4515	.5140	.5765	.6390	.7015	.7640	.8265	.8890
	Tol.	.0056	.0056	.0056	.0056	.0056	.0056	.0056	.0056
Class 3, pitch diameter	Max.	.4499	.5124	.5749	.6374	.6999	.7624	.8249	.8874
	Tol.	.0040	.0040	.0040	.0040	.0040	.0040	.0040	.0040
Class 4, pitch diameter	Max.	.4479	.5104	.5729	.6354	.6979	.7604	.8229	.8854
	Tol.	.0020	.0020	.0020	.0020	.0020	.0020	.0020	.0020

Footnotes at end of table.

TABLE 88.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National 12-pitch thread series—Continued

Dimensions and tolerances ¹	Size, (inches)							
	1	1 1/16	1 1/8 ²	1 1/4	1 3/8	1 1/2	1 5/8	
1	10	11	12	13	14	15	16	
BOLTS AND SCREWS								
Class 1, major diameter-----	{Max--	0.9976	1.0601	1.1226	1.1851	1.2476	1.3101	1.3726
	{Min--	.9818	1.0443	1.1068	1.1693	1.2318	1.2943	1.3568
	{Tol--	.0158	.0158	.0158	.0158	.0158	.0158	.0158
Classes 2, 3, and 4, major diameter--	{Max--	1.0000	1.0625	1.1250	1.1875	1.2500	1.3125	1.3750
	{Min--	.9888	1.0513	1.1138	1.1763	1.2388	1.3013	1.3638
	{Tol--	.0112	.0112	.0112	.0112	.0112	.0112	.0112
Class 1, minor diameter-----	Max ⁴ --	.8954	.9579	1.0204	1.0829	1.1454	1.2079	1.2704
Classes 2, 3, and 4, minor diameter--	Max ⁴ --	.8978	.9603	1.0228	1.0853	1.1478	1.2103	1.2728
Class 1, loose fit, pitch diameter----	{Max--	.9435	1.0060	1.0685	1.1310	1.1935	1.2560	1.3185
	{Min--	.9356	.9981	1.0606	1.1231	1.1856	1.2481	1.3106
	{Tol--	.0079	.0079	.0079	.0079	.0079	.0079	.0079
Class 2, free fit, pitch diameter-----	{Max--	.9459	1.0084	1.0709	1.1334	1.1959	1.2584	1.3209
	{Min--	.9403	1.0028	1.0653	1.1278	1.1903	1.2528	1.3153
	{Tol--	.0056	.0056	.0056	.0056	.0056	.0056	.0056
Class 3, medium fit, pitch diameter----	{Max--	.9459	1.0084	1.0709	1.1334	1.1959	1.2584	1.3209
	{Min--	.9419	1.0044	1.0669	1.1294	1.1919	1.2544	1.3169
	{Tol--	.0040	.0040	.0040	.0040	.0040	.0040	.0040
Class 4, close fit, pitch diameter----	{Max--	.9464	1.0089	1.0714	1.1339	1.1964	1.2589	1.3214
	{Min--	.9444	1.0069	1.0694	1.1319	1.1944	1.2569	1.3194
	{Tol--	.0020	.0020	.0020	.0020	.0020	.0020	.0020
NUTS AND TAPPED HOLES								
Classes 1, 2, 3, and 4, major diameter--	Min. ⁵ --	1.0000	1.0625	1.1250	1.1875	1.2500	1.3125	1.3750
Classes 1, 2, 3, and 4, minor diameter--	{Max--	.9188	.9813	1.0438	1.1063	1.1688	1.2313	1.2938
	{Min--	.9098	.9723	1.0348	1.0973	1.1598	1.2223	1.2848
	{Tol--	.0090	.0090	.0090	.0090	.0090	.0090	.0090
Classes 1, 2, 3, and 4, pitch diameter--	Min--	.9459	1.0084	1.0709	1.1334	1.1959	1.2584	1.3209
Class 1, pitch diameter-----	{Max--	.9538	1.0163	1.0788	1.1413	1.2038	1.2663	1.3288
	{Tol--	.0079	.0079	.0079	.0079	.0079	.0079	.0079
Class 2, pitch diameter-----	{Max--	.9515	1.0140	1.0765	1.1390	1.2015	1.2640	1.3265
	{Tol--	.0056	.0056	.0056	.0056	.0056	.0056	.0056
Class 3, pitch diameter-----	{Max--	.9499	1.0124	1.0749	1.1374	1.1999	1.2624	1.3249
	{Tol--	.0040	.0040	.0040	.0040	.0040	.0040	.0040
Class 4, pitch diameter-----	{Max--	.9479	1.0104	1.0729	1.1354	1.1979	1.2604	1.3229
	{Tol--	.0020	.0020	.0020	.0020	.0020	.0020	.0020

Footnotes at end of table.

TABLE 88.—Limiting dimensions and tolerances, classes 1, 2, 3, and 4 fits, American National 12-pitch thread series—Continued

Dimensions and tolerances ¹	Size, (inches)							
	1½ ³	1¾	2	2¼	2½	2¾	3	
1	17	18	19	20	21	22	23	
BOLTS AND SCREWS								
Class 1, major diameter-----	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>	
	Max..	1. 4976	1. 7476	1. 9976	2. 2476	2. 4976	2. 7476	2. 9976
	Min..	1. 4818	1. 7318	1. 9818	2. 2318	2. 4818	2. 7318	2. 9818
Classes 2, 3, and 4, major diameter-----	Tol..	. 0158	. 0158	. 0158	. 0158	. 0158	. 0158	. 0158
	Max..	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500	3. 0000
	Min..	1. 4888	1. 7388	1. 9888	2. 2388	2. 4888	2. 7388	2. 9888
Class 1, minor diameter-----	Tol..	. 0112	. 0112	. 0112	. 0112	. 0112	. 0112	. 0112
	Max. ⁴ ..	1. 3954	1. 6454	1. 8954	2. 1454	2. 3954	2. 6454	2. 8954
	Max. ⁴ ..	1. 3978	1. 6478	1. 8978	2. 1478	2. 3978	2. 6478	2. 8978
Class 1, loose fit, pitch diameter-----	Max..	1. 4435	1. 6935	1. 9435	2. 1935	2. 4435	2. 6935	2. 9435
	Min..	1. 4356	1. 6829	1. 9329	2. 1823	2. 4323	2. 6823	2. 9323
	Tol..	. 0079	. 0106	. 0106	. 0112	. 0112	. 0112	. 0112
Class 2, free fit, pitch diameter-----	Max..	1. 4459	1. 6959	1. 9459	2. 1959	2. 4459	2. 6959	2. 9459
	Min..	1. 4403	1. 6882	1. 9382	2. 1876	2. 4376	2. 6876	2. 9376
	Tol..	. 0056	. 0077	. 0077	. 0083	. 0083	. 0083	. 0083
Class 3, medium fit, pitch diameter-----	Max..	1. 4459	1. 6959	1. 9459	2. 1959	2. 4459	2. 6959	2. 9459
	Min..	1. 4419	1. 6896	1. 9396	2. 1890	2. 4390	2. 6890	2. 9390
	Tol..	. 0040	. 0063	. 0063	. 0069	. 0069	. 0069	. 0069
Class 4, close fit, pitch diameter-----	Max..	1. 4464	1. 6964	1. 9464	2. 1964	2. 4464	2. 6964	2. 9464
	Min..	1. 4444	1. 6933	1. 9433	2. 1930	2. 4430	2. 6930	2. 9430
	Tol..	. 0020	. 0031	. 0031	. 0034	. 0034	. 0034	. 0034
NUTS AND TAPPED HOLES								
Classes 1, 2, 3, and 4, major diameter_Min. ⁵ ..	1. 5000	1. 7500	2. 0000	2. 2500	2. 5000	2. 7500	3. 0000	
Classes 1, 2, 3, and 4, minor diameter-----	Max..	1. 4188	1. 6688	1. 9188	2. 1688	2. 4188	2. 6688	2. 9188
	Min..	1. 4098	1. 6598	1. 9098	2. 1598	2. 4098	2. 6598	2. 9098
	Tol..	. 0090	. 0090	. 0090	. 0090	. 0090	. 0090	. 0090
Classes 1, 2, 3, and 4, pitch diameter_Min..	1. 4459	1. 6959	1. 9459	2. 1959	2. 4459	2. 6959	2. 9459	
Class 1, pitch diameter-----	Max..	1. 4538	1. 7065	1. 9565	2. 2071	2. 4571	2. 7071	2. 9571
	Tol..	. 0079	. 0106	. 0106	. 0112	. 0112	. 0112	. 0112
Class 2, pitch diameter-----	Max..	1. 4515	1. 7036	1. 9536	2. 2042	2. 4542	2. 7042	2. 9542
	Tol..	. 0056	. 0077	. 0077	. 0083	. 0083	. 0083	. 0083
Class 3, pitch diameter-----	Max..	1. 4499	1. 7022	1. 9522	2. 2028	2. 4528	2. 7028	2. 9528
	Tol..	. 0040	. 0063	. 0063	. 0069	. 0069	. 0069	. 0069
Class 4, pitch diameter-----	Max..	1. 4479	1. 6990	1. 9490	2. 1993	2. 4493	2. 6993	2. 9493
	Tol..	. 0020	. 0031	. 0031	. 0034	. 0034	. 0034	. 0034

¹ Tolerances are based on a length of engagement of 1 inch.

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

³ Standard size screw and nut of the American national fine-thread series.

⁴ 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 $\frac{1}{8} \times p$, and may be determined by subtracting 0.0541 inch from the minimum pitch diameter of the screw.

⁵ Dimensions for the minimum major diameter of the nut correspond to the basic flat, ($\frac{1}{4} \times p$), 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 $\frac{1}{4} \times p$, and may be determined by adding 0.0662 inch to the maximum pitch diameter of the nut.

II. SCREW THREADS OF SPECIAL DIAMETERS, PITCHES, AND LENGTHS OF ENGAGEMENT

For threaded parts such as hub and radiator caps in the automotive industry, threaded collars on machine tools, etc., where the diameters are larger, the pitches finer, and the lengths of engagement shorter than for bolt and nut practice Tables 27, 28, 29, 30, and 31 are arranged herein, and are intended to cover all practical combinations of diameter, pitch, length of engagement, and class of fit. The use of these tables instead of the application of formulas to determine limiting dimensions of a special thread facilitates placing dimensions on drawings. Also, in cases of special threads of the same diameter, pitch, and class of fit, but slightly different lengths of engagement, the threads may be gaged by a single set of gages, as identical pitch diameter tolerances will be applied.

RULES FOR USE OF TABLES.—For consistent application of these pitch-diameter tolerance tables to all cases, adherence to the following rules relative to the use of the tables is necessary:

1. All thread dimensions of threads of special diameters, pitches, and lengths of engagement, except pitch diameter tolerances, are derived from Table 27. Pitch diameter tolerances are taken from Tables 28, 29, 30, and 31, depending upon the class of fit required.

Tolerances on pitch diameter corresponding to major diameters between those for which values are given in the tables shall be those of the next larger diameter.

2. Tolerances on pitch diameter for pitches between those for which values are given in the tables shall be those of the next coarser pitch, except that for screws having 80, 72, 44, 13, 11, 9, 7, 5, or 4½ threads per inch, lengths of engagement of one and one-half diameters or less, and diameters less than the standard diameters for the respective pitches as given in Section III² for standard sizes and pitches, the tolerances given in Section III shall be used

3. Tolerances on pitch diameter for pitches coarser than 4 threads per inch shall be the same as those for 4 threads per inch.

4. Tolerances on pitch diameter when the length of engagement is ½, or 1½, inches for 12 threads per inch and finer, or 1, or 3, inches for pitches coarser than 12 threads per inch, shall correspond to the interval of which these are the upper limits.

5. Tolerances on pitch diameter for lengths of engagement greater than those for which values are given shall be the maximum values listed for the pitch concerned.

Example: ¾ inch, 16-thread, class 1, with allowance on screw, one-half inch length of engagement:

From Table 28:

Pitch diameter tolerance.....=0.0095

Also from Table 27, for the screw:

Maximum major diameter=3.2500-0.0018=3.2482

Minimum major diameter =3.2482- .0126=3.2356

Maximum minor diameter=3.2500- .0785=3.1715

Maximum pitch diameter =3.2500- .0424=3.2076

Minimum pitch diameter =3.2076- .0095=3.1981

And for the nut:

Minimum major diameter.....=3.2500

Minimum minor diameter =3.2500- .0677=3.1823

Maximum minor diameter=3.1823+ .0068=3.1891

Minimum pitch diameter =3.2500- .0406=3.2094

Maximum pitch diameter =3.2094+ .0095=3.2189

² Of the 1928 report.

TABLE 27.—Thread dimensions of special screw threads, classes 1, 2, 3, and 4 fls

Threads per inch	SCREW SIZES				NUT SIZES						
	Major diameter				Minor diameter, maximum						
	Maximum		Tolerance		Class 1		Classes 2, 3, 4				
	Class 1	Classes 2, 3, 4	Class 1	Classes 2, 3, 4	Class 1	Classes 2, 3, 4	Class 1	Classes 2, 3, 4			
64	Inch 0.0007	Inch 0.0038	Inch 0.0052	Inch 0.0108	Inch 0.0101	Inch 0.0100	Inch 0.0199	Inch 0.0192	Inch 0.0017	Inch 0.0101	Inch 0.0000
56	0.0008	0.0040	0.0056	0.0124	0.0116	0.114	0.0227	0.0219	0.0193	0.0116	0.0000
48	0.0009	0.0044	0.0062	0.0144	0.0135	0.133	0.0265	0.0256	0.0223	0.0135	0.0000
40	0.0010	0.0048	0.0068	0.0172	0.0162	0.160	0.0317	0.0307	0.0271	0.0162	0.0000
36	0.0011	0.0050	0.0072	0.0191	0.0180	0.178	0.0352	0.0341	0.0301	0.0180	0.0000
32	0.0011	0.0054	0.0076	0.0214	0.0203	0.201	0.0394	0.0383	0.0338	0.0203	0.0000
28	0.0012	0.0062	0.0080	0.0244	0.232	0.230	0.0450	0.438	0.387	0.232	0.0000
24	0.0013	0.0066	0.0092	0.284	0.271	0.268	0.0524	0.511	0.451	0.271	0.0000
20	0.0015	0.0072	0.0102	0.340	0.325	0.322	0.0628	0.613	0.541	0.325	0.0000
18	0.0016	0.0082	0.0114	0.377	0.361	0.358	0.0698	0.682	0.601	0.361	0.0000
16	0.0018	0.0090	0.0126	0.424	0.406	0.402	0.0785	0.767	0.677	0.406	0.0000
14	0.0021	0.0098	0.0140	0.485	0.464	0.460	0.0897	0.876	0.773	0.464	0.0000
12	0.0024	0.0112	0.0158	0.565	0.541	0.536	0.1046	1.022	0.902	0.541	0.0000
10	0.0028	0.0128	0.0184	0.678	0.650	0.644	1.255	1.227	1.083	0.650	0.0000
8	0.0034	0.0152	0.0222	0.846	0.812	0.805	1.568	1.534	1.353	0.812	0.0000
6	0.0044	0.0202	0.0290	1.127	1.083	1.074	2.089	2.045	1.804	1.083	0.0000
4	0.0064	0.0280	0.0408	1.688	1.624	1.611	3.131	3.067	2.706	1.624	0.0000

To obtain maximum dimensions for major, pitch, and minor diameters, subtract the values in the "maximum" columns from the basic major diameter.
Apply tolerances minus.
See Tables 28, 29, 30, and 31 for pitch diameter tolerances.

To obtain minimum dimensions for minor, pitch, and major diameters, subtract the values in the "minimum" columns from the basic major diameter.
Apply tolerances plus.
See Tables 28, 29, 30, and 31 for pitch diameter tolerances.

Threads per inch

¹ Dimensions given for the maximum minor diameter of the screw are figured to the intersection of the worm 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 $\frac{1}{4} \times p$, 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 ($\frac{1}{4} \times p$), 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 $\frac{1}{4} \times p$, and may be determined by adding $1\frac{1}{4} \times h$ (or $0.7939p$) to the maximum pitch diameter of the nut.

TABLE 28.—Pitch diameter tolerances for special screw threads, class 1, loose fit

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1/16 inch	1/8 inch	3/16 inch	1/4 inch	5/16 inch	3/8 inch	1/2 inch
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
64	-----	1/2	0. 0026	0. 0026	0. 0034	0. 0038	0. 0042	0. 0044	0. 0047
56	{	1/2	. 0028	. 0028	. 0034	. 0038	. 0044	. 0046	. 0049
		1 1/2	. 0052	. 0054	. 0055	. 0056	. 0056	. 0056	. 0056
48	{	1/2	. 0031	. 0031	. 0034	. 0038	. 0046	. 0048	. 0051
		1 1/2	. 0054	. 0056	. 0057	. 0057	. 0057	. 0057	. 0057
40	{	1/2	. 0034	¹ . 0034	. 0034	. 0038	. 0046	. 0051	. 0054
		1 1/2	. 0057	. 0057	. 0057	. 0057	. 0057	. 0057	. 0057
36	{	1/2	-----	. 0036	. 0036	. 0038	. 0046	. 0051	. 0056
		1 1/2	-----	. 0057	. 0057	. 0057	. 0057	. 0057	. 0057
32	{	1/2	-----	. 0038	. 0038	. 0038	. 0046	. 0051	. 0057
		1 1/2	-----	. 0057	. 0057	. 0057	. 0057	. 0057	. 0057
28	{	1/2	-----	-----	. 0043	² . 0043	. 0046	. 0051	. 0057
		1 1/2	-----	-----	. 0057	. 0057	. 0057	. 0057	. 0057
24	{	1/2	-----	-----	. 0046	. 0046	² . 0046	. 0051	. 0057
		1 1/2	-----	-----	. 0057	. 0057	. 0057	. 0057	. 0057
20	{	1/2	-----	-----	. 0051	¹ . 0051	. 0051	² . 0051	. 0057
		1 1/2	3	-----	. 0057	. 0057	. 0057	. 0057	. 0057
18	{	1/2	-----	-----	-----	. 0057	. 0057	. 0057	. 0057
		1 1/2	3	-----	-----	-----	. 0102	. 0104	. 0106
16	{	1/2	-----	-----	-----	. 0063	¹ . 0063	. 0063	. 0063
		1 1/2	3	-----	-----	-----	. 0063	. 0063	² . 0063
14	{	1/2	-----	-----	-----	-----	. 0070	. 0070	. 0070
		1 1/2	3	-----	-----	-----	-----	. 0111	. 0113
12	{	1/2	-----	-----	-----	-----	. 0075	. 0077	. 0079
		1 1/2	3	-----	-----	-----	-----	. 0079	. 0079
10	{	1	-----	-----	-----	-----	-----	. 0087	¹ . 0092
		3	6	-----	-----	-----	-----	. 0117	. 0120
8	{	1	-----	-----	-----	-----	-----	. 0167	. 0171
		3	6	-----	-----	-----	-----	-----	. 0095
6	{	1	-----	-----	-----	-----	-----	-----	. 0125
		3	6	-----	-----	-----	-----	-----	. 0175
	{	1	-----	-----	-----	-----	-----	-----	. 0109
		3	6	-----	-----	-----	-----	-----	. 0139
			-----	-----	-----	-----	-----	-----	. 0189

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

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

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 28.—Pitch diameter tolerances for special screw threads, class 1, loose fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1 inch	1½ inches	2 inches	3 inches	4 inches	6 inches	8 inches
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
64		½	0.0050	0.0052					
56	{	½	.0052	.0056					
		1½	.0056	.0056					
48	{	½	.0054	.0058	0.0062				
		1½	.0062	.0062	.0062				
40	{	½	.0057	.0061	.0065				
		1½	.0068	.0068	.0068				
36	{	½	.0058	.0063	.0067	0.0072			
		1½	.0070	.0072	.0072	.0072			
32	{	½	.0060	.0065	.0069	.0075			
		1½	.0070	.0076	.0076	.0076			
28	{	½	.0063	.0067	.0071	.0077	0.0083		
		1½	.0070	.0079	.0086	.0086	.0086		
24	{	½	.0066	.0070	.0074	.0080	.0086		
		1½	.0070	.0079	.0089	.0092	.0092		
20	{	½	.0070	.0074	.0078	.0084	.0090	0.0099	
		1½	.0070	.0079	.0093	.0099	.0102	.0102	
		3	.0102	.0102	.0102	.0102	.0102	.0102	
18	{	½	.0070	.0077	.0080	.0087	.0092	.0101	0.0109
		1½	.0070	.0079	.0095	.0102	.0107	.0114	.0114
		3	.0112	.0114	.0114	.0114	.0114	.0114	.0114
16	{	½	.0070	.0079	.0083	.0090	.0095	.0104	.0112
		1½	.0070	.0079	.0098	.0105	.0110	.0119	.0126
		3	.0115	.0120	.0123	.0126	.0126	.0126	.0126
14	{	½	.0070	.0079	.0087	.0093	.0099	.0108	.0115
		1½	.0070	.0079	.0102	.0108	.0114	.0123	.0130
		3	.0119	.0123	.0127	.0133	.0139	.0140	.0140
12	{	½	.0079	.0079	.0091	.0097	.0103	.0112	.0119
		1½	.0079	.0079	.0106	.0112	.0118	.0127	.0134
		3	.0123	.0127	.0131	.0137	.0143	.0152	.0158
10	{	1	.0093	.0098	.0102	.0108	.0113	.0122	.0130
		3	.0123	.0128	.0132	.0138	.0143	.0152	.0160
		6	.0173	.0178	.0181	.0184	.0184	.0184	.0184
8	{	1	.0111	.0111	.0111	.0115	.0121	.0130	.0137
		3	.0131	.0135	.0139	.0145	.0151	.0160	.0167
		6	.0181	.0185	.0189	.0195	.0201	.0210	.0217
6	{	1	.0112	.0116	.0120	.0126	.0132	.0141	.0148
		3	.0142	.0145	.0150	.0156	.0162	.0171	.0178
		6	.0192	.0196	.0200	.0206	.0212	.0221	.0228
4	{	1	.0130	.0134	.0138	.0145	.0150	.0159	.0167
		3	.0160	.0164	.0168	.0204	.0204	.0204	.0204
		6	.0210	.0215	.0218	.0225	.0230	.0239	.0247

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

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

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 28.—Pitch diameter tolerances for special screw threads, class 1, loose fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	10 inches	12 inches	14 inches	16 inches	18 inches	20 inches	24 inches
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
18	1/2	3/2	0.0114						
	1/2	1 1/2	.0114						
	1 1/2	3	.0114						
16	1/2	3/2	.0118	0.0124					
	1/2	1 1/2	.0126	.0126					
	1 1/2	3	.0126	.0126					
14	1/2	3/2	.0122	.0128	0.0133	0.0138			
	1/2	1 1/2	.0137	.0140	.0140	.0140			
	1 1/2	3	.0140	.0140	.0140	.0140			
12	1/2	3/2	.0126	.0132	.0138	.0143	0.0148	0.0152	
	1/2	1 1/2	.0141	.0147	.0153	.0158	.0158	.0158	
	1 1/2	3	.0158	.0158	.0158	.0158	.0158	.0158	
10	1	3	.0136	.0142	.0148	.0153	.0158	.0163	0.0171
	1	3	.0166	.0172	.0178	.0183	.0184	.0184	.0184
	3	6	.0184	.0184	.0184	.0184	.0184	.0184	.0184
8	1	3	.0144	.0150	.0156	.0161	.0166	.0170	.0179
	1	3	.0174	.0180	.0186	.0191	.0196	.0200	.0209
	3	6	.0222	.0222	.0222	.0222	.0222	.0222	.0222
6	1	3	.0155	.0161	.0166	.0172	.0176	.0181	.0190
	1	3	.0185	.0191	.0196	.0202	.0206	.0211	.0220
	3	6	.0235	.0241	.0246	.0252	.0256	.0261	.0270
4	1	3	.0173	.0179	.0185	.0190	.0195	.0199	.0208
	1	3	.0204	.0209	.0215	.0220	.0225	.0229	.0238
	3	6	.0253	.0259	.0265	.0270	.0275	.0279	.0288

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 29.—Pitch diameter tolerances for special screw threads, class 2, free fit

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1/16 inch	1/8 inch	3/16 inch	1/4 inch	5/16 inch	3/8 inch	1/2 inch
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
64	-----	1/2	0. 0019	0. 0019	0. 0024	0. 0027	0. 0030	0. 0032	0. 0035
56	{----- 1/2	1/2 1 1/2	. 0020 . 0038	. 0020 . 0040	. 0024 . 0040	. 0027 . 0040	. 0031 . 0040	. 0033 . 0040	. 0036 . 0040
48	{----- 1/2	1/2 1 1/2	. 0022 . 0039	. 0022 . 0041	. 0024 . 0041	. 0027 . 0041	. 0032 . 0041	. 0034 . 0041	. 0037 . 0041
40	{----- 1/2	1/2 1 1/2	. 0024 . 0041	¹ . 0024 . 0041	. 0024 . 0041	. 0027 . 0041	. 0033 . 0041	. 0035 . 0041	. 0038 . 0041
36	{----- 1/2	1/2 1 1/2	----- -----	. 0025 . 0041	. 0025 . 0041	. 0027 . 0041	. 0033 . 0041	. 0036 . 0041	. 0039 . 0041
32	{----- 1/2	1/2 1 1/2	----- -----	. 0027 . 0041	. 0027 . 0041	. 0027 . 0041	. 0033 . 0041	. 0036 . 0041	. 0040 . 0041
28	{----- 1/2	1/2 1 1/2	----- -----	----- -----	. 0031 . 0041	² . 0031 . 0041	. 0033 . 0041	. 0036 . 0041	. 0041 . 0041
24	{----- 1/2	1/2 1 1/2	----- -----	----- -----	. 0033 . 0041	. 0033 . 0041	² . 0033 . 0041	. 0036 . 0041	. 0041 . 0041
20	{----- 1/2	1/2 1 1/2	----- -----	----- -----	. 0036 . 0041	¹ . 0036 . 0041	. 0036 . 0041	² . 0036 . 0041	. 0041 . 0041
18	{----- 1 1/2	1/2 3	----- -----	----- -----	----- -----	. 0039 . 0041 . 0079	. 0041 . 0041 . 0081	. 0041 . 0041 . 0082	. 0041 . 0041 . 0082
16	{----- 1 1/2	1/2 3	----- -----	----- -----	----- -----	. 0040 . 0045 . 0080	¹ . 0045 . 0045 . 0082	. 0045 . 0045 . 0084	. 0045 ² . 0045 . 0087
14	{----- 1 1/2	1/2 3	----- -----	----- -----	----- -----	----- -----	. 0045 . 0049 . 0084	. 0048 . 0049 . 0086	. 0049 . 0049 . 0089
12	{----- 1 1/2	1/2 3	----- -----	----- -----	----- -----	----- -----	. 0046 . 0056 . 0086	. 0048 . 0056 . 0088	. 0051 . 0056 . 0091
10	{----- 3	1 3 6	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0056 . 0088 . 0128	¹ . 0064 . 0091 . 0128
8	{----- 3	1 3 6	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0060 . 0090 . 0140	. 0064 . 0093 . 0143
6	{----- 3	1 3 6	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0068 . 0098 . 0148

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

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

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 29.—Pitch diameter tolerances for special screw threads, class 2, free fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1 inch	1½ inches	2 inches	3 inches	4 inches	6 inches	8 inches
	<i>Inches</i>	<i>Inches</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>
64		½	0.0038						
56	{	½	.0038	0.0040					
		1½	.0040	.0040					
48	{	½	.0039	.0044					
		1½	.0044	.0044					
40	{	½	.0041	.0045	0.0048				
		1½	.0048	.0048	.0048				
36	{	½	.0042	.0046	.0050				
		1½	.0049	.0050	.0050				
32	{	½	.0043	.0047	.0051	0.0054			
		1½	.0049	.0054	.0054	.0054			
28	{	½	.0044	.0048	.0052	.0058	0.0062		
		1½	.0049	.0056	.0062	.0062	.0062		
24	{	½	.0045	.0050	.0054	.0060	.0065		
		1½	.0049	.0056	.0066	.0066	.0066		
20	{	½	.0047	.0052	.0056	.0062	.0067	0.0072	
		1½	.0049	.0056	.0071	.0072	.0072	.0072	
18	{	½	.0049	.0053	.0057	.0063	.0069	.0078	0.0082
		1½	.0049	.0056	.0072	.0078	.0082	.0082	.0082
		3	.0082	.0082	.0082	.0082	.0082	.0082	.0082
16	{	½	.0049	.0054	.0058	.0065	.0070	.0079	.0087
		1½	.0049	.0056	.0073	.0080	.0085	.0090	.0090
		3	.0090	.0090	.0090	.0090	.0090	.0090	.0090
14	{	½	.0049	.0056	.0060	.0066	.0072	.0081	.0088
		1½	.0049	.0056	.0075	.0081	.0087	.0096	.0098
		3	.0092	.0096	.0098	.0098	.0098	.0098	.0098
12	{	½	.0054	.0056	.0062	.0068	.0074	.0083	.0090
		1½	.0056	.0056	.0077	.0083	.0089	.0098	.0105
		3	.0094	.0098	.0100	.0108	.0112	.0112	.0112
10	{	1	.0064	.0066	.0070	.0076	.0082	.0091	.0098
		3	.0094	.0098	.0100	.0108	.0112	.0121	.0128
		3	.0128	.0128	.0128	.0128	.0128	.0128	.0128
8	{	1	.0076	.0076	.0076	.0080	.0085	.0094	.0102
		3	.0095	.0100	.0104	.0110	.0115	.0124	.0132
		3	.0145	.0150	.0152	.0152	.0152	.0152	.0152
6	{	1	.0071	.0075	.0079	.0085	.0091	.0100	.0107
		3	.0101	.0101	.0109	.0115	.0121	.0130	.0137
		3	.0151	.0155	.0159	.0165	.0171	.0180	.0187
4	{	1	.0080	.0084	.0088	.0095	.0100	.0109	.0117
		3	.0110	.0114	.0118	.0140	.0140	.0140	.0147
		3	.0160	.0164	.0168	.0175	.0180	.0189	.0197

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

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

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 29.—Pitch diameter tolerances for special screw threads, class 2, free fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	10 inches	12 inches	14 inches	16 inches	18 inches	20 inches	24 inches
	<i>Inches</i>	<i>Inches</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>
16.....	1/2	1/2	0.0090						
	1/2	1 1/2	.0090						
	1 1/2	3	.0090						
14.....	1/2	1/2	.0095	0.0098					
	1/2	1 1/2	.0098	.0098					
	1 1/2	3	.0098	.0098					
12.....	1/2	1/2	.0097	.0103	0.0109	0.0112			
	1/2	1 1/2	.0112	.0112	.0112	.0112			
	1 1/2	3	.0112	.0112	.0112	.0112			
10.....	1	1	.0105	.0111	.0116	.0122	0.0126	0.0128	
	1	3	.0128	.0128	.0128	.0128	.0128	.0128	
	3	6	.0128	.0128	.0128	.0128	.0128	.0128	
8.....	1	1	.0109	.0115	.0120	.0125	.0130	.0135	0.0143
	1	3	.0139	.0145	.0150	.0152	.0152	.0152	.0152
	3	6	.0152	.0152	.0152	.0152	.0152	.0152	.0152
6.....	1	1	.0114	.0120	.0126	.0131	.0136	.0140	.0149
	1	3	.0144	.0150	.0156	.0161	.0166	.0170	.0179
	3	6	.0194	.0200	.0202	.0202	.0202	.0202	.0202
4.....	1	1	.0123	.0129	.0135	.0140	.0145	.0149	.0158
	1	3	.0153	.0159	.0165	.0170	.0175	.0199	.0188
	3	6	.0203	.0209	.0215	.0220	.0225	.0229	.0238

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 30.—Pitch diameter tolerances for special screw threads, class 3, medium fit

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—							
	From—	To and including—	1/16 inch	1/8 inch	3/16 inch	1/4 inch	5/16 inch	3/8 inch	1/2 inch	3/4 inch
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch
64	{ 1/2	1/2 1 1/2	0. 0014 . 0030	0. 0014 . 0030	0. 0017 . 0030	0. 0019 . 0030	0. 0023 . 0030	0. 0025 . 0030	0. 0028 . 0030	0. 0028 . 0030
56	{ 1/2	1/2 1 1/2	. 0015 . 0030	. 0015 . 0030	. 0017 . 0030	. 0019 . 0030	. 0024 . 0030	. 0026 . 0030	. 0029 . 0030	. 0029 . 0030
48	{ 1/2	1/2 1 1/2	. 0016 . 0030	. 0016 . 0030	. 0017 . 0030	. 0019 . 0030	. 0024 . 0030	. 0026 . 0030	. 0029 . 0030	. 0029 . 0030
40	{ 1/2	1/2 1 1/2	. 0017 . 0030	. 0017 . 0030	. 0017 . 0030	. 0019 . 0030	. 0024 . 0030	. 0026 . 0030	. 0030 . 0030	. 0030 . 0030
36	{ 1/2	1/2 1 1/2	----- -----	. 0018 . 0030	. 0018 . 0030	. 0019 . 0030	. 0024 . 0030	. 0026 . 0030	. 0030 . 0030	. 0030 . 0030
32	{ 1/2	1/2 1 1/2	----- -----	. 0019 . 0030	. 0019 . 0030	. 0019 . 0030	. 0024 . 0030	. 0026 . 0030	. 0030 . 0030	. 0030 . 0030
28	{ 1/2	1/2 1 1/2	----- -----	----- -----	. 0022 . 0030	² . 0022 . 0030	. 0024 . 0030	. 0026 . 0030	. 0030 . 0030	. 0030 . 0030
24	{ 1/2	1/2 1 1/2	----- -----	----- -----	. 0024 . 0030	. 0024 . 0030	² . 0024 . 0030	. 0026 . 0030	. 0030 . 0030	. 0030 . 0030
20	{ 1/2 1 1/2	1/2 1 1/2 3	----- ----- -----	----- ----- -----	. 0025 . 0030 . 0065	¹ . 0026 . 0030 . 0066	. 0026 . 0030 . 0068	² . 0026 . 0030 . 0070	. 0030 . 0030 . 0071	. 0030 . 0030 . 0071
18	{ 1/2 1 1/2	1/2 1 1/2 3	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0027 . 0030 . 0067	. 0030 . 0030 . 0069	. 0030 . 0030 . 0071	. 0030 . 0030 . 0071
16	{ 1/2 1 1/2	1/2 1 1/2 3	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0028 . 0032 . 0068	¹ . 0032 . 0032 . 0070	. 0032 . 0032 . 0071	² . 0032 . 0071
14	{ 1/2 1 1/2	1/2 1 1/2 3	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0032 . 0036 . 0071	. 0036 . 0036 . 0071	. 0036 . 0036 . 0071
12	{ 1/2 1 1/2	1/2 1 1/2 3	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0032 . 0040 . 0071	. 0036 . 0040 . 0071	. 0040 . 0040 . 0071
10	{ 1 3	1 3 6	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0040 . 0071 . 0120	¹ . 0045 . 0071 . 0123
8	{ 1 3	1 3 6	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0042 . 0071 . 0122	. 0045 . 0071 . 0125
6	{ 1 3	1 3 6	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	----- ----- -----	. 0048 . 0071 . 0128

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

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

TABLE 30.—Pitch diameter tolerances for special screw threads, class 3, medium fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1 inch	1½ inches	2 inches	3 inches	4 inches	6 inches	8 inches
	<i>Inches</i>	<i>Inches</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>
64	½	½	0.0031	0.0036	0.0038				
	½	1½	.0036	.0038	.0038				
56	½	½	.0032	.0036	.0040				
	½	1½	.0036	.0040	.0040				
48	½	½	.0032	.0037	.0041	0.0044			
	½	1½	.0036	.0040	.0044	.0044			
40	½	½	.0033	.0037	.0041	.0048			
	½	1½	.0036	.0040	.0048	.0048			
36	½	½	.0033	.0038	.0042	.0048	0.0050		
	½	1½	.0036	.0040	.0050	.0050	.0050		
32	½	½	.0034	.0038	.0042	.0048	.0054		
	½	1½	.0036	.0040	.0054	.0054	.0054		
28	½	½	.0034	.0039	.0043	.0049	.0054	0.0062	
	½	1½	.0036	.0040	.0058	.0062	.0062	.0062	
24	½	½	.0035	.0040	.0044	.0050	.0055	.0064	
	½	1½	.0036	.0040	.0059	.0065	.0066	.0066	
20	½	½	.0036	.0040	.0045	.0051	.0056	.0065	0.0072
	1½	1½	.0036	.0040	.0060	.0066	.0071	.0072	.0072
	1½	3	.0071	.0071	.0072	.0072	.0072	.0072	.0072
18	½	½	.0036	.0040	.0045	.0051	.0057	.0066	.0073
	1½	1½	.0036	.0040	.0060	.0066	.0072	.0081	.0082
	1½	3	.0071	.0071	.0082	.0082	.0082	.0082	.0082
16	½	½	.0036	.0040	.0046	.0052	.0058	.0066	.0074
	1½	1½	.0036	.0040	.0061	.0067	.0073	.0081	.0089
	1½	3	.0071	.0071	.0084	.0090	.0090	.0090	.0090
14	½	½	.0036	.0040	.0047	.0053	.0058	.0067	.0075
	1½	1½	² .0036	.0040	.0062	.0068	.0073	.0082	.0090
	1½	3	.0071	.0071	.0084	.0092	.0098	.0098	.0098
12	½	½	.0040	.0040	.0048	.0054	.0059	.0068	.0076
	1½	1½	.0040	² .0040	.0063	.0069	.0074	.0083	.0091
	1½	3	.0071	.0071	.0084	.0092	.0099	.0108	.0112
10	1	1	.0046	.0050	.0054	.0060	.0066	.0075	.0082
	3	3	.0071	.0071	² .0084	.0092	.0099	.0108	.0112
	3	6	.0126	.0128	.0128	.0128	.0128	.0128	.0128
8	1	1	¹ .0054	.0054	.0056	.0062	.0068	.0077	.0084
	3	3	.0071	.0071	.0086	² .0092	.0099	.0108	.0114
	3	6	.0128	.0132	.0136	.0142	.0148	.0152	.0152
6	1	1	.0054	.0055	.0059	.0065	.0070	.0079	.0087
	3	3	.0071	¹ .0071	.0089	.0095	.0100	.0109	.0117
	3	6	.0130	.0135	.0139	.0145	.0150	.0159	.0167
4	1	1	.0055	.0059	.0063	.0070	.0075	.0084	.0092
	3	3	.0085	.0089	.0093	¹ .0097	.0105	.0114	.0122
	3	6	.0135	.0139	.0143	.0150	.0155	.0164	.0172

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

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 30.—Pitch diameter tolerances for special screw threads, class 3, medium fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	10 inches	12 inches	14 inches	16 inches	18 inches	20 inches	24 inches
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
18	$\frac{1}{2}$ $1\frac{1}{2}$	$\frac{1}{2}$ $1\frac{1}{2}$ 3	0. 0080 <i>. 0082</i> <i>. 0082</i>						
16	$\frac{1}{2}$ $1\frac{1}{2}$	$\frac{1}{2}$ $1\frac{1}{2}$ 3	. 0081 <i>. 0090</i> <i>. 0090</i>	0. 0087 <i>. 0090</i> <i>. 0090</i>					
14	$\frac{1}{2}$ $1\frac{1}{2}$	$\frac{1}{2}$ $1\frac{1}{2}$ 3	. 0082 <i>. 0097</i> <i>. 0098</i>	. 0088 <i>. 0098</i> <i>. 0098</i>	0. 0093 <i>. 0098</i> <i>. 0098</i>	0. 0098 <i>. 0098</i> <i>. 0098</i>			
12	$\frac{1}{2}$ $1\frac{1}{2}$	$\frac{1}{2}$ $1\frac{1}{2}$ 3	. 0083 <i>. 0098</i> <i>. 0112</i>	. 0089 <i>. 0104</i> <i>. 0112</i>	. 0094 <i>. 0109</i> <i>. 0112</i>	. 0099 <i>. 0112</i> <i>. 0112</i>	0. 0104 <i>. 0112</i> <i>. 0112</i>	0. 0109 <i>. 0112</i> <i>. 0112</i>	
10	1 3	1 3 6	. 0089 <i>. 0119</i> <i>. 0128</i>	. 0095 <i>. 0125</i> <i>. 0128</i>	. 0101 <i>. 0128</i> <i>. 0128</i>	. 0106 <i>. 0128</i> <i>. 0128</i>	. 0111 <i>. 0128</i> <i>. 0128</i>	. 0115 <i>. 0128</i> <i>. 0128</i>	0. 0124 <i>. 0128</i> <i>. 0128</i>
8	1 3	1 3 6	. 0091 <i>. 0121</i> <i>. 0152</i>	. 0097 <i>. 0127</i> <i>. 0152</i>	. 0102 <i>. 0132</i> <i>. 0152</i>	0108 <i>. 0138</i> <i>. 0152</i>	. 0113 <i>. 0143</i> <i>. 0152</i>	. 0117 <i>. 0147</i> <i>. 0152</i>	. 0126 <i>. 0152</i> <i>. 0152</i>
6	1 3	1 3 6	. 0094 <i>. 0124</i> <i>. 0174</i>	. 0100 <i>. 0130</i> <i>. 0180</i>	. 0105 <i>. 0135</i> <i>. 0185</i>	. 0110 <i>. 0140</i> <i>. 0190</i>	. 0115 <i>. 0145</i> <i>. 0195</i>	. 0120 <i>. 0150</i> <i>. 0200</i>	. 0128 <i>. 0158</i> <i>. 0202</i>
4	1 3	1 3 6	. 0098 <i>. 0128</i> <i>. 0178</i>	. 0104 <i>. 0134</i> <i>. 0184</i>	. 0110 <i>. 0140</i> <i>. 0190</i>	. 0115 <i>. 0145</i> <i>. 0195</i>	. 0120 <i>. 0150</i> <i>. 0200</i>	. 0124 <i>. 0154</i> <i>. 0204</i>	. 0133 <i>. 0163</i> <i>. 0213</i>

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a closer fit, shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 31.—Pitch diameter tolerances for special screw threads, class 4, close fit

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1/16 inch	1/8 inch	3/16 inch	1/4 inch	5/16 inch	3/8 inch	1/2 inch
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
64	1/2	1/2	0.0007	0.0007	0.0009	0.0010	0.0012	0.0013	0.0014
	1 1/2	1 1/2	.0015	.0015	.0015	.0015	0.0015	.0015	.0015
56	1/2	1/2	.0007	.0007	.0009	.0010	.0012	.0013	.0014
	1 1/2	3	.0015	.0015	.0015	.0015	.0015	.0015	.0015
48	1/2	1/2	.0008	.0008	.0009	.0010	.0012	.0013	.0015
	1 1/2	3	.0015	.0015	.0015	.0015	.0015	.0015	.0015
40	1/2	1/2	.0009	¹ .0009	.0009	.0010	.0012	.0013	.0015
	1 1/2	3	.0015	.0015	.0015	.0015	.0015	.0015	.0015
36	1/2	1/2		.0009	.0009	.0010	.0012	.0013	.0015
	1 1/2	3		.0015	.0015	.0015	.0015	.0015	.0015
32	1/2	1/2		.0010	.0010	.0010	.0012	.0013	.0015
	1 1/2	3		.0015	.0015	.0015	.0015	.0015	.0015
28	1/2	1/2			.0011	² .0011	.0012	.0013	.0015
	1 1/2	3			.0015	.0015	.0015	.0015	.0015
24	1/2	1/2			.0012	.0012	² .0012	.0013	.0015
	1 1/2	3			.0015	.0015	.0015	.0015	.0015
20	1/2	1/2			.0012	¹ .0013	.0013	² .0013	.0015
	1 1/2	3			.0015	.0015	.0015	.0015	.0015
18	1/2	1/2				.0013	.0015	.0015	.0015
	1 1/2	3				.0015	.0015	.0015	.0015
16	1/2	1/2				.0014	¹ .0016	.0016	.0016
	1 1/2	3				.0016	.0016	.0016	² .0016
14	1/2	1/2					.0016	.0018	.0018
	1 1/2	3					.0018	.0018	.0018
12	1/2	1/2					.0016	.0018	.0020
	1 1/2	3					.0020	.0020	.0020
10	1	3						.0020	¹ .0023
	3	6						.0036	.0036
8	1	3						.0021	.0023
	3	6						.0036	.0036
6	1	3							.0024
	3	6							.0036

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

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

TABLE 31.—Pitch diameter tolerances for special screw threads, class 4, close fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	1 inch	1½ inches	2 inches	3 inches	4 inches	6 inches	8 inches
	<i>Inches</i>	<i>Inches</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>
64	½	½	0.0016	0.0018	0.0020	0.0023	0.0026	0.0030	0.0034
	1½	3	.0018	.0020	.0027	.0030	.0033	.0038	.0038
56	½	½	.0016	.0018	.0020	.0023	.0026	.0030	.0034
	1½	3	.0018	.0020	.0027	.0031	.0033	.0038	.0040
48	½	½	.0016	.0018	.0020	.0023	.0026	.0031	.0034
	1½	3	.0018	.0020	.0028	.0031	.0034	.0038	.0042
40	½	½	.0016	.0018	.0021	.0024	.0027	.0031	.0035
	1½	3	.0018	.0020	.0028	.0031	.0034	.0038	.0042
36	½	½	.0017	.0019	.0021	.0024	.0027	.0031	.0035
	1½	3	.0018	.0020	.0028	.0031	.0034	.0039	.0042
32	½	½	.0017	.0019	.0021	.0024	.0027	.0031	.0035
	1½	3	.0018	.0020	.0029	.0032	.0034	.0039	.0043
28	½	½	.0017	.0019	.0021	.0024	.0027	.0032	.0036
	1½	3	.0018	.0020	.0029	.0032	.0035	.0039	.0043
24	½	½	.0018	.0020	.0022	.0025	.0028	.0032	.0036
	1½	3	.0018	.0020	.0029	.0032	.0035	.0040	.0043
20	½	½	.0018	.0020	.0022	.0025	.0028	.0033	.0036
	1½	3	.0018	.0020	.0030	.0033	.0036	.0040	.0044
18	½	½	.0018	.0020	.0023	.0026	.0028	.0033	.0037
	1½	3	.0018	.0020	.0030	.0033	.0036	.0040	.0044
16	½	½	.0018	.0020	.0023	.0026	.0029	.0033	.0037
	1½	3	.0018	.0020	.0030	.0033	.0036	.0041	.0044
14	½	½	.0018	.0020	.0023	.0026	.0029	.0034	.0038
	1½	3	.0018	.0020	.0031	.0034	.0037	.0041	.0045
12	½	½	.0020	.0020	.0024	.0027	.0030	.0034	.0038
	1½	3	.0020	.0020	.0031	.0034	.0037	.0042	.0046
10	1	3	.0023	.0023	.0027	.0030	.0033	.0037	.0041
	3	6	.0036	.0036	.0042	.0046	.0050	.0054	.0058
8	1	3	.0027	.0027	.0028	.0031	.0034	.0038	.0042
	3	6	.0036	.0036	.0043	.0046	.0050	.0054	.0058
6	1	3	.0027	.0027	.0029	.0032	.0035	.0040	.0043
	3	6	.0036	.0036	.0044	.0047	.0050	.0055	.0058
4	1	3	.0028	.0030	.0032	.0035	.0038	.0042	.0046
	3	6	.0043	.0045	.0047	.0048	.0053	.0057	.0061

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

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

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a shorter length of engagement, coarser pitch, or smaller diameter.

TABLE 31.—Pitch diameter tolerances for special screw threads, class 4, close fit—Continued

Threads per inch	Lengths of engagement		Pitch diameter tolerances for diameters up to and including—						
	From—	To and including—	10 inches	12 inches	14 inches	16 inches	18 inches	20 inches	24 inches
	Inches	Inches	Inch	Inch	Inch	Inch	Inch	Inch	Inch
64	1/2	1/2	0.0037						
	1/2	1 1/2	.0038						
	1 1/2	3	.0038						
56		1/2	.0037	0.0040					
	1/2	1 1/2	.0040	.0040					
	1 1/2	3	.0040	.0040					
48		1/2	.0038	.0041	0.0044				
	1/2	1 1/2	.0044	.0044	.0044				
	1 1/2	3	.0044	.0044	.0044				
40		1/2	.0038	.0041	.0044	0.0046			
	1/2	1 1/2	.0046	.0048	.0048	.0048			
	1 1/2	3	.0048	.0048	.0048	.0048			
36		1/2	.0038	.0041	.0044	.0047	0.0049		
	1/2	1 1/2	.0046	.0049	.0050	.0050	.0050		
	1 1/2	3	.0050	.0050	.0050	.0050	.0050		
32		1/2	.0038	.0041	.0044	.0047	.0049	0.0052	
	1/2	1 1/2	.0046	.0049	.0052	.0054	.0054	.0054	
	1 1/2	3	.0054	.0054	.0054	.0054	.0054	.0054	
28		1/2	.0039	.0042	.0045	.0047	.0050	.0052	0.0056
	1/2	1 1/2	.0046	.0049	.0052	.0055	.0057	.0059	.0062
	1 1/2	3	.0059	.0062	.0062	.0062	.0062	.0062	.0062
24		1/2	.0039	.0042	.0045	.0048	.0050	.0052	.0057
	1/2	1 1/2	.0047	.0050	.0052	.0055	.0057	.0060	.0064
	1 1/2	3	.0059	.0062	.0065	.0066	.0066	.0066	.0066
20		1/2	.0040	.0043	.0046	.0048	.0050	.0053	.0057
	1/2	1 1/2	.0047	.0050	.0053	.0056	.0058	.0060	.0065
	1 1/2	3	.0060	.0063	.0066	.0068	.0070	.0072	.0072
18		1/2	.0040	.0043	.0046	.0048	.0051	.0053	.0057
	1/2	1 1/2	.0047	.0050	.0053	.0056	.0058	.0061	.0065
	1 1/2	3	.0060	.0063	.0066	.0068	.0071	.0073	.0077
16		1/2	.0040	.0043	.0046	.0049	.0051	.0053	.0058
	1/2	1 1/2	.0048	.0051	.0054	.0056	.0059	.0061	.0065
	1 1/2	3	.0060	.0063	.0066	.0069	.0071	.0073	.0078
14		1/2	.0041	.0044	.0047	.0049	.0052	.0054	.0058
	1/2	1 1/2	.0048	.0051	.0054	.0057	.0059	.0061	.0066
	1 1/2	3	.0061	.0064	.0067	.0069	.0072	.0074	.0078
12		1/2	.0041	.0044	.0047	.0050	.0052	.0054	.0059
	1/2	1 1/2	.0049	.0052	.0055	.0057	.0060	.0062	.0066
	1 1/2	3	.0061	.0064	.0067	.0070	.0072	.0074	.0079
10		1	.0044	.0048	.0050	.0053	.0055	.0058	.0062
	1	3	.0061	.0064	.0067	.0070	.0072	.0074	.0079
	3	6	.0084	.0088	.0090	.0093	.0095	.0098	.0102
8		1	.0045	.0048	.0051	.0054	.0056	.0059	.0063
	1	3	.0061	.0064	.0067	.0070	.0072	.0074	.0079
	3	6	.0085	.0088	.0091	.0094	.0096	.0099	.0103
6		1	.0047	.0050	.0053	.0055	.0058	.0060	.0064
	1	3	.0062	.0065	.0068	.0070	.0073	.0075	.0079
	3	6	.0087	.0090	.0093	.0095	.0098	.0100	.0104
4		1	.0049	.0052	.0055	.0058	.0060	.0062	.0066
	1	3	.0064	.0067	.0070	.0073	.0075	.0077	.0082
	3	6	.0089	.0092	.0095	.0098	.0100	.0102	.0106

NOTE.—It is preferable to avoid the use of tolerances set in italics by choosing a shorter length of engagement, coarser pitch, or smaller diameter.



