

FED-STD-H28/3

31 March 1978

Superseding
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Part I Section 3

FEDERAL STANDARD

SCREW-THREAD STANDARDS FOR FEDERAL SERVICES
SECTION 3

UNIFIED THREADS OF SPECIAL DIAMETERS,
PITCHES, AND LENGTHS OF ENGAGEMENT

This standard was approved by the Commissioner Federal Supply Service, General Services Administration, for the use of all Federal agencies.

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INFORMATION SHEET ON FEDERAL STANDARDS

This Federal Standard is issued in loose leaf form to permit the insertion or removal of new or revised pages and sections.

All Users of Federal Standards should keep them up to date by inserting revised or new pages as issued and removing superseded and cancelled pages.

New and revised pages will be issued under Change Notices which will be numbered consecutively and will bear the date of issuance. Change Notices should be retained and filed in front of the Standard until such time as they are superseded by a reissue of the entire Standard.

NOTICE

From 1939, the Interdepartmental Screw-Thread Committee (ISTC), under the Chairmanship of the National Bureau of Standards (NBS), Department of Commerce had developed and published NBS Handbook H28, Screw-Thread Standards for Federal Services.

Section 487 of Title 40 of the U.S. Code states that the authority for development of Federal Standards for procurement purposes rests with the General Services Administration (GSA).

In November 1976, the ISTC was terminated, and the General Services Administration (GSA) accepted the responsibility for NBS Handbook H28 and agreed to convert it and maintain it as a Federal Standard.

The standards which had been published as NBS Handbook H28, Part I, Part II and Part III will now be promulgated as a fully coordinated FED-STD-H28, maintaining the existing sections and identifying them with slant lines. For example, NBS Handbook H28, Part I, Section 3 will be detailed standard FED-STD-H28/3 which must be procured individually.

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The text of this section is reprinted from the NBS HANDBOOK H28 with minor editorial corrections. Page 5 contain corrections indicated by an asterisk.

Reorganization of the document from NBS HANDBOOK H28 to FED-STD-H28 creates an editorial inconvenience, when maintaining continuity of cross references amongst the pages, paragraphs, tables and figures of the different sections. For this standard individual sections will be numbered sequentially starting with (1) one. If the reprinted text refers to another page, such as Page 6.3, this will be understood to mean section 6 page 3. All figures and tables will maintain the established designations, prefixed with the section; e.g. Table 3.1 and Figure 2.5 to identify their location in this standard. All appendices will be incorporated in the basic document FED-STD-H28 with other general information and will continue to be identified with the prefix A.

1. INTRODUCTION

The thread series, tolerances, and allowances specified in section 2 of H28 apply in general to bolts, nuts, and tapped holes of standard pitches and diameters. In addition, there are large quantities of threaded parts produced where the relations of diameter to pitch are necessarily different from those of the standard thread series, and the lengths of engagement either shorter or longer than for bolt and nut practice. Such threads are designated "threads of special diameters, pitches, and lengths of engagement". Selected combinations of Unified special screw threads are listed in table 3.1. Pitch diameter tolerances in this table are based on a length of thread engagement of 9 times the pitch. The pitch diameter limits are applicable to a length of engagement of from 5 to 15 times the pitch. (This should not be confused with the length of thread on mating parts, as it may exceed the length of engagement by a considerable amount.)

2. TYPES OF SPECIAL THREADS

There are various degrees of specialization in the design of special threads that may be classified as follows:

(1) A standard thread that is modified by the inclusion of some nonstandard feature as discussed in section 2.

(2) A thread of a standard diameter such as is found in one or more of the thread series in section 2 associated with a standard pitch listed in table 2.1 forming a diameter-pitch combination that is not in a standard thread series; for example, 1.000-10 UNS.

(3) A diameter of odd size such as 1.137 in. associated with a standard pitch.

(4) A thread of either standard or nonstandard diameter associated with a nonstandard pitch; for example, 1.000-15 UNS or .895-26 UNS.

(5) A thread of any of the first four degrees of specialization to which special tolerances are applied.

(6) A completely special thread that deviates from the standard Unified thread form.

In the interest of economy, the designer should adhere to standard threads or to thread features conforming as closely as possible to established standards. It should be remembered that special threads entail the design and manufacture of special threading tools and gages with consequent greater costs, increase in inventories, and difficulties in procuring spare parts when replacements are necessary.

In this section, standards for special threads are presented, including thread form, selected combinations of Unified special screw threads (table 3.1), allowances and tolerances, and detailed directions for specifying special threads on drawings. A discussion of factors affecting the design of special threads is presented in appendix A5.

3. UNIFIED FORM OF THREAD

The Unified form of thread profile as specified in section 2 shall be used.

4. PREFERRED DIAMETERS AND PITCHES

The use, whenever possible, of the standard series of screw threads listed in table 2.7 is recommended for all applications. Whenever sizes and pitches in table 2.7 are not suitable, the designer should, if possible, choose a thread from table 3.1 which lists selected combinations of Unified special screw threads. If a selection cannot be made from either table 2.7 or 3.1, consideration should be given to the following paragraphs in a choice of thread.

4.1. PREFERRED DIAMETERS.—Whenever possible, the basic diameter should be selected from series of diameter increments as follows:

Range	Diameter increments	
	First choice	Second choice
in 0.25 to 0.6	in 0.05	in 0.05
above 0.6 to 1.5	0.1	0.05
above 1.5 to 6.0	0.25	0.1
above 6 to 16	0.5	0.25
above 16 to 24	1.0	0.5

It is recommended that diameters less than 0.25 in conform to the standard sizes of screws under 0.25 in. as there is virtually no necessity for the selection of a diameter not included in those sizes. Furthermore, the coarse and fine thread series provide ample choice as to diameter-pitch combinations.

4.2. PREFERRED PITCHES.—Whenever possible, the pitch should be selected from the series 40, 38, 32, 28, 24, 20, 16, 12, 10, 8, 6, and 4 threads per inch. Intermediate pitches should be used only when absolutely necessary. Pitches coarser than 4 threads per inch are not recommended.

There are practical limits to both the largest and smallest diameters suitable for any pitch. The curves on the chart for determining minimum length of thread engagement in Appendix A5 stop at such limits.

4.3. BASIC THREAD DATA.—Basic thread data for standard pitches are given in table 2.1. These data are to be used in conjunction with the directions for specifying special threads on drawings as given in par. 5.4, p. 3.02.

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5. THREAD CLASSES

Thread classes are distinguished from each other by the amounts of tolerance and allowance. The function of these classes is to assure the interchangeability of threaded parts. Six distinct classes of screw threads have been established for general use. These classes are: 1A, 2A, and 3A (for external threads only) and 1B, 2B, and 3B (for internal threads only).

Class 1AR (for external threads only, 16 threads per inch and coarser) is also included for special use. Class 1AR is produced by combining the American National class 1 allowances with class 1A tolerances.

The disposition of the tolerances, allowances, and crest clearances for the six general use classes is illustrated in figures 2.5 and 2.6.

The requirements for a screw thread fit for a specific application can be met by specifying the proper combination of classes for the components. For example, an external thread made to class 2A limits can be used with an internal thread made to classes 1B, 2B, or 3B limits for specific applications.

5.1. CLASSES 1A, 1AR, and 1B.—The combinations of classes 1A or 1AR and 1B are intended to cover the manufacture of threaded parts where quick and easy assembly is necessary, and where an allowance is required to permit ready assembly, even when the threads are slightly bruised or dirty.

Maximum diameters of class 1A (external) threads are less than basic by the amount of the same allowance as applied to class 2A. For the intended applications in American practice the allowance is not available for plating or coating. Where the thread is plated or coated, special provisions are necessary. The minimum diameters of class 1B (internal) threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly with maximum material external thread components having maximum diameters which are basic.

Allowances for all diameters and pitch diameter tolerances are specified in tables 3.2, 3.3, and 3.6. Their application is shown in figure 2.5.

5.2. CLASSES 2A and 2B.—Classes 2A for external threads and 2B for internal threads are designed for general use. A moderate allowance is provided for class 2A threads.

The maximum diameters of class 2A (external) uncoated threads are less than basic by the amount of the allowance. The allowance minimizes galling and seizing in high-cycle wrench assembly, or it can be used to accommodate plated finishes or other coating. However, for threads with additive finish, the maximum diameters of class 2A may be exceeded by the amount of the allowance; i.e., the 2A maximum diameters apply to an unplated part or to a part before plating, whereas the basic diameters (the 2A maximum diameter plus allowance) apply to a part after plating. The minimum diameters of class 2B (internal) threads, whether or not plated or

coated, are basic, affording no allowance or clearance in assembly at maximum material limits.

Allowances for all diameters and pitch diameter tolerances are specified in tables 3.2, 3.4, and 3.7. Their application is shown in figure 2.5.

5.3. CLASSES 3A AND 3B.—Classes 3A for external threads and 3B for internal threads provides for applications where closeness of fit and accuracy of lead and angle of thread are important. They are obtainable consistently only by the use of high quality production equipment supported by a very efficient system of gaging and inspection. The maximum diameters of class 3A (external) threads and the minimum diameters of class 3B (internal) threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly of maximum material components.

No allowance is provided, but since the tolerances on GO gages are within the limits of size of the product, the gages will assure a slight clearance between product made to the maximum-material limits. Pitch diameter tolerances are specified in tables 3.5 and 3.8. Their application is shown in figure 2.6.

5.4. SELECTION OF CLASS OF THREAD.—Consideration should first be given to the use of a class 2A external thread with a class 2B internal thread since these classes are designed for general use. The use of class 2A provides that there will always be a small clearance between maximum-material parts except when the external thread is plated. Plated parts are intended to be gaged with basic-size GO gages. In either case, it is expected that parts will assemble readily without galling or seizing. Tolerances are sufficiently large so that ordinary production methods are generally applicable.

Past experience with similar designs may indicate that a more accurately made or closer fitting thread is required than that which is permitted by classes 2A and 2B tolerances. In such cases consideration should be given to the use of classes 3A and 3B. The necessary increase in cost should not be overlooked.

In some designs there may be advantages in providing for greater average looseness of fit than that obtained with classes 2A and 2B. Such greater average looseness is provided by classes 1A and 1B or the assembly of class 1A external threads with class 2B internal threads. The minimum looseness, however, is the same as for classes 2A and 2B except that a positive allowance is provided for plated parts. When a greater minimum looseness is requisite to provide for adverse conditions of assembly, class 1AR is available, which is not a Unified class and is based on the American National class 1 allowance combined with class 1A tolerance. These classes also provide larger tolerances to the manufacturer, which may be of advantage if the thread is difficult to produce.

It should be noted that any class of external thread may be associated with any class of internal thread, there being no requirement to combine classes of like number.

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6. ALLOWANCES

The allowance is minus and is applied from the basic size to below basic size. Allowance is applied only to the classes 1A, 1AR, and 2A external threads. Values of the allowance for classes 1A and 2A are obtained by use of a C factor of 0.3 in the formula shown in paragraph 7.3. Numerical values of classes 1A and 2A allowances for the commonly used pitches are listed in table 3.2.

The formula in paragraph 7.3 is not applicable to class 1AR as this class is produced by combining the American National class 1 allowances with class 1A tolerances. These allowances are larger than those for classes 1A and 2A and provide for ready assembly under adverse conditions.

Numerical values of class 1AR allowances are:

Threads per inch (tpi), n	Class 1AR allowance in
16	.0018
14	.0021
12	.0024
10	.0028
8	.0034
6	.0044
4	.0064

(Class 1AR allowances apply only to external threads, 16 tpi and coarser.)

7. TOLERANCES

The following general specifications apply to all classes specified for applications of the Unified form of thread.

7.1. UNIFORM MINIMUM INTERNAL THREAD.—The minimum major, pitch, and minor diameters of the internal thread are, respectively, the same for classes 1B, 2B, and 3B.

7.2. DIRECTION AND SCOPE OF TOLERANCES.—

(a) The tolerance on the internal thread is plus, and is applied from the basic size to above basic size.

(b) The tolerance on the external thread is minus and is applied from the maximum (or design) size to below the maximum size.

(c) The tolerances specified represent the extreme variations permitted on the product.

7.3. PITCH DIAMETER TOLERANCES.—The basic formula for pitch diameter tolerance is composed of the following increments:

P.D. Tolerance

$$= C(0.0015\sqrt{D} + 0.0015\sqrt{L} + 0.015\sqrt{p}),$$

where

C = a factor which differs for each class

D = basic major diameter

L = length of engagement

p = pitch.

This formula is based on the accuracy of present day threading practice, and is applicable to all reasonable combinations of diameter, pitch, and length of engagement. Numerical values of the increments in the formula for standard diameters, pitches, and lengths of engagement are given in table 2.19. The values of factor C for pitch diameter tolerances are as follows:

Class	Factor C
1A and 1AR	1.500
1B	1.950
2A	1.000
2B	1.300
3A	0.750
3B	.975

It will be noted that the factor C is 30 percent greater for internal than for external threads of a given class number on account of the relative difficulties of manufacture.

Numerical values of pitch diameter tolerances for classes 1A, 1AR, 1B, 2A, 2B, 3A, and 3B are given in tables 3.3 through 3.8. Two sets of tolerances are given: Those for 5 to 15 pitches length of engagement, based on lengths of 9 pitches, and those for 16 to 30 pitches length of engagement, which are 1.25 times the 9-pitch values. For lengths of engagement over 30 pitches, it is recommended that pitch diameter tolerances 1.5 times the 9-pitch values be used. If excessively small or large lengths of engagement are encountered, the thread tolerances may be calculated from the formulas, if considered advisable. Also, for threads per inch not included in the tables, tolerances should be calculated by applying the formulas.

7.4. MAJOR DIAMETER TOLERANCES.—(a) External threads.—The tolerance on major diameter for special threads is not specified, as it must be determined in relation to the requirements of a given design in accordance with the procedure outlined in appendix A5. Preferred tolerances equal to $0.060\sqrt{p}$ for classes 2A and 3A, and equal to $0.090\sqrt{p}$ for classes 1A and 1AR are as follows:

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Threads per inch	Major diameter tolerance	
	Classes 1A and 1AR, $0.090\sqrt{p^3}$	Classes 2A and 3A, $0.060\sqrt{p^3}$
80	in	in
72		.0032
64		.0036
56		.0038
48		.0041
44		.0045
40	.0077	.0051
36	.0063	.0055
32	.0089	.0060
28	.0098	.0065
27	.0100	.0067
24	.0108	.0072
20	.0122	.0081
18	.0131	.0087
16	.0142	.0094
14	.0155	.0103
12	.0172	.0114
10	.0194	.0129
8	.0225	.0150
6	.0273	.0182
4	.0357	.0238

(b) *Internal threads.*—The tolerance on major diameter is for reference only. It is equal to $H/6$ plus the pitch diameter tolerance of the class of thread involved. The maximum major diameter of the internal thread may be determined by adding $0.793857p$ ($= 11H/12$, table 2.1) to the maximum pitch diameter of the internal thread. However, this diameter shall not result in a root flat width less than $p/24$. In dimensioning internal threads the maximum major diameter is not specified, being established by the crest of an unworn tool. In practice, the major diameter of an internal thread is satisfactory when accepted by a gage or gaging method that represents the maximum material condition of an external thread which has no allowance.

7.5. MINOR DIAMETER TOLERANCES.—(a) *External threads.*—The tolerance on minor diameter of external threads is for reference only. At the nominal minor diameter, that is, at the intersection of the rounded root with its center line (see fig. 2.3) it equals the pitch diameter tolerance plus $H/12$ and applies only where the rounded root is a requirement of the design. Otherwise the tolerance shall be $H/4$ plus the pitch diameter tolerance. The minimum minor diameter of the external thread may be determined by subtracting $0.649519p$ ($= 0.75H$, table 2.1) from the minimum pitch diameter of the external thread. However, this diameter shall not result in a root flat width less than $p/8$. In dimensioning external threads the minimum minor diameter is not specified, being established by the crest of an unworn tool. In practice, the minor diameter of an external thread is satisfactory when accepted by

a gage or gaging method that represents the maximum-material condition of the internal thread less the allowances, if any.

(b) *Internal threads.*—Formulas for the internal thread minor diameter tolerances are shown in table 2.20. Numerical values for the tolerances are shown in tables 3.9 and 3.10. To reduce the number of minor diameter tolerances to a practical minimum, tolerances are shown in these tables for selected pitches and diameters. In these tables, the tolerances are as follows:

Length of engagement	Percent of formula value	Tolerance ratio
Less than $0.33D$	50%	0.5
From $0.33D$ to $0.67D$	75%	0.75
Over $0.67D$ to $1.5D$	100%	1.0
Over $1.5D$	125%	1.25

When the tolerance value so computed is more than $0.394p$, which corresponds to a resulting minimum thread height of 53 percent, the value is adjusted to equal $0.394p$.

8. LENGTH OF ENGAGEMENT

The values in tables 3.9 and 3.10 for lengths of engagement from $0.67D$ to $1.5D$, are suitable for general applications.

Some thread applications have lengths of engagement which are greater than 1.5 diameters or less than $0.67D$. For applications having shorter or longer lengths of engagement it may be advantageous to decrease or increase the internal thread minor diameter tolerance as explained below.

The principal practical factors that govern these tolerances are tapping difficulties, particularly tap breakage in the small sizes, availability of standard drill sizes in the medium and large sizes, and depth of engagement. Depth of engagement correlates with the stripping strength of the thread assembly, and thus also with the length of engagement. It also correlates with the tendency toward disengagement of the threads on one side when assembly is eccentric. The amount of possible eccentricity is one half of the sum of the pitch diameter allowance and tolerance on both mating threads. For a given pitch or height of thread this sum increases with the diameter, and accordingly this factor would require a decrease in minor diameter tolerance with increase in diameter. However, such decrease in tolerance often is not feasible without requiring special drill sizes; therefore, to be able to use as many as possible of the available standard drill sizes listed in USA B5.12, the minor diameter tolerance for classes 1B and 2B of a given pitch for 0.25 in. diameter and larger is constant, in accordance with the formula:

$$0.25p - 0.4p^3$$

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There may be applications where the lengths of engagement of the mating threads or the combination of materials used for mating threads are such that the maximum tolerance may not provide the desired strength of the fastening. Experience has shown that for lengths of engagements less than $0.67D$ (the minimum thickness of standard nuts) the minor diameter tolerance may be reduced without causing tapping difficulties.

In other applications, the length of engagement of mating threads may be long because of design considerations or the combination of materials used for mating threads. As the threads engaged increase in number, their depth of engagement may be shallower and still develop stripping strength greater than the external thread breaking strength. In these cases the maximum tolerance should be increased to reduce the possibility of tapping difficulties.

Recommended internal thread minor diameter tolerances for various lengths of engagement are shown in tables 3.9 and 3.10. Recommended hole size limits before threading for different lengths of engagement are shown in appendix A3.

9. LIMITS OF SIZE

With respect to the pitch diameter limits of size, it is intended, except as hereinafter qualified, that no portion of the complete thread be permitted to project beyond the envelope defined by the maximum-material limits on the one hand, or beyond that defined by the minimum-material limits on the other, and thus be outside of the tolerance zone as illustrated in figures 2.5 and 2.6. The full tolerance cannot therefore, be used on pitch diameter unless deviations in other thread elements are zero.

Diameter equivalents of variations in lead, uniformity of helix, and flank angle are in the direction toward maximum material. Also included in pitch-diameter limits are other variations from size and profile, such as taper, out-of-round, and surface defects. Thus the maximum-material pitch diameter limits are a limitation of the virtual diameter (effective size) and are so specified herein for all thread classes. It is intended that diameter equivalents of deviations in any given element except pitch diameter should not exceed one-half of the pitch-diameter tolerance. Values are given in table 2.22 for deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances. Flank angle equivalents should be based on a depth of thread engagement of $0.625H$.

Variations in taper and roundness of the pitch diameter, together with variations of the pitch diameter as a whole, may be in the direction of minimum material and thus the minimum-material pitch diameter limit may be specified as a limitation of the pitch diameter as a single element. However, in view of the interrelation of the pitch diameter, variations in lead and flank angle, etc., together with practical considerations relating to established production processes, product application and inspection procedures, except for class 3A, for

fasteners and some custom threaded parts, it is customary to base acceptance at the minimum-material condition (minimum pitch diameter of the external thread and maximum pitch diameter of the internal thread) on threaded plug and ring gaging, with gages to the thread form and length specified in section 6. See Dimensional acceptability of threads in that section.

10. METHOD OF DESIGNATING SPECIAL SCREW THREADS

For the method of designating threads of special diameters, pitches, and lengths of engagement, and UNS threads (threads with Unified tolerance formulations), see also section 2.

The symbol "UNS" is applicable to any thread,

- (1) having the basic Unified thread form,
- (2) with limits based on Unified formulations, and
- (3) which is not listed in table 2.7.

Selected combinations of UNS threads are listed in table 3.1.

11. DIRECTIONS FOR DETERMINING LIMITS OF SIZE OF SPECIAL THREADS

The following directions are intended to simplify the task of the designer or specification writer in preparing the specification for a special thread:

The procedure to be followed in determining values for the essential thread elements (as shown in fig. 3.12) and the associated tolerances, is outlined in table 3.11. The application of this and other tables is illustrated by the following example:

Internal thread, 2.500-28UNS-2B

Length of engagement, 1 in.

Min major diameter = 2.5000 in.

$$\begin{aligned} \text{Min pitch diameter} &= \text{basic major diameter} - \\ &\quad 0.75H \text{ (table 2.1)} \\ &= 2.5000 - 0.0232 = \\ &\quad 2.4768 \end{aligned}$$

$$\begin{aligned} \text{Max pitch diameter} &= \text{min pitch diameter} + \\ &\quad \text{tolerance (table 3.7)} \\ &= 2.4768 + 0.0073 = \\ &\quad 2.4841 \end{aligned}$$

$$\begin{aligned} \text{Min minor diameter} &= \text{basic major diameter} - \\ &\quad 1.25H \text{ (table 2.1)} \\ &= 2.500 - 0.0387 = 2.461 \end{aligned}$$

$$\begin{aligned} \text{Max minor diameter} &= \text{min minor diameter} + \\ &\quad \text{tolerance (table 3.9)} \\ &= 2.4613 + 0.0063 = 2.468. \end{aligned}$$

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The dimensions of the above internal thread may be stated on the drawing as follows:

Major diameter: 2.5000 min

Pitch diameter: 2.4768 + 0.0073
- 0.0000

Minor diameter: 2.461 + 0.0063
- 0.0000.

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External thread, 2.500-28UNS-2A (To mate with the above thread)

$$\begin{aligned}\text{Max major diameter} &= \text{basic major diameter} - \\ &\quad \text{allowance (table 3.2)} \\ &= 2.5000 - 0.0014 = 2.4986\end{aligned}$$

$$\begin{aligned}\text{Min major diameter} &= \text{max major diameter} - \\ &\quad \text{tolerance (tabulated on} \\ &\quad \text{p. 3.04)} \\ &= 2.4986 - 0.0065 = 2.4921\end{aligned}$$

$$\begin{aligned}\text{Max pitch diameter} &= \text{max major diameter} - \\ &\quad 0.75H \text{ (table 2.1)} \\ &= 2.4986 - 0.0232 = 2.4754\end{aligned}$$

$$\begin{aligned}\text{Min pitch diameter} &= \text{max pitch diameter} - \text{tolerance (table 3.4)} \\ &= 2.4754 - 0.0049 = 2.4705\end{aligned}$$

$$\begin{aligned}\text{Nom minor diameter} &= \text{max major diameter} - \\ &\quad 17H/12 (1.4167H) \text{ (table} \\ &\quad 2.1) \\ &= 2.4986 - 0.0438 = 2.4548.\end{aligned}$$

The dimensions of the above external thread may

be stated on the drawing as follows:

$$\begin{aligned}\text{Major diameter: } &2.4986 + 0.0000 \\ &- 0.0065\end{aligned}$$

$$\begin{aligned}\text{Pitch diameter: } &2.4754 + 0.0000 \\ &- 0.0049\end{aligned}$$

$$\begin{aligned}\text{Minor diameter: } &2.4548, \text{ nominal.}\end{aligned}$$

The design of a special thread usually requires that consideration be given to various factors in order that the thread assembly will function properly. These factors are discussed in appendix A5. It is to be noted particularly that deviations from the preferred tolerances for major diameter of the external thread and for minor diameter of the internal thread may be necessary in order to arrive at the optimum design.

12. GAGES

The specifications for gages, including marking, as presented in section 6 apply also to gages for special threads.

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TABLE 3.1. Selected combinations, Unified special screw threads, UNS

Nominal size and threads per inch	External										Internal									
	Class	Allowance	Major diameter		Pitch diameter			Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter					
			Max ^a	Min	Max ^b	Min	Tolerance			Min	Max	Min	Max	Tolerance						
1	2A	.00010	.1890	.1825	.1858	.1825	.0033	.1452	2B	.181	.180	.1888	.1711	.0043	.1900					
.100-28	2A	.0008	.1801	.1838	.1711	.1681	.0030	.1580	2B	.160	.165	.1720	.1750	.0039	.1900					
.100-36	2A	.0009	.1691	.1640	.1720	.1700	.0029	.1584	2B	.163	.169	.1738	.1775	.0037	.1900					
.100-40	2A	.0008	.1692	.1647	.1737	.1731	.0028	.1636	2B	.167	.172	.1765	.1799	.0034	.1900					
.100-56	2A	.0007	.1693	.1652	.1777	.1752	.0025	.1671	2B	.171	.175	.1784	.1815	.0033	.1900					
.216-36	2A	.0009	.2181	.2096	.1971	.1941	.0030	.1810	2B	.186	.192	.1980	.2019	.0039	.2160					
.216-40	2A	.0009	.2181	.2100	.1989	.1960	.0029	.1844	2B	.189	.195	.1998	.2035	.0037	.2160					
.216-48	2A	.0008	.2182	.2107	.2017	.1991	.0026	.1896	2B	.193	.198	.2025	.2059	.0034	.2160					
.216-56	2A	.0007	.2153	.2112	.2037	.2012	.0023	.1934	2B	.197	.201	.2044	.2076	.0032	.2160					
.250-24	2A	.0011	.2489	.2417	.2218	.2181	.0037	.1978	2B	.205	.215	.2220	.2277	.0048	.2500					
.250-27	2A	.0010	.2490	.2423	.2249	.2214	.0035	.2038	2B	.210	.219	.2250	.2304	.0045	.2500					
.250-36	2A	.0009	.2491	.2436	.2311	.2280	.0031	.2150	2B	.220	.226	.2320	.2380	.0040	.2500					
.250-40	2A	.0009	.2491	.2440	.2320	.2300	.0029	.2184	2B	.223	.229	.2338	.2378	.0038	.2500					
.250-48	2A	.0008	.2492	.2447	.2357	.2330	.0027	.2236	2B	.227	.232	.2385	.2401	.0036	.2500					
.250-56	2A	.0008	.2492	.2481	.2378	.2350	.0026	.2273	2B	.231	.235	.2384	.2417	.0033	.2500					
.3125-27	2A	.0010	.3119	.3048	.2874	.2839	.0035	.2661	2B	.272	.281	.2934	.3029	.0045	.3125					
.3125-34	2A	.0009	.3116	.3061	.2938	.2906	.0031	.2775	2B	.282	.290	.2945	.3085	.0040	.3125					
.3125-40	2A	.0009	.3116	.3065	.2954	.2925	.0029	.2809	2B	.285	.291	.2963	.3001	.0038	.3125					
.3125-48	2A	.0008	.3117	.3079	.2982	.2953	.0027	.2881	2B	.290	.298	.2990	.3028	.0036	.3125					
.375-18	2A	.0013	.3737	.3660	.3376	.3333	.0013	.3058	2B	.318	.328	.3389	.3445	.0036	.3750					
.375-27	2A	.0011	.3739	.3671	.3498	.3462	.0030	.3285	2B	.335	.344	.3509	.3556	.0047	.3750					
.375-36	2A	.0010	.3740	.3683	.3560	.3528	.0032	.3399	2B	.343	.352	.3570	.3612	.0042	.3750					
.375-40	2A	.0009	.3741	.3690	.3579	.3548	.0031	.3434	2B	.348	.354	.3588	.3628	.0040	.3750					
.390-27	2A	.0011	.3889	.3822	.3648	.3613	.0038	.3435	2B	.380	.389	.3869	.3706	.0047	.3900					
.4375-18	2A	.0013	.4362	.4275	.4001	.3958	.0043	.3680	2B	.377	.390	.4014	.4070	.0056	.4375					
.4375-24	2A	.0011	.4364	.4292	.4093	.4056	.0038	.3853	2B	.392	.402	.4104	.4153	.0049	.4375					
.4375-27	2A	.0011	.4364	.4297	.4123	.4087	.0038	.3910	2B	.397	.406	.4134	.4181	.0047	.4375					
.4375-28	2A	.0011	.4365	.4310	.4155	.4183	.0032	.4024	2B	.407	.414	.4185	.4237	.0042	.4375					
.4375-40	2A	.0009	.4388	.4318	.4021	.3973	.0033	.4059	2B	.410	.418	.4213	.4253	.0040	.4375					
.500-12	2A	.0018	.4984	.4870	.4443	.4389	.0054	.3982	2B	.410	.428	.4489	.4529	.0070	.5000					
.500-14	2A	.0009	.5000	.4986	.4489	.4419	.0040	.3978	2B	.4100	.4223	.4459	.4511	.0052	.5000					
.500-18	2A	.0015	.4985	.4882	.4521	.4471	.0050	.4109	2B	.423	.438	.4538	.4601	.0065	.5000					
.500-24	2A	.0012	.4988	.4918	.4717	.4678	.0039	.4477	2B	.433	.465	.4729	.4780	.0051	.5000					
.500-27	2A	.0011	.4989	.4922	.4748	.4711	.0037	.4535	2B	.440	.469	.4739	.4807	.0048	.5000					
.500-30	2A	.0010	.4990	.4933	.4810	.4777	.0033	.4610	2B	.470	.476	.4830	.4863	.0042	.5000					
.500-40	2A	.0010	.4990	.4839	.4828	.4796	.0032	.4883	2B	.473	.479	.4838	.4879	.0041	.5000					
.5625-14	2A	.0018	.5610	.5507	.5146	.5096	.0050	.4734	2B	.485	.501	.5161	.5228	.0068	.5625					
.5625-27	2A	.0011	.5614	.5347	.5373	.5336	.0037	.5160	2B	.522	.531	.5384	.5422	.0048	.5625					
.5625-38	2A	.0010	.5615	.5560	.5435	.5402	.0033	.5274	2B	.532	.539	.5415	.5488	.0043	.5625					
.5625-40	2A	.0010	.5615	.5564	.5153	.5121	.0032	.5308	2B	.535	.541	.5463	.5504	.0041	.5625					
.625-14	2A	.0015	.6235	.6132	.5771	.5720	.0051	.5350	2B	.548	.564	.5786	.5853	.0068	.6250					

See footnotes at end of table.



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TABLE 3.1. Selected combinations, Unified special screw threads, UNS—Continued

Nominal size and threads per inch	External										Internal							
	Class	Allowance	Major diameter		Pitch diameter			6 ¹ Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter			
			Max ^b	Min	Max ^b	Min	Tolerance			Min	Max	Min	Max	Tolerance				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
.050-07	2A	in .0011	.0300	.0173	.0306	.0160	.0038	.0788	1B	.035	.034	.0600	.0680	.0060	in .0250			
.050-08	2A	.0010	.0340	.0186	.0360	.0136	.0034	.0800	1B	.036	.032	.0670	.0714	.0044	.0250			
.050-09	2A	.0010	.0340	.0188	.0378	.0148	.0033	.0813	1B	.035	.034	.0688	.0731	.0043	.0250			
.750-14	2A	.0018	.7406	.7323	.7021	.6970	.0051	.6600	1B	.673	.633	.7036	.7103	.0067	.7500			
.750-15	2A	.0014	.7406	.7330	.7125	.7079	.0048	.6804	1B	.690	.703	.7129	.7199	.0080	.7500			
.750-16	2A	.0012	.7406	.7416	.7217	.7176	.0041	.6977	1B	.705	.715	.7220	.7233	.0043	.7500			
.750-17	2A	.0012	.7406	.7421	.7247	.7303	.0039	.7034	1B	.710	.710	.7250	.7310	.0051	.7500			
.750-18	2A	.0010	.7400	.7428	.7310	.7278	.0035	.7148	1B	.720	.728	.7320	.7365	.0044	.7500			
.750-19	2A	.0010	.7400	.7429	.7328	.7294	.0034	.7183	1B	.723	.729	.7338	.7383	.0044	.7500			
.075-10	2A	.0018	.0723	.0803	.0823	.0823	.0060	.7804	1B	.767	.788	.8100	.8178	.0078	.0750			
.075-18	2A	.0014	.0726	.0849	.0878	.0836	.0046	.8054	2B	.818	.828	.8330	.8449	.0080	.0750			
.075-24	2A	.0012	.0734	.0856	.0857	.0828	.0041	.8227	2B	.830	.840	.8479	.8523	.0043	.0750			
.075-27	2A	.0012	.0738	.0871	.0857	.0858	.0039	.8334	2B	.835	.844	.8300	.8380	.0081	.0750			
.075-35	2A	.0010	.0740	.0838	.0840	.0838	.0035	.8390	2B	.848	.852	.8570	.8618	.0045	.0750			
.075-40	2A	.0010	.0740	.0838	.0878	.0846	.0034	.8433	2B	.848	.854	.8588	.8623	.0044	.0750			
1.050-10	2A	.0018	.9803	.9803	.9323	.9270	.0063	.8758	1B	.982	.913	.9320	.9420	.0080	1.0000			
1.000-14 ^d	1A	.0017	.9803	.9833	.9819	.9426	.0054	.9107	1B	.923	.933	.9628	.9648	.0109	1.0000			
	2A	.0017	.9803	.9830	.9819	.9463	.0056	.9107	2B	.923	.933	.9638	.9659	.0073	1.0000			
	3A	.0000	1.0000	.9807	.9838	.9494	.0043	.9124	2B	.920	.9318	.9636	.9660	.0054	1.0000			
1.000-18	2A	.0014	.9806	.9806	.9436	.9578	.0047	.9304	2B	.940	.953	.9629	.9701	.0063	1.0000			
1.000-24	2A	.0018	.9807	.9818	.9716	.9674	.0043	.9478	2B	.955	.966	.9725	.9784	.0046	1.0000			
1.000-27	2A	.0012	.9808	.9821	.9747	.9707	.0040	.9534	2B	.960	.968	.9750	.9811	.0033	1.0000			
1.000-36	2A	.0011	.9809	.9834	.9800	.9773	.0038	.9648	2B	.970	.978	.9830	.9867	.0047	1.0000			
1.000-40	2A	.0010	.9800	.9839	.9838	.9793	.0035	.9682	2B	.973	.979	.9833	.9833	.0045	1.0000			
1.125-10	2A	.0018	1.1223	1.1103	1.0882	1.0830	.0063	1.0005	1B	1.017	1.033	1.0600	1.0880	.0080	1.1250			
1.125-14	2A	.0016	1.1224	1.1131	1.0770	1.0717	.0063	1.0285	2B	1.048	1.064	1.0786	1.0865	.0069	1.1250			
1.125-24	2A	.0018	1.1227	1.1166	1.0988	1.0926	.0043	1.0736	2B	1.080	1.090	1.0797	1.1034	.0046	1.1250			
1.250-10	2A	.0019	1.2481	1.2383	1.1831	1.1788	.0063	1.1284	2B	1.143	1.163	1.1820	1.1933	.0083	1.2500			
1.250-14	2A	.0016	1.2484	1.2381	1.2020	1.1966	.0064	1.1908	2B	1.173	1.183	1.2030	1.2106	.0070	1.2500			
1.250-24	2A	.0013	1.2487	1.2415	1.2216	1.2173	.0043	1.1978	2B	1.208	1.218	1.2279	1.2388	.0064	1.2500			
1.275-10	2A	.0019	1.2771	1.2803	1.2081	1.2018	.0063	1.2604	2B	1.267	1.288	1.3100	1.3183	.0083	1.2750			
1.275-14	2A	.0018	1.2774	1.2821	1.2370	1.2318	.0064	1.2853	2B	1.298	1.314	1.2336	1.2384	.0070	1.2750			
1.275-24	2A	.0013	1.2777	1.2868	1.2446	1.2423	.0043	1.3336	2B	1.330	1.340	1.3479	1.3538	.0054	1.2750			
1.000-10	2A	.0019	1.4901	1.4933	1.4331	1.4307	.0064	1.3784	2B	1.392	1.413	1.4350	1.4423	.0063	1.6000			
1.000-14	2A	.0017	1.4903	1.4930	1.4510	1.4464	.0066	1.4107	2B	1.423	1.438	1.4538	1.4628	.0073	1.6000			
1.000-24	2A	.0018	1.4907	1.4915	1.4716	1.4679	.0044	1.4478	2B	1.455	1.465	1.4730	1.4787	.0044	1.6000			
1.025-10	2A	.0019	1.6321	1.6103	1.5541	1.5517	.0064	1.5004	2B	1.617	1.623	1.5800	1.6423	.0063	1.6500			
1.025-14	2A	.0017	1.6323	1.6130	1.5700	1.5714	.0068	1.6237	2B	1.648	1.664	1.6786	1.6838	.0073	1.6500			
1.025-24	2A	.0018	1.6327	1.6168	1.5900	1.5823	.0044	1.6736	2B	1.680	1.690	1.6979	1.6937	.0048	1.6500			
1.750-10	2A	.0019	1.7481	1.7383	1.6831	1.6796	.0068	1.6284	2B	1.643	1.663	1.6350	1.6624	.0064	1.7500			
1.750-14	2A	.0017	1.7483	1.7380	1.7019	1.6963	.0080	1.6807	2B	1.673	1.693	1.7038	1.7109	.0073	1.7500			

See footnotes at end of table.

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TABLE 3.1. Selected combinations, Unified special screw threads, UNS—Continued

Nominal size and threads per inch	External ^a									Internal ^b								
	Class	Allowance	Major diameter		Pitch diameter			(e) Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter			
			Max ^b	Min	Max ^b	Min	Tolerance			Min	Max	Min	Max	Tolerance		Min		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
1.750-18	2A	.0018	1.7485	1.7388	1.7184	1.7079	.0051	1.6803	2B	1.690	1.703	1.7120	1.7205	.0064	1.7300			
1.875-10	2A	.0019	1.8731	1.8602	1.8081	1.8018	.0068	1.7804	2B	1.787	1.798	1.8100	1.8184	.0084	1.8750			
1.875-14	2A	.0017	1.8733	1.8630	1.8269	1.8213	.0056	1.7857	2B	1.798	1.814	1.8258	1.8389	.0073	1.8750			
1.875-18	2A	.0015	1.8733	1.8648	1.8374	1.8323	.0051	1.8083	2B	1.815	1.828	1.8386	1.8455	.0068	1.8750			
3.000-10	2A	.0020	3.0082	3.0057	2.9330	2.9285	.0043	2.8783	2B	1.892	1.913	1.9350	1.9433	.0053	2.0000			
3.000-14	2A	.0017	3.0083	3.0080	2.9519	2.9462	.0057	2.9107	2B	1.923	1.938	1.9534	1.9610	.0074	3.0000			
3.000-18	2A	.0015	3.0083	3.0088	2.9624	2.9573	.0051	2.9303	2B	1.940	1.963	1.9639	1.9704	.0067	3.0000			
3.0625-16	2A	.0018	3.0609	3.0515	2.0203	2.0149	.0051	2.9842	2B	1.963	2.009	2.0219	2.0229	.0070	3.0625			
3.0625-18	2A	.0016	3.0609	3.0531	2.0219	2.0179	.0040	2.9858	2B	1.9860	2.0013	2.0219	2.0271	.0063	3.0625			
3.1275-16	2A	.0018	3.1250	3.1275	2.1766	2.1453	.0054	2.1092	2B	2.120	2.134	2.1460	2.1530	.0070	3.1275			
3.1275-18	2A	.0000	3.1275	3.1278	2.1781	2.1459	.0041	2.1108	2B	2.1200	2.1253	2.1469	2.1521	.0063	3.1275			
3.250-10	2A	.0020	3.2480	3.2351	2.1830	2.1768	.0063	2.1253	2B	2.142	2.163	2.1850	2.1925	.0068	3.2500			
3.300-14	2A	.0017	3.3183	3.3280	2.2019	2.1952	.0057	2.1807	2B	2.173	2.193	2.2038	2.2110	.0074	3.2500			
3.325-16	2A	.0015	3.3285	3.3398	2.2124	2.2073	.0051	2.1903	2B	2.190	2.202	2.2150	2.2206	.0067	3.3250			
3.3125-16	2A	.0017	3.3108	3.3125	2.2014	2.2070	.0048	2.2341	2B	2.248	2.250	2.2718	2.2791	.0073	3.3125			
3.3125-18	2A	.0000	3.3125	3.3031	2.2719	2.2578	.0041	2.2358	2B	2.2450	2.2533	2.2719	2.2773	.0064	3.3125			
3.4375-16	2A	.0017	3.4355	3.4284	2.3963	2.3897	.0046	2.3591	2B	2.370	2.384	2.3960	2.4041	.0072	3.4375			
3.4375-18	2A	.0000	3.4375	3.4281	2.3960	2.3823	.0041	2.3608	2B	2.3700	2.3723	2.3960	2.4033	.0064	3.4375			
2.500-10	2A	.0020	3.4980	3.4831	2.4330	2.4283	.0057	2.3753	2B	2.392	2.413	2.4350	2.4427	.0067	2.5000			
2.500-14	2A	.0017	3.4983	3.4830	2.4519	2.4461	.0058	2.4107	2B	2.423	2.438	2.4635	2.4612	.0078	2.5000			
2.500-18	2A	.0015	3.4984	3.4897	2.4623	2.4570	.0053	2.4302	2B	2.440	2.453	2.4638	2.4700	.0069	2.5000			
2.750-10	2A	.0020	3.7480	3.7381	2.6830	2.6763	.0067	2.6258	2B	2.642	2.663	2.6850	2.6937	.0087	2.7500			
2.750-14	2A	.0017	3.7482	3.7380	2.7019	2.6961	.0058	2.6607	2B	2.673	2.688	2.7026	2.7112	.0076	2.7500			
2.750-18	2A	.0015	3.7484	3.7394	2.7397	2.7123	.0053	2.6803	2B	2.690	2.703	2.7120	2.7206	.0069	2.7500			
3.000-10	2A	.0020	3.9980	3.9851	2.9330	2.9262	.0068	2.8783	2B	2.892	2.913	2.9350	2.9420	.0088	3.0000			
3.000-14	2A	.0018	3.9982	3.9879	2.9318	2.9180	.0059	2.9106	2B	2.923	2.938	2.9530	2.9618	.0077	3.0000			
3.000-18	2A	.0016	3.9984	3.9897	2.9623	2.9549	.0054	2.9302	2B	2.940	2.953	2.9630	2.9708	.0070	3.0000			
3.250-10	2A	.0020	3.2480	3.2381	2.1830	2.1762	.0068	2.1253	2B	2.142	2.163	2.1850	2.1938	.0088	3.2500			
3.250-14	2A	.0018	3.2482	3.2370	2.2018	2.1939	.0058	2.1806	2B	2.173	2.188	2.2036	2.2113	.0077	3.2500			
3.250-18	2A	.0015	3.2484	3.2397	2.2123	2.2069	.0054	2.1802	2B	2.190	2.203	2.2120	2.2206	.0076	3.2500			
3.500-10	2A	.0021	3.4979	3.4830	3.4339	3.4260	.0069	3.3783	2B	3.382	3.413	3.4330	3.4400	.0080	3.5000			
3.500-14	2A	.0018	3.4982	3.4879	3.4518	3.4457	.0061	3.4106	2B	3.423	3.438	3.4536	3.4618	.0079	3.5000			
3.500-18	2A	.0017	3.4983	3.4886	3.4632	3.4587	.0055	3.4301	2B	3.440	3.453	3.4630	3.4711	.0073	3.5000			
3.750-10	2A	.0021	3.7479	3.7350	3.6820	3.6760	.0069	3.6233	2B	3.642	3.663	3.6850	3.6940	.0080	3.7500			
3.750-14	2A	.0018	3.7483	3.7379	3.7018	3.6957	.0061	3.6808	2B	3.673	3.688	3.7026	3.7115	.0079	3.7500			
3.750-18	2A	.0017	3.7483	3.7398	3.7132	3.7087	.0058	3.6804	2B	3.690	3.703	3.7120	3.7211	.0073	3.7500			
4.000-10	2A	.0021	3.9979	3.9850	3.9339	3.9250	.0070	3.8782	2B	3.882	3.913	3.9350	3.9441	.0081	4.0000			
4.000-14	2A	.0018	3.9983	3.9879	3.9518	3.9456	.0063	3.8106	2B	3.923	3.938	3.9530	3.9618	.0080	4.0000			
4.250-10	2A	.0021	4.2479	4.2280	4.1820	4.1759	.0070	4.1233	2B	4.142	4.153	4.1850	4.1941	.0081	4.2500			
4.250-14	2A	.0018	4.2482	4.2379	4.3018	4.1964	.0063	4.1608	2B	4.173	4.188	4.2036	4.2116	.0080	4.2500			
4.500-10	2A	.0021	4.4979	4.4850	4.4229	4.4250	.0070	4.3782	2B	4.392	4.413	4.4350	4.4441	.0081	4.5000			

See footnotes at end of table.

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TABLE 3.1. Selected combinations, Unified special screw threads, UNS—Continued

Nominal size and threads per inch	External ^a										Internal ^b						
	Class	Allowance	Major diameter		Pitch diameter			(c) Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter		
			Max ^c	Min	Max ^d	Min	Tolerance			Min	Max	Min	Max	Tolerance			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
4.500-14	2A	.0018	4.4983	4.4870	4.4818	4.4486	.0063	4.4106	2B	4.423	4.438	4.4835	4.4816	.0080	in	4.8000	
4.750-10	2A	.0022	4.7478	4.7349	4.6828	4.6736	.0073	4.6281	2B	4.642	4.643	4.6850	4.6844	.0084	4.7500		
4.750-14	2A	.0019	4.7481	4.7378	4.7017	4.6963	.0064	4.6605	2B	4.673	4.683	4.7038	4.7118	.0083	4.7500		
5.000-10	2A	.0022	4.9978	4.9849	4.9328	4.9256	.0073	4.8781	2B	4.892	4.913	4.9350	4.9464	.0084	5.0000		
5.000-14	2A	.0019	4.9981	4.9878	4.9517	4.9153	.0064	4.9105	2B	4.923	4.928	4.9628	4.9619	.0083	5.0000		
5.250-10	2A	.0022	5.2478	5.2349	5.1828	5.1756	.0073	5.1251	2B	5.142	5.183	5.1850	5.1844	.0084	5.2500		
5.250-14	2A	.0019	5.2481	5.2378	5.2017	5.1653	.0064	5.1605	2B	5.173	5.182	5.2038	5.2110	.0083	5.2500		
5.500-10	2A	.0022	5.4078	5.3849	5.3328	5.4256	.0073	5.3751	2B	5.392	5.413	5.4230	5.4444	.0084	5.5000		
5.500-14	2A	.0019	5.4081	5.3878	5.4517	5.4483	.0064	5.4105	2B	5.423	5.438	5.4538	5.4619	.0083	5.5000		
5.750-10	2A	.0022	5.7478	5.7349	5.6828	5.6754	.0073	5.6251	2B	5.642	5.643	5.6850	5.6916	.0084	5.7500		
5.750-14	2A	.0020	5.7480	5.7377	5.7016	5.6901	.0063	5.6604	2B	5.673	5.683	5.7038	5.7191	.0085	5.7500		
6.000-10	2A	.0022	5.9978	5.9849	5.9328	5.9256	.0073	5.8781	2B	5.892	5.913	5.9350	5.9446	.0084	6.0000		
6.000-14	2A	.0020	5.9980	5.9877	5.9316	5.9181	.0065	5.9104	2B	5.923	5.938	5.9538	5.9621	.0085	6.0000		

^a Regarding combinations of thread classes, see under Thread classes in section 2.^b For class 2A threads having an additive finish the maximum is increased to the basic size. See under Classes 2A and 2B threads, and Coated threads in section 2.^c See figures 2.3, 2.4, and 2.5.^d The 1.000-14 size was formerly NF. The tolerances and allowances for this size are based on one diameter length of engagement.

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TABLE 3.2 Allowances for external threads of special diameters and pitches, classes 1A and 2A*
(UTG threads. See par. 10, p. 2.03.)

Allowance based on diameter of --		0.0435	0.0375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1	1.125	1.5
For diameter range		0.0470	0.0781	0.1084	0.1843	0.2168	0.3125	0.4375	0.5625	0.6875	0.875	1.125	1.375
Above --		0.0470	0.0781	0.1084	0.1843	0.2168	0.3125	0.4375	0.5625	0.6875	0.875	1.125	1.375
To and including --		0.0781	0.1084	0.1843	0.2168	0.3125	0.4375	0.5625	0.6875	0.875	1.125	1.375	1.625
Threads per inch													
		Major, pitch, and minor diameter allowances											
80		in	in	in	in	in	in	in	in	in	in	in	in
72		.0006	.0006	.0006	.0007	.0007	.0007	.0007	.0008	.0009	.0010	.0011	.0012
64		.0006	.0006	.0006	.0007	.0007	.0007	.0007	.0008	.0009	.0010	.0011	.0012
56		.0007	.0007	.0007	.0007	.0008	.0008	.0008	.0009	.0009	.0010	.0011	.0012
48		.0007	.0007	.0008	.0008	.0008	.0008	.0009	.0009	.0010	.0010	.0011	.0012
44		.0008	.0008	.0008	.0008	.0008	.0008	.0009	.0009	.0010	.0010	.0011	.0012
40					.0008	.0008	.0009	.0009	.0010	.0010	.0010	.0011	.0012
32					.0008	.0008	.0010	.0010	.0010	.0011	.0011	.0012	.0013
28					.0008	.0008	.0010	.0010	.0011	.0011	.0012	.0013	.0014
27					.0010	.0010	.0011	.0011	.0011	.0013	.0013	.0013	.0013
24					.0010	.0010	.0011	.0011	.0013	.0013	.0013	.0013	.0013
20					.0011	.0011	.0011	.0013	.0013	.0013	.0013	.0013	.0013
18											.0013	.0014	.0014
16											.0014	.0015	.0016
14											.0014	.0015	.0016
12											.0015	.0016	.0017
10											.0016	.0017	.0018
8											.0017	.0018	.0019
6											.0018	.0019	.0021
4											.0019	.0021	.0024
Allowance based on diameter of --		1.75	2	2.5	3	3.5	4	5	6	8	10	12	
For diameter range		1.026	1.375	2.25	3.75	3.25	3.75	4.5	5.5	7	8	11	
Above --		1.375	2.25	3.75	3.25	3.75	4.5	5.5	7	8	11	12	
To and including --		1.375	2.25	3.75	3.25	3.75	4.5	5.5	7	8	11	12	
Threads per inch													
		in	in	in	in	in	in	in	in	in	in	in	in
80													
72													
64													
56													
48													
44													
40													
32		0.0013	0.0013	0.0013	0.0013	0.0014	0.0014	0.0015	0.0016	0.0018	0.0018	0.0019	0.0020
28		.0013	.0013	.0016	.0016	.0014	.0014	.0015	.0016	.0018	.0018	.0019	.0020
27		.0013	.0013	.0014	.0014	.0014	.0014	.0015	.0016	.0018	.0018	.0019	.0020
24		.0014	.0014	.0014	.0018	.0018	.0018	.0018	.0018	.0020	.0021	.0022	.0023
20		.0018	.0018	.0018	.0018	.0018	.0018	.0018	.0017	.0017	.0017	.0018	.0019
18		.0018	.0018	.0016	.0018	.0017	.0017	.0017	.0017	.0018	.0018	.0019	.0020
16		.0016	.0016	.0017	.0017	.0017	.0017	.0018	.0018	.0019	.0019	.0020	.0022
14		.0017	.0017	.0017	.0018	.0018	.0018	.0018	.0019	.0020	.0021	.0021	.0023
12		.0018	.0018	.0019	.0019	.0019	.0019	.0020	.0020	.0021	.0021	.0022	.0023
10		.0019	.0020	.0020	.0020	.0021	.0021	.0022	.0022	.0023	.0023	.0024	.0024
8		.0021	.0022	.0022	.0023	.0023	.0023	.0024	.0024	.0025	.0025	.0026	.0026
6		.0023	.0023	.0026	.0026	.0026	.0026	.0026	.0027	.0027	.0028	.0029	.0029
4		.0030	.0031	.0031	.0031	.0031	.0032	.0032	.0033	.0034	.0034	.0035	

* Class 1A allowances are tabulated on p. 2.03.

CLASSES 1A, 2A ALLOWANCES

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TABLE 3.3. Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, classes 1A and 1AR
(UNI threads. See par. 7.3, p. 2.03; par. 10, p. 3.05.)

Tolerance based on diameter of --		<i>t</i>	0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range			0.0470	0.0781	0.1094	0.1562	0.2125	0.3125	0.4375	0.5425	0.6875	0.875
Above --			0.0781	0.1094	0.1562	0.2125	0.3125	0.4375	0.5425	0.6875	0.875	1.125
To and including --												
Threads per inch	Length of engagement		Pitch diameter tolerances									
	Number of pitches	Inches										
80	8 to 15	0.06 to 0.10			in	in	in	in	in	in	in	in
	16 to 30	0.19 to 0.33										
72	8 to 15	0.07 to 0.21										
	16 to 30	0.21 to 0.43										
64	8 to 15	0.08 to 0.22										
	16 to 30	0.23 to 0.48										
56	8 to 15	0.09 to 0.27										
	16 to 30	0.27 to 0.54										
48	8 to 15	0.10 to 0.31										
	16 to 30	0.31 to 0.62										
44	8 to 15	0.11 to 0.34	0.0038	0.0039	0.0041	0.0043	0.0044	0.0048	0.0047	0.0049	0.0051	
	16 to 30	0.34 to 0.68	.0048	.0049	.0051	.0053	.0055	.0058	.0059	.0061	.0063	
40	8 to 15	0.12 to 0.38			.0041	.0043	.0044	.0046	.0048	.0049	.0050	
	16 to 30	0.38 to 0.78			.0051	.0053	.0055	.0058	.0060	.0061	.0063	.0068
36	8 to 15	0.14 to 0.42			.0043	.0045	.0046	.0048	.0049	.0050	.0051	.0054
	16 to 30	0.42 to 0.84			.0054	.0056	.0058	.0060	.0062	.0064	.0066	.0068
32	8 to 15	0.16 to 0.47			.0045	.0047	.0048	.0050	.0052	.0053	.0055	.0057
	16 to 30	0.47 to 0.94			.0057	.0059	.0061	.0063	.0065	.0067	.0068	.0071
30	8 to 15	0.18 to 0.54										
	16 to 30	0.54 to 1.08										
27	8 to 15	0.19 to 0.58										
	16 to 30	0.58 to 1.13										
24	8 to 15	0.21 to 0.62										
	16 to 30	0.62 to 1.24										
20	8 to 15	0.25 to 0.75										
	16 to 30	0.75 to 1.50										
18	8 to 15	0.28 to 0.82										
	16 to 30	0.82 to 1.66										
16	8 to 15	0.31 to 0.94										
	16 to 30	0.94 to 1.88										
14	8 to 15	0.36 to 1.07										
	16 to 30	1.07 to 2.14										
12	8 to 15	0.42 to 1.23										
	16 to 30	1.23 to 2.50										
10	8 to 15	0.50 to 1.40										
	16 to 30	1.40 to 3.00										
8	8 to 15	0.62 to 1.88										
	16 to 30	1.88 to 3.78										
6	8 to 15	0.83 to 2.60										
	16 to 30	2.80 to 5.00										
4	8 to 15	1.25 to 3.75										
	16 to 30	3.75 to 7.50										

1A, 1AR P.D. TOLERANCES

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TABLE 3.3. Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, classes 1A and 1AR—Con.

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerances

Threads per task

LEGENDA

- These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 4UN thread series in Table 2.21.
 - Classes 1A and 1AR tolerances in this table for 5 to 16 pitches are based on 9 pitches and are obtained by multiplying the class 1A (external thread) tolerances for 9 pitches taken to six decimal places (see table 2.19) by a factor of 1.5.
 - Classes 1A and 1AR tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places (see table 2.19) by a factor of 1.78 (obtained by multiplying the 1.5 factor by 1.23). For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
 - Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
 - Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see *Dimensions of External Threads* in appendix A5.

in	in	in	in	in	in	in	in	in	in	in	in	in	in	in
.0058 .0070	.0058 .0072													
.0058 .0073	.0060 .0078	.0061 .0077	.0062 .0078	.0065 .0081	.0067 .0083									
.0061 .0077	.0063 .0079	.0064 .0080	.0066 .0082	.0068 .0083	.0070 .0085	.0071 .0087	.0073 .0089	.0073 .0091						
.0061 .0078	.0061 .0080	.0065 .0081	.0066 .0083	.0066 .0086	.0070 .0088	.0072 .0090	.0074 .0092	.0076 .0096	.0079 .0096	.0082 .0099				
.0065 .0081	.0067 .0083	.0068 .0083	.0069 .0086	.0071 .0089	.0073 .0092	.0075 .0094	.0077 .0096	.0079 .0099	.0082 .0102					
.0070 .0087	.0071 .0089	.0073 .0091	.0074 .0092	.0076 .0093	.0078 .0098	.0080 .0100	.0081 .0102	.0084 .0103	.0087 .0109	.0090 .0112	.0094 .0117			
.0073 .0091	.0074 .0093	.0076 .0093	.0077 .0096	.0079 .0099	.0081 .0101	.0083 .0104	.0084 .0104	.0087 .0109	.0090 .0113	.0094 .0116	.0097 .0122	.0101 .0128		
.0077 .0098	.0076 .0098	.0079 .0099	.0081 .0101	.0083 .0104	.0085 .0106	.0086 .0108	.0088 .0110	.0091 .0113	.0093 .0116	.0098 .0122	.0102 .0127	.0105 .0132	.0108 .0138	
.0081 .0101	.0083 .0103	.0084 .0103	.0085 .0106	.0087 .0109	.0089 .0113	.0091 .0114	.0092 .0116	.0093 .0119	.0098 .0122	.0102 .0134	.0105 .0142	.0108 .0143		
.0087 .0106	.0088 .0110	.0090 .0112	.0091 .0113	.0093 .0116	.0095 .0119	.0097 .0121	.0098 .0123	.0101 .0126	.0103 .0129	.0107 .0134	.0111 .0140	.0114 .0142		
.0094 .0115	.0096 .0119	.0097 .0121	.0098 .0123	.0100 .0125	.0102 .0128	.0104 .0130	.0105 .0132	.0108 .0133	.0111 .0138	.0115 .0144	.0118 .0148	.0121 .0152	.0124 .0153	
.0104 .0130	.0106 .0132	.0107 .0124	.0108 .0126	.0111 .0128	.0113 .0141	.0114 .0143	.0116 .0145	.0119 .0148	.0121 .0151	.0125 .0158	.0129 .0161	.0132 .0163	.0134 .0165	
		.0121 .0133	.0122 .0134	.0124 .0135	.0126 .0150	.0128 .0160	.0130 .0162	.0132 .0164	.0134 .0168	.0137 .0171	.0141 .0178	.0144 .0180	.0147 .0184	
				.0151 .0169	.0154 .0192	.0155 .0194	.0157 .0196	.0158 .0198	.0162 .0202	.0164 .0203	.0168 .0210	.0172 .0214	.0175 .0218	

1A, 1AR P.D. TOLERANCES

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TABLE 3.4 Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 8A
 (UNB threads. See par. 7.3, p. 3.03; par. 10, p. 3.04.)

Tolerance based on diameter of --		0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above --		0.0770	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including --		0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement										Pitch diameter tolerances
	Number of pitches	Inches									
80	{ 8 to 15 16 to 30	0.06 to 0.19 0.191 to 0.38	.0019 .0024	.0020 .0025	.0021 .0026	.0022 .0027	.0023 .0028	.0023 .0028	-- --	-- --	in
72	{ 8 to 15 16 to 30	0.07 to 0.21 0.211 to 0.42	.0020 .0023	.0021 .0026	.0021 .0027	.0022 .0028	.0023 .0029	.0023 .0031	-- --	-- --	in
64	{ 8 to 15 16 to 30	0.08 to 0.23 0.231 to 0.46	.0021 .0026	.0022 .0027	.0022 .0028	.0023 .0029	.0024 .0031	.0028 .0031	0.0027 .0031	0.0027 .0034	in
56	{ 8 to 15 16 to 30	0.09 to 0.27 0.271 to 0.54	......0029	.0023 .0030	.0024 .0031	.0025 .0031	.0028 .0032	.0028 .0034	.0028 .0035	.0029 .0038	0.0030 .0037
48	{ 8 to 15 16 to 30	0.10 to 0.31 0.311 to 0.62	......0031	.0023 .0033	.0025 .0033	.0026 .0033	.0027 .0034	.0028 .0034	.0030 .0037	.0031 .0038	.0031 .0039
44	{ 8 to 15 16 to 20	0.11 to 0.34 0.341 to 0.68	......0032	.0026 .0033	.0026 .0034	.0027 .0033	.0028 .0035	.0029 .0037	.0030 .0038	.0031 .0040	.0032 .0041
40	{ 8 to 15 16 to 30	0.12 to 0.38 0.381 to 0.76	......0034	......0038	.0027 .0037	.0029 .0038	.0029 .0037	.0031 .0038	.0033 .0040	.0034 .0041	.0034 .0043
36	{ 8 to 15 16 to 30	0.14 to 0.42 0.431 to 0.84	......0038	......0039	.0029 .0037	.0030 .0038	.0031 .0038	.0032 .0040	.0033 .0041	.0034 .0043	.0034 .0044
32	{ 8 to 15 16 to 30	0.16 to 0.47 0.471 to 0.94	......0038	......0039	.0030 .0039	.0031 .0040	.0032 .0040	.0034 .0042	.0035 .0043	.0036 .0044	.0036 .0047
28	{ 8 to 15 16 to 30	0.18 to 0.54 0.541 to 1.08	......0042	......0043	.0033 .0043	.0034 .0044	.0034 .0044	.0037 .0046	.0038 .0047	.0038 .0048	.0040 .0050
27	{ 8 to 15 16 to 30	0.19 to 0.56 0.561 to 1.13	......0043	......0043	.0034 .0043	.0035 .0043	.0035 .0044	.0037 .0047	.0038 .0048	.0038 .0049	.0040 .0060
24	{ 8 to 15 16 to 30	0.21 to 0.62 0.621 to 1.34	......0048	......0048	.0036 .0048	.0037 .0048	.0038 .0048	.0039 .0049	.0040 .0050	.0041 .0051	.0042 .0053
20	{ 8 to 15 16 to 30	0.25 to 0.75 0.751 to 1.50	......0050	......0050	......0050	.0040 .0050	.0041 .0050	.0042 .0053	.0043 .0054	.0044 .0055	.0045 .0056
18	{ 8 to 15 16 to 30	0.28 to 0.82 0.821 to 1.68	......0054	......0054	......0054	......0054	.0043 .0054	.0044 .0055	.0045 .0056	.0046 .0058	.0047 .0060
16	{ 8 to 15 16 to 30	0.31 to 0.94 0.941 to 1.88	......0057	......0057	......0057	......0057	......0058	.0046 .0058	.0047 .0060	.0048 .0060	.0049 .0063
14	{ 8 to 15 16 to 30	0.36 to 1.07 1.071 to 2.14	......0062	......0062	......0062	......0062	......0063	.0050 .0063	.0051 .0063	.0051 .0064	.0051 .0066
12	{ 8 to 15 16 to 30	0.43 to 1.25 1.251 to 2.50	......0067	......0067	......0067	......0067	......0068	.0054 .0068	.0054 .0068	.0055 .0069	.0057 .0071
10	{ 8 to 15 16 to 30	0.50 to 1.50 1.501 to 3.00	......0073	..... .0073	..... .0073	..... .0073	..... .0073	..... .0073	..... .0073	.0060 .0073	.0063 .0077
8	{ 8 to 15 16 to 30	0.62 to 1.62 1.661 to 3.76	......0081	......0081	..... .0081	..... .0081	..... .0081	..... .0081	..... .0081	..... .0081	.0065 .0081
6	{ 8 to 15 16 to 30	0.83 to 2.50 2.501 to 8.00009600960096						
4	{ 8 to 15 16 to 30	1.23 to 8.78 2.751 to 7.80010401040104						

2A P.D. TOLERANCES

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TABLE 3.4. Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 2A—Con

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	Threads per inch
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													
LEGENDS													
1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and SUN thread series in table 2.21. 2. Formula: $\text{Class 2A tolerance} = 0.0018\sqrt{D} + 0.0018\sqrt{l_e} + 0.018\sqrt{p^2}$ where D = basic major diameter l_e = length of engagement p = pitch 3. Length of engagement increments included in the tabulated tolerances for lengths of engagement of from 8 to 15 pitches are based on lengths of 9 pitches; those for lengths of engagement greater than 15 to 20 pitches are obtained by multiplying the 9-pitch values (taken to six decimal places (see table 2.10) by 1.25. For lengths of engagement not tabulated, the formula in legend 2 should be applied except as modified by par. 7.3, p. 3-03. 4. Pitches listed are those used most commonly and are recommended. When intermediate pitches are specified, the formula in legend 2 should be applied. 5. Tolerances are tabulated only for combinations of diameter, pitch and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix AB.													
... 0.0037 .00470039 .00490041 .00510043 .00530043 .00530047 .00580049 .00610050 .00610052 .00620053 .00630054 .00630058 .00680060 .00690061 .00690062 .00680064 .00690065 .00700066 .00710066 .00710067 .00720068 .00730069 .00730070 .00740071 .00750072 .00760073 .00770074 .00780075 .00790076 .00800077 .00810078 .00820079 .00830080 .00840081 .00850082 .00860083 .00870084 .00880085 .00890086 .00900087 .00910088 .00920089 .00930090 .00940091 .00950092 .00960093 .00970094 .00980095 .01000096 .01010097 .01020098 .01030099 .01040100 .01050101 .01060102 .01070103 .01080104 .01090105 .01100106 .01110107 .01120108 .01130109 .01140110 .01150111 .01160112 .01170113 .01180114 .01190115 .01200116 .01210117 .01220118 .01230119 .01240120 .01250121 .01260122 .01270123 .01280124 .01290125 .01300126 .01310127 .01320128 .01330129 .01340130 .01350131 .01360132 .01370133 .01380134 .01390135 .01400136 .01410137 .01420138 .01430139 .01440140 .0145 ...	40 36 32 30 28 27 24 20 18 16 14 12 10 8 6 4												

2A P.D. TOLERANCES

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TABLE 3.5 Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 3.4
(UNB threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of --			0.0635	0.06375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range			0.0470	0.0781	0.1094	0.1863	0.2153	0.3125	0.4375	0.5625	0.6875	0.875
Above --												
To and including --			0.0781	0.1094	0.1563	0.2153	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement:		Pitch diameter tolerances									
	Number of pitches	Inches										
80	5 to 15	0.05 to 0.19	in	in	in	in	in	in	in	in	in	in
	16 to 30	0.191 to 0.38	.0014	.0018	.0018	.0018	.0018	.0017	.0017	.0017	.0017	.0017
			.0018	.0019	.0019	.0020	.0020	.0021	.0021	.0021	.0021	.0021
72	5 to 15	0.07 to 0.21	.0015	.0018	.0018	.0018	.0017	.0018	.0019	.0019	.0019	.0019
	16 to 30	0.211 to 0.43	.0019	.0019	.0020	.0020	.0021	.0021	.0022	.0022	.0022	.0022
64	5 to 15	0.08 to 0.23	.0016	.0018	.0018	.0017	.0018	.0018	.0019	.0020	.0020	.0020
	16 to 30	0.231 to 0.48	.0020	.0020	.0021	.0021	.0022	.0022	.0023	.0023	.0023	.0023
56	5 to 15	0.09 to 0.37	.....	.0017	.0018	.0019	.0019	.0019	.0020	.0021	.0022	.0022
	16 to 30	0.371 to 0.84	.....	.0022	.0022	.0023	.0023	.0024	.0025	.0026	.0027	.0028
48	5 to 15	0.10 to 0.31	.....	.0019	.0019	.0020	.0020	.0020	.0021	.0022	.0024	.0024
	16 to 30	0.311 to 0.63	.....	.0023	.0024	.0025	.0025	.0026	.0027	.0028	.0030	.0030
44	5 to 15	0.11 to 0.34	.....	.0019	.0020	.0021	.0021	.0021	.0022	.0023	.0024	.0024
	16 to 30	0.341 to 0.68	.....	.0024	.0025	.0026	.0026	.0027	.0028	.0029	.0030	.0032
40	5 to 15	0.13 to 0.38	.....	.....	.0021	.0021	.0022	.0022	.0023	.0024	.0025	.0026
	16 to 30	0.381 to 0.78	.....	.....	.0026	.0027	.0028	.0029	.0030	.0031	.0031	.0033
36	5 to 15	0.14 to 0.43	.....	.....	.0022	.0022	.0023	.0023	.0024	.0025	.0026	.0027
	16 to 30	0.431 to 0.84	.....	.....	.0027	.0028	.0029	.0030	.0031	.0032	.0033	.0034
32	5 to 15	0.16 to 0.47	.....	.....	.0023	.0024	.0024	.0025	.0026	.0027	.0027	.0028
	16 to 30	0.471 to 0.94	.....	.....	.0028	.0029	.0030	.0032	.0033	.0033	.0034	.0035
28	5 to 15	0.18 to 0.51	.....	.....	.....	.0025	.0026	.0027	.0028	.0029	.0030	.0030
	16 to 30	0.541 to 1.08	.....	.....	.....	.0031	.0032	.0033	.0034	.0035	.0036	.0037
24	5 to 15	0.19 to 0.56	.....	.....	.....	.0025	.0026	.0027	.0028	.0029	.0030	.0030
	16 to 30	0.561 to 1.13	.....	.....	.....	.0033	.0033	.0034	.0035	.0036	.0037	.0038
20	5 to 15	0.21 to 0.62	.....	.....	.....	.0027	.0028	.0029	.0030	.0030	.0031	.0032
	16 to 30	0.631 to 1.24	.....	.....	.....	.0034	.0034	.0035	.0036	.0038	.0038	.0040
18	5 to 15	0.25 to 0.75	.....	.....	.....	.....	.0030	.0031	.0033	.0040	.0041	.0043
	16 to 30	0.761 to 1.50	.....	.....	.....	.....	.0037	.0039	.0040	.0041	.0041	.0043
16	5 to 15	0.28 to 0.83	.....	.....	.....	.....	.....	.0033	.0033	.0034	.0035	.0036
	16 to 30	0.831 to 1.68	.....	.....	.....	.....	.....	.0041	.0043	.0043	.0043	.0044
14	5 to 15	0.35 to 1.07	.....	.....	.....	.....	.....	.....	.0037	.0038	.0039	.0040
	16 to 30	1.071 to 3.14	.....	.....	.....	.....	.....	.....	.0047	.0048	.0048	.0050
12	5 to 15	0.42 to 1.25	.....	.....	.....	.....	.....	.....	.....	.0040	.0041	.0042
	16 to 30	1.251 to 3.50	.....	.....	.....	.....	.....	.....	.....	.0050	.0051	.0052
10	5 to 15	0.50 to 1.50	.....	.....	.....	.....	.....	.....	.....	.....	.0043	.0046
	16 to 30	1.501 to 3.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.0058
8	5 to 15	0.63 to 1.53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.0051
	16 to 30	1.531 to 3.760064
6	5 to 15	0.83 to 1.50
	16 to 30	1.501 to 3.00
4	5 to 15	1.25 to 3.75
	16 to 30	3.731 to 7.50

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TABLE 3.5 Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 3A—Con

.1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerance

Threads
per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.31.
2. Class 3A tolerances in this table for 8 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 3A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.75. (See table 2.19.)
3. Class 3A tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 3A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.6375 (obtained by multiplying the 0.75 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A8.

in	in	in	in	in	in	in	in	in	in	in	in	in
0.0025	0.0029	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.0038	.0034	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.0020	.0030	.0031	.0031	.0032	.0032	.....	.....	.....	.....	.....	.....	.....
.0037	.0038	.0038	.0039	.0040	.0042	.....	.....	.....	.....	.....	.....	.....
.0031	.0031	.0023	.0023	.0034	.0035	.0036	.0036	.....	.....	.....	.....	.....
.0038	.0039	.0040	.0041	.0042	.0044	.0045	.0046	.....	.....	.....	.....	.....
.0031	.0033	.0033	.0033	.0034	.0035	.0036	.0037	.0038	.0039	.....	.....	.....
.0038	.0040	.0041	.0041	.0042	.0044	.0045	.0046	.0048	.0049	.....	.....	.....
.0033	.0033	.0034	.0035	.0036	.0037	.0037	.0038	.0040	.0041	.....	.....	.....
.0041	.0043	.0043	.0043	.0045	.0046	.0047	.0048	.0050	.0051	.....	.....	.....
.0035	.0036	.0038	.0037	.0038	.0039	.0040	.0041	.0043	.0043	.....	.....	.....
.0044	.0045	.0045	.0046	.0046	.0049	.0050	.0051	.0053	.0054	.....	.....	.....
.0038	.0037	.0038	.0039	.0040	.0041	.0041	.0042	.0044	.0045	.0046	.0047	.....
.0045	.0047	.0047	.0048	.0050	.0051	.0052	.0053	.0054	.0055	.0056	.0057	.....
.0038	.0039	.0040	.0040	.0041	.0042	.0043	.0044	.0045	.0047	.0048	.0049	.0050
.0048	.0049	.0050	.0050	.0052	.0053	.0054	.0055	.0057	.0058	.0061	.0063	.....
.0043	.0040	.0040	.0040	.0041	.0042	.0043	.0044	.0045	.0047	.0049	.0050	.....
.0048	.0049	.0050	.0050	.0052	.0053	.0054	.0055	.0057	.0058	.0061	.0063	.....
.0041	.0041	.0043	.0043	.0044	.0045	.0045	.0046	.0048	.0049	.0051	.0053	.0054
.0048	.0048	.0049	.0049	.0051	.0052	.0053	.0054	.0055	.0056	.0058	.0060	.....
.0043	.0044	.0045	.0045	.0046	.0047	.0048	.0049	.0050	.0052	.0054	.0055	.0057
.0048	.0048	.0048	.0048	.0049	.0050	.0050	.0051	.0053	.0055	.0057	.0059	.0071
.0047	.0048	.0048	.0049	.0050	.0051	.0052	.0053	.0054	.0055	.0057	.0059	.0071
.0049	.0050	.0051	.0051	.0052	.0053	.0054	.0055	.0056	.0058	.0060	.0061	.0073
.0052	.0053	.0054	.0054	.0055	.0055	.0057	.0058	.0059	.0061	.0063	.0064	.0066
.0065	.0066	.0067	.0068	.0068	.0070	.0071	.0073	.0074	.0076	.0078	.0080	.0082
.0061	.0061	.0062	.0063	.0064	.0065	.0066	.0067	.0068	.0070	.0072	.0074	.0076
.0078	.0077	.0078	.0079	.0080	.0081	.0083	.0084	.0085	.0086	.0088	.0090	.0092
			.0078	.0077	.0078	.0079	.0079	.0081	.0082	.0084	.0086	.0087
			.0098	.0096	.0096	.0098	.0098	.0101	.0102	.0103	.0107	.0109
												4

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TABLE 3.6. Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 1B—Con

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerances

Threads
per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNP, and SUN thread series in table 2.31.
2. Class 1B (internal thread) tolerances in this table for 3 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.85. (See table 2.10.)
3. Class 1B tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 2.4375 (obtained by multiplying the 1.85 factor by 1.25.) (See table 2.10.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A8.

| in | in | in | in | in | in | in | in | in | in | in | in | in |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0.0073 | 0.0075 | | | | | | | | | | | |
| .0091 | .0094 | | | | | | | | | | | |
| .0078 | .0078 | 0.0080 | 0.0081 | 0.0084 | 0.0087 | | | | | | | |
| .0095 | .0098 | .0100 | .0102 | .0105 | .0108 | | | | | | | |
| .0080 | .0082 | .0084 | .0085 | .0088 | .0090 | 0.0093 | 0.0095 | | | | | |
| .0100 | .0102 | .0104 | .0106 | .0110 | .0113 | .0116 | .0118 | | | | | |
| .0090 | .0083 | .0085 | .0085 | .0088 | .0092 | .0094 | .0096 | 0.0099 | 0.0103 | | | |
| .0101 | .0104 | .0106 | .0108 | .0111 | .0114 | .0117 | .0120 | .0124 | .0128 | | | |
| .0085 | .0087 | .0088 | .0088 | .0089 | .0093 | .0095 | .0097 | .0100 | .0103 | .0106 | | |
| .0105 | .0109 | .0110 | .0112 | .0118 | .0121 | .0123 | .0124 | .0129 | .0133 | | | |
| .0091 | .0093 | .0095 | .0096 | .0099 | .0101 | .0104 | .0106 | .0109 | .0112 | | | |
| .0114 | .0118 | .0118 | .0120 | .0124 | .0127 | .0130 | .0133 | .0137 | .0141 | | | |
| .0095 | .0097 | .0099 | .0100 | .0103 | .0105 | .0108 | .0110 | .0113 | .0116 | 0.0122 | | |
| .0118 | .0121 | .0123 | .0125 | .0129 | .0132 | .0135 | .0137 | .0142 | .0146 | .0152 | | |
| .0100 | .0101 | .0103 | .0105 | .0108 | .0110 | .0112 | .0114 | .0118 | .0121 | .0126 | 0.0131 | |
| .0124 | .0127 | .0129 | .0131 | .0135 | .0138 | .0140 | .0143 | .0148 | .0151 | .0156 | .0164 | |
| .0105 | .0107 | .0109 | .0111 | .0114 | .0116 | .0118 | .0120 | .0124 | .0127 | .0132 | .0137 | 0.0141 |
| .0132 | .0134 | .0136 | .0138 | .0142 | .0145 | .0148 | .0150 | .0155 | .0159 | .0165 | .0171 | .0176 |
| .0113 | .0118 | .0118 | .0120 | .0121 | .0123 | .0126 | .0128 | .0131 | .0134 | .0140 | .0144 | .0148 |
| .0141 | .0143 | .0145 | .0147 | .0151 | .0154 | .0157 | .0159 | .0164 | .0168 | .0175 | .0180 | .0185 |
| .0122 | .0124 | .0126 | .0128 | .0130 | .0133 | .0135 | .0137 | .0141 | .0144 | .0149 | .0154 | .0158 |
| .0163 | .0168 | .0168 | .0169 | .0169 | .0169 | .0169 | .0173 | .0176 | .0180 | .0187 | .0192 | .0197 |
| .0138 | .0138 | .0139 | .0141 | .0144 | .0146 | .0148 | .0151 | .0154 | .0157 | .0163 | .0167 | .0171 |
| .0170 | .0172 | .0174 | .0176 | .0180 | .0183 | .0185 | .0188 | .0193 | .0197 | .0203 | .0209 | .0214 |
| .0158 | .0160 | .0161 | .0164 | .0167 | .0169 | .0171 | .0174 | .0178 | .0183 | .0187 | .0191 | .0195 |
| .0197 | .0200 | .0202 | .0204 | .0206 | .0208 | .0211 | .0214 | .0218 | .0222 | .0226 | .0231 | .0236 |
| | | | .0197 | .0200 | .0202 | .0204 | .0206 | .0210 | .0213 | .0216 | .0222 | .0227 |
| | | | .0248 | .0250 | .0253 | .0255 | .0258 | .0262 | .0266 | .0270 | .0274 | .0281 |

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TABLE 3.6. Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 1B
 (UNS threads. See par. 7.3, p. 8-03; par. 10, p. 8-06.)

Tolerance based on diameter of --			0.0625	0.0678	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above --			0.0170	0.0781	0.1094	0.1643	0.2188	0.3125	0.4375	0.5625	0.6875	0.8125
To and including --			0.0781	0.1094	0.1562	0.2153	0.3125	0.4375	0.5625	0.6875	0.8125	1.125
Threads per inch	Length of engagement		Pitch diameter tolerances									
	Number of pitches	Inches	in	in	in	in	in	in	in	in	in	in
80	{ 8 to 15 15 to 30	0.06 to 0.19 0.191 to 0.38										
72	{ 8 to 15 15 to 30	0.07 to 0.21 0.211 to 0.43										
64	{ 8 to 15 15 to 20	0.08 to 0.23 0.231 to 0.46										
56	{ 8 to 15 15 to 30	0.09 to 0.27 0.271 to 0.64										
48	{ 8 to 15 15 to 30	0.10 to 0.31 0.311 to 0.63										
44	{ 8 to 15 15 to 30	0.11 to 0.34 0.341 to 0.68	0.0030 0.003	0.0081 0.0064	0.0053 0.0067	0.0055 0.0069	0.0058 0.0073	0.0060 0.0074	0.0063 0.0077	0.0063 0.0079	0.0066 0.0082	
40	{ 8 to 15 15 to 30	0.12 to 0.38 0.381 to 0.76		0.0044 0.0047	0.0066 0.0070	0.0067 0.0073	0.0069 0.0078	0.0063 0.0078	0.0064 0.0080	0.0066 0.0083	0.0068 0.0088	
38	{ 8 to 15 15 to 30	0.14 to 0.42 0.421 to 0.84		0.0056 0.0070	0.0055 0.0073	0.0040 0.0078	0.0063 0.0078	0.0065 0.0081	0.0066 0.0083	0.0068 0.0088	0.0071 0.0093	
32	{ 8 to 15 15 to 30	0.18 to 0.47 0.471 to 0.94		0.0066 0.0074	0.0041 0.0077	0.0062 0.0079	0.0068 0.0082	0.0068 0.0088	0.0070 0.0087	0.0071 0.0089	0.0074 0.0093	
28	{ 8 to 15 15 to 30	0.18 to 0.64 0.541 to 1.08			0.0065 0.0081	0.0067 0.0083	0.0068 0.0087	0.0073 0.0098	0.0073 0.0092	0.0078 0.0094	0.0078 0.0097	
27	{ 8 to 15 15 to 30	0.19 to 0.68 0.561 to 1.13			0.0068 0.0083	0.0068 0.0085	0.0070 0.0088	0.0073 0.0091	0.0074 0.0093	0.0078 0.0098	0.0079 0.0099	
24	{ 8 to 15 15 to 30	0.21 to 0.62 0.621 to 1.24			0.0070 0.0087	0.0073 0.0089	0.0074 0.0093	0.0076 0.0093	0.0078 0.0098	0.0080 0.0103	0.0083 0.0103	
20	{ 8 to 15 15 to 30	0.25 to 0.75 0.751 to 1.50				0.0078 0.0097	0.0080 0.0101	0.0083 0.0103	0.0084 0.0106	0.0088 0.0107	0.0090 0.0111	
18	{ 8 to 15 15 to 30	0.28 to 0.83 0.831 to 1.66					0.0084 0.0105	0.0087 0.0108	0.0089 0.0110	0.0090 0.0113	0.0093 0.0116	
16	{ 8 to 15 15 to 30	0.31 to 0.91 0.941 to 1.88						0.0090 0.0111	0.0091 0.0114	0.0093 0.0116	0.0098 0.0122	
14	{ 8 to 15 15 to 30	0.38 to 1.07 1.071 to 2.14							0.0097 0.0121	0.0099 0.0134	0.0100 0.0123	
12	{ 8 to 15 15 to 30	0.42 to 1.25 1.251 to 2.50								0.0104 0.0130	0.0106 0.0133	0.0108 0.0135
10	{ 8 to 15 15 to 30	0.50 to 1.60 1.601 to 3.00									0.0117 0.0147	0.0120 0.0160
8	{ 8 to 15 15 to 30	0.62 to 1.88 1.881 to 3.78										0.0133 0.0167
6	{ 8 to 15 15 to 30	0.83 to 2.50 2.501 to 5.00										
4	{ 8 to 15 15 to 30	1.25 to 3.75 3.751 to 7.50										

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TABLE 3.7. Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 2B
(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.03.)

Tolerance based on diameter of --		0.0625	0.06375	0.125	0.1875	0.35	0.375	0.5	0.625	0.75	1	
For diameter range Above --		0.0470	0.0781	0.1094	0.1562	0.3183	0.3125	0.4378	0.5625	0.6875	0.875	
To and including --		0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125	
Threads per inch	Length of engagement										Pitch diameter tolerances	
	Number of pitches	Inches									in	in
60	{ 8 to 15 16 to 30	0.06 to 0.19 0.191 to 0.38	0.0025 0.0031	0.0036 0.0033	0.0027 0.0033	0.0029 0.0035	0.0029 0.0037	0.0030 -----	0.0032 -----	0.0033 -----	-----	-----
72	{ 8 to 15 16 to 30	0.07 to 0.21 0.211 to 0.42	0.0026 0.0032	0.0037 0.0034	0.0028 0.0035	0.0029 0.0037	0.0029 0.0038	0.0030 0.0040	0.0032 0.0040	0.0033 -----	0.0034 -----	0.0035 -----
84	{ 8 to 15 16 to 30	0.08 to 0.22 0.231 to 0.46	0.0027 0.0034	0.0028 0.0035	0.0029 0.0037	0.0031 0.0038	0.0022 0.0040	0.0023 0.0042	0.0034 0.0044	0.0035 0.0044	0.0036 0.0045	0.0037 0.0046
96	{ 8 to 15 16 to 30	0.09 to 0.27 0.271 to 0.54	0.0028 0.0037	0.0029 0.0039	0.0031 0.0040	0.0032 0.0042	0.0033 0.0041	0.0035 0.0044	0.0037 0.0046	0.0038 0.0047	0.0039 0.0046	0.0040 0.0049
48	{ 8 to 15 16 to 30	0.10 to 0.31 0.311 to 0.62	0.0029 0.0040	0.0032 0.0041	0.0033 0.0043	0.0034 0.0043	0.0036 0.0044	0.0037 0.0047	0.0039 0.0048	0.0040 0.0050	0.0041 0.0051	0.0041 0.0050
44	{ 8 to 15 16 to 30	0.11 to 0.34 0.341 to 0.66	0.0030 0.0043	0.0033 0.0043	0.0034 0.0043	0.0035 0.0043	0.0037 0.0048	0.0039 0.0048	0.0040 0.0050	0.0041 0.0051	0.0041 0.0050	0.0041 0.0050
40	{ 8 to 15 16 to 30	0.12 to 0.38 0.381 to 0.78	0.0030 0.0045	0.0033 0.0046	0.0037 0.0046	0.0038 0.0046	0.0038 0.0048	0.0039 0.0050	0.0040 0.0053	0.0041 0.0053	0.0043 0.0053	0.0044 0.0057
36	{ 8 to 15 16 to 30	0.14 to 0.42 0.421 to 0.84	0.0031 0.0047	0.0033 0.0049	0.0037 0.0050	0.0039 0.0052	0.0040 0.0053	0.0042 0.0053	0.0043 0.0054	0.0044 0.0055	0.0045 0.0057	0.0047 0.0058
32	{ 8 to 15 16 to 30	0.16 to 0.47 0.471 to 0.94	0.0032 0.0049	0.0034 0.0051	0.0041 0.0053	0.0042 0.0056	0.0043 0.0056	0.0044 0.0058	0.0045 0.0060	0.0046 0.0063	0.0047 0.0063	0.0049 0.0061
28	{ 8 to 15 16 to 30	0.18 to 0.54 0.541 to 1.08	0.0033 0.0051	0.0035 0.0054	0.0043 0.0054	0.0044 0.0058	0.0044 0.0058	0.0046 0.0060	0.0048 0.0061	0.0049 0.0061	0.0050 0.0063	0.0052 0.0065
27	{ 8 to 15 16 to 30	0.19 to 0.56 0.561 to 1.12	0.0034 0.0052	0.0036 0.0057	0.0044 0.0059	0.0045 0.0061	0.0047 0.0061	0.0048 0.0063	0.0049 0.0063	0.0050 0.0063	0.0051 0.0063	0.0052 0.0066
24	{ 8 to 15 16 to 30	0.21 to 0.63 0.631 to 1.33	0.0035 0.0058	0.0037 0.0060	0.0047 0.0063	0.0048 0.0067	0.0049 0.0063	0.0049 0.0064	0.0051 0.0066	0.0052 0.0066	0.0053 0.0066	0.0055 0.0069
20	{ 8 to 15 16 to 30	0.25 to 0.75 0.751 to 1.80	0.0036 0.0063	0.0038 0.0063	0.0052 0.0067	0.0054 0.0067	0.0055 0.0069	0.0056 0.0070	0.0058 0.0070	0.0059 0.0073	0.0060 0.0073	0.0062 0.0074
18	{ 8 to 15 16 to 30	0.28 to 0.83 0.831 to 1.66	0.0037 0.0064	0.0039 0.0064	0.0053 0.0067	0.0055 0.0070	0.0056 0.0073	0.0058 0.0073	0.0059 0.0074	0.0060 0.0075	0.0060 0.0077	0.0062 0.0077
16	{ 8 to 15 16 to 30	0.31 to 0.94 0.941 to 1.88	0.0038 0.0065	0.0041 0.0068	0.0044 0.0070	0.0045 0.0074	0.0046 0.0075	0.0047 0.0077	0.0048 0.0077	0.0049 0.0079	0.0051 0.0081	0.0052 0.0081
14	{ 8 to 15 16 to 30	0.35 to 1.07 1.071 to 2.14	0.0039 0.0066	0.0042 0.0071	0.0048 0.0077	0.0049 0.0076	0.0049 0.0077	0.0050 0.0077	0.0051 0.0077	0.0052 0.0079	0.0053 0.0081	0.0055 0.0083
12	{ 8 to 15 16 to 30	0.42 to 1.25 1.251 to 2.60	0.0040 0.0068	0.0044 0.0076	0.0050 0.0083	0.0052 0.0087	0.0053 0.0083	0.0054 0.0083	0.0055 0.0083	0.0056 0.0083	0.0057 0.0083	0.0058 0.0083
10	{ 8 to 15 16 to 30	0.50 to 1.50 1.501 to 3.00	0.0041 0.0070	0.0046 0.0076	0.0053 0.0080	0.0055 0.0080	0.0056 0.0080	0.0057 0.0080	0.0058 0.0080	0.0059 0.0080	0.0060 0.0080	0.0060 0.0080
8	{ 8 to 15 16 to 30	0.62 to 1.88 1.681 to 3.78	0.0042 0.0071	0.0048 0.0077	0.0055 0.0081	0.0057 0.0081	0.0058 0.0081	0.0059 0.0081	0.0060 0.0081	0.0061 0.0081	0.0062 0.0081	0.0063 0.0081
6	{ 8 to 15 16 to 30	0.63 to 2.60 2.501 to 6.00	0.0043 0.0072	0.0049 0.0078	0.0056 0.0082	0.0058 0.0082	0.0059 0.0082	0.0060 0.0082	0.0061 0.0082	0.0062 0.0082	0.0063 0.0082	0.0064 0.0082
4	{ 8 to 15 16 to 30	1.25 to 3.75 3.751 to 7.50	0.0044 0.0073	0.0050 0.0083	0.0057 0.0083	0.0059 0.0083	0.0060 0.0083	0.0061 0.0083	0.0062 0.0083	0.0063 0.0083	0.0064 0.0083	0.0065 0.0083

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TABLE 3.7 Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 2B—Con

1.25	1.6	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.275	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerances

Threads
per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and SUN thread series in table 2.21.
2. Class 2B (internal thread) tolerances in this table for 8 to 15 pitches are based on 8 pitches and are obtained by multiplying the class 2A (internal thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.3. (See table 2.19.)
3. Class 2B tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.625 (obtained by multiplying the 1.3 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3-13.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3-03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A4.

in	in	in	in	in	in	in	in	in	in	in	in	in
0.0049	0.0050											
.0081	.0063											
.0063	.0055	0.0053	0.0054	0.0058	0.0058							
.0067	.0068	.0070	.0071	.0073	.0073							
.0053	.0055	.0058	.0057	.0059	.0060	0.0062	0.0063					
.0067	.0068	.0070	.0071	.0073	.0073	.0077	.0079					
.0053	.0055	.0058	.0057	.0059	.0061	.0063	.0064	0.0066	0.0068			
.0067	.0069	.0071	.0072	.0074	.0076	.0078	.0080	.0082	.0083			
.0054	.0058	.0060	.0062	.0064	.0065	.0066	.0068	.0069	.0071			
.0070	.0073	.0074	.0075	.0077	.0079	.0081	.0083	.0085	.0086			
.0061	.0062	.0063	.0064	.0066	.0068	.0069	.0070	.0072	.0075			
.0078	.0077	.0079	.0080	.0083	.0085	.0086	.0088	.0091	.0094			
.0063	.0065	.0066	.0067	.0069	.0070	.0073	.0073	.0076	.0078	0.0081		
.0079	.0081	.0082	.0083	.0088	.0088	.0090	.0091	.0094	.0097	.0101		
.0066	.0068	.0069	.0070	.0072	.0073	.0075	.0076	.0079	.0081	.0084	.0087	
.0083	.0083	.0086	.0087	.0090	.0093	.0094	.0095	.0098	.0101	.0104	.0109	
.0070	.0073	.0073	.0074	.0076	.0077	.0079	.0080	.0083	.0085	.0088	.0091	.0094
.0088	.0090	.0091	.0092	.0093	.0097	.0099	.0100	.0103	.0105	.0110	.0114	.0117
.0076	.0076	.0078	.0079	.0081	.0082	.0084	.0085	.0087	.0090	.0093	.0095	.0098
.0094	.0096	.0097	.0098	.0101	.0103	.0103	.0106	.0109	.0113	.0116	.0120	.0123
.0083	.0083	.0084	.0085	.0087	.0089	.0090	.0091	.0094	.0096	.0100	.0103	.0106
.0103	.0104	.0103	.0106	.0109	.0111	.0113	.0114	.0117	.0120	.0124	.0128	.0131
.0090	.0092	.0093	.0094	.0096	.0098	.0099	.0100	.0103	.0105	.0108	.0111	.0114
.0113	.0115	.0116	.0118	.0120	.0122	.0124	.0126	.0128	.0131	.0133	.0139	.0143
.0105	.0106	.0108	.0109	.0111	.0113	.0114	.0116	.0118	.0122	.0125	.0128	.0131
.0132	.0133	.0134	.0137	.0139	.0141	.0142	.0145	.0148	.0153	.0156	.0159	.0160
			.0131	.0133	.0135	.0138	.0139	.0140	.0142	.0146	.0149	.0151
			.0164	.0166	.0168	.0170	.0172	.0173	.0178	.0183	.0186	.0188

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TABLE 3.8 Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 3B
(UNS threads. See par. 7.3, p. 3-03; par. 10, p. 3-05.)

Tolerance based on diameter of --		0.0625	0.06375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range		0.0470	0.0781	0.1094	0.1862	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
Above --											
To and including --		0.0781	0.1094	0.1862	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement		Pitch diameter tolerances								
	Number of pitches	Inches	in	in	in	in	in	in	in	in	in
50	5 to 15	0.08 to 0.19	.0019	.0019	.0020	.0021	.0022	.0023	.0024	.0025	.0026
	16 to 30	0.101 to 0.38	.0023	.0024	.0025	.0026	.0027				
72	5 to 15	0.07 to 0.21	.0019	.0020	.0021	.0022	.0023	.0024	.0025	.0026	.0027
	16 to 30	0.211 to 0.42	.0024	.0025	.0026	.0027	.0028				
64	5 to 15	0.08 to 0.23	.0020	.0021	.0022	.0023	.0024	.0025	.0026	.0027	.0028
	16 to 30	0.231 to 0.46	.0026	.0027	.0028	.0029	.0030	.0031	.0032	.0033	.0034
56	5 to 15	0.09 to 0.27		.0023	.0023	.0024	.0025	.0026	.0027	.0028	.0029
	16 to 30	0.271 to 0.54		.0028	.0029	.0030	.0031	.0032	.0033	.0034	.0035
48	5 to 15	0.10 to 0.31		.0024	.0025	.0026	.0027	.0028	.0029	.0030	.0031
	16 to 30	0.311 to 0.62		.0030	.0031	.0032	.0033	.0034	.0035	.0036	.0037
44	5 to 15	0.11 to 0.34		.0025	.0026	.0027	.0028	.0029	.0030	.0031	.0032
	16 to 30	0.341 to 0.68		.0031	.0032	.0033	.0034	.0035	.0036	.0037	.0038
40	5 to 15	0.13 to 0.38		.0027	.0028	.0029	.0030	.0031	.0032	.0033	.0034
	16 to 30	0.381 to 0.76		.0033	.0035	.0036	.0037	.0039	.0040	.0041	.0043
36	5 to 15	0.14 to 0.42		.0028	.0028	.0030	.0031	.0032	.0033	.0034	.0035
	16 to 30	0.421 to 0.84		.0038	.0038	.0037	.0039	.0040	.0042	.0043	.0044
32	5 to 15	0.16 to 0.47		.0030	.0031	.0031	.0033	.0034	.0035	.0036	.0037
	16 to 30	0.471 to 0.94		.0037	.0038	.0039	.0041	.0042	.0043	.0044	.0046
28	5 to 15	0.18 to 0.54			.0033	.0033	.0035	.0038	.0037	.0037	.0039
	16 to 30	0.541 to 1.06			.0041	.0042	.0043	.0045	.0046	.0047	.0048
27	5 to 15	0.19 to 0.56				.0033	.0034	.0035	.0035	.0037	.0038
	16 to 30	0.561 to 1.12				.0041	.0042	.0044	.0045	.0046	.0049
24	5 to 15	0.21 to 0.63				.0035	.0036	.0037	.0038	.0039	.0040
	16 to 30	0.621 to 1.24				.0044	.0045	.0046	.0048	.0049	.0051
20	5 to 15	0.25 to 0.75					.0033	.0040	.0041	.0042	.0044
	16 to 30	0.731 to 1.50					.0049	.0050	.0052	.0053	.0054
18	5 to 15	0.28 to 0.83						.0042	.0043	.0044	.0046
	16 to 30	0.831 to 1.66						.0053	.0054	.0055	.0056
16	5 to 15	0.31 to 0.94						.0043	.0046	.0048	.0049
	16 to 30	0.941 to 1.88						.0056	.0057	.0058	.0061
14	5 to 15	0.35 to 1.07							.0049	.0049	.0050
	16 to 30	1.071 to 2.14							.0061	.0062	.0064
12	5 to 15	0.42 to 1.25							.0053	.0053	.0054
	16 to 30	1.231 to 2.50							.0065	.0066	.0067
10	5 to 15	0.50 to 1.60								.0059	.0060
	16 to 30	1.601 to 3.00									.0073
8	5 to 15	0.63 to 1.88									.0067
	16 to 30	1.881 to 3.78									.0083
6	5 to 15	0.83 to 2.50									
	16 to 30	2.501 to 5.00									
4	5 to 15	1.25 to 3.75									
	16 to 30	3.751 to 7.80									

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TABLE 3.8 Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 3B—Con

1.25	1.5	1.75	2	2.75	3	3.5	4	5	6	8	10	12
1.125	1.275	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.875	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	12

Pitch diameter tolerances

Threads
per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and JIS thread series in table 2.21.
2. Class 3B (internal thread) tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.975. (See table 2.19.)
3. Class 3B tolerances in this table for 16 to 20 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.31875 (obtained by multiplying the 0.975 factor by 1.33.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.2, p. 3-03.
4. Pitches listed are those used most economically and are recommended. Where intermediate pitches are specified, the formula in par. 7.2, p. 3-03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

in	in	in	in	in	in	in	in	in	in	in	in	in	in
0.0038	0.0037												
.0044	.0047												
.0033	.0038	0.0040	0.0041	0.0043	0.0043								
.0048	.0049	.0050	.0051	.0053	.0054								
.0040	.0041	.0043	.0043	.0044	.0045	0.0046	0.0047						
.0050	.0061	.0063	.0063	.0058	.0067	.0058							
.0043	.0041	.0043	.0043	.0045	.0046	.0046	.0047						
.0061	.0062	.0053	.0054	.0056	.0057	.0059	.0060	0.0060	0.0061	0.0062	0.0064		
.0043	.0043	.0044	.0045	.0046	.0048	.0048	.0049	.0050	.0052	.0053	.0054		
.0053	.0054	.0055	.0056	.0058	.0058	.0060	.0061	.0062	.0064	.0066	.0067		
.0043	.0046	.0047	.0048	.0050	.0051	.0051	.0053	.0053	.0056	.0058	.0058		
.0057	.0058	.0059	.0060	.0062	.0063	.0065	.0066	.0068	.0070	.0070	.0070		
.0047	.0048	.0049	.0050	.0051	.0053	.0053	.0054	.0055	.0057	.0058	.0061		
.0060	.0060	.0062	.0063	.0064	.0066	.0067	.0068	.0069	.0071	.0073	.0076		
.0050	.0051	.0053	.0053	.0054	.0055	.0055	.0057	.0058	.0061	.0063	.0066		
.0062	.0063	.0066	.0066	.0067	.0068	.0070	.0072	.0074	.0076	.0078	.0083		
.0053	.0054	.0056	.0055	.0057	.0058	.0058	.0060	.0063	.0063	.0066	.0068	0.0070	
.0066	.0067	.0068	.0068	.0071	.0072	.0071	.0075	.0077	.0079	.0083	.0086	.0088	
.0066	.0067	.0058	.0059	.0060	.0062	.0063	.0064	.0066	.0067	.0070	.0073	.0074	
.0070	.0072	.0073	.0074	.0078	.0077	.0078	.0080	.0083	.0084	.0087	.0090	.0092	
.0061	.0062	.0063	.0064	.0065	.0066	.0068	.0069	.0070	.0072	.0073	.0077	.0079	
.0076	.0078	.0079	.0080	.0082	.0083	.0084	.0088	.0088	.0090	.0093	.0096	.0098	
.0068	.0069	.0070	.0071	.0073	.0073	.0074	.0075	.0077	.0079	.0081	.0084	.0086	
.0055	.0056	.0057	.0058	.0060	.0061	.0063	.0064	.0066	.0068	.0070	.0102	.0104	.0107
.0079	.0080	.0081	.0082	.0083	.0084	.0085	.0087	.0088	.0091	.0091	.0094	.0096	
.0089	.0100	.0101	.0103	.0104	.0106	.0107	.0109	.0111	.0114	.0117	.0120		
				.0098	.0100	.0101	.0102	.0103	.0105	.0107	.0109	.0111	.0113
				.0123	.0125	.0126	.0128	.0130	.0131	.0133	.0137		.0142

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TABLE 3.9. Minor diameter tolerances for internal special screw threads, classes 1B and 2B
(UNS threads, see par. 10, p. 3-06.)

Tolerance based on basic major diameter of --			0.060	0.073	0.086	0.099	0.112	0.125	0.138	0.154	0.190	0.216	All larger diameters				
For diameter range Above --			0.053	0.066	0.079	0.092	0.105	0.118	0.131	0.151	0.177	0.203					
To and including --			0.066	0.079	0.092	0.105	0.118	0.131	0.151	0.177	0.203	0.223					
1B, 2B Minor diameter tolerances 1B, 2B																	
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter	Above	To and including													
80	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0038 0.0049 0.0051 0.0049	0.0029 0.0044 0.0049 0.0049	0.0023 0.0038 0.0043 0.0049	0.0022 0.0034 0.0038 0.0049	0.0020 0.0030 0.0037 0.0049	0.0018 0.0028 0.0031 0.0042	0.0013 0.0023 0.0031 0.0039	0.0016 0.0023 0.0031 0.0039	0.0019 0.0023 0.0031 0.0039	0.0016 0.0023 0.0031 0.0039					
72	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0039 0.0048 0.0053 0.0055	0.0029 0.0049 0.0053 0.0055	0.0023 0.0038 0.0043 0.0053	0.0026 0.0038 0.0046 0.0053	0.0023 0.0032 0.0043 0.0053	0.0017 0.0028 0.0034 0.0043	0.0017 0.0028 0.0034 0.0042	0.0017 0.0028 0.0034 0.0042	0.0017 0.0028 0.0034 0.0042	0.0017 0.0028 0.0034 0.0042					
64	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 2D	0.0045 0.0052 0.0052 0.0062	0.0038 0.0037 0.0042 0.0043	0.0033 0.0041 0.0049 0.0061	0.0029 0.0040 0.0049 0.0061	0.0027 0.0037 0.0043 0.0061	0.0024 0.0037 0.0043 0.0061	0.0020 0.0030 0.0038 0.0048	0.0019 0.0028 0.0038 0.0048	0.0019 0.0028 0.0038 0.0048	0.0019 0.0028 0.0038 0.0048					
56	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 4D	0.0044 0.0068 0.0070 0.0070	0.0038 0.0057 0.0068 0.0070	0.0038 0.0051 0.0062 0.0070	0.0034 0.0046 0.0053 0.0070	0.0031 0.0043 0.0053 0.0070	0.0029 0.0040 0.0053 0.0068	0.0023 0.0038 0.0047 0.0058	0.0022 0.0032 0.0043 0.0054	0.0022 0.0032 0.0043 0.0054	0.0022 0.0032 0.0043 0.0054					
48	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0048 0.0068 0.0068 0.0082	0.0040 0.0058 0.0061 0.0082	0.0040 0.0058 0.0061 0.0082	0.0037 0.0055 0.0061 0.0082	0.0034 0.0046 0.0053 0.0082	0.0032 0.0043 0.0053 0.0070	0.0025 0.0038 0.0047 0.0063	0.0025 0.0038 0.0047 0.0063	0.0025 0.0038 0.0047 0.0063	0.0025 0.0038 0.0047 0.0063					
44	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0073 0.0080 0.0090	0.0044 0.0067 0.0089 0.0090	0.0044 0.0061 0.0081 0.0090	0.0040 0.0058 0.0061 0.0090	0.0037 0.0055 0.0061 0.0090	0.0033 0.0045 0.0053 0.0088	0.0028 0.0040 0.0052 0.0077	0.0028 0.0041 0.0054 0.0070	0.0028 0.0041 0.0054 0.0069	0.0028 0.0041 0.0054 0.0069					
40	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0049 0.0074 0.0083 0.0093	0.0048 0.0067 0.0081 0.0093	0.0049 0.0062 0.0083 0.0093	0.0041 0.0058 0.0061 0.0093	0.0039 0.0055 0.0061 0.0093	0.0034 0.0046 0.0051 0.0088	0.0029 0.0040 0.0047 0.0078	0.0031 0.0043 0.0049 0.0078	0.0030 0.0043 0.0049 0.0078	0.0030 0.0043 0.0049 0.0078					
36	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0080 0.0090	0.0044 0.0067 0.0081 0.0090	0.0044 0.0062 0.0083 0.0090	0.0040 0.0058 0.0061 0.0090	0.0037 0.0055 0.0061 0.0090	0.0033 0.0045 0.0051 0.0088	0.0028 0.0038 0.0045 0.0078	0.0028 0.0038 0.0045 0.0082	0.0028 0.0038 0.0045 0.0082	0.0028 0.0038 0.0045 0.0082					
32	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 2D	0.0050 0.0075 0.0080 0.0106	0.0044 0.0067 0.0081 0.0106	0.0044 0.0062 0.0083 0.0106	0.0039 0.0055 0.0061 0.0106	0.0034 0.0046 0.0051 0.0106	0.0029 0.0038 0.0045 0.0106	0.0027 0.0036 0.0044 0.0099	0.0027 0.0036 0.0044 0.0099	0.0027 0.0036 0.0044 0.0099	0.0027 0.0036 0.0044 0.0099					
28	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0080 0.0106	0.0044 0.0067 0.0081 0.0106	0.0044 0.0062 0.0083 0.0106	0.0039 0.0055 0.0061 0.0106	0.0034 0.0046 0.0051 0.0106	0.0029 0.0038 0.0045 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106					
27	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0080 0.0106	0.0044 0.0067 0.0081 0.0106	0.0044 0.0062 0.0083 0.0106	0.0039 0.0055 0.0061 0.0106	0.0034 0.0046 0.0051 0.0106	0.0029 0.0038 0.0045 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106					
21	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0080 0.0106	0.0044 0.0067 0.0081 0.0106	0.0044 0.0062 0.0083 0.0106	0.0039 0.0055 0.0061 0.0106	0.0034 0.0046 0.0051 0.0106	0.0029 0.0038 0.0045 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106	0.0027 0.0036 0.0044 0.0106					
Length of engagement in terms of diameter			Minor diameter tolerances (Not applicable to diameters less than 0.25 in.)														
Tolerance ratios	Length of engagement in terms of diameter		20 tpi	18 tpi	16 tpi	14 tpi	13 tpi	12 tpi	11 tpi	10 tpi	9 tpi	8 tpi	7 tpi	6 tpi	5 tpi	4.5 tpi	4 tpi
	Above	To and including															
0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	in 0.0053 0.0064 0.0070 0.0079 0.0086 0.0095 0.0118 0.0128 0.0146 0.0160 0.0178 0.0198 0.0213 0.0225 0.0242 0.0263 0.0283 0.0303 0.0323 0.0344 0.0363 0.0383 0.0403 0.0423 0.0443 0.0463 0.0483 0.0503 0.0523 0.0543 0.0563 0.0583 0.0603 0.0623 0.0643 0.0663 0.0683 0.0703 0.0723 0.0743 0.0763 0.0783 0.0803 0.0823 0.0843 0.0863 0.0883 0.0903 0.0923 0.0943 0.0963 0.0983 0.0153 0.0163 0.0171 0.0181 0.0191 0.0201 0.0211 0.0221 0.0231 0.0241 0.0251 0.0261 0.0271 0.0281 0.0291 0.0301 0.0311 0.0321 0.0331 0.0341 0.0351 0.0361 0.0371 0.0381 0.0391 0.0401 0.0411 0.0421 0.0431 0.0441 0.0451 0.0461 0.0471 0.0481 0.0491 0.0501 0.0511 0.0521 0.0531 0.0541 0.0551 0.0561 0.0571 0.0581 0.0591 0.0512 0.0522 0.0532 0.0542 0.0552 0.0562 0.0572 0.0582 0.0592 0.0602 0.0612 0.0622 0.0632 0.0642 0.0652 0.0662 0.0672 0.0682 0.0692 0.0702 0.0712 0.0722 0.0732 0.0742 0.0752 0.0762 0.0772 0.0782 0.0792 0.0802 0.0812 0.0822 0.0832 0.0842 0.0852 0.0862 0.0872 0.0882 0.0892 0.0813 0.0823 0.0833 0.0843 0.0853 0.0863 0.0873 0.0883 0.0893 0.0903 0.0913 0.0923 0.0933 0.0943 0.0953 0.0963 0.0973 0.0983 0.0993 0.0179 0.0189 0.0199 0.0209 0.0219 0.0229 0.0239 0.0249 0.0259 0.0269 0.0279 0.0289 0.0299 0.0309 0.0319 0.0329 0.0339 0.0349 0.0359 0.0369 0.0379 0.0389 0.0399 0.0409 0.0419 0.0429 0.0439 0.0449 0.0459 0.0469 0.0479 0.0489 0.0499 0.0509 0.0519 0.0529 0.0539 0.0549 0.0559 0.0569 0.0579 0.0589 0.0599 0.0609 0.0619 0.0629 0.0639 0.0649 0.0659 0.0669 0.0679 0.0689 0.0699 0.0709 0.0719 0.0729 0.0739 0.0749 0.0759 0.0769 0.0779 0.0789 0.0799 0.0809 0.0819 0.0829 0.0839 0.0849 0.0859 0.0869 0.0879 0.0889 0.0899 0.0909 0.0919 0.0929 0.0939 0.0949 0.0959 0.0969 0.0979 0.0989 0.0999 0.0179 0.0189 0.0199 0.0209 0.0219 0.0229 0.0239 0.0249 0.0259 0.0269 0.0279 0.0289 0.0299 0.0309 0.0319 0.0329 0.0339 0.0349 0.0359 0.0369 0.0379 0.0389 0.0399 0.0409 0.0419 0.0429 0.0439 0.0449 0.0459 0.0469 0.0479 0.0489 0.0499 0.0509 0.0519 0.0529 0.0539 0.0549 0.0559 0.0569 0.0579 0.0589 0.0599 0.0609 0.0619 0.0629 0.0639 0.0649 0.0659 0.0669 0.0679 0.0689 0.0699 0.0709 0.0719 0.0729 0.0739 0.0749 0.0759 0.0769 0.0779 0.0789 0.0799 0.0809 0.0819 0.0829 0.0839 0.0849 0.0859 0.0869 0.0879 0.0889 0.0899 0.0909 0.0919 0.0929 0.0939 0.0949 0.0959 0.0969 0.0979 0.0989 0.0999 0.0179 0.0189 0.0199 0.0209 0.0219 0.0229 0.0239 0.0249 0.0259 0.0269 0.0279 0.0289 0.0299 0.0309 0.0319 0.0329 0.0339 0.0349 0.0359 0.0369 0.0379 0.0389 0.0399 0.0409 0.0419 0.0429 0.0439 0.0449 0.0459 0.0469 0.0479 0.0489 0.0499 0.0509 0.0519 0.0529 0.0539 0.0549 0.0559 0.0569 0.0579 0.0589 0.0599 0.0609 0.0619 0.0629 0.0639 0.0649 0.0659 0.0669 0.0679 0.0689 0.0699 0.0709 0.0719 0.0729 0.0739 0.0749 0.0759 0.0769 0.0779 0.0789 0.0799 0.0809 0.0819 0.0829 0.0839 0.0849 0.0859 0.0869 0.0879 0.0889 0.0899 0.0909 0.0919 0.0929 0.0939 0.0949 0.0959 0.0969 0.0979 0.0989 0.0999 0.0179 0.0189 0.0199 0.0209 0.0219 0.0229 0.0239 0.0249 0.0259 0.0269 0.0279 0.0289 0.0299 0.0309 0.0319 0.0329 0.0339 0.0349 0.0359 0.0369 0.0379 0.0389 0.0399 0.0409 0.0419 0.0429 0.0439 0.0449 0.0459 0.0469 0.0479 0.0489 0.0499 0.0509 0.0519 0.0529 0.0539 0.0549 0.0559 0.0569 0.0579 0.0589 0.0599 0.0609 0.0619 0.0629 0.0639 0.0649 0.0659 0.0669 0.0679 0.0689 0.0699 0.0709 0.0719 0.0729 0.0739 0.0749 0.0759 0.0769 0.0779 0.0789 0.0799 0.0809 0.0819 0.0829 0.0839 0.0849 0.0859 0.0869 0.0879 0.0889 0.0899 0.0909 0.0919 0.0929 0.0939 0.0949 0.0959 0.0969 0.0979 0.0989 0.0999 0.0179 0.0189 0.0199 0.0209 0.0219 0.0229 0.0239 0.0249 0.0259 0.0269 0.0279 0.0289 0.0299 0.0309 0.0319 0.0329 0.0339 0.0349 0.0359 0.0369 0.0379 0.0389 0.0399 0.0409 0.0419 0.0429 0.0439 0.0449 0.0459 0.0469 0.0479 0.0489 0.0499 0.0509 0.0519 0.0529 0.0539 0.0549 0.0559 0.0569 0.0579 0.0589 0.0599 0.0609 0.0619 0.0629 0.0639 0.0649 0.0659 0.0669 0.0679 0.0689 0.0699 0.0709 0.0719 0.0729 0.0739 0.0749 0.0759 0.0769 0.0779 0.0789 0.0799 0.0809 0.0819 0.0829 0.0839 0.0849 0.0859 0.0869 0.0879 0.0889 0.0899 0.0909 0.0919 0.0929 0.0939 0.0949 0.0959 0.0969 0.0979 0.0989 0.0999 0.0179 0.0189															

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(UNS threads, see per. 10, p. 3.05.)

Tolerance based on basic major diameter of →				0.164	0.190	0.216	0.250	0.3125	0.375	0.4375	0.500	0.5625	0.625	0.6875	All larger diameters
For diameter range Above →			0.033	0.151	0.177	0.203	0.233	0.281	0.344	0.406	0.469	0.531	0.594	0.656	0.688
To and including →			0.151	0.177	0.203	0.233	0.281	0.344	0.406	0.469	0.531	0.594	0.656	0.719	
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter*		3B	Minor diameter tolerances†								3B		
		Above‡	To and including		in	in									
80	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D	(*)	0.0018 0.0022 0.0029 0.0037	0.0013 0.0020 0.0027 0.0033	0.0013 0.0020 0.0028 0.0033									
72	0.6 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0017 0.0026 0.0034 0.0043	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039	0.0015 0.0018 0.0024 0.0030	0.0015 0.0018 0.0024 0.0030	0.0015 0.0018 0.0024 0.0030	0.0015 0.0018 0.0024 0.0030	0.0015 0.0018 0.0024 0.0030	
64	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0020 0.0030 0.0040 0.0050	0.0018 0.0025 0.0033 0.0041	0.0018 0.0025 0.0033 0.0040	0.0018 0.0025 0.0033 0.0040	0.0018 0.0025 0.0033 0.0040	0.0018 0.0025 0.0033 0.0040	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	
56	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0023 0.0033 0.0047 0.0058	0.0021 0.0029 0.0033 0.0043	0.0018 0.0027 0.0034 0.0043	0.0018 0.0027 0.0034 0.0043	0.0018 0.0027 0.0034 0.0043	0.0018 0.0027 0.0034 0.0043	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	0.0018 0.0018 0.0024 0.0030	
48	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0028 0.0038 0.0054 0.0070	0.0023 0.0033 0.0047 0.0063	0.0021 0.0031 0.0041 0.0054	0.0021 0.0031 0.0041 0.0053								
44	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0031 0.0046 0.0062 0.0077	0.0028 0.0039 0.0052 0.0070	0.0024 0.0033 0.0047 0.0059	0.0024 0.0033 0.0045 0.0056								
40	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0034 0.0051 0.0068 0.0085	0.0031 0.0047 0.0063 0.0078	0.0029 0.0043 0.0057 0.0073									
36	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0038 0.0058 0.0077 0.0096	0.0033 0.0048 0.0064 0.0082	0.0030 0.0044 0.0059 0.0074	0.0028 0.0043 0.0058 0.0073								
32	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0043 0.0058 0.0073 0.0108	0.0039 0.0055 0.0070 0.0099	0.0034 0.0045 0.0060 0.0084	0.0030 0.0043 0.0057 0.0073	0.0030 0.0043 0.0057 0.0073	0.0029 0.0043 0.0057 0.0073	0.0029 0.0043 0.0057 0.0073	0.0029 0.0043 0.0057 0.0073	0.0029 0.0043 0.0057 0.0073	0.0029 0.0043 0.0057 0.0073	0.0029 0.0043 0.0057 0.0073	
28	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0045 0.0061 0.0091 0.0113	0.0042 0.0058 0.0087 0.0108	0.0039 0.0053 0.0077 0.0096	0.0034 0.0047 0.0063 0.0084	0.0034 0.0047 0.0063 0.0084	0.0032 0.0047 0.0063 0.0084	0.0032 0.0047 0.0063 0.0084	0.0032 0.0047 0.0063 0.0084	0.0032 0.0047 0.0063 0.0084	0.0032 0.0047 0.0063 0.0084	0.0032 0.0047 0.0063 0.0084	
27	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0047 0.0071 0.0094 0.0118	0.0044 0.0068 0.0090 0.0109	0.0040 0.0053 0.0068 0.0083	0.0036 0.0048 0.0063 0.0081	0.0036 0.0048 0.0063 0.0081	0.0032 0.0047 0.0063 0.0081	0.0032 0.0047 0.0063 0.0081	0.0032 0.0047 0.0063 0.0081	0.0032 0.0047 0.0063 0.0081	0.0032 0.0047 0.0063 0.0081	0.0032 0.0047 0.0063 0.0081	
24	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0051 0.0070 0.0106 0.0132	0.0049 0.0068 0.0086 0.0122	0.0045 0.0058 0.0080 0.0113	0.0040 0.0053 0.0073 0.0100	0.0040 0.0053 0.0073 0.0102	0.0037 0.0050 0.0070 0.0092	0.0037 0.0050 0.0070 0.0092	0.0035 0.0048 0.0065 0.0087	0.0035 0.0048 0.0065 0.0087	0.0035 0.0048 0.0065 0.0087	0.0035 0.0048 0.0065 0.0087	
20	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0054 0.0081 0.0106 0.0133	0.0048 0.0061 0.0087 0.0122	0.0044 0.0056 0.0078 0.0114	0.0041 0.0053 0.0073 0.0103	0.0041 0.0053 0.0073 0.0103	0.0045 0.0068 0.0095 0.0122	0.0045 0.0068 0.0095 0.0122	0.0043 0.0065 0.0088 0.0111	0.0043 0.0065 0.0088 0.0111	0.0043 0.0065 0.0088 0.0111	0.0043 0.0065 0.0088 0.0111	
18	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0056 0.0083 0.0108 0.0133	0.0048 0.0064 0.0087 0.0122	0.0044 0.0056 0.0078 0.0114	0.0041 0.0053 0.0073 0.0103	0.0041 0.0053 0.0073 0.0103	0.0045 0.0068 0.0095 0.0122	0.0045 0.0068 0.0095 0.0122	0.0043 0.0065 0.0088 0.0111	0.0043 0.0065 0.0088 0.0111	0.0043 0.0065 0.0088 0.0111	0.0043 0.0065 0.0088 0.0111	
16	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.3D		0.0058 0.0086 0.0110 0.0138	0.0048 0.0066 0.0090 0.0127	0.0044 0.0058 0.0082 0.0120	0.0041 0.0053 0.0076 0.0108	0.0041 0.0053 0.0076 0.0108	0.0045 0.0068 0.0095 0.0120	0.0045 0.0068 0.0095 0.0120	0.0043 0.0065 0.0088 0.0110	0.0043 0.0065 0.0088 0.0110	0.0043 0.0065 0.0088 0.0110	0.0043 0.0065 0.0088 0.0110	

* Tolerances for lengths of engagement in terms of pitch should be selected from equivalent lengths of engagement in terms of diameter ranges.

† If the minor-diameter tolerance as selected from the table is less than pitch-diameter tolerance, use the latter. See Design of Special Threads in appendix A3.

‡ For 0.151 in diam sizes and smaller, tolerance values for all three classes are the same. For these smaller sizes, tolerance values are given in table 3.9.

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TABLE 3.10. Minor diameter tolerances for internal special screw threads, class 3B—Continued
(UNS threads, see par. 10, p. 3-05.)

Tolerance based on basic major diameter of—			0.375	0.4375	0.500	0.5625	0.625	0.6875	0.750	0.8125	0.875	0.9375	All larger diameters					
For diameter range Above →			0.314	0.406	0.489	0.531	0.594	0.656	0.710	0.761	0.814	0.908						
To and including →			0.406	0.489	0.531	0.594	0.656	0.719	0.781	0.844	0.906	0.969						
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter*	Above	To and including	3B	Minor diameter tolerance ^b	3B											
14	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D		in .0048 .0068 .0118 .0144	in .0054 .0082 .0109 .0130	in .0050 .0078 .0104 .0120	in .0049 .0073 .0100 .0122	in .0047 .0071 .0101 .0118	in .0048 .0068 .0092 .0118	in .0044 .0067 .0091 .0113	in .0044 .0066 .0089 .0110						
13	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D			.0058 .0087 .0117 .0148	.0066 .0093 .0111 .0139	.0044 .0078 .0107 .0134	.0052 .0078 .0104 .0130	.0060 .0090 .0101 .0126	.0049 .0073 .0099 .0124	.0048 .0071 .0097 .0119	.0047 .0070 .0094 .0118					
12	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D				.0063 .0094 .0125 .0167	.0060 .0089 .0109 .0120	.0055 .0084 .0115 .0144	.0058 .0082 .0109 .0140	.0064 .0092 .0106 .0138	.0053 .0083 .0104 .0130	.0051 .0075 .0097 .0128	.0050 .0075 .0100 .0125				
11	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D					.0063 .0094 .0125 .0166	.0060 .0089 .0117 .0146	.0055 .0084 .0115 .0146	.0058 .0088 .0118 .0144	.0060 .0098 .0112 .0140	.0058 .0088 .0112 .0138	.0058 .0088 .0110 .0138	.0058 .0088 .0109 .0138			
10	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D						.0066 .0099 .0131 .0164	.0064 .0098 .0128 .0160	.0062 .0093 .0125 .0164	.0061 .0092 .0122 .0163	.0060 .0090 .0120 .0160	.0060 .0090 .0110 .0150	.0060 .0090 .0110 .0150	.0060 .0090 .0109 .0150		
9	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D							.0068 .0103 .0137 .0171	.0067 .0100 .0134 .0168	.0068 .0100 .0133 .0166	.0068 .0100 .0133 .0166	.0068 .0100 .0133 .0166	.0068 .0100 .0133 .0166	.0068 .0100 .0133 .0166	.0068 .0100 .0133 .0166	
8	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D								.0075 .0119 .0150 .0188	.0075 .0112 .0150 .0188	.0075 .0112 .0150 .0188	.0075 .0112 .0150 .0188	.0075 .0112 .0150 .0188	.0075 .0112 .0150 .0188	.0075 .0112 .0150 .0188	.0075 .0112 .0150 .0188
7	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D											.0086 .0129 .0171 .0214				
6	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D											.0100 .0150 .0200 .0250				
5	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D											.0120 .0180 .0240 .0300				
4.5	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D											.0123 .0180 .0247 .0323				
4	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D											.0120 .0180 .0240 .0300 .0375				

See previous page for footnotes.

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TABLE 3.11. Consolidated method for the calculation of dimensions of special threads

Thread element	External thread				Internal thread			
	Class 1A	Class 1AB	Class 2A	Class 1B	Class 1B	Class 1B	Class 1B	Thread element
Max major dia	Table 3.3	Table 3.3	Nominal size	Nominal size				Min major dia
		Tabled on p. 1.03	Table 3.3					Tolerance on major dia
(Use values tabulated on p. 1.01 or compute in accordance with directions for designing special threads in Appendix 3A, APPLY PLUS).								
Tolerance on major dia								
Subtract 0.75H, table 3.1, col. 14, from minimum major diameter shown above.								
Max pitch dia								Min pitch dia
Subtract 0.75H, table 2.1, col. 14, from maximum major diameter shown above.								
Reference on pitch dia	Table 3.3	Table 3.3	Table 3.3	Table 3.3	Table 3.4 APPLY PLUS	Table 3.7 APPLY PLUS	Table 3.14 APPLY PLUS	Tolerance on pitch dia
	APPLY MINUS	APPLY MINUS	APPLY MINUS	APPLY MINUS				
Max minor dia								Min minor dia
Subtract 1.5H/12(0.4167H), table 2.1, col. 18, from maximum minor diameter. This is a reference dimension only.								
Max minor dia								
Tolerance on minor dia								
H/32(0.03125H), table 2.1, col. 4.								
APPLY MINUS								

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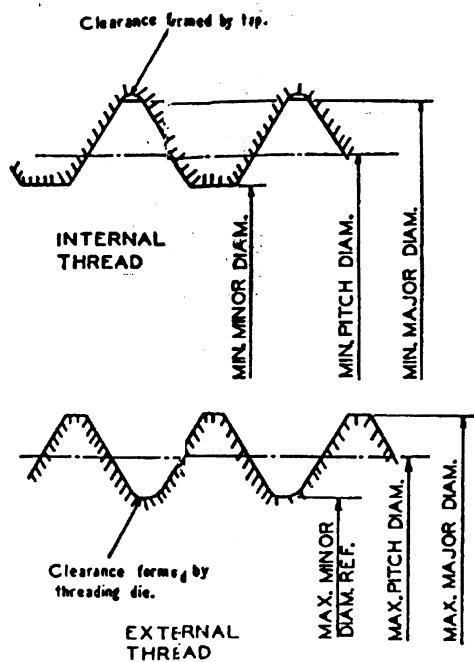


FIGURE 3.12. Thread dimensions to be determined for a special thread.

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