ASME B1.1-2019

[Revision of ASME B1.1-2003 (R2018)]

Unified Inch Screw Threads (UN, UNR, and UNJ Thread Forms)

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AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: June 30, 2020

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FOREWORD

ASME B1.1, Unified Inch Screw Threads, is an integrated system of threads for fastening purposes in mechanisms and structures. Its outstanding characteristic is its general interchangeability of threads, achieved through the standardization of thread form, diameter-pitch combinations, and limits of size.

This Standard is the outgrowth of and supersedes previous editions that were published as ASME B1-1924, ASME B1.1-1935, ASME B1.1-1949, ASME B1.1-1960, ASME B1.1-1974, ASME B1.1-1982, ASME B1.1-1989, and ASME B1.1-2003.

The achievements represented by ASME B1.1 in development, standardization, and unification are the result of the cooperation and coordination of many organizations, including The American Society of Mechanical Engineers (ASME), SAE International (formerly Society of Automotive Engineers), National Institute of Science and Technology (formerly National Bureau of Standards), Committee B1, the former National Screw Thread Commission, the former Interdepartmental Screw Thread Committee, British Standards Institution, CSA Group (formerly Canadian Standards Association), and American National Standards Institute (ANSI).

This Standard has its basis in the work done more than a century ago by William Sellers in the United States and Sir Joseph Whitworth in Great Britain. Through the intervening years, there have been many developments and revisions, culminating in the Unified Thread Standard approved and adopted for use by all inch-using countries.

The unification of screw thread standards meets the need for interchangeability among the billions of fasteners made in different countries and used in the complex equipment of modern technology. Unification is equally important for the international trade in mechanisms of all kinds and the servicing of transportation equipment that moves from country to country. Unification is therefore not only highly advantageous but also essential.

Complete unification of certain thread series and six tolerance classes in sizes $\frac{1}{4}$ in. and larger was achieved with the signing of an accord in Washington, D. C. on November 18, 1948. Since that time, unification has extended to smaller sizes.

Developed by Technical Committee No. 1 of the International Organization for Standardization (ISO), the unified inch standard that was adopted as ISO 5864 is parallel to the ISO metric screw thread system. Both systems have a common basic profile. The standard was subject to Quadripartite Standardization Agreement (QSTAG) 247 in the ABCA Army Standardization Program of America, Britain, Canada, and Australia.

Throughout this history, special attention has been given to the practical aspects of thread standardization, and many details of ASME B1.1 result from studies and tests based on real-world use. For example, users communicated the need for free assembly in high-production industries and the desirability of providing for threads that require a coating. The tolerance classes 2A and 2B were developed to meet these two major requirements as well as to provide a general standard for externally and internally threaded fasteners. Thread symbols and nomenclature are now consistent with ASME B1.7. Thread acceptability now follows ASME B1.3.

In 1992, ASME B1.30 implemented eight-place decimal and rounding rules that are mandatory for all new editions and future revisions of ASME B1 documents. To comply with this decision, the 2003 edition, ASME B1.1-2003

(a) revised some of the values in Table 2 and created Table E-1 of Nonmandatory Appendix E, which identifies and lists the revised dimensions from Table 2 in the ASME B1.1-1989 edition. The majority of the dimensional changes are within ±0.0001 in. As stated in para. 8.2.1, the values in this former Table 2, now Tables 2A and 2B, and Table E-1 should be considered acceptable until a future revision of this Standard makes the values in Tables 2A and 2B the only acceptable values.

(b) moved Table 3B, which provides calculated values for various UNS (unified specials), to Nonmandatory Appendix D. The ASME B1 Committee strongly urges users to adopt the standard thread sizes in Tables 2A and 2B instead of those listed in Table D-1.

(c) moved Tables 31 through 40, which include some values that differ from those derived by use of the formulas in paras. 5 and 8, to Nonmandatory Appendix D and renamed these Tables D-2 through D-11. (All future special threads should be based on calculations only.)

(d) eliminated all references to thread engagement from this Standard. Past changes in the thread form designation of the "basic" thread height from 0.7500*H* to 0.62500*H* confused the calculation of percent of thread engagement.

(e) included the definition of "functional diameter" and added the term to Table 2 in the same column as "pitch diameter," since both characteristics have the same limits of size.

(f) explained in greater depth the effects of coating on threads (see section 7).

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Changes to this 2019 edition include the splitting of ASME B1.1-2003 Table 2, which contained values for both internal and external threads for UN and UNR only, into two tables, Table 2A: Limits of Size for Standard Series External Threads (UN, UNR, and UNJ), and Table 2B: Limits of Size for Standard Series Internal Threads (UN, UNR, and UNJ). The metric translation of this Standard was removed, as were Tables D-2 through D-11 (formerly Tables 31 through 40 in ASME B1.1-1989).

Finally, the UNJ thread profile, formerly defined in ASME B1.15, was added to this Standard. Following the U.S. Department of Defense (DoD) approval of SAE AS8879C-2003, ASME B1 Subcommittee 15 recognized it would become the standard used by the aerospace industry for this thread form. As a result, Subcommittee 15 recommended that the technical information from ASME B1.15 be included in ASME B1.1 for non-aerospace applications.

The UNJ thread form having the enlarged root radius in the external thread was introduced to minimize size and weight in parts for applications requiring high-fatigue strength under high working-stress levels, as in aerospace applications. It is also appropriate for designs in commercial products where stresses are critical. To meet these requirements, the UNJ external thread root radius is designed to be between 0.15011107P and 0.18042196P and the minor diameter of the mating internal thread is increased to ensure the necessary clearance.

This Standard includes Classes 2A and 2B UNJ screw threads. Either Class 2A or Class 3A UNJ threads are appropriate for commercial applications commensurate with the fatigue and stress levels required.

The UNJ thread form is the UN thread form modified to 0.562500H, which allows the 0.18042196P maximum root radius in the external thread. The first known U.S. standard of similar thread form was SAE AS-82, published in March 1942, which describes a modified American National thread form to 75% h basic thread depth and specifies 0.10800P to 0.1800P root radius in the external thread. This thread was symbolized NR, National Round, and was developed for aircraft engine applications.

Tension fatigue testing of aircraft fasteners in 1942 demonstrated the importance of the external thread root contour in the fatigue life of a screw thread rolled after heat treatment. Fatigue testing isolated the elements of good external thread root design. The root should be radiused, not sharp. Theoretically, it should be a continuous circular arc, blending smoothly with the thread flanks. The radius should be as large as possible within the allowable design form. The root contour should also be smooth throughout and free of any imperfections, tool marks, or other minor notches.

Recognizing the need for improved 160,000 psi tensile strength bolts, the DoD published MIL-B-7838A, the bolt procurement specification for aircraft applications based on the unified thread form of 0.62500H, in April 1952, thus acknowledging a larger external root radius requires a shallower internal thread depth to clear the flank tangency point.

The root radius of the external thread was increased to 0.15011107P minimum and 0.18042196P maximum for the 180,000 psi and higher tensile strength bolts. This external thread form was developed in 1955 by the aerospace fastener industry and was known as the “Hi R” thread form.

Through coordinated effort with the SAE E-25 Engine and Propeller Standard Utility Parts Committee and the Aerospace Industries Association National Aerospace Standards Committee (NASC), the DoD developed and published in September 1960 the thread specification MIL-S-8879, which features the “Hi R” thread root radius in the external thread and the internal thread modified to 0.562500H basic. In aircraft gas turbine engines, the high-temperature threaded fasteners exhibited better elevated temperature performance using MIL-S-8879 UNJ thread root radius, as the stress-rupture life of bolts was greatly improved.

The UNJ thread form has been adopted by the aerospace industry as the all-purpose thread standard, except for electrical hardware and thread sizes 0.1380 and smaller, which may use the UN thread form.

The UNJ profile as defined in this Standard is similar to SAE AS8879C-2003 (superseding MIL-S-8879C) and equivalent to ISO 3161:1977 for thread Classes 3A and 3B. British Standards Institution BS 4084:1978, including Amendment 1, is technically identical to ISO 3161:1977, except for Appendix A, which provides information for a 20-UNJ constant pitch series for diameters through 3 in.

ASME B1.1-2019 was approved by the American National Standards Institute (ANSI) on August 26, 2019.

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Standardization and Unification of Screw Threads

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This Standard is always open for comment, and the Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

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UNIFIED INCH SCREW THREADS (UN, UNR, AND UNJ THREAD FORMS)

1 GENERAL

1.1 Scope

This Standard specifies the thread form, series, class, allowance, tolerance, and designation for unified screw threads. (In order to emphasize that unified screw threads are based on inch modules, they may be denoted unified inch screw threads.) Several variations in thread form have been developed for unified threads; however, this Standard covers only UN, UNR, and UNJ thread forms.

The metric translation of this Standard that was in the 2003 edition has been removed (see Nonmandatory Appendix C). Nonmandatory Appendices D through F contain information that is supplementary to the sections of this Standard.

1.2 Unified Screw Thread Standards

The standards for unified screw threads published in this Standard are in agreement with formal standards of the International Organization for Standardization (ISO) for diameter-pitch combinations, designations, and tolerances for 60-deg triangular form inch screw threads. The unified screw thread symbols UN, UNC, UNF, and UNEF were derived by the addition of the letter "U" preceding the thread symbols used for American National screw threads N, NC, NF, and NEF.

Unified screw threads have their origin in an accord signed in Washington, D.C. on November 18, 1948 by representatives of standardizing bodies of Canada, the United Kingdom, and the United States and have subsequently superseded American National screw threads.

1.3 Thread Forms

UN applies to both internal and external threads. UNR applies only to external threads; the difference between UN and UNR threads, in addition to designation, is that a flat or rounded root contour due to tool wear is specified for UN threads, while only a defined rounded root contour is specified for UNR threads. Basic thread height is 0.54126588*P*.

The UNJ screw thread is designed for use on highly stressed applications requiring high-fatigue strength. For aerospace applications, only Classes 3A and 3B should be used. Basic thread height is only 0.48713929*P* to permit a root radius larger than that of the UN and UNR forms.

1.4 Interchangeability

1.4.1 UN and UNR. Unified (UN/UNR) and its predecessor American National (N) screw threads have substantially the same thread form, and threads of both standards having the same diameter and pitch are mechanically interchangeable. The principal differences between the standards relate to the application of allowances, the variation of tolerances with size, differences in the amounts of pitch diameter tolerances for external and internal threads, and differences in thread designations. Unified inch and ISO metric screw threads are not mechanically interchangeable.

1.4.2 UNJ. UN and UNJ threads are interchangeable with the exception of UNJ-3A external threads, which at maximum material condition will not assemble with a UN internal thread of any class at maximum material condition (see Figure 1).

1.5 Designations

Unified thread sizes (specific combinations of diameter and pitch shown in Table 1) are identified by the letter combination "UN" in the thread symbol. In the unified standards, the pitch diameter tolerances for external threads differ from those for internal threads; for this reason the letter "A" is used in the thread symbol to denote an external thread and the letter "B," an internal thread. Where the letters "U," "A," or "B" do not appear in the thread designation, the threads conform to the outdated American National screw threads. Details regarding thread designations are given in section 6.

1.6 References

The following is a list of publications referenced in this Standard. Unless otherwise specified, the latest edition shall apply. The following documents form a part of this Standard to the extent specified herein.

ASME B1.2, Gages and Gaging for Unified Inch Screw Threads

ASME B1.3, Screw Thread Gaging Systems for Acceptability: Inch and Metric Screw Threads

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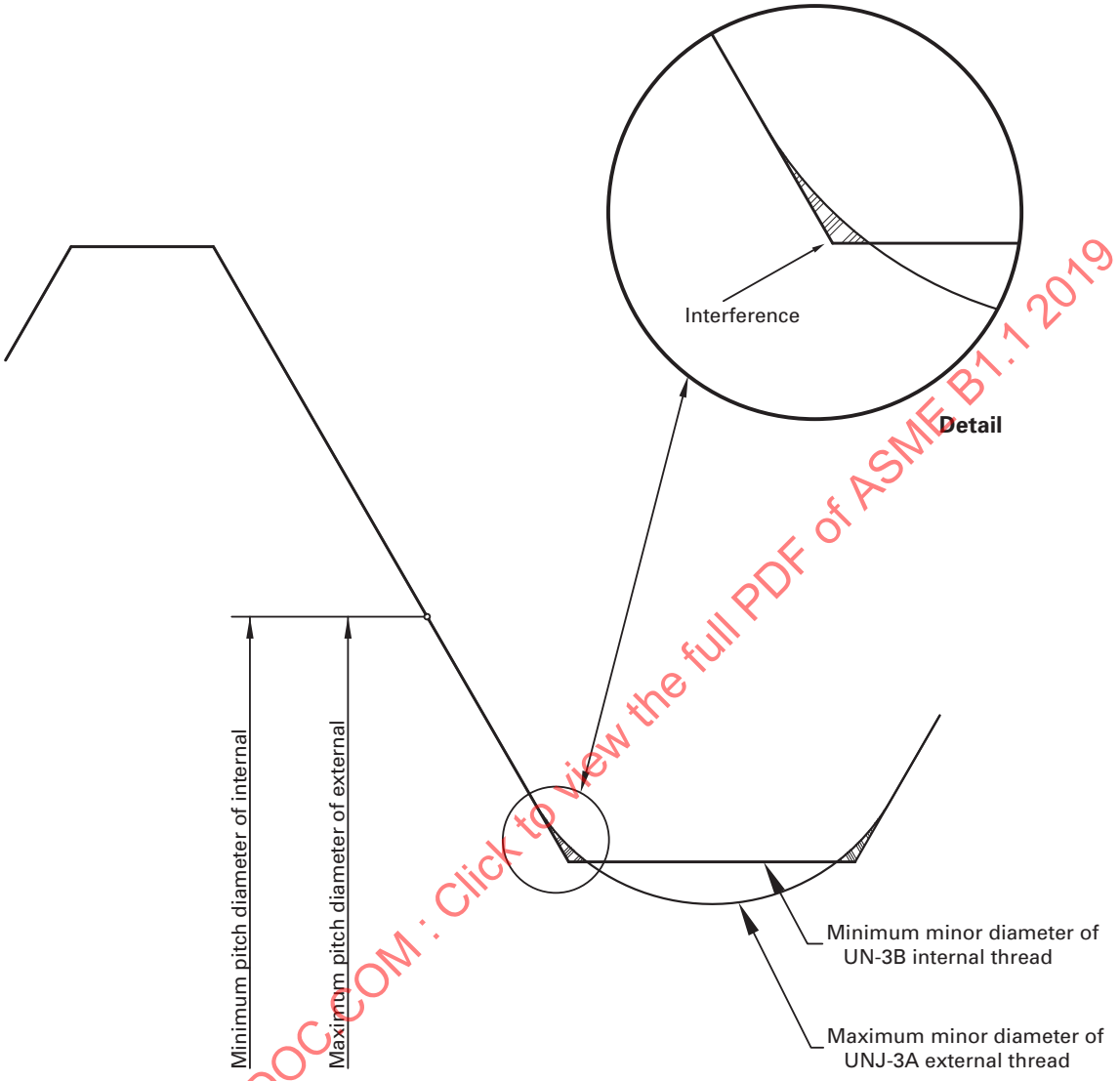
Figure 1 Illustration of Assembly Interference of UNJ-3A Thread and UN-3B Thread in the Maximum Material Condition



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ASME B1.7, Screw Threads: Nomenclature, Definitions, and Letter Symbols
ASME B1.30, Screw Threads: Standard Practice for Calculating and Rounding Dimensions
ASME B47.1, Gage Blanks
ASME B94.11M, Twist Drills
ASME Y14.5, Dimensioning and Tolerancing
Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ISO 68, General Purpose Screw Threads — Basic Profile
Publisher: International Organization for Standardization (ISO), Central Secretariat, Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland (www.iso.org)

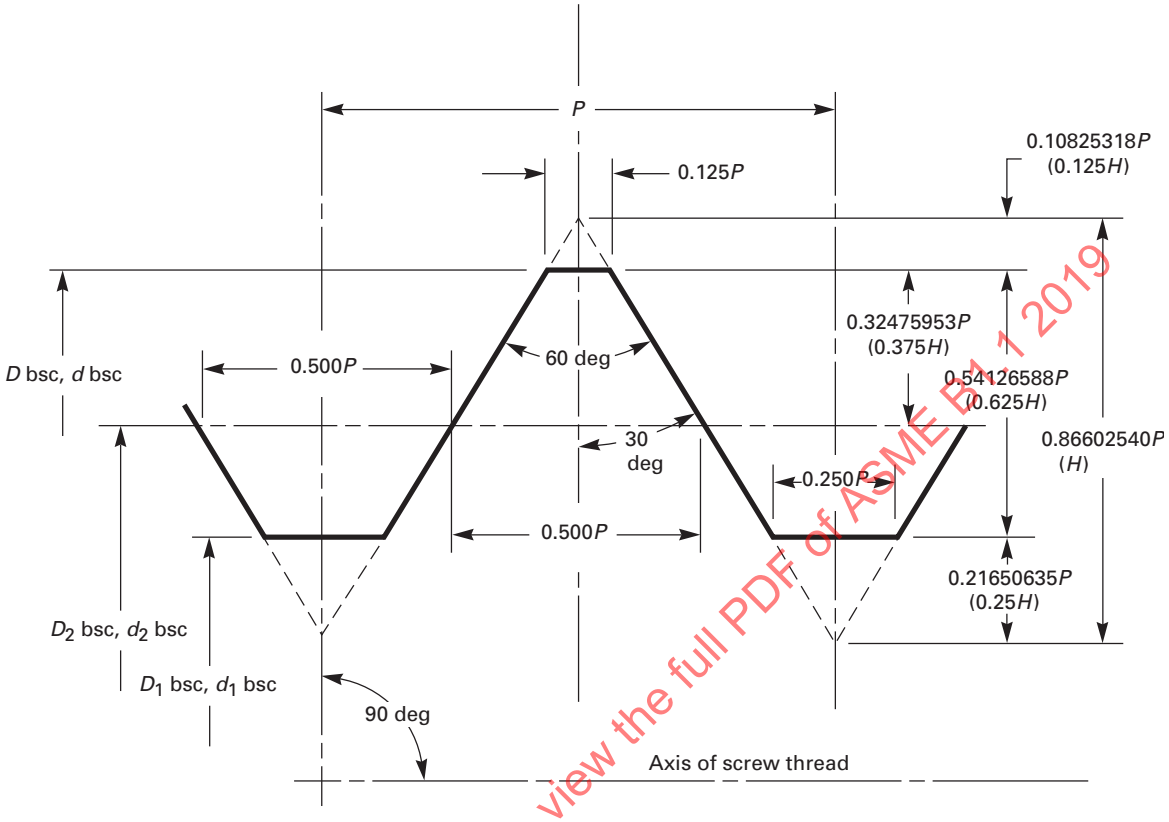
1.7 Acceptability

Acceptability of product threads shall be in accordance with ASME B1.3. Gages and gaging shall be in accordance with ASME B1.2.

1.8 Reference Temperature

The reference temperature is 68°F for dimensions defined by this system.

Figure 2 Basic Profile for UN and UNR Screw Threads



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1.9 Units of Measure

All dimensions in this Standard, including all tables, are in inches unless otherwise specified.

1.10 Federal Government Use

When this Standard is approved by the Department of Defense and federal agencies and is incorporated into FED-STD-H28/2, Screw Thread Standards for Federal Services, para. 2, the use of this Standard by the federal government will be subject to all the requirements and limitations of FED-STD-H28/2.

2 SCREW THREAD PROFILE

2.1 Scope

The basic profile and design profiles are defined in this Section and are the basis of all thread dimensions given in this Standard.

2.2 Basic Profile

2.2.1 UN and UNR. The basic profile for UN screw threads is identical to that for UNR screw threads and is shown in Figure 2. Profile applies to an axial plane.

For reference, the basic profile for UN and UNR screw threads is identical to that for ISO metric screw threads shown in ISO 68.

2.2.2 UNJ. The basic profile for UNJ screw threads is shown in Figure 3. It is the theoretical profile corresponding to the basic dimensions of the thread major diameter, pitch diameter, and minor diameter. This profile includes a 0.15011107P to 0.18042196P radius at the root of the external thread as shown in Figure 4. This also requires that the minor diameter of the external and internal threads be larger than the UN and UNR thread forms to accommodate the external thread maximum root radius. It is similar to but not the same as the profile for UN and UNR.

2.3 Design Profiles

The design profiles define the maximum material conditions for external and internal threads with no allowance and are derived from the basic profile. The design profiles of both external and internal screw threads vary from the basic profile.

Figure 3 Basic Profile for UNJ Screw Threads

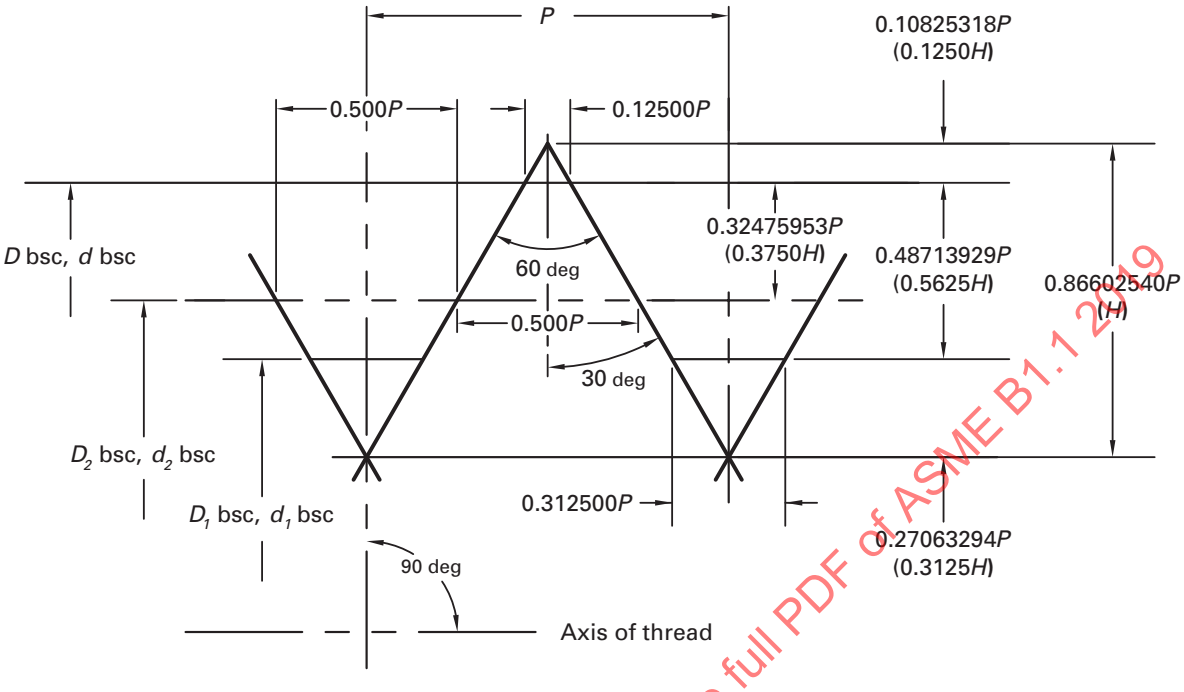
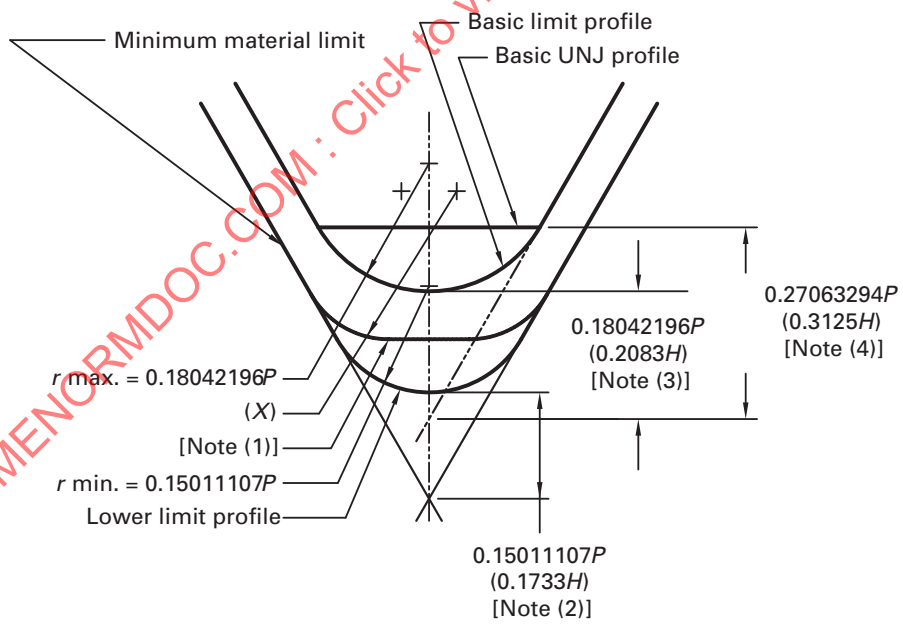


Figure 4 Root Radius of UNJ External Thread



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NOTES:
(1) Optional profile comprised of two circular arcs (*X*) tangential to the flanks and flat at the root.
(2) Minimum truncation.
(3) Maximum truncation.
(4) Tangent flank radii (minor diameter).

2.3.1 Design Profiles of External Threads

2.3.1.1 UN and UNR. The design profiles of external UN and UNR screw threads are included in Figures 5 through 8. A flat root contour is specified for UN threads; however, it is permissible to provide for some threading tool crest wear. Therefore, a rounded root contour cleared beyond the 0.2500*P* flat width of the basic profile is optional. The rounded root also reduces the rate of threading tool crest wear and improves fatigue strength over that of a flat root thread.

(a) At the least material condition (LMC), the root form of the UNR external thread shall be a full root radius of not less than 0.10825318*P*. At maximum material condition (MMC), the root form of the UNR external thread may be one of the following types:

(1) a full root radius of not more than 0.14433757*P*, which makes the point of tangency between the radius and the flanks at a point 0.54126588*P* below the basic major diameter (the equivalent of a 0.2500*P* width of flat).

(2) a "rounded form" consisting of a combination of flats and radii not less than 0.10825318*P*, as shown in Figures 7 and 8. When the root is the rounded form, the radii may exceed 0.14433757*P* so long as the point of tangency between the radii and the flanks is no less than 0.54126588*P* below the basic major diameter (the equivalent of a 0.2500*P* width of flat).

(b) The design profiles of external UN and UNR screw threads have flat crests. However, in practice, product thread crests may be flat, partially rounded, or fully rounded. A rounded crest tangent at a 0.12500*P* flat is shown as an option in Figures 5 through 8.

2.3.1.2 UNJ. The design profile of the external UNJ screw thread specifies that the actual root of the thread shall lie within the root radius tolerance zone shown in Figures 4 and 9. The limit dimensions of the root radius, *r*, are shown in Figures 10 and 11 and their values are specified in Table 2A. The profile shall be a continuous smoothly blended non-reversing curve, no part of which shall have a radius of less than 0.15011107*P* and which is tangent to the thread flanks at not less than 0.48713929*P* basic thread depth. The profile may comprise tangent flank circular arcs that are tangent to the flanks and a flat at the minor diameter provided that the minor diameter, d_3, is within the zone established in Figures 10 and 11. Unless otherwise specified, the runout or incomplete UNJ threads on externally threaded parts shall be no less than 1 pitch nor more than 2 pitches in length. The threads shall runout onto the shank without any abrupt change in cross-sectional area. The root radius shall be no less than the minimum radius of the full thread section.

2.3.2 Design Profile of Internal Threads. The design profiles of the internal UN and UNJ screw threads are included in Figures 2, 5 through 8, and 10 through 12 (there is no internal UNR screw thread). In practice, it is necessary to provide for some threading tool crest wear resulting in a profile that may be flat or partially or fully rounded; therefore, the root of the design profile is rounded and cleared beyond the 0.12500*P* flat width of the basic profile. No root radius is specified.

2.4 Formulas and Nomenclature

The formulas and nomenclature pertaining to the basic profile and the design profiles are given in section 10.

3 SCREW THREAD SERIES

3.1 Thread Series Definition

Thread series are groups of diameter-pitch combinations distinguished from each other by the number of threads per inch applied to a series of specific diameters. There are two general series classifications: standard and special.

3.1.1 Standard Series. The standard series consists of three series with graded pitches (coarse, fine, and extra fine) and eight series with constant pitches (4, 6, 8, 12, 16, 20, 28, and 32 threads per inch). The standard series is shown in Table 1. Limits of size are shown in Tables 2A and 2B and discussed in section 8.

3.1.2 Special Series. The special series consists of all threads with diameter-pitch combinations that are not included in the standard series. When allowances and tolerances of special series threads are derived from unified formulation as shown in section 5, the threads are designated UNS, UNJS, or UNRS. If allowance and tolerance are not derived from unified formulation, the threads are designated "SPL 60-deg Form." (See para. 6.1 and Figure 13 for details of designation.)

3.2 Order of Selection

Wherever possible, selection should be made from Table 1, preference being given to the coarse- and fine-thread series. As second choice, if the threads in the standard series in Table 1 do not meet the requirements of the design, special thread sizes should be selected from Table E-1 and their limits calculated using the formulas in section 8. The limits in Table D-1 are for reference only and are not recommended for new applications.

3.3 Coarse-Thread Series Applications

The coarse-thread series (UNC, UNRC, or UNJC) is generally used for the bulk production of screws, bolts, and nuts. It is commonly used in materials such as cast iron, aluminum, magnesium, brass, bronze, and plastic, because the coarse-thread series provides more resistance to internal thread stripping than the fine- or extra-fine-thread series. The coarse-thread series is advantageous where rapid assembly or disassembly is

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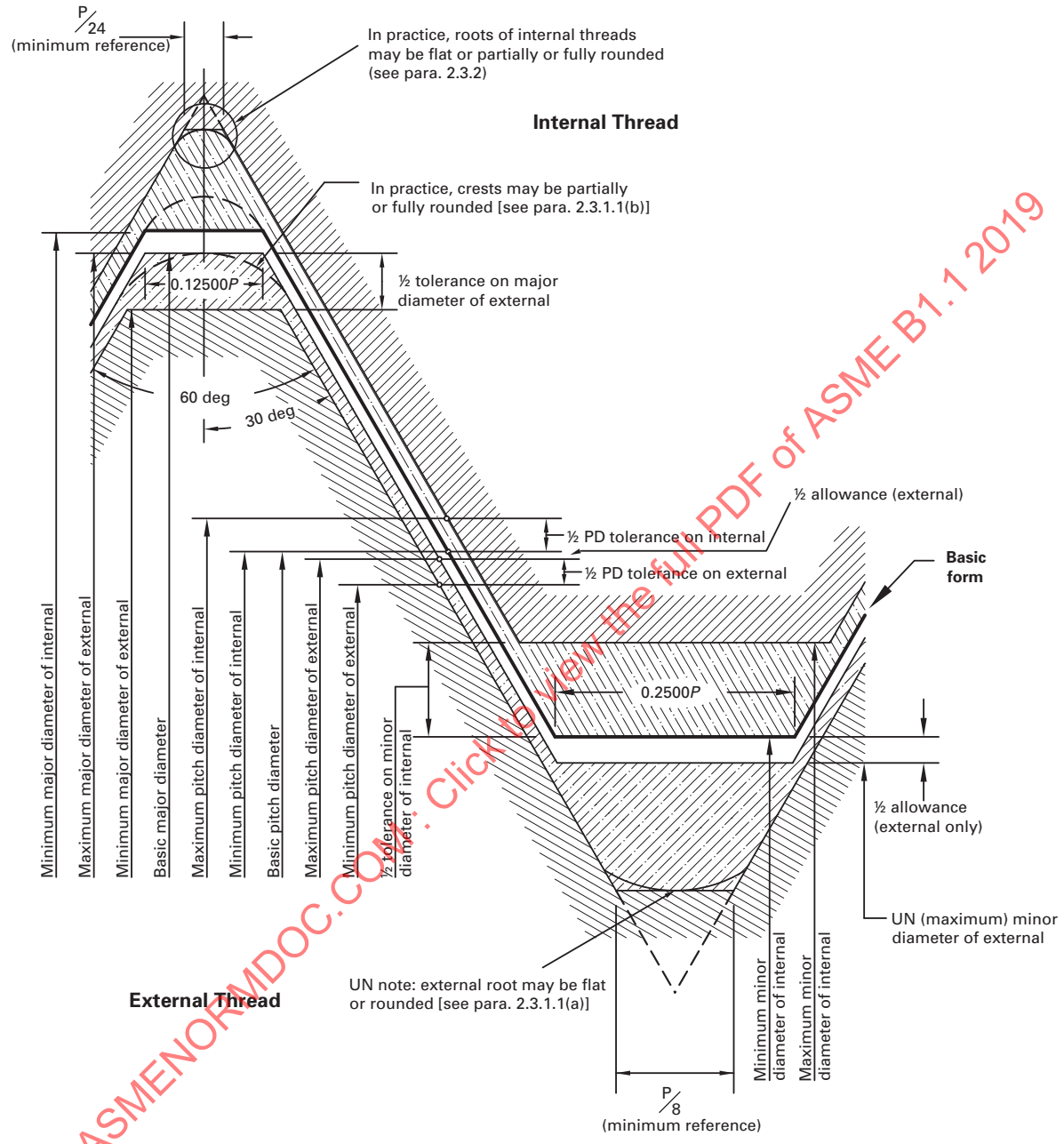
Figure 5 Disposition of Diametral Tolerances, Allowance, and Crest Clearance for Unified Inch Screw Thread Series UN, Classes 1A, 2A, 1B, and 2B



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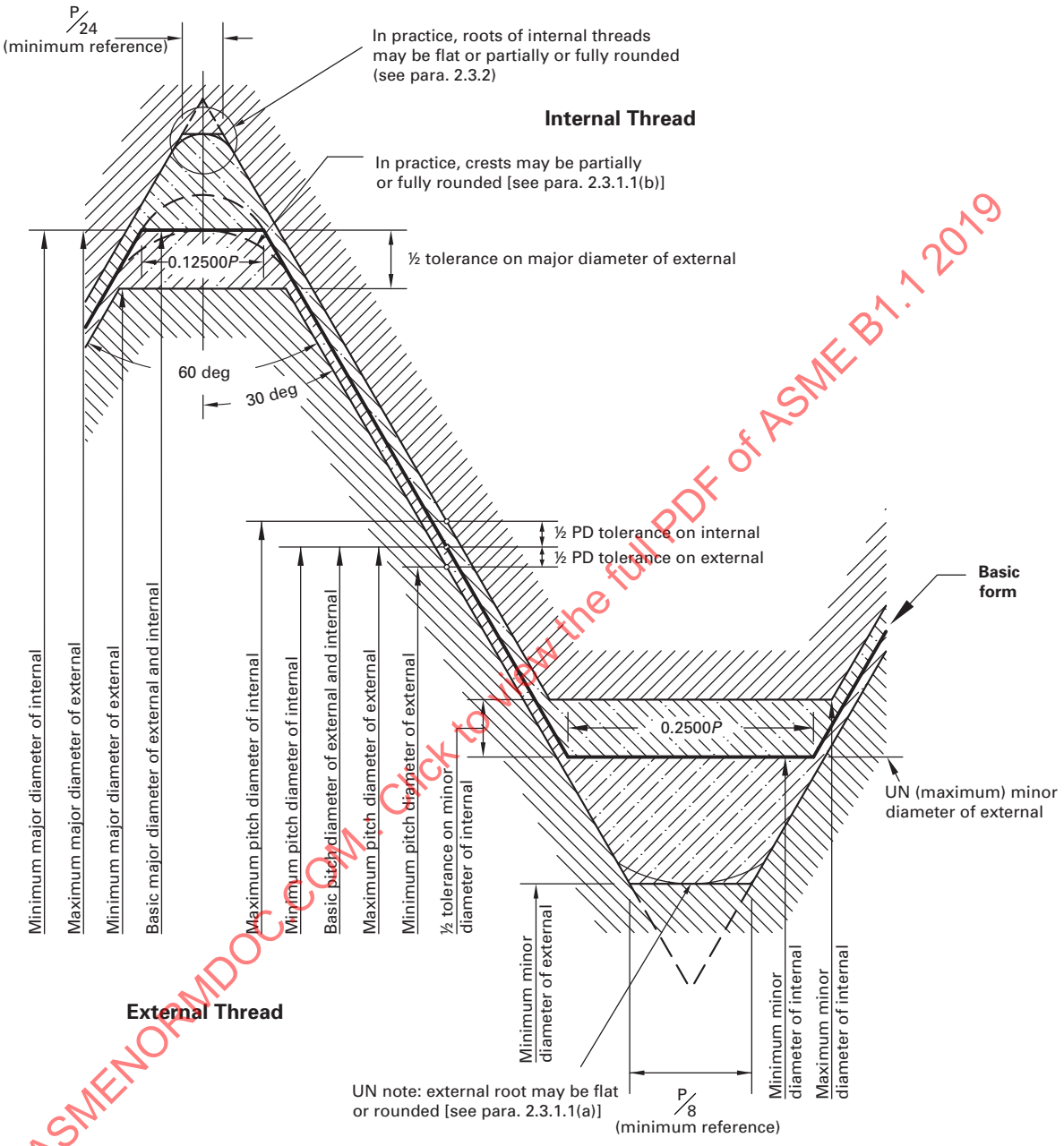
GENERAL NOTE: Lead and angle tolerances are defined in section 9.

Figure 6 Disposition of Diametral Tolerances and Crest Clearance for Unified Inch Screw Thread Series UN, Classes 3A and 3B



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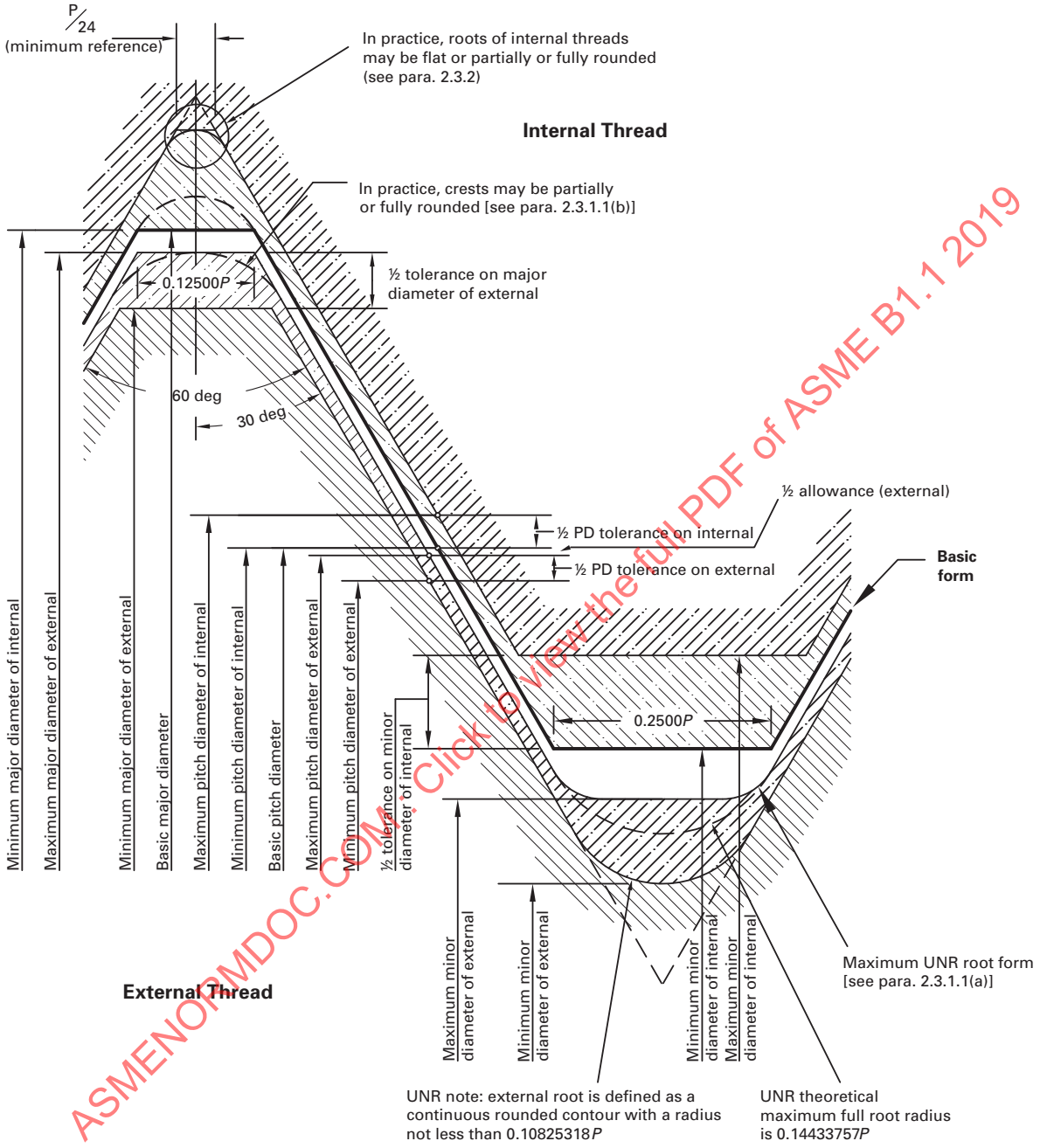
GENERAL NOTE: Lead and angle tolerances are defined in section 9.

Figure 7 Disposition of Diametral Tolerances, Allowance, and Crest Clearance for Unified Inch Screw Thread Series UNR, Classes 1A and 2A, and Series UN, Classes 1B and 2B



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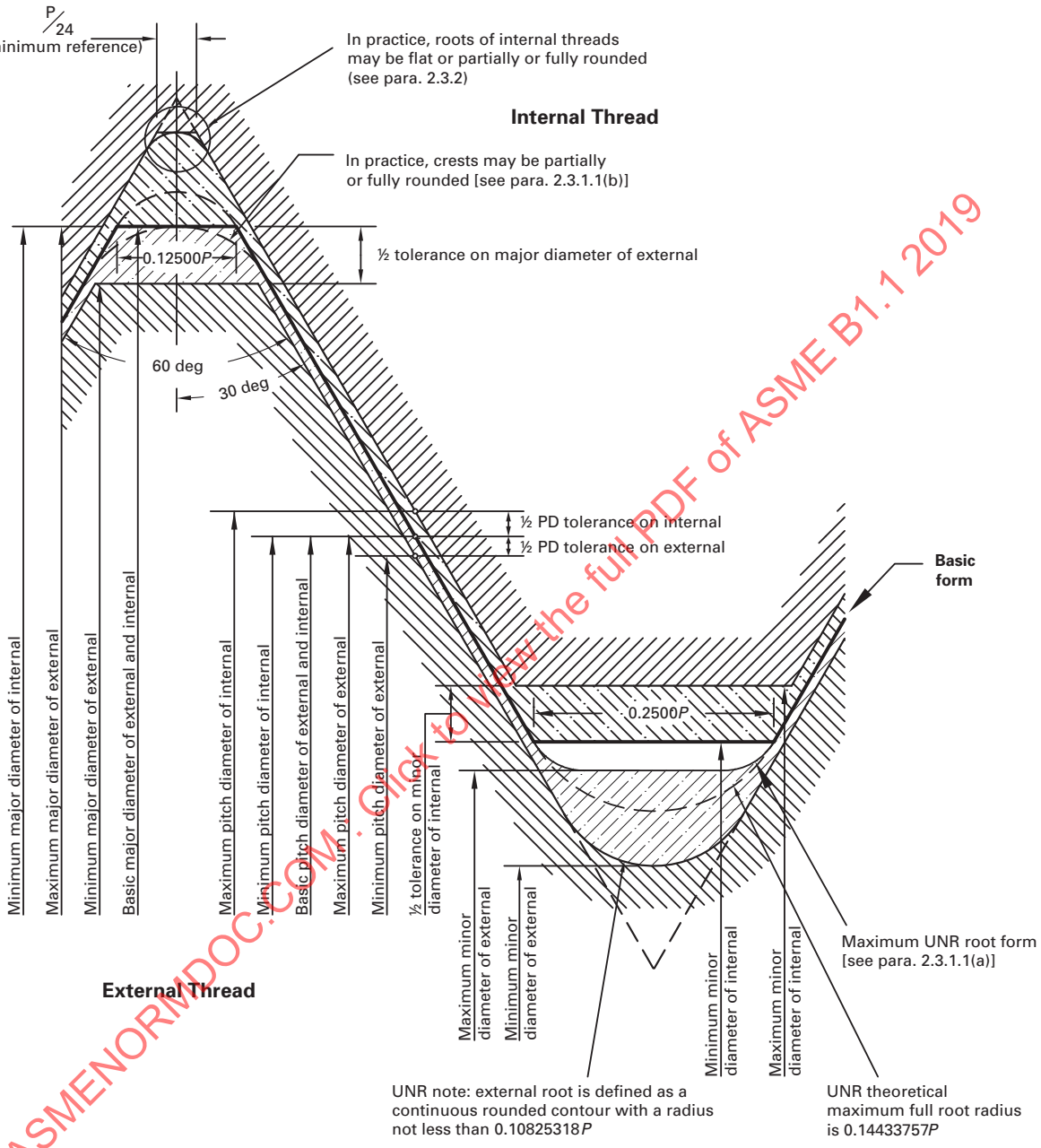
GENERAL NOTE: Lead and angle tolerances are defined in section 9.

Figure 8 Disposition of Diametral Tolerances and Crest Clearance for Unified Inch Screw Thread Series UNR, Class 3A and Series UN, Class 3B



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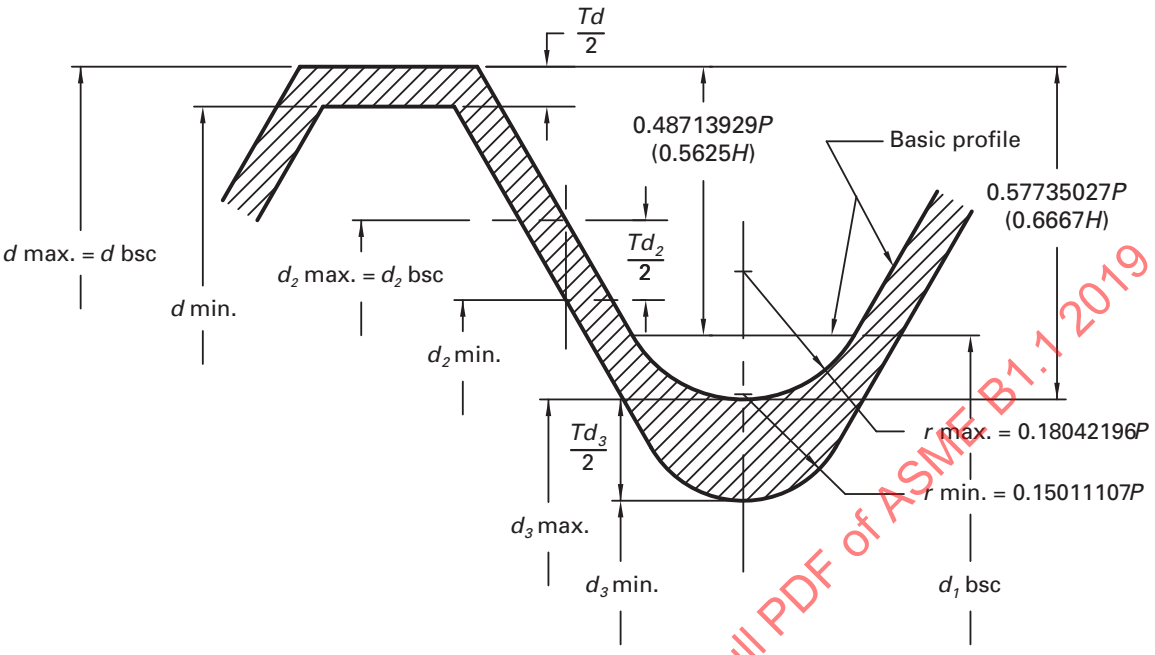
GENERAL NOTE: Lead and angle tolerances are defined in section 9.

Figure 9 External UNJ Thread Design Profile and Tolerances



GENERAL NOTE: Rounded crest is optional (see para. 7.1.2.2).

required, or if corrosion or damage from nicks due to handling or use is likely.

3.4 Fine-Thread Series Applications

The fine-thread series (UNF, UNRF, or UNJF) is commonly used for bolts and nuts in high-strength applications. This series has less thread depth and a larger minor diameter than the coarse-thread series. Consequently, thinner walls are permitted for internal threads and more strength is available to external threads than for coarse-thread series of the same nominal size. In order to prevent internal thread stripping, a longer length of engagement is required for fine-thread series than for coarse-thread series for thread materials of the same strength levels. However, for both fine- and coarse-thread series, length of engagement in tapped holes must be selected to meet strength requirements. This also allows for finer adjustment in cases such as a slotted nut and cotter pin assembly.

3.5 Extra-Fine-Thread Series Applications

The extra-fine-thread series (UNEF, UNREF, or UNJEF) is used particularly for equipment and threaded parts that require fine adjustment, such as bearing retaining nuts, adjusting screws, etc., and for thin-wall tubing and thin nuts.

3.6 Constant-Pitch-Thread Series Applications

The various constant-pitch series (UN, UNR, or UNJ) with 4, 6, 8, 12, 16, 20, 28, and 32 threads per inch (see Table 1) offers a comprehensive range of diameter-pitch combinations for those purposes where the threads in the coarse-, fine-, and extra-fine-thread series do not meet the particular requirements of the design. The primary sizes of the 8-UN, 12-UN, and 16-UN series shown in Table 1 are the most commonly used.

Whenever a thread in a constant-pitch series also appears in the UNC, UNF, or UNEF series, the symbols and tolerances for limits of size of those standard series are applicable.

3.6.1 8-Thread Series. The 8-thread series (8-UN) is a uniform-pitch series used for large diameters or as a compromise between coarse- and fine-thread series. Although originally intended for high-pressure-joint bolts and nuts, it is now widely used as a substitute for the coarse-thread series for diameters larger than 1 in.

3.6.2 12-Thread Series. The 12-thread series (12-UN) is a uniform-pitch series for large diameters requiring threads of medium-fine pitch. Although originally intended for boiler practice, it is now used as a continuation of the fine-thread series for diameters larger than $1\frac{1}{2}$ in.

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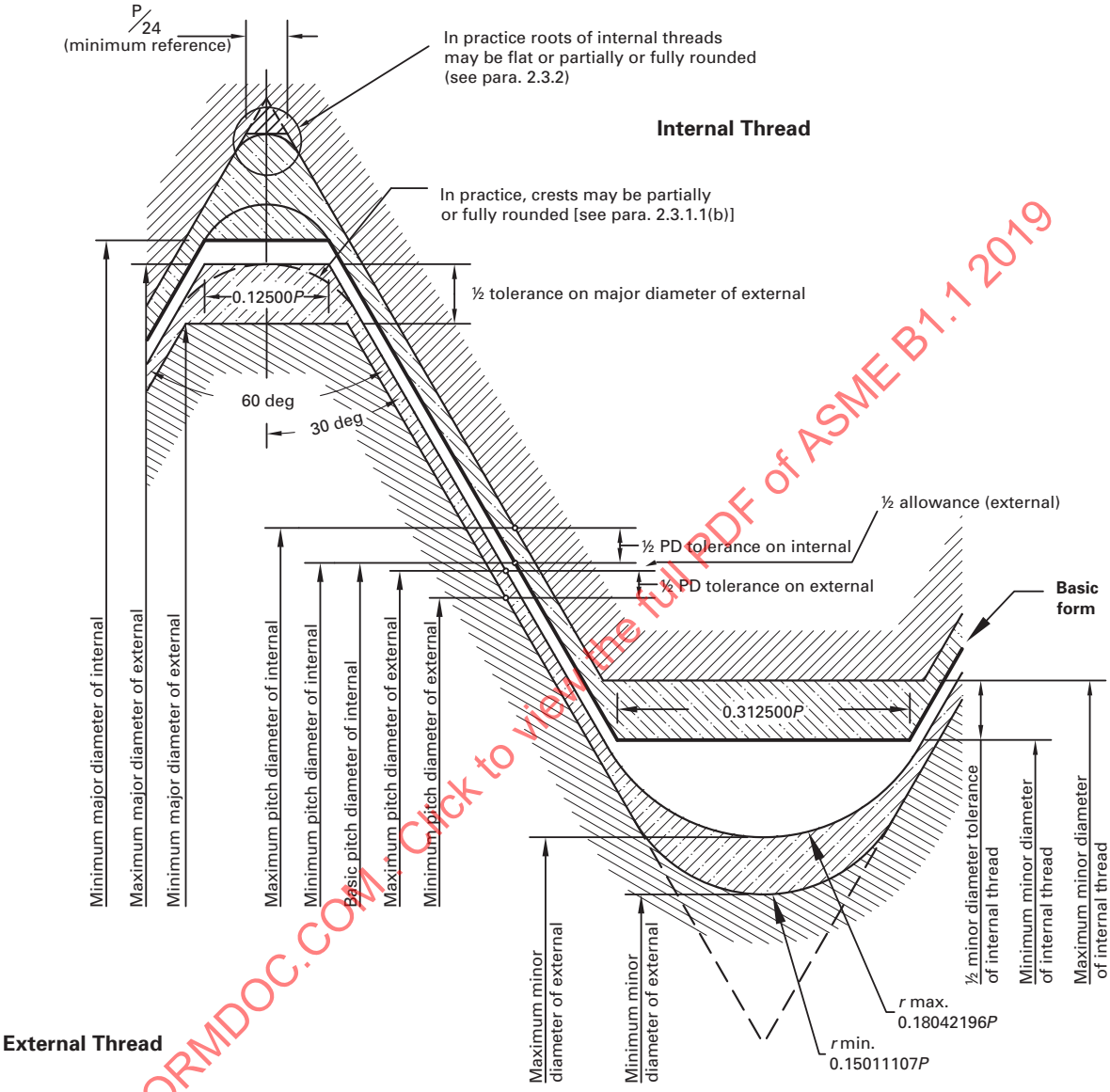
Figure 10 Disposition of Diametral Tolerances, Allowance, and Crest Clearance for Unified Inch Screw Thread Series UNJ, Classes 2A and 2B



GENERAL NOTE: Lead and angle tolerances are defined in section 9.

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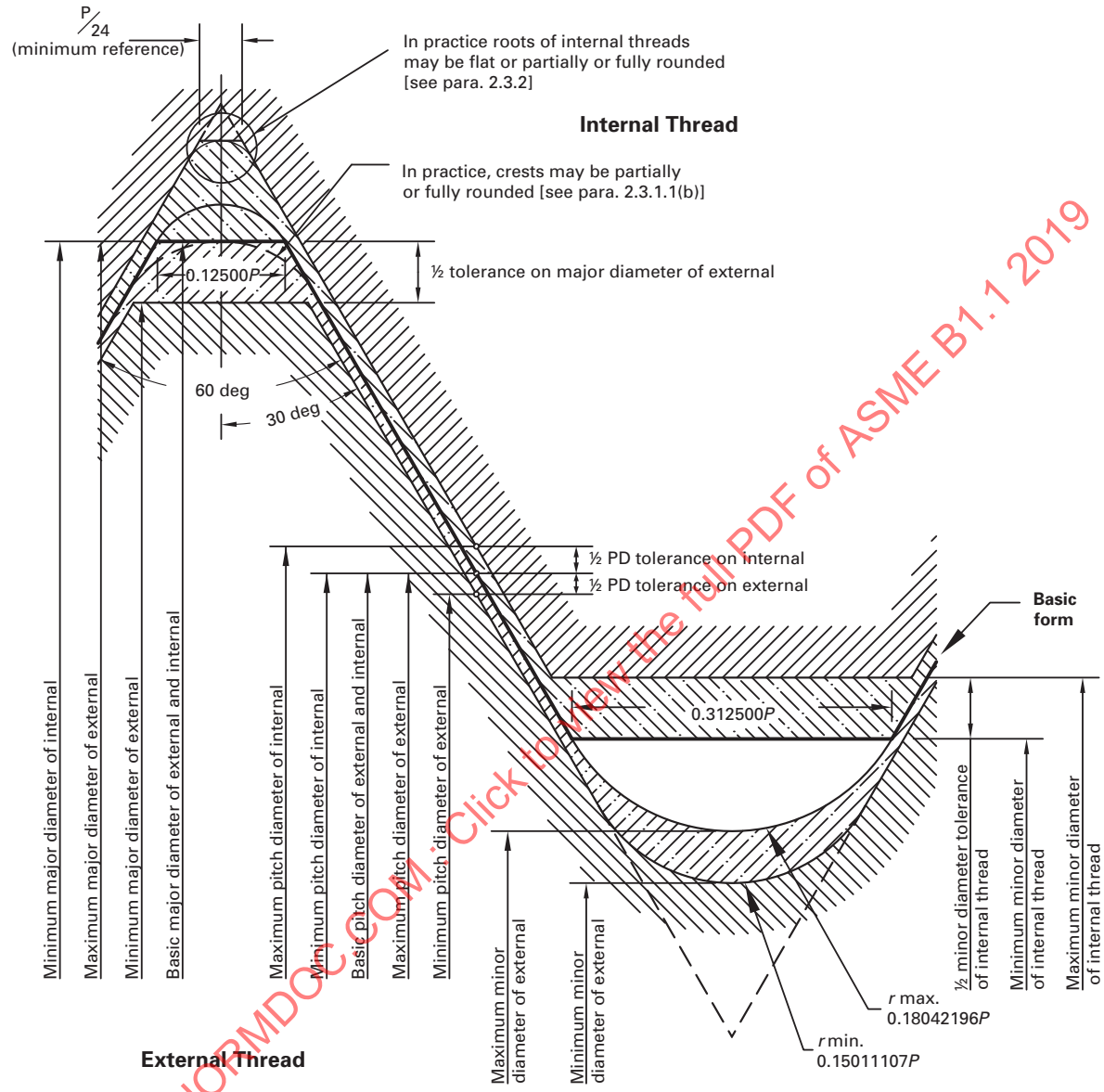
Figure 11 Disposition of Diametral Tolerances and Crest Clearance for Unified Inch Screw Thread Series UNJ, Classes 3A and 3B



GENERAL NOTE: Lead and angle tolerances are defined in section 9.

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Table 1 Standard Series Threads (UN, UNR, and UNJ)

Nominal Size, in.		Basic Major Diameter	Threads/in.											Nominal Size, in.
			Series With Graded Pitches			Series With Constant Pitches								
Primary	Secondary		Coarse UNC	Fine UNF	Extra Fine UNEF	4–UN	6–UN	8–UN	12–UN	16–UN	20–UN	28–UN	32–UN	
0	...	0.0600	...	80	...	...	...	...	...	...	...	...	...	0
...	1	0.0730	64	72	...	...	...	...	...	...	...	...	...	1
2	...	0.0860	56	64	...	...	...	...	...	...	...	...	...	2
...	3	0.0990	48	56	...	...	...	...	...	...	...	...	...	3
4	...	0.1120	40	48	...	...	...	...	...	...	...	...	...	4
5	...	0.1250	40	44	...	...	...	...	...	...	...	...	...	5
6	...	0.1380	32	40	...	...	...	...	...	...	...	...	UNC	6
8	...	0.1640	32	36	...	...	...	...	...	...	...	...	UNC	8
10	...	0.1900	24	32	...	...	...	...	...	...	...	...	UNF	10
...	12	0.2160	24	28	32	...	...	...	...	...	...	UNF	UNEF	12
1/4	...	0.2500	20	28	32	...	...	...	...	...	UNC	UNF	UNEF	1/4
5/16	...	0.3125	18	24	32	...	...	...	...	...	20	28	UNEF	5/16
3/8	...	0.3750	16	24	32	...	...	...	...	UNC	20	28	UNEF	3/8
7/16	...	0.4375	14	20	28	...	...	...	...	16	UNF	UNEF	32	7/16
1/2	...	0.5000	13	20	28	...	...	...	...	16	UNF	UNEF	32	1/2
9/16	...	0.5625	12	I8	24	...	...	...	UNC	16	20	28	32	9/16
5/8	...	0.6250	11	18	24	...	...	...	12	16	20	28	32	5/8
...	11/16	0.6875	...	...	24	...	...	...	12	16	20	28	32	11/16
3/4		0.7500	10	16	20	...	...	...	12	UNF	UNEF	28	32	3/4
...	13/16	0.8125	...	...	20	...	...	...	12	16	UNEF	28	32	13/16
7/8	...	0.8750	9	14	20	...	...	...	12	16	UNEF	28	32	7/8
...	15/16	0.9375	...	...	20	...	...	...	12	16	UNEF	28	32	15/16
1	...	1.0000	8	12	20	...	...	UNC	UNF	16	UNEF	28	32	1
...	1 1/16	1.0625	...	...	18	...	...	8	12	16	20	28	...	1 1/16
1 1/8	...	1.1250	7	12	18	...	...	8	UNF	16	20	28	...	1 1/8
...	1 3/16	1.1875	...	...	18	...	...	8	12	16	20	28	...	1 3/16
1 1/4	...	1.2500	7	12	18	...	...	8	UNF	16	20	28	...	1 1/4
...	1 5/16	1.3125	...	...	18	...	...	8	12	16	20	28	...	1 5/16
1 3/8	...	1.3750	6	12	18	...	UNC	8	UNF	16	20	28	...	1 3/8
...	1 7/16	1.4375	...	...	18	...	6	8	12	16	20	28	...	1 7/16
1 1/2	...	1.5000	6	12	18	...	UNC	8	UNF	16	20	28	...	1 1/2
...	1 9/16	1.5625	...	...	18	...	6	8	12	16	20	...	...	1 9/16
1 5/8	...	1.6250	...	...	18	...	6	8	12	16	20	...	...	1 5/8
...	1 11/16	1.6875	...	...	18	...	6	8	12	16	20	...	...	1 11/16
1 3/4	...	1.7500	5	...	...	...	6	8	12	16	20	...	...	1 3/4
...	1 13/16	1.8125	...	...	...	...	6	8	12	16	20	...	...	1 13/16
1 7/8	...	1.8750	...	...	...	...	6	8	12	16	20	...	...	1 7/8
...	1 15/16	1.9375	...	...	...	...	6	8	12	16	20	...	...	1 15/16
2	...	2.0000	4 1/2	...	...	...	6	8	12	16	20	...	...	2
...	2 1/8	2.1250	...	...	...	...	6	8	12	16	20	...	...	2 1/8

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Table 1 Standard Series Threads (UN, UNR, and UNJ) (Cont'd)

Nominal Size, in.			Threads/in.											
			Series With Graded Pitches			Series With Constant Pitches								
Primary	Secondary	Basic Major Diameter	Coarse UNC	Fine UNF	Extra Fine UNEF	4–UN	6–UN	8–UN	12–UN	16–UN	20–UN	28–UN	32–UN	Nominal Size, in.
2 1/4	...	2.2500	4 1/2	...	...	...	6	8	12	16	20	...	...	2 1/4
...	2 3/8	2.3750	...	...	...	...	6	8	12	16	20	...	...	2 3/8
2 1/2	...	2.5000	4	...	...	UNC	6	8	12	16	20	...	...	2 1/2
...	2 5/8	2.6250	...	...	...	4	6	8	12	16	20	...	...	2 5/8
2 3/4	...	2.7500	4	...	...	UNC	6	8	12	16	20	...	...	2 3/4
...	2 7/8	2.8750	...	...	...	4	6	8	12	16	20	...	...	2 7/8
3	...	3.0000	4	...	...	UNC	6	8	12	16	20	...	...	3
...	3 1/8	3.1250	...	...	...	4	6	8	12	16	...	...	...	3 1/8
3 1/4	...	3.2500	4	...	...	UNC	6	8	12	16	...	...	...	3 1/4
...	3 3/8	3.3750	...	...	...	4	6	8	12	16	...	...	...	3 3/8
3 1/2	...	3.5000	4	...	...	UNC	6	8	12	16	...	...	...	3 1/2
...	3 5/8	3.6250	...	...	...	4	6	8	12	16	...	...	...	3 5/8
3 3/4	...	3.7500	4	...	...	UNC	6	8	12	16	...	...	...	3 3/4
...	3 7/8	3.8750	...	...	...	4	6	8	12	16	...	...	...	3 7/8
4	...	4.0000	4	...	...	UNC	6	8	12	16	...	...	...	4
...	4 1/8	4.1250	...	...	...	4	6	8	12	16	...	...	...	4 1/8
4 1/4	...	4.2500	...	...	...	4	6	8	12	16	...	...	...	4 1/4
...	4 3/8	4.3750	...	...	...	4	6	8	12	16	...	...	...	4 3/8
4 1/2	...	4.5000	...	...	...	4	6	8	12	16	...	...	...	4 1/2
...	4 5/8	4.6250	...	...	...	4	6	8	12	16	...	...	...	4 5/8
4 3/4	...	4.7500	...	...	...	4	6	8	12	16	...	...	...	4 3/4
...	4 7/8	4.8750	...	...	...	4	6	8	12	16	...	...	...	4 7/8
5	...	5.0000	...	...	...	4	6	8	12	16	...	...	...	5
...	5 1/8	5.1250	...	...	...	4	6	8	12	16	...	...	...	5 1/8
5 1/4	...	5.2500	...	...	...	4	6	8	12	16	...	...	...	5 1/4
...	5 3/8	5.3750	...	...	...	4	6	8	12	16	...	...	...	5 3/8
5 1/2	...	5.5000	...	...	...	4	6	8	12	16	...	...	...	5 1/2
...	5 5/8	5.6250	...	...	...	4	6	8	12	16	...	...	...	5 5/8
5 3/4	...	5.7500	...	...	...	4	6	8	12	16	...	...	...	5 3/4
...	5 7/8	5.8750	...	...	...	4	6	8	12	16	...	...	...	5 7/8
6	...	6.0000	...	...	...	4	6	8	12	16	...	...	...	6

GENERAL NOTE: Series designation shown indicates the UN thread form; however, the UNJ thread form may be specified by substituting applicable symbol in place of UN in all designations for both internal and external use and the UNR thread form may be specified by substituting applicable symbol in place of UN in all designations for external use only.

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0 – 80 or 0.0600 – 80	UNF	2A	0.0005	0.0595	0.0563	...	0.0514	0.0496	0.001762	0.0460	0.0415	0.0446	...	0.0018	0.0014	0.0451	0.0425	0.0023	0.0019
	80		3A	0.0000	0.0600	0.0568	...	0.0519	0.0506	0.0013	0.0465	0.0425	0.0451	...	0.0018	0.0014	0.0456	0.0435	0.0023	0.0019
(8)	1 – 64 or 0.0730 – 64	UNC	2A	0.0006	0.0724	0.0686	...	0.0623	0.0603	0.001970	0.0555	0.0502	0.0538	...	0.0023	0.0017	0.0544	0.0515	0.0028	0.0023
(8)	64		3A	0.0000	0.0730	0.0692	...	0.0629	0.0614	0.0015	0.0561	0.0513	0.0544	...	0.0023	0.0017	0.0550	0.0526	0.0028	0.0023
(8)	1 – 72 or 0.0730 – 72	UNF	2A	0.0006	0.0724	0.0689	...	0.0634	0.0615	0.001899	0.0574	0.0525	0.0559	...	0.0020	0.0015	0.0564	0.0536	0.0025	0.0021
(8)	72		3A	0.0000	0.0730	0.0695	...	0.0640	0.0626	0.0014	0.0580	0.0536	0.0565	...	0.0020	0.0015	0.0570	0.0547	0.0025	0.0021
	2 – 56 or 0.0860 – 56	UNC	2A	0.0006	0.0854	0.0813	...	0.0738	0.0717	0.002127	0.0661	0.0601	0.0641	...	0.0026	0.0019	0.0648	0.0616	0.0032	0.0027
	56		3A	0.0000	0.0860	0.0819	...	0.0744	0.0728	0.0016	0.0667	0.0612	0.0647	...	0.0026	0.0019	0.0654	0.0627	0.0032	0.0027
(8)	2 – 64 or 0.0860 – 64	UNF	2A	0.0006	0.0854	0.0816	...	0.0753	0.0733	0.002040	0.0685	0.0632	0.0668	...	0.0023	0.0017	0.0674	0.0645	0.0028	0.0023
(8)	64		3A	0.0000	0.0860	0.0822	...	0.0759	0.0744	0.0015	0.0691	0.0643	0.0674	...	0.0023	0.0017	0.0680	0.0656	0.0028	0.0023
	3 – 48 or 0.0990 – 48	UNC	2A	0.0007	0.0983	0.0938	...	0.0848	0.0825	0.002302	0.0757	0.0690	0.0735	...	0.0030	0.0023	0.0743	0.0707	0.0038	0.0031
	48		3A	0.0000	0.0990	0.0945	...	0.0855	0.0838	0.0017	0.0764	0.0703	0.0742	...	0.0030	0.0023	0.0750	0.0720	0.0038	0.0031
	3 – 56 or 0.0990 – 56	UNF	2A	0.0007	0.0983	0.0942	...	0.0867	0.0845	0.002191	0.0790	0.0729	0.0770	...	0.0026	0.0019	0.0777	0.0744	0.0032	0.0027
	56		3A	0.0000	0.0990	0.0949	...	0.0874	0.0858	0.0016	0.0797	0.0742	0.0777	...	0.0026	0.0019	0.0784	0.0757	0.0032	0.0027
	4 – 40 or 0.1120 – 40	UNC	2A	0.0008	0.1112	0.1061	...	0.095	0.0925	0.002507	0.0841	0.0763	0.0814	...	0.0036	0.0027	0.0824	0.0784	0.0045	0.0038
	40		3A	0.0000	0.1120	0.1069	...	0.0958	0.0939	0.0019	0.0849	0.0777	0.0822	...	0.0036	0.0027	0.0832	0.0798	0.0045	0.0038
	4 – 48 or 0.1120 – 48	UNF	2A	0.0007	0.1113	0.1068	...	0.0978	0.0954	0.002361	0.0887	0.0819	0.0865	...	0.0030	0.0023	0.0873	0.0836	0.0038	0.0031
	48		3A	0.0000	0.1120	0.1075	...	0.0985	0.0967	0.0018	0.0894	0.0832	0.0872	...	0.0030	0.0023	0.0880	0.0849	0.0038	0.0031
	5 – 40 or 0.1250 – 40	UNC	2A	0.0008	0.1242	0.1191	...	0.1080	0.1054	0.002562	0.0971	0.0892	0.0944	...	0.0036	0.0027	0.0954	0.0913	0.0045	0.0038
	40		3A	0.0000	0.1250	0.1199	...	0.1088	0.1069	0.0019	0.0979	0.0907	0.0952	...	0.0036	0.0027	0.0962	0.0928	0.0045	0.0038
	5 – 44 or 0.1250 – 44	UNF	2A	0.0007	0.1243	0.1195	...	0.1095	0.1070	0.002484	0.0997	0.0922	0.0972	...	0.0033	0.0025	0.0980	0.0941	0.0041	0.0034
	44		3A	0.0000	0.1250	0.1202	...	0.1102	0.1083	0.0019	0.1004	0.0935	0.0979	...	0.0033	0.0025	0.0987	0.0954	0.0041	0.0034
	6 – 32 or 0.1380 – 32	UNC	2A	0.0008	0.1372	0.1312	...	0.1169	0.1141	0.002820	0.1034	0.0938	0.1000	...	0.0045	0.0034	0.1011	0.0964	0.0056	0.0047
(8)	32		3A	0.0000	0.1380	0.1320	...	0.1177	0.1156	0.0021	0.1042	0.0953	0.1008	...	0.0045	0.0034	0.1019	0.0979	0.0056	0.0047
	6 – 40 or 0.1380 – 40	UNF	2A	0.0008	0.1372	0.1321	...	0.1210	0.1184	0.002614	0.1101	0.1022	0.1074	...	0.0036	0.0027	0.1084	0.1043	0.0045	0.0038
	40		3A	0.0000	0.1380	0.1329	...	0.1218	0.1198	0.0020	0.1109	0.1036	0.1082	...	0.0036	0.0027	0.1092	0.1057	0.0045	0.0038

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	8 – 32 or 0.1640 – 32	UNC	2A	0.0009	0.1631	0.1571	...	0.1428	0.1399	0.002916	0.1293	0.1196	0.1259	...	0.0045	0.0034	0.1270	0.1222	0.0056	0.0047
(8)	32		3A	0.0000	0.1640	0.1580	...	0.1437	0.1415	0.0022	0.1302	0.1212	0.1268	...	0.0045	0.0034	0.1279	0.1238	0.0056	0.0047
	8 – 36 or 0.1640 – 36	UNF	2A	0.0008	0.1632	0.1577	...	0.1452	0.1424	0.002804	0.1331	0.1244	0.1301	...	0.0040	0.0030	0.1312	0.1267	0.0050	0.0042
	36		3A	0.0000	0.1640	0.1585	...	0.1460	0.1439	0.0021	0.1339	0.1259	0.1309	...	0.0040	0.0030	0.1320	0.1282	0.0050	0.0042
(8)	10 – 24 or 0.1900 – 24	UNC	2A	0.0010	0.1890	0.1818	...	0.1619	0.1586	0.003319	0.1439	0.1315	0.1394	...	0.0060	0.0045	0.1409	0.1350	0.0075	0.0063
	24		3A	0.0000	0.190	0.1828	...	0.1629	0.1604	0.0025	0.1449	0.1333	0.1404	...	0.0060	0.0045	0.1419	0.1368	0.0075	0.0063
	10 – 32 or 0.1900 – 32	UNF	2A	0.0009	0.1891	0.1831	...	0.1688	0.1658	0.003004	0.1553	0.1455	0.1519	...	0.0045	0.0034	0.1530	0.1481	0.0056	0.0047
	32		3A	0.0000	0.1900	0.1840	...	0.1697	0.1674	0.0023	0.1562	0.1471	0.1528	...	0.0045	0.0034	0.1539	0.1497	0.0056	0.0047
	12 – 24 or 0.2160 – 24	UNC	2A	0.0010	0.2150	0.2078	...	0.1879	0.1845	0.003400	0.1699	0.1574	0.1654	...	0.0060	0.0045	0.1669	0.1609	0.0075	0.0063
	24		3A	0.0000	0.2160	0.2088	...	0.1889	0.1863	0.0026	0.1709	0.1592	0.1664	...	0.0060	0.0045	0.1679	0.1627	0.0075	0.0063
	12 – 28 or 0.2160 – 28	UNF	2A	0.0010	0.2150	0.2085	...	0.1918	0.1886	0.003224	0.1763	0.1654	0.1725	...	0.0052	0.0039	0.1738	0.1684	0.0064	0.0054
	28		3A	0.0000	0.2160	0.2095	...	0.1928	0.1904	0.0024	0.1773	0.1672	0.1735	...	0.0052	0.0039	0.1748	0.1702	0.0064	0.0054
(8)	12 – 32 or 0.2160 – 32	UNEF	2A	0.0010	0.2150	0.2090	...	0.1947	0.1915	0.003183	0.1812	0.1712	0.1778	...	0.0045	0.0034	0.1789	0.1738	0.0056	0.0047
	32		3A	0.0000	0.2160	0.2100	...	0.1957	0.1933	0.0024	0.1822	0.1730	0.1788	...	0.0045	0.0034	0.1799	0.1756	0.0056	0.0047
	1/4 – 20 or 0.2500 – 20	UNC	1A	0.0011	0.2489	0.2367	...	0.2164	0.2108	0.0056	0.1948	0.1783	0.1894	...	0.0072	0.0054	...	...	...	...
	20		2A	0.0011	0.2489	0.2408	0.2367	0.2164	0.2127	0.003731	0.1948	0.1802	0.1894	...	0.0072	0.0054	0.1911	0.1844	0.0090	0.0075
	20		3A	0.0000	0.2500	0.2419	...	0.2175	0.2147	0.0028	0.1959	0.1822	0.1905	...	0.0072	0.0054	0.1922	0.1864	0.009	0.0075
	1/4 – 28 or 0.2500 – 28	UNF	1A	0.0010	0.2490	0.2392	...	0.2258	0.2208	0.0050	0.2103	0.1976	0.2065	...	0.0052	0.0039	...	...	...	...
	28		2A	0.0010	0.2490	0.2425	...	0.2258	0.2225	0.003322	0.2103	0.1993	0.2065	...	0.0052	0.0039	0.2078	0.2023	0.0064	0.0054
	28		3A	0.0000	0.2500	0.2435	...	0.2268	0.2243	0.0025	0.2113	0.2011	0.2075	...	0.0052	0.0039	0.2088	0.2041	0.0064	0.0054
	1/4 – 32 or 0.2500 – 32	UNEF	2A	0.0010	0.2490	0.2430	...	0.2287	0.2255	0.003228	0.2152	0.2052	0.2118	...	0.0045	0.0034	0.2129	0.2078	0.0056	0.0047
	32		3A	0.0000	0.2500	0.2440	...	0.2297	0.2273	0.0024	0.2162	0.2070	0.2128	...	0.0045	0.0034	0.2139	0.2096	0.0056	0.0047
	5/16 – 18 or 0.3125 – 18	UNC	1A	0.0012	0.3113	0.2982	...	0.2752	0.2691	0.0061	0.2512	0.2330	0.2451	...	0.0080	0.0060	...	...	...	...
	18		2A	0.0012	0.3113	0.3026	0.2982	0.2752	0.2712	0.004041	0.2512	0.2351	0.2451	...	0.0080	0.0060	0.2471	0.2398	0.0100	0.0083
	18		3A	0.0000	0.3125	0.3038	...	0.2764	0.2734	0.0030	0.2524	0.2373	0.2463	...	0.0080	0.0060	0.2483	0.2420	0.0100	0.0083
(8)	5/16 – 20 or 0.3125 – 20	UN	2A	0.0012	0.3113	0.3032	...	0.2788	0.2747	0.004060	0.2572	0.2422	0.2518	...	0.0072	0.0054	0.2535	0.2464	0.0090	0.0075
(8)	20		3A	0.0000	0.3125	0.3044	...	0.2800	0.2770	0.0030	0.2584	0.2445	0.2530	...	0.0072	0.0054	0.2547	0.2487	0.0090	0.0075

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	5/16 – 24 or 0.3125 – 24	UNF	1A	0.0011	0.3114	0.3006	...	0.2843	0.2788	0.0055	0.2663	0.2517	0.2618	...	0.0060	0.0045	...	...	...	...
	24		2A	0.0011	0.3114	0.3042	...	0.2843	0.2806	0.003660	0.2663	0.2535	0.2618	...	0.0060	0.0045	0.2633	0.2570	0.0075	0.0063
	24		3A	0.0000	0.3125	0.3053	...	0.2854	0.2827	0.0027	0.2674	0.2556	0.2629	...	0.0060	0.0045	0.2644	0.2591	0.0075	0.0063
(8)	5/16 – 28 or 0.3125 – 28	UN	2A	0.00100	0.3115	0.3050	...	0.2883	0.2848	0.003495	0.2728	0.2616	0.2690	...	0.0052	0.0039	0.2703	0.2646	0.0064	0.0054
(8)	28		3A	0.0000	0.3125	0.3060	...	0.2893	0.2867	0.0026	0.2738	0.2635	0.2700	...	0.0052	0.0039	0.2713	0.2665	0.0064	0.0054
(8)	5/16 – 32 or 0.3125 – 32	UNEF	2A	0.0010	0.3115	0.3055	...	0.2912	0.2879	0.003301	0.2777	0.2676	0.2743	...	0.0045	0.0034	0.2754	0.2702	0.0056	0.0047
(8)	32		3A	0.0000	0.3125	0.3065	...	0.2922	0.2897	0.0025	0.2787	0.2694	0.2753	...	0.0045	0.0034	0.2764	0.2720	0.0056	0.0047
	3/8 – 16 or 0.3750 – 16	UNC	1A	0.0013	0.3737	0.3595	...	0.3331	0.3266	0.0065	0.3060	0.2860	0.2993	...	0.0090	0.0068	...	...	...	...
	16		2A	0.0013	0.3737	0.3643	0.3595	0.3331	0.3287	0.004363	0.3060	0.2881	0.2993	...	0.0090	0.0068	0.3015	0.2933	0.0113	0.0094
	16		3A	0.0000	0.3750	0.3656	...	0.3344	0.3311	0.0033	0.3073	0.2905	0.3006	...	0.009	0.0068	0.3028	0.2957	0.0113	0.0094
	3/8 – 20 or 0.3750 – 20	UN	2A	0.0012	0.3738	0.3657	...	0.3413	0.3372	0.004124	0.3197	0.3047	0.3143	...	0.0072	0.0054	0.3160	0.3089	0.0090	0.0075
	20		3A	0.0000	0.3750	0.3669	...	0.3425	0.3394	0.0031	0.3209	0.3069	0.3155	...	0.0072	0.0054	0.3172	0.3111	0.0090	0.0075
	3/8 – 24 or 0.3750 – 24	UNF	1A	0.0011	0.3739	0.3631	...	0.3468	0.3411	0.0057	0.3288	0.3140	0.3243	...	0.0060	0.0045	...	...	...	...
	24		2A	0.0011	0.3739	0.3667	...	0.3468	0.3430	0.003804	0.3288	0.3159	0.3243	...	0.0060	0.0045	0.3258	0.3194	0.0075	0.0063
	24		3A	0.0000	0.3750	0.3678	...	0.3479	0.3450	0.0029	0.3299	0.3179	0.3254	...	0.0060	0.0045	0.3269	0.3214	0.0075	0.0063
	3/8 – 28 or 0.3750 – 28	UN	2A	0.0011	0.3739	0.3674	...	0.3507	0.3471	0.003559	0.3352	0.3239	0.3314	...	0.0052	0.0039	0.3327	0.3269	0.0064	0.0054
	28		3A	0.0000	0.3750	0.3685	...	0.3518	0.3491	0.0027	0.3363	0.3259	0.3325	...	0.0052	0.0039	0.3338	0.3289	0.0064	0.0054
	3/8 – 32 or 0.3750 – 32	UNEF	2A	0.0010	0.3740	0.3680	...	0.3537	0.3503	0.003365	0.3402	0.3300	0.3368	...	0.0045	0.0034	0.3379	0.3326	0.0056	0.0047
	32		3A	0.0000	0.3750	0.3690	...	0.3547	0.3522	0.0025	0.3412	0.3319	0.3378	...	0.0045	0.0034	0.3389	0.3345	0.0056	0.0047
	7/16 – 14 or 0.4375 – 14	UNC	1A	0.0014	0.4361	0.4206	...	0.3897	0.3826	0.0071	0.3588	0.3362	0.3510	...	0.0103	0.0077	...	...	...	...
	14		2A	0.0014	0.4361	0.4258	0.4206	0.3897	0.3850	0.004713	0.3588	0.3386	0.3510	...	0.0103	0.0077	0.3536	0.3446	0.0129	0.0107
	14		3A	0.0000	0.4375	0.4272	...	0.3911	0.3876	0.0035	0.3602	0.3412	0.3524	...	0.0103	0.0077	0.3550	0.3472	0.0129	0.0107
(8)	7/16 – 16 or 0.4375 – 16	UN	2A	0.0014	0.4361	0.4267	...	0.3955	0.3909	0.004626	0.3684	0.3503	0.3617	...	0.0090	0.0068	0.3639	0.3555	0.0113	0.0094
(8)	16		3A	0.0000	0.4375	0.4281	...	0.3969	0.3934	0.0035	0.3698	0.3528	0.3631	...	0.0090	0.0068	0.3653	0.3580	0.0113	0.0094
(8)	7/16 – 20 or 0.4375 – 20	UNF	1A	0.0013	0.4362	0.4240	...	0.4037	0.3974	0.0063	0.3821	0.3649	0.3767	...	0.0072	0.0054	...	...	...	...
	20		2A	0.0013	0.4362	0.4281	...	0.4037	0.3995	0.004167	0.3821	0.3670	0.3767	...	0.0072	0.0054	0.3784	0.3712	0.0090	0.0075
	20		3A	0.0000	0.4375	0.4294	...	0.4050	0.4019	0.0031	0.3834	0.3694	0.3780	...	0.0072	0.0054	0.3797	0.3736	0.0090	0.0075

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	7/16 – 28 or 0.4375 – 28	UNEF	2A	0.0011	0.4364	0.4299	...	0.4132	0.4096	0.003616	0.3977	0.3864	0.3939	...	0.0052	0.0039	0.3952	0.3894	0.0064	0.0054
	28		3A	0.0000	0.4375	0.4310	...	0.4143	0.4116	0.0027	0.3988	0.3884	0.3950	...	0.0052	0.0039	0.3963	0.3914	0.0064	0.0054
(8)	7/16 – 32 or 0.4375 – 32	UN	2A	0.0010	0.4365	0.4305	...	0.4162	0.4128	0.003422	0.4027	0.3925	0.3993	...	0.0045	0.0034	0.4004	0.3951	0.0056	0.0047
	32		3A	0.0000	0.4375	0.4315	...	0.4172	0.4146	0.0026	0.4037	0.3943	0.4003	...	0.0045	0.0034	0.4014	0.3969	0.0056	0.0047
	1/2 – 13 or 0.5000 – 13	UNC	1A	0.0015	0.4985	0.4822	...	0.4485	0.4411	0.0074	0.4152	0.3911	0.4069	...	0.0111	0.0083	...	...	...	...
	13		2A	0.0015	0.4985	0.4876	0.4822	0.4485	0.4435	0.004965	0.4152	0.3935	0.4069	...	0.0111	0.0083	0.4096	0.4000	0.0139	0.0115
	13		3A	0.0000	0.5000	0.4891	...	0.4500	0.4463	0.0037	0.4167	0.3963	0.4084	...	0.0111	0.0083	0.4111	0.4028	0.0139	0.0115
	1/2 – 16 or 0.5000 – 16	UN	2A	0.0014	0.4986	0.4892	...	0.4580	0.4533	0.004678	0.4309	0.4127	0.4242	...	0.0090	0.0068	0.4264	0.4179	0.0113	0.0094
(8)	16		3A	0.0000	0.5000	0.4906	...	0.4594	0.4559	0.0035	0.4323	0.4153	0.4256	...	0.0090	0.0068	0.4278	0.4205	0.0113	0.0094
	1/2 – 20 or 0.5000 – 20	UNF	1A	0.0013	0.4987	0.4865	...	0.4662	0.4598	0.0064	0.4446	0.4273	0.4392	...	0.0072	0.0054	...	...	...	...
	20		2A	0.0013	0.4987	0.4906	...	0.4662	0.4619	0.004288	0.4446	0.4294	0.4392	...	0.0072	0.0054	0.4409	0.4336	0.0090	0.0075
	20		3A	0.0000	0.5000	0.4919	...	0.4675	0.4643	0.0032	0.4459	0.4318	0.4405	...	0.0072	0.0054	0.4422	0.4360	0.0090	0.0075
	1/2 – 28 or 0.5000 – 28	UNEF	2A	0.0011	0.4989	0.4924	...	0.4757	0.4720	0.003668	0.4602	0.4488	0.4564	...	0.0052	0.0039	0.4577	0.4518	0.0064	0.0054
	28		3A	0.0000	0.5000	0.4935	...	0.4768	0.4740	0.0028	0.4613	0.4508	0.4575	...	0.0052	0.0039	0.4588	0.4538	0.0064	0.0054
	1/2 – 32 or 0.5000 – 32	UN	2A	0.0010	0.4990	0.4930	...	0.4787	0.4752	0.003474	0.4652	0.4549	0.4618	...	0.0045	0.0034	0.4629	0.4575	0.0056	0.0047
	32		3A	0.0000	0.5000	0.4940	...	0.4797	0.4771	0.0026	0.4662	0.4568	0.4628	...	0.0045	0.0034	0.4639	0.4594	0.0056	0.0047
	9/16 – 12 or 0.5625 – 12	UNC	1A	0.0016	0.5609	0.5437	...	0.5068	0.4990	0.0078	0.4707	0.4449	0.4617	...	0.0120	0.0090	...	...	...	...
	12		2A	0.0016	0.5609	0.5495	0.5437	0.5068	0.5016	0.005225	0.4707	0.4475	0.4617	...	0.0120	0.0090	0.4647	0.4545	0.0150	0.0125
	12		3A	0.0000	0.5625	0.5511	...	0.5084	0.5045	0.0039	0.4723	0.4504	0.4633	...	0.0120	0.0090	0.4663	0.4574	0.0150	0.0125
	9/16 – 16 or 0.5625 – 16	UN	2A	0.0014	0.5611	0.5517	...	0.5205	0.5158	0.004725	0.4934	0.4752	0.4867	...	0.0090	0.0068	0.4889	0.4804	0.0113	0.0094
(8)	16		3A	0.0000	0.5625	0.5531	...	0.5219	0.5184	0.0035	0.4948	0.4778	0.4881	...	0.0090	0.0068	0.4903	0.4830	0.0113	0.0094
	9/16 – 18 or 0.5625 – 18	UNF	1A	0.0014	0.5611	0.5480	...	0.5250	0.5182	0.0068	0.5010	0.4821	0.4949	...	0.0080	0.0060	...	...	...	...
	18		2A	0.0014	0.5611	0.5524	...	0.5250	0.5205	0.004547	0.501	0.4844	0.4949	...	0.0080	0.0060	0.4969	0.4891	0.0100	0.0083
	18		3A	0.0000	0.5625	0.5538	...	0.5264	0.5230	0.0034	0.5024	0.4869	0.4963	...	0.0080	0.0060	0.4983	0.4916	0.0100	0.0083
(8)	9/16 – 20 or 0.5625 – 20	UN	2A	0.0013	0.5612	0.5531	...	0.5287	0.5244	0.004280	0.5071	0.4919	0.5017	...	0.0072	0.0054	0.5034	0.4961	0.0090	0.0075
(8)	20		3A	0.0000	0.5625	0.5544	...	0.5300	0.5268	0.0032	0.5084	0.4943	0.5030	...	0.0072	0.0054	0.5047	0.4985	0.0090	0.0075
(8)	9/16 – 24 or 0.5625 – 24	UNEF	2A	0.0012	0.5613	0.5541	...	0.5342	0.5302	0.003960	0.5162	0.5031	0.5117	...	0.0060	0.0045	0.5132	0.5066	0.0075	0.0063

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	24		3A	0.0000	0.5625	0.5553	...	0.5354	0.5324	0.0030	0.5174	0.5053	0.5129	...	0.0060	0.0045	0.5144	0.5088	0.0075	0.0063
	9/16 – 28 or 0.5625 – 28	UN	2A	0.0011	0.5614	0.5549	...	0.5382	0.5345	0.003715	0.5227	0.5113	0.5189	...	0.0052	0.0039	0.5202	0.5143	0.0064	0.0054
	28		3A	0.0000	0.5625	0.5560	...	0.5393	0.5365	0.0028	0.5238	0.5133	0.5200	...	0.0052	0.0039	0.5213	0.5163	0.0064	0.0054
(8)	9/16 – 32 or 0.5625 – 32	UN	2A	0.0011	0.5614	0.5554	...	0.5411	0.5376	0.003521	0.5276	0.5173	0.5242	...	0.0045	0.0034	0.5253	0.5199	0.0056	0.0047
	32		3A	0.0000	0.5625	0.5565	...	0.5422	0.5396	0.0026	0.5287	0.5193	0.5253	...	0.0045	0.0034	0.5264	0.5219	0.0056	0.0047
(8)	5/8 – 11 or 0.625 – 11	UNC	1A	0.0017	0.6233	0.6051	...	0.5643	0.5560	0.0083	0.5249	0.4970	0.5150	...	0.0131	0.0098	...	...	...	...
(8)	11		2A	0.0017	0.6233	0.6112	0.6052	0.5643	0.5588	0.005501	0.5249	0.4998	0.5150	...	0.0131	0.0098	0.5184	0.5074	0.0164	0.0136
	11		3A	0.0000	0.6250	0.6129	...	0.5660	0.5619	0.0041	0.5266	0.5029	0.5167	...	0.0131	0.0098	0.5201	0.5105	0.0164	0.0136
	5/8 – 12 or 0.625 – 12	UN	2A	0.0016	0.6234	0.6120	...	0.5693	0.5639	0.005443	0.5332	0.5098	0.5242	...	0.0120	0.0090	0.5272	0.5168	0.0150	0.0125
	12		3A	0.0000	0.6250	0.6136	...	0.5709	0.5668	0.0041	0.5348	0.5127	0.5258	...	0.0120	0.0090	0.5288	0.5197	0.0150	0.0125
	5/8 – 16 or 0.6250 – 16	UN	2A	0.0014	0.6236	0.6142	...	0.5830	0.5782	0.004769	0.5559	0.5376	0.5492	...	0.0090	0.0068	0.5514	0.5428	0.0113	0.0094
	16		3A	0.0000	0.6250	0.6156	...	0.5844	0.5808	0.0036	0.5573	0.5402	0.5506	...	0.0090	0.0068	0.5528	0.5454	0.0113	0.0094
	5/8 – 18 or 0.6250 – 18	UNF	1A	0.0014	0.6236	0.6105	...	0.5875	0.5805	0.0070	0.5635	0.5444	0.5574	...	0.0080	0.0060	...	...	...	...
	18		2A	0.0014	0.6236	0.6149	...	0.5875	0.5828	0.004652	0.5635	0.5467	0.5574	...	0.0080	0.0060	0.5594	0.5514	0.0100	0.0083
	18		3A	0.0000	0.6250	0.6163	...	0.5889	0.5854	0.0035	0.5649	0.5493	0.5588	...	0.0080	0.0060	0.5608	0.5540	0.0100	0.0083
	5/8 – 20 or 0.6250 – 20	UN	2A	0.0013	0.6237	0.6156	...	0.5912	0.5869	0.004324	0.5696	0.5544	0.5642	...	0.0072	0.0054	0.5659	0.5586	0.0090	0.0075
	20		3A	0.0000	0.6250	0.6169	...	0.5925	0.5893	0.0032	0.5709	0.5568	0.5655	...	0.0072	0.0054	0.5672	0.5610	0.0090	0.0075
	5/8 – 24 or 0.6250 – 24	UNEF	2A	0.0012	0.6238	0.6166	...	0.5967	0.5927	0.004004	0.5787	0.5656	0.5742	...	0.0060	0.0045	0.5757	0.5691	0.0075	0.0063
	24		3A	0.0000	0.6250	0.6178	...	0.5979	0.5949	0.0030	0.5799	0.5678	0.5754	...	0.0060	0.0045	0.5769	0.5713	0.0075	0.0063
	5/8 – 28 or 0.6250 – 28	UN	2A	0.0011	0.6239	0.6174	...	0.6007	0.5969	0.003759	0.5852	0.5737	0.5814	...	0.0052	0.0039	0.5827	0.5767	0.0064	0.0054
	28		3A	0.0000	0.6250	0.6185	...	0.6018	0.5990	0.0028	0.5863	0.5758	0.5825	...	0.0052	0.0039	0.5838	0.5788	0.0064	0.0054
	5/8 – 32 or 0.6250 – 32	UN	2A	0.0011	0.6239	0.6179	...	0.6036	0.6000	0.003565	0.5901	0.5797	0.5867	...	0.0045	0.0034	0.5878	0.5823	0.0056	0.0047
	32		3A	0.0000	0.6250	0.6190	...	0.6047	0.6020	0.0027	0.5912	0.5817	0.5878	...	0.0045	0.0034	0.5889	0.5843	0.0056	0.0047
(8)	11/16 – 12 or 0.6875 – 12	UN	2A	0.0016	0.6859	0.6745	...	0.6318	0.6263	0.005485	0.5957	0.5722	0.5867	...	0.0120	0.0090	0.5897	0.5792	0.0150	0.0125
	12		3A	0.0000	0.6875	0.6761	...	0.6334	0.6293	0.0041	0.5973	0.5752	0.5883	...	0.0120	0.0090	0.5913	0.5822	0.0150	0.0125
(8)	11/16 – 16 or 0.6875 – 16	UN	2A	0.0014	0.6861	0.6767	...	0.6455	0.6407	0.004811	0.6184	0.6001	0.6117	...	0.0090	0.0068	0.6139	0.6053	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	16		3A	0.0000	0.6875	0.6781	...	0.6469	0.6433	0.0036	0.6198	0.6027	0.6131	...	0.0090	0.0068	0.6153	0.6079	0.0113	0.0094
(8)	$^{11}/_{16}$ – 20 or 0.6875 – 20	UN	2A	0.0013	0.6862	0.6781	...	0.6537	0.6493	0.004366	0.6321	0.6168	0.6267	...	0.0072	0.0054	0.6284	0.6210	0.0090	0.0075
(8)	20		3A	0.0000	0.6875	0.6794	...	0.6550	0.6517	0.0033	0.6334	0.6192	0.6280	...	0.0072	0.0054	0.6297	0.6234	0.0090	0.0075
(8)	$^{11}/_{16}$ – 24 or 0.6875 – 24	UNEF	2A	0.0012	0.6863	0.6791	...	0.6592	0.6552	0.004046	0.6412	0.6281	0.6367	...	0.0060	0.0045	0.6382	0.6316	0.0075	0.0063
	24		3A	0.0000	0.6875	0.6803	...	0.6604	0.6574	0.0030	0.6424	0.6303	0.6379	...	0.0060	0.0045	0.6394	0.6338	0.0075	0.0063
	$^{11}/_{16}$ – 28 or 0.6875 – 28	UN	2A	0.0011	0.6864	0.6799	...	0.6632	0.6594	0.003801	0.6477	0.6362	0.6439	...	0.0052	0.0039	0.6452	0.6392	0.0064	0.0054
(8)	28		3A	0.0000	0.6875	0.6810	...	0.6643	0.6614	0.0029	0.6488	0.6382	0.6450	...	0.0052	0.0039	0.6463	0.6412	0.0064	0.0054
(8)	$^{11}/_{16}$ – 32 or 0.6875 – 32	UN	2A	0.0011	0.6864	0.6804	...	0.6661	0.6625	0.003607	0.6526	0.6422	0.6492	...	0.0045	0.0034	0.6503	0.6448	0.0056	0.0047
	32		3A	0.0000	0.6875	0.6815	...	0.6672	0.6645	0.0027	0.6537	0.6442	0.6503	...	0.0045	0.0034	0.6514	0.6468	0.0056	0.0047
	$^{3}/_{4}$ – 10 or 0.7500 – 10	UNC	1A	0.0018	0.7482	0.7288	...	0.6832	0.6744	0.0088	0.6399	0.6094	0.6291	...	0.0144	0.0108	...	...	...	...
	10		2A	0.0018	0.7482	0.7353	0.7288	0.6832	0.6773	0.005894	0.6399	0.6123	0.6291	...	0.0144	0.0108	0.6327	0.6207	0.0180	0.0150
	10		3A	0.0000	0.7500	0.7371	...	0.6850	0.6806	0.0044	0.6417	0.6156	0.6309	...	0.0144	0.0108	0.6345	0.6240	0.0180	0.0150
	$^{3}/_{4}$ – 12 or 0.7500 – 12	UN	2A	0.0017	0.7483	0.7369	...	0.6942	0.6887	0.005524	0.6581	0.6346	0.6491	...	0.0120	0.0090	0.6521	0.6416	0.0150	0.0125
	12		3A	0.0000	0.7500	0.7386	...	0.6959	0.6918	0.0041	0.6598	0.6377	0.6508	...	0.0120	0.0090	0.6538	0.6447	0.0150	0.0125
	$^{3}/_{4}$ – 16 or 0.7500 – 16	UNF	1A	0.0015	0.7485	0.7343	...	0.7079	0.7004	0.0075	0.6808	0.6598	0.6741	...	0.0090	0.0068	...	...	...	...
	16		2A	0.0015	0.7485	0.7391	...	0.7079	0.7029	0.005024	0.6808	0.6623	0.6741	...	0.0090	0.0068	0.6763	0.6675	0.0113	0.0094
(8)	16		3A	0.0000	0.7500	0.7406	...	0.7094	0.7056	0.0038	0.6823	0.6650	0.6756	...	0.0090	0.0068	0.6778	0.6702	0.0113	0.0094
	$^{3}/_{4}$ – 20 or 0.7500 – 20	UNEF	2A	0.0013	0.7487	0.7406	...	0.7162	0.7118	0.004405	0.6946	0.6793	0.6892	...	0.0072	0.0054	0.6909	0.6835	0.0090	0.0075
	20		3A	0.0000	0.7500	0.7419	...	0.7175	0.7142	0.0033	0.6959	0.6817	0.6905	...	0.0072	0.0054	0.6922	0.6859	0.0090	0.0075
	$^{3}/_{4}$ – 28 or 0.7500 – 28	UN	2A	0.0012	0.7488	0.7423	...	0.7256	0.7218	0.003840	0.7101	0.6986	0.7063	...	0.0052	0.0039	0.7076	0.7016	0.0064	0.0054
(8)	28		3A	0.0000	0.7500	0.7435	...	0.7268	0.7239	0.0029	0.7113	0.7007	0.7075	...	0.0052	0.0039	0.7088	0.7037	0.0064	0.0054
	$^{3}/_{4}$ – 32 or 0.7500 – 32	UN	2A	0.0011	0.7489	0.7429	...	0.7286	0.7250	0.003646	0.7151	0.7047	0.7117	...	0.0045	0.0034	0.7128	0.7073	0.0056	0.0047
	32		3A	0.0000	0.7500	0.7440	...	0.7297	0.7270	0.0027	0.7162	0.7067	0.7128	...	0.0045	0.0034	0.7139	0.7093	0.0056	0.0047
(8)	$^{13}/_{16}$ – 12 or 0.8125 – 12	UN	2A	0.0017	0.8108	0.7994	...	0.7567	0.7511	0.005561	0.7206	0.6970	0.7116	...	0.0120	0.0090	0.7146	0.7040	0.0150	0.0125
(8)	12		3A	0.0000	0.8125	0.8011	...	0.7584	0.7542	0.0042	0.7223	0.7001	0.7133	...	0.0120	0.0090	0.7163	0.7071	0.0150	0.0125
(8)	$^{13}/_{16}$ – 16 or 0.8125 – 16	UN	2A	0.0015	0.8110	0.8016	...	0.7704	0.7655	0.004887	0.7433	0.7249	0.7366	...	0.0090	0.0068	0.7388	0.7301	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	16		3A	0.0000	0.8125	0.8031	...	0.7719	0.7682	0.0037	0.7448	0.7276	0.7381	...	0.0090	0.0068	0.7403	0.7328	0.0113	0.0094
(8)	13/16 – 20 or 0.8125 – 20	UNEF	2A	0.0013	0.8112	0.8031	...	0.7787	0.7743	0.004442	0.7571	0.7418	0.7517	...	0.0072	0.0054	0.7534	0.7460	0.0090	0.0075
(8)	20		3A	0.0000	0.8125	0.8044	...	0.7800	0.7767	0.0033	0.7584	0.7442	0.7530	...	0.0072	0.0054	0.7547	0.7484	0.0090	0.0075
(8)	13/16 – 28 or 0.8125 – 28	UN	2A	0.0012	0.8113	0.8048	...	0.7881	0.7842	0.003877	0.7726	0.7610	0.7688	...	0.0052	0.0039	0.7701	0.7640	0.0064	0.0054
(8)	28		3A	0.0000	0.8125	0.8060	...	0.7893	0.7864	0.0029	0.7738	0.7632	0.7700	...	0.0052	0.0039	0.7713	0.7662	0.0064	0.0054
(8)	13/16 – 32 or 0.8125 – 32	UN	2A	0.0011	0.8114	0.8054	...	0.7911	0.7874	0.003683	0.7776	0.7671	0.7742	...	0.0045	0.0034	0.7753	0.7697	0.0056	0.0047
(8)	32		3A	0.0000	0.8125	0.8065	...	0.7922	0.7894	0.0028	0.7787	0.7691	0.7753	...	0.0045	0.0034	0.7764	0.7717	0.0056	0.0047
	7/8 – 9 or 0.8750 – 9	UNC	1A	0.0019	0.8731	0.8523	...	0.8009	0.7914	0.0095	0.7528	0.7192	0.7408	...	0.0160	0.0120	...	...	...	...
	9		2A	0.0019	0.8731	0.8592	0.8523	0.8009	0.7946	0.006305	0.7528	0.7224	0.7408	...	0.0160	0.0120	0.7448	0.7317	0.0200	0.0167
	9		3A	0.0000	0.8750	0.8611	...	0.8028	0.7981	0.0047	0.7547	0.7259	0.7427	...	0.0160	0.0120	0.7467	0.7352	0.0200	0.0167
(8)	7/8 – 12 or 0.8750 – 12	UN	2A	0.0017	0.8733	0.8619	...	0.8192	0.8136	0.005596	0.7831	0.7595	0.7741	...	0.0120	0.0090	0.7771	0.7665	0.0150	0.0125
(8)	12		3A	0.0000	0.8750	0.8636	...	0.8209	0.8167	0.0042	0.7848	0.7626	0.7758	...	0.0120	0.0090	0.7788	0.7696	0.0150	0.0125
(8)	7/8 – 14 or 0.8750 – 14	UNF	1A	0.0016	0.8734	0.8579	...	0.8270	0.8189	0.0081	0.7961	0.7725	0.7883	...	0.0103	0.0077	...	...	...	...
(8)	14		2A	0.0016	0.8734	0.8631	...	0.8270	0.8216	0.005420	0.7961	0.7752	0.7883	...	0.0103	0.0077	0.7909	0.7812	0.0129	0.0107
(8)	14		3A	0.0000	0.8750	0.8647	...	0.8286	0.8245	0.0041	0.7977	0.7781	0.7899	...	0.0103	0.0077	0.7925	0.7841	0.0129	0.0107
(8)	7/8 – 16 or 0.8750 – 16	UN	2A	0.0015	0.8735	0.8641	...	0.8329	0.8280	0.004922	0.8058	0.7874	0.7991	...	0.0090	0.0068	0.8013	0.7926	0.0113	0.0094
(8)	16		3A	0.0000	0.8750	0.8656	...	0.8344	0.8307	0.0037	0.8073	0.7901	0.8006	...	0.0090	0.0068	0.8028	0.7953	0.0113	0.0094
(8)	7/8 – 20 or 0.8750 – 20	UNEF	2A	0.0013	0.8737	0.8656	...	0.8412	0.8367	0.004477	0.8196	0.8042	0.8142	...	0.0072	0.0054	0.8159	0.8084	0.0090	0.0075
(8)	20		3A	0.0000	0.8750	0.8669	...	0.8425	0.8391	0.0034	0.8209	0.8066	0.8155	...	0.0072	0.0054	0.8172	0.8108	0.0090	0.0075
(8)	7/8 – 28 or 0.8750 – 28	UN	2A	0.0012	0.8738	0.8673	...	0.8506	0.8467	0.003912	0.8351	0.8235	0.8313	...	0.0052	0.0039	0.8326	0.8265	0.0064	0.0054
(8)	28		3A	0.0000	0.8750	0.8685	...	0.8518	0.8489	0.0029	0.8363	0.8257	0.8325	...	0.0052	0.0039	0.8338	0.8287	0.0064	0.0054
(8)	7/8 – 32 or 0.8750 – 32	UN	2A	0.0011	0.8739	0.8679	...	0.8536	0.8499	0.003718	0.8401	0.8296	0.8367	...	0.0045	0.0034	0.8378	0.8322	0.0056	0.0047
(8)	32		3A	0.0000	0.8750	0.8690	...	0.8547	0.8519	0.0028	0.8412	0.8316	0.8378	...	0.0045	0.0034	0.8389	0.8342	0.0056	0.0047
(8)	15/16 – 12 or 0.9375 – 12	UN	2A	0.0017	0.9358	0.9244	...	0.8817	0.8761	0.005629	0.8456	0.8220	0.8366	...	0.0120	0.0090	0.8396	0.8290	0.0150	0.0125
(8)	12		3A	0.0000	0.9375	0.9261	...	0.8834	0.8792	0.0042	0.8473	0.8251	0.8383	...	0.0120	0.0090	0.8413	0.8321	0.0150	0.0125
(8)	15/16 – 16 or 0.9375 – 16	UN	2A	0.0015	0.9360	0.9266	...	0.8954	0.8904	0.004955	0.8683	0.8498	0.8616	...	0.0090	0.0068	0.8638	0.8550	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	16		3A	0.0000	0.9375	0.9281	...	0.8969	0.8932	0.0037	0.8698	0.8526	0.8631	...	0.0090	0.0068	0.8653	0.8578	0.0113	0.0094
	$^{15}/_{16}$ – 20 or 0.9375 – 20	UNEF	2A	0.0014	0.9361	0.9280	...	0.9036	0.8991	0.004510	0.8820	0.8666	0.8766	...	0.0072	0.0054	0.8783	0.8708	0.0090	0.0075
(8)	20		3A	0.0000	0.9375	0.9294	...	0.9050	0.9016	0.0034	0.8834	0.8691	0.8780	...	0.0072	0.0054	0.8797	0.8733	0.0090	0.0075
(8)	$^{15}/_{16}$ – 28 or 0.9375 – 28	UN	2A	0.0012	0.9363	0.9298	...	0.9131	0.9092	0.003945	0.8976	0.8860	0.8938	...	0.0052	0.0039	0.8951	0.8890	0.0064	0.0054
(8)	28		3A	0.0000	0.9375	0.9310	...	0.9143	0.9113	0.0030	0.8988	0.8881	0.8950	...	0.0052	0.0039	0.8963	0.8911	0.0064	0.0054
	$^{15}/_{16}$ – 32 or 0.9375 – 32	UN	2A	0.0011	0.9364	0.9304	...	0.9161	0.9123	0.003751	0.9026	0.8920	0.8992	...	0.0045	0.0034	0.9003	0.8946	0.0056	0.0047
	32		3A	0.0000	0.9375	0.9315	...	0.9172	0.9144	0.0028	0.9037	0.8941	0.9003	...	0.0045	0.0034	0.9014	0.8967	0.0056	0.0047
	1– 8 or 1.0000 – 8	UNC	1A	0.0020	0.9980	0.9755	...	0.9168	0.9067	0.0101	0.8627	0.8255	0.8492	...	0.0180	0.0135	...	...	...	...
	8		2A	0.0020	0.9980	0.9830	0.9755	0.9168	0.9101	0.006750	0.8627	0.8289	0.8492	...	0.0180	0.0135	0.8537	0.8394	0.0226	0.0188
	8		3A	0.0000	1.0000	0.9850	...	0.9188	0.9137	0.0051	0.8647	0.8325	0.8512	...	0.0180	0.0135	0.8557	0.8430	0.0226	0.0188
	1 – 12 or 1.000 – 12	UNF	1A	0.0018	0.9982	0.9810	...	0.9441	0.9353	0.0088	0.9080	0.8812	0.8990	...	0.0120	0.0090	...	...	...	...
	12		2A	0.0018	0.9982	0.9868	...	0.9441	0.9382	0.005862	0.9080	0.8841	0.8990	...	0.0120	0.0090	0.9020	0.8911	0.0150	0.0125
	12		3A	0.0000	1.0000	0.9886	...	0.9459	0.9415	0.0044	0.9098	0.8874	0.9008	...	0.0120	0.0090	0.9038	0.8944	0.0150	0.0125
(8), (9)	1 – 14 or 1.0000 – 14	UNS	2A	0.0016	0.9984	0.9881	...	0.9520	0.9467	0.005285	0.9211	0.9003	0.9133	...	0.0103	0.0077	0.9159	0.9063	0.0129	0.0107
(8)	14		3A	0.0000	1.0000	0.9897	...	0.9536	0.9496	0.0040	0.9227	0.9032	0.9149	...	0.0103	0.0077	0.9175	0.9092	0.0129	0.0107
	1 – 16 or 1.0000 – 16	UN	2A	0.0015	0.9985	0.9891	...	0.9579	0.9529	0.004987	0.9308	0.9123	0.9241	...	0.0090	0.0068	0.9263	0.9175	0.0113	0.0094
	16		3A	0.0000	1.0000	0.9906	...	0.9594	0.9557	0.0037	0.9323	0.9151	0.9256	...	0.0090	0.0068	0.9278	0.9203	0.0113	0.0094
	1 – 20 or 1.0000 – 20	UNEF	2A	0.0014	0.9986	0.9905	...	0.9661	0.9616	0.004542	0.9445	0.9291	0.9391	...	0.0072	0.0054	0.9408	0.9333	0.0000	0.0075
	20		3A	0.0000	1.0000	0.9919	...	0.9675	0.9641	0.0034	0.9459	0.9316	0.9405	...	0.0072	0.0054	0.9422	0.9358	0.0090	0.0075
	1 – 28 or 1.0000 – 28	UN	2A	0.0012	0.9988	0.9923	...	0.9756	0.9716	0.003977	0.9601	0.9484	0.9563	...	0.0052	0.0039	0.9576	0.9514	0.0064	0.0054
	28		3A	0.0000	1.0000	0.9935	...	0.9768	0.9738	0.0030	0.9613	0.9506	0.9575	...	0.0052	0.0039	0.9588	0.9536	0.0064	0.0054
	1 – 32 or 1.0000 – 32	UN	2A	0.0011	0.9989	0.9929	...	0.9786	0.9748	0.003783	0.9651	0.9545	0.9617	...	0.0045	0.0034	0.9628	0.9571	0.0056	0.0047
	32		3A	0.0000	1.0000	0.9940	...	0.9797	0.9769	0.0028	0.9662	0.9566	0.9628	...	0.0045	0.0034	0.9639	0.9592	0.0056	0.0047
	$1^{1}/_{16}$ – 8 or 1.0625 – 8	UN	2A	0.0020	1.0605	1.0455	...	0.9793	0.9725	0.006827	0.9252	0.8913	0.9117	...	0.0180	0.0135	0.9162	0.9018	0.0226	0.0188
	8		3A	0.0000	1.0625	1.0475	...	0.9813	0.9762	0.0051	0.9272	0.8950	0.9137	...	0.0180	0.0135	0.9182	0.9055	0.0226	0.0188
	$1^{1}/_{16}$ – 12 or 1.0625 – 12	UN	2A	0.0017	1.0608	1.0494	...	1.0067	1.0010	0.005692	0.9706	0.9469	0.9616	...	0.0120	0.0090	0.9646	0.9539	0.0150	0.0125

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	12		3A	0.0000	1.0625	1.0511	...	1.0084	1.0041	0.0043	0.9723	0.9500	0.9633	...	0.0120	0.0090	0.9663	0.9570	0.0150	0.0125
	$1\frac{1}{16}$ – 16 or 1.0625 – 16	UN	2A	0.0015	1.0610	1.0516	...	1.0204	1.0154	0.005018	0.9933	0.9748	0.9866	...	0.0090	0.0068	0.9888	0.9800	0.0113	0.0094
(8)	16		3A	0.0000	1.0625	1.0531	...	1.0219	1.0181	0.0038	0.9948	0.9775	0.9881	...	0.0090	0.0068	0.9903	0.9827	0.0113	0.0094
(8)	$1\frac{1}{16}$ – 18 or 1.0625 – 18	UNEF	2A	0.0014	1.0611	1.0524	...	1.0250	1.0202	0.004776	1.0010	0.9841	0.9949	...	0.0080	0.0060	0.9969	0.9888	0.0100	0.0083
(8)	18		3A	0.0000	1.0625	1.0538	...	1.0264	1.0228	0.0036	1.0024	0.9867	0.9963	...	0.0080	0.0060	0.9983	0.9914	0.0100	0.0083
(8)	$1\frac{1}{16}$ – 20 or 1.0625 – 20	UN	2A	0.0014	1.0611	1.0530	...	1.0286	1.0240	0.004573	1.0070	0.9915	1.0016	...	0.0072	0.0054	1.0033	0.9957	0.0090	0.0075
(8)	20		3A	0.0000	1.0625	1.0544	...	1.0300	1.0266	0.0034	1.0084	0.9941	1.0030	...	0.0072	0.0054	1.0047	0.9983	0.0090	0.0075
	$1\frac{1}{16}$ – 28 or 1.0625 – 28	UN	2A	0.0012	1.0613	1.0548	...	1.0381	1.0341	0.004008	1.0226	1.0109	1.0188	...	0.0052	0.0039	1.0201	1.0139	0.0064	0.0054
	28		3A	0.0000	1.0625	1.0560	...	1.0393	1.0363	0.0030	1.0238	1.0131	1.0200	...	0.0052	0.0039	1.0213	1.0161	0.0064	0.0054
	$1\frac{1}{8}$ – 7 or 1.1250 – 7	UNC	1A	0.0022	1.1228	1.0982	...	1.0300	1.0191	0.0109	0.9682	0.9263	0.9527	...	0.0206	0.0155	...	...	...	...
(8)	7		2A	0.0022	1.1228	1.1064	1.0982	1.0300	1.0228	0.007250	0.9682	0.9300	0.9527	...	0.0206	0.0155	0.9578	0.9420	0.0258	0.0214
	7		3A	0.0000	1.1250	1.1086	...	1.0322	1.0268	0.0054	0.9704	0.9340	0.9549	...	0.0206	0.0155	0.9600	0.9460	0.0258	0.0214
	$1\frac{1}{8}$ – 8 or 1.1250 – 8	UN	2A	0.0021	1.1229	1.1079	1.1004	1.0417	1.0348	0.006901	0.9876	0.9536	0.9741	...	0.0180	0.0135	0.9786	0.9641	0.0226	0.0188
	8		3A	0.0000	1.1250	1.1100	...	1.0438	1.0386	0.0052	0.9897	0.9574	0.9762	...	0.0180	0.0135	0.9807	0.9679	0.0226	0.0188
	$1\frac{1}{8}$ – 12 or 1.1250 – 12	UNF	1A	0.0018	1.1232	1.1060	...	1.0691	1.0601	0.0090	1.0330	1.0060	1.0240	...	0.0120	0.0090	...	...	...	...
	12		2A	0.0018	1.1232	1.1118	...	1.0691	1.0631	0.006013	1.0330	1.0090	1.0240	...	0.0120	0.0090	1.0270	1.0160	0.0150	0.0125
	12		3A	0.0000	1.1250	1.1136	...	1.0709	1.0664	0.0045	1.0348	1.0123	1.0258	...	0.0120	0.0090	1.0288	1.0193	0.0150	0.0125
(8)	$1\frac{1}{8}$ – 16 or 1.1250 – 16	UN	2A	0.0015	1.1235	1.1141	...	1.0829	1.0779	0.005047	1.0558	1.0373	1.0491	...	0.0090	0.0068	1.0513	1.0425	0.0113	0.0094
(8)	16		3A	0.0000	1.1250	1.1156	...	1.0844	1.0806	0.0038	1.0573	1.0400	1.0506	...	0.0090	0.0068	1.0528	1.0452	0.0113	0.0094
	$1\frac{1}{8}$ – 18 or 1.1250 – 18	UNEF	2A	0.0014	1.1236	1.1149	...	1.0875	1.0827	0.004805	1.0635	1.0466	1.0574	...	0.0080	0.0060	1.0594	1.0513	0.0100	0.0083
(8)	18		3A	0.0000	1.1250	1.1163	...	1.0889	1.0853	0.0036	1.0649	1.0492	1.0588	...	0.0080	0.0060	1.0608	1.0539	0.0100	0.0083
(8)	$1\frac{1}{8}$ – 20 or 1.1250 – 20	UN	2A	0.0014	1.1236	1.1155	...	1.0911	1.0865	0.004602	1.0695	1.0540	1.0641	...	0.0072	0.0054	1.0658	1.0582	0.0090	0.0075
(8)	20		3A	0.0000	1.1250	1.1169	...	1.0925	1.0890	0.0035	1.0709	1.0565	1.0655	...	0.0072	0.0054	1.0672	1.0607	0.0090	0.0075
	$1\frac{1}{8}$ – 28 or 1.1250 – 28	UN	2A	0.0012	1.1238	1.1173	...	1.1006	1.0966	0.004037	1.0851	1.0734	1.0813	...	0.0052	0.0039	1.0826	1.0764	0.0064	0.0054
	28		3A	0.0000	1.1250	1.1185	...	1.1018	1.0988	0.0030	1.0863	1.0756	1.0825	...	0.0052	0.0039	1.0838	1.0786	0.0064	0.0054
	$1\frac{3}{16}$ – 8 or 1.1875 – 8	UN	2A	0.0021	1.1854	1.1704	...	1.1042	1.0972	0.006973	1.0501	1.016	1.0366	...	0.0180	0.0135	1.0411	1.0265	0.0226	0.0188

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	8		3A	0.0000	1.1875	1.1725	...	1.1063	1.1011	0.0052	1.0522	1.0199	1.0387	...	0.0180	0.0135	1.0432	1.0304	0.0226	0.0188
(8)	$1\frac{3}{16}$ – 12 or 1.1875 – 12	UN	2A	0.0017	1.1858	1.1744	...	1.1317	1.1260	0.005749	1.0956	1.0719	1.0866	...	0.0120	0.0090	1.0896	1.0789	0.0150	0.0125
	12		3A	0.0000	1.1875	1.1761	...	1.1334	1.1291	0.0043	1.0973	1.0750	1.0883	...	0.0120	0.0090	1.0913	1.0820	0.0150	0.0125
	$1\frac{3}{16}$ – 16 or 1.1875 – 16	UN	2A	0.0015	1.1860	1.1766	...	1.1454	1.1403	0.005075	1.1183	1.0997	1.1116	...	0.0090	0.0068	1.1138	1.1049	0.0113	0.0094
(8)	16		3A	0.0000	1.1875	1.1781	...	1.1469	1.1431	0.0038	1.1198	1.1025	1.1131	...	0.0090	0.0068	1.1153	1.1077	0.0113	0.0094
(8)	$1\frac{3}{16}$ – 18 or 1.1875 – 18	UNEF	2A	0.0014	1.1861	1.1774	...	1.1500	1.1452	0.004833	1.1260	1.1091	1.1199	...	0.0080	0.0060	1.1219	1.1138	0.0100	0.0083
	18		3A	0.0000	1.1875	1.1788	...	1.1514	1.1478	0.0036	1.1274	1.1117	1.1213	...	0.0080	0.0060	1.1233	1.1164	0.0100	0.0083
(8)	$1\frac{3}{16}$ – 20 or 1.1875 – 20	UN	2A	0.0014	1.1861	1.1780	...	1.1536	1.1490	0.004630	1.1320	1.1165	1.1266	...	0.0072	0.0054	1.1283	1.1207	0.0090	0.0075
(8)	20		3A	0.0000	1.1875	1.1794	...	1.1550	1.1515	0.0035	1.1334	1.1190	1.1280	...	0.0072	0.0054	1.1297	1.1232	0.0090	0.0075
	$1\frac{3}{16}$ – 28 or 1.1875 – 28	UN	2A	0.0012	1.1863	1.1798	...	1.1631	1.1590	0.004065	1.1476	1.1358	1.1438	...	0.0052	0.0039	1.1451	1.1388	0.0064	0.0054
	28		3A	0.0000	1.1875	1.1810	...	1.1643	1.1612	0.0031	1.1488	1.1380	1.1450	...	0.0052	0.0039	1.1463	1.1410	0.0064	0.0054
	$1\frac{1}{4}$ – 7 or 1.2500 – 7	UNC	1A	0.0022	1.2478	1.2232	...	1.1550	1.1439	0.0111	1.0932	1.0511	1.0777	...	0.0206	0.0155	...	...	...	...
	7		2A	0.0022	1.2478	1.2314	1.2232	1.1550	1.1476	0.007392	1.0932	1.0548	1.0777	...	0.0206	0.0155	1.0828	1.0668	0.0258	0.0214
	7		3A	0.0000	1.2500	1.2336	...	1.1572	1.1517	0.0055	1.0954	1.0589	1.0799	...	0.0206	0.0155	1.0850	1.0709	0.0258	0.0214
	$1\frac{1}{4}$ – 8 or 1.2500 – 8	UN	2A	0.0021	1.2479	1.2329	1.2254	1.1667	1.1597	0.007043	1.1126	1.0785	1.0991	...	0.0180	0.0135	1.1036	1.0890	0.0226	0.0188
	8		3A	0.0000	1.2500	1.2350	...	1.1688	1.1635	0.0053	1.1147	1.0823	1.1012	...	0.0180	0.0135	1.1057	1.0928	0.0226	0.0188
	$1\frac{1}{4}$ – 12 or 1.2500 – 12	UNF	1A	0.0018	1.2482	1.2310	...	1.1941	1.1849	0.0092	1.1580	1.1308	1.1490	...	0.0120	0.0090	...	...	...	...
	12		2A	0.0018	1.2482	1.2368	...	1.1941	1.1879	0.006155	1.1580	1.1338	1.1490	...	0.0120	0.0090	1.1520	1.1408	0.0150	0.0125
	12		3A	0.0000	1.2500	1.2386	...	1.1959	1.1913	0.0046	1.1598	1.1372	1.1508	...	0.0120	0.0090	1.1538	1.1442	0.0150	0.0125
	$1\frac{1}{4}$ – 16 or 1.2500 – 16	UN	2A	0.0015	1.2485	1.2391	...	1.2079	1.2028	0.005103	1.1808	1.1622	1.1741	...	0.0090	0.0068	1.1763	1.1674	0.0113	0.0094
(8)	16		3A	0.0000	1.2500	1.2406	...	1.2094	1.2056	0.0038	1.1823	1.1650	1.1756	...	0.0090	0.0068	1.1778	1.1702	0.0113	0.0094
	$1\frac{1}{4}$ – 18 or 1.2500 – 18	UNEF	2A	0.0015	1.2485	1.2398	...	1.2124	1.2075	0.004861	1.1884	1.1714	1.1823	...	0.0080	0.0060	1.1843	1.1761	0.0100	0.0083
	18		3A	0.0000	1.2500	1.2413	...	1.2139	1.2103	0.0036	1.1899	1.1742	1.1838	...	0.0080	0.0060	1.1858	1.1789	0.0100	0.0083
	$1\frac{1}{4}$ – 20 or 1.2500 – 20	UN	2A	0.0014	1.2486	1.2405	...	1.2161	1.2114	0.004658	1.1945	1.1789	1.1891	...	0.0072	0.0054	1.1908	1.1831	0.0090	0.0075
(8)	20		3A	0.0000	1.2500	1.2419	...	1.2175	1.2140	0.0035	1.1959	1.1815	1.1905	...	0.0072	0.0054	1.1922	1.1857	0.0090	0.0075
	$1\frac{1}{4}$ – 28 or 1.2500 – 28	UN	2A	0.0012	1.2488	1.2423	...	1.2256	1.2215	0.004093	1.2101	1.1983	1.2063	...	0.0052	0.0039	1.2076	1.2013	0.0064	0.0054

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	28		3A	0.0000	1.2500	1.2435	...	1.2268	1.2237	0.0031	1.2113	1.2005	1.2075	...	0.0052	0.0039	1.2088	1.2035	0.0064	0.0054
	$1\frac{5}{16}$ – 8 or 1.3125 – 8	UN	2A	0.0021	1.3104	1.2954	...	1.2292	1.2221	0.007110	1.1751	1.1409	1.1616	...	0.0180	0.0135	1.1661	1.1514	0.0226	0.0188
	8		3A	0.0000	1.3125	1.2975	...	1.2313	1.2260	0.0053	1.1772	1.1448	1.1637	...	0.0180	0.0135	1.1682	1.1553	0.0226	0.0188
	$1\frac{5}{16}$ – 12 or 1.3125 – 12	UN	2A	0.0017	1.3108	1.2994	...	1.2567	1.2509	0.005803	1.2206	1.1968	1.2116	...	0.0120	0.0090	1.2146	1.2038	0.0150	0.0125
(8)	12		3A	0.0000	1.3125	1.3011	...	1.2584	1.2540	0.0044	1.2223	1.1999	1.2133	...	0.0120	0.0090	1.2163	1.2069	0.0150	0.0125
(8)	$1\frac{5}{16}$ – 16 or 1.3125 – 16	UN	2A	0.0015	1.3110	1.3016	...	1.2704	1.2653	0.005129	1.2433	1.2247	1.2366	...	0.0090	0.0068	1.2388	1.2299	0.0113	0.0094
(8)	16		3A	0.0000	1.3125	1.3031	...	1.2719	1.2681	0.0038	1.2448	1.2275	1.2381	...	0.0090	0.0068	1.2403	1.2327	0.0113	0.0094
(8)	$1\frac{5}{16}$ – 18 or 1.3125 – 18	UNEF	2A	0.0015	1.3110	1.3023	...	1.2749	1.2700	0.004887	1.2509	1.2339	1.2448	...	0.0080	0.0060	1.2468	1.2386	0.0100	0.0083
(8)	18		3A	0.0000	1.3125	1.3038	...	1.2764	1.2727	0.0037	1.2524	1.2366	1.2463	...	0.0080	0.0060	1.2483	1.2413	0.0100	0.0083
	$1\frac{5}{16}$ – 20 or 1.3125 – 20	UN	2A	0.0014	1.3111	1.3030	...	1.2786	1.2739	0.004684	1.2570	1.2414	1.2516	...	0.0072	0.0054	1.2533	1.2456	0.0090	0.0075
(8)	20		3A	0.0000	1.3125	1.3044	...	1.2800	1.2765	0.0035	1.2584	1.2440	1.2530	...	0.0072	0.0054	1.2547	1.2482	0.0090	0.0075
(8)	$1\frac{5}{16}$ – 28 or 1.3125 – 28	UN	2A	0.0012	1.3113	1.3048	...	1.2881	1.2840	0.004119	1.2726	1.2608	1.2688	...	0.0052	0.0039	1.2701	1.2638	0.0064	0.0054
	28		3A	0.0000	1.3125	1.3060	...	1.2893	1.2862	0.0031	1.2738	1.263	1.2700	...	0.0052	0.0039	1.2713	1.2660	0.0064	0.0054
	$1\frac{3}{8}$ – 6 or 1.3750 – 6	UNC	1A	0.0024	1.3726	1.3453	...	1.2643	1.2523	0.012	1.1922	1.1440	1.1741	...	0.0241	0.0180	...	...	...	...
	6		2A	0.0024	1.3726	1.3544	1.3453	1.2643	1.2563	0.007970	1.1922	1.1480	1.1741	...	0.0241	0.0180	1.1801	1.1620	0.0301	0.0250
	6		3A	0.0000	1.3750	1.3568	...	1.2667	1.2607	0.0060	1.1946	1.1524	1.1765	...	0.0241	0.0180	1.1825	1.1664	0.0301	0.0250
	$1\frac{3}{8}$ – 8 or 1.3750 – 8	UN	2A	0.0022	1.3728	1.3578	1.3503	1.2916	1.2844	0.007177	1.2375	1.2032	1.2240	...	0.0180	0.0135	1.2285	1.2137	0.0226	0.0188
	8		3A	0.0000	1.3750	1.3600	...	1.2938	1.2884	0.0054	1.2397	1.2072	1.2262	...	0.0180	0.0135	1.2307	1.2177	0.0226	0.0188
	$1\frac{3}{8}$ – 12 or 1.3750 – 12	UNF	1A	0.0019	1.3731	1.3559	...	1.3190	1.3096	0.0094	1.2829	1.2555	1.2739	...	0.0120	0.0090	...	...	...	...
	12		2A	0.0019	1.3731	1.3617	...	1.3190	1.3127	0.006289	1.2829	1.2586	1.2739	...	0.0120	0.0090	1.2769	1.2656	0.0150	0.0125
	12		3A	0.0000	1.3750	1.3636	...	1.3209	1.3162	0.0047	1.2848	1.2621	1.2758	...	0.0120	0.0090	1.2788	1.2691	0.0150	0.0125
(8)	$1\frac{3}{8}$ – 16 or 1.3750 – 16	UN	2A	0.0015	1.3735	1.3641	...	1.3329	1.3277	0.005155	1.3058	1.2871	1.2991	...	0.0090	0.0068	1.3013	1.2923	0.0113	0.0094
(8)	16		3A	0.0000	1.3750	1.3656	...	1.3344	1.3305	0.0039	1.3073	1.2899	1.3006	...	0.0090	0.0068	1.3028	1.2951	0.0113	0.0094
(8)	$1\frac{3}{8}$ – 18 or 1.3750 – 18	UNEF	2A	0.0015	1.3735	1.3648	...	1.3374	1.3325	0.004913	1.3134	1.2964	1.3073	...	0.0080	0.0060	1.3093	1.3011	0.0100	0.0083
(8)	18		3A	0.0000	1.3750	1.3663	...	1.3389	1.3352	0.0037	1.3149	1.2991	1.3088	...	0.0080	0.0060	1.3108	1.3038	0.0100	0.0083
	$1\frac{3}{8}$ – 20 or 1.3750 – 20	UN	2A	0.0014	1.3736	1.3655	...	1.3411	1.3364	0.004710	1.3195	1.3039	1.3141	...	0.0072	0.0054	1.3158	1.3081	0.0090	0.0075

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	20		3A	0.0000	1.3750	1.3669	...	1.3425	1.3390	0.003500	1.3209	1.3065	1.3155	...	0.0072	0.0054	1.3172	1.3107	0.0090	0.0075
(8)	1⅜ – 28 or 1.3750 – 28	UN	2A	0.0012	1.3738	1.3673	...	1.3506	1.3465	0.004145	1.3351	1.3233	1.3313	...	0.0052	0.0039	1.3326	1.3263	0.0064	0.0054
	28		3A	0.0000	1.3750	1.3685	...	1.3518	1.3487	0.0031	1.3363	1.3255	1.3325	...	0.0052	0.0039	1.3338	1.3285	0.0064	0.0054
	1⁷⁄₁₆ – 6 or 1.4375 – 6	UN	2A	0.0024	1.4351	1.4169	...	1.3268	1.3188	0.008034	1.2547	1.2105	1.2366	...	0.0241	0.0180	1.2426	1.2245	0.0301	0.0250
	6		3A	0.0000	1.4375	1.4193	...	1.3292	1.3232	0.0060	1.2571	1.2149	1.2390	...	0.0241	0.0180	1.2450	1.2289	0.0301	0.0250
	1⁷⁄₁₆ – 8 or 1.4375 – 8	UN	2A	0.0022	1.4353	1.4203	...	1.3541	1.3469	0.007241	1.3000	1.2657	1.2865	...	0.0180	0.0135	1.2910	1.2762	0.0226	0.0188
	8		3A	0.0000	1.4375	1.4225	...	1.3563	1.3509	0.0054	1.3022	1.2697	1.2887	...	0.0180	0.0135	1.2932	1.2802	0.0226	0.0188
	1⁷⁄₁₆ – 12 or 1.4375 – 12	UN	2A	0.0018	1.4357	1.4243	...	1.3816	1.3757	0.005854	1.3455	1.3216	1.3365	...	0.0120	0.0090	1.3395	1.3286	0.0150	0.0125
	12		3A	0.0000	1.4375	1.4261	...	1.3834	1.3790	0.0044	1.3473	1.3249	1.3383	...	0.0120	0.0090	1.3413	1.3319	0.0150	0.0125
(8)	1⁷⁄₁₆ – 16 or 1.4375 – 16	UN	2A	0.0016	1.4359	1.4265	...	1.3953	1.3901	0.005180	1.3682	1.3495	1.3615	...	0.0090	0.0068	1.3637	1.3547	0.0113	0.0094
(8)	16		3A	0.0000	1.4375	1.4281	...	1.3969	1.3930	0.0039	1.3698	1.3524	1.3631	...	0.0090	0.0068	1.3653	1.3576	0.0113	0.0094
(8)	1⁷⁄₁₆ – 18 or 1.4375 – 18	UNEF	2A	0.0015	1.4360	1.4273	...	1.3999	1.3950	0.004938	1.3759	1.3589	1.3698	...	0.0080	0.0060	1.3718	1.3636	0.0100	0.0083
	18		3A	0.0000	1.4375	1.4288	...	1.4014	1.3977	0.0037	1.3774	1.3616	1.3713	...	0.0080	0.0060	1.3733	1.3663	0.0100	0.0083
(8)	1⁷⁄₁₆ – 20 or 1.4375 – 20	UN	2A	0.0014	1.4361	1.4280	...	1.4036	1.3989	0.004735	1.3820	1.3664	1.3766	...	0.0072	0.0054	1.3783	1.3706	0.0090	0.0075
(8)	20		3A	0.0000	1.4375	1.4294	...	1.4050	1.4014	0.0036	1.3834	1.3689	1.3780	...	0.0072	0.0054	1.3797	1.3731	0.0090	0.0075
(8)	1⁷⁄₁₆ – 28 or 1.4375 – 28	UN	2A	0.0013	1.4362	1.4297	...	1.4130	1.4088	0.004170	1.3975	1.3856	1.3937	...	0.0052	0.0039	1.3950	1.3886	0.0064	0.0054
	28		3A	0.0000	1.4375	1.4310	...	1.4143	1.4112	0.0031	1.3988	1.3880	1.3950	...	0.0052	0.0039	1.3963	1.3910	0.0064	0.0054
	1½ – 6 or 1.5000 – 6	UNC	1A	0.0024	1.4976	1.4703	...	1.3893	1.3772	0.0121	1.3172	1.2689	1.2991	...	0.0241	0.0180	...	...	...	...
	6		2A	0.0024	1.4976	1.4794	1.4703	1.3893	1.3812	0.008097	1.3172	1.2729	1.2991	...	0.0241	0.0180	1.3051	1.2869	0.0301	0.0250
	6		3A	0.0000	1.5000	1.4818	...	1.3917	1.3856	0.0061	1.3196	1.2773	1.3015	...	0.0241	0.0180	1.3075	1.2913	0.0301	0.0250
	1½ – 8 or 1.5000 – 8	UN	2A	0.0022	1.4978	1.4828	1.4753	1.4166	1.4093	0.007304	1.3625	1.3281	1.3490	...	0.0180	0.0135	1.3535	1.3386	0.0226	0.0188
	8		3A	0.0000	1.5000	1.4850	...	1.4188	1.4133	0.0055	1.3647	1.3321	1.3512	...	0.0180	0.0135	1.3557	1.3426	0.0226	0.0188
	1½ – 12 or 1.5000 – 12	UNF	1A	0.0019	1.4981	1.4809	...	1.4440	1.4344	0.0096	1.4079	1.3803	1.3989	...	0.0120	0.0090	...	...	...	...
	12		2A	0.0019	1.4981	1.4867	...	1.4440	1.4376	0.006416	1.4079	1.3835	1.3989	...	0.0120	0.0090	1.4019	1.3905	0.0150	0.0125
	12		3A	0.0000	1.5000	1.4886	...	1.4459	1.4411	0.0048	1.4098	1.3870	1.4008	...	0.0120	0.0090	1.4038	1.3940	0.0150	0.0125
(8)	1½ – 16 or 1.5000 – 16	UN	2A	0.0016	1.4984	1.4890	...	1.4578	1.4526	0.005204	1.4307	1.4120	1.4240	...	0.0090	0.0068	1.4262	1.4172	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	16		3A	0.0000	1.5000	1.4906	...	1.4594	1.4555	0.0039	1.4323	1.4149	1.4256	...	0.0090	0.0068	1.4278	1.4201	0.0113	0.0094
(8)	$1\frac{1}{2}$ – 18 or 1.5000 – 18	UNEF	2A	0.0015	1.4985	1.4898	...	1.4624	1.4574	0.004962	1.4384	1.4213	1.4323	...	0.0080	0.0060	1.4343	1.4260	0.0100	0.0083
	18		3A	0.0000	1.5000	1.4913	...	1.4639	1.4602	0.0037	1.4399	1.4241	1.4338	...	0.0080	0.0060	1.4358	1.4288	0.0100	0.0083
	$1\frac{1}{2}$ – 20 or 1.5000 – 20	UN	2A	0.0014	1.4986	1.4905	...	1.4661	1.4613	0.004759	1.4445	1.4288	1.4391	...	0.0072	0.0054	1.4408	1.4330	0.0090	0.0075
(8)	20		3A	0.0000	1.5000	1.4919	...	1.4675	1.4639	0.0036	1.4459	1.4314	1.4405	...	0.0072	0.0054	1.4422	1.4356	0.0090	0.0075
	$1\frac{1}{2}$ – 28 or 1.5000 – 28	UN	2A	0.0013	1.4987	1.4922	...	1.4755	1.4713	0.004194	1.4600	1.4481	1.4562	...	0.0052	0.0039	1.4575	1.4511	0.0064	0.0054
	28		3A	0.0000	1.5000	1.4935	...	1.4768	1.4737	0.0031	1.4613	1.4505	1.4575	...	0.0052	0.0039	1.4588	1.4535	0.0064	0.0054
	$1\frac{9}{16}$ – 6 or 1.5625 – 6	UN	2A	0.0024	1.5601	1.5419	...	1.4518	1.4436	0.008159	1.3797	1.3353	1.3616	...	0.0241	0.0180	1.3676	1.3493	0.0301	0.0250
	6		3A	0.0000	1.5625	1.5443	...	1.4542	1.4481	0.0061	1.3821	1.3398	1.3640	...	0.0241	0.0180	1.3700	1.3538	0.0301	0.0250
	$1\frac{9}{16}$ – 8 or 1.5625 – 8	UN	2A	0.0022	1.5603	1.5453	...	1.4791	1.4717	0.007366	1.4250	1.3905	1.4115	...	0.0180	0.0135	1.4160	1.4010	0.0226	0.0188
	8		3A	0.0000	1.5625	1.5475	...	1.4813	1.4758	0.0055	1.4272	1.3946	1.4137	...	0.0180	0.0135	1.4182	1.4051	0.0226	0.0188
(8)	$1\frac{9}{16}$ – 12 or 1.5625 – 12	UN	2A	0.0018	1.5607	1.5493	...	1.5066	1.5007	0.005902	1.4705	1.4466	1.4615	...	0.0120	0.0090	1.4645	1.4536	0.0150	0.0125
(8)	12		3A	0.0000	1.5625	1.5511	...	1.5084	1.5040	0.0044	1.4723	1.4499	1.4633	...	0.0120	0.0090	1.4663	1.4569	0.0150	0.0125
	$1\frac{9}{16}$ – 16 or 1.5625 – 16	UN	2A	0.0016	1.5609	1.5515	...	1.5203	1.5151	0.005228	1.4932	1.4745	1.4865	...	0.0090	0.0068	1.4887	1.4797	0.0113	0.0094
(8)	16		3A	0.0000	1.5625	1.5531	...	1.5219	1.5180	0.0039	1.4948	1.4774	1.4881	...	0.0090	0.0068	1.4903	1.4826	0.0113	0.0094
	$1\frac{9}{16}$ – 18 or 1.5625 – 18	UNEF	2A	0.0015	1.5610	1.5523	...	1.5249	1.5199	0.004986	1.5009	1.4838	1.4948	...	0.0080	0.0060	1.4968	1.4885	0.0100	0.0083
(8)	18		3A	0.0000	1.5625	1.5538	...	1.5264	1.5227	0.0037	1.5024	1.4866	1.4963	...	0.0080	0.0060	1.4983	1.4913	0.0100	0.0083
	$1\frac{9}{16}$ – 20 or 1.5625 – 20	UN	2A	0.0014	1.5611	1.5530	...	1.5286	1.5238	0.004783	1.5070	1.4913	1.5016	...	0.0072	0.0054	1.5033	1.4955	0.0090	0.0075
(8)	20		3A	0.0000	1.5625	1.5544	...	1.5300	1.5264	0.0036	1.5084	1.4939	1.5030	...	0.0072	0.0054	1.5047	1.4981	0.0090	0.0075
	$1\frac{5}{8}$ – 6 or 1.6250 – 6	UN	2A	0.0025	1.6225	1.6043	...	1.5142	1.5060	0.008219	1.4421	1.3977	1.4240	...	0.0241	0.0180	1.4300	1.4117	0.0301	0.0250
	6		3A	0.0000	1.6250	1.6068	...	1.5167	1.5105	0.0062	1.4446	1.4022	1.4265	...	0.0241	0.0180	1.4325	1.4162	0.0301	0.0250
	$1\frac{5}{8}$ – 8 or 1.6250 – 8	UN	2A	0.0022	1.6228	1.6078	1.6003	1.5416	1.5342	0.007426	1.4875	1.4530	1.4740	...	0.0180	0.0135	1.4785	1.4635	0.0226	0.0188
	8		3A	0.0000	1.6250	1.6100	...	1.5438	1.5382	0.0056	1.4897	1.4570	1.4762	...	0.0180	0.0135	1.4807	1.4675	0.0226	0.0188
(8)	$1\frac{5}{8}$ – 12 or 1.6250 – 12	UN	2A	0.0018	1.6232	1.6118	...	1.5691	1.5632	0.005925	1.5330	1.5091	1.5240	...	0.0120	0.0090	1.5270	1.5161	0.0150	0.0125
(8)	12		3A	0.0000	1.6250	1.6136	...	1.5709	1.5665	0.0044	1.5348	1.5124	1.5258	...	0.0120	0.0090	1.5288	1.5194	0.0150	0.0125
(8)	$1\frac{5}{8}$ – 16 or 1.6250 – 16	UN	2A	0.0016	1.6234	1.6140	...	1.5828	1.5775	0.005251	1.5557	1.5369	1.5490	...	0.0090	0.0068	1.5512	1.5421	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	16	...	3A	0.0000	1.6250	1.6156	...	1.5844	1.5805	0.0039	1.5573	1.5399	1.5506	...	0.0090	0.0068	1.5528	1.5451	0.0113	0.0094
(8)	$1\frac{5}{8}$ – 18 or 1.6250 – 18	UNEF	2A	0.0015	1.6235	1.6148	...	1.5874	1.5824	0.005009	1.5634	1.5463	1.5573	...	0.0080	0.0060	1.5593	1.5510	0.0100	0.0083
	18		3A	0.0000	1.6250	1.6163	...	1.5889	1.5851	0.0038	1.5649	1.5490	1.5588	...	0.0080	0.0060	1.5608	1.5537	0.0100	0.0083
(8)	$1\frac{5}{8}$ – 20 or 1.6250 – 20	UN	2A	0.0014	1.6236	1.6155	...	1.5911	1.5863	0.004806	1.5695	1.5538	1.5641	...	0.0072	0.0054	1.5658	1.5580	0.0090	0.0075
	20		3A	0.0000	1.6250	1.6169	...	1.5925	1.5889	0.0036	1.5709	1.5564	1.5655	...	0.0072	0.0054	1.5672	1.5606	0.0090	0.0075
	$1\frac{11}{16}$ – 6 or 1.6875 – 6	UN	2A	0.0025	1.6850	1.6668	...	1.5767	1.5684	0.008278	1.5046	1.4601	1.4865	...	0.0241	0.0180	1.4925	1.4741	0.0301	0.0250
	6		3A	0.0000	1.6875	1.6693	...	1.5792	1.5730	0.0062	1.5071	1.4647	1.4890	...	0.0241	0.0180	1.4950	1.4787	0.0301	0.0250
	$1\frac{11}{16}$ – 8 or 1.6875 – 8	UN	2A	0.0022	1.6853	1.6703	...	1.6041	1.5966	0.007485	1.5500	1.5154	1.5365	...	0.0180	0.0135	1.5410	1.5259	0.0226	0.0188
	8		3A	0.0000	1.6875	1.6725	...	1.6063	1.6007	0.0056	1.5522	1.5195	1.5387	...	0.0180	0.0135	1.5432	1.5300	0.0226	0.0188
(8)	$1\frac{11}{16}$ – 12 or 1.6875 – 12	UN	2A	0.0018	1.6857	1.6743	...	1.6316	1.6257	0.005947	1.5955	1.5716	1.5865	...	0.0120	0.0090	1.5895	1.5786	0.0150	0.0125
	12		3A	0.0000	1.6875	1.6761	...	1.6334	1.6289	0.0045	1.5973	1.5748	1.5883	...	0.0120	0.0090	1.5913	1.5818	0.0150	0.0125
	$1\frac{11}{16}$ – 16 or 1.6875 – 16	UN	2A	0.0016	1.6859	1.6765	...	1.6453	1.6400	0.005273	1.6182	1.5994	1.6115	...	0.0090	0.0068	1.6137	1.6046	0.0113	0.0094
(8)	16		3A	0.0000	1.6875	1.6781	...	1.6469	1.6429	0.0040	1.6198	1.6023	1.6131	...	0.0090	0.0068	1.6153	1.6075	0.0113	0.0094
(8)	$1\frac{11}{16}$ – 18 or 1.6875 – 18	UNEF	2A	0.0015	1.6860	1.6773	...	1.6499	1.6449	0.005031	1.6259	1.6088	1.6198	...	0.0080	0.0060	1.6218	1.6135	0.0100	0.0083
	18		3A	0.0000	1.6875	1.6788	...	1.6514	1.6476	0.0038	1.6274	1.6115	1.6213	...	0.0080	0.0060	1.6233	1.6162	0.0100	0.0083
(8)	$1\frac{11}{16}$ – 20 or 1.6875 – 20	UN	2A	0.0014	1.6861	1.6780	...	1.6536	1.6488	0.004828	1.6320	1.6163	1.6266	...	0.0072	0.0054	1.6283	1.6205	0.0090	0.0075
(8)	20		3A	0.0000	1.6875	1.6794	...	1.6550	1.6514	0.0036	1.6334	1.6189	1.6280	...	0.0072	0.0054	1.6297	1.6231	0.0090	0.0075
(8)	$1\frac{3}{4}$ – 5 or 1.7500 – 5	UNC	1A	0.0027	1.7473	1.7165	...	1.6174	1.6040	0.0134	1.5308	1.4741	1.5091	...	0.0289	0.0217	...	...	...	...
(8)	5		2A	0.0027	1.7473	1.7268	1.7165	1.6174	1.6085	0.008922	1.5308	1.4786	1.5091	...	0.0289	0.0217	1.5164	1.4953	0.0361	0.0300
(8)	5		3A	0.0000	1.7500	1.7295	...	1.6201	1.6134	0.0067	1.5335	1.4835	1.5118	...	0.0289	0.0217	1.5191	1.5002	0.0361	0.0300
	$1\frac{3}{4}$ – 6 or 1.7500 – 6	UN	2A	0.0025	1.7475	1.7293	...	1.6392	1.6309	0.008335	1.5671	1.5226	1.5490	...	0.0241	0.0180	1.5550	1.5366	0.0301	0.0250
	6		3A	0.0000	1.7500	1.7318	...	1.6417	1.6354	0.0063	1.5696	1.5271	1.5515	...	0.0241	0.0180	1.5575	1.5411	0.0301	0.0250
	$1\frac{3}{4}$ – 8 or 1.7500 – 8	UN	2A	0.0023	1.7477	1.7327	1.7252	1.6665	1.6590	0.007542	1.6124	1.5778	1.5989	...	0.0180	0.0135	1.6034	1.5883	0.0226	0.0188
(8)	8		3A	0.0000	1.7500	1.7350	...	1.6688	1.6631	0.0057	1.6147	1.5819	1.6012	...	0.0180	0.0135	1.6057	1.5924	0.0226	0.0188
	$1\frac{3}{4}$ – 12 or 1.7500 – 12	UN	2A	0.0018	1.7482	1.7368	...	1.6941	1.6881	0.005969	1.6580	1.6340	1.6490	...	0.0120	0.0090	1.6520	1.6410	0.0150	0.0125
	12		3A	0.0000	1.7500	1.7386	...	1.6959	1.6914	0.0045	1.6598	1.6373	1.6508	...	0.0120	0.0090	1.6538	1.6443	0.0150	0.0125

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	$1\frac{3}{4}$ – 16 or 1.7500 – 16	UN	2A	0.0016	1.7484	1.7390	...	1.7078	1.7025	0.005295	1.6807	1.6619	1.6740	...	0.0090	0.0068	1.6762	1.6671	0.0113	0.0094
(8)	16		3A	0.0000	1.7500	1.7406	...	1.7094	1.7054	0.00400	1.6823	1.6648	1.6756	...	0.0090	0.0068	1.6778	1.6700	0.0113	0.0094
	$1\frac{3}{4}$ – 20 or 1.7500 – 20	UN	2A	0.0015	1.7485	1.7404	...	1.7160	1.7112	0.004850	1.6944	1.6787	1.6890	...	0.0072	0.0054	1.6907	1.6829	0.0090	0.0075
(8)	20		3A	0.0000	1.7500	1.7419	...	1.7175	1.7139	0.0036	1.6959	1.6814	1.6905	...	0.0072	0.0054	1.6922	1.6856	0.0090	0.0075
	$1\frac{13}{16}$ – 6 or 1.8125 – 6	UN	2A	0.0025	1.8100	1.7918	...	1.7017	1.6933	0.008391	1.6296	1.5850	1.6115	...	0.0241	0.0180	1.6175	1.5990	0.0301	0.0250
	6		3A	0.0000	1.8125	1.7943	...	1.7042	1.6979	0.0063	1.6321	1.5896	1.6140	...	0.0241	0.0180	1.6200	1.6036	0.0301	0.0250
	$1\frac{13}{16}$ – 8 or 1.8125 – 8	UN	2A	0.0023	1.8102	1.7952	...	1.7290	1.7214	0.007598	1.6749	1.6402	1.6614	...	0.0180	0.0135	1.6659	1.6507	0.0226	0.0188
	8		3A	0.0000	1.8125	1.7975	...	1.7313	1.7256	0.0057	1.6772	1.6444	1.6637	...	0.0180	0.0135	1.6682	1.6549	0.0226	0.0188
	$1\frac{13}{16}$ – 12 or 1.8125 – 12	UN	2A	0.0018	1.8107	1.7993	...	1.7566	1.7506	0.005990	1.7205	1.6965	1.7115	...	0.0120	0.0090	1.7145	1.7035	0.0150	0.0125
	12		3A	0.0000	1.8125	1.8011	...	1.7584	1.7539	0.0045	1.7223	1.6998	1.7133	...	0.0120	0.0090	1.7163	1.7068	0.0150	0.0125
	$1\frac{13}{16}$ – 16 or 1.8125 – 16	UN	2A	0.0016	1.8109	1.8015	...	1.7703	1.7650	0.005316	1.7432	1.7244	1.7365	...	0.0090	0.0068	1.7387	1.7296	0.0113	0.0094
(8)	16		3A	0.0000	1.8125	1.8031	...	1.7719	1.7679	0.0040	1.7448	1.7273	1.7381	...	0.0090	0.0068	1.7403	1.7325	0.0113	0.0094
	$1\frac{13}{16}$ – 20 or 1.8125 – 20	UN	2A	0.0015	1.8110	1.8029	...	1.7785	1.7736	0.004871	1.7569	1.7411	1.7515	...	0.0072	0.0054	1.7532	1.7453	0.0090	0.0075
(8)	20		3A	0.0000	1.8125	1.8044	...	1.7800	1.7763	0.0037	1.7584	1.7438	1.7530	...	0.0072	0.0054	1.7547	1.7480	0.0090	0.0075
	$1\frac{7}{8}$ – 6 or 1.8750 – 6	UN	2A	0.0025	1.8725	1.8543	...	1.7642	1.7558	0.008447	1.6921	1.6475	1.6740	...	0.0241	0.0180	1.6800	1.6615	0.0301	0.0250
	6		3A	0.0000	1.8750	1.8568	...	1.7667	1.7604	0.0063	1.6946	1.6521	1.6765	...	0.0241	0.0180	1.6825	1.6661	0.0301	0.0250
	$1\frac{7}{8}$ – 8 or 1.8750 – 8	UN	2A	0.0023	1.8727	1.8577	1.8502	1.7915	1.7838	0.007654	1.7374	1.7026	1.7239	...	0.0180	0.0135	1.7284	1.7131	0.0226	0.0188
	8		3A	0.0000	1.8750	1.8600	...	1.7938	1.7881	0.0057	1.7397	1.7069	1.7262	...	0.0180	0.0135	1.7307	1.7174	0.0226	0.0188
	$1\frac{7}{8}$ – 12 or 1.8750 – 12	UN	2A	0.0018	1.8732	1.8618	...	1.8191	1.8131	0.006011	1.7830	1.7590	1.7746	...	0.0120	0.0090	1.7770	1.7660	0.0150	0.0125
(8)	12		3A	0.0000	1.8750	1.8636	...	1.8209	1.8164	0.0045	1.7848	1.7623	1.7758	...	0.0120	0.0090	1.7788	1.7693	0.0150	0.0125
	$1\frac{7}{8}$ – 16 or 1.8750 – 16	UN	2A	0.0016	1.8734	1.8640	...	1.8328	1.8275	0.005337	1.8057	1.7869	1.7990	...	0.0090	0.0068	1.8012	1.7921	0.0113	0.0094
(8)	16		3A	0.0000	1.8750	1.8656	...	1.8344	1.8304	0.0040	1.8073	1.7898	1.8006	...	0.0090	0.0068	1.8028	1.7950	0.0113	0.0094
(8)	$1\frac{7}{8}$ – 20 or 1.8750 – 20	UN	2A	0.0015	1.8735	1.8654	...	1.8410	1.8361	0.004892	1.8194	1.8036	1.8140	...	0.0072	0.0054	1.8157	1.8078	0.0090	0.0075
(8)	20		3A	0.0000	1.8750	1.8669	...	1.8425	1.8388	0.0037	1.8209	1.8063	1.8155	...	0.0072	0.0054	1.8172	1.8105	0.0090	0.0075
	$1\frac{15}{16}$ – 6 or 1.9375 – 6	UN	2A	0.0026	1.9349	1.9167	...	1.8266	1.8181	0.008501	1.7545	1.7098	1.7364	...	0.0241	0.0180	1.7424	1.7238	0.0301	0.0250
	6		3A	0.0000	1.9375	1.9193	...	1.8292	1.8228	0.0064	1.7571	1.7145	1.7390	...	0.0241	0.0180	1.7450	1.7285	0.0301	0.0250

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	$1\frac{15}{16}$ – 8 or 1.9375 – 8	UN	2A	0.0023	1.9352	1.9202	...	1.8540	1.8463	0.007708	1.7999	1.7651	1.7864	...	0.0180	0.0135	1.7909	1.7756	0.0226	0.0188
	8		3A	0.0000	1.9375	1.9225	...	1.8563	1.8505	0.0058	1.8022	1.7693	1.7887	...	0.0180	0.0135	1.7932	1.7798	0.0226	0.0188
(8)	$1\frac{15}{16}$ – 12 or 1.9375 – 12	UN	2A	0.0018	1.9357	1.9243	...	1.8816	1.8756	0.006031	1.8455	1.8215	1.8365	...	0.0120	0.0090	1.8395	1.8285	0.0150	0.0125
	12		3A	0.0000	1.9375	1.9261	...	1.8834	1.8789	0.0045	1.8473	1.8248	1.8383	...	0.0120	0.0090	1.8413	1.8318	0.0150	0.0125
	$1\frac{15}{16}$ – 16 or 1.9375 – 16	UN	2A	0.0016	1.9359	1.9265	...	1.8953	1.8899	0.005357	1.8682	1.8493	1.8615	...	0.0090	0.0068	1.8637	1.8545	0.0113	0.0094
(8)	16		3A	0.0000	1.9375	1.9281	...	1.8969	1.8929	0.0040	1.8698	1.8523	1.8631	...	0.0090	0.0068	1.8653	1.8575	0.0113	0.0094
	$1\frac{15}{16}$ – 20 or 1.9375 – 20	UN	2A	0.0015	1.9360	1.9279	...	1.9035	1.8986	0.004912	1.8819	1.8661	1.8765	...	0.0072	0.0054	1.8782	1.8703	0.0090	0.0075
(8)	20		3A	0.0000	1.9375	1.9294	...	1.9050	1.9013	0.0037	1.8834	1.8688	1.8780	...	0.0072	0.0054	1.8797	1.8730	0.0090	0.0075
	2 – 4.5 or 2.0000 – 4.5	UNC	1A	0.0029	1.9971	1.9641	...	1.8528	1.8385	0.0143	1.7565	1.6942	1.7325	...	0.0321	0.0241	...	...	...	...
	4.5		2A	0.0029	1.9971	1.9751	1.9641	1.8528	1.8433	0.009514	1.7565	1.6990	1.7325	...	0.0321	0.0241	1.7405	1.7176	0.0401	0.0334
	4.5		3A	0.0000	2.0000	1.9780	...	1.8557	1.8486	0.0071	1.7594	1.7043	1.7354	...	0.0321	0.0241	1.7434	1.7229	0.0401	0.0334
	2 – 6 or 2.0000 – 6	UN	2A	0.0026	1.9974	1.9792	...	1.8891	1.8805	0.008554	1.8170	1.7722	1.7989	...	0.0241	0.0180	1.8049	1.7862	0.0301	0.0250
	6		3A	0.0000	2.0000	1.9818	...	1.8917	1.8853	0.0064	1.8196	1.7770	1.8015	...	0.0241	0.0180	1.8075	1.7910	0.0301	0.0250
	2 – 8 or 2.0000 – 8	UN	2A	0.0023	1.9977	1.9827	1.9752	1.9165	1.9087	0.007761	1.8624	1.8275	1.8489	...	0.0180	0.0135	1.8534	1.8380	0.0226	0.0188
	8		3A	0.0000	2.0000	1.9850	...	1.9188	1.9130	0.0058	1.8647	1.8318	1.8512	...	0.0180	0.0135	1.8557	1.8423	0.0226	0.0188
	2 – 12 or 2.0000 – 12	UN	2A	0.0018	1.9982	1.9868	...	1.9441	1.9380	0.006051	1.9080	1.8839	1.8990	...	0.0120	0.0090	1.9020	1.8909	0.0150	0.0125
	12		3A	0.0000	2.0000	1.9886	...	1.9459	1.9414	0.0045	1.9098	1.8873	1.9008	...	0.0120	0.0090	1.9038	1.8943	0.0150	0.0125
	2 – 16 or 2.0000 – 16	UN	2A	0.0016	1.9984	1.9890	...	1.9578	1.9524	0.005377	1.9307	1.9118	1.9240	...	0.0090	0.0068	1.9262	1.9170	0.0113	0.0094
(8)	16		3A	0.0000	2.0000	1.9906	...	1.9594	1.9554	0.0040	1.9323	1.9148	1.9256	...	0.0090	0.0068	1.9278	1.9200	0.0113	0.0094
	2 – 20 or 2.0000 – 20	UN	2A	0.0015	1.9985	1.9904	...	1.9660	1.9611	0.004932	1.9444	1.9286	1.9390	...	0.0072	0.0054	1.9407	1.9328	0.0090	0.0075
(8)	20		3A	0.0000	2.0000	1.9919	...	1.9675	1.9638	0.0037	1.9459	1.9313	1.9405	...	0.0072	0.0054	1.9422	1.9355	0.0090	0.0075
	$2\frac{1}{8}$ – 6 or 2.1250 – 6	UN	2A	0.0026	2.1224	2.1042	...	2.0141	2.0054	0.008658	1.9420	1.8971	1.9239	...	0.0241	0.0180	1.9299	1.9111	0.0301	0.0250
	6		3A	0.0000	2.1250	2.1068	...	2.0167	2.0102	0.0065	1.9446	1.9019	1.9265	...	0.0241	0.0180	1.9325	1.9159	0.0301	0.0250
	$2\frac{1}{8}$ – 8 or 2.1250 – 8	UN	2A	0.0024	2.1226	2.1076	2.1001	2.0414	2.0335	0.007865	1.9873	1.9523	1.9738	...	0.0180	0.0135	1.9783	1.9628	0.0226	0.0188
	8		3A	0.0000	2.1250	2.1100	...	2.0438	2.0379	0.0059	1.9897	1.9567	1.9762	...	0.0180	0.0135	1.9807	1.9672	0.0226	0.0188
	$2\frac{1}{8}$ – 12 or 2.1250 – 12	UN	2A	0.0018	2.1232	2.1118	...	2.0691	2.0630	0.006089	2.0330	2.0089	2.0240	...	0.0120	0.0090	2.0270	2.0159	0.0150	0.0125

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	12		3A	0.0000	2.1250	2.1136	...	2.0709	2.0663	0.0046	2.0348	2.0122	2.0258	...	0.0120	0.0090	2.0288	2.0192	0.0150	0.0125
	$2\frac{1}{8}$ – 16 or 2.1250 – 16	UN	2A	0.0016	2.1234	2.1140	...	2.0828	2.0774	0.005415	2.0557	2.0368	2.0490	...	0.0090	0.0068	2.0512	2.0420	0.0113	0.0094
(8)	16		3A	0.0000	2.1250	2.1156	...	2.0844	2.0803	0.0041	2.0573	2.0397	2.0506	...	0.0090	0.0068	2.0528	2.0449	0.0113	0.0094
(8)	$2\frac{1}{8}$ – 20 or 2.1250 – 20	UN	2A	0.0015	2.1235	2.1154	...	2.0910	2.0860	0.004970	2.0694	2.0535	2.0640	...	0.0072	0.0054	2.0657	2.0577	0.0090	0.0075
(8)	20		3A	0.0000	2.1250	2.1169	...	2.0925	2.0888	0.0037	2.0709	2.0563	2.0655	...	0.0072	0.0054	2.0672	2.0605	0.0090	0.0075
	$2\frac{1}{4}$ – 4.5 or 2.2500 – 4.5	UNC	1A	0.0029	2.2471	2.2141	...	2.1028	2.0882	0.0146	2.0065	1.9439	1.9825	...	0.0321	0.0241	...	...	...	...
	4.5		2A	0.0029	2.2471	2.2251	2.2141	2.1028	2.0931	0.009719	2.0065	1.9488	1.9825	...	0.0321	0.0241	1.9905	1.9674	0.0401	0.0334
	4.5		3A	0.0000	2.2500	2.2280	...	2.1057	2.0984	0.0073	2.0094	1.9541	1.9854	...	0.0321	0.0241	1.9934	1.9727	0.0401	0.0334
	$2\frac{1}{4}$ – 6 or 2.2500 – 6	UN	2A	0.0026	2.2474	2.2292	...	2.1391	2.1303	0.008759	2.0670	2.0220	2.0489	...	0.0241	0.0180	2.0549	2.0360	0.0301	0.0250
	6		3A	0.0000	2.2500	2.2318	...	2.1417	2.1351	0.0066	2.0696	2.0268	2.0515	...	0.0241	0.0180	2.0575	2.0408	0.0301	0.0250
	$2\frac{1}{4}$ – 8 or 2.2500 – 8	UN	2A	0.0024	2.2476	2.2326	2.2251	2.1664	2.1584	0.007966	2.1123	2.0772	2.0988	...	0.0180	0.0135	2.1033	2.0877	0.0226	0.0188
	8		3A	0.0000	2.2500	2.2350	...	2.1688	2.1628	0.0060	2.1147	2.0816	2.1012	...	0.0180	0.0135	2.1057	2.0921	0.0226	0.0188
(8)	$2\frac{1}{4}$ – 12 or 2.2500 – 12	UN	2A	0.0018	2.2482	2.2368	...	2.1941	2.1880	0.006127	2.1580	2.1339	2.1490	...	0.0120	0.0090	2.1520	2.1409	0.0150	0.0125
(8)	12		3A	0.0000	2.2500	2.2386	...	2.1959	2.1913	0.0046	2.1598	2.1372	2.1508	...	0.0120	0.0090	2.1538	2.1442	0.0150	0.0125
(8)	$2\frac{1}{4}$ – 16 or 2.2500 – 16	UN	2A	0.0016	2.2484	2.2390	...	2.2078	2.2023	0.005453	2.1807	2.1617	2.1740	...	0.0090	0.0068	2.1762	2.1669	0.0113	0.0094
(8)	16		3A	0.0000	2.2500	2.2406	...	2.2094	2.2053	0.0041	2.1823	2.1647	2.1756	...	0.0090	0.0068	2.1778	2.1699	0.0113	0.0094
(8)	$2\frac{1}{4}$– 20 or 2.2500 – 20	UN	2A	0.0015	2.2485	2.2404	...	2.2160	2.2110	0.005008	2.1944	2.1785	2.1890	...	0.0072	0.0054	2.1907	2.1827	0.0090	0.0075
(8)	20		3A	0.0000	2.2500	2.2419	...	2.2175	2.2137	0.0038	2.1959	2.1812	2.1905	...	0.0072	0.0054	2.1922	2.1854	0.0090	0.0075
(8)	$2\frac{3}{8}$ – 6 or 2.3750 – 6	UN	2A	0.0027	2.3723	2.3541	...	2.2640	2.2551	0.008856	2.1919	2.1468	2.1738	...	0.0241	0.0180	2.1798	2.1608	0.0301	0.0250
	6		3A	0.0000	2.3750	2.3568	...	2.2667	2.2601	0.0066	2.1946	2.1518	2.1765	...	0.0241	0.0180	2.1825	2.1658	0.0301	0.0250
	$2\frac{3}{8}$ – 8 or 2.3750 – 8	UN	2A	0.0024	2.3726	2.3576	...	2.2914	2.2833	0.008063	2.2373	2.2021	2.2238	...	0.0180	0.0135	2.2283	2.2126	0.0226	0.0188
	8		3A	0.0000	2.3750	2.3600	...	2.2938	2.2878	0.0060	2.2397	2.2066	2.2262	...	0.0180	0.0135	2.2307	2.2171	0.0226	0.0188
(8)	$2\frac{3}{8}$ – 12 or 2.3750 – 12	UN	2A	0.0018	2.3732	2.3618	...	2.3191	2.3129	0.006162	2.2830	2.2588	2.2740	...	0.0120	0.0090	2.2770	2.2658	0.0150	0.0125
	12		3A	0.0000	2.3750	2.3636	...	2.3209	2.3163	0.0046	2.2848	2.2622	2.2758	...	0.0120	0.0090	2.2788	2.2692	0.0150	0.0125
(8)	$2\frac{3}{8}$ – 16 or 2.3750 – 16	UN	2A	0.0016	2.3734	2.3640	...	2.3328	2.3273	0.005488	2.3057	2.2867	2.2990	...	0.0090	0.0068	2.3012	2.2919	0.0113	0.0094
(8)	16		3A	0.0000	2.3750	2.3656	...	2.3344	2.3303	0.0041	2.3073	2.2897	2.3006	...	0.0090	0.0068	2.3028	2.2949	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	$2\frac{3}{8}$ – 20 or 2.3750 – 20	UN	2A	0.0015	2.3735	2.3654	...	2.3410	2.3360	0.005043	2.3194	2.3035	2.3140	...	0.0072	0.0054	2.3157	2.3077	0.0090	0.0075
(8)	20		3A	0.0000	2.3750	2.3669	...	2.3425	2.3387	0.0038	2.3209	2.3062	2.3155	...	0.0072	0.0054	2.3172	2.3104	0.0090	0.0075
	$2\frac{1}{2}$ – 4 or 2.5000 – 4	UNC	1A	0.0031	2.4969	2.4612	...	2.3345	2.3190	0.0155	2.2263	2.1566	2.1992	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0031	2.4969	2.4731	2.4612	2.3345	2.3241	0.010361	2.2263	2.1617	2.1992	...	0.0361	0.0271	2.2082	2.1827	0.0451	0.0375
	4		3A	0.0000	2.5000	2.4762	...	2.3376	2.3298	0.0078	2.2294	2.1674	2.2023	...	0.0361	0.0271	2.2113	2.1884	0.0451	0.0375
	$2\frac{1}{2}$ – 6 or 2.5000 – 6	UN	2A	0.0027	2.4973	2.4791	...	2.3890	2.3800	0.008951	2.3169	2.2717	2.2988	...	0.0241	0.0180	2.3048	2.2857	0.0301	0.0250
	6		3A	0.0000	2.5000	2.4818	...	2.3917	2.3850	0.0067	2.3196	2.2767	2.3015	...	0.0241	0.0180	2.3075	2.2907	0.0301	0.0250
	$2\frac{1}{2}$ – 8 or 2.5000 – 8	UN	2A	0.0024	2.4976	2.4826	2.4751	2.4164	2.4082	0.008158	2.3623	2.3270	2.3488	...	0.0180	0.0135	2.3533	2.3375	0.0226	0.0188
	8		3A	0.0000	2.5000	2.4850	...	2.4188	2.4127	0.0061	2.3647	2.3315	2.3512	...	0.0180	0.0135	2.3557	2.3420	0.0226	0.0188
	$2\frac{1}{2}$ – 12 or 2.5000 – 12	UN	2A	0.0019	2.4981	2.4867	...	2.4440	2.4378	0.006197	2.4079	2.3837	2.3989	...	0.0120	0.0090	2.4019	2.3907	0.0150	0.0125
	12		3A	0.0000	2.5000	2.4886	...	2.4459	2.4413	0.0046	2.4098	2.3872	2.4008	...	0.0120	0.0090	2.4038	2.3942	0.0150	0.0125
	$2\frac{1}{2}$ – 16 or 2.5000 – 16	UN	2A	0.0017	2.4983	2.4889	...	2.4577	2.4522	0.005523	2.4306	2.4116	2.4239	...	0.0090	0.0068	2.4261	2.4168	0.0113	0.0094
(8)	16		3A	0.0000	2.5000	2.4906	...	2.4594	2.4553	0.0041	2.4323	2.4147	2.4256	...	0.0090	0.0068	2.4278	2.4199	0.0113	0.0094
	$2\frac{1}{2}$ – 20 or 2.5000 – 20	UN	2A	0.0015	2.4985	2.4904	...	2.4660	2.4609	0.005078	2.4444	2.4284	2.4390	...	0.0072	0.0054	2.4407	2.4326	0.0090	0.0075
(8)	20		3A	0.0000	2.5000	2.4919	...	2.4675	2.4637	0.0038	2.4459	2.4312	2.4405	...	0.0072	0.0054	2.4422	2.4354	0.0090	0.0075
	$2\frac{5}{8}$ – 4 or 2.6250 – 4	UN	2A	0.0031	2.6219	2.5981	...	2.4595	2.4490	0.010452	2.3513	2.2866	2.3242	...	0.0361	0.0271	2.3332	2.3076	0.0451	0.0375
	4		3A	0.0000	2.6250	2.6012	...	2.4626	2.4548	0.0078	2.3544	2.2924	2.3273	...	0.0361	0.0271	2.3363	2.3134	0.0451	0.0375
	$2\frac{5}{8}$ – 6 or 2.6250 – 6	UN	2A	0.0027	2.6223	2.6041	...	2.5140	2.5050	0.009042	2.4419	2.3967	2.4238	...	0.0241	0.0180	2.4298	2.4107	0.0301	0.0250
	6		3A	0.0000	2.6250	2.6068	...	2.5167	2.5099	0.0068	2.4446	2.4016	2.4265	...	0.0241	0.0180	2.4325	2.4156	0.0301	0.0250
	$2\frac{5}{8}$ – 8 or 2.6250 – 8	UN	2A	0.0025	2.6225	2.6075	...	2.5413	2.5331	0.008249	2.4872	2.4519	2.4737	...	0.0180	0.0135	2.4782	2.4624	0.0226	0.0188
	8		3A	0.0000	2.6250	2.6100	...	2.5438	2.5376	0.0062	2.4897	2.4564	2.4762	...	0.0180	0.0135	2.4807	2.4669	0.0226	0.0188
(8)	$2\frac{5}{8}$ – 12 or 2.6250 – 12	UN	2A	0.0019	2.6231	2.6117	...	2.5690	2.5628	0.006230	2.5329	2.5087	2.5239	...	0.0120	0.0090	2.5269	2.5157	0.0150	0.0125
	12		3A	0.0000	2.6250	2.6136	...	2.5709	2.5662	0.0047	2.5348	2.5121	2.5258	...	0.0120	0.0090	2.5288	2.5191	0.0150	0.0125
(8)	$2\frac{5}{8}$ – 16 or 2.6250 – 16	UN	2A	0.0017	2.6233	2.6139	...	2.5827	2.5771	0.005556	2.5556	2.5365	2.5489	...	0.0090	0.0068	2.5511	2.5417	0.0113	0.0094
(8)	16		3A	0.0000	2.6250	2.6156	...	2.5844	2.5802	0.0042	2.5573	2.5396	2.5506	...	0.0090	0.0068	2.5528	2.5448	0.0113	0.0094
	$2\frac{5}{8}$ – 20 or 2.6250 – 20	UN	2A	0.0015	2.6235	2.6154	...	2.5910	2.5859	0.005111	2.5694	2.5534	2.5640	...	0.0072	0.0054	2.5657	2.5576	0.0090	0.0075

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	20		3A	0.0000	2.6250	2.6169	...	2.5925	2.5887	0.0038	2.5709	2.5562	2.5655	...	0.0072	0.0054	2.5672	2.5604	0.0090	0.0075
	$2\frac{3}{4}$ – 4 or 2.7500 – 4	UNC	1A	0.0032	2.7468	2.7111	...	2.5844	2.5686	0.0158	2.4762	2.4062	2.4491	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0032	2.7468	2.7230	2.7111	2.5844	2.5739	0.010542	2.4762	2.4115	2.4491	...	0.0361	0.0271	2.4581	2.4325	0.0451	0.0375
	4		3A	0.0000	2.7500	2.7262	...	2.5876	2.5797	0.0079	2.4794	2.4173	2.4523	...	0.0361	0.0271	2.4613	2.4383	0.0451	0.0375
	$2\frac{3}{4}$ – 6 or 2.7500 – 6	UN	2A	0.0027	2.7473	2.7291	...	2.6390	2.6299	0.009132	2.5669	2.5216	2.5488	...	0.0241	0.0180	2.5548	2.5356	0.0301	0.0250
	6		3A	0.0000	2.7500	2.7318	...	2.6417	2.6349	0.0068	2.5696	2.5266	2.5515	...	0.0241	0.0180	2.5575	2.5406	0.0301	0.0250
	$2\frac{3}{4}$ – 8 or 2.7500 – 8	UN	2A	0.0025	2.7475	2.7325	2.7250	2.6663	2.6580	0.008339	2.6122	2.5768	2.5987	...	0.0180	0.0135	2.6032	2.5873	0.0226	0.0188
	8		3A	0.0000	2.7500	2.7350	...	2.6688	2.6625	0.0063	2.6147	2.5813	2.6012	...	0.0180	0.0135	2.6057	2.5918	0.0226	0.0188
(8)	$2\frac{3}{4}$ – 12 or 2.7500 – 12	UN	2A	0.0019	2.7481	2.7367	...	2.6940	2.6877	0.006263	2.6579	2.6336	2.6489	...	0.0120	0.0090	2.6519	2.6406	0.0150	0.0125
(8)	12		3A	0.0000	2.7500	2.7386	...	2.6959	2.6912	0.0047	2.6598	2.6371	2.6508	...	0.0120	0.0090	2.6538	2.6441	0.0150	0.0125
(8)	$2\frac{3}{4}$ – 16 or 2.7500 – 16	UN	2A	0.0017	2.7483	2.7389	...	2.7077	2.7021	0.005589	2.6806	2.6615	2.6739	...	0.0090	0.0068	2.6761	2.6667	0.0113	0.0094
(8)	16		3A	0.0000	2.7500	2.7406	...	2.7094	2.7052	0.0042	2.6823	2.6646	2.6756	...	0.0090	0.0068	2.6778	2.6698	0.0113	0.0094
(8)	$2\frac{3}{4}$ – 20 or 2.7500 – 20	UN	2A	0.0015	2.7485	2.7404	...	2.7160	2.7109	0.005144	2.6944	2.6784	2.6890	...	0.0072	0.0054	2.6907	2.6826	0.0090	0.0075
(8)	20		3A	0.0000	2.7500	2.7419	...	2.7175	2.7136	0.0039	2.6959	2.6811	2.6905	...	0.0072	0.0054	2.6922	2.6853	0.0090	0.0075
	$2\frac{7}{8}$ – 4 or 2.8750 – 4	UN	2A	0.0032	2.8718	2.8480	...	2.7094	2.6988	0.010629	2.6012	2.5364	2.5741	...	0.0361	0.0271	2.5831	2.5574	0.0451	0.0375
	4		3A	0.0000	2.8750	2.8512	...	2.7126	2.7046	0.0080	2.6044	2.5422	2.5773	...	0.0361	0.0271	2.5863	2.5632	0.0451	0.0375
	$2\frac{7}{8}$ – 6 or 2.8750 – 6	UN	2A	0.0028	2.8722	2.8540	...	2.7639	2.7547	0.009219	2.6918	2.6464	2.6737	...	0.0241	0.0180	2.6797	2.6604	0.0301	0.0250
	6		3A	0.0000	2.8750	2.8568	...	2.7667	2.7598	0.0069	2.6946	2.6515	2.6765	...	0.0241	0.0180	2.6825	2.6655	0.0301	0.0250
	$2\frac{7}{8}$ – 8 or 2.8750 – 8	UN	2A	0.0025	2.8725	2.8575	...	2.7913	2.7829	0.008426	2.7372	2.7017	2.7237	...	0.0180	0.0135	2.7282	2.7122	0.0226	0.0188
	8		3A	0.0000	2.8750	2.8600	...	2.7938	2.7875	0.0063	2.7397	2.7063	2.7262	...	0.0180	0.0135	2.7307	2.7168	0.0226	0.0188
	$2\frac{7}{8}$ – 12 or 2.8750 – 12	UN	2A	0.0019	2.8731	2.8617	...	2.8190	2.8127	0.006294	2.7829	2.7586	2.7739	...	0.0120	0.0090	2.7769	2.7656	0.0150	0.0125
	12		3A	0.0000	2.8750	2.8636	...	2.8209	2.8162	0.0047	2.7848	2.7621	2.7758	...	0.0120	0.0090	2.7788	2.7691	0.0150	0.0125
	$2\frac{7}{8}$ – 16 or 2.8750 – 16	UN	2A	0.0017	2.8733	2.8639	...	2.8327	2.8271	0.005620	2.8056	2.7865	2.7989	...	0.0090	0.0068	2.8011	2.7917	0.0113	0.0094
(8)	16		3A	0.0000	2.8750	2.8656	...	2.8344	2.8302	0.0042	2.8073	2.7896	2.8006	...	0.0090	0.0068	2.8028	2.7948	0.0113	0.0094
(8)	$2\frac{7}{8}$ – 20 or 2.8750 – 20	UN	2A	0.0016	2.8734	2.8653	...	2.8409	2.8357	0.005175	2.8193	2.8032	2.8139	...	0.0072	0.0054	2.8156	2.8074	0.0090	0.0075
(8)	20		3A	0.0000	2.8750	2.8669	...	2.8425	2.8386	0.0039	2.8209	2.8061	2.8155	...	0.0072	0.0054	2.8172	2.8103	0.0090	0.0075

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	3 – 4 or 3.0000 – 4	UNC	1A	0.0032	2.9968	2.9611	...	2.8344	2.8183	0.0161	2.7262	2.6559	2.6991	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0032	2.9968	2.9730	2.9611	2.8344	2.8237	0.010714	2.7262	2.6613	2.6991	...	0.0361	0.0271	2.7081	2.6823	0.0451	0.0375
	4		3A	0.0000	3.0000	2.9762	...	2.8376	2.8296	0.0080	2.7294	2.6672	2.7023	...	0.0361	0.0271	2.7113	2.6882	0.0451	0.0375
	3 – or 3.0000 – 6	UN	2A	0.0028	2.9972	2.9790	...	2.8889	2.8796	0.009304	2.8168	2.7713	2.7987	...	0.0241	0.0180	2.8047	2.7853	0.0301	0.0250
	6		3A	0.0000	3.0000	2.9818	...	2.8917	2.8847	0.0070	2.8196	2.7764	2.8015	...	0.0241	0.0180	2.8075	2.7904	0.0301	0.0250
	3 – 8 or 3.0000 – 8	UN	2A	0.0026	2.9974	2.9824	2.9749	2.9162	2.9077	0.008511	2.8621	2.8265	2.8486	...	0.0180	0.0135	2.8531	2.8370	0.0226	0.0188
	8		3A	0.0000	3.0000	2.9850	...	2.9188	2.9124	0.0064	2.8647	2.8312	2.8512	...	0.0180	0.0135	2.8557	2.8417	0.0226	0.0188
	3 – 12 or 3.0000 – 12	UN	2A	0.0019	2.9981	2.9867	...	2.9440	2.9377	0.006324	2.9079	2.8836	2.8989	...	0.0120	0.0090	2.9019	2.8906	0.0150	0.0125
	12		3A	0.0000	3.0000	2.9886	...	2.9459	2.9412	0.0047	2.9098	2.8871	2.9008	...	0.0120	0.0090	2.9038	2.8941	0.0150	0.0125
(8)	3 – 16 or 3.0000 – 16	UN	2A	0.0017	2.9983	2.9889	...	2.9577	2.9521	0.005650	2.9306	2.9115	2.9239	...	0.0090	0.0068	2.9261	2.9167	0.0113	0.0094
(8)	16		3A	0.0000	3.0000	2.9906	...	2.9594	2.9552	0.0042	2.9323	2.9146	2.9256	...	0.0090	0.0068	2.9278	2.9198	0.0113	0.0094
	3 – 20 or 3.0000 – 20	UN	2A	0.0016	2.9984	2.9903	...	2.9659	2.9607	0.005205	2.9443	2.9282	2.9389	...	0.0072	0.0054	2.9406	2.9324	0.0090	0.0075
(8)	20		3A	0.0000	3.0000	2.9919	...	2.9675	2.9636	0.0039	2.9459	2.9311	2.9405	...	0.0072	0.0054	2.9422	2.9353	0.0090	0.0075
	$3\frac{1}{8}$ – 4 or 3.1250 – 4	UN	2A	0.0032	3.1218	3.0980	...	2.9594	2.9486	0.010798	2.8512	2.7862	2.8241	...	0.0361	0.0271	2.8331	2.8072	0.0451	0.0375
	4		3A	0.0000	3.1250	3.1012	...	2.9626	2.9545	0.0081	2.8544	2.7921	2.8273	...	0.0361	0.0271	2.8363	2.8131	0.0451	0.0375
	$3\frac{1}{8}$ – 6 or 3.1250 – 6	UN	2A	0.0028	3.1222	3.1040	...	3.0139	3.0045	0.009388	2.9418	2.8962	2.9237	...	0.0241	0.0180	2.9297	2.9102	0.0301	0.0250
	6		3A	0.0000	3.1250	3.1068	...	3.0167	3.0097	0.0070	2.9446	2.9014	2.9265	...	0.0241	0.0180	2.9325	2.9154	0.0301	0.0250
	$3\frac{1}{8}$ – 8 or 3.1250 – 8	UN	2A	0.0026	3.1224	3.1074	...	3.0412	3.0326	0.008595	2.9871	2.9514	2.9736	...	0.0180	0.0135	2.9781	2.9619	0.0226	0.0188
	8		3A	0.0000	3.1250	3.1100	...	3.0438	3.0374	0.0064	2.9897	2.9562	2.9762	...	0.0180	0.0135	2.9807	2.9667	0.0226	0.0188
(8)	$3\frac{1}{8}$ – 12 or 3.1250 – 12	UN	2A	0.0019	3.1231	3.1117	...	3.0690	3.0626	0.006354	3.0329	3.0085	3.0239	...	0.0120	0.0090	3.0269	3.0155	0.0150	0.0125
(8)	12		3A	0.0000	3.1250	3.1136	...	3.0709	3.0661	0.0048	3.0348	3.0120	3.0258	...	0.0120	0.0090	3.0288	3.0190	0.0150	0.0125
(8)	$3\frac{1}{8}$ – 16 or 3.1250 – 16	UN	2A	0.0017	3.1233	3.1139	...	3.0827	3.0770	0.005680	3.0556	3.0364	3.0489	...	0.0090	0.0068	3.0511	3.0416	0.0113	0.0094
(8)	16		3A	0.0000	3.1250	3.1156	...	3.0844	3.0801	0.0043	3.0573	3.0395	3.0506	...	0.0090	0.0068	3.0528	3.0447	0.0113	0.0094
	$3\frac{1}{4}$ – 4 or 3.2500 – 4	UNC	1A	0.0033	3.2467	3.2110	...	3.0843	3.0680	0.0163	2.9761	2.9056	2.9490	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0033	3.2467	3.2229	3.2110	3.0843	3.0734	0.010879	2.9761	2.9110	2.9490	...	0.0361	0.0271	2.9580	2.9320	0.0451	0.0375
	4		3A	0.0000	3.2500	3.2262	...	3.0876	3.0794	0.0082	2.9794	2.9170	2.9523	...	0.0361	0.0271	2.9613	2.9380	0.0451	0.0375

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	3¼ – 6 or 3.2500 – 6	UN	2A	0.0028	3.2472	3.2290	...	3.1389	3.1294	0.009469	3.0668	3.0211	3.0487	...	0.0241	0.0180	3.0547	3.0351	0.0301	0.0250
	6		3A	0.0000	3.2500	3.2318	...	3.1417	3.1346	0.0071	3.0696	3.0263	3.0515	...	0.0241	0.0180	3.0575	3.0403	0.0301	0.0250
	3¼ – 8 or 3.2500 – 8	UN	2A	0.0026	3.2474	3.2324	3.2249	3.1662	3.1575	0.008676	3.1121	3.0763	3.0986	...	0.0180	0.0135	3.1031	3.0868	0.0226	0.0188
	8		3A	0.0000	3.2500	3.2350	...	3.1688	3.1623	0.0065	3.1147	3.0811	3.1012	...	0.0180	0.0135	3.1057	3.0916	0.0226	0.0188
(8)	3¼ – 12 or 3.2500 – 12	UN	2A	0.0019	3.2481	3.2367	...	3.1940	3.1876	0.006383	3.1579	3.1335	3.1489	...	0.0120	0.0090	3.1519	3.1405	0.0150	0.0125
(8)	12		3A	0.0000	3.2500	3.2386	...	3.1959	3.1911	0.0048	3.1598	3.1370	3.1508	...	0.0120	0.0090	3.1538	3.1440	0.0150	0.0125
(8)	3¼ – 16 or 3.2500 – 16	UN	2A	0.0017	3.2483	3.2389	...	3.2077	3.2020	0.005709	3.1806	3.1614	3.1739	...	0.0090	0.0068	3.1761	3.1666	0.0113	0.0094
(8)	16		3A	0.0000	3.2500	3.2406	...	3.2094	3.2051	0.0043	3.1823	3.1645	3.1756	...	0.0090	0.0068	3.1778	3.1697	0.0113	0.0094
	3⅜ – 4 or 3.3750 – 4	UN	2A	0.0033	3.3717	3.3479	...	3.2093	3.1983	0.010959	3.1011	3.0359	3.0740	...	0.0361	0.0271	3.0830	3.0569	0.0451	0.0375
	4		3A	0.0000	3.3750	3.3512	...	3.2126	3.2044	0.0082	3.1044	3.0420	3.0773	...	0.0361	0.0271	3.0863	3.0630	0.0451	0.0375
	3⅜ – 6 or 3.3750 – 6	UN	2A	0.0029	3.3721	3.3539	...	3.2638	3.2543	0.009549	3.1917	3.1460	3.1736	...	0.0241	0.0180	3.1796	3.1600	0.0301	0.0250
	6		3A	0.0000	3.3750	3.3568	...	3.2667	3.2595	0.0072	3.1946	3.1512	3.1765	...	0.0241	0.0180	3.1825	3.1652	0.0301	0.0250
	3⅜ – 8 or 3.3750 – 8	UN	2A	0.0026	3.3724	3.3574	...	3.2912	3.2824	0.008756	3.2371	3.2012	3.2236	...	0.0180	0.0135	3.2281	3.2117	0.0226	0.0188
	8		3A	0.0000	3.3750	3.3600	...	3.2938	3.2872	0.0066	3.2397	3.2060	3.2262	...	0.0180	0.0135	3.2307	3.2165	0.0226	0.0188
(8)	3⅜ – 12 or 3.3750 – 12	UN	2A	0.0019	3.3731	3.3617	...	3.3190	3.3126	0.006411	3.2829	3.2585	3.2739	...	0.0120	0.0090	3.2769	3.2655	0.0150	0.0125
	12		3A	0.0000	3.3750	3.3636	...	3.3209	3.3161	0.0048	3.2848	3.2620	3.2758	...	0.0120	0.0090	3.2788	3.2690	0.0150	0.0125
(8)	3⅜ – 16 or 3.3750 – 16	UN	2A	0.0017	3.3733	3.3639	...	3.3327	3.3270	0.005737	3.3056	3.2864	3.2989	...	0.0090	0.0068	3.3011	3.2916	0.0113	0.0094
(8)	16		3A	0.0000	3.3750	3.3656	...	3.3344	3.3301	0.0043	3.3073	3.2895	3.3006	...	0.0090	0.0068	3.3028	3.2947	0.0113	0.0094
	3½ – 4 or 3.5000 – 4	UNC	1A	0.0033	3.4967	3.4610	...	3.3343	3.3177	0.0166	3.2261	3.1553	3.1990	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0033	3.4967	3.4729	3.4610	3.3343	3.3233	0.011036	3.2261	3.1609	3.1990	...	0.0361	0.0271	3.2080	3.1819	0.0451	0.0375
	4		3A	0.0000	3.5000	3.4762	...	3.3376	3.3293	0.0083	3.2294	3.1669	3.2023	...	0.0361	0.0271	3.2113	3.1879	0.0451	0.0375
	3½ – 6 or 3.5000 – 6	UN	2A	0.0029	3.4971	3.4789	...	3.3888	3.3792	0.009626	3.3167	3.2709	3.2986	...	0.0241	0.0180	3.3046	3.2849	0.0301	0.0250
	6		3A	0.0000	3.5000	3.4818	...	3.3917	3.3845	0.0072	3.3196	3.2762	3.3015	...	0.0241	0.0180	3.3075	3.2902	0.0301	0.0250
	3½ – 8 or 3.5000 – 8	UN	2A	0.0026	3.4974	3.4824	3.4749	3.4162	3.4074	0.008833	3.3621	3.3262	3.3486	...	0.0180	0.0135	3.3531	3.3367	0.0226	0.0188
	8		3A	0.0000	3.5000	3.4850	...	3.4188	3.4122	0.0066	3.3647	3.3310	3.3512	...	0.0180	0.0135	3.3557	3.3415	0.0226	0.0188
	3½ – 12 or 3.5000 – 12	UN	2A	0.0019	3.4981	3.4867	...	3.4440	3.4376	0.006438	3.4079	3.3835	3.3989	...	0.0120	0.0090	3.4019	3.3905	0.0150	0.0125

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	12		3A	0.0000	3.5000	3.4886	...	3.4459	3.4411	0.0048	3.4098	3.3870	3.4008	...	0.0120	0.0090	3.4038	3.3940	0.0150	0.0125
	$3\frac{1}{2}$ – 16 or 3.5000 – 16	UN	2A	0.0017	3.4983	3.4889	...	3.4577	3.4519	0.005764	3.4306	3.4113	3.4239	...	0.0090	0.0068	3.4261	3.4165	0.0113	0.0094
(8)	16		3A	0.0000	3.5000	3.4906	...	3.4594	3.4551	0.0043	3.4323	3.4145	3.4256	...	0.0090	0.0068	3.4278	3.4197	0.0113	0.0094
	$3\frac{5}{8}$ – 4 or 3.6250 – 4	UN	2A	0.0033	3.6217	3.5979	...	3.4593	3.4482	0.011113	3.3511	3.2858	3.3240	...	0.0361	0.0271	3.3330	3.3068	0.0451	0.0375
	4		3A	0.0000	3.6250	3.6012	...	3.4626	3.4543	0.0083	3.3544	3.2919	3.3273	...	0.0361	0.0271	3.3363	3.3129	0.0451	0.0375
	$3\frac{5}{8}$ – 6 or 3.6250 – 6	UN	2A	0.0029	3.6221	3.6039	...	3.5138	3.5041	0.009703	3.4417	3.3958	3.4236	...	0.0241	0.0180	3.4296	3.4098	0.0301	0.0250
	6		3A	0.0000	3.6250	3.6068	...	3.5167	3.5094	0.0073	3.4446	3.4011	3.4265	...	0.0241	0.0180	3.4325	3.4151	0.0301	0.0250
	$3\frac{5}{8}$ – 8 or 3.6250 – 8	UN	2A	0.0027	3.6223	3.6073	...	3.5411	3.5322	0.008910	3.4870	3.4510	3.4735	...	0.0180	0.0135	3.4780	3.4615	0.0226	0.0188
	8		3A	0.0000	3.6250	3.6100	...	3.5438	3.5371	0.0067	3.4897	3.4559	3.4762	...	0.0180	0.0135	3.4807	3.4664	0.0226	0.0188
(8)	$3\frac{5}{8}$ – 12 or 3.6250 – 12	UN	2A	0.0019	3.6231	3.6117	...	3.5690	3.5625	0.006465	3.5329	3.5084	3.5239	...	0.0120	0.0090	3.5269	3.5154	0.0150	0.0125
	12		3A	0.0000	3.6250	3.6136	...	3.5709	3.5661	0.0048	3.5348	3.5120	3.5258	...	0.0120	0.0090	3.5288	3.5190	0.0150	0.0125
	$3\frac{5}{8}$ – 16 or 3.6250 – 16	UN	2A	0.0017	3.6233	3.6139	...	3.5827	3.5769	0.005791	3.5556	3.5363	3.5489	...	0.0090	0.0068	3.5511	3.5415	0.0113	0.0094
(8)	16		3A	0.0000	3.6250	3.6156	...	3.5844	3.5801	0.0043	3.5573	3.5395	3.5506	...	0.0090	0.0068	3.5528	3.5447	0.0113	0.0094
	$3\frac{3}{4}$ – 4 or 3.7500 – 4	UNC	1A	0.0034	3.7466	3.7109	...	3.5842	3.5674	0.0168	3.4760	3.4050	3.4489	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0034	3.7466	3.7228	3.7109	3.5842	3.5730	0.011188	3.4760	3.4106	3.4489	...	0.0361	0.0271	3.4579	3.4316	0.0451	0.0375
	4		3A	0.0000	3.7500	3.7262	...	3.5876	3.5792	0.0084	3.4794	3.4168	3.4523	...	0.0361	0.0271	3.4613	3.4378	0.0451	0.0375
	$3\frac{3}{4}$ – 6 or 3.7500 – 6	UN	2A	0.0029	3.7471	3.7289	...	3.6388	3.6290	0.009778	3.5667	3.5207	3.5486	...	0.0241	0.0180	3.5546	3.5347	0.0301	0.0250
	6		3A	0.0000	3.7500	3.7318	...	3.6417	3.6344	0.0073	3.5696	3.5261	3.5515	...	0.0241	0.0180	3.5575	3.5401	0.0301	0.0250
	$3\frac{3}{4}$ – 8 or 3.7500 – 8	UN	2A	0.0027	3.7473	3.7323	3.7248	3.6661	3.6571	0.008985	3.6120	3.5759	3.5985	...	0.0180	0.0135	3.6030	3.5864	0.0226	0.0188
	8		3A	0.0000	3.7500	3.7350	...	3.6688	3.6621	0.0067	3.6147	3.5809	3.6012	...	0.0180	0.0135	3.6057	3.5914	0.0226	0.0188
(8)	$3\frac{3}{4}$ – 12 or 3.7500 – 12	UN	2A	0.0019	3.7481	3.7367	...	3.6940	3.6875	0.006491	3.6579	3.6334	3.6489	...	0.0120	0.0090	3.6519	3.6404	0.0150	0.0125
(8)	12		3A	0.0000	3.7500	3.7386	...	3.6959	3.6910	0.0049	3.6598	3.6369	3.6508	...	0.0120	0.0090	3.6538	3.6439	0.0150	0.0125
(8)	$3\frac{3}{4}$ – 16 or 3.7500 – 16	UN	2A	0.0017	3.7483	3.7389	...	3.7077	3.7019	0.005817	3.6806	3.6613	3.6739	...	0.0090	0.0068	3.6761	3.6665	0.0113	0.0094
(8)	16		3A	0.0000	3.7500	3.7406	...	3.7094	3.7050	0.0044	3.6823	3.6644	3.6756	...	0.0090	0.0068	3.6778	3.6696	0.0113	0.0094
	$3\frac{7}{8}$ – 4 or 3.8750 – 4	UN	2A	0.0034	3.8716	3.8478	...	3.7092	3.6979	0.011262	3.6010	3.5355	3.5739	...	0.0361	0.0271	3.5829	3.5565	0.0451	0.0375
	4		3A	0.0000	3.8750	3.8512	...	3.7126	3.7042	0.0084	3.6044	3.5418	3.5773	...	0.0361	0.0271	3.5863	3.5628	0.0451	0.0375

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	$3\frac{7}{8}$ – 6 or 3.8750 – 6	UN	2A	0.0030	3.8720	3.8538	...	3.7637	3.7538	0.009852	3.6916	3.6455	3.6735	...	0.0241	0.0180	3.6795	3.6595	0.0301	0.0250
	6		3A	0.0000	3.8750	3.8568	...	3.7667	3.7593	0.0074	3.6946	3.6510	3.6765	...	0.0241	0.0180	3.6825	3.6650	0.0301	0.0250
	$3\frac{7}{8}$ – 8 or 3.8750 – 8	UN	2A	0.0027	3.8723	3.8573	...	3.7911	3.7820	0.009059	3.7370	3.7008	3.7235	...	0.0180	0.0135	3.7280	3.7113	0.0226	0.0188
	8		3A	0.0000	3.8750	3.8600	...	3.7938	3.7870	0.0068	3.7397	3.7058	3.7262	...	0.0180	0.0135	3.7307	3.7163	0.0226	0.0188
	$3\frac{7}{8}$ – 12 or 3.8750 – 12	UN	2A	0.0020	3.8730	3.8616	...	3.8189	3.8124	0.006517	3.7828	3.7583	3.7738	...	0.0120	0.0090	3.7768	3.7653	0.0150	0.0125
	12		3A	0.0000	3.8750	3.8636	...	3.8209	3.8160	0.0049	3.7848	3.7619	3.7758	...	0.0120	0.0090	3.7788	3.7689	0.0150	0.0125
(8)	$3\frac{7}{8}$ – 16 or 3.8750 – 16	UN	2A	0.0018	3.8732	3.8638	...	3.8326	3.8268	0.005843	3.8055	3.7862	3.7988	...	0.0090	0.0068	3.8010	3.7914	0.0113	0.0094
(8)	16		3A	0.0000	3.8750	3.8656	...	3.8344	3.8300	0.0044	3.8073	3.7894	3.8006	...	0.0090	0.0068	3.8028	3.7946	0.0113	0.0094
	4 – 4 or 4.0000 – 4	UNC	1A	0.0034	3.9966	3.9609	...	3.8342	3.8172	0.0170	3.7260	3.6548	3.6989	...	0.0361	0.0271	...	...	...	...
	4		2A	0.0034	3.9966	3.9728	3.9609	3.8342	3.8229	0.011334	3.7260	3.6605	3.6989	...	0.0361	0.0271	3.7079	3.6815	0.0451	0.0375
	4		3A	0.0000	4.0000	3.9762	...	3.8376	3.8291	0.0085	3.7294	3.6667	3.7023	...	0.0361	0.0271	3.7113	3.6877	0.0451	0.0375
	4 – 6 or 4.0000 – 6	UN	2A	0.0030	3.9970	3.9788	...	3.8887	3.8788	0.009924	3.8166	3.7705	3.7985	...	0.0241	0.0180	3.8045	3.7845	0.0301	0.0250
	6		3A	0.0000	4.0000	3.9818	...	3.8917	3.8843	0.0074	3.8196	3.7760	3.8015	...	0.0241	0.0180	3.8075	3.7900	0.0301	0.0250
	4 – 8 or 4.0000 – 8	UN	2A	0.0027	3.9973	3.9823	3.9748	3.9161	3.9070	0.009131	3.8620	3.8258	3.8485	...	0.0180	0.0135	3.8530	3.8363	0.0226	0.0188
	8		3A	0.0000	4.0000	3.9850	...	3.9188	3.9120	0.0068	3.8647	3.8308	3.8512	...	0.0180	0.0135	3.8557	3.8413	0.0226	0.0188
	4 – 12 or 4.0000 – 12	UN	2A	0.0020	3.9980	3.9866	...	3.9439	3.9374	0.006542	3.9078	3.8833	3.8988	...	0.0120	0.0090	3.9018	3.8903	0.0150	0.0125
	12		3A	0.0000	4.0000	3.9886	...	3.9459	3.9410	0.0049	3.9098	3.8869	3.9008	...	0.0120	0.0090	3.9038	3.8939	0.0150	0.0125
	4 – 16 or 4.0000 – 16	UN	2A	0.0018	3.9982	3.9888	...	3.9576	3.9517	0.005868	3.9305	3.9111	3.9238	...	0.0090	0.0068	3.9260	3.9163	0.0113	0.0094
(8)	16		3A	0.0000	4.0000	3.9906	...	3.9594	3.9550	0.0044	3.9323	3.9144	3.9256	...	0.0090	0.0068	3.9278	3.9196	0.0113	0.0094
	$4\frac{1}{8}$ – 4 or 4.1250 – 4	UN	2A	0.0034	4.1216	4.0978	...	3.9592	3.9478	0.011406	3.8510	3.7854	3.8239	...	0.0361	0.0271	3.8329	3.8064	0.0451	0.0375
	4		3A	0.0000	4.1250	4.1012	...	3.9626	3.9540	0.0086	3.8544	3.7916	3.8273	...	0.0361	0.0271	3.8363	3.8126	0.0451	0.0375
	$4\frac{1}{8}$ – 6 or 4.1250 – 6	UN	2A	0.0030	4.1220	4.1038	...	4.0137	4.0037	0.009996	3.9416	3.8954	3.9235	...	0.0241	0.0180	3.9295	3.9094	0.0301	0.0250
	6		3A	0.0000	4.1250	4.1068	...	4.0167	4.0092	0.0075	3.9446	3.9009	3.9265	...	0.0241	0.0180	3.9325	3.9149	0.0301	0.0250
	$4\frac{1}{8}$ – 8 or 4.1250 – 8	UN	2A	0.0028	4.1222	4.1072	...	4.0410	4.0318	0.009203	3.9869	3.9506	3.9734	...	0.0180	0.0135	3.9779	3.9611	0.0226	0.0188
	8		3A	0.0000	4.1250	4.1100	...	4.0438	4.0369	0.0069	3.9897	3.9557	3.9762	...	0.0180	0.0135	3.9807	3.9662	0.0226	0.0188
(8)	$4\frac{1}{8}$ – 12 or 4.1250 – 12	UN	2A	0.0020	4.1230	4.1116	...	4.0689	4.0623	0.006567	4.0328	4.0082	4.0238	...	0.0120	0.0090	4.0268	4.0152	0.0150	0.0125

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	12		3A	0.0000	4.1250	4.1136	...	4.0709	4.0660	0.0049	4.0348	4.0119	4.0258	...	0.0120	0.0090	4.0288	4.0189	0.0150	0.0125
(8)	$4\frac{1}{8}$ – 16 or 4.1250 – 16	UN	2A	0.0018	4.1232	4.1138	...	4.0826	4.0767	0.005893	4.0555	4.0361	4.0488	...	0.0090	0.0068	4.0510	4.0413	0.0113	0.0094
(8)	16		3A	0.0000	4.1250	4.1156	...	4.0844	4.0800	0.0044	4.0573	4.0394	4.0506	...	0.0090	0.0068	4.0528	4.0446	0.0113	0.0094
	$4\frac{1}{4}$ – 4 or 4.2500 – 4	UNC	2A	0.0034	4.2466	4.2228	...	4.0842	4.0727	0.011475	3.9760	3.9103	3.9489	...	0.0361	0.0271	3.9579	3.9313	0.0451	0.0375
	4		3A	0.0000	4.2500	4.2262	...	4.0876	4.0790	0.0086	3.9794	3.9166	3.9523	...	0.0361	0.0271	3.9613	3.9376	0.0451	0.0375
	$4\frac{1}{4}$ – 6 or 4.2500 – 6	UN	2A	0.0030	4.2470	4.2288	...	4.1387	4.1286	0.010065	4.0666	4.0203	4.0485	...	0.0241	0.0180	4.0545	4.0343	0.0301	0.0250
	6		3A	0.0000	4.2500	4.2318	...	4.1417	4.1342	0.0075	4.0696	4.0259	4.0515	...	0.0241	0.0180	4.0575	4.0399	0.0301	0.0250
(8)	$4\frac{1}{4}$ – 8 or 4.2500 – 8	UN	2A	0.0028	4.2472	4.2322	...	4.1660	4.1567	0.009272	4.1119	4.0755	4.0984	...	0.0180	0.0135	4.1029	4.0860	0.0226	0.0188
(8)	8		3A	0.0000	4.2500	4.2350	...	4.1688	4.1618	0.0070	4.1147	4.0806	4.1012	...	0.0180	0.0135	4.1057	4.0911	0.0226	0.0188
(8)	$4\frac{1}{4}$ – 12 or 4.2500 – 12	UN	2A	0.0020	4.2480	4.2366	...	4.1939	4.1873	0.006591	4.1578	4.1332	4.1488	...	0.0120	0.0090	4.1518	4.1402	0.0150	0.0125
	12		3A	0.0000	4.2500	4.2386	...	4.1959	4.1910	0.0049	4.1598	4.1369	4.1508	...	0.0120	0.0090	4.1538	4.1439	0.0150	0.0125
(8)	$4\frac{1}{4}$ – 16 or 4.2500 – 16	UN	2A	0.0018	4.2482	4.2388	...	4.2076	4.2017	0.005917	4.1805	4.1611	4.1738	...	0.0090	0.0068	4.1760	4.1663	0.0113	0.0094
(8)	16		3A	0.0000	4.2500	4.2406	...	4.2094	4.2050	0.0044	4.1823	4.1644	4.1756	...	0.0090	0.0068	4.1778	4.1696	0.0113	0.0094
	$4\frac{3}{8}$ – 4 or 4.3750 – 4	UN	2A	0.0035	4.3715	4.3477	...	4.2091	4.1976	0.011543	4.1009	4.0352	4.0738	...	0.0361	0.0271	4.0828	4.0562	0.0451	0.0375
	4		3A	0.0000	4.3750	4.3512	...	4.2126	4.2039	0.0087	4.1044	4.0415	4.0773	...	0.0361	0.0271	4.0863	4.0625	0.0451	0.0375
	$4\frac{3}{8}$ – 6 or 4.3750 – 6	UN	2A	0.0030	4.3720	4.3538	...	4.2637	4.2536	0.010133	4.1916	4.1453	4.1735	...	0.0241	0.0180	4.1795	4.1593	0.0301	0.0250
	6		3A	0.0000	4.3750	4.3568	...	4.2667	4.2591	0.0076	4.1946	4.1508	4.1765	...	0.0241	0.0180	4.1825	4.1648	0.0301	0.0250
(8)	$4\frac{3}{8}$ – 8 or 4.3750 – 8	UN	2A	0.0028	4.3722	4.3572	...	4.2910	4.2817	0.009340	4.2369	4.2005	4.2234	...	0.0180	0.0135	4.2279	4.2110	0.0226	0.0188
	8		3A	0.0000	4.3750	4.3600	...	4.2938	4.2868	0.0070	4.2397	4.2056	4.2262	...	0.0180	0.0135	4.2307	4.2161	0.0226	0.0188
(8)	$4\frac{3}{8}$ – 12 or 4.3750 – 12	UN	2A	0.0020	4.3730	4.3616	...	4.3189	4.3123	0.006614	4.2828	4.2582	4.2738	...	0.0120	0.0090	4.2768	4.2652	0.0150	0.0125
(8)	12		3A	0.0000	4.3750	4.3636	...	4.3209	4.3159	0.0050	4.2848	4.2618	4.2758	...	0.0120	0.0090	4.2788	4.2688	0.0150	0.0125
(8)	$4\frac{3}{8}$ – 16 or 4.3750 – 16	UN	2A	0.0018	4.3732	4.3638	...	4.3326	4.3267	0.005940	4.3055	4.2861	4.2988	...	0.0090	0.0068	4.3010	4.2913	0.0113	0.0094
(8)	16		3A	0.0000	4.3750	4.3656	...	4.3344	4.3299	0.0045	4.3073	4.2893	4.3006	...	0.0090	0.0068	4.3028	4.2945	0.0113	0.0094
	$4\frac{1}{2}$ – 4 or 4.5000 – 4	UNC	2A	0.0035	4.4965	4.4727	...	4.3341	4.3225	0.011611	4.2259	4.1601	4.1988	...	0.0361	0.0271	4.2078	4.1811	0.0451	0.0375
	4		3A	0.0000	4.5000	4.4762	...	4.3376	4.3289	0.0087	4.2294	4.1665	4.2023	...	0.0361	0.0271	4.2113	4.1875	0.0451	0.0375
	$4\frac{1}{2}$ – 6 or 4.5000 – 6	UN	2A	0.0031	4.4969	4.4787	...	4.3886	4.3784	0.010201	4.3165	4.2701	4.2984	...	0.0241	0.0180	4.3044	4.2841	0.0301	0.0250

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	6		3A	0.0000	4.5000	4.4818	...	4.3917	4.3840	0.0077	4.3196	4.2757	4.3015	...	0.0241	0.0180	4.3075	4.2897	0.0301	0.0250
	$4\frac{1}{2}$ – 8 or 4.5000 – 8	UN	2A	0.0028	4.4972	4.4822	...	4.4160	4.4066	0.009408	4.3619	4.3254	4.3484	...	0.0180	0.0135	4.3529	4.3359	0.0226	0.0188
	8		3A	0.0000	4.5000	4.4850	...	4.4188	4.4117	0.0071	4.3647	4.3305	4.3512	...	0.0180	0.0135	4.3557	4.3410	0.0226	0.0188
(8)	$4\frac{1}{2}$ – 12 or 4.5000 – 12	UN	2A	0.0020	4.4980	4.4866	...	4.4439	4.4373	0.006637	4.4078	4.3832	4.3988	...	0.0120	0.0090	4.4018	4.3902	0.0150	0.0125
(8)	12		3A	0.0000	4.5000	4.4886	...	4.4459	4.4409	0.0050	4.4098	4.3868	4.4008	...	0.0120	0.0090	4.4038	4.3938	0.0150	0.0125
(8)	$4\frac{1}{2}$ – 16 or 4.5000 – 16	UN	2A	0.0018	4.4982	4.4888	...	4.4576	4.4516	0.005963	4.4305	4.4110	4.4238	...	0.0090	0.0068	4.4260	4.4162	0.0113	0.0094
(8)	16		3A	0.0000	4.5000	4.4906	...	4.4594	4.4549	0.0045	4.4323	4.4143	4.4256	...	0.0090	0.0068	4.4278	4.4195	0.0113	0.0094
	$4\frac{5}{8}$ – 4 or 4.6250 – 4	UN	2A	0.0035	4.6215	4.5977	...	4.4591	4.4474	0.011678	4.3509	4.2850	4.3238	...	0.0361	0.0271	4.3328	4.3060	0.0451	0.0375
	4		3A	0.0000	4.6250	4.6012	...	4.4626	4.4538	0.0088	4.3544	4.2914	4.3273	...	0.0361	0.0271	4.3363	4.3124	0.0451	0.0375
	$4\frac{5}{8}$ – 6 or 4.6250 – 6	UN	2A	0.0031	4.6219	4.6037	...	4.5136	4.5033	0.010268	4.4415	4.3950	4.4234	...	0.0241	0.0180	4.4294	4.4090	0.0301	0.0250
	6		3A	0.0000	4.6250	4.6068	...	4.5167	4.5090	0.0077	4.4446	4.4007	4.4265	...	0.0241	0.0180	4.4325	4.4147	0.0301	0.0250
(8)	$4\frac{5}{8}$ – 8 or 4.6250 – 8	UN	2A	0.0028	4.6222	4.6072	...	4.5410	4.5315	0.009475	4.4869	4.4503	4.4734	...	0.0180	0.0135	4.4779	4.4608	0.0226	0.0188
(8)	8		3A	0.0000	4.6250	4.6100	...	4.5438	4.5367	0.0071	4.4897	4.4555	4.4762	...	0.0180	0.0135	4.4807	4.4660	0.0226	0.0188
(8)	$4\frac{5}{8}$ – 12 or 4.6250 – 12	UN	2A	0.0020	4.6230	4.6116	...	4.5689	4.5622	0.006660	4.5328	4.5081	4.5238	...	0.0120	0.0090	4.5268	4.5151	0.0150	0.0125
(8)	12		3A	0.0000	4.6250	4.6136	...	4.5709	4.5659	0.0050	4.5348	4.5118	4.5258	...	0.0120	0.0090	4.5288	4.5188	0.0150	0.0125
(8)	$4\frac{5}{8}$ – 16 or 4.6250 – 16	UN	2A	0.0018	4.6232	4.6138	...	4.5826	4.5766	0.005986	4.5555	4.5360	4.5488	...	0.0090	0.0068	4.5510	4.5412	0.0113	0.0094
(8)	16		3A	0.0000	4.6250	4.6156	...	4.5844	4.5799	0.0045	4.5573	4.5393	4.5506	...	0.0090	0.0068	4.5528	4.5445	0.0113	0.0094
	$4\frac{3}{4}$ – 4 or 4.7500 – 4	UNC	2A	0.0035	4.7465	4.7227	...	4.5841	4.5724	0.011743	4.4759	4.4100	4.4488	...	0.0361	0.0271	4.4578	4.4310	0.0451	0.0375
	4		3A	0.0000	4.7500	4.7262	...	4.5876	4.5788	0.0088	4.4794	4.4164	4.4523	...	0.0361	0.0271	4.4613	4.4374	0.0451	0.0375
	$4\frac{3}{4}$ – 6 or 4.7500 – 6	UN	2A	0.0031	4.7469	4.7287	...	4.6386	4.6283	0.010333	4.5665	4.5200	4.5484	...	0.0241	0.0180	4.5544	4.5340	0.0301	0.0250
	6		3A	0.0000	4.7500	4.7318	...	4.6417	4.6340	0.0077	4.5696	4.5257	4.5515	...	0.0241	0.0180	4.5575	4.5397	0.0301	0.0250
	$4\frac{3}{4}$ – 8 or 4.7500 – 8	UN	2A	0.0029	4.7471	4.7321	...	4.6659	4.6564	0.009540	4.6118	4.5752	4.5983	...	0.0180	0.0135	4.6028	4.5857	0.0226	0.0188
(8)	8		3A	0.0000	4.7500	4.7350	...	4.6688	4.6616	0.0072	4.6147	4.5804	4.6012	...	0.0180	0.0135	4.6057	4.5909	0.0226	0.0188
	$4\frac{3}{4}$ – 12 or 4.7500 – 12	UN	2A	0.0020	4.7480	4.7366	...	4.6939	4.6872	0.006682	4.6578	4.6331	4.6488	...	0.0120	0.0090	4.6518	4.6401	0.0150	0.0125
(8)	12		3A	0.0000	4.7500	4.7386	...	4.6959	4.6909	0.0050	4.6598	4.6368	4.6508	...	0.0120	0.0090	4.6538	4.6438	0.0150	0.0125
(8)	$4\frac{3}{4}$ – 16 or 4.7500 – 16	UN	2A	0.0018	4.7482	4.7388	...	4.7076	4.7016	0.006008	4.6805	4.6610	4.6738	...	0.0090	0.0068	4.6760	4.6662	0.0113	0.0094

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	16		3A	0.0000	4.7500	4.7406	...	4.7094	4.7049	0.0045	4.6823	4.6643	4.6756	...	0.0090	0.0068	4.6778	4.6695	0.0113	0.0094
	$4\frac{7}{8}$ – 4 or 4.8750 – 4	UN	2A	0.0035	4.8715	4.8477	...	4.7091	4.6973	0.011808	4.6009	4.5349	4.5738	...	0.0361	0.0271	4.5828	4.5559	0.0451	0.0375
	4		3A	0.0000	4.8750	4.8512	...	4.7126	4.7037	0.0089	4.6044	4.5413	4.5773	...	0.0361	0.0271	4.5863	4.5623	0.0451	0.0375
	$4\frac{7}{8}$ – 6 or 4.8750 – 6	UN	2A	0.0031	4.8719	4.8537	...	4.7636	4.7532	0.010398	4.6915	4.6449	4.6734	...	0.0241	0.0180	4.6794	4.6589	0.0301	0.0250
	6		3A	0.0000	4.8750	4.8568	...	4.7667	4.7589	0.0078	4.6946	4.6506	4.6765	...	0.0241	0.0180	4.6825	4.6646	0.0301	0.0250
	$4\frac{7}{8}$ – 8 or 4.8750 – 8	UN	2A	0.0029	4.8721	4.8571	...	4.7909	4.7813	0.009605	4.7368	4.7001	4.7233	...	0.0180	0.0135	4.7278	4.7106	0.0226	0.0188
	8		3A	0.0000	4.8750	4.8600	...	4.7938	4.7866	0.0072	4.7397	4.7054	4.7262	...	0.0180	0.0135	4.7307	4.7159	0.0226	0.0188
	$4\frac{7}{8}$ – 12 or 4.8750 – 12	UN	2A	0.0020	4.8730	4.8616	...	4.8189	4.8122	0.006704	4.7828	4.7581	4.7738	...	0.0120	0.0090	4.7768	4.7651	0.0150	0.0125
(8)	12		3A	0.0000	4.8750	4.8636	...	4.8209	4.8159	0.0050	4.7848	4.7618	4.7758	...	0.0120	0.0090	4.7788	4.7688	0.0150	0.0125
(8)	$4\frac{7}{8}$ – 16 or 4.8750 – 16	UN	2A	0.0018	4.8732	4.8638	...	4.8326	4.8266	0.006030	4.8055	4.7860	4.7988	...	0.0090	0.0068	4.8010	4.7912	0.0113	0.0094
(8)	16		3A	0.0000	4.8750	4.8656	...	4.8344	4.8299	0.0045	4.8073	4.7893	4.8006	...	0.0090	0.0068	4.8028	4.7945	0.0113	0.0094
	5 – 4 or 5.0000 – 4	UNC	2A	0.0036	4.9964	4.9726	...	4.8340	4.8221	0.011872	4.7258	4.6597	4.6987	...	0.0361	0.0271	4.7077	4.6807	0.0451	0.0375
	4		3A	0.0000	5.0000	4.9762	...	4.8376	4.8287	0.0089	4.7294	4.6663	4.7023	...	0.0361	0.0271	4.7113	4.6873	0.0451	0.0375
	5 – 6 or 5.0000 – 6	UN	2A	0.0031	4.9969	4.9787	...	4.8886	4.8781	0.010462	4.8165	4.7698	4.7984	...	0.0241	0.0180	4.8044	4.7838	0.0301	0.0250
	6		3A	0.0000	5.0000	4.9818	...	4.8917	4.8839	0.0078	4.8196	4.7756	4.8015	...	0.0241	0.0180	4.8075	4.7896	0.0301	0.0250
	5 – 8 or 5.0000 – 8	UN	2A	0.0029	4.9971	4.9821	...	4.9159	4.9062	0.009669	4.8618	4.8250	4.8483	...	0.0180	0.0135	4.8528	4.8355	0.0226	0.0188
(8)	8		3A	0.0000	5.0000	4.9850	...	4.9188	4.9115	0.0073	4.8647	4.8303	4.8512	...	0.0180	0.0135	4.8557	4.8408	0.0226	0.0188
	5 – 12 or 5.0000 – 12	UN	2A	0.0020	4.9980	4.9866	...	4.9439	4.9372	0.006726	4.9078	4.8831	4.8988	...	0.0120	0.0090	4.9018	4.8901	0.0150	0.0125
	12		3A	0.0000	5.0000	4.9886	...	4.9459	4.9409	0.0050	4.9098	4.8868	4.9008	...	0.0120	0.0090	4.9038	4.8938	0.0150	0.0125
	5 – 16 or 5.0000 – 16	UN	2A	0.0018	4.9982	4.9888	...	4.9576	4.9515	0.006052	4.9305	4.9109	4.9238	...	0.0090	0.0068	4.9260	4.9161	0.0113	0.0094
(8)	16		3A	0.0000	5.0000	4.9906	...	4.9594	4.9549	0.0045	4.9323	4.9143	4.9256	...	0.0090	0.0068	4.9278	4.9195	0.0113	0.0094
	$5\frac{1}{8}$ – 4 or 5.1250 – 4	UN	2A	0.0036	5.1214	5.0976	...	4.9590	4.9471	0.011935	4.8508	4.7847	4.8237	...	0.0361	0.0271	4.8327	4.8057	0.0451	0.0375
	4		3A	0.0000	5.1250	5.1012	...	4.9626	4.9536	0.0090	4.8544	4.7912	4.8273	...	0.0361	0.0271	4.8363	4.8122	0.0451	0.0375
	$5\frac{1}{8}$ – 6 or 5.1250 – 6	UN	2A	0.0032	5.1218	5.1036	...	5.0135	5.0030	0.010525	4.9414	4.8947	4.9233	...	0.0241	0.0180	4.9293	4.9087	0.0301	0.0250
	6		3A	0.0000	5.1250	5.1068	...	5.0167	5.0088	0.0079	4.9446	4.9005	4.9265	...	0.0241	0.0180	4.9325	4.9145	0.0301	0.0250
(8)	$5\frac{1}{8}$ – 8 or 5.1250 – 8	UN	2A	0.0029	5.1221	5.1071	...	5.0409	5.0312	0.009732	4.9868	4.9500	4.9733	...	0.0180	0.0135	4.9778	4.9605	0.0226	0.0188

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	8		3A	0.0000	5.1250	5.1100	...	5.0438	5.0365	0.0073	4.9897	4.9553	4.9762	...	0.0180	0.0135	4.9807	4.9658	0.0226	0.0188
(8)	$5\frac{1}{8}$ – 12 or 5.1250 – 12	UN	2A	0.0020	5.1230	5.1116	...	5.0689	5.0622	0.006747	5.0328	5.0081	5.0238	...	0.0120	0.0090	5.0268	5.0151	0.0150	0.0125
(8)	12		3A	0.0000	5.1250	5.1136	...	5.0709	5.0658	0.0051	5.0348	5.0117	5.0258	...	0.0120	0.0090	5.0288	5.0187	0.0150	0.0125
	$5\frac{1}{8}$ – 16 or 5.1250 – 16	UN	2A	0.0018	5.1232	5.1138	...	5.0826	5.0765	0.006073	5.0555	5.0359	5.0488	...	0.0090	0.0068	5.0510	5.0411	0.0113	0.0094
(8)	16		3A	0.0000	5.1250	5.1156	...	5.0844	5.0798	0.0046	5.0573	5.0392	5.0506	...	0.0090	0.0068	5.0528	5.0444	0.0113	0.0094
	$5\frac{1}{4}$ – 4 or 5.2500 – 4	UNC	2A	0.0036	5.2464	5.2226	...	5.0840	5.0720	0.011997	4.9758	4.9096	4.9487	...	0.0361	0.0271	4.9577	4.9306	0.0451	0.0375
	4		3A	0.0000	5.2500	5.2262	...	5.0876	5.0786	0.0090	4.9794	4.9162	4.9523	...	0.0361	0.0271	4.9613	4.9372	0.0451	0.0375
	$5\frac{1}{4}$ – 6 or 5.2500 – 6	UN	2A	0.0032	5.2468	5.2286	...	5.1385	5.1279	0.010587	5.0664	5.0196	5.0483	...	0.0241	0.0180	5.0543	5.0336	0.0301	0.0250
	6		3A	0.0000	5.2500	5.2318	...	5.1417	5.1338	0.0079	5.0696	5.0255	5.0515	...	0.0241	0.0180	5.0575	5.0395	0.0301	0.0250
	$5\frac{1}{4}$ – 8 or 5.2500 – 8	UN	2A	0.0029	5.2471	5.2321	...	5.1659	5.1561	0.009794	5.1118	5.0749	5.0983	...	0.0180	0.0135	5.1028	5.0854	0.0226	0.0188
(8)	8		3A	0.0000	5.2500	5.2350	...	5.1688	5.1615	0.0073	5.1147	5.0803	5.1012	...	0.0180	0.0135	5.1057	5.0908	0.0226	0.0188
(8)	$5\frac{1}{4}$ – 12 or 5.2500 – 12	UN	2A	0.0020	5.2480	5.2366	...	5.1939	5.1871	0.006768	5.1578	5.1330	5.1488	...	0.0120	0.0090	5.1518	5.1400	0.0150	0.0125
(8)	12		3A	0.0000	5.2500	5.2386	...	5.1959	5.1908	0.0051	5.1598	5.1367	5.1508	...	0.0120	0.0090	5.1538	5.1437	0.0150	0.0125
	$5\frac{1}{4}$ – 16 or 5.2500 – 16	UN	2A	0.0018	5.2482	5.2388	...	5.2076	5.2015	0.006094	5.1805	5.1609	5.1738	...	0.0090	0.0068	5.1760	5.1661	0.0113	0.0094
(8)	16		3A	0.0000	5.2500	5.2406	...	5.2094	5.2048	0.0046	5.1823	5.1642	5.1756	...	0.0090	0.0068	5.1778	5.1694	0.0113	0.0094
	$5\frac{3}{8}$ – 4 or 5.3750 – 4	UN	2A	0.0036	5.3714	5.3476	...	5.2090	5.1969	0.012059	5.1008	5.0345	5.0737	...	0.0361	0.0271	5.0827	5.0555	0.0451	0.0375
	4		3A	0.0000	5.3750	5.3512	...	5.2126	5.2036	0.0090	5.1044	5.0412	5.0773	...	0.0361	0.0271	5.0863	5.0622	0.0451	0.0375
	$5\frac{3}{8}$ – 6 or 5.3750 – 6	UN	2A	0.0032	5.3718	5.3536	...	5.2635	5.2529	0.010649	5.1914	5.1446	5.1733	...	0.0241	0.0180	5.1793	5.1586	0.0301	0.0250
	6		3A	0.0000	5.3750	5.3568	...	5.2667	5.2587	0.0080	5.1946	5.1504	5.1765	...	0.0241	0.0180	5.1825	5.1644	0.0301	0.0250
(8)	$5\frac{3}{8}$ – 8 or 5.3750 – 8	UN	2A	0.0030	5.3720	5.3570	...	5.2908	5.2809	0.009856	5.2367	5.1997	5.2232	...	0.0180	0.0135	5.2277	5.2102	0.0226	0.0188
(8)	8		3A	0.0000	5.3750	5.3600	...	5.2938	5.2864	0.0074	5.2397	5.2052	5.2262	...	0.0180	0.0135	5.2307	5.2157	0.0226	0.0188
(8)	$5\frac{3}{8}$ – 12 or 5.3750 – 12	UN	2A	0.0020	5.3730	5.3616	...	5.3189	5.3121	0.006789	5.2828	5.2580	5.2738	...	0.0120	0.0090	5.2768	5.2650	0.0150	0.0125
(8)	12		3A	0.0000	5.3750	5.3636	...	5.3209	5.3158	0.0051	5.2848	5.2617	5.2758	...	0.0120	0.0090	5.2788	5.2687	0.0150	0.0125
	$5\frac{3}{8}$ – 16 or 5.3750 – 16	UN	2A	0.0018	5.3732	5.3638	...	5.3326	5.3265	0.006115	5.3055	5.2859	5.2988	...	0.0090	0.0068	5.3010	5.2911	0.0113	0.0094
(8)	16		3A	0.0000	5.3750	5.3656	...	5.3344	5.3298	0.0046	5.3073	5.2892	5.3006	...	0.0090	0.0068	5.3028	5.2944	0.0113	0.0094
	$5\frac{1}{2}$ – 4 or 5.5000 – 4	UNC	2A	0.0036	5.4964	5.4726	...	5.3340	5.3219	0.012119	5.2258	5.1595	5.1987	...	0.0361	0.0271	5.2077	5.1805	0.0451	0.0375

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, *es*	Major Diameter, *d*			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	4		3A	0.0000	5.5000	5.4762	...	5.3376	5.3285	0.0091	5.2294	5.1661	5.2023	...	0.0361	0.0271	5.2113	5.1871	0.0451	0.0375
	5½ – 6 or 5.5000 – 6	UN	2A	0.0032	5.4968	5.4786	...	5.3885	5.3778	0.010709	5.3164	5.2695	5.2983	...	0.0241	0.0180	5.3043	5.2835	0.0301	0.0250
	6		3A	0.0000	5.5000	5.4818	...	5.3917	5.3837	0.0080	5.3196	5.2754	5.3015	...	0.0241	0.0180	5.3075	5.2894	0.0301	0.0250
	5½ – 8 or 5.5000 – 8	UN	2A	0.0030	5.4970	5.4820	...	5.4158	5.4059	0.009916	5.3617	5.3247	5.3482	...	0.0180	0.0135	5.3527	5.3352	0.0226	0.0188
	8		3A	0.0000	5.5000	5.4850	...	5.4188	5.4114	0.0074	5.3647	5.3302	5.3512	...	0.0180	0.0135	5.3557	5.3407	0.0226	0.0188
(8)	5½ – 12 or 5.5000 – 12	UN	2A	0.0020	5.4980	5.4866	...	5.4439	5.4371	0.006809	5.4078	5.3830	5.3988	...	0.0120	0.0090	5.4018	5.3900	0.0150	0.0125
(8)	12		3A	0.0000	5.5000	5.4886	...	5.4459	5.4408	0.0051	5.4098	5.3867	5.4008	...	0.0120	0.0090	5.4038	5.3937	0.0150	0.0125
(8)	5½ – 16 or 5.5000 – 16	UN	2A	0.0018	5.4982	5.4888	...	5.4576	5.4515	0.006135	5.4305	5.4109	5.4238	...	0.0090	0.0068	5.4260	5.4161	0.0113	0.0094
(8)	16		3A	0.0000	5.5000	5.4906	...	5.4594	5.4548	0.0046	5.4323	5.4142	5.4256	...	0.0090	0.0068	5.4278	5.4194	0.0113	0.0094
	5⅝ – 6 or 5.6250 – 6	UN	2A	0.0032	5.6218	5.6036	...	5.5135	5.5027	0.010769	5.4414	5.3944	5.4233	...	0.0241	0.0180	5.4293	5.4084	0.0301	0.0250
	6		3A	0.0000	5.6250	5.6068	...	5.5167	5.5086	0.0081	5.4446	5.4003	5.4265	...	0.0241	0.0180	5.4325	5.4143	0.0301	0.0250
	5⅝ – 4 or 5.6250 – 4	UN	2A	0.0037	5.6213	5.5975	...	5.4589	5.4467	0.012179	5.3507	5.2843	5.3236	...	0.0361	0.0271	5.3326	5.3053	0.0451	0.0375
	4		3A	0.0000	5.6250	5.6012	...	5.4626	5.4535	0.0091	5.3544	5.2911	5.3273	...	0.0361	0.0271	5.3363	5.3121	0.0451	0.0375
	5⅝ – 8 or 5.6250 – 8	UN	2A	0.0030	5.6220	5.6070	...	5.5408	5.5308	0.009976	5.4867	5.4496	5.4732	...	0.0180	0.0135	5.4777	5.4601	0.0226	0.0188
(8)	8		3A	0.0000	5.6250	5.6100	...	5.5438	5.5363	0.0075	5.4897	5.4551	5.4762	...	0.0180	0.0135	5.4807	5.4656	0.0226	0.0188
(8)	5⅝ – 12 or 5.6250 – 12	UN	2A	0.0020	5.6230	5.6116	...	5.5689	5.5621	0.006829	5.5328	5.5080	5.5238	...	0.0120	0.0090	5.5268	5.5150	0.0150	0.0125
(8)	12		3A	0.0000	5.6250	5.6136	...	5.5709	5.5658	0.0051	5.5348	5.5117	5.5258	...	0.0120	0.0090	5.5288	5.5187	0.0150	0.0125
(8)	5⅝ – 16 or 5.6250 – 16	UN	2A	0.0018	5.6232	5.6138	...	5.5826	5.5764	0.006155	5.5555	5.5358	5.5488	...	0.0090	0.0068	5.5510	5.5410	0.0113	0.0094
(8)	16		3A	0.0000	5.6250	5.6156	...	5.5844	5.5798	0.0046	5.5573	5.5392	5.5506	...	0.0090	0.0068	5.5528	5.5444	0.0113	0.0094
	5¾ – 4 or 5.7500 – 4	UNC	2A	0.0037	5.7463	5.7225	...	5.5839	5.5717	0.012237	5.4757	5.4093	5.4486	...	0.0361	0.0271	5.4576	5.4303	0.0451	0.0375
	4		3A	0.0000	5.7500	5.7262	...	5.5876	5.5784	0.0092	5.4794	5.4160	5.4523	...	0.0361	0.0271	5.4613	5.4370	0.0451	0.0375
	5¾ – 6 or 5.7500 – 6	UN	2A	0.0032	5.7468	5.7286	...	5.6385	5.6277	0.010827	5.5664	5.5194	5.5483	...	0.0241	0.0180	5.5543	5.5334	0.0301	0.0250
	6		3A	0.0000	5.7500	5.7318	...	5.6417	5.6336	0.0081	5.5696	5.5253	5.5515	...	0.0241	0.0180	5.5575	5.5393	0.0301	0.0250
(8)	5¾ – 8 or 5.7500 – 8	UN	2A	0.0030	5.7470	5.7320	...	5.6658	5.6558	0.010034	5.6117	5.5746	5.5982	...	0.0180	0.0135	5.6027	5.5851	0.0226	0.0188
	8		3A	0.0000	5.7500	5.7350	...	5.6688	5.6613	0.0075	5.6147	5.5801	5.6012	...	0.0180	0.0135	5.6057	5.5906	0.0226	0.0188
(8)	5¾ – 12 or 5.7500 – 12	UN	2A	0.0021	5.7479	5.7365	...	5.6938	5.6870	0.006848	5.6577	5.6329	5.6487	...	0.0120	0.0090	5.6517	5.6399	0.0150	0.0125

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Allowance, es	Major Diameter, d			Pitch Diameter, d_2, and Functional Diameter [Note (4)]			Minor Diameter, d_1/Root Radius									
											UN		UNR				UNJ			
											Reference Diameter [Notes (6), (7)]		Reference Diameter [Note (6)]		Radius		Diameter		Radius	
					Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance, Td_2 [Note (5)]	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(8)	12		3A	0.0000	5.7500	5.7386	...	5.6959	5.6908	0.0051	5.6598	5.6367	5.6508	...	0.0120	0.0090	5.6538	5.6437	0.0150	0.0125
(8)	$5\frac{3}{4}$– 16 or 5.7500 – 16	UN	2A	0.0019	5.7481	5.7387	...	5.7075	5.7013	0.006174	5.6804	5.6607	5.6737	...	0.0090	0.0068	5.6759	5.6659	0.0113	0.0094
(8)	16		3A	0.0000	5.7500	5.7406	...	5.7094	5.7048	0.0046	5.6823	5.6642	5.6756	...	0.0090	0.0068	5.6778	5.6694	0.0113	0.0094
	$5\frac{7}{8}$ – 4 or 5.8750 – 4	UN	2A	0.0037	5.8713	5.8475	...	5.7089	5.6966	0.012296	5.6007	5.5342	5.5736	...	0.0361	0.0271	5.5826	5.5552	0.0451	0.0375
	4		3A	0.0000	5.8750	5.8512	...	5.7126	5.7034	0.0092	5.6044	5.5410	5.5773	...	0.0361	0.0271	5.5863	5.5620	0.0451	0.0375
	$5\frac{7}{8}$ – 6 or 5.8750 – 6	UN	2A	0.0033	5.8717	5.8535	...	5.7634	5.7525	0.010886	5.6913	5.6442	5.6732	...	0.0241	0.0180	5.6792	5.6582	0.0301	0.0250
	6		3A	0.0000	5.8750	5.8568	...	5.7667	5.7585	0.0082	5.6946	5.6502	5.6765	...	0.0241	0.0180	5.6825	5.6642	0.0301	0.0250
(8)	$5\frac{7}{8}$ – 8 or 5.8750 – 8	UN	2A	0.0030	5.8720	5.8570	...	5.7908	5.7807	0.010093	5.7367	5.6995	5.7232	...	0.0180	0.0135	5.7277	5.7100	0.0226	0.0188
	8		3A	0.0000	5.8750	5.8600	...	5.7938	5.7862	0.0076	5.7397	5.7050	5.7262	...	0.0180	0.0135	5.7307	5.7155	0.0226	0.0188
(8)	$5\frac{7}{8}$ – 12 or 5.8750 – 12	UN	2A	0.0021	5.8729	5.8615	...	5.8188	5.8119	0.006868	5.7827	5.7578	5.7737	...	0.0120	0.0090	5.7767	5.7648	0.0150	0.0125
	12		3A	0.0000	5.8750	5.8636	...	5.8209	5.8157	0.0052	5.7848	5.7616	5.7758	...	0.0120	0.0090	5.7788	5.7686	0.0150	0.0125
	$5\frac{7}{8}$ – 16 or 5.8750 – 16	UN	2A	0.0019	5.8731	5.8637	...	5.8325	5.8263	0.006194	5.8054	5.7857	5.7987	...	0.0090	0.0068	5.8009	5.7909	0.0113	0.0094
(8)	16		3A	0.0000	5.8750	5.8656	...	5.8344	5.8298	0.0046	5.8073	5.7892	5.8006	...	0.0090	0.0068	5.8028	5.7944	0.0113	0.0094
	6 – 4 or 6.0000 – 4	UN	2A	0.0037	5.9963	5.9725	...	5.8339	5.8215	0.012353	5.7257	5.6591	5.6986	...	0.0361	0.0271	5.7076	5.6801	0.0451	0.0375
	4		3A	0.0000	6.0000	5.9762	...	5.8376	5.8283	0.0093	5.7294	5.6659	5.7023	...	0.0361	0.0271	5.7113	5.6869	0.0451	0.0375
	6 – 6 or 6.0000 – 6	UN	2A	0.0033	5.9967	5.9785	...	5.8884	5.8775	0.010943	5.8163	5.7692	5.7982	...	0.0241	0.0180	5.8042	5.7832	0.0301	0.0250
	6		3A	0.0000	6.0000	5.9818	...	5.8917	5.8835	0.0082	5.8196	5.7752	5.8015	...	0.0241	0.0180	5.8075	5.7892	0.0301	0.0250
(8)	6 – 8 or 6.0000 – 8	UN	2A	0.0030	5.9970	5.9820	...	5.9158	5.9057	0.010150	5.8617	5.8245	5.8482	...	0.0180	0.0135	5.8527	5.8350	0.0226	0.0188
(8)	8		3A	0.0000	6.0000	5.9850	...	5.9188	5.9112	0.007600	5.8647	5.8300	5.8512	...	0.0180	0.0135	5.8557	5.8405	0.0226	0.0188
	6 – 12 or 6.0000 – 12	UN	2A	0.0021	5.9979	5.9865	...	5.9438	5.9369	0.006887	5.9077	5.8828	5.8987	...	0.0120	0.0090	5.9017	5.8898	0.0150	0.0125
	12		3A	0.0000	6.0000	5.9886	...	5.9459	5.9407	0.0052	5.9098	5.8866	5.9008	...	0.0120	0.0090	5.9038	5.8936	0.0150	0.0125
	6 – 16 or 6.0000 – 16	UN	2A	0.0019	5.9981	5.9887	...	5.9575	5.9513	0.006213	5.9304	5.9107	5.9237	...	0.0090	0.0068	5.9259	5.9159	0.0113	0.0094
(8)	16		3A	0.0000	6.0000	5.9906	...	5.9594	5.9547	0.0047	5.9323	5.9141	5.9256	...	0.0090	0.0068	5.9278	5.9193	0.0113	0.0094

GENERAL NOTES:

(a) Series designation shown in column 2 indicates the UN thread form; however, the UNR or UNJ thread form may be specified by substituting UNR or UNJ in place of UN in all designations.

(b) Thread classes may be combined. See para. 4.1.

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Table 2A Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) (Cont'd)

NOTES:

(1) There is no Class 1A for the UNJ thread series.

(2) For Class 2A threads having an additive finish, the maximum major, d max., and pitch, d_2 max., diameters after coating may equal the basic sizes whose values are the same as maximum values shown for Class 3A in these columns. See para. 4.1.2.

(3) The minimum shown is for unfinished hot material, not including standard fasteners with rolled threads.

(4) See para. 5.2.1 for functional diameter.

(5) The 2A pitch diameter tolerance, Td_2, is used as a six-place decimal to calculate the Class 1A/1B, 2B and 3A/3B tolerances; Class 1A/2A allowances; and all other dimensional limits that depend on them. The tolerance is rounded to four places when use for calculating the 2A minimum pitch diameter.

(6) These values are for reference only. The minimum minor diameter, d_1 min., is not normally specified. See para. 5.4 and paras. 8.3.1(e) and 8.3.1(f).

(7) UN threads are allowed to have a rounded root contour but there is no root radius required. See para 2.3.1.

(8) One or more of the numbers listed in this row have been changed to correct for calculation and rounding errors. The original numbers from past issues of this Standard are listed in Nonmandatory Appendix E and are for reference only.

(9) Formerly NF; tolerances and allowances are based on 1 diameter length of engagement.

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	0 – 80 or 0.0600 – 80	UNF	2B	0.0600	...	0.0519	0.0542	0.0023	0.0465	0.0514	...	...	0.0478	0.0510
	80		3B	0.0600	...	0.0519	0.0536	0.0017	0.0465	0.0514	...	...	0.0478	0.0510
(6)	1 – 64 or 0.0730 – 64	UNC	2B	0.0730	...	0.0629	0.0655	0.0026	0.0561	0.0623	...	...	0.0578	0.0619
(6)	64		3B	0.0730	...	0.0629	0.0648	0.0019	0.0561	0.0623	...	...	0.0578	0.0619
(6)	1 – 72 or 0.0730 – 72	UNF	2B	0.0730	...	0.0640	0.0665	0.0025	0.0580	0.0635	...	...	0.0595	0.0631
(6)	72		3B	0.0730	...	0.0640	0.0659	0.0019	0.0580	0.0635	...	...	0.0595	0.0631
	2 – 56 or 0.0860 – 56	UNC	2B	0.0860	...	0.0744	0.0772	0.0028	0.0667	0.0737	...	...	0.0686	0.0732
	56		3B	0.0860	...	0.0744	0.0765	0.0021	0.0667	0.0737	...	...	0.0686	0.0732
(6)	2 – 64 or 0.0860 – 64	UNF	2B	0.0860	...	0.0759	0.0786	0.0027	0.0691	0.0753	...	...	0.0708	0.0749
(6)	64		3B	0.0860	...	0.0759	0.0779	0.0020	0.0691	0.0753	...	...	0.0708	0.0749
	3 – 48 or 0.0990 – 48	UNC	2B	0.0990	...	0.0855	0.0885	0.0030	0.0764	0.0845	...	...	0.0787	0.0841
	48		3B	0.0990	...	0.0855	0.0877	0.0022	0.0764	0.0845	...	...	0.0787	0.0841
	3 – 56 or 0.0990 – 56	UNF	2B	0.0990	...	0.0874	0.0902	0.0028	0.0797	0.0865	...	...	0.0816	0.0862
	56		3B	0.0990	...	0.0874	0.0895	0.0021	0.0797	0.0865	...	...	0.0816	0.0862
	4 – 40 or 0.1120 – 40	UNC	2B	0.1120	...	0.0958	0.0991	0.0033	0.0849	0.0939	...	...	0.0876	0.0941
	40		3B	0.1120	...	0.0958	0.0982	0.0024	0.0849	0.0939	...	...	0.0876	0.0941
	4 – 48 or 0.1120 – 48	UNF	2B	0.1120	...	0.0985	0.1016	0.0031	0.0894	0.0968	...	...	0.0917	0.0971
	48		3B	0.1120	...	0.0985	0.1008	0.0023	0.0894	0.0968	...	...	0.0917	0.0971
	5 – 40 or 0.1250 – 40	UNC	2B	0.1250	...	0.1088	0.1121	0.0033	0.0979	0.1062	...	...	0.1006	0.1071
	40		3B	0.1250	...	0.1088	0.1113	0.0025	0.0979	0.1062	...	...	0.1006	0.1071
	5 – 44 or 0.1250 – 44	UNF	2B	0.1250	...	0.1102	0.1134	0.0032	0.1004	0.1079	...	...	0.1029	0.1088
	44		3B	0.1250	...	0.1102	0.1126	0.0024	0.1004	0.1079	...	...	0.1029	0.1088
	6 – 32 or 0.1380 – 32	UNC	2B	0.1380	...	0.1177	0.1214	0.0037	0.104	0.114	...	...	0.108	0.116
(6)	32		3B	0.1380	...	0.1177	0.1204	0.0027	0.1040	0.1140	...	...	0.1076	0.1157

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	6 – 40 or 0.1380 – 40	UNF	2B	0.1380	...	0.1218	0.1252	0.0034	0.111	0.119	...	...	0.114	0.120
	40		3B	0.1380	...	0.1218	0.1243	0.0025	0.1110	0.1186	...	...	0.1136	0.1201
	8 – 32 or 0.1640 – 32	UNC	2B	0.1640	...	0.1437	0.1475	0.0038	0.130	0.139	...	...	0.134	0.142
(6)	32		3B	0.1640	...	0.1437	0.1465	0.0028	0.1300	0.1389	...	...	0.1336	0.1417
	8 – 36 or 0.1640 – 36	UNF	2B	0.1640	...	0.1460	0.1496	0.0036	0.134	0.142	...	...	0.137	0.144
	36		3B	0.1640	...	0.1460	0.1487	0.0027	0.1340	0.1416	...	...	0.1369	0.1441
(6)	10 – 24 or 0.1900 – 24	UNC	2B	0.1900	...	0.1629	0.1672	0.0043	0.145	0.155	...	...	0.149	0.160
	24		3B	0.1900	...	0.1629	0.1661	0.0032	0.1450	0.1555	...	...	0.1494	0.1600
	10 – 32 or 0.1900 – 32	UNF	2B	0.1900	...	0.1697	0.1736	0.0039	0.156	0.164	...	...	0.160	0.167
	32		3B	0.1900	...	0.1697	0.1726	0.0029	0.1560	0.1641	...	...	0.1596	0.1675
	12 – 24 or 0.2160 – 24	UNC	2B	0.2160	...	0.1889	0.1933	0.0044	0.171	0.181	...	...	0.175	0.185
	24		3B	0.2160	...	0.1889	0.1922	0.0033	0.1710	0.1807	...	...	0.1754	0.1852
	12 – 28 or 0.2160 – 28	UNF	2B	0.2160	...	0.1928	0.1970	0.0042	0.177	0.186	...	...	0.181	0.190
	28		3B	0.2160	...	0.1928	0.1959	0.0031	0.1770	0.1857	...	...	0.1812	0.1896
(6)	12 – 32 or 0.2160 – 32	UNEF	2B	0.2160	...	0.1957	0.1998	0.0041	0.182	0.190	...	...	0.186	0.193
	32		3B	0.2160	...	0.1957	0.1988	0.0031	0.1820	0.1895	...	...	0.1856	0.1929
	¼ – 20 or 0.2500 – 20	UNC	1B	0.2500	...	0.2175	0.2248	0.0073	0.196	0.207	...	...	...	...
	20		2B	0.2500	...	0.2175	0.2224	0.0049	0.196	0.207	...	...	0.201	0.212
	20		3B	0.2500	...	0.2175	0.2211	0.0036	0.1960	0.2067	...	...	0.2013	0.2121
	¼ – 28 or 0.2500 – 28	UNF	1B	0.2500	...	0.2268	0.2333	0.0065	0.211	0.220	...	...	...	...
	28		2B	0.2500	...	0.2268	0.2311	0.0043	0.211	0.220	...	...	0.215	0.223
	28		3B	0.2500	...	0.2268	0.2300	0.0032	0.2110	0.2190	...	...	0.2152	0.2229
	¼ – 32 or 0.2500 – 32	UNEF	2B	0.2500	...	0.2297	0.2339	0.0042	0.216	0.224	...	...	0.220	0.226
	32		3B	0.2500	...	0.2297	0.2328	0.0031	0.2160	0.2229	...	...	0.2196	0.2263

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$\frac{5}{16}$ – 18 or 0.3125 – 18	UNC	1B	0.3125	...	0.2764	0.2843	0.0079	0.252	0.265	...	...	...	...
	18		2B	0.3125	...	0.2764	0.2817	0.0053	0.252	0.265	...	...	0.258	0.269
	18		3B	0.3125	...	0.2764	0.2803	0.0039	0.2520	0.2630	...	...	0.2584	0.2690
(6)	$\frac{5}{16}$ – 20 or 0.3125 – 20	UN	2B	0.3125	...	0.2800	0.2853	0.0053	0.258	0.270	...	...	0.264	0.273
(6)	20		3B	0.3125	...	0.2800	0.2840	0.0040	0.2580	0.2680	...	...	0.2638	0.2734
	$\frac{5}{16}$ – 24 or 0.3125 – 24	UNF	1B	0.3125	...	0.2854	0.2925	0.0071	0.267	0.277	...	...	...	...
	24		2B	0.3125	...	0.2854	0.2902	0.0048	0.267	0.277	...	...	0.272	0.280
	24		3B	0.3125	...	0.2854	0.2890	0.0036	0.2670	0.2754	...	...	0.2719	0.2799
(6)	$\frac{5}{16}$ – 28 or 0.3125 – 28	UN	2B	0.3125	...	0.2893	0.2938	0.0045	0.274	0.282	...	...	0.278	0.285
(6)	28		3B	0.3125	...	0.2893	0.2927	0.0034	0.2740	0.2807	...	...	0.2777	0.2846
(6)	$\frac{5}{16}$ – 32 or 0.3125 – 32	UNEF	2B	0.3125	...	0.2922	0.2965	0.0043	0.279	0.286	...	...	0.282	0.288
(6)	32		3B	0.3125	...	0.2922	0.2954	0.0032	0.2790	0.2847	...	...	0.2821	0.2881
	$\frac{3}{8}$ – 16 or 0.3750 – 16	UNC	1B	0.3750	...	0.3344	0.3429	0.0085	0.307	0.321	...	...	...	...
	16		2B	0.3750	...	0.3344	0.3401	0.0057	0.307	0.321	...	...	0.314	0.325
	16		3B	0.3750	...	0.3344	0.3387	0.0043	0.3070	0.3182	...	...	0.3141	0.3250
	$\frac{3}{8}$ – 20 or 0.3750 – 20	UN	2B	0.3750	...	0.3425	0.3479	0.0054	0.321	0.332	...	...	0.326	0.335
	20		3B	0.3750	...	0.3425	0.3465	0.0040	0.3210	0.3297	...	...	0.3263	0.3351
	$\frac{3}{8}$ – 24 or 0.3750 – 24	UNF	1B	0.3750	...	0.3479	0.3553	0.0074	0.330	0.340	...	...	...	...
	24		2B	0.3750	...	0.3479	0.3528	0.0049	0.330	0.340	...	...	0.334	0.342
	24		3B	0.3750	...	0.3479	0.3516	0.0037	0.3300	0.3372	...	...	0.3344	0.3417
	$\frac{3}{8}$ – 28 or 0.3750 – 28	UN	2B	0.3750	...	0.3518	0.3564	0.0046	0.336	0.345	...	...	0.340	0.347
	28		3B	0.3750	...	0.3518	0.3553	0.0035	0.3360	0.3426	...	...	0.3402	0.3465
	$\frac{3}{8}$ – 32 or 0.3750 – 32	UNEF	2B	0.3750	...	0.3547	0.3591	0.0044	0.341	0.349	...	...	0.345	0.350
	32		3B	0.3750	...	0.3547	0.3580	0.0033	0.3410	0.3469	...	...	0.3446	0.3501

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$^{7}/_{16}$ – 14 or 0.4375 – 14	UNC	1B	0.4375	...	0.3911	0.4003	0.0092	0.360	0.376	...	...	...	...
	14		2B	0.4375	...	0.3911	0.3972	0.0061	0.360	0.376	...	...	0.368	0.379
	14		3B	0.4375	...	0.3911	0.3957	0.0046	0.3600	0.3717	...	...	0.3679	0.3794
(6)	$^{7}/_{16}$ – 16 or 0.4375 – 16	UN	2B	0.4375	...	0.3969	0.4029	0.0060	0.370	0.384	...	...	0.377	0.387
(6)	16		3B	0.4375	...	0.3969	0.4014	0.0045	0.3700	0.3800	...	...	0.3766	0.3868
(6)	$^{7}/_{16}$ – 20 or 0.4375 – 20	UNF	1B	0.4375	...	0.4050	0.4131	0.0081	0.383	0.395	...	...	...	...
	20		2B	0.4375	...	0.4050	0.4104	0.0054	0.383	0.395	...	...	0.389	0.397
	20		3B	0.4375	...	0.4050	0.4091	0.0041	0.3830	0.3916	...	...	0.3888	0.3970
(6)	$^{7}/_{16}$ – 28 or 0.4375 – 28	UNEF	2B	0.4375	...	0.4143	0.4190	0.0047	0.399	0.407	...	...	0.403	0.409
	28		3B	0.4375	...	0.4143	0.4178	0.0035	0.3990	0.4051	...	...	0.4027	0.4086
(6)	$^{7}/_{16}$ – 32 or 0.4375 – 32	UN	2B	0.4375	...	0.4172	0.4216	0.0044	0.404	0.411	...	...	0.407	0.412
	32		3B	0.4375	...	0.4172	0.4205	0.0033	0.4040	0.4094	...	...	0.4071	0.4122
	$^{1}/_{2}$ – 13 or 0.5000 – 13	UNC	1B	0.5000	...	0.4500	0.4597	0.0097	0.417	0.434	...	...	...	...
	13		2B	0.5000	...	0.4500	0.4565	0.0065	0.417	0.434	...	...	0.425	0.437
	13		3B	0.5000	...	0.4500	0.4548	0.0048	0.4170	0.4284	...	...	0.4251	0.4368
	$^{1}/_{2}$ – 16 or 0.5000 – 16	UN	2B	0.5000	...	0.4594	0.4655	0.0061	0.432	0.446	...	...	0.439	0.449
(6)	16		3B	0.5000	...	0.4594	0.4640	0.0046	0.4320	0.4419	...	...	0.4391	0.4487
	$^{1}/_{2}$ – 20 or 0.5000 – 20	UNF	1B	0.5000	...	0.4675	0.4759	0.0084	0.446	0.457	...	...	...	...
	20		2B	0.5000	...	0.4675	0.4731	0.0056	0.446	0.457	...	...	0.451	0.459
	20		3B	0.5000	...	0.4675	0.4717	0.0042	0.4460	0.4537	...	...	0.4513	0.4591
	$^{1}/_{2}$ – 28 or 0.5000 – 28	UNEF	2B	0.5000	...	0.4768	0.4816	0.0048	0.461	0.470	...	...	0.465	0.471
	28		3B	0.5000	...	0.4768	0.4804	0.0036	0.4610	0.4676	...	...	0.4652	0.4708
	$^{1}/_{2}$ – 32 or 0.5000 – 32	UN	2B	0.5000	...	0.4797	0.4842	0.0045	0.466	0.474	...	...	0.470	0.474
	32		3B	0.5000	...	0.4797	0.4831	0.0034	0.4660	0.4719	...	...	0.4696	0.4744

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$^{9}/_{16}$ – 12 or 0.5625 – 12	UNC	1B	0.5625	...	0.5084	0.5186	0.0102	0.472	0.490	...	...	...	...
	12		2B	0.5625	...	0.5084	0.5152	0.0068	0.472	0.490	...	...	0.481	0.491
	12		3B	0.5625	...	0.5084	0.5135	0.0051	0.4720	0.4843	...	...	0.4813	0.4913
	$^{9}/_{16}$ – 16 or 0.5625 – 16	UN	2B	0.5625	...	0.5219	0.5280	0.0061	0.495	0.509	...	...	0.502	0.511
(6)	16		3B	0.5625	...	0.5219	0.5265	0.0046	0.4950	0.5040	...	...	0.5016	0.5108
	$^{9}/_{16}$ – 18 or 0.5625 – 18	UNF	1B	0.5625	...	0.5264	0.5353	0.0089	0.502	0.515	...	...	...	...
	18		2B	0.5625	...	0.5264	0.5323	0.0059	0.502	0.515	...	...	0.508	0.517
	18		3B	0.5625	...	0.5264	0.5308	0.0044	0.5020	0.5106	...	...	0.5084	0.5166
(6)	$^{9}/_{16}$ – 20 or 0.5625 – 20	UN	2B	0.5625	...	0.5300	0.5356	0.0056	0.508	0.520	...	...	0.514	0.521
(6)	20		3B	0.5625	...	0.5300	0.5342	0.0042	0.5080	0.5162	...	...	0.5138	0.5213
(6)	$^{9}/_{16}$ – 24 or 0.5625 – 24	UNEF	2B	0.5625	...	0.5354	0.5405	0.0051	0.517	0.527	...	...	0.522	0.528
(6)	24		3B	0.5625	...	0.5354	0.5393	0.0039	0.5170	0.5244	...	...	0.5219	0.5281
	$^{9}/_{16}$ – 28 or 0.5625 – 28	UN	2B	0.5625	...	0.5393	0.5441	0.0048	0.524	0.532	...	...	0.528	0.533
	28		3B	0.5625	...	0.5393	0.5429	0.0036	0.5240	0.5301	...	...	0.5277	0.5330
(6)	$^{9}/_{16}$ – 32 or 0.5625 – 32	UN	2B	0.5625	...	0.5422	0.5468	0.0046	0.529	0.536	...	...	0.532	0.537
	32		3B	0.5625	...	0.5422	0.5456	0.0034	0.5290	0.5344	...	...	0.5321	0.5367
(6)	$^{5}/_{8}$ – 11 or 0.6250 – 11	UNC	1B	0.6250	...	0.5660	0.5767	0.0107	0.527	0.546	...	...	...	...
(6)	11		2B	0.6250	...	0.5660	0.5732	0.0072	0.527	0.546	...	...	0.536	0.547
	11		3B	0.6250	...	0.5660	0.5714	0.0054	0.5270	0.5391	...	...	0.5364	0.5473
	$^{5}/_{8}$ – 12 or 0.6250 – 12	UN	2B	0.6250	...	0.5709	0.5780	0.0071	0.535	0.553	...	...	0.544	0.554
	12		3B	0.6250	...	0.5709	0.5762	0.0053	0.5350	0.5463	...	...	0.5438	0.5538
	$^{5}/_{8}$ – 16 or 0.6250 – 16	UN	2B	0.6250	...	0.5844	0.5906	0.0062	0.557	0.571	...	...	0.564	0.573
	16		3B	0.6250	...	0.5844	0.5890	0.0046	0.5570	0.5662	...	...	0.5641	0.5730

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$^5/_8$ – 18 or 0.6250 – 18	UNF	1B	0.6250	...	0.5889	0.5980	0.0091	0.565	0.578	...	...	...	...
	18		2B	0.6250	...	0.5889	0.5949	0.0060	0.565	0.578	...	...	0.571	0.579
	18		3B	0.6250	...	0.5889	0.5934	0.0045	0.5650	0.5730	...	...	0.5709	0.5788
	$^5/_8$ – 20 or 0.6250 – 20	UN	2B	0.6250	...	0.5925	0.5981	0.0056	0.571	0.582	...	...	0.576	0.583
	20		3B	0.6250	...	0.5925	0.5967	0.0042	0.5710	0.5787	...	...	0.5763	0.5835
	$^5/_8$ – 24 or 0.6250 – 24	UNEF	2B	0.6250	...	0.5979	0.6031	0.0052	0.580	0.590	...	...	0.584	0.590
	24		3B	0.6250	...	0.5979	0.6018	0.0039	0.5800	0.5869	...	...	0.5844	0.5904
	$^5/_8$ – 28 or 0.6250 – 28	UN	2B	0.6250	...	0.6018	0.6067	0.0049	0.586	0.595	...	...	0.590	0.595
	28		3B	0.6250	...	0.6018	0.6055	0.0037	0.5860	0.5926	...	...	0.5902	0.5953
	$^5/_8$ – 32 or 0.6250 – 32	UN	2B	0.6250	...	0.6047	0.6093	0.0046	0.591	0.599	...	...	0.595	0.599
	32		3B	0.6250	...	0.6047	0.6082	0.0035	0.5910	0.5969	...	...	0.5946	0.5991
(6)	$^{11}/_{16}$ – 12 or 0.6875 – 12	UN	2B	0.6875	...	0.6334	0.6405	0.0071	0.597	0.615	...	...	0.606	0.616
	12		3B	0.6875	...	0.6334	0.6387	0.0053	0.5970	0.6085	...	...	0.6063	0.6163
(6)	$^{11}/_{16}$ – 16 or 0.6875 – 16	UN	2B	0.6875	...	0.6469	0.6532	0.0063	0.620	0.634	...	...	0.627	0.635
	16		3B	0.6875	...	0.6469	0.6516	0.0047	0.6200	0.6284	...	...	0.6266	0.6352
(6)	$^{11}/_{16}$ – 20 or 0.6875 – 20	UN	2B	0.6875	...	0.6550	0.6607	0.0057	0.633	0.645	...	...	0.639	0.646
(6)	20		3B	0.6875	...	0.6550	0.6593	0.0043	0.6330	0.6412	...	...	0.6388	0.6458
(6)	$^{11}/_{16}$ – 24 or 0.6875 – 24	UNEF	2B	0.6875	...	0.6604	0.6657	0.0053	0.642	0.652	...	...	0.647	0.653
	24		3B	0.6875	...	0.6604	0.6643	0.0039	0.6420	0.6494	...	...	0.6469	0.6527
	$^{11}/_{16}$ – 28 or 0.6875 – 28	UN	2B	0.6875	...	0.6643	0.6692	0.0049	0.649	0.657	...	...	0.653	0.658
(6)	28		3B	0.6875	...	0.6643	0.6680	0.0037	0.6490	0.6551	...	...	0.6527	0.6577
(6)	$^{11}/_{16}$ – 32 or 0.6875 – 32	UN	2B	0.6875	...	0.6672	0.6719	0.0047	0.654	0.661	...	...	0.657	0.661
	32		3B	0.6875	...	0.6672	0.6707	0.0035	0.6540	0.6594	...	...	0.6571	0.6614

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$^{3}/_{4}$ – 10 or 0.7500 – 10	UNC	1B	0.7500	...	0.6850	0.6965	0.0115	0.642	0.663	...	...	...	...
	10		2B	0.7500	...	0.6850	0.6927	0.0077	0.642	0.663	...	...	0.653	0.665
	10		3B	0.7500	...	0.6850	0.6907	0.0057	0.6420	0.6545	...	...	0.6526	0.6646
	$^{3}/_{4}$ – 12 or 0.7500 – 12	UN	2B	0.7500	...	0.6959	0.7031	0.0072	0.660	0.678	...	...	0.669	0.679
	12		3B	0.7500	...	0.6959	0.7013	0.0054	0.6600	0.6707	...	...	0.6688	0.6788
	$^{3}/_{4}$ – 16 or 0.7500 – 16	UNF	1B	0.7500	...	0.7094	0.7192	0.0098	0.682	0.696	...	...	...	...
	16		2B	0.7500	...	0.7094	0.7159	0.0065	0.682	0.696	...	...	0.689	0.698
(6)	16		3B	0.7500	...	0.7094	0.7143	0.0049	0.6820	0.6908	...	...	0.6891	0.6976
	$^{3}/_{4}$ – 20 or 0.7500 – 20	UNEF	2B	0.7500	...	0.7175	0.7232	0.0057	0.696	0.707	...	...	0.701	0.708
	20		3B	0.7500	...	0.7175	0.7218	0.0043	0.6960	0.7037	...	...	0.7013	0.7081
	$^{3}/_{4}$ – 28 or 0.7500 – 28	UN	2B	0.7500	...	0.7268	0.7318	0.0050	0.711	0.720	...	...	0.715	0.720
(6)	28		3B	0.7500	...	0.7268	0.7305	0.0037	0.7110	0.7176	...	...	0.7152	0.7201
	$^{3}/_{4}$ – 32 or 0.7500 – 32	UN	2B	0.7500	...	0.7297	0.7344	0.0047	0.716	0.724	...	...	0.720	0.724
	32		3B	0.7500	...	0.7297	0.7333	0.0036	0.7160	0.7219	...	...	0.7196	0.7238
(6)	$^{13}/_{16}$ – 12 or 0.8125 – 12	UN	2B	0.8125	...	0.7584	0.7656	0.0072	0.722	0.740	...	...	0.731	0.741
(6)	12		3B	0.8125	...	0.7584	0.7638	0.0054	0.7220	0.7329	...	...	0.7313	0.7413
(6)	$^{13}/_{16}$ – 16 or 0.8125 – 16	UN	2B	0.8125	...	0.7719	0.7783	0.0064	0.745	0.759	...	...	0.752	0.760
(6)	16		3B	0.8125	...	0.7719	0.7767	0.0048	0.7450	0.7533	...	...	0.7516	0.7601
(6)	$^{13}/_{16}$ – 20 or 0.8125 – 20	UNEF	2B	0.8125	...	0.7800	0.7858	0.0058	0.758	0.770	...	...	0.764	0.771
(6)	20		3B	0.8125	...	0.7800	0.7843	0.0043	0.7580	0.7662	...	...	0.7638	0.7706
(6)	$^{13}/_{16}$ – 28 or 0.8125 – 28	UN	2B	0.8125	...	0.7893	0.7943	0.0050	0.774	0.782	...	...	0.778	0.783
(6)	28		3B	0.8125	...	0.7893	0.7931	0.0038	0.7740	0.7801	...	...	0.7777	0.7825
(6)	$^{13}/_{16}$ – 32 or 0.8125 – 32	UN	2B	0.8125	...	0.7922	0.7970	0.0048	0.779	0.786	...	...	0.782	0.786
(6)	32		3B	0.8125	...	0.7922	0.7958	0.0036	0.7790	0.7844	...	...	0.7821	0.7863

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$\frac{7}{8}$ – 9 or 0.8750 – 9	UNC	1B	0.8750	...	0.8028	0.8151	0.0123	0.755	0.778	...	...	...	...
	9		2B	0.8750	...	0.8028	0.8110	0.0082	0.755	0.778	...	...	0.767	0.780
	9		3B	0.8750	...	0.8028	0.8089	0.0061	0.7550	0.7681	...	...	0.7667	0.7800
(6)	$\frac{7}{8}$ – 12 or 0.8750 – 12	UN	2B	0.8750	...	0.8209	0.8282	0.0073	0.785	0.803	...	...	0.794	0.804
(6)	12		3B	0.8750	...	0.8209	0.8264	0.0055	0.7850	0.7952	...	...	0.7938	0.8038
(6)	$\frac{7}{8}$ – 14 or 0.8750 – 14	UNF	1B	0.8750	...	0.8286	0.8392	0.0106	0.798	0.813	...	...	...	...
(6)	14		2B	0.8750	...	0.8286	0.8356	0.0070	0.798	0.813	...	...	0.805	0.815
(6)	14		3B	0.8750	...	0.8286	0.8339	0.0053	0.7980	0.8068	...	...	0.8054	0.8151
(6)	$\frac{7}{8}$ – 16 or 0.8750 – 16	UN	2B	0.8750	...	0.8344	0.8408	0.0064	0.807	0.821	...	...	0.814	0.823
(6)	16		3B	0.8750	...	0.8344	0.8392	0.0048	0.8070	0.8158	...	...	0.8141	0.8226
(6)	$\frac{7}{8}$ – 20 or 0.8750 – 20	UNEF	2B	0.8750	...	0.8425	0.8483	0.0058	0.821	0.832	...	...	0.826	0.833
(6)	20		3B	0.8750	...	0.8425	0.8469	0.0044	0.8210	0.8287	...	...	0.8263	0.8331
(6)	$\frac{7}{8}$ – 28 or 0.8750 – 28	UN	2B	0.8750	...	0.8518	0.8569	0.0051	0.836	0.845	...	...	0.840	0.845
(6)	28		3B	0.8750	...	0.8518	0.8556	0.0038	0.8360	0.8426	...	...	0.8402	0.8450
(6)	$\frac{7}{8}$ – 32 or 0.8750 – 32	UN	2B	0.8750	...	0.8547	0.8595	0.0048	0.841	0.849	...	...	0.845	0.849
(6)	32		3B	0.8750	...	0.8547	0.8583	0.0036	0.8410	0.8469	...	...	0.8446	0.8488
(6)	$\frac{15}{16}$ – 12 or 0.9375 – 12	UN	2B	0.9375	...	0.8834	0.8907	0.0073	0.847	0.865	...	...	0.856	0.866
(6)	12		3B	0.9375	...	0.8834	0.8889	0.0055	0.8470	0.8575	...	...	0.8563	0.8663
(6)	$\frac{15}{16}$ – 16 or 0.9375 – 16	UN	2B	0.9375	...	0.8969	0.9033	0.0064	0.870	0.884	...	...	0.877	0.885
(6)	16		3B	0.9375	...	0.8969	0.9017	0.0048	0.8700	0.8783	...	...	0.8766	0.8851
	$\frac{15}{16}$ – 20 or 0.9375 – 20	UNEF	2B	0.9375	...	0.9050	0.9109	0.0059	0.883	0.895	...	...	0.889	0.896
(6)	20		3B	0.9375	...	0.9050	0.9094	0.0044	0.8830	0.8912	...	...	0.8888	0.8956
(6)	$\frac{15}{16}$ – 28 or 0.9375 – 28	UN	2B	0.9375	...	0.9143	0.9194	0.0051	0.899	0.907	...	...	0.903	0.908
(6)	28		3B	0.9375	...	0.9143	0.9181	0.0038	0.8990	0.9051	...	...	0.9027	0.9075

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$^{15}/_{16}$ – 32 or 0.9375 – 32	UN	2B	0.9375	...	0.9172	0.9221	0.0049	0.904	0.911	...	...	0.907	0.911
	32		3B	0.9375	...	0.9172	0.9209	0.0037	0.9040	0.9094	...	...	0.9071	0.9113
	1 – 8 or 1.0000 – 8	UNC	1B	1.0000	...	0.9188	0.9320	0.0132	0.865	0.890	...	...	...	...
	8		2B	1.0000	...	0.9188	0.9276	0.0088	0.865	0.890	...	...	0.878	0.893
	8		3B	1.0000	...	0.9188	0.9254	0.0066	0.8650	0.8797	...	...	0.8782	0.8932
	1 – 12 or 1.0000 – 12	UNF	1B	1.0000	...	0.9459	0.9573	0.0114	0.910	0.928	...	...	...	...
	12		2B	1.0000	...	0.9459	0.9535	0.0076	0.910	0.928	...	...	0.919	0.929
	12		3B	1.0000	...	0.9459	0.9516	0.0057	0.9100	0.9198	...	...	0.9188	0.9288
(6), (7)	1 – 14 or 1.0000 – 14	UNS	2B	1.0000	...	0.9536	0.9605	0.0069	0.923	0.938	...	...	0.930	0.940
(6)	14		3B	1.0000	...	0.9536	0.9588	0.0052	0.9230	0.9315	...	...	0.9304	0.9401
	1 – 16 or 1.0000 – 16	UN	2B	1.0000	...	0.9594	0.9659	0.0065	0.932	0.946	...	...	0.939	0.948
	16		3B	1.0000	...	0.9594	0.9643	0.0049	0.9320	0.9408	...	...	0.9391	0.9476
	1 – 20 or 1.0000 – 20	UNEF	2B	1.0000	...	0.9675	0.9734	0.0059	0.946	0.957	...	...	0.951	0.958
	20		3B	1.0000	...	0.9675	0.9719	0.0044	0.9460	0.9537	...	...	0.9513	0.9581
	1 – 28 or 1.0000 – 28	UN	2B	1.0000	...	0.9768	0.9820	0.0052	0.961	0.970	...	...	0.965	0.970
	28		3B	1.0000	...	0.9768	0.9807	0.0039	0.9610	0.9676	...	...	0.9652	0.9700
	1 – 32 or 1.0000 – 32	UN	2B	1.0000	...	0.9797	0.9846	0.0049	0.966	0.974	...	...	0.970	0.974
	32		3B	1.0000	...	0.9797	0.9834	0.0037	0.9660	0.9719	...	...	0.9696	0.9738
	$1^{1}/_{16}$ – 8 or 1.0625 – 8	UN	2B	1.0625	...	0.9813	0.9902	0.0089	0.927	0.952	...	...	0.941	0.956
	8		3B	1.0625	...	0.9813	0.9880	0.0067	0.9270	0.9422	...	...	0.9407	0.9557
	$1^{1}/_{16}$ – 12 or 1.0625 – 12	UN	2B	1.0625	...	1.0084	1.0158	0.0074	0.972	0.990	...	...	0.981	0.991
(6)	12		3B	1.0625	...	1.0084	1.0139	0.0055	0.9720	0.9823	...	...	0.9813	0.9913
	$1^{1}/_{16}$ – 16 or 1.0625 – 16	UN	2B	1.0625	...	1.0219	1.0284	0.0065	0.995	1.009	...	...	1.002	1.010
(6)	16		3B	1.0625	...	1.0219	1.0268	0.0049	0.9950	1.0033	...	...	1.0016	1.0101
(6)	$1^{1}/_{16}$ – 18 or 1.0625 – 18	UNEF	2B	1.0625	...	1.0264	1.0326	0.0062	1.002	1.015	...	...	1.008	1.016

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	18		3B	1.0625	...	1.0264	1.0311	0.0047	1.0020	1.0105	...	...	1.0084	1.0159
(6)	$1\frac{1}{16}$ – 20 or 1.0625 – 20	UN	2B	1.0625	...	1.0300	1.0359	0.0059	1.008	1.020	...	...	1.014	1.021
(6)	20		3B	1.0625	...	1.0300	1.0345	0.0045	1.0080	1.0162	...	...	1.0138	1.0206
	$1\frac{1}{16}$ – 28 or 1.0625 – 28	UN	2B	1.0625	...	1.0393	1.0445	0.0052	1.024	1.032	...	...	1.028	1.033
	28		3B	1.0625	...	1.0393	1.0432	0.0039	1.0240	1.0301	...	...	1.0277	1.0325
	$1\frac{1}{8}$ – 7 or 1.1250 – 7	UNC	1B	1.1250	...	1.0322	1.0463	0.0141	0.970	0.998	...	...	...	...
(6)	7		2B	1.1250	...	1.0322	1.0416	0.0094	0.970	0.998	...	...	0.986	1.003
	7		3B	1.1250	...	1.0322	1.0393	0.0071	0.9700	0.9875	...	...	0.9858	1.0029
	$1\frac{1}{8}$ – 8 or 1.1250 – 8	UN	2B	1.1250	...	1.0438	1.0528	0.0090	0.990	1.015	...	...	1.003	1.018
	8		3B	1.1250	...	1.0438	1.0505	0.0067	0.9900	1.0047	...	...	1.0032	1.0182
	$1\frac{1}{8}$ – 12 or 1.1250 – 12	UNF	1B	1.1250	...	1.0709	1.0826	0.0117	1.035	1.053	...	...	...	...
	12		2B	1.1250	...	1.0709	1.0787	0.0078	1.035	1.053	...	...	1.044	1.054
	12		3B	1.1250	...	1.0709	1.0768	0.0059	1.0350	1.0448	...	...	1.0438	1.0538
(6)	$1\frac{1}{8}$ – 16 or 1.1250 – 16	UN	2B	1.1250	...	1.0844	1.0910	0.0066	1.057	1.071	...	...	1.064	1.073
(6)	16		3B	1.1250	...	1.0844	1.0893	0.0049	1.0570	1.0658	...	...	1.0641	1.0726
	$1\frac{1}{8}$ – 18 or 1.1250 – 18	UNEF	2B	1.1250	...	1.0889	1.0951	0.0062	1.065	1.078	...	...	1.071	1.078
(6)	18		3B	1.1250	...	1.0889	1.0936	0.0047	1.0650	1.0730	...	...	1.0709	1.0784
(6)	$1\frac{1}{8}$ – 20 or 1.1250 – 20	UN	2B	1.1250	...	1.0925	1.0985	0.0060	1.071	1.082	...	...	1.076	1.083
(6)	20		3B	1.1250	...	1.0925	1.0970	0.0045	1.0710	1.0787	...	...	1.0763	1.0831
	$1\frac{1}{8}$ – 28 or 1.1250 – 28	UN	2B	1.1250	...	1.1018	1.1070	0.0052	1.086	1.095	...	...	1.090	1.095
	28		3B	1.1250	...	1.1018	1.1057	0.0039	1.0860	1.0926	...	...	1.0902	1.0950
	$1\frac{3}{16}$ – 8 or 1.1875 – 8	UN	2B	1.1875	...	1.1063	1.1154	0.0091	1.052	1.077	...	...	1.066	1.081
	8		3B	1.1875	...	1.1063	1.1131	0.0068	1.0520	1.0672	...	...	1.0657	1.0807
(6)	$1\frac{3}{16}$ – 12 or 1.1875 – 12	UN	2B	1.1875	...	1.1334	1.1409	0.0075	1.097	1.115	...	...	1.106	1.116

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	12		3B	1.1875	...	1.1334	1.1390	0.0056	1.0970	1.1073	...	...	1.1063	1.1163
	$1\frac{3}{16}$ – 16 or 1.1875 – 16	UN	2B	1.1875	...	1.1469	1.1535	0.0066	1.120	1.134	...	...	1.127	1.135
(6)	16		3B	1.1875	...	1.1469	1.1518	0.0049	1.1200	1.1283	...	...	1.1266	1.1351
(6)	$1\frac{3}{16}$ – 18 or 1.1875 – 18	UNEF	2B	1.1875	...	1.1514	1.1577	0.0063	1.127	1.140	...	...	1.133	1.141
	18		3B	1.1875	...	1.1514	1.1561	0.0047	1.1270	1.1355	...	...	1.1334	1.1409
(6)	$1\frac{3}{16}$ – 20 or 1.1875 – 20	UN	2B	1.1875	...	1.1550	1.1610	0.0060	1.133	1.145	...	...	1.139	1.146
(6)	20		3B	1.1875	...	1.1550	1.1595	0.0045	1.1330	1.1412	...	...	1.1388	1.1456
	$1\frac{3}{16}$ – 28 or 1.1875 – 28	UN	2B	1.1875	...	1.1643	1.1696	0.0053	1.149	1.157	...	...	1.153	1.158
	28		3B	1.1875	...	1.1643	1.1683	0.0040	1.1490	1.1551	...	...	1.1527	1.1575
	$1\frac{1}{4}$ – 7 or 1.2500 – 7	UNC	1B	1.2500	...	1.1572	1.1716	0.0144	1.095	1.123	...	...	...	...
	7		2B	1.2500	...	1.1572	1.1668	0.0096	1.095	1.123	...	...	1.111	1.128
	7		3B	1.2500	...	1.1572	1.1644	0.0072	1.0950	1.1125	...	...	1.1108	1.1279
	$1\frac{1}{4}$ – 8 or 1.2500 – 8	UN	2B	1.2500	...	1.1688	1.1780	0.0092	1.115	1.140	...	...	1.128	1.143
	8		3B	1.2500	...	1.1688	1.1757	0.0069	1.1150	1.1297	...	...	1.1282	1.1432
	$1\frac{1}{4}$ – 12 or 1.2500 – 12	UNF	1B	1.2500	...	1.1959	1.2079	0.0120	1.160	1.178	...	...	...	...
	12		2B	1.2500	...	1.1959	1.2039	0.0080	1.160	1.178	...	...	1.169	1.179
	12		3B	1.2500	...	1.1959	1.2019	0.0060	1.1600	1.1698	...	...	1.1688	1.1788
	$1\frac{1}{4}$ – 16 or 1.2500 – 16	UN	2B	1.2500	...	1.2094	1.2160	0.0066	1.182	1.196	...	...	1.189	1.198
(6)	16		3B	1.2500	...	1.2094	1.2144	0.0050	1.1820	1.1908	...	...	1.1891	1.1976
	$1\frac{1}{4}$ – 18 or 1.2500 – 18	UNEF	2B	1.2500	...	1.2139	1.2202	0.0063	1.190	1.203	...	...	1.196	1.203
	18		3B	1.2500	...	1.2139	1.2186	0.0047	1.1900	1.1980	...	...	1.1959	1.2034
	$1\frac{1}{4}$ – 20 or 1.2500 – 20	UN	2B	1.2500	...	1.2175	1.2236	0.0061	1.196	1.207	...	...	1.201	1.208
(6)	20		3B	1.2500	...	1.2175	1.2220	0.0045	1.1960	1.2037	...	...	1.2013	1.2081
	$1\frac{1}{4}$ – 28 or 1.2500 – 28	UN	2B	1.2500	...	1.2268	1.2321	0.0053	1.211	1.220	...	...	1.215	1.220

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	28		3B	1.2500	...	1.2268	1.2308	0.0040	1.2110	1.2176	...	...	1.2152	1.2200
	$1\frac{5}{16}$ – 8 or 1.3125 – 8	UN	2B	1.3125	...	1.2313	1.2405	0.0092	1.177	1.202	...	...	1.191	1.206
	8		3B	1.3125	...	1.2313	1.2382	0.0069	1.1770	1.1922	...	...	1.1907	1.2057
	$1\frac{5}{16}$ – 12 or 1.3125 – 12	UN	2B	1.3125	...	1.2584	1.2659	0.0075	1.222	1.240	...	...	1.231	1.241
(6)	12		3B	1.3125	...	1.2584	1.2641	0.0057	1.2220	1.2323	...	...	1.2313	1.2413
(6)	$1\frac{5}{16}$ – 16 or 1.3125 – 16	UN	2B	1.3125	...	1.2719	1.2786	0.0067	1.245	1.259	...	...	1.252	1.260
(6)	16		3B	1.3125	...	1.2719	1.2769	0.0050	1.2450	1.2533	...	...	1.2516	1.2601
(6)	$1\frac{5}{16}$ – 18 or 1.3125 – 18	UNEF	2B	1.3125	...	1.2764	1.2828	0.0064	1.252	1.265	...	...	1.258	1.266
(6)	18		3B	1.3125	...	1.2764	1.2812	0.0048	1.2520	1.2605	...	...	1.2584	1.2659
	$1\frac{5}{16}$ – 20 or 1.3125 – 20	UN	2B	1.3125	...	1.2800	1.2861	0.0061	1.258	1.270	...	...	1.264	1.271
(6)	20		3B	1.3125	...	1.2800	1.2846	0.0046	1.2580	1.2662	...	...	1.2638	1.2706
(6)	$1\frac{5}{16}$ – 28 or 1.3125 – 28	UN	2B	1.3125	...	1.2893	1.2947	0.0054	1.274	1.282	...	...	1.278	1.283
	28		3B	1.3125	...	1.2893	1.2933	0.0040	1.2740	1.2801	...	...	1.2777	1.2825
	$1\frac{3}{8}$ – 6 or 1.3750 – 6	UNC	1B	1.3750	...	1.2667	1.2822	0.0155	1.195	1.225	...	...	...	...
	6		2B	1.3750	...	1.2667	1.2771	0.0104	1.195	1.225	...	...	1.213	1.233
	6		3B	1.3750	...	1.2667	1.2745	0.0078	1.1950	1.2146	...	...	1.2126	1.2326
	$1\frac{3}{8}$ – 8 or 1.3750 – 8	UN	2B	1.3750	...	1.2938	1.3031	0.0093	1.240	1.265	...	...	1.253	1.268
	8		3B	1.3750	...	1.2938	1.3008	0.0070	1.2500	1.2547	...	...	1.2532	1.2682
	$1\frac{3}{8}$ – 12 or 1.3750 – 12	UNF	1B	1.3750	...	1.3209	1.3332	0.0123	1.285	1.303	...	...	...	...
	12		2B	1.3750	...	1.3209	1.3291	0.0082	1.285	1.303	...	...	1.294	1.304
	12		3B	1.3750	...	1.3209	1.3270	0.0061	1.2850	1.2948	...	...	1.2938	1.3038
(6)	$1\frac{3}{8}$ – 16 or 1.3750 – 16	UN	2B	1.3750	...	1.3344	1.3411	0.0067	1.307	1.321	...	...	1.314	1.323
(6)	16		3B	1.3750	...	1.3344	1.3394	0.0050	1.3070	1.3158	...	...	1.3141	1.3226
(6)	$1\frac{3}{8}$ – 18 or 1.3750 – 18	UNEF	2B	1.3750	...	1.3389	1.3453	0.0064	1.315	1.328	...	...	1.321	1.328

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	18		3B	1.3750	...	1.3389	1.3437	0.0048	1.3150	1.3230	...	...	1.3209	1.3284
	$1\frac{3}{8}$ – 20 or 1.3750 – 20	UN	2B	1.3750	...	1.3425	1.3486	0.0061	1.321	1.332	...	...	1.326	1.333
(6)	20		3B	1.3750	...	1.3425	1.3471	0.0046	1.3210	1.3287	...	...	1.3263	1.3331
(6)	$1\frac{3}{8}$ – 28 or 1.3750 – 28	UN	2B	1.3750	...	1.3518	1.3572	0.0054	1.336	1.345	...	...	1.340	1.345
	28		3B	1.3750	...	1.3518	1.3558	0.0040	1.3360	1.3426	...	...	1.3402	1.3450
	$1\frac{7}{16}$ – 6 or 1.4375 – 6	UN	2B	1.4375	...	1.3292	1.3396	0.0104	1.257	1.288	...	...	1.275	1.295
	6		3B	1.4375	...	1.3292	1.3370	0.0078	1.2570	1.2771	...	...	1.2751	1.2951
	$1\frac{7}{16}$ – 8 or 1.4375 – 8	UN	2B	1.4375	...	1.3563	1.3657	0.0094	1.302	1.327	...	...	1.316	1.331
	8		3B	1.4375	...	1.3563	1.3634	0.0071	1.3020	1.3172	...	...	1.3157	1.3307
	$1\frac{7}{16}$ – 12 or 1.4375 – 12	UN	2B	1.4375	...	1.3834	1.3910	0.0076	1.347	1.365	...	...	1.356	1.366
	12		3B	1.4375	...	1.3834	1.3891	0.0057	1.3470	1.3573	...	...	1.3563	1.3663
(6)	$1\frac{7}{16}$ – 16 or 1.4375 – 16	UN	2B	1.4375	...	1.3969	1.4036	0.0067	1.370	1.384	...	...	1.377	1.385
(6)	16		3B	1.4375	...	1.3969	1.4020	0.0051	1.3700	1.3783	...	...	1.3766	1.3851
(6)	$1\frac{7}{16}$ – 18 or 1.4375 – 18	UNEF	2B	1.4375	...	1.4014	1.4078	0.0064	1.377	1.390	...	...	1.383	1.391
	18		3B	1.4375	...	1.4014	1.4062	0.0048	1.3770	1.3855	...	...	1.3834	1.3909
(6)	$1\frac{7}{16}$ – 20 or 1.4375 – 20	UN	2B	1.4375	...	1.4050	1.4112	0.0062	1.383	1.395	...	...	1.389	1.396
(6)	20		3B	1.4375	...	1.4050	1.4096	0.0046	1.3830	1.3912	...	...	1.3888	1.3956
(6)	$1\frac{7}{16}$ – 28 or 1.4375 – 28	UN	2B	1.4375	...	1.4143	1.4197	0.0054	1.399	1.407	...	...	1.403	1.408
	28		3B	1.4375	...	1.4143	1.4184	0.0041	1.3990	1.4051	...	...	1.4027	1.4075
	$1\frac{1}{2}$ – 6 or 1.5000 – 6	UNC	1B	1.5000	...	1.3917	1.4075	0.0158	1.320	1.350	...	...	...	...
	6		2B	1.5000	...	1.3917	1.4022	0.0105	1.320	1.350	...	...	1.338	1.358
	6		3B	1.5000	...	1.3917	1.3996	0.0079	1.3200	1.3396	...	...	1.3376	1.3576
	$1\frac{1}{2}$ – 8 or 1.5000 – 8	UN	2B	1.5000	...	1.4188	1.4283	0.0095	1.365	1.390	...	...	1.378	1.393
	8		3B	1.5000	...	1.4188	1.4259	0.0071	1.3650	1.3797	...	...	1.3782	1.3932

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$1\frac{1}{2}$ – 12 or 1.5000 – 12	UNF	1B	1.5000	...	1.4459	1.4584	0.0125	1.410	1.428	...	...	...	...
	12		2B	1.5000	...	1.4459	1.4542	0.0083	1.410	1.428	...	...	1.419	1.429
	12		3B	1.5000	...	1.4459	1.4522	0.0063	1.4100	1.4198	...	...	1.4188	1.4288
(6)	$1\frac{1}{2}$ – 16 or 1.5000 – 16	UN	2B	1.5000	...	1.4594	1.4662	0.0068	1.432	1.446	...	...	1.439	1.448
	16		3B	1.5000	...	1.4594	1.4645	0.0051	1.4320	1.4408	...	...	1.4391	1.4476
(6)	$1\frac{1}{2}$ – 18 or 1.5000 – 18	UNEF	2B	1.5000	...	1.4639	1.4704	0.0065	1.440	1.453	...	...	1.446	1.453
	18		3B	1.5000	...	1.4639	1.4687	0.0048	1.4400	1.4480	...	...	1.4459	1.4534
	$1\frac{1}{2}$ – 20 or 1.5000 – 20	UN	2B	1.5000	...	1.4675	1.4737	0.0062	1.446	1.457	...	...	1.451	1.458
(6)	20		3B	1.5000	...	1.4675	1.4721	0.0046	1.4460	1.4537	...	...	1.4513	1.4581
	$1\frac{1}{2}$ – 28 or 1.5000 – 28	UN	2B	1.5000	...	1.4768	1.4823	0.0055	1.461	1.470	...	...	1.465	1.470
	28		3B	1.5000	...	1.4768	1.4809	0.0041	1.4610	1.4676	...	...	1.4652	1.4700
	$1\frac{9}{16}$ – 6 or 1.5625 – 6	UN	2B	1.5625	...	1.4542	1.4648	0.0106	1.382	1.413	...	...	1.400	1.420
	6		3B	1.5625	...	1.4542	1.4622	0.0080	1.3820	1.4021	...	...	1.4001	1.4201
	$1\frac{9}{16}$ – 8 or 1.5625 – 8	UN	2B	1.5625	...	1.4813	1.4909	0.0096	1.427	1.452	...	...	1.441	1.456
	8		3B	1.5625	...	1.4813	1.4885	0.0072	1.4270	1.4422	...	...	1.4407	1.4557
(6)	$1\frac{9}{16}$ – 12 or 1.5625 – 12	UN	2B	1.5625	...	1.5084	1.5161	0.0077	1.472	1.490	...	...	1.481	1.491
(6)	12		3B	1.5625	...	1.5084	1.5142	0.0058	1.4720	1.4823	...	...	1.4813	1.4913
	$1\frac{9}{16}$ – 16 or 1.5625 – 16	UN	2B	1.5625	...	1.5219	1.5287	0.0068	1.495	1.509	...	...	1.502	1.510
(6)	16		3B	1.5625	...	1.5219	1.5270	0.0051	1.4950	1.5033	...	...	1.5016	1.5101
	$1\frac{9}{16}$ – 18 or 1.5625 – 18	UNEF	2B	1.5625	...	1.5264	1.5329	0.0065	1.502	1.515	...	...	1.508	1.516
(6)	18		3B	1.5625	...	1.5264	1.5313	0.0049	1.5020	1.5105	...	...	1.5084	1.5159
	$1\frac{9}{16}$ – 20 or 1.5625 – 20	UN	2B	1.5625	...	1.5300	1.5362	0.0062	1.508	1.520	...	...	1.514	1.521
(6)	20		3B	1.5625	...	1.5300	1.5347	0.0047	1.5080	1.5162	...	...	1.5138	1.5206
	$1\frac{5}{8}$ – 6 or 1.6250 – 6	UN	2B	1.6250	...	1.5167	1.5274	0.0107	1.445	1.475	...	...	1.463	1.483
	6		3B	1.6250	...	1.5167	1.5247	0.0080	1.4450	1.4646	...	...	1.4626	1.4826

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$1\frac{5}{8}$ – 8 or 1.6250 – 8	UN	2B	1.6250	...	1.5438	1.5535	0.0097	1.490	1.515	...	...	1.503	1.518
	8		3B	1.6250	...	1.5438	1.5510	0.0072	1.4900	1.5047	...	...	1.5032	1.5182
(6)	$1\frac{5}{8}$ – 12 or 1.6250 – 12	UN	2B	1.6250	...	1.5709	1.5786	0.0077	1.535	1.553	...	...	1.544	1.554
(6)	12		3B	1.6250	...	1.5709	1.5767	0.0058	1.5350	1.5448	...	...	1.5438	1.5538
(6)	$1\frac{5}{8}$ – 16 or 1.6250 – 16	UN	2B	1.6250	...	1.5844	1.5912	0.0068	1.557	1.571	...	...	1.564	1.573
	16		3B	1.6250	...	1.5844	1.5895	0.0051	1.5570	1.5658	...	...	1.5641	1.5726
(6)	$1\frac{5}{8}$ – 18 or 1.6250 – 18	UNEF	2B	1.6250	...	1.5889	1.5954	0.0065	1.565	1.578	...	...	1.571	1.578
	18		3B	1.6250	...	1.5889	1.5938	0.0049	1.5650	1.5730	...	...	1.5709	1.5784
(6)	$1\frac{5}{8}$ – 20 or 1.6250 – 20	UN	2B	1.6250	...	1.5925	1.5987	0.0062	1.571	1.582	...	...	1.576	1.583
	20		3B	1.6250	...	1.5925	1.5972	0.0047	1.5710	1.5787	...	...	1.5763	1.5831
	$1\frac{11}{16}$ – 6 or 1.6875 – 6	UN	2B	1.6875	...	1.5792	1.5900	0.0108	1.507	1.538	...	...	1.525	1.545
	6		3B	1.6875	...	1.5792	1.5873	0.0081	1.5070	1.5271	...	...	1.5251	1.5451
	$1\frac{11}{16}$ – 8 or 1.6875 – 8	UN	2B	1.6875	...	1.6063	1.6160	0.0097	1.552	1.577	...	...	1.566	1.581
	8		3B	1.6875	...	1.6063	1.6136	0.0073	1.5520	1.5672	...	...	1.5657	1.5807
(6)	$1\frac{11}{16}$ – 12 or 1.6875 – 12	UN	2B	1.6875	...	1.6334	1.6411	0.0077	1.597	1.615	...	...	1.606	1.616
	12		3B	1.6875	...	1.6334	1.6392	0.0058	1.5970	1.6073	...	...	1.6063	1.6163
	$1\frac{11}{16}$ – 16 or 1.6875 – 16	UN	2B	1.6875	...	1.6469	1.6538	0.0069	1.620	1.634	...	...	1.627	1.635
(6)	16		3B	1.6875	...	1.6469	1.6520	0.0051	1.6200	1.6283	...	...	1.6266	1.6351
(6)	$1\frac{11}{16}$ – 18 or 1.6875 – 18	UNEF	2B	1.6875	...	1.6514	1.6579	0.0065	1.627	1.640	...	...	1.633	1.641
	18		3B	1.6875	...	1.6514	1.6563	0.0049	1.6270	1.6355	...	...	1.6334	1.6409
(6)	$1\frac{11}{16}$ – 20 or 1.6875 – 20	UN	2B	1.6875	...	1.6550	1.6613	0.0063	1.633	1.645	...	...	1.639	1.646
(6)	20		3B	1.6875	...	1.6550	1.6597	0.0047	1.6330	1.6412	...	...	1.6388	1.6456
(6)	$1\frac{3}{4}$ – 5 or 1.7500 – 5	UNC	1B	1.7500	...	1.6201	1.6375	0.0174	1.533	1.567	...	...	...	...
(6)	5		2B	1.7500	...	1.6201	1.6317	0.0116	1.533	1.567	...	...	1.555	1.579

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	5		3B	1.7500	...	1.6201	1.6288	0.0087	1.5330	1.5575	...	...	1.5551	1.5791
	$1\frac{3}{4}$ – 6 or 1.7500 – 6	UN	2B	1.7500	...	1.6417	1.6525	0.0108	1.570	1.600	...	...	1.588	1.608
	6		3B	1.7500	...	1.6417	1.6498	0.0081	1.5700	1.5896	...	...	1.5876	1.6076
	$1\frac{3}{4}$ – 8 or 1.7500 – 8	UN	2B	1.7500	...	1.6688	1.6786	0.0098	1.615	1.640	...	...	1.628	1.643
(6)	8		3B	1.7500	...	1.6688	1.6762	0.0074	1.6150	1.6297	...	...	1.6282	1.6432
	$1\frac{3}{4}$ – 12 or 1.7500 – 12	UN	2B	1.7500	...	1.6959	1.7037	0.0078	1.660	1.678	...	...	1.669	1.679
	12		3B	1.7500	...	1.6959	1.7017	0.0058	1.6600	1.6698	...	...	1.6688	1.6788
	$1\frac{3}{4}$ – 16 or 1.7500 – 16	UN	2B	1.7500	...	1.7094	1.7163	0.0069	1.682	1.696	...	...	1.689	1.698
(6)	16		3B	1.7500	...	1.7094	1.7146	0.0052	1.6820	1.6908	...	...	1.6891	1.6976
	$1\frac{3}{4}$ – 20 or 1.7500 – 20	UN	2B	1.7500	...	1.7175	1.7238	0.0063	1.696	1.707	...	...	1.701	1.708
(6)	20		3B	1.7500	...	1.7175	1.7222	0.0047	1.6960	1.7037	...	...	1.7013	1.7081
	$1\frac{13}{16}$ – 6 or 1.8125 – 6	UN	2B	1.8125	...	1.7042	1.7151	0.0109	1.632	1.663	...	...	1.650	1.670
	6		3B	1.8125	...	1.7042	1.7124	0.0082	1.6320	1.6521	...	...	1.6501	1.6701
	$1\frac{13}{16}$ – 8 or 1.8125 – 8	UN	2B	1.8125	...	1.7313	1.7412	0.0099	1.677	1.702	...	...	1.691	1.706
	8		3B	1.8125	...	1.7313	1.7387	0.0074	1.6770	1.6922	...	...	1.6907	1.7057
	$1\frac{13}{16}$ – 12 or 1.8125 – 12	UN	2B	1.8125	...	1.7584	1.7662	0.0078	1.722	1.740	...	...	1.731	1.741
	12		3B	1.8125	...	1.7584	1.7642	0.0058	1.7220	1.7323	...	...	1.7313	1.7413
	$1\frac{13}{16}$ – 16 or 1.8125 – 16	UN	2B	1.8125	...	1.7719	1.7788	0.0069	1.745	1.759	...	...	1.752	1.760
(6)	16		3B	1.8125	...	1.7719	1.7771	0.0052	1.7450	1.7533	...	...	1.7516	1.7601
	$1\frac{13}{16}$ – 20 or 1.8125 – 20	UN	2B	1.8125	...	1.7800	1.7863	0.0063	1.758	1.770	...	...	1.764	1.771
(6)	20		3B	1.8125	...	1.7800	1.7847	0.0047	1.7580	1.7662	...	...	1.7638	1.7706
	$1\frac{7}{8}$ – 6 or 1.8750 – 6	UN	2B	1.8750	...	1.7667	1.7777	0.0110	1.695	1.725	...	...	1.713	1.733
	6		3B	1.8750	...	1.7667	1.7749	0.0082	1.6950	1.7146	...	...	1.7126	1.7326
	$1\frac{7}{8}$ – 8 or 1.8750 – 8	UN	2B	1.8750	...	1.7938	1.8038	0.0100	1.740	1.765	...	...	1.753	1.768

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	8		3B	1.8750	...	1.7938	1.8013	0.0075	1.7400	1.7547	...	...	1.7532	1.7682
	$1\frac{7}{8}$ – 12 or 1.8750 – 12	UN	2B	1.8750	...	1.8209	1.8287	0.0078	1.785	1.803	...	...	1.794	1.804
(6)	12		3B	1.8750	...	1.8209	1.8268	0.0059	1.7850	1.7948	...	...	1.7938	1.8038
	$1\frac{7}{8}$ – 16 or 1.8750 – 16	UN	2B	1.8750	...	1.8344	1.8413	0.0069	1.807	1.821	...	...	1.814	1.823
(6)	16		3B	1.8750	...	1.8344	1.8396	0.0052	1.8070	1.8158	...	...	1.8141	1.8226
(6)	$1\frac{7}{8}$ – 20 or 1.8750 – 20	UN	2B	1.8750	...	1.8425	1.8489	0.0064	1.821	1.832	...	...	1.826	1.833
(6)	20		3B	1.8750	...	1.8425	1.8473	0.0048	1.8210	1.8287	...	...	1.8263	1.8331
	$1\frac{15}{16}$ – 6 or 1.9375 – 6	UN	2B	1.9375	...	1.8292	1.8403	0.0111	1.757	1.788	...	...	1.775	1.795
	6		3B	1.9375	...	1.8292	1.8375	0.0083	1.7570	1.7771	...	...	1.7751	1.7951
	$1\frac{15}{16}$ – 8 or 1.9375 – 8	UN	2B	1.9375	...	1.8563	1.8663	0.0100	1.802	1.827	...	...	1.816	1.831
	8		3B	1.9375	...	1.8563	1.8638	0.0075	1.8020	1.8172	...	...	1.8157	1.8307
(6)	$1\frac{15}{16}$ – 12 or 1.9375 – 12	UN	2B	1.9375	...	1.8834	1.8912	0.0078	1.847	1.865	...	...	1.856	1.866
	12		3B	1.9375	...	1.8834	1.8893	0.0059	1.8470	1.8573	...	...	1.8563	1.8663
	$1\frac{15}{16}$ – 16 or 1.9375 – 16	UN	2B	1.9375	...	1.8969	1.9039	0.0070	1.870	1.884	...	...	1.877	1.885
(6)	16		3B	1.9375	...	1.8969	1.9021	0.0052	1.8700	1.8783	...	...	1.8766	1.8851
	$1\frac{15}{16}$ – 20 or 1.9375 – 20	UN	2B	1.9375	...	1.9050	1.9114	0.0064	1.883	1.895	...	...	1.889	1.896
(6)	20		3B	1.9375	...	1.9050	1.9098	0.0048	1.8830	1.8912	...	...	1.8888	1.8956
	2 – 4.5 or 2.0000 – 4.5	UNC	1B	2.0000	...	1.8557	1.8743	0.0186	1.759	1.795	...	...	...	...
	4.5		2B	2.0000	...	1.8557	1.8681	0.0124	1.759	1.795	...	...	1.783	1.810
	4.5		3B	2.0000	...	1.8557	1.8650	0.0093	1.7590	1.7861	...	...	1.7835	1.8102
	2 – 6 or 2.0000 – 6	UN	2B	2.0000	...	1.8917	1.9028	0.0111	1.820	1.850	...	...	1.838	1.858
	6		3B	2.0000	...	1.8917	1.9000	0.0083	1.8200	1.8396	...	...	1.8376	1.8576
	2 – 8 or 2.0000 – 8	UN	2B	2.0000	...	1.9188	1.9289	0.0101	1.865	1.890	...	...	1.878	1.893
	8		3B	2.0000	...	1.9188	1.9264	0.0076	1.8650	1.8797	...	...	1.8782	1.8932

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	2 – 12 or 2.0000 – 12	UN	2B	2.0000	...	1.9459	1.9538	0.0079	1.910	1.928	...	...	1.919	1.929
	12		3B	2.0000	...	1.9459	1.9518	0.0059	1.9100	1.9198	...	...	1.9188	1.9288
	2 – 16 or 2.0000 – 16	UN	2B	2.0000	...	1.9594	1.9664	0.0070	1.932	1.946	...	...	1.939	1.948
(6)	16		3B	2.0000	...	1.9594	1.9646	0.0052	1.9320	1.9408	...	...	1.9391	1.9476
	2 – 20 or 2.0000 – 20	UN	2B	2.0000	...	1.9675	1.9739	0.0064	1.946	1.957	...	...	1.951	1.958
(6)	20		3B	2.0000	...	1.9675	1.9723	0.0048	1.9460	1.9537	...	...	1.9513	1.9581
	2⅛ – 6 or 2.1250 – 6	UN	2B	2.1250	...	2.0167	2.0280	0.0113	1.945	1.975	...	...	1.963	1.983
	6		3B	2.1250	...	2.0167	2.0251	0.0084	1.9450	1.9646	...	...	1.9626	1.9826
	2⅛ – 8 or 2.1250 – 8	UN	2B	2.1250	...	2.0438	2.0540	0.0102	1.990	2.015	...	...	2.003	2.018
	8		3B	2.1250	...	2.0438	2.0515	0.0077	1.9900	2.0047	...	...	2.0032	2.0182
	2⅛ – 12 or 2.1250 – 12	UN	2B	2.1250	...	2.0709	2.0788	0.0079	2.035	2.053	...	...	2.044	2.054
(6)	12		3B	2.1250	...	2.0709	2.0768	0.0059	2.0350	2.0448	...	...	2.0438	2.0538
	2⅛ – 16 or 2.1250 – 16	UN	2B	2.1250	...	2.0844	2.0914	0.0070	2.057	2.071	...	...	2.064	2.073
(6)	16		3B	2.1250	...	2.0844	2.0897	0.0053	2.0570	2.0658	...	...	2.0641	2.0726
(6)	2⅛ – 20 or 2.1250 – 20	UN	2B	2.1250	...	2.0925	2.0990	0.0065	2.071	2.082	...	...	2.076	2.083
(6)	20		3B	2.1250	...	2.0925	2.0973	0.0048	2.0710	2.0787	...	...	2.0763	2.0831
	2¼ – 4.5 or 2.2500 – 4.5	UNC	1B	2.2500	...	2.1057	2.1247	0.0190	2.009	2.045	...	...	...	...
	4.5		2B	2.2500	...	2.1057	2.1183	0.0126	2.009	2.045	...	...	2.033	2.060
	4.5		3B	2.2500	...	2.1057	2.1152	0.0095	2.0090	2.0361	...	...	2.0335	2.0602
	2¼ – 6 or 2.2500 – 6	UN	2B	2.2500	...	2.1417	2.1531	0.0114	2.070	2.100	...	...	2.088	2.108
	6		3B	2.2500	...	2.1417	2.1502	0.0085	2.0700	2.0896	...	...	2.0876	2.1076
	2¼ – 8 or 2.2500 – 8	UN	2B	2.2500	...	2.1688	2.1792	0.0104	2.115	2.140	...	...	2.128	2.143
	8		3B	2.2500	...	2.1688	2.1766	0.0078	2.1150	2.1297	...	...	2.1282	2.1432
(6)	2¼ – 12 or 2.2500 – 12	UN	2B	2.2500	...	2.1959	2.2039	0.0080	2.160	2.178	...	...	2.169	2.179

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	12		3B	2.2500	...	2.1959	2.2019	0.0060	2.1600	2.1698	...	...	2.1688	2.1788
(6)	$2\frac{1}{4}$ – 16 or 2.2500 – 16	UN	2B	2.2500	...	2.2094	2.2165	0.0071	2.182	2.196	...	...	2.189	2.198
(6)	16		3B	2.2500	...	2.2094	2.2147	0.0053	2.1820	2.1908	...	...	2.1891	2.1976
(6)	$2\frac{1}{4}$ – 20 or 2.2500 – 20	UN	2B	2.2500	...	2.2175	2.2240	0.0065	2.196	2.207	...	...	2.201	2.208
(6)	20		3B	2.2500	...	2.2175	2.2224	0.0049	2.1960	2.2037	...	...	2.2013	2.2081
(6)	$2\frac{3}{8}$ – 6 or 2.3750 – 6	UN	2B	2.3750	...	2.2667	2.2782	0.0115	2.195	2.225	...	...	2.213	2.233
	6		3B	2.3750	...	2.2667	2.2753	0.0086	2.1950	2.2146	...	...	2.2126	2.2326
	$2\frac{3}{8}$ – 8 or 2.3750 – 8	UN	2B	2.3750	...	2.2938	2.3043	0.0105	2.240	2.265	...	...	2.253	2.268
	8		3B	2.3750	...	2.2938	2.3017	0.0079	2.2400	2.2547	...	...	2.2532	2.2682
(6)	$2\frac{3}{8}$ – 12 or 2.3750 – 12	UN	2B	2.3750	...	2.3209	2.3289	0.0080	2.285	2.303	...	...	2.294	2.304
	12		3B	2.3750	...	2.3209	2.3269	0.0060	2.2850	2.2948	...	...	2.2938	2.3038
(6)	$2\frac{3}{8}$ – 16 or 2.3750 – 16	UN	2B	2.3750	...	2.3344	2.3415	0.0071	2.307	2.321	...	...	2.314	2.323
(6)	16		3B	2.3750	...	2.3344	2.3398	0.0054	2.3070	2.3158	...	...	2.3141	2.3226
(6)	$2\frac{3}{8}$ – 20 or 2.3750 – 20	UN	2B	2.3750	...	2.3425	2.3491	0.0066	2.321	2.332	...	...	2.326	2.333
(6)	20		3B	2.3750	...	2.3425	2.3474	0.0049	2.3210	2.3287	...	...	2.3263	2.3331
	$2\frac{1}{2}$ – 4 or 2.5000 – 4	UNC	1B	2.5000	...	2.3376	2.3578	0.0202	2.229	2.267	...	...	...	...
	4		2B	2.5000	...	2.3376	2.3511	0.0135	2.229	2.267	...	...	2.256	2.286
	4		3B	2.5000	...	2.3376	2.3477	0.0101	2.2290	2.2594	...	...	2.2564	2.2864
	$2\frac{1}{2}$ – 6 or 2.5000 – 6	UN	2B	2.5000	...	2.3917	2.4033	0.0116	2.320	2.350	...	...	2.338	2.358
	6		3B	2.5000	...	2.3917	2.4004	0.0087	2.3200	2.3396	...	...	2.3376	2.3576
	$2\frac{1}{2}$ – 8 or 2.5000 – 8	UN	2B	2.5000	...	2.4188	2.4294	0.0106	2.365	2.390	...	...	2.378	2.393
	8		3B	2.5000	...	2.4188	2.4268	0.0080	2.3650	2.3797	...	...	2.3782	2.3932
	$2\frac{1}{2}$ – 12 or 2.5000 – 12	UN	2B	2.5000	...	2.4459	2.4540	0.0081	2.410	2.428	...	...	2.419	2.429
	12		3B	2.5000	...	2.4459	2.4519	0.0060	2.4100	2.4198	...	...	2.4188	2.4288

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$2\frac{1}{2}$ – 16 or 2.5000 – 16	UN	2B	2.5000	...	2.4594	2.4666	0.0072	2.432	2.446	...	...	2.439	2.448
(6)	16		3B	2.5000	...	2.4594	2.4648	0.0054	2.4320	2.4408	...	...	2.4391	2.4476
	$2\frac{1}{2}$ – 20 or 2.5000 – 20	UN	2B	2.5000	...	2.4675	2.4741	0.0066	2.446	2.457	...	...	2.451	2.458
(6)	20		3B	2.5000	...	2.4675	2.4725	0.0050	2.4460	2.4537	...	...	2.4513	2.4581
	$2\frac{5}{8}$ – 4 or 2.6250 – 4	UN	2B	2.6250	...	2.4626	2.4762	0.0136	2.354	2.392	...	...	2.381	2.411
	4		3B	2.6250	...	2.4626	2.4727	0.0101	2.3540	2.3844	...	...	2.3814	2.4114
	$2\frac{5}{8}$ – 6 or 2.6250 – 6	UN	2B	2.6250	...	2.5167	2.5285	0.0118	2.445	2.475	...	...	2.463	2.483
	6		3B	2.6250	...	2.5167	2.5255	0.0088	2.4450	2.4646	...	...	2.4626	2.4826
	$2\frac{5}{8}$ – 8 or 2.6250 – 8	UN	2B	2.6250	...	2.5438	2.5545	0.0107	2.490	2.515	...	...	2.503	2.518
	8		3B	2.6250	...	2.5438	2.5518	0.0080	2.4900	2.5047	...	...	2.5032	2.5182
(6)	$2\frac{5}{8}$ – 12 or 2.6250 – 12	UN	2B	2.6250	...	2.5709	2.5790	0.0081	2.535	2.553	...	...	2.544	2.554
	12		3B	2.6250	...	2.5709	2.5770	0.0061	2.5350	2.5448	...	...	2.5438	2.5538
(6)	$2\frac{5}{8}$ – 16 or 2.6250 – 16	UN	2B	2.6250	...	2.5844	2.5916	0.0072	2.557	2.571	...	...	2.564	2.573
(6)	16		3B	2.6250	...	2.5844	2.5898	0.0054	2.5570	2.5658	...	...	2.5641	2.5726
	$2\frac{5}{8}$ – 20 or 2.6250 – 20	UN	2B	2.6250	...	2.5925	2.5991	0.0066	2.571	2.582	...	...	2.576	2.583
(6)	20		3B	2.6250	...	2.5925	2.5975	0.0050	2.5710	2.5787	...	...	2.5763	2.5831
	$2\frac{3}{4}$ – 4 or 2.7500 – 4	UNC	1B	2.7500	...	2.5876	2.6082	0.0206	2.479	2.517	...	...	...	...
	4		2B	2.7500	...	2.5876	2.6013	0.0137	2.479	2.517	...	...	2.506	2.536
	4		3B	2.7500	...	2.5876	2.5979	0.0103	2.4790	2.5094	...	...	2.5064	2.5364
	$2\frac{3}{4}$ – 6 or 2.7500 – 6	UN	2B	2.7500	...	2.6417	2.6536	0.0119	2.570	2.600	...	...	2.588	2.608
	6		3B	2.7500	...	2.6417	2.6506	0.0089	2.5700	2.5896	...	...	2.5876	2.6076
	$2\frac{3}{4}$ – 8 or 2.7500 – 8	UN	2B	2.7500	...	2.6688	2.6796	0.0108	2.615	2.640	...	...	2.628	2.643
	8		3B	2.7500	...	2.6688	2.6769	0.0081	2.6150	2.6297	...	...	2.6282	2.6432
(6)	$2\frac{3}{4}$ – 12 or 2.7500 – 12	UN	2B	2.7500	...	2.6959	2.7040	0.0081	2.660	2.678	...	...	2.669	2.679
(6)	12		3B	2.7500	...	2.6959	2.7020	0.0061	2.6600	2.6698	...	...	2.6688	2.6788

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	$2\frac{3}{4}$ – 16 or 2.7500 – 16	UN	2B	2.7500	...	2.7094	2.7167	0.0073	2.682	2.696	...	...	2.689	2.698
(6)	16		3B	2.7500	...	2.7094	2.7148	0.0054	2.6820	2.6908	...	...	2.6891	2.6976
(6)	$2\frac{3}{4}$ – 20 or 2.7500 – 20	UN	2B	2.7500	...	2.7175	2.7242	0.0067	2.696	2.707	...	...	2.701	2.708
(6)	20		3B	2.7500	...	2.7175	2.7225	0.0050	2.6960	2.7037	...	...	2.7013	2.7081
	$2\frac{7}{8}$ – 4 or 2.8750 – 4	UN	2B	2.8750	...	2.7126	2.7264	0.0138	2.604	2.642	...	...	2.631	2.661
	4		3B	2.8750	...	2.7126	2.7230	0.0104	2.6040	2.6344	...	...	2.6314	2.6614
	$2\frac{7}{8}$ – 6 or 2.8750 – 6	UN	2B	2.8750	...	2.7667	2.7787	0.0120	2.695	2.725	...	...	2.713	2.733
	6		3B	2.8750	...	2.7667	2.7757	0.0090	2.6950	2.7146	...	...	2.7126	2.7326
	$2\frac{7}{8}$ – 8 or 2.8750 – 8	UN	2B	2.8750	...	2.7938	2.8048	0.0110	2.740	2.765	...	...	2.753	2.768
	8		3B	2.8750	...	2.7938	2.8020	0.0082	2.7400	2.7547	...	...	2.7532	2.7682
	$2\frac{7}{8}$ – 12 or 2.8750 – 12	UN	2B	2.8750	...	2.8209	2.8291	0.0082	2.785	2.803	...	...	2.794	2.804
	12		3B	2.8750	...	2.8209	2.8270	0.0061	2.7850	2.7948	...	...	2.7938	2.8038
	$2\frac{7}{8}$ – 16 or 2.8750 – 16	UN	2B	2.8750	...	2.8344	2.8417	0.0073	2.807	2.821	...	...	2.814	2.823
(6)	16		3B	2.8750	...	2.8344	2.8399	0.0055	2.8070	2.8158	...	...	2.8141	2.8226
(6)	$2\frac{7}{8}$ – 20 or 2.8750 – 20	UN	2B	2.8750	...	2.8425	2.8492	0.0067	2.821	2.832	...	...	2.826	2.833
(6)	20		3B	2.8750	...	2.8425	2.8475	0.0050	2.8210	2.8287	...	...	2.8263	2.8331
	3 – 4 or 3.0000 – 4	UNC	1B	3.0000	...	2.8376	2.8585	0.0209	2.729	2.767	...	...	...	...
	4		2B	3.0000	...	2.8376	2.8515	0.0139	2.729	2.767	...	...	2.756	2.786
	4		3B	3.0000	...	2.8376	2.8480	0.0104	2.7290	2.7594	...	...	2.7564	2.7864
	3 – 6 or 3.0000 – 6	UN	2B	3.0000	...	2.8917	2.9038	0.0121	2.820	2.850	...	...	2.838	2.858
	6		3B	3.0000	...	2.8917	2.9008	0.0091	2.8200	2.8396	...	...	2.8376	2.8576
	3 – 8 or 3.0000– 8	UN	2B	3.0000	...	2.9188	2.9299	0.0111	2.865	2.890	...	...	2.878	2.893
	8		3B	3.0000	...	2.9188	2.9271	0.0083	2.8650	2.8797	...	...	2.8782	2.8932

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	3 – 12 or 3.0000– 12	UN	2B	3.0000	...	2.9459	2.9541	0.0082	2.910	2.928	...	...	2.919	2.929
	12		3B	3.0000	...	2.9459	2.9521	0.0062	2.9100	2.9198	...	...	2.9188	2.9880
(6)	3 – 16 or 3.0000– 16	UN	2B	3.0000	...	2.9594	2.9667	0.0073	2.932	2.946	...	...	2.939	2.948
(6)	16		3B	3.0000	...	2.9594	2.9649	0.0055	2.9320	2.9408	...	...	2.9391	2.9476
	3 – 20 or 3.0000– 20	UN	2B	3.0000	...	2.9675	2.9743	0.0068	2.946	2.957	...	...	2.951	2.958
(6)	20		3B	3.0000	...	2.9675	2.9726	0.0051	2.9460	2.9537	...	...	2.9513	2.9581
	3⅛ – 4 or 3.1250 – 4	UN	2B	3.1250	...	2.9626	2.9766	0.0140	2.854	2.892	...	...	2.881	2.911
	4		3B	3.1250	...	2.9626	2.9731	0.0105	2.8540	2.8844	...	...	2.8814	2.9114
	3⅛ – 6 or 3.1250 – 6	UN	2B	3.1250	...	3.0167	3.0289	0.0122	2.945	2.975	...	...	2.963	2.983
	6		3B	3.1250	...	3.0167	3.0259	0.0092	2.9450	2.9646	...	...	2.9626	2.9826
	3⅛ – 8 or 3.1250 – 8	UN	2B	3.1250	...	3.0438	3.0550	0.0112	2.990	3.015	...	...	3.003	3.018
	8		3B	3.1250	...	3.0438	3.0522	0.0084	2.9900	3.0047	...	...	3.0032	3.0182
(6)	3⅛ – 12 or 3.1250 – 12	UN	2B	3.1250	...	3.0709	3.0792	0.0083	3.035	3.053	...	...	3.044	3.054
(6)	12		3B	3.1250	...	3.0709	3.0771	0.0062	3.0350	3.0448	...	...	3.0438	3.0538
(6)	3⅛ – 16 or 3.1250 – 16	UN	2B	3.1250	...	3.0844	3.0918	0.0074	3.057	3.071	...	...	3.064	3.073
(6)	16		3B	3.1250	...	3.0844	3.0899	0.0055	3.0570	3.0658	...	...	3.0641	3.0726
	3¼ – 4 or 3.2500 – 4	UNC	1B	3.2500	...	3.0876	3.1088	0.0212	2.979	3.017	...	...	...	...
	4		2B	3.2500	...	3.0876	3.1017	0.0141	2.979	3.017	...	...	3.006	3.036
	4		3B	3.2500	...	3.0876	3.0982	0.0106	2.9790	3.0094	...	...	3.0064	3.0364
	3¼ – 6 or 3.2500 – 6	UN	2B	3.2500	...	3.1417	3.1540	0.0123	3.070	3.100	...	...	3.088	3.108
	6		3B	3.2500	...	3.1417	3.1509	0.0092	3.0700	3.0896	...	...	3.0876	3.1076
	3¼ – 8 or 3.2500 – 8	UN	2B	3.2500	...	3.1688	3.1801	0.0113	3.115	3.140	...	...	3.128	3.143
	8		3B	3.2500	...	3.1688	3.1773	0.0085	3.1150	3.1297	...	...	3.1282	3.1432
(6)	3¼ – 12 or 3.2500 – 12	UN	2B	3.2500	...	3.1959	3.2042	0.0083	3.160	3.178	...	...	3.169	3.179
(6)	12		3B	3.2500	...	3.1959	3.2021	0.0062	3.1600	3.1698	...	...	3.1688	3.1788

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	3¼ – 16 or 3.2500 – 16	UN	2B	3.2500	...	3.2094	3.2168	0.0074	3.182	3.196	...	...	3.189	3.198
(6)	16		3B	3.2500	...	3.2094	3.2150	0.0056	3.1820	3.1908	...	...	3.1891	3.1976
	3⅜ – 4 or 3.3750 – 4	UN	2B	3.3750	...	3.2126	3.2268	0.0142	3.104	3.142	...	...	3.131	3.161
	4		3B	3.3750	...	3.2126	3.2233	0.0107	3.1040	3.1344	...	...	3.1314	3.1614
	3⅜ – 6 or 3.3750 – 6	UN	2B	3.3750	...	3.2667	3.2791	0.0124	3.195	3.225	...	...	3.213	3.233
	6		3B	3.3750	...	3.2667	3.2760	0.0093	3.1950	3.2146	...	...	3.2126	3.2326
	3⅜ – 8 or 3.3750 – 8	UN	2B	3.3750	...	3.2938	3.3052	0.0114	3.240	3.265	...	...	3.253	3.268
	8		3B	3.3750	...	3.2938	3.3023	0.0085	3.2400	3.2547	...	...	3.2532	3.2682
(6)	3⅜ – 12 or 3.3750 – 12	UN	2B	3.3750	...	3.3209	3.3292	0.0083	3.285	3.303	...	...	3.294	3.304
	12		3B	3.3750	...	3.3209	3.3272	0.0063	3.2850	3.2948	...	...	3.2938	3.3038
(6)	3⅜ – 16 or 3.3750 – 16	UN	2B	3.3750	...	3.3344	3.3419	0.0075	3.307	3.321	...	...	3.314	3.323
(6)	16		3B	3.3750	...	3.3344	3.3400	0.0056	3.3070	3.3158	...	...	3.3141	3.3226
	3½ – 4 or 3.5000 – 4	UNC	1B	3.5000	...	3.3376	3.3591	0.0215	3.229	3.267	...	...	...	...
	4		2B	3.5000	...	3.3376	3.3519	0.0143	3.229	3.267	...	...	3.256	3.286
	4		3B	3.5000	...	3.3376	3.3484	0.0108	3.2290	3.2594	...	...	3.2564	3.2864
	3½ – 6 or 3.5000 – 6	UN	2B	3.5000	...	3.3917	3.4042	0.0125	3.320	3.350	...	...	3.338	3.358
	6		3B	3.5000	...	3.3917	3.4011	0.0094	3.3200	3.3396	...	...	3.3376	3.3576
	3½ – 8 or 3.5000 – 8	UN	2B	3.5000	...	3.4188	3.4303	0.0115	3.365	3.390	...	...	3.378	3.393
	8		3B	3.5000	...	3.4188	3.4274	0.0086	3.3650	3.3797	...	...	3.3782	3.3932
	3½ – 12 or 3.5000 – 12	UN	2B	3.5000	...	3.4459	3.4543	0.0084	3.410	3.428	...	...	3.419	3.429
	12		3B	3.5000	...	3.4459	3.4522	0.0063	3.4100	3.4198	...	...	3.4188	3.4288
	3½ – 16 or 3.5000 – 16	UN	2B	3.5000	...	3.4594	3.4669	0.0075	3.432	3.446	...	...	3.439	3.448
(6)	16		3B	3.5000	...	3.4594	3.4650	0.0056	3.4320	3.4408	...	...	3.4391	3.4476
	3⅝ – 4 or 3.6250 – 4	UN	2B	3.6250	...	3.4626	3.4770	0.0144	3.354	3.392	...	...	3.381	3.411

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	4		3B	3.6250	...	3.4626	3.4734	0.0108	3.3540	3.3844	...	...	3.3814	3.4114
	$3\frac{5}{8}$ – 6 or 3.6250 – 6	UN	2B	3.6250	...	3.5167	3.5293	0.0126	3.445	3.475	...	...	3.463	3.483
	6		3B	3.6250	...	3.5167	3.5262	0.0095	3.4450	3.4646	...	...	3.4626	3.4826
	$3\frac{5}{8}$ – 8 or 3.6250 – 8	UN	2B	3.6250	...	3.5438	3.5554	0.0116	3.490	3.515	...	...	3.503	3.518
	8		3B	3.6250	...	3.5438	3.5525	0.0087	3.4900	3.5047	...	...	3.5032	3.5182
(6)	$3\frac{5}{8}$ – 12 or 3.6250 – 12	UN	2B	3.6250	...	3.5709	3.5793	0.0084	3.535	3.553	...	...	3.544	3.554
	12		3B	3.6250	...	3.5709	3.5772	0.0063	3.5350	3.5448	...	...	3.5438	3.5538
	$3\frac{5}{8}$ – 16 or 3.6250 – 16	UN	2B	3.6250	...	3.5844	3.5919	0.0075	3.557	3.571	...	...	3.564	3.573
(6)	16		3B	3.6250	...	3.5844	3.5900	0.0056	3.5570	3.5658	...	...	3.5641	3.5726
	$3\frac{3}{4}$ – 4 or 3.7500 – 4	UNC	1B	3.7500	...	3.5876	3.6094	0.0218	3.479	3.517	...	...	...	...
	4		2B	3.7500	...	3.5876	3.6021	0.0145	3.479	3.517	...	...	3.506	3.536
	4		3B	3.7500	...	3.5876	3.5985	0.0109	3.4790	3.5094	...	...	3.5064	3.5364
	$3\frac{3}{4}$ – 6 or 3.7500 – 6	UN	2B	3.7500	...	3.6417	3.6544	0.0127	3.570	3.600	...	...	3.588	3.608
	6		3B	3.7500	...	3.6417	3.6512	0.0095	3.5700	3.5896	...	...	3.5876	3.6076
	$3\frac{3}{4}$ – 8 or 3.7500 – 8	UN	2B	3.7500	...	3.6688	3.6805	0.0117	3.615	3.640	...	...	3.628	3.643
	8		3B	3.7500	...	3.6688	3.6776	0.0088	3.6150	3.6297	...	...	3.6282	3.6432
(6)	$3\frac{3}{4}$ – 12 or 3.7500 – 12	UN	2B	3.7500	...	3.6959	3.7043	0.0084	3.660	3.678	...	...	3.669	3.679
(6)	12		3B	3.7500	...	3.6959	3.7022	0.0063	3.6600	3.6698	...	...	3.6688	3.6788
(6)	$3\frac{3}{4}$ – 16 or 3.7500 – 16	UN	2B	3.7500	...	3.7094	3.7170	0.0076	3.682	3.696	...	...	3.689	3.698
(6)	16		3B	3.7500	...	3.7094	3.7151	0.0057	3.6820	3.6908	...	...	3.6891	3.6976
	$3\frac{7}{8}$ – 4 or 3.8750 – 4	UN	2B	3.8750	...	3.7126	3.7272	0.0146	3.604	3.642	...	...	3.631	3.661
	4		3B	3.8750	...	3.7126	3.7235	0.0109	3.6040	3.6344	...	...	3.6314	3.6614
	$3\frac{7}{8}$ – 6 or 3.8750 – 6	UN	2B	3.8750	...	3.7667	3.7795	0.0128	3.695	3.725	...	...	3.713	3.733
	6		3B	3.8750	...	3.7667	3.7763	0.0096	3.6950	3.7146	...	...	3.7126	3.7326

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$3\frac{7}{8}$ – 8 or 3.8750 – 8	UN	2B	3.8750	...	3.7938	3.8056	0.0118	3.740	3.765	...	...	3.753	3.768
	8		3B	3.8750	...	3.7938	3.8026	0.0088	3.7400	3.7547	...	...	3.7532	3.7682
	$3\frac{7}{8}$ – 12 or 3.8750 – 12	UN	2B	3.8750	...	3.8209	3.8294	0.0085	3.785	3.803	...	...	3.794	3.804
	12		3B	3.8750	...	3.8209	3.8273	0.0064	3.7850	3.7948	...	...	3.7938	3.8038
(6)	$3\frac{7}{8}$ – 16 or 3.8750 – 16	UN	2B	3.8750	...	3.8344	3.8420	0.0076	3.807	3.821	...	...	3.814	3.823
(6)	16		3B	3.8750	...	3.8344	3.8401	0.0057	3.8070	3.8158	...	...	3.8141	3.8226
	4 – 4 or 4.0000 – 4	UNC	1B	4.0000	...	3.8376	3.8597	0.0221	3.729	3.767	...	...	...	...
	4		2B	4.0000	...	3.8376	3.8523	0.0147	3.729	3.767	...	...	3.7560	3.7860
	4		3B	4.0000	...	3.8376	3.8487	0.0111	3.7290	3.7594	...	...	3.7564	3.7864
	4 – 6 or 4.0000 – 6	UN	2B	4.0000	...	3.8917	3.9046	0.0129	3.820	3.850	...	...	3.838	3.858
	6		3B	4.0000	...	3.8917	3.9014	0.0097	3.8200	3.8396	...	...	3.8376	3.8576
	4 – 8 or 4.0000 – 8	UN	2B	4.0000	...	3.9188	3.9307	0.0119	3.865	3.890	...	...	3.878	3.893
	8		3B	4.0000	...	3.9188	3.9277	0.0089	3.8650	3.8797	...	...	3.8782	3.8932
	4 – 12 or 4.0000 – 12	UN	2B	4.0000	...	3.9459	3.9544	0.0085	3.910	3.928	...	...	3.919	3.929
	12		3B	4.0000	...	3.9459	3.9523	0.0064	3.9100	3.9198	...	...	3.9188	3.9288
	4 – 16 or 4.0000 – 16	UN	2B	4.0000	...	3.9594	3.9670	0.0076	3.932	3.946	...	...	3.939	3.948
(6)	16		3B	4.0000	...	3.9594	3.9651	0.0057	3.9320	3.9408	...	...	3.9391	3.9476
	$4\frac{1}{8}$ – 4 or 4.1250 – 4	UN	2B	4.1250	...	3.9626	3.9774	0.0148	3.854	3.892	...	...	3.881	3.911
	4		3B	4.1250	...	3.9626	3.9738	0.0112	3.8540	3.8844	...	...	3.8814	3.9114
	$4\frac{1}{8}$ – 6 or 4.1250 – 6	UN	2B	4.1250	...	4.0167	4.0297	0.0130	3.945	3.975	...	...	3.963	3.983
	6		3B	4.1250	...	4.0167	4.0264	0.0097	3.9450	3.9646	...	...	3.9626	3.9826
	$4\frac{1}{8}$ – 8 or 4.1250 – 8	UN	2B	4.1250	...	4.0438	4.0558	0.0120	3.990	4.015	...	...	4.003	4.018
	8		3B	4.1250	...	4.0438	4.0528	0.0090	3.9900	4.0047	...	...	4.0032	4.0182
(6)	$4\frac{1}{8}$ – 12 or 4.1250 – 12	UN	2B	4.1250	...	4.0709	4.0794	0.0085	4.035	4.053	...	...	4.044	4.054
	12		3B	4.1250	...	4.0709	4.0773	0.0064	4.0350	4.0448	...	...	4.0438	4.0538

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	$4\frac{1}{8}$ – 16 or 4.1250 – 16	UN	2B	4.1250	...	4.0844	4.0921	0.0077	4.057	4.071	...	...	4.064	4.073
(6)	16		3B	4.1250	...	4.0844	4.0901	0.0057	4.0570	4.0658	...	...	4.0641	4.0726
	$4\frac{1}{4}$ – 4 or 4.2500 – 4	UNC	2B	4.2500	...	4.0876	4.1025	0.0149	3.979	4.017	...	...	4.006	4.036
	4		3B	4.2500	...	4.0876	4.0988	0.0112	3.9790	4.0094	...	...	4.0064	4.0364
	$4\frac{1}{4}$ – 6 or 4.2500 – 6	UN	2B	4.2500	...	4.1417	4.1548	0.0131	4.070	4.100	...	...	4.088	4.108
	6		3B	4.2500	...	4.1417	4.1515	0.0098	4.0700	4.0896	...	...	4.0876	4.1076
(6)	$4\frac{1}{4}$ – 8 or 4.2500 – 8	UN	2B	4.2500	...	4.1688	4.1809	0.0121	4.115	4.140	...	...	4.128	4.143
(6)	8		3B	4.2500	...	4.1688	4.1778	0.0090	4.1150	4.1297	...	...	4.1282	4.1432
(6)	$4\frac{1}{4}$ – 12 or 4.2500 – 12	UN	2B	4.2500	...	4.1959	4.2045	0.0086	4.160	4.178	...	...	4.169	4.179
	12		3B	4.2500	...	4.1959	4.2023	0.0064	4.1600	4.1698	...	...	4.1688	4.1788
(6)	$4\frac{1}{4}$ – 16 or 4.2500 – 16	UN	2B	4.2500	...	4.2094	4.2171	0.0077	4.182	4.196	...	...	4.189	4.198
(6)	16		3B	4.2500	...	4.2094	4.2152	0.0058	4.1820	4.1908	...	...	4.1891	4.1976
	$4\frac{3}{8}$ – 4 or 4.3750 – 4	UN	2B	4.3750	...	4.2126	4.2276	0.0150	4.104	4.142	...	...	4.131	4.161
	4		3B	4.3750	...	4.2126	4.2239	0.0113	4.1040	4.1344	...	...	4.1314	4.1614
	$4\frac{3}{8}$ – 6 or 4.3750 – 6	UN	2B	4.3750	...	4.2667	4.2799	0.0132	4.195	4.225	...	...	4.213	4.233
	6		3B	4.3750	...	4.2667	4.2766	0.0099	4.1950	4.2146	...	...	4.2126	4.2326
(6)	$4\frac{3}{8}$ – 8 or 4.3750 – 8	UN	2B	4.3750	...	4.2938	4.3059	0.0121	4.240	4.265	...	...	4.253	4.268
	8		3B	4.3750	...	4.2938	4.3029	0.0091	4.2400	4.2547	...	...	4.2532	4.2682
(6)	$4\frac{3}{8}$ – 12 or 4.3750 – 12	UN	2B	4.3750	...	4.3209	4.3295	0.0086	4.285	4.303	...	...	4.294	4.304
(6)	12		3B	4.3750	...	4.3209	4.3273	0.0064	4.2850	4.2948	...	...	4.2938	4.3038
(6)	$4\frac{3}{8}$ – 16 or 4.3750 – 16	UN	2B	4.3750	...	4.3344	4.3421	0.0077	4.307	4.321	...	...	4.314	4.323
(6)	16		3B	4.3750	...	4.3344	4.3402	0.0058	4.3070	4.3158	...	...	4.3141	4.3226
	$4\frac{1}{2}$ – 4 or 4.5000 – 4	UNC	2B	4.5000	...	4.3376	4.3527	0.0151	4.229	4.267	...	...	4.256	4.286
	4		3B	4.5000	...	4.3376	4.3489	0.0113	4.2290	4.2594	...	...	4.2564	4.2864

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	4½ – 6 or 4.5000 – 6	UN	2B	4.5000	...	4.3917	4.4050	0.0133	4.320	4.350	...	...	4.338	4.358
	6		3B	4.5000	...	4.3917	4.4016	0.0099	4.3200	4.3396	...	...	4.3376	4.3576
	4½ – 8 or 4.5000 – 8	UN	2B	4.5000	...	4.4188	4.4310	0.0122	4.365	4.390	...	...	4.378	4.393
	8		3B	4.5000	...	4.4188	4.4280	0.0092	4.3650	4.3797	...	...	4.3782	4.3932
(6)	4½ – 12 or 4.5000 – 12	UN	2B	4.5000	...	4.4459	4.4545	0.0086	4.410	4.428	...	...	4.419	4.429
(6)	12		3B	4.5000	...	4.4459	4.4524	0.0065	4.4100	4.4198	...	...	4.4188	4.4288
(6)	4½ – 16 or 4.5000 – 16	UN	2B	4.5000	...	4.4594	4.4672	0.0078	4.432	4.446	...	...	4.439	4.448
(6)	16		3B	4.5000	...	4.4594	4.4652	0.0058	4.4320	4.4408	...	...	4.4391	4.4476
	4⅝ – 4 or 4.6250 – 4	UN	2B	4.6250	...	4.4626	4.4778	0.0152	4.354	4.392	...	...	4.381	4.411
	4		3B	4.6250	...	4.4626	4.4740	0.0114	4.3540	4.3844	...	...	4.3814	4.4114
	4⅝ – 6 or 4.6250 – 6	UN	2B	4.6250	...	4.5167	4.5300	0.0133	4.445	4.475	...	...	4.463	4.483
	6		3B	4.6250	...	4.5167	4.5267	0.0100	4.4450	4.4646	...	...	4.4626	4.4826
(6)	4⅝ – 8 or 4.6250 – 8	UN	2B	4.6250	...	4.5438	4.5561	0.0123	4.490	4.515	...	...	4.503	4.518
(6)	8		3B	4.6250	...	4.5438	4.5530	0.0092	4.4900	4.5047	...	...	4.5032	4.5182
(6)	4⅝ – 12 or 4.6250 – 12	UN	2B	4.6250	...	4.5709	4.5796	0.0087	4.535	4.553	...	...	4.544	4.554
(6)	12		3B	4.6250	...	4.5709	4.5774	0.0065	4.5350	4.5448	...	...	4.5438	4.5538
(6)	4⅝ – 16 or 4.6250 – 16	UN	2B	4.6250	...	4.5844	4.5922	0.0078	4.557	4.571	...	...	4.564	4.573
(6)	16		3B	4.6250	...	4.5844	4.5902	0.0058	4.5570	4.5658	...	...	4.5641	4.5726
	4¾ – 4 or 4.7500 – 4	UNC	2B	4.7500	...	4.5876	4.6029	0.0153	4.479	4.517	...	...	4.506	4.536
	4		3B	4.7500	...	4.5876	4.5990	0.0114	4.4790	4.5094	...	...	4.5064	4.5364
	4¾ – 6 or 4.7500 – 6	UN	2B	4.7500	...	4.6417	4.6551	0.0134	4.570	4.600	...	...	4.588	4.608
	6		3B	4.7500	...	4.6417	4.6518	0.0101	4.5700	4.5896	...	...	4.5876	4.6076
	4¾ – 8 or 4.7500 – 8	UN	2B	4.7500	...	4.6688	4.6812	0.0124	4.615	4.640	...	...	4.628	4.643
(6)	8		3B	4.7500	...	4.6688	4.6781	0.0093	4.6150	4.6297	...	...	4.6282	4.6432

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$4\frac{3}{4}$ – 12 or 4.7500 – 12	UN	2B	4.7500	...	4.6959	4.7046	0.0087	4.660	4.678	...	...	4.669	4.679
(6)	12		3B	4.7500	...	4.6959	4.7024	0.0065	4.6600	4.6698	...	...	4.6688	4.6788
(6)	$4\frac{3}{4}$ – 16 or 4.7500 – 16	UN	2B	4.7500	...	4.7094	4.7172	0.0078	4.682	4.696	...	...	4.689	4.698
(6)	16		3B	4.7500	...	4.7094	4.7153	0.0059	4.6820	4.6908	...	...	4.6891	4.6976
	$4\frac{3}{4}$ – 4 or 4.8750 – 4	UN	2B	4.8750	...	4.7126	4.7280	0.0154	4.604	4.642	...	...	4.631	4.661
	4		3B	4.8750	...	4.7126	4.7242	0.0116	4.6040	4.6344	...	...	4.6314	4.6614
	$4\frac{7}{8}$ – 6 or 4.8750 – 6	UN	2B	4.8750	...	4.7667	4.7802	0.0135	4.695	4.725	...	...	4.713	4.733
	6		3B	4.8750	...	4.7667	4.7768	0.0101	4.6950	4.7146	...	...	4.7126	4.7326
	$4\frac{7}{8}$ – 8 or 4.8750 – 8	UN	2B	4.8750	...	4.7938	4.8063	0.0125	4.740	4.765	...	...	4.753	4.768
	8		3B	4.8750	...	4.7938	4.8032	0.0094	4.7400	4.7547	...	...	4.7532	4.7682
	$4\frac{7}{8}$ – 12 or 4.8750 – 12	UN	2B	4.8750	...	4.8209	4.8296	0.0087	4.785	4.803	...	...	4.794	4.804
(6)	12		3B	4.8750	...	4.8209	4.8274	0.0065	4.7850	4.7948	...	...	4.7938	4.8038
(6)	$4\frac{7}{8}$ – 16 or 4.8750 – 16	UN	2B	4.8750	...	4.8344	4.8422	0.0078	4.807	4.821	...	...	4.814	4.823
(6)	16		3B	4.8750	...	4.8344	4.8403	0.0059	4.8070	4.8158	...	...	4.8141	4.8226
	5 – 4 or 5.0000 – 4	UNC	2B	5.0000	...	4.8376	4.8530	0.0154	4.729	4.767	...	...	4.756	4.786
	4		3B	5.0000	...	4.8376	4.8492	0.0116	4.7290	4.7594	...	...	4.7546	4.7864
	5 – 6 or 5.0000 – 6	UN	2B	5.0000	...	4.8917	4.9053	0.0136	4.820	4.850	...	...	4.838	4.858
	6		3B	5.0000	...	4.8917	4.9019	0.0102	4.8200	4.8396	...	...	4.8376	4.8576
	5 – 8 or 5.0000 – 8	UN	2B	5.0000	...	4.9188	4.9314	0.0126	4.865	4.890	...	...	4.878	4.893
(6)	8		3B	5.0000	...	4.9188	4.9282	0.0094	4.8650	4.8797	...	...	4.8782	4.8932
	5 – 12 or 5.0000 – 12	UN	2B	5.0000	...	4.9459	4.9546	0.0087	4.910	4.928	...	...	4.919	4.929
	12		3B	5.0000	...	4.9459	4.9525	0.0066	4.9100	4.9198	...	...	4.9188	4.9288
	5 – 16 or 5.0000 – 16	UN	2B	5.0000	...	4.9594	4.9673	0.0079	4.932	4.946	...	...	4.939	4.948
(6)	16		3B	5.0000	...	4.9594	4.9653	0.0059	4.9320	4.9408	...	...	4.9391	4.9476

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	$5\frac{1}{8}$ – 4 or 5.1250 – 4	UN	2B	5.1250	...	4.9626	4.9781	0.0155	4.854	4.892	...	...	4.881	4.911
	4		3B	5.1250	...	4.9626	4.9743	0.0117	4.8540	4.8844	...	...	4.8814	4.9114
	$5\frac{1}{8}$ – 6 or 5.1250 – 6	UN	2B	5.1250	...	5.0167	5.0304	0.0137	4.945	4.975	...	...	4.963	4.983
	6		3B	5.1250	...	5.0167	5.0270	0.0103	4.9450	4.9646	...	...	4.9626	4.9826
(6)	$5\frac{1}{8}$ – 8 or 5.1250 – 8	UN	2B	5.1250	...	5.0438	5.0565	0.0127	4.990	5.015	...	...	5.003	5.018
	8		3B	5.1250	...	5.0438	5.0533	0.0095	4.9900	5.0047	...	...	5.0032	5.0182
(6)	$5\frac{1}{8}$ – 12 or 5.1250 – 12	UN	2B	5.1250	...	5.0709	5.0797	0.0088	5.035	5.053	...	...	5.044	5.054
(6)	12		3B	5.1250	...	5.0709	5.0775	0.0066	5.0350	5.0448	...	...	5.0438	5.0538
	$5\frac{1}{8}$ – 16 or 5.1250 – 16	UN	2B	5.1250	...	5.0844	5.0923	0.0079	5.057	5.071	...	...	5.064	5.073
(6)	16		3B	5.1250	...	5.0844	5.0903	0.0059	5.0570	5.0658	...	...	5.0641	5.0726
	$5\frac{1}{4}$ – 4 or 5.2500 – 4	UNC	2B	5.2500	...	5.0876	5.1032	0.0156	4.979	5.017	...	...	5.006	5.036
	4		3B	5.2500	...	5.0876	5.0993	0.0117	4.9790	5.0094	...	...	5.0064	5.0364
	$5\frac{1}{4}$ – 6 or 5.2500 – 6	UN	2B	5.2500	...	5.1417	5.1555	0.0138	5.070	5.100	...	...	5.088	5.108
	6		3B	5.2500	...	5.1417	5.1520	0.0103	5.0700	5.0896	...	...	5.0876	5.1076
	$5\frac{1}{8}$ – 8 or 5.2500 – 8	UN	2B	5.2500	...	5.1688	5.1815	0.0127	5.115	5.140	...	...	5.128	5.143
(6)	8		3B	5.2500	...	5.1688	5.1783	0.0095	5.1150	5.1297	...	...	5.1282	5.1432
(6)	$5\frac{1}{8}$ – 12 or 5.2500 – 12	UN	2B	5.2500	...	5.1959	5.2047	0.0088	5.160	5.178	...	...	5.169	5.179
(6)	12		3B	5.2500	...	5.1959	5.2025	0.0066	5.1600	5.1698	...	...	5.1688	5.1788
	$5\frac{1}{4}$ – 16 or 5.2500 – 16	UN	2B	5.2500	...	5.2094	5.2173	0.0079	5.182	5.196	...	...	5.189	5.198
(6)	16		3B	5.2500	...	5.2094	5.2153	0.0059	5.1820	5.1908	...	...	5.1891	5.1976
	$5\frac{3}{8}$ – 4 or 5.3875 – 4	UN	2B	5.3875	...	5.2251	5.2408	0.0157	5.117	5.154	...	...	5.144	5.174
	4		3B	5.3875	...	5.2251	5.2368	0.0117	5.1170	5.1469	...	...	5.1439	5.1739
	$5\frac{3}{8}$ – 6 or 5.3750 – 6	UN	2B	5.3750	...	5.2667	5.2805	0.0138	5.195	5.225	...	...	5.213	5.233
	6		3B	5.3750	...	5.2667	5.2771	0.0104	5.1950	5.2146	...	...	5.2126	5.2326

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	$5\frac{3}{8}$ – 8 or 5.3750 – 8	UN	2B	5.3750	...	5.2938	5.3066	0.0128	5.240	5.265	...	...	5.253	5.268
(6)	8		3B	5.3750	...	5.2938	5.3034	0.0096	5.2400	5.2547	...	...	5.2532	5.2682
(6)	$5\frac{3}{8}$ – 12 or 5.3750 – 12	UN	2B	5.3750	...	5.3209	5.3297	0.0088	5.285	5.303	...	...	5.294	5.304
(6)	12		3B	5.3750	...	5.3209	5.3275	0.0066	5.2850	5.2948	...	...	5.2938	5.3038
	$5\frac{3}{8}$ – 16 or 5.3750 – 16	UN	2B	5.3750	...	5.3344	5.3423	0.0079	5.307	5.321	...	...	5.314	5.323
(6)	16		3B	5.3750	...	5.3344	5.3404	0.0060	5.3070	5.3158	...	...	5.3141	5.3226
	$5\frac{1}{2}$ – 4 or 5.5000 – 4	UNC	2B	5.5000	...	5.3376	5.3534	0.0158	5.229	5.267	...	...	5.256	5.286
	4		3B	5.5000	...	5.3376	5.3494	0.0118	5.2290	5.2594	...	...	5.2564	5.2864
	$5\frac{1}{2}$ – 6 or 5.5000 – 6	UN	2B	5.5000	...	5.3917	5.4056	0.0139	5.320	5.350	...	...	5.338	5.358
	6		3B	5.5000	...	5.3917	5.4021	0.0104	5.3200	5.3396	...	...	5.3376	5.3576
	$5\frac{1}{2}$ – 8 or 5.5000 – 8	UN	2B	5.5000	...	5.4188	5.4317	0.0129	5.365	5.390	...	...	5.378	5.393
	8		3B	5.5000	...	5.4188	5.4285	0.0097	5.3650	5.3797	...	...	5.3782	5.3932
(6)	$5\frac{1}{2}$ – 12 or 5.5000 – 12	UN	2B	5.5000	...	5.4459	5.4548	0.0089	5.410	5.428	...	...	5.419	5.429
(6)	12		3B	5.5000	...	5.4459	5.4525	0.0066	5.4100	5.4198	...	...	5.4188	5.4288
(6)	$5\frac{1}{2}$ – 16 or 5.5000 – 16	UN	2B	5.5000	...	5.4594	5.4674	0.0080	5.432	5.446	...	...	5.439	5.448
(6)	16		3B	5.5000	...	5.4594	5.4654	0.0060	5.4320	5.4408	...	...	5.4391	5.4476
	$5\frac{5}{8}$ – 4 or 5.6250 – 4	UN	2B	5.6250	...	5.4626	5.4784	0.0158	5.354	5.392	...	...	5.381	5.411
	4		3B	5.6250	...	5.4626	5.4744	0.0118	5.3540	5.3844	...	...	5.3814	5.4114
	$5\frac{5}{8}$ – 6 or 5.6250 – 6	UN	2B	5.6250	...	5.5167	5.5307	0.0140	5.445	5.475	...	...	5.463	5.483
	6		3B	5.6250	...	5.5167	5.5272	0.0105	5.4450	5.4646	...	...	5.4626	5.4826
	$5\frac{5}{8}$ – 8 or 5.6250 – 8	UN	2B	5.6250	...	5.5438	5.5568	0.0130	5.490	5.515	...	...	5.503	5.518
(6)	8		3B	5.6250	...	5.5438	5.5535	0.0097	5.4900	5.5047	...	...	5.5032	5.5182
(6)	$5\frac{5}{8}$ – 12 or 5.6250 – 12	UN	2B	5.6250	...	5.5709	5.5798	0.0089	5.535	5.553	...	...	5.544	5.554
(6)	12		3B	5.6250	...	5.5709	5.5776	0.0067	5.5350	5.5448	...	...	5.5438	5.5538

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(6)	$5\frac{5}{8}$ – 16 or 5.6250 – 16	UN	2B	5.6250	...	5.5844	5.5924	0.0080	5.557	5.571	...	...	5.564	5.573
(6)	16		3B	5.6250	...	5.5844	5.5904	0.0060	5.5570	5.5658	...	...	5.5641	5.5726
	$5\frac{3}{4}$ – 4 or 5.7500 – 4	UNC	2B	5.7500	...	5.5876	5.6035	0.0159	5.479	5.517	...	...	5.506	5.536
	4		3B	5.7500	...	5.5876	5.5995	0.0119	5.4790	5.5094	...	...	5.5064	5.5364
	$5\frac{3}{4}$ – 6 or 5.7500 – 6	UN	2B	5.7500	...	5.6417	5.6558	0.0141	5.570	5.600	...	...	5.588	5.608
	6		3B	5.7500	...	5.6417	5.6523	0.0106	5.5700	5.5896	...	...	5.5876	5.6076
(6)	$5\frac{3}{4}$ – 8 or 5.7500 – 8	UN	2B	5.7500	...	5.6688	5.6818	0.0130	5.615	5.640	...	...	5.628	5.643
	8		3B	5.7500	...	5.6688	5.6786	0.0098	5.6150	5.6297	...	...	5.6282	5.6432
(6)	$5\frac{3}{4}$ – 12 or 5.7500 – 12	UN	2B	5.7500	...	5.6959	5.7048	0.0089	5.660	5.678	...	...	5.669	5.679
(6)	12		3B	5.7500	...	5.6959	5.7026	0.0067	5.6600	5.6698	...	...	5.6688	5.6788
(6)	$5\frac{3}{4}$ – 16 or 5.7500 – 16	UN	2B	5.7500	...	5.7094	5.7174	0.0080	5.682	5.696	...	...	5.689	5.698
(6)	16		3B	5.7500	...	5.7094	5.7154	0.0060	5.6820	5.6908	...	...	5.6891	5.6976
	$5\frac{7}{8}$ – 4 or 5.8750 – 4	UN	2B	5.8750	...	5.7126	5.7286	0.0160	5.604	5.642	...	...	5.631	5.661
	4		3B	5.8750	...	5.7126	5.7246	0.0120	5.6040	5.6344	...	...	5.6314	5.6614
	$5\frac{7}{8}$ – 6 or 5.8750 – 6	UN	2B	5.8750	...	5.7667	5.7809	0.0142	5.695	5.725	...	...	5.713	5.733
	6		3B	5.8750	...	5.7667	5.7773	0.0106	5.6950	5.7146	...	...	5.7126	5.7326
(6)	$5\frac{7}{8}$ – 8 or 5.8750 – 8	UN	2B	5.8750	...	5.7938	5.8069	0.0131	5.740	5.765	...	...	5.753	5.768
	8		3B	5.8750	...	5.7938	5.8036	0.0098	5.7400	5.7547	...	...	5.7532	5.7682
(6)	$5\frac{7}{8}$ – 12 or 5.8750 – 12	UN	2B	5.8750	...	5.8209	5.8298	0.0089	5.785	5.803	...	...	5.794	5.804
	12		3B	5.8750	...	5.8209	5.8276	0.0067	5.7850	5.7948	...	...	5.7938	5.8038
	$5\frac{7}{8}$ – 16 or 5.8750 – 16	UN	2B	5.8750	...	5.8344	5.8425	0.0081	5.807	5.821	...	...	5.814	5.823
(6)	16		3B	5.8750	...	5.8344	5.8404	0.0060	5.8070	5.8158	...	...	5.8141	5.8226
	6 – 4 or 6.0000 – 4	UN	2B	6.0000	...	5.8376	5.8537	0.0161	5.729	5.767	...	...	5.756	5.786
	4		3B	6.0000	...	5.8376	5.8496	0.0120	5.7290	5.7594	...	...	5.7564	5.7864

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Table 2B Limits of Size for Standard Series Internal Threads (UN and UNJ) (Cont'd)

	Nominal Size and Threads/in.	Series Designation	Class [Note (1)]	Major Diameter, D		Pitch Diameter, D_2, and Functional Diameter [Note (3)]			Minor Diameter, D_1					
									UN [Note (4)]		UNR [Note (5)]		UNJ	
				Min.	Max. [Note (2)]	Min.	Max.	Tolerance, TD_2	Min.	Max.	Min.	Max.	Min.	Max.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	6 – 6 or 6.0000 – 6	UN	2B	6.0000	...	5.8917	5.9059	0.0142	5.820	5.850	...	...	5.838	5.858
	6		3B	6.0000	...	5.8917	5.9024	0.0107	5.8200	5.8396	...	...	5.8376	5.8576
(6)	6 – 8 or 6.0000 – 8	UN	2B	6.0000	...	5.9188	5.9320	0.0132	5.865	5.890	...	...	5.878	5.893
(6)	8		3B	6.0000	...	5.9188	5.9287	0.0099	5.8650	5.8797	...	...	5.8782	5.8932
	6 – 12 or 6.0000 – 12	UN	2B	6.0000	...	5.9459	5.9549	0.0090	5.910	5.928	...	...	5.919	5.929
	12		3B	6.0000	...	5.9459	5.9526	0.0067	5.9100	5.9198	...	...	5.9188	5.9288
	6 – 16 or 6.0000 – 16	UN	2B	6.0000	...	5.9594	5.9675	0.0081	5.932	5.946	...	...	5.939	5.948
(6)	16		3B	6.0000	...	5.9594	5.9655	0.0061	5.9320	5.9408	...	...	5.9391	5.9476

GENERAL NOTES:

(a) Series designation shown in column 2 indicates the UN thread form; however, the UNR or UNJ thread form may be specified.

(b) Thread classes may be combined. See para. 4.1.

NOTES:

(1) There is no Class 1B for the UNJ thread series.

(2) Maximum major diameter, D, is not specified. See paras. 5.5 and 8.3.2(a).

(3) See para. 5.2.1 for functional diameter.

(4) Values for UN minor diameter are shown as three or four decimal places. See paras 8.3.2(e) and 8.3.2(f).

(5) There is no UNR internal thread, only an external UNR that is intended to assemble with an internal UN thread.

(6) One or more of the numbers listed in this row have been changed to correct for calculation and rounding errors. The original numbers from past issues of this Standard are listed in Nonmandatory Appendix E and are for reference only.

(7) Formerly NF; tolerances and allowances are based on 1 diameter length of engagement.

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3.6.3 16-Thread Series. The 16-thread series (16-UN) is a uniform-pitch series for large diameters requiring fine-pitch threads. It is suitable for adjusting collars and retaining nuts and also serves as a continuation of the extra-fine-thread series for diameters larger than $1\frac{11}{16}$ in.

3.7 Fine Threads for Thin-Wall Tubing

The limits of size for a 28-thread series, ranging from 0.216 in. to 1.5 in. nominal size, are included in Tables 2A and 2B. These threads are recommended for general use on thin-wall tubing. The 27-thread series is no longer standard but is included in Table D-1.

4 SCREW THREAD CLASSES

4.1 Thread Classes

Thread classes are distinguished from each other by the amounts of tolerance and allowance. Classes 1A, 2A, and 3A apply to external threads only, and Classes 1B, 2B, and 3B apply to internal threads only. Allowance is specified only for Classes 1A and 2A and the allowance is identical for both classes. Tolerance decreases as class number increases (e.g., tolerance for Class 3A is less than that for Class 2A, which is less than that for Class 1A). End-use applications dictate the requirements for selection of thread classes, but it should be understood that all internal classes will assemble with all external classes. For example, a Class 2A external thread may be used with a Class 1B, Class 2B, or Class 3B internal thread.

4.1.1 Classes 1A and 1B Threads. Classes 1A (external) and 1B (internal) threads replaced American National Class 1 screw threads. These classes provide for applications where a liberal tolerance and an allowance are required to permit easy assembly even with slightly nicked threads. These classes are intended for ordnance and other special uses. Maximum diameters of Class 1A threads are less than basic by the amount of the allowance (the allowance is identical to that for Class 2A). The allowance is not available for plating or coating; consequently, it will be necessary to make special provisions in thread manufacturing for accommodation of plating or coating. The minimum diameters of Class 1B threads, whether or not plated or coated, are basic and therefore afford no allowance or clearance for assembly at maximum material limits.

4.1.2 Classes 2A and 2B Threads. Classes 2A (external) and 2B (internal) threads are the most commonly used thread classes for general applications, including production of bolts, screws, nuts, and similar threaded fasteners.

The maximum diameters of Class 2A 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 coatings. 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 apply to a part after plating. The minimum diameters of Class 2B threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly at maximum material limits.

4.1.3 Classes 3A and 3B Threads. Classes 3A (external) and 3B (internal) threads provide for applications where closeness of fit and/or accuracy of thread elements are important. The maximum diameters of Class 3A threads and the minimum diameters of Class 3B threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly at maximum material limits.

5 SCREW THREAD ALLOWANCE AND TOLERANCE

5.1 Allowance

Allowance is specified only for Classes 1A and 2A external threads. For Class 1A threads, its purpose is to preclude the possibility of surface-to-surface fit between mating parts and it cannot be used to accommodate plating or coating. For Class 2A threads, the allowance may be used to accommodate plating or coating. Allowance for Classes 1A and 2A is identical: it is based on Class 2A pitch diameter tolerance, Td_2, for the respective series' standard length of engagement and is applicable for all lengths of engagement.

Formulas for allowance are given in para. 5.8.1(a). Applications of allowances to the basic thread form are shown in Figures 5, 7, and 10.

EXAMPLE: 2.0625-12-UNS-2A
From para. 5.8.1(a): Allowance, es = 0.300 Td_2 (2A)
From para. 5.2(a): Td_2 (2A) = 0.006070
Therefore, es = 0.300 × 0.006070 = 0.001821, or 0.0018 in. when rounded.

5.2 Pitch Diameter Tolerance, All Classes

NOTE: Refer to Table 1 for the standard series of diameter-pitch combinations. Allowances and tolerances for standard series threads are applied in Tables 2A and 2B. All other diameter-pitch combinations are considered nonstandard. Allowances and tolerances for nonstandard threads must be calculated using the appropriate formulas contained in this Standard.

The pitch diameter tolerances specified in Table 2A for all classes of the UNC/UNRC/UNJC and UNF/UNRF/UNJF series are based on a length of engagement equal to the basic major (nominal) diameter and are applicable for lengths of engagement from 5 pitches up to 1.5 diameters. For the 4-UN/UNR/UNJ, 6-UN/UNR/UNJ, and 8-UN/UNR/UNJ series, the pitch diameter tolerances specified for Classes 2A and 3A are based on a length of engagement

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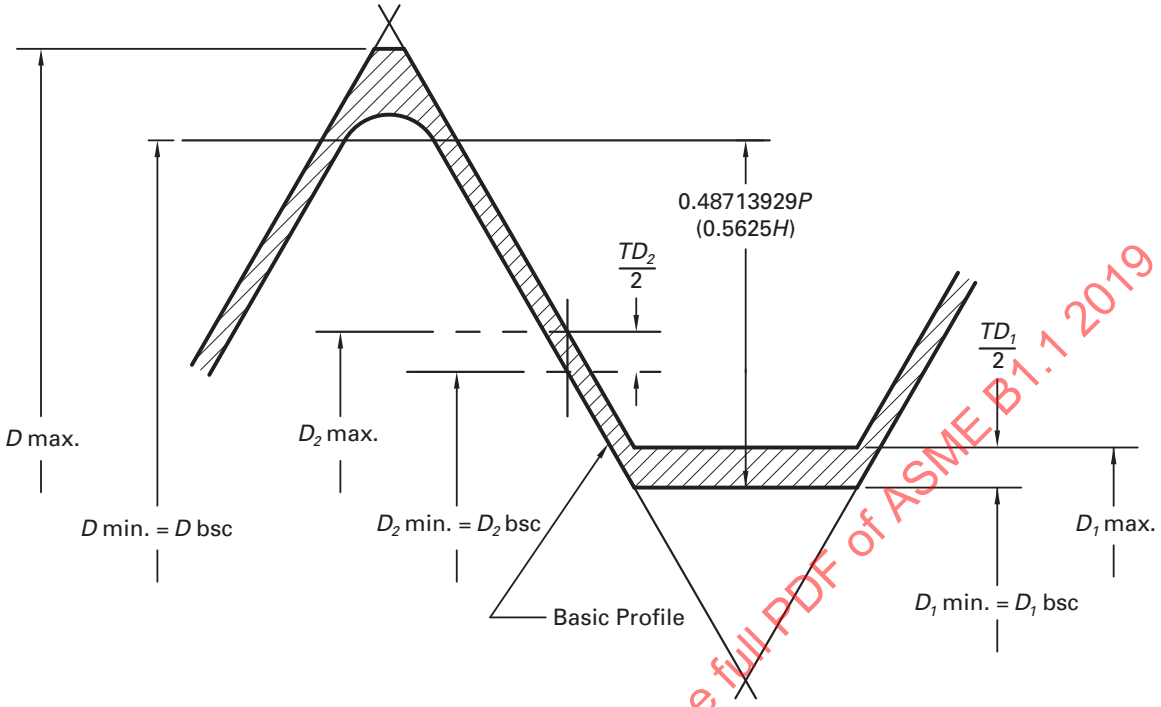
Figure 12 Internal UNJ Thread Design Profile and Tolerances



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equal to the basic major (nominal) diameter and are applicable for lengths of engagement up to 1.5 diameters.

The pitch diameter tolerances specified in Table 2A for all classes of the UNEF/UNRF/UNJEF, 12-UN/UNR/UNJ, 16-UN/UNR/UNJ, 20-UN/UNR/UNJ, 28-UN/UNR/UNJ, and 32-UN/UNR/UNJ series are based on a length of engagement of 9 pitches and are applicable for lengths of engagement from 5 pitches to 15 pitches.

The pitch diameter tolerances specified in Table 2B for all classes of the UNC/UNJC and UNF/UNJF series are based on a length of engagement equal to the basic major (nominal) diameter and are applicable for lengths of engagement from 5 pitches up to 1.5 diameters. For the 4-UN/UNJ, 6-UN/UNJ, and 8-UN/UNJ series, the pitch diameter tolerances specified for Classes 2B and 3B are based on a length of engagement equal to the basic major (nominal) diameter and are applicable for lengths of engagement up to 1.5 diameters.

The pitch diameter tolerances specified in Table 2B for all classes of the UNEF/UNJEF, 12-UN/UNJ, 16-UN/UNJ, 20-UN/UNJ, 28-UN/UNJ, and 32-UN/UNJ series are based on a length of engagement of 9 pitches and are applicable for lengths of engagement from 5 pitches to 15 pitches.

The pitch diameter tolerances specified in Table D-1 for all classes of the UNS series are based on a length of engagement of 9 pitches and are applicable for lengths of engagement from 5 pitches to 15 pitches.

Formulas for pitch diameter tolerance are given in paras. 5.8.1(c) and 5.8.2(b).

Applications of tolerances to the thread form are shown in Figures 5 through 12.

For special threads, tolerances and allowances shall be computed from the formulas in paras. 5.8.1 and 5.8.2. If the length of engagement is between 5 pitches and 15 pitches or is unknown, use 9 pitches in the applicable formulas. For all other lengths of engagement, use the known values.

EXAMPLE 1: 2.0625-12-UNS-2A [length of engagement (LE) not specified]

$$Td_2 = 0.0015\sqrt[3]{D} + 0.0015\sqrt{\text{LE}} + 0.015\sqrt[3]{P^2}$$
$$Td_2 = 0.0015\sqrt[3]{2.0625} + 0.0015\sqrt{9/12} + 0.015\sqrt[3]{0.08333333^2}$$
$$Td_2 = 0.001909 + 0.001299 + 0.002862$$
$$Td_2 = 0.006070$$

EXAMPLE 2: 2.0625-12-UNS-SE2A [18 pitches length of engagement (LE)]

$$Td_2 = 0.0015\sqrt[3]{D} + 0.0015\sqrt{\text{LE}} + 0.015\sqrt[3]{P^2}$$
$$Td_2 = 0.0015\sqrt[3]{2.0625} + 0.0015\sqrt{1.500} + 0.015\sqrt[3]{0.08333333^2}$$
$$Td_2 = 0.001909 + 0.001837 + 0.002862$$
$$Td_2 = 0.006608$$

5.2.1 Functional Diameter. Functional diameter size includes the effects of all variations in pitch diameter, thread form, and profile. The variations in the individual thread characteristics such as flank angle, lead, taper, and roundness on a given thread cause the measurements of the pitch diameter and functional diameter to vary from one another on most threads. The pitch diameter and functional diameter on a given thread are equal to one another only when the thread form is perfect.

When required to inspect/evaluate the pitch diameter and/or the functional diameter for thread acceptance (see ASME B1.3), use the same limits of size for the appropriate thread size and class.

5.3 Special Lengths of Engagement (LE)

Length of engagement is the actual length of thread that is engaged when internal and external mated threads are fully assembled, and is equal to the shorter of the two thread lengths.

For example, a ½-in.-wide threaded nut when fully assembled with a 2-in.-long threaded bolt has ½ in. (0.500 in.) of thread engagement. However, a 2-in.-wide threaded nut when fully assembled with a ½-in.-long threaded bolt also has ½ in. (0.500 in.) of thread engagement.

Length of engagement can have an effect on the functional diameter size (see para 5.2.1) due to the cumulative effects of variations in lead and flank angles (see Table 3). On internal threads these variations will reduce functional diameter size and on external threads they will increase it, resulting in a reduction in allowance (clearance) when assembled. The longer the engagement, the greater this effect, and the less the clearance can be. Using longer than standard lengths of engagements can result in the external and internal threads not assembling.

In many cases, part producers are required to manufacture only the internal thread or only the external thread without information about the corresponding thread length, so the length of engagement is unknown. In these cases, it may be necessary to obtain more information identifying the length of engagement so the proper formulas (for allowances and/or tolerances) and gaging are used to result in full assembly.

The allowances and/or tolerances as well as the resulting thread elements listed in Tables 2A and 2B are for what are considered standard lengths of engagement as outlined in para. 5.2. Special lengths of engagement are ones that are longer or shorter than those identified in para. 5.2.

The required length of engagement may be the determining factor in the proper selection of thread allowances and tolerances. When design considerations require lengths of engagement less than or greater than those covered by the tables, the allowances and/or tolerances should be adjusted using formulas in para 5.8. When using longer than standard lengths of engagement, it is particularly important that changes in allowances and/or tolerances be considered for external threads designated Class 3A or 2A coated to basic limits (see para. 7.2). This is because there is no allowance as with a Class 2A (uncoated) thread and the functional effects of lead variation may prevent full assembly.

Determining the product or manufacturing specifications for special lengths of engagement is application dependent and is therefore outside the scope of this document. It is the responsibility of the designer of the parts to determine these specifications.

NOTE: Past editions of this Standard provided examples of how to handle special lengths of engagement. These were examples only and not requirements. Because of this, they are no longer part of this Standard and have been moved to Nonmandatory Appendix F for historical and reference purposes.

5.4 Minor Diameter Tolerance and Allowance for External Threads

The tolerance for minor diameter is for reference only. 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 allowance, if any. A formula for the minor diameter tolerance of external threads is given in para. 5.8.1(d).

5.5 Major Diameter Tolerance for Internal Threads

The tolerance for major diameter is for reference only. 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 that has no allowance. A formula for the major diameter tolerance of internal threads is given in para. 5.8.2(a).

5.6 Minor Diameter Tolerance and Length of Engagement for Internal Threads

Formulas for the minor diameter tolerance for internal threads are given in para. 5.8.2(c).

Internal thread minor diameter tolerances are suitable for lengths of engagement up to 1.5 diameters. For applications having shorter or longer lengths of engagement, it may be advantageous to decrease or increase the tolerance as explained in para. 5.6.1.

5.6.1 The principal practical factors that govern minor diameter tolerance are ease of tapping, standard drill sizes, and height of engagement.

NOTE: Height of engagement is measured in a radial direction, while length of engagement is measured in an axial direction.

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
0-80 or 0.0600-80	UNF	2A	0.00052	0.00090	2B	0.00066	0.00115
		3A	0.00038	0.00065	3B	0.00048	0.00085
1-64 or 0.0730-64	UNC	2A	0.00058	0.00100	2B	0.00075	0.00130
		3A	0.00043	0.00075	3B	0.00055	0.00095
1-72 or 0.0730-72	UNF	2A	0.00055	0.00095	2B	0.00072	0.00125
		3A	0.00040	0.00070	3B	0.00055	0.00095
2-56 or 0.0860-56	UNC	2A	0.00061	0.00105	2B	0.00081	0.00140
		3A	0.00046	0.00080	3B	0.00061	0.00105
2-64 or 0.0860-64	UNF	2A	0.00058	0.00100	2B	0.00078	0.00135
		3A	0.00043	0.00075	3B	0.00058	0.00100
3-48 or 0.0990-48	UNC	2A	0.00066	0.00115	2B	0.00087	0.00150
		3A	0.00049	0.00085	3B	0.00064	0.00110
3-56 or 0.0990-56	UNF	2A	0.00064	0.00110	2B	0.00081	0.00140
		3A	0.00046	0.00080	3B	0.00061	0.00105
4-40 or 0.1120-40	UNC	2A	0.00072	0.00125	2B	0.00095	0.00165
		3A	0.00055	0.00095	3B	0.00069	0.00120
4-48 or 0.1120-48	UNF	2A	0.00069	0.00120	2B	0.00089	0.00155
		3A	0.00052	0.00090	3B	0.00066	0.00115
5-40 or 0.1250-40	UNC	2A	0.00075	0.00130	2B	0.00095	0.00165
		3A	0.00055	0.00095	3B	0.00072	0.00125
5-44 or 0.1250-44	UNF	2A	0.00072	0.00125	2B	0.00092	0.00160
		3A	0.00055	0.00095	3B	0.00069	0.00120
6-32 or 0.1380-32	UNC	2A	0.00081	0.00140	2B	0.00107	0.00185
		3A	0.00061	0.00105	3B	0.00078	0.00135
6-40 or 0.1380-40	UNF	2A	0.00075	0.00130	2B	0.00098	0.00170
		3A	0.00058	0.00100	3B	0.00072	0.00125
8-32 or 0.1640-32	UNC	2A	0.00084	0.00145	2B	0.00110	0.00190
		3A	0.00064	0.00110	3B	0.00081	0.00140
8-36 or 0.1640-36	UNF	2A	0.00081	0.00140	2B	0.00104	0.00180
		3A	0.00061	0.00105	3B	0.00078	0.00135
10-24 or 0.1900-24	UNC	2A	0.00095	0.00165	2B	0.00124	0.00215
		3A	0.00072	0.00125	3B	0.00092	0.00160
10-32 or 0.1900-32	UNF	2A	0.00087	0.00150	2B	0.00113	0.00195
		3A	0.00066	0.00115	3B	0.00084	0.00145
12-24 or 0.2160-24	UNC	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00075	0.00130	3B	0.00095	0.00165
12-28 or 0.2160-28	UNF	2A	0.00092	0.00160	2B	0.00121	0.00210
		3A	0.00069	0.00120	3B	0.00089	0.00155

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
12-32 or 0.2160-32	UNEF	2A	0.00089	0.00155	2B	0.00118	0.00205
		3A	0.00069	0.00120	3B	0.00089	0.00155
1/4-20 or 0.2500-20	UNC	1A	0.00162	0.00280	1B	0.00211	0.00365
		2A	0.00107	0.00185	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00104	0.00180
1/4-28 or 0.2500-28	UNF	1A	0.00144	0.00250	1B	0.00188	0.00325
		2A	0.00095	0.00165	2B	0.00124	0.00215
		3A	0.00072	0.00125	3B	0.00092	0.00160
1/4-32 or 0.2500-32	UNEF	2A	0.00092	0.00160	2B	0.00121	0.00210
		3A	0.00069	0.00120	3B	0.00089	0.00155
5/16-18 or 0.3125-18	UNC	1A	0.00176	0.00305	1B	0.00223	0.00395
		2A	0.00115	0.00200	2B	0.00153	0.00265
		3A	0.00087	0.00150	3B	0.00113	0.00195
5/16-20 or 0.3125-20	UN	2A	0.00115	0.00200	2B	0.0015	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
5/16-24 or 0.3125-24	UNF	1A	0.00159	0.00275	1B	0.00205	0.00355
		2A	0.00107	0.00185	2B	0.00139	0.00240
		3A	0.00078	0.00135	3B	0.00104	0.00180
5/16-28 or 0.3125-28	UN	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00075	0.00130	3B	0.00095	0.00165
5/16-32 or 0.3125-32	UNEF	2A	0.00092	0.00160	2B	0.00121	0.00210
		3A	0.00069	0.00120	3B	0.00089	0.00155
3/8-16 or 0.3750-16	UNC	1A	0.00188	0.00325	1B	0.00245	0.00425
		2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
3/8-20 or 0.3750-20	UN	2A	0.00118	0.00205	2B	0.00156	0.00270
		3A	0.00089	0.00155	3B	0.00115	0.00200
3/8-24 or 0.3750-24	UNF	1A	0.00165	0.00285	1B	0.00214	0.00370
		2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00084	0.00145	3B	0.00107	0.00185
3/8-28 or 0.3750-28	UN	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
3/8-32 or 0.3750-32	UNEF	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00072	0.00125	3B	0.00095	0.00165
7/16-14 or 0.4375-14	UNC	1A	0.00205	0.00355	1B	0.00266	0.00460
		2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00133	0.00230
7/16-16 or 0.4375-16	UN	2A	0.00133	0.00230	2B	0.0017	0.00295
		3A	0.00098	0.00170	3B	0.00130	0.00225

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
7/16-20 or 0.4375-20	UNF	1A	0.00182	0.00315	1B	0.00234	0.00405
		2A	0.00121	0.00210	2B	0.00156	0.00270
		3A	0.00089	0.00155	3B	0.00118	0.00205
7/16-28 or 0.4375-28	UNEF	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
7/16-32 or 0.4375-32	UN	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00072	0.00125	3B	0.00095	0.00165
1/2-13 or 0.5000-13	UNC	1A	0.00214	0.00370	1B	0.00280	0.00485
		2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
1/2-16 or 0.5000-16	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00133	0.00230
1/2-20 or 0.5000-20	UNF	1A	0.00185	0.00320	1B	0.00242	0.00420
		2A	0.00124	0.00215	2B	0.00162	0.00280
		3A	0.00092	0.00160	3B	0.00121	0.00210
1/2-28 or 0.5000-28	UNEF	2A	0.00107	0.00185	2B	0.00139	0.00240
		3A	0.00081	0.00140	3B	0.00104	0.0018
1/2-32 or 0.5000-32	UN	2A	0.00101	0.00175	2B	0.00130	0.00225
		3A	0.00075	0.00130	3B	0.00098	0.00170
9/16-12 or 0.5625-12	UNC	1A	0.00225	0.00390	1B	0.00294	0.00510
		2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
9/16-16 or 0.5625-16	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00133	0.00230
9/16-18 or 0.5625-18	UNF	1A	0.00196	0.00340	1B	0.00257	0.00445
		2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
9/16-20 or 0.5625-20	UN	2A	0.00121	0.00210	2B	0.00159	0.00275
		3A	0.00092	0.00160	3B	0.00118	0.00205
9/16-24 or 0.5625-24	UNEF	2A	0.00113	0.00195	2B	0.00147	0.00255
		3A	0.00084	0.00145	3B	0.00110	0.00190
9/16-28 or 0.5625-28	UN	2A	0.00107	0.00185	2B	0.00139	0.00240
		3A	0.00081	0.00140	3B	0.00104	0.00180
9/16-32 or 0.5625-32	UN	2A	0.00101	0.00175	2B	0.00130	0.00225
		3A	0.00075	0.00130	3B	0.00098	0.00170
5/8-11 or 0.6250-11	UNC	1A	0.00240	0.00415	1B	0.00309	0.00535
		2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
5/8-12 or 0.6250-12	UN	2A	0.00156	0.00270	2B	0.00205	0.00355

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
		3A	0.00118	0.00205	3B	0.00153	0.00265
5/8-16 or 0.6250-16	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
5/8-18 or 0.6250-18	UNF	1A	0.00202	0.00350	1B	0.00263	0.00455
		2A	0.00136	0.00235	2B	0.00173	0.00300
		3A	0.00101	0.00175	3B	0.00130	0.00255
5/8-20 or 0.6250-20	UN	2A	0.00124	0.00215	2B	0.00162	0.00280
		3A	0.00092	0.00160	3B	0.00121	0.00210
5/8-24 or 0.6250-24	UNEF	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
5/8-28 or 0.6250-28	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
5/8-32 or 0.6250-32	UN	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
11/16-12 or 0.6875-12	UN	2A	0.00156	0.00270	2B	0.00205	0.00355
		3A	0.00118	0.00205	3B	0.00153	0.00265
11/16-16 or 0.6875-16	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00130	3B	0.00133	0.00230
11/16-20 or 0.6875-20	UN	2A	0.00124	0.00215	2B	0.00162	0.00280
		3A	0.00092	0.00160	3B	0.00121	0.00210
11/16-24 or 0.6875-24	UNEF	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
11/16-28 or 0.6875-28	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
11/16-32 or 0.6875-32	UN	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
3/4-10 or 0.7500-10	UNC	1A	0.00254	0.00440	1B	0.00332	0.00575
		2A	0.00170	0.00295	2B	0.00222	0.00385
		3A	0.00127	0.00220	3B	0.00165	0.00285
3/4-12 or 0.7500-12	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
3/4-16 or 0.7500-16	UNF	1A	0.00217	0.00375	1B	0.00283	0.00490
		2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00110	0.00190	3B	0.00141	0.00245
3/4-20 or 0.7500-20	UNEF	2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
3/4-28 or 0.7500-28	UN	2A	0.00110	0.00190	2B	0.00144	0.00250
		3A	0.00084	0.00145	3B	0.00107	0.00185

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
3/4-32 or 0.7500-32	UN	2A	0.00104	0.00180	2B	0.00136	0.00235
		3A	0.00078	0.00135	3B	0.00104	0.00180
13/16-12 or 0.8125-12	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
13/16-16 or 0.8125-16	UN	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
13/16-20 or 0.8125-20	UNEF	2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
13/16-28 or 0.8125-28	UN	2A	0.00110	0.00190	2B	0.00144	0.00250
		3A	0.00084	0.00145	3B	0.00107	0.00185
13/16-32 or 0.8125-32	UN	2A	0.00104	0.00180	2B	0.00136	0.00235
		3A	0.00078	0.00135	3B	0.00104	0.00180
7/8-9 or 0.8750-9	UNC	1A	0.00274	0.00475	1B	0.00355	0.00615
		2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00176	0.00305
7/8-12 or 0.8750-12	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
7/8-14 or 0.8750-14	UNF	1A	0.00234	0.00405	1B	0.00306	0.00530
		2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00118	0.00205	3B	0.00153	0.00265
7/8-16 or 0.8750-16	UN	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
7/8-20 or 0.8750-20	UNEF	2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
7/8-28 or 0.8750-28	UN	2A	0.00110	0.00190	2B	0.00144	0.00250
		3A	0.00084	0.00145	3B	0.00107	0.00185
7/8-32 or 0.8750-32	UN	2A	0.00104	0.00180	2B	0.00136	0.00235
		3A	0.00078	0.00135	3B	0.00104	0.00180
15/16-12 or 0.9375-12	UN	2A	0.00165	0.00255	2B	0.00214	0.00370
		3A	0.00121	0.00210	3B	0.00159	0.00275
15/16-16 or 0.9375-16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245
15/16-20 or 0.9375-20	UNEF	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
15/16-28 or 0.9375-28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
15/16-32 or 0.9375-32	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
1-8 or 1.0000-8	UNC	1A	0.00292	0.00505	1B	0.00381	0.0066
		2A	0.00196	0.00340	2B	0.00254	0.00440
		3A	0.00147	0.00255	3B	0.00191	0.00330
1-12 or 1.0000-12	UNF	1A	0.00254	0.00440	1B	0.00329	0.00570
		2A	0.0017	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
1-14 or 1.0000-14	UNS	1A	0.00242	0.00420	1B	0.00315	0.00545
		2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00156	0.00270
1-16 or 1.0000-16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.001850	3B	0.00141	0.00245
1-20 or 1.0000-20	UNEF	2A	0.0013	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
1-28 or 1.0000-28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
1-32 or 1.0000-32	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
$1\frac{1}{16}$-8 or 1.0625-8	UN	2A	0.00196	0.00340	2B	0.00257	0.00445
		3A	0.00147	0.00255	3B	0.00193	0.00335
$1\frac{1}{16}$-12 or 1.0625-12	UN	2A	0.00165	0.00285	2B	0.00214	0.00370
		3A	0.00121	0.00210	3B	0.00159	0.00275
$1\frac{1}{16}$-16 or 1.0625-16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245
$1\frac{1}{16}$-18 or 1.0625-18	UNEF	2A	0.00136	0.00235	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{1}{16}$-20 or 1.0625-20	UN	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
$1\frac{1}{16}$-28 or 1.0625-28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
$1\frac{1}{8}$-7 or 1.1250-7	UNC	1A	0.00315	0.00545	1B	0.00407	0.00705
		2A	0.00208	0.00360	2B	0.00271	0.00470
		3A	0.00156	0.00270	3B	0.00205	0.00355
$1\frac{1}{8}$-8 or 1.1250-8	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
$1\frac{1}{8}$-12 or 1.1250-12	UNF	1A	0.00260	0.00450	1B	0.00338	0.00585
		2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00170	0.00295
$1\frac{1}{8}$-16 or 1.1250-16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

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		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
$1\frac{1}{8}$-18 or 1.1250-18	UNEF	2A	0.00136	0.00235	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{1}{8}$-20 or 1.1250-20	UN	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
$1\frac{1}{8}$-28 or 1.1250-28	UN	2A	0.00115	0.00200	2B	0.0015	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
$1\frac{3}{16}$-8 or 1.1875-8	UN	2A	0.00202	0.00350	2B	0.00263	0.00455
		3A	0.00150	0.00260	3B	0.00196	0.00340
$1\frac{3}{16}$-12 or 1.1875-12	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.002150	3B	0.00162	0.00280
$1\frac{3}{16}$-16 or 1.1875-16	UN	2A	0.00147	0.002550	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$1\frac{3}{16}$-18 or 1.1875-18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{3}{16}$-20 or 1.1875-20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{3}{16}$-28 or 1.1875-28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{1}{4}$-7 or 1.2500-7	UNC	1A	0.00320	0.00555	1B	0.00416	0.00720
		2A	0.00214	0.00370	2B	0.00277	0.00480
		3A	0.00159	0.00275	3B	0.00208	0.00360
$1\frac{1}{4}$-8 or 1.2500-8	UN	2A	0.00202	0.00350	2B	0.00266	0.00460
		3A	0.00153	0.00265	3B	0.00199	0.00345
$1\frac{1}{4}$-12 or 1.2500-12	UNF	1A	0.00266	0.00460	1B	0.00346	0.00600
		2A	0.00179	0.00310	2B	0.00231	0.00400
		3A	0.00133	0.00230	3B	0.00173	0.00300
$1\frac{1}{4}$-16 or 1.2500-16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00100	0.00190	3B	0.00144	0.00250
$1\frac{1}{4}$-18 or 1.2500-18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{1}{4}$-20 or 1.2500-20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{1}{4}$-28 or 1.2500-28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{5}{16}$-8 or 1.3125-8	UN	2A	0.00205	0.00355	2B	0.00266	0.00460
		3A	0.00153	0.00265	3B	0.00199	0.00345
$1\frac{5}{16}$-12 or 1.3125-12	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

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		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
$1\frac{5}{16}$-16 or 1.3125-16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$1\frac{5}{16}$-18 or 1.3125-18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{5}{16}$-20 or 1.3125-20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{5}{16}$-28 or 1.3125-28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{3}{8}$-6 or 1.3750-6	UNC	1A	0.00346	0.00600	1B	0.00447	0.00775
		2A	0.00231	0.00400	2B	0.00300	0.00520
		3A	0.00173	0.00300	3B	0.00225	0.00390
$1\frac{3}{8}$-8 or 1.3750-8	UN	2A	0.00208	0.00360	2B	0.00268	0.00465
		3A	0.00156	0.00270	3B	0.00202	0.00350
$1\frac{3}{8}$-12 or 1.3750-12	UNF	1A	0.00271	0.00470	1B	0.00355	0.00615
		2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00176	0.00305
$1\frac{3}{8}$-16 or 1.3750-16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$1\frac{3}{8}$-18 or 1.3750-18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{3}{8}$-20 or 1.3750-20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{3}{8}$-28 or 1.3750-28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{7}{16}$-6 or 1.4375-6	UN	2A	0.00231	0.00400	2B	0.00300	0.00520
		3A	0.00173	0.00300	3B	0.00225	0.00390
$1\frac{7}{16}$-8 or 1.4375-8	UN	2A	0.00208	0.00360	2B	0.00271	0.00470
		3A	0.00156	0.00270	3B	0.00205	0.00355
$1\frac{7}{16}$-12 or 1.4375-12	UN	2A	0.00170	0.00295	2B	0.00219	0.0038
		3A	0.00127	0.00220	3B	0.00165	0.00285
$1\frac{7}{16}$-16 or 1.4375-16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
$1\frac{7}{16}$-18 or 1.4375-18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
$1\frac{7}{16}$-20 or 1.4375-20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{7}{16}$-28 or 1.4375-28	UN	2A	0.00121	0.00210	2B	0.00159	0.00275
		3A	0.00089	0.00155	3B	0.00118	0.00205

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
1½-6 or 1.5000-6	UNC	1A	0.00349	0.00605	1B	0.00456	0.00790
		2A	0.00234	0.00405	2B	0.00303	0.00525
		3A	0.00176	0.00305	3B	0.00228	0.00395
1½-8 or 1.5000-8	UN	2A	0.00211	0.00365	2B	0.00274	0.00475
		3A	0.00159	0.00275	3B	0.00205	0.00355
1½-12 or 1.5000-12	UNF	1A	0.00277	0.00480	1B	0.00361	0.00625
		2A	0.00185	0.00320	2B	0.00240	0.00415
		3A	0.00139	0.00240	3B	0.00182	0.00315
1½-16 or 1.5000-16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
1½-18 or 1.5000-18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
1½-20 or 1.5000-20	UN	2A	0.00139	0.00240	2B	0.00179	0.0031
		3A	0.00104	0.00180	3B	0.00133	0.00230
1½-28 or 1.5000-28	UN	2A	0.00121	0.00210	2B	0.00159	0.00275
		3A	0.00089	0.00155	3B	0.00118	0.00205
1⁹⁄₁₆-6 or 1.5625-6	UN	2A	0.00237	0.00410	2B	0.00306	0.00530
		3A	0.00176	0.00305	3B	0.00231	0.00400
1⁹⁄₁₆-8 or 1.5625-8	UN	2A	0.00214	0.00370	2B	0.00277	0.00480
		3A	0.00159	0.00275	3B	0.00208	0.00360
1⁹⁄₁₆-12 or 1.5625-12	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
1⁹⁄₁₆-16 or 1.5625-16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
1⁹⁄₁₆-18 or 1.5625-18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
1⁹⁄₁₆-20 or 1.5625-20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
1⅝-6 or 1.6250-6	UN	2A	0.00237	0.00410	2B	0.00309	0.00535
		3A	0.00179	0.00310	3B	0.00231	0.00400
1⅝-8 or 1.6250-8	UN	2A	0.00214	0.00370	2B	0.00280	0.00485
		3A	0.00162	0.00280	3B	0.00208	0.00360
1⅝-12 or 1.6250-12	UN	2A	0.00170	0.00295	2B	0.00219	0.0038
		3A	0.00127	0.00220	3B	0.00165	0.00285
1⅝-16 or 1.6250-16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
1⅝-18 or 1.6250-18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00130	0.00240

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

		External			Internal		
Nominal Size and Threads/in.	Series Designation	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
$1\frac{5}{8}$-20 or 1.6250-20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{11}{16}$-6 or 1.6875-6	UN	2A	0.00240	0.00415	2B	0.00312	0.00540
		3A	0.00179	0.00310	3B	0.00234	0.00405
$1\frac{11}{16}$-8 or 1.6875-8	UN	2A	0.00217	0.00375	2B	0.00280	0.00485
		3A	0.00162	0.00280	3B	0.00211	0.00365
$1\frac{11}{16}$-12 or 1.6875-12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{11}{16}$-16 or 1.6875-16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{11}{16}$-18 or 1.6875-18	UNEF	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00141	0.00245
$1\frac{11}{16}$-20 or 1.6875-20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{3}{4}$-5 or 1.7500-5	UNC	1A	0.00387	0.00670	1B	0.00502	0.00870
		2A	0.00257	0.00445	2B	0.00335	0.00580
		3A	0.00193	0.00335	3B	0.00251	0.00435
$1\frac{3}{4}$-6 or 1.7500-6	UN	2A	0.00240	0.00415	2B	0.00312	0.00540
		3A	0.00182	0.00315	3B	0.00234	0.00405
$1\frac{3}{4}$-8 or 1.7500-8	UN	2A	0.00217	0.00375	2B	0.00283	0.00490
		3A	0.00165	0.00285	3B	0.00214	0.00370
$1\frac{3}{4}$-12 or 1.7500-12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{3}{4}$-16 or 1.7500-16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{3}{4}$-20 or 1.7500-20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{13}{16}$-6 or 1.8125-6	UN	2A	0.00242	0.00420	2B	0.00315	0.00545
		3A	0.00182	0.00315	3B	0.00237	0.00410
$1\frac{13}{16}$-8 or 1.8125-8	UN	2A	0.00219	0.00380	2B	0.00286	0.00495
		3A	0.00165	0.00285	3B	0.00214	0.00370
$1\frac{13}{16}$-12 or 1.8125-12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{13}{16}$-16 or 1.8125-16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{13}{16}$-20 or 1.8125-20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{7}{8}$-6 or 1.8750-6	UN	2A	0.00242	0.00420	2B	0.00318	0.00550

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
		3A	0.00182	0.00315	3B	0.00237	0.00410
$1\frac{7}{8}$-8 or 1.8750-8	UN	2A	0.00222	0.00385	2B	0.00289	0.00500
		3A	0.00165	0.00285	3B	0.00217	0.00375
$1\frac{7}{8}$-12 or 1.8750-12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{7}{8}$-16 or 1.8750-16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{7}{8}$-20 or 1.8750-20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.001800	3B	0.00136	0.00235
$1\frac{15}{16}$-6 or 1.9375-6	UN	2A	0.00245	0.00425	2B	0.00320	0.00555
		3A	0.00185	0.00320	3B	0.00240	0.00415
$1\frac{15}{16}$-8 or 1.9375-8	UN	2A	0.00222	0.00385	2B	0.00289	0.00500
		3A	0.00167	0.00290	3B	0.00217	0.00375
$1\frac{15}{16}$-12 or 1.9375-12	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.0013	0.00225	3B	0.00170	0.00295
$1\frac{15}{16}$-16 or 1.9375-16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{15}{16}$-20 or 1.9375-20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
2-4$\frac{1}{2}$ or 2.0000-4.5	UNC	1A	0.00413	0.00715	1B	0.00537	0.00930
		2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00205	0.00355	3B	0.00268	0.00465
2-6 or 2.0000-6	UN	2A	0.00248	0.00430	2B	0.00320	0.00555
		3A	0.00185	0.00320	3B	0.00240	0.00415
2-8 or 2.0000-8	UN	2A	0.00225	0.00390	2B	0.00292	0.00505
		3A	0.00167	0.00290	3B	0.00219	0.00380
2-12 or 2.0000-12	UN	2A	0.00176	0.00305	2B	0.00223	0.00395
		3A	0.00130	0.00225	3B	0.0017	0.00295
2-16 or 2.0000-16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
2-20 or 2.0000-20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
$2\frac{1}{8}$-6 or 2.1250-6	UN	2A	0.00251	0.00435	2B	0.00326	0.00565
		3A	0.00188	0.00325	3B	0.00242	0.00420
$2\frac{1}{8}$-8 or 2.1250-8	UN	2A	0.00228	0.00395	2B	0.00294	0.00510
		3A	0.00170	0.00295	3B	0.00212	0.00385
$2\frac{1}{8}$-12 or 2.1250-12	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
2 1/8-16 or 2.1250-16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
2 1/8-20 or 2.1250-20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
2 1/4-4 1/2 or 2.2500-4.5	UNC	1A	0.00421	0.00730	1B	0.00548	0.00950
		2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
2 1/4-6 or 2.2500-6	UN	2A	0.00254	0.00440	2B	0.00329	0.00570
		3A	0.00191	0.00330	3B	0.00214	0.00425
2 1/4-8 or 2.2500-8	UN	2A	0.00231	0.00400	2B	0.00300	0.00520
		3A	0.00173	0.00300	3B	0.00225	0.00390
2 1/4-12 or 2.2500-12	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
2 1/4-16 or 2.2500-16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
2 1/4-20 or 2.2500-20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
2 3/8-6 or 2.3750-6	UN	2A	0.00257	0.00445	2B	0.00332	0.00575
		3A	0.00191	0.00330	3B	0.00248	0.00430
2 3/8-8 or 2.3750-8	UN	2A	0.00234	0.00405	2B	0.00303	0.00525
		3A	0.00173	0.00300	3B	0.00228	0.00395
2 3/8-12 or 2.3750-12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
2 3/8-16 or 2.3750-16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00155	0.00270
2 3/8-20 or 2.3750-20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
2 1/2-4 or 2.5000-4	UNC	1A	0.00447	0.00775	1B	0.00583	0.0101
		2A	0.00300	0.00520	2B	0.0039	0.00675
		3A	0.00225	0.00390	3B	0.00292	0.00505
2 1/2-6 or 2.5000-6	UN	2A	0.00260	0.00450	2B	0.00335	0.00580
		3A	0.00193	0.00335	3B	0.00251	0.00435
2 1/2-8 or 2.5000-8	UN	2A	0.00237	0.00410	2B	0.00306	0.00530
		3A	0.00176	0.00305	3B	0.00231	0.00400
2 1/2-12 or 2.5000-12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
2 1/2-16 or 2.5000-16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
$2\frac{1}{2}$-20 or 2.5000-20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.0011	0.00190	3B	0.00144	0.00250
$2\frac{5}{8}$-6 or 2.6250-6	UN	2A	0.00260	0.00450	2B	0.00341	0.00590
		3A	0.00196	0.00340	3B	0.00254	0.00440
$2\frac{5}{8}$-8 or 2.6250-8	UN	2A	0.00237	0.00410	2B	0.00309	0.00535
		3A	0.00179	0.00310	3B	0.00231	0.00400
$2\frac{5}{8}$-12 or 2.6250-12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
$2\frac{5}{8}$-16 or 2.6250-16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$2\frac{5}{8}$-20 or 2.6250-20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$2\frac{3}{4}$-4 or 2.7500-4	UNC	1A	0.00456	0.00790	1B	0.00595	0.01030
		2A	0.00303	0.00525	2B	0.00395	0.00685
		3A	0.00228	0.00395	3B	0.00297	0.00515
$2\frac{3}{4}$-6 or 2.7500-6	UN	2A	0.00263	0.00455	2B	0.00344	0.00595
		3A	0.00196	0.00340	3B	0.00257	0.00445
$2\frac{3}{4}$-8 or 2.7500-8	UN	2A	0.00240	0.00415	2B	0.00312	0.00540
		3A	0.00182	0.00315	3B	0.00234	0.00405
$2\frac{3}{4}$-12 or 2.7500-12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
$2\frac{3}{4}$-16 or 2.7500-16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$2\frac{3}{4}$-20 or 2.7500-20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$2\frac{7}{8}$-6 or 2.8750-6	UN	2A	0.00266	0.00460	2B	0.00346	0.00600
		3A	0.00199	0.00345	3B	0.00280	0.00450
$2\frac{7}{8}$-8 or 2.8750-8	UN	2A	0.00242	0.00420	2B	0.00318	0.00550
		3A	0.00182	0.00315	3B	0.00237	0.00410
$2\frac{7}{8}$-12 or 2.8750-12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
$2\frac{7}{8}$-16 or 2.8750-16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
$2\frac{7}{8}$-20 or 2.8750-20	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
3-4 or 3.0000-4	UNC	1A	0.00465	0.00805	1B	0.00603	0.01045
		2A	0.00309	0.00535	2B	0.00401	0.00695
		3A	0.00231	0.00400	3B	0.00300	0.00520

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
3-6 or 3.0000-6	UN	2A	0.00268	0.00465	2B	0.00349	0.00605
		3A	0.00202	0.00350	3B	0.00263	0.00455
3-8 or 3.0000-8	UN	2A	0.00245	0.00425	2B	0.00320	0.00555
		3A	0.00185	0.00320	3B	0.00240	0.00415
3-12 or 3.0000-12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
3-16 or 3.0000-16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
3-20 or 3.0000-20	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
3⅛-6 or 3.1250-6	UN	2A	0.00271	0.00470	2B	0.00352	0.00610
		3A	0.00202	0.00350	3B	0.00266	0.00460
3⅛-8 or 3.1250-8	UN	2A	0.00248	0.00430	2B	0.00323	0.00560
		3A	0.00185	0.00320	3B	0.00242	0.00420
3⅛-12 or 3.1250-12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
3⅛-16 or 3.1250-16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
3¼-4 or 3.2500-4	UNC	1A	0.00471	0.00815	1B	0.00612	0.01060
		2A	0.00315	0.00545	2B	0.00407	0.00705
		3A	0.00237	0.00410	3B	0.00306	0.00530
3¼-6 or 3.2500-6	UN	2A	0.00274	0.00475	2B	0.00355	0.00615
		3A	0.00205	0.00355	3B	0.00266	0.00460
3¼-8 or 3.2500-8	UN	2A	0.00251	0.00435	2B	0.00326	0.00565
		3A	0.00188	0.00325	3B	0.00245	0.00425
3¼-12 or 3.2500-12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
3¼-16 or 3.2500-16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
3⅜-6 or 3.3750-6	UN	2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00208	0.00360	3B	0.00258	0.00465
3⅜-8 or 3.3750-8	UN	2A	0.00254	0.00440	2B	0.00329	0.00570
		3A	0.00191	0.00330	3B	0.00245	0.00425
3⅜-12 or 3.3750-12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00242	3B	0.00182	0.00315
3⅜-16 or 3.3750-16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
3½-4 or 3.5000-4	UNC	1A	0.00479	0.00830	1B	0.00621	0.01075

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
		2A	0.00318	0.00550	2B	0.00413	0.00715
		3A	0.00240	0.00415	3B	0.00312	0.00540
3½-6 or 3.5000-6	UN	2A	0.00277	0.00480	2B	0.00361	0.00625
		3A	0.00208	0.00360	3B	0.00271	0.00470
3½-8 or 3.5000-8	UN	2A	0.00254	0.00440	2B	0.00332	0.00575
		3A	0.00191	0.00330	3B	0.00248	0.00430
3½-12 or 3.5000-12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00240	3B	0.00182	0.00315
3½-16 or 3.5000-16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
3⅝-6 or 3.6250-6	UN	2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
3⅝-8 or 3.6250-8	UN	2A	0.00257	0.00445	2B	0.00335	0.00580
		3A	0.00193	0.00335	3B	0.00251	0.00435
3⅝-12 or 3.6250-12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00240	3B	0.00182	0.00315
3⅝-16 or 3.6250-16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00214	0.00215	3B	0.00162	0.00280
3¾-4 or 3.7500-4	UNC	1A	0.00485	0.00840	1B	0.00629	0.01090
		2A	0.00323	0.00560	2B	0.00419	0.00725
		3A	0.00242	0.00420	3B	0.00315	0.00545
3¾-6 or 3.7500-6	UN	2A	0.00283	0.00490	2B	0.00367	0.00635
		3A	0.00211	0.00365	3B	0.00274	0.00475
3¾-8 or 3.7500-8	UN	2A	0.00260	0.00450	2B	0.00338	0.00585
		3A	0.00193	0.00335	3B	0.00254	0.00440
3¾-12 or 3.7500-12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00240	3B	0.00182	0.00315
3¾-16 or 3.7500-16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
3⅞-6 or 3.8750-6	UN	2A	0.00286	0.00495	2B	0.00369	0.00640
		3A	0.00214	0.00370	3B	0.00277	0.00480
3⅞-8 or 3.8750-8	UN	2A	0.00263	0.00455	2B	0.00341	0.00590
		3A	0.00196	0.00340	3B	0.00254	0.00440
3⅞-12 or 3.8750-12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
3⅞-16 or 3.8750-16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4-4 or 4.0000-4	UNC	1A	0.00491	0.00850	1B	0.00638	0.01105

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
		2A	0.00326	0.00565	2B	0.00424	0.00735
		3A	0.00245	0.00425	3B	0.00320	0.00555
4-6 or 4.0000-6	UN	2A	0.00286	0.00495	2B	0.00372	0.00645
		3A	0.00214	0.00370	3B	0.00280	0.00485
4-8 or 4.0000-8	UN	2A	0.00263	0.00455	2B	0.00344	0.00595
		3A	0.00196	0.00340	3B	0.00257	0.00445
4-12 or 4.0000-12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
4-16 or 4.0000-16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4⅛-6 or 4.1250-6	UN	2A	0.00289	0.00500	2B	0.00375	0.00650
		3A	0.00217	0.00375	3B	0.00280	0.00485
4⅛-8 or 4.1250-8	UN	2A	0.00266	0.00460	2B	0.00346	0.00600
		3A	0.00199	0.00345	3B	0.00260	0.00450
4⅛-12 or 4.1250-12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
4⅛-16 or 4.1250-16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4¼-4 or 4.2500-4	UN	2A	0.00332	0.00575	2B	0.00430	0.00745
		3A	0.00248	0.00430	3B	0.00323	0.00560
4¼-6 or 4.2500-6	UN	2A	0.00292	0.00505	2B	0.00378	0.00655
		3A	0.00217	0.00375	3B	0.00283	0.00490
4¼-8 or 4.2500-8	UN	2A	0.00268	0.00465	2B	0.00346	0.00600
		3A	0.00202	0.00350	3B	0.00263	0.00455
4¼-12 or 4.2500-12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
4¼-16 or 4.2500-16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4⅜-6 or 4.3750-6	UN	2A	0.00292	0.00505	2B	0.00381	0.00660
		3A	0.00219	0.00380	3B	0.00286	0.00495
4⅜-8 or 4.3750-8	UN	2A	0.00268	0.00465	2B	0.00346	0.00600
		3A	0.00202	0.00350	3B	0.00263	0.00455
4⅜-12 or 4.3750-12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
4⅜-16 or 4.3750-16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4½-4 or 4.5000-4	UN	2A	0.00335	0.00580	2B	0.00436	0.00755
		3A	0.00251	0.00435	3B	0.00326	0.00565

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
4½-6 or 4.5000-6	UN	2A	0.00294	0.00510	2B	0.00384	0.00665
		3A	0.00222	0.00385	3B	0.00286	0.00495
4½-8 or 4.5000-8	UN	2A	0.00271	0.00470	2B	0.00352	0.00610
		3A	0.00205	0.00355	3B	0.00266	0.00460
4½-12 or 4.5000-12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
4½-16 or 4.5000-16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4⅝-6 or 4.6250-6	UN	2A	0.00297	0.00515	2B	0.00384	0.00665
		3A	0.00222	0.00385	3B	0.00289	0.00500
4⅝-8 or 4.6250-8	UN	2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00205	0.00355	3B	0.00268	0.00465
4⅝-12 or 4.6250-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
4⅝-16 or 4.6250-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
4¾-4 or 4.7500-4	UN	2A	0.00338	0.00585	2B	0.00442	0.00765
		3A	0.00254	0.00440	3B	0.00329	0.00570
4¾-6 or 4.7500-6	UN	2A	0.00297	0.00515	2B	0.00387	0.00670
		3A	0.00222	0.00385	3B	0.00292	0.00505
4¾-8 or 4.7500-8	UN	2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00205	0.00355	3B	0.00268	0.00465
4¾-12 or 4.7500-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
4¾-16 or 4.7500-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
4⅞-6 or 4.8750-6	UN	2A	0.00300	0.00520	2B	0.00390	0.00675
		3A	0.00225	0.00390	3B	0.00292	0.00505
4⅞-8 or 4.8750-8	UN	2A	0.00277	0.00480	2B	0.00361	0.00625
		3A	0.00208	0.00360	3B	0.00271	0.00470
4⅞-12 or 4.8750-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00101	0.00330
4⅞-16 or 4.8750-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5-4 or 5.0000-4	UN	2A	0.00344	0.00595	2B	0.00445	0.00770
		3A	0.00257	0.00445	3B	0.00335	0.00580
5-6 or 5.0000-6	UN	2A	0.00303	0.00525	2B	0.00393	0.00680
		3A	0.00225	0.00390	3B	0.00294	0.00510

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
5-8 or 5.0000-8	UN	2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
5-12 or 5.0000-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5-16 or 5.0000-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00305
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 1/8-8 or 5.1250-8	UN	2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
5 1/8-12 or 5.1250-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 1/8-16 or 5.1250-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 1/4-4 or 5.2500-4	UN	2A	0.00346	0.00600	2B	0.00450	0.00780
		3A	0.00260	0.00450	3B	0.00385	0.00585
5 1/4-8 or 5.2500-8	UN	2A	0.00283	0.00490	2B	0.00367	0.00635
		3A	0.00214	0.00370	3B	0.00277	0.00480
5 1/4-12 or 5.2500-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 1/4-16 or 5.2500-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 3/8-8 or 5.3750-8	UN	2A	0.00286	0.00495	2B	0.00372	0.00645
		3A	0.00214	0.00370	3B	0.00280	0.00485
5 3/8-12 or 5.3750-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 3/8-16 or 5.3750-16	UN	2A	0.00176	0.00305	2B	0.00231	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 1/2-4 or 5.5000-4	UN	2A	0.00349	0.00605	2B	0.00456	0.00790
		3A	0.00263	0.00455	3B	0.00341	0.00500
5 1/2-8 or 5.5000-8	UN	2A	0.00286	0.00495	2B	0.00372	0.00645
		3A	0.00214	0.00370	3B	0.00280	0.00485
5 1/2-12 or 5.5000-12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 1/2-16 or 5.5000-16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 5/8-8 or 5.6250-8	UN	2A	0.00289	0.00500	2B	0.00375	0.00650
		3A	0.00217	0.00375	3B	0.00283	0.00490
5 5/8-12 or 5.6250-12	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (−)
1	2	3	4	5	6	7	8
$5\frac{5}{8}$-16 or 5.6250-16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305
$5\frac{3}{4}$-4 or 5.7500-4	UN	2A	0.00352	0.00610	2B	0.00459	0.00795
		3A	0.00266	0.00460	3B	0.00344	0.00595
$5\frac{3}{4}$-8 or 5.7500-8	UN	2A	0.00289	0.00500	2B	0.00375	0.00650
		3A	0.00217	0.00375	3B	0.00283	0.00490
$5\frac{3}{4}$-12 or 5.7500-12	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
$5\frac{3}{4}$-16 or 5.7500-16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305
$5\frac{7}{8}$-8 or 5.8750-8	UN	2A	0.00292	0.00505	2B	0.00378	0.00655
		3A	0.00219	0.00380	3B	0.00283	0.00490
$5\frac{7}{8}$-12 or 5.8750-12	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
$5\frac{7}{8}$-16 or 5.8750-16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305
6-4 or 6.0000-4	UN	2A	0.00358	0.00620	2B	0.00455	0.00805
		3A	0.00268	0.00465	3B	0.00346	0.00600
6-8 or 6.0000-8	UN	2A	0.00294	0.00510	2B	0.00384	0.00665
		3A	0.00222	0.00385	3B	0.00286	0.00495
6-12 or 6.0000-12	UN	2A	0.00199	0.00315	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
6-16 or 6.0000-16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305

GENERAL NOTE: See paras. 9.2.2 through 9.2.5 for applicability.

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Height of engagement correlates with the stripping strength of the thread assembly and, therefore, 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 allowance and pitch diameter tolerances 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 an increase in thread diameter. However, such a decrease in tolerance often is not feasible without requiring special drill sizes; in order to better accommodate available standard drill sizes listed in ASME B94.11M, the minor diameter tolerance for Classes 1B and 2B of a given pitch for $\frac{1}{4}$-in. diameter and larger is constant.

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 engagement 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 height of engagement may be shallower and still

develop stripping strength greater than the external thread breaking strength. In these cases, the maximum limit should be increased to reduce the possibility of tapping difficulties.

It is particularly important to reduce the number of minor diameter tolerances to a practical minimum. This reduction is usually obvious to the producer of longer internally threaded components, but sometimes is not understood by the user.

The tolerances for lengths of engagement less than $0.33D$ are 0.50 times the formula values in para. 5.8.2(c). For lengths of engagement from $0.33D$ to $0.67D$, the tolerances are 0.75 times the formula values; for lengths of engagement from $0.67D$ to $1.5D$, the tolerances are equal to the formula values; and for lengths of engagement over $1.5D$, the tolerances are 1.25 times the formula values. Where the tolerance value so computed is more than $0.39400P$, the value is adjusted to equal $0.39400P$.

5.7 Disposition of Allowance and Tolerance

The disposition of allowance, tolerance, and crest clearances for the various thread classes is shown in Figures 5 through 8 and 10 and 11.

5.8 Formulas for Allowance and Tolerance

The following formulas for allowance, *es*, and tolerance are used for unified formulation and apply to standard and special series screw threads.

Calculations shall use Class 2A pitch diameter tolerance, Td_2, with six decimal places. Final values shall be rounded to four decimal places.

The following nomenclature is used in the equations:

D = diameter
es = allowance, external threads
H = height of fundamental triangle = $0.86602540P$
LE = length of engagement, in.
n = threads per inch
P = pitch, in. = $1/n$
TD = major diameter tolerance, internal thread
Td = major diameter tolerance, external thread
TD_1 = minor diameter tolerance, internal thread
Td_1 = minor diameter tolerance, external thread
TD_2 = pitch diameter tolerance, internal thread
Td_2 = pitch diameter tolerance, external thread

5.8.1 External Thread

(a) Allowance (External Threads)

(1) for Classes 1A and 2A

$es = 0.300 \times$ Class 2A Td_2

(2) for Class 3A, there is no allowance

(b) Major Diameter Tolerance (External Threads)

(1) for Class 1A

$Td = 0.0900 \sqrt[3]{P^2}$

(2) for Classes 2A and 3A

$Td = 0.0600 \sqrt[3]{P^2}$

(c) Pitch Diameter Tolerance (External Threads)

(1) for Class 1A

$Td_2 = 1.5000 \times$ Class 2A Td_2

(2) for Class 2A

$Td_2 = 0.0015 \sqrt[3]{D} + 0.0015 \sqrt{LE} + 0.0150 \sqrt[3]{P^2}$

NOTE: See Table 4 for the values of these terms corresponding to given values of diameter and length of engagement.

(3) for Class 3A

$Td_2 = 0.7500 \times$ Class 2A Td_2

(d) Minor Diameter Tolerance (External Threads)

(1) for UNR Classes, to intersection of rounded root with its centerline (see Figures 7 and 8), $Td_1 = Td_2$ for class of thread specified + $0.10825318P$ (see Table 5)

(2) for UN Classes 1A, 2A, and 3A, to intersection of flat root with flanks of threads (see Figures 5 and 6), threads $Td_1 = Td_2$ for class of thread specified + $0.21650635P$ (see Table 5)

(3) for UNJ Classes 2A and 3A, see Figures 7 and 8, para. 8.3.1(f), and Table 5

5.8.2 Internal Thread

(a) Major Diameter Tolerance (Internal Threads) for Classes 1B, 2B, and 3B

$TD = 0.14433757P$ (see Table 5) + TD_2 of the class of thread under consideration

(b) Pitch Diameter Tolerance (Internal Threads)

(1) for Class 1B

$TD_2 = 1.9500 \times$ Class 2A TD_2[1]

(2) for Class 2B

$TD_2 = 1.3000 \times$ Class 2A TD_2[1]

(3) for Class 3B

$TD_2 = 0.9750 \times$ Class 2A TD_2[1]

(c) Minor Diameter Tolerance (Internal Threads)

(1) for UN Classes 1B and 2B

(-a) for all thread series and special threads in sizes less than $\frac{1}{4}$ in.

$TD_1 = [0.0500 \sqrt[3]{P^2} + 0.0300P/D] - 0.002$ in., within the following limitations:

(-1) tolerances shall not be greater than $0.39400P$

(-2) tolerances shall not be less than $0.2500P - 0.400P^2$

[1] Calculations shall use Class 2A pitch diameter tolerance, Td_2, with six decimal places. Final values shall be rounded to four decimal places.

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Table 4 Increments in Pitch Diameter Tolerance — Class 2A
(PD Tolerance = 0.0015 $\sqrt[3]{D}$ + 0.0015$\sqrt{LE}$ + 0.015 $\sqrt[3]{P^2}$)

D	Increments in Td_2 0.0015 $\sqrt[3]{D}$	D	Increments in Td_2 due to D 0.0015 $\sqrt[3]{D}$	1D for sizes	9P for TPI	20P for TPI	LE	Increments in Td_2 due to LE 0.0015 $\sqrt{LE}$	1D for sizes	9P for TPI	20P for TPI	LE	Increments in Td_2 due to LE 0.0015 $\sqrt{LE}$	1D for sizes	20P for TPI	LE	Increments in Td_2 due to LE 0.0015 $\sqrt{LE}$	TPI	Increments in Td_2 due to TPI 0.015 $\sqrt[3]{P^2}$
0.0600	0.000587	1.9375	0.001870	0	...	...	0.060000	0.000367	1/2	18	40	0.500000	0.001061	2 3/8	...	2.375000	0.002312	80	0.000808
0.0625	0.000595	2.0000	0.001890	1/16	...	...	0.062500	0.000375	...	...	36	0.555556	0.001118	2 1/2	8	2.500000	0.002372	72	0.000867
0.0730	0.000627	2.1250	0.001928	#1	...	...	0.073000	0.000405	9/16	16	...	0.562500	0.001125	2 5/8	...	2.625000	0.002430	64	0.000938
0.0860	0.000662	2.2500	0.001966	5/64	...	...	0.078125	0.000419	5/8	...	32	0.625000	0.001186	2 3/4	...	2.750000	0.002487	60	0.000979
0.0938	0.000682	2.3750	0.002001	#2	...	...	0.086000	0.000440	...	14	...	0.642857	0.001203	...	7	2.857143	0.002535	56	0.001025
0.0990	0.000694	2.5000	0.002036	3/32	...	...	0.093800	0.000459	11/16	...	...	0.687500	0.001244	2 7/8	...	2.875000	0.002543	50	0.001105
0.1120	0.000723	2.6250	0.002069	#3	...	...	0.099000	0.000472	...	13	...	0.692308	0.001248	3	...	3.000000	0.002598	48	0.001136
0.1250	0.000750	2.7500	0.002102	7/64	...	...	0.109400	0.000496	...	...	28	0.714286	0.001268	3 1/8	...	3.125000	0.002652	44	0.001204
0.1380	0.000775	2.8750	0.002133	#4	...	...	0.112000	0.000502	...	...	27	0.740741	0.001291	3 1/4	...	3.250000	0.002704	42	0.001241
0.1640	0.000821	3.0000	0.002163	...	80	...	0.112500	0.000503	3/4	12	...	0.750000	0.001299	...	6	3.333333	0.002739	40	0.001282
0.1875	0.000859	3.1250	0.002193	#5	72	...	0.125000	0.000530	...	11.5	...	0.782609	0.001327	3 3/8	...	3.375000	0.002756	36	0.001376
0.1900	0.000862	3.2500	0.002222	#6	...	...	0.138000	0.000557	13/16	...	...	0.812500	0.001352	3 1/2	...	3.500000	0.002806	34	0.001429
0.2160	0.000900	3.3750	0.002250	...	64	...	0.140625	0.000563	...	11	...	0.818182	0.001357	3 5/8	...	3.625000	0.002856	32	0.001488
0.2500	0.000945	3.5000	0.002277	5/32	...	...	0.156300	0.000593	...	...	24	0.833333	0.001369	3 3/4	...	3.750000	0.002905	30	0.001554
0.3125	0.001018	3.6250	0.002304	...	56	...	0.160714	0.000601	7/8	...	...	0.875000	0.001403	3 7/8	...	3.875000	0.002953	28	0.001627
0.3750	0.001082	3.7500	0.002330	#8	...	...	0.164000	0.000607	...	10	...	0.900000	0.001423	4	5	4.000000	0.003000	27	0.001667
0.4375	0.001139	3.8750	0.002356	11/64	...	...	0.171900	0.000622	15/16	...	...	0.937500	0.001452	4 1/8	...	4.125000	0.003047	26	0.001709
0.5000	0.001191	4.0000	0.002381	3/16	48	...	0.187500	0.000650	1"	9	20	1.000000	0.001500	4 1/4	...	4.250000	0.003092	24	0.001803
0.5625	0.001238	4.1250	0.002406	#10	...	...	0.190000	0.000654	1 1/16	...	...	1.062500	0.001546	4 3/8	...	4.375000	0.003137	22	0.001910
0.6250	0.001282	4.2500	0.002430	13/64	...	...	0.203100	0.000676	...	...	18	1.111111	0.001581	...	4.5	4.444444	0.003162	20	0.002036
0.6875	0.001324	4.3750	0.002453	...	44	...	0.204545	0.000678	1 1/8	8	...	1.125000	0.001591	4 1/2	...	4.500000	0.003182	18	0.002184
0.7500	0.001363	4.5000	0.002476	#12	...	...	0.216000	0.000697	1 3/16	...	...	1.187500	0.001635	4 5/8	...	4.625000	0.003226	16	0.002362
0.8125	0.001400	4.6250	0.002499	7/32	...	...	0.218800	0.000702	1 1/4	...	16	1.250000	0.001677	4 3/4	...	4.750000	0.003269	14	0.002582
0.8750	0.001435	4.7500	0.002521	...	40	...	0.225000	0.000712	...	7	...	1.285714	0.001701	4 7/8	...	4.875000	0.003312	13	0.002713
0.9375	0.001468	4.8750	0.002543	15/64	...	...	0.234400	0.000726	1 5/16	...	...	1.312500	0.001718	5	4	5.000000	0.003354	12	0.002862
1.0000	0.001500	5.0000	0.002565	1/4	36	80	0.250000	0.000750	1 3/8	...	...	1.375000	0.001759	5 1/8	...	5.125000	0.003396	11.5	0.002944
1.0625	0.001531	5.1250	0.002586	17/64	...	...	0.265600	0.000773	...	...	14	1.428571	0.001793	5 1/4	...	5.250000	0.003437	11	0.003033

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Table 4 Increments in Pitch Diameter Tolerance — Class 2A
(PD Tolerance = 0.0015 $\sqrt[3]{D}$ + 0.0015$\sqrt{LE}$ + 0.015 $\sqrt[3]{P^2}$) (Cont'd)

D	Increments in Td_2 0.0015 $\sqrt[3]{D}$	D	Increments in Td_2 due to D 0.0015 $\sqrt[3]{D}$	1D for sizes	9P for TPI	20P for TPI	LE	Increments in Td_2 due to LE 0.0015 $\sqrt{LE}$	1D for sizes	9P for TPI	20P for TPI	LE	Increments in Td_2 due to LE 0.0015 $\sqrt{LE}$	1D for sizes	20P for TPI	LE	Increments in Td_2 due to LE 0.0015 $\sqrt{LE}$	TPI	Increments in Td_2 due to TPI 0.015 $\sqrt[3]{P^2}$
1.1250	0.001560	5.2500	0.002607	...	...	72	0.277778	0.000791	1 7/16	...	...	1.437500	0.001798	5 3/8	...	5.375000	0.003478	10	0.003232
1.1875	0.001588	5.3750	0.002628	...	32	...	0.281250	0.000795	1 1/2	6	...	1.500000	0.001837	5 1/2	...	5.500000	0.003518	9	0.003467
1.2500	0.001616	5.5000	0.002648	19/64	...	...	0.296900	0.000817	...	...	13	1.538462	0.001861	5 5/8	...	5.625000	0.003558	8	0.003750
1.3125	0.001642	5.6250	0.002668	5/16	...	64	0.312500	0.000839	1 9/16	...	...	1.562500	0.001875	5 3/4	...	5.750000	0.003597	7	0.004099
1.3750	0.001668	5.7500	0.002687	...	28	...	0.321429	0.000850	1 5/8	...	...	1.625000	0.001912	5 7/8	...	5.875000	0.003636	6	0.004543
1.4375	0.001693	5.8750	0.002707	21/64	...	...	0.328100	0.000859	...	...	12	1.666667	0.001936	6	...	6.000000	0.003674	5.5	0.004814
1.5000	0.001717	6.0000	0.002726	...	27	60	0.333333	0.000866	1 11/16	...	...	1.687500	0.001949	6 1/2	...	6.500000	0.003824	5	0.005130
1.5625	0.001741	7.0000	0.002869	11/32	...	...	0.343800	0.000880	...	...	11.5	1.739130	0.001978	7	...	7.000000	0.003969	4.5	0.005503
1.6250	0.001764	8.0000	0.003000	...	...	56	0.357143	0.000896	1 3/4	...	...	1.750000	0.001984	7 1/2	...	7.500000	0.004108	4	0.005953
1.6875	0.001786	9.0000	0.003120	23/64	...	...	0.359400	0.000899	...	5	...	1.800000	0.002012	8	...	8.000000	0.004243	...	...
1.7500	0.001808	10.0000	0.003232	3/8	24	...	0.375000	0.000919	1 13/16	...	...	1.812500	0.002019	8 1/2	...	8.500000	0.004373	...	...
1.8125	0.001829	12.0000	0.003434	25/64	...	...	0.390600	0.000937	...	...	11	1.818182	0.002023	9	...	9.000000	0.004500	...	...
1.8750	0.001850	14.0000	0.003615	13/32	...	...	0.406300	0.000956	1 7/8	...	...	1.875000	0.002054	9 1/2	...	9.500000	0.004623	...	...
...	...	16.0000	0.003780	...	...	48	0.416667	0.000968	1 15/16	...	...	1.937500	0.002088	10	...	10.000000	0.004743	...	...
...	...	18.0000	0.003931	27/64	...	...	0.421900	0.000974	2	4.5	10	2.000000	0.002121	10 1/2	...	10.500000	0.004861	...	...
...	...	20.0000	0.004072	7/16	...	...	0.437500	0.000992	2 1/8	...	...	2.125000	0.002187	11	...	11.000000	0.004975	...	...
...	...	24.0000	0.004327	...	20	...	0.450000	0.001006	...	...	9	2.222222	0.002236	11 1/2	...	11.500000	0.005087	...	...
...	...			...	...	44	0.454545	0.001011	2 1/4	4		2.250000	0.002250	12	...	12.000000	0.005196	...	...

GENERAL NOTE:
D = diameter
LE = length of engagement
P = pitch
Td_2 = pitch diameter tolerance, external
TPI = threads per inch

NOTE: (1) For example: LE = 0.5000 is equivalent to one diameter for the 1/2 in. size, 9 pitches for 18 threads per inch, or 20 pitches for 40 threads per inch.

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Table 5 Basic Profile and Constants for Calculation Formulas of Thread Dimensions, in.

Reference Only [Note (1)]		0.1250H	0.1443H	0.1667H	0.17333333H	0.1875H
Threads/in.	Pitch, $P = 1/n$	UN/UNJ Truncation of Internal Thread Root and External Thread Crest, $f_{rn} = f_{es} =$ 0.10825318P	UN/UNJ Flat at Internal Thread Root and External Thread Crest, $F_{rn} = F_{cs} = P/8 =$ 0.12500000P	UN/UNR External Thread Root Full Radius, Max., $r_{rs} =$ 0.14433757P	UNJ Min. External Thread Root Radius, r min. = 0.15011107P	Truncation of UNR Design Profile External Thread Root and Half Addendum of UNR/UNJ External Thread, $S_{rs} =$ 0.16237976P
1	2	3 [Note (2)]	4	5	6	7
80	0.01250000	0.001353	0.001563	0.001804	0.0019	0.002030
72	0.01388889	0.001504	0.001736	0.002005	0.0021	0.002255
64	0.01562500	0.001691	0.001953	0.002255	0.0023	0.002537
56	0.01785714	0.001933	0.002232	0.002577	0.0027	0.002900
48	0.02083333	0.002255	0.002604	0.003007	0.0031	0.003383
44	0.02272727	0.002460	0.002841	0.003280	0.0034	0.003690
40	0.02500000	0.002706	0.003125	0.003608	0.0038	0.004059
36	0.02777778	0.003007	0.003472	0.004009	0.0042	0.004511
32	0.03125000	0.003383	0.003906	0.004511	0.0047	0.005074
28	0.03571429	0.003866	0.004464	0.005155	0.0054	0.005799
27	0.03703704	0.004009	0.004630	0.005346	0.0056	0.006014
24	0.04166667	0.004511	0.005208	0.006014	0.0063	0.006766
20	0.05000000	0.005413	0.006250	0.007217	0.0075	0.008119
18	0.05555556	0.006014	0.006944	0.008019	0.0083	0.009021
16	0.06250000	0.006766	0.007813	0.009021	0.0094	0.010149
14	0.07142857	0.007732	0.008929	0.010310	0.0107	0.011599
13	0.07692308	0.008327	0.009615	0.011103	0.0115	0.012491
12	0.08333333	0.009021	0.010417	0.012028	0.0125	0.013532
11.5	0.08695652	0.009413	0.010870	0.012551	0.0131	0.014120
11	0.09090909	0.009841	0.011364	0.013122	0.0136	0.014762
10	0.10000000	0.010825	0.012500	0.014434	0.0150	0.016238
9	0.11111111	0.012028	0.013889	0.016038	0.0167	0.018042
8	0.12500000	0.013532	0.015625	0.018042	0.0188	0.020297
7	0.14285714	0.015465	0.017857	0.020620	0.0214	0.023197
6	0.16666667	0.018042	0.020833	0.024056	0.0250	0.027063
5	0.20000000	0.021651	0.025000	0.028868	0.0300	0.032476
4.5	0.22222222	0.024056	0.027778	0.032075	0.0334	0.036084
4	0.25000000	0.027063	0.031250	0.036084	0.0375	0.040595

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Table 5 Basic Profile and Constants for Calculation Formulas of Thread Dimensions, in.

0.20833333*H*	0.2500*H*	0.2886*H*	0.3125*H*	0.3608*H*	0.375*H*	0.5000*H*
UNJ Max. External Thread Root Radius, r max. = 0.18042196*P*	UN External Thread Root and Truncation of Internal Thread Crest, $f_{rs} = f_{cn} =$ 0.21650635*P*	UN Basic Flat at Internal Thread Crest and External UN Thread Root, $F_{rs} = F_{cn} = P/4 =$ 0.25000000*P*	Truncation of UNJ Internal Thread Crest 0.27063294*P*	Flat at UNJ Internal Thread Crest 0.31250000*P*	UN, UNR, UNJ Addendum of External Thread, $h_{as} =$ 0.32475953*P*	Half the Height of Sharp V-UN, UNR, and UNJ Thread 0.43301270*P*
8	9 [Note (3)]	10	11	12	13 [Notes (4), (5)]	14
0.0023	0.002706	0.003125	0.003383	0.003906	0.004059	0.005413
0.0025	0.003007	0.003472	0.003759	0.004340	0.004511	0.006014
0.0028	0.003383	0.003906	0.004229	0.004883	0.005074	0.006766
0.0032	0.003866	0.004464	0.004833	0.005580	0.005799	0.007732
0.0038	0.004511	0.005208	0.005638	0.006510	0.006766	0.009021
0.0041	0.004921	0.005682	0.006151	0.007102	0.007381	0.009841
0.0045	0.005413	0.006250	0.006766	0.007813	0.008119	0.010825
0.0050	0.006014	0.006944	0.007518	0.008681	0.009021	0.012028
0.0056	0.006766	0.007813	0.008457	0.009766	0.010149	0.013532
0.0064	0.007732	0.008929	0.009665	0.011161	0.011599	0.015465
0.0067	0.008019	0.009259	0.010023	0.011574	0.012028	0.016038
0.0075	0.009021	0.010417	0.011276	0.013021	0.013532	0.018042
0.0090	0.010825	0.012500	0.013532	0.015625	0.016238	0.021651
0.0100	0.012028	0.013889	0.015035	0.017361	0.018042	0.024056
0.0113	0.013532	0.015625	0.016915	0.019531	0.020297	0.027063
0.0129	0.015465	0.017857	0.019331	0.022321	0.023197	0.030929
0.0139	0.016654	0.019231	0.020818	0.024038	0.024982	0.033309
0.0150	0.018042	0.020833	0.022553	0.026042	0.027063	0.036084
0.0157	0.018827	0.021739	0.023533	0.027174	0.028240	0.037653
0.0164	0.019682	0.022727	0.024603	0.028409	0.029524	0.039365
0.0180	0.021651	0.025000	0.027063	0.031250	0.032476	0.043301
0.0200	0.024056	0.027778	0.030070	0.034722	0.036084	0.048113
0.0226	0.027063	0.031250	0.033829	0.039063	0.040595	0.054127
0.0258	0.030929	0.035714	0.038662	0.044643	0.046394	0.061859
0.0301	0.036084	0.041667	0.045105	0.052083	0.054127	0.072169
0.0361	0.043301	0.050000	0.054127	0.062500	0.064952	0.086603
0.0401	0.048113	0.055556	0.060141	0.069444	0.072169	0.096225
0.0451	0.054127	0.062500	0.067658	0.078125	0.081190	0.108253

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Table 5 Basic Profile and Constants for Calculation Formulas of Thread Dimensions, in.

Reference Only [Note (1)]		0.5625H	0.57735H	0.58333H	0.625H	0.65336H
Threads/in.	Pitch, $P = 1/n$	UNJ Height of Internal Thread and Depth of Thread Engagement 0.48713929P	UN, UNR, and UNJ Pitch Line 0.50000000P	UNJ Difference Between Max. Pitch Dia. and Max. Minor Dia. of Ext. Thread 0.50518149P	Height of Internal Thread, UN External Thread, and Depth of Thread Engagement, $h_s = h_n = h_e = 0.54126588P$	UNJ Difference Between Min. Pitch Dia. and Min. Minor Dia. of Ext. Thread = 0.56580540P
1	2	15	16	17	18 [Note (5)]	19
80	0.01250000	0.006089	0.006250	0.006315	0.006766	0.007073
72	0.01388889	0.006766	0.006944	0.007016	0.007518	0.007858
64	0.01562500	0.007612	0.007813	0.007893	0.008457	0.008841
56	0.01785714	0.008699	0.008929	0.009021	0.009665	0.010104
48	0.02083333	0.010149	0.010417	0.010525	0.011276	0.011788
44	0.02272727	0.011071	0.011364	0.011481	0.012301	0.012859
40	0.02500000	0.012178	0.012500	0.012630	0.013532	0.014145
36	0.02777778	0.013532	0.013889	0.014033	0.015035	0.015717
32	0.03125000	0.015223	0.015625	0.015787	0.016915	0.017681
28	0.03571429	0.017398	0.017857	0.018042	0.019331	0.020207
27	0.03703704	0.018042	0.018519	0.018710	0.020047	0.020956
24	0.04166667	0.020297	0.020833	0.021049	0.022553	0.023575
20	0.05000000	0.024357	0.025000	0.025259	0.027063	0.028290
18	0.05555556	0.027063	0.027778	0.028066	0.030070	0.031434
16	0.06250000	0.030446	0.031250	0.031574	0.033829	0.035363
14	0.07142857	0.034796	0.035714	0.036084	0.038662	0.040415
13	0.07692308	0.037472	0.038462	0.038860	0.041636	0.043523
12	0.08333333	0.040595	0.041667	0.042098	0.045105	0.047150
11.5	0.08695652	0.042360	0.043478	0.043929	0.047067	0.049200
11	0.09090909	0.044285	0.045455	0.045926	0.049206	0.051437
10	0.10000000	0.048714	0.050000	0.050518	0.054127	0.056581
9	0.11111111	0.054127	0.055556	0.056131	0.060141	0.062867
8	0.12500000	0.060892	0.062500	0.063148	0.067658	0.070726
7	0.14285714	0.069591	0.071429	0.072169	0.077324	0.080829
6	0.16666667	0.081190	0.083333	0.084197	0.090211	0.094301
5	0.20000000	0.097428	0.100000	0.101036	0.108253	0.113161
4.5	0.22222222	0.108253	0.111111	0.112263	0.120281	0.125735
4	0.25000000	0.121785	0.125000	0.126295	0.135316	0.141451

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Table 5 Basic Profile and Constants for Calculation Formulas of Thread Dimensions, in.

0.66667H	0.6875H	0.7500H	0.9167H	H	1.125H	1.2500H	1.3750H
UNJ Height of External Thread, $h_s = 0.57735027P$	Height of UNR External Thread, $h_s = 0.59539247P$	UN, UNR, and UNJ Twice the External Thread Addendum, $h_b = 2h_{as} = 0.64951905P$	UN, UNR, and UNJ Difference Between Max. Major and Pitch Diameters of Internal Thread = $0.79385662P$	UN, UNR, and UNJ Height of Sharp V-Thread = $0.86602540P$	Double Height of UNJ Internal Thread $0.97427858P$	Double Height of Internal Thread and External UN Thread, $2h_n = 1.08253175P$	Double Height of External UNR Thread, $2h_s = 1.19078493P$
20 [Note (5)]	21	22	23	24	25	26	27
0.007217	0.007442	0.008119	0.009923	0.010825	0.012178	0.013532	0.014885
0.008019	0.008269	0.009021	0.011026	0.012028	0.013532	0.015035	0.016539
0.009021	0.009303	0.010149	0.012404	0.013532	0.015223	0.016915	0.018606
0.010310	0.010632	0.011599	0.014176	0.015465	0.017398	0.019331	0.021264
0.012028	0.012404	0.013532	0.016539	0.018042	0.020297	0.022553	0.024808
0.013122	0.013532	0.014762	0.018042	0.019682	0.022143	0.024603	0.027063
0.014434	0.014885	0.016238	0.019846	0.021651	0.024357	0.027063	0.029770
0.016038	0.016539	0.018042	0.022052	0.024056	0.027063	0.030070	0.033077
0.018042	0.018606	0.020297	0.024808	0.027063	0.030446	0.033829	0.037212
0.020620	0.021264	0.023197	0.028352	0.030929	0.034796	0.038662	0.04252
0.021383	0.022052	0.024056	0.029402	0.032075	0.036084	0.040094	0.044103
0.024056	0.024808	0.027063	0.033077	0.036084	0.040595	0.045105	0.049616
0.028868	0.029770	0.032476	0.039693	0.043301	0.048714	0.054127	0.059539
0.032075	0.033077	0.036084	0.044103	0.048113	0.054127	0.060141	0.066155
0.036084	0.037212	0.040595	0.049616	0.054127	0.060892	0.067658	0.074424
0.041239	0.042528	0.046394	0.056704	0.061859	0.069591	0.077324	0.085056
0.044412	0.045799	0.049963	0.061066	0.066617	0.074945	0.083272	0.091599
0.048113	0.049616	0.054127	0.066155	0.072169	0.081190	0.090211	0.099232
0.050204	0.051773	0.056480	0.069031	0.075307	0.084720	0.094133	0.103547
0.052486	0.054127	0.059047	0.072169	0.078730	0.088571	0.098412	0.108253
0.057735	0.059539	0.064952	0.079386	0.086603	0.097428	0.108253	0.119078
0.064150	0.066155	0.072169	0.088206	0.096225	0.108253	0.120281	0.132309
0.072169	0.074424	0.081190	0.099232	0.108253	0.121785	0.135316	0.148848
0.082479	0.085056	0.092788	0.113408	0.123718	0.139183	0.154647	0.170112
0.096225	0.099232	0.108253	0.132309	0.144338	0.162380	0.180422	0.198464
0.115470	0.119078	0.129904	0.158771	0.173205	0.194856	0.216506	0.238157
0.128300	0.132309	0.144338	0.176413	0.192450	0.216506	0.240563	0.264619
0.144338	0.148848	0.162380	0.198464	0.216506	0.243570	0.270633	0.297696

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Table 5 Basic Profile and Constants for Calculation Formulas of Thread Dimensions, in. (Cont'd)

GENERAL NOTE: All thread calculations are to be performed using a function of pitch, P; the use of thread height, H, is for reference only, as stated in ASME B1.30.

NOTES:
(1) The thread values based on function of height, H, are used for reference only.
(2) The values tabulated in Column 3 also pertain to the minimum root radius of UNR screw threads. See paras. 2.3.1.1 and 2.3.1.1(a).
(3) $h_{an} = f_{cn} = 0.250H = 0.21650635P$.
(4) $h_{dn} = f_{as} = 0.375H = 0.32475953P$.
(5) The constants in Columns 13, 18, and 20 are the rounded value of half their respective values in Columns 22, 26, and 27.

The formulas are suitable for general applications having lengths of engagement up to 1.5 diameters.

(-b) for all thread series and special threads $\frac{1}{4}$ in. and larger with

(-1) 80 threads/in. to 4 threads/in., inclusive

$TD_1 = 0.2500P - 0.400P^2$

(-2) less than 4 threads/in.

$TD_1 = 0.1500P$

(2) for UNJ, Class 2B

(-a) 13 threads/in. and finer

$TD_1 = [0.0500\sqrt[3]{P^2} + 0.0300P/D] - 0.002$ in., within the following limitations:

(-1) tolerances shall not be greater than $0.25980762P$

(-2) tolerances shall not be less than $0.13531647P$

(-b) 12 threads/in. and coarser

$TD_1 = 0.1200P$

The formulas are suitable for general applications having lengths of engagement up to 1.5 diameters.

(3) for UN, Class 3B

(-a) for all thread series

$TD_1 = [0.0500\sqrt[3]{P^2} + 0.0300P/D] - 0.002$ in., within the following limitations:

(-1) tolerance shall be not greater than $0.39400P$

(-2) tolerance shall be not less than

(+a) for 80 threads/in. to 13 threads/in., inclusive, $0.2300P - 1.500P^2$

(+b) for 12 threads/in. and coarser, $0.1200P$

The formulas are suitable for general applications having lengths of engagement up to 1.5 diameters.

(4) for UNJ, Class 3B

(-a) 13 threads/in. and finer

$TD_1 = [0.0500\sqrt[3]{P^2} + 0.0300P/D] - 0.002$ in., within the following limitations:

(-1) tolerances shall not be greater than $0.25980762P$

(-2) tolerances shall not be less than $0.13531647P$

(-b) 12 threads/in. and coarser

$TD_1 = 0.1200P$

5.9 Lead and Flank Angle Tolerances

See section 9.

5.10 Coated or Plated Threads

See section 7 for dimensional accommodation and limits for coated threads.

5.11 Circular Runout

5.11.1 Circular Runout Is the Full Indicator Movement (FIM) (See ASME Y14.5). Runout of the crest (minor diameter of internal thread or major diameter of external thread) relative to the functional diameter cylinder shall not be so great that the basic profile is transgressed.

5.11.2 Internal Thread. Maximum runout, which will maintain the crest inside the basic thread profile, is the difference between the measured minor diameter and the basic minor diameter. An out-of-round functional diameter cylinder may reduce the available runout.

5.11.3 External Thread. Maximum runout, which will maintain the crest inside the basic thread profile, is the difference between the measured major diameter and the basic major diameter. An out-of-round functional diameter cylinder may reduce the available runout.

6 SCREW THREAD DESIGNATION

6.1 Basic Method of Designating

The designation specifies in sequence the nominal size, number of threads per inch, thread series symbol, thread class symbol, and gaging system per ASME B1.3 (see Figure 13). The nominal size is the basic major diameter and is specified as either a fractional diameter, machine screw number, or the decimal equivalent. Where decimal equivalents are used for size callout, they shall be shown in four-place decimals (omitting the cipher in the fourth place) for fractional sizes, and in three-place decimals for number sizes. They shall be interpreted as being nominal size designations only and shall have no dimensional significance beyond the fractional size or number designation. The thread series symbol indicates the thread form, series, and tolerance formulation. The thread series

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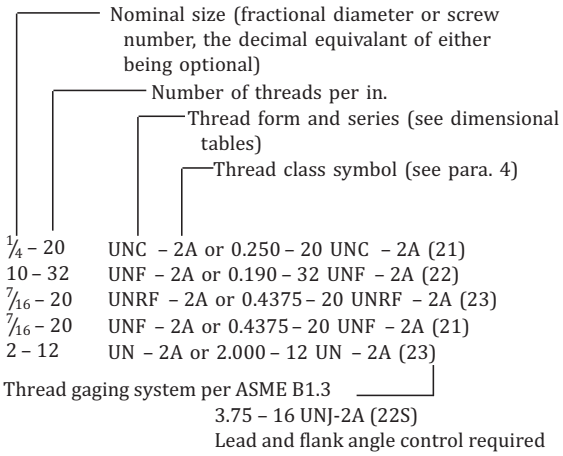
Figure 13 Basic Method of Designating Screw Threads



NOTE: The thread acceptability gaging system requirement of ASME B1.3 may be added to the thread size designation as noted above or as specified in pertinent documentation, such as a drawing or procurement document.

symbols for the UN thread form are UNC, UNF, UNEF, or UN for only those sizes of the various series shown in Table 1 and UNS for any other diameter-pitch combination having tolerances to unified formulation.

The thread series symbols for the UNR thread form are UNRC, UNRF, UNREF, or UNR for only those sizes of the various series shown in Table 1 and UNRS for any other diameter-pitch combination having tolerances to unified formulation.

The thread series symbols for the UNJ thread form are UNJC, UNJF, UNJEF, or UNJ for only those sizes of the various series shown in Table 1 and UNJS for any other diameter-pitch combination having tolerances to unified formulation.

The basic method of designating a screw thread is used where the standard tolerances or limits of size based on the standard length of engagement are applicable, as indicated in Figure 13.

6.2 Method of Designating Coated Threads

Specification on drawings of the before- and after-coating dimensions for screw threads is sometimes dictated by an engineering or production consideration that the size before and after coating be controlled. This results from coated screw threads having two stages of design, the before-coating stage and the after-coating stage. The threaded product may be produced by a supplier and coated by a user. In this case, it is necessary that a clear understanding of the coating requirements and the allowance for coating buildup be agreed upon by both supplier and user (see section 7).

The before-coating (plating) dimensions have a definite bearing on the strength of the screw threads. The before-coating stage is, therefore, decidedly an engineering consideration; it is also a production consideration when requiring that proper allowance be made for the specified coating thickness. The finished parts should be of a size after coating that will allow them to be assembled with their coating components as intended.

Recommended methods for designating coated thread under various conditions are described in para. 6.2.1.

6.2.1 For coated (or plated) Class 2A external threads, the basic (maximum) major and basic (maximum) pitch diameters shall be given, preceded by the words AFTER COATING. The major and pitch diameter limits of size before coating shall also be given, preceded by the words BEFORE COATING.

EXAMPLE: 3/4-10-UNC-2A (21)

AFTER COATING (from Table 2A for Class 3A)
Maximum major diameter 0.7500
Maximum pitch diameter (PD) 0.6850

BEFORE COATING (from Table 2A for Class 2A)
Major diameter 0.7482 – 0.7353
PD 0.6832 – 0.6773

Threads accepted to Class 2A limits before coating are accepted after coating by basic size Class 3A GO thread gages. The allowance given in the dimensional tables for Class 2A thread is sufficient to allow for a limited amount of coating as described in section 7. However, if a greater coating thickness is required, it will be necessary to calculate the before-coating limits in accordance with section 7.

6.2.2 For coated (or plated) Class 3A external threads, the maximum major and maximum pitch diameters may optionally be given, preceded by the words AFTER COATING, thereby indicating that the thread before coating must have special provisions to allow for coating thickness. The major and pitch diameter limits of size before coating (calculated in accordance with section 7) shall be given, followed by the letters "SPL" (special) and preceded by the words BEFORE COATING.

EXAMPLE: 1/4-28-UNF-3A (21), given a thickness of coating 0.0002 in. to 0.0003 in.

AFTER COATING (use of maximum major diameter and PD optional)
Maximum major diameter 0.2500
Maximum PD 0.2268

BEFORE COATING
Major diameter 0.2494 – 0.2431 SPL
PD 0.2256 – 0.2235 SPL

6.2.3 For coated (or plated) Class 1A external threads, the maximum major and maximum pitch diameters may optionally be given, preceded by the words AFTER COATING, thereby indicating that the thread before

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coating must have special provisions to allow for coating thickness. The major and pitch diameter limits of size before coating (calculated in accordance with section 7) shall be given, followed by the letters "SPL" (special) and preceded by the words BEFORE COATING.

EXAMPLE: ¼-20-UNC-1A (21), given a thickness of coating 0.0002 in. to 0.0003 in.

AFTER COATING (use of maximum major diameter and PD optional)
Maximum major diameter 0.2489
Maximum PD 0.2164

BEFORE COATING
Major diameter 0.2483 ő– 0.2363 SPL
PD 0.2152 – 0.2100 SPL

6.2.4 Where an allowance is required to accommodate coating (or plating) on Class 1B, 2B, or 3B internal threads, the minimum minor and minimum pitch diameters may optionally be given, preceded by the words AFTER COATING. The minor and pitch diameter limits of size before coating (calculated in accordance with section 7) shall be given, followed by the letters "SPL" (special) and preceded by the words BEFORE COATING.

EXAMPLE: ¼-20-UNC-1B (21), given a thickness of coating 0.0002 in. to 0.0003 in.

AFTER COATING Minimum minor diameter 0.196
Minimum PD 0.2175
(This information optional)

BEFORE COATING
Minor diameter 0.197 - 0.207 SPL
PD 0.2187 - 0.2256 SPL

EXAMPLE: ¾-10-UNC-2B (22), given a thickness of coating 0.0002 in. to 0.0003 in.

AFTER COATING Minimum minor diameter 0.642
Minimum PD 0.6850
(This information optional)

BEFORE COATING
Minor diameter 0.643 - 0.663 SPL
PD 0.6862 - 0.6935 SPL

EXAMPLE: ¼-28-UNF-3B (23), given a thickness of coating 0.0002 in. to 0.0003 in.

AFTER COATING Minimum minor diameter 0.2110
Minimum PD 0.2268
(This information optional)

BEFORE COATING
Minor diameter 0.2116 - 0.2194 SPL
PD 0.2280 - 0.2308 SPL

NOTE: The after-coating limits for all of the examples above are the minor and PD values in Table 2B for the respective class of thread.

6.3 Method of Designating Left-Hand Threads

Unless otherwise specified, threads are right hand; a left-hand thread shall be designated LH as shown in the following example: ¼-20-UNC-3A-LH (21).

6.4 Method of Designating Special Unified Threads

UNS, UNRS, and UNJS threads are special combinations of diameter and pitch with tolerance to unified formulation.

EXAMPLE: ¼-24-UNS-3A (21)
Major diameter 0.2500 - 0.2428
PD 0.2229 - 0.2201
Maximum minor diameter 0.2049

EXAMPLE: 0.4950-20-UNS-3A (21)
Major diameter 0.4950 - 0.4869
PD 0.4625 - 0.4593
Maximum minor diameter 0.4409

EXAMPLE: 1.200-10-UNS-2B (21)
Minor diameter 1.092 - 1.113
PD 1.1350 - 1.1432
Minimum major diameter 1.200

EXAMPLE: 0.2800-28-UNJS-3A (22)
Major diameter 0.2735 – 0.2800
PD .2542 – 0.2568
Minor diameter 0.2340 – 0.2388
Root radius 0.0054 – 0.0064

EXAMPLE: 0.2800-28-UNJS-3B (22)
Major diameter 0.2800 min.
PD 0.2568 – 0.2601
Minor diameter 0.2452 – 0.2529
Root radius 0.0054 – 0.0064

6.5 Designations for Other Threads

Threads having tolerances that do not conform to unified formulation and threads having multiple start or lead or special form also require additional considerations in the thread designation. The recommended methods of designating these threads are described in paras. 6.5.1 through 6.5.3.

6.5.1 Method of Designating Threads Having Tolerances Not to Unified Formulation. If a standard series thread is altered in any respect other than revised pitch diameter limits for a special length of engagement, the modification of crests, or the adjustment of the limits of

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size to accommodate coating, as shown above, it is designated in accordance with the examples herein.

EXAMPLE: 7/16-24 Unified Form SPL-EXT (22)
Major diameter 0.4340 – 0.4280 SPL
PD 0.4065 – 0.4025 SPL
Maximum minor diameter 0.3889
LE 0.38

EXAMPLE: 1/2-13 Unified Form SPL-INT (22)
Minor diameter 0.424 – 0.434 SPL
PD 0.4500 – 0.4580 SPL
Minimum major diameter 0.5000
LE 0.50

6.5.2 Method of Designating Multiple Start Threads. If a thread is required with a multiple start or lead, it is designated by specifying in sequence the nominal size, pitch (in decimals or threads per inch), and lead (in decimals or number of starts), thread series, class, and gaging system in parenthesis if required as in the examples herein.

EXAMPLE: 3/4-0.0625*P* - 0.1875*L*-UNF SPL-EXT (23)
Major diameter 0.7485 to 0.7391
PD 0.7079 SPL to 0.7003 SPL
Maximum minor diameter 0.6808
LE 0.75

EXAMPLE: 3/4-16 - 0.1875*L*-UNF-2A (21)

Specifying the threads per inch (TPI) will help ensure the determination of the proper decimal pitch value. When converting TPI to decimal pitch, the values may need to be carried out to eight decimal places in order to state the proper decimal value for pitch and lead. For example, 3/4-16-(3 START)-UNF-2B means the same thing as 0.7500 - 0.0625*P* - 0.1875*L*-UNF-2B. If the decimal pitch is properly stated, the decimal lead should mathematically be equal to the decimal pitch times the number of starts.

Premature rounding of decimal pitch and/or lead values may yield improper results; for example, 0.7500 - 0.063*P* - 0.188*L*-UNF-2B is incorrect.

6.5.3 Method of Designating Special Form Threads. If a thread for design consideration requires a variation from unified standard thread contour and is not covered by another recognized standard, such as when the detail of the root differs from that for the standard thread form, the designation shall not include either the letter "U" or the word "Unified."

EXAMPLE: 7/8-18 SPL 60-deg Form-EXT (22)
Major diameter 0.8750 - 0.8668
PD 0.8384 - 0.8343
Maximum minor diameter 0.8068
LE 0.69

6.6 Method of Designating Threads Having Special Length of Engagement

In the assembly of threads in mating parts, the length of engagement varies according to the design requirements. It should be noted that the length of engagement is not necessarily the same as the full thread length provided on the part, but is the amount/length of thread engaged when mating parts are assembled.

Where a standard series thread has a special length of engagement differing from that for which the standard pitch diameter tolerances are applicable as indicated in section 5, the thread class symbol is qualified by the addition of the letters SE (special engagement) preceding the class symbol. The specification of the special pitch diameter limits of size and the length of engagement, rounded to a two-place decimal, are a requirement, as shown in the examples herein.

EXAMPLE: 1/2-13-UNC-SE2A (23)
PD 0.4485 - 0.4431
LE 1.00

EXAMPLE: 1/4-24-UNS-SE3A (23)
Major diameter 0.2500 - 0.2428
PD 0.2229 - 0.2198
LE 0.88

NOTE: Past editions of this Standard provided examples of how some situations previously included in para. 5.3 were designated. These were examples only and not requirements. Because of this, they are no longer part of this Standard and have been moved to Nonmandatory Appendix F for historical and reference purposes.

6.7 Method of Designating Threads Having Modified Crests

It is occasionally necessary to modify the limits of size of the major diameter of an external thread or the minor diameter of an internal thread within the maximum material limits established for standard series and special threads in order to fit a specific purpose, but without change in class of thread or pitch diameter limits. (It should be noted that standard thread gages may be used to accept such threads.) Such threads shall be specified with the established thread designation, followed by a statement of the modified diameter limits and the designation MOD. This practice also applies to modifications of internal thread minor diameters described in para. 5.6.1.

NOTE: Threads having modified roots can be designated in a similar way but cannot be inspected/evaluated with standard gages.

EXAMPLE: 3/8-24-UNF-3A MOD (21)
Major diameter 0.3720 - 0.3648 MOD

EXAMPLE: 1 1/2-10-UNS-3B MOD (21)
Minor diameter 1.3980 - 1.4090 MOD
PD 1.4350 - 1.4412
Minimum major diameter 1.5000

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7 DIMENSIONAL ACCOMMODATION OF COATING OR PLATING FOR 60-DEG THREADS

7.1 Introduction

It is not within the scope of this Standard to make recommendations for thickness of, or to specify limits for, coatings. However, it will aid mechanical interchangeability if certain principles are followed wherever conditions permit. The guidelines in paras. 7.7 through 7.9 should be helpful in determining the amount and direction of the alterations to establish applicable limits of before-coating thread size with a 60-deg included angle.

Some commonly used and firmly established processes for heavy coatings do not fall within the scope of this standard.

When coating threads with dry film lubricant, an adjustment in pitch diameter to accommodate the thickness of solid film lubricant is not in addition to that specified in paras 7.7 through 7.9. The product thread, before application of solid film lubricant, shall comply with after-coated dimensions.

NOTE: The term "coating" refers to one or more applications of additive material to threads including, but not limited to, electroplated deposits, dip-spin applied materials, and mechanically applied plating. It does not include soft or liquid lubricants that are readily displaced in assembly.

7.1.1 Coated UN and UNR Threads. This Standard specifies limits of size that pertain whether threads are coated or uncoated. Only in Class 2A external threads is the allowance available to accommodate coatings. Thus, in all classes of internal threads and in Class 3A external threads, limits of size must be adjusted before plating to provide suitable provision for the desired coating.

7.1.2 Coated UNJ Threads. The general rules for calculation of coating allowance are defined in paras. 7.7 through 7.9. Restrictions in paras. 7.1.2.1 through 7.1.2.3 also apply.

7.1.2.1 Coated UNJ External Threads — Class 3A. Unless otherwise specified, coated or plated external threads with a pitch diameter tolerance of 0.0035 in. or less may have the minimum pitch diameter specified in Table 2A reduced by not more than 0.0010 in. The minimum major and minor diameter limits specified in Table 2A may be reduced by 2 times the minimum coating or plating thickness. When the pitch diameter tolerance exceeds 0.0035 in., the minimum pitch diameter may be reduced by 0.3 times the pitch diameter tolerance, but this reduction shall not exceed 0.0015 in. The material limits for coated external threads shall be as specified herein. All thread elements shall be within the size limits specified in Table 2A.

7.1.2.2 Coated UNJ External Threads — Class 2A. Unless otherwise specified, the external thread material limits may not be reduced beyond the minimum material limits to accommodate coating. After coating, the threads shall be no larger than Class 3A material limits specified in Table 2A.

7.1.2.3 Coated UNJ Internal Threads — Classes 2B and 3B. Unless otherwise specified for coated or plated internal threads, the maximum values of minor diameter and pitch diameter specified in Table 2B may be increased by the same amount permitted in para. 7.1.2.1 for external thread decrease. The limits for coated or plated internal threads shall be within the values specified in Table 2B.

7.2 Strength

There is a possibility that coating thickness adjustments will result in a before-plate condition that may significantly affect strength of externally threaded parts. Limitations on coating thickness or part redesign may be necessary.

7.3 Electrodeposited Coatings

Electroplated coatings may not cover threads uniformly. Deposits build up more on thread crests than on thread flanks and coating thickness is greater on lead end of a thread than on threads in the center of a part. The guidelines for calculating before-coating thread sizes for uniformly coated threads can be used as a starting place in determining the before-coating thread sizes on a given part, but the exact sizes for any given part may have to be determined by trial and error.

7.4 Other Considerations

It is essential to adequately review all possibilities and consider limitations in the threading and coating production processes before finalizing the coating process and the allowance required to accommodate the coating. A thread with no allowance after coating shall not transgress the basic maximum material limits, and is therefore subject to acceptance using a maximum material limit thread gage for Class 3A, 1B, 2B, or 3B.

7.5 Material Limits for Coated Threads

Unless otherwise specified, size limits for standard external thread Class 2A apply prior to coating. The external thread allowance may thus be used to accommodate the coating thickness on coated parts, provided that the maximum coating thickness is no more than one-fourth of the allowance (see Figures 5, 7, and 10). Thus, the thread after coating is subject to acceptance using a Class 3A maximum material limit and/or size thread gage.

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Where UN and UNR external threads have no allowance, or allowance must be maintained after coating, and for standard internal threads, sufficient allowance must be provided prior to coating to ensure that finished product threads do not exceed the maximum material limits specified. For thread Class 3A, Class 2A allowances should be applied whenever possible in accordance with calculations in section 5. For UNJ threads, see paras. 7.1.2.1 and 7.1.2.2.

7.6 Dimensional Effects of Coating

7.6.1 On a cylindrical surface, the effect of coating is to change the diameter by twice the coating thickness (2:1 ratio), one coating thickness on each side of the cylinder. On a screw thread, this would apply to the major and minor diameters.

7.6.2 Because the coating thickness is measured perpendicular to the coated surface while the pitch diameter is measured perpendicular to the thread axis, the effect of a uniformly coated thread flank on the pitch diameter is a change of 4 times the thickness of coating on the flank (4:1 ratio) (see Figure 14). The diameters of external threads before coating will be smaller while the diameters of internal threads before coating will be larger than the coated diameters.

7.6.3 On uniformly coated threads, the effect on a thread root radius reduces the radius by the coating thickness (1:1 ratio).

7.6.4 Depending on the type and amount of plating, some coatings and plating do not apply uniformly on threads (see Figure 15). Different coating materials and processes have different application characteristics. The threaded part's overall length and other configuration characteristics also affect the way the coatings build up on the threads. Paragraphs 7.7 through 7.9 provide general guidelines for calculating precoating thread size to allow for coating buildup while preventing interference in assembly. The exact precoating thread size for a given part with a given type of coating may have to be developed by the producer experimentally.

7.7 External Thread With Allowance Available for Coating

7.7.1 Maximum and Minimum Coating Thickness Specified. The amount of the allowance on the pitch diameter is sufficient if 4 times the maximum coating thickness is equal to or less than the allowance tabulated in Table 2A or calculated per formula in para. 5.8.1(a).

7.7.2 Only Nominal or Minimum Coating Thickness Specified. If no thickness tolerance is given, it is recommended that a tolerance of +50% of the nominal or minimum thickness be assumed. Then the amount of the allowance on the pitch diameter is sufficient if 6 times the specified coating thickness is equal to or less than the allowance tabulated in Table 2A or calculated per formula in para. 5.8.1(a).

7.8 External Thread With No Allowance for Coating

7.8.1 Maximum and Minimum Coating Thickness Specified

(a) To determine before-coating product limits, decrease

(1) the maximum major diameter by 2 times the maximum coating thickness

(2) the minimum major diameter by 2 times the minimum coating thickness

(3) the maximum pitch diameter by 4 times the maximum coating thickness

(4) the minimum pitch diameter by 4 times the minimum coating thickness

(5) the maximum minor diameter by 2 times the maximum coating thickness

(6) the minimum minor diameter by 2 times the minimum coating thickness

(b) To determine before-coating product limits for root radius, increase

(1) the maximum root radius by the minimum coating thickness

(2) the minimum root radius by the maximum coating thickness

NOTE: (a)(1) through (a)(6) apply to UN threads; (a)(1) through (a)(6) and (b)(1) and (b)(2) apply to UNR and UNJ threads.

7.8.1.1 EXAMPLE: $^{3}/_{8}$-16-UNC-2A AFTER COATING
Coating thickness 0.0002 in. – 0.0003 in.
To determine the before coating maximum material sizes:

0.3737 after coating maximum major diameter
– 0.0006 (2 × 0.0003 maximum coating thickness)
= 0.3731 before coating maximum major diameter

0.3331 after coating maximum pitch diameter
– 0.0012 (4 × 0.0003 maximum coating thickness)
= 0.3319 before coating maximum pitch diameter

To determine the before coating minimum material sizes:

0.3643 after coating minimum major diameter
– 0.0004 (2 × 0.0002 minimum coating thickness)
= 0.3639 before coating minimum major diameter

0.3287 after coating minimum pitch diameter
– 0.0008 (4 × .0002 minimum coating thickness)
= 0.3279 before coating minimum pitch diameter

The before-coating sizes should be included in the thread designation (see para. 6.2.1).

7.8.1.2 EXAMPLE: $^{3}/_{8}$-16-UNJC-2A AFTER COATING
Coating thickness 0.0002 in. – 0.0003 in.

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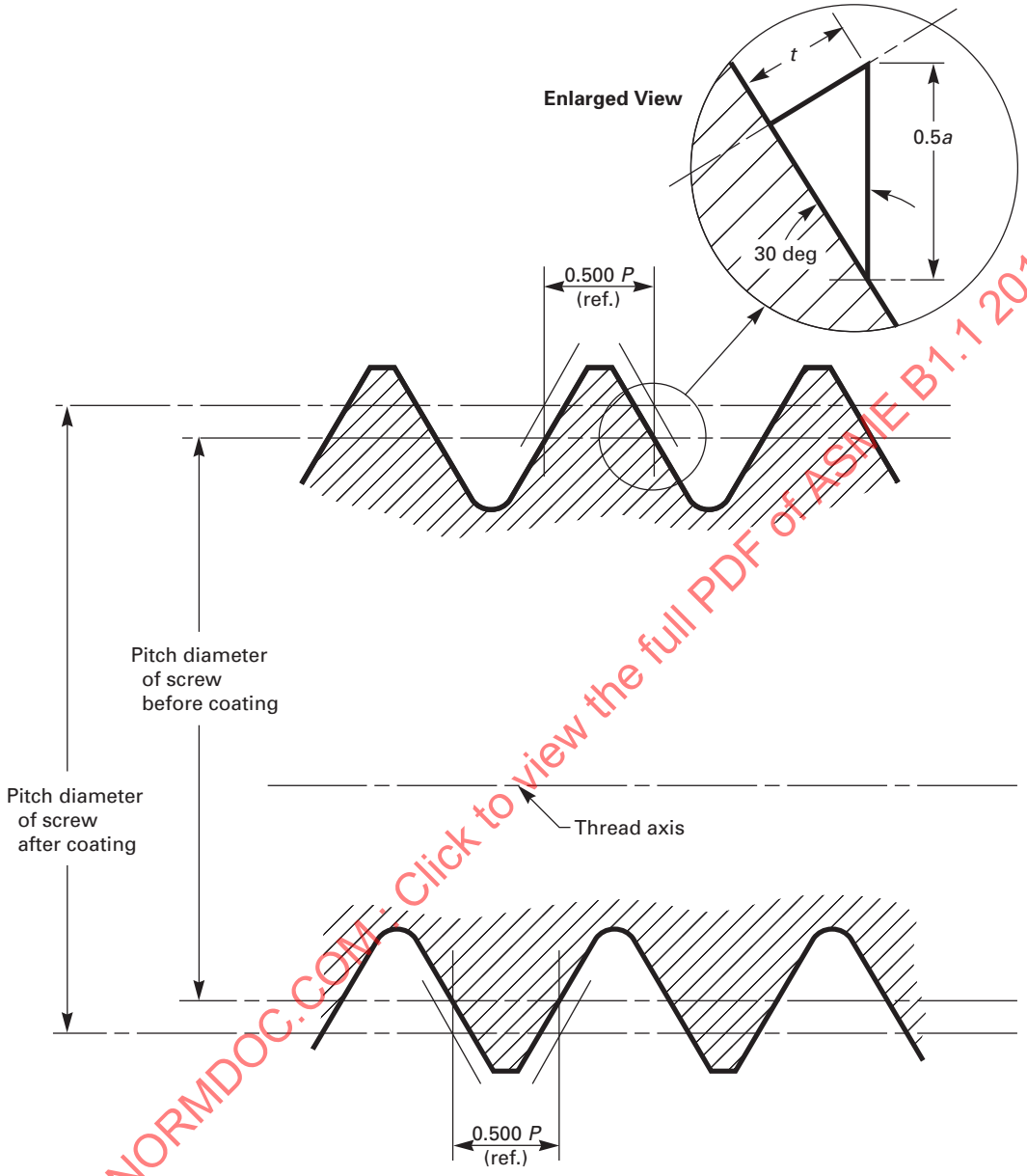
Figure 14 Ratio of Pitch Diameter Change to Thickness of Coating on 60-deg Threads



GENERAL NOTE: In the enlarged view,

t = thickness of coating

a = pitch diameter change due to coating

Sine 30 deg = $\frac{1}{0.5a}$ = 0.5

$0.25a = t$ and $a = 4t$ or the pitch diameter of a 60-deg thread changes 4 times the thickness of coating

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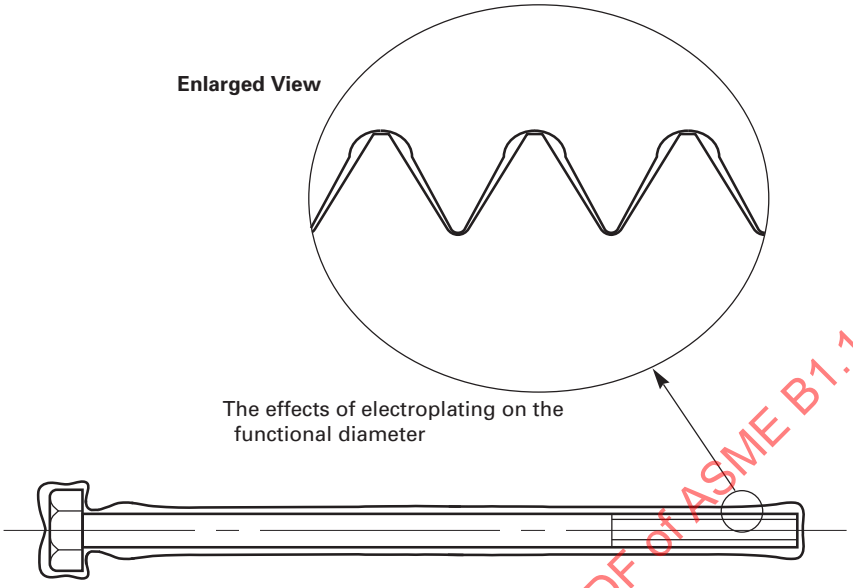
Figure 15 Effect of Electrodeposited Coating on 60-deg External Threads



GENERAL NOTE: Electrodeposited coatings build up more heavily at sharp corners, are greater at the extreme ends and edges, and are least in the center and recessed areas.

To determine the before coating maximum material sizes:

0.3737 after coating maximum major diameter
− 0.0006 (2 × 0.0003 maximum coating thickness)
= 0.3731 before coating maximum major diameter

0.3331 after coating maximum pitch diameter
− 0.0012 (4 × 0.0003 maximum coating thickness)
= 0.3319 before coating maximum pitch diameter

0.3015 after coating maximum minor diameter
− 0.0006 (2 × 0.0003 maximum coating thickness)
= 0.3009 before coating maximum minor diameter

0.0113 after coating maximum root radius
+ 0.0002 (1 × 0.0002 minimum coating thickness)
= 0.0115 before coating maximum root radius

To determine the before coating minimum material sizes:

0.3643 after coating minimum major diameter
− 0.0004 (2 × 0.0002 minimum coating thickness)
= 0.3639 before coating minimum major diameter

0.3287 after coating minimum pitch diameter
− 0.0008 (4 × 0.0002 minimum coating thickness)
= 0.3279 before coating minimum pitch diameter

0.2933 after coating minimum minor diameter
− 0.0004 (2 × 0.0002 minimum coating thickness)
= 0.2929 before coating minimum minor diameter

0.0094 after coating minimum root radius
+ 0.0003 (1 × 0.0003 maximum coating thickness)
= 0.0097 before coating minimum root radius

The before-coating sizes should be included in the thread designation (see para. 6.2.1).

7.8.2 Only Nominal or Minimum Coating Thickness Specified. If no coating thickness tolerance is given, it is recommended that a tolerance of +50% of the nominal or minimum thickness be assumed. Then

(a) to determine before-coating product limits for a coated thread, decrease

(1) the maximum major diameter by 3 times the coating thickness

(2) the minimum major diameter by 2 times the coating thickness

(3) the maximum pitch diameter by 6 times the coating thickness

(4) the minimum pitch diameter by 4 times the coating thickness

(5) the maximum minor diameter by 3 times the coating thickness

(6) the minimum minor diameter by 2 times the coating thickness

(b) to determine before-coating product limits for root radius increase

(1) the maximum root radius by the coating thickness

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(2) the minimum root radius by 1.5 times the coating thickness

NOTE: *(a)* applies to UN threads; *(b)* applies to UNR and UNJ threads.

7.8.2.1 EXAMPLE: ½-13-UNC-3A Coating thickness: 0.0004 in.

(a) Since the allowance for Class 2A thread is 0.0015 in., the nominal or minimum coating thickness that may be applied is equal to 0.0015 in. divided by 6, or 0.00025 in. (the maximum thickness of coating that may be applied is equal to 0.0015 divided by 4 or 0.00038 in.). This is not sufficient for the required nominal or minimum coating of 0.0004 in. specified, so additional adjustments to the before-coating pitch and major diameters must be made.

(b) To determine the before coating maximum material sizes:

0.5000 after coating maximum major diameter
− 0.0012 (3 × 0.0004 coating thickness)
= 0.4988 before coating maximum major diameter

0.4500 after coating maximum pitch diameter
− 0.0024 (6 × 0.0004 coating thickness)
= 0.4476 before coating maximum pitch diameter

To determine the before coating minimum material sizes:

0.4891 after coating minimum major diameter
− 0.0008 (2 × 0.0004 coating thickness)
= 0.4883 before coating minimum major diameter

0.4463 after coating minimum pitch diameter
− 0.0016 (4 × .0004 coating thickness)
= 0.4447 before coating minimum pitch diameter

The before-coating sizes should be included in the thread designation (see para. 6.2.1).

7.8.2.2 EXAMPLE: ½-13-UNJC-3A Coating Thickness 0.0002 in.

To determine the before coating maximum material sizes:

0.5000 after coating maximum major diameter
− 0.0006 (3 × 0.0002 coating thickness)
= 0.4994 before coating maximum major diameter

0.4500 after coating maximum pitch diameter
− 0.0012 (6 × 0.0002 coating thickness)
= 0.4488 before coating maximum pitch diameter

0.4111 after coating maximum minor diameter
− 0.0006 (3 × 0.0002 coating thickness)
= 0.4105 before coating maximum minor diameter

0.0139 after coating maximum root radius
+ 0.0002 (1 × 0.0002 coating thickness)
= 0.0141 before coating maximum root radius

To determine the before coating minimum material sizes:

0.4891 after coating minimum major diameter
− 0.0004 (2 × 0.0002 coating thickness)
= 0.4887 before coating minimum major diameter

0.4463 after coating minimum pitch diameter
− 0.0008 (4 × 0.0002 coating thickness)
= 0.4455 before coating minimum pitch diameter

0.4028 after coating minimum minor diameter
− 0.0004 2 × 0.0002 coating thickness)
= 0.4024 before coating minimum minor diameter

0.0115 after coating minimum root radius
+ 0.0003 (1.5 × 0.0002 coating thickness)
= 0.0118 before coating minimum root radius

The before-coating sizes should be included in the thread designation (see para. 6.2.1).

7.8.3 Adjusted Size Limits. It should be noted in the preceding examples that the before-coating material limit tolerances are less than the tolerances after coating. This is because the coating tolerance consumes some of the product tolerance. In some instances, there may be insufficient pitch diameter tolerance available for manufacturing in the before-coating condition and additional adjustments and controls will be necessary and shall be agreed upon between supplier and purchaser.

7.9 Internal Threads

Standard internal threads provide no allowance for coating thickness like external threads in para 7.7.

7.9.1 Maximum and Minimum Coating Thickness Specified. To determine before-coating product limits for a coated thread, increase

(a) the minimum major diameter by 2 times the maximum coating thickness

(b) the minimum pitch diameter by 4 times the maximum coating thickness

(c) the maximum pitch diameter by 4 times the minimum coating thickness

(d) the minimum minor diameter by 2 times the maximum coating thickness

(e) the maximum minor diameter by 2 times the minimum coating thickness

7.9.1.1 EXAMPLE: ⅜-16 UNC-2B AFTER COATING

Coating thickness: 0.0002 in. to 0.0003 in.

To determine the before-coating maximum material sizes:

0.3750 after-coating minimum major diameter
+ 0.0006 (2 × 0.0003 maximum coating thickness)
= 0.3756 before coating minimum major diameter

0.3344 after coating minimum pitch diameter

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+ 0.0012 (4 × 0.0003 maximum coating thickness)
= 0.3356 before coating minimum pitch diameter

0.3070 after coating minimum minor diameter
+ 0.0006 (2 × 0.0003 maximum coating thickness)
= 0.3076 before coating minimum minor diameter

To determine the before-coating maximum material sizes:

0.3401 after coating maximum pitch diameter
+ 0.0008 (4 × 0.0002 minimum coating thickness)
= 0.3409 before coating maximum pitch diameter

0.3210 after coating maximum minor diameter
+ 0.0004 (2 × 0.0002 minimum coating thickness)
= 0.3214 before coating maximum minor diameter

The before-coating sizes should be included in the thread designation (see para. 6.2.1).

7.9.2 Only Nominal or Minimum Coating Thickness Specified. If no coating thickness tolerance is given, it is recommended that a tolerance of +50% of the nominal or minimum thickness be assumed. Then, to determine before-coating product limits for a coated thread, increase

(a) the minimum major diameter by 3 times the minimum or nominal coating thickness

(b) the minimum pitch diameter by 6 times the minimum or nominal coating thickness

(c) the maximum pitch diameter by 4 times the minimum or nominal coating thickness

(d) the minimum minor diameter by 3 times the minimum or nominal coating thickness

(e) the maximum minor diameter by 2 times the minimum or nominal coating thickness

7.9.2.1 Example: ½-13-UNJC-3B

Coating thickness: 0.0002 in.

To determine the before-coating maximum material sizes:

0.5000 after coating minimum major diameter
+ 0.0006 (3 × 0.0002 coating thickness)
= 0.5006 before coating minimum major diameter

0.4500 after coating minimum pitch diameter
+ 0.0012 (6 × 0.0002 coating thickness)
= 0.4512 before coating minimum pitch diameter

0.4251 after coating minimum minor diameter
+ 0.0006 (3 × 0.0002 coating thickness)
= 0.4257 before coating minimum minor diameter

To determine the before-coating minimum material sizes:

0.4548 after coating maximum pitch diameter
+ 0.0008 (4 × 0.0002 coating thickness)
= 0.4556 before coating maximum pitch diameter

0.4368 after coating maximum minor diameter
+ 0.0004 (2 × 0.0002 coating thickness)
= 0.4372 before coating maximum minor diameter

The before-coating sizes should be included in the thread designation (see para. 6.2.1).

8 LIMITS OF SIZE FOR STANDARD (UN, UNR, and UNJ) AND SPECIAL (UNS, UNRS, AND UNJS) SERIES OF THREADS

8.1 Standard Series

The standard series for unified inch screw threads is listed in Table 1. Although the designations shown are for the UN thread form, UNR and UNJ designations may be used in all cases.

8.2 Limits of Size

The limits of size are defined by the design profile at its maximum material condition and the minimum profile at the minimum material condition. The limits are specified as diameters (major diameter, minor diameter, pitch diameter), and the practical interpretation of these limits on a three-dimensional threaded product depends on the method of inspection/evaluation. These dimensions serve as a basis for measurement and gaging of the thread, but the methods, techniques, and equipment used for thread evaluation establish the degree of thread conformance to the tabulated dimensions. Current techniques for measuring and gaging do not necessarily verify exact conformance of a thread to its specified maximum and minimum envelope. See ASME B1.3 for gaging systems for dimensional acceptability.

8.2.1 Limits of size for the majority of the standard series are shown in Tables 2A and 2B and E-1. Until this Standard is revised to require the calculated and rounded values per ASME B1.30 shown in Tables 2A and 2B, both these and the values in Table E-1 will be equally acceptable. It is recommended that all users prepare for the eventual adoption of only the values in Tables 2A and 2B.

8.2.2 Limits of size not given may be calculated from the formulas given in paras. 8.3 through 8.3.2. Formulas and symbols for thread form are given in section 10.

8.3 Formulas for Limits of Size

The formulas in these paragraphs were used to calculate the values shown in Tables 2A and 2B for standard series. The following symbols and nomenclature is used in the equations (see Figures 2, 3, and 16):

D = major diameter, internal

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d = major diameter, external
D_1 = minor diameter, internal
d_1 = minor diameter, external
D_1 bsc = basic minor diameter, internal (see Tables 6 through 16)
= $D - 2h_n$
D_1 max. = maximum minor diameter, internal
d_1 max. = maximum minor diameter, external
D_1 min. = minimum minor diameter, internal
d_1 min. = minimum minor diameter, external
D_2 = pitch diameter, internal
d_2 = pitch diameter, external
D_2 bsc = basic pitch diameter, internal (see Tables 6 through 16)
= $D - h_b$
D_2 max. = maximum pitch diameter, internal
d_2 max. = maximum pitch diameter, external
D_2 min. = minimum pitch diameter, internal
d_2 min. = minimum pitch diameter, external
d_3 max. = maximum minor diameter, external
d_3 min. = minimum minor diameter, external
D bsc = basic major (nominal) diameter, internal
d max. = maximum major diameter, external
D min. = minimum major diameter, internal
d min. = minimum major diameter, external
es = allowance at the major, pitch, and minor diameter of the external thread
h_b = $2h_{as}$ (see Table 5)
h_n = height of internal thread (see Table 5)
P = pitch, in.
r max. = maximum root radius, external thread
r min. = minimum root radius, external thread
Td = major diameter tolerance, external thread
TD_1 = minor diameter tolerance, internal thread
Td_2 = pitch diameter tolerance, external thread

To obtain limits of size using the formulas, see Table 5 for basic thread form data, section 11 for basic dimensions, and section 5 for formulas of allowance and tolerance. For easy reference, outline guides for determining limits of size of external and internal threads are given in Tables 17A and 17B.

8.3.1 External Thread

(a) Maximum Major Diameter (External Threads)
(1) for Classes 1A and 2A
d max. = D bsc − es
(2) for Class 3A
d max. = D bsc
(b) Minimum Major Diameter (External Threads)
(1) for all classes
d min. = d max. − Td for respective class of thread
(c) Maximum Pitch Diameter (External Threads)
(1) for Classes 1A and 2A
$d_2 = D_2$ bsc − es
(2) for Class 3A
$d_2 = D_2$ bsc
(d) Minimum Pitch Diameter (External Threads)
(1) for all classes
d_2 min. = d_2 max. − Td_2 for respective class of thread
(e) Maximum Minor Diameter (External Threads)
(1) in dimensioning UN series external threads, the minor diameter is not specified. In practice, the minor diameter is satisfactory when accepted by a standard GO thread gage in accordance with ASME B1.2. When minor diameter values for reference purposes are desired, they are calculated as follows:
(-a) for Classes 1A and 2A
d_1 max. = D_1 bsc − es
(-b) for Class 3A
d_1 max. = D_1 bsc
(2) for UNR series threads, the formulas are
(-a) for Classes 1A and 2A
d_3 max. = D_1 bsc − es − 0.10825318P
(-b) for Class 3A
d_3 max. = D_1 bsc − 0.10825318P
(3) for UNJ series threads, the formulas are
(-a) for Class 2A
d_3 max. = d_2 max. (for Class 2A UN) − 0.5051800P (see Table 5)
(-b) for Class 3A
d_3 max. = d_2 max. (for Class 3A UN) − 0.5051800P (see Table 5)
(-c) r max. = 0.18042196P
(f) Minimum Minor Diameter (External Threads)
(1) for UN and UNR series threads, when the minimum diameter is desirable for design purposes, it can be calculated for all classes by
d_1 min. = d_2 min. − 0.64951905P
(2) for UNJ series threads, the formulas are
(-a) for Class 2A
d_3 min. = d_2 min. (for Class 2A UN) − 0.565800P (see Table 5)
(-b) for Class 3A
d_3 min. = d_2 min. (for Class 3A UN) − 0.565800P (see Table 5)
(-c) r min. = 0.15011107P

8.3.2 Internal Thread

(a) Maximum Major Diameter (Internal Threads). In dimensioning internal threads, the maximum major diameter is established by the crest of an unworn tool and therefore is not specified. 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 that has no allowance.
(b) Minimum Major Diameter (Internal Threads)
(1) For all classes
D min. = D bsc
(c) Minimum Pitch Diameter (Internal Threads)
(1) For all classes

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D_2 min. = D_2 bsc

(d) Maximum Pitch Diameter (Internal Threads)

(1) For all classes

D_2 max. = D_2 min. + Td_2 for respective class of thread

(e) Minimum Minor Diameter (Internal Threads)

(1) for UN and UNR series threads, for all classes

D_1 min. = D bsc − $2h_n$ or D bsc − 1.08253175P, rounded as follows:

(-a) for all classes, less than 0.1380 (#6) nominal size, round to four decimal places

(-b) for Classes 1B and 2B, equal to or greater than 0.1380 (#6) nominal size, round to three decimal places

(-c) for Class 3B, equal to or greater than 0.1380 (#6) nominal size, round to three decimal places and add a zero to yield a four-decimal place value

(2) for UNJ series threads, for all classes

D_1 min. = D min. − 0.97427858P, rounded as follows:

(-a) for all Classes, less than 0.1380 (#6) nominal size, round to four decimal places

(-b) for Class 2B, equal to or greater than 0.1380 (#6) nominal size, round to three decimal places

(-c) for Class 3B, equal to or greater than 0.1380 (#6) nominal size, round to four decimal places

(f) Maximum Minor Diameter (Internal Threads)

(1) For all classes

D_1 max. = D_1 min. (six decimal-place value) + TD_1 [see para. 5.8.2(c)], rounded as follows:

(-a) for Classes 1 B and 2 B, less than 0.1380 (#6) nominal size, round to four decimal places

(-b) for Classes 1B and 2 B, equal to or greater than 0.1380 (#6) nominal size, round to three decimal places

(-c) for Class 3B, all sizes, round to four decimal places

8.4 Example of Calculations From Formulas

Tables 18A and 18B are based on the practices for calculating and rounding screw thread dimensions as specified in ASME B1.30; see ASME B1.30 for additional examples.

9 THREAD FORM TOLERANCES

9.1 Form Variation

Form variation is the combined effect on functional size of individual thread form variations in lead (pitch), helix, flank angle, taper, and roundness.

9.2 Lead and Flank Angle Acceptance

Acceptance of lead and flank angles of product screw threads shall be in accordance with paras 9.2.1 through 9.2.6. These factors also contribute to visual identification of gross defects in thread profile.

9.2.1 When Thread Gaging System 21 of ASME B1.3 is specified, product thread lead (including helix) and flank angle variations are not considered as separate elements.

9.2.2 When Thread Gaging System 22 of ASME B1.3 is specified, with the pitch diameter or thread-groove diameter inspection/evaluation required, the product thread lead (including helix) and flank angles shall be considered acceptable when the minimum material characteristic (pitch diameter or thread-groove diameter in ASME B1.3, Tables 1 and 2, columns C and D) and the maximum material characteristic (GO in ASME B1.3, Tables 1 and 2, column A) are accepted by the gages specified for System 22, over the standard GO thread gage length.

When Thread Gaging System 22 is specified with NO GO functional diameter combined with inspection/evaluation of lead and flank option, agreements must be reached between the purchaser and the supplier on lead and flank angle limits and method of evaluation.

9.2.3 When Thread Gaging System 23 of ASME B1.3 is specified, product thread lead and flank angles shall be acceptable if within the allowable variations specified in Tables 3 and 19 of this Standard. Also, the minimum material characteristic (pitch diameter or thread-groove diameter in ASME B1.3, Tables 1 and 2, columns C and D) and the maximum material characteristic (GO in ASME B1.3, Tables 1 and 2, column A) must be accepted by the gages specified for System 23 over the standard GO thread gage length.

Allowable variations in lead and flank angles are maximum values. Maximum variation in these and pitch diameter tolerance cannot be taken simultaneously (see paras. 9.2.5 and 9.2.6).

9.2.4 When individual inspection/evaluation of lead (including helix) and/or flank angle variations are required in addition to Thread Gaging System 21 or 22 of ASME B1.3, the allowable variations for these characteristics shall be as specified in Tables 3 and 19 of this Standard.

When individual inspection of lead (including helix) and flank angle variations are required, the allowable variations for these characteristics shall be in accordance with Tables 6 and 7 unless otherwise specified.

9.2.5 For sizes not included in Tables 3 and 19, the allowable lead variation is equal to one-half the pitch diameter tolerance divided by 1.732051. This is the lead variation that causes a change in functional diameter equal to ½ the pitch diameter tolerance, external thread, Td_2. The allowable flank half-angle variation in minutes of arc is equal to 30 plus 1.875 times the number of threads per inch, rounded to the nearest 5 min for UN threads and UNJ threads 32 threads/in. and coarser. For UNJ threads finer than 32 threads/in., this is equal to 62 plus 0.775 times the number of threads/in. rounded to the nearest 5 min.

(a) EXAMPLE: 0.945-8.5-UNJS or UNS-3A; lead and angle control required

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Table 6 Basic Dimensions for Coarse-Thread Series (UNC, UNRC, and UNJC)

Nominal Size		Basic Major Diam., D bsc	Threads/ in.	Basic Pitch Diam., D_2 bsc	UNR Design Minor Diam. External, d_3 (Ref.)	UNJ Design Minor Diam. External, d_3 (Ref.)	Basic UN Minor Diam. Internal, D_1 bsc	Basic UNJ Minor Diam. Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diam., λ		Area at Minor Diam. $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary								deg	Min.		
...	1	0.0730	64	0.0629	0.0544	0.0550	0.0561	0.0578	4	32	0.00218	0.00263
2	...	0.0860	56	0.0744	0.0647	0.0654	0.0667	0.0686	4	23	0.00310	0.00370
...	3	0.0990	48	0.0855	0.0742	0.0750	0.0764	0.0787	4	27	0.00406	0.00487
4	...	0.1120	40	0.0958	0.0822	0.0832	0.0849	0.0876	4	46	0.00497	0.00604
5	...	0.1250	40	0.1088	0.0952	0.0962	0.0979	0.1006	4	11	0.00672	0.00796
6	...	0.1380	32	0.1177	0.1008	0.1019	0.1042	0.1076	4	51	0.00745	0.00908
8	...	0.1640	32	0.1437	0.1268	0.1279	0.1302	0.1336	3	58	0.01200	0.01400
10	...	0.1900	24	0.1629	0.1404	0.1419	0.1449	0.1494	4	40	0.01450	0.01750
...	12	0.2160	24	0.1889	0.1664	0.1679	0.1709	0.1754	4	1	0.02060	0.02420
1/4	...	0.2500	20	0.2175	0.1905	0.1922	0.1959	0.2013	4	12	0.02690	0.03180
5/16	...	0.3125	18	0.2764	0.2463	0.2483	0.2524	0.2584	3	40	0.04540	0.05240
3/8	...	0.3750	16	0.3344	0.3006	0.3028	0.3073	0.3141	3	25	0.06780	0.07750
7/16	...	0.4375	14	0.3911	0.3524	0.3550	0.3602	0.3679	3	20	0.09330	0.10630
1/2	...	0.5000	13	0.4500	0.4084	0.4111	0.4167	0.4251	3	7	0.12570	0.14190
9/16	...	0.5625	12	0.5084	0.4633	0.4663	0.4723	0.4813	2	59	0.16200	0.18200
5/8	...	0.6250	11	0.5660	0.5167	0.5201	0.5266	0.5364	2	56	0.20200	0.22600
3/4	...	0.7500	10	0.6850	0.6309	0.6345	0.6417	0.6526	2	40	0.30200	0.33400
7/8	...	0.8750	9	0.8028	0.7427	0.7467	0.7547	0.7667	2	31	0.41900	0.46200
1	...	1.0000	8	0.9188	0.8512	0.8557	0.8647	0.8782	2	29	0.55100	0.60600
1 1/8	...	1.1250	7	1.0322	0.9549	0.9600	0.9704	0.9858	2	31	0.69300	0.76300
1 1/4	...	1.2500	7	1.1572	1.0799	1.0850	1.0954	1.1108	2	15	0.89000	0.96900
1 3/8	...	1.3750	6	1.2667	1.1766	1.1825	1.1946	1.2126	2	24	1.05400	1.15500
1 1/2	...	1.5000	6	1.3917	1.3015	1.3075	1.3196	1.3376	2	11	1.29400	1.40500
1 3/4	...	1.7500	5	1.6201	1.5118	1.5191	1.5335	1.5551	2	15	1.74000	1.90000
2	...	2.0000	4 1/2	1.8557	1.7354	1.7434	1.7594	1.7835	2	11	2.30000	2.50000
2 1/4	...	2.2500	4	2.0876	1.9523	1.9613	1.9794	2.0064	2	11	2.91000	3.16000
2 1/2	...	2.5000	4	2.3376	2.2023	2.2113	2.2294	2.2564	1	57	3.72000	4.00000
2 3/4	...	2.7500	4	2.5876	2.4523	2.4613	2.4794	2.5064	1	46	4.62000	4.93000
3	...	3.0000	4	2.8376	2.7023	2.7113	2.7294	2.7564	1	36	5.62000	5.97000
3 1/4	...	3.2500	4	3.0876	2.9523	2.9613	2.9794	3.0064	1	29	6.72000	7.10000
3 1/2	...	3.5000	4	3.3376	3.2023	3.2113	3.2294	3.2564	1	22	7.92000	8.33000
3 3/4	...	3.7500	4	3.5876	3.4523	3.4613	3.4794	3.5064	1	16	9.21000	9.66000
4	...	4.0000	4	3.8376	3.7023	3.7113	3.7294	3.7564	1	11	10.61000	11.08000

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.

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Table 7 Basic Dimensions for Fine-Thread Series (UNF, UNRF, and UNJF)

Nominal Size		Basic Major Diam., D bsc	Threads/ in.	Basic Pitch Diam., D_2 bsc	UNR Design Minor Diam. External, d_3 (Ref.)	UNJ Design Minor Diam. External, d_3 (Ref.)	Basic UN Minor Diam. Internal, D_1 bsc	Basic UNJ Minor Diam. Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diam., λ		Area at Minor Diam. $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary								deg	Min.		
0	...	0.0600	80	0.0519	0.0451	0.0456	0.0465	0.0478	4	24	0.00150	0.00180
...	1	0.0730	72	0.0640	0.0565	0.0570	0.0580	0.0595	3	57	0.00237	0.00278
2	...	0.0860	64	0.0759	0.0674	0.0680	0.0691	0.0708	3	45	0.00339	0.00394
...	3	0.0990	56	0.0874	0.0777	0.0784	0.0797	0.0816	3	44	0.00451	0.00523
4	...	0.1120	48	0.0985	0.0872	0.0880	0.0894	0.0917	3	51	0.00567	0.00661
5	...	0.1250	44	0.1102	0.0979	0.0987	0.1004	0.1029	3	46	0.00716	0.00830
6	...	0.1380	40	0.1218	0.1082	0.1092	0.1109	0.1136	3	45	0.00875	0.01015
8	...	0.1640	36	0.1460	0.1309	0.1320	0.1339	0.1369	3	28	0.01285	0.01474
10	...	0.1900	32	0.1697	0.1528	0.1539	0.1562	0.1596	3	22	0.01750	0.02000
...	12	0.2160	28	0.1928	0.1735	0.1748	0.1773	0.1812	3	23	0.02260	0.02580
1/4	...	0.2500	28	0.2268	0.2075	0.2088	0.2113	0.2152	2	52	0.03260	0.03640
5/16	...	0.3125	24	0.2854	0.2629	0.2644	0.2674	0.2719	2	40	0.05240	0.05810
3/8	...	0.3750	24	0.3479	0.3254	0.3269	0.3299	0.3344	2	11	0.08090	0.08780
7/16	...	0.4375	20	0.4050	0.3780	0.3797	0.3834	0.3888	2	15	0.10900	0.11870
1/2	...	0.5000	20	0.4675	0.4405	0.4422	0.4459	0.4513	1	57	0.14860	0.15990
9/16	...	0.5625	18	0.5264	0.4963	0.4983	0.5024	0.5084	1	55	0.18900	0.20300
5/8	...	0.6250	18	0.5889	0.5588	0.5608	0.5649	0.5709	1	43	0.24000	0.25600
3/4	...	0.7500	16	0.7094	0.6756	0.6778	0.6823	0.6891	1	36	0.35100	0.37300
7/8	...	0.8750	14	0.8286	0.7899	0.7925	0.7977	0.8054	1	34	0.48100	0.50900
1	...	1.0000	12	0.9459	0.9008	0.9038	0.9098	0.9188	1	36	0.62500	0.66300
1 1/8	...	1.1250	12	1.0709	1.0258	1.0288	1.0348	1.0438	1	25	0.81200	0.85600
1 1/4	...	1.2500	12	1.1959	1.1508	1.1538	1.1598	1.1688	1	16	1.02400	1.07300
1 3/8	...	1.3750	12	1.3209	1.2758	1.2788	1.2848	1.2938	1	9	1.26000	1.31500
1 1/2	...	1.5000	12	1.4459	1.4008	1.4038	1.4098	1.4188	1	3	1.52100	1.58100

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.

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Table 8 Basic Dimensions for Extra Fine-Thread Series (UNEF, UNREF, and UNJEF)

Nominal Size		Basic Major Diam., D bsc	Threads/ in.	Basic Pitch Diam., D_2 bsc	UNR Design Minor Diam. External, d_3 (Ref.)	UNJ Design Minor Diam. External, d_3 (Ref.)	Basic UN Minor Diam. Internal, D_1 bsc	Basic UNJ Minor Diam. Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diam., λ		Area at Minor Diam. $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary								deg	Min.		
...	12	0.2160	32	0.1957	0.1788	0.1799	0.1822	0.1856	2	55	0.0242	0.0270
1/4	...	0.2500	32	0.2297	0.2128	0.2139	0.2162	0.2196	2	29	0.0344	0.0379
5/16	...	0.3125	32	0.2922	0.2753	0.2764	0.2787	0.2821	1	57	0.0581	0.0625
3/8	...	0.3750	32	0.3547	0.3378	0.3389	0.3412	0.3446	1	36	0.0878	0.0932
7/16	...	0.4375	28	0.4143	0.3950	0.3963	0.3988	0.4027	1	34	0.1201	0.1274
1/2	...	0.5000	28	0.4768	0.4575	0.4588	0.4613	0.4652	1	22	0.1620	0.1700
9/16	...	0.5625	24	0.5354	0.5129	0.5144	0.5174	0.5219	1	25	0.2030	0.2140
5/8	...	0.6250	24	0.5979	0.5754	0.5769	0.5799	0.5844	1	16	0.2560	0.2680
...	11/16	0.6875	24	0.6604	0.6379	0.6394	0.6424	0.6469	1	9	0.3150	0.3290
3/4	...	0.7500	20	0.7175	0.6905	0.6922	0.6959	0.7013	1	16	0.3690	0.3860
...	13/16	0.8125	20	0.7800	0.7530	0.7547	0.7584	0.7638	1	10	0.4390	0.4580
7/8	...	0.8750	20	0.8425	0.8155	0.8172	0.8209	0.8263	1	5	0.5150	0.5360
...	15/16	0.9375	20	0.9050	0.8780	0.8797	0.8834	0.8888	1	0	0.5980	0.6200
1	...	1.0000	20	0.9675	0.9405	0.9422	0.9459	0.9513	0	57	0.6870	0.7110
...	1 1/16	1.0625	18	1.0264	0.9963	0.9983	1.0024	1.0084	0	59	0.7700	0.7990
1 1/8	...	1.1250	18	1.0889	1.0588	1.0608	1.0649	1.0709	0	56	0.8710	0.9010
...	1 3/16	1.1875	18	1.1514	1.1213	1.1233	1.1274	1.1334	0	53	0.9770	1.0090
1 1/4	...	1.2500	18	1.2139	1.1838	1.1858	1.1899	1.1959	0	50	1.0900	1.1230
...	1 5/16	1.3125	18	1.2764	1.2463	1.2483	1.2524	1.2584	0	48	1.2080	1.2440
1 3/8	...	1.3750	18	1.3389	1.3088	1.3108	1.3149	1.3209	0	45	1.3330	1.3700
...	1 7/16	1.4375	18	1.4014	1.3713	1.3733	1.3774	1.3834	0	43	1.4640	1.5030
1 1/2	...	1.5000	18	1.4639	1.4338	1.4358	1.4399	1.4459	0	42	1.6000	1.6400
...	1 9/16	1.5625	18	1.5264	1.4963	1.4983	1.5024	1.5084	0	40	1.7400	1.7900
1 5/8	...	1.6250	18	1.5889	1.5588	1.5608	1.5649	1.5709	0	38	1.8900	1.9400
...	1 11/16	1.6875	18	1.6514	1.6213	1.6233	1.6274	1.6334	0	37	2.0500	2.1000

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, section B-1.
(3) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(4) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.

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Table 9 Basic Dimensions for 4-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
2½ [Note (5)]	...	2.5000	2.3376	2.2023	2.2113	2.2294	2.2564	1	57	3.72	4.00
...	2⅝	2.6250	2.4626	2.3273	2.3363	2.3544	2.3814	1	51	4.16	4.45
2¾ [Note (5)]	...	2.7500	2.5876	2.4523	2.4613	2.4794	2.5064	1	46	4.62	4.93
...	2⅞	2.8750	2.7126	2.5773	2.5863	2.6044	2.6314	1	41	5.11	5.44
3 [Note (5)]	...	3.0000	2.8376	2.7023	2.7113	2.7294	2.7564	1	36	5.62	5.97
...	3⅛	3.1250	2.9626	2.8273	2.8363	2.8544	2.8814	1	32	6.16	6.52
3¼ [Note (5)]	...	3.2500	3.0876	2.9523	2.9613	2.9794	3.0064	1	29	6.72	7.10
...	3⅜	3.3750	3.2126	3.0773	3.0863	3.1044	3.1314	1	25	7.31	7.70
3½ [Note (5)]	...	3.5000	3.3376	3.2023	3.2113	3.2294	3.2564	1	22	7.92	8.33
...	3⅝	3.6250	3.4626	3.3273	3.3363	3.3544	3.3814	1	19	8.55	8.98
3¾ [Note (5)]	...	3.7500	3.5876	3.4523	3.4613	3.4794	3.5064	1	16	9.21	9.66
...	3⅞	3.8750	3.7126	3.5773	3.5863	3.6044	3.6314	1	14	9.90	10.36
4	...	4.0000	3.8376	3.7023	3.7113	3.7294	3.7564	1	11	10.61	11.08
...	4⅛	4.1250	3.9626	3.8273	3.8363	3.8544	3.8814	1	9	11.34	11.83
4¼	...	4.2500	4.0876	3.9523	3.9613	3.9794	4.0064	1	7	12.10	12.61
...	4⅜	4.3750	4.2126	4.0773	4.0863	4.1044	4.1314	1	5	12.88	13.41
4½	...	4.5000	4.3376	4.2023	4.2113	4.2294	4.2564	1	3	13.69	14.23
...	4⅝	4.6250	4.4626	4.3273	4.3363	4.3544	4.3814	1	1	14.52	15.08
4¾	...	4.7500	4.5876	4.4523	4.4613	4.4794	4.5064	0	60	15.38	15.95
...	4⅞	4.8750	4.7126	4.5773	4.5863	4.6044	4.6314	0	58	16.26	16.85
5	...	5.0000	4.8376	4.7023	4.7113	4.7294	4.7564	0	57	17.17	17.77
...	5⅛	5.1250	4.9626	4.8273	4.8363	4.8544	4.8814	0	55	18.10	18.71
5¼	...	5.2500	5.0876	4.9523	4.9613	4.9794	5.0064	0	54	19.05	19.69
...	5⅜	5.3750	5.2126	5.0773	5.0863	5.1044	5.1314	0	52	20.03	20.68
5½	...	5.5000	5.3376	5.2023	5.2113	5.2294	5.2564	0	51	21.04	21.70
...	5⅝	5.6250	5.4626	5.3273	5.3363	5.3544	5.3814	0	50	22.06	22.74
5¾	...	5.7500	5.5876	5.4523	5.4613	5.4794	5.5064	0	49	23.12	23.81
...	5⅞	5.8750	5.7126	5.5773	5.5863	5.6044	5.6314	0	48	24.19	24.91
6	...	6.0000	5.8376	5.7023	5.7113	5.7294	5.7564	0	47	25.30	26.03

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Table 9 Basic Dimensions for 4-Thread Series (UN, UNR, and UNJ) (Cont'd)

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 10 Basic Dimensions for 6-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
1 3/8 [Note (5)]	...	1.3750	1.2667	1.1765	1.1825	1.1946	1.2126	2	24	1.0541	1.1548
...	1 7/16	1.4375	1.3292	1.2390	1.2450	1.2571	1.2751	2	17	1.1709	1.2769
1 1/2 [Note (5)]	...	1.5000	1.3917	1.3015	1.3075	1.3196	1.3376	2	11	1.2938	1.4052
...	1 9/16	1.5625	1.4542	1.3640	1.3700	1.3821	1.4001	2	5	1.4229	1.5395
1 5/8	...	1.6250	1.5167	1.4265	1.4325	1.4446	1.4626	2	0	1.5581	1.6801
...	1 11/16	1.6875	1.5792	1.4890	1.4950	1.5071	1.5251	1	55	1.6995	1.8267
1 3/4	...	1.7500	1.6417	1.5515	1.5575	1.5696	1.5876	1	51	1.8469	1.9795
...	1 13/16	1.8125	1.7042	1.6140	1.6200	1.6321	1.6501	1	47	2.0006	2.1384
1 7/8	...	1.8750	1.7667	1.6765	1.6825	1.6946	1.7126	1	43	2.1603	2.3035
...	1 15/16	1.9375	1.8292	1.7390	1.7450	1.7571	1.7751	1	40	2.3262	2.4747
2	...	2.0000	1.8917	1.8015	1.8075	1.8196	1.8376	1	36	2.4982	2.6520
...	2 1/8	2.1250	2.0167	1.9265	1.9325	1.9446	1.9626	1	30	2.8607	3.0251
2 1/4	...	2.2500	2.1417	2.0515	2.0575	2.0696	2.0876	1	25	3.2477	3.4227
...	2 3/8	2.3750	2.2667	2.1765	2.1825	2.1946	2.2126	1	20	3.6592	3.8449
2 1/2	...	2.5000	2.3917	2.3015	2.3075	2.3196	2.3376	1	16	4.0953	4.2916
...	2 5/8	2.6250	2.5167	2.4265	2.4325	2.4446	2.4626	1	12	4.5560	4.7629
2 3/4	...	2.7500	2.6417	2.5515	2.5575	2.5696	2.5876	1	9	5.0411	5.2587
...	2 7/8	2.8750	2.7667	2.6765	2.6825	2.6946	2.7126	1	6	5.5509	5.7790
3	...	3.0000	2.8917	2.8015	2.8075	2.8196	2.8376	1	3	6.0851	6.3239
...	3 1/8	3.1250	3.0167	2.9265	2.9325	2.9446	2.9626	1	0	6.6439	6.8933
3 1/4	...	3.2500	3.1417	3.0515	3.0575	3.0696	3.0876	0	58	7.2273	7.4873
...	3 3/8	3.3750	3.2667	3.1765	3.1825	3.1946	3.2126	0	56	7.8352	8.1058
3 1/2	...	3.5000	3.3917	3.3015	3.3075	3.3196	3.3376	0	54	8.4676	8.7489
...	3 5/8	3.6250	3.5167	3.4265	3.4325	3.4446	3.4626	0	52	9.1246	9.4165
3 3/4	...	3.7500	3.6417	3.5515	3.5575	3.5696	3.5876	0	50	9.8061	10.1086
...	3 7/8	3.8750	3.7667	3.6765	3.6825	3.6946	3.7126	0	48	10.5122	10.8253
4	...	4.0000	3.8917	3.8015	3.8075	3.8196	3.8376	0	47	11.2428	11.5665
...	4 1/8	4.1250	4.0167	3.9265	3.9325	3.9446	3.9626	0	45	11.9980	12.3323
4 1/4	...	4.2500	4.1417	4.0515	4.0575	4.0696	4.0876	0	44	12.7777	13.1226
...	4 3/8	4.3750	4.2667	4.1765	4.1825	4.1946	4.2126	0	43	13.5819	13.9375

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Table 10 Basic Dimensions for 6-Thread Series (UN, UNR, and UNJ) (Cont'd)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
$4\frac{1}{2}$	...	4.5000	4.3917	4.3015	4.3075	4.3196	4.3376	0	42	14.4107	14.7769
...	$4\frac{5}{8}$	4.6250	4.5167	4.4265	4.4325	4.4446	4.4626	0	40	15.2641	15.6409
$4\frac{3}{4}$	...	4.7500	4.6417	4.5515	4.5575	4.5696	4.5876	0	39	16.1419	16.5294
...	$4\frac{7}{8}$	4.8750	4.7667	4.6765	4.6825	4.6946	4.7126	0	38	17.0444	17.4424
5	...	5.0000	4.8917	4.8015	4.8075	4.8196	4.8376	0	37	17.9713	18.3800
...	$5\frac{1}{8}$	5.1250	5.0167	4.9265	4.9325	4.9446	4.9626	0	36	18.9228	19.3421
$5\frac{1}{4}$	...	5.2500	5.1417	5.0515	5.0575	5.0696	5.0876	0	35	19.8989	20.3288
...	$5\frac{3}{8}$	5.3750	5.2667	5.1765	5.1825	5.1946	5.2126	0	35	20.8995	21.3400
$5\frac{1}{2}$	...	5.5000	5.3917	5.3015	5.3075	5.3196	5.3376	0	34	21.9246	22.3758
...	$5\frac{5}{8}$	5.6250	5.5167	5.4265	5.4325	5.4446	5.4626	0	33	22.9743	23.4361
$5\frac{3}{4}$	...	5.7500	5.6417	5.5515	5.5575	5.5696	5.5876	0	32	24.0485	24.5209
...	$5\frac{7}{8}$	5.8750	5.7667	5.6765	5.6825	5.6946	5.7126	0	32	25.1473	25.6303
6	...	6.0000	5.8917	5.8015	5.8075	5.8196	5.8376	0	31	26.2706	26.7642

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 11 Basic Dimensions for 8-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
1 [Note (5)]	...	1.0000	0.9188	0.8512	0.8557	0.8647	0.8782	2	29	0.551	0.606
...	1 1/16	1.0625	0.9813	0.9137	0.9182	0.9272	0.9407	2	19	0.636	0.695
1 1/8	...	1.1250	1.0438	0.9762	0.9807	0.9897	1.0032	2	11	0.728	0.790
...	1 3/16	1.1875	1.1063	1.0387	1.0432	1.0522	1.0657	2	4	0.825	0.892
1 1/4	...	1.2500	1.1688	1.1012	1.1057	1.1147	1.1282	1	57	0.929	1.000
...	1 5/16	1.3125	1.2313	1.1637	1.1682	1.1772	1.1907	1	51	1.039	1.114
1 3/8	...	1.3750	1.2938	1.2262	1.2307	1.2397	1.2532	1	46	1.155	1.233
...	1 7/16	1.4375	1.3563	1.2887	1.2932	1.3022	1.3157	1	41	1.277	1.360
1 1/2	...	1.5000	1.4188	1.3512	1.3557	1.3647	1.3782	1	36	1.41	1.49
...	1 9/16	1.5625	1.4813	1.4137	1.4182	1.4272	1.4407	1	32	1.54	1.63
1 5/8	...	1.6250	1.5438	1.4762	1.4807	1.4897	1.5032	1	29	1.68	1.77
...	1 11/16	1.6875	1.6063	1.5387	1.5432	1.5522	1.5657	1	25	1.83	1.93
1 3/4	...	1.7500	1.6688	1.6012	1.6057	1.6147	1.6282	1	22	1.98	2.08
...	1 13/16	1.8125	1.7313	1.6637	1.6682	1.6772	1.6907	1	19	2.14	2.25
1 7/8	...	1.8750	1.7938	1.7262	1.7307	1.7397	1.7532	1	16	2.30	2.41
...	1 15/16	1.9375	1.8563	1.7887	1.7932	1.8022	1.8157	1	14	2.47	2.59
2	...	2.0000	1.9188	1.8512	1.8557	1.8647	1.8782	1	11	2.65	2.77
...	2 1/8	2.1250	2.0438	1.9762	1.9807	1.9897	2.0032	1	7	3.03	3.15
2 1/4	...	2.2500	2.1688	2.1012	2.1057	2.1147	2.1282	1	3	3.42	3.56
...	2 3/8	2.3750	2.2938	2.2262	2.2307	2.2397	2.2532	0	60	3.85	3.99
2 1/2	...	2.5000	2.4188	2.3512	2.3557	2.3647	2.3782	0	57	4.29	4.44
...	2 5/8	2.6250	2.5438	2.4762	2.4807	2.4897	2.5032	0	54	4.76	4.92
2 3/4	...	2.7500	2.6688	2.6012	2.6057	2.6147	2.6282	0	51	5.26	5.43
...	2 7/8	2.8750	2.7938	2.7262	2.7307	2.7397	2.7532	0	49	5.78	5.95
3	...	3.0000	2.9188	2.8512	2.8557	2.8647	2.8782	0	47	6.32	6.51
...	3 1/8	3.1250	3.0438	2.9762	2.9807	2.9897	3.0032	0	45	6.89	7.08
3 1/4	...	3.2500	3.1688	3.1012	3.1057	3.1147	3.1282	0	43	7.49	7.69
...	3 3/8	3.3750	3.2938	3.2262	3.2307	3.2397	3.2532	0	42	8.11	8.31
3 1/2	...	3.5000	3.4188	3.3512	3.3557	3.3647	3.3782	0	40	8.75	8.96
...	3 5/8	3.6250	3.5438	3.4762	3.4807	3.4897	3.5032	0	39	9.42	9.64

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Table 11 Basic Dimensions for 8-Thread Series (UN, UNR, and UNJ) (Cont'd)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
$3\frac{3}{4}$	...	3.7500	3.6688	3.6012	3.6057	3.6147	3.6282	0	37	10.11	10.34
...	$3\frac{7}{8}$	3.8750	3.7938	3.7262	3.7307	3.7397	3.7532	0	36	10.83	11.06
4	...	4.0000	3.9188	3.8512	3.8557	3.8647	3.8782	0	35	11.57	11.81
...	$4\frac{1}{8}$	4.1250	4.0438	3.9762	3.9807	3.9897	4.0032	0	34	12.33	12.59
$4\frac{1}{4}$	...	4.2500	4.1688	4.1012	4.1057	4.1147	4.1282	0	33	13.12	13.38
...	$4\frac{3}{8}$	4.3750	4.2938	4.2262	4.2307	4.2397	4.2532	0	32	13.94	14.21
$4\frac{1}{2}$	...	4.5000	4.4188	4.3512	4.3557	4.3647	4.3782	0	31	14.8	15.1
...	$4\frac{5}{8}$	4.6250	4.5438	4.4762	4.4807	4.4897	4.5032	0	30	15.6	15.9
$4\frac{3}{4}$	...	4.7500	4.6688	4.6012	4.6057	4.6147	4.6282	0	29	16.5	16.8
...	$4\frac{7}{8}$	4.8750	4.7938	4.7262	4.7307	4.7397	4.7532	0	29	17.4	17.7
5	...	5.0000	4.9188	4.8512	4.8557	4.8647	4.8782	0	28	18.4	18.7
...	$5\frac{1}{8}$	5.1250	5.0438	4.9762	4.9807	4.9897	5.0032	0	27	19.3	19.7
$5\frac{1}{4}$	...	5.2500	5.1688	5.1012	5.1057	5.1147	5.1282	0	26	20.3	20.7
...	$5\frac{3}{8}$	5.3750	5.2938	5.2262	5.2307	5.2397	5.2532	0	26	21.3	21.7
$5\frac{1}{2}$	...	5.5000	5.4188	5.3512	5.3557	5.3647	5.3782	0	25	22.4	22.7
...	$5\frac{5}{8}$	5.6250	5.5438	5.4762	5.4807	5.4897	5.5032	0	25	23.4	23.8
$5\frac{3}{4}$	...	5.7500	5.6688	5.6012	5.6057	5.6147	5.6282	0	24	24.5	24.9
...	$5\frac{7}{8}$	5.8750	5.7938	5.7262	5.7307	5.7397	5.7532	0	24	25.6	26.0
6	...	6.0000	5.9188	5.8512	5.8557	5.8647	5.8782	0	23	26.8	27.1

NOTES:

(1) For information only.

(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.

(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.

(4) See formulas in Nonmandatory Appendix B, section B-1.

(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 12 Basic Dimensions for 12-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
9/16 [Note (5)]	...	0.5625	0.5084	0.4633	0.4663	0.4723	0.4813	2	59	0.162	0.182
5/8	...	0.6250	0.5709	0.5258	0.5288	0.5348	0.5438	2	40	0.210	0.232
...	11/16	0.6875	0.6334	0.5883	0.5913	0.5973	0.6063	2	24	0.264	0.289
3/4	...	0.7500	0.6959	0.6508	0.6538	0.6598	0.6688	2	11	0.323	0.351
...	13/16	0.8125	0.7584	0.7133	0.7163	0.7223	0.7313	2	0	0.390	0.420
7/8	...	0.8750	0.8209	0.7758	0.7788	0.7848	0.7938	1	51	0.462	0.495
...	15/16	0.9375	0.8834	0.8383	0.8413	0.8473	0.8563	1	43	0.540	0.576
1 [Note (5)]	...	1.0000	0.9459	0.9008	0.9038	0.9098	0.9188	1	36	0.625	0.663
...	1 1/16	1.0625	1.0084	0.9633	0.9663	0.9723	0.9813	1	30	0.715	0.756
1 1/8 [Note (5)]	...	1.1250	1.0709	1.0258	1.0288	1.0348	1.0438	1	25	0.812	0.856
...	1 3/16 [Note (5)]	1.1875	1.1334	1.0883	1.0913	1.0973	1.1063	1	20	0.915	0.961
1 1/4 [Note (5)]	...	1.2500	1.1959	1.1508	1.1538	1.1598	1.1688	1	16	1.024	1.073
...	1 5/16	1.3125	1.2584	1.2133	1.2163	1.2223	1.2313	1	12	1.139	1.191
1 3/8 [Note (5)]	...	1.3750	1.3209	1.2758	1.2788	1.2848	1.2938	1	9	1.260	1.315
...	1 7/16	1.4375	1.3834	1.3383	1.3413	1.3473	1.3563	1	6	1.388	1.445
1 1/2 [Note (5)]	...	1.5000	1.4459	1.4008	1.4038	1.4098	1.4188	1	3	1.520	1.580
...	1 9/16	1.5625	1.5084	1.4633	1.4663	1.4723	1.4813	1	0	1.660	1.720
1 5/8	...	1.6250	1.5709	1.5258	1.5288	1.5348	1.5438	0	58	1.810	1.870
...	1 11/16	1.6875	1.6334	1.5883	1.5913	1.5973	1.6063	0	56	1.960	2.030
1 3/4	...	1.7500	1.6959	1.6508	1.6538	1.6598	1.6688	0	54	2.120	2.190
...	1 13/16	1.8125	1.7584	1.7133	1.7163	1.7223	1.7313	0	52	2.280	2.350
1 7/8	...	1.8750	1.8209	1.7758	1.7788	1.7848	1.7938	0	50	2.450	2.530
...	1 15/16	1.9375	1.8834	1.8383	1.8413	1.8473	1.8563	0	48	2.630	2.710
2	...	2.0000	1.9459	1.9008	1.9038	1.9098	1.9188	0	47	2.810	2.890
...	2 1/8	2.1250	2.0709	2.0258	2.0288	2.0348	2.0438	0	44	3.190	3.280
2 1/4	...	2.2500	2.1959	2.1508	2.1538	2.1598	2.1688	0	42	3.600	3.690
...	2 3/8	2.3750	2.3209	2.2758	2.2788	2.2848	2.2938	0	39	4.040	4.130
2 1/2	...	2.5000	2.4459	2.4008	2.4038	2.4098	2.4188	0	37	4.490	4.600
...	2 5/8	2.6250	2.5709	2.5258	2.5288	2.5348	2.5438	0	35	4.970	5.080

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Table 12 Basic Dimensions for 12-Thread Series (UN, UNR, and UNJ) (Cont'd)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
$2\frac{3}{4}$	...	2.7500	2.6959	2.6508	2.6538	2.6598	2.6688	0	34	5.480	5.590
...	$2\frac{7}{8}$	2.8750	2.8209	2.7758	2.7788	2.7848	2.7938	0	32	6.010	6.130
3	...	3.0000	2.9459	2.9008	2.9038	2.9098	2.9188	0	31	6.570	6.690
...	$3\frac{1}{8}$	3.1250	3.0709	3.0258	3.0288	3.0348	3.0438	0	30	7.150	7.280
$3\frac{1}{4}$	...	3.2500	3.1959	3.1508	3.1538	3.1598	3.1688	0	29	7.800	7.900
...	$3\frac{3}{8}$	3.3750	3.3209	3.2758	3.2788	3.2848	3.2938	0	27	8.400	8.500
$3\frac{1}{2}$	...	3.5000	3.4459	3.4008	3.4038	3.4098	3.4188	0	26	9.000	9.200
...	$3\frac{5}{8}$	3.6250	3.5709	3.5258	3.5288	3.5348	3.5438	0	26	9.700	9.900
$3\frac{3}{4}$	...	3.7500	3.6959	3.6508	3.6538	3.6598	3.6688	0	25	10.400	10.600
...	$3\frac{7}{8}$	3.8750	3.8209	3.7758	3.7788	3.7848	3.7938	0	24	11.100	11.300
4	...	4.0000	3.9459	3.9008	3.9038	3.9098	3.9188	0	23	11.900	12.100
...	$4\frac{1}{8}$	4.1250	4.0709	4.0258	4.0288	4.0348	4.0438	0	22	12.700	12.800
$4\frac{1}{4}$	...	4.2500	4.1959	4.1508	4.1538	4.1598	4.1688	0	22	13.500	13.600
	$4\frac{3}{8}$	4.3750	4.3209	4.2758	4.2788	4.2848	4.2938	0	21	14.300	14.500
$4\frac{1}{2}$	...	4.5000	4.4459	4.4008	4.4038	4.4098	4.4188	0	21	15.100	15.300
...	$4\frac{5}{8}$	4.6250	4.5709	4.5258	4.5288	4.5348	4.5438	0	20	16.000	16.200
$4\frac{3}{4}$	...	4.7500	4.6959	4.6508	4.6538	4.6598	4.6688	0	19	16.900	17.100
...	$4\frac{7}{8}$	4.8750	4.8209	4.7758	4.7788	4.7848	4.7938	0	19	17.800	18.000
5	...	5.0000	4.9459	4.9008	4.9038	4.9098	4.9188	0	18	18.800	19.000
...	$5\frac{1}{8}$	5.1250	5.0709	5.0258	5.0288	5.0348	5.0438	0	18	19.800	20.000
$5\frac{1}{4}$	...	5.2500	5.1959	5.1508	5.1538	5.1598	5.1688	0	18	20.800	21.000
...	$5\frac{3}{8}$	5.3750	5.3209	5.2758	5.2788	5.2848	5.2938	0	17	21.800	22.000
$5\frac{1}{2}$	...	5.5000	5.4459	5.4008	5.4038	5.4098	5.4188	0	17	22.800	23.100
...	$5\frac{5}{8}$	5.6250	5.5709	5.5258	5.5288	5.5348	5.5438	0	16	23.900	24.100
$5\frac{3}{4}$	...	5.7500	5.6959	5.6508	5.6538	5.6598	5.6688	0	16	25.000	25.200
	$5\frac{7}{8}$	5.8750	5.8209	5.7758	5.7788	5.7848	5.7938	0	16	26.100	26.400
6	...	6.0000	5.9459	5.9008	5.9038	5.9098	5.9188	0	15	27.300	27.500

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Table 12 Basic Dimensions for 12-Thread Series (UN, UNR, and UNJ) (Cont'd)

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 13 Basic Dimensions for 16-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
3/8 [Note (5)]	...	0.3750	0.3344	0.3006	0.3028	0.3073	0.3141	3	25	0.0678	0.0775
7/16	...	0.4375	0.3969	0.3631	0.3653	0.3698	0.3766	2	52	0.0997	0.1114
1/2	...	0.5000	0.4594	0.4256	0.4278	0.4323	0.4391	2	29	0.1378	0.1514
9/16	...	0.5625	0.5219	0.4881	0.4903	0.4948	0.5016	2	11	0.1819	0.1976
5/8	...	0.6250	0.5844	0.5506	0.5528	0.5573	0.5641	1	57	0.2320	0.2500
...	11/16	0.6875	0.6469	0.6131	0.6153	0.6198	0.6266	1	46	0.2890	0.3080
3/4 [Note (5)]	...	0.7500	0.7094	0.6756	0.6778	0.6823	0.6891	1	36	0.3510	0.3730
...	13/16	0.8125	0.7719	0.7381	0.7403	0.7448	0.7516	1	29	0.4200	0.4440
7/8	...	0.8750	0.8344	0.8006	0.8028	0.8073	0.8141	1	22	0.4950	0.5210
...	15/16	0.9375	0.8969	0.8631	0.8653	0.8698	0.8766	1	16	0.5760	0.6040
1	...	1.0000	0.9594	0.9256	0.9278	0.9323	0.9391	1	11	0.6630	0.6930
...	1 1/16	1.0625	1.0219	0.9881	0.9903	0.9948	1.0016	1	7	0.7560	0.7880
1 1/8	...	1.1250	1.0844	1.0506	1.0528	1.0573	1.0641	1	3	0.8560	0.8890
...	1 3/16	1.1875	1.1469	1.1131	1.1153	1.1198	1.1266	0	60	0.9610	0.9970
1 1/4	...	1.2500	1.2094	1.1756	1.1778	1.1823	1.1891	0	57	1.0730	1.1110
...	1 5/16	1.3125	1.2719	1.2381	1.2403	1.2448	1.2516	0	54	1.1910	1.2300
1 3/8	...	1.3750	1.3344	1.3006	1.3028	1.3073	1.3141	0	51	1.3150	1.3560
...	1 7/16	1.4375	1.3969	1.3631	1.3653	1.3698	1.3766	0	49	1.4450	1.4880
1 1/2	...	1.5000	1.4594	1.4256	1.4278	1.4323	1.4391	0	47	1.5800	1.6300
...	1 9/16	1.5625	1.5219	1.4881	1.4903	1.4948	1.5016	0	45	1.7200	1.7700
1 5/8	...	1.6250	1.5844	1.5506	1.5528	1.5573	1.5641	0	43	1.8700	1.9200
...	1 11/16	1.6875	1.6469	1.6131	1.6153	1.6198	1.6266	0	42	2.0300	2.0800
1 3/4		1.7500	1.7094	1.6756	1.6778	1.6823	1.6891	0	40	2.1900	2.2400
...	1 13/16	1.8125	1.7719	1.7381	1.7403	1.7448	1.7516	0	39	2.3500	2.4100
1 7/8	...	1.8750	1.8344	1.8006	1.8028	1.8073	1.8141	0	37	2.5300	2.5800
...	1 15/16	1.9375	1.8969	1.8631	1.8653	1.8698	1.8766	0	36	2.7100	2.7700
2	...	2.0000	1.9594	1.9256	1.9278	1.9323	1.9391	0	35	2.8900	2.9500
...	2 1/8	2.1250	2.0844	2.0506	2.0528	2.0573	2.0641	0	33	3.2800	3.3500
2 1/4	...	2.2500	2.2094	2.1756	2.1778	2.1823	2.1891	0	31	3.6900	3.7600
...	2 3/8	2.3750	2.3344	2.3006	2.3028	2.3073	2.3141	0	29	4.1300	4.2100

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Table 13 Basic Dimensions for 16-Thread Series (UN, UNR, and UNJ) (Cont'd)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
2 1/2	...	2.5000	2.4594	2.4256	2.4278	2.4323	2.4391	0	28	4.6000	4.6700
...	2 5/8	2.6250	2.5844	2.5506	2.5528	2.5573	2.5641	0	26	5.0800	5.1600
2 3/4	...	2.7500	2.7094	2.6756	2.6778	2.6823	2.6891	0	25	5.5900	5.6800
...	2 7/8	2.8750	2.8344	2.8006	2.8028	2.8073	2.8141	0	24	6.1300	6.2200
3	...	3.0000	2.9594	2.9256	2.9278	2.9323	2.9391	0	23	6.6900	6.7800
...	3 1/8	3.1250	3.0844	3.0506	3.0528	3.0573	3.0641	0	22	7.2800	7.3700
3 1/4	...	3.2500	3.2094	3.1756	3.1778	3.1823	3.1891	0	21	7.8900	7.9900
...	3 3/8	3.3750	3.3344	3.3006	3.3028	3.3073	3.3141	0	21	8.5200	8.6300
3 1/2	...	3.5000	3.4594	3.4256	3.4278	3.4323	3.4391	0	20	9.1800	9.2900
...	3 5/8	3.6250	3.5844	3.5506	3.5528	3.5573	3.5641	0	19	9.8600	9.9800
3 3/4	...	3.7500	3.7094	3.6756	3.6778	3.6823	3.6891	0	18	10.5700	10.6900
...	3 7/8	3.8750	3.8344	3.8006	3.8028	3.8073	3.8141	0	18	11.3000	11.4300
4	...	4.0000	3.9594	3.9256	3.9278	3.9323	3.9391	0	17	12.0600	12.1900
...	4 1/8	4.1250	4.0844	4.0506	4.0528	4.0573	4.0641	0	17	12.8400	12.9700
4 1/4	...	4.2500	4.2094	4.1756	4.1778	4.1823	4.1891	0	16	13.6500	13.7800
...	4 3/8	4.3750	4.3344	4.3006	4.3028	4.3073	4.3141	0	16	14.4800	14.6200
4 1/2	...	4.5000	4.4594	4.4256	4.4278	4.4323	4.4391	0	15	15.3000	15.5000
...	4 5/8	4.6250	4.5844	4.5506	4.5528	4.5573	4.5641	0	15	16.2000	16.4000
4 3/4	...	4.7500	4.7094	4.6756	4.6778	4.6823	4.6891	0	15	17.1000	17.3000
...	4 7/8	4.8750	4.8344	4.8006	4.8028	4.8073	4.8141	0	14	18.0000	18.2000
5	...	5.0000	4.9594	4.9256	4.9278	4.9323	4.9391	0	14	19.0000	19.2000
...	5 1/8	5.1250	5.0844	5.0506	5.0528	5.0573	5.0641	0	13	20.0000	20.1000
5 1/4	...	5.2500	5.2094	5.1756	5.1778	5.1823	5.1891	0	13	21.0000	21.1000
...	5 3/8	5.3750	5.3344	5.3006	5.3028	5.3073	5.3141	0	13	22.0000	22.2000
5 1/2	...	5.5000	5.4594	5.4256	5.4278	5.4323	5.4391	0	13	23.1000	23.2000
...	5 5/8	5.6250	5.5844	5.5506	5.5528	5.5573	5.5641	0	12	24.1000	24.3000
5 3/4	...	5.7500	5.7094	5.6756	5.6778	5.6823	5.6891	0	12	25.2000	25.4000
...	5 7/8	5.8750	5.8344	5.8006	5.8028	5.8073	5.8141	0	12	26.4000	26.5000
6	...	6.0000	5.9594	5.9256	5.9278	5.9323	5.9391	0	11	27.5000	27.7000

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Table 13 Basic Dimensions for 16-Thread Series (UN, UNR, and UNJ) (Cont'd)

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 14 Basic Dimensions for 20-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
1/4 [Note (5)]	...	0.2500	0.2175	0.1905	0.1922	0.1959	0.2013	4	12	0.0269	0.0318
5/16	...	0.3125	0.2800	0.2530	0.2547	0.2584	0.2638	3	15	0.0481	0.0546
3/8	...	0.3750	0.3425	0.3155	0.3172	0.3209	0.3263	2	40	0.0755	0.0836
7/16 [Note (5)]	...	0.4375	0.4050	0.3780	0.3797	0.3834	0.3888	2	15	0.1090	0.1187
1/2 [Note (5)]		0.5000	0.4675	0.4405	0.4422	0.4459	0.4513	1	57	0.1486	0.1599
9/16	...	0.5625	0.5300	0.5030	0.5047	0.5084	0.5138	1	43	0.1944	0.2073
5/8	...	0.6250	0.5925	0.5655	0.5672	0.5709	0.5763	1	32	0.2463	0.2608
...	11/16	0.6875	0.6550	0.6280	0.6297	0.6334	0.6388	1	24	0.3044	0.3205
3/4 [Note (5)]	...	0.7500	0.7175	0.6905	0.6922	0.6959	0.7013	1	16	0.3686	0.3862
...	13/16 [Note (5)]	0.8125	0.7800	0.7530	0.7547	0.7584	0.7638	1	10	0.4389	0.4581
7/8 [Note (5)]	...	0.8750	0.8425	0.8155	0.8172	0.8209	0.8263	1	5	0.5154	0.5362
...	15/16 [Note (5)]	0.9375	0.9050	0.8780	0.8797	0.8834	0.8888	1	0	0.5980	0.6204
1 [Note (5)]	...	1.0000	0.9675	0.9405	0.9422	0.9459	0.9513	0	57	0.6867	0.7107
...	1 1/16	1.0625	1.0300	1.0030	1.0047	1.0084	1.0138	0	53	0.7816	0.8072
1 1/8	...	1.1250	1.0925	1.0655	1.0672	1.0709	1.0763	0	50	0.8826	0.9098
...	1 3/16	1.1875	1.1550	1.1280	1.1297	1.1334	1.1388	0	47	0.9897	1.0185
1 1/4	...	1.2500	1.2175	1.1905	1.1922	1.1959	1.2013	0	45	1.1030	1.1334
...	1 5/16	1.3125	1.2800	1.2530	1.2547	1.2584	1.2638	0	43	1.2224	1.2544
1 3/8	...	1.3750	1.3425	1.3155	1.3172	1.3209	1.3263	0	41	1.3479	1.3815
...	1 7/16	1.4375	1.4050	1.3780	1.3797	1.3834	1.3888	0	39	1.4796	1.5148
1 1/2	...	1.5000	1.4675	1.4405	1.4422	1.4459	1.4513	0	37	1.6174	1.6542
...	1 9/16	1.5625	1.5300	1.5030	1.5047	1.5084	1.5138	0	36	1.7614	1.7997
1 5/8	...	1.6250	1.5925	1.5655	1.5672	1.5709	1.5763	0	34	1.9115	1.9514
...	1 11/16	1.6875	1.6550	1.6280	1.6297	1.6334	1.6388	0	33	2.0677	2.1092
1 3/4	...	1.7500	1.7175	1.6905	1.6922	1.6959	1.7013	0	32	2.2300	2.2732
...	1 13/16	1.8125	1.7800	1.7530	1.7547	1.7584	1.7638	0	31	2.3985	2.4433
1 7/8	...	1.8750	1.8425	1.8155	1.8172	1.8209	1.8263	0	30	2.5732	2.6195
...	1 15/16	1.9375	1.9050	1.8780	1.8797	1.8834	1.8888	0	29	2.7539	2.8018
2	...	2.0000	1.9675	1.9405	1.9422	1.9459	1.9513	0	28	2.9409	2.9903
...	2 1/8	2.1250	2.0925	2.0655	2.0672	2.0709	2.0763	0	26	3.3331	3.3857

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Table 14 Basic Dimensions for 20-Thread Series (UN, UNR, and UNJ) (Cont'd)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
$2\frac{1}{4}$	...	2.2500	2.2175	2.1905	2.1922	2.1959	2.2013	0	25	3.7498	3.8057
...	$2\frac{3}{8}$	2.3750	2.3425	2.3155	2.3172	2.3209	2.3263	0	23	4.1911	4.2502
$2\frac{1}{2}$	...	2.5000	2.4675	2.4405	2.4422	2.4459	2.4513	0	22	4.6570	4.7192
...	$2\frac{5}{8}$	2.6250	2.5925	2.5655	2.5672	2.5709	2.5763	0	21	5.1474	5.2128
$2\frac{3}{4}$	...	2.7500	2.7175	2.6905	2.6922	2.6959	2.7013	0	20	5.6623	5.7309
...	$2\frac{7}{8}$	2.8750	2.8425	2.8155	2.8172	2.8209	2.8263	0	19	6.2018	6.2736
3	...	3.0000	2.9675	2.9405	2.9422	2.9459	2.9513	0	18	6.7658	6.8408

NOTES:
(1) For information only.
(2) Area at minor diameter = $\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 15 Basic Dimensions for 28-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
...	12 [Note (5)]	0.2160	0.1928	0.1735	0.1748	0.1773	0.1812	3	23	0.0226	0.0258
1/4 [Note (5)]	...	0.2500	0.2268	0.2075	0.2088	0.2113	0.2152	2	52	0.0326	0.0364
5/16	...	0.3125	0.2893	0.2700	0.2713	0.2738	0.2777	2	15	0.0556	0.0606
3/8	...	0.3750	0.3518	0.3325	0.3338	0.3363	0.3402	1	51	0.0848	0.0909
7/16 [Note (5)]	...	0.4375	0.4143	0.3950	0.3963	0.3988	0.4027	1	34	0.1201	0.1274
1/2 [Note (5)]	...	0.5000	0.4768	0.4575	0.4588	0.4613	0.4652	1	22	0.1616	0.1700
9/16	...	0.5625	0.5393	0.5200	0.5213	0.5238	0.5277	1	12	0.2092	0.2187
5/8	...	0.6250	0.6018	0.5825	0.5838	0.5863	0.5902	1	5	0.2629	0.2736
...	11/16	0.6875	0.6643	0.6450	0.6463	0.6488	0.6527	0	59	0.3228	0.3346
3/4	...	0.7500	0.7268	0.7075	0.7088	0.7113	0.7152	0	54	0.3888	0.4017
...	13/16	0.8125	0.7893	0.7700	0.7713	0.7738	0.7777	0	50	0.4610	0.4750
7/8	...	0.8750	0.8518	0.8325	0.8338	0.8363	0.8402	0	46	0.5392	0.5544
...	15/16	0.9375	0.9143	0.8950	0.8963	0.8988	0.9027	0	43	0.6237	0.6400
1	...	1.0000	0.9768	0.9575	0.9588	0.9613	0.9652	0	40	0.7142	0.7317
...	1 1/16	1.0625	1.0393	1.0200	1.0213	1.0238	1.0277	0	38	0.8109	0.8295
1 1/8	...	1.1250	1.1018	1.0825	1.0838	1.0863	1.0902	0	35	0.9137	0.9335
...	1 3/16	1.1875	1.1643	1.1450	1.1463	1.1488	1.1527	0	34	1.0227	1.0436
1 1/4	...	1.2500	1.2268	1.2075	1.2088	1.2113	1.2152	0	32	1.1378	1.1598
...	1 5/16	1.3125	1.2893	1.2700	1.2713	1.2738	1.2777	0	30	1.2590	1.2822
1 3/8	...	1.3750	1.3518	1.3325	1.3338	1.3363	1.3402	0	29	1.3864	1.4107
...	1 7/16	1.4375	1.4143	1.3950	1.3963	1.3988	1.4027	0	28	1.5199	1.5453
1 1/2	...	1.5000	1.4768	1.4575	1.4588	1.4613	1.4652	0	26	1.6595	1.6861

NOTES:
(1) For information only.
(2) Area at minor diameter $=\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 16 Basic Dimensions for 32-Thread Series (UN, UNR, and UNJ)

Nominal Size		Basic Major Diameter, D bsc	Basic Pitch Diameter, D_2 bsc	UNR Design Minor Diameter External, d_3 (Ref.)	UNJ Design Minor Diameter External, d_3 (Ref.)	Basic UN Minor Diameter Internal, D_1 bsc	Basic UNJ Minor Diameter Internal, D_1 min. = D_1 bsc	Lead Angle at Basic Pitch Diameter, λ		Area at Minor Diameter $D - 2h_b$, in.^{2} [Notes (1), (2), (3)]	UN/UNR Tensile Stress Area, in.^{2} [Notes (1), (3), (4)]
Primary	Secondary							deg	Min.		
6 [Note (5)]	...	0.1380	0.1177	0.1008	0.1019	0.1042	0.1076	4	51	0.00745	0.00908
8 [Note (5)]	...	0.1640	0.1437	0.1268	0.1279	0.1302	0.1336	3	58	0.01196	0.01401
10 [Note (5)]	...	0.1900	0.1697	0.1528	0.1539	0.1562	0.1596	3	22	0.01753	0.01999
...	12 [Note (5)]	0.2160	0.1957	0.1788	0.1799	0.1822	0.1856	2	55	0.02420	0.02700
1/4 [Note (5)]	...	0.2500	0.2297	0.2128	0.2139	0.2162	0.2196	2	29	0.03440	0.03790
5/16 [Note (5)]	...	0.3125	0.2922	0.2753	0.2764	0.2787	0.2821	1	57	0.05810	0.06250
3/8 [Note (5)]	...	0.3750	0.3547	0.3378	0.3389	0.3412	0.3446	1	36	0.08780	0.09320
7/16	...	0.4375	0.4172	0.4003	0.4014	0.4037	0.4071	1	22	0.12370	0.13010
1/2	...	0.5000	0.4797	0.4628	0.4639	0.4662	0.4696	1	11	0.16600	0.17300
9/16	...	0.5625	0.5422	0.5253	0.5264	0.5287	0.5321	1	3	0.21400	0.22200
5/8	...	0.6250	0.6047	0.5878	0.5889	0.5912	0.5946	0	57	0.26800	0.27800
...	11/16	0.6875	0.6672	0.6503	0.6514	0.6537	0.6571	0	51	0.32900	0.33900
3/4	...	0.7500	0.7297	0.7128	0.7139	0.7162	0.7196	0	47	0.39500	0.40700
...	13/16	0.8125	0.7922	0.7753	0.7764	0.7787	0.7821	0	43	0.46800	0.48000
7/8	...	0.8750	0.8547	0.8378	0.8389	0.8412	0.8446	0	40	0.54700	0.56000
...	15/16	0.9375	0.9172	0.9003	0.9014	0.9037	0.9071	0	37	0.63200	0.64600
1	...	1.0000	0.9797	0.9628	0.9639	0.9662	0.9696	0	35	0.72300	0.73800

NOTES:
(1) For information only.
(2) Area at minor diameter $=\pi[(D - 2h_b/2)^2]$.
(3) For tensile stress area for UNJ threads, see applicable fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, SAE AS 7478D, etc.
(4) See formulas in Nonmandatory Appendix B, section B-1.
(5) Standard sizes of the UNC, UNF, or UNEF series.

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Table 17A Outline Guide for Determining Limits of Size of External Threads

Thread Class	Major Diameter, d		Pitch Diameter, d_2		Minor Diameter, d_1
	Max.	Min.	Max.	Min.	
1A	Nominal size − allowance	Maximum − tolerance	Max. major diameter − h_b (see Table 5, col. 22 for h_b values)	Maximum − tolerance	See para. 8.3.1(e) for max. and para. 8.3.1(f) for min.; established by crest of new tool and minimum minor diameter of GO thread gage
2A	Nominal size − allowance	Maximum − tolerance	Max. major diameter − h_b (see Table 5, col. 22 for h_b values)	Maximum − tolerance	See para. 8.3.1(e) for max. and para. 8.3.1(f) for min.; established by crest of new tool and minimum minor diameter of GO thread gage
3A	Nominal size	Maximum − tolerance	Max. major diameter − h_b (see Table 5, col. 22 for h_b values)	Maximum − tolerance	See para. 8.3.1(e) for max. and para. 8.3.1(f) for min.; established by crest of new tool and minimum minor diameter of GO thread gage

Table 17B Outline Guide for Determining Limits of Size of Internal Threads

Thread Class	Minor Diameter, D_1		Pitch Diameter, D_2		Major Diameter, D
	Min.	Max.	Min.	Max.	
1B	Nominal size $-2h_n$ [see Table 5, col. 26 (UN) or 25 (UNJ) for h_b values; see para. 8.3.2(e) for formulas]	Minimum, 6 decimal place value + tolerance [see para. 8.3.2(f)]	Nominal size $-h_b$ [see Table 5, col. 22 for h_b values and para. 8.3.2(c) for formula]	Minimum + tolerance	See para. 8.3.2(a) for max. and para. 8.3.2(b) for min.; established by crest of new tool and maximum major diameter of GO thread gage
2B	Nominal size $-2h_n$ [see Table 5, col. 26 (UN) or 25 (UNJ) for h_b values; see para. 8.3.2(e) for formulas]	Minimum, 6 decimal place value + tolerance [see para. 8.3.2(f)]	Nominal size $-h_b$ [see Table 5, col. 22 for h_b values and para. 8.3.2(c) for formula]	Minimum + tolerance	See para. 8.3.2(a) for max. and para. 8.3.2(b) for min.; established by crest of new tool and maximum major diameter of GO thread gage
3B	Nominal size $-2h_n$ [see Table 5, col. 26 (UN) or 25 (UNJ) for h_b values; see para. 8.3.2(e) for formulas]	Minimum, 6 decimal place value + tolerance [see para. 8.3.2(f)]	Nominal size $-h_b$ [see Table 5, col. 22 for h_b values and para. 8.3.2(c) for formula]	Minimum + tolerance	See para. 8.3.2(a) for max. and para. 8.3.2(b) for min.; established by crest of new tool and maximum major diameter of GO thread gage

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No lead and angle tolerances were specified nor do default values appear in Tables 6 and 7. Values are calculated as follows:

Lead tolerance = $(0.5Td_2)/1.732051$

Td_2 = 0.0050

Lead tolerance = (0.5 × 0.0050)/1.732051 = 0.0014 in.

Angle tolerance (for 32 TPI and coarser) = 30 + (1.875 × TPI)

Angle tolerance = 30 + (1.875 × 8.5)

= 45.94 min

= 45 min when rounded to nearest 5 min

(b) EXAMPLE: 0.500-41-UNJS-3B; lead and angle control required

Lead tolerance = $(0.5Td_2)/1.732051$

Pitch diameter tolerance, Td_2 = 0.0031

Lead tolerance = (0.5 × 0.0031)/1.732051= 0.0009 in.

Angle tolerance (for finer than 32 TPI) = 62 + (0.775 × TPI)

Angle tolerance = 62 + (0.775 × 41)

= 93.78 min

= 1 deg and 35 min when rounded to nearest 5 min

(c) For UNJ, if lead and angle tolerances are specified as a pitch diameter equivalent in terms of pitch diameter tolerance, tolerances in accordance with para. 9.2.3 or para. 9.2.4 may be adjusted proportionately using 0.5 times pitch diameter tolerance as a basis.

(1) EXAMPLE: 0.5000-20-UNJF-3A (22S); lead and angle control required − 0.4 PD tolerance

Table 18A Examples of External Screw Threads

Thread Size = ½ - 28 or 0.5000 - 23 UNEF-2A		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
(1) Maximum external major diameter, d max. = Basic major diameter, d bsc − allowance, es	d max. = d bsc − es	...
	d bsc = 0.5000	This is the final value of the basic major diameter, which is rounded to four decimal places.
	es = 0.300 (Td_2 for Class 2A)	For the Class 2A pitch diameter tolerance, see (4).
	es = 0.300 (0.003668)	The six-decimal place value for Class 2A pitch diameter tolerance, Td_2, is used in this calculation.
	es = 0.001100	This figure is rounded to four decimal places to obtain the final value of es.
	es = 0.0011	...
	d max. = 0.5000 − 0.0011	...
	d max. = 0.4989	...
(2) Minimum external major diameter, d min. = Maximum external major diameter, d max. − major diameter tolerance, Td	d min. = d max. − Td	...
		...
	$Td = 0.060\sqrt[3]{P^2}$	...
	$Td = 0.060\sqrt[3]{(0.03571429)^2}$	All thread calculations are to be performed using P rounded to eight decimal places.
	$Td = 0.060\sqrt[3]{0.001276}$	...
	Td = 0.060 (0.108463)	...
	Td = 0.006508	This figure is rounded to four decimal places to obtain the final value of Td.
	Td = 0.0065	...
	d min. = 0.4989 − 0.0065	...
	d min. = 0.4924	...
(3) Maximum external pitch diameter, d_2 max. = Maximum external major diameter, d max. − twice the external thread addendum, $2h_{as}$	d_2 max. = d max. − $2h_{as}$	...
	$2h_{as}$ = 0.64951905P	...
	$2h_{as}$ = 0.64951905(0.03571429)	All thread calculations are to be performed using P rounded to eight decimal places.
	$2h_{as}$ = 0.023197	...
	d_2 max. = 0.4989 − 0.023197	...
	d_2 max. = 0.475703	This figure is rounded to four decimal places to obtain the final value of d_2 max.
	d_2 max. = 0.4757	...

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Table 18A Examples of External Screw Threads (Cont'd)

Thread Size = ½ - 28 or 0.5000 - 23 UNEF-2A

Characteristic Description	Example of Size Calculation	Additional Information
(4) Minimum external pitch diameter, d_2 min. = Maximum external pitch diameter, d_2 max. − external pitch diameter tolerance, Td_2	d_2 min. = d_2 max. − Td_2	...
	$Td_2 = 0.0015\sqrt[3]{d\,\text{bsc}} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$	Length of engagement (LE) required in this example is equal to 9P. See para. 5.2 for LE applications for other thread series.
	$TD_2 = 0.0015\sqrt[3]{0.5000} + 0.0015\sqrt{9(0.03571429)} + 0.015\sqrt[3]{(0.03571429)^2}$	...
	$Td_2 = 0.0015\sqrt[3]{0.5000} + 0.0015\sqrt{0.321429} + 0.015\sqrt[3]{0.001276}$	...
	$Td_2 = (0.0015)(0.793701) + (0.0015)(0.566947) + (0.015)(0.108463)$	...
	$Td_2 = 0.001191 + 0.000850 + 0.001627$	...
	$Td_2 = 0.003668$	This figure is rounded to six decimal places to obtain the final value of the external pitch diameter tolerance Td_2.
	d_2 min. = 0.4757 − 0.003668	...
	d_2 min. = 0.472032	This figure is rounded to four decimal places to obtain the final value of d_2 min.
	d_2 min. = 0.4720	...
(5) Maximum external UN minor diameter, d_1 max. = Maximum external major diameter, d max. − double height of external UN thread, $2h_s$	d_1 max. = d max. − $2h_s$	...
	$2h_s = 1.08253175P$	For UN threads, $2h_s = 2h_n$
	$2h_s = 1.08253175(0.03571429)$	All thread calculations are to be performed using P rounded to eight decimal places.
	$2h_s = 0.038662$	...
	d_1 max. = 0.4989 − 0.038662	...
	d_1 max. = 0.460238	This figure is rounded to four decimal places to obtain the final value of d_1 max.
	d_1 max. = 0.4602	...

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/28 = 0.03571429$.

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Table 18B Examples of Internal Screw Threads

Characteristic Description	Example of Size Calculation	Additional Information
Thread Size = ½ - 28 or 0.5000 - 28 UNEF-2B		
(1) Minimum internal minor diameter, D_1 min.	D_1 min. = D bsc − $2h_n$	...
= Basic major diameter, D bsc − double height of internal thread, $2h_n$	$2h_n$ = 1.0825317 5P	...
	$2h_n$ = 1.08253175 (0.03571429)	All thread calculations are to be performed using P rounded to eight decimal places.
	$2h_n$ = 0.038662	...
	D_1 min. = 0.5000 − 0.038662	...
	D_1 min. = 0.461338	For the Class 2B thread used in this example, this figure is rounded to three decimal places to obtain the final value of D_1 min. Other sizes and classes are expressed in a four-place decimal. See para. 8.3.2(e).
	D_1 min. = 0.461	...
(2) Maximum internal minor diameter, D_1 max.	D_1 max. = D_1 min. (to six decimal plates) + TD_1	See para. 5.8.2(c) for limitations on use of this formula.
= Minimum internal minor diameter, D_1 min., rounded to six decimal places + internal minor diameter tolerance, TD_1	TD_1 = 0.25P − 0.4P^2	
	TD_1 = 0.25 (0.03571429) − 0.4 (0.03571429)^2	All thread calculations are to be performed using P rounded to eight decimal places.
	TD_1 = 0.25 (0.03571429) − 0.4 (0.001276)	...
	TD_1 = 0.008929 − 0.000510	...
	TD_1 = 0.008419	...
	TD_1 = 0.0084	This figure is rounded to four decimal places to obtain the final value of TD_1.
	D_1 max. = 0.461338 + 0.0084	...
	D_1 max. = 0.469738	For the Class 2B thread used in this example, this figure is rounded to three decimal places to obtain the final value of D_1 max. Other sizes and classes are expressed in a four-place decimal. See para. 8.3.2(f).
	D_1 max. = 0.470	...
(3) Minimum internal pitch diameter, D_2 min.	D_2 min. = D bsc − h_b	...
= Basic major diameter, D bsc − twice the external thread addendum, h_b	h_b = 0.64951905P	...
	h_b = 0.64951905(0.03571429)	All thread calculations are to be performed using P rounded to eight decimal places.
	h_b = 0.023197	...
	D_2 min. = 0.5000 − 0.023197	...
	D_2 min. = 0.476803	

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Table 18B Examples of Internal Screw Threads (Cont'd)

Thread Size = ½ - 28 or 0.5000 - 28 UNEF-2B		
Characteristic Description	**Example of Size Calculation**	**Additional Information**
		This figure is rounded to four decimal places to obtain the final value of D_2 min.
	D_2 min. = 0.4768	...
(4) Maximum internal pitch diameter, D_2 max.	D_2 max. = D_2 min. + TD_2	...
= Minimum internal pitch diameter, D_2 min. + internal pitch diameter tolerance, TD_2	TD_2 = 1.300 (Td_2 for Class 2A)	The constant 1.300 is for this Class 2B example and will be different for Classes 1B and 3B. See para. 5.8.2.
	TD_2 = 1.300 (0.003668)	For the Td_2 Class 2A pitch diameter tolerance, see Table 18A, (4). The six-place decimal place value is used.
	TD_2 = 0.004768	...
	TD_2 = 0.0048	This figure is rounded to four decimal places to obtain the final value of TD_2.
	D_2 max. = 0.4768 + 0.0048	...
	D_2 max. = 0.4816	...
(5) Minimum internal major diameter, D min.	D min. = D bsc	...
= Basic major diameter, D bsc	D bsc = 0.5000	...
	D min. = 0.5000	...

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/28 = 0.03571429$.

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From Table 3, allowable lead variation is 0.0009 in. This would be adjusted to 0.4/0.5 times 0.0009, which is 0.0007 in.

From Table 19, allowable angle variation is 1 deg 10 min or 70 min. This would be adjusted to 0.4/0.5 times 70, which is 56 min, or 55 min when rounded.

9.2.6 For the requirements of paras. 9.2.4 and 9.2.5, lead variation values tabulated or calculated are the maximum variations from specified lead between any two points not farther apart than the length of the standard GO thread gage. Flank angle variation values are maximum variations from the basic 30-deg angle between thread flanks and perpendicular to the thread axis.

10 FORMULAS AND NOMENCLATURE FOR THREAD FORM

Formulas are given below; data are tabulated in Table 5.

The nomenclature is defined in Table 20 and application of the symbols is shown in Figure 16. Formulas that are a function of "H" are for reference only.

(a) Included angle of thread

$2\alpha = 60$ deg

(b) Half angle of thread

$\alpha = 30$ deg

(c) Number of threads per inch (TPI) is $1/P$ pitch of thread

$P = 1/\text{TPI}$ (see Table 5, column 2)

(d) Height of sharp V thread (fundamental triangle)

$H = 0.86602540P$ (see Table 5, column 24)

(e) Height of UNR external thread, design form

h_s (for UNR)$= 0.59539247P = (0.6875H$ or $^{11}\!/_{16}H)$ (see Table 5, column 21)

(f) Height of internal thread and UN external thread

h_s (for UN) $= h_n = 0.54126588P = (0.6250H$ or $^{5}\!/_{8}H)$ (see Table 5, column 18)

(g) Height of thread engagement

h_s (for UN)$= 0.54126588P = (0.6250H$ or $^{5}\!/_{8}H)$ (see Table 5, column 18)

(h) Flat at crest of external thread

$F_{cs} = 0.12500P = (0.1250H$ or $P/8)$ (see Table 5, column 4)

(i) Truncation of UN external thread crest

$f_{cs} = 0.10825318P = (0.1250H$ or $H/8)$ (see Table 5, column 3)

(j) Truncation of UNR external thread (for calculating minor diameter values in tables)

$S_{rs} = 0.16237976P = (0.1875H$ or $^{3}\!/_{16}H)$ (see Table 5, column 7)

(k) Basic flat at crest of internal thread and root of external thread

$F_{rs} = F_{cn} = 0.2500P = (0.2886H$ or $P/4)$ (see Table 5, column 10)

(l) Truncation of internal thread crest

$f_{cn} = 0.21650635P = (0.2500H$ or $H/4)$ (see Table 5, column 9)

(m) Flat at root of internal thread

$F_{rn} = 0.12500P = (0.1443H$ or $P/8)$ (see Table 5, column 4)

(n) Truncation of internal thread root

$f_{rn} = 0.10825318P = (0.1250H$ or $H/8)$ (see Table 5, column 3)

(o) Addendum of external thread

$h_{as} = 0.32475953P = (0.3750H$ or $3/8H)$ (see Table 5, column 13)

(p) Major diameter of external thread

$d = D - es$

(q) Pitch diameter of external thread

$d_2 = d - 2h_{as} = d - 0.64951905P = (0.7500H$ or $^{3}\!/_{4}H)$ (see Table 5, column 22)

(r) Minor diameter of UNR external thread

$d_3 = d - 2h_s = 1.19078493P = (1.3750H$ or $1^{3}\!/_{8}H)$ (see Table 5, column 27)

(s) Minor diameter of UN external thread

$d_1 = d - 2h_s = d - 1.08253175P = (1.1250H$ or $1^{1}\!/_{8}H)$ (see Table 5, column 26)

(t) Major diameter of internal thread is D

$D = D$ bsc

(u) Pitch diameter of internal thread is D_2

$D_2 = D - 2h_{as} = D - 0.64951905P = (0.7500H$ or $^{3}\!/_{4}H)$ (see Table 5, column 22)

(v) Minor diameter of internal thread D_1

$D_1 = D - 2h_n = D - 1.08253175P = (1.1250H$ or $1^{1}\!/_{8}H)$ (see Table 5, column 26)

11 TABLES OF BASIC DIMENSIONS

11.1 Table Content

The basic dimensions tabulated in Tables 6 through 16 include major diameter, pitch diameter, minor diameter of external threads, minor diameter of internal threads, lead angle, cross-sectional area at the minor diameter, and the tensile stress area.

11.2 Thread Series

Basic dimensions are given for each of the standard series threads.

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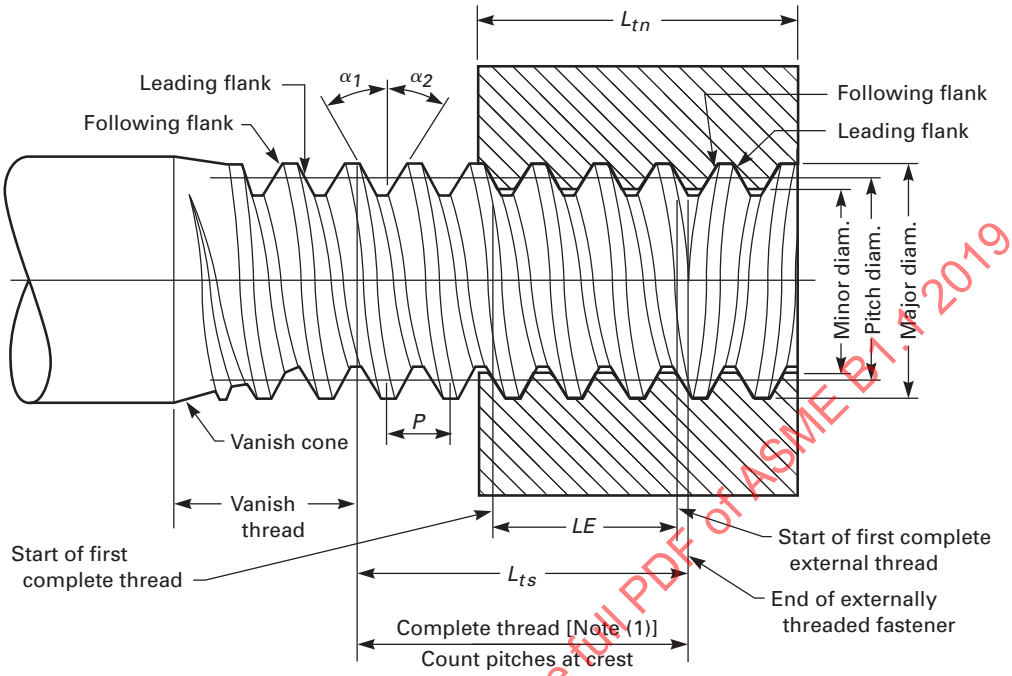
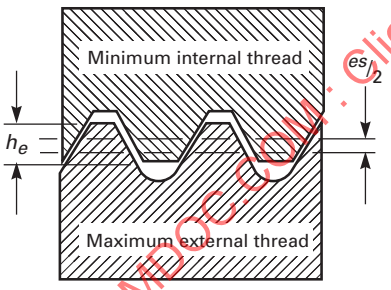
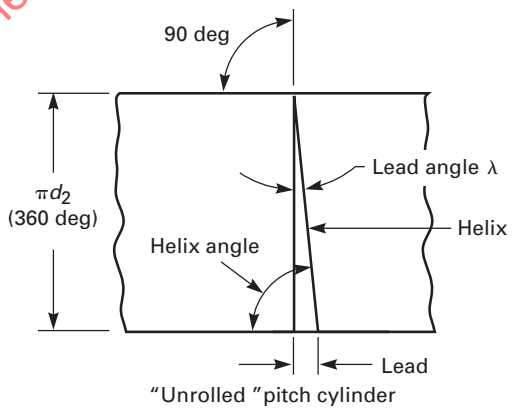
Figure 16 Application of General Thread Symbols





Thread With an Allowance



Lead and Helix Angles

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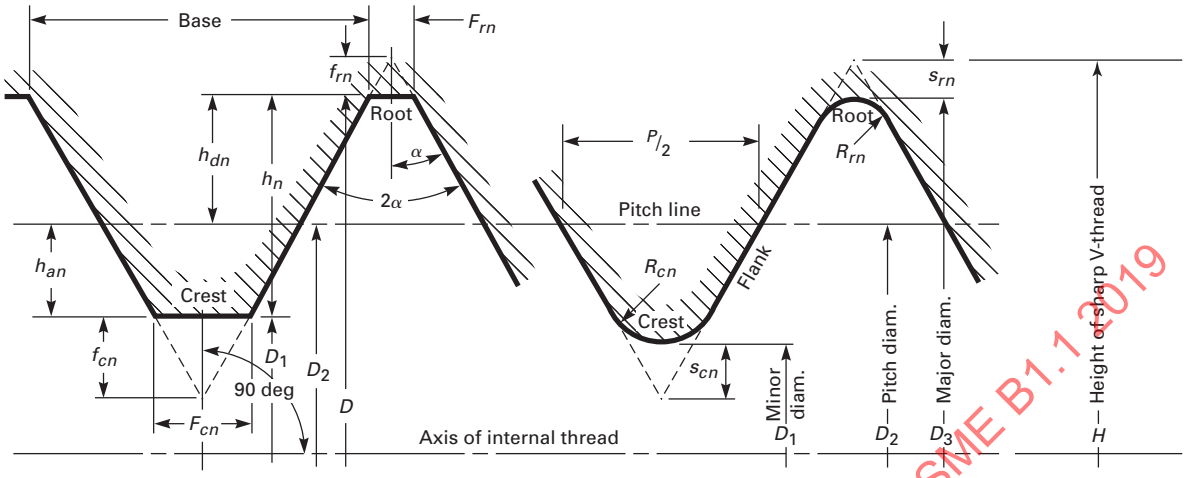
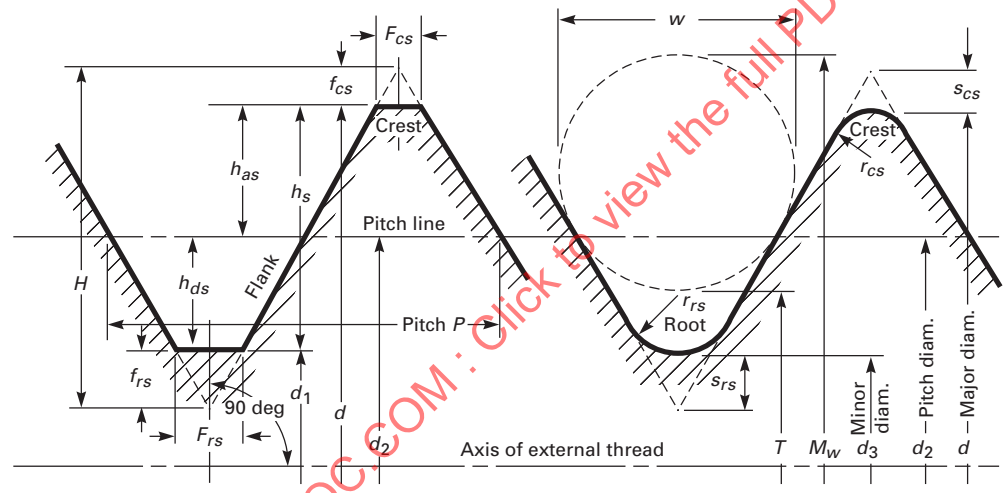
Figure 16 Application of General Thread Symbols (Cont'd)



Internal Thread



External Thread

GENERAL NOTE: These diagrams are not intended to show standard thread forms, but only to illustrate the application of symbols.

NOTE: (1) Portion of thread fully formed at crest and root.

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Table 19 Allowable Variation in 30-deg Basic Half Angle of External and Internal Screw Threads

	Allowable Variation in Half Angle of Thread	
Threads/in.	±deg	Minimum
80	3	00
72	2	45
64	2	30
56	2	15
48	2	00
44	1	50
40	1	45
36	1	35
32	1	30
28	1	20
27	1	20
24	1	15
20	1	10
18	1	05
16	1	00
14	0	55
13	0	55
12	0	55
11½	0	50
11	0	50
10	0	50
9	0	50
8	0	45
7	0	45
6	0	40
5	0	40
4½	0	40
4	0	40

GENERAL NOTE: See paras. 9.2.3 through 9.2.6 for applicability.

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Table 20 Nomenclature

Symbol	Dimension	Remarks
C	Correction to measurement over best size wires to give pitch diameter	d_2 *or* $D_2 = M_w - C - c$ $C = W\,(1 + \text{cosec}\,\alpha) - (\cot\,\alpha)/2n$
c	Wire angle correction for large lead angles	See ASME B1.2
D	Major diameter, internal thread	...
d	Major diameter, external thread	...
D bsc	Basic major diameter, internal thread	...
d bsc	Basic major diameter, external thread	...
D max.	Maximum major diameter, internal thread	...
d max.	Maximum major diameter, external thread	...
D min.	Minimum major diameter, internal thread	...
d min.	Minimum major diameter, external thread	...
D_1	Minor diameter, internal thread	...
d_1	Minor diameter, external thread	...
D_1 bsc	Basic minor diameter, internal thread	...
D_1 max.	Maximum minor diameter, internal thread	...
d_1 max.	Maximum minor diameter, external thread	...
D_1 min.	Minimum minor diameter, internal thread	...
d_1 min.	Minimum minor diameter, external thread	...
D_2	Pitch diameter, internal thread	...
d_2	Pitch diameter, external thread	...
D_2 bsc	Basic pitch diameter, internal thread	...
D_2 max.	Maximum pitch diameter, internal thread	...
d_2 max.	Maximum pitch diameter, external thread	...
D_2 min.	Minimum pitch diameter, internal thread	...
d_2 min.	Minimum pitch diameter, external thread	...
D_3	Major diameter, rounded root, internal thread	...
d_3 min.	Minimum minor diameter, rounded root, external thread	...
EI	Allowance at major, pitch, and minor diameters of internal thread	...
es	Allowance at major, pitch, and minor diameters of external thread	...
H	Height of fundamental triangle	...
h	Thread height (or depth)	...
h_a	Addendum	...
h_{as}	Addendum of external thread	...
h_b	Twice the external thread addendum	...
h_d	Dedendum	...
h_e	Depth of thread engagement	...
h_n	Height of UN internal thread	...
h_s	Height of UN, UNR or UNJ external thread; UN, UNR, and UNJ have different values for thread height	See Table 5
L_{tn}	Length of complete internal thread, including chamfer	...
L_{ts}	Length of complete external thread	...
LE	Length of thread engagement	...
LG	Gaging length	...
M_w	Measurement over wires	...
N	$1/L$, number of turns per unit of length (per in.)	...
n	$1/P$, number of threads per unit of length (per in.)	...
P	Pitch	...
r	Root radius, external thread	...
r max.	Maximum root radius, external thread	...
r min.	Minimum root radius, external thread	...

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Table 20 Nomenclature (Cont'd)

Symbol	Dimension	Remarks
T	Tolerance, internal or external thread	...
Td	Major diameter tolerance, external thread	...
TD_1	Minor diameter tolerance, internal thread	...
Td_1	Minor diameter tolerance, external thread	...
TD_2	Pitch diameter tolerance, internal thread	...
Td_2	Pitch diameter tolerance, external thread	...
Td_3	Minor diameter tolerance, external thread, rounded form	...
W	Diameter of measuring wires	...
α	Half angle of symmetrical thread	...
α_1	Angle between leading flank of thread and normal to axis of thread	...
α_2	Angle between following flank of thread and normal to axis of thread	...
$\Delta d_2\alpha$	Pitch diameter equivalent of variation in combined flank angles	...
$\Delta d_2\,\lambda$ or $\Delta D_2\,\lambda$	Pitch diameter equivalent of variation in pitch (lead)	...
Prefix symbol with Δ	Variation in any dimension	Examples: Variation in pitch, ΔP Variation in half angle, $\Delta\alpha_1$ or $\Delta\alpha_2$
λ	Lead angle	$\tan\lambda = L\ \pi\ (d_2$ or $D_2)$
λ'	Wire angle	...
Radius of rounding at:		
R_{cn}	Crest of internal thread	...
r_{cs}	Crest of external thread	...
R_{rn}	Root of internal thread	...
r_{rs}	Root of external thread	...
Radial distance from apex of fundamental triangle to:		
s_{cn}	Rounded crest of internal thread	...
s_{cs}	Rounded crest of external thread	...
s_{rn}	Rounded root of internal thread	...
s_{rs}	Rounded root of external thread	
Distance from apex of fundamental triangle to:		
f_{cn}	Flat at crest of internal thread	...
f_{cs}	Flat at crest of external thread	...
f_{rn}	Flat at root of internal thread	...
f_{rs}	Flat at root of external thread	...
Width of:		
F	Flat (general)	...
F_{cn}	Flat at crest of internal thread	...
F_{cs}	Flat at crest of external thread	...
F_{rn}	Flat at root of internal thread	...
F_{rs}	Flat at root of external thread	...

GENERAL NOTE:
(a) See Figures 2 through 12.
(b) Refer to ASME B1.7 for latest symbol identification. Greek alphabet is below.

A, α	=	Alpha	Z, ζ	=	Zeta	ʌ, λ	=	Lambda	π	=	Pi	ϕ, φ	=	Phi
B, β	=	Beta	H, η	=	Eta	M, μ	=	Mu	P, ρ	=	Rho	X, χ	=	Chi
r, Υ	=	Gamma	Θ, θ	=	Theta	N, ν	=	Nu	Σ, σ	=	Sigma	Ψ, ψ	=	Psi
Δ, δ	=	Delta	I, ι	=	Iota	Ξ, ξ	=	Xi	T, τ	=	Tau	Ω, ω	=	Omega
E, ε	=	Epsilon	K, κ	=	Kappa	O, o	=	Omicron	Υ, υ	=	Upsilon			

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NONMANDATORY APPENDIX A
TERMINOLOGY AND IDENTIFICATION OF UNIFIED INCH SCREW THREADS

A-1 TERMINOLOGY

All terms relating to screw threads used in this Standard are defined in ASME B1.7.

A-2 IDENTIFICATION

The various unified screw threads covered in ASME B1 standards are compared in Figure A-1 and Table A-1.

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Figure A-1 Identification of 60-deg Inch Screw Threads Within the Scope of the ASME B1 Committee

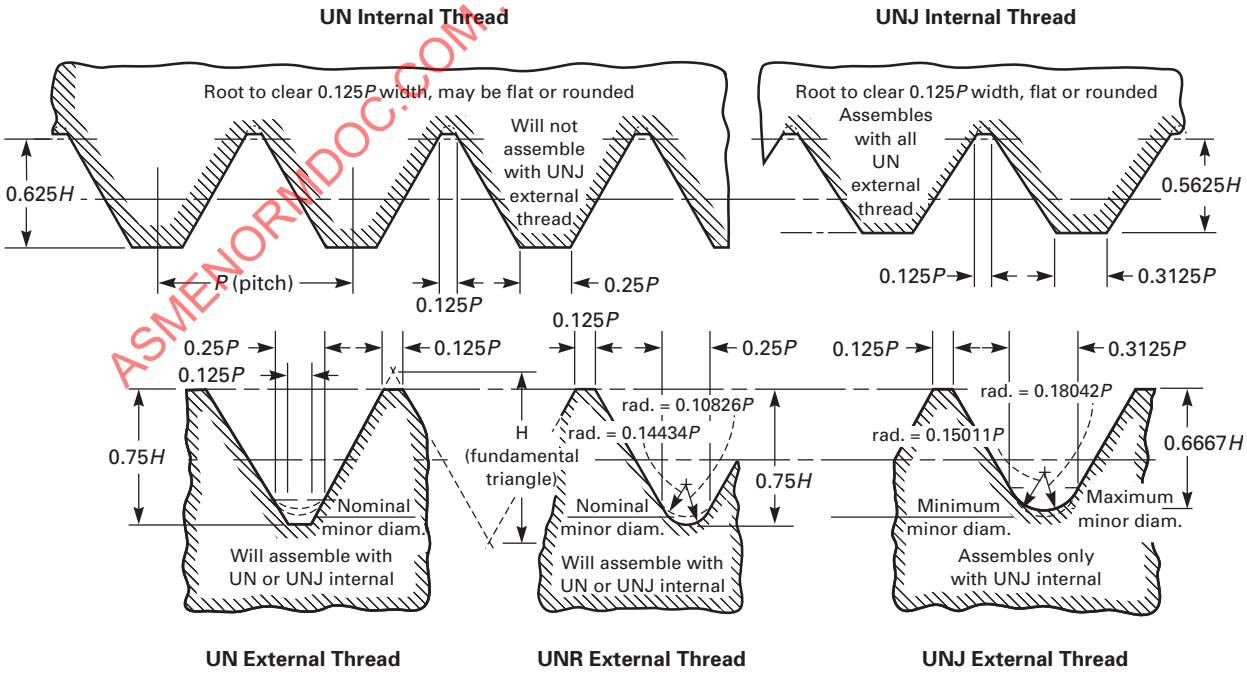

Table A-1 Identification of 60-deg Inch Screw Threads Within the Scope of the ASME B1 Committee

Thread Identification	UN Threads, Internal and External	UNR Threads, External Only	UNJ Threads, Internal and External
ASME standards documents	B1.1, Unified Inch Screw Threads; B1.2, Gages and Gaging for Unified Screw Threads	B1.1, Unified Inch Screw Threads; B1.2, Gages and Gaging for Unified Inch Screw Threads	B1.1, Unified Inch Screw Threads; B1.2, Gages and Gaging for Unified Inch Screw Threads
External root	External thread root may be flat or rounded	Rounded root specified	Rounded root specified
External minor diameter	External thread minor diameter is not tolerance	External thread minor diameter is not tolerance	External thread minor diameter is tolerance
External threads	UN Classes 1A, 2A, and 3A	UNR Classes 1A, 2A, and 3A	UNJ Classes 2A and 3A mate only with UNJ internal threads
Internal threads	UN Classes 1B, 2B, and 3B	No internal threads designated UNR; UNR mates with UN internal threads	UNJ Classes 2B and 3B (no rounding required on internal thread root)

GENERAL NOTES:
(a) Table A-1 cannot be used as a working sheet. Refer to the appropriate standards, as listed, for complete thread details and conformance data.
(b) The appropriate current standard is the authoritative document for complete details and data and takes precedence over this table.

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NONMANDATORY APPENDIX B
THREAD STRENGTH DESIGN FORMULAS

B-1 THREAD TENSILE STRESS AREA FOR UN, UNR, AND UNJ THREADS

The following thread tensile stress area formulas are used for the purpose of product acceptance computations:

(a) For UN and UNR

$$A_s = 3.1416\left[\left(\frac{D_2}{2}\right) - \left(0.16237976P\right)\right]^2$$

or

$$A_s = 0.7854\left[(D) - \left(\frac{0.9743}{(1/P)}\right)\right]^2$$

where

D = basic major diameter
D_2 = basic pitch diameter
$1/P$ = number of threads per inch

For $0.16237976P$, see Table 5.

(b) For UNJ, see applicable UNJ fastener standard such as SAE AS-7251C, SAE AS-7455A, SAE AS-7459B, SAE AS-7466E, SAE AS-7477F, or SAE AS-7478D.

B-2 THREAD SHEAR DATA FOR UN, UNR, AND UNJ THREADS

The following formulas for thread shear areas are geometric minimum values. Shear (thread stripping) strengths of screw threads under load are dependent, in addition, on mating component relative material strengths, nut geometry, and coefficient of friction between thread-bearing surfaces. Effective shear areas are therefore somewhat less than the geometric values.

(a) For UN and UNR

$$AS_n = 3.1416(1/P)(\text{LE})(d\text{min.}) \times[(1/(2(1/P)) + 0.57735\,(d\text{min.} - D_2\text{max.}))]$$

$$AS_s = 3.1416\,(1/P)(\text{LE})(D_1\text{max.}) \times[1/(2(1/P)) + 0.57735\,(d_2\text{min.} - D_1\text{max.})]$$

where

AS_n = minimum thread shear area for internal threads
AS_s = minimum thread shear area for external threads
$1/P$ = number of threads per inch
D_1 max. = maximum minor diameter of internal thread
D_2 max. = maximum pitch diameter of internal thread
d min. = minimum major diameter of external thread
d_2 min. = minimum pitch diameter of external thread
LE = length of engagement

(b) For UNJ, see applicable UNJ fastener standard such as SAE AS 7251C, SAE AS 7455A, SAE AS 7459B, SAE AS 7466E, SAE AS 7477F, or SAE AS 7478D.

B-3 LENGTH OF THREAD ENGAGEMENT

In general, the length of engagement of mating threads is selected to utilize full tensile strength of a bolt prior to shearing of nut threads. Other applications may require internal thread shear prior to failure of the externally threaded part. For noncritical design, the following formulas are often used for approximation:

(a) tensile strength of externally threaded part = S_tA_s
(b) shear strength of threads = $0.5S_t$ (AS_n or AS_s)

where

S_t = ultimate tensile strength of material, psi

An internationally accepted study on the subject was published in the 1977 Transactions of the Society of Automotive Engineers as Technical Paper 770420, "Analysis and Design of Threaded Assemblies," by E. M. Alexander.

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NONMANDATORY APPENDIX C
UNIFIED INCH SCREW THREADS — METRIC TRANSLATION

The tables that were in this Appendix in the 2003 revision of this Standard have been removed. They were the translation of unified inch screw threads into metric units of measurement. They included the limiting dimensions for UN/UNR and UNS/UNRS series threads and the table of thread form data, translated from inches to millimeters by multiplying the inch values by 25.4. Their removal was approved by the ASME B1.1 subcommittee during the revision of this document. The reasoning was that the tables had little use and the values can be reproduced when needed.

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NONMANDATORY APPENDIX D
SPECIAL THREADS

Newly created special thread dimensions shall be determined by use of the formulas in the body of this Standard and the employment of the rounding rules set forth by ASME B1.30.

Existing special thread dimensions developed from previous editions of ASME B1.1 and using rounding rules other than those contained in ASME B1.30 may differ. Previously established special thread dimensions are acceptable for continued use.

This Appendix contains Table D-1 (formerly Table 3B in ASME B1.1-1989), which contains tabulated values for many of the more commonly used nonstandard thread sizes.

Tables D-2 through D-11 (formerly Tables 31 through 40 in ASME B1.1-1989) have been removed. These tables were used in the past to calculate special thread sizes. Their removal was approved by the ASME B1.1 subcommittee during the revision of this document. The reasoning was that the table values are no longer used, but if needed they can be obtained from previous revisions of this document.

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)]		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]	(Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
(6)	10 - 28 or 0.1900 - 28	UNS	2A	0.0010	0.1890	0.1825	0.1658	0.1625	0.003339	0.1465	2B	0.151	0.160	0.1668	0.1711	0.0043	0.1900
(6)	10 - 36 or 0.1900 - 36	UNS	2A	0.0009	0.1891	0.1836	0.1711	0.1681	0.002988	0.1560	2B	0.160	0.167	0.1720	0.1759	0.0039	0.1900
(6)	10 - 40 or 0.1900 - 40	UNS	2A	0.0009	0.1891	0.1840	0.1729	0.1700	0.002856	0.1593	2B	0.163	0.169	0.1738	0.1775	0.0037	0.1900
	10 - 48 or 0.1900 - 48	UNS	2A	0.0008	0.1892	0.1847	0.1757	0.1731	0.002648	0.1644	2B	0.167	0.172	0.1765	0.1799	0.0034	0.1900
(6)	10 - 56 or 0.1900 - 56	UNS	2A	0.0007	0.1893	0.1852	0.1777	0.1752	0.002488	0.1680	2B	0.171	0.175	0.1784	0.1816	0.0032	0.1900
(6)	12 - 36 or 0.2160 - 36	UNS	2A	0.0009	0.2151	0.2096	0.1971	0.1941	0.003026	0.1820	2B	0.186	0.193	0.1980	0.2019	0.0039	0.2160
(6)	12 - 40 or 0.2160 - 40	UNS	2A	0.0009	0.2151	0.2100	0.1989	0.1960	0.002894	0.1853	2B	0.189	0.195	0.1998	0.2036	0.0038	0.2160
(6)	12 - 48 or 0.2160 - 48	UNS	2A	0.0008	0.2152	0.2107	0.2017	0.1990	0.002686	0.1904	2B	0.193	0.198	0.2025	0.2060	0.0035	0.2160
(6)	12 - 56 or 0.2160 - 56	UNS	2A	0.0008	0.2152	0.2111	0.2036	0.2011	0.002526	0.1939	2B	0.197	0.201	0.2044	0.2077	0.0033	0.2160
	1/4 - 24 or 0.2500 - 24	UNS	2A	0.0011	0.2489	0.2417	0.2218	0.2181	0.003667	0.1993	2B	0.205	0.215	0.2229	0.2277	0.0048	0.2500
	1/4 - 27 or 0.2500 - 27	UNS	2A	0.0010	0.2490	0.2423	0.2249	0.2214	0.003478	0.2049	2B	0.210	0.219	0.2259	0.2304	0.0045	0.2500
(6)	1/4 - 36 or 0.2500 - 36	UNS	2A	0.0009	0.2491	0.2436	0.2311	0.2280	0.003071	0.2160	2B	0.220	0.227	0.2320	0.2360	0.0040	0.2500
	1/4 - 40 or 0.2500 - 40	UNS	2A	0.0009	0.2491	0.2440	0.2329	0.2300	0.002939	0.2193	2B	0.223	0.229	0.2338	0.2376	0.0038	0.2500
(6)	1/4 - 48 or 0.2500 - 48	UNS	2A	0.0008	0.2492	0.2447	0.2357	0.2330	0.002731	0.2244	2B	0.227	0.232	0.2365	0.2401	0.0036	0.2500
(6)	1/4 - 56 or 0.2500 - 56	UNS	2A	0.0008	0.2492	0.2451	0.2376	0.2350	0.002571	0.2279	2B	0.231	0.235	0.2384	0.2417	0.0033	0.2500
(6)	5/16 -27 or 0.3125-27	UNS	2A	0.0011	0.3114	0.3047	0.2873	0.2837	0.003551	0.2673	2B	0.272	0.281	0.2884	0.2930	0.0046	0.3125

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]		Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
(6)	5/16 -36 or 0.3125-36	UNS	2A	0.0009	0.3116	0.3061	0.2936	0.2905	0.003144	0.2785	2B	0.282	0.289	0.2945	0.2986	0.0041	0.3125
(6)	5/16 -40 or 0.3125-40	UNS	2A	0.0009	0.3116	0.3065	0.2954	0.2924	0.003012	0.2818	2B	0.285	0.291	0.2963	0.3002	0.0039	0.3125
(6)	5/16 -48 or 0.3125-48	UNS	2A	0.0008	0.3117	0.3072	0.2982	0.2954	0.002804	0.2869	2B	0.290	0.295	0.2990	0.3026	0.0036	0.3125
(6)	3/8 - 18 or 0.3750 - 18	UNS	2A	0.0013	0.3737	0.3650	0.3376	0.3333	0.004327	0.3075	2B	0.315	0.328	0.3389	0.3445	0.0056	0.3750
	3/8 - 27 or 0.3750 - 27	UNS	2A	0.0011	0.3739	0.3672	0.3498	0.3462	0.003615	0.3298	2B	0.335	0.344	0.3509	0.3556	0.0047	0.3750
	3/8 - 36 or 0.3750 - 36	UNS	2A	0.0010	0.3740	0.3685	0.3560	0.3528	0.003208	0.3409	2B	0.345	0.352	0.3570	0.3612	0.0042	0.3750
	3/8 - 40 or 0.3750 - 40	UNS	2A	0.0009	0.3741	0.3690	0.3579	0.3548	0.003076	0.3443	2B	0.348	0.354	0.3588	0.3628	0.0040	0.3750
	0.390 - 27 or 0.3900 - 27	UNS	2A	0.0011	0.3889	0.3822	0.3648	0.3612	0.003629	0.3448	2B	0.350	0.359	0.3659	0.3706	0.0047	0.3900
(6)	7/16 - 18 or 0.4375-18	UNS	2A	0.0013	0.4362	0.4275	0.4001	0.3957	0.004384	0.3700	2B	0.377	0.390	0.4014	0.4071	0.0057	0.4375
(6)	7/16 - 24 or 0.4375-24	UNS	2A	0.0012	0.4363	0.4291	0.4092	0.4053	0.003861	0.3867	2B	0.392	0.402	0.4104	0.4154	0.0050	0.4375
(6)	7/16 - 27 or 0.4375-27	UNS	2A	0.0011	0.4364	0.4297	0.4123	0.4086	0.003672	0.3923	2B	0.397	0.406	0.4134	0.4182	0.0048	0.4375
(6)	1/2 - 12 or 0.5000 - 12	UNS	2A	0.0016	0.4984	0.4870	0.4443	0.4389	0.005352	0.3992	2B	0.410	0.428	0.4459	0.4529	0.0070	0.5000
(6)			3A	0.0000	0.5000	0.4886	0.4459	0.4419	0.004000	0.4008	3B	0.4100	0.4223	0.4459	0.4511	0.0052	0.5000
(6)	1/2 - 14 or 0.5000 - 14	UNS	2A	0.0015	0.4985	0.4882	0.4521	0.4471	0.004976	0.4134	2B	0.423	0.438	0.4536	0.4601	0.0065	0.5000
(6)	1/2 - 18 or 0.5000 - 18	UNS	2A	0.0013	0.4987	0.4900	0.4626	0.4582	0.004436	0.4325	2B	0.440	0.453	0.4639	0.4697	0.0058	0.5000

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]		Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
	1/2 - 24 or 0.5000 - 24	UNS	2A	0.0012	0.4988	0.4916	0.4717	0.4678	0.003913	0.4492	2B	0.455	0.465	0.4729	0.4780	0.0051	0.5000
	1/2 - 27 or 0.5000 - 27	UNS	2A	0.0011	0.4989	0.4922	0.4748	0.4711	0.003724	0.4548	2B	0.460	0.469	0.4759	0.4807	0.0048	0.5000
(6)	9/16 - 14 or 0.5625 - 14	UNS	2A	0.0015	0.5610	0.5507	0.5146	0.5096	0.005023	0.4759	2B	0.485	0.501	0.5161	0.5226	0.0065	0.5625
(6)	9/16 - 27 or 0.5625 - 27	UNS	2A	0.0011	0.5614	0.5547	0.5373	0.5335	0.003771	0.5173	2B	0.522	0.531	0.5384	0.5433	0.0049	0.5625
(6)	5/8 - 14 or 0.6250 - 14	UNS	2A	0.0015	0.6235	0.6132	0.5771	0.5720	0.005067	0.5384	2B	0.548	0.563	0.5786	0.5852	0.0066	0.6250
	5/8 - 27 or 0.6250 - 27	UNS	2A	0.0011	0.6239	0.6172	0.5998	0.5960	0.003815	0.5798	2B	0.585	0.594	0.6009	0.6059	0.0050	0.6250
(6)	3/4 - 14 or 0.7500 - 14	UNS	2A	0.0015	0.7485	0.7382	0.7021	0.6970	0.005148	0.6634	2B	0.673	0.688	0.7036	0.7103	0.0067	0.7500
(6)	3/4 - 18 or 0.7500 - 18	UNS	2A	0.0014	0.7486	0.7399	0.7125	0.7079	0.004608	0.6824	2B	0.690	0.703	0.7139	0.7199	0.0060	0.7500
	3/4 - 24 or 0.7500 - 24	UNS	2A	0.0012	0.7488	0.7416	0.7217	0.7176	0.004085	0.6992	2B	0.705	0.715	0.7229	0.7282	0.0053	0.7500
	3/4 - 27 or 0.7500 - 27	UNS	2A	0.0012	0.7488	0.7421	0.7247	0.7208	0.003896	0.7047	2B	0.710	0.719	0.7259	0.7310	0.0051	0.7500
(6)	7/8 - 10 or 0.8750 - 10	UNS	2A	0.0018	0.8732	0.8603	0.8082	0.8021	0.006090	0.7541	2B	0.767	0.788	0.8100	0.8179	0.0079	0.8750
(6)	7/8 - 18 or 0.8750 - 18	UNS	2A	0.0014	0.8736	0.8649	0.8375	0.8328	0.004680	0.8074	2B	0.815	0.828	0.8389	0.8450	0.0061	0.8750
(6)	7/8 - 24 or 0.8750 - 24	UNS	2A	0.0012	0.8738	0.8666	0.8467	0.8425	0.004157	0.8242	2B	0.830	0.840	0.8479	0.8533	0.0054	0.8750
(6)	7/8 - 27 or 0.8750 - 27	UNS	2A	0.0012	0.8738	0.8671	0.8497	0.8457	0.003968	0.8297	2B	0.835	0.844	0.8509	0.8561	0.0052	0.8750
(6)	1 - 10 or 1.0000 - 10	UNS	2A	0.0018	0.9982	0.9853	0.9332	0.9270	0.006155	0.8791	2B	0.892	0.913	0.9350	0.9430	0.0080	1.0000
(6)	1 - 18 or 1.0000 - 18	UNS	2A	0.0014	0.9986	0.9899	0.9625	0.9578	0.004745	0.9324	2B	0.940	0.953	0.9639	0.9701	0.0062	1.0000

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)]		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]	(Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
	1 - 24 or 1.0000 - 24	UNS	2A	0.0013	0.9987	0.9915	0.9716	0.9674	0.004222	0.9491	2B	0.955	0.965	0.9729	0.9784	0.0055	1.0000
	1 - 27 or 1.0000 - 27	UNS	2A	0.0012	0.9988	0.9921	0.9747	0.9707	0.004033	0.9547	2B	0.960	0.969	0.9759	0.9811	0.0052	1.0000
(6)	1 1/8 - 10 or 1.1250 - 10	UNS	2A	0.0019	1.1231	1.1102	1.0581	1.0519	0.006215	1.0040	2B	1.017	1.038	1.0600	1.0681	0.0081	1.1250
(6)	1 1/8 - 14 or 1.1250 - 14	UNS	2A	0.0016	1.1234	1.1131	1.0770	1.0717	0.005345	1.0383	2B	1.048	1.063	1.0786	1.0855	0.0069	1.1250
(6)	1 1/8 - 24 or 1.1250 - 24	UNS	2A	0.0013	1.1237	1.1165	1.0966	1.0923	0.004282	1.0741	2B	1.080	1.090	1.0979	1.1035	0.0056	1.1250
(6)	1 1/4 - 10 or 1.2500 - 10	UNS	2A	0.0019	1.2481	1.2352	1.1831	1.1768	0.006271	1.1290	2B	1.142	1.163	1.1850	1.1932	0.0082	1.2500
(6)	1 1/4 - 14 or 1.2500 - 14	UNS	2A	0.0016	1.2484	1.2381	1.2020	1.1966	0.005401	1.1633	2B	1.173	1.188	1.2036	1.2106	0.0070	1.2500
	1 1/4 - 24 or 1.2500 - 24	UNS	2A	0.0013	1.2487	1.2415	1.2216	1.2173	0.004338	1.1991	2B	1.205	1.215	1.2229	1.2285	0.0056	1.2500
(6)	1 3/8 - 10 or 1.3750 - 10	UNS	2A	0.0019	1.3731	1.3602	1.3081	1.3018	0.006323	1.2540	2B	1.267	1.288	1.3100	1.3182	0.0082	1.3750
(6)	1 3/8 - 14 or 1.3750 - 14	UNS	2A	0.0016	1.3734	1.3631	1.3270	1.3215	0.005453	1.2883	2B	1.298	1.313	1.3286	1.3357	0.0071	1.3750
(6)	1 3/8 - 24 or 1.3750 - 24	UNS	2A	0.0013	1.3737	1.3665	1.3466	1.3422	0.004390	1.3241	2B	1.330	1.340	1.3479	1.3536	0.0057	1.3750
(6)	1 1/2 - 10 or 1.5000 - 10	UNS	2A	0.0019	1.4981	1.4852	1.4331	1.4267	0.006372	1.3790	2B	1.392	1.413	1.4350	1.4433	0.0083	1.5000
(6)	1 1/2 - 14 or 1.5000 - 14	UNS	2A	0.0017	1.4983	1.4880	1.4519	1.4464	0.005502	1.4132	2B	1.423	1.438	1.4536	1.4608	0.0072	1.5000
	1 1/2 - 24 or 1.5000 - 24	UNS	2A	0.0013	1.4987	1.4915	1.4716	1.4672	0.004439	1.4491	2B	1.455	1.465	1.4729	1.4787	0.0058	1.5000
(6)	1 5/8 - 10 or 1.6250 - 10	UNS	2A	0.0019	1.6231	1.6102	1.5581	1.5517	0.006419	1.5040	2B	1.517	1.538	1.5600	1.5683	0.0083	1.6250

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]		Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
(6)	$1\frac{5}{8}$ - 14 or 1.6250 - 14	UNS	2A	0.0017	1.6233	1.6130	1.5769	1.5714	0.005549	1.5382	2B	1.548	1.563	1.5786	1.5858	0.0072	1.6250
(6)	$1\frac{5}{8}$ - 24 or 1.6250 - 24	UNS	2A	0.0013	1.6237	1.6165	1.5966	1.5921	0.004486	1.5741	2B	1.580	1.590	1.5979	1.6037	0.0058	1.6250
(6)	$1\frac{3}{4}$ - 10 or 1.7500 - 10	UNS	2A	0.0019	1.7481	1.7352	1.6831	1.6766	0.006463	1.6290	2B	1.642	1.663	1.6850	1.6934	0.0084	1.7500
	$1\frac{3}{4}$ - 14 or 1.7500 - 14	UNS	2A	0.0017	1.7483	1.7380	1.7019	1.6963	0.005593	1.6632	2B	1.673	1.688	1.7036	1.7109	0.0073	1.7500
(6)	$1\frac{3}{4}$ - 18 or 1.7500 - 18	UNS	2A	0.0015	1.7485	1.7398	1.7124	1.7073	0.005053	1.6823	2B	1.690	1.703	1.7139	1.7205	0.0066	1.7500
(6)	$1\frac{7}{8}$ - 10 or 1.8750 - 10	UNS	2A	0.0020	1.8730	1.8601	1.8080	1.8015	0.006505	1.7539	2B	1.767	1.788	1.8100	1.8185	0.0085	1.8750
(6)	$1\frac{7}{8}$ - 14 or 1.8750 - 14	UNS	2A	0.0017	1.8733	1.8630	1.8269	1.8213	0.005635	1.7882	2B	1.798	1.813	1.8286	1.8359	0.0073	1.8750
(6)	$1\frac{7}{8}$ - 18 or 1.8750 - 18	UNS	2A	0.0015	1.8735	1.8648	1.8374	1.8323	0.005095	1.8073	2B	1.815	1.828	1.8389	1.8455	0.0066	1.8750
(6)	2 - 10 or 2.0000 - 10	UNS	2A	0.0020	1.9980	1.9851	1.9330	1.9265	0.006545	1.8789	2B	1.892	1.913	1.9350	1.9435	0.0085	2.0000
(6)	2 - 14 or 2.0000 - 14	UNS	2A	0.0017	1.9983	1.9880	1.9519	1.9462	0.005675	1.9132	2B	1.923	1.938	1.9536	1.9610	0.0074	2.0000
(6)	2 - 18 or 2.0000 - 18	UNS	2A	0.0015	1.9985	1.9898	1.9624	1.9573	0.005135	1.9323	2B	1.940	1.953	1.9639	1.9706	0.0067	2.0000
(6)	$2\frac{1}{16}$ - 16 or 2.0630 - 16	UNS	2A	0.0016	2.0609	2.0515	2.0203	2.0149	0.005396	1.9865	2B	1.995	2.009	2.0219	2.0289	0.0070	2.0625
(6)			3A	0.0000	2.0625	2.0531	2.0219	2.0179	0.004000	1.9881	3B	1.9950	2.0034	2.0219	2.0272	0.0053	2.0625
(6)	$2\frac{3}{16}$ - 16 or 2.1875 - 16	UNS	2A	0.0016	2.1859	2.1765	2.1453	2.1399	0.005434	2.1115	2B	2.120	2.134	2.1469	2.1540	0.0071	2.1875
(6)			3A	0.0000	2.1875	2.1781	2.1469	2.1428	0.004100	2.1131	3B	2.1200	2.1284	2.1469	2.1522	0.0053	2.1875
(6)	$2\frac{1}{4}$ - 10 or 2.2500 - 10	UNS	2A	0020	2.2480	2.2351	2.1830	2.1764	0.006621	2.1289	2B	2.142	2.163	2.1850	2.1936	0.0086	2.2500
(6)	$2\frac{1}{4}$ - 14 or 2.2500 - 14	UNS	2A	0.0017	2.2483	2.2380	2.2019	2.1961	0.005751	2.1632	2B	2.173	2.188	2.2036	2.2111	0.0075	2.2500

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]		Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
(6)	2 1/4 - 18 or 2.2500 - 18	UNS	2A	0.0016	2.2484	2.2397	2.2123	2.2071	0.005211	2.1822	2B	2.190	2.203	2.2139	2.2207	0.0068	2.2500
(6)	2 5/16 - 16 or 2.3125 - 16	UNS	2A	0.0016	2.3109	2.3015	2.2703	2.2648	0.005471	2.2365	2B	2.245	2.259	2.2719	2.2790	0.0071	2.3125
(6)			3A	0.0000	2.3125	2.3031	2.2719	2.2678	0.004100	2.2381	3B	2.2450	2.2534	2.2719	2.2772	0.0053	2.3125
(6)	2 7/16 - 16 or 2.4375 - 16	UNS	2A	0.0017	2.4358	2.4264	2.3952	2.3897	0.005506	2.3614	2B	2.370	2.384	2.3969	2.4041	0.0072	2.4375
(6)			3A	0.0000	2.4375	2.4281	2.3969	2.3928	0.004100	2.3631	3B	2.3700	2.3784	2.3969	2.4023	0.0054	2.4375
(6)	2 1/2 - 10 or 2.5000 - 10	UNS	2A	0.0020	2.4980	2.4851	2.4330	2.4263	0.006691	2.3789	2B	2.392	2.413	2.4350	2.4437	0.0087	2.5000
(6)	2 1/2 - 14 or 2.5000 - 14	UNS	2A	0.0017	2.4983	2.4880	2.4519	2.4461	0.005821	2.4132	2B	2.423	2.438	2.4536	2.4612	0.0076	2.5000
(6)	2 1/2 - 18 or 2.5000 - 18	UNS	2A	0.0016	2.4984	2.4897	2.4623	2.4570	0.005281	2.4322	2B	2.440	2.453	2.4639	2.4708	0.0069	2.5000
(6)	2 3/4 - 10 or 2.7500 - 10	UNS	2A	0.0020	2.7480	2.7351	2.6830	2.6762	0.006757	2.6289	2B	2.642	2.663	2.6850	2.6938	0.0088	2.7500
(6)	2 3/4 - 14 or 2.7500 - 14	UNS	2A	0.0018	2.7482	2.7379	2.7018	2.6959	0.005887	2.6631	2B	2.673	2.688	2.7036	2.7113	0.0077	2.7500
(6)	2 3/4 - 18 or 2.7500 - 18	UNS	2A	0.0016	2.7484	2.7397	2.7123	2.7070	0.005347	2.6822	2B	2.690	2.703	2.7139	2.7209	0.0070	2.7500
(6)	3 - 10 or 3.0000 - 10	UNS	2A	0.0020	2.9980	2.9851	2.9330	2.9262	0.006818	2.8789	2B	2.892	2.913	2.9350	2.9439	0.0089	3.0000
(6)	3 - 14 or 3.0000 - 14	UNS	2A	0.0018	2.9982	2.9879	2.9518	2.9459	0.005948	2.9131	2B	2.923	2.938	2.9536	2.9613	0.0077	3.0000
(6)	3 - 18 or 3.0000 - 18	UNS	2A	0.0016	2.9984	2.9897	2.9623	2.9569	0.005408	2.9322	2B	2.940	2.953	2.9639	2.9709	0.0070	3.0000
(6)	3 1/4 - 10 or 3.2500 - 10	UNS	2A	0.0021	3.2479	3.2350	3.1829	3.1760	0.006877	3.1288	2B	3.142	3.163	3.1850	3.1939	0.0089	3.2500
(6)	3 1/4 - 14 or 3.2500 - 14	UNS	2A	0.0018	3.2482	3.2379	3.2018	3.1958	0.006007	3.1631	2B	3.173	3.188	3.2036	3.2114	0.0078	3.2500

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]		Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
(6)	3¼ - 18 or 3.2500 - 18	UNS	2A	0.0016	3.2484	3.2397	3.2123	3.2068	0.005467	3.1822	2B	3.190	3.203	3.2139	3.2210	0.0071	3.2500
(6)	3½ - 10 or 3.5000 - 10	UNS	2A	0.0021	3.4979	3.4850	3.4329	3.4260	0.006932	3.3788	2B	3.392	3.413	3.4350	3.4440	0.0090	3.5000
(6)	3½ - 14 or 3.5000 - 14	UNS	2A	0.0018	3.4982	3.4879	3.4518	3.4457	0.006062	3.4131	2B	3.423	3.438	3.4536	3.4615	0.0079	3.5000
(6)	3½ - 18 or 3.5000 - 18	UNS	2A	0.0017	3.4983	3.4896	3.4622	3.4567	0.005522	3.4321	2B	3.440	3.453	3.4639	3.4711	0.0072	3.5000
(6)	3¾ - 10 or 3.7500 - 10	UNS	2A	0.0021	3.7479	3.7350	3.6829	3.6759	0.006985	3.6288	2B	3.642	3.663	3.6850	3.6941	0.0091	3.7500
(6)	3¾ - 14 or 3.7500 - 14	UNS	2A	0.0018	3.7482	3.7379	3.7018	3.6957	0.006115	3.6631	2B	3.673	3.688	3.7036	3.7115	0.0079	3.7500
(6)	3¾ - 18 or 3.7500 - 18	UNS	2A	0.0017	3.7483	3.7396	3.7122	3.7066	0.005575	3.6821	2B	3.690	3.703	3.7139	3.7211	0.0072	3.7500
(6)	4 - 10 or 4.0000 - 10	UNS	2A	0.0021	3.9979	3.9850	3.9329	3.9259	0.007036	3.8788	2B	3.892	3.913	3.9350	3.9441	0.0091	4.0000
(6)	4 - 14 or 4.0000 - 14	UNS	2A	0.0018	3.9982	3.9879	3.9518	3.9456	0.006166	3.9131	2B	3.923	3.938	3.9536	3.9616	0.0080	4.0000
(6)	4¼ - 10 or 4.2500 - 10	UNS	2A	0.0021	4.2479	4.2350	4.1829	4.1758	0.007085	4.1288	2B	4.142	4.163	4.1850	4.1942	0.0092	4.2500
(6)	4¼ - 14 or 4.2500 - 14	UNS	2A	0.0019	4.2481	4.2378	4.2017	4.1955	0.006215	4.1630	2B	4.173	4.188	4.2036	4.2117	0.0081	4.2500
(6)	4½ - 10 or 4.5000 - 10	UNS	2A	0.0021	4.4979	4.4850	4.4329	4.4258	0.007131	4.3788	2B	4.392	4.413	4.4350	4.4443	0.0093	4.5000
(6)	4½ - 14 or 4.5000 - 14	UNS	2A	0.0019	4.4981	4.4878	4.4517	4.4454	0.006261	4.4130	2B	4.423	4.438	4.4536	4.4617	0.0081	4.5000
(6)	4¾ - 10 or 4.7500 - 10	UNS	2A	0.0022	4.7478	4.7349	4.6828	4.6756	0.007176	4.6287	2B	4.642	4.663	4.6850	4.6943	0.0093	4.7500
(6)	4¾ - 14 or 4.7500 - 14	UNS	2A	0.0019	4.7481	4.7378	4.7017	4.6954	0.006306	4.6630	2B	4.673	4.688	4.7036	4.7118	0.0082	4.7500
(6)	5 - 10 or 5.0000 - 10	UNS	2A	0.0022	4.9978	4.9849	4.9328	4.9256	0.007220	4.8787	2B	4.892	4.913	4.9350	4.9444	0.0094	5.0000

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Table D-1 Limits of Size for Selected Combinations of UNS/UNRS Series Threads (Cont'd)

			External [Note (1)]								Internal [Note (1)]						
					Major Diameter		Pitch Diameter and Functional Diameter [Note (3)]			Maximum UNR Minor Diameter [Note (5)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (3)]			
	Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max. [Note (2)]	Min.	Max. [Note (2)]	Min.	Tolerance [Note (4)]		Class	Min.	Max.	Min.	Max.	Tolerance	Miimum Major Diameter
(6)	5 - 14 or 5.0000 - 14	UNS	2A	0.0019	4.9981	4.9878	4.9517	4.9454	0.006350	4.9130	2B	4.923	4.938	4.9536	4.9619	0.0083	5.0000
(6)	5 1/4 - 10 or 5.2500 - 10	UNS	2A	0.0022	5.2478	5.2349	5.1828	5.1755	0.007262	5.1287	2B	5.142	5.163	5.1850	5.1944	0.0094	5.2500
(6)	5 1/4 - 14 or 5.2500 - 14	UNS	2A	0.0019	5.2481	5.2378	5.2017	5.1953	0.006392	5.1630	2B	5.173	5.188	5.2036	5.2119	0.0083	5.2500
(6)	5 1/2 - 10 or 5.5000 - 10	UNS	2A	0.0022	5.4978	5.4849	5.4328	5.4255	0.007303	5.3787	2B	5.392	5.413	5.4350	5.4445	0.0095	5.5000
(6)	5 1/2 - 14 or 5.5000 - 14	UNS	2A	0.0019	5.4981	5.4878	5.4517	5.4453	0.006433	5.4130	2B	5.423	5.438	5.4536	5.4620	0.0084	5.5000
(6)	5 3/4 - 10 or 5.7500 - 10	UNS	2A	0.0022	5.7478	5.7349	5.6828	5.6755	0.007342	5.6287	2B	5.642	5.663	5.6850	5.6945	0.0095	5.7500
(6)	5 3/4 - 14 or 5.7500 - 14	UNS	2A	0.0019	5.7481	5.7378	5.7017	5.6952	0.006472	5.6630	2B	5.673	5.688	5.7036	5.7120	0.0084	5.7500
(6)	6 - 10 or 6.0000 - 10	UNS	2A	0.0022	5.9978	5.9849	5.9328	5.9254	0.007381	5.8787	2B	5.892	5.913	5.9350	5.9446	0.0096	6.0000
(6)	6 - 14 or 6.0000 - 14	UNS	2A	0.0020	5.9980	5.9877	5.9516	5.9451	0.006511	5.9129	2B	5.923	5.938	5.9536	5.9621	0.0085	6.0000

GENERAL NOTE: Series designation shown indicates the UN thread form; however, the UNR thread form may be specified by substituting UNR in place of UN in all designations for external use only.

NOTES:

(1) Thread classes may be combined. See para. 4.1.

(2) For Class 2A threads having an additive finish, the maximum major and pitch diameters, after coating, may equal the basic sizes, whose values are the same as the nominal major diameter and the minimum pitch diameter shown for Class 2B, respectively. See para. 4.1.2.

(3) See para. 5.2.1 for functional diameter.

(4) 2A pitch diameter tolerance (Td_2) is listed and used to a six-place decimal to calculate the listed Class 1A/1B, 2B, 3A/3B tolerances, Class 1A/2A allowances, and all dimensional limits that depend on them.

(5) UN series external thread maximum minor diameter is basic [D_1 bsc in para. 8.3.1(e)(1)(-b)] for Class 3A and basic minus allowance [D_1 bsc $-es$ in para. 8.3.1(e)(1)(-a)]for Classes 1A and 2A.

(6) One or more of the numbers listed in this row have been changed to correct for calculation errors and a change in rounding methods. The original numbers from past issues of this Standard are listed in Nonmandatory Appendix E and are for reference only.

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NONMANDATORY APPENDIX E
CHANGES TO ASME B1.1-1989, TABLES 3A AND 3B

This Appendix contains Tables E-1 and E-2, which show the thread sizes that were listed in Tables 3A and 3B, respectively, in 1989 and earlier editions of ASME B1.1. Those areas in which no data are listed are identical to data in Tables 2A, 2B, and D-1 in this Standard.

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989

			External							Internal						
			Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
1 - 64 or 0.0730 - 64	UNC	2A	...	...	...	...	...	...	...	...	2B	...	0.0623	...	.....	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.0623	...	.....	...	...
1 - 72 or 0.0730 - 72	UNF	2A	...	...	...	...	...	...	...	...	2B	...	0.0635	...	.....	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.0635	...	.....	...	...
2 - 64 or 0.0860 - 64	UNF	2A	...	...	...	...	...	...	...	...	2B	...	0.0753	...	.....	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.0753	...	.....	...	...
6 - 32 or 0.1380 - 32	UNC	3A	...	...	...	...	...	...	...	...	3B	...	0.1140	...	.....	...	...
8 - 32 or 0.1640 - 32	UNC	3A	...	...	...	...	...	...	...	...	3B	...	0.1389	...	.....	...	...
10 - 24 or 0.1900 - 24	UNC	2A	...	...	...	...	...	...	...	...	2B	...	0.156	...	.....	...	...
12 - 32 or 0.2160 - 32	UNEF	2A	0.0009	0.2151	0.2091	...	0.1948	0.1917	0.0031	...	2B	...	...	...	.....	...	...
5/16 - 20 or 0.3125 - 20	UN	2A	...	...	...	...	...	0.2748	0.0040	...	2B	...	...	...	0.2852	0.0052	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	0.2839	0.0039	...
5/16 - 28 or 0.3125 - 28	UN	2A	...	...	...	...	...	0.2849	0.0034	...	2B	...	...	...	0.2937	0.0044	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	0.2926	0.0033	...
5/16 - 32 or 0.3125 - 32	UNEF	2A	...	...	...	...	...	0.2880	0.0032	...	2B	...	...	...	0.2964	0.0042	...
		3A	...	...	...	...	...	0.2898	0.0024	...	3B	...	0.2847	...	0.2953	0.0031	
7/16 - 16 or 0.4375 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.4028	0.0059	...
		3A	...	...	...	...	...	0.3935	0.0034	...	3B	...	...	...	.....	...	...
7/16 - 20 or 0.4375 - 20	UNF	1A	...	...	...	...	...	0.3975	0.0062	...	1B	...	...	...	.....	...	...
7/16 - 28 or 0.4375 - 28	UNEF	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.4189	0.0046	...
7/16 - 32 or 0.4375 - 32	UN	3A	...	...	...	...	...	0.4147	0.0025	...	3B	...	...	...	.....	...	...
1/2 - 16 or 0.5000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	0.4419	...	.....	...	...
7/16 - 16 or 0.5625 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	0.5040	...	.....	...	...
9/16 - 20 or 0.5625 - 20	UN	2A	...	...	...	...	...	0.5245	0.0042	...	2B	...	...	...	0.5355	0.0055	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.5162	...	0.5341	0.0041	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
9/16 - 24 or 0.5625 - 24	UNEF	2A	...	...	...	...	...	0.5303	0.0039	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	0.5325	0.0029	...	3B	...	...	...	0.5392	0.0038	...
9/16 - 32 or 0.5625 - 32	UN	2A	0.0010	0.5615	0.5555	...	0.5412	0.5377	...	...	2B	...	...	...	0.5467	0.0045	...
5/8 - 11 or 0.6250 - 11	UNC	1A	0.0016	0.6234	0.6052	0.5644	0.5561	...	...	...	1B	...	...	...	...	...	...
		2A	0.0016	0.6234	0.6113	...	0.5644	0.5589	...	...	2B	...	...	...	...	...	...
5/8 - 32 or 0.6250 - 32	UN	2A	...	...	...	...	...	...	...	...	2B	...	0.590	...	...	...	...
11/16 - 12 or 0.6875 - 12	UN	2A	...	...	...	...	...	0.6264	0.0054	...	2B	...	...	...	...	...	...
11/16 - 16 or 0.6875 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.6531	0.0062	...
11/16 - 20 or 0.6875 - 20	UN	2A	...	...	...	...	...	0.6494	0.0043	...	2B	...	...	...	0.6606	0.0056	...
		3A	...	...	...	...	...	0.6518	0.0032	...	3B	...	0.6412	...	0.6592	0.0042	...
11/16 - 24 or 0.6875 - 24	UNEF	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.6656	0.0052	...
11/16 - 28 or 0.6875 - 28	UN	3A	...	...	...	...	...	0.6615	0.0028	...	3B	...	...	...	...	...	...
11/16 - 32 or 0.6875 - 32	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.6718	0.0046	...
3/4 - 16 or 0.7500 - 16	UNF	3A	...	...	...	...	...	...	...	...	3B	...	0.6908	...	...	...	...
3/4 - 20 or 0.7500 - 20	UNEF	3A	...	...	...	...	...	...	...	...	3B	...	0.7037	...	...	...	...
3/4 - 28 or 0.7500 - 28	UN	3A	...	...	...	...	...	...	...	0.7074	3B	...	...	...	...	...	...
13/16 - 12 or 0.8125 - 12	UN	2A	...	...	...	...	...	0.7512	0.0055	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	0.7543	0.0041	...	3B	...	...	...	...	...	...
13/16 - 16 or 0.8125 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.7782	0.0063	...
		3A	...	...	...	...	...	0.7683	0.0036	...	3B	...	0.7533	...	...	0.0047	...
13/16 - 20 or 0.8125 - 20	UNEF	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.7857	0.0057	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.7662	...	...	...	...
13/16 - 28 or 0.8125 - 28	UN	2A	...	...	...	...	...	0.7843	0.0038	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	0.7930	0.0037	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
13/16 - 32 or 0.8125 - 32	UN	2A	...	...	...	...	...	0.7875	0.0036	...	2B	...	...	...	0.7969	0.0047	...
		3A	...	...	...	...	...	0.7895	0.0027	...	3B	...	...	...	...	...	...
7/8 - 12 or 0.8750 - 12	UN	2A	...	...	...	...	...	0.8137	0.0055	...	2B	...	...	...	0.8281	0.0072	...
		3A	...	...	...	...	...	0.8168	...	...	3B	...	0.7948	...	0.8263	0.0054	...
7/8 - 14 or 0.8750 - 14	UNF	1A	...	...	...	...	...	...	...	...	1B	...	0.814	...	...	...	...
		2A	...	...	...	...	...	...	...	...	2B	...	0.814	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.8068	...	...	...	...
7/8 - 16 or 0.8750 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.8407	0.0063	...
		3A	...	...	...	...	...	0.8308	0.0036	...	3B	...	0.8158	...	0.8391	0.0047	...
7/8 - 20 or 0.8750 - 20	UNEF	2A	...	...	...	...	...	0.8368	0.0044	...	2B	...	...	...	0.8482	0.0057	...
		3A	...	...	...	...	...	0.8392	0.0033	...	3B	...	0.8287	...	0.8468	0.0043	...
7/8 - 28 or 0.8750 - 28	UN	2A	...	...	...	...	...	0.8468	0.0038	...	2B	...	...	...	0.8568	0.0050	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	0.8555	0.0037	...
7/8 - 32 or 0.8750 - 32	UN	2A	...	...	...	...	...	0.8500	0.0036	...	2B	...	...	...	0.8594	0.0047	...
		3A	...	...	...	...	...	0.8520	0.0027	...	3B	...	...	...	...	...	...
15/16 - 12 or 0.9375 - 12	UN	2A	...	...	...	...	...	0.8760	0.0057	...	2B	...	...	...	0.8908	0.0074	...
		3A	...	...	...	...	...	0.8793	0.0041	...	3B	...	...	...	...	...	...
15/16 - 16 or 0.9375 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	0.9034	0.0065	...
		3A	...	...	...	...	...	...	...	...	3B	...	0.8783	...	0.9018	0.0049	...
15/16 - 20 or 0.9375 - 20	UNEF	3A	...	...	...	...	...	...	...	...	3B	...	0.8912	...	...	...	...
15/16 - 28 or 0.9375 - 28	UN	2A	...	...	...	...	...	0.9091	0.0040	...	2B	...	...	...	0.9195	0.0052	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	0.9182	0.0039	...
1 - 8 or 1.0000 - 8	UNC	2A	...	...	...	...	...	0.9100	...	...	2B	...	...	...	...	...	...
1 - 14 or 1.0000 - 14	UNS	2A	0.0017	0.9983	0.9880	...	0.9519	0.9463	0.0056	...	2B	...	...	...	0.9609	0.0073	...
		3A	...	...	...	...	...	0.9494	0.0042	...	3B	...	...	...	0.9590	0.0054	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
$1\frac{1}{16}$ - 12 or 1.0625 - 12	UN	3A	...	...	...	...	...	1.0042	0.0042	...	3B	...	...	...	...	...	...
$1\frac{1}{16}$ - 16 or 1.0625 - 16	UN	3A	...	...	...	...	...	1.0182	0.0037	...	3B	...	1.0033	...	...	...	...
$1\frac{1}{16}$ - 18 or 1.0625 - 18	UNEF	2A	...	...	...	...	...	1.0203	0.0047	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	1.0310	0.0046	...
$1\frac{1}{16}$ - 20 or 1.0625 - 20	UN	2A	...	...	...	...	...	1.0241	0.0045	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.0162	...	1.0344	0.0044	...
$1\frac{1}{8}$ - 7 or 1.1250 - 7	UNC	2A	...	...	...	...	...	...	0.0072	...	2B	...	...	...	...	...	...
$1\frac{1}{8}$ - 16 or 1.1250 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.0909	0.0065	...
		3A	...	...	...	...	...	1.0807	0.0037	...	3B	...	1.0658	...	...	...	...
$1\frac{1}{8}$ - 18 or 1.1250 - 18	UNEF	2A	...	...	...	...	...	1.0828	0.0047	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	1.0935	0.0046	...
$1\frac{1}{8}$ - 20 or 1.1250 - 20	UN	2A	...	...	...	...	...	1.0866	0.0045	...	2B	...	...	...	1.0984	0.0059	...
		3A	...	...	...	...	...	1.0891	0.0034	...	3B	...	1.0787	...	1.0969	0.0044	...
$1\frac{3}{16}$ - 12 or 1.1875 - 12	UN	2A	...	...	...	...	...	1.1259	0.0058	...	2B	...	...	...	...	...	...
$1\frac{3}{16}$ - 16 or 1.1875 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.1283	...	1.1519	0.0050	...
$1\frac{3}{16}$ - 18 or 1.1875 - 18	UNEF	2A	0.0015	1.1860	1.1773	...	1.1499	1.1450	0.0049	...	2B	...	...	...	...	...	...
$1\frac{3}{16}$ - 20 or 1.1875 - 20	UN	2A	...	...	...	...	...	1.1489	0.0047	...	2B	...	...	...	1.1611	0.0061	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.1412	...	...	...	...
$1\frac{1}{4}$ - 16 or 1.2500 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.1908	...	...	...	...
$1\frac{1}{4}$ - 20 or 1.2500 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.2037	...	...	...	...
$1\frac{5}{16}$ - 12 or 1.3125 - 12	UN	3A	...	...	...	...	...	1.2541	0.0045	...	3B	...	...	...	1.2640	0.0056	...
$1\frac{5}{16}$- 16 or 1.3125 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.2785	0.0066	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.2533	...	...	...	...
$1\frac{5}{16}$ - 18 or 1.3125 - 18	UNEF	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.2827	0.0063	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
		3A	...	...	...	...	...	1.2728	0.0038	...	3B	...	...	...	1.2811	0.0047	...
$1\frac{5}{16}$ - 20 or 1.3125 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.2662	...	1.2845	0.0045	...
$1\frac{5}{16}$ - 28 or 1.3125 - 28	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.2946	0.0053	...
$1\frac{3}{8}$ - 16 or 1.3750 - 16	UN	2A	...	...	...	...	...	1.3278	0.0051	...	2B	...	...	...	1.3410	0.0066	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.3158	...	...	...	...
$1\frac{3}{8}$ - 18 or 1.3750 - 18	UNEF	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.3452	0.0063	...
		3A	...	...	...	...	...	1.3353	0.0036	...	3B	...	...	...	1.3436	0.0047	...
$1\frac{3}{8}$ - 20 or 1.3750 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.3287	...	1.3470	0.0045	...
$1\frac{3}{8}$ - 28 or 1.3750 - 28	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.3571	0.0053	...
$1\frac{7}{16}$ - 16 or 1.4375 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.4037	0.0068	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.3783	...	...	...	...
$1\frac{7}{16}$ - 18 or 1.4375 - 18	UNEF	2A	...	...	...	...	...	1.3949	0.0050	...	2B	...	...	...	...	...	...
$1\frac{7}{16}$- 20 or 1.4375 - 20	UN	2A	...	...	...	...	...	1.3988	0.0048	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.3912	...	...	...	...
$1\frac{7}{16}$ - 28 or 1.4375 - 28	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.4198	0.0055	...
$1\frac{1}{2}$ - 16 or 1.5000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.4408	...	...	...	...
$1\frac{1}{2}$ - 18 or 1.5000 - 18	UNEF	2A	...	...	...	...	...	...	...	...	2B	...	1.452	...	...	...	...
$1\frac{1}{2}$ - 20 or 1.5000 - 20		3A	...	...	...	...	...	...	...	...	3B	...	1.4537	...	...	...	...
$1\frac{9}{16}$ - 12 or 1.5625 - 12	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.5160	0.0076	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	1.5141	0.0057	...
$1\frac{9}{16}$ - 16 or 1.5625 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.5033	...	...	...	...
$1\frac{9}{16}$ - 18 or 1.5625 - 18	UNEF	3A	...	...	...	...	...	...	...	...	3B	...	...	...	1.5312	0.0048	...
$1\frac{9}{16}$ - 20 or 1.5625 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.5162	...	1.5346	0.0046	...
$1\frac{5}{8}$ - 12 or 1.6250 - 12	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	1.5785	0.0076	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	1.5766	0.0057	...
$1\frac{5}{8}$ - 16 or 1.6250 - 16	UN	2A	...	...	...	...	1.5776	0.0052	...	...	2B	...	...	...	...	...	...
$1\frac{5}{8}$ - 18 or 1.6250 - 18	UN	3A	...	...	...	...	1.5852	0.0037	...	...	3B	...	...	...	1.5937	0.0048	...
$1\frac{5}{8}$ - 20 or 1.6250 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.5787	...	1.5971	0.0046	...
$1\frac{11}{16}$ - 12 or 1.6875 - 12	UN	2A	...	...	...	...	1.6256	0.0060	...	...	2B	...	...	...	1.6412	0.0076	...
$1\frac{11}{16}$ - 16 or 1.6875 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.6283	...	1.6521	0.0052	...
$1\frac{11}{16}$ - 18 or 1.6875 - 18	UNEF	2A	...	...	...	...	1.6448	0.0051	...	...	2B	...	...	...	1.6580	0.0066	...
$1\frac{11}{16}$ - 20 or 1.6875 - 20	UN	2A	0.0015	1.6860	1.6779	...	1.6535	1.6487	...	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	1.6412	...	...	...	...
$1\frac{3}{4}$ - 5 or 1.7500 - 5	UNC	1A	...	...	...	...	...	...	...	...	1B	1.534	1.568	...	...	...	...
		2A	...	...	...	...	...	...	...	...	2B	1.534	1.568	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	1.5340	...	...	...	...	...
$1\frac{3}{4}$ - 8 or 1.7500 - 8	UN	3A	...	...	...	...	...	1.6632	0.0056	...	3B	...	...	...	...	...	...
$1\frac{3}{4}$ - 16 or 1.7500 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.6908	...	...	...	...
$1\frac{3}{4}$ - 20 or 1.7500 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.7037	...	...	...	...
$1\frac{13}{16}$ - 16 or 1.8125 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.7533	...	...	...	...
$1\frac{13}{16}$ - 20 or 1.8125 - 20	UN	3A	...	...	...	...	...	1.7764	0.0036	...	3B	...	1.7662	...	...	...	...
$1\frac{7}{8}$ - 12 or 1.8750 - 12	UN	3A	...	...	...	...	...	...	...	...	3B	...	...	...	1.8267	0.0058	...
$1\frac{7}{8}$ - 16 or 1.8750 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.8158	...	...	...	...
$1\frac{7}{8}$ - 20 or 1.8750 - 20	UN	2A	...	...	...	...	...	1.8362	0.0048	...	2B	...	...	...	1.8488	0.0063	...
		3A	...	...	...	...	...	1.8389	0.0036	...	3B	...	1.8287	...	1.8472	0.0047	...
$1\frac{15}{16}$ - 12 or 1.9375 - 12	UN	2A	...	...	...	...	...	1.8755	0.0061	...	2B	...	...	...	1.8913	0.0079	...
$1\frac{15}{16}$ - 16 or 1.9375 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.8785	...	...	...	...
$1\frac{15}{16}$ - 20 or 1.9375 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.8912	...	...	...	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

			External							Internal						
			Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
2 - 16 or 2.0000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.9408	...	...	...	...
2 - 20 or 2.0000 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	1.9537	...	...	...	...
2 1/8 - 12 or 2.1250 - 12	UN	3A	...	...	...	...	...	2.0664	0.0045	...	3B	...	...	...	...	...	...
2 1/8 - 16 or 2.1250 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	2.0658	...	2.0896	0.0052	...
2 1/8 - 20 or 2.1250 - 20	UN	2A	...	...	...	...	...	2.0861	0.0049	...	2B	...	...	...	2.0989	0.0064	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.0787	...	...	...	...
2 1/4 - 12 or 2.2500 - 12	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	2.2038	0.0079	...
		3A	...	...	...	...	...	2.1914	0.0045	...	3B	...	...	...	2.2018	0.0059	...
2 1/4 - 16 or 2.2500 - 16	UN	2A	...	...	...	...	...	2.2024	0.0054	...	2B	...	...	...	2.2164	0.0070	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.1908	...	2.2146	0.0052	...
2 1/4 - 20 or 2.2500 - 20	UN	2A	...	...	...	...	...	2.2111	0.0049	...	2B	...	...	...	2.2239	0.0064	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.2037	...	2.2223	0.0048	...
2 3/8 - 6 or 2.3750 - 6	UN	2A	...	...	...	...	...	...	...	...	2B	...	2.226	...	...	...	...
2 3/8 - 12 or 2.3750 - 12	UN	2A	0.0019	2.3731	2.3617	...	2.3190	2.3128	...	...	2B	...	...	...	2.3290	0.0081	...
2 3/8 - 16 or 2.3750 - 16	UN	2A	0.0017	2.3733	2.3639	...	2.3327	2.3272	...	...	2B	...	...	...	2.3416	0.0072	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.3158	...	...	...	...
2 3/8 - 20 or 2.3750 - 20	UN	2A	...	...	...	...	...	2.3359	0.0051	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.3287	...	2.3475	0.0050	...
2 1/2 - 16 or 2.5000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	2.4408	...	...	...	...
2 1/2 - 20 or 2.5000 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	2.4537	...	...	...	...
2 5/8 - 12 or 2.6250 - 12	UN	3A	...	...	...	...	...	2.5663	0.0046	...	3B	...	...	...	2.5769	0.0060	...
2 5/8 - 16 or 2.6250 - 16	UN	2A	...	...	...	...	...	2.5772	0.0055	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	2.5803	0.0041	...	3B	...	2.5658	...	...	...	...
2 5/8 - 20 or 2.6250 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	2.5784	...	...	...	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
$2\frac{3}{4}$ - 12 or 2.7500 - 12	UN	2A	...	...	...	...	...	2.6878	0.0062	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	2.6913	0.0046	...	3B	...	...	...	2.7019	0.0060	...
$2\frac{3}{4}$ - 16 or 2.7500 - 16	UN	2A	...	...	...	...	...	2.7022	0.0055	...	2B	...	...	...	2.7166	0.0072	...
		3A	...	...	...	...	...	2.7053	0.0041	...	3B	...	2.6908	...	...	...	...
$2\frac{3}{4}$ - 20 or 2.7500 - 20	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	2.7241	0.0066	...
		3A	...	...	...	...	...	2.7137	0.0038	...	3B	...	2.7037	...	...	...	...
$2\frac{7}{8}$ - 12 or 2.8750 - 12	UN	3A	...	...	...	...	...	...	...	...	3B	...	...	...	2.8271	0.0062	...
$2\frac{7}{8}$ - 16 or 2.8750 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	2.8158	...	...	...	...
$2\frac{7}{8}$ - 20 or 2.8750 - 20	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	2.8493	0.0068	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.8287	...	2.8476	0.0051	...
3 - 16 or 3.0000 - 16	UN	2A	...	...	...	...	...	...	0.0056	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	2.9408	...	...	...	...
3 - 20 or 3.0000 - 20	UN	3A	...	...	...	...	...	...	...	...	3B	...	2.9537	...	...	...	...
$3\frac{1}{8}$ - 12 or 3.1250 - 12	UN	2A	...	...	...	...	...	3.0627	0.0063	...	2B	...	...	...	3.0791	0.0082	...
		3A	...	...	...	...	...	3.0662	0.0047	...	3B	...	...	...	...	...	...
$3\frac{1}{8}$ - 16 or 3.1250 - 16	UN	2A	...	...	...	...	...	3.0771	0.0056	...	2B	...	...	...	3.0917	0.0073	...
		3A	...	...	...	...	...	3.0802	0.0042	...	3B	...	3.0658	...	...	...	...
$3\frac{1}{4}$ - 12 or 3.2500 - 12	UN	2A	...	...	...	...	...	3.1877	0.0063	...	2B	...	...	...	3.2041	0.0082	...
		3A	...	...	...	...	...	3.1912	0.0047	...	3B	...	...	...	...	...	...
$3\frac{1}{4}$ - 16 or 3.2500 - 16	UN	2A	...	...	...	...	...	3.2021	0.0056	...	2B	...	...	...	3.2167	0.0073	...
		3A	...	...	...	...	...	3.2052	0.0042	...	3B	...	3.1908	...	3.2149	0.0055	...
$3\frac{3}{8}$ - 12 or 3.3750 - 12	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	3.3293	0.0084	...
$3\frac{3}{8}$ - 16 or 3.3750 - 16	UN	2A	...	...	...	...	...	3.3269	0.0058	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	3.3158	...	...	...	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
3½ - 16 or 3.5000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	3.4408	...	...	...	...
3⅝ - 12 or 3.6250 - 12	UN	2A	...	...	...	...	...	3.5626	0.0064	...	2B	...	...	...	...	...	...
3⅝ - 16 or 3.6250 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	3.5658	...	...	...	...
3¾ - 12 or 3.7500 - 12	UN	2A	...	...	...	...	...	3.6876	0.0064	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	3.6911	0.0048	...	3B	...	...	...	...	...	...
3¾ - 16 or 3.7500 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	3.7169	0.0075	...
		3A	...	...	...	...	...	3.7051	0.0043	...	3B	...	3.6908	...	3.7150	0.0056	...
3⅞ - 16 or 3.8750 - 16	UN	2A	...	...	...	...	...	3.8267	0.0059	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	...	3B	...	3.8158	...	...	...	...
4 - 16 or 4.0000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	3.9408	...	...	...	...
4⅛ - 12 or 4.1250 - 12	UN	2A	...	...	...	...	...	4.0624	0.0065	...	2B	...	...	...	...	...	...
4⅛ - 16 or 4.1250 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	4.0920	0.0076	...
		3A	...	...	...	...	...	...	...	...	3B	...	4.0658	...	...	...	...
4¼ - 8 or 4.2500 - 8	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	4.1808	0.0120	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	4.1779	0.0091	...
4¼ - 12 or 4.2500 - 12	UN	2A	...	...	...	...	...	4.1874	0.0065	...	2B	...	...	...	4.2044	0.0085	...
4¼ - 16 or 4.2500 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	4.2170	0.0076	...
		3A	...	...	...	...	...	...	...	...	3B	...	4.1908	...	4.2151	0.0057	...
4⅜ - 8 or 4.3750 - 8	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	4.3058	0.0120	...
4⅜ - 12 or 4.3750 - 12	UN	2A	...	...	...	...	...	4.3124	0.0065	...	2B	...	...	...	4.3294	0.0085	...
		3A	...	...	...	...	...	4.3160	0.0049	...	3B	...	...	...	...	...	...
4⅜ - 16 or 4.3750 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	4.3420	0.0076	...
		3A	...	...	...	...	...	4.3300	0.0044	...	3B	...	4.3158	...	4.3401	0.0057	...
4½ - 12 or 4.5000 - 12	UN	2A	...	...	...	...	...	4.4374	0.0065	...	2B	...	...	...	4.4544	0.0085	...
		3A	...	...	...	...	...	4.4410	0.0049	...	3B	...	...	...	4.4523	0.0064	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

				External							Internal						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
4½ - 16 or 4.5000 - 16	UN	2A	...	...	...	...	...	4.4517	0.0059	...	2B	...	...	...	4.4670	0.0076	...
		3A	...	...	...	...	...	4.4550	0.0044	...	3B	...	4.4408	...	4.4651	0.0057	...
4⅝ - 8 or 4.6250 - 8	UN	2A	0.0029	4.6221	4.6071	...	4.5409	4.5314	...	...	2B	...	...	...	4.5562	0.0124	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	4.5531	0.0093	...
4⅝ - 16 or 4.6250 - 16	UN	2A	...	...	...	...	...	4.5765	0.0061	...	2B	...	...	...	4.5923	0.0079	...
		3A	...	...	...	...	...	...	...	...	3B	...	4.5658	...	4.5903	0.0059	...
4¾ - 8 or 4.7500 - 8	UN	3A	...	...	...	...	...	4.6617	0.0071	...	3B	...	...	...	...	...	...
4¾ - 12 or 4.7500 - 12	UN	3A	...	...	...	...	...	...	...	...	3B	...	...	...	4.7025	0.0066	...
4¾ - 16 or 4.7500 - 16	UN	2A	...	...	...	...	...	4.7015	0.0059	...	2B	...	...	...	4.7173	0.0079	...
		3A	...	...	...	...	...	...	...	...	3B	...	4.6908	...	...	...	...
4⅞ - 12 or 4.8750 - 12	UN	3A	...	...	...	...	...	...	...	...	3B	...	...	...	4.8275	0.0066	...
4⅞ - 16 or 4.8750 - 16	UN	2A	...	...	...	...	...	4.8265	0.0061	...	2B	...	...	...	4.8423	0.0079	...
		3A	...	...	...	...	...	...	...	...	3B	...	4.8158	...	...	...	...
5 - 8 or 5.0000 - 8	UN	3A	...	...	...	...	...	...	...	...	3B	...	...	...	4.9283	0.0095	...
5 - 16 or 5.0000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	4.9408	...	...	...	...
5⅛ - 8 or 5.1250 - 8	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	5.0564	0.0126	...
5⅛ - 12 or 5.1250 - 12	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	5.0796	0.0087	...
		3A	...	...	...	...	...	5.0659	0.0050	...	3B	...	...	...	...	...	...
5⅛ - 16 or 5.1250 - 16	UN	3A	...	...	...	...	...	5.0799	0.0045	...	3B	...	5.0658	...	...	...	...
5¼ - 8 or 5.2500 - 8	UN	3A	...	...	...	...	...	5.1614	0.0074	...	3B	...	...	...	5.1784	0.0096	...
5¼ - 12 or 5.2500 - 12	UN	2A	...	...	...	...	...	5.1872	0.0067	...	2B	...	...	...	5.2046	0.0087	...
		3A	...	...	...	...	...	5.1909	0.0050	...	3B	...	...	...	...	...	...
5¼ - 16 or 5.2500 - 16	UN	3A	...	...	...	...	...	5.2049	0.0047	...	3B	...	...	...	...	...	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

			External							Internal						
			Major Diameter			Pitch Diameter and Functional Diameter [Note (1)]					Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Min.	Max.	Min.	Tolerance	Maximum UNR Minor Diameter (Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Minimum Major Diameter
$5\frac{3}{8}$ - 8 or 5.3750 - 8	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	5.3067	0.0129	...
		3A	...	...	...	...	...	...	...	...	3B	...	...	...	5.3035	0.0097	...
$5\frac{3}{8}$ - 12 or 5.3750 - 12	UN	2A	...	...	...	...	...	5.3122	0.0067	...	2B	...	...	...	5.3296	0.0087	...
		3A	...	...	...	...	...	5.3159	0.0050	...	3B	...	...	...	...	...	...
$5\frac{3}{8}$ - 16 or 5.3750 - 16	UN	3A	...	...	...	...	...	5.3299	0.0045	...	3B	...	5.3158	...	5.3403	0.0059	...
$5\frac{1}{2}$ - 12 or 5.5000 - 12	UN	2A	...	...	...	...	...	5.4372	0.0067	...	2B	...	...	...	5.4546	0.0087	...
		3A	...	...	...	...	...	5.4409	0.0050	...	3B	...	...	...	...	...	...
$5\frac{1}{2}$ - 16 or 5.5000 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	5.4673	0.0079	...
		3A	...	...	...	...	...	5.4549	0.0045	...	3B	...	5.4408	...	5.4653	0.0059	...
$5\frac{5}{8}$ - 8 or 5.6250 - 8	UN	3A	...	...	...	...	...	...	...	...	3B	...	...	...	5.5536	0.0098	...
$5\frac{5}{8}$ - 12 or 5.6250 - 12	UN	2A	0.0021	5.6229	5.6115	...	5.5688	5.5619	0.0069	...	2B	...	...	...	5.5799	0.0090	...
		3A	...	...	...	...	...	5.5657	0.0052	...	3B	...	...	...	...	...	...
$5\frac{5}{8}$ - 16 or 5.6250 - 16	UN	2A	0.0019	5.6231	5.6137	...	5.5825	5.5763	...	...	2B	...	...	...	5.5925	0.0081	...
		3A	...	...	...	...	...	5.5797	0.0047	...	3B	...	5.5658	...	5.5905	0.0061	...
$5\frac{3}{4}$ - 8 or 5.7500 - 8	UN	2A	...	...	5.7250	...	...	...	...	...	2B	...	...	...	...	...	...
$5\frac{3}{4}$ - 12 or 5.7500 - 12	UN	2A	...	...	...	...	...	5.6869	0.0069	...	2B	...	...	...	5.7049	0.0090	...
		3A	...	...	...	...	...	5.6907	0.0052	...	3B	...	...	...	...	...	...
$5\frac{3}{4}$ - 16 or 5.7500 - 16	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	5.7175	0.0081	...
		3A	...	...	...	...	...	5.7047	0.0047	...	3B	...	5.6908	...	5.7155	0.0061	...
$5\frac{7}{8}$ - 8 or 5.8750 - 8	UN	2A	0.0031	5.8719	5.8569	...	5.7907	5.7806	...	...	2B	...	...	...	...	...	...
$5\frac{7}{8}$ - 12 or 5.8750 - 12	UN	2A	...	...	...	...	...	...	...	...	2B	...	...	...	5.8299	0.0090	...
$5\frac{7}{8}$ - 16 or 5.8750 - 16	UN	3A	...	...	...	...	...	5.8297	0.0047	...	3B	...	5.8158	...	5.8405	0.0061	...
6 - 8 or 6.0000 - 8	UN	2A	0.0031	5.9969	5.9819	...	5.9157	5.9055	...	...	2B	...	...	...	5.9321	0.0131	...
		3A	...	...	...	...	...	5.9111	0.0077	...	3B	...	...	...	5.9287	0.0099	...
6 - 16 or 6.0000 - 16	UN	3A	...	...	...	...	...	...	...	...	3B	...	5.9408	...	...	...	...

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Table E-1 Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 (Cont'd)

GENERAL NOTES:

(a) The limits listed in this Table are no longer considered standard and are for information only. They have been replaced because of calculation errors and a change in rounding methods.

(b) Product threads, gages, or tooling that conform to or were generated using limits listed in this Table should be considered acceptable. When replacing, the new limits should be used.

(c) It is recommended that all users prepare for the eventual adoption of only the values in Tables 2A and 2B.

NOTE: (1) See para. 5.2.1 for functional diameter.

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Table E-2 Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition

		External								Internal						
				Major Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Maximum UNR Minor Diameter (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Minimum Major Diameter
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Max.	Min.	Toler-ance		Class	Min.	Max.	Min.	Max.	Toler-ance	
10 - 28 or 0.1900 - 28	UNS	2A	...	...	...	...	...	...	0.1464	2B	...	...	...	...	...	...
10 - 36 or 0.1900 - 36	UNS	2A	...	...	...	...	...	...	...	2B	...	0.166	...	...	...	...
10 - 40 or 0.1900 - 40	UNS	2A	...	...	...	...	...	...	0.1592	2B	...	...	...	...	...	...
10 - 48 or 0.1900 - 48	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
10 - 56 or 0.1900 - 56	UNS	2A	...	...	...	...	...	...	0.1681	2B	...	...	...	...	...	...
12 - 36 or 0.2160 - 36	UNS	2A	...	...	...	...	...	...	0.1821	2B	...	0.192	...	...	...	...
12 - 40 or 0.2160 - 40	UNS	2A	...	...	...	...	...	...	0.1835	2B	...	...	...	0.2035	0.0037	...
12 - 48 or 0.2160 - 48	UNS	2A	...	...	...	...	0.1991	0.0026	...	2B	...	...	...	0.2059	0.0034	...
12 - 56 or 0.2160 - 56	UNS	2A	0.0007	0.2153	0.2112	0.2037	0.2012	...	0.1941	2B	...	...	...	0.2076	0.0032	...
1/4 - 24 or 0.2500 - 24	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1/4 - 27 or 0.2500 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1/4 - 36 or 0.2500 - 36	UNS	2A	...	...	...	...	...	...	0.2161	2B	...	0.226	...	...	...	...
1/4 - 40 or 0.2500 - 40	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1/4 - 48 or 0.2500 - 48	UNS	2A	...	...	...	...	...	...	0.2243	2B	...	...	...	...	...	...
1/4 - 56 or 0.2500 - 56	UNS	2A	...	...	...	...	...	...	0.2280	2B	...	...	...	...	...	...
5/16 - 27 or 0.3125 - 27	UNS	2A	0.0010	0.3115	0.3048	0.2874	0.2839	0.0035	0.2674	2B	...	...	...	0.2929	0.0045	...
5/16 - 36 or 0.3125 - 36	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	0.2985	0.0040	...
5/16 - 40 or 0.3125 - 40	UNS	2A	...	...	...	...	0.2925	0.0029	...	2B	...	...	...	0.3001	0.0038	...
5/16 - 48 or 0.3125 - 48	UNS	2A	...	...	...	...	0.2955	0.0027	...	2B	...	...	...	...	...	...
3/8 - 18 or 0.3750 - 18	UNS	2A	...	...	...	...	...	...	0.3076	2B	...	...	...	...	...	...
3/8 - 27 or 0.3750 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
3/8 - 36 or 0.3750 - 36	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...

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Table E-2 Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition (Cont'd)

		External								Internal						
				Major Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Maximum UNR Minor Diameter (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Minimum Major Diameter
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Max.	Min.	Toler-ance		Class	Min.	Max.	Min.	Max.	Toler-ance	
3/8 - 40 or 0.3750 - 40	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
0.390 - 27 or 0.3900 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
7/16 - 18 or 0.4375 - 18	UNS	2A	...	...	...	...	0.3958	0.0043	0.3701	2B	...	...	...	0.4070	0.0056	...
7/16 - 24 or 0.4375 - 24	UNS	2A	0.0011	0.4364	0.4292	0.4093	0.4055	0.0038	0.3868	2B	...	...	...	0.4153	0.0049	...
7/16 - 27 or 0.4375 - 27	UNS	2A	...	...	...	...	0.4087	0.0036	...	2B	...	...	...	0.4181	0.0047	...
1/2 - 12 or 0.5000 - 12	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	...	3B	...	0.422	...	...	...	...
1/2 - 14 or 0.5000 - 14	UNS	2A	...	...	...	...	...	...	0.4135	2B	...	...	...	...	...	...
1/2 - 18 or 0.5000 - 18	UNS	2A	...	...	...	...	...	...	0.4326	2B	...	...	...	...	...	...
1/2 - 24 or 0.5000 - 24	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1/2 - 27 or 0.5000 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
9/16 - 14 or 0.5625 - 14	UNS	2A	...	...	...	...	...	...	0.4760	2B	...	...	...	...	...	...
9/16 - 27 or 0.5625 - 27	UNS	2A	...	...	...	...	0.5336	0.0037	...	2B	...	...	...	0.5432	0.0048	...
5/8 - 14 or 0.625 - 14	UNS	2A	...	...	...	...	...	...	0.5385	2B	...	0.564	...	...	...	...
5/8 - 27 or 0.6250 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
3/4 - 14 or 0.7500 - 14	UNS	2A	...	...	...	...	...	...	0.6635	2B	...	...	...	...	...	...
3/4 - 18 or 0.7500 - 18	UNS	2A	...	...	...	...	...	...	0.6825	2B	...	...	...	...	...	...
3/4 - 24 or 0.7500 - 24	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
3/4 - 27 or 0.7500 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
7/8 - 10 or 0.8750 - 10	UNS	2A	...	...	...	...	0.8022	0.0060	0.7542	2B	...	...	...	0.8178	0.0078	...
7/8 - 18 or 0.8750 - 18	UNS	2A	...	...	...	...	0.8329	0.0046	0.8075	2B	...	...	...	0.8449	0.0060	...
7/8 - 24 or 0.8750 - 24	UNS	2A	...	...	...	...	0.8426	0.0041	...	2B	...	...	...	0.8532	0.0052	...

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Table E-2 Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition (Cont'd)

		External								Internal						
				Major Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Maximum UNR Minor Diameter (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Minimum Major Diameter
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Max.	Min.	Toler-ance		Class	Min.	Max.	Min.	Max.	Toler-ance	
7/8 - 27 or 0.8750 - 27	UNS	2A	...	...	...	...	0.8458	0.0039	...	2B	...	...	...	0.8560	0.0051	...
1 - 10 or 1.0000 - 10	UNS	2A	...	...	...	...	...	...	0.8792	2B	...	...	...	...	...	...
1 - 18 or 1.0000 - 18	UNS	2A	...	...	...	...	...	...	0.9325	2B	...	...	...	...	...	...
1 - 24 or 1.0000 - 24	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1 - 27 or 1.0000 - 27	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1 1/8 - 10 or 1.1250 - 10	UNS	2A	0.0018	1.1232	1.1103	1.0582	1.0520	...	1.0042	2B	...	...	...	1.0680	0.0080	...
1 1/8 - 14 or 1.1250 - 14	UNS	2A	...	...	...	...	...	...	1.0384	2B	...	1.064	...	...	...	...
1 1/8 - 24 or 1.1250 - 24	UNS	2A	...	...	...	...	1.0924	0.0042	1.0742	2B	...	...	...	1.1034	0.0055	...
1 1/4 - 10 or 1.2500 - 10	UNS	2A	...	...	...	...	...	...	1.1291	2B	...	...	...	...	...	...
1 1/4 - 14 or 1.2500 - 14	UNS	2A	...	...	...	...	...	...	1.1634	2B	...	...	...	...	...	...
1 1/4 - 24 or 1.2500 - 24	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1 3/8 - 10 or 1.3750 - 10	UNS	2A	...	...	...	...	...	...	1.2541	2B	...	...	...	...	...	...
1 3/8 - 14 or 1.3750 - 14	UNS	2A	...	...	...	...	1.3216	0.0054	1.2884	2B	...	1.314	...	1.3356	0.0070	...
1 3/8 - 24 or 1.3750 - 24	UNS	2A	...	...	...	...	1.3423	0.0043	...	2B	...	...	...	1.3535	0.0056	...
1 1/2 - 10 or 1.5000 - 10	UNS	2A	...	...	...	...	...	...	1.3791	2B	...	...	...	...	...	...
1 1/2 - 14 or 1.5000 - 14	UNS	2A	...	...	...	...	...	...	1.4133	2B	...	...	...	...	...	...
1 1/2 - 24 or 1.5000 - 24	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...
1 5/8 - 10 or 1.6250 - 10	UNS	2A	...	...	...	...	...	...	1.5041	2B	...	...	...	...	...	...
1 5/8 - 14 or 1.6250 - 14	UNS	2A	...	...	...	...	...	...	1.5383	2B	...	1.564	...	...	...	...
1 5/8 - 24 or 1.6250 - 24	UNS	2A	...	...	...	...	1.5922	0.0044	...	2B	...	...	...	...	...	...
1 3/4 - 10 or 1.7500 - 10	UNS	2A	...	...	...	...	...	...	1.6291	2B	...	...	...	...	...	...
1 3/4 - 14 or 1.7500 - 14	UNS	2A	...	...	...	...	...	...	...	2B	...	...	...	...	...	...

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Table E-2 Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition (Cont'd)

		External								Internal						
				Major Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Maximum UNR Minor Diameter (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Minimum Major Diameter
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Max.	Min.	Toler-ance		Class	Min.	Max.	Min.	Max.	Toler-ance	
1¾ - 18 or 1.7500 - 18	UNS	2A	...	...	...	...	...	...	1.6824	2B	...	...	...	...	...	...
1⅞ - 10 or 1.8750 - 10	UNS	2A	0.0019	1.8731	1.8602	1.8081	1.8016	...	1.7534	2B	...	...	...	1.8184	0.0084	...
1⅞ - 14 or 1.8750 - 14	UNS	2A	...	...	...	...	...	...	1.7883	2B	...	1.814	...	...	...	...
1⅞ - 18 or 1.8750 - 18	UNS	2A	...	...	...	...	...	...	1.8074	2B	...	...	...	...	...	...
2 - 10 or 2.0000 - 10	UNS	2A	...	...	...	...	...	...	1.8790	2B	...	...	...	...	...	...
2 - 14 or 2.0000 - 14	UNS	2A	...	...	...	...	...	...	1.9133	2B	...	...	...	...	...	...
2 - 18 or 2.0000 - 18	UNS	2A	...	...	...	...	...	...	1.9324	2B	...	...	...	...	...	...
2 1/16- 16 or 2.0625 - 16	UNS	2A	...	...	...	...	...	...	1.9864	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	1.9880	3B	...	2.003	...	2.0271	0.0052	...
2 3/16- 16 or 2.1875 - 16	UNS	2A	...	...	...	...	...	...	2.1154	2B	...	...	...	2.1539	0.0070	...
		3A	...	...	...	...	...	...	2.1130	3B	...	2.128	...	2.1521	0.0052	...
2¼ - 10 or 2.2500 - 10	UNS	2A	...	...	...	...	2.1765	0.0065	2.1290	2B	...	...	...	2.1935	0.0085	...
2¼ - 14 or 2.2500 - 14	UNS	2A	...	...	...	...	2.1962	0.0057	2.1633	2B	...	...	...	2.2110	0.0074	...
2¼ - 18 or 2.2500 - 18	UNS	2A	0.0015	2.2485	2.2398	2.2124	2.2073	0.0051	2.1824	2B	...	...	...	2.2206	0.0067	...
2 5/16- 16 or 2.3125 - 16	UNS	2A	0.0017	2.3108	2.3014	2.2702	2.2647	...	2.2363	2B	...	...	...	2.2791	0.0072	...
		3A	...	...	...	...	...	...	2.2380	3B	...	2.253	...	2.2773	0.0054	...
2 7/16- 16 or 2.4375 - 16	UNS	2A	...	...	...	...	...	...	2.3613	2B	...	...	...	...	...	...
		3A	...	...	...	...	...	...	2.3630	3B	...	2.378	...	...	...	...
2½ - 10 or 2.5000 - 10	UNS	2A	...	...	...	...	...	...	2.3790	2B	...	...	...	...	...	...
2½ - 14 or 2.5000 - 14	UNS	2A	...	...	...	...	...	...	2.4133	2B	...	...	...	...	...	...
2½ - 18 or 2.5000 - 18	UNS	2A	...	...	...	...	...	...	2.4323	2B	...	...	...	...	...	...
2¾ - 10 or 2.7500 - 10	UNS	2A	...	...	...	...	2.6763	0.0067	2.6290	2B	...	...	...	2.6837	0.0087	...
2¾ - 14 or 2.7500 - 14	UNS	2A	0.0017	2.7483	2.7380	2.7019	2.6961	0.0058	2.6633	2B	...	...	...	2.7112	0.0076	...

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Table E-2 Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition (Cont'd)

		External								Internal						
				Major Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Maximum UNR Minor Diameter		Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Minimum Major Diameter
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Max.	Min.	Toler-ance	(Ref.)	Class	Min.	Max.	Min.	Max.	Toler-ance	
2¾ - 18 or 2.7500 - 18	UNS	2A	...	...	...	...	...	...	2.6823	2B	...	...	...	2.7208	0.0069	...
3 - 10 or 3.0000 - 10	UNS	2A	...	...	...	...	...	...	2.8790	2B	...	...	...	...	...	...
3 - 14 or 3.0000 - 14	UNS	2A	...	...	...	...	...	...	2.9132	2B	...	...	...	...	...	...
3 - 18 or 3.0000 - 18	UNS	2A	...	...	...	...	...	...	2.9323	2B	...	...	...	...	...	...
3¼ - 10 or 3.2500 - 10	UNS	2A	0.0020	3.2480	3.2351	3.1830	3.1762	0.0068	3.1290	2B	...	...	...	...	...	...
3¼ - 14 or 3.2500 - 14	UNS	2A	...	...	...	...	3.1959	0.0059	3.1632	2B	...	...	...	3.2113	0.0077	...
3¼ - 18 or 3.2500 - 18	UNS	2A	...	...	...	...	3.2069	0.0054	3.1823	2B	...	...	...	3.2209	0.0070	...
3½ - 10 or 3.5000 - 10	UNS	2A	...	...	...	...	...	...	3.3789	2B	...	...	...	...	...	...
3½ - 14 or 3.5000 - 14	UNS	2A	...	...	...	...	...	...	3.4132	2B	...	...	...	...	...	...
3½ - 18 or 3.5000 - 18	UNS	2A	...	...	...	...	...	...	3.4322	2B	...	...	...	...	...	...
3¾ - 10 or 3.7500 - 10	UNS	2A	...	...	...	...	3.6760	0.0069	3.6289	2B	...	...	...	3.6940	0.0090	...
3¾ - 14 or 3.7500 - 14	UNS	2A	...	...	...	...	...	...	3.6632	2B	...	...	...	...	...	...
3¾ - 18 or 3.7500 - 18	UNS	2A	...	...	...	...	3.7067	0.0055	3.6822	2B	...	...	...	...	...	...
4 - 10 or 4.0000 - 10	UNS	2A	...	...	...	...	...	...	3.8768	2B	...	...	...	...	...	...
4 - 14 or 4.0000 - 14	UNS	2A	...	...	...	...	...	...	3.9132	2B	...	...	...	...	...	...
4¼ - 10 or 4.2500 - 10	UNS	2A	...	...	...	...	4.1759	0.0070	4.1289	2B	...	...	...	4.1941	0.0091	...
4¼ - 14 or 4.2500 - 14	UNS	2A	0.0018	4.2482	4.2379	4.2018	4.1956	...	4.1632	2B	...	...	...	4.2116	0.0080	...
4½ - 10 or 4.5000 - 10	UNS	2A	...	...	...	...	4.4259	0.0070	4.3789	2B	...	...	...	4.4441	0.0091	...
4½ - 14 or 4.5000 - 14	UNS	2A	0.0018	4.4982	4.4879	4.4518	4.4456	0.0062	4.4132	2B	...	...	...	4.4616	0.0080	...
4¾ - 10 or 4.7500 - 10	UNS	2A	...	...	...	...	...	...	4.6288	2B	...	...	...	4.6944	0.0094	...
4¾ - 14 or 4.7500 - 14	UNS	2A	...	...	...	...	4.6953	0.0064	4.6631	2B	...	...	...	4.7119	0.0083	...
5 - 10 or 5.0000 - 10	UNS	2A	...	...	...	...	...	...	4.8788	2B	...	...	...	...	...	...

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Table E-2 Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition (Cont'd)

		External								Internal						
				Major Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Maximum UNR Minor Diameter (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (1)]			Minimum Major Diameter
Nominal Size and Threads/in.	Series Designation	Class	Allowance	Max.	Min.	Max.	Min.	Toler-ance		Class	Min.	Max.	Min.	Max.	Toler-ance	
5 - 14 or 5.0000 - 14	UNS	2A	...	...	...	...	4.9453	...	4.9131	2B	...	...	...	...	...	...
5¼ - 10 or 5.2500 - 10	UNS	2A	...	...	...	...	5.1756	0.0072	5.1288	2B	...	...	...	...	...	...
5¼ - 14 or 5.2500 - 14	UNS	2A	...	...	...	...	...	...	5.1631	2B	...	...	...	...	...	...
5½ - 10 or 5.5000 - 10	UNS	2A	...	...	...	...	5.4256	0.0072	5.3788	2B	...	...	...	5.4444	0.0094	...
5½ - 14 or 5.5000 - 14	UNS	2A	...	...	...	...	...	...	5.4131	2B	...	...	...	5.4619	0.0083	...
5¾ - 10 or 5.7500 - 10	UNS	2A	...	...	...	...	5.6754	0.0074	5.6288	2B	...	...	...	5.6946	0.0096	...
5¾ - 14 or 5.7500 - 14	UNS	2A	0.0020	5.7480	5.7377	5.7016	5.6951	...	...	2B	...	...	...	5.7121	0.0085	...
6 - 10 or 6.0000 - 10	UNS	2A	...	...	...	...	...	...	5.8788	2B	...	...	...	...	...	...
6 - 14 or 6.0000 - 14	UNS	2A	...	...	...	...	...	...	5.9130	2B	...	...	...	...	...	...

GENERAL NOTES:

(a) The limits listed in this Table are no longer considered standard and are for information only. They have been replaced because of calculation errors and a change in rounding methods.

(b) Product threads, gages, or tooling that to conform or were generated using limits listed in this Table should be considered acceptable. When replacing, the new limits should be used.

(c) It is recommended that all users prepare for the eventual adoption of only the values determined by use of the formulas in the body of this Standard and the employment of the rounding rules set forth by ASME B1.30.

NOTE: (1) See para. 5.2.1 for functional diameter.

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NONMANDATORY APPENDIX F
SPECIAL LENGTHS OF ENGAGEMENT SPECIFICATIONS AND DESIGNATIONS

NOTE: Determining product or manufacturing specifications for special lengths of engagements are application dependent and the responsibility of the designer of the parts. Therefore it is outside the scope of ASME B1.1 and was removed from the body of this Standard and placed in this Appendix for historical and reference purposes.

F-1 SPECIAL LENGTHS OF ENGAGEMENT, LE, SPECIFICATIONS

F-1.1 Long LE Using Gage Length, LG, Equal to LE

(a) High-Strength Materials Using Standard Pitch Diameter Tolerances. For applications of long length of engagement of mating parts involving very high-strength materials, increases in tolerances based on standard length of engagement may be detrimental. In these cases, the tolerances based on the standard length of engagement may be applied to increased length of engagement threads. This requires the GO thread gages to have a special length equal to the length of engagement.

(b) Standard Bolt, Added Allowance in Tapped Hole, LE Increases. In some cases where greater than standard length of engagement is required, it is desirable to use standard externally threaded parts with tolerances based on standard length of engagement. For example, in the case of a standard bolt assembled into a tapped hole in aluminum, the designation of the bolt thread will conform to that of a thread for a standard length of engagement.

To ensure proper assembly, the tapped hole thread into which the bolt is assembled must not interfere with the bolt thread. This could happen if no special provisions were made in the tapped hole thread due to the cumulative effect of lead variation on the bolt thread, inasmuch as the increased length of engagement exceeds the thickness of the GO thread gage used for acceptance of the bolt thread. To avoid this condition, an allowance should be provided in the tapped hole, the amount of which should be the diameter equivalent of the cumulative lead variation for the increased length of engagement, which is one-half the pitch diameter tolerance of the bolt thread allowed for the standard length of engagement. This requires the GO functional thread gage and GO plain gage to have a special length equal to the length of engagement.

(1) EXAMPLE: 0.5000 13 UNC-SE2B; LE = 1 in. (2 diameters); assembled with standard bolt thread.

Add allowance, EI, = $\frac{1}{2}Td_2$ for standard bolt thread. From Table 3, column 5, $\frac{1}{2}Td_2$ (standard) = 0.0025. Therefore, the thread is redesignated to indicate a nonstandard internal thread with the allowance of 0.0025 added to the basic size of 0.5000. New designation is 0.5025-13 UNS-SE2B. Allowance is also added to the standard minor diameter size limits and to the adjusted pitch diameter size limits. See para. F-2.1.

(c) Standard Internal Thread, Added Allowance on External Thread, es, Increases. In some cases where greater than standard length of engagement is required, it is desirable to use standard internally threaded parts with tolerances based on standard length of engagement. In these cases, an allowance should be added to the mating external thread.

(1) EXAMPLE: 0.3750-24-UNF-SE2A; LE = 0.88 in. (2.35 diameters); assembled with standard internal thread.

Add allowance equal to $\frac{1}{2}TD_2$ for standard internal thread. From Table 3, column 8, $\frac{1}{2}TD_2$ (standard) = 0.00245, which is rounded to 0.0025. Therefore, the thread is redesignated to indicate a nonstandard external thread with the allowance of 0.0025 subtracted from the basic size of 0.3750. New designation is 0.3725-24-UNS-SE2A. The added allowance is also subtracted from the standard major diameter size limits and from the adjusted pitch diameter size limits. See para. F-2.1.

F-1.2 Long Length of Engagement Using Standard Thread Gage Limits.

ASME B1.2 recommends the length of the GO gage approximate the length of engagement. However, it is sometimes more economical to accept these threads with GO thread gages made from standard gage blanks (refer to ASME B47.1), which have lengths approximating the standard lengths of engagement.

NOTE: When this is done, additional precautions are necessary to determine the effect of cumulative variation of lead and straightness of thread axis due to a long length of engagement.

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If applicable, an additional allowance should be provided, preferably on the external thread, the amount of which should be the diameter equivalent of the cumulative lead variation for the increased length of engagement, equal to the sum of one-half the pitch diameter tolerances of the external and internal threads allowed for the standard length of engagement.

(a) EXAMPLE: 0.3750-24-UNF-2A; LE = 0.88 in. (2.35 diameters); with external and internal thread gages of standard length.

Add allowance equal to $\frac{1}{2}Td_2 + \frac{1}{2}TD_2$ for standard mating threads. From Table 3, column 5, $\frac{1}{2}Td_2$ (standard) = 0.0019. From Table 3, column 8, $\frac{1}{2}TD_2$ (standard) = 0.00245.

The sum of these, after rounding, is equal to 0.0044, which is the added allowance. Therefore, the thread is redesignated to indicate a nonstandard external thread, with the allowance of 0.0044 subtracted from the basic size of 0.3750. New designation is 0.3706-24 UNS-2A. The added allowance is also subtracted from the standard major diameter and pitch diameter size limits. See para. F-2.2.

F-2 METHOD OF DESIGNATING THREADS HAVING SPECIAL LENGTH OF ENGAGEMENT

In the assembly of threads in mating parts, the length of engagement varies according to the design requirements. It should be noted that the length of engagement is not necessarily the same as the full thread length provided on the part, but it is the length of assembled thread in the mating parts.

Where a standard series thread has a special length of engagement differing from that for which the standard pitch diameter tolerances are applicable as indicated in section 5, the thread class symbol is qualified by the addition of the letters SE (special engagement) preceding the class symbol. The specification of the special pitch diameter limits of size and the length of engagement, LE, rounded to a two-place decimal, are a requirement.

EXAMPLES:

(a) ½ - 13 UNC-SE2A (23)
PD 0.4485 - 0.4431
LE 1.00

(b) ¼ - 24 UNS-SE3A (23)
Major diameter 0.2500 - 0.2428
PD 0.2229 - 0.2198
LE 0.88

F-2.1 Greater Than Standard Length Used

In some cases where greater than standard length of engagement is required, it is desirable to use standard externally threaded parts with tolerances based on standard length of engagement. For example, in the case of a standard bolt assembled into a tapped hole, the designation of the bolt thread will conform to that of a thread for a standard length of engagement.

The designation for the tapped hole thread should include the allowance in the basic size, the pitch diameter limits of size, and the length of gage, in addition to the information normally given. See para. F-1.1(b).

EXAMPLE: (requiring use of 1.00-long GO functional thread gage and GO plain gage)
0.5000 - 13 UNC-SE2B (21)
Minor diameter 0.420 - 0.437
PD 0.4525 - 0.4606
LG 1.00

Similarly, where greater than standard length of engagement is required, it is desirable to use standard internally threaded parts with tolerances based on standard length of engagement. Therefore, the external thread is provided with an added allowance. See para. F-1.1(c).

The designation for the external thread should include the added allowance in the basic size, the pitch diameter limits of size, and the length of gage, in addition to the information normally given.

EXAMPLE: (requiring use of 0.88-long GO functional thread gage and GO plain gage)
0.3750 - 24-UNF-SE2A (21)
Major diameter 0.3714 - 0.3642
PD 0.3443 - 0.3396
LG 0.88

F-2.2 Long Length. GO Functional Thread Gage, and GO Plain Ring Gage Used

When a long length of engagement is required and standard length GO functional thread gage and GO plain gage is used, the thread designation should indicate the thread modifications and a standard gage length, LG Std. See para. F-1.2.

EXAMPLES: (with additional allowance indicating use of standard length GO functional thread gage and GO plain gage)

(a) 0.5058-13 UNS-2B (22)
Minor diameter 0.423 - 0.440
PD 0.4558 - 0.4623
LG Std.

(b) 0.3706 - 24UNS-2A (22)
Major diameter 0.3695 - 0.3623
PD 0.3424 - 0.3386
LG Std.

F-2.3 Long Length of Engagement, High-Strength Materials Used

For applications of long length of engagement of mating parts involving very high-strength materials, increases in tolerances based on standard length of engagement may be detrimental. In these cases, the tolerances based on the standard length of engagement may be applied to increased length of engagement threads. This requires

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the GO thread gages to have a special length equal to the length of engagement as specified. The designations for restricted applications should be qualified with the abbreviation SPL (special) as shown in the examples that follow. See para. F-1.1(a).

EXAMPLES: Requiring use of 1.00-long GO thread and GO plain gages:

(a) 0.500 - 20-UNF-3A SPL (21)
LG 1.00 SPL

(b) 0.500 - 20-UNF-3B SPL (21)
LG 1.00 SPL

NOTE: In drawings, tolerances tabulated for the standard length of engagement in this Standard shall apply over the full length of engagement.

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B1 STANDARDS FOR SCREW THREADS

B1.1-2019	Unified Inch Screw Threads (UN, UNR, and UNJ Thread Forms)
B1.2-1983 (R2007)	Gages and Gaging for Unified Inch Screw Threads
B1.3-2007 (R2017)	Screw Thread Gaging Systems for Dimensional Acceptability: Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)
B1.5-1997 (R2009)	Acme Screw Threads
B1.7-2006 (R2016)	Screw Threads: Nomenclature, Definitions, and Letter Symbols
B1.8-1988 (R2016)	Stub Acme Screw Threads
B1.9-1973 (R2017)	Buttress Inch Screw Threads 7°/45° Form With 0.6 Pitch Basic Height of Thread Engagement
B1.10M-2004 (R2019)	Unified Miniature Screw Threads
B1.11-1958 (R2016)	Microscope Objective Thread
B1.12-1987 (R2018)	Class 5 Interference-Fit Thread
B1.13M-2005 (R2020)	Metric Screw Threads — M Profile
B1.16M-1984 (R2016)	Gages and Gaging for Metric M Screw Threads
B1.20.1-2013 (R2018)	Pipe Threads, General Purpose (Inch)
B1.20.3-1976 (R2018)	Dryseal Pipe Threads (Inch)
B1.20.5-1991 (R2019)	Gaging for Dryseal Pipe Threads (Inch)
B1.20.7-1991 (R2018)	Hose Coupling Screw Threads (Inch)
B1.21M-1997 (R2018)	Metric Screw Threads: MJ Profile
B1.22M-1985 (R2016)	Gages and Gaging for MJ Series Metric Screw Threads
B1.25-2019	Measurement Uncertainty Factors in the Calibration of Screw Thread Gages
B1.30-2002 (R2017)	Screw Threads — Standard Practice for Calculating and Rounding Dimensions

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ASME B1.1-2019

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ISBN 978-0-7918-7309-0

ASME B1.1-2003
[Revision of ASME B1.1-1989 (R2001)]

Unified Inch Screw Threads

(UN and UNR Thread Form)

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UNIFIED INCH SCREW THREADS

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ASME B1.1-2003

[Revision of ASME B1.1-1989 (R2001)]

Date of Issuance: September 30, 2004

The 2004 edition of this Standard is being issued with an automatic addenda subscription service. The use of addenda allows revisions made in response to public review comments or committee actions to be published as necessary. This Standard will be revised when the Society approves the issuance of a new edition.

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FOREWORD

This Standard is the outgrowth of and supersedes previous editions that were published as B1-1924, B1.1-1935, B1.1-1949, B1.1-1960, B1.1-1974, B1.1-1982, and B1.1-1989. Throughout such development, special attention has been given to the practical aspects of thread standardization, and many details of the current Standard result from studies and tests based on user problems. For example, there was disclosed the need for free assembly in high-production industries and the desirability of making some provision for threads that require a coating. The tolerance classes 2A/2B were developed to meet these two major requirements as well as to provide a general standard for externally and internally threaded fasteners. Thread symbols and nomenclature were changed to be expressed according to ASME B1.7. Thread acceptability now refers to ASME B1.3.

This issue includes the following changes to ASME B1.1-1989:

(a) The revision of some of the values in Table 2. These revisions are the result of the application of the consistent eight place decimal and rounding rules established in ASME B1.30-1992 that were mandated for use in all new and future revisions of ASME B1 documents. ASME B1.30 was developed under the direction of the B1 Committee as the basis for rounding of decimal values associated with the computation of screw thread dimensions. Using the thread calculation formulas in paras. 5 and 8 of this document and following the rounding rules of B1.30 all parties using a calculator or standard computer spreadsheet program will derive precisely the same values.

Table E-1 of Nonmandatory Appendix E identifies the thread sizes in Table 2 that have been revised and lists the dimensions from the ASME B1.1-1989 standard. The majority of the dimensional changes are within ± 0.0001 in.

Paragraph 8.2.1 states that both the values in Tables 2 and E-1 should be considered acceptable until a future revision of this standard makes the values in Table 2 the only acceptable values.

(b) Former Table 3B has been moved to Nonmandatory Appendix D. This table provides calculated values for various UNS (Unified Specials). ASME B1 strongly urges the adoption of the standard thread sizes in Table 2 whenever possible instead of those listed in Table D-1.

(c) Former Tables 20 through 30 have been eliminated because the allowances and tolerances contained in them was determined to be redundant with data provided in Table 2.

(d) Former Tables 31 through 40 have been moved to Nonmandatory Appendix D and were renamed Tables D-2 through D-11. These tables were used in the past for the quick calculation of special threads. In some cases the derived values resulted in values that differ from those derived by use of the formulas in paras. 5 and 8 of ASME B1.1. All future special threads should be based on calculations in paras. 5 and 8 in this document using the rounding rules in ASME B1.30 to ensure uniformity and consistency.

(e) All references to percent of thread engagement have been eliminated from this document. Past changes in the thread form designation of the "basic" thread height from $0.750H$ to $0.625H$ confused the calculation of percent of thread engagement. This calculation has been used in the past for threaded products users to determine drill size selection. It is now recommended that users select a drill size that will result in a hole size that lies between the maximum and minimum size of the internal thread's minor diameter shown in the tables included in this Standard.

(f) The definition of "functional diameter" has been included in this document and the term has been added in Table 2 in the same column as "pitch diameter" since both characteristics have the same limits of size.

(g) The effects of coating on threads have been explained in more depth in para. 7.

The Unified Screw Threads Standard is an integrated system of threads for fastening purposes in mechanisms and structures. Its outstanding characteristic is general interchangeability of threads, achieved through the standardization of thread form, diameter-pitch combinations, and limits of size.

The Standard has as its original basis the work done more than a century ago by William Sellers in the United States and Sir Joseph Whitworth in Great Britain. Throughout the intervening

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years there have been many further developments and revisions, culminating in the system of Unified Threads approved and adopted for use by all inch-using countries.

The achievements represented by ASME B1.1 in development, standardization, and unification are the result of cooperation and coordination of many organizations, including The American Society of Mechanical Engineers, Society of Automotive Engineers, National Institute of Science and Technology (formerly National Bureau of Standards), Committee B1, the former National Screw Thread Commission, the former Interdepartmental Screw Thread Committee, British Standards Institution, Canadian Standards Association, and American National Standards Institute.

Unification of screw thread standards received its impetus from the need for interchangeability among the billions of fasteners used in the complex equipment of modern technology and made in different countries. Equally important, however, are international trade in mechanisms of all kinds and the servicing of transportation equipment which moves from country to country. These have made unification not only highly advantageous, but practically essential. In sizes ¼ in. and larger, complete unification of certain thread series and six tolerance classes was signaled by the signing of an accord on November 18, 1948. Since that time, further unification has been extended into smaller sizes. Working through Technical Committee No. 1 of the International Organization for Standardization (ISO), the unified standard was adopted as an ISO inch screw thread standard, ISO 5864, parallel to the ISO metric screw thread system. Both systems have a common basic profile. The standard was subject to Quadripartite Standardization Agreement (QSTAG) 247, in the ABCA Army Standardization Program of America, Britain, Canada, and Australia.

Suggestions for improvement of this Standard will be welcomed. They should be sent to the American Society of Mechanical Engineers at ASME International, Three Park Avenue, New York, NY 10016-5990, U.S.A.

ASME B1.1-2003 was approved by the American National Standards Institute (ANSI) on March 27, 2003.

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Standardization and Unification of Screw Threads

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UNIFIED INCH SCREW THREADS

(UN AND UNR THREAD FORM)

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1 GENERAL

1.1 Scope

This Standard specifies the thread form, series, class, allowance, tolerance, and designation for unified screw threads. (In order to emphasize that unified screw threads are based on inch modules, they may be denoted unified inch screw threads.) Several variations in thread form have been developed for unified threads; however, this Standard covers only UN and UNR thread forms.

For easy reference, a metric translation of this Standard has been incorporated as Nonmandatory Appendix C. Nonmandatory Appendices A through E contain useful information that is supplementary to the sections of this Standard.

1.2 Unified Screw Thread Standards

The standards for unified screw threads published in this Standard are in agreement with formal standards of the International Organization for Standardization for diameter-pitch combinations, designations, and tolerances for 60 deg triangular form inch screw threads. Unified screw threads had their origin in an accord signed in Washington, D.C., on November 18, 1948, by representatives of standardizing bodies of Canada, the United Kingdom, and the United States, and have subsequently superseded American National screw threads.

1.3 UN and UNR Screw Threads

UNR applies only to external threads; the difference between UN and UNR threads, in addition to designation, is that a flat or optional rounded root contour is specified for UN threads, while only a rounded root contour is specified for UNR threads.

1.4 Interchangeability

Unified (UN/UNR) and its predecessor, American National screw threads, have substantially the same thread form, and threads of both standards having the same diameter and pitch are mechanically interchangeable. The principal differences between these standards relate to the application of allowances, the variation of tolerances with size, differences in the amounts of pitch diameter tolerances for external and internal threads, and differences in thread designations. Unified inch and ISO metric screw threads are not mechanically interchangeable.

1.5 Designations

Unified thread sizes (specific combinations of diameter and pitch) are identified by the letter combination "UN" in the thread symbol. In the unified standards, the pitch diameter tolerances for external threads differ from those for internal threads; for this reason the letter "A" is used in the thread symbol to denote an external thread and the letter "B," an internal thread. Where the letters "UN," "A," or "B" do not appear in the thread designation, the threads conform to the outdated American National screw threads. Details regarding thread designations are given in para. 6.

1.6 Reference Documents

The latest issues of the following documents form a part of this Standard to the extent specified herein.

When the following American National Standards referred to in this Standard are superseded by a revision approved by the American National Standards Institute, Inc., the revision should apply.

ASME B1.2, Gages and Gaging for Unified Inch Screw Threads

ASME B1.3, Screw Thread Gaging Systems for Dimensional Acceptability — Inch and Metric Screw Threads

ASME B1.7, Nomenclature, Definitions, and Letter Symbols for Screw Threads

ASME B1.30, Screw Threads — Standard Practices for Calculating and Rounding Dimensions

ASME B47.1, Gage Blanks

ASME B94.11, Twist Drills

ASME Y14.5, Dimensioning and Tolerancing

Publisher: The American Society of Mechanical Engineers (ASME International), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

ISO 68, General Purpose Screw Threads — Basic Profile

Publisher: International Organization for Standardization (ISO), 1 rue de Varembé, Case Postale 56, CH-1211, Genève 20, Switzerland/Suisse

1.7 Acceptability

Acceptability of product threads shall be in accordance with ASME B1.3. Gages and gaging shall be in accordance with ASME B1.2.

1.8 Reference Temperature

The reference temperature is 68°F for dimensions defined by this system.

1.9 Units of Measure

All dimensions in this Standard, including all tables, are in inches unless otherwise specified.

1.10 Federal Government Use

When this Standard is approved by the Department of Defense and federal agencies and is incorporated into FED-STD-H28/2, Screw-Thread Standards for Federal Services, para. 2, the use of this Standard by the federal government will be subject to all the requirements and limitations of FED-STD-H28/2.

2 SCREW THREAD PROFILE

2.1 Scope

The basic profile and design profiles are defined in this paragraph and are the basis of all thread dimensions given in this Standard.

2.2 Basic Profile

The basic profile for UN screw threads is identical to that for UNR screw threads and is shown in Fig. 1. Profile applies to an axial plane.

For reference, the basic profile for UN and UNR screw threads is identical to that for ISO metric screw threads shown in ISO 68.

2.3 Design Profiles

The design profiles define the maximum-material conditions for external and internal threads with no allowance and are derived from the basic profile. The design profiles of both external and internal screw threads vary from the basic profile.

2.3.1 Design Profiles of External Threads. The design profiles of external UN and UNR screw threads are included in Figs. 2 and 3. A flat root contour is specified for UN threads; however, it is permissible to provide for some threading tool crest wear. Therefore, a rounded root contour cleared beyond the 0.250P flat width of the basic profile is optional. The rounded root also reduces the rate of threading tool crest wear and improves fatigue strength over that of a flat root thread.

(a) The root contour of external UNR screw threads shown in Figs. 2 and 3 shall have a smooth, continuous, nonreversing contour with a radius of curvature not less than 0.10825318P at any point and shall blend tangentially into the flanks and any straight segment. At the maximum-material condition, the point of tangency shall be at a distance not less than 0.54126588P (0.625H) below the basic major diameter.

NOTE: The maximum full root radius is 0.14433757P, but this may be exceeded when the root contour consists of a combination of flats and radii.

(b) The design profiles of external UN and UNR screw threads have flat crests. However, in practice, product thread crests may be flat, or partially corner rounded. A rounded crest tangent at a 0.125P flat is shown as an option in Figs. 2 and 3.

2.3.2 Design Profile of Internal Threads. The design profile of the internal UN screw thread is included in Figs. 2 and 3 (there is no internal UNR screw thread). In practice, it is necessary to provide for some threading tool crest wear; therefore, the root of the design profile is rounded and cleared beyond the 0.125P flat width of the basic profile.

2.4 Formulas and Symbols

The formulas and symbols pertaining to the basic profile and the design profiles are given in para. 10.

3 SCREW THREAD SERIES

3.1 Thread Series Definition

Thread series are groups of diameter-pitch combinations distinguished from each other by the number of threads per inch applied to a series of specific diameters. There are two general series classifications: standard and special.

3.1.1 Standard Series. The standard series consists of three series with graded pitches (coarse, fine, and extra fine) and eight series with constant pitches (4, 6, 8, 12, 16, 20, 28, and 32 threads per inch). The standard series is shown in Table 1. Limits of size are shown in Table 2. See para. 8 for limits of size.

3.1.2 Special Series. The special series consists of all threads with diameter-pitch combinations that are not included in the standard series. When allowances and tolerances of special series threads are derived from unified formulation as shown in para. 5, the threads are designated UNS or UNRS. If allowance and tolerance are not derived from unified formulation, the threads are designated "SPL 60 degree Form." See para. 6 for details of designation.

3.2 Order of Selection

Wherever possible, selection should be made from Table 2, Standard Series — Unified Screw Threads, preference being given to the coarse- and fine-thread series. Second choice; if the threads in the standard series in Table 2 do not meet the requirements of the design,

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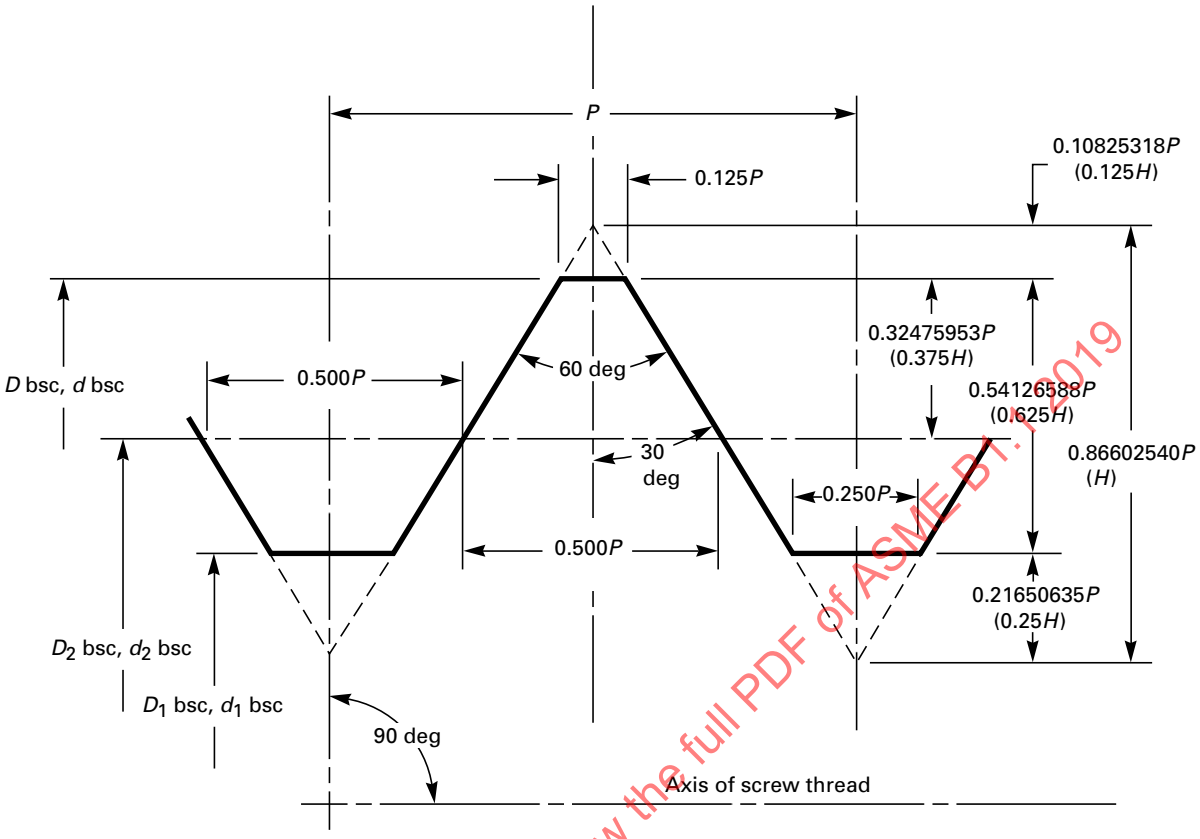

GENERAL NOTE: For standardization, values have been established based on a function of pitch, *P*. The thread values based on a function of height, *H*, are used for reference only.

Fig. 1 Basic Profile for UN and UNR Screw Threads

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special thread sizes should be selected from Table E-1 of Nonmandatory Appendix E and their limits calculated using the formulas in para. 8. The limits in Table D-1 of Nonmandatory Appendix D are for reference only and are not recommended for new applications.

3.3 Coarse-Thread Series Applications

The coarse-thread series (UNC/UNRC) is generally used for the bulk production of screws, bolts, and nuts. It is commonly used in relatively low-strength materials such as cast iron, aluminum, magnesium, brass, bronze, and plastic, because the coarse-thread series provide more resistance to internal thread stripping than the fine or extra-fine series. Coarse-thread series are advantageous where rapid assembly or disassembly is required, or if corrosion or damage from nicks due to handling or use is likely.

3.4 Fine-Thread Series Applications

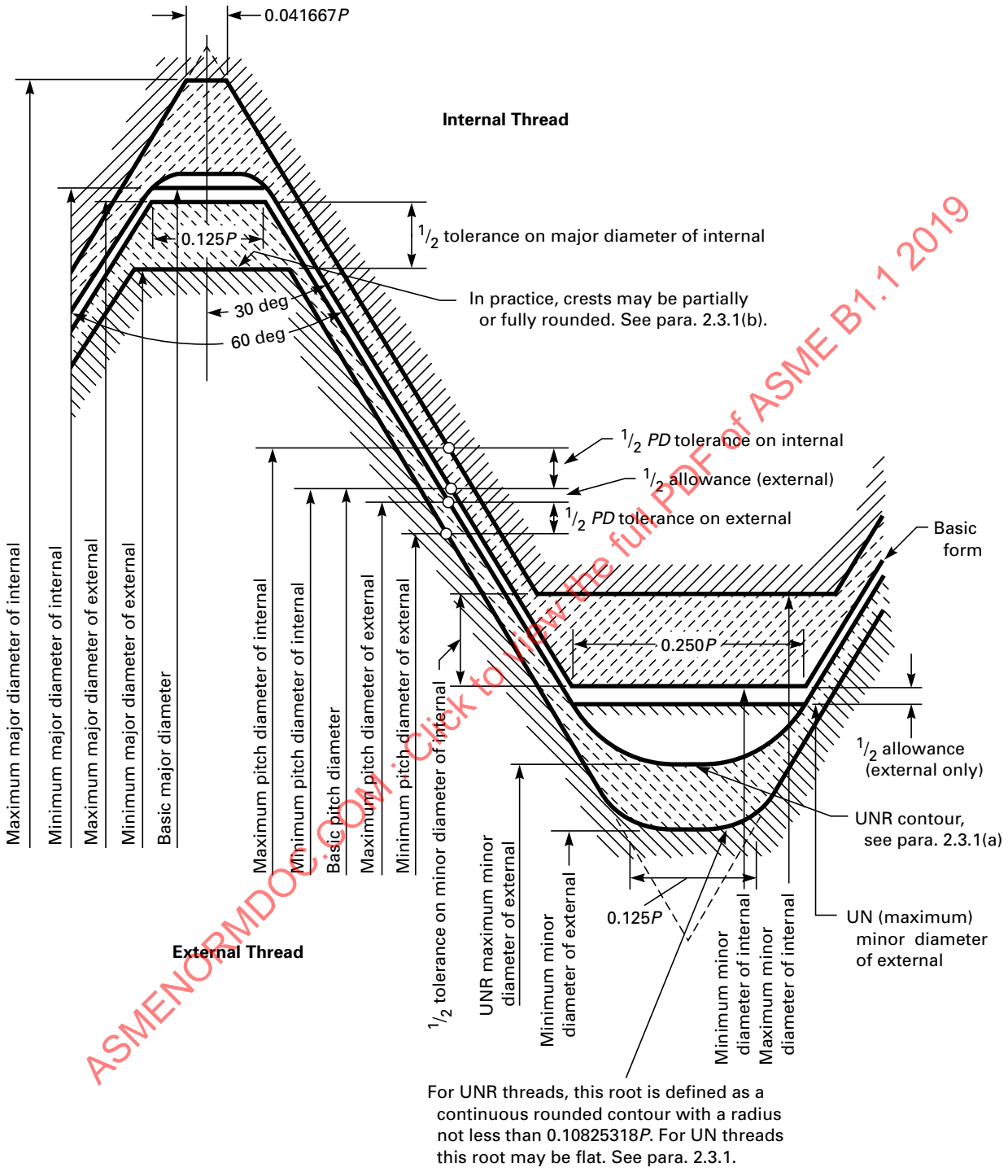
The fine-thread series (UNF/UNRF) is commonly used for bolts and nuts in high-strength applications. This series has less thread depth and a larger minor diameter than coarse-thread series. Consequently, thinner walls are permitted for internal threads and more strength is available to external threads than for coarse-thread series of the same nominal size. In order to prevent internal thread stripping, a longer length of engagement is required for fine-thread series than for coarse-thread series for thread materials of the same strength levels. However, for both fine- and coarse-thread series, length of engagement in tapped holes must be selected to meet strength requirements. This also allows for finer adjustment in cases such as a slotted nut and cotter pin assembly.

3.5 Extra-Fine-Thread Series Applications

The extra-fine-thread series (UNEF/UNREF) is used particularly for equipment and threaded parts that require fine adjustment, such as bearing retaining nuts, adjusting screws, etc., and for thin-wall tubing and thin nuts.

3.6 Constant-Pitch Thread Series Applications

The various constant-pitch series (UN/UNR) with 4, 6, 8, 12, 16, 20, 28, and 32 threads per inch, given in



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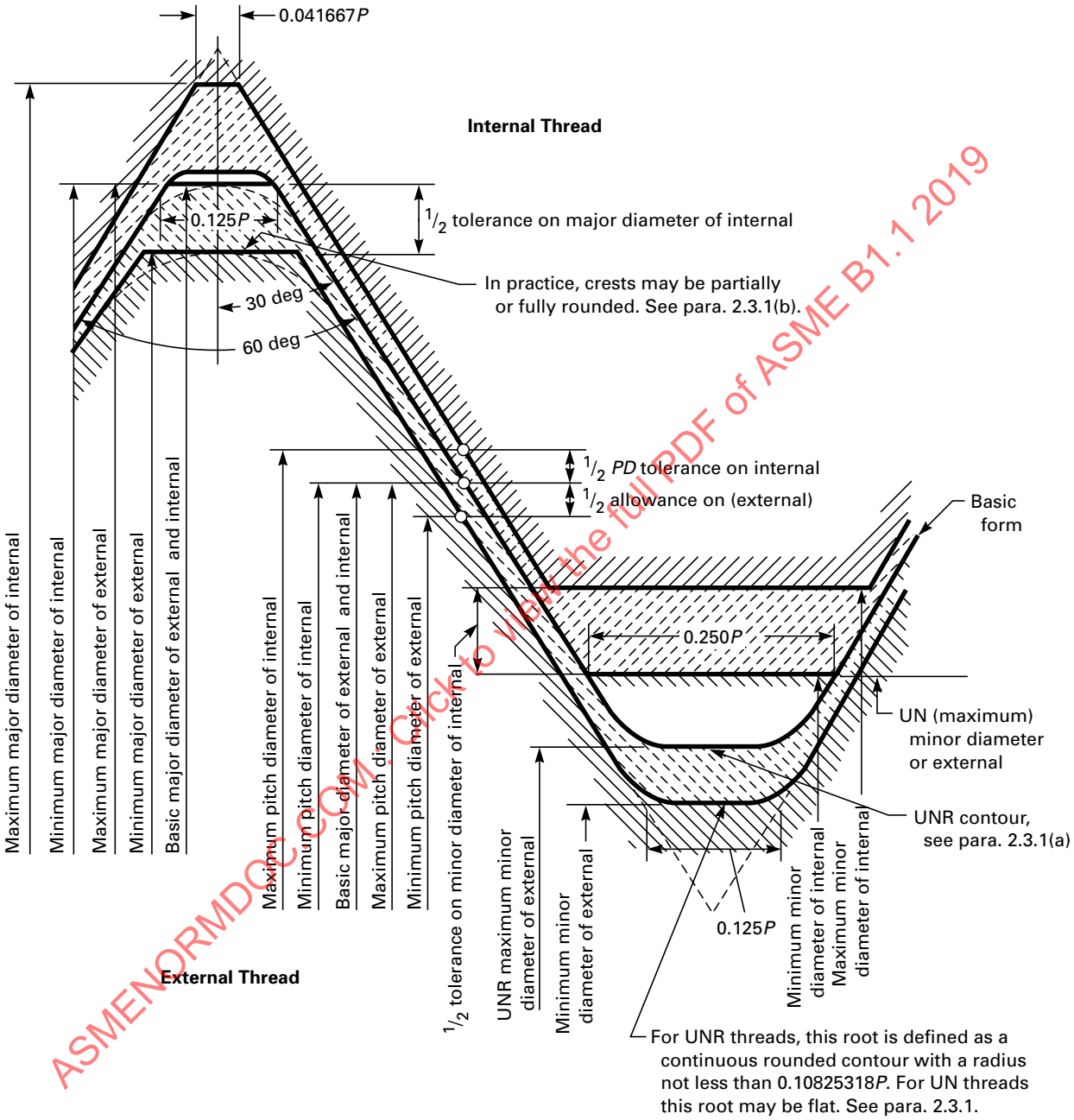
GENERAL NOTE: Lead and angle tolerances are defined in para. 9.

Fig. 2 Disposition of Diametral Tolerances, Allowance, and Crest Clearance for Unified Inch Screw Thread Classes 1A, 2A, 1B, and 2B



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GENERAL NOTE: Lead and angle tolerances are defined in para. 9.

Fig. 3 Disposition of Diametral Tolerances and Crest Clearances for Unified Inch Screw Thread Classes 3A and 3B

Table 1 Standard Series Threads (UN/UNR)

Nominal Size, in.		Basic Major Diameter	Threads/in.											Nominal Size, in.
			Series With Graded Pitches			Series With Constant Pitches								
Primary	Secondary		Course UNC	Fine UNF	Extra Fine UNEF	4-UN	6-UN	8-UN	12-UN	16-UN	20-UN	28-UN	32-UN	
0	...	0.0600	...	80	...	...	...	...	...	...	...	...	...	0
...	1	0.0730	64	72	...	...	...	...	...	...	...	...	...	1
2	...	0.0860	56	64	...	...	...	...	...	...	...	...	...	2
...	3	0.0990	48	56	...	...	...	...	...	...	...	...	...	3
4	...	0.1120	40	48	...	...	...	...	...	...	...	...	...	4
5	...	0.1250	40	44	...	...	...	...	...	...	...	...	...	5
6	...	0.1380	32	40	...	...	...	...	...	...	...	...	UNC	6
8	...	0.1640	32	36	...	...	...	...	...	...	...	...	UNC	8
10	...	0.1900	24	32	...	...	...	...	...	...	...	...	UNF	10
...	12	0.2160	24	28	32	...	...	...	...	...	...	UNF	UNEF	12
1/4	...	0.2500	20	28	32	...	...	...	...	...	UNC	UNF	UNEF	1/4
5/16	...	0.3125	18	24	32	...	...	...	...	...	20	28	UNEF	5/16
3/8	...	0.3750	16	24	32	...	...	...	...	UNC	20	28	UNEF	3/8
7/16	...	0.4375	14	20	28	...	...	...	...	16	UNF	UNEF	32	7/16
1/2	...	0.5000	13	20	28	...	...	...	...	16	UNF	UNEF	32	1/2
9/16	...	0.5625	12	18	24	...	...	...	UNC	16	20	28	32	9/16
5/8	...	0.6250	11	18	24	...	...	...	12	16	20	28	32	5/8
...	11/16	0.6875	...	...	24	...	...	...	12	16	20	28	32	11/16
3/4	...	0.7500	10	16	20	...	...	...	12	UNF	UNEF	28	32	3/4
...	13/16	0.8125	...	...	20	...	...	...	12	16	UNEF	28	32	13/16
7/8	...	0.8750	9	14	20	...	...	...	12	16	UNEF	28	32	7/8
...	15/16	0.9375	...	...	20	...	...	...	12	16	UNEF	28	32	15/16
1	...	1.0000	8	12	20	...	...	UNC	UNF	16	UNEF	28	32	1
...	1 1/16	1.0625	...	...	18	...	...	8	12	16	20	28	...	1 1/16
1 1/8	...	1.1250	7	12	18	...	...	8	UNF	16	20	28	...	1 1/8
...	1 3/16	1.1875	...	...	18	...	...	8	12	16	20	28	...	1 3/16
1 1/4	...	1.2500	7	12	18	...	...	8	UNF	16	20	28	...	1 1/4
...	1 5/16	1.3125	...	...	18	...	...	8	12	16	20	28	...	1 5/16
1 3/8	...	1.3750	6	12	18	...	UNC	8	UNF	16	20	28	...	1 3/8
...	1 7/16	1.4375	...	...	18	...	6	8	12	16	20	28	...	1 7/16
1 1/2	...	1.5000	6	12	18	...	UNC	8	UNF	16	20	28	..	1 1/2
...	1 9/16	1.5625	...	...	18	...	6	8	12	16	20	...	...	1 9/16
1 5/8	...	1.6250	...	...	18	...	6	8	12	16	20	...	...	1 5/8
...	1 11/16	1.6875	...	...	18	...	6	8	12	16	20	...	...	1 11/16
1 3/4	...	1.7500	5	...	...	...	6	8	12	16	20	...	...	1 3/4
...	1 13/16	1.8125	...	...	...	...	6	8	12	16	20	...	...	1 13/16
1 7/8	...	1.8750	...	...	...	...	6	8	12	16	20	...	...	1 7/8
...	1 15/16	1.9375	...	...	...	...	6	8	12	16	20	...	...	1 15/16
2	...	2.0000	4 1/2	...	...	...	6	8	12	16	20	...	...	2
...	2 1/8	2.1250	...	...	...	...	6	8	12	16	20	...	...	2 1/8
2 1/4	...	2.2500	4 1/2	...	...	...	6	8	12	16	20	...	...	2 1/4
...	2 3/8	2.3750	...	...	...	...	6	8	12	16	20	...	...	2 3/8
2 1/2	...	2.5000	4	...	...	UNC	6	8	12	16	20	...	...	2 1/2
...	2 5/8	2.6250	...	...	...	4	6	8	12	16	20	...	...	2 5/8
2 3/4	...	2.7500	4	...	...	UNC	6	8	12	16	20	...	...	2 3/4
...	2 7/8	2.8750	...	...	...	4	6	8	12	16	20	...	...	2 7/8

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Table 1 Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size, in.		Basic Major Diameter	Threads/in.											Nominal Size, in.
			Series With Graded Pitches			Series With Constant Pitches								
Primary	Secondary		Course UNC	Fine UNF	Extra Fine UNEF	4-UN	6-UN	8-UN	12-UN	16-UN	20-UN	28-UN	32-UN	
3	...	3.0000	4	...	...	UNC	6	8	12	16	20	...	...	3
...	3 1/8	3.1250	...	...	...	4	6	8	12	16	...	...	...	3 1/8
3 1/4	...	3.2500	4	...	...	UNC	6	8	12	16	...	...	...	3 1/4
...	3 3/8	3.3750	...	...	...	4	6	8	12	16	...	...	...	3 3/8
3 1/2	...	3.5000	4	...	...	UNC	6	8	12	16	...	...	...	3 1/2
...	3 5/8	3.6250	...	...	...	4	6	8	12	16	...	...	...	3 5/8
3 3/4	...	3.7500	4	...	...	UNC	6	8	12	16	...	...	...	3 3/4
...	3 7/8	3.8750	...	...	...	4	6	8	12	16	...	...	...	3 7/8
4	...	4.0000	4	...	...	UNC	6	8	12	16	...	...	...	4
...	4 1/8	4.1250	...	...	...	4	6	8	12	16	...	...	...	4 1/8
4 1/4	...	4.2500	...	...	...	4	6	8	12	16	...	...	...	4 1/4
...	4 3/8	4.3750	...	...	...	4	6	8	12	16	...	...	...	4 3/8
4 1/2	...	4.5000	...	...	...	4	6	8	12	16	...	...	...	4 1/2
...	4 5/8	4.6250	...	...	...	4	6	8	12	16	..	...	...	4 5/8
4 3/4	...	4.7500	...	...	...	4	6	8	12	16	...	...	...	4 3/4
...	4 7/8	4.8750	...	...	...	4	6	8	12	16	...	...	...	4 7/8
5	...	5.0000	...	...	...	4	6	8	12	16	...	...	...	5
...	5 1/8	5.1250	...	...	...	4	6	8	12	16	...	...	...	5 1/8
5 1/4	...	5.2500	...	...	...	4	6	8	12	16	...	...	...	5 1/4
...	5 3/8	5.3750	...	...	...	4	6	8	12	16	...	...	...	5 3/8
5 1/2	...	5.5000	...	...	...	4	6	8	12	16	...	...	...	5 1/2
...	5 5/8	5.6250	...	...	...	4	6	8	12	16	...	...	...	5 5/8
5 3/4	...	5.7500	...	...	...	4	6	8	12	16	...	...	...	5 3/4
...	5 7/8	5.8750	...	...	...	4	6	8	12	16	...	...	...	5 7/8
6	...	6.0000	...	...	...	4	6	8	12	16	...	...	...	6

GENERAL NOTE: Series designation shown indicates the UN thread form; however, the UNR thread form may be specified by substituting UNR in place of UN in all designations for external use only.

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Table 1, offer a comprehensive range of diameter-pitch combinations for those purposes where the threads in the coarse-, fine-, and extra-fine-thread series do not meet the particular requirements of the design. The primary sizes of the 8-UN, 12-UN, and 16-UN series shown in Table 1 are the most commonly used.

Whenever a thread in a constant-pitch series also appears in the UNC, UNF, or UNEF series, the symbols and tolerances for limits of size of those standard series are applicable.

3.6.1 8-Thread Series. The 8-thread series (8-UN) is a uniform-pitch series for large diameters or as a compromise between coarse and fine thread series. Although originally intended for high-pressure-joint bolts and nuts, it is now widely used as a substitute for the coarse thread series for diameters larger than 1 in.

3.6.2 12-Thread Series. The 12-thread series (12-UN) is a uniform-pitch series for large diameters requiring threads of medium-fine pitch. Although originally intended for boiler practice, it is now used as a continuation of the fine thread series for diameters larger than 1 1/2 in.

3.6.3 16-Thread Series. The 16-thread series (16-UN) is a uniform-pitch series for large diameters requiring fine-pitch threads. It is suitable for adjusting collars and retaining nuts and also serves as a continuation of the extra-fine thread series for diameters larger than $1\frac{11}{16}$ in.

3.7 Fine Threads for Thin-Wall Tubing

The limits of size for a 28-thread series, ranging from 0.216 in. to 1.5 in. nominal size, are included in Table 2. These threads are recommended for general use on thin-wall tubing. The 27-thread series is no longer standard but is included in Table D-1 of Nonmandatory Appendix D.

Table 2 Limits of Size for Standard Series Threads (UN/UNR)

Nominal Size and Threads/in.	Series Designation	External [Note (1)]									Internal [Note (1)]						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (4)]			UNR Minor Diameter, Max. [Note (6)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (4)]			Major Diameter, Min.
		Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance [Note (5)]		Class	Min.	Max.	Min.	Max.	Tolerance	
0–80 or 0.060–80	UNF	2A	0.0005	0.0595	0.0563	...	0.0514	0.0496	0.001762	0.0446	2B	0.0465	0.0514	0.0519	0.0542	0.0023	0.0600
		3A	0.0000	0.0600	0.0568	...	0.0519	0.0506	0.001300	0.0451	3B	0.0465	0.0514	0.0519	0.0536	0.0017	0.0600
(7) 1–64 or 0.073–64	UNC	2A	0.0006	0.0724	0.0686	...	0.0623	0.0603	0.001970	0.0538	2B	0.0561	0.0622	0.0629	0.0655	0.0026	0.0730
(7)		3A	0.0000	0.0730	0.0692	...	0.0629	0.0614	0.001500	0.0544	3B	0.0561	0.0622	0.0629	0.0648	0.0019	0.0730
(7) 1–72 or 0.073–72	UNF	2A	0.0006	0.0724	0.0689	...	0.0634	0.0615	0.001899	0.0559	2B	0.058	0.0634	0.0640	0.0665	0.0025	0.0730
(7)		3A	0.0000	0.0730	0.0695	...	0.0640	0.0626	0.001400	0.0565	3B	0.0580	0.0634	0.0640	0.0659	0.0019	0.0730
2–56 or 0.086–56	UNC	2A	0.0006	0.0854	0.0813	...	0.0738	0.0717	0.002127	0.0641	2B	0.0667	0.0737	0.0744	0.0772	0.0028	0.0860
		3A	0.0000	0.0860	0.0819	...	0.0744	0.0728	0.001600	0.0647	3B	0.0667	0.0737	0.0744	0.0765	0.0021	0.0860
(7) 2–64 or 0.086–64	UNF	2A	0.0006	0.0854	0.0816	...	0.0753	0.0733	0.002040	0.0668	2B	0.0691	0.0752	0.0759	0.0786	0.0027	0.0860
(7)		3A	0.0000	0.0860	0.0822	...	0.0759	0.0744	0.001500	0.0674	3B	0.0691	0.0752	0.0759	0.0779	0.0020	0.0860
3–48 or 0.099–48	UNC	2A	0.0007	0.0983	0.0938	...	0.0848	0.0825	0.002302	0.0735	2B	0.0764	0.0845	0.0855	0.0885	0.0030	0.0990
		3A	0.0000	0.0990	0.0945	...	0.0855	0.0838	0.001700	0.0742	3B	0.0764	0.0845	0.0855	0.0877	0.0022	0.0990
3–56 or 0.099–56	UNF	2A	0.0007	0.0983	0.0942	...	0.0867	0.0845	0.002191	0.0770	2B	0.0797	0.0865	0.0874	0.0902	0.0028	0.0990
		3A	0.0000	0.0990	0.0949	...	0.0874	0.0858	0.001600	0.0777	3B	0.0797	0.0865	0.0874	0.0895	0.0021	0.0990
4–40 or 0.112–40	UNC	2A	0.0008	0.1112	0.1061	...	0.0950	0.0925	0.002507	0.0814	2B	0.0849	0.0939	0.0958	0.0991	0.0033	0.1120
		3A	0.0000	0.1120	0.1069	...	0.0958	0.0939	0.001900	0.0822	3B	0.0849	0.0939	0.0958	0.0982	0.0024	0.1120
4–48 or 0.112–48	UNF	2A	0.0007	0.1113	0.1068	...	0.0978	0.0954	0.002361	0.0865	2B	0.0894	0.0968	0.0985	0.1016	0.0031	0.1120
		3A	0.0000	0.1120	0.1075	...	0.0985	0.0967	0.001800	0.0872	3B	0.0894	0.0968	0.0985	0.1008	0.0023	0.1120
5–40 or 0.125–40	UNC	2A	0.0008	0.1242	0.1191	...	0.1080	0.1054	0.002562	0.0944	2B	0.0979	0.1062	0.1088	0.1121	0.0033	0.1250
		3A	0.0000	0.1250	0.1199	...	0.1088	0.1069	0.001900	0.0952	3B	0.0979	0.1062	0.1088	0.1113	0.0025	0.1250
5–44 or 0.125–44	UNF	2A	0.0007	0.1243	0.1195	...	0.1095	0.1070	0.002484	0.0972	2B	0.1004	0.1079	0.1102	0.1134	0.0032	0.1250
		3A	0.0000	0.1250	0.1202	...	0.1102	0.1083	0.001900	0.0979	3B	0.1004	0.1079	0.1102	0.1126	0.0024	0.1250
6–32 or 0.138–32	UNC	2A	0.0008	0.1372	0.1312	...	0.1169	0.1141	0.002820	0.1000	2B	0.104	0.114	0.1177	0.1214	0.0037	0.1380
(7)		3A	0.0000	0.1380	0.1320	...	0.1177	0.1156	0.002100	0.1008	3B	0.1040	0.1139	0.1177	0.1204	0.0027	0.1380
6–40 or 0.138–40	UNF	2A	0.0008	0.1372	0.1321	...	0.1210	0.1184	0.002614	0.1074	2B	0.111	0.119	0.1218	0.1252	0.0034	0.1380
		3A	0.0000	0.1380	0.1329	...	0.1218	0.1198	0.002000	0.1082	3B	0.1110	0.1186	0.1218	0.1243	0.0025	0.1380

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
8 – 32 or 0.164 – 32	UNC	2A	0.0009	0.1631	0.1571	...	0.1428	0.1399	0.002916	0.1259	2B	0.130	0.139	0.1437	0.1475	0.0038	0.1640
(7)		3A	0.0000	0.1640	0.1580	...	0.1437	0.1415	0.002200	0.1268	3B	0.1300	0.1388	0.1437	0.1465	0.0028	0.1640
8 – 36 or 0.164 – 36	UNF	2A	0.0008	0.1632	0.1577	...	0.1452	0.1424	0.002804	0.1301	2B	0.134	0.142	0.1460	0.1496	0.0036	0.1640
		3A	0.0000	0.1640	0.1585	...	0.1460	0.1439	0.002100	0.1309	3B	0.1340	0.1416	0.1460	0.1487	0.0027	0.1640
(7) 10 – 24 or 0.190 – 24	UNC	2A	0.0010	0.1890	0.1818	...	0.1619	0.1586	0.003319	0.1394	2B	0.145	0.155	0.1629	0.1672	0.0043	0.1900
		3A	0.0000	0.1900	0.1828	...	0.1629	0.1604	0.002500	0.1404	3B	0.1450	0.1555	0.1629	0.1661	0.0032	0.1900
10 – 32 or 0.190 – 32	UNF	2A	0.0009	0.1891	0.1831	...	0.1688	0.1658	0.003004	0.1519	2B	0.156	0.164	0.1697	0.1736	0.0039	0.1900
		3A	0.0000	0.1900	0.1840	...	0.1697	0.1674	0.002300	0.1528	3B	0.1560	0.1641	0.1697	0.1726	0.0029	0.1900
12 – 24 or 0.216 – 24	UNC	2A	0.0010	0.2150	0.2078	...	0.1879	0.1845	0.003400	0.1654	2B	0.171	0.181	0.1889	0.1933	0.0044	0.2160
		3A	0.0000	0.2160	0.2088	...	0.1889	0.1863	0.002600	0.1664	3B	0.1710	0.1807	0.1889	0.1922	0.0033	0.2160
12 – 28 or 0.216 – 28	UNF	2A	0.0010	0.2150	0.2085	...	0.1918	0.1886	0.003224	0.1725	2B	0.177	0.186	0.1928	0.1970	0.0042	0.2160
		3A	0.0000	0.2160	0.2095	...	0.1928	0.1904	0.002400	0.1735	3B	0.1770	0.1857	0.1928	0.1959	0.0031	0.2160
(7) 12 – 32 or 0.216 – 32	UNEF	2A	0.0010	0.2150	0.2090	...	0.1947	0.1915	0.003184	0.1778	2B	0.182	0.190	0.1957	0.1998	0.0041	0.2160
		3A	0.0000	0.2160	0.2100	...	0.1957	0.1933	0.002400	0.1788	3B	0.1820	0.1895	0.1957	0.1988	0.0031	0.2160
1/4 – 20 or 0.2500 – 20	UNC	1A	0.0011	0.2489	0.2367	...	0.2164	0.2108	0.005600	0.1894	1B	0.196	0.207	0.2175	0.2248	0.0073	0.2500
		2A	0.0011	0.2489	0.2408	0.2367	0.2164	0.2127	0.003731	0.1894	2B	0.196	0.207	0.2175	0.2224	0.0049	0.2500
		3A	0.0000	0.2500	0.2419	...	0.2175	0.2147	0.002800	0.1905	3B	0.1960	0.2067	0.2175	0.2211	0.0036	0.2500
1/4 – 28 or 0.2500 – 28	UNF	1A	0.0010	0.2490	0.2392	...	0.2258	0.2208	0.005000	0.2065	1B	0.211	0.22	0.2268	0.2333	0.0065	0.2500
		2A	0.0010	0.2490	0.2425	...	0.2258	0.2225	0.003322	0.2065	2B	0.211	0.220	0.2268	0.2311	0.0043	0.2500
		3A	0.0000	0.2500	0.2435	...	0.2268	0.2243	0.002500	0.2075	3B	0.2110	0.2190	0.2268	0.2300	0.0032	0.2500
1/4 – 32 or 0.2500 – 32	UNEF	2A	0.0010	0.2490	0.2430	...	0.2287	0.2255	0.003229	0.2118	2B	0.216	0.224	0.2297	0.2339	0.0042	0.2500
		3A	0.0000	0.2500	0.2440	...	0.2297	0.2273	0.002400	0.2128	3B	0.2160	0.2229	0.2297	0.2328	0.0031	0.2500
5/16 – 18 or 0.3125 – 18	UNC	1A	0.0012	0.3113	0.2982	...	0.2752	0.2691	0.006100	0.2451	1B	0.252	0.265	0.2764	0.2843	0.0079	0.3125
		2A	0.0012	0.3113	0.3026	0.2982	0.2752	0.2712	0.004041	0.2451	2B	0.252	0.265	0.2764	0.2817	0.0053	0.3125
		3A	0.0000	0.3125	0.3038	...	0.2764	0.2734	0.003000	0.2463	3B	0.2520	0.2630	0.2764	0.2803	0.0039	0.3125
(7) 5/16 – 20 or 0.3125 – 20	UN	2A	0.0012	0.3113	0.3032	...	0.2788	0.2747	0.004060	0.2518	2B	0.258	0.270	0.2800	0.2853	0.0053	0.3125
(7)		3A	0.0000	0.3125	0.3044	...	0.2800	0.2770	0.003000	0.2530	3B	0.2580	0.2680	0.2800	0.2840	0.0040	0.3125

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)]									Internal [Note (1)]						
				Major Diameter			Pitch Diameter and Functional Diameter [Note (4)]			UNR Minor Diameter, Max. [Note (6)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Note (4)]			Major Diameter, Min.
		Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance [Note (5)]		Class	Min.	Max.	Min.	Max.	Tolerance	
5/16 – 24 or 0.3125 – 24	UNF	1A	0.0011	0.3114	0.3006	...	0.2843	0.2788	0.005500	0.2618	1B	0.267	0.277	0.2854	0.2925	0.0071	0.3125
		2A	0.0011	0.3114	0.3042	...	0.2843	0.2806	0.003660	0.2618	2B	0.267	0.277	0.2854	0.2902	0.0048	0.3125
		3A	0.0000	0.3125	0.3053	...	0.2854	0.2827	0.002700	0.2629	3B	0.2670	0.2754	0.2854	0.2890	0.0036	0.3125
(7) 5/16 – 28 or 0.3125 – 28	UN	2A	0.0010	0.3115	0.3050	...	0.2883	0.2848	0.003495	0.2690	2B	0.274	0.282	0.2893	0.2938	0.0045	0.3125
(7)		3A	0.0000	0.3125	0.3060	...	0.2893	0.2867	0.002600	0.2700	3B	0.2740	0.2807	0.2893	0.2927	0.0034	0.3125
(7) 5/16 – 32 or 0.3125 – 32	UNEF	2A	0.0010	0.3115	0.3055	...	0.2912	0.2879	0.003302	0.2743	2B	0.279	0.286	0.2922	0.2965	0.0043	0.3125
(7)		3A	0.0000	0.3125	0.3065	...	0.2922	0.2897	0.002500	0.2753	3B	0.2790	0.2846	0.2922	0.2954	0.0032	0.3125
3/8 – 16 or 0.3750 – 16	UNC	1A	0.0013	0.3737	0.3595	...	0.3331	0.3266	0.006500	0.2993	1B	0.307	0.321	0.3344	0.3429	0.0085	0.3750
		2A	0.0013	0.3737	0.3643	0.3595	0.3331	0.3287	0.004363	0.2993	2B	0.307	0.321	0.3344	0.3401	0.0057	0.3750
		3A	0.0000	0.3750	0.3656	...	0.3344	0.3311	0.003300	0.3006	3B	0.3070	0.3182	0.3344	0.3387	0.0043	0.3750
3/8 – 20 or 0.3750 – 20	UN	2A	0.0012	0.3738	0.3657	...	0.3413	0.3372	0.004124	0.3143	2B	0.321	0.332	0.3425	0.3479	0.0054	0.3750
		3A	0.0000	0.3750	0.3669	...	0.3425	0.3394	0.003100	0.3155	3B	0.3210	0.3297	0.3425	0.3465	0.0040	0.3750
3/8 – 24 or 0.3750 – 24	UNF	1A	0.0011	0.3739	0.3631	...	0.3468	0.3411	0.005700	0.3243	1B	0.33	0.34	0.3479	0.3553	0.0074	0.3750
		2A	0.0011	0.3739	0.3667	...	0.3468	0.3430	0.003804	0.3243	2B	0.330	0.340	0.3479	0.3528	0.0049	0.3750
		3A	0.0000	0.3750	0.3678	...	0.3479	0.3450	0.002900	0.3254	3B	0.3300	0.3372	0.3479	0.3516	0.0037	0.3750
3/8 – 28 or 0.3750 – 28	UN	2A	0.0011	0.3739	0.3674	...	0.3507	0.3471	0.003559	0.3314	2B	0.336	0.345	0.3518	0.3564	0.0046	0.3750
		3A	0.0000	0.3750	0.3685	...	0.3518	0.3491	0.002700	0.3325	3B	0.3360	0.3426	0.3518	0.3553	0.0035	0.3750
3/8 – 32 or 0.3750 – 32	UNEF	2A	0.0010	0.3740	0.3680	...	0.3537	0.3503	0.003366	0.3368	2B	0.341	0.349	0.3547	0.3591	0.0044	0.3750
		3A	0.0000	0.3750	0.3690	...	0.3547	0.3522	0.002500	0.3378	3B	0.3410	0.3469	0.3547	0.3580	0.0033	0.3750
7/16 – 14 or 0.4375 – 14	UNC	1A	0.0014	0.4361	0.4206	...	0.3897	0.3826	0.007100	0.3510	1B	0.36	0.376	0.3911	0.4003	0.0092	0.4375
		2A	0.0014	0.4361	0.4258	0.4206	0.3897	0.3850	0.004713	0.3510	2B	0.360	0.376	0.3911	0.3972	0.0061	0.4375
		3A	0.0000	0.4375	0.4272	...	0.3911	0.3876	0.003500	0.3524	3B	0.3600	0.3717	0.3911	0.3957	0.0046	0.4375
(7) 7/16 – 16 or 0.4375 – 16	UN	2A	0.0014	0.4361	0.4267	...	0.3955	0.3909	0.004626	0.3617	2B	0.370	0.384	0.3969	0.4029	0.0060	0.4375
(7)		3A	0.0000	0.4375	0.4281	...	0.3969	0.3934	0.003500	0.3631	3B	0.3700	0.3800	0.3969	0.4014	0.0045	0.4375
(7) 7/16 – 20 or 0.4375 – 20	UNF	1A	0.0013	0.4362	0.4240	...	0.4037	0.3974	0.006300	0.3767	1B	0.383	0.395	0.4050	0.4131	0.0081	0.4375
		2A	0.0013	0.4362	0.4281	...	0.4037	0.3995	0.004167	0.3767	2B	0.383	0.395	0.4050	0.4104	0.0054	0.4375
		3A	0.0000	0.4375	0.4294	...	0.4050	0.4019	0.003100	0.3780	3B	0.3830	0.3916	0.4050	0.4091	0.0041	0.4375

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
(7) 7/16 – 28 or 0.4375 – 28	UNEF	2A	0.0011	0.4364	0.4299	...	0.4132	0.4096	0.003616	0.3939	2B	0.399	0.407	0.4143	0.4190	0.0047	0.4375
		3A	0.0000	0.4375	0.4310	...	0.4143	0.4116	0.002700	0.3950	3B	0.3990	0.4051	0.4143	0.4178	0.0035	0.4375
(7) 7/16 – 32 or 0.4375 – 32	UN	2A	0.0010	0.4365	0.4305	...	0.4162	0.4128	0.003423	0.3993	2B	0.404	0.411	0.4172	0.4216	0.0044	0.4375
		3A	0.0000	0.4375	0.4315	...	0.4172	0.4146	0.002600	0.4003	3B	0.4040	0.4094	0.4172	0.4205	0.0033	0.4375
1/2 – 13 or 0.5000 – 13	UNC	1A	0.0015	0.4985	0.4822	...	0.4485	0.4411	0.007400	0.4069	1B	0.417	0.434	0.4500	0.4597	0.0097	0.5000
		2A	0.0015	0.4985	0.4876	0.4822	0.4485	0.4435	0.004965	0.4069	2B	0.417	0.434	0.4500	0.4565	0.0065	0.5000
		3A	0.0000	0.5000	0.4891	...	0.4500	0.4463	0.003700	0.4084	3B	0.4170	0.4284	0.4500	0.4548	0.0048	0.5000
1/2 – 16 or 0.5000 – 16	UN	2A	0.0014	0.4986	0.4892	...	0.4580	0.4533	0.004678	0.4242	2B	0.432	0.446	0.4594	0.4655	0.0061	0.5000
(7)		3A	0.0000	0.5000	0.4906	...	0.4594	0.4559	0.003500	0.4256	3B	0.4320	0.4420	0.4594	0.4640	0.0046	0.5000
1/2 – 20 or 0.5000 – 20	UNF	1A	0.0013	0.4987	0.4865	...	0.4662	0.4598	0.006400	0.4392	1B	0.446	0.457	0.4675	0.4759	0.0084	0.5000
		2A	0.0013	0.4987	0.4906	...	0.4662	0.4619	0.004288	0.4392	2B	0.446	0.457	0.4675	0.4731	0.0056	0.5000
		3A	0.0000	0.5000	0.4919	...	0.4675	0.4643	0.003200	0.4405	3B	0.4460	0.4537	0.4675	0.4717	0.0042	0.5000
1/2 – 28 or 0.5000 – 28	UNEF	2A	0.0011	0.4989	0.4924	...	0.4757	0.4720	0.003668	0.4564	2B	0.461	0.470	0.4768	0.4816	0.0048	0.5000
		3A	0.0000	0.5000	0.4935	...	0.4768	0.4740	0.002800	0.4575	3B	0.4610	0.4676	0.4768	0.4804	0.0036	0.5000
1/2 – 32 or 0.5000 – 32	UN	2A	0.0010	0.4990	0.4930	...	0.4787	0.4752	0.003475	0.4618	2B	0.466	0.474	0.4797	0.4842	0.0045	0.5000
		3A	0.0000	0.5000	0.4940	...	0.4797	0.4771	0.002600	0.4628	3B	0.4660	0.4719	0.4797	0.4831	0.0034	0.5000
9/16 – 12 or 0.5625 – 12	UNC	1A	0.0016	0.5609	0.5437	...	0.5068	0.4990	0.007800	0.4617	1B	0.472	0.49	0.5084	0.5186	0.0102	0.5625
		2A	0.0016	0.5609	0.5495	0.5437	0.5068	0.5016	0.005225	0.4617	2B	0.472	0.490	0.5084	0.5152	0.0068	0.5625
		3A	0.0000	0.5625	0.5511	...	0.5084	0.5045	0.003900	0.4633	3B	0.4720	0.4843	0.5084	0.5135	0.0051	0.5625
9/16 – 16 or 0.5625 – 16	UN	2A	0.0014	0.5611	0.5517	...	0.5205	0.5158	0.004725	0.4867	2B	0.495	0.509	0.5219	0.5280	0.0061	0.5625
(7)		3A	0.0000	0.5625	0.5531	...	0.5219	0.5184	0.003500	0.4881	3B	0.4950	0.5041	0.5219	0.5265	0.0046	0.5625
9/16 – 18 or 0.5625 – 18	UNF	1A	0.0014	0.5611	0.5480	...	0.5250	0.5182	0.006800	0.4949	1B	0.502	0.515	0.5264	0.5353	0.0089	0.5625
		2A	0.0014	0.5611	0.5524	...	0.5250	0.5205	0.004547	0.4949	2B	0.502	0.515	0.5264	0.5323	0.0059	0.5625
		3A	0.0000	0.5625	0.5538	...	0.5264	0.5230	0.003400	0.4963	3B	0.5020	0.5106	0.5264	0.5308	0.0044	0.5625
(7) 9/16 – 20 or 0.5625 – 20	UN	2A	0.0013	0.5612	0.5531	...	0.5287	0.5244	0.004280	0.5017	2B	0.508	0.520	0.5300	0.5356	0.0056	0.5625
(7)		3A	0.0000	0.5625	0.5544	...	0.5300	0.5268	0.003200	0.5030	3B	0.5080	0.5161	0.5300	0.5342	0.0042	0.5625
(7) 9/16 – 24 or 0.5625 – 24	UNEF	2A	0.0012	0.5613	0.5541	...	0.5342	0.5302	0.003960	0.5117	2B	0.517	0.527	0.5354	0.5405	0.0051	0.5625
(7)		3A	0.0000	0.5625	0.5553	...	0.5354	0.5324	0.003000	0.5129	3B	0.5170	0.5244	0.5354	0.5393	0.0039	0.5625

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Tolerance	Major Diameter, Min.
9/16 – 28 or 0.5625 – 28	UN	2A	0.0011	0.5614	0.5549	...	0.5382	0.5345	0.003715	0.5189	2B	0.524	0.532	0.5393	0.5441	0.0048	0.5625
		3A	0.0000	0.5625	0.5560	...	0.5393	0.5365	0.002800	0.5200	3B	0.5240	0.5301	0.5393	0.5429	0.0036	0.5625
(7) 9/16 – 32 or 0.5625 – 32	UN	2A	0.0011	0.5614	0.5554	...	0.5411	0.5376	0.003522	0.5242	2B	0.529	0.536	0.5422	0.5468	0.0046	0.5625
		3A	0.0000	0.5625	0.5565	...	0.5422	0.5396	0.002600	0.5253	3B	0.5290	0.5344	0.5422	0.5456	0.0034	0.5625
(7) 5/8 – 11 or 0.6250 – 11	UNC	1A	0.0017	0.6233	0.6051	...	0.5643	0.5560	0.008300	0.5150	1B	0.527	0.546	0.5660	0.5767	0.0107	0.6250
(7)		2A	0.0017	0.6233	0.6112	0.6052	0.5643	0.5588	0.005501	0.5150	2B	0.527	0.546	0.5660	0.5732	0.0072	0.6250
		3A	0.0000	0.6250	0.6129	...	0.5660	0.5619	0.004100	0.5167	3B	0.5270	0.5391	0.5660	0.5714	0.0054	0.6250
5/8 – 12 or 0.6250 – 12	UN	2A	0.0016	0.6234	0.6120	...	0.5693	0.5639	0.005443	0.5242	2B	0.535	0.553	0.5709	0.5780	0.0071	0.6250
		3A	0.0000	0.6250	0.6136	...	0.5709	0.5668	0.004100	0.5258	3B	0.5350	0.5463	0.5709	0.5762	0.0053	0.6250
5/8 – 16 or 0.6250 – 16	UN	2A	0.0014	0.6236	0.6142	...	0.5830	0.5782	0.004769	0.5492	2B	0.557	0.571	0.5844	0.5906	0.0062	0.6250
		3A	0.0000	0.6250	0.6156	...	0.5844	0.5808	0.003600	0.5506	3B	0.5570	0.5662	0.5844	0.5890	0.0046	0.6250
5/8 – 18 or 0.6250 – 18	UNF	1A	0.0014	0.6236	0.6105	...	0.5875	0.5805	0.007000	0.5574	1B	0.565	0.578	0.5889	0.5980	0.0091	0.6250
		2A	0.0014	0.6236	0.6149	...	0.5875	0.5828	0.004652	0.5574	2B	0.565	0.578	0.5889	0.5949	0.0060	0.6250
		3A	0.0000	0.6250	0.6163	...	0.5889	0.5854	0.003500	0.5588	3B	0.5650	0.5730	0.5889	0.5934	0.0045	0.6250
5/8 – 20 or 0.6250 – 20	UN	2A	0.0013	0.6237	0.6156	...	0.5912	0.5869	0.004324	0.5642	2B	0.571	0.582	0.5925	0.5981	0.0056	0.6250
		3A	0.0000	0.6250	0.6169	...	0.5925	0.5893	0.003200	0.5655	3B	0.5710	0.5786	0.5925	0.5967	0.0042	0.6250
5/8 – 24 or 0.6250 – 24	UNEF	2A	0.0012	0.6238	0.6166	...	0.5967	0.5927	0.004004	0.5742	2B	0.580	0.590	0.5979	0.6031	0.0052	0.6250
		3A	0.0000	0.6250	0.6178	...	0.5979	0.5949	0.003000	0.5754	3B	0.5800	0.5869	0.5979	0.6018	0.0039	0.6250
5/8 – 28 or 0.6250 – 28	UN	2A	0.0011	0.6239	0.6174	...	0.6007	0.5969	0.003759	0.5814	2B	0.586	0.595	0.6018	0.6067	0.0049	0.6250
		3A	0.0000	0.6250	0.6185	...	0.6018	0.5990	0.002800	0.5825	3B	0.5860	0.5926	0.6018	0.6055	0.0037	0.6250
(7) 5/8 – 32 or 0.6250 – 32	UN	2A	0.0011	0.6239	0.6179	...	0.6036	0.6000	0.003566	0.5867	2B	0.591	0.599	0.6047	0.6093	0.0046	0.6250
		3A	0.0000	0.6250	0.6190	...	0.6047	0.6020	0.002700	0.5878	3B	0.5910	0.5969	0.6047	0.6082	0.0035	0.6250
(7) 11/16–12 or 0.6875–12	UN	2A	0.0016	0.6859	0.6745	...	0.6318	0.6263	0.005485	0.5867	2B	0.597	0.615	0.6334	0.6405	0.0071	0.6875
		3A	0.0000	0.6875	0.6761	...	0.6334	0.6293	0.004100	0.5883	3B	0.5970	0.6085	0.6334	0.6387	0.0053	0.6875
(7) 11/16–16 or 0.6875–16	UN	2A	0.0014	0.6861	0.6767	...	0.6455	0.6407	0.004811	0.6117	2B	0.620	0.634	0.6469	0.6532	0.0063	0.6875
		3A	0.0000	0.6875	0.6781	...	0.6469	0.6433	0.003600	0.6131	3B	0.6200	0.6284	0.6469	0.6516	0.0047	0.6875

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
(7) 11/16–20 or 0.6875–20	UN	2A	0.0013	0.6862	0.6781	...	0.6537	0.6493	0.004366	0.6267	2B	0.633	0.645	0.6550	0.6607	0.0057	0.6875
(7)		3A	0.0000	0.6875	0.6794	...	0.6550	0.6517	0.003300	0.6280	3B	0.6330	0.6411	0.6550	0.6593	0.0043	0.6875
(7) 11/16–24 or 0.6875–24	UNEF	2A	0.0012	0.6863	0.6791	...	0.6592	0.6552	0.004046	0.6367	2B	0.642	0.652	0.6604	0.6657	0.0053	0.6875
		3A	0.0000	0.6875	0.6803	...	0.6604	0.6574	0.003000	0.6379	3B	0.6420	0.6494	0.6604	0.6643	0.0039	0.6875
11/16–28 or 0.6875–28	UN	2A	0.0011	0.6864	0.6799	...	0.6632	0.6594	0.003801	0.6439	2B	0.649	0.657	0.6643	0.6692	0.0049	0.6875
(7)		3A	0.0000	0.6875	0.6810	...	0.6643	0.6614	0.002900	0.6450	3B	0.6490	0.6551	0.6643	0.6680	0.0037	0.6875
(7) 11/16–32 or 0.6875–32	UN	2A	0.0011	0.6864	0.6804	...	0.6661	0.6625	0.003608	0.6492	2B	0.654	0.661	0.6672	0.6719	0.0047	0.6875
		3A	0.0000	0.6875	0.6815	...	0.6672	0.6645	0.002700	0.6503	3B	0.6540	0.6594	0.6672	0.6707	0.0035	0.6875
3/4 – 10 or 0.7500 – 10	UNC	1A	0.0018	0.7482	0.7288	...	0.6832	0.6744	0.008800	0.6291	1B	0.642	0.663	0.6850	0.6965	0.0115	0.7500
		2A	0.0018	0.7482	0.7353	0.7288	0.6832	0.6773	0.005894	0.6291	2B	0.642	0.663	0.6850	0.6927	0.0077	0.7500
		3A	0.0000	0.7500	0.7371	...	0.6850	0.6806	0.004400	0.6309	3B	0.6420	0.6545	0.6850	0.6907	0.0057	0.7500
3/4 – 12 or 0.7500 – 12	UN	2A	0.0017	0.7483	0.7369	...	0.6942	0.6887	0.005524	0.6491	2B	0.660	0.678	0.6959	0.7031	0.0072	0.7500
		3A	0.0000	0.7500	0.7386	...	0.6959	0.6918	0.004100	0.6508	3B	0.6600	0.6707	0.6959	0.7013	0.0054	0.7500
3/4 – 16 or 0.7500 – 16	UNF	1A	0.0015	0.7485	0.7343	...	0.7079	0.7004	0.007500	0.6741	1B	0.682	0.696	0.7094	0.7192	0.0098	0.7500
		2A	0.0015	0.7485	0.7391	...	0.7079	0.7029	0.005024	0.6741	2B	0.682	0.696	0.7094	0.7159	0.0065	0.7500
(7)		3A	0.0000	0.7500	0.7406	...	0.7094	0.7056	0.003800	0.6756	3B	0.6820	0.6909	0.7094	0.7143	0.0049	0.7500
3/4 – 20 or 0.7500 – 20	UNEF	2A	0.0013	0.7487	0.7406	...	0.7162	0.7118	0.004405	0.6892	2B	0.696	0.707	0.7175	0.7232	0.0057	0.7500
(7)		3A	0.0000	0.7500	0.7419	...	0.7175	0.7142	0.003300	0.6905	3B	0.6960	0.7036	0.7175	0.7218	0.0043	0.7500
3/4 – 28 or 0.7500 – 28	UN	2A	0.0012	0.7488	0.7423	...	0.7256	0.7218	0.003840	0.7063	2B	0.711	0.720	0.7268	0.7318	0.0050	0.7500
(7)		3A	0.0000	0.7500	0.7435	...	0.7268	0.7239	0.002900	0.7075	3B	0.7110	0.7176	0.7268	0.7305	0.0037	0.7500
3/4 – 32 or 0.7500 – 32	UN	2A	0.0011	0.7489	0.7429	...	0.7286	0.7250	0.003647	0.7117	2B	0.716	0.724	0.7297	0.7344	0.0047	0.7500
		3A	0.0000	0.7500	0.7440	...	0.7297	0.7270	0.002700	0.7128	3B	0.7160	0.7219	0.7297	0.7333	0.0036	0.7500
(7) 13/16–12 or 0.8125–12	UN	2A	0.0017	0.8108	0.7994	...	0.7567	0.7511	0.005561	0.7116	2B	0.722	0.740	0.7584	0.7656	0.0072	0.8125
(7)		3A	0.0000	0.8125	0.8011	...	0.7584	0.7542	0.004200	0.7133	3B	0.7220	0.7329	0.7584	0.7638	0.0054	0.8125
(7) 13/16–16 or 0.8125–16	UN	2A	0.0015	0.8110	0.8016	...	0.7704	0.7655	0.004887	0.7366	2B	0.745	0.759	0.7719	0.7783	0.0064	0.8125
(7)		3A	0.0000	0.8125	0.8031	...	0.7719	0.7682	0.003700	0.7381	3B	0.7450	0.7534	0.7719	0.7767	0.0048	0.8125

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
(7) $^{13}/_{16}$–20 or 0.8125–20	UNEF	2A	0.0013	0.8112	0.8031	...	0.7787	0.7743	0.004442	0.7517	2B	0.758	0.770	0.7800	0.7858	0.0058	0.8125
(7)		3A	0.0000	0.8125	0.8044	...	0.7800	0.7767	0.003300	0.7530	3B	0.7580	0.7661	0.7800	0.7843	0.0043	0.8125
(7) $^{13}/_{16}$–28 or 0.8125–28	UN	2A	0.0012	0.8113	0.8048	...	0.7881	0.7842	0.003877	0.7688	2B	0.774	0.782	0.7893	0.7943	0.0050	0.8125
(7)		3A	0.0000	0.8125	0.8060	...	0.7893	0.7864	0.002900	0.7700	3B	0.7740	0.7801	0.7893	0.7931	0.0038	0.8125
(7) $^{13}/_{16}$–32 or 0.8125–32	UN	2A	0.0011	0.8114	0.8054	...	0.7911	0.7874	0.003684	0.7742	2B	0.779	0.786	0.7922	0.7970	0.0048	0.8125
(7)		3A	0.0000	0.8125	0.8065	...	0.7922	0.7894	0.002800	0.7753	3B	0.7790	0.7844	0.7922	0.7958	0.0036	0.8125
$^{7}/_{8}$ – 9 or 0.8750 – 9	UNC	1A	0.0019	0.8731	0.8523	...	0.8009	0.7914	0.009500	0.7408	1B	0.755	0.778	0.8028	0.8151	0.0123	0.8750
		2A	0.0019	0.8731	0.8592	0.8523	0.8009	0.7946	0.006305	0.7408	2B	0.755	0.778	0.8028	0.8110	0.0082	0.8750
		3A	0.0000	0.8750	0.8611	...	0.8028	0.7981	0.004700	0.7427	3B	0.7550	0.7681	0.8028	0.8089	0.0061	0.8750
(7) $^{7}/_{8}$–12 or 0.8750–12	UN	2A	0.0017	0.8733	0.8619	...	0.8192	0.8136	0.005596	0.7741	2B	0.785	0.803	0.8209	0.8282	0.0073	0.8750
(7)		3A	0.0000	0.8750	0.8636	...	0.8209	0.8167	0.004200	0.7758	3B	0.7850	0.7952	0.8209	0.8264	0.0055	0.8750
(7) $^{7}/_{8}$–14 or 0.8750–14	UNF	1A	0.0016	0.8734	0.8579	...	0.8270	0.8189	0.008100	0.7883	1B	0.798	0.813	0.8286	0.8392	0.0106	0.8750
(7)		2A	0.0016	0.8734	0.8631	...	0.8270	0.8216	0.005420	0.7883	2B	0.798	0.813	0.8286	0.8356	0.0070	0.8750
(7)		3A	0.0000	0.8750	0.8647	...	0.8286	0.8245	0.004100	0.7899	3B	0.7980	0.8067	0.8286	0.8339	0.0053	0.8750
(7) $^{7}/_{8}$–16 or 0.8750–16	UN	2A	0.0015	0.8735	0.8641	...	0.8329	0.8280	0.004922	0.7991	2B	0.807	0.821	0.8344	0.8408	0.0064	0.8750
(7)		3A	0.0000	0.8750	0.8656	...	0.8344	0.8307	0.003700	0.8006	3B	0.8070	0.8159	0.8344	0.8392	0.0048	0.8750
(7) $^{7}/_{8}$–20 or 0.8750–20	UNEF	2A	0.0013	0.8737	0.8656	...	0.8412	0.8367	0.004477	0.8142	2B	0.821	0.832	0.8425	0.8483	0.0058	0.8750
(7)		3A[7]	0.0000	0.8750	0.8669	...	0.8425	0.8391	0.003400	0.8155	3B	0.8210	0.8286	0.8425	0.8469	0.0044	0.8750
(7) $^{7}/_{8}$–28 or 0.8750–28	UN	2A	0.0012	0.8738	0.8673	...	0.8506	0.8467	0.003912	0.8313	2B	0.836	0.845	0.8518	0.8569	0.0051	0.8750
(7)		3A[7]	0.0000	0.8750	0.8685	...	0.8518	0.8489	0.002900	0.8325	3B	0.8360	0.8426	0.8518	0.8556	0.0038	0.8750
(7) $^{7}/_{8}$–32 or 0.8750–32	UN	2A	0.0011	0.8739	0.8679	...	0.8536	0.8499	0.003719	0.8367	2B	0.841	0.849	0.8547	0.8595	0.0048	0.8750
(7)		3A	0.0000	0.8750	0.8690	...	0.8547	0.8519	0.002800	0.8378	3B	0.8410	0.8469	0.8547	0.8583	0.0036	0.8750
(7) $^{15}/_{16}$–12 or 0.9375–12	UN	2A	0.0017	0.9358	0.9244	...	0.8817	0.8761	0.005629	0.8366	2B	0.847	0.865	0.8834	0.8907	0.0073	0.9375
(7)		3A[7]	0.0000	0.9375	0.9261	...	0.8834	0.8792	0.004200	0.8383	3B	0.8470	0.8575	0.8834	0.8889	0.0055	0.9375
(7) $^{15}/_{16}$–16 or 0.9375–16	UN	2A	0.0015	0.9360	0.9266	...	0.8954	0.8904	0.004955	0.8616	2B	0.870	0.884	0.8969	0.9033	0.0064	0.9375
(7)		3A	0.0000	0.9375	0.9281	...	0.8969	0.8932	0.003700	0.8631	3B	0.8700	0.8784	0.8969	0.9017	0.0048	0.9375

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
15/16 – 20 or 0.9375 – 20	UNEF	2A	0.0014	0.9361	0.9280	...	0.9036	0.8991	0.004510	0.8766	2B	0.883	0.895	0.9050	0.9109	0.0059	0.9375
(7)		3A	0.0000	0.9375	0.9294	...	0.9050	0.9016	0.003400	0.8780	3B	0.8830	0.8911	0.9050	0.9094	0.0044	0.9375
(7) 15/16–28 or 0.9375–28	UN	2A	0.0012	0.9363	0.9298	...	0.9131	0.9092	0.003945	0.8938	2B	0.899	0.907	0.9143	0.9194	0.0051	0.9375
(7)		3A	0.0000	0.9375	0.9310	...	0.9143	0.9113	0.003000	0.8950	3B	0.8990	0.9051	0.9143	0.9181	0.0038	0.9375
15/16 – 32 or 0.9375 – 32	UN	2A	0.0011	0.9364	0.9304	...	0.9161	0.9123	0.003752	0.8992	2B	0.904	0.911	0.9172	0.9221	0.0049	0.9375
		3A	0.0000	0.9375	0.9315	...	0.9172	0.9144	0.002800	0.9003	3B	0.9040	0.9094	0.9172	0.9209	0.0037	0.9375
(7) 1 – 8 or 1.0000 – 8	UNC	1A	0.0020	0.9980	0.9755	...	0.9168	0.9067	0.010100	0.8492	1B	0.865	0.89	0.9188	0.9320	0.0132	1.0000
		2A	0.0020	0.9980	0.9830	0.9755	0.9168	0.9101	0.006750	0.8492	2B	0.865	0.890	0.9188	0.9276	0.0088	1.0000
		3A	0.0000	1.0000	0.9850	...	0.9188	0.9137	0.005100	0.8512	3B	0.8650	0.8797	0.9188	0.9254	0.0066	1.0000
1 – 12 or 1.0000 – 12	UNF	1A	0.0018	0.9982	0.9810	...	0.9441	0.9353	0.008800	0.8990	1B	0.91	0.928	0.9459	0.9573	0.0114	1.0000
		2A	0.0018	0.9982	0.9868	...	0.9441	0.9382	0.005862	0.8990	2B	0.910	0.928	0.9459	0.9535	0.0076	1.0000
		3A	0.0000	1.0000	0.9886	...	0.9459	0.9415	0.004400	0.9008	3B	0.9100	0.9198	0.9459	0.9516	0.0057	1.0000
(7) 1 – 14 or 1.0000 – 14	UNS (8)	2A	0.0016	0.9984	0.9881	...	0.9520	0.9467	0.005285	0.9133	2B	0.923	0.938	0.9536	0.9605	0.0069	1.0000
(7)		3A	0.0000	1.0000	0.9897	...	0.9536	0.9496	0.004000	0.9149	3B	0.9230	0.9315	0.9536	0.9588	0.0052	1.0000
1 – 16 or 1.0000 – 16	UN	2A	0.0015	0.9985	0.9891	...	0.9579	0.9529	0.004987	0.9241	2B	0.932	0.946	0.9594	0.9659	0.0065	1.0000
		3A	0.0000	1.0000	0.9906	...	0.9594	0.9557	0.003700	0.9256	3B	0.9320	0.9409	0.9594	0.9643	0.0049	1.0000
1 – 20 or 1.0000 – 20	UNEF	2A	0.0014	0.9986	0.9905	...	0.9661	0.9616	0.004542	0.9391	2B	0.946	0.957	0.9675	0.9734	0.0059	1.0000
		3A	0.0000	1.0000	0.9919	...	0.9675	0.9641	0.003400	0.9405	3B	0.9460	0.9536	0.9675	0.9719	0.0044	1.0000
1 – 28 or 1.0000 – 28	UN	2A	0.0012	0.9988	0.9923	...	0.9756	0.9716	0.003977	0.9563	2B	0.961	0.970	0.9768	0.9820	0.0052	1.0000
		3A	0.0000	1.0000	0.9935	...	0.9768	0.9738	0.003000	0.9575	3B	0.9610	0.9676	0.9768	0.9807	0.0039	1.0000
1 – 32 or 1.0000 – 32	UN	2A	0.0011	0.9989	0.9929	...	0.9786	0.9748	0.003784	0.9617	2B	0.966	0.974	0.9797	0.9846	0.0049	1.0000
		3A	0.0000	1.0000	0.9940	...	0.9797	0.9769	0.002800	0.9628	3B	0.9660	0.9719	0.9797	0.9834	0.0037	1.0000
1 1/16 – 8 or 1.0625 – 8	UN	2A	0.0020	1.0605	1.0455	...	0.9793	0.9725	0.006827	0.9117	2B	0.927	0.952	0.9813	0.9902	0.0089	1.0625
		3A	0.0000	1.0625	1.0475	...	0.9813	0.9762	0.005100	0.9137	3B	0.9270	0.9422	0.9813	0.9880	0.0067	1.0625
1 1/16 – 12 or 1.0625 – 12	UN	2A	0.0017	1.0608	1.0494	...	1.0067	1.0010	0.005692	0.9616	2B	0.972	0.990	1.0084	1.0158	0.0074	1.0625
(7)		3A	0.0000	1.0625	1.0511	...	1.0084	1.0041	0.004300	0.9633	3B	0.9720	0.9823	1.0084	1.0139	0.0055	1.0625
1 1/16 – 16 or 1.0625 – 16	UN	2A	0.0015	1.0610	1.0516	...	1.0204	1.0154	0.005018	0.9866	2B	0.995	1.009	1.0219	1.0284	0.0065	1.0625
(7)		3A	0.0000	1.0625	1.0531	...	1.0219	1.0181	0.003800	0.9881	3B	0.9950	1.0034	1.0219	1.0268	0.0049	1.0625

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Tolerance	Major Diameter, Min.
(7) $1\frac{1}{16}$ – 18 or 1.0625 – 18	UNEF	2A	0.0014	1.0611	1.0524	...	1.0250	1.0202	0.004776	0.9949	2B	1.002	1.015	1.0264	1.0326	0.0062	1.0625
(7)		3A	0.0000	1.0625	1.0538	...	1.0264	1.0228	0.003600	0.9963	3B	1.0020	1.0105	1.0264	1.0311	0.0047	1.0625
(7) $1\frac{1}{16}$ – 20 or 1.0625 – 20	UN	2A	0.0014	1.0611	1.0530	...	1.0286	1.0240	0.004573	1.0016	2B	1.008	1.020	1.0300	1.0359	0.0059	1.0625
(7)		3A	0.0000	1.0625	1.0544	...	1.0300	1.0266	0.003400	1.0030	3B	1.0080	1.0161	1.0300	1.0345	0.0045	1.0625
$1\frac{1}{16}$ – 28 or 1.0625 – 28	UN	2A	0.0012	1.0613	1.0548	...	1.0381	1.0341	0.004008	1.0188	2B	1.024	1.032	1.0393	1.0445	0.0052	1.0625
		3A	0.0000	1.0625	1.0560	...	1.0393	1.0363	0.003000	1.0200	3B	1.0240	1.0301	1.0393	1.0432	0.0039	1.0625
$1\frac{1}{8}$ – 7 or 1.1250 – 7	UNC	1A	0.0022	1.1228	1.0982	...	1.0300	1.0191	0.010900	0.9527	1B	0.97	0.998	1.0322	1.0463	0.0141	1.1250
(7)		2A	0.0022	1.1228	1.1064	1.0982	1.0300	1.0228	0.007250	0.9527	2B	0.970	0.998	1.0322	1.0416	0.0094	1.1250
		3A	0.0000	1.1250	1.1086	...	1.0322	1.0268	0.005400	0.9549	3B	0.9700	0.9875	1.0322	1.0393	0.0071	1.1250
$1\frac{1}{8}$ – 8 or 1.1250 – 8	UN	2A	0.0021	1.1229	1.1079	1.1004	1.0417	1.0348	0.006901	0.9741	2B	0.990	1.015	1.0438	1.0528	0.0090	1.1250
		3A	0.0000	1.1250	1.1100	...	1.0438	1.0386	0.005200	0.9762	3B	0.9900	1.0047	1.0438	1.0505	0.0067	1.1250
$1\frac{1}{8}$ – 12 or 1.1250 – 12	UNF	1A	0.0018	1.1232	1.1060	...	1.0691	1.0601	0.009000	1.0240	1B	1.035	1.053	1.0709	1.0826	0.0117	1.1250
		2A	0.0018	1.1232	1.1118	...	1.0691	1.0631	0.006013	1.0240	2B	1.035	1.053	1.0709	1.0787	0.0078	1.1250
		3A	0.0000	1.1250	1.1136	...	1.0709	1.0664	0.004500	1.0258	3B	1.0350	1.0448	1.0709	1.0768	0.0059	1.1250
(7) $1\frac{1}{8}$ – 16 or 1.1250 – 16	UN	2A	0.0015	1.1235	1.1141	...	1.0829	1.0779	0.005047	1.0491	2B	1.057	1.071	1.0844	1.0910	0.0066	1.1250
(7)		3A	0.0000	1.1250	1.1156	...	1.0844	1.0806	0.003800	1.0506	3B	1.0570	1.0659	1.0844	1.0893	0.0049	1.1250
(7) $1\frac{1}{8}$ – 18 or 1.1250 – 18	UNEF	2A	0.0014	1.1236	1.1149	...	1.0875	1.0827	0.004805	1.0574	2B	1.065	1.078	1.0889	1.0951	0.0062	1.1250
(7)		3A	0.0000	1.1250	1.1163	...	1.0889	1.0853	0.003600	1.0588	3B	1.0650	1.0730	1.0889	1.0936	0.0047	1.1250
(7) $1\frac{1}{8}$ – 20 or 1.1250 – 20	UN	2A	0.0014	1.1236	1.1155	...	1.0911	1.0865	0.004602	1.0641	2B	1.071	1.082	1.0925	1.0985	0.0060	1.1250
(7)		3A	0.0000	1.1250	1.1169	...	1.0925	1.0890	0.003500	1.0655	3B	1.0710	1.0786	1.0925	1.0970	0.0045	1.1250
$1\frac{1}{8}$ – 28 or 1.1250 – 28	UN	2A	0.0012	1.1238	1.1173	...	1.1006	1.0966	0.004037	1.0813	2B	1.086	1.095	1.1018	1.1070	0.0052	1.1250
		3A	0.0000	1.1250	1.1185	...	1.1018	1.0988	0.003000	1.0825	3B	1.0860	1.0926	1.1018	1.1057	0.0039	1.1250
$1\frac{3}{16}$ – 8 or 1.1875 – 8	UN	2A	0.0021	1.1854	1.1704	...	1.1042	1.0972	0.006973	1.0366	2B	1.052	1.077	1.1063	1.1154	0.0091	1.1875
		3A	0.0000	1.1875	1.1725	...	1.1063	1.1011	0.005200	1.0387	3B	1.0520	1.0672	1.1063	1.1131	0.0068	1.1875
(7) $1\frac{3}{16}$ – 12 or 1.1875 – 12	UN	2A	0.0017	1.1858	1.1744	...	1.1317	1.1260	0.005749	1.0866	2B	1.097	1.115	1.1334	1.1409	0.0075	1.1875
		3A	0.0000	1.1875	1.1761	...	1.1334	1.1291	0.004300	1.0883	3B	1.0970	1.1073	1.1334	1.1390	0.0056	1.1875

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	Class	External [Note (1)] Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$1\frac{3}{16}$ – 16 or 1.1875 – 16	UN	2A	0.0015	1.1860	1.1766	...	1.1454	1.1403	0.005075	1.1116	2B	1.120	1.134	1.1469	1.1535	0.0066	1.1875
(7)		3A	0.0000	1.1875	1.1781	...	1.1469	1.1431	0.003800	1.1131	3B	1.1200	1.1284	1.1469	1.1518	0.0049	1.1875
(7) $1\frac{3}{16}$ – 18 or 1.1875 – 18	UNEF	2A	0.0014	1.1861	1.1774	...	1.1500	1.1452	0.004833	1.1199	2B	1.127	1.140	1.1514	1.1577	0.0063	1.1875
		3A	0.0000	1.1875	1.1788	...	1.1514	1.1478	0.003600	1.1213	3B	1.1270	1.1355	1.1514	1.1561	0.0047	1.1875
(7) $1\frac{3}{16}$ – 20 or 1.1875 – 20	UN	2A	0.0014	1.1861	1.1780	...	1.1536	1.1490	0.004630	1.1266	2B	1.133	1.145	1.1550	1.1610	0.0060	1.1875
(7)		3A	0.0000	1.1875	1.1794	...	1.1550	1.1515	0.003500	1.1280	3B	1.1330	1.1411	1.1550	1.1595	0.0045	1.1875
$1\frac{3}{16}$ – 28 or 1.1875 – 28	UN	2A	0.0012	1.1863	1.1798	...	1.1631	1.1590	0.004065	1.1438	2B	1.149	1.157	1.1643	1.1696	0.0053	1.1875
		3A	0.0000	1.1875	1.1810	...	1.1643	1.1613	0.003000	1.1450	3B	1.1490	1.1551	1.1643	1.1683	0.0040	1.1875
$1\frac{1}{4}$ – 7 or 1.2500 – 7	UNC	1A	0.0022	1.2478	1.2232	...	1.1550	1.1439	0.011100	1.0777	1B	1.095	1.123	1.1572	1.1716	0.0144	1.2500
		2A	0.0022	1.2478	1.2314	1.2232	1.1550	1.1476	0.007392	1.0777	2B	1.095	1.123	1.1572	1.1668	0.0096	1.2500
		3A	0.0000	1.2500	1.2336	...	1.1572	1.1517	0.005500	1.0799	3B	1.0950	1.1125	1.1572	1.1644	0.0072	1.2500
$1\frac{1}{4}$ – 8 or 1.2500 – 8	UN	2A	0.0021	1.2479	1.2329	1.2254	1.1667	1.1597	0.007043	1.0991	2B	1.115	1.140	1.1688	1.1780	0.0092	1.2500
		3A	0.0000	1.2500	1.2350	...	1.1688	1.1635	0.005300	1.1012	3B	1.1150	1.1297	1.1688	1.1757	0.0069	1.2500
$1\frac{1}{4}$ – 12 or 1.2500 – 12	UNF	1A	0.0018	1.2482	1.2310	...	1.1941	1.1849	0.009200	1.1490	1B	1.16	1.178	1.1959	1.2079	0.0120	1.2500
		2A	0.0018	1.2482	1.2368	...	1.1941	1.1879	0.006155	1.1490	2B	1.160	1.178	1.1959	1.2039	0.0080	1.2500
		3A	0.0000	1.2500	1.2386	...	1.1959	1.1913	0.004600	1.1508	3B	1.1600	1.1698	1.1959	1.2019	0.0060	1.2500
$1\frac{1}{4}$ – 16 or 1.2500 – 16	UN	2A	0.0015	1.2485	1.2391	...	1.2079	1.2028	0.005103	1.1741	2B	1.182	1.196	1.2094	1.2160	0.0066	1.2500
(7)		3A	0.0000	1.2500	1.2406	...	1.2094	1.2056	0.003800	1.1756	3B	1.1820	1.1909	1.2094	1.2144	0.0050	1.2500
$1\frac{1}{4}$ – 18 or 1.2500 – 18	UNEF	2A	0.0015	1.2485	1.2398	...	1.2124	1.2075	0.004861	1.1823	2B	1.190	1.203	1.2139	1.2202	0.0063	1.2500
		3A	0.0000	1.2500	1.2413	...	1.2139	1.2103	0.003600	1.1838	3B	1.1900	1.1980	1.2139	1.2186	0.0047	1.2500
$1\frac{1}{4}$ – 20 or 1.2500 – 20	UN	2A	0.0014	1.2486	1.2405	...	1.2161	1.2114	0.004658	1.1891	2B	1.196	1.207	1.2175	1.2236	0.0061	1.2500
(7)		3A	0.0000	1.2500	1.2419	...	1.2175	1.2140	0.003500	1.1905	3B	1.1960	1.2036	1.2175	1.2220	0.0045	1.2500
$1\frac{1}{4}$ – 28 or 1.2500 – 28	UN	2A	0.0012	1.2488	1.2423	...	1.2256	1.2215	0.004093	1.2063	2B	1.211	1.220	1.2268	1.2321	0.0053	1.2500
		3A	0.0000	1.2500	1.2435	...	1.2268	1.2237	0.003100	1.2075	3B	1.2110	1.2176	1.2268	1.2308	0.0040	1.2500
$1\frac{5}{16}$ – 8 or 1.3125 – 8	UN	2A	0.0021	1.3104	1.2954	...	1.2292	1.2221	0.007110	1.1616	2B	1.177	1.202	1.2313	1.2405	0.0092	1.3125
		3A	0.0000	1.3125	1.2975	...	1.2313	1.2260	0.005300	1.1637	3B	1.1770	1.1922	1.2313	1.2382	0.0069	1.3125

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$1\frac{5}{16}$ – 12 or 1.3125 – 12	UN	2A	0.0017	1.3108	1.2994	...	1.2567	1.2509	0.005803	1.2116	2B	1.222	1.240	1.2584	1.2659	0.0075	1.3125
(7)		3A	0.0000	1.3125	1.3011	...	1.2584	1.2540	0.004400	1.2133	3B	1.2220	1.2323	1.2584	1.2641	0.0057	1.3125
(7) $1\frac{5}{16}$ – 16 or 1.3125 – 16	UN	2A	0.0015	1.3110	1.3016	...	1.2704	1.2653	0.005129	1.2366	2B	1.245	1.259	1.2719	1.2786	0.0067	1.3125
(7)		3A	0.0000	1.3125	1.3031	...	1.2719	1.2681	0.003800	1.2381	3B	1.2450	1.2534	1.2719	1.2769	0.0050	1.3125
(7) $1\frac{5}{16}$ – 18 or 1.3125 – 18	UNEF	2A	0.0015	1.3110	1.3023	...	1.2749	1.2700	0.004887	1.2448	2B	1.252	1.265	1.2764	1.2828	0.0064	1.3125
(7)		3A	0.0000	1.3125	1.3038	...	1.2764	1.2727	0.003700	1.2463	3B	1.2520	1.2605	1.2764	1.2812	0.0048	1.3125
$1\frac{5}{16}$ – 20 or 1.3125 – 20	UN	2A	0.0014	1.3111	1.3030	...	1.2786	1.2739	0.004684	1.2516	2B	1.258	1.270	1.2800	1.2861	0.0061	1.3125
(7)		3A	0.0000	1.3125	1.3044	...	1.2800	1.2765	0.003500	1.2530	3B	1.2580	1.2661	1.2800	1.2846	0.0046	1.3125
(7) $1\frac{5}{16}$ – 28 or 1.3125 – 28	UN	2A	0.0012	1.3113	1.3048	...	1.2881	1.2840	0.004119	1.2688	2B	1.274	1.282	1.2893	1.2947	0.0054	1.3125
		3A	0.0000	1.3125	1.3060	...	1.2893	1.2862	0.003100	1.2700	3B	1.2740	1.2801	1.2893	1.2933	0.0040	1.3125
$1\frac{3}{8}$ – 6 or 1.3750 – 6	UNC	1A	0.0024	1.3726	1.3453	...	1.2643	1.2523	0.012000	1.1741	1B	1.195	1.225	1.2667	1.2822	0.0155	1.3750
		2A	0.0024	1.3726	1.3544	1.3453	1.2643	1.2563	0.007970	1.1741	2B	1.195	1.225	1.2667	1.2771	0.0104	1.3750
		3A	0.0000	1.3750	1.3568	...	1.2667	1.2607	0.006000	1.1765	3B	1.1950	1.2146	1.2667	1.2745	0.0078	1.3750
$1\frac{3}{8}$ – 8 or 1.3750 – 8	UN	2A	0.0022	1.3728	1.3578	1.3503	1.2916	1.2844	0.007177	1.2240	2B	1.240	1.265	1.2938	1.3031	0.0093	1.3750
		3A	0.0000	1.3750	1.3600	...	1.2938	1.2884	0.005400	1.2262	3B	1.2400	1.2547	1.2938	1.3008	0.0070	1.3750
$1\frac{3}{8}$ – 12 or 1.3750 – 12	UNF	1A	0.0019	1.3731	1.3559	...	1.3190	1.3096	0.009400	1.2739	1B	1.285	1.303	1.3209	1.3332	0.0123	1.3750
		2A	0.0019	1.3731	1.3617	...	1.3190	1.3127	0.006289	1.2739	2B	1.285	1.303	1.3209	1.3291	0.0082	1.3750
		3A	0.0000	1.3750	1.3636	...	1.3209	1.3162	0.004700	1.2758	3B	1.2850	1.2948	1.3209	1.3270	0.0061	1.3750
(7) $1\frac{3}{8}$ – 16 or 1.3750 – 16	UN	2A	0.0015	1.3735	1.3641	...	1.3329	1.3277	0.005155	1.2991	2B	1.307	1.321	1.3344	1.3411	0.0067	1.3750
(7)		3A	0.0000	1.3750	1.3656	...	1.3344	1.3305	0.003900	1.3006	3B	1.3070	1.3159	1.3344	1.3394	0.0050	1.3750
(7) $1\frac{3}{8}$ – 18 or 1.3750 – 18	UNEF	2A	0.0015	1.3735	1.3648	...	1.3374	1.3325	0.004913	1.3073	2B	1.315	1.328	1.3389	1.3453	0.0064	1.3750
(7)		3A	0.0000	1.3750	1.3663	...	1.3389	1.3352	0.003700	1.3088	3B	1.3150	1.3230	1.3389	1.3437	0.0048	1.3750
$1\frac{3}{8}$ – 20 or 1.3750 – 20	UN	2A	0.0014	1.3736	1.3655	...	1.3411	1.3364	0.004710	1.3141	2B	1.321	1.332	1.3425	1.3486	0.0061	1.3750
(7)		3A	0.0000	1.3750	1.3669	...	1.3425	1.3390	0.003500	1.3155	3B	1.3210	1.3286	1.3425	1.3471	0.0046	1.3750
(7) $1\frac{3}{8}$ – 28 or 1.3750 – 28	UN	2A	0.0012	1.3738	1.3673	...	1.3506	1.3465	0.004145	1.3313	2B	1.336	1.345	1.3518	1.3572	0.0054	1.3750
		3A	0.0000	1.3750	1.3685	...	1.3518	1.3487	0.003100	1.3325	3B	1.3360	1.3426	1.3518	1.3558	0.0040	1.3750

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$1\frac{7}{16}$ – 6 or 1.4375 – 6	UN	2A	0.0024	1.4351	1.4169	...	1.3268	1.3188	0.008034	1.2366	2B	1.257	1.288	1.3292	1.3396	0.0104	1.4375
		3A	0.0000	1.4375	1.4193	...	1.3292	1.3232	0.006000	1.2390	3B	1.2570	1.2771	1.3292	1.3370	0.0078	1.4375
$1\frac{7}{16}$ – 8 or 1.4375 – 8	UN	2A	0.0022	1.4353	1.4203	...	1.3541	1.3469	0.007241	1.2865	2B	1.302	1.327	1.3563	1.3657	0.0094	1.4375
		3A	0.0000	1.4375	1.4225	...	1.3563	1.3509	0.005400	1.2887	3B	1.3020	1.3172	1.3563	1.3634	0.0071	1.4375
$1\frac{7}{16}$ – 12 or 1.4375 – 12	UN	2A	0.0018	1.4357	1.4243	...	1.3816	1.3757	0.005854	1.3365	2B	1.347	1.365	1.3834	1.3910	0.0076	1.4375
		3A	0.0000	1.4375	1.4261	...	1.3834	1.3790	0.004400	1.3383	3B	1.3470	1.3573	1.3834	1.3891	0.0057	1.4375
(7) $1\frac{7}{16}$ – 16 or 1.4375 – 16	UN	2A	0.0016	1.4359	1.4265	...	1.3953	1.3901	0.005180	1.3615	2B	1.370	1.384	1.3969	1.4036	0.0067	1.4375
(7)		3A	0.0000	1.4375	1.4281	...	1.3969	1.3930	0.003900	1.3631	3B	1.3700	1.3784	1.3969	1.4020	0.0051	1.4375
(7) $1\frac{7}{16}$ – 18 or 1.4375 – 18	UNEF	2A	0.0015	1.4360	1.4273	...	1.3999	1.3950	0.004938	1.3698	2B	1.377	1.390	1.4014	1.4078	0.0064	1.4375
		3A	0.0000	1.4375	1.4288	...	1.4014	1.3977	0.003700	1.3713	3B	1.3770	1.3855	1.4014	1.4062	0.0048	1.4375
(7) $1\frac{7}{16}$ – 20 or 1.4375 – 20	UN	2A	0.0014	1.4361	1.4280	...	1.4036	1.3989	0.004735	1.3766	2B	1.383	1.395	1.4050	1.4112	0.0062	1.4375
(7)		3A	0.0000	1.4375	1.4294	...	1.4050	1.4014	0.003600	1.3780	3B	1.3830	1.3911	1.4050	1.4096	0.0046	1.4375
(7) $1\frac{7}{16}$ – 28 or 1.4375 – 28	UN	2A	0.0013	1.4362	1.4297	...	1.4130	1.4088	0.004170	1.3937	2B	1.399	1.407	1.4143	1.4197	0.0054	1.4375
		3A	0.0000	1.4375	1.4310	...	1.4143	1.4112	0.003100	1.3950	3B	1.3990	1.4051	1.4143	1.4184	0.0041	1.4375
$1\frac{1}{2}$ – 6 or 1.5000 – 6	UNC	1A	0.0024	1.4976	1.4703	...	1.3893	1.3772	0.012100	1.2991	1B	1.32	1.35	1.3917	1.4075	0.0158	1.5000
		2A	0.0024	1.4976	1.4794	1.4703	1.3893	1.3812	0.008097	1.2991	2B	1.320	1.350	1.3917	1.4022	0.0105	1.5000
		3A	0.0000	1.5000	1.4818	...	1.3917	1.3856	0.006100	1.3015	3B	1.3200	1.3396	1.3917	1.3996	0.0079	1.5000
$1\frac{1}{2}$ – 8 or 1.5000 – 8	UN	2A	0.0022	1.4978	1.4828	1.4753	1.4166	1.4093	0.007304	1.3490	2B	1.365	1.390	1.4188	1.4283	0.0095	1.5000
		3A	0.0000	1.5000	1.4850	...	1.4188	1.4133	0.005500	1.3512	3B	1.3650	1.3797	1.4188	1.4259	0.0071	1.5000
$1\frac{1}{2}$ – 12 or 1.5000 – 12	UNF	1A	0.0019	1.4981	1.4809	...	1.4440	1.4344	0.009600	1.3989	1B	1.41	1.428	1.4459	1.4584	0.0125	1.5000
		2A	0.0019	1.4981	1.4867	...	1.4440	1.4376	0.006416	1.3989	2B	1.410	1.428	1.4459	1.4542	0.0083	1.5000
		3A	0.0000	1.5000	1.4886	...	1.4459	1.4411	0.004800	1.4008	3B	1.4100	1.4198	1.4459	1.4522	0.0063	1.5000
(7) $1\frac{1}{2}$ – 16 or 1.5000 – 16	UN	2A	0.0016	1.4984	1.4890	...	1.4578	1.4526	0.005204	1.4240	2B	1.432	1.446	1.4594	1.4662	0.0068	1.5000
		3A	0.0000	1.5000	1.4906	...	1.4594	1.4555	0.003900	1.4256	3B	1.4320	1.4409	1.4594	1.4645	0.0051	1.5000
(7) $1\frac{1}{2}$ – 18 or 1.5000 – 18	UNEF	2A	0.0015	1.4985	1.4898	...	1.4624	1.4574	0.004962	1.4323	2B	1.440	1.453	1.4639	1.4704	0.0065	1.5000
		3A	0.0000	1.5000	1.4913	...	1.4639	1.4602	0.003700	1.4338	3B	1.4400	1.4480	1.4639	1.4687	0.0048	1.5000

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$1\frac{1}{2}$ – 20 or 1.5000 – 20	UN	2A	0.0014	1.4986	1.4905	...	1.4661	1.4613	0.004759	1.4391	2B	1.446	1.457	1.4675	1.4737	0.0062	1.5000
(7)		3A	0.0000	1.5000	1.4919	...	1.4675	1.4639	0.003600	1.4405	3B	1.4460	1.4536	1.4675	1.4721	0.0046	1.5000
$1\frac{1}{2}$ – 28 or 1.5000 – 28	UN	2A	0.0013	1.4987	1.4922	...	1.4755	1.4713	0.004194	1.4562	2B	1.461	1.470	1.4768	1.4823	0.0055	1.5000
		3A	0.0000	1.5000	1.4935	...	1.4768	1.4737	0.003100	1.4575	3B	1.4610	1.4676	1.4768	1.4809	0.0041	1.5000
$1\frac{9}{16}$ – 6 or 1.5625 – 6	UN	2A	0.0024	1.5601	1.5419	...	1.4518	1.4436	0.008159	1.3616	2B	1.382	1.413	1.4542	1.4648	0.0106	1.5625
		3A	0.0000	1.5625	1.5443	...	1.4542	1.4481	0.006100	1.3640	3B	1.3820	1.4021	1.4542	1.4622	0.0080	1.5625
$1\frac{9}{16}$ – 8 or 1.5625 – 8	UN	2A	0.0022	1.5603	1.5453	...	1.4791	1.4717	0.007366	1.4115	2B	1.427	1.452	1.4813	1.4909	0.0096	1.5625
		3A	0.0000	1.5625	1.5475	...	1.4813	1.4758	0.005500	1.4137	3B	1.4270	1.4422	1.4813	1.4885	0.0072	1.5625
(7) $1\frac{9}{16}$ – 12 or 1.5625 – 12	UN	2A	0.0018	1.5607	1.5493	...	1.5066	1.5007	0.005902	1.4615	2B	1.472	1.490	1.5084	1.5161	0.0077	1.5625
(7)		3A	0.0000	1.5625	1.5511	...	1.5084	1.5040	0.004400	1.4633	3B	1.4720	1.4823	1.5084	1.5142	0.0058	1.5625
$1\frac{9}{16}$ – 16 or 1.5625 – 16	UN	2A	0.0016	1.5609	1.5515	...	1.5203	1.5151	0.005228	1.4865	2B	1.495	1.509	1.5219	1.5287	0.0068	1.5625
(7)		3A	0.0000	1.5625	1.5531	...	1.5219	1.5180	0.003900	1.4881	3B	1.4950	1.5034	1.5219	1.5270	0.0051	1.5625
$1\frac{9}{16}$ – 18 or 1.5625 – 18	UNEF	2A	0.0015	1.5610	1.5523	...	1.5249	1.5199	0.004986	1.4948	2B	1.502	1.515	1.5264	1.5329	0.0065	1.5625
(7)		3A	0.0000	1.5625	1.5538	...	1.5264	1.5227	0.003700	1.4963	3B	1.5020	1.5105	1.5264	1.5313	0.0049	1.5625
$1\frac{9}{16}$ – 20 or 1.5625 – 20	UN	2A	0.0014	1.5611	1.5530	...	1.5286	1.5238	0.004783	1.5016	2B	1.508	1.520	1.5300	1.5362	0.0062	1.5625
(7)		3A	0.0000	1.5625	1.5544	...	1.5300	1.5264	0.003600	1.5030	3B	1.5080	1.5161	1.5300	1.5347	0.0047	1.5625
$1\frac{5}{8}$ – 6 or 1.6250 – 6	UN	2A	0.0025	1.6225	1.6043	...	1.5142	1.5060	0.008219	1.4240	2B	1.445	1.475	1.5167	1.5274	0.0107	1.6250
		3A	0.0000	1.6250	1.6068	...	1.5167	1.5105	0.006200	1.4265	3B	1.4450	1.4646	1.5167	1.5247	0.0080	1.6250
$1\frac{5}{8}$ – 8 or 1.6250 – 8	UN	2A	0.0022	1.6228	1.6078	1.6003	1.5416	1.5342	0.007426	1.4740	2B	1.490	1.515	1.5438	1.5535	0.0097	1.6250
		3A	0.0000	1.6250	1.6100	...	1.5438	1.5382	0.005600	1.4762	3B	1.4900	1.5047	1.5438	1.5510	0.0072	1.6250
(7) $1\frac{5}{8}$ – 12 or 1.6250 – 12	UN	2A	0.0018	1.6232	1.6118	...	1.5691	1.5632	0.005925	1.5240	2B	1.535	1.553	1.5709	1.5786	0.0077	1.6250
(7)		3A	0.0000	1.6250	1.6136	...	1.5709	1.5665	0.004400	1.5258	3B	1.5350	1.5448	1.5709	1.5767	0.0058	1.6250
(7) $1\frac{5}{8}$ – 16 or 1.6250 – 16	UN	2A	0.0016	1.6234	1.6140	...	1.5828	1.5775	0.005251	1.5490	2B	1.557	1.571	1.5844	1.5912	0.0068	1.6250
		3A	0.0000	1.6250	1.6156	...	1.5844	1.5805	0.003900	1.5506	3B	1.5570	1.5659	1.5844	1.5895	0.0051	1.6250
(7) $1\frac{5}{8}$ – 18 or 1.6250 – 18	UNEF	2A	0.0015	1.6235	1.6148	...	1.5874	1.5824	0.005009	1.5573	2B	1.565	1.578	1.5889	1.5954	0.0065	1.6250
		3A	0.0000	1.6250	1.6163	...	1.5889	1.5851	0.003800	1.5588	3B	1.5650	1.5730	1.5889	1.5938	0.0049	1.6250

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
(7) $1\frac{5}{8}$ – 20 or 1.6250 – 20	UN	2A	0.0014	1.6236	1.6155	...	1.5911	1.5863	0.004806	1.5641	2B	1.571	1.582	1.5925	1.5987	0.0062	1.6250
		3A	0.0000	1.6250	1.6169	...	1.5925	1.5889	0.003600	1.5655	3B	1.5710	1.5786	1.5925	1.5972	0.0047	1.6250
$1\frac{11}{16}$ – 6 or 1.6875 – 6	UN	2A	0.0025	1.6850	1.6668	...	1.5767	1.5684	0.008278	1.4865	2B	1.507	1.538	1.5792	1.5900	0.0108	1.6875
		3A	0.0000	1.6875	1.6693	...	1.5792	1.5730	0.006200	1.4890	3B	1.5070	1.5271	1.5792	1.5873	0.0081	1.6875
$1\frac{11}{16}$ – 8 or 1.6875 – 8	UN	2A	0.0022	1.6853	1.6703	...	1.6041	1.5966	0.007485	1.5365	2B	1.552	1.577	1.6063	1.6160	0.0097	1.6875
		3A	0.0000	1.6875	1.6725	...	1.6063	1.6007	0.005600	1.5387	3B	1.5520	1.5672	1.6063	1.6136	0.0073	1.6875
(7) $1\frac{11}{16}$ – 12 or 1.6875 – 12	UN	2A	0.0018	1.6857	1.6743	...	1.6316	1.6257	0.005947	1.5865	2B	1.597	1.615	1.6334	1.6411	0.0077	1.6875
		3A	0.0000	1.6875	1.6761	...	1.6334	1.6289	0.004500	1.5883	3B	1.5970	1.6073	1.6334	1.6392	0.0058	1.6875
$1\frac{11}{16}$ – 16 or 1.6875 – 16	UN	2A	0.0016	1.6859	1.6765	...	1.6453	1.6400	0.005273	1.6115	2B	1.620	1.634	1.6469	1.6538	0.0069	1.6875
(7)		3A	0.0000	1.6875	1.6781	...	1.6469	1.6429	0.004000	1.6131	3B	1.6200	1.6284	1.6469	1.6520	0.0051	1.6875
(7) $1\frac{11}{16}$ – 18 or 1.6875 – 18	UNEF	2A	0.0015	1.6860	1.6773	...	1.6499	1.6449	0.005031	1.6198	2B	1.627	1.640	1.6514	1.6579	0.0065	1.6875
		3A	0.0000	1.6875	1.6788	...	1.6514	1.6476	0.003800	1.6213	3B	1.6270	1.6355	1.6514	1.6563	0.0049	1.6875
(7) $1\frac{11}{16}$ – 20 or 1.6875 – 20	UN	2A	0.0014	1.6861	1.6780	...	1.6536	1.6488	0.004828	1.6266	2B	1.633	1.645	1.6550	1.6613	0.0063	1.6875
(7)		3A	0.0000	1.6875	1.6794	...	1.6550	1.6514	0.003600	1.6280	3B	1.6330	1.6411	1.6550	1.6597	0.0047	1.6875
(7) $1\frac{3}{4}$ – 5 or 1.7500 – 5	UNC	1A	0.0027	1.7473	1.7165	...	1.6174	1.6040	0.013400	1.5091	1B	1.533	1.567	1.6201	1.6375	0.0174	1.7500
(7)		2A	0.0027	1.7473	1.7268	1.7165	1.6174	1.6085	0.008922	1.5091	2B	1.533	1.567	1.6201	1.6317	0.0116	1.7500
(7)		3A	0.0000	1.7500	1.7295	...	1.6201	1.6134	0.006700	1.5118	3B	1.5330	1.5575	1.6201	1.6288	0.0087	1.7500
$1\frac{3}{4}$ – 6 or 1.7500 – 6	UN	2A	0.0025	1.7475	1.7293	...	1.6392	1.6309	0.008335	1.5490	2B	1.570	1.600	1.6417	1.6525	0.0108	1.7500
		3A	0.0000	1.7500	1.7318	...	1.6417	1.6354	0.006300	1.5515	3B	1.5700	1.5896	1.6417	1.6498	0.0081	1.7500
$1\frac{3}{4}$ – 8 or 1.7500 – 8	UN	2A	0.0023	1.7477	1.7327	1.7252	1.6665	1.6590	0.007542	1.5989	2B	1.615	1.640	1.6688	1.6786	0.0098	1.7500
(7)		3A	0.0000	1.7500	1.7350	...	1.6688	1.6631	0.005700	1.6012	3B	1.6150	1.6297	1.6688	1.6762	0.0074	1.7500
$1\frac{3}{4}$ – 12 or 1.7500 – 12	UN	2A	0.0018	1.7482	1.7368	...	1.6941	1.6881	0.005969	1.6490	2B	1.660	1.678	1.6959	1.7037	0.0078	1.7500
		3A	0.0000	1.7500	1.7386	...	1.6959	1.6914	0.004500	1.6508	3B	1.6600	1.6698	1.6959	1.7017	0.0058	1.7500
$1\frac{3}{4}$ – 16 or 1.7500 – 16	UN	2A	0.0016	1.7484	1.7390	...	1.7078	1.7025	0.005295	1.6740	2B	1.682	1.696	1.7094	1.7163	0.0069	1.7500
(7)		3A	0.0000	1.7500	1.7406	...	1.7094	1.7054	0.004000	1.6756	3B	1.6820	1.6909	1.7094	1.7146	0.0052	1.7500
$1\frac{3}{4}$ – 20 or 1.7500 – 20	UN	2A	0.0015	1.7485	1.7404	...	1.7160	1.7112	0.004850	1.6890	2B	1.696	1.707	1.7175	1.7238	0.0063	1.7500
(7)		3A	0.0000	1.7500	1.7419	...	1.7175	1.7139	0.003600	1.6905	3B	1.6960	1.7036	1.7175	1.7222	0.0047	1.7500

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. Note (3)]	Pitch Diameter and Functional Diameter [Note 4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note 4)] Min.	Pitch Diameter and Functional Diameter [Note 4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$1\frac{13}{16}$ – 6 or 1.8125 – 6	UN	2A	0.0025	1.8100	1.7918	...	1.7017	1.6933	0.008391	1.6115	2B	1.632	1.663	1.7042	1.7151	0.0109	1.8125
		3A	0.0000	1.8125	1.7943	...	1.7042	1.6979	0.006300	1.6140	3B	1.6320	1.6521	1.7042	1.7124	0.0082	1.8125
$1\frac{13}{16}$ – 8 or 1.8125 – 8	UN	2A	0.0023	1.8102	1.7952	...	1.7290	1.7214	0.007598	1.6614	2B	1.677	1.702	1.7313	1.7412	0.0099	1.8125
		3A	0.0000	1.8125	1.7975	...	1.7313	1.7256	0.005700	1.6637	3B	1.6770	1.6922	1.7313	1.7387	0.0074	1.8125
$1\frac{13}{16}$ – 12 or 1.8125 – 12	UN	2A	0.0018	1.8107	1.7993	...	1.7566	1.7506	0.005990	1.7115	2B	1.722	1.740	1.7584	1.7662	0.0078	1.8125
		3A	0.0000	1.8125	1.8011	...	1.7584	1.7539	0.004500	1.7133	3B	1.7220	1.7323	1.7584	1.7642	0.0058	1.8125
$1\frac{13}{16}$ – 16 or 1.8125 – 16	UN	2A	0.0016	1.8109	1.8015	...	1.7703	1.7650	0.005316	1.7365	2B	1.745	1.759	1.7719	1.7788	0.0069	1.8125
(7)		3A	0.0000	1.8125	1.8031	...	1.7719	1.7679	0.004000	1.7381	3B	1.7450	1.7534	1.7719	1.7771	0.0052	1.8125
$1\frac{13}{16}$ – 20 or 1.8125 – 20	UN	2A	0.0015	1.8110	1.8029	...	1.7785	1.7736	0.004871	1.7515	2B	1.758	1.770	1.7800	1.7863	0.0063	1.8125
(7)		3A	0.0000	1.8125	1.8044	...	1.7800	1.7763	0.003700	1.7530	3B	1.7580	1.7661	1.7800	1.7847	0.0047	1.8125
$1\frac{7}{8}$ – 6 or 1.8750 – 6	UN	2A	0.0025	1.8725	1.8543	...	1.7642	1.7558	0.008447	1.6740	2B	1.695	1.725	1.7667	1.7777	0.0110	1.8750
		3A	0.0000	1.8750	1.8568	...	1.7667	1.7604	0.006300	1.6765	3B	1.6950	1.7146	1.7667	1.7749	0.0082	1.8750
$1\frac{7}{8}$ – 8 or 1.8750 – 8	UN	2A	0.0023	1.8727	1.8577	1.8502	1.7915	1.7838	0.007654	1.7239	2B	1.740	1.765	1.7938	1.8038	0.0100	1.8750
		3A	0.0000	1.8750	1.8600	...	1.7938	1.7881	0.005700	1.7262	3B	1.7400	1.7547	1.7938	1.8013	0.0075	1.8750
$1\frac{7}{8}$ – 12 or 1.8750 – 12	UN	2A	0.0018	1.8732	1.8618	...	1.8191	1.8131	0.006011	1.7740	2B	1.785	1.803	1.8209	1.8287	0.0078	1.8750
(7)		3A	0.0000	1.8750	1.8636	...	1.8209	1.8164	0.004500	1.7758	3B	1.7850	1.7948	1.8209	1.8268	0.0059	1.8750
$1\frac{7}{8}$ – 16 or 1.8750 – 16	UN	2A	0.0016	1.8734	1.8640	...	1.8328	1.8275	0.005337	1.7990	2B	1.807	1.821	1.8344	1.8413	0.0069	1.8750
(7)		3A	0.0000	1.8750	1.8656	...	1.8344	1.8304	0.004000	1.8006	3B	1.8070	1.8159	1.8344	1.8396	0.0052	1.8750
(7) $1\frac{7}{8}$ – 20 or 1.8750 – 20	UN	2A	0.0015	1.8735	1.8654	...	1.8410	1.8361	0.004892	1.8140	2B	1.821	1.832	1.8425	1.8489	0.0064	1.8750
(7)		3A	0.0000	1.8750	1.8669	...	1.8425	1.8388	0.003700	1.8155	3B	1.8210	1.8286	1.8425	1.8473	0.0048	1.8750
$1\frac{15}{16}$ – 6 or 1.9375 – 6	UN	2A	0.0026	1.9349	1.9167	...	1.8266	1.8181	0.008501	1.7364	2B	1.752	1.788	1.8292	1.8403	0.0111	1.9375
		3A	0.0000	1.9375	1.9193	...	1.8292	1.8228	0.006400	1.7390	3B	1.7570	1.7771	1.8292	1.8375	0.0083	1.9375
$1\frac{15}{16}$ – 8 or 1.9375 – 8	UN	2A	0.0023	1.9352	1.9202	...	1.8540	1.8463	0.007708	1.7864	2B	1.802	1.827	1.8563	1.8663	0.0100	1.9375
		3A	0.0000	1.9375	1.9225	...	1.8563	1.8505	0.005800	1.7887	3B	1.8020	1.8172	1.8563	1.8638	0.0075	1.9375
(7) $1\frac{15}{16}$ – 12 or 1.9375 – 12	UN	2A	0.0018	1.9357	1.9243	...	1.8816	1.8756	0.006031	1.8365	2B	1.847	1.865	1.8834	1.8912	0.0078	1.9375
		3A	0.0000	1.9375	1.9261	...	1.8834	1.8789	0.004500	1.8383	3B	1.8470	1.8573	1.8834	1.8893	0.0059	1.9375

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$1\frac{15}{16}$ – 16 or 1.9375 – 16	UN	2A	0.0016	1.9359	1.9265	...	1.8953	1.8899	0.005357	1.8615	2B	1.870	1.884	1.8969	1.9039	0.0070	1.9375
(7)		3A	0.0000	1.9375	1.9281	...	1.8969	1.8929	0.004000	1.8631	3B	1.8700	1.8784	1.8969	1.9021	0.0052	1.9375
$1\frac{15}{16}$ – 20 or 1.9375 – 20	UN	2A	0.0015	1.9360	1.9279	...	1.9035	1.8986	0.004912	1.8765	2B	1.883	1.895	1.9050	1.9114	0.0064	1.9375
(7)		3A	0.0000	1.9375	1.9294	...	1.9050	1.9013	0.003700	1.8780	3B	1.8830	1.8911	1.9050	1.9098	0.0048	1.9375
2 – 4.5 or 2.0000 – 4.5	UNC	1A	0.0029	1.9971	1.9641	...	1.8528	1.8385	0.014300	1.7325	1B	1.759	1.795	1.8557	1.8743	0.0186	2.0000
		2A	0.0029	1.9971	1.9751	1.9641	1.8528	1.8433	0.009514	1.7325	2B	1.759	1.795	1.8557	1.8681	0.0124	2.0000
		3A	0.0000	2.0000	1.9780	...	1.8557	1.8486	0.007100	1.7354	3B	1.7590	1.7861	1.8557	1.8650	0.0093	2.0000
2 – 6 or 2.0000 – 6	UN	2A	0.0026	1.9974	1.9792	...	1.8891	1.8805	0.008554	1.7989	2B	1.820	1.850	1.8917	1.9028	0.0111	2.0000
		3A	0.0000	2.0000	1.9818	...	1.8917	1.8853	0.006400	1.8015	3B	1.8200	1.8396	1.8917	1.9000	0.0083	2.0000
2 – 8 or 2.0000 – 8	UN	2A	0.0023	1.9977	1.9827	1.9752	1.9165	1.9087	0.007761	1.8489	2B	1.865	1.890	1.9188	1.9289	0.0101	2.0000
		3A	0.0000	2.0000	1.9850	...	1.9188	1.9130	0.005800	1.8512	3B	1.8650	1.8797	1.9188	1.9264	0.0076	2.0000
2 – 12 or 2.0000 – 12	UN	2A	0.0018	1.9982	1.9868	...	1.9441	1.9380	0.006051	1.8990	2B	1.910	1.928	1.9459	1.9538	0.0079	2.0000
		3A	0.0000	2.0000	1.9886	...	1.9459	1.9414	0.004500	1.9008	3B	1.9100	1.9198	1.9459	1.9518	0.0059	2.0000
2 – 16 or 2.0000 – 16	UN	2A	0.0016	1.9984	1.9890	...	1.9578	1.9524	0.005377	1.9240	2B	1.932	1.946	1.9594	1.9664	0.0070	2.0000
(7)		3A	0.0000	2.0000	1.9906	...	1.9594	1.9554	0.004000	1.9256	3B	1.9320	1.9409	1.9594	1.9646	0.0052	2.0000
2 – 20 or 2.0000 – 20	UN	2A	0.0015	1.9985	1.9904	...	1.9660	1.9611	0.004932	1.9390	2B	1.946	1.957	1.9675	1.9739	0.0064	2.0000
(7)		3A	0.0000	2.0000	1.9919	...	1.9675	1.9638	0.003700	1.9405	3B	1.9460	1.9536	1.9675	1.9723	0.0048	2.0000
$2\frac{1}{8}$ – 6 or 2.1250 – 6	UN	2A	0.0026	2.1224	2.1042	...	2.0141	2.0054	0.008658	1.9239	2B	1.945	1.975	2.0167	2.0280	0.0113	2.1250
		3A	0.0000	2.1250	2.1068	...	2.0167	2.0102	0.006500	1.9265	3B	1.9450	1.9646	2.0167	2.0251	0.0084	2.1250
$2\frac{1}{8}$ – 8 or 2.1250 – 8	UN	2A	0.0024	2.1226	2.1076	2.1001	2.0414	2.0335	0.007865	1.9738	2B	1.990	2.015	2.0438	2.0540	0.0102	2.1250
		3A	0.0000	2.1250	2.1100	...	2.0438	2.0379	0.005900	1.9762	3B	1.9900	2.0047	2.0438	2.0515	0.0077	2.1250
$2\frac{1}{8}$ – 12 or 2.1250 – 12	UN	2A	0.0018	2.1232	2.1118	...	2.0691	2.0630	0.006089	2.0240	2B	2.035	2.053	2.0709	2.0788	0.0079	2.1250
(7)		3A	0.0000	2.1250	2.1136	...	2.0709	2.0663	0.004600	2.0258	3B	2.0350	2.0448	2.0709	2.0768	0.0059	2.1250
$2\frac{1}{8}$ – 16 or 2.1250 – 16	UN	2A	0.0016	2.1234	2.1140	...	2.0828	2.0774	0.005415	2.0490	2B	2.057	2.071	2.0844	2.0914	0.0070	2.1250
(7)		3A	0.0000	2.1250	2.1156	...	2.0844	2.0803	0.004100	2.0506	3B	2.0570	2.0659	2.0844	2.0897	0.0053	2.1250
(7) $2\frac{1}{8}$ – 20 or 2.1250 – 20	UN	2A	0.0015	2.1235	2.1154	...	2.0910	2.0860	0.004970	2.0640	2B	2.071	2.082	2.0925	2.0990	0.0065	2.1250
(7)		3A	0.0000	2.1250	2.1169	...	2.0925	2.0888	0.003700	2.0655	3B	2.0710	2.0786	2.0925	2.0973	0.0048	2.1250

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$2\frac{1}{4}$ – 4.5 or 2.2500 – 4.5	UNC	1A	0.0029	2.2471	2.2141	...	2.1028	2.0882	0.014600	1.9825	1B	2.009	2.045	2.1057	2.1247	0.0190	2.2500
		2A	0.0029	2.2471	2.2251	2.2141	2.1028	2.0931	0.009719	1.9825	2B	2.009	2.045	2.1057	2.1183	0.0126	2.2500
		3A	0.0000	2.2500	2.2280	...	2.1057	2.0984	0.007300	1.9854	3B	2.0090	2.0361	2.1057	2.1152	0.0095	2.2500
$2\frac{1}{4}$ – 6 or 2.2500 – 6	UN	2A	0.0026	2.2474	2.2292	...	2.1391	2.1303	0.008759	2.0489	2B	2.070	2.100	2.1417	2.1531	0.0114	2.2500
		3A	0.0000	2.2500	2.2318	...	2.1417	2.1351	0.006600	2.0515	3B	2.0700	2.0896	2.1417	2.1502	0.0085	2.2500
$2\frac{1}{4}$ – 8 or 2.2500 – 8	UN	2A	0.0024	2.2476	2.2326	2.2251	2.1664	2.1584	0.007966	2.0988	2B	2.115	2.140	2.1688	2.1792	0.0104	2.2500
		3A	0.0000	2.2500	2.2350	...	2.1688	2.1628	0.006000	2.1012	3B	2.1150	2.1297	2.1688	2.1766	0.0078	2.2500
(7) $2\frac{1}{4}$ – 12 or 2.2500 – 12	UN	2A	0.0018	2.2482	2.2368	...	2.1941	2.1880	0.006127	2.1490	2B	2.160	2.178	2.1959	2.2039	0.0080	2.2500
(7)		3A	0.0000	2.2500	2.2386	...	2.1959	2.1913	0.004600	2.1508	3B	2.1600	2.1698	2.1959	2.2019	0.0060	2.2500
(7) $2\frac{1}{4}$ – 16 or 2.2500 – 16	UN	2A	0.0016	2.2484	2.2390	...	2.2078	2.2023	0.005453	2.1740	2B	2.182	2.196	2.2094	2.2165	0.0071	2.2500
(7)		3A	0.0000	2.2500	2.2406	...	2.2094	2.2053	0.004100	2.1756	3B	2.1820	2.1909	2.2094	2.2147	0.0053	2.2500
(7) $2\frac{1}{4}$ – 20 or 2.2500 – 20	UN	2A	0.0015	2.2485	2.2404	...	2.2160	2.2110	0.005008	2.1890	2B	2.196	2.207	2.2175	2.2240	0.0065	2.2500
(7)		3A	0.0000	2.2500	2.2419	...	2.2175	2.2137	0.003800	2.1905	3B	2.1960	2.2036	2.2175	2.2224	0.0049	2.2500
(7) $2\frac{3}{8}$ – 6 or 2.3750 – 6	UN	2A	0.0027	2.3723	2.3541	...	2.2640	2.2551	0.008856	2.1738	2B	2.195	2.225	2.2667	2.2782	0.0115	2.3750
		3A	0.0000	2.3750	2.3568	...	2.2667	2.2601	0.006600	2.1765	3B	2.1950	2.2146	2.2667	2.2753	0.0086	2.3750
$2\frac{3}{8}$ – 8 or 2.3750 – 8	UN	2A	0.0024	2.3726	2.3576	...	2.2914	2.2833	0.008063	2.2238	2B	2.240	2.265	2.2938	2.3043	0.0105	2.3750
		3A	0.0000	2.3750	2.3600	...	2.2938	2.2878	0.006000	2.2262	3B	2.2400	2.2547	2.2938	2.3017	0.0079	2.3750
(7) $2\frac{3}{8}$ – 12 or 2.3750 – 12	UN	2A	0.0018	2.3732	2.3618	...	2.3191	2.3129	0.006162	2.2740	2B	2.285	2.303	2.3209	2.3289	0.0080	2.3750
		3A	0.0000	2.3750	2.3636	...	2.3209	2.3163	0.004600	2.2758	3B	2.2850	2.2948	2.3209	2.3269	0.0060	2.3750
(7) $2\frac{3}{8}$ – 16 or 2.3750 – 16	UN	2A	0.0016	2.3734	2.3640	...	2.3328	2.3273	0.005488	2.2990	2B	2.307	2.321	2.3344	2.3415	0.0071	2.3750
(7)		3A	0.0000	2.3750	2.3656	...	2.3344	2.3303	0.004100	2.3006	3B	2.3070	2.3159	2.3344	2.3398	0.0054	2.3750
(7) $2\frac{3}{8}$ – 20 or 2.3750 – 20	UN	2A	0.0015	2.3735	2.3654	...	2.3410	2.3360	0.005043	2.3140	2B	2.321	2.332	2.3425	2.3491	0.0066	2.3750
(7)		3A	0.0000	2.3750	2.3669	...	2.3425	2.3387	0.003800	2.3155	3B	2.3210	2.3286	2.3425	2.3474	0.0049	2.3750
$2\frac{1}{2}$ – 4 or 2.5000 – 4	UNC	1A	0.0031	2.4969	2.4612	...	2.3345	2.3190	0.015500	2.1992	1B	2.229	2.267	2.3376	2.3578	0.0202	2.5000
		2A	0.0031	2.4969	2.4731	2.4612	2.3345	2.3241	0.010361	2.1992	2B	2.229	2.267	2.3376	2.3511	0.0135	2.5000
		3A	0.0000	2.5000	2.4762	...	2.3376	2.3298	0.007800	2.2023	3B	2.2290	2.2594	2.3376	2.3477	0.0101	2.5000

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$2\frac{1}{2}$ – 6 or 2.5000 – 6	UN	2A	0.0027	2.4973	2.4791	...	2.3890	2.3800	0.008951	2.2988	2B	2.320	2.350	2.3917	2.4033	0.0116	2.5000
		3A	0.0000	2.5000	2.4818	...	2.3917	2.3850	0.006700	2.3015	3B	2.3200	2.3396	2.3917	2.4004	0.0087	2.5000
$2\frac{1}{2}$ – 8 or 2.5000 – 8	UN	2A	0.0024	2.4976	2.4826	2.4751	2.4164	2.4082	0.008158	2.3488	2B	2.365	2.390	2.4188	2.4294	0.0106	2.5000
		3A	0.0000	2.5000	2.4850	...	2.4188	2.4127	0.006100	2.3512	3B	2.3650	2.3797	2.4188	2.4268	0.0080	2.5000
$2\frac{1}{2}$ – 12 or 2.5000 – 12	UN	2A	0.0019	2.4981	2.4867	...	2.4440	2.4378	0.006197	2.3989	2B	2.410	2.428	2.4459	2.4540	0.0081	2.5000
		3A	0.0000	2.5000	2.4886	...	2.4459	2.4413	0.004600	2.4008	3B	2.4100	2.4198	2.4459	2.4519	0.0060	2.5000
$2\frac{1}{2}$ – 16 or 2.5000 – 16	UN	2A	0.0017	2.4983	2.4889	...	2.4577	2.4522	0.005523	2.4239	2B	2.432	2.446	2.4594	2.4666	0.0072	2.5000
(7)		3A	0.0000	2.5000	2.4906	...	2.4594	2.4553	0.004100	2.4256	3B	2.4320	2.4409	2.4594	2.4648	0.0054	2.5000
$2\frac{1}{2}$ – 20 or 2.5000 – 20	UN	2A	0.0015	2.4985	2.4904	...	2.4660	2.4609	0.005078	2.4390	2B	2.446	2.457	2.4675	2.4741	0.0066	2.5000
(7)		3A	0.0000	2.5000	2.4919	...	2.4675	2.4637	0.003800	2.4405	3B	2.4460	2.4536	2.4675	2.4725	0.0050	2.5000
$2\frac{5}{8}$ – 6 or 2.6250 – 6	UN	2A	0.0027	2.6223	2.6041	...	2.5140	2.5050	0.009042	2.4238	2B	2.445	2.475	2.5167	2.5285	0.0118	2.6250
		3A	0.0000	2.6250	2.6068	...	2.5167	2.5099	0.006800	2.4265	3B	2.4450	2.4646	2.5167	2.5255	0.0088	2.6250
$2\frac{5}{8}$ – 8 or 2.6250 – 8	UN	2A	0.0025	2.6225	2.6075	...	2.5413	2.5331	0.008249	2.4737	2B	2.490	2.515	2.5438	2.5545	0.0107	2.6250
		3A	0.0000	2.6250	2.6100	...	2.5438	2.5376	0.006200	2.4762	3B	2.4900	2.5047	2.5438	2.5518	0.0080	2.6250
(7) $2\frac{5}{8}$ – 12 or 2.6250 – 12	UN	2A	0.0019	2.6231	2.6117	...	2.5690	2.5628	0.006230	2.5239	2B	2.535	2.553	2.5709	2.5790	0.0081	2.6250
		3A	0.0000	2.6250	2.6136	...	2.5709	2.5662	0.004700	2.5258	3B	2.5350	2.5448	2.5709	2.5770	0.0061	2.6250
(7) $2\frac{5}{8}$ – 16 or 2.6250 – 16	UN	2A	0.0017	2.6233	2.6139	...	2.5827	2.5771	0.005556	2.5489	2B	2.557	2.571	2.5844	2.5916	0.0072	2.6250
(7)		3A	0.0000	2.6250	2.6156	...	2.5844	2.5802	0.004200	2.5506	3B	2.5570	2.5659	2.5844	2.5898	0.0054	2.6250
$2\frac{5}{8}$ – 20 or 2.6250 – 20	UN	2A	0.0015	2.6235	2.6154	...	2.5910	2.5859	0.005111	2.5640	2B	2.571	2.582	2.5925	2.5991	0.0066	2.6250
(7)		3A	0.0000	2.6250	2.6169	...	2.5925	2.5887	0.003800	2.5655	3B	2.5710	2.5786	2.5925	2.5975	0.0050	2.6250
$2\frac{3}{4}$ – 4 or 2.7500 – 4	UNC	1A	0.0032	2.7468	2.7111	...	2.5844	2.5686	0.015800	2.4491	1B	2.479	2.517	2.5876	2.6082	0.0206	2.7500
		2A	0.0032	2.7468	2.7230	2.7111	2.5844	2.5739	0.010542	2.4491	2B	2.479	2.517	2.5876	2.6013	0.0137	2.7500
		3A	0.0000	2.7500	2.7262	...	2.5876	2.5797	0.007900	2.4523	3B	2.4790	2.5094	2.5876	2.5979	0.0103	2.7500
$2\frac{3}{4}$ – 6 or 2.7500 – 6	UN	2A	0.0027	2.7473	2.7291	...	2.6390	2.6299	0.009132	2.5488	2B	2.570	2.600	2.6417	2.6536	0.0119	2.7500
		3A	0.0000	2.7500	2.7318	...	2.6417	2.6349	0.006800	2.5515	3B	2.5700	2.5896	2.6417	2.6506	0.0089	2.7500
$2\frac{3}{4}$ – 8 or 2.7500 – 8	UN	2A	0.0025	2.7475	2.7325	2.7250	2.6663	2.6580	0.008339	2.5987	2B	2.615	2.640	2.6688	2.6796	0.0108	2.7500
		3A	0.0000	2.7500	2.7350	...	2.6688	2.6625	0.006300	2.6012	3B	2.6150	2.6297	2.6688	2.6769	0.0081	2.7500

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
(7) $2\frac{3}{4}$ – 12 or 2.7500 – 12	UN	2A	0.0019	2.7481	2.7367	...	2.6940	2.6877	0.006263	2.6489	2B	2.660	2.678	2.6959	2.7040	0.0081	2.7500
(7)		3A	0.0000	2.7500	2.7386	...	2.6959	2.6912	0.004700	2.6508	3B	2.6600	2.6698	2.6959	2.7020	0.0061	2.7500
(7) $2\frac{3}{4}$ – 16 or 2.7500 – 16	UN	2A	0.0017	2.7483	2.7389	...	2.7077	2.7021	0.005589	2.6739	2B	2.682	2.696	2.7094	2.7167	0.0073	2.7500
(7)		3A	0.0000	2.7500	2.7406	...	2.7094	2.7052	0.004200	2.6756	3B	2.6820	2.6909	2.7094	2.7148	0.0054	2.7500
(7) $2\frac{3}{4}$ – 20 or 2.7500 – 20	UN	2A	0.0015	2.7485	2.7404	...	2.7160	2.7109	0.005144	2.6890	2B	2.696	2.707	2.7175	2.7242	0.0067	2.7500
(7)		3A	0.0000	2.7500	2.7419	...	2.7175	2.7136	0.003900	2.6905	3B	2.6960	2.7036	2.7175	2.7225	0.0050	2.7500
$2\frac{7}{8}$ – 6 or 2.8750 – 6	UN	2A	0.0028	2.8722	2.8540	...	2.7639	2.7547	0.009219	2.6737	2B	2.695	2.725	2.7667	2.7787	0.0120	2.8750
		3A	0.0000	2.8750	2.8568	...	2.7667	2.7598	0.006900	2.6765	3B	2.6950	2.7146	2.7667	2.7757	0.0090	2.8750
$2\frac{7}{8}$ – 8 or 2.8750 – 8	UN	2A	0.0025	2.8725	2.8575	...	2.7913	2.7829	0.008426	2.7237	2B	2.740	2.765	2.7938	2.8048	0.0110	2.8750
		3A	0.0000	2.8750	2.8600	...	2.7938	2.7875	0.006300	2.7262	3B	2.7400	2.7547	2.7938	2.8020	0.0082	2.8750
$2\frac{7}{8}$ – 12 or 2.8750 – 12	UN	2A	0.0019	2.8731	2.8617	...	2.8190	2.8127	0.006294	2.7739	2B	2.785	2.803	2.8209	2.8291	0.0082	2.8750
(7)		3A	0.0000	2.8750	2.8636	...	2.8209	2.8162	0.004700	2.7758	3B	2.7850	2.7948	2.8209	2.8270	0.0061	2.8750
$2\frac{7}{8}$ – 16 or 2.8750 – 16	UN	2A	0.0017	2.8733	2.8639	...	2.8327	2.8271	0.005620	2.7989	2B	2.807	2.821	2.8344	2.8417	0.0073	2.8750
(7)		3A	0.0000	2.8750	2.8656	...	2.8344	2.8302	0.004200	2.8006	3B	2.8070	2.8159	2.8344	2.8399	0.0055	2.8750
(7) $2\frac{7}{8}$ – 20 or 2.8750 – 20	UN	2A	0.0016	2.8734	2.8653	...	2.8409	2.8357	0.005175	2.8139	2B	2.821	2.832	2.8425	2.8492	0.0067	2.8750
(7)		3A	0.0000	2.8750	2.8669	...	2.8425	2.8386	0.003900	2.8155	3B	2.8210	2.8286	2.8425	2.8475	0.0050	2.8750
3 – 4 or 3.0000 – 4	UNC	1A	0.0032	2.9968	2.9611	...	2.8344	2.8183	0.016100	2.6991	1B	2.729	2.767	2.8376	2.8585	0.0209	3.0000
		2A	0.0032	2.9968	2.9730	2.9611	2.8344	2.8237	0.010714	2.6991	2B	2.729	2.767	2.8376	2.8515	0.0139	3.0000
		3A	0.0000	3.0000	2.9762	...	2.8376	2.8296	0.008000	2.7023	3B	2.7290	2.7594	2.8376	2.8480	0.0104	3.0000
3 – 6 or 3.0000 – 6	UN	2A	0.0028	2.9972	2.9790	...	2.8889	2.8796	0.009304	2.7987	2B	2.820	2.850	2.8917	2.9038	0.0121	3.0000
		3A	0.0000	3.0000	2.9818	...	2.8917	2.8847	0.007000	2.8015	3B	2.8200	2.8396	2.8917	2.9008	0.0091	3.0000
3 – 8 or 3.0000 – 8	UN	2A	0.0026	2.9974	2.9824	2.9749	2.9162	2.9077	0.008511	2.8486	2B	2.865	2.890	2.9188	2.9299	0.0111	3.0000
		3A	0.0000	3.0000	2.9850	...	2.9188	2.9124	0.006400	2.8512	3B	2.8650	2.8797	2.9188	2.9271	0.0083	3.0000
3 – 12 or 3.0000 – 12	UN	2A	0.0019	2.9981	2.9867	...	2.9440	2.9377	0.006324	2.8989	2B	2.910	2.928	2.9459	2.9541	0.0082	3.0000
		3A	0.0000	3.0000	2.9886	...	2.9459	2.9412	0.004700	2.9008	3B	2.9100	2.9198	2.9459	2.9521	0.0062	3.0000
(7) 3 – 16 or 3.0000 – 16	UN	2A	0.0017	2.9983	2.9889	...	2.9577	2.9521	0.005650	2.9239	2B	2.932	2.946	2.9594	2.9667	0.0073	3.0000
(7)		3A	0.0000	3.0000	2.9906	...	2.9594	2.9552	0.004200	2.9256	3B	2.9320	2.9409	2.9594	2.9649	0.0055	3.0000

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
3 – 20 or 3.0000 – 20	UN	2A	0.0016	2.9984	2.9903	...	2.9659	2.9607	0.005205	2.9389	2B	2.946	2.957	2.9675	2.9743	0.0068	3.0000
(7)		3A	0.0000	3.0000	2.9919	...	2.9675	2.9636	0.003900	2.9405	3B	2.9460	2.9536	2.9675	2.9726	0.0051	3.0000
$3\frac{1}{8}$ – 6 or 3.1250 – 6	UN	2A	0.0028	3.1222	3.1040	...	3.0139	3.0045	0.009388	2.9237	2B	2.945	2.975	3.0167	3.0289	0.0122	3.1250
		3A	0.0000	3.1250	3.1068	...	3.0167	3.0097	0.007000	2.9265	3B	2.9450	2.9646	3.0167	3.0259	0.0092	3.1250
$3\frac{1}{8}$ – 8 or 3.1250 – 8	UN	2A	0.0026	3.1224	3.1074	...	3.0412	3.0326	0.008595	2.9736	2B	2.990	3.015	3.0438	3.0550	0.0112	3.1250
		3A	0.0000	3.1250	3.1100	...	3.0438	3.0374	0.006400	2.9762	3B	2.9900	3.0047	3.0438	3.0522	0.0084	3.1250
(7) $3\frac{1}{8}$ – 12 or 3.1250 – 12	UN	2A	0.0019	3.1231	3.1117	...	3.0690	3.0626	0.006354	3.0239	2B	3.035	3.053	3.0709	3.0792	0.0083	3.1250
(7)		3A	0.0000	3.1250	3.1136	...	3.0709	3.0661	0.004800	3.0258	3B	3.0350	3.0448	3.0709	3.0771	0.0062	3.1250
(7) $3\frac{1}{8}$ – 16 or 3.1250 – 16	UN	2A	0.0017	3.1233	3.1139	...	3.0827	3.0770	0.005680	3.0489	2B	3.057	3.071	3.0844	3.0918	0.0074	3.1250
(7)		3A	0.0000	3.1250	3.1156	...	3.0844	3.0801	0.004300	3.0506	3B	3.0570	3.0659	3.0844	3.0899	0.0055	3.1250
$3\frac{1}{4}$ – 4 or 3.2500 – 4	UNC	1A	0.0033	3.2467	3.2110	...	3.0843	3.0680	0.016300	2.9490	1B	2.979	3.017	3.0876	3.1088	0.0212	3.2500
		2A	0.0033	3.2467	3.2229	3.2110	3.0843	3.0734	0.010879	2.9490	2B	2.979	3.017	3.0876	3.1017	0.0141	3.2500
		3A	0.0000	3.2500	3.2262	...	3.0876	3.0794	0.008200	2.9523	3B	2.9790	3.0094	3.0876	3.0982	0.0106	3.2500
$3\frac{1}{4}$ – 6 or 3.2500 – 6	UN	2A	0.0028	3.2472	3.2290	...	3.1389	3.1294	0.009469	3.0487	2B	3.070	3.100	3.1417	3.1540	0.0123	3.2500
		3A	0.0000	3.2500	3.2318	...	3.1417	3.1346	0.007100	3.0515	3B	3.0700	3.0896	3.1417	3.1509	0.0092	3.2500
$3\frac{1}{4}$ – 8 or 3.2500 – 8	UN	2A	0.0026	3.2474	3.2324	3.2249	3.1662	3.1575	0.008676	3.0986	2B	3.115	3.140	3.1688	3.1801	0.0113	3.2500
		3A	0.0000	3.2500	3.2350	...	3.1688	3.1623	0.006500	3.1012	3B	3.1150	3.1297	3.1688	3.1773	0.0085	3.2500
(7) $3\frac{1}{4}$ – 12 or 3.2500 – 12	UN	2A	0.0019	3.2481	3.2367	...	3.1940	3.1876	0.006383	3.1489	2B	3.160	3.178	3.1959	3.2042	0.0083	3.2500
(7)		3A	0.0000	3.2500	3.2386	...	3.1959	3.1911	0.004800	3.1508	3B	3.1600	3.1698	3.1959	3.2021	0.0062	3.2500
(7) $3\frac{1}{4}$ – 16 or 3.2500 – 16	UN	2A	0.0017	3.2483	3.2389	...	3.2077	3.2020	0.005709	3.1739	2B	3.182	3.196	3.2094	3.2168	0.0074	3.2500
(7)		3A	0.0000	3.2500	3.2406	...	3.2094	3.2051	0.004300	3.1756	3B	3.1820	3.1909	3.2094	3.2150	0.0056	3.2500
$3\frac{3}{8}$ – 6 or 3.3750 – 6	UN	2A	0.0029	3.3721	3.3539	...	3.2638	3.2543	0.009549	3.1736	2B	3.195	3.225	3.2667	3.2791	0.0124	3.3750
		3A	0.0000	3.3750	3.3568	...	3.2667	3.2595	0.007200	3.1765	3B	3.1950	3.2146	3.2667	3.2760	0.0093	3.3750
$3\frac{3}{8}$ – 8 or 3.3750 – 8	UN	2A	0.0026	3.3724	3.3574	...	3.2912	3.2824	0.008756	3.2236	2B	3.240	3.265	3.2938	3.3052	0.0114	3.3750
		3A	0.0000	3.3750	3.3600	...	3.2938	3.2872	0.006600	3.2262	3B	3.2400	3.2547	3.2938	3.3023	0.0085	3.3750
(7) $3\frac{3}{8}$ – 12 or 3.3750 – 12	UN	2A	0.0019	3.3731	3.3617	...	3.3190	3.3126	0.006411	3.2739	2B	3.285	3.303	3.3209	3.3292	0.0083	3.3750
		3A	0.0000	3.3750	3.3636	...	3.3209	3.3161	0.004800	3.2758	3B	3.2850	3.2948	3.3209	3.3272	0.0063	3.3750

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
(7) $3\frac{3}{8}$ – 16 or 3.3750 – 16	UN	2A	0.0017	3.3733	3.3639	...	3.3327	3.3270	0.005737	3.2989	2B	3.307	3.321	3.3344	3.3419	0.0075	3.3750
(7)		3A	0.0000	3.3750	3.3656	...	3.3344	3.3301	0.004300	3.3006	3B	3.3070	3.3159	3.3344	3.3400	0.0056	3.3750
$3\frac{1}{2}$ – 4 or 3.5000 – 4	UNC	1A	0.0033	3.4967	3.4610	...	3.3343	3.3177	0.016600	3.1990	1B	3.229	3.267	3.3376	3.3591	0.0215	3.5000
		2A	0.0033	3.4967	3.4729	3.4610	3.3343	3.3233	0.011036	3.1990	2B	3.229	3.267	3.3376	3.3519	0.0143	3.5000
		3A	0.0000	3.5000	3.4762	...	3.3376	3.3293	0.008300	3.2023	3B	3.2290	3.2594	3.3376	3.3484	0.0108	3.5000
$3\frac{1}{2}$ – 6 or 3.5000 – 6	UN	2A	0.0029	3.4971	3.4789	...	3.3888	3.3792	0.009626	3.2986	2B	3.320	3.350	3.3917	3.4042	0.0125	3.5000
		3A	0.0000	3.5000	3.4818	...	3.3917	3.3845	0.007200	3.3015	3B	3.3200	3.3396	3.3917	3.4011	0.0094	3.5000
$3\frac{1}{2}$ – 8 or 3.5000 – 8	UN	2A	0.0026	3.4974	3.4824	3.4749	3.4162	3.4074	0.008833	3.3486	2B	3.365	3.390	3.4188	3.4303	0.0115	3.5000
		3A	0.0000	3.5000	3.4850	...	3.4188	3.4122	0.006600	3.3512	3B	3.3650	3.3797	3.4188	3.4274	0.0086	3.5000
$3\frac{1}{2}$ – 12 or 3.5000 – 12	UN	2A	0.0019	3.4981	3.4867	...	3.4440	3.4376	0.006438	3.3989	2B	3.410	3.428	3.4459	3.4543	0.0084	3.5000
		3A	0.0000	3.5000	3.4886	...	3.4459	3.4411	0.004800	3.4008	3B	3.4100	3.4198	3.4459	3.4522	0.0063	3.5000
$3\frac{1}{2}$ – 16 or 3.5000 – 16	UN	2A	0.0017	3.4983	3.4889	...	3.4577	3.4519	0.005764	3.4239	2B	3.432	3.446	3.4594	3.4669	0.0075	3.5000
(7)		3A	0.0000	3.5000	3.4906	...	3.4594	3.4551	0.004300	3.4256	3B	3.4320	3.4409	3.4594	3.4650	0.0056	3.5000
$3\frac{5}{8}$ – 6 or 3.6250 – 6	UN	2A	0.0029	3.6221	3.6039	...	3.5138	3.5041	0.009703	3.4236	2B	3.445	3.475	3.5167	3.5293	0.0126	3.6250
		3A	0.0000	3.6250	3.6068	...	3.5167	3.5094	0.007300	3.4265	3B	3.4450	3.4646	3.5167	3.5262	0.0095	3.6250
$3\frac{5}{8}$ – 8 or 3.6250 – 8	UN	2A	0.0027	3.6223	3.6073	...	3.5411	3.5322	0.008910	3.4735	2B	3.490	3.515	3.5438	3.5554	0.0116	3.6250
		3A	0.0000	3.6250	3.6100	...	3.5438	3.5371	0.006700	3.4762	3B	3.4900	3.5047	3.5438	3.5525	0.0087	3.6250
$3\frac{5}{8}$ – 12 or 3.6250 – 12	UN	2A	0.0019	3.6231	3.6117	...	3.5690	3.5625	0.006465	3.5239	2B	3.535	3.553	3.5709	3.5793	0.0084	3.6250
(7)		3A	0.0000	3.6250	3.6136	...	3.5709	3.5661	0.004800	3.5258	3B	3.5350	3.5448	3.5709	3.5772	0.0063	3.6250
(7) $3\frac{5}{8}$ – 16 or 3.6250 – 16	UN	2A	0.0017	3.6233	3.6139	...	3.5827	3.5769	0.005791	3.5489	2B	3.557	3.571	3.5844	3.5919	0.0075	3.6250
		3A	0.0000	3.6250	3.6156	...	3.5844	3.5801	0.004300	3.5506	3B	3.5570	3.5659	3.5844	3.5900	0.0056	3.6250
$3\frac{3}{4}$ – 4 or 3.7500 – 4	UNC	1A	0.0034	3.7466	3.7109	...	3.5842	3.5674	0.016800	3.4489	1B	3.479	3.517	3.5876	3.6094	0.0218	3.7500
		2A	0.0034	3.7466	3.7228	3.7109	3.5842	3.5730	0.011188	3.4489	2B	3.479	3.517	3.5876	3.6021	0.0145	3.7500
		3A	0.0000	3.7500	3.7262	...	3.5876	3.5792	0.008400	3.4523	3B	3.4790	3.5094	3.5876	3.5985	0.0109	3.7500
$3\frac{3}{4}$ – 6 or 3.7500 – 6	UN	2A	0.0029	3.7471	3.7289	...	3.6388	3.6290	0.009778	3.5486	2B	3.570	3.600	3.6417	3.6544	0.0127	3.7500
		3A	0.0000	3.7500	3.7318	...	3.6417	3.6344	0.007300	3.5515	3B	3.5700	3.5896	3.6417	3.6512	0.0095	3.7500

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$3\frac{3}{4}$ – 8 or 3.7500 – 8	UN	2A	0.0027	3.7473	3.7323	3.7248	3.6661	3.6571	0.008985	3.5985	2B	3.615	3.640	3.6688	3.6805	0.0117	3.7500
		3A	0.0000	3.7500	3.7350	...	3.6688	3.6621	0.006700	3.6012	3B	3.6150	3.6297	3.6688	3.6776	0.0088	3.7500
(7) $3\frac{3}{4}$ – 12 or 3.7500 – 12	UN	2A	0.0019	3.7481	3.7367	...	3.6940	3.6875	0.006491	3.6489	2B	3.660	3.678	3.6959	3.7043	0.0084	3.7500
(7)		3A	0.0000	3.7500	3.7386	...	3.6959	3.6910	0.004900	3.6508	3B	3.6600	3.6698	3.6959	3.7022	0.0063	3.7500
(7) $3\frac{3}{4}$ – 16 or 3.7500 – 16	UN	2A	0.0017	3.7483	3.7389	...	3.7077	3.7019	0.005817	3.6739	2B	3.682	3.696	3.7094	3.7170	0.0076	3.7500
(7)		3A	0.0000	3.7500	3.7406	...	3.7094	3.7050	0.004400	3.6756	3B	3.6820	3.6909	3.7094	3.7151	0.0057	3.7500
$3\frac{7}{8}$ – 6 or 3.8750 – 6	UN	2A	0.0030	3.8720	3.8538	...	3.7637	3.7538	0.009852	3.6735	2B	3.695	3.725	3.7667	3.7795	0.0128	3.8750
		3A	0.0000	3.8750	3.8568	...	3.7667	3.7593	0.007400	3.6765	3B	3.6950	3.7146	3.7667	3.7763	0.0096	3.8750
$3\frac{7}{8}$ – 8 or 3.8750 – 8	UN	2A	0.0027	3.8723	3.8573	...	3.7911	3.7820	0.009059	3.7235	2B	3.740	3.765	3.7938	3.8056	0.0118	3.8750
		3A	0.0000	3.8750	3.8600	...	3.7938	3.7870	0.006800	3.7262	3B	3.7400	3.7547	3.7938	3.8026	0.0088	3.8750
$3\frac{7}{8}$ – 12 or 3.8750 – 12	UN	2A	0.0020	3.8730	3.8616	...	3.8189	3.8124	0.006517	3.7738	2B	3.785	3.803	3.8209	3.8294	0.0085	3.8750
		3A	0.0000	3.8750	3.8636	...	3.8209	3.8160	0.004900	3.7758	3B	3.7850	3.7948	3.8209	3.8273	0.0064	3.8750
(7) $3\frac{7}{8}$ – 16 or 3.8750 – 16	UN	2A	0.0018	3.8732	3.8638	...	3.8326	3.8268	0.005843	3.7988	2B	3.807	3.821	3.8344	3.8420	0.0076	3.8750
(7)		3A	0.0000	3.8750	3.8656	...	3.8344	3.8300	0.004400	3.8006	3B	3.8070	3.8159	3.8344	3.8401	0.0057	3.8750
4 – 4 or 4.0000 – 4	UNC	1A	0.0034	3.9966	3.9609	...	3.8342	3.8172	0.017000	3.6989	1B	3.729	3.767	3.8376	3.8597	0.0221	4.0000
		2A	0.0034	3.9966	3.9728	3.9609	3.8342	3.8229	0.011334	3.6989	2B	3.729	3.767	3.8376	3.8523	0.0147	4.0000
		3A	0.0000	4.0000	3.9762	...	3.8376	3.8291	0.008500	3.7023	3B	3.7290	3.7594	3.8376	3.8487	0.0111	4.0000
4 – 6 or 4.0000 – 6	UN	2A	0.0030	3.9970	3.9788	...	3.8887	3.8788	0.009924	3.7985	2B	3.820	3.850	3.8917	3.9046	0.0129	4.0000
		3A	0.0000	4.0000	3.9818	...	3.8917	3.8843	0.007400	3.8015	3B	3.8200	3.8396	3.8917	3.9014	0.0097	4.0000
4 – 8 or 4.0000 – 8	UN	2A	0.0027	3.9973	3.9823	3.9748	3.9161	3.9070	0.009131	3.8485	2B	3.865	3.890	3.9188	3.9307	0.0119	4.0000
		3A	0.0000	4.0000	3.9850	...	3.9188	3.9120	0.006800	3.8512	3B	3.8650	3.8797	3.9188	3.9277	0.0089	4.0000
4 – 12 or 4.0000 – 12	UN	2A	0.0020	3.9980	3.9866	...	3.9439	3.9374	0.006542	3.8988	2B	3.910	3.928	3.9459	3.9544	0.0085	4.0000
		3A	0.0000	4.0000	3.9886	...	3.9459	3.9410	0.004900	3.9008	3B	3.9100	3.9198	3.9459	3.9523	0.0064	4.0000
4 – 16 or 4.0000 – 16	UN	2A	0.0018	3.9982	3.9888	...	3.9576	3.9517	0.005868	3.9238	2B	3.932	3.946	3.9594	3.9670	0.0076	4.0000
(7)		3A	0.0000	4.0000	3.9906	...	3.9594	3.9550	0.004400	3.9256	3B	3.9320	3.9409	3.9594	3.9651	0.0057	4.0000
$4\frac{1}{8}$ – 6 or 4.1250 – 6	UN	2A	0.0030	4.1220	4.1038	...	4.0137	4.0037	0.009996	3.9235	2B	3.945	3.975	4.0167	4.0297	0.0130	4.1250
		3A	0.0000	4.1250	4.1068	...	4.0167	4.0092	0.007500	3.9265	3B	3.9450	3.9646	4.0167	4.0264	0.0097	4.1250

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$4\frac{1}{8}$ – 8 or 4.1250 – 8	UN	2A	0.0028	4.1222	4.1072	...	4.0410	4.0318	0.009203	3.9734	2B	3.990	4.015	4.0438	4.0558	0.0120	4.1250
		3A	0.0000	4.1250	4.1100	...	4.0438	4.0369	0.006900	3.9762	3B	3.9900	4.0047	4.0438	4.0528	0.0090	4.1250
(7) $4\frac{1}{8}$ – 12 or 4.1250 – 12	UN	2A	0.0020	4.1230	4.1116	...	4.0689	4.0623	0.006567	4.0238	2B	4.035	4.053	4.0709	4.0794	0.0085	4.1250
		3A	0.0000	4.1250	4.1136	...	4.0709	4.0660	0.004900	4.0258	3B	4.0350	4.0448	4.0709	4.0773	0.0064	4.1250
(7) $4\frac{1}{8}$ – 16 or 4.1250 – 16	UN	2A	0.0018	4.1232	4.1138	...	4.0826	4.0767	0.005893	4.0488	2B	4.057	4.071	4.0844	4.0921	0.0077	4.1250
(7)		3A	0.0000	4.1250	4.1156	...	4.0844	4.0800	0.004400	4.0506	3B	4.0570	4.0659	4.0844	4.0901	0.0057	4.1250
$4\frac{1}{4}$ – 4 or 4.2500 – 4	UN	2A	0.0034	4.2466	4.2228	...	4.0842	4.0727	0.011475	3.9489	2B	3.979	4.017	4.0876	4.1025	0.0149	4.2500
		3A	0.0000	4.2500	4.2262	...	4.0876	4.0790	0.008600	3.9523	3B	3.9790	4.0094	4.0876	4.0988	0.0112	4.2500
$4\frac{1}{4}$ – 6 or 4.2500 – 6	UN	2A	0.0030	4.2470	4.2288	...	4.1387	4.1286	0.010065	4.0485	2B	4.070	4.100	4.1417	4.1548	0.0131	4.2500
		3A	0.0000	4.2500	4.2318	...	4.1417	4.1342	0.007500	4.0515	3B	4.0700	4.0896	4.1417	4.1515	0.0098	4.2500
(7) $4\frac{1}{4}$ – 8 or 4.2500 – 8	UN	2A	0.0028	4.2472	4.2322	...	4.1660	4.1567	0.009272	4.0984	2B	4.115	4.140	4.1688	4.1809	0.0121	4.2500
(7)		3A	0.0000	4.2500	4.2350	...	4.1688	4.1618	0.007000	4.1012	3B	4.1150	4.1297	4.1688	4.1778	0.0090	4.2500
(7) $4\frac{1}{4}$ – 12 or 4.2500 – 12	UN	2A	0.0020	4.2480	4.2366	...	4.1939	4.1873	0.006591	4.1488	2B	4.160	4.178	4.1959	4.2045	0.0086	4.2500
		3A	0.0000	4.2500	4.2386	...	4.1959	4.1910	0.004900	4.1508	3B	4.1600	4.1698	4.1959	4.2023	0.0064	4.2500
(7) $4\frac{1}{4}$ – 16 or 4.2500 – 16	UN	2A	0.0018	4.2482	4.2388	...	4.2076	4.2017	0.005917	4.1738	2B	4.182	4.196	4.2094	4.2171	0.0077	4.2500
(7)		3A	0.0000	4.2500	4.2406	...	4.2094	4.2050	0.004400	4.1756	3B	4.1820	4.1909	4.2094	4.2152	0.0058	4.2500
$4\frac{3}{8}$ – 6 or 4.3750 – 6	UN	2A	0.0030	4.3720	4.3538	...	4.2637	4.2536	0.010133	4.1735	2B	4.195	4.225	4.2667	4.2799	0.0132	4.3750
		3A	0.0000	4.3750	4.3568	...	4.2667	4.2591	0.007600	4.1765	3B	4.1950	4.2146	4.2667	4.2766	0.0099	4.3750
(7) $4\frac{3}{8}$ – 8 or 4.3750 – 8	UN	2A	0.0028	4.3722	4.3572	...	4.2910	4.2817	0.009340	4.2234	2B	4.240	4.265	4.2938	4.3059	0.0121	4.3750
		3A	0.0000	4.3750	4.3600	...	4.2938	4.2868	0.007000	4.2262	3B	4.2400	4.2547	4.2938	4.3029	0.0091	4.3750
(7) $4\frac{3}{8}$ – 12 or 4.3750 – 12	UN	2A	0.0020	4.3730	4.3616	...	4.3189	4.3123	0.006614	4.2738	2B	4.285	4.303	4.3209	4.3295	0.0086	4.3750
(7)		3A	0.0000	4.3750	4.3636	...	4.3209	4.3159	0.005000	4.2758	3B	4.2850	4.2948	4.3209	4.3273	0.0064	4.3750
(7) $4\frac{3}{8}$ – 16 or 4.3750 – 16	UN	2A	0.0018	4.3732	4.3638	...	4.3326	4.3267	0.005940	4.2988	2B	4.307	4.321	4.3344	4.3421	0.0077	4.3750
(7)		3A	0.0000	4.3750	4.3656	...	4.3344	4.3299	0.004500	4.3006	3B	4.3070	4.3159	4.3344	4.3402	0.0058	4.3750
$4\frac{1}{2}$ – 4 or 4.5000 – 4	UN	2A	0.0035	4.4965	4.4727	...	4.3341	4.3225	0.011611	4.1988	2B	4.229	4.267	4.3376	4.3527	0.0151	4.5000
		3A	0.0000	4.5000	4.4762	...	4.3376	4.3289	0.008700	4.2023	3B	4.2290	4.2594	4.3376	4.3489	0.0113	4.5000

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$4\frac{1}{2}$ – 6 or 4.5000 – 6	UN	2A	0.0031	4.4969	4.4787	...	4.3886	4.3784	0.010201	4.2984	2B	4.320	4.350	4.3917	4.4050	0.0133	4.5000
		3A	0.0000	4.5000	4.4818	...	4.3917	4.3840	0.007700	4.3015	3B	4.3200	4.3396	4.3917	4.4016	0.0099	4.5000
$4\frac{1}{2}$ – 8 or 4.5000 – 8	UN	2A	0.0028	4.4972	4.4822	...	4.4160	4.4066	0.009408	4.3484	2B	4.365	4.390	4.4188	4.4310	0.0122	4.5000
		3A	0.0000	4.5000	4.4850	...	4.4188	4.4117	0.007100	4.3512	3B	4.3650	4.3797	4.4188	4.4280	0.0092	4.5000
(7) $4\frac{1}{2}$ – 12 or 4.5000 – 12	UN	2A	0.0020	4.4980	4.4866	...	4.4439	4.4373	0.006637	4.3988	2B	4.410	4.428	4.4459	4.4545	0.0086	4.5000
(7)		3A	0.0000	4.5000	4.4886	...	4.4459	4.4409	0.005000	4.4008	3B	4.4100	4.4198	4.4459	4.4524	0.0065	4.5000
(7) $4\frac{1}{2}$ – 16 or 4.5000 – 16	UN	2A	0.0018	4.4982	4.4888	...	4.4576	4.4516	0.005963	4.4238	2B	4.432	4.446	4.4594	4.4672	0.0078	4.5000
(7)		3A	0.0000	4.5000	4.4906	...	4.4594	4.4549	0.004500	4.4256	3B	4.4320	4.4409	4.4594	4.4652	0.0058	4.5000
$4\frac{5}{8}$ – 6 or 4.6250 – 6	UN	2A	0.0031	4.6219	4.6037	...	4.5136	4.5033	0.010268	4.4234	2B	4.445	4.475	4.5167	4.5300	0.0133	4.6250
		3A	0.0000	4.6250	4.6068	...	4.5167	4.5090	0.007700	4.4265	3B	4.4450	4.4646	4.5167	4.5267	0.0100	4.6250
(7) $4\frac{5}{8}$ – 8 or 4.6250 – 8	UN	2A	0.0028	4.6222	4.6072	...	4.5410	4.5315	0.009475	4.4734	2B	4.490	4.515	4.5438	4.5561	0.0123	4.6250
(7)		3A	0.0000	4.6250	4.6100	...	4.5438	4.5367	0.007100	4.4762	3B	4.4900	4.5047	4.5438	4.5530	0.0092	4.6250
$4\frac{5}{8}$ – 12 or 4.6250 – 12	UN	2A	0.0020	4.6230	4.6116	...	4.5689	4.5622	0.006660	4.5238	2B	4.535	4.553	4.5709	4.5796	0.0087	4.6250
(7)		3A	0.0000	4.6250	4.6136	...	4.5709	4.5659	0.005000	4.5258	3B	4.5350	4.5448	4.5709	4.5774	0.0066	4.6250
(7) $4\frac{5}{8}$ – 16 or 4.6250 – 16	UN	2A	0.0018	4.6232	4.6138	...	4.5826	4.5766	0.005986	4.5488	2B	4.557	4.571	4.5844	4.5922	0.0078	4.6250
(7)		3A	0.0000	4.6250	4.6156	...	4.5844	4.5799	0.004500	4.5506	3B	4.5570	4.5659	4.5844	4.5902	0.0058	4.6250
$4\frac{3}{4}$ – 4 or 4.7500 – 4	UN	2A	0.0035	4.7465	4.7227	...	4.5841	4.5724	0.011743	4.4488	2B	4.479	4.517	4.5876	4.6029	0.0153	4.7500
		3A	0.0000	4.7500	4.7262	...	4.5876	4.5788	0.008800	4.4523	3B	4.4790	4.5094	4.5876	4.5990	0.0114	4.7500
$4\frac{3}{4}$ – 6 or 4.7500 – 6	UN	2A	0.0031	4.7469	4.7287	...	4.6386	4.6283	0.010333	4.5484	2B	4.570	4.600	4.6417	4.6551	0.0134	4.7500
		3A	0.0000	4.7500	4.7318	...	4.6417	4.6340	0.007700	4.5515	3B	4.5700	4.5896	4.6417	4.6518	0.0101	4.7500
$4\frac{3}{4}$ – 8 or 4.7500 – 8	UN	2A	0.0029	4.7471	4.7321	...	4.6659	4.6564	0.009540	4.5983	2B	4.615	4.640	4.6688	4.6812	0.0124	4.7500
(7)		3A	0.0000	4.7500	4.7350	...	4.6688	4.6616	0.007200	4.6012	3B	4.6150	4.6297	4.6688	4.6781	0.0093	4.7500
$4\frac{3}{4}$ – 12 or 4.7500 – 12	UN	2A	0.0020	4.7480	4.7366	...	4.6939	4.6872	0.006682	4.6488	2B	4.660	4.678	4.6959	4.7046	0.0087	4.7500
(7)		3A	0.0000	4.7500	4.7386	...	4.6959	4.6909	0.005000	4.6508	3B	4.6600	4.6698	4.6959	4.7024	0.0065	4.7500
(7) $4\frac{3}{4}$ – 16 or 4.7500 – 16	UN	2A	0.0018	4.7482	4.7388	...	4.7076	4.7016	0.006008	4.6738	2B	4.682	4.696	4.7094	4.7172	0.0078	4.7500
(7)		3A	0.0000	4.7500	4.7406	...	4.7094	4.7049	0.004500	4.6756	3B	4.6820	4.6909	4.7094	4.7153	0.0059	4.7500

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Tolerance	Major Diameter, Min.
$4\frac{7}{8}$ – 6 or 4.8750 – 6	UN	2A	0.0031	4.8719	4.8537	...	4.7636	4.7532	0.010398	4.6734	2B	4.695	4.725	4.7667	4.7802	0.0135	4.8750
		3A	0.0000	4.8750	4.8568	...	4.7667	4.7589	0.007800	4.6765	3B	4.6950	4.7146	4.7667	4.7768	0.0101	4.8750
$4\frac{7}{8}$ – 8 or 4.8750 – 8	UN	2A	0.0029	4.8721	4.8571	...	4.7909	4.7813	0.009605	4.7233	2B	4.740	4.765	4.7938	4.8063	0.0125	4.8750
		3A	0.0000	4.8750	4.8600	...	4.7938	4.7866	0.007200	4.7262	3B	4.7400	4.7547	4.7938	4.8032	0.0094	4.8750
$4\frac{7}{8}$ – 12 or 4.8750 – 12	UN	2A	0.0020	4.8730	4.8616	...	4.8189	4.8122	0.006704	4.7738	2B	4.785	4.803	4.8209	4.8296	0.0087	4.8750
(7)		3A	0.0000	4.8750	4.8636	...	4.8209	4.8159	0.005000	4.7758	3B	4.7850	4.7948	4.8209	4.8274	0.0065	4.8750
(7) $4\frac{7}{8}$ – 16 or 4.8750 – 16	UN	2A	0.0018	4.8732	4.8638	...	4.8326	4.8266	0.006030	4.7988	2B	4.807	4.821	4.8344	4.8422	0.0078	4.8750
(7)		3A	0.0000	4.8750	4.8656	...	4.8344	4.8299	0.004500	4.8006	3B	4.8070	4.8159	4.8344	4.8403	0.0059	4.8750
5 – 4 or 5.0000 – 4	UN	2A	0.0036	4.9964	4.9726	...	4.8340	4.8221	0.011872	4.6987	2B	4.729	4.767	4.8376	4.8530	0.0154	5.0000
		3A	0.0000	5.0000	4.9762	...	4.8376	4.8287	0.008900	4.7023	3B	4.7290	4.7594	4.8376	4.8492	0.0116	5.0000
5 – 6 or 5.0000 – 6	UN	2A	0.0031	4.9969	4.9787	...	4.8886	4.8781	0.010462	4.7984	2B	4.820	4.850	4.8917	4.9053	0.0136	5.0000
		3A	0.0000	5.0000	4.9818	...	4.8917	4.8839	0.007800	4.8015	3B	4.8200	4.8396	4.8917	4.9019	0.0102	5.0000
5 – 8 or 5.0000 – 8	UN	2A	0.0029	4.9971	4.9821	...	4.9159	4.9062	0.009669	4.8483	2B	4.865	4.890	4.9188	4.9314	0.0126	5.0000
(7)		3A	0.0000	5.0000	4.9850	...	4.9188	4.9115	0.007300	4.8512	3B	4.8650	4.8797	4.9188	4.9282	0.0094	5.0000
5 – 12 or 5.0000 – 12	UN	2A	0.0020	4.9980	4.9866	...	4.9439	4.9372	0.006726	4.8988	2B	4.910	4.928	4.9459	4.9546	0.0087	5.0000
		3A	0.0000	5.0000	4.9886	...	4.9459	4.9409	0.005000	4.9008	3B	4.9100	4.9198	4.9459	4.9525	0.0066	5.0000
5 – 16 or 5.0000 – 16	UN	2A	0.0018	4.9982	4.9888	...	4.9576	4.9515	0.006052	4.9238	2B	4.932	4.946	4.9594	4.9673	0.0079	5.0000
(7)		3A	0.0000	5.0000	4.9906	...	4.9594	4.9549	0.004500	4.9256	3B	4.9320	4.9409	4.9594	4.9653	0.0059	5.0000
$5\frac{1}{8}$ – 6 or 5.1250 – 6	UN	2A	0.0032	5.1218	5.1036	...	5.0135	5.0030	0.010525	4.9233	2B	4.945	4.975	5.0167	5.0304	0.0137	5.1250
		3A	0.0000	5.1250	5.1068	...	5.0167	5.0088	0.007900	4.9265	3B	4.9450	4.9646	5.0167	5.0270	0.0103	5.1250
(7) $5\frac{1}{8}$ – 8 or 5.1250 – 8	UN	2A	0.0029	5.1221	5.1071	...	5.0409	5.0312	0.009732	4.9733	2B	4.990	5.015	5.0438	5.0565	0.0127	5.1250
		3A	0.0000	5.1250	5.1100	...	5.0438	5.0365	0.007300	4.9762	3B	4.9900	5.0047	5.0438	5.0533	0.0095	5.1250
(7) $5\frac{1}{8}$ – 12 or 5.1250 – 12	UN	2A	0.0020	5.1230	5.1116	...	5.0689	5.0622	0.006747	5.0238	2B	5.035	5.053	5.0709	5.0797	0.0088	5.1250
(7)		3A	0.0000	5.1250	5.1136	...	5.0709	5.0658	0.005100	5.0258	3B	5.0350	5.0448	5.0709	5.0775	0.0066	5.1250
$5\frac{1}{8}$ – 16 or 5.1250 – 16	UN	2A	0.0018	5.1232	5.1138	...	5.0826	5.0765	0.006073	5.0488	2B	5.057	5.071	5.0844	5.0923	0.0079	5.1250
(7)		3A	0.0000	5.1250	5.1156	...	5.0844	5.0798	0.004600	5.0506	3B	5.0570	5.0659	5.0844	5.0903	0.0059	5.1250

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Tolerance	Major Diameter, Min.
$5\frac{1}{4}$ – 4 or 5.2500 – 4	UN	2A	0.0036	5.2464	5.2226	...	5.0840	5.0720	0.011997	4.9487	2B	4.979	5.017	5.0876	5.1032	0.0156	5.2500
		3A	0.0000	5.2500	5.2262	...	5.0876	5.0786	0.009000	4.9523	3B	4.9790	5.0094	5.0876	5.0993	0.0117	5.2500
$5\frac{1}{4}$ – 6 or 5.2500 – 6	UN	2A	0.0032	5.2468	5.2286	...	5.1385	5.1279	0.010587	5.0483	2B	5.070	5.100	5.1417	5.1555	0.0138	5.2500
		3A	0.0000	5.2500	5.2318	...	5.1417	5.1338	0.007900	5.0515	3B	5.0700	5.0896	5.1417	5.1520	0.0103	5.2500
$5\frac{1}{4}$ – 8 or 5.2500 – 8	UN	2A	0.0029	5.2471	5.2321	...	5.1659	5.1561	0.009794	5.0983	2B	5.115	5.140	5.1688	5.1815	0.0127	5.2500
(7)		3A	0.0000	5.2500	5.2350	...	5.1688	5.1615	0.007300	5.1012	3B	5.1150	5.1297	5.1688	5.1783	0.0095	5.2500
(7) $5\frac{1}{4}$ – 12 or 5.2500 – 12	UN	2A	0.0020	5.2480	5.2366	...	5.1939	5.1871	0.006768	5.1488	2B	5.160	5.178	5.1959	5.2047	0.0088	5.2500
(7)		3A	0.0000	5.2500	5.2386	...	5.1959	5.1908	0.005100	5.1508	3B	5.1600	5.1698	5.1959	5.2025	0.0066	5.2500
$5\frac{1}{4}$ – 16 or 5.2500 – 16	UN	2A	0.0018	5.2482	5.2388	...	5.2076	5.2015	0.006094	5.1738	2B	5.182	5.196	5.2094	5.2173	0.0079	5.2500
(7)		3A	0.0000	5.2500	5.2406	...	5.2094	5.2048	0.004600	5.1756	3B	5.1820	5.1909	5.2094	5.2153	0.0059	5.2500
$5\frac{3}{8}$ – 6 or 5.3750 – 6	UN	2A	0.0032	5.3718	5.3536	...	5.2635	5.2529	0.010649	5.1733	2B	5.195	5.225	5.2667	5.2805	0.0138	5.3750
		3A	0.0000	5.3750	5.3568	...	5.2667	5.2587	0.008000	5.1765	3B	5.1950	5.2146	5.2667	5.2771	0.0104	5.3750
(7) $5\frac{3}{8}$ – 8 or 5.3750 – 8	UN	2A	0.0030	5.3720	5.3570	...	5.2908	5.2809	0.009856	5.2232	2B	5.240	5.265	5.2938	5.3066	0.0128	5.3750
(7)		3A	0.0000	5.3750	5.3600	...	5.2938	5.2864	0.007400	5.2262	3B	5.2400	5.2547	5.2938	5.3034	0.0096	5.3750
(7) $5\frac{3}{8}$ – 12 or 5.3750 – 12	UN	2A	0.0020	5.3730	5.3616	...	5.3189	5.3121	0.006789	5.2738	2B	5.285	5.303	5.3209	5.3297	0.0088	5.3750
(7)		3A	0.0000	5.3750	5.3636	...	5.3209	5.3158	0.005100	5.2758	3B	5.2850	5.2948	5.3209	5.3275	0.0066	5.3750
$5\frac{3}{8}$ – 16 or 5.3750 – 16	UN	2A	0.0018	5.3732	5.3638	...	5.3326	5.3265	0.006115	5.2988	2B	5.307	5.321	5.3344	5.3423	0.0079	5.3750
(7)		3A	0.0000	5.3750	5.3656	...	5.3344	5.3298	0.004600	5.3006	3B	5.3070	5.3159	5.3344	5.3404	0.0060	5.3750
$5\frac{1}{2}$ – 4 or 5.5000 – 4	UN	2A	0.0036	5.4964	5.4726	...	5.3340	5.3219	0.012119	5.1987	2B	5.229	5.267	5.3376	5.3534	0.0158	5.5000
		3A	0.0000	5.5000	5.4762	...	5.3376	5.3285	0.009100	5.2023	3B	5.2290	5.2594	5.3376	5.3494	0.0118	5.5000
$5\frac{1}{2}$ – 6 or 5.5000 – 6	UN	2A	0.0032	5.4968	5.4786	...	5.3885	5.3778	0.010709	5.2983	2B	5.320	5.350	5.3917	5.4056	0.0139	5.5000
		3A	0.0000	5.5000	5.4818	...	5.3917	5.3837	0.008000	5.3015	3B	5.3200	5.3396	5.3917	5.4021	0.0104	5.5000
$5\frac{1}{2}$ – 8 or 5.5000 – 8	UN	2A	0.0030	5.4970	5.4820	...	5.4158	5.4059	0.009916	5.3482	2B	5.365	5.390	5.4188	5.4317	0.0129	5.5000
		3A	0.0000	5.5000	5.4850	...	5.4188	5.4114	0.007400	5.3512	3B	5.3650	5.3797	5.4188	5.4285	0.0097	5.5000
(7) $5\frac{1}{2}$ – 12 or 5.5000 – 12	UN	2A	0.0020	5.4980	5.4866	...	5.4439	5.4371	0.006809	5.3988	2B	5.410	5.428	5.4459	5.4548	0.0089	5.5000
(7)		3A	0.0000	5.5000	5.4886	...	5.4459	5.4408	0.005100	5.4008	3B	5.4100	5.4198	5.4459	5.4525	0.0066	5.5000

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

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(7) $5\frac{1}{2}$ – 16 or 5.5000 – 16	UN	2A	0.0018	5.4982	5.4888	...	5.4576	5.4515	0.006135	5.4238	2B	5.432	5.446	5.4594	5.4674	0.0080	5.5000
(7)		3A	0.0000	5.5000	5.4906	...	5.4594	5.4548	0.004600	5.4256	3B	5.4320	5.4409	5.4594	5.4654	0.0060	5.5000
$5\frac{5}{8}$ – 6 or 5.6250 – 6	UN	2A	0.0032	5.6218	5.6036	...	5.5135	5.5027	0.010769	5.4233	2B	5.445	5.475	5.5167	5.5307	0.0140	5.6250
		3A	0.0000	5.6250	5.6068	...	5.5167	5.5086	0.008100	5.4265	3B	5.4450	5.4646	5.5167	5.5272	0.0105	5.6250
$5\frac{5}{8}$ – 8 or 5.6250 – 8	UN	2A	0.0030	5.6220	5.6070	...	5.5408	5.5308	0.009976	5.4732	2B	5.490	5.515	5.5438	5.5568	0.0130	5.6250
(7)		3A	0.0000	5.6250	5.6100	...	5.5438	5.5363	0.007500	5.4762	3B	5.4900	5.5047	5.5438	5.5535	0.0097	5.6250
(7) $5\frac{5}{8}$ – 12 or 5.6250 – 12	UN	2A	0.0020	5.6230	5.6116	...	5.5689	5.5621	0.006829	5.5238	2B	5.535	5.553	5.5709	5.5798	0.0089	5.6250
(7)		3A	0.0000	5.6250	5.6136	...	5.5709	5.5658	0.005100	5.5258	3B	5.5350	5.5448	5.5709	5.5776	0.0067	5.6250
(7) $5\frac{5}{8}$ – 16 or 5.6250 – 16	UN	2A	0.0018	5.6232	5.6138	...	5.5826	5.5764	0.006155	5.5488	2B	5.557	5.571	5.5844	5.5924	0.0080	5.6250
(7)		3A	0.0000	5.6250	5.6156	...	5.5844	5.5798	0.004600	5.5506	3B	5.5570	5.5659	5.5844	5.5904	0.0060	5.6250
$5\frac{3}{4}$ – 4 or 5.7500 – 4	UN	2A	0.0037	5.7463	5.7225	...	5.5839	5.5717	0.012237	5.4486	2B	5.479	5.517	5.5876	5.6035	0.0159	5.7500
		3A	0.0000	5.7500	5.7262	...	5.5876	5.5784	0.009200	5.4523	3B	5.4790	5.5094	5.5876	5.5995	0.0119	5.7500
$5\frac{3}{4}$ – 6 or 5.7500 – 6	UN	2A	0.0032	5.7468	5.7286	...	5.6385	5.6277	0.010827	5.5483	2B	5.570	5.600	5.6417	5.6558	0.0141	5.7500
		3A	0.0000	5.7500	5.7318	...	5.6417	5.6336	0.008100	5.5515	3B	5.5700	5.5896	5.6417	5.6523	0.0106	5.7500
(7) $5\frac{3}{4}$ – 8 or 5.7500 – 8	UN	2A	0.0030	5.7470	5.7320	...	5.6658	5.6558	0.010034	5.5982	2B	5.615	5.640	5.6688	5.6818	0.0130	5.7500
		3A	0.0000	5.7500	5.7350	...	5.6688	5.6613	0.007500	5.6012	3B	5.6150	5.6297	5.6688	5.6786	0.0098	5.7500
(7) $5\frac{3}{4}$ – 12 or 5.7500 – 12	UN	2A	0.0021	5.7479	5.7365	...	5.6938	5.6870	0.006848	5.6487	2B	5.660	5.678	5.6959	5.7048	0.0089	5.7500
(7)		3A	0.0000	5.7500	5.7386	...	5.6959	5.6908	0.005100	5.6508	3B	5.6600	5.6698	5.6959	5.7026	0.0067	5.7500
(7) $5\frac{3}{4}$ – 6 or 5.7500 – 16	UN	2A	0.0019	5.7481	5.7387	...	5.7075	5.7013	0.006174	5.6737	2B	5.682	5.696	5.7094	5.7174	0.0080	5.7500
(7)		3A	0.0000	5.7500	5.7406	...	5.7094	5.7048	0.004600	5.6756	3B	5.6820	5.6909	5.7094	5.7154	0.0060	5.7500
$5\frac{7}{8}$ – 6 or 5.8750 – 6	UN	2A	0.0033	5.8717	5.8535	...	5.7634	5.7525	0.010886	5.6732	2B	5.695	5.725	5.7667	5.7809	0.0142	5.8750
		3A	0.0000	5.8750	5.8568	...	5.7667	5.7585	0.008200	5.6765	3B	5.6950	5.7146	5.7667	5.7773	0.0106	5.8750
(7) $5\frac{7}{8}$ – 8 or 5.8750 – 8	UN	2A	0.0030	5.8720	5.8570	...	5.7908	5.7807	0.010093	5.7232	2B	5.740	5.765	5.7938	5.8069	0.0131	5.8750
		3A	0.0000	5.8750	5.8600	...	5.7938	5.7862	0.007600	5.7262	3B	5.7400	5.7547	5.7938	5.8036	0.0098	5.8750
(7) $5\frac{7}{8}$ – 12 or 5.8750 – 12	UN	2A	0.0021	5.8729	5.8615	...	5.8188	5.8119	0.006868	5.7737	2B	5.785	5.803	5.8209	5.8298	0.0089	5.8750
		3A	0.0000	5.8750	5.8636	...	5.8209	5.8157	0.005200	5.7758	3B	5.7850	5.7948	5.8209	5.8276	0.0067	5.8750

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Table 2 Limits of Size for Standard Series Threads (UN/UNR) (Cont'd)

Nominal Size and Threads/in.	Series Designation	External [Note (1)] Class	Allowance	Major Diameter Max. [Note (2)]	Major Diameter Min.	Major Diameter Min. [Note (3)]	Pitch Diameter and Functional Diameter [Note (4)] Max. [Note (2)]	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance [Note (5)]	UNR Minor Diameter, Max. [Note (6)] (Ref.)	Internal [Note (1)] Class	Minor Diameter Min.	Minor Diameter Max.	Pitch Diameter and Functional Diameter [Note (4)] Min.	Pitch Diameter and Functional Diameter [Note (4)] Max.	Pitch Diameter and Functional Diameter [Note (4)] Tolerance	Major Diameter, Min.
$5\frac{7}{8}$ – 16 or 5.8750 – 16	UN	2A	0.0019	5.8731	5.8637	...	5.8325	5.8263	0.006194	5.7987	2B	5.807	5.821	5.8344	5.8425	0.0081	5.8750
(7)		3A	0.0000	5.8750	5.8656	...	5.8344	5.8298	0.004600	5.8006	3B	5.8070	5.8159	5.8344	5.8404	0.0060	5.8750
6 – 4 or 6.0000 – 4	UN	2A	0.0037	5.9963	5.9725	...	5.8339	5.8215	0.012353	5.6986	2B	5.729	5.767	5.8376	5.8537	0.0161	6.0000
		3A	0.0000	6.0000	5.9762	...	5.8376	5.8283	0.009300	5.7023	3B	5.7290	5.7594	5.8376	5.8496	0.0120	6.0000
6 – 6 or 6.0000 – 6	UN	2A	0.0033	5.9967	5.9785	...	5.8884	5.8775	0.010943	5.7982	2B	5.820	5.850	5.8917	5.9059	0.0142	6.0000
		3A	0.0000	6.0000	5.9818	...	5.8917	5.8835	0.008200	5.8015	3B	5.8200	5.8396	5.8917	5.9024	0.0107	6.0000
(7) 6 – 8 or 6.0000 – 8	UN	2A	0.0030	5.9970	5.9820	...	5.9158	5.9057	0.010150	5.8482	2B	5.865	5.890	5.9188	5.9320	0.0132	6.0000
(7)		3A	0.0000	6.0000	5.9850	...	5.9188	5.9112	0.007600	5.8512	3B	5.8650	5.8797	5.9188	5.9287	0.0099	6.0000
6 – 12 or 6.0000 – 12	UN	2A	0.0021	5.9979	5.9865	...	5.9438	5.9369	0.006887	5.8987	2B	5.910	5.928	5.9459	5.9549	0.0090	6.0000
		3A	0.0000	6.0000	5.9886	...	5.9459	5.9407	0.005200	5.9008	3B	5.9100	5.9198	5.9459	5.9526	0.0067	6.0000
6 – 16 or 6.0000 – 16	UN	2A	0.0019	5.9981	5.9887	...	5.9575	5.9513	0.006213	5.9237	2B	5.932	5.946	5.9594	5.9675	0.0081	6.0000
(7)		3A	0.0000	6.0000	5.9906	...	5.9594	5.9547	0.004700	5.9256	3B	5.9320	5.9409	5.9594	5.9655	0.0061	6.0000

GENERAL NOTE: Series designation shown indicates the UN thread form; however, the UNR thread form may be specified by substituting UNR in place of UN in all designations for external use only.

NOTES:

(1) Thread classes may be combined. See para. 4.2.

(2) For Class 2A threads having an additive finish, the maximum major and pitch diameters, after coating, may equal the basic sizes, whose values are the same as maximum values shown for Class 3A in these columns. See paras. 4.1.1 and 4.1.3.

(3) For unfinished hot material, not including standard fasteners with rolled threads.

(4) See para. 5.2.1 for Functional Diameter.

(5) 2A pitch diameter tolerance (Td_2) is listed and used to a six place decimal to calculate the listed Class 1A/1B, 2B, 3A/3B tolerances and Class 1A/2A allowances and all dimensional limits that depend upon them.

(6) These values are for reference only. UN series external thread maximum minor diameter is basic (D_1 in para. 11) for Class 3A and basic minus allowance for Classes 1A and 2A.

(7) One or more of the numbers listed in this row have been changed to correct for calculation and rounding errors. The original numbers from past issues of B1.1 are listed in Appendix E and are for reference only.

(8) Formerly NF. Not a recommended standard size. Tolerances and allowances are based on one diameter length of engagement.

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4 SCREW THREAD CLASSES

4.1 Thread Classes

Thread classes are distinguished from each other by the amounts of tolerance and allowance. Classes 1A, 2A, and 3A apply to external threads only, and Classes 1B, 2B, and 3B apply to internal threads only. Allowance is specified only for Classes 1A and 2A and the allowance is identical for both classes. Tolerance decreases as class number increases (e.g., tolerance for Class 3A is less than that for Class 2A, which is less than that for Class 1A).

4.1.1 Classes 1A and 1B Threads. Classes 1A (external) and 1B (internal) threads replaced American National Class 1 screw threads. These classes provide for applications where a liberal tolerance and an allowance are required to permit easy assembly even with slightly nicked threads. These classes are intended for ordnance and other special uses. Maximum diameters of Class 1A threads are less than basic by the amount of the allowance (the allowance is identical to that for Class 2A). The allowance is not available for plating or coating; and consequently, in some cases it may be necessary to make special provisions in thread manufacturing for accommodation of plating or coating. The minimum diameters of Class 1B threads, whether or not plated or coated, are basic and consequently afford no allowance or clearance for assembly at maximum-material limits.

4.1.2 Classes 2A and 2B Threads. Classes 2A (external) and 2B (internal) threads are the most commonly used thread classes for general applications, including production of bolts, screws, nuts, and similar threaded fasteners.

The maximum diameters of Class 2A 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 apply to a part after plating. The minimum diameters of Class 2B threads, whether or not plated or coated, are basic, affording no allowance or clearance in assembly at maximum-material limits.

4.1.3 Classes 3A and 3B Threads. Classes 3A (external) and 3B (internal) threads provide for applications where closeness of fit and/or accuracy of thread elements are important. The maximum diameters of Class 3A threads and the minimum diameters of Class 3B threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly at maximum-material limits.

4.2 Combinations of Classes

The requirements for screw thread fits for specific applications are predicated on end use and can be met by specifying the proper combinations of thread classes for the components. For example, a Class 2A external thread may be used with a Class 1B, 2B, or 3B internal thread.

5 SCREW THREAD ALLOWANCE AND TOLERANCE

5.1 Allowance

Allowance is specified only for Classes 1A and 2A external threads. For Class 1A threads, its purpose is to preclude the possibility of surface-to-surface fit between mating parts and it cannot be used to accommodate plating or coating. For Class 2A threads, the allowance may be used to accommodate plating or coating. Allowance for Classes 1A and 2A is identical and is based on Class 2A pitch diameter tolerance for the respective series standard length of engagement and is applicable for all lengths of engagement.

Formulas for allowance are given in para. 5.8.1(a).

Applications of allowances to the basic thread form are shown in Fig. 2.

EXAMPLE: 2.0625-12-UNS-2A
From para. 5.8.1(a): Allowance, $es = 0.300\ Td_2(2A)$.
From para. 5.2, example (1): $Td_2(2A) = 0.006070$.
Therefore, $es = 0.300 \times 0.006070 = 0.001821$, or 0.0018 in. when rounded.

5.2 Pitch Diameter Tolerance, All Classes

NOTE: Refer to Table 1 for the standard series of diameter-pitch combinations. Allowances and tolerances for standard series threads are applied in Table 2. All other diameter-pitch combinations are considered nonstandard. Allowances and tolerances for nonstandard threads must be calculated using the appropriate formulas contained in this Standard.

The pitch diameter tolerances specified in Table 2 for all classes of the UNC and UNF series are based on a length of engagement equal to the basic major (nominal) diameter and are applicable for lengths of engagement from 5 pitches to up to 1.5 diameters. For the 4-UN, 6-UN, and 8-UN series, the pitch diameter tolerances specified for Classes 2A, 2B, 3A, and 3B are based on a length of engagement equal to the basic major (nominal) diameter and are applicable for lengths of engagement up to 1.5 diameters.

The pitch diameter tolerances specified in Table 2 for all classes of the UNEF, 12-UN, 16-UN, 20-UN, 28-UN, and 32-UN series are based on a length of engagement of 9 pitches and are applicable for lengths of engagement from 5 to 15 pitches.

The pitch diameter tolerances specified in Table D-1 of Nonmandatory Appendix D for all classes of the UNS series are based on a length of engagement of 9 pitches and are applicable for lengths of engagement from 5 to 15 pitches.

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Formulas for pitch diameter tolerance are given in paras. 5.8.1(c) and 5.8.2(b).

Applications of tolerances to the thread form are shown in Figs. 2 and 3.

For special threads, tolerances and allowances shall be computed from the formulas in paras. 5.8.1 and 5.8.2. If the length of engagement is between 5 and 15 pitches or is unknown, use 9 pitches in the applicable formulas. For all other lengths of engagement, use the known values.

EXAMPLES:

(1) 2.0625-12-UNS-2A (length of engagement not specified)

$$Td_2 = 0.0015\sqrt[3]{D} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$$

$$Td_2 = 0.0015\sqrt[3]{2.0625} + 0.0015\sqrt{9/12} + 0.015\sqrt[3]{0.08333333^2}$$

$$Td_2 = 0.001909 + 0.001299 + 0.002862$$

$$Td_2 = 0.006070$$

(2) 2.0625-12-UNS-SE2A (18 pitches length of engagement)

$$Td_2 = 0.0015\sqrt[3]{D} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$$

$$Td_2 = 0.0015\sqrt[3]{2.0625} + 0.0015\sqrt{1.500} + 0.015\sqrt[3]{0.08333333^2}$$

$$Td_2 = 0.001909 + 0.001837 + 0.002862$$

$$Td_2 = 0.006608$$

5.2.1 Functional Diameter. Functional diameter size includes the effects of all variations in pitch diameter, thread form, and profile. The variations in the individual thread characteristics, such as flank angle, lead, taper, and roundness, on a given thread cause the measurements of the pitch diameter and functional diameter to vary from one another on most threads. The pitch diameter and functional diameter on a given thread are equal to one another only when the thread form is perfect.

When required to inspect/evaluate either the pitch diameter and/or the functional diameter for thread acceptance (see ASME B1.3), use the same limits of size for the appropriate thread size and class.

5.3 Special Lengths of Engagement, *LE*

For special applications, the required length of engagement might be the determining factor in the proper selection of thread tolerances. When design considerations require nonstandard pitches or extreme conditions of engagement not covered by the tables, the tolerances may be adjusted using the formulas. It is particularly important that changes in tolerance be noted by the user for external threads designated Class 3A when using longer than standard lengths of engagement.

5.3.1 Long *LE* Using Gage Length *LG* Equal to *LE*

(a) High-Strength Materials Using Standard Pitch Diameter Tolerances. For applications of long length of engagement of mating parts involving very high-strength materials, increases in tolerances based on standard length of engagement may be detrimental. In these cases, the tolerances based on the standard length of engagement may be applied to increased length of engagement threads. This requires the GO thread gages to have a special length equal to the length of engagement.

(b) Standard Bolt, Added Allowance in Tapped Hole, LE Increases. In some cases where greater than standard length of engagement is required, it is desirable to use standard externally threaded parts with tolerances based on standard length of engagement. For example, in the case of a standard bolt assembled into a tapped hole in aluminum, the designation of the bolt thread will conform to that of a thread for a standard length of engagement.

To ensure proper assembly, the tapped hole thread into which the bolt is assembled must not interfere with the bolt thread. This could happen if no special provisions were made in the tapped hole thread due to the cumulative effect of lead variation on the bolt thread, inasmuch as the increased length of engagement exceeds the thickness of the GO thread gage used for acceptance of the bolt thread. To avoid this condition, an allowance should be provided in the tapped hole, the amount of which should be the diameter equivalent of the cumulative lead variation for the increased length of engagement, which is one-half the pitch diameter tolerance of the bolt thread allowed for the standard length of engagement. This requires the GO thread and GO plain gages to have a special length equal to the length of engagement.

EXAMPLE: 0.5000-13UNC-SE2B; $LE = 1$ in. (2 diameters); assembled with standard bolt thread.

Add allowance $EI = \frac{1}{2}Td_2$ for standard bolt thread. From Table 3, column 5, $\frac{1}{2}Td_2$ (standard) = 0.0025. Therefore, the thread is redesignated to indicate a nonstandard internal thread with the allowance of 0.0025 added to the basic size of 0.5000. New designation is 0.5025-13UNS-SE2B. Allowance is also added to the standard minor diameter size limits and to the adjusted pitch diameter size limits. See para. 6.6.1.

(c) Standard Internal Thread, Added Allowance on External Thread, es, Increases. In some cases where greater than standard length of engagement is required, it is desirable to use standard internally threaded parts with tolerances based on standard length of engagement. In these cases an allowance should be added to the mating external thread.

EXAMPLE: 0.3750-24UNF-SE2A; $LE = 0.88$ in. (2.35 diameters); assembled with standard internal thread.

Add allowance, equal to $\frac{1}{2}TD_2$ for standard internal thread. From Table 3, column 8, $\frac{1}{2}TD_2$ (standard) = 0.00245, which is rounded to 0.0025. Therefore, the thread is redesignated to indicate a nonstandard external thread with the allowance of 0.0025 subtracted from the basic size of 0.3750. New designation is 0.3725-24UNS-SE2A. The added allowance is also subtracted from the standard major diameter size limits and from the adjusted pitch diameter size limits. See para. 6.6.1.

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
0 – 80 or 0.060 – 80	UNF	2A	0.00052	0.00090	2B	0.00066	0.00115
		3A	0.00038	0.00065	3B	0.00048	0.00085
1 – 64 or 0.073 – 64	UNC	2A	0.00058	0.00100	2B	0.00075	0.00130
		3A	0.00043	0.00075	3B	0.00055	0.00095
1 – 72 or 0.073 – 72	UNF	2A	0.00055	0.00095	2B	0.00072	0.00125
		3A	0.00040	0.00070	3B	0.00055	0.00095
2 – 56 or 0.086 – 56	UNC	2A	0.00061	0.00105	2B	0.00081	0.00140
		3A	0.00046	0.00080	3B	0.00061	0.00105
2 – 64 or 0.086 – 64	UNF	2A	0.00058	0.00100	2B	0.00078	0.00135
		3A	0.00043	0.00075	3B	0.00058	0.00100
3 – 48 or 0.099 – 48	UNC	2A	0.00066	0.00115	2B	0.00087	0.00150
		3A	0.00049	0.00085	3B	0.00064	0.00110
3 – 56 or 0.099 – 56	UNF	2A	0.00064	0.00110	2B	0.00081	0.00140
		3A	0.00046	0.00080	3B	0.00061	0.00105
4 – 40 or 0.112 – 40	UNC	2A	0.00072	0.00125	2B	0.00095	0.00165
		3A	0.00055	0.00095	3B	0.00069	0.00120
4 – 48 or 0.112 – 48	UNF	2A	0.00069	0.00120	2B	0.00089	0.00155
		3A	0.00052	0.00090	3B	0.00066	0.00115
5 – 40 or 0.125 – 40	UNC	2A	0.00075	0.00130	2B	0.00095	0.00165
		3A	0.00055	0.00095	3B	0.00072	0.00125
5 – 44 or 0.125 – 44	UNF	2A	0.00072	0.00125	2B	0.00092	0.00160
		3A	0.00055	0.00095	3B	0.00069	0.00120
6 – 32 or 0.138 – 32	UNC	2A	0.00081	0.00140	2B	0.00107	0.00185
		3A	0.00061	0.00105	3B	0.00078	0.00135
6 – 40 or 0.138 – 40	UNF	2A	0.00075	0.00130	2B	0.00098	0.00170
		3A	0.00058	0.00100	3B	0.00072	0.00125
8 – 32 or 0.164 – 32	UNC	2A	0.00084	0.00145	2B	0.00110	0.00190
		3A	0.00064	0.00110	3B	0.00081	0.00140
8 – 36 or 0.164 – 36	UNF	2A	0.00081	0.00140	2B	0.00104	0.00180
		3A	0.00061	0.00105	3B	0.00078	0.00135
10 – 24 or 0.190 – 24	UNC	2A	0.00095	0.00165	2B	0.00124	0.00215
		3A	0.00072	0.00125	3B	0.00092	0.00160
10 – 32 or 0.190 – 32	UNF	2A	0.00087	0.00150	2B	0.00113	0.00195
		3A	0.00066	0.00115	3B	0.00084	0.00145
12 – 24 or 0.216 – 24	UNC	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00075	0.00130	3B	0.00095	0.00165
12 – 28 or 0.216 – 28	UNF	2A	0.00092	0.00160	2B	0.00121	0.00210
		3A	0.00069	0.00120	3B	0.00089	0.00155
12 – 32 or 0.216 – 32	UNEF	2A	0.00089	0.00155	2B	0.00118	0.00205
		3A	0.00069	0.00120	3B	0.00089	0.00155
$\frac{1}{4}$ – 20 or 0.250 – 20	UNC	1A	0.00162	0.00280	1B	0.00211	0.00365
		2A	0.00107	0.00185	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00104	0.00180

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
1/4 – 28 or 0.250 – 28	UNF	1A	0.00144	0.00250	1B	0.00188	0.00325
		2A	0.00095	0.00165	2B	0.00124	0.00215
		3A	0.00072	0.00125	3B	0.00092	0.00160
1/4 – 32 or 0.250 – 32	UNEF	2A	0.00092	0.00160	2B	0.00121	0.00210
		3A	0.00069	0.00120	3B	0.00089	0.00155
5/16 – 18 or 0.3125 – 18	UNC	1A	0.00176	0.00305	1B	0.00223	0.00395
		2A	0.00115	0.00200	2B	0.00153	0.00265
		3A	0.00087	0.00150	3B	0.00113	0.00195
5/16 – 20 or 0.3125 – 20	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
5/16 – 24 or 0.3125 – 24	UNF	1A	0.00159	0.00275	1B	0.00205	0.00355
		2A	0.00107	0.00185	2B	0.00139	0.00240
		3A	0.00078	0.00135	3B	0.00104	0.00180
5/16 – 28 or 0.3125 – 28	UN	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00075	0.00130	3B	0.00095	0.00165
5/16 – 32 or 0.3125 – 32	UNEF	2A	0.00092	0.00160	2B	0.00121	0.00210
		3A	0.00069	0.00120	3B	0.00089	0.00155
3/8 – 16 or 0.375 – 16	UNC	1A	0.00188	0.00325	1B	0.00245	0.00425
		2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
3/8 – 20 or 0.375 – 20	UN	2A	0.00118	0.00205	2B	0.00156	0.00270
		3A	0.00089	0.00155	3B	0.00115	0.00200
3/8 – 24 or 0.375 – 24	UNF	1A	0.00165	0.00285	1B	0.00214	0.00370
		2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00084	0.00145	3B	0.00107	0.00185
3/8 – 28 or 0.375 – 28	UN	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
3/8 – 32 or 0.375 – 32	UNEF	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00072	0.00125	3B	0.00095	0.00165
7/16 – 14 or 0.4375 – 14	UNC	1A	0.00205	0.00355	1B	0.00266	0.00460
		2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00133	0.00230
7/16 – 16 or 0.4375 – 16	UN	2A	0.00133	0.00230	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00130	0.00225
7/16 – 20 or 0.4375 – 20	UNF	1A	0.00182	0.00315	1B	0.00234	0.00405
		2A	0.00121	0.00210	2B	0.00156	0.00270
		3A	0.00089	0.00155	3B	0.00118	0.00205
7/16 – 28 or 0.4375 – 28	UNEF	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
7/16 – 32 or 0.4375 – 32	UN	2A	0.00098	0.00170	2B	0.00127	0.00220
		3A	0.00072	0.00125	3B	0.00095	0.00165
1/2 – 13 or 0.500 – 13	UNC	1A	0.00214	0.00370	1B	0.00280	0.00485
		2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
1/2 – 16 or 0.500 – 16	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00133	0.00230
1/2 – 20 or 0.500 – 20	UNF	1A	0.00185	0.00320	1B	0.00242	0.00420
		2A	0.00124	0.00215	2B	0.00162	0.00280
		3A	0.00092	0.00160	3B	0.00121	0.00210
1/2 – 28 or 0.500 – 28	UNEF	2A	0.00107	0.00185	2B	0.00139	0.00240
		3A	0.00081	0.00140	3B	0.00104	0.00180
1/2 – 32 or 0.500 – 32	UN	2A	0.00101	0.00175	2B	0.00130	0.00225
		3A	0.00075	0.00130	3B	0.00098	0.00170
9/16 – 12 or 0.5625 – 12	UNC	1A	0.00225	0.00390	1B	0.00294	0.00510
		2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
9/16 – 16 or 0.5625 – 16	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00133	0.00230
9/16 – 18 or 0.5625 – 18	UNF	1A	0.00196	0.00340	1B	0.00257	0.00445
		2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
9/16 – 20 or 0.5625 – 20	UN	2A	0.00121	0.00210	2B	0.00159	0.00275
		3A	0.00092	0.00160	3B	0.00118	0.00205
9/16 – 24 or 0.5625 – 24	UNEF	2A	0.00113	0.00195	2B	0.00147	0.00255
		3A	0.00084	0.00145	3B	0.00110	0.00190
9/16 – 28 or 0.5625 – 28	UN	2A	0.00107	0.00185	2B	0.00139	0.00240
		3A	0.00081	0.00140	3B	0.00104	0.00180
9/16 – 32 or 0.5625 – 32	UN	2A	0.00101	0.00175	2B	0.00130	0.00225
		3A	0.00075	0.00130	3B	0.00098	0.00170
5/8 – 11 or 0.625 – 11	UNC	1A	0.00240	0.00415	1B	0.00309	0.00535
		2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
5/8 – 12 or 0.625 – 12	UN	2A	0.00156	0.00270	2B	0.00205	0.00355
		3A	0.00118	0.00205	3B	0.00153	0.00265
5/8 – 16 or 0.625 – 16	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
5/8 – 18 or 0.625 – 18	UNF	1A	0.00202	0.00350	1B	0.00263	0.00455
		2A	0.00136	0.00235	2B	0.00173	0.00300
		3A	0.00101	0.00175	3B	0.00130	0.00255
5/8 – 20 or 0.625 – 20	UN	2A	0.00124	0.00215	2B	0.00162	0.00280
		3A	0.00092	0.00160	3B	0.00121	0.00210
5/8 – 24 or 0.625 – 24	UNEF	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
5/8 – 28 or 0.625 – 28	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
5/8 – 32 or 0.625 – 32	UN	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
11/16 – 12 or 0.6875 – 12	UN	2A	0.00156	0.00270	2B	0.00205	0.00355
		3A	0.00118	0.00205	3B	0.00153	0.00265

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$\frac{11}{16}$ – 16 or 0.6875 – 16	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00130	3B	0.00133	0.00230
$\frac{11}{16}$ – 20 or 0.6875 – 20	UN	2A	0.00124	0.00215	2B	0.00162	0.00280
		3A	0.00092	0.00160	3B	0.00121	0.00210
$\frac{11}{16}$ – 24 or 0.6875 – 24	UNEF	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
$\frac{11}{16}$ – 28 or 0.6875 – 28	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
$\frac{11}{16}$ – 32 or 0.6875 – 32	UN	2A	0.00104	0.00180	2B	0.00133	0.00230
		3A	0.00078	0.00135	3B	0.00101	0.00175
$\frac{3}{4}$ – 10 or 0.750 – 10	UNC	1A	0.00254	0.00440	1B	0.00332	0.00575
		2A	0.00170	0.00295	2B	0.00222	0.00385
		3A	0.00127	0.00220	3B	0.00165	0.00285
$\frac{3}{4}$ – 12 or 0.750 – 12	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$\frac{3}{4}$ – 16 or 0.750 – 16	UNF	1A	0.00217	0.00375	1B	0.00283	0.00490
		2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00110	0.00190	3B	0.00141	0.00245
$\frac{3}{4}$ – 20 or 0.750 – 20	UNEF	2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
$\frac{3}{4}$ – 28 or 0.750 – 28	UN	2A	0.00110	0.00190	2B	0.00144	0.00250
		3A	0.00084	0.00145	3B	0.00107	0.00185
$\frac{3}{4}$ – 32 or 0.750 – 32	UN	2A	0.00104	0.00180	2B	0.00136	0.00235
		3A	0.00078	0.00135	3B	0.00104	0.00180
$\frac{13}{16}$ – 12 or 0.8125 – 12	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$\frac{13}{16}$ – 16 or 0.8125 – 16	UN	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$\frac{13}{16}$ – 20 or 0.8125 – 20	UNEF	2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
$\frac{13}{16}$ – 28 or 0.8125 – 28	UN	2A	0.00110	0.00190	2B	0.00144	0.00250
		3A	0.00084	0.00145	3B	0.00107	0.00185
$\frac{13}{16}$ – 32 or 0.8125 – 32	UN	2A	0.00104	0.00180	2B	0.00136	0.00235
		3A	0.00078	0.00135	3B	0.00104	0.00180
$\frac{7}{8}$ – 9 or 0.875 – 9	UNC	1A	0.00274	0.00475	1B	0.00355	0.00615
		2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00176	0.00305
$\frac{7}{8}$ – 12 or 0.875 – 12	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$\frac{7}{8}$ – 14 or 0.875 – 14	UNF	1A	0.00234	0.00405	1B	0.00306	0.00530
		2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00118	0.00205	3B	0.00153	0.00265
$\frac{7}{8}$ – 16 or 0.875 – 16	UN	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

		External			Internal		
Nominal Size and Threads/in.	Series Designation	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$\frac{7}{8}$ – 20 or 0.875 – 20	UNEF	2A	0.00127	0.00220	2B	0.00165	0.00285
		3A	0.00095	0.00165	3B	0.00124	0.00215
$\frac{7}{8}$ – 28 or 0.875 – 28	UN	2A	0.00110	0.00190	2B	0.00144	0.00250
		3A	0.00084	0.00145	3B	0.00107	0.00185
$\frac{7}{8}$ – 32 or 0.875 – 32	UN	2A	0.00104	0.00180	2B	0.00136	0.00235
		3A	0.00078	0.00135	3B	0.00104	0.00180
$\frac{15}{16}$ – 12 or 0.9375 – 12	UN	2A	0.00165	0.00255	2B	0.00214	0.00370
		3A	0.00121	0.00210	3B	0.00159	0.00275
$\frac{15}{16}$ – 16 or 0.9375 – 16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245
$\frac{15}{16}$ – 20 or 0.9375 – 20	UNEF	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
$\frac{15}{16}$ – 28 or 0.9375 – 28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
$\frac{15}{16}$ – 32 or 0.9375 – 32	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
1 – 8 or 1.000 – 8	UNC	1A	0.00292	0.00505	1B	0.00381	0.00660
		2A	0.00196	0.00340	2B	0.00254	0.00440
		3A	0.00147	0.00255	3B	0.00191	0.00330
1 – 12 or 1.000 – 12	UNF	1A	0.00254	0.00440	1B	0.00329	0.00570
		2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
1 – 14 or 1.000 – 14	UNS	1A	0.00242	0.00420	1B	0.00315	0.00545
		2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00156	0.00270
1 – 16 or 1.000 – 16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245
1 – 20 or 1.000 – 20	UNEF	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
1 – 28 or 1.000 – 28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
1 – 32 or 1.000 – 32	UN	2A	0.00110	0.00190	2B	0.00141	0.00245
		3A	0.00081	0.00140	3B	0.00107	0.00185
$1\frac{1}{16}$ – 8 or 1.0625 – 8	UN	2A	0.00196	0.00340	2B	0.00257	0.00445
		3A	0.00147	0.00255	3B	0.00193	0.00335
$1\frac{1}{16}$ – 12 or 1.0625 – 12	UN	2A	0.00165	0.00285	2B	0.00214	0.00370
		3A	0.00121	0.00210	3B	0.00159	0.00275
$1\frac{1}{16}$ – 16 or 1.0625 – 16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245
$1\frac{1}{16}$ – 18 or 1.0625 – 18	UNEF	2A	0.00136	0.00235	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{1}{16}$ – 20 or 1.0625 – 20	UN	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$1\frac{1}{16}$ – 28 or 1.0625 – 28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
$1\frac{1}{8}$ – 7 or 1.125 – 7	UNC	1A	0.00315	0.00545	1B	0.00407	0.00705
		2A	0.00208	0.00360	2B	0.00271	0.00470
		3A	0.00156	0.00270	3B	0.00205	0.00355
$1\frac{1}{8}$ – 8 or 1.125 – 8	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
$1\frac{1}{8}$ – 12 or 1.125 – 12	UNF	1A	0.00260	0.00450	1B	0.00338	0.00585
		2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00170	0.00295
$1\frac{1}{8}$ – 16 or 1.125 – 16	UN	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00141	0.00245
$1\frac{1}{8}$ – 18 or 1.125 – 18	UNEF	2A	0.00136	0.00235	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{1}{8}$ – 20 or 1.125 – 20	UN	2A	0.00130	0.00225	2B	0.00170	0.00295
		3A	0.00098	0.00170	3B	0.00127	0.00220
$1\frac{1}{8}$ – 28 or 1.125 – 28	UN	2A	0.00115	0.00200	2B	0.00150	0.00260
		3A	0.00087	0.00150	3B	0.00113	0.00195
$1\frac{3}{16}$ – 8 or 1.1875 – 8	UN	2A	0.00202	0.00350	2B	0.00263	0.00455
		3A	0.00150	0.00260	3B	0.00196	0.00340
$1\frac{3}{16}$ – 12 or 1.1875 – 12	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
$1\frac{3}{16}$ – 16 or 1.1875 – 16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$1\frac{3}{16}$ – 18 or 1.1875 – 18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{3}{16}$ – 20 or 1.1875 – 20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{3}{16}$ – 28 or 1.1875 – 28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{1}{4}$ – 7 or 1.250 – 7	UNC	1A	0.00320	0.00555	1B	0.00416	0.00720
		2A	0.00214	0.00370	2B	0.00277	0.00480
		3A	0.00159	0.00275	3B	0.00208	0.00360
$1\frac{1}{4}$ – 8 or 1.250 – 8	UN	2A	0.00202	0.00350	2B	0.00266	0.00460
		3A	0.00153	0.00265	3B	0.00199	0.00345
$1\frac{1}{4}$ – 12 or 1.250 – 12	UNF	1A	0.00266	0.00460	1B	0.00346	0.00600
		2A	0.00179	0.00310	2B	0.00231	0.00400
		3A	0.00133	0.00230	3B	0.00173	0.00300
$1\frac{1}{4}$ – 16 or 1.250 – 16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00100	0.00190	3B	0.00144	0.00250
$1\frac{1}{4}$ – 18 or 1.250 – 18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{1}{4}$ – 20 or 1.250 – 20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$1\frac{1}{4}$ – 28 or 1.250 – 28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{5}{16}$ – 8 or 1.3125 – 8	UN	2A	0.00205	0.00355	2B	0.00266	0.00460
		3A	0.00153	0.00265	3B	0.00199	0.00345
$1\frac{5}{16}$ – 12 or 1.3125 – 12	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
$1\frac{5}{16}$ – 16 or 1.3125 – 16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$1\frac{5}{16}$ – 18 or 1.3125 – 18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{5}{16}$ – 20 or 1.3125 – 20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{5}{16}$ – 28 or 1.3125 – 28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{3}{8}$ – 6 or 1.375 – 6	UNC	1A	0.00346	0.00600	1B	0.00447	0.00775
		2A	0.00231	0.00400	2B	0.00300	0.00520
		3A	0.00173	0.00300	3B	0.00225	0.00390
$1\frac{3}{8}$ – 8 or 1.375 – 8	UN	2A	0.00208	0.00360	2B	0.00268	0.00465
		3A	0.00156	0.00270	3B	0.00202	0.00350
$1\frac{3}{8}$ – 12 or 1.375 – 12	UNF	1A	0.00271	0.00470	1B	0.00355	0.00615
		2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00176	0.00305
$1\frac{3}{8}$ – 16 or 1.375 – 16	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$1\frac{3}{8}$ – 18 or 1.375 – 18	UNEF	2A	0.00141	0.00245	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{3}{8}$ – 20 or 1.375 – 20	UN	2A	0.00136	0.00235	2B	0.00176	0.00305
		3A	0.00101	0.00175	3B	0.00130	0.00225
$1\frac{3}{8}$ – 28 or 1.375 – 28	UN	2A	0.00118	0.00205	2B	0.00153	0.00265
		3A	0.00089	0.00155	3B	0.00115	0.00200
$1\frac{7}{16}$ – 6 or 1.4375 – 6	UN	2A	0.00231	0.00400	2B	0.00300	0.00520
		3A	0.00173	0.00300	3B	0.00225	0.00390
$1\frac{7}{16}$ – 8 or 1.4375 – 8	UN	2A	0.00208	0.00360	2B	0.00271	0.00470
		3A	0.00156	0.00270	3B	0.00205	0.00355
$1\frac{7}{16}$ – 12 or 1.4375 – 12	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$1\frac{7}{16}$ – 16 or 1.4375 – 16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
$1\frac{7}{16}$ – 18 or 1.4375 – 18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
$1\frac{7}{16}$ – 20 or 1.4375 – 20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{7}{16}$ – 28 or 1.4375 – 28	UN	2A	0.00121	0.00210	2B	0.00159	0.00275
		3A	0.00089	0.00155	3B	0.00118	0.00205

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$1\frac{1}{2}$ – 6 or 1.500 – 6	UNC	1A	0.00349	0.00605	1B	0.00456	0.00790
		2A	0.00234	0.00405	2B	0.00303	0.00525
		3A	0.00176	0.00305	3B	0.00228	0.00305
$1\frac{1}{2}$ – 8 or 1.500 – 8	UN	2A	0.00211	0.00365	2B	0.00274	0.00475
		3A	0.00159	0.00275	3B	0.00205	0.00355
$1\frac{1}{2}$ – 12 or 1.500 – 12	UNF	1A	0.00277	0.00480	1B	0.00361	0.00625
		2A	0.00185	0.00320	2B	0.00240	0.00415
		3A	0.00139	0.00240	3B	0.00182	0.00315
$1\frac{1}{2}$ – 16 or 1.500 – 16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
$1\frac{1}{2}$ – 18 or 1.500 – 18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
$1\frac{1}{2}$ – 20 or 1.500 – 20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{1}{2}$ – 28 or 1.500 – 28	UN	2A	0.00121	0.00210	2B	0.00159	0.00275
		3A	0.00089	0.00155	3B	0.00118	0.00205
$1\frac{9}{16}$ – 6 or 1.5625 – 6	UN	2A	0.00237	0.00410	2B	0.00306	0.00530
		3A	0.00176	0.00305	3B	0.00231	0.00400
$1\frac{9}{16}$ – 8 or 1.5625 – 8	UN	2A	0.00214	0.00370	2B	0.00277	0.00480
		3A	0.00159	0.00275	3B	0.00208	0.00360
$1\frac{9}{16}$ – 12 or 1.5625 – 12	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$1\frac{9}{16}$ – 16 or 1.5625 – 16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
$1\frac{9}{16}$ – 18 or 1.5625 – 18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00139	0.00240
$1\frac{9}{16}$ – 20 or 1.5625 – 20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{5}{8}$ – 6 or 1.625 – 6	UN	2A	0.00237	0.00410	2B	0.00309	0.00535
		3A	0.00179	0.00310	3B	0.00231	0.00400
$1\frac{5}{8}$ – 8 or 1.625 – 8	UN	2A	0.00214	0.00370	2B	0.00280	0.00485
		3A	0.00162	0.00280	3B	0.00208	0.00360
$1\frac{5}{8}$ – 12 or 1.625 – 12	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$1\frac{5}{8}$ – 16 or 1.625 – 16	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
$1\frac{5}{8}$ – 18 or 1.625 – 18	UNEF	2A	0.00144	0.00250	2B	0.00188	0.00325
		3A	0.00107	0.00185	3B	0.00130	0.00240
$1\frac{5}{8}$ – 20 or 1.625 – 20	UN	2A	0.00139	0.00240	2B	0.00179	0.00310
		3A	0.00104	0.00180	3B	0.00133	0.00230
$1\frac{11}{16}$ – 6 or 1.6875 – 6	UN	2A	0.00240	0.00415	2B	0.00312	0.00540
		3A	0.00179	0.00310	3B	0.00234	0.00405
$1\frac{11}{16}$ – 8 or 1.6875 – 8	UN	2A	0.00217	0.00375	2B	0.00280	0.00485
		3A	0.00162	0.00280	3B	0.00211	0.00365

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$1\frac{11}{16}$ – 12 or 1.6875 – 12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{11}{16}$ – 16 or 1.6875 – 16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{11}{16}$ – 18 or 1.6875 – 18	UNEF	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00141	0.00245
$1\frac{11}{16}$ – 20 or 1.6875 – 20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{3}{4}$ – 5 or 1.750 – 5	UNC	1A	0.00387	0.00670	1B	0.00502	0.00870
		2A	0.00257	0.00445	2B	0.00335	0.00580
		3A	0.00193	0.00335	3B	0.00251	0.00435
$1\frac{3}{4}$ – 6 or 1.750 – 6	UN	2A	0.00240	0.00415	2B	0.00312	0.00540
		3A	0.00182	0.00315	3B	0.00234	0.00405
$1\frac{3}{4}$ – 8 or 1.750 – 8	UN	2A	0.00217	0.00375	2B	0.00283	0.00490
		3A	0.00165	0.00285	3B	0.00214	0.00370
$1\frac{3}{4}$ – 12 or 1.750 – 12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{3}{4}$ – 16 or 1.750 – 16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{3}{4}$ – 20 or 1.750 – 20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{13}{16}$ – 6 or 1.8125 – 6	UN	2A	0.00242	0.00420	2B	0.00315	0.00545
		3A	0.00182	0.00315	3B	0.00237	0.00410
$1\frac{13}{16}$ – 8 or 1.8125 – 8	UN	2A	0.00219	0.00380	2B	0.00286	0.00495
		3A	0.00165	0.00285	3B	0.00214	0.00370
$1\frac{13}{16}$ – 12 or 1.8125 – 12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{13}{16}$ – 16 or 1.8125 – 16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{13}{16}$ – 20 or 1.8125 – 20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{7}{8}$ – 6 or 1.875 – 6	UN	2A	0.00242	0.00420	2B	0.00318	0.00550
		3A	0.00182	0.00315	3B	0.00237	0.00410
$1\frac{7}{8}$ – 8 or 1.875 – 8	UN	2A	0.00222	0.00385	2B	0.00289	0.00500
		3A	0.00165	0.00285	3B	0.00217	0.00375
$1\frac{7}{8}$ – 12 or 1.875 – 12	UN	2A	0.00173	0.00300	2B	0.00225	0.00390
		3A	0.00130	0.00225	3B	0.00167	0.00290
$1\frac{7}{8}$ – 16 or 1.875 – 16	UN	2A	0.00153	0.00265	2B	0.00199	0.00345
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{7}{8}$ – 20 or 1.875 – 20	UN	2A	0.00139	0.00240	2B	0.00182	0.00315
		3A	0.00104	0.00180	3B	0.00136	0.00235
$1\frac{15}{16}$ – 6 or 1.9375 – 6	UN	2A	0.00245	0.00425	2B	0.00320	0.00555
		3A	0.00185	0.00320	3B	0.00240	0.00415

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$1\frac{15}{16}$ – 8 or 1.9375 – 8	UN	2A	0.00222	0.00385	2B	0.00289	0.00500
		3A	0.00167	0.00290	3B	0.00217	0.00375
$1\frac{15}{16}$ – 12 or 1.9375 – 12	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
$1\frac{15}{16}$ – 16 or 1.9375 – 16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
$1\frac{15}{16}$ – 20 or 1.9375 – 20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
2 – $4\frac{1}{2}$ or 2.000 – 4.5	UNC	1A	0.00413	0.00715	1B	0.00537	0.00930
		2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00205	0.00355	3B	0.00268	0.00465
2 – 6 or 2.000 – 6	UN	2A	0.00248	0.00430	2B	0.00320	0.00555
		3A	0.00185	0.00320	3B	0.00240	0.00415
2 – 8 or 2.000 – 8	UN	2A	0.00225	0.00390	2B	0.00292	0.00505
		3A	0.00167	0.00290	3B	0.00219	0.00380
2 – 12 or 2.000 – 12	UN	2A	0.00176	0.00305	2B	0.00223	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
2 – 16 or 2.000 – 16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
2 – 20 or 2.000 – 20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
$2\frac{1}{8}$ – 6 or 2.125 – 6	UN	2A	0.00251	0.00435	2B	0.00326	0.00565
		3A	0.00188	0.00325	3B	0.00242	0.00420
$2\frac{1}{8}$ – 8 or 2.125 – 8	UN	2A	0.00228	0.00395	2B	0.00294	0.00510
		3A	0.00170	0.00295	3B	0.00212	0.00385
$2\frac{1}{8}$ – 12 or 2.125 – 12	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
$2\frac{1}{8}$ – 16 or 2.125 – 16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
$2\frac{1}{8}$ – 20 or 2.125 – 20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240
$2\frac{1}{4}$ – $4\frac{1}{2}$ or 2.250 – 4.5	UNC	1A	0.00421	0.00730	1B	0.00548	0.00950
		2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
$2\frac{1}{4}$ – 6 or 2.250 – 6	UN	2A	0.00254	0.00440	2B	0.00329	0.00570
		3A	0.00191	0.00330	3B	0.00214	0.00425
$2\frac{1}{4}$ – 8 or 2.250 – 8	UN	2A	0.00231	0.00400	2B	0.00300	0.00520
		3A	0.00173	0.00300	3B	0.00225	0.00390
$2\frac{1}{4}$ – 12 or 2.250 – 12	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
$2\frac{1}{4}$ – 16 or 2.250 – 16	UN	2A	0.00156	0.00270	2B	0.00202	0.00350
		3A	0.00115	0.00200	3B	0.00150	0.00260
$2\frac{1}{4}$ – 20 or 2.250 – 20	UN	2A	0.00141	0.00245	2B	0.00185	0.00320
		3A	0.00107	0.00185	3B	0.00139	0.00240

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$2\frac{3}{8}$ – 6 or 2.375 – 6	UN	2A	0.00257	0.00445	2B	0.00332	0.00575
		3A	0.00191	0.00330	3B	0.00248	0.00430
$2\frac{3}{8}$ – 8 or 2.375 – 8	UN	2A	0.00234	0.00405	2B	0.00303	0.00525
		3A	0.00173	0.00300	3B	0.00228	0.00395
$2\frac{3}{8}$ – 12 or 2.375 – 12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
$2\frac{3}{8}$ – 16 or 2.375 – 16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00155	0.00270
$2\frac{3}{8}$ – 20 or 2.375 – 20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$2\frac{1}{2}$ – 4 or 2.500 – 4	UNC	1A	0.00447	0.00775	1B	0.00583	0.01010
		2A	0.00300	0.00520	2B	0.00390	0.00675
		3A	0.00225	0.00390	3B	0.00292	0.00505
$2\frac{1}{2}$ – 6 or 2.500 – 6	UN	2A	0.00260	0.00450	2B	0.00335	0.00580
		3A	0.00193	0.00335	3B	0.00251	0.00435
$2\frac{1}{2}$ – 8 or 2.500 – 8	UN	2A	0.00237	0.00410	2B	0.00306	0.00530
		3A	0.00176	0.00305	3B	0.00231	0.00400
$2\frac{1}{2}$ – 12 or 2.500 – 12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
$2\frac{1}{2}$ – 16 or 2.500 – 16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$2\frac{1}{2}$ – 20 or 2.500 – 20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$2\frac{5}{8}$ – 6 or 2.625 – 6	UN	2A	0.00260	0.00450	2B	0.00341	0.00590
		3A	0.00196	0.00340	3B	0.00254	0.00440
$2\frac{5}{8}$ – 8 or 2.625 – 8	UN	2A	0.00237	0.00410	2B	0.00309	0.00535
		3A	0.00179	0.00310	3B	0.00231	0.00400
$2\frac{5}{8}$ – 12 or 2.625 – 12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300
$2\frac{5}{8}$ – 16 or 2.625 – 16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$2\frac{5}{8}$ – 20 or 2.625 – 20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$2\frac{3}{4}$ – 4 or 2.750 – 4	UNC	1A	0.00456	0.00790	1B	0.00595	0.01030
		2A	0.00303	0.00525	2B	0.00395	0.00685
		3A	0.00228	0.00395	3B	0.00297	0.00515
$2\frac{3}{4}$ – 6 or 2.750 – 6	UN	2A	0.00263	0.00455	2B	0.00344	0.00595
		3A	0.00196	0.00340	3B	0.00257	0.00445
$2\frac{3}{4}$ – 8 or 2.750 – 8	UN	2A	0.00240	0.00415	2B	0.00312	0.00540
		3A	0.00182	0.00315	3B	0.00234	0.00405
$2\frac{3}{4}$ – 12 or 2.750 – 12	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00133	0.00230	3B	0.00173	0.00300

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$(+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$2\frac{3}{4}$ – 16 or 2.750 – 16	UN	2A	0.00159	0.00275	2B	0.00208	0.00360
		3A	0.00118	0.00205	3B	0.00156	0.00270
$2\frac{3}{4}$ – 20 or 2.750 – 20	UN	2A	0.00147	0.00255	2B	0.00191	0.00330
		3A	0.00110	0.00190	3B	0.00144	0.00250
$2\frac{7}{8}$ – 6 or 2.875 – 6	UN	2A	0.00266	0.00460	2B	0.00346	0.00600
		3A	0.00199	0.00345	3B	0.00280	0.00450
$2\frac{7}{8}$ – 8 or 2.875 – 8	UN	2A	0.00242	0.00420	2B	0.00318	0.00550
		3A	0.00182	0.00315	3B	0.00237	0.00410
$2\frac{7}{8}$ – 12 or 2.875 – 12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
$2\frac{7}{8}$ – 16 or 2.875 – 16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
$2\frac{7}{8}$ – 20 or 2.875 – 20	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
3 – 4 or 3.000 – 4	UNC	1A	0.00465	0.00805	1B	0.00603	0.01045
		2A	0.00309	0.00535	2B	0.00401	0.00695
		3A	0.00231	0.00400	3B	0.00300	0.00520
3 – 6 or 3.000 – 6	UN	2A	0.00268	0.00465	2B	0.00349	0.00605
		3A	0.00202	0.00350	3B	0.00263	0.00455
3 – 8 or 3.000 – 8	UN	2A	0.00245	0.00425	2B	0.00320	0.00555
		3A	0.00185	0.00320	3B	0.00240	0.00415
3 – 12 or 3.000 – 12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
3 – 16 or 3.000 – 16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
3 – 20 or 3.000 – 20	UN	2A	0.00150	0.00260	2B	0.00196	0.00340
		3A	0.00113	0.00195	3B	0.00147	0.00255
$3\frac{1}{8}$ – 6 or 3.125 – 6	UN	2A	0.00271	0.00470	2B	0.00352	0.00610
		3A	0.00202	0.00350	3B	0.00266	0.00460
$3\frac{1}{8}$ – 8 or 3.125 – 8	UN	2A	0.00248	0.00430	2B	0.00323	0.00560
		3A	0.00185	0.00320	3B	0.00242	0.00420
$3\frac{1}{8}$ – 12 or 3.125 – 12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310
$3\frac{1}{8}$ – 16 or 3.125 – 16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
$3\frac{1}{4}$ – 4 or 3.250 – 4	UNC	1A	0.00471	0.00815	1B	0.00612	0.01060
		2A	0.00315	0.00545	2B	0.00407	0.00705
		3A	0.00237	0.00410	3B	0.00306	0.00530
$3\frac{1}{4}$ – 6 or 3.250 – 6	UN	2A	0.00274	0.00475	2B	0.00355	0.00615
		3A	0.00205	0.00355	3B	0.00266	0.00460
$3\frac{1}{4}$ – 8 or 3.250 – 8	UN	2A	0.00251	0.00435	2B	0.00326	0.00565
		3A	0.00188	0.00325	3B	0.00245	0.00425
$3\frac{1}{4}$ – 12 or 3.250 – 12	UN	2A	0.00182	0.00315	2B	0.00237	0.00410
		3A	0.00136	0.00235	3B	0.00179	0.00310

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$3\frac{1}{4}$ – 16 or 3.250 – 16	UN	2A	0.00162	0.00280	2B	0.00211	0.00365
		3A	0.00121	0.00210	3B	0.00159	0.00275
$3\frac{3}{8}$ – 6 or 3.375 – 6	UN	2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00208	0.00360	3B	0.00258	0.00465
$3\frac{3}{8}$ – 8 or 3.375 – 8	UN	2A	0.00254	0.00440	2B	0.00329	0.00570
		3A	0.00191	0.00330	3B	0.00245	0.00425
$3\frac{3}{8}$ – 12 or 3.375 – 12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00242	3B	0.00182	0.00315
$3\frac{3}{8}$ – 16 or 3.375 – 16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
$3\frac{1}{2}$ – 4 or 3.500 – 4	UNC	1A	0.00479	0.00830	1B	0.00621	0.01075
		2A	0.00318	0.00550	2B	0.00413	0.00715
		3A	0.00240	0.00415	3B	0.00312	0.00540
$3\frac{1}{2}$ – 6 or 3.500 – 6	UN	2A	0.00277	0.00480	2B	0.00361	0.00625
		3A	0.00208	0.00360	3B	0.00271	0.00470
$3\frac{1}{2}$ – 8 or 3.500 – 8	UN	2A	0.00254	0.00440	2B	0.00332	0.00575
		3A	0.00191	0.00330	3B	0.00248	0.00430
$3\frac{1}{2}$ – 12 or 3.500 – 12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00240	3B	0.00182	0.00315
$3\frac{1}{2}$ – 16 or 3.500 – 16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
$3\frac{5}{8}$ – 6 or 3.625 – 6	UN	2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
$3\frac{5}{8}$ – 8 or 3.625 – 8	UN	2A	0.00257	0.00445	2B	0.00335	0.00580
		3A	0.00193	0.00335	3B	0.00251	0.00435
$3\frac{5}{8}$ – 12 or 3.625 – 12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00240	3B	0.00182	0.00315
$3\frac{5}{8}$ – 16 or 3.625 – 16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00214	0.00215	3B	0.00162	0.00280
$3\frac{3}{4}$ – 4 or 3.750 – 4	UNC	1A	0.00485	0.00840	1B	0.00629	0.01090
		2A	0.00323	0.00560	2B	0.00419	0.00725
		3A	0.00242	0.00420	3B	0.00315	0.00545
$3\frac{3}{4}$ – 6 or 3.750 – 6	UN	2A	0.00283	0.00490	2B	0.00367	0.00635
		3A	0.00211	0.00365	3B	0.00274	0.00475
$3\frac{3}{4}$ – 8 or 3.750 – 8	UN	2A	0.00260	0.00450	2B	0.00338	0.00585
		3A	0.00193	0.00335	3B	0.00254	0.00440
$3\frac{3}{4}$ – 12 or 3.750 – 12	UN	2A	0.00185	0.00320	2B	0.00242	0.00420
		3A	0.00139	0.00240	3B	0.00182	0.00315
$3\frac{3}{4}$ – 16 or 3.750 – 16	UN	2A	0.00167	0.00290	2B	0.00217	0.00375
		3A	0.00124	0.00215	3B	0.00162	0.00280
$3\frac{7}{8}$ – 6 or 3.875 – 6	UN	2A	0.00286	0.00495	2B	0.00369	0.00640
		3A	0.00214	0.00370	3B	0.00277	0.00480

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$3\frac{7}{8}$ – 8 or 3.875 – 8	UN	2A	0.00263	0.00455	2B	0.00341	0.00590
		3A	0.00196	0.00340	3B	0.00254	0.00440
$3\frac{7}{8}$ – 12 or 3.875 – 12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
$3\frac{7}{8}$ – 16 or 3.875 – 16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
4 – 4 or 4.000 – 4	UNC	1A	0.00491	0.00850	1B	0.00638	0.01105
		2A	0.00326	0.00565	2B	0.00424	0.00735
		3A	0.00245	0.00425	3B	0.00320	0.00555
4 – 6 or 4.000 – 6	UN	2A	0.00286	0.00495	2B	0.00372	0.00645
		3A	0.00214	0.00370	3B	0.00280	0.00485
4 – 8 or 4.000 – 8	UN	2A	0.00263	0.00455	2B	0.00344	0.00595
		3A	0.00196	0.00340	3B	0.00257	0.00445
4 – 12 or 4.000 – 12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
4 – 16 or 4.000 – 16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$4\frac{1}{8}$ – 6 or 4.125 – 6	UN	2A	0.00289	0.00500	2B	0.00375	0.00650
		3A	0.00217	0.00375	3B	0.00280	0.00485
$4\frac{1}{8}$ – 8 or 4.125 – 8	UN	2A	0.00266	0.00460	2B	0.00346	0.00600
		3A	0.00199	0.00345	3B	0.00260	0.00450
$4\frac{1}{8}$ – 12 or 4.125 – 12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
$4\frac{1}{8}$ – 16 or 4.125 – 16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$4\frac{1}{4}$ – 4 or 4.250 – 4	UN	2A	0.00332	0.00575	2B	0.00430	0.00745
		3A	0.00248	0.00430	3B	0.00323	0.00560
$4\frac{1}{4}$ – 6 or 4.250 – 6	UN	2A	0.00292	0.00505	2B	0.00378	0.00655
		3A	0.00217	0.00375	3B	0.00283	0.00490
$4\frac{1}{4}$ – 8 or 4.250 – 8	UN	2A	0.00268	0.00465	2B	0.00346	0.00600
		3A	0.00202	0.00350	3B	0.00263	0.00455
$4\frac{1}{4}$ – 12 or 4.250 – 12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
$4\frac{1}{4}$ – 16 or 4.250 – 16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$4\frac{3}{8}$ – 6 or 4.375 – 6	UN	2A	0.00292	0.00505	2B	0.00381	0.00660
		3A	0.00219	0.00380	3B	0.00286	0.00495
$4\frac{3}{8}$ – 8 or 4.375 – 8	UN	2A	0.00268	0.00465	2B	0.00346	0.00600
		3A	0.00202	0.00350	3B	0.00263	0.00455
$4\frac{3}{8}$ – 12 or 4.375 – 12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
$4\frac{3}{8}$ – 16 or 4.375 – 16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$4\frac{1}{2}$ – 4 or 4.500 – 4	UN	2A	0.00335	0.00580	2B	0.00436	0.00755
		3A	0.00251	0.00435	3B	0.00326	0.00565
$4\frac{1}{2}$ – 6 or 4.500 – 6	UN	2A	0.00294	0.00510	2B	0.00384	0.00665
		3A	0.00222	0.00385	3B	0.00286	0.00495
$4\frac{1}{2}$ – 8 or 4.500 – 8	UN	2A	0.00271	0.00470	2B	0.00352	0.00610
		3A	0.00205	0.00355	3B	0.00266	0.00460
$4\frac{1}{2}$ – 12 or 4.500 – 12	UN	2A	0.00188	0.00325	2B	0.00245	0.00425
		3A	0.00141	0.00245	3B	0.00185	0.00320
$4\frac{1}{2}$ – 16 or 4.500 – 16	UN	2A	0.00170	0.00295	2B	0.00219	0.00380
		3A	0.00127	0.00220	3B	0.00165	0.00285
$4\frac{5}{8}$ – 6 or 4.625 – 6	UN	2A	0.00297	0.00515	2B	0.00384	0.00665
		3A	0.00222	0.00385	3B	0.00289	0.00500
$4\frac{5}{8}$ – 8 or 4.625 – 8	UN	2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00205	0.00355	3B	0.00268	0.00465
$4\frac{5}{8}$ – 12 or 4.625 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
$4\frac{5}{8}$ – 16 or 4.625 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
$4\frac{3}{4}$ – 4 or 4.750 – 4	UN	2A	0.00338	0.00585	2B	0.00442	0.00765
		3A	0.00254	0.00440	3B	0.00329	0.00570
$4\frac{3}{4}$ – 6 or 4.750 – 6	UN	2A	0.00297	0.00515	2B	0.00387	0.00670
		3A	0.00222	0.00385	3B	0.00292	0.00505
$4\frac{3}{4}$ – 8 or 4.750 – 8	UN	2A	0.00274	0.00475	2B	0.00358	0.00620
		3A	0.00205	0.00355	3B	0.00268	0.00465
$4\frac{3}{4}$ – 12 or 4.750 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
$4\frac{3}{4}$ – 16 or 4.750 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
$4\frac{7}{8}$ – 6 or 4.875 – 6	UN	2A	0.00300	0.00520	2B	0.00390	0.00675
		3A	0.00225	0.00390	3B	0.00292	0.00505
$4\frac{7}{8}$ – 8 or 4.875 – 8	UN	2A	0.00277	0.00480	2B	0.00361	0.00625
		3A	0.00208	0.00360	3B	0.00271	0.00470
$4\frac{7}{8}$ – 12 or 4.875 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00101	0.00330
$4\frac{7}{8}$ – 16 or 4.875 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 – 4 or 5.000 – 4	UN	2A	0.00344	0.00595	2B	0.00445	0.00770
		3A	0.00257	0.00445	3B	0.00335	0.00580
5 – 6 or 5.000 – 6	UN	2A	0.00303	0.00525	2B	0.00393	0.00680
		3A	0.00225	0.00390	3B	0.00294	0.00510

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

Nominal Size and Threads/in.	Series Designation	External			Internal		
		Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+)	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
5 – 8 or 5.000 – 8	UN	2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
5 – 12 or 5.000 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 – 16 or 5.000 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00305
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 1/8 – 8 or 5.125 – 8	UN	2A	0.00280	0.00485	2B	0.00364	0.00630
		3A	0.00211	0.00365	3B	0.00274	0.00475
5 1/8 – 12 or 5.125 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 1/8 – 16 or 5.125 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 1/4 – 4 or 5.250 – 4	UN	2A	0.00346	0.00600	2B	0.00450	0.00780
		3A	0.00260	0.00450	3B	0.00385	0.00585
5 1/4 – 8 or 5.250 – 8	UN	2A	0.00283	0.00490	2B	0.00367	0.00635
		3A	0.00214	0.00370	3B	0.00277	0.00480
5 1/4 – 12 or 5.250 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 1/4 – 16 or 5.250 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 3/8 – 8 or 5.375 – 8	UN	2A	0.00286	0.00495	2B	0.00372	0.00645
		3A	0.00214	0.00370	3B	0.00280	0.00485
5 3/8 – 12 or 5.375 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 3/8 – 16 or 5.375 – 16	UN	2A	0.00176	0.00305	2B	0.00231	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 1/2 – 4 or 5.500 – 4	UN	2A	0.00349	0.00605	2B	0.00456	0.00790
		3A	0.00263	0.00455	3B	0.00341	0.00500
5 1/2 – 8 or 5.500 – 8	UN	2A	0.00286	0.00495	2B	0.00372	0.00645
		3A	0.00214	0.00370	3B	0.00280	0.00485
5 1/2 – 12 or 5.500 – 12	UN	2A	0.00193	0.00335	2B	0.00251	0.00435
		3A	0.00144	0.00250	3B	0.00191	0.00330
5 1/2 – 16 or 5.500 – 16	UN	2A	0.00176	0.00305	2B	0.00228	0.00395
		3A	0.00130	0.00225	3B	0.00170	0.00295
5 5/8 – 8 or 5.625 – 8	UN	2A	0.00289	0.00500	2B	0.00375	0.00650
		3A	0.00217	0.00375	3B	0.00283	0.00490
5 5/8 – 12 or 5.625 – 12	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
5 5/8 – 16 or 5.625 – 16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305
5 3/4 – 4 or 5.750 – 4	UN	2A	0.00352	0.00610	2B	0.00459	0.00795
		3A	0.00266	0.00460	3B	0.00344	0.00595

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Table 3 Allowable Variations in Lead and Equivalent Change in Functional Diameter (Cont'd)

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

		External			Internal		
Nominal Size and Threads/in.	Series Designation	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, $\frac{1}{2}Td_2$	Class	Allowable Variation in Lead, in. (±)	Equivalent Change in Functional Diameter, in. $\frac{1}{2}TD_2$ (–)
1	2	3	4	5	6	7	8
$5\frac{3}{4}$ – 8 or 5.750 – 8	UN	2A	0.00289	0.00500	2B	0.00375	0.00650
		3A	0.00217	0.00375	3B	0.00283	0.00490
$5\frac{3}{4}$ – 12 or 5.750 – 12	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
$5\frac{3}{4}$ – 16 or 5.750 – 16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305
$5\frac{7}{8}$ – 8 or 5.875 – 8	UN	2A	0.00292	0.00505	2B	0.00378	0.00655
		3A	0.00219	0.00380	3B	0.00283	0.00490
$5\frac{7}{8}$ – 12 or 5.875 – 12	UN	2A	0.00199	0.00345	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
$5\frac{7}{8}$ – 16 or 5.875 – 16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305
6 – 4 or 6.000 – 4	UN	2A	0.00358	0.00620	2B	0.00455	0.00805
		3A	0.00268	0.00465	3B	0.00346	0.00600
6 – 8 or 6.000 – 8	UN	2A	0.00294	0.00510	2B	0.00384	0.00665
		3A	0.00222	0.00385	3B	0.00286	0.00495
6 – 12 or 6.000 – 12	UN	2A	0.00199	0.00315	2B	0.00260	0.00450
		3A	0.00150	0.00260	3B	0.00193	0.00335
6 – 16 or 6.000 – 16	UN	2A	0.00179	0.00310	2B	0.00234	0.00405
		3A	0.00136	0.00235	3B	0.00176	0.00305

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5.3.2 Long Length of Engagement Using Standard Thread Gage Limits. ASME B1.2 recommends that the length of the GO gage should approximate the length of engagement. However, it is sometimes more economical to accept these threads with GO thread gages made from standard gage blanks (refer to ASME B47.1), which have length approximating the standard lengths of engagement.

NOTE: When this is done, additional precautions are necessary to determine the effect of cumulative variation of lead and straightness of thread axis due to a long length of engagement.

If applicable, an additional allowance should be provided, preferably on the external thread, the amount of which should be the diameter equivalent of the cumulative lead variation for the increased length of engagement, equal to the sum of one-half the pitch diameter tolerances of the external and internal threads allowed for the standard length of engagement.

EXAMPLE: 0.3750-24UNF-2A; $LE = 0.88$ in. (2.35 diameters); with external and internal thread gages of standard length.

Add allowance equal to $\frac{1}{2}Td_2 + \frac{1}{2}TD_2$ for standard mating threads. From Table 3, column 5, $\frac{1}{2}Td_2$ (standard) = 0.0019.

From Table 3, column 8, $\frac{1}{2}TD_2$ (standard) = 0.00245.

The sum of these, after rounding, is equal to 0.0044, which is the added allowance. Therefore, the thread is redesignated to indicate a nonstandard external thread, with the allowance of 0.0044 subtracted from the basic size of 0.3750. New designation is 0.3706-24UNS-2A. The added allowance is also subtracted from the standard major diameter and pitch diameter size limits. See para. 6.6.2.

5.4 Minor Diameter Tolerance and Allowance for External Threads

The tolerance for minor diameter is for reference only. 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 allowance, *es*, if any. A formula for the minor diameter tolerance of external threads is given in para. 5.8.1(d).

5.5 Major Diameter Tolerance for Internal Threads

The tolerance for major diameter is for reference only. 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. A formula for the major diameter tolerance of internal threads is given in para. 5.8.2(a).

5.6 Minor Diameter Tolerance and Length of Engagement for Internal Threads

Formulas for the minor diameter tolerance for internal threads are given in para. 5.8.2(c).

Internal thread minor diameter tolerances are suitable for lengths of engagement up to 1.5 diameters. For applications having shorter or longer lengths of engagement, it may be advantageous to decrease or increase the tolerance as explained in para. 5.6.1.

5.6.1 The principal practical factors that govern minor diameter tolerance are ease of tapping, standard drill sizes, and height of engagement.

NOTE: Height of engagement is measured in a radial direction, while length of engagement is measured in an axial direction.

Height of engagement correlates with the stripping strength of the thread assembly and, therefore, 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 allowance and pitch diameter tolerances 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 an increase in thread diameter. However, such a 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 ASME B94.11M, the minor diameter tolerance for Classes 1B and 2B of a given pitch for $\frac{1}{4}$ in. diameter and larger is constant.

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 engagement 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 height 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.

It is particularly important to reduce the number of minor diameter tolerances to a practical minimum. This reduction is usually obvious to the producer of longer internally threaded components, but sometimes is not understood by the user.

The tolerances for lengths of engagement less than 0.33D are 0.50 times the formula values in para. 5.8.2 (c). For lengths of engagement from 0.33D to 0.67D, the tolerances are 0.75 times the formula values; for lengths of engagement from 0.67D to 1.5D, the tolerances are equal to the formula values; and for lengths of engagement over 1.5D, the tolerances are 1.25 times the formula values. Where the tolerance value so computed is more than 0.394P, the value is adjusted to equal 0.394P.

5.7 Disposition of Allowance and Tolerance

The disposition of allowance, tolerance, and crest clearances for the various thread classes is shown in Figs. 2 and 3.

5.8 Formulas for Allowance and Tolerance

The following formulas for allowance and tolerance are used for unified formulation and apply to standard and special series screw threads.

The following symbols are used in the equations:

D_{bsc} = basic major (nominal) diameter
LE = length of engagement, in.
P = pitch, in. = $1/n$
H = height of fundamental triangle = 0.86602540P
n = threads per inch

5.8.1 External Thread

(a) Allowance (External Threads)

(1) Classes 1A and 2A = 0.300 Class 2A pitch diameter tolerance[1]

(2) Class 3A = no allowance

(b) Major Diameter Tolerance (External Threads)

(1) Class 1A = $0.090\sqrt[3]{P^2}$

(2) Classes 2A and 3A = $0.060\sqrt[3]{P^2}$

The tolerance for Class 2A coarse and the 8-thread series threads of unfinished, hot-rolled material is $0.090\sqrt[3]{P^2}$. This does not apply to standard fasteners with rolled threads.

(c) Pitch Diameter Tolerance (External Threads)

(1) Class 1A = 1.500 Class 2A pitch diameter tolerance[1]

(2) Class 2A = $0.0015\sqrt[3]{D} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$

NOTE: See Table 4 for the values of these terms corresponding to given values of diameter, length of engagement.[1]

(3) Class 3A = 0.750 Class 2A pitch diameter tolerance[1]

[1] Calculations shall use Class 2A pitch diameter tolerance with six decimal places. Final values shall be rounded to four decimal places.

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Table 4 Increments in Pitch Diameter Tolerance — Class 2A

$$(PD \text{ Tolerance} = 0.0015\sqrt[3]{D} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2})$$

Diameter, D				Length of Engagement, LE												Pitch, P	
				Based on Note (1)					Based on Note (1)				Based on Note (1)				
D	$0.0015\sqrt[3]{D}$	D	$0.0015\sqrt[3]{D}$	$1D$ for Sizes	$9P$ for TPI	$20P$ for TPI	LE	$0.0015\sqrt{LE}$	$1D$ for Sizes	$9P$ for TPI	$20P$ for TPI	LE	$0.0015\sqrt{LE}$	$1D$ for Sizes	$20P$ for TPI	LE	$0.0015\sqrt{LE}$	Threads/in.	$0.015\sqrt[3]{P^2}$
0.0600	0.000587	1.9375	0.001870	#0	...	...	0.0600	0.000367	1/2	18	40	0.5000	0.001061	2 3/8	...	2.3750	0.002312	80	0.000808
0.0625	0.000595	2.0000	0.001890	1/16	...	...	0.0625	0.000375	...	...	36	0.5556	0.001118	2 1/2	8	2.5000	0.002372	72	0.000867
0.0730	0.000627	2.1250	0.001928	#1	...	...	0.0730	0.000405	9/16	16	...	0.5625	0.001125	2 5/8	...	2.6250	0.002430	64	0.000938
0.0860	0.000662	2.2500	0.001966	3/64	...	...	0.0781	0.000419	5/8	...	32	0.6250	0.001186	2 3/4	...	2.7500	0.002487	60	0.000979
0.0938	0.000682	2.3750	0.002001	#2	...	...	0.0860	0.000440	...	14	...	0.6429	0.001203	...	7	2.8571	0.002535	56	0.001025
0.0990	0.000694	2.5000	0.002036	3/32	...	...	0.0938	0.000459	11/16	...	...	0.6875	0.001244	2 7/8	...	2.8750	0.002543	50	0.001105
0.1120	0.000723	2.6250	0.002069	#3	...	...	0.0990	0.000472	...	13	...	0.6923	0.001248	3	...	3.0000	0.002598	48	0.001136
0.1250	0.000750	2.7500	0.002102	7/64	...	...	0.1094	0.000496	...	...	28	0.7143	0.001268	3 1/8	...	3.1250	0.002652	44	0.001204
0.1380	0.000775	2.8750	0.002133	#4	...	...	0.1120	0.000502	...	...	27	0.7407	0.001291	3 1/4	...	3.2500	0.002704	42	0.001241
0.1640	0.000821	3.0000	0.002163	...	80	...	0.1125	0.000503	3/4	12	...	0.7500	0.001299	...	6	3.3333	0.002739	40	0.001282
0.1875	0.000859	3.1250	0.002193	#5	72	...	0.1250	0.000530	...	11 1/2	...	0.7826	0.001327	3 3/8	...	3.3750	0.002756	36	0.001376
0.1900	0.000862	3.2500	0.002222	#6	...	..	0.1380	0.000557	13/16	...	...	0.8125	0.001352	3 1/2	...	3.5000	0.002806	34	0.001429
0.2160	0.000900	3.3750	0.002250	...	64	...	0.1406	0.000562	...	11	...	0.8182	0.001357	3 5/8	...	3.6250	0.002856	32	0.001488
0.2500	0.000945	3.5000	0.002277	5/32	...	...	0.1562	0.000593	...	...	24	0.8333	0.001369	3 3/4	...	3.7500	0.002905	30	0.001554
0.3125	0.001018	3.6250	0.002304	...	56	...	0.1607	0.000601	7/8	...	...	0.8750	0.001403	3 7/8	...	3.8750	0.002953	28	0.001627
0.3750	0.001082	3.7500	0.002330	#8	...	...	0.1640	0.000607	...	10	...	0.9000	0.001423	4	5	4.0000	0.003000	27	0.001667
0.4375	0.001139	3.8750	0.002356	11/64	...	...	0.1719	0.000622	15/16	...	...	0.9375	0.001452	4 1/8	...	4.1250	0.003047	26	0.001709
0.5000	0.001191	4.0000	0.002381	3/16	48	...	0.1875	0.000650	1	9	20	1.0000	0.001500	4 1/4	...	4.2500	0.003092	24	0.001803
0.5625	0.001238	4.1250	0.002406	#10	...	...	0.1900	0.000654	1 1/16	...	...	1.0625	0.001546	4 3/8	...	4.3750	0.003137	22	0.001910
0.6250	0.001282	4.2500	0.002430	13/64	...	...	0.2031	0.000676	...	...	18	1.1111	0.001581	...	4 1/2	4.4444	0.003162	20	0.002036
0.6875	0.001324	4.3750	0.002453	...	44	...	0.2045	0.000678	1 1/8	8	...	1.1250	0.001591	4 1/2	...	4.5000	0.003182	18	0.002184
0.7500	0.001363	4.5000	0.002476	#12	...	...	0.2160	0.000697	1 3/16	...	...	1.1875	0.001635	4 5/8	...	4.6250	0.003226	16	0.002362
0.8125	0.001400	4.6250	0.002499	7/32	...	...	0.2188	0.000702	1 1/4	...	16	1.2500	0.001677	4 3/4	...	4.7500	0.003269	14	0.002582
0.8750	0.001435	4.7500	0.002521	...	40	...	0.2250	0.000712	...	7	...	1.2857	0.001701	4 7/8	...	4.8750	0.003312	13	0.002713
0.9375	0.001468	4.8750	0.002543	15/64	...	...	0.2344	0.000726	1 5/16	...	...	1.3125	0.001718	5	4	5.0000	0.003354	12	0.002862
1.0000	0.001500	5.0000	0.002565	1/4	36	80	0.2500	0.000750	1 3/8	...	...	1.3750	0.001759	5 1/8	...	5.1250	0.003396	11 1/2	0.002944
1.0625	0.001531	5.1250	0.002586	17/64	...	...	0.2656	0.000773	...	...	14	1.4286	0.001793	5 1/4	...	5.2500	0.003437	11	0.003033
1.1250	0.001560	5.2500	0.002607	...	...	72	0.2778	0.000791	1 7/16	...	...	1.4375	0.001798	5 3/8	...	5.3750	0.003478	10	0.003232
1.1875	0.001588	5.3750	0.002628	...	32	...	0.2812	0.000795	1 1/2	6	...	1.5000	0.001837	5 1/2	...	5.5000	0.003518	9	0.003467
1.2500	0.001616	5.5000	0.002648	19/64	...	...	0.2969	0.000817	...	...	13	1.5385	0.001861	5 5/8	...	5.6250	0.003558	8	0.003750

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Table 4 Increments in Pitch Diameter Tolerance — Class 2A (Cont'd)

(PD Tolerance $= 0.0015\sqrt[3]{D} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$)

Diameter, D				Length of Engagement, LE														Pitch, P	
				Based on Note (1)					Based on Note (1)					Based on Note (1)					
D	$0.0015\sqrt[3]{D}$	D	$0.0015\sqrt[3]{D}$	1 D for Sizes	9P for TPI	20P for TPI	LE	$0.0015\sqrt{LE}$	1 D for Sizes	9P for TPI	20P for TPI	LE	$0.0015\sqrt{LE}$	1 D for Sizes	20P for TPI	LE	$0.0015\sqrt{LE}$	Threads/ in.	$0.015\sqrt[3]{P^2}$
1.3125	0.001642	5.6250	0.002668	5/16	...	64	0.3125	0.000839	1 9/16	...	...	1.5625	0.001875	5 3/4	...	5.7500	0.003597	7	0.004099
1.3750	0.001668	5.7500	0.002687	...	28	...	0.3214	0.000850	1 5/8	...	...	1.6250	0.001912	5 7/8	...	5.8750	0.003636	6	0.004543
1.4375	0.001693	5.8750	0.002707	21/64	...	...	0.3281	0.000859	...	...	12	1.6667	0.001936	6	...	6.0000	0.003674	5 1/2	0.004814
1.5000	0.001717	6.0000	0.002726	...	27	60	0.3333	0.000866	1 11/16	...	...	1.6875	0.001949	6 1/2	...	6.5000	0.003824	5	0.005130
1.5625	0.001741	7.0000	0.002869	11/32	...	...	0.3438	0.000880	...	...	11 1/2	1.7391	0.001978	7	...	7.0000	0.003969	4 1/2	0.005503
1.6250	0.001764	8.0000	0.003000	...	...	56	0.3571	0.000896	1 3/4	...	...	1.7500	0.001984	7 1/2	...	7.5000	0.004108	4	0.005953
1.6875	0.001786	9.0000	0.003120	23/64	...	...	0.3594	0.000899	...	5	...	1.8000	0.002012	8	...	8.0000	0.004243	...	...
1.7500	0.001808	10.0000	0.003232	3/8	24	...	0.3750	0.000919	1 13/16	...	...	1.8125	0.002019	8 1/2	...	8.5000	0.004373	...	...
1.8125	0.001829	12.0000	0.003434	25/64	...	...	0.3906	0.000937	...	...	11	1.8182	0.002023	9	...	9.0000	0.004500	...	...
1.8750	0.001850	14.0000	0.003615	13/32	...	...	0.4063	0.000956	1 7/8	...	...	1.8750	0.002054	9 1/2	...	9.5000	0.004623	...	...
...	...	16.0000	0.003780	...	...	48	0.4167	0.000968	1 15/16	...	...	1.9375	0.002088	10	...	10.0000	0.004743	...	...
...	...	18.0000	0.003931	27/64	...	...	0.4219	0.000974	2	4 1/2	10	2.0000	0.002121	10 1/2	...	10.5000	0.004861	...	...
...	...	20.0000	0.004072	7/16	...	...	0.4375	0.000992	2 1/8	...	...	2.1250	0.002187	11	...	11.0000	0.004975	...	...
...	...	24.0000	0.004327	...	20	...	0.4500	0.001006	...	...	9	2.2222	0.002236	11 1/2	...	11.5000	0.005087	...	...
...	...	...	...	...	...	44	0.4545	0.001011	2 1/4	4	...	2.2500	0.002250	12	...	12.0000	0.005196	...	...

GENERAL NOTE: Class 2A tolerances are the bases for the tolerances for Classes 1A, 3A, 1B, 2B, and 3B.

NOTE:

(1) For example: $LE = 0.5000$ is equivalent to one diameter for the 1/2 in. size, 9 pitches for 18 threads per inch, or 20 pitches for 40 threads per inch.

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(d) Minor Diameter Tolerance (External Threads)

(1) UNR Classes. To intersection of rounded root with its centerline (see Figs. 2 and 3), equals pitch diameter tolerance for class of thread specified, plus 0.10825318P (see Table 5).

(2) UN Classes 1A, 2A, and 3A. To intersection of flat root with flanks of threads (see Figs. 2 and 3), equals pitch diameter tolerance for class of thread specified, plus 0.21650635P (see Table 5).

5.8.2 Internal Thread

(a) Major Diameter Tolerance (Internal Threads)

(1) For Classes 1B, 2B, and 3B, equals 0.14433757P (see Table 5) plus the pitch diameter tolerance of the class of thread under consideration.

(b) Pitch Diameter Tolerance (Internal Threads)

(1) Class 1B = 1.950 Class 2A pitch diameter tolerance (nominally equal to 1.5 Class 2B)[1] (see page 55 for footnote)

(2) Class 2B = 1.300 Class 2A pitch diameter tolerance[1]

(3) Class 3B = 0.975 Class 2A pitch diameter tolerance (nominally equal to 0.750 Class 2B)[1]

(c) Minor Diameter Tolerance (Internal Threads)

(1) Classes 1B and 2B. For all thread series and special threads in sizes less than $\frac{1}{4}$ in., equals $[0.0500\sqrt[3]{P^2} + 0.03\ P/D] - 0.002$ in., within the following limitations:

(a) Tolerances shall not be greater than 0.39400P.

(b) Tolerances shall not be less than $0.2500P - 0.400P^2$

The formulas are suitable for general applications having lengths of engagement up to 1.5 diameters.

For all thread series and special threads $\frac{1}{4}$ in. and larger, 80 to 4 threads per inch, inclusive, equals $0.25P - 0.4P^2$. For all thread series and special threads $\frac{1}{4}$ in. and larger with less than 4 threads per inch, equals 0.15P.

(2) Class 3B. For all thread series, equals $[0.05\sqrt[3]{P^2} + 0.03\ P/D] - 0.002$ in., within the following limitations:

(a) Tolerance shall be not greater than 0.394P.

(b) Tolerance shall be not less than

(1) for 80 to 13 threads per inch, inclusive, $0.23P - 1.5P^2$

(2) for 12 threads per inch and coarser, 0.120P

The formulas are suitable for general applications having lengths of engagement up to 1.5 diameters.

5.9 Lead and Flank Angle Tolerances

See para. 9.

5.10 Coated or Plated Threads

See para. 7 for dimensional accommodation and limits for coated threads.

5.11 Circular Runout

5.11.1 Circular Runout Is the Full Indicator Movement (FIM) (See ASME Y14.5). Runout of the crest (minor diameter of internal thread or major diameter of external thread) relative to the functional diameter cylinder shall not be so great that the basic profile is transgressed.

5.11.2 Internal Thread. Maximum runout, which will maintain the crest inside the basic thread profile, is the difference between the measured minor diameter and the basic minor diameter. An out-of-round functional diameter cylinder may reduce the available runout.

5.11.3 External Thread. Maximum runout, which will maintain the crest inside the basic thread profile, is the difference between the measured major diameter and the basic major diameter. An out-of-round functional diameter cylinder may reduce the available runout.

6 SCREW THREAD DESIGNATION

6.1 Basic Method of Designating

The designation specifies in sequence the nominal size, number of threads per inch, thread series symbol, thread class symbol, and gaging system per ASME B1.3 (see screw thread designations listed at the end of this paragraph). The nominal size is the basic major diameter and is specified as the fractional diameter, screw number, or their decimal equivalent. Where decimal equivalents are used for size callout, they shall be shown in four place decimals (omitting the cipher in the fourth place) for fractional sizes, and in three place decimals for number sizes. They shall be interpreted as being nominal size designations only and shall have no dimensional significance beyond the fractional size or number designation. The thread series symbol indicates the thread form (see para. 2), series, and tolerance formulation (see para. 3). The thread series symbols for the UN thread form are UNC, UNF, UNEF, or UN for only those sizes of the various series shown in Table 1 and UNS for any other intermediate and larger size diameter-pitch combination having tolerances to unified formulation. The corresponding thread series symbols for the UNR thread form are UNRC, UNRF, UNREF, or UNR. The symbol UNRS corresponds to UNS. The thread class symbols are 1A, 1B, 2A, 2B, 3A, or 3B, where the suffixes A and B relate to external and internal threads, respectively.

The basic method of designating a screw thread is used where the standard tolerances or limits of size based on the standard length of engagement are applicable, as indicated in para. 5.

UNS threads and threads having special length of engagement require certain additional information as shown in paras. 6.4 and 6.6.

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Table 5 Thread Form Data

Threads/ in.	Pitch, P	Basic Flat at Internal Thread Crest, and External UN Thread Root, $F_{rs} = F_{cn} = P/4 =$ 0.25000000P	Flat at Internal Thread Root and External Thread Crest, $F_{rn} = F_{cs} = P/8 =$ 0.12500000P	H [Note (1)] Height of Sharp V-Thread = 0.86602540P	0.1250H [Note (1)] Truncation of Internal Thread Root and External Thread Crest, $f_{rn} = f_{es} =$ 0.10825318P [Note (2)]	0.1667H [Note (1)] External Thread Root Full Radius, Max., $r_{rs} =$ 0.14433757P	0.1875H [Note (1)] Truncation of UNR Design Profile External Thread Root and Half Addendum of External Thread, $S_{rs} =$ 0.16237976P	0.2500H [Note (1)] External Thread Root and Truncation of Internal Thread Crest, $f_{rs} = f_{cn} =$ 0.21650635P [Note (3)]
1	2	3	4	5	6	7	8	9
80	0.01250000	0.003125	0.001563	0.010825	0.001353	0.001804	0.002030	0.002706
72	0.01388889	0.003472	0.001736	0.012028	0.001504	0.002005	0.002255	0.003007
64	0.01562500	0.003906	0.001953	0.013532	0.001691	0.002255	0.002537	0.003383
56	0.01785714	0.004464	0.002232	0.015465	0.001933	0.002577	0.002900	0.003866
48	0.02083333	0.005208	0.002604	0.018042	0.002255	0.003007	0.003383	0.004511
44	0.02272727	0.005682	0.002841	0.019682	0.002460	0.003280	0.003690	0.004921
40	0.02500000	0.006250	0.003125	0.021651	0.002706	0.003608	0.004059	0.005413
36	0.02777778	0.006944	0.003472	0.024056	0.003007	0.004009	0.004511	0.006014
32	0.03125000	0.007813	0.003906	0.027063	0.003383	0.004511	0.005074	0.006766
28	0.03571429	0.008929	0.004464	0.030929	0.003866	0.005155	0.005799	0.007732
27	0.03703704	0.009259	0.004630	0.032075	0.004009	0.005346	0.006014	0.008019
24	0.04166667	0.010417	0.005208	0.036084	0.004511	0.006014	0.006766	0.009021
20	0.05000000	0.012500	0.006250	0.043301	0.005413	0.007217	0.008119	0.010825
18	0.05555556	0.013889	0.006944	0.048113	0.006014	0.008019	0.009021	0.012028
16	0.06250000	0.015625	0.007813	0.054127	0.006766	0.009021	0.010149	0.013532
14	0.07142857	0.017857	0.008929	0.061859	0.007732	0.010310	0.011599	0.015465
13	0.07692308	0.019231	0.009615	0.066617	0.008327	0.011103	0.012491	0.016654
12	0.08333333	0.020833	0.010417	0.072169	0.009021	0.012028	0.013532	0.018042
11.5	0.08695652	0.021739	0.010870	0.075307	0.009413	0.012551	0.014120	0.018827
11	0.09090909	0.022727	0.011364	0.078730	0.009841	0.013122	0.014762	0.019682
10	0.10000000	0.025000	0.012500	0.086603	0.010825	0.014434	0.016238	0.021651
9	0.11111111	0.027778	0.013889	0.096225	0.012028	0.016038	0.018042	0.024056
8	0.12500000	0.031250	0.015625	0.108253	0.013532	0.018042	0.020297	0.027063
7	0.14285714	0.035714	0.017857	0.123718	0.015465	0.020620	0.023197	0.030929
6	0.16666667	0.041667	0.020833	0.144338	0.018042	0.024056	0.027063	0.036084
5	0.20000000	0.050000	0.025000	0.173205	0.021651	0.028868	0.032476	0.043301
4.5	0.22222222	0.055556	0.027778	0.192450	0.024056	0.032075	0.036084	0.048113
4	0.25000000	0.062500	0.031250	0.216506	0.027063	0.036084	0.040595	0.054127

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Table 5 Thread Form Data (Cont'd)

Threads/ in.	0.375*H* [Note (1)] Addendum of External Thread, h_{as} = 0.32475953*P* [Note (4)]	0.625*H* [Note (1)] Height of Internal Thread, UN External Thread, and Depth of Thread Engagement, $h_s = h_n = h_e$ = 0.54126588*P*	0.6875*H* [Note (1)] Height of UNR External Thread, h_s = 0.59539247*P*	0.7500*H* [Note (1)] Twice the External Thread Addendum, $h_b = 2h_{as}$ = 0.64951905*P*	0.9167*H* [Note (1)] Difference Between Max. Major and Pitch Diameters of Internal Thread = 0.79385662*P*	1.2500*H* [Note (1)] Double Height of Internal Thread and External UN Thread, $2h_n$ = 1.08253175*P*	1.3750*H* [Note (1)] Double Height of External UNR Thread, $2h_s$ = 1.19078493*P*	0.5000*H* [Note (1)] 0.43301270*P*
1	10	11	12	13	14	15	16	17
80	0.004059	0.006766	0.007442	0.008119	0.009923	0.013532	0.014885	0.005413
72	0.004511	0.007518	0.008269	0.009021	0.011026	0.015035	0.016539	0.006014
64	0.005074	0.008457	0.009303	0.010149	0.012404	0.016915	0.018606	0.006766
56	0.005799	0.009665	0.010632	0.011599	0.014176	0.019331	0.021264	0.007732
48	0.006766	0.011276	0.012404	0.013532	0.016539	0.022553	0.024808	0.009021
44	0.007381	0.012301	0.013532	0.014762	0.018042	0.024603	0.027063	0.009841
40	0.008119	0.013532	0.014885	0.016238	0.019846	0.027063	0.029770	0.010825
36	0.009021	0.015035	0.016539	0.018042	0.022052	0.030070	0.033077	0.012028
32	0.010149	0.016915	0.018606	0.020297	0.024808	0.033829	0.037212	0.013532
28	0.011599	0.019331	0.021264	0.023197	0.028351	0.038662	0.042528	0.015465
27	0.012028	0.020047	0.022052	0.024056	0.029402	0.040094	0.044103	0.016038
24	0.013532	0.022553	0.024808	0.027063	0.033077	0.045105	0.049616	0.018042
20	0.016238	0.027063	0.029770	0.032476	0.039693	0.054127	0.059539	0.021651
18	0.018042	0.030070	0.033077	0.036084	0.044103	0.060141	0.066155	0.024056
16	0.020297	0.033829	0.037212	0.040595	0.049616	0.067658	0.074424	0.027063
14	0.023197	0.038662	0.042528	0.046394	0.056704	0.077324	0.085056	0.030929
13	0.024982	0.041636	0.045799	0.049963	0.061066	0.083272	0.091599	0.033309
12	0.027063	0.045105	0.049616	0.054127	0.066155	0.090211	0.099232	0.036084
11.5	0.028240	0.047067	0.051773	0.056480	0.069031	0.094133	0.103547	0.037653
11	0.029524	0.049206	0.054127	0.059047	0.072169	0.098412	0.108253	0.039365
10	0.032476	0.054127	0.059539	0.064952	0.079386	0.108253	0.119078	0.043301
9	0.036084	0.060141	0.066155	0.072169	0.088206	0.120281	0.132309	0.048113
8	0.040595	0.067658	0.074424	0.081190	0.099232	0.135316	0.148848	0.054127
7	0.046394	0.077324	0.085056	0.092788	0.113408	0.154647	0.170112	0.061859
6	0.054127	0.090211	0.099232	0.108253	0.132309	0.180422	0.198464	0.072169
5	0.064952	0.108253	0.119078	0.129904	0.158771	0.216506	0.238157	0.086603
4.5	0.072169	0.120281	0.132309	0.144338	0.176413	0.240563	0.264619	0.096225
4	0.081190	0.135316	0.148848	0.162380	0.198464	0.270633	0.297696	0.108253

GENERAL NOTES:

(a) All dimensions are in inches.

(b) All thread calculations are to be performed using a function of pitch (*P*); the use of thread height (*H*) is for reference only as stated in ASME B1.30.

NOTES:

(1) The thread values based on a function of height "*H*" are used for reference only.

(2) The values tabulated in column 6 also pertain to the minimum root radius of UNR screw threads. See paras. 2.3.1 and 2.3.1(a).

(3) $h_{an} = f_{cn} = 0.25H = 0.21650635P$

(4) $h_{dn} = h_{as} = 0.375H = 0.32475953P$

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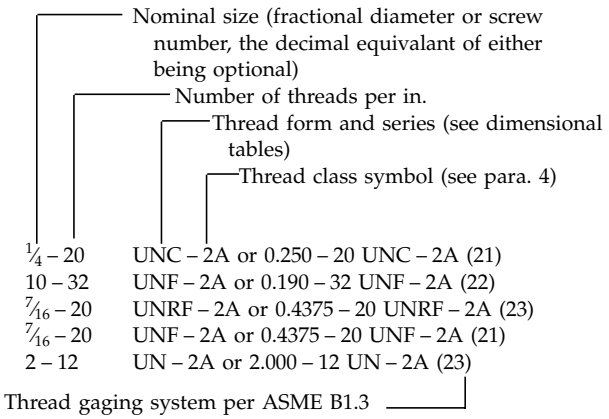

NOTE: Thread acceptability gaging system requirement of ASME B1.3 may be added to the thread size designation as noted above or as specified in pertinent documentation, such as drawing or procurement document.

6.2 Method of Designating Coated Threads

Specification on drawings of the before and after coating dimensions for screw threads is sometimes dictated by an engineering or production consideration that the size before and after coating be controlled. This results from coated screw threads having two stages of design, the before coating stage and the after coating stage. The threaded product may be produced by a supplier and coated by a user. In this case, it is necessary that a clear understanding of the coating requirements and the allowance for coating buildup be agreed upon by both supplier and user (see para. 7).

The before coating (plating) dimensions have a definite bearing on the strength of the screw threads. The before coating stage is, therefore, decidedly an engineering consideration; it is also a production consideration in requiring that proper allowance be made for the specified coating thickness. The finished parts should be of a size after coating that will allow them to be assembled with their coating components as intended.

Recommended methods for designating coated thread under various conditions are described in para. 6.2.1.

6.2.1 For coated (or plated) Class 2A external threads, the basic (max.) major and basic (max.) pitch diameters shall be given, preceded by the words AFTER COATING. The major and pitch diameter limits of size before coating shall also be given, preceded by the words BEFORE COATING.

EXAMPLE:

3/4 – 10 UNC – 2A (21)

After Coating

Max. major diameter 0.7500
Max. *PD* 0.6850
} *Values shown from Table 2 for Class 3A*

Before Coating

Major diameter 0.7482 – 0.7353
PD 0.6832 – 0.6773
} *Values shown from Table 2 for Class 2A*

Threads accepted to Class 2A limits before coating are accepted after coating by basic size Class 3A GO thread gages. The allowance given in the dimensional tables for Class 2A thread is sufficient to allow for a limited amount of coating as described in para. 7. However, if a greater coating thickness is required, it will be necessary to calculate the before coating limits in accordance with para. 7.

6.2.2 For coated (or plated) Class 3A external threads, the maximum major and maximum pitch diameters may optionally be given, preceded by the words AFTER COATING, thereby indicating that the thread before coating must have special provisions to allow for coating thickness. The major and pitch diameter limits of size before coating (calculated in accordance with para. 7 shall be given, followed by the letters SPL (special) and preceded by the words BEFORE COATING.

EXAMPLE: Thickness of coating 0.0002 in. to 0.0003 in.

1/4 – 28 UNF-3A (21)

After Coating

Max. major diameter 0.2500
Max. *PD* 0.2268
} *Optional Information*

Before Coating

Major diameter 0.2494 – 0.2431 SPL
PD 0.2256 – 0.2235 SPL

6.2.3 For coated (or plated) Class 1A external threads, the maximum major and maximum pitch diameters may optionally be given, preceded by the words AFTER COATING, thereby indicating that the thread before coating must have special provisions to allow for coating thickness. The major and pitch diameter limits of size before coating (calculated in accordance with para. 7 shall be given, followed by the letters SPL (special) and preceded by the words BEFORE COATING.

EXAMPLE: Thickness of coating 0.0002 in. to 0.0003 in.

1/4 – 20 UNC-1A (21)

After Coating

Max. major diameter 0.2489
Max. *PD* 0.2164
} *Optional Information*

Before Coating

Major diameter 0.2483 – 0.2363 SPL
PD 0.2152 – 0.2100 SPL

6.2.4 Where an allowance is required to accommodate coating (or plating) on Class 1B, 2B, or 3B internal threads, the minimum minor and minimum pitch diameters may optionally be given, preceded by the words AFTER COATING. The minor and pitch diameter limits of size before coating (calculated in accordance with para. 7 shall be given, followed by the letters SPL (special) and preceded by the words BEFORE COATING.

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EXAMPLES: Thickness of coating 0.0002 in. to 0.0003 in.

(a) 1/4 – 20 UNC-1B (21)

After Coating

Min. minor diameter 0.196 } Optional Information
Min. *PD* 0.2175 }

Before Coating

Minor diameter 0.197 – 0.207 SPL
PD 0.2187 – 0.2256 SPL

(b) 3/4 – 10 UNC-2B (22)

After Coating

Min. minor diameter 0.642 } Optional Information
Min. *PD* 0.6850 }

Before Coating

Minor diameter 0.643 – 0.663 SPL
PD 0.6862 – 0.6935 SPL

(c) 1/4 – 28 UNF-3B (23)

After Coating

Min. minor diameter 0.2110 } Optional Information
Min. *PD* 0.2268 }

Before Coating

Minor diameter 0.2116 – 0.2194 SPL
PD 0.2280 – 0.2308 SPL

NOTE: The after coating limits for all of the examples above are the minor and *PD* values in Table 2 for the respective class of thread.

6.3 Method of Designating Left-Hand Threads

Unless otherwise specified, threads are right hand; a left-hand thread shall be designated LH as follows:

EXAMPLE: 1/4 – 20 UNC-3A-LH (21)

6.4 Method of Designating UNS Threads

UNS threads are special combinations of diameter and pitch with tolerance to unified formulation.

UNS threads have the basic form of designation set out above, supplemented always by the limits of size.

EXAMPLES:

(a) 1/4 – 24 UNS-3A (21)
Major diameter 0.2500 – 0.2428
PD 0.2229 – 0.2201
Max. Minor diameter 0.205

(b) 0.495 – 20 UNS-3A (21)
Major diameter 0.4950 – 0.4869
PD 0.4625 – 0.4593
Max. Minor diameter 0.441

(c) 1.200 – 10 UNS-2B (21)
Minor diameter 1.092 – 1.113
PD 1.1350 – 1.1432
Min. Major diameter 1.200

6.5 Designations for Other Threads

Threads having tolerances that do not conform to unified formulation and threads having multiple start or lead, or special form, also require additional considerations in the thread designation. The recommended methods of designating these threads are described in paras. 6.5.1 through 6.5.3.

6.5.1 Method of Designating Threads Having Tolerances Not to Unified Formulation. If a standard series thread is altered in any respect other than revised pitch diameter limits for a special length of engagement, the modification of crests, or the adjustment of the limits of size to accommodate coating, as shown above, it is designated in accordance with the following:

EXAMPLES:

(a) 7/16 – 24 Unified Form SPL-EXT (22)
Major diameter 0.4340 – 0.4280 SPL
PD 0.4065 – 0.4025 SPL
Max. Minor diameter 0.3889
LE 0.38

(b) 1/2 – 13 Unified Form SPL-INT (22)
Minor diameter 0.424 – 0.434 SPL
PD 0.4500 – 0.4580 SPL
Min. Major diameter 0.5000
LE 0.50

6.5.2 Method of Designating Multiple Start Threads. If a thread is required with a multiple start or lead, it is designated by specifying in sequence the nominal size, pitch (in decimals or threads per inch), and lead (in decimals or fractions), number of starts in parenthesis, thread series, class, and gaging system in parenthesis if required to the following examples:

EXAMPLES:

(a) 3/4 – 0.0625*P* – 0.1875*L* (3 STARTS) UNF SPL-EXT (23)
Major diameter 0.7485 – 0.7391
PD 0.7079 – 0.7003 SPL
Max. Minor diameter 0.6808
LE 0.75

(b) 3/4 – 16 – 0.1875*L* (3 STARTS) UNF-2A (21)

6.5.3 Method of Designating Special Form Threads. If a thread for design consideration requires a variation from unified standard thread contour and is not covered by another recognized standard, such as when the detail of the root differs from that for the standard thread form, the designation shall not include either the letters "UN" or the word "UNIFIED", but shall be as follows:

EXAMPLE:

7/8 – 18 SPL 60 deg Form-EXT (22)
Major diameter 0.8750 – 0.8668
PD 0.8384 – 0.8343
Max. Minor diameter 0.8068
LE 0.69

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6.6 Method of Designating Threads Having Special Length of Engagement

In the assembly of threads in mating parts, the length of engagement varies according to the design requirements. It should be noted that the length of engagement is not necessarily the same as the full thread length provided on the part, but is the length of assembled thread in the mating parts.

Where a standard series thread has a special length of engagement differing from that for which the standard pitch diameter tolerances are applicable as indicated in para. 5, the thread class symbol is qualified by the addition of the letters SE (special engagement) preceding the class symbol. The specification of the special pitch diameter limits of size and the length of engagement *LE*, rounded to a two place decimal, are a requirement.

EXAMPLES:

(a) $\frac{1}{2}$ – 13 UNC-SE2A (23)
PD 0.4485 – 0.4423
LE 1.00

(b) $\frac{1}{4}$ – 24 UNS-SE3A (23)
Major diameter 0.2500 – 0.2428
PD 0.2229 – 0.2194
LE 0.88

6.6.1 In some cases where greater than standard length of engagement is required, it is desirable to use standard externally threaded parts with tolerances based on standard length of engagement. For example, in the case of a standard bolt assembled into a tapped hole in aluminum, the designation of the bolt thread will conform to that of a thread for a standard length of engagement.

The designation for the tapped hole thread should include the allowance in the basic size, the pitch diameter limits of size, and the length of gage, in addition to the information normally given. See para. 5.3.1(b).

EXAMPLE: Requiring use of 1.00 long GO thread and GO plain gages.
0.5025 – 13 UNS-SE2B (21)
Minor diameter 0.420 – 0.437
PD 0.4525 – 0.4606
LG 1.00

Similarly, where greater than standard length of engagement is required, it is desirable to use standard internally threaded parts with tolerances based on standard length of engagement. Therefore, the external thread is provided with an added allowance. See para. 5.3.1(c).

The designation for the external thread should include the added allowance in the basic size, the pitch diameter limits of size, and the length of gage, in addition to the information normally given.

EXAMPLE: Requiring use of 0.88 long GO thread and GO plain gages.
0.3725 – 24 UNS-SE2A (21)
Major diameter 0.3714 – 0.3642
PD 0.3443 – 0.3396
LG 0.88

6.6.2 When a long length of engagement is required and standard length GO thread and GO plain gages are to be used, the thread designation should indicate the thread modifications and a standard gage length, *LG* Std. See para. 5.3.2.

EXAMPLES: With additional allowance indicating use of standard length GO thread and GO plain gages.

(a) 0.5058 – 13 UNS-2B (22)
Minor diameter 0.423 – 0.440
PD 0.4558 – 0.4623
LG Std.

(b) 0.3706 – 24 UNS-2A (22)
Major diameter 0.3695 – 0.3623
PD 0.3424 – 0.3386
LG Std.

6.6.3 For applications of long length of engagement of mating parts involving very high strength materials, increases in tolerances based on standard length of engagement may be detrimental. In these cases, the tolerances based on the standard length of engagement may be applied to increased length of engagement threads. This requires the GO thread gages to have a special length equal to the length of engagement as specified.

The designations for restricted applications should be qualified with the abbreviation SPL (special) as shown in the examples below. See para. 5.3.1(a)

EXAMPLES: Requiring use of 1.00 long GO thread and GO plain gages

(a) 0.500 – 20 UNF-3A SPL (21)
LG 1.00 SPL

(b) 0.500 – 20 UNF-3B SPL (21)
LG 1.00 SPL

NOTE: In drawings, tolerances tabulated for the standard length of engagement in ASME B1.1 shall apply over the full length of engagement.

6.7 Method of Designating Threads Having Modified Crests

It is occasionally necessary to modify the limits of size of the major diameter of an external thread or the minor diameter of an internal thread within the maximum-material limits established for standard series and special threads in order to fit a specific purpose, but without change in class of thread or pitch diameter limits. (It should be noted that standard pitch diameter gages may be used to accept such threads.) Such threads shall be specified with the established thread designation, followed by a statement of the modified diameter limits and the designation MOD. This practice also applies to modifications of internal thread minor diameters described in para. 5.6.1.

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EXAMPLES:
(a) $\frac{3}{8}$ – 24 UNF-3A MOD (21)
Major diameter 0.3720 – 0.3648 MOD
(b) $1\frac{1}{2}$ – 10 UNS-3B MOD (21)
Minor diameter 1.398 – 1.409 MOD
PD 1.4350 – 1.4412
Min. major diameter 1.500

7 DIMENSIONAL ACCOMMODATION OF COATING OR PLATING FOR 60-deg THREADS

7.1 Introduction

It is not within the scope of this Standard to make recommendations for thickness of, or to specify limits for, coatings. However, it will aid mechanical interchangeability if certain principles are followed wherever conditions permit. The guidelines in paras. 7.4, 7.5, and 7.6 should be helpful in determining the amount and direction of the alterations to establish applicable limits of size before coating threads with a 60 deg included angle. Some commonly used and firmly established processes for heavy coatings, such as hot dip galvanizing, do not fall within the scope of this paragraph. Heavy coating, for purposes of this standard, is defined as a coating thickness greater than 0.25 times the thread's allowance.

NOTE: The term *coating* refers to one or more applications of additive material to threads, including, but not limited to, electroplated deposits, dip-spin applied materials, and mechanically applied platings. It does not include soft or liquid lubricants that are readily displaced in assembly and gaging.

This Standard specifies limits of size that pertain whether threads are coated or uncoated. Only in Class 2A threads is the allowance available to accommodate coatings. Thus, in all classes of internal threads and in all Classes 1A and 3A external threads, limits of size must be adjusted before plating to provide suitable provision for the desired coating.

7.2 Material Limits for Coated Threads

Unless otherwise specified, size limits for standard external thread Class 2A apply prior to coating. The external thread allowance may thus be used to accommodate the coating thickness on coated parts, provided that the maximum coating thickness is no more than one-fourth of the allowance (see Fig. 4). Thus, the thread after coating is subject to acceptance using a basic Class 3A GO thread gage and a Class 2A thread gage for either minimum material or NOT GO. Where external thread has no allowance, or allowance must be maintained after coating, and for standard internal threads, sufficient allowance must be provided prior to coating to ensure that finished product threads do not exceed the maximum-material limits specified. For thread Class 3A, Class 2A allowances should be applied whenever possible in accordance with calculations in para. 5.

7.3 Dimensional Effects of Coating

7.3.1 On a cylindrical surface, the effect of coating is to change the diameter by twice the coating thickness, one coating thickness on each side of the cylinder. On a screw thread, this would apply to the major and minor diameter.

7.3.2 Because the coating thickness is measured perpendicular to the coated surface, while the pitch diameter is measured perpendicular to the thread axis, the effect of a uniformly coated thread flank on the pitch diameter is a change of four times the thickness of coating on the flank (see Fig. 4). The diameters of external threads before coating will be smaller, while the diameters of internal threads before coating will be larger, than the coated diameters.

7.3.3 Most coatings and platings do not apply uniformly on threads (see Fig. 5). Different coating materials and processes have different application characteristics. The threaded part's overall length and other configuration characteristics also affect the way the coatings build up on the threads. Paragraphs 7.4, 7.5, and 7.6 provide general guidelines for calculating precoating thread size to allow for coating buildup while preventing interference in assembly. The exact precoating thread size for a given part with a given type of coating will frequently have to be developed by the producer experimentally.

7.4 External Thread With Allowance Available for Coating

7.4.1 Maximum and Minimum Coating Thickness Specified. The amount of the allowance on the pitch diameter is sufficient if 4 times the maximum coating thickness is equal to or less than the allowance tabulated in Table 2 or calculated per formula in para. 5.8.1(a).

7.4.2 Only Nominal or Minimum Coating Thickness Specified. If no thickness tolerance is given, it is recommended that a tolerance of plus 50% of the nominal or minimum thickness be assumed. Then the amount of the allowance on the pitch diameter is sufficient if 6 times the specified coating thickness is equal to or less than the allowance tabulated in Table 2 or calculated per formula in para. 5.8.1(a).

7.5 External Thread With No Allowance for Coating

7.5.1 Maximum and Minimum Coating Thickness Specified. To determine before coating gaging limits decrease

(a) the maximum pitch diameter by 4 times the maximum coating thickness

(b) the minimum pitch diameter by 4 times the minimum coating thickness

(c) the maximum major diameter by 2 times the maximum coating

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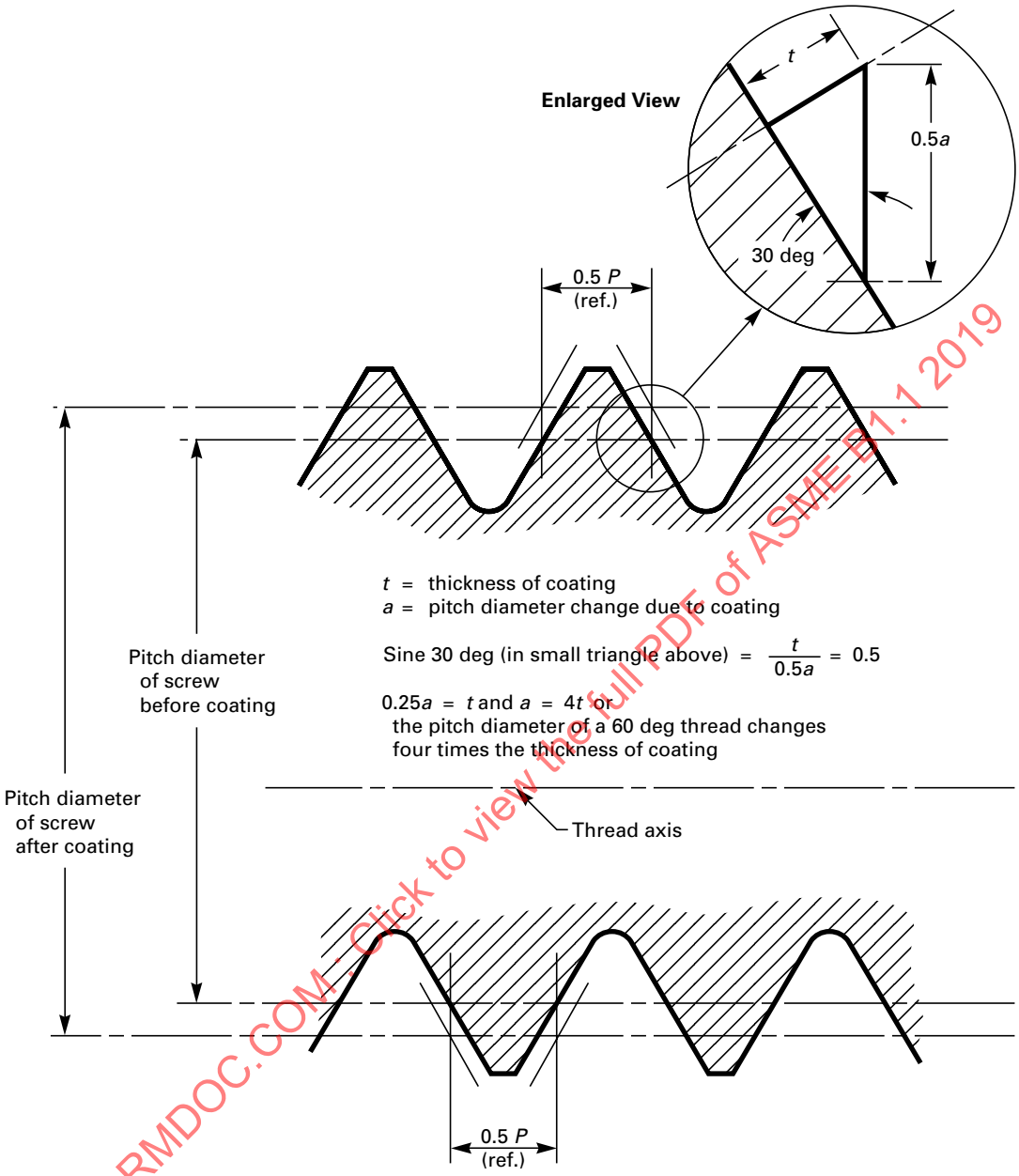

Fig. 4 Ratio of Pitch Diameter Change to Thickness of Coating on 60-deg Threads

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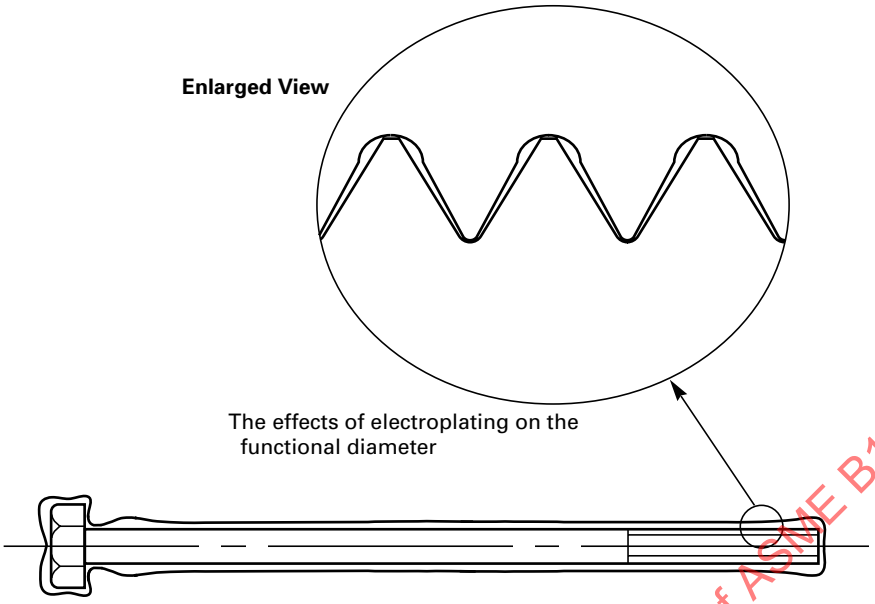
(d) the minimum major diameter by 2 times the minimum coating thickness

EXAMPLE: $\frac{3}{8}$ – 16 UNC-2A (21) AFTER COATING
Coating thickness 0.0002 – 0.0003 in.

To determine the before coating maximum material sizes, decrease the maximum pitch diameter of 0.3331 in. by 0.0012 in. (4 × 0.0003) to 0.3319 in., and the maximum major diameter of 0.3737 in. by 0.0006 in. (2 × 0.0003) to 0.3731 in. For the before coating minimum sizes, decrease the minimum pitch diameter of 0.3287 in. by 0.0008 in. (4 × 0.0002) to 0.3279 in., and the minimum major diameter of 0.3643 in. by 0.0004 in. (2 × 0.0002) to 0.3639 in. The before coating sizes should be included in the thread designation (see para. 6.2.1).

7.5.2 Only Nominal or Minimum Coating Thickness Specified. If no coating thickness tolerance is given, it is recommended that a tolerance of plus 50% of the nominal or minimum thickness be assumed. Then, to determine before coating gaging limits for a coated thread, decrease



GENERAL NOTE: Electrodeposited coatings build up more heavily at sharp corners; is greater at the extreme ends and edges; and is least in the center and recessed areas.

Fig. 5 Effect of Electrodeposited Coatings on 60-deg External Threads

(a) the maximum pitch diameter by 6 times the coating thickness

(b) the minimum pitch diameter by 4 times the coating thickness

(c) the maximum major diameter by 3 times the coating thickness

(d) the minimum major diameter by 2 times the coating thickness

EXAMPLE: ½ – 13 UNC-3A (22)
Coating thickness 0.0004 in.

Since the allowance for Class 2A thread is 0.0015 in., the nominal or minimum coating thickness that may be applied is equal to 0.0015 in. divided by 6, or 0.00025 in. (the maximum thickness of coating that may be applied is equal to 0.0015 divided by 4 or 0.0038 in.). This is not sufficient for the required nominal or minimum coating of 0.0004 in. specified, so additional adjustments to the before coating pitch and major diameters must be made.

To determine the before coating maximum material sizes, decrease the maximum pitch diameter of 0.4500 in. by 0.0024 in. (6 × 0.0004) to 0.4476 in., and the maximum major diameter of 0.5000 in. by 0.0012 in. (3 × 0.0004) to 0.4988 in. For the before coating minimum sizes, decrease the minimum pitch diameter of 0.4463 in. by 0.0016 in. (4 × 0.0004) to 0.4447 in., and the minimum major diameter of 0.4891 in. by 0.0008 in. (2 × 0.0004) to 0.4883 in. The before coating sizes should be included in the thread designation (see para. 6.2.1).

7.5.3 Adjusted Size Limits. It should be noted in the preceding examples that the before coating material limit tolerances are less than the tolerances after coating. This is because the coating tolerance consumes some of the product tolerance. In some instances, there may be insufficient pitch diameter tolerance available in the before coating condition, so that additional adjustments and controls will be necessary.

7.5.4 Strength. On small thread sizes (0.190 in. and smaller) there is a possibility that coating thickness adjustments will cause base material (minimum) conditions that may significantly affect strength of externally threaded parts. Limitations on coating thickness, or part redesign, may be necessary.

7.6 Internal Threads

Standard internal threads provide no allowance for coating thickness. To determine before coating gaging limits for a coated thread, increase

(a) the minimum pitch diameter by 4 times the maximum coating thickness, if specified, or by 6 times the minimum or nominal coating thickness, if not specified

(b) the maximum pitch diameter by 4 times the minimum or nominal coating thickness

(c) the minimum minor diameter by 2 times the maximum coating thickness, if specified, or by 3 times the minimum or nominal coating thickness, if not specified

(d) the maximum minor diameter by 2 times the minimum or nominal coating thickness

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7.7 Electrodeposited Coatings

Electroplated coatings do not cover threads uniformly. Deposits build up more on thread crests than on thread flanks and coating thickness is greater on lead end of a thread than on threads in the center of a part. The guidelines for calculating precoating thread sizes for uniformly coated threads can be used as a starting place in determining the precoating thread sizes on a given part, but the exact sizes for any given part may have to be determined by trial and error experimentation.

One of the effects of electrodeposited coatings not applying uniformly is that the functional diameter of an external thread will generally increase by a greater magnitude than the increase of the pitch diameter on a given part. Depending on an externally threaded part's configuration an electrodeposited coating of 0.0001 in. on a thread flank will probably result in a growth of the pitch diameter of approximately 0.0004 in., but the functional diameter may change by as much as 0.0006 in. or more. In the case of internally threaded parts, electrodeposited coatings cause the pitch diameter and functional diameter to decrease in size, with the pitch diameter decreasing less than the functional diameter on a given part.

Another effect of the nonuniform buildup of electrodeposited coatings is that the coating thickness on the lead end of a thread is commonly greater than the thickness on the threads in the center of the part. This results in the pitch diameter and functional diameter of a thread to be considerably larger on the end of the part than their comparable measurements away from the end. The longer the part, in the case of external threads, or the thicker the part, in the case of internal threads, the greater these differences tend to be. The part producer and the plater can not control this phenomenon. It is the nature of electrodeposited coatings on threaded parts. It is conceivable that a part's dimensions can measure within limits on the lead threads and be beyond their limits on the threads away from the lead threads.

7.8 Other Considerations

It is essential to adequately review all possibilities and consider limitations in the threading and coating production processes before finalizing the coating process and the allowance required to accommodate the coating. A no allowance thread after coating shall not transgress the basic profile, and is therefore subject to acceptance using a basic Class 3A, 1B, 2B, or 3B size GO thread gage.

8 STANDARD SERIES THREADS (UN/UNR) AND LIMITS OF SIZE FOR STANDARD SERIES AND UNS/UNRS SERIES THREADS

8.1 Standard Series

The standard series for unified inch screw threads is listed in Table 1. Although the designations shown are for the UN thread form, UNR designations may be used in all cases.

8.2 Limits of Size

The limits of size are defined by the design profile at its maximum-material condition and the minimum profile at the minimum-material condition. The limits are specified as diameters (major diameter, minor diameter, pitch diameter), and the practical interpretation of these limits on a three-dimensional threaded product depends on the method of inspection/evaluation. These dimensions serve as a basis for measurement and gaging of the thread, but the methods, techniques, and equipment used for thread evaluation establish the degree of thread conformance to the tabulated dimensions. Current techniques for measuring and gaging do not verify exact conformance of a thread to its specified maximum and minimum envelope. See ASME B1.3 for gaging systems for dimensional acceptability.

8.2.1 Limits of size for the majority of the standard series are shown in Tables 2 and E-1. Until this Standard is revised to require the calculated and rounded values per ASME B1.30 shown in Table 2, both these and the values in Table E-1 will be equally acceptable. It is recommended that all users prepare for the eventual adoption of only the values in Table 2.

Omissions are the secondary size range in the 4-UN series, and all sizes over 6 in. refer to Table 1 for a list of secondary sizes.

8.2.2 Limits of size not given may be calculated from the formulas given in the following paragraphs. Formulas and symbols for thread form are given in para. 10.

8.3 Formulas for Limits of Size

These formulas were used to calculate the values shown in Table 2 for standard series. The following symbols are used in the equations. (See Figs. 1 and 6.)

D bsc = basic major (nominal) diameter
D_1 bsc = basic minor diameter ($D - 2h_n$) (see Tables 6 through 16)
D_2 bsc = basic pitch diameter ($D - h_b$) (see Tables 6 through 16)
d_3 = UNR series design minor diameter [$d_1 - (H/8)$] (see Tables 6 through 16)
h_{as} = screw addendum height (see Table 5)
h_b = $2h_{as}$ (see Table 5)
h_n = height of internal thread (see Table 5)
h_s = height of external thread (see Table 5)
P = pitch, in.

To obtain limits of size using the formulas, see Table 5 for basic thread form data, para. 11 for basic dimensions, and para. 5 for formulas of allowance and tolerance. For easy reference, outline guides for determining

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limits of size of external and internal threads are given in Tables 17A and 17B.

8.3.1 External Thread

(a) Maximum Major Diameter (External Threads)

(1) For Classes 1A and 2A, d = basic major diameter, D bsc, minus allowance.

(2) For Class 3A, d = basic major diameter, D bsc.

(b) Minimum Major Diameter (External Threads). For all classes, equals maximum major diameter, minus major diameter tolerance for respective class of thread.

(c) Maximum Pitch Diameter (External Threads)

(1) For Classes 1A and 2A, d_2 = basic pitch diameter D_2 bsc, minus allowance.

(2) For Class 3A, d_2 = basic pitch diameter D_2 bsc.

(d) Minimum Pitch Diameter (External Threads). For all classes, equals maximum pitch diameter, minus pitch diameter tolerance for respective class of thread.

(e) Maximum Minor Diameter (External Threads). In dimensioning UN series external threads, the minor diameter is not specified. In practice, the minor diameter is satisfactory when accepted by a standard GO thread gage in accordance with ASME B1.2. When it is desirable to obtain minor diameter values for reference purposes and for UNR threads, they can be calculated as follows:

(1) For UN series threads, the formulas are:

(a) for Classes 1A and 2A, d_1 = basic minor diameter D_1 bsc, minus allowance

(b) for Class 3A, d_1 = basic minor diameter D_1 bsc

(2) For UNR series threads, the formulas are:

(a) for Classes 1A and 2A, d_3 = basic minor diameter D_1 bsc, minus allowance, minus $H/8$

(b) or Class 3A, d_3 = basic minor diameter D_1 bsc, minus $H/8$

(f) Minimum Minor Diameter (External Threads). When it is desirable for design purposes to calculate the minimum diameter, it can be obtained for all classes by the formula: minimum pitch diameter minus $0.64951905P$.

8.3.2 Internal Thread

(a) Maximum Major Diameter (Internal Threads). 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 that has no allowance.

(b) Minimum Major Diameter (Internal Threads), D bsc. For all classes, equals basic diameter D bsc.

(c) Minimum Pitch Diameter. For all classes, D_2 bsc equals basic pitch diameter D_2 minimum.

(d) Maximum Pitch Diameter (Internal Threads). For all classes, equals minimum pitch diameter D_2 bsc, plus pitch diameter tolerance for respective class of thread.

(e) Minimum Minor Diameter (Internal Threads). For all classes, D_1 bsc equals minimum pitch diameter D_2 minimum minus $0.43301122P$, then rounded off to the nearest 0.001 in. for sizes 0.138 in. and larger. For Class 3B, a cipher is added to yield four decimal places.

(f) Maximum Minor Diameter (Internal Threads). All classes are calculated before rounding, then rounded for Classes 1B and 2B to the nearest 0.001 in. for sizes 0.138 in. and larger. Class 3B values are rounded to four decimal places.

8.4 Example of Calculations From Formulas

Tables 18A and 18B are based on the practices for calculating and rounding screw thread dimensions as specified in ASME B1.30.

9 LEAD AND ANGLE TOLERANCES

9.1 Lead and Flank Angle Acceptance

Acceptance of lead and flank angles of product screw threads shall be in accordance with the following. Also, these are factors contributing to visual identification of gross defects in thread profile.

9.1.1 When Thread Gaging System 21 of ASME B1.3 is specified, product thread lead (including helix) and flank angle variations are not considered as separate elements.

9.1.2 When Thread Gaging System 22 of ASME B1.3 is specified, with the pitch diameter or thread-groove diameter inspection/evaluation required, the product thread lead (including helix) and flank angles shall be considered acceptable when the minimum-material characteristic (pitch diameter or thread-groove diameter in Tables 1 and 2, columns C and D of ASME B1.3) and the maximum-material characteristic (GO in Tables 1 and 2, column A of ASME B1.3) are accepted by the gages specified for System 22, over the standard GO thread gage length.

When Thread Gaging System 22 is specified with NOT GO functional diameter combined with inspection/evaluation of lead and flank option, agreements must be reached between the purchaser and the supplier on lead and flank angle limits and method of evaluation.

9.1.3 When Thread Gaging System 23 of ASME B1.3 is specified, product thread lead and flank angles shall be acceptable if within the allowable variations specified in Tables 3 and 19, respectively. Also, the minimum-material characteristic (pitch diameter or thread-groove diameter in Tables 1 and 2, columns C and D of ASME B1.3) and the maximum-material characteristic (GO in Tables 1 and 2, column A of ASME B1.3) must be accepted by the gages specified for System 23, over the standard GO thread gage length.

Allowable variations in lead and flank angles are maximum values. Maximum variation in these and pitch

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diameter tolerance cannot be taken simultaneously (see paras. 9.1.5 and 9.1.6).

9.1.4 When individual inspection/evaluation of lead (including helix) and flank angle variations are required in addition to thread gaging System 21 or 22 of ASME B1.3, the allowable variations for these characteristics shall be as specified in Tables 3 and 19.

9.1.5 For sizes not included in Tables 3 and 19, the allowable lead variation is equal to 0.57735 times one-half the pitch diameter tolerance. This is the lead variation that causes a change in functional diameter equal to one-half the pitch diameter tolerance. The allowable flank half-angle variation in minutes of arc is equal to 30 plus 1.875 times the number of threads per inch, rounded to the nearest 5 min.

9.1.6 For the requirements of paras. 9.1.4 and 9.1.5, lead variation values tabulated or calculated are the maximum variations from specified lead between any two points not farther apart than the length of the standard GO thread gage. Flank angle variation values are maximum variations from the basic 30 deg angle between thread flanks and perpendiculars to the thread axis.

10 FORMULAS AND SYMBOLS FOR THREAD FORM

10.1 Thread Form Formulas and Symbols

Formulas are given below; data are tabulated in Table 5.

The general symbols used are defined in Table 20 and application of the symbols is shown in Fig. 6.

(a) Included Angle of Thread

$$2\alpha = 60 \text{ deg}$$

(b) Half angle of thread

$$\alpha = 30 \text{ deg}$$

(c) Number of threads per inch (TPI) is $1/P$ Pitch of thread.

$$P = 1/\text{TPI}$$

(d) Height of sharp V-thread (fundamental triangle)

$$H = 0.86602540P$$

(e) Height of UNR external thread, design form

$$h_s = 0.59539247P = (11/16H)$$

(f) Height of internal thread and UN external thread

$$h_s = h_n = 0.54126588P = (5/8H)$$

(g) Height of thread engagement

$$h_s = 0.54126588P = (5/8H)$$

(h) Flat at crest of external thread

$$F_{cs} = 0.12500000P = P/8$$

(i) Truncation of UN external thread crest

$$f_{cs} = 0.10825318P = (H/8)$$

(j) Truncation of UNR external thread (for calculating minor diameter values in tables)

$$S_{rs} = 0.16237976P = (3/16H)$$

(k) Basic flat at crest of internal thread and root of external thread

$$F_{rs} = F_{cn} = 0.25000000P = P/4$$

(l) Truncation of internal thread crest

$$f_{cn} = 0.21650635P = (H/4)$$

(m) Flat at root of internal thread

$$F_{rn} = 0.12500000P = P/8$$

(n) Truncation of internal thread root

$$f_{rn} = 0.10825318P = (H/8)$$

(o) Addendum of external thread

$$h_{as} = 0.32475953P = (3/8H)$$

(p) Major diameter of external thread is d. Pitch diameter of external thread

$$d_2 = d - 2h_{as} = d - 0.64951905P$$

(q) Minor diameter of UNR external thread

$$d_3 = d - 2h_s = 1.19078493P$$

(r) Minor diameter of UN external thread

$$d_1 = d - 2h_s = d - 1.08253175P$$

(s) Major diameter of internal thread is D. Pitch diameter of internal thread is D_2. Minor diameter of internal thread:

$$D_1 = D - 2h_n = D - 1.08253175P$$

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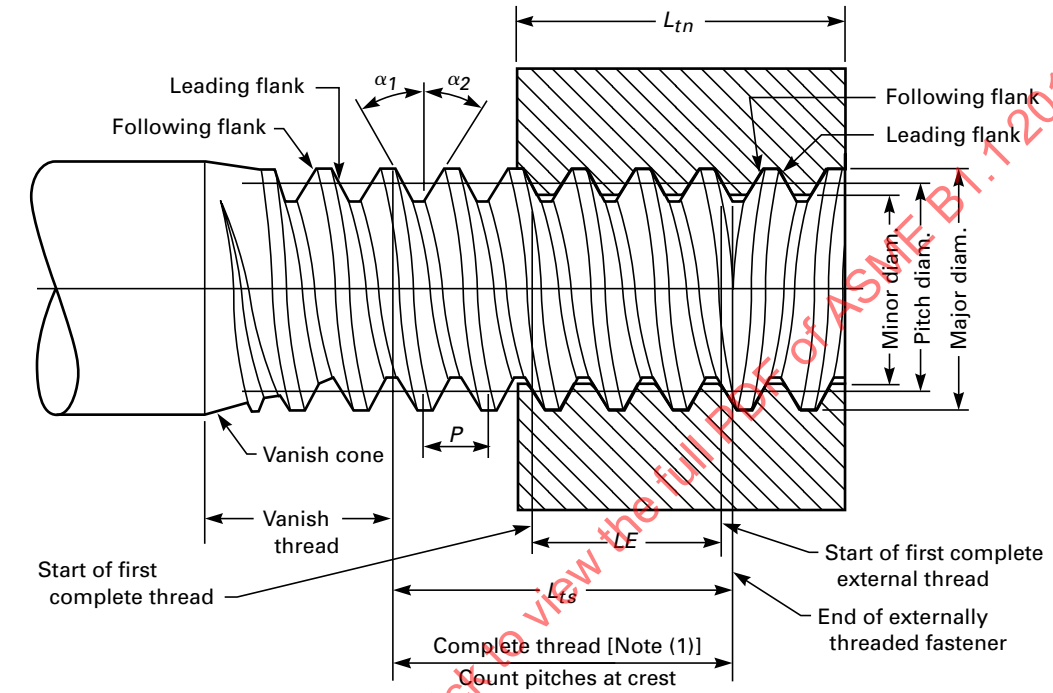
11 TABLES OF BASIC DIMENSIONS

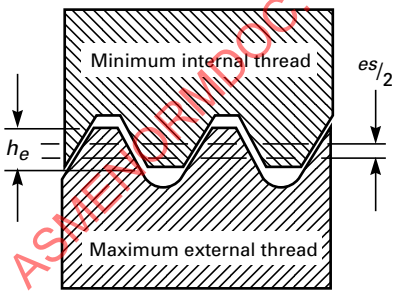
11.1 Table Content

The basic dimensions tabulated in Tables 6 through 16 include major diameter, pitch diameter, minor diameter of external threads, minor diameter of internal threads, lead angle, cross-sectional area at the minor diameter, and the tensile stress area.

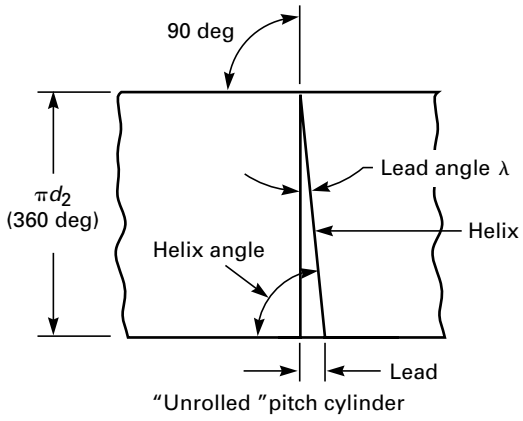
11.2 Thread Series

Basic dimensions are given for each of the standard series threads.





Thread With an Allowance



Lead and Helix Angles

NOTE:
(1) Portion of thread fully formed at crest and root.

Fig. 6 Application of General Thread Symbols (See Table 5)

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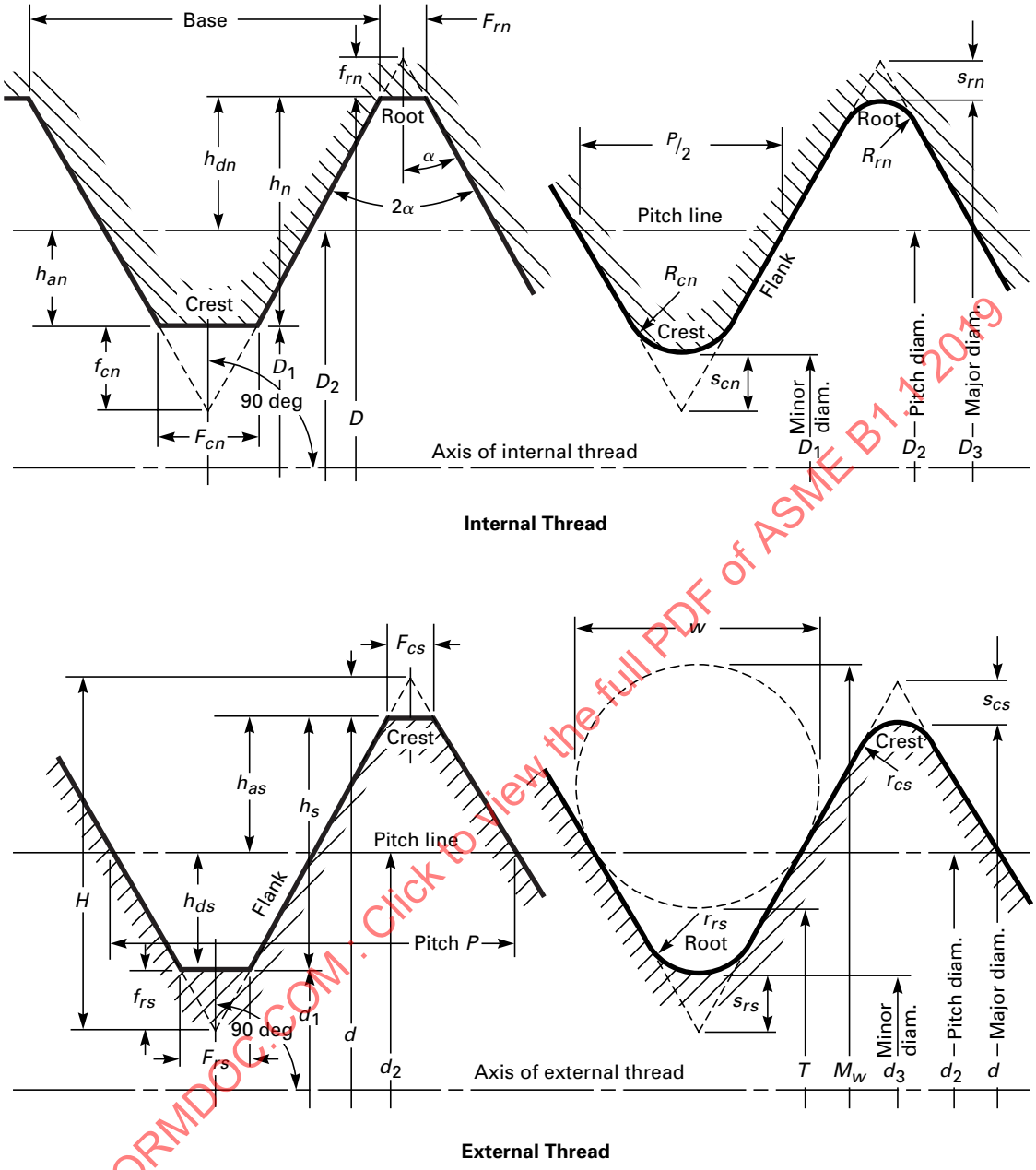

GENERAL NOTE: These diagrams are not intended to show standard thread forms, but only to illustrate the application of symbols.

Fig. 6 Application of General Thread Symbols (See Table 5) (Cont'd)

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Table 6 Basic Dimensions for Coarse-Thread Series (UNC/UNRC)

Nominal Size, in.	Basic Major Diameter, D, in.	Threads/ in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ deg	Lead Angle at Basic Pitch Diameter, λ Min.	Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
1 (0.073) [Note (3)]	0.0730	64	0.0629	0.0544	0.0561	4	31	0.00218	0.00263
2 (0.086)	0.0860	56	0.0744	0.0648	0.0667	4	22	0.00310	0.00370
3 (0.099) [Note (3)]	0.0990	48	0.0855	0.0741	0.0764	4	26	0.00406	0.00487
4 (0.112)	0.1120	40	0.0958	0.0822	0.0849	4	45	0.00496	0.00604
5 (0.125)	0.1250	40	0.1088	0.0952	0.0979	4	11	0.00672	0.00796
6 (0.138)	0.1380	32	0.1177	0.1008	0.1042	4	50	0.00745	0.00909
8 (0.164)	0.1640	32	0.1437	0.1268	0.1302	3	58	0.01196	0.0140
10 (0.190)	0.1900	24	0.1629	0.1404	0.1449	4	39	0.01450	0.0175
12 (0.216) [Note (3)]	0.2160	24	0.1889	0.1664	0.1709	4	1	0.0206	0.0242
1/4	0.2500	20	0.2175	0.1905	0.1959	4	11	0.0269	0.0318
5/16	0.3125	18	0.2764	0.2464	0.2524	3	40	0.0454	0.0524
3/8	0.3750	16	0.3344	0.3005	0.3073	3	24	0.0678	0.0775
7/16	0.4375	14	0.3911	0.3525	0.3602	3	20	0.0933	0.1063
1/2	0.5000	13	0.4500	0.4084	0.4167	3	7	0.1257	0.1419
9/16	0.5625	12	0.5084	0.4633	0.4723	2	59	0.162	0.182
5/8	0.6250	11	0.5660	0.5168	0.5266	2	56	0.202	0.226
3/4	0.7500	10	0.6850	0.6309	0.6417	2	40	0.302	0.334
7/8	0.8750	9	0.8028	0.7427	0.7547	2	31	0.419	0.462
1	1.0000	8	0.9188	0.8512	0.8647	2	29	0.551	0.606
1 1/8	1.1250	7	1.0322	0.9549	0.9704	2	31	0.693	0.763
1 1/4	1.2500	7	1.1572	1.0799	1.0954	2	15	0.890	0.969
1 3/8	1.3750	6	1.2667	1.1766	1.1946	2	24	1.054	1.155
1 1/2	1.5000	6	1.3917	1.3016	1.3196	2	11	1.294	1.405
1 3/4	1.7500	5	1.6201	1.5119	1.5335	2	15	1.74	1.90
2	2.0000	4 1/2	1.8557	1.7353	1.7594	2	11	2.30	2.50
2 1/4	2.2500	4 1/2	2.1057	1.9853	2.0094	1	55	3.02	3.25
2 1/2	2.5000	4	2.3376	2.2023	2.2294	1	57	3.72	4.00
2 3/4	2.7500	4	2.5876	2.4523	2.4794	1	46	4.62	4.93
3	3.0000	4	2.8376	2.7023	2.7294	1	36	5.62	5.97
3 1/4	3.2500	4	3.0876	2.9523	2.9794	1	29	6.72	7.10
3 1/2	3.5000	4	3.3376	3.2023	3.2294	1	22	7.92	8.33
3 3/4	3.7500	4	3.5876	3.4523	3.4794	1	16	9.21	9.66
4	4.0000	4	3.8376	3.7023	3.7294	1	11	10.61	11.08

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Secondary sizes.

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Table 7 Basic Dimensions for Fine-Thread Series (UNF/UNRF)

Nominal Size, in.	Basic Major Diameter, D, in.	Threads/ in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ deg	Lead Angle at Basic Pitch Diameter, λ Min.	Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
0 (0.060)	0.0600	80	0.0519	0.0451	0.0465	4	23	0.00151	0.00180
1 (0.073) [Note (3)]	0.0730	72	0.0640	0.0565	0.0580	3	57	0.00237	0.00278
2 (0.086)	0.0860	64	0.0759	0.0674	0.0691	3	45	0.00339	0.00394
3 (0.099) [Note (3)]	0.0990	56	0.0874	0.0778	0.0797	3	43	0.00451	0.00523
4 (0.112)	0.1120	48	0.0985	0.0871	0.0894	3	51	0.00566	0.00661
5 (0.125)	0.1250	44	0.1102	0.0979	0.1004	3	45	0.00716	0.00830
6 (0.138)	0.1380	40	0.1218	0.1082	0.1109	3	44	0.00874	0.01015
8 (0.164)	0.1640	36	0.1460	0.1309	0.1339	3	28	0.01285	0.01474
10 (0.190)	0.1900	32	0.1697	0.1528	0.1562	3	21	0.0175	0.0200
12 (0.216) [Note (3)]	0.2160	28	0.1928	0.1734	0.1773	3	22	0.0226	0.0258
1/4	0.2500	28	0.2268	0.2074	0.2113	2	52	0.0326	0.0364
5/16	0.3125	24	0.2854	0.2629	0.2674	2	40	0.0524	0.0580
3/8	0.3750	24	0.3479	0.3254	0.3299	2	11	0.0809	0.0878
7/16	0.4375	20	0.4050	0.3780	0.3834	2	15	0.1090	0.1187
1/2	0.5000	20	0.4675	0.4405	0.4459	1	57	0.1486	0.1599
9/16	0.5625	18	0.5264	0.4964	0.5024	1	55	0.189	0.203
5/8	0.6250	18	0.5889	0.5589	0.5649	1	43	0.240	0.256
3/4	0.7500	16	0.7094	0.6763	0.6823	1	36	0.351	0.373
7/8	0.8750	14	0.8286	0.7900	0.7977	1	34	0.480	0.509
1	1.0000	12	0.9459	0.9001	0.9098	1	36	0.625	0.663
1 1/8	1.1250	12	1.0709	1.0258	1.0348	1	25	0.812	0.856
1 1/4	1.2500	12	1.1959	1.1508	1.1598	1	16	1.024	1.073
1 3/8	1.3750	12	1.3209	1.2758	1.2848	1	9	1.260	1.315
1 1/2	1.5000	12	1.4459	1.4008	1.4098	1	3	1.521	1.581

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Secondary sizes.

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Table 8 Basic Dimensions for Extra-Fine-Thread Series (UNEF/UNREF)

Nominal Size, in.		Basic Major Diameter, D, in.	Threads/ in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary						deg	Min.		
...	12 (0.216)	0.2160	32	0.1957	0.1788	0.1822	2	55	0.0242	0.0270
1/4	...	0.2500	32	0.2297	0.2128	0.2162	2	29	0.0344	0.0379
5/16	...	0.3125	32	0.2922	0.2753	0.2787	1	57	0.0581	0.0625
3/8	...	0.3750	32	0.3547	0.3378	0.3412	1	36	0.0878	0.0932
7/16	...	0.4375	28	0.4143	0.3949	0.3988	1	34	0.1201	0.1274
1/2	...	0.5000	28	0.4768	0.4574	0.4613	1	22	0.162	0.170
9/16	...	0.5625	24	0.5354	0.5129	0.5174	1	25	0.203	0.214
5/8	...	0.6250	24	0.5879	0.5754	0.5799	1	16	0.256	0.268
...	11/16	0.6875	24	0.6604	0.6379	0.6424	1	9	0.315	0.329
3/4	...	0.7500	20	0.7175	0.6905	0.6959	1	16	0.369	0.386
...	13/16	0.8125	20	0.7800	0.7530	0.7584	1	10	0.439	0.458
7/8	...	0.8750	20	0.8425	0.8155	0.8209	1	5	0.515	0.536
...	15/16	0.9375	20	0.9050	0.8780	0.8834	1	0	0.598	0.620
1	...	1.0000	20	0.9675	0.9405	0.9459	0	57	0.687	0.711
...	1 1/16	1.0625	18	1.0264	0.9964	1.0024	0	59	0.770	0.799
1 1/8	...	1.1250	18	1.0889	1.0589	1.0649	0	56	0.871	0.901
...	1 3/16	1.1875	18	1.1514	1.1214	1.1274	0	53	0.977	1.009
1 1/4	...	1.2500	18	1.2139	1.1839	1.1899	0	50	1.090	1.123
...	1 5/16	1.3125	18	1.2764	1.2464	1.2524	0	48	1.208	1.244
1 3/8	...	1.3750	18	1.3389	1.3089	1.3149	0	45	1.333	1.370
...	1 7/16	1.4375	18	1.4014	1.3714	1.3774	0	43	1.464	1.503
1 1/2	...	1.5000	18	1.4639	1.4339	1.4399	0	42	1.60	1.64
...	1 9/16	1.5625	18	1.5264	1.4964	1.5024	0	40	1.74	1.79
1 5/8	...	1.6250	18	1.5889	1.5589	1.5649	0	38	1.89	1.94
...	1 11/16	1.6875	18	1.6514	1.6214	1.6274	0	37	2.05	2.10

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.

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Table 9 Basic Dimensions for 4-Thread Series (4-UN/4-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
2 1/2 [Note (3)]	...	2.5000	2.3376	2.2023	2.2294	1	57	3.72	4.00
...	2 5/8	2.6250	2.4626	2.3273	2.3544	1	51	4.16	4.45
2 3/4 [Note (3)]	...	2.7500	2.5876	2.4523	2.4794	1	46	4.62	4.93
...	2 7/8	2.8750	2.7126	2.5773	2.6044	1	41	5.11	5.44
3 [Note (3)]	...	3.0000	2.8376	2.7023	2.7294	1	36	5.62	5.97
...	3 1/8	3.1250	2.9626	2.8273	2.8544	1	32	6.16	6.52
3 1/4 [Note (3)]	...	3.2500	3.0876	2.9523	2.9794	1	29	6.72	7.10
...	3 3/8	3.3750	3.2126	3.0773	3.1044	1	25	7.31	7.70
3 1/2 [Note (3)]	...	3.5000	3.3376	3.2023	3.2294	1	22	7.92	8.33
...	3 5/8	3.6250	3.4626	3.3273	3.3544	1	19	8.55	9.00
3 3/4 [Note (3)]	...	3.7500	3.5876	3.4523	3.4794	1	16	9.21	9.66
...	3 7/8	3.8750	3.7126	3.5773	3.6044	1	14	9.90	10.36
4 [Note (3)]	...	4.0000	3.8376	3.7023	3.7294	1	11	10.61	11.08
...	4 1/8	4.1250	3.9626	3.8273	3.8544	1	9	11.34	11.83
4 1/4	...	4.2500	4.0876	3.9523	3.9794	1	7	12.10	12.61
...	4 3/8	4.3750	4.2126	4.0773	4.1044	1	5	12.88	13.41
4 1/2	...	4.5000	4.3376	4.2023	4.2294	1	3	13.69	14.23
...	4 5/8	4.6250	4.4626	4.3273	4.3544	1	1	14.52	15.1
4 3/4	...	4.7500	4.5876	4.4523	4.4794	1	0	15.4	15.9
...	4 7/8	4.8750	4.7126	4.5773	4.6044	0	58	16.3	16.8
5	...	5.0000	4.8376	4.7023	4.7294	0	57	17.2	17.8
...	5 1/8	5.1250	4.9626	4.8273	4.8544	0	55	18.1	18.7
5 1/4	...	5.2500	5.0876	4.9523	4.9794	0	54	19.1	19.7
...	5 3/8	5.3750	5.2126	5.0773	5.1044	0	52	20.0	20.7
5 1/2	...	5.5000	5.3376	5.2023	5.2294	0	51	21.0	21.7
...	5 5/8	5.6250	5.4626	5.3273	5.3544	0	50	22.1	22.7
5 3/4	...	5.7500	5.5876	5.4523	5.4794	0	49	23.1	23.8
...	5 7/8	5.8750	5.7126	5.5773	5.6044	0	48	24.2	24.9
6	...	6.0000	5.8376	5.7023	5.7294	0	47	25.3	26.0

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNC series.

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Table 10 Basic Dimensions for 6-Thread Series (6-UN/6-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
1 3/8 [Note (3)]	...	1.3750	1.2667	1.1766	1.1946	2	24	1.054	1.155
...	1 7/16	1.4375	1.3292	1.2391	1.2571	2	17	1.171	1.277
1 1/2 [Note (3)]	...	1.5000	1.3917	1.3016	1.3196	2	11	1.294	1.405
...	1 9/16	1.5625	1.4542	1.3641	1.3821	2	5	1.423	1.54
1 5/8	...	1.6250	1.5167	1.4271	1.4446	2	0	1.56	1.68
...	1 11/16	1.6875	1.5792	1.4891	1.5071	1	55	1.70	1.83
1 3/4	...	1.7500	1.6417	1.5516	1.5696	1	51	1.85	1.98
...	1 13/16	1.8125	1.7042	1.6141	1.6321	1	47	2.00	2.14
1 7/8	...	1.8750	1.7667	1.6766	1.6946	1	43	2.16	2.30
...	1 15/16	1.9375	1.8292	1.7391	1.7571	1	40	2.33	2.47
2	...	2.0000	1.8917	1.8016	1.8196	1	36	2.50	2.65
...	2 1/8	2.1250	2.0167	1.9266	1.9446	1	30	2.86	3.03
2 1/4	...	2.2500	2.1417	2.0516	2.0696	1	25	3.25	3.42
...	2 3/8	2.3750	2.2667	2.1766	2.1946	1	20	3.66	3.85
2 1/2	...	2.5000	2.3917	2.3016	2.3196	1	16	4.10	4.29
...	2 5/8	2.6250	2.5167	2.4266	2.4446	1	12	4.56	4.76
2 3/4	...	2.7500	2.6417	2.5516	2.5696	1	9	5.04	5.26
...	2 7/8	2.8750	2.7667	2.6766	2.6946	1	6	5.55	5.78
3	...	3.0000	2.8917	2.8016	2.8196	1	3	6.09	6.33
...	3 1/8	3.1250	3.0167	2.9266	2.9446	1	0	6.64	6.89
3 1/4	...	3.2500	3.1417	3.0516	3.0696	0	58	7.23	7.49
...	3 3/8	3.3750	3.2667	3.1766	3.1946	0	56	7.84	8.11
3 1/2	...	3.5000	3.3917	3.3016	3.3196	0	54	8.47	8.75
...	3 5/8	3.6250	3.5167	3.4266	3.4446	0	52	9.12	9.42
3 3/4	...	3.7500	3.6417	3.5516	3.5696	0	50	9.81	10.11
...	3 7/8	3.8750	3.7667	3.6766	3.6946	0	48	10.51	10.83
4	...	4.0000	3.8917	3.8016	3.8196	0	47	11.24	11.57
...	4 1/8	4.1250	4.0167	3.9266	3.9446	0	45	12.00	12.33
4 1/4	...	4.2500	4.1417	4.0516	4.0696	0	44	12.78	13.12
...	4 3/8	4.3750	4.2667	4.1766	4.1946	0	43	13.58	13.94
4 1/2	...	4.5000	4.3917	4.3016	4.3196	0	42	14.41	14.78
...	4 5/8	4.6250	4.5167	4.4266	4.4446	0	40	15.3	15.6
4 3/4	...	4.7500	4.6417	4.5516	4.5696	0	39	16.1	16.5
...	4 7/8	4.8750	4.7667	4.6766	4.6946	0	38	17.0	17.5
5	...	5.0000	4.8917	4.8016	4.8196	0	37	18.0	18.4
...	5 1/8	5.1250	5.0167	4.9266	4.9446	0	36	18.9	19.3
5 1/4	...	5.2500	5.1417	5.0516	5.0696	0	35	19.9	20.3
...	5 3/8	5.3750	5.2667	5.1766	5.1946	0	35	20.9	21.3
5 1/2	...	5.5000	5.3917	5.3016	5.3196	0	34	21.9	22.4
...	5 5/8	5.6250	5.5167	5.4266	5.4446	0	33	23.0	23.4
5 3/4	...	5.7500	5.6417	5.5516	5.5696	0	32	24.0	24.5
...	5 7/8	5.8750	5.7667	5.6766	5.6946	0	32	25.1	25.6
6	...	6.0000	5.8917	5.8016	5.8196	0	31	26.3	26.8

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNC series.

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Table 11 Basic Dimensions for 8-Thread Series (8-UN/8-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
1 [Note (3)]	...	1.0000	0.9188	0.8512	0.8647	2	29	0.551	0.606
...	1 1/16	1.0625	0.9813	0.9137	0.9272	2	19	0.636	0.695
1 1/8	...	1.1250	1.0438	0.9792	0.9897	2	11	0.728	0.790
...	1 3/16	1.1875	1.1063	1.0387	1.0522	2	4	0.825	0.892
1 1/4	...	1.2500	1.1688	1.1012	1.1147	1	57	0.929	1.000
...	1 5/16	1.3125	1.2313	1.1637	1.1772	1	51	1.039	1.114
1 3/8	...	1.3750	1.2938	1.2262	1.2397	1	46	1.155	1.233
...	1 7/16	1.4375	1.3563	1.2887	1.3022	1	41	1.277	1.360
1 1/2	...	1.5000	1.4188	1.3512	1.3647	1	36	1.405	1.492
...	1 9/16	1.5625	1.4813	1.4137	1.4272	1	32	1.54	1.63
1 5/8	...	1.6250	1.5438	1.4806	1.4897	1	29	1.68	1.78
...	1 11/16	1.6875	1.6063	1.5387	1.5522	1	25	1.83	1.93
1 3/4	...	1.7500	1.6688	1.6012	1.6147	1	22	1.98	2.08
...	1 13/16	1.8125	1.7313	1.6637	1.6772	1	19	2.14	2.25
1 7/8	...	1.8750	1.7938	1.7262	1.7397	1	16	2.30	2.41
...	1 15/16	1.9375	1.8563	1.7887	1.8022	1	14	2.47	2.59
2	...	2.0000	1.9188	1.8512	1.8647	1	11	2.65	2.77
...	2 1/8	2.1250	2.0438	1.9762	1.9897	1	7	3.03	3.15
2 1/4	...	2.2500	2.1688	2.1012	2.1147	1	3	3.42	3.56
...	2 3/8	2.3750	2.2938	2.2262	2.2397	1	0	3.85	3.99
2 1/2	...	2.5000	2.4188	2.3512	2.3647	0	57	4.29	4.44
...	2 5/8	2.6250	2.5438	2.4762	2.4897	0	54	4.76	4.92
2 3/4	...	2.7500	2.6688	2.6012	2.6147	0	51	5.26	5.43
...	2 7/8	2.8750	2.7938	2.7262	2.7397	0	49	5.78	5.95
3	...	3.0000	2.9188	2.8512	2.8647	0	47	6.32	6.51
...	3 1/8	3.1250	3.0438	2.9762	2.9897	0	45	6.89	7.08
3 1/4	...	3.2500	3.1688	3.1012	3.1147	0	43	7.49	7.69
...	3 3/8	3.3750	3.2938	3.2262	3.2397	0	42	8.11	8.31
3 1/2	...	3.5000	3.4188	3.3512	3.3647	0	40	8.75	8.96
...	3 5/8	3.6250	3.5438	3.4762	3.4897	0	39	9.42	9.64
3 3/4	...	3.7500	3.6688	3.6012	3.6147	0	37	10.11	10.34
...	3 7/8	3.8750	3.7938	3.7262	3.7397	0	36	10.83	11.06
4	...	4.0000	3.9188	3.8512	3.8647	0	35	11.57	11.81
...	4 1/8	4.1250	4.0438	3.9762	3.9897	0	34	12.34	12.59
4 1/4	...	4.2500	4.1688	4.1012	4.1147	0	33	13.12	13.38
...	4 3/8	4.3750	4.2938	4.2262	4.2397	0	32	13.94	14.21
4 1/2	...	4.5000	4.4188	4.3512	4.3647	0	31	14.78	15.1
...	4 5/8	4.6250	4.5438	4.4762	4.4897	0	30	15.6	15.9
4 3/4	...	4.7500	4.6688	4.6012	4.6147	0	29	16.5	16.8
...	4 7/8	4.8750	4.7938	4.7262	4.7397	0	29	17.4	17.7
5	...	5.0000	4.9188	4.8512	4.8647	0	28	18.4	18.7
...	5 1/8	5.1250	5.0438	4.9762	4.9897	0	27	19.3	19.7
5 1/4	...	5.2500	5.1688	5.1012	5.1147	0	26	20.3	20.7
...	5 3/8	5.3750	5.2938	5.2262	5.2397	0	26	21.3	21.7

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Table 11 Basic Dimensions for 8-Thread Series (8-UN/8-UNR) (Cont'd)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
5 1/2	...	5.5000	5.4188	5.3512	5.3647	0	25	22.4	22.7
...	5 5/8	5.6250	5.5438	5.4762	5.4897	0	25	23.4	23.8
5 3/4	...	5.7500	5.6688	5.6012	5.6147	0	24	24.5	24.9
...	5 7/8	5.8750	5.7938	5.7262	5.7397	0	24	25.6	26.0
6	...	6.0000	5.9188	5.8512	5.8647	0	23	26.8	27.1

NOTES:
(1) For information only.
(2) See formulas in Nonmandatoray Appendix B, para. B-1.
(3) Standard size of the UNC series.

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Table 12 Basic Dimensions for 12-Thread Series (12-UN/12-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
9/16 [Note (3)]	...	0.5625	0.5084	0.4633	0.4723	2	59	0.162	0.182
5/8	...	0.6250	0.5709	0.5258	0.5348	2	40	0.210	0.232
...	11/16	0.6875	0.6334	0.5883	0.5973	2	24	0.264	0.289
3/4	...	0.7500	0.6959	0.6508	0.6598	2	11	0.323	0.351
...	13/16	0.8125	0.7584	0.7133	0.7223	2	0	0.390	0.420
7/8	...	0.8750	0.8209	0.7758	0.7848	1	51	0.462	0.495
...	15/16	0.9375	0.8834	0.8383	0.8473	1	43	0.540	0.576
1 [Note (3)]	...	1.0000	0.9459	0.9008	0.9098	1	36	0.625	0.663
...	1 1/16	1.0625	1.0084	0.9633	0.9723	1	30	0.715	0.756
1 1/8 [Note (3)]	...	1.1250	1.0709	1.0258	1.0348	1	25	0.812	0.856
...	1 3/16	1.1875	1.1334	1.0883	1.0973	1	20	0.915	0.961
1 1/4 [Note (3)]	...	1.2500	1.1959	1.1508	1.1598	1	16	1.024	1.073
...	1 5/16	1.3125	1.2584	1.2133	1.2223	1	12	1.139	1.191
1 3/8 [Note (3)]	...	1.3750	1.3209	1.2758	1.2848	1	9	1.260	1.315
...	1 7/16	1.4375	1.3834	1.3383	1.3473	1	6	1.388	1.445
1 1/2 [Note (3)]	...	1.5000	1.4459	1.4008	1.4098	1	3	1.52	1.58
...	1 9/16	1.5625	1.5084	1.4633	1.4723	1	0	1.66	1.72
1 5/8	...	1.6250	1.5709	1.5258	1.5348	0	58	1.81	1.87
...	1 11/16	1.6875	1.6334	1.5883	1.5973	0	56	1.96	2.03
1 3/4	...	1.7500	1.6959	1.6508	1.6598	0	54	2.12	2.19
...	1 13/16	1.8125	1.7584	1.7133	1.7223	0	52	2.28	2.35
1 7/8	...	1.8750	1.8209	1.7758	1.7848	0	50	2.45	2.53
...	1 15/16	1.9375	1.8834	1.8383	1.8473	0	48	2.63	2.71
2	...	2.0000	1.9459	1.9008	1.9098	0	47	2.81	2.89
...	2 1/8	2.1250	2.0709	2.0258	2.0348	0	44	3.19	3.28
2 1/4	...	2.2500	2.1959	2.1508	2.1598	0	42	3.60	3.69
...	2 3/8	2.3750	2.3209	2.2758	2.2848	0	39	4.04	4.13
2 1/2	...	2.5000	2.4459	2.4008	2.4098	0	37	4.49	4.60
...	2 5/8	2.6250	2.5709	2.5258	2.5348	0	35	4.97	5.08
2 3/4	...	2.7500	2.6959	2.6508	2.6598	0	34	5.48	5.59
...	2 7/8	2.8750	2.8209	2.7758	2.7848	0	32	6.01	6.13
3	...	3.0000	2.9459	2.9008	2.9098	0	31	6.57	6.69
...	3 1/8	3.1250	3.0709	3.0258	3.0348	0	30	7.15	7.28
3 1/4	...	3.2500	3.1959	3.1508	3.1598	0	29	7.75	7.89
...	3 3/8	3.3750	3.3209	3.2758	3.2848	0	27	8.38	8.52
3 1/2	...	3.5000	3.4459	3.4008	3.4098	0	26	9.03	9.18
...	3 5/8	3.6250	3.5709	3.5258	3.5348	0	26	9.71	9.86
3 3/4	...	3.7500	3.6959	3.6508	3.6598	0	25	10.42	10.57
...	3 7/8	3.8750	3.8209	3.7758	3.7848	0	24	11.14	11.30
4	...	4.0000	3.9459	3.9008	3.9098	0	23	11.90	12.06
...	4 1/8	4.1250	4.0709	4.0258	4.0348	0	22	12.67	12.84
4 1/4	...	4.2500	4.1959	4.1508	4.1598	0	22	13.47	13.65
...	4 3/8	4.3750	4.3209	4.2758	4.2848	0	21	14.30	14.48

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Table 12 Basic Dimensions for 12-Thread Series (12-UN/12-UNR) (Cont'd)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
4 1/2	...	4.5000	4.4459	4.4008	4.4098	0	21	15.1	15.3
...	4 5/8	4.6250	4.5709	4.5258	4.5348	0	20	16.0	16.2
4 3/4	...	4.7500	4.6959	4.6508	4.6598	0	19	16.9	17.1
...	4 7/8	4.8750	4.8209	4.7758	4.7848	0	19	17.8	18.0
5	...	5.0000	4.9459	4.9008	4.9098	0	18	18.8	19.0
...	5 1/8	5.1250	5.0709	5.0258	5.0348	0	18	19.8	20.0
5 1/4	...	5.2500	5.1959	5.1508	5.1598	0	18	20.8	21.0
...	5 3/8	5.3750	5.3209	5.2758	5.2848	0	17	21.8	22.0
5 1/2	...	5.5000	5.4459	5.4008	5.4098	0	17	22.8	23.1
...	5 5/8	5.6250	5.5709	5.5258	5.5348	0	16	23.9	24.1
5 3/4	...	5.7500	5.6959	5.6508	5.6598	0	16	25.0	25.2
...	5 7/8	5.8750	5.8209	5.7758	5.7848	0	16	26.1	26.4
6	...	6.0000	5.9459	5.9008	5.9098	0	15	27.3	27.5

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNC or UNF series.

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Table 13 Basic Dimensions for 16-Thread Series (16-UN/16-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
3/8 [Note (3)]	...	0.3750	0.3344	0.3005	0.3073	3	24	00678	0.0775
7/16	...	0.4375	0.3969	0.3630	0.3698	2	52	0.0997	0.1114
1/2	...	0.5000	0.4594	0.4255	0.4323	2	29	0.1378	0.151
9/16	...	0.5625	0.5219	0.4880	0.4948	2	11	0.182	0.198
5/8	...	0.6250	0.5844	0.5505	0.5573	1	57	0.232	0.250
...	11/16	0.6875	0.6469	0.6130	0.6198	1	46	0.289	0.308
3/4 [Note (3)]	...	0.7500	0.7094	0.6755	0.6823	1	36	0.351	0.373
...	13/16	0.8125	0.7719	0.7380	0.7448	1	29	0.420	0.444
7/8	...	0.8750	0.8344	0.8005	0.8073	1	22	0.495	0.521
...	15/16	0.9375	0.8969	0.8630	0.8698	1	16	0.576	0.604
1	...	1.0000	0.9594	0.9255	0.9323	1	11	0.663	0.693
...	1 1/16	1.0625	1.0219	0.9880	0.9948	1	7	0.756	0.788
1 1/8	...	1.1250	1.0844	1.0505	1.0573	1	3	0.856	0.889
...	1 3/16	1.1875	1.1469	1.1130	1.1198	1	0	0.961	0.997
1 1/4	...	1.2500	1.2094	1.1755	1.1823	0	57	1.073	1.111
...	1 5/16	1.3125	1.2719	1.2380	1.2448	0	54	1.191	1.230
1 3/8	...	1.3750	1.3344	1.3005	1.3073	0	51	1.315	1.356
...	1 7/16	1.4375	1.3969	1.3630	1.3698	0	49	1.445	1.488
1 1/2	...	1.5000	1.4594	1.4255	1.4323	0	47	1.58	1.63
...	1 9/16	1.5625	1.5219	1.4880	1.4948	0	45	1.72	1.77
1 5/8	...	1.6250	1.5844	1.5505	1.5573	0	43	1.87	1.92
...	1 11/16	1.6875	1.6469	1.6130	1.6198	0	42	2.03	2.08
1 3/4	...	1.7500	1.7094	1.6755	1.6823	0	40	2.19	2.24
...	1 13/16	1.8125	1.7719	1.7380	1.7448	0	39	2.35	2.41
1 7/8	...	1.8750	1.8344	1.8005	1.8073	0	37	2.53	2.58
...	1 15/16	1.9375	1.8969	1.8630	1.8698	0	36	2.71	2.77
2	...	2.0000	1.9594	1.9255	1.9323	0	35	2.89	2.95
...	2 1/8	2.1250	2.0844	2.0505	2.0573	0	33	3.28	3.35
2 1/4	...	2.2500	2.2094	2.1755	2.1823	0	31	3.69	3.76
...	2 3/8	2.3750	2.3344	2.3005	2.3073	0	29	4.13	4.21
2 1/2	...	2.5000	2.4594	2.4255	2.4323	0	28	4.60	4.67
...	2 5/8	2.6250	2.5844	2.5505	2.5573	0	26	5.08	5.16
2 3/4	...	2.7500	2.7094	2.6755	2.6823	0	25	5.59	5.68
...	2 7/8	2.8750	2.8344	2.8005	2.8073	0	24	6.13	6.22
3	...	3.0000	2.9594	2.9255	2.9323	0	23	6.69	6.78
...	3 1/8	3.1250	3.0844	3.0505	3.0573	0	22	7.28	7.37
3 1/4	...	3.2500	3.2094	3.1755	3.1823	0	21	7.89	7.99
...	3 3/8	3.3750	3.3344	3.3005	3.3073	0	21	8.52	8.63
3 1/2	...	3.5000	3.4594	3.4255	3.4323	0	20	9.18	9.29
...	3 5/8	3.6250	3.5844	3.5505	3.5573	0	19	9.86	9.98
3 3/4	...	3.7500	3.7094	3.6755	3.6823	0	18	10.57	10.69
...	3 7/8	3.8750	3.8344	3.8005	3.8073	0	18	11.30	11.43

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Table 13 Basic Dimensions for 16-Thread Series (16-UN/16-UNR) (Cont'd)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
4	...	4.0000	3.9594	3.9255	3.9323	0	17	12.06	12.19
...	4 1/8	4.1250	4.0844	4.0505	4.0573	0	17	12.84	12.97
4 1/4	...	4.2500	4.2094	4.1755	4.1823	0	16	13.65	13.78
...	4 3/8	4.3750	4.3344	4.3005	4.3073	0	16	14.48	14.62
4 1/2	...	4.5000	4.4594	4.4255	4.4323	0	15	15.34	15.5
...	4 5/8	4.6250	4.5844	4.5505	4.5573	0	15	16.2	16.4
4 3/4	...	4.7500	4.7094	4.6755	4.6823	0	15	17.1	17.3
...	4 7/8	4.8750	4.8344	4.8005	4.8073	0	14	18.0	18.2
5	...	5.0000	4.9594	4.9255	4.9323	0	14	19.0	19.2
...	5 1/8	5.1250	5.0844	5.0505	5.0573	0	13	20.0	20.1
5 1/4	...	5.2500	5.2094	5.1755	5.1823	0	13	21.0	21.1
...	5 3/8	5.3750	5.3344	5.3005	5.3073	0	13	22.0	22.2
5 1/2	...	5.5000	5.4594	5.4255	5.4323	0	13	23.1	23.2
...	5 5/8	5.6250	5.5844	5.5505	5.5573	0	12	24.1	24.3
5 3/4	...	5.7500	5.7094	5.6755	5.6823	0	12	25.2	25.4
...	5 7/8	5.8750	5.8344	5.8005	5.8073	0	12	26.4	26.5
6	...	6.0000	5.9594	5.9255	5.9323	0	11	27.5	27.7

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNC or UNF series.

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Table 14 Basic Dimensions for 20-Thread Series (20-UN/20-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
1/4 [Note (3)]	...	0.2500	0.2175	0.1905	0.1959	4	11	0.0269	0.0318
5/16	...	0.3125	0.2800	0.2530	0.2584	3	15	0.0481	0.0547
3/8	...	0.3750	0.3425	0.3155	0.3209	2	40	0.0755	0.0836
7/16 [Note (3)]	...	0.4375	0.4050	0.3780	0.3834	2	15	0.1090	0.1187
1/2 [Note (3)]	...	0.5000	0.4675	0.4405	0.4459	1	57	0.1486	0.160
9/16	...	0.5625	0.5300	0.5030	0.5084	1	43	0.194	0.207
5/8	...	0.6250	0.5925	0.5655	0.5709	1	32	0.246	0.261
...	11/16	0.6875	0.6550	0.6280	0.6334	1	24	0.304	0.320
3/4 [Note (3)]	...	0.7500	0.7175	0.6905	0.6959	1	16	0.369	0.386
...	13/16 [Note (3)]	0.8125	0.7800	0.7530	0.7584	1	10	0.439	0.458
7/8 [Note (3)]	...	0.8750	0.8425	0.8155	0.8209	1	5	0.515	0.536
...	15/16 [Note (3)]	0.9375	0.9050	0.8780	0.8834	1	0	0.598	0.620
1 [Note (3)]	...	1.0000	0.9675	0.9405	0.9459	0	57	0.687	0.711
...	1 1/16	1.0625	1.0300	1.0030	1.0084	0	53	0.782	0.807
1 1/8	...	1.1250	1.0925	1.0655	1.0709	0	50	0.882	0.910
...	1 3/16	1.1875	1.1550	1.1280	1.1334	0	47	0.990	1.018
1 1/4	...	1.2500	1.2175	1.1905	1.1959	0	45	1.103	1.133
...	1 5/16	1.3125	1.2800	1.2530	1.2584	0	43	1.222	1.254
1 3/8	...	1.3750	1.3425	1.3155	1.3209	0	41	1.348	1.382
...	7/16	1.4375	1.4050	1.3780	1.3834	0	39	1.479	1.51
1 1/2	...	1.5000	1.4675	1.4405	1.4459	0	37	1.62	1.65
...	1 9/16	1.5625	1.5300	1.5030	1.5084	0	36	1.76	1.80
1 5/8	...	1.6250	1.5925	1.5655	1.5709	0	34	1.91	1.95
...	1 11/16	1.6875	1.6550	1.6280	1.6334	0	33	2.07	2.11
1 3/4	...	1.7500	1.7175	1.6905	1.6959	0	32	2.23	2.27
...	1 13/16	1.8125	1.7800	1.7530	1.7584	0	31	2.40	2.44
1 7/8	...	1.8750	1.8425	1.8155	1.8209	0	30	2.57	2.62
...	1 15/16	1.9375	1.9050	1.8780	1.8834	0	29	2.75	2.80
2	...	2.0000	1.9675	1.9405	1.9459	0	28	2.94	2.99
...	2 1/8	2.1250	2.0925	2.0655	2.0709	0	26	3.33	3.39
2 1/4	...	2.2500	2.2175	2.1905	2.1959	0	25	3.75	3.81
...	2 3/8	2.3750	2.3425	2.3155	2.3209	0	23	4.19	4.25
2 1/2	...	2.5000	2.4675	2.4405	2.4459	0	22	4.66	4.72
...	2 5/8	2.6250	2.5925	2.5655	2.5709	0	21	5.15	5.21
2 3/4	...	2.7500	2.7175	2.6905	2.6959.	0	20	5.66	5.73
...	2 7/8	2.8750	2.8425	2.8155	2.8209	0	19	6.20	6.27
3	...	3.0000	2.9675	2.9405	2.9459	0	18	6.77	6.84

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNC, UNF, or UNEF series.

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Table 15 Basic Dimensions for 28-Thread Series (28-UN/28-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
...	12 (0.216) [Note (3)]	0.2160	0.1928	0.1734	0.1773	3	22	0.0226	0.0258
1/4 [Note (3)]	...	0.2500	0.2268	0.2074	0.2113	2	52	0.0326	0.0364
5/16	...	0.3125	0.2893	0.2699	0.2738	2	15	0.0556	0.0606
3/8	...	0.3750	0.3518	0.3324	0.3363	1	51	0.0848	0.0909
7/16 [Note (3)]	...	0.4375	0.4143	0.3949	0.3988	1	34	0.1201	0.1274
1/2 [Note (3)]	...	0.5000	0.4768	0.4574	0.4613	1	22	0.162	0.170
9/16	...	0.5625	0.5393	0.5199	0.5238	1	12	0.209	0.219
5/8	...	0.6250	0.6018	0.5824	0.5863	1	5	0.263	0.274
...	11/16	0.6875	0.6643	0.6449	0.6488	0	59	0.323	0.335
3/4	...	0.7500	0.7268	0.7074	0.7113	0	54	0.389	0.402
...	13/16	0.8125	0.7893	0.7699	0.7738	0	50	0.461	0.475
7/8	...	0.8750	0.8518	0.8324	0.8363	0	46	0.539	0.554
...	15/16	0.9375	0.9143	0.8949	0.8988	0	43	0.624	0.640
1	. , .	1.0000	0.9768	0.9574	0.9613	0	40	0.714	0.732
...	1 1/16	1.0625	1.0393	1.0199	1.0238	0	38	0.811	0.830
1 1/8	...	1.1250	1.1018	1.0824	1.0863	0	35	0.914	0.933
...	1 3/16	1.1875	1.1643	1.1449	1.1488	0	34	1.023	1.044
1 1/4	...	1.2500	1.2268	1.2074	1.2113	0	32	1.138	1.160
...	1 5/16	1.3125	1.2893	1.2699	1.2738	0	30	1.259	1.282
1 3/8	...	1.3750	1.3518	1.3324	1.3363	0	29	1.386	1.411
...	1 7/16	1.4375	1.4143	1.3949	1.3988	0	28	1.52	1.55
1 1/2	...	1.5000	1.4768	1.4574	1.4613	0	26	1.66	1.69

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNF or UNEF series.

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Table 16 Basic Dimensions for 32-Thread Series (32-UN/32-UNR)

Nominal Size, in.		Basic Major Diameter, D, in.	Basic Pitch Diameter, D_2, in.	UNR Design Minor Diameter External, d_3, in. (Ref.)	Basic Minor Diameter Internal, D_1, in.	Lead Angle at Basic Pitch Diameter, λ		Section at Minor Diameter at $D - 2h_b$, sq in. [Note (1)]	Tensile Stress Area, sq in. [Notes (1), (2)]
Primary	Secondary					deg	Min.		
6 (0.138) [Note (3)]	...	0.1380	0.1177	0.1008	0.1042	4	50	0.00745	0.00909
8 (0.164) [Note (3)]	...	0.1640	0.1437	0.1268	0.1302	3	58	0.01196	0.0140
10 (0.190) [Note (3)]	...	0.1900	0.1697	0.1528	0.1562	3	21	0.01750	0.0200
...	12 (0.216) [Note (3)]	0.2160	0.1957	0.1788	0.1822	2	55	0.0242	0.0270
1/4 [Note (3)]	...	0.2500	0.2297	0.2128	0.2162	2	29	0.0344	0.0379
5/16 [Note (3)]	...	0.3125	0.2922	0.2753	0.2787	1	57	0.0581	0.0625
3/8 [Note (3)]	...	0.3750	0.3547	0.3378	0.3412	1	36	0.0878	0.0932
7/16	...	0.4375	0.4172	0.4003	0.4037	1	22	0.1237	0.1301
1/2	...	0.5000	0.4797	0.4628	0.4662	1	11	0.166	0.173
9/16	...	0.5625	0.5422	0.5253	0.5287	1	3	0.214	0.222
5/8	...	0.6250	0.6047	0.5878	0.5912	0	57	0.268	0.278
...	11/16	0.6875	0.6672	0.6503	0.6537	0	51	0.329	0.339
3/4	...	0.7500	0.7297	0.7128	0.7162	0	47	0.395	0.407
...	13/16	0.8125	0.7922	0.7753	0.7787	0	43	0.468	0.480
7/8	...	0.8750	0.8547	0.8378	0.8412	0	40	0.547	0.560
...	15/16	0.9375	0.9172	0.9003	0.9037	0	37	0.632	0.646
1	...	1.0000	0.9797	0.9628	0.9662	0	35	0.723	0.738

NOTES:
(1) For information only.
(2) See formulas in Nonmandatory Appendix B, para. B-1.
(3) Standard sizes of the UNC, UNF, or UNEF series.

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Table 17A Outline Guide for Determining Limits of Size of External Threads

Thread Class	Major Diameter, d		Pitch Diameter, d_2		Minor Diameter, d_1
	Max.	Min.	Max.	Min.	
1A	Nominal size minus allowance	Maximum, minus tolerance	Maximum major diameter minus h_b (Table 5, col. 13)	Maximum, minus tolerance	See paras. 8.3.1(e) and (f). Established by crest of new tool and minimum minor diameter of GO thread gage.
2A	Nominal size minus allowance	Maximum, minus tolerance	Maximum major diameter minus h_b (Table 5, col. 13)	Maximum, minus tolerance	See paras. 8.3.1(e) and (f). Established by crest of new tool and minimum minor diameter of GO thread gage.
3A	Nominal size	Maximum, minus tolerance	Maximum major diameter minus h_b (Table 5, col. 13)	Maximum, minus tolerance	See paras. 8.3.1(e) and (f). Established by crest of new tool and minimum minor diameter of GO thread gage.

Table 17B Outline Guide for Determining Limits of Size of Internal Threads

Thread Class	Minor Diameter, D_1		Pitch Diameter, D_2		Major Diameter, D
	Min.	Max.	Min.	Max.	
1B	Nominal size minus $2h_n$ (Table 5, col. 15)	Minimum, plus tolerance	Nominal size minus h_b (Table 5, col. 13)	Minimum, plus tolerance	See paras. 8.3.2(a) and (b). Established by crest of new tool and maximum major diameter of GO thread gage.
2B	Nominal size minus $2h_n$ (Table 5, col. 15)	Minimum, plus tolerance	Nominal size minus h_b (Table 5, col. 13)	Minimum, plus tolerance	See paras. 8.3.2(a) and (b). Established by crest of new tool and maximum major diameter of GO thread gage.
3B	Nominal size minus $2h_n$ (Table 5, col. 15)	Minimum, plus tolerance	Nominal size minus h_b (Table 5, col. 13)	Minimum, plus tolerance	See paras. 8.3.2(a) and (b). Established by crest of new tool and maximum major diameter of GO thread gage.

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Table 18A Examples of External Screw Threads

Thread Size = $\frac{1}{2}$ – 28 or 0.5000 – 28 UNEF-2A

Characteristic Description	Example of Size Calculation	Additional Information
(1) Maximum external major diameter (d max.) = Basic major diameter (d bsc) – allowance (es)	d max. = d bsc – es	. . .
	d bsc = 0.5000	This is the final value of the basic major diameter which is rounded to four decimal places.
	es = 0.300 (Td_2 for Class 2A)	For the Class 2A pitch diameter tolerance, see Table 18A, (4).
	es = 0.300 (0.003668)	The six decimal place value for Class 2A pitch diameter tolerance (Td_2) is used in this calculation.
	es = 0.001100	This figure is rounded to four decimal places to obtain the final value of es.
	es = 0.0011	. . .
	d max. = 0.5000 – 0.0011	. . .
	d max. = 0.4989	. . .
(2) Minimum external major diameter (d min.) = Maximum external major diameter (d max.) – major diameter tolerance (Td)	d min. = d max. – Td	. . .
	$Td = 0.060\sqrt[3]{P^2}$	. . .
	$Td = 0.060\sqrt[3]{(0.03571429)^2}$	All thread calculations are to be performed using (P) rounded to eight decimal places.
	$Td = 0.060\sqrt[3]{0.001276}$	. . .
	Td = 0.060 (0.108463)	. . .
	Td = 0.006508	This figure is rounded to four decimal places to obtain the final value of Td.
	Td = 0.0065	. . .
	d min. = 0.4989 – 0.0065	. . .
	d min. = 0.4924	. . .

Table 18A Examples of External Screw Threads (Cont'd)

Thread Size = ½ – 28 or 0.5000 – 28 UNEF-2A

Characteristic Description	Example of Size Calculation	Additional Information
(3) Maximum external pitch diameter (d_2 max.) = Maximum external major diameter (d max.) – twice the external thread addendum ($2h_{as}$)	d_2 max. = d max. – $2h_{as}$	. . .
	$2h_{as}$ = 0.64951905P	. . .
	$2h_{as}$ = 0.64951905 (0.03571429)	All thread calculations are to be performed using (P) rounded to eight decimal places.
	$2h_{as}$ = 0.023197	. . .
	d_2 max. = 0.4989 – 0.023197	. . .
	d_2 max. = 0.475703	This figure is rounded to four decimal places to obtain the final value of d_2 max.
	d_2 max. = 0.4757	. . .
(4) Minimum external pitch diameter (d_2 min.) = Maximum external pitch diameter (d_2 max.) – external pitch diameter tolerance (Td_2)	d_2 min. = d_2 max. – Td_2	. . .
	$Td_2 = 0.0015\sqrt[3]{d\ \text{bsc}} + 0.0015\sqrt{LE} + 0.015\sqrt[3]{P^2}$	LE (length of engagement) required in this example, is equal to 9P. See para. 5.2 for LE applications for other thread series.
	$Td_2 = 0.0015\sqrt[3]{0.5000} + 0.0015\sqrt{9\ (0.03571429)} + 0.015\sqrt[3]{(0.03571429)^2}$	. . .
	$Td_2 = 0.0015\sqrt[3]{0.5000} + 0.0015\sqrt{0.321429} + 0.015\sqrt[3]{0.001276}$	. . .
	Td_2 = (0.0015) (0.793701) + (0.0015) (0.566947) + (0.015) (0.108463)	. . .
	Td_2 = 0.001191 + 0.000850 + 0.001627	. . .
	Td_2 = 0.003668	This figure is rounded to six decimal places to obtain the final value of the external pitch diameter tolerance Td_2.
	d_2 min. = 0.4757 – 0.003668	. . .
	d_2 min. = 0.472032	This figure is rounded to four decimal places to obtain the final value of d_2 min.
	d_2 min. = 0.4720	. . .

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Table 18A Examples of External Inch Screw Threads, (Cont'd)

Thread Size = ½ – 28 or 0.5000 – 28 UNEF-2A

Characteristic Description	Example of Size Calculation	Additional Information
(5) Maximum external UNR minor diameter (d_3 max.) = Maximum external major diameter (d max.) – double height of external UNR thread ($2h_s$)	d_3 max. = d max. – $2h_s$	. . .
	$2h_s = 1.19078493P$	. . .
	$2h_s = 1.19078493\ (0.03571429)$	All thread calculations are to be performed using (P) rounded to eight decimal places.
	$2h_s = 0.042528$	. . .
	d_3 max. = 0.4989 – 0.042528	. . .
	d_3 max. = 0.456372	This figure is rounded to four decimal places to obtain the final value of d_3 max.
	d_3 max. = 0.4564	. . .
(6) Maximum external UN minor diameter (d_1 max.) = Maximum external major diameter (d max.) – double height of external UN thread ($2h_s$)	d_1 max. = d max. – $2h_s$	. . .
	$2h_s = 1.08253175P$	For UN threads, $2h_s = 2h_n$
	$2h_s = 1.08253175\ (0.03571429)$	All thread calculations are to be performed using (P) rounded to eight decimal places.
	$2h_s = 0.038662$	. . .
	d_1 max. = 0.4989 – 0.038662	. . .
	d_1 max. = 0.460238	This figure is rounded to four decimal places to obtain the final value of d_1 max.
	d_1 max. = 0.4602	. . .

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/28 = 0.03571429$.

Table 18B Examples of Internal Screw Threads

Thread Size = $\frac{1}{2}$ – 28 or 0.5000 – 28 UNEF-2B

Characteristic Description	Example of Size Calculation	Additional Information
(1) Minimum internal minor diameter (D_1 min.) = Basic major diameter (D bsc) – double height of internal thread ($2h_n$)	D_1 min. = D bsc – $2h_n$	. . .
	$2h_n = 1.08253175P$	. . .
	$2h_n = 1.08253175\ (0.03571429)$	All thread calculations are to be performed using (P) rounded to eight decimal places.
	$2h_n = 0.038662$	. . .
	D_1 min. = 0.5000 – 0.038662	. . .
	D_1 min. = 0.461338	For the Class 2B thread used in this example, this figure is rounded to three decimal places to obtain the final value of D_1 min. Other sizes and classes are expressed in a four place decimal. See para. 8.3.2(e).
	D_1 min. = 0.461	. . .
(2) Maximum internal minor diameter (D_1 max.) = Minimum internal minor diameter (D_1 min.) rounded to six decimal places + internal minor diameter tolerance (TD_1)	D_1 max. = D_1 min. (to six decimal places) + TD_1	See para. 5.8.2(c) for limitations on use of this formula.
	$TD_1 = 0.25P - 0.4P^2$	
	$TD_1 = 0.25\ (0.03571429) - 0.4\ (0.03571429)^2$	All thread calculations are to be performed using (P) rounded to eight decimal places.
	$TD_1 = 0.25\ (0.03571429) - 0.4\ (0.001276)$	. . .
	$TD_1 = 0.008929 - 0.000510$	. . .
	$TD_1 = 0.008419$	. . .
	$TD_1 = 0.0084$	This figure is rounded to four decimal places to obtain the final value of TD_1.
	D_1 max. = 0.461338 + 0.0084	. . .
	D_1 max. = 0.469757	For the Class 2B thread used in this example, this figure is rounded to three decimal places to obtain the final value of D_1 max. Other sizes and classes are expressed in a four place decimal. See para. 8.3.2(e).
	D_1 max. = 0.470	. . .

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Table 18B Examples of Internal Screw Threads (Cont'd)

Thread Size = $^1/_2$ – 28 or 0.5000 – 28 UNEF-2B

Characteristic Description	Example of Size Calculation	Additional Information
(3) Minimum internal pitch diameter (D_2 min.) = Basic major diameter (D bsc) – twice the external thread addendum (h_b)	D_2 min. = D bsc – h_b	. . .
	h_b = 0.64951905P	. . .
	h_b = 0.64951905 (0.03571429)	All thread calculations are to be performed using (P) rounded to eight decimal places.
	h_b = 0.023197	. . .
	D_2 min. = 0.5000 – 0.023197	. . .
	D_2 min. = 0.476803	This figure is rounded to four decimal places to obtain the final value of D_2 min.
	D_2 min. = 0.4768	. . .
(4) Maximum internal pitch diameter (D_2 max.) = Minimum internal pitch diameter (D_2 min.) + internal pitch diameter tolerance (TD_2)	D_2 max. = D_2 min. + TD_2	. . .
	TD_2 = 1.300 (Td_2 for Class 2A)	The constant 1.300 is for this Class 2B example and will be different for Classes 1B and 3B. See para. 5.8.2.
	TD_2 = 1.300 (0.003668)	For the Td_2 Class 2A pitch diameter tolerance, see Table 18A, (4). The six place decimal place value is used.
	TD_2 = 0.004768	. . .
	TD_2 = 0.0048	This figure is rounded to four decimal places to obtain the final value of TD_2.
	D_2 max. = 0.4768 + 0.0048	. . .
	D_2 max. = 0.4816	. . .
(5) Minimum internal major diameter (D min.) = Basic major diameter (D bsc)	D min. = D bsc	. . .
	D bsc = 0.5000	. . .
	D min. = 0.5000	. . .

GENERAL NOTES:
(a) All dimensions expressed in inches for calculations in this table.
(b) $P = 1/n = 1/28 = 0.03571429$.

Table 19 Allowable Variation in 30 deg Basic Half Angle of External and Internal Screw Threads

	Allowable Variation in Half Angle of Thread	
Threads/in.	±deg	Min.
80	3	00
72	2	45
64	2	30
56	2	15
48	2	00
44	1	50
40	1	45
36	1	35
32	1	30
28	1	20
27	1	20
24	1	15
20	1	10
18	1	05
16	1	00
14	0	55
13	0	55
12	0	50
11½	0	50
11	0	50
10	0	50
9	0	50
8	0	45
7	0	45
6	0	40
5	0	40
4½	0	40
4	0	40

GENERAL NOTE: See paras. 9.1.3 through 9.1.6 for applicability.

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Table 20 General Symbols (See Fig. 6)

Symbol	Dimension	Remarks
d	Major diameter, external thread	
D	Major diameter, internal thread	
D_3	Major diameter, rounded root, internal thread	
d_2	Pitch diameter, external thread	
D_2	Pitch diameter, internal thread	
d_1	Minor diameter, external thread	
d_3	Minor diameter, rounded root, external thread	
D_1	Minor diameter, internal thread	
P	Pitch	
$n = {}^1/_P$	Number of threads per unit of length (per inch)	
$N = {}^1/_L$	Number of turns per unit of length (per inch)	
H	Height of fundamental triangle	
h	Thread height (or depth)	
h_a	Addendum	
h_d	Dedendum	
h_e	Depth of thread engagement	
h_s	Height of UN or UNR external thread	
h_n	Height of UN internal thread	
h_{as}	Addendum of external thread	
H_b	Twice the external thread addendum	
α	Half angle of symmetrical thread	
α_1	Angle between leading flank of thread and normal to axis of thread	
α_2	Angle between following flank of thread and normal to axis of thread	
λ	Lead angle	$\tan \lambda = \frac{L}{\pi(d_2 \text{ or } D_2)}$
	Radius of rounding at:	
r_{cs}	crest of external thread	
r_{rs}	root of external thread	
R_{cn}	crest of internal thread	
R_{rn}	root of internal thread	
	Radial distance from apex of fundamental triangle to:	
s_{cs}	rounded crest of external thread	
s_{rs}	rounded root of external thread	
s_{cn}	rounded crest of internal thread	
s_{rn}	rounded root of internal thread	
	Distance from apex of fundamental triangle to:	
f_{cs}	flat at crest of external thread	

Table 20 General Symbols (See Fig. 6) (Cont'd)

Symbol	Dimension	Remarks
f_{rs}	flat at root of external thread	
f_{cn}	flat at crest of internal thread	
f_{rn}	flat at root of internal thread	
	Width of:	
F	flat (general)	
F_{cs}	flat at crest of external thread	
F_{rs}	flat at root of external thread	
F_{cn}	flat at crest of internal thread	
F_{rn}	flat at root of internal thread	
es	Allowance at major, pitch, and minor diameters of external thread	
EI	Allowance at major, pitch, and minor diameters of internal thread	
L_{ts}	Length of complete external thread	
L_{tn}	Length of complete internal thread, including chamfer	
LE	Length of thread engagement	
W	Diameter of measuring wires	
M_w	Measurement over wires	
C	Correction to measurement over best size wires to give pitch diameter	d_2 or $D_2 = M_w - C - c$ $C = W(1 + \text{cosec } \alpha) - (\cot \alpha)/2n$
λ'	Wire angle	
c	Wire angle correction for large lead angles	See FED-STD-H28/6
Prefix Symbol with Δ	Variation in any dimension	Examples: Variation in pitch ΔPi variation in half angle, $\Delta\ \alpha_1$ or $\Delta\alpha_2$
$\Delta d_2\alpha$, $\Delta D_2\alpha$	Pitch diameter equivalent of variation in flank angles	
$\Delta d_2\lambda$, $\Delta D_2\lambda$	Pitch diameter equivalent of variation in pitch (lead)	

GENERAL NOTE: Refer to ASME B1.7 for latest symbol identification. Greek alphabet is below.

A, α	= Alpha	N, ν	= Nu
B, β	= Beta	Ξ, ξ	= Xi
Γ, γ	= Gamma	O, o	= Omicron
Δ, δ	= Delta	Π, π	= Pi
E, ϵ	= Epsilon	P, ρ	= Rho
Z, ζ	= Zeta	Σ, σ	= Sigma
H, η	= Eta	T, τ	= Tau
Θ, θ	= Theta	Y, υ	= Upsilon
I, ι	= Iota	Φ, ϕ	= Phi
K, κ	= Kappa	X, χ	= Chi
Λ, λ	= Lambda	Ψ, ψ	= Psi
M, μ	= Mu	Ω, ω	= Omega

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NONMANDATORY APPENDIX A
TERMINOLOGY AND IDENTIFICATION OF UNIFIED INCH SCREW THREADS

A-1 TERMINOLOGY

All terms relating to screw threads used in this Standard are defined in ASME B1.7.

A-2 IDENTIFICATION

The various unified screw threads covered in B1 standards are compared in Fig. A-1 and Table A-1.

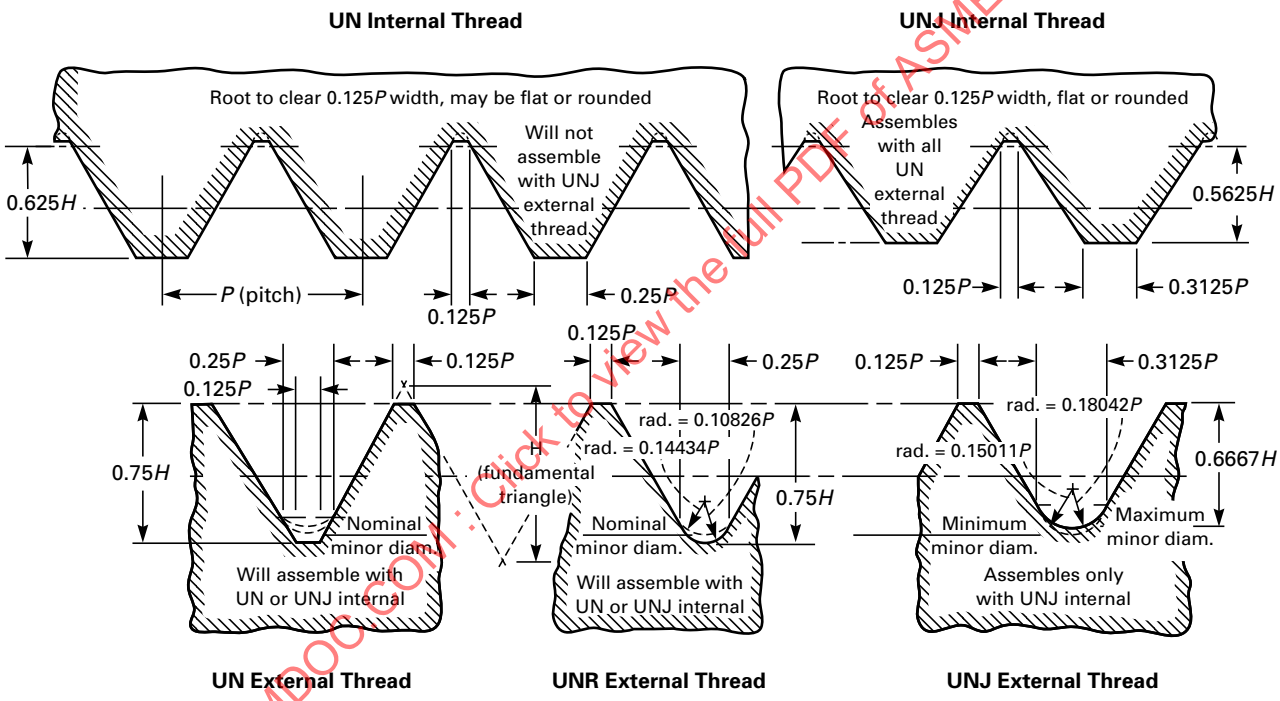

Fig. A-1 Identification of 60-deg Inch Screw Threads Within the Scope of ASME B1 Committee

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Table A-1 Identification of 60-deg Inch Screw Threads Within the Scope of ASME B1 Committee

Thread Identification	UN Threads, Internal and External	UNR Threads, External Only	UNJ Threads, Internal and External
ASME standards documents	B1.1, Unified Inch Screw Threads; B1.2, Gages and Gaging for Unified Inch Screw Threads	B1.1, Unified Inch Screw Threads; B1.2, Gages and Gaging for Unified Inch Screw Threads	B1.15, Unified Inch Screw Threads — UNJ Thread Form; draft of B1.2, Gages and Gaging for Unified Inch Screw Threads
External root	External thread root may be flat or rounded	Rounded root specified	Rounded root specified
External minor diameter	External thread minor diameter is not toleranced	External thread minor diameter is not toleranced	External thread minor diameter is toleranced
External threads	UN Classes 1A, 2A, and 3A	UNR Classes 1A, 2A, and 3A	UNJ Classes 2A and 3A mate only with UNJ internal threads
Internal threads	UN Classes 1B, 2B, and 3B	No internal threads designated UNR; UNR mates with UN internal threads	UNJ Classes 2B and 3B (no rounding required on internal thread root)

GENERAL NOTES:

(a) The above cannot be used as a working sheet. Refer to the appropriate standards, as listed, for complete thread details and conformance data.

(b) The appropriate current standard is the authoritative document for complete details and data and takes precedence over this sheet.

(c) These standards may be purchased from the ASME Order Department, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300: telephone (201) 882-1167 or 1-800-THE-ASME.

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NONMANDATORY APPENDIX B
THREAD STRENGTH DESIGN FORMULAS

B-1 THREAD TENSILE STRESS AREA

The following thread tensile stress area formulas are used for the purpose of product acceptance computations. Tensile stress area:

$$A_s = 3.1416 \left[\frac{D_2}{2} - \frac{3H}{16}\right]^2$$

or

$$A_s = 0.7854 \left[D - \frac{0.9743}{1/P}\right]^2$$

where

D = basic major diameter
D_2 = basic pitch diameter
$1/P$ = number of threads per inch

For $3H/16$, see Table 5.

B-2 THREAD SHEAR DATA

The following formulas for thread shear areas are geometric minimum values. Shear (thread stripping) strengths of screw threads under load are dependent, in addition, on mating component relative material strengths, nut geometry, and coefficient of friction between thread bearing surfaces. Effective shear areas are therefore somewhat less than the geometric values. Thread geometric shear areas:

$$AS_n = 3.1416\ (1/P)(LE)(d \text{ min.}) \times \left[\frac{1}{2(1/P)} + 0.57735\ (d \text{ min.} - D_2 \text{ max.})\right]$$

$$AS_s = 3.1416\ (1/P)(LE)(D_1 \text{ max.}) \times \left[\frac{1}{2(1/P)} + 0.57735\ (d_2 \text{ min.} - D_1 \text{ max.})\right]$$

where

AS_n = minimum thread shear area for internal threads
AS_s = minimum thread shear area for external threads
$1/P$ = number of threads per inch
LE = length of engagement
d min. = minimum major diameter of external thread
d_2 min. = minimum pitch diamter of external thread
D_1 max. = maximum minor diameter of internal thread
D_2 max. = maximum pitch diameter of internal thread

B-3 LENGTH OF THREAD ENGAGEMENT

In general, the length of engagement of mating threads is selected to utilize full tensile strength of a bolt prior to shearing of nut threads. Other applications may require internal thread shear prior to failure of the externally threaded part. For noncritical design, the following formulas are often used for approximation:

$$\text{tensile strength of externally threaded part} = S_t A_s$$

$$\text{shear strength of threads} = 0.5 S_t\ (AS_n \text{ or } AS_s)$$

where

S_t = ultimate tensile strength of material, psi

An internationally accepted study on the subject was published in the 1977 Transactions of the Society of Automotive Engineers as paper number 770420, *Analysis and Design of Threaded Assemblies*, by E. M. Alexander.

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NONMANDATORY APPENDIX C
UNIFIED INCH SCREW THREADS — METRIC TRANSLATION

C-1 BACKGROUND

This Appendix presents a translation of unified inch screw threads into metric units of measurement. It is very important to recognize that this translation is not ISO metric screw threads. The tables of limiting dimensions of standard and UNS/UNRS series threads and the table of thread form data translated from inches to millimeters presented in this Appendix implement the decision of the B1 Committee that there should be official metric translations of inch screw thread standards to better fill communication needs in international exchange of technical data. This philosophy originated at the May 4, 1964, meeting of the Committee and was approved by a letter ballot of the Committee on November 2, 1966.

The tables in this Appendix were originally published as USAS B1.1a-1968 Supplement to USAS B1.1-1960, in the interest of meeting urgent needs of industry.

C-2 DIMENSIONS

All dimensions in this Appendix are given in millimeters unless otherwise specified. Metric values in the limiting dimension tables are translations of the inch values tabulated in ASME B1.1.

The values in Table C-1 are a direct soft conversion of Table 2 in this Standard. All inch values were multiplied by 25.4 and rounded to four decimal places, per the rounding policy stated in ASME B1.30. Similarly, Tables C-2 and C-3 are soft conversions of Tables D-1 and 5, respectively.

Where it is necessary to use metric values of threads for which the metric limiting dimensions are not tabulated herein, the inch values should be determined in accordance with para. 8 of ASME B1.1 before translating to metric values and rounding by the method prescribed in the foregoing paragraph.

C-3 DESIGNATIONS

Designation of unified inch screw threads expressed in metric dimensions shall be as prescribed in paras. C-3.1 and C-3.2.

C-3.1 Metric Drawings or Documents

On metric drawings or documents, the designation shall specify, in sequence, the nominal size (expressed in decimal inches), the number of threads per inch, thread series symbol, and thread class symbol. All supplemental dimensions shall be as shown in metric units. The equivalent inch dimensions, as indicated and enclosed in parentheses, may be included if desired.

EXAMPLE (on metric drawing or metric document):
0.250 – 28 UNF-2A (22)
PD 5.7353 – 5.6515
(0.2258 – 0.2225 in.) (optional)

C-3.2 Inch Drawings or Documents

On inch drawings or documents, the designation and supplemental dimensions expressed in inches may be further supplemented by inclusion of the equivalent metric dimensions, so indicated and enclosed in parentheses.

EXAMPLE:
0.250 – 28 UNF-2A (22)
PD 0.2258 – 0.2225
(5.7353 – 5.6515 mm) (optional)

C-4 TABLES

Tables C-1, C-2, and C-3 give limits of size for standard series and UNS/UNRS series threads and thread form data.

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Table C-1 Limits of Size for Standard Series (UN/UNR) Threads, mm

Nominal Size and Threads/in.	Series Designation	Metric Equivalents		External [Note (1)]									Internal [Note (1)]						
						Major Diameter			Pitch Diameter and Functional Diameter [Notes (4), (5)]			UNR Minor Diameter, Max. [Note (6)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Notes (4), (5)]			Major Diameter, Min.
		Dia.	Pitch	Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance		Class	Min.	Max.	Min.	Max.	Tolerance	
0–80 or 0.060–80	UNF	1.5240	0.3175	2A	0.0127	1.5113	1.4300	...	1.3056	1.2598	0.0457	1.1328	2B	1.1811	1.3056	1.3183	1.3767	0.0584	1.5240
				3A	0.0000	1.5240	1.4427	...	1.3183	1.2852	0.0330	1.1455	3B	1.1811	1.3056	1.3183	1.3614	0.0432	1.5240
1–64 or 0.073–64	UNC	1.8542	0.3969	2A	0.0152	1.8390	1.7424	...	1.5824	1.5316	0.0508	1.3665	2B	1.4249	1.5799	1.5977	1.6637	0.0660	1.8542
				3A	0.0000	1.8542	1.7577	...	1.5977	1.5596	0.0381	1.3818	3B	1.4249	1.5799	1.5977	1.6459	0.0483	1.8542
1–72 or 0.073–72	UNF	1.8542	0.3528	2A	0.0152	1.8390	1.7501	...	1.6104	1.5621	0.0483	1.4199	2B	1.4732	1.6104	1.6256	1.6891	0.0635	1.8542
				3A	0.0000	1.8542	1.7653	...	1.6256	1.5900	0.0356	1.4351	3B	1.4732	1.6104	1.6256	1.6739	0.0483	1.8542
2–56 or 0.086–56	UNC	2.1844	0.4536	2A	0.0152	2.1692	2.0650	...	1.8745	1.8212	0.0533	1.6281	2B	1.6942	1.8720	1.8898	1.9609	0.0711	2.1844
				3A	0.0000	2.1844	2.0803	...	1.8898	1.8491	0.0406	1.6434	3B	1.6942	1.8720	1.8898	1.9431	0.0533	2.1844
2–64 or 0.086–64	UNF	2.1844	0.3969	2A	0.0152	2.1692	2.0726	...	1.9126	1.8618	0.0508	1.6967	2B	1.7551	1.9101	1.9279	1.9964	0.0686	2.1844
				3A	0.0000	2.1844	2.0879	...	1.9279	1.8898	0.0381	1.7120	3B	1.7551	1.9101	1.9279	1.9787	0.0508	2.1844
3–48 or 0.099–48	UNC	2.5146	0.5292	2A	0.0178	2.4968	2.3825	...	2.1539	2.0955	0.0584	1.8669	2B	1.9406	2.1463	2.1717	2.2479	0.0762	2.5146
				3A	0.0000	2.5146	2.4003	...	2.1717	2.1285	0.0432	1.8847	3B	1.9406	2.1463	2.1717	2.2276	0.0559	2.5146
3–56 or 0.099–56	UNF	2.5146	0.4536	2A	0.0178	2.4968	2.3927	...	2.2022	2.1463	0.0559	1.9558	2B	2.0244	2.1971	2.2200	2.2911	0.0711	2.5146
				3A	0.0000	2.5146	2.4105	...	2.2200	2.1793	0.0406	1.9736	3B	2.0244	2.1971	2.2200	2.2733	0.0533	2.5146
4–40 or 0.112–40	UNC	2.8448	0.6350	2A	0.0203	2.8245	2.6949	...	2.4130	2.3495	0.0635	2.0676	2B	2.1565	2.3851	2.4333	2.5171	0.0838	2.8448
				3A	0.0000	2.8448	2.7153	...	2.4333	2.3851	0.0483	2.0879	3B	2.1565	2.3851	2.4333	2.4943	0.0610	2.8448
4–48 or 0.112–48	UNF	2.8448	0.5292	2A	0.0178	2.8270	2.7127	...	2.4841	2.4232	0.0610	2.1971	2B	2.2708	2.4587	2.5019	2.5806	0.0787	2.8448
				3A	0.0000	2.8448	2.7305	...	2.5019	2.4562	0.0457	2.2149	3B	2.2708	2.4587	2.5019	2.5603	0.0584	2.8448
5–40 or 0.125–40	UNC	3.1750	0.6350	2A	0.0203	3.1547	3.0251	...	2.7432	2.6772	0.0660	2.3978	2B	2.4867	2.6975	2.7635	2.8473	0.0838	3.1750
				3A	0.0000	3.1750	3.0455	...	2.7635	2.7153	0.0483	2.4181	3B	2.4867	2.6975	2.7635	2.8270	0.0635	3.1750
5–44 or 0.125–44	UNF	3.1750	0.5773	2A	0.0178	3.1572	3.0353	...	2.7813	2.7178	0.0635	2.4689	2B	2.5502	2.7407	2.7991	2.8804	0.0813	3.1750
				3A	0.0000	3.1750	3.0531	...	2.7991	2.7508	0.0483	2.4867	3B	2.5502	2.7407	2.7991	2.8600	0.0610	3.1750
6–32 or 0.138–32	UNC	3.5052	0.7938	2A	0.0203	3.4849	3.3325	...	2.9693	2.8981	0.0711	2.5400	2B	2.6416	2.8956	2.9896	3.0836	0.0940	3.5052
				3A	0.0000	3.5052	3.3528	...	2.9896	2.9362	0.0533	2.5603	3B	2.6416	2.8931	2.9896	3.0582	0.0686	3.5052
6–40 or 0.138–40	UNF	3.5052	0.6350	2A	0.0203	3.4849	3.3553	...	3.0734	3.0074	0.0660	2.7280	2B	2.8194	3.0226	3.0937	3.1801	0.0864	3.5052
				3A	0.0000	3.5052	3.3757	...	3.0937	3.0429	0.0508	2.7483	3B	2.8194	3.0124	3.0937	3.1572	0.0635	3.5052
8–32 or 0.164–32	UNC	4.1656	0.7938	2A	0.0229	4.1427	3.9903	...	3.6271	3.5535	0.0737	3.1979	2B	3.3020	3.5306	3.6500	3.7465	0.0965	4.1656
				3A	0.0000	4.1656	4.0132	...	3.6500	3.5941	0.0559	3.2207	3B	3.3020	3.5255	3.6500	3.7211	0.0711	4.1656

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Table C-1 Limits of Size for Standard Series (UN/UNR) Threads, mm (Cont'd)

Nominal Size and Threads/in.	Series Designation	Metric Equivalents		External [Note (1)]									Internal [Note (1)]						
						Major Diameter			Pitch Diameter and Functional Diameter [Notes (4), (5)]			UNR Minor Diameter, Max. [Note (6)]		Minor Diameter		Pitch Diameter and Functional Diameter [Notes (4), (5)]			Major Diameter,
		Dia.	Pitch	Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance	(Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Min.
8–36 or 0.164–36	UNF	4.1656	0.7056	2A	0.0203	4.1453	4.0056	...	3.6881	3.6170	0.0711	3.3045	2B	3.4036	3.6068	3.7084	3.7998	0.0914	4.1656
				3A	0.0000	4.1656	4.0259	...	3.7084	3.6551	0.0533	3.3249	3B	3.4036	3.5966	3.7084	3.7770	0.0686	4.1656
10–24 or 0.190–24	UNC	4.8260	1.0583	2A	0.0254	4.8006	4.6177	...	4.1123	4.0284	0.0838	3.5408	2B	3.6830	3.9370	4.1377	4.2469	0.1092	4.8260
				3A	0.0000	4.8260	4.6431	...	4.1377	4.0742	0.0635	3.5662	3B	3.6830	3.9497	4.1377	4.2189	0.0813	4.8260
10–32 or 0.190–32	UNF	4.8260	0.7938	2A	0.0229	4.8031	4.6507	...	4.2875	4.2113	0.0762	3.8583	2B	3.9624	4.1656	4.3104	4.4094	0.0991	4.8260
				3A	0.0000	4.8260	4.6736	...	4.3104	4.2520	0.0584	3.8811	3B	3.9624	4.1681	4.3104	4.3840	0.0737	4.8260
12–24 or 0.216–24	UNC	5.4864	1.0583	2A	0.0254	5.4610	5.2781	...	4.7727	4.6863	0.0864	4.2012	2B	4.3434	4.5974	4.7981	4.9098	0.1118	5.4864
				3A	0.0000	5.4864	5.3035	...	4.7981	4.7320	0.0660	4.2266	3B	4.3434	4.5898	4.7981	4.8819	0.0838	5.4864
12–28 or 0.216–28	UNF	5.4864	0.9071	2A	0.0254	5.4610	5.2959	...	4.8717	4.7904	0.0813	4.3815	2B	4.4958	4.7244	4.8971	5.0038	0.1067	5.4864
				3A	0.0000	5.4864	5.3213	...	4.8971	4.8362	0.0610	4.4069	3B	4.4958	4.7168	4.8971	4.9759	0.0787	5.4864
12–32 or0.216–32	UNEF	5.4864	0.7938	2A	0.0254	5.4610	5.3086	...	4.9454	4.8641	0.0813	4.5161	2B	4.6228	4.8260	4.9708	5.0749	0.1041	5.4864
				3A	0.0000	5.4864	5.3340	...	4.9708	4.9098	0.0610	4.5415	3B	4.6228	4.8133	4.9708	5.0495	0.0787	5.4864
1/4–20 or 0.2500–20	UNC	6.3500	1.2700	1A	0.0279	6.3221	6.0122	...	5.4966	5.3543	0.1422	4.8108	1B	4.9784	5.2578	5.5245	5.7099	0.1854	6.3500
				2A	0.0279	6.3221	6.1163	6.0122	5.4966	5.4026	0.0940	4.8108	2B	4.9784	5.2578	5.5245	5.6490	0.1245	6.3500
				3A	0.0000	6.3500	6.1443	...	5.5245	5.4534	0.0711	4.8387	3B	4.9784	5.2502	5.5245	5.6159	0.0914	6.3500
1/4–28 or 0.2500–28	UNF	6.3500	0.9071	1A	0.0254	6.3246	6.0757	...	5.7353	5.6083	0.1270	5.2451	1B	5.3594	5.5880	5.7607	5.9258	0.1651	6.3500
				2A	0.0254	6.3246	6.1595	...	5.7353	5.6515	0.0838	5.2451	2B	5.3594	5.5880	5.7607	5.8699	0.1092	6.3500
				3A	0.0000	6.3500	6.1849	...	5.7607	5.6972	0.0635	5.2705	3B	5.3594	5.5626	5.7607	5.8420	0.0813	6.3500
1/4–32 or 0.2500–32	UNEF	6.3500	0.7938	2A	0.0254	6.3246	6.1722	...	5.8090	5.7277	0.0813	5.3797	2B	5.4864	5.6896	5.8344	5.9411	0.1067	6.3500
				3A	0.0000	6.3500	6.1976	...	5.8344	5.7734	0.0610	5.4051	3B	5.4864	5.6617	5.8344	5.9131	0.0787	6.3500
5/16–18 or 0.3125–18	UNC	7.9375	1.4111	1A	0.0305	7.9070	7.5743	...	6.9901	6.8351	0.1549	6.2255	1B	6.4008	6.7310	7.0206	7.2212	0.2007	7.9375
				2A	0.0305	7.9070	7.6860	7.5743	6.9901	6.8885	0.1016	6.2255	2B	6.4008	6.7310	7.0206	7.1552	0.1346	7.9375
				3A	0.0000	7.9375	7.7165	...	7.0206	6.9444	0.0762	6.2560	3B	6.4008	6.6802	7.0206	7.1196	0.0991	7.9375
5/16–20 or 0.3125–20	UN	7.9375	1.2700	2A	0.0305	7.9070	7.7013	...	7.0815	6.9774	0.1041	6.3957	2B	6.5532	6.8580	7.1120	7.2466	0.1346	7.9375
				3A	0.0000	7.9375	7.7318	...	7.1120	7.0358	0.0762	6.4262	3B	6.5532	6.8072	7.1120	7.2136	0.1016	7.9375
5/16–24 or 0.3125–24	UNF	7.9375	1.0583	1A	0.0279	7.9096	7.6352	...	7.2212	7.0815	0.1397	6.6497	1B	6.7818	7.0358	7.2492	7.4295	0.1803	7.9375
				2A	0.0279	7.9096	7.7267	...	7.2212	7.1272	0.0940	6.6497	2B	6.7818	7.0358	7.2492	7.3711	0.1219	7.9375
				3A	0.0000	7.9375	7.7546	...	7.2492	7.1806	0.0686	6.6777	3B	6.7818	6.9952	7.2492	7.3406	0.0914	7.9375

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Table C-1 Limits of Size for Standard Series (UN/UNR) Threads, mm (Cont'd)

Nominal Size and Threads/in.	Series Designation	Metric Equivalents		External [Note (1)]									Internal [Note (1)]						
						Major Diameter			Pitch Diameter and Functional Diameter [Notes (4), (5)]			UNR Minor Diameter, Max. [Note (6)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Notes (4), (5)]			Major Diameter, Min.
		Dia.	Pitch	Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance		Class	Min.	Max.	Min.	Max.	Tolerance	
$^{5}/_{16}$–28 or 0.3125–28	UN	7.9375	0.9071	2A	0.0254	7.9121	7.7470	...	7.3228	7.2339	0.0889	6.8326	2B	6.9596	7.1628	7.3482	7.4625	0.1143	7.9375
				3A	0.0000	7.9375	7.7724	...	7.3482	7.2822	0.0660	6.8580	3B	6.9596	7.1298	7.3482	7.4346	0.0864	7.9375
$^{5}/_{16}$–32 or 0.3125–32	UNEF	7.9375	0.7938	2A	0.0254	7.9121	7.7597	...	7.3965	7.3127	0.0838	6.9672	2B	7.0866	7.2644	7.4219	7.5311	0.1092	7.9375
				3A	0.0000	7.9375	7.7851	...	7.4219	7.3584	0.0635	6.9926	3B	7.0866	7.2288	7.4219	7.5032	0.0813	7.9375
$^{3}/_{8}$–16 or 0.3750–16	UNC	9.5250	1.5875	1A	0.0330	9.4920	9.1313	...	8.4607	8.2956	0.1651	7.6022	1B	7.7978	8.1534	8.4938	8.7097	0.2159	9.5250
				2A	0.0330	9.4920	9.2532	9.1313	8.4607	8.3490	0.1118	7.6022	2B	7.7978	8.1534	8.4938	8.6385	0.1448	9.5250
				3A	0.0000	9.5250	9.2862	...	8.4938	8.4099	0.0838	7.6352	3B	7.7978	8.0823	8.4938	8.6030	0.1092	9.5250
$^{3}/_{8}$–20 or 0.3750–20	UN	9.5250	1.2700	2A	0.0305	9.4945	9.2888	...	8.6690	8.5649	0.1041	7.9832	2B	8.1534	8.4328	8.6995	8.8367	0.1372	9.5250
				3A	0.0000	9.5250	9.3193	...	8.6995	8.6208	0.0787	8.0137	3B	8.1534	8.3744	8.6995	8.8011	0.1016	9.5250
$^{3}/_{8}$–24 or 0.3750–24	UNF	9.5250	1.0583	1A	0.0279	9.4971	9.2227	...	8.8087	8.6639	0.1448	8.2372	1B	8.3820	8.6360	8.8367	9.0246	0.1880	9.5250
				2A	0.0279	9.4971	9.3142	...	8.8087	8.7122	0.0965	8.2372	2B	8.3820	8.6360	8.8367	8.9611	0.1245	9.5250
				3A	0.0000	9.5250	9.3421	...	8.8367	8.7630	0.0737	8.2652	3B	8.3820	8.5649	8.8367	8.9306	0.0940	9.5250
$^{3}/_{8}$–28 or 0.3750–28	UN	9.5250	0.9071	2A	0.0279	9.4971	9.3320	...	8.9078	8.8163	0.0914	8.4176	2B	8.5344	8.7630	8.9357	9.0526	0.1168	9.5250
				3A	0.0000	9.5250	9.3599	...	8.9357	8.8671	0.0686	8.4455	3B	8.5344	8.7020	8.9357	9.0246	0.0889	9.5250
$^{3}/_{8}$–32 or 0.3750–32	UNEF	9.5250	0.7938	2A	0.0254	9.4996	9.3472	...	8.9840	8.8976	0.0864	8.5547	2B	8.6614	8.8646	9.0094	9.1211	0.1118	9.5250
				3A	0.0000	9.5250	9.3726	...	9.0094	8.9459	0.0635	8.5801	3B	8.6614	8.8113	9.0094	9.0932	0.0838	9.5250
$^{7}/_{16}$–14 or 0.4375–14	UNC	11.1125	1.8143	1A	0.0356	11.0769	10.6832	...	9.8984	9.7180	0.1803	8.9154	1B	9.1440	9.5504	9.9339	10.1676	0.2337	11.1125
				2A	0.0356	11.0769	10.8153	10.6832	9.8984	9.7790	0.1194	8.9154	2B	9.1440	9.5504	9.9339	10.0889	0.1549	11.1125
				3A	0.0000	11.1125	10.8509	...	9.9339	9.8450	0.0889	8.9510	3B	9.1440	9.4412	9.9339	10.0508	0.1168	11.1125
$^{7}/_{16}$–16 or 0.4375–16	UN	11.1125	1.5875	2A	0.0356	11.0769	10.8382	...	10.0457	9.9289	0.1168	9.1872	2B	9.3980	9.7536	10.0813	10.2337	0.1524	11.1125
				3A	0.0000	11.1125	10.8737	...	10.0813	9.9924	0.0889	9.2227	3B	9.3980	9.6520	10.0813	10.1956	0.1143	11.1125
$^{7}/_{16}$–20 or 0.4375–20	UNF	11.1125	1.2700	1A	0.0330	11.0795	10.7696	...	10.2540	10.0940	0.1600	9.5682	1B	9.7282	10.0330	10.2870	10.4927	0.2057	11.1125
				2A	0.0330	11.0795	10.8737	...	10.2540	10.1473	0.1067	9.5682	2B	9.7282	10.0330	10.2870	10.4242	0.1372	11.1125
				3A	0.0000	11.1125	10.9068	...	10.2870	10.2083	0.0787	9.6012	3B	9.7282	9.9466	10.2870	10.3911	0.1041	11.1125
$^{7}/_{16}$–28 or 0.4375–28	UNEF	11.1125	0.9071	2A	0.0279	11.0846	10.9195	...	10.4953	10.4038	0.0914	10.0051	2B	10.1346	10.3378	10.5232	10.6426	0.1194	11.1125
				3A	0.0000	11.1125	10.9474	...	10.5232	10.4546	0.0686	10.0330	3B	10.1346	10.2895	10.5232	10.6121	0.0889	11.1125
$^{7}/_{16}$–32 or 0.4375–32	UN	11.1125	0.7938	2A	0.0254	11.0871	10.9347	...	10.5715	10.4851	0.0864	10.1422	2B	10.2616	10.4394	10.5969	10.7086	0.1118	11.1125
				3A	0.0000	11.1125	10.9601	...	10.5969	10.5308	0.0660	10.1676	3B	10.2616	10.3988	10.5969	10.6807	0.0838	11.1125

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Table C-1 Limits of Size for Standard Series (UN/UNR) Threads, mm (Cont'd)

Nominal Size and Threads/in.	Series Designation	Metric Equivalents		External [Note (1)]									Internal [Note (1)]						
						Major Diameter			Pitch Diameter and Functional Diameter [Notes (4), (5)]			UNR Minor Diameter, Max. [Note (6)]		Minor Diameter		Pitch Diameter and Functional Diameter [Notes (4), (5)]			Major Diameter,
		Dia.	Pitch	Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance	(Ref.)	Class	Min.	Max.	Min.	Max.	Tolerance	Min.
1/2–13 or 0.5000–13	UNC	12.7000	1.9538	1A	0.0381	12.6619	12.2479	...	11.3919	11.2039	0.1880	10.3353	1B	10.5918	11.0236	11.4300	11.6764	0.2464	12.7000
				2A	0.0381	12.6619	12.3850	12.2479	11.3919	11.2649	0.1270	10.3353	2B	10.5918	11.0236	11.4300	11.5951	0.1651	12.7000
				3A	0.0000	12.7000	12.4231	...	11.4300	11.3360	0.0940	10.3734	3B	10.5918	10.8814	11.4300	11.5519	0.1219	12.7000
1/2–16 or 0.5000–16	UN	12.7000	1.5875	2A	0.0356	12.6644	12.4257	...	11.6332	11.5138	0.1194	10.7747	2B	10.9728	11.3284	11.6688	11.8237	0.1549	12.7000
				3A	0.0000	12.7000	12.4612	...	11.6688	11.5799	0.0889	10.8102	3B	10.9728	11.2268	11.6688	11.7856	0.1168	12.7000
1/2–20 or 0.5000–20	UNF	12.7000	1.2700	1A	0.0330	12.6670	12.3571	...	11.8415	11.6789	0.1626	11.1557	1B	11.3284	11.6078	11.8745	12.0879	0.2134	12.7000
				2A	0.0330	12.6670	12.4612	...	11.8415	11.7323	0.1092	11.1557	2B	11.3284	11.6078	11.8745	12.0167	0.1422	12.7000
				3A	0.0000	12.7000	12.4943	...	11.8745	11.7932	0.0813	11.1887	3B	11.3284	11.5240	11.8745	11.9812	0.1067	12.7000
1/2–28 or 0.5000–28	UNEF	12.7000	0.9071	2A	0.0279	12.6721	12.5070	...	12.0828	11.9888	0.0940	11.5926	2B	11.7094	11.9380	12.1107	12.2326	0.1219	12.7000
				3A	0.0000	12.7000	12.5349	...	12.1107	12.0396	0.0711	11.6205	3B	11.7094	11.8770	12.1107	12.2022	0.0914	12.7000
1/2–32 or 0.5000–32	UN	12.7000	0.7938	2A	0.0254	12.6746	12.5222	...	12.1590	12.0701	0.0889	11.7297	2B	11.8364	12.0396	12.1844	12.2987	0.1143	12.7000
				3A	0.0000	12.7000	12.5476	...	12.1844	12.1183	0.0660	11.7551	3B	11.8364	11.9863	12.1844	12.2707	0.0864	12.7000
9/16–12 or 0.5625–12	UNC	14.2875	2.1167	1A	0.0406	14.2469	13.8100	...	12.8727	12.6746	0.1981	11.7272	1B	11.9888	12.4460	12.9134	13.1724	0.2591	14.2875
				2A	0.0406	14.2469	13.9573	13.8100	12.8727	12.7406	0.1321	11.7272	2B	11.9888	12.4460	12.9134	13.0861	0.1727	14.2875
				3A	0.0000	14.2875	13.9979	...	12.9134	12.8143	0.0991	11.7678	3B	11.9888	12.3012	12.9134	13.0429	0.1295	14.2875
9/16–16 or 0.5625–16	UN	14.2875	1.5875	2A	0.0356	14.2519	14.0132	...	13.2207	13.1013	0.1194	12.3622	2B	12.5730	12.9286	13.2563	13.4112	0.1549	14.2875
				3A	0.0000	14.2875	14.0487	...	13.2563	13.1674	0.0889	12.3977	3B	12.5730	12.8041	13.2563	13.3731	0.1168	14.2875
9/16–18 or 0.5625–18	UNF	14.2875	1.4111	1A	0.0356	14.2519	13.9192	...	13.3350	13.1623	0.1727	12.5705	1B	12.7508	13.0810	13.3706	13.5966	0.2261	14.2875
				2A	0.0356	14.2519	14.0310	...	13.3350	13.2207	0.1143	12.5705	2B	12.7508	13.0810	13.3706	13.5204	0.1499	14.2875
				3A	0.0000	14.2875	14.0665	...	13.3706	13.2842	0.0864	12.6060	3B	12.7508	12.9692	13.3706	13.4823	0.1118	14.2875
9/16–20 or 0.5625–20	UN	14.2875	1.2700	2A	0.0330	14.2545	14.0487	...	13.4290	13.3198	0.1092	12.7432	2B	12.9032	13.2080	13.4620	13.6042	0.1422	14.2875
				3A	0.0000	14.2875	14.0818	...	13.4620	13.3807	0.0813	12.7762	3B	12.9032	13.1089	13.4620	13.5687	0.1067	14.2875
9/16–24 or 0.5625–24	UNEF	14.2875	1.0583	2A	0.0305	14.2570	14.0741	...	13.5687	13.4671	0.1016	12.9972	2B	13.1318	13.3858	13.5992	13.7287	0.1295	14.2875
				3A	0.0000	14.2875	14.1046	...	13.5992	13.5230	0.0762	13.0277	3B	13.1318	13.3198	13.5992	13.6982	0.0991	14.2875
9/16–28 or 0.5625–28	UN	14.2875	0.9071	2A	0.0279	14.2596	14.0945	...	13.6703	13.5763	0.0940	13.1801	2B	13.3096	13.5128	13.6982	13.8201	0.1219	14.2875
				3A	0.0000	14.2875	14.1224	...	13.6982	13.6271	0.0711	13.2080	3B	13.3096	13.4645	13.6982	13.7897	0.0914	14.2875
9/16–32 or 0.5625–32	UN	14.2875	0.7938	2A	0.0279	14.2596	14.1072	...	13.7439	13.6550	0.0889	13.3147	2B	13.4366	13.6144	13.7719	13.8887	0.1168	14.2875
				3A	0.0000	14.2875	14.1351	...	13.7719	13.7058	0.0660	13.3426	3B	13.4366	13.5738	13.7719	13.8582	0.0864	14.2875

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Table C-1 Limits of Size for Standard Series (UN/UNR) Threads, mm (Cont'd)

Nominal Size and Threads/in.	Series Designation	Metric Equivalents		External [Note (1)]									Internal [Note (1)]						
						Major Diameter			Pitch Diameter and Functional Diameter [Notes (4), (5)]			UNR Minor Diameter, Max. [Note (6)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Notes (4), (5)]			Major Diameter, Min.
		Dia.	Pitch	Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance		Class	Min.	Max.	Min.	Max.	Tolerance	
$\frac{5}{8}$–11 or 0.6250–11	UNC	15.8750	2.3091	1A	0.0432	15.8318	15.3695	...	14.3332	14.1224	0.2108	13.0810	1B	13.3858	13.8684	14.3764	14.6482	0.2718	15.8750
				2A	0.0432	15.8318	15.5245	15.3721	14.3332	14.1935	0.1397	13.0810	2B	13.3858	13.8684	14.3764	14.5593	0.1829	15.8750
				3A	0.0000	15.8750	15.5677	...	14.3764	14.2723	0.1041	13.1242	3B	13.3858	13.6931	14.3764	14.5136	0.1372	15.8750
$\frac{5}{8}$–12 or 0.6250–12	UN	15.8750	2.1167	2A	0.0406	15.8344	15.5448	...	14.4602	14.3231	0.1372	13.3147	2B	13.5890	14.0462	14.5009	14.6812	0.1803	15.8750
				3A	0.0000	15.8750	15.5854	...	14.5009	14.3967	0.1041	13.3553	3B	13.5890	13.8760	14.5009	14.6355	0.1346	15.8750
$\frac{5}{8}$–16 or 0.6250–16	UN	15.8750	1.5875	2A	0.0356	15.8394	15.6007	...	14.8082	14.6863	0.1219	13.9497	2B	14.1478	14.5034	14.8438	15.0012	0.1575	15.8750
				3A	0.0000	15.8750	15.6362	...	14.8438	14.7523	0.0914	13.9852	3B	14.1478	14.3815	14.8438	14.9606	0.1168	15.8750
$\frac{5}{8}$–18 or 0.6250–18	UNF	15.8750	1.4111	1A	0.0356	15.8394	15.5067	...	14.9225	14.7447	0.1778	14.1580	1B	14.3510	14.6812	14.9581	15.1892	0.2311	15.8750
				2A	0.0356	15.8394	15.6185	...	14.9225	14.8031	0.1194	14.1580	2B	14.3510	14.6812	14.9581	15.1105	0.1524	15.8750
				3A	0.0000	15.8750	15.6540	...	14.9581	14.8692	0.0889	14.1935	3B	14.3510	14.5542	14.9581	15.0724	0.1143	15.8750
$\frac{5}{8}$–20 or 0.6250–20	UN	15.8750	1.2700	2A	0.0330	15.8420	15.6362	...	15.0165	14.9073	0.1092	14.3307	2B	14.5034	14.7828	15.0495	15.1917	0.1422	15.8750
				3A	0.0000	15.8750	15.6693	...	15.0495	14.9682	0.0813	14.3637	3B	14.5034	14.6964	15.0495	15.1562	0.1067	15.8750
$\frac{5}{8}$–24 or 0.6250–24	UNEF	15.8750	1.0583	2A	0.0305	15.8445	15.6616	...	15.1562	15.0546	0.1016	14.5847	2B	14.7320	14.9860	15.1867	15.3187	0.1321	15.8750
				3A	0.0000	15.8750	15.6921	...	15.1867	15.1105	0.0762	14.6152	3B	14.7320	14.9073	15.1867	15.2857	0.0991	15.8750
$\frac{5}{8}$–28 or 0.6250–28	UN	15.8750	0.9071	2A	0.0279	15.8471	15.6820	...	15.2578	15.1613	0.0965	14.7676	2B	14.8844	15.1130	15.2857	15.4102	0.1245	15.8750
				3A	0.0000	15.8750	15.7099	...	15.2857	15.2146	0.0711	14.7955	3B	14.8844	15.0520	15.2857	15.3797	0.0940	15.8750
$\frac{5}{8}$–32 or 0.6250–32	UN	15.8750	0.7938	2A	0.0279	15.8471	15.6947	...	15.3314	15.2400	0.0914	14.9022	2B	15.0114	15.2146	15.3594	15.4762	0.1168	15.8750
				3A	0.0000	15.8750	15.7226	...	15.3594	15.2908	0.0686	14.9301	3B	15.0114	15.1613	15.3594	15.4483	0.0889	15.8750
$\frac{11}{16}$–12 or 0.6875–12	UN	17.4625	2.1167	2A	0.0406	17.4219	17.1323	...	16.0477	15.9080	0.1397	14.9022	2B	15.1638	15.6210	16.0884	16.2687	0.1803	17.4625
				3A	0.0000	17.4625	17.1729	...	16.0884	15.9842	0.1041	14.9428	3B	15.1638	15.4559	16.0884	16.2230	0.1346	17.4625
$\frac{11}{16}$–16 or 0.6875–16	UN	17.4625	1.5875	2A	0.0356	17.4269	17.1882	...	16.3957	16.2738	0.1219	15.5372	2B	15.7480	16.1036	16.4313	16.5913	0.1600	17.4625
				3A	0.0000	17.4625	17.2237	...	16.4313	16.3398	0.0914	15.5727	3B	15.7480	15.9614	16.4313	16.5506	0.1194	17.4625
$\frac{11}{16}$–20 or 0.6875–20	UN	17.4625	1.2700	2A	0.0330	17.4295	17.2237	...	16.6040	16.4922	0.1118	15.9182	2B	16.0782	16.3830	16.6370	16.7818	0.1448	17.4625
				3A	0.0000	17.4625	17.2568	...	16.6370	16.5532	0.0838	15.9512	3B	16.0782	16.2839	16.6370	16.7462	0.1092	17.4625
$\frac{11}{16}$–24 or 0.6875–24	UNEF	17.4625	1.0583	2A	0.0305	17.4320	17.2491	...	16.7437	16.6421	0.1016	16.1722	2B	16.3068	16.5608	16.7742	16.9088	0.1346	17.4625
				3A	0.0000	17.4625	17.2796	...	16.7742	16.6980	0.0762	16.2027	3B	16.3068	16.4948	16.7742	16.8732	0.0991	17.4625
$\frac{11}{16}$–28 or 0.6875–28	UN	17.4625	0.9071	2A	0.0279	17.4346	17.2695	...	16.8453	16.7488	0.0965	16.3551	2B	16.4846	16.6878	16.8732	16.9977	0.1245	17.4625
				3A	0.0000	17.4625	17.2974	...	16.8732	16.7996	0.0737	16.3830	3B	16.4846	16.6395	16.8732	16.9672	0.0940	17.4625

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Table C-1 Limits of Size for Standard Series (UN/UNR) Threads, mm (Cont'd)

Nominal Size and Threads/in.	Series Designation	Metric Equivalents		External [Note (1)]									Internal [Note (1)]						
						Major Diameter			Pitch Diameter and Functional Diameter [Notes (4), (5)]			UNR Minor Diameter, Max. [Note (6)] (Ref.)		Minor Diameter		Pitch Diameter and Functional Diameter [Notes (4), (5)]			Major Diameter, Min.
		Dia.	Pitch	Class	Allowance	Max. [Note (2)]	Min.	Min. [Note (3)]	Max. [Note (2)]	Min.	Tolerance		Class	Min.	Max.	Min.	Max.	Tolerance	
$^{11}/_{16}$–32 or 0.6875–32	UN	17.4625	0.7938	2A	0.0279	17.4346	17.2822	...	16.9189	16.8275	0.0914	16.4897	2B	16.6116	16.7894	16.9469	17.0663	0.1194	17.4625
				3A	0.0000	17.4625	17.3101	...	16.9469	16.8783	0.0686	16.5176	3B	16.6116	16.7488	16.9469	17.0358	0.0889	17.4625
$^{3}/_{4}$–10 or 0.7500–10	UNC	19.0500	2.5400	1A	0.0457	19.0043	18.5115	...	17.3533	17.1298	0.2235	15.9791	1B	16.3068	16.8402	17.3990	17.6911	0.2921	19.0500
				2A	0.0457	19.0043	18.6766	18.5115	17.3533	17.2034	0.1499	15.9791	2B	16.3068	16.8402	17.3990	17.5946	0.1956	19.0500
				3A	0.0000	19.0500	18.7223	...	17.3990	17.2872	0.1118	16.0249	3B	16.3068	16.6243	17.3990	17.5438	0.1448	19.0500
$^{3}/_{4}$–12 or 0.7500–12	UN	19.0500	2.1167	2A	0.0432	19.0068	18.7173	...	17.6327	17.4930	0.1397	16.4871	2B	16.7640	17.2212	17.6759	17.8587	0.1829	19.0500
				3A	0.0000	19.0500	18.7604	...	17.6759	17.5717	0.1041	16.5303	3B	16.7640	17.0358	17.6759	17.8130	0.1372	19.0500
$^{3}/_{4}$–16 or 0.7500–16	UNF	19.0500	1.5875	1A	0.0381	19.0119	18.6512	...	17.9807	17.7902	0.1905	17.1221	1B	17.3228	17.6784	18.0188	18.2677	0.2489	19.0500
				2A	0.0381	19.0119	18.7731	...	17.9807	17.8537	0.1270	17.1221	2B	17.3228	17.6784	18.0188	18.1839	0.1651	19.0500
				3A	0.0000	19.0500	18.8112	...	18.0188	17.9222	0.0965	17.1602	3B	17.3228	17.5489	18.0188	18.1432	0.1245	19.0500
$^{3}/_{4}$–20 or 0.7500–20	UNEF	19.0500	1.2700	2A	0.0330	19.0170	18.8112	...	18.1915	18.0797	0.1118	17.5057	2B	17.6784	17.9578	18.2245	18.3693	0.1448	19.0500
				3A	0.0000	19.0500	18.8443	...	18.2245	18.1407	0.0838	17.5387	3B	17.6784	17.8714	18.2245	18.3337	0.1092	19.0500
$^{3}/_{4}$–28 or 0.7500–28	UN	19.0500	0.9071	2A	0.0305	19.0195	18.8544	...	18.4302	18.3337	0.0965	17.9400	2B	18.0594	18.2880	18.4607	18.5877	0.1270	19.0500
				3A	0.0000	19.0500	18.8849	...	18.4607	18.3871	0.0737	17.9705	3B	18.0594	18.2270	18.4607	18.5547	0.0940	19.0500
$^{3}/_{4}$–32 or 0.7500–32	UN	19.0500	0.7938	2A	0.0279	19.0221	18.8697	...	18.5064	18.4150	0.0914	18.0772	2B	18.1864	18.3896	18.5344	18.6538	0.1194	19.0500
				3A	0.0000	19.0500	18.8976	...	18.5344	18.4658	0.0686	18.1051	3B	18.1864	18.3363	18.5344	18.6258	0.0914	19.0500
$^{13}/_{16}$–12 or 0.8125–12	UN	20.6375	2.1167	2A	0.0432	20.5943	20.3048	...	19.2202	19.0779	0.1422	18.0746	2B	18.3388	18.7960	19.2634	19.4462	0.1829	20.6375
				3A	0.0000	20.6375	20.3479	...	19.2634	19.1567	0.1067	18.1178	3B	18.3388	18.6157	19.2634	19.4005	0.1372	20.6375
$^{13}/_{16}$–16 or 0.8125–16	UN	20.6375	1.5875	2A	0.0381	20.5994	20.3606	...	19.5682	19.4437	0.1245	18.7096	2B	18.9230	19.2786	19.6063	19.7688	0.1626	20.6375
				3A	0.0000	20.6375	20.3987	...	19.6063	19.5123	0.0940	18.7477	3B	18.9230	19.1364	19.6063	19.7282	0.1219	20.6375
$^{13}/_{16}$–20 or 0.8125–20	UNEF	20.6375	1.2700	2A	0.0330	20.6045	20.3987	...	19.7790	19.6672	0.1118	19.0932	2B	19.2532	19.5580	19.8120	19.9593	0.1473	20.6375
				3A	0.0000	20.6375	20.4318	...	19.8120	19.7282	0.0838	19.1262	3B	19.2532	19.4589	19.8120	19.9212	0.1092	20.6375
$^{13}/_{16}$–28 or 0.8125–28	UN	20.6375	0.9071	2A	0.0305	20.6070	20.4419	...	20.0177	19.9187	0.0991	19.5275	2B	19.6596	19.8628	20.0482	20.1752	0.1270	20.6375
				3A	0.0000	20.6375	20.4724	...	20.0482	19.9746	0.0737	19.5580	3B	19.6596	19.8145	20.0482	20.1447	0.0965	20.6375
$^{13}/_{16}$–32 or 0.8125–32	UN	20.6375	0.7938	2A	0.0279	20.6096	20.4572	...	20.0939	20.0000	0.0940	19.6647	2B	19.7866	19.9644	20.1219	20.2438	0.1219	20.6375
				3A	0.0000	20.6375	20.4851	...	20.1219	20.0508	0.0711	19.6926	3B	19.7866	19.9238	20.1219	20.2133	0.0914	20.6375

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