

ASME B1.1-2019
[Revision of ASME B1.1-2003 (R2018)]

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

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

ASME B1.1-2019
[Revision of ASME B1.1-2003 (R2018)]

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

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: June 30, 2020

The next edition of this Standard is scheduled for publication in 2024. This Standard will become effective 1 year after the Date of Issuance.

Periodically certain actions of the ASME B1 Committee may be published as Cases. Cases are published on the ASME website under the B1 Committee Page at <http://go.asme.org/B1committee> as they are issued.

Errata to codes and standards may be posted on the ASME website under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The B1 Committee Page can be found at <http://go.asme.org/B1committee>. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or endorse any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright ©2020 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All Rights Reserved
Printed in U.S.A.

CONTENTS

| | | |
|--------------------------------------|---|------------|
| Foreword | | v |
| Committee Roster | | vii |
| Correspondence With the B1 Committee | | viii |
| 1 | General | 1 |
| 2 | Screw Thread Profile | 3 |
| 3 | Screw Thread Series | 5 |
| 4 | Screw Thread Classes | 77 |
| 5 | Screw Thread Allowance and Tolerance | 77 |
| 6 | Screw Thread Designation | 106 |
| 7 | Dimensional Accommodation of Coating or Plating for 60-Deg Threads | 110 |
| 8 | Limits of Size for Standard (UN, UNR, and UNJ) and Special (UNS, UNRS, and UNJS) Series of Threads | 115 |
| 9 | Thread Form Tolerances | 117 |
| 10 | Formulas and Nomenclature for Thread Form | 142 |
| 11 | Tables of Basic Dimensions | 142 |
| Nonmandatory Appendices | | |
| A | Terminology and Identification of Unified Inch Screw Threads | 148 |
| B | Thread Strength Design Formulas | 150 |
| C | Unified Inch Screw Threads — Metric Translation | 151 |
| D | Special Threads | 152 |
| E | Changes to ASME B1.1-1989, Tables 3A and 3B | 161 |
| F | Special Lengths of Engagement Specifications and Designations | 180 |
| Figures | | |
| 1 | Illustration of Assembly Interference of UNJ-3A Thread and UN-3B Thread in the Maximum Material Condition | 2 |
| 2 | Basic Profile for UN and UNR Screw Threads | 3 |
| 3 | Basic Profile for UNJ Screw Threads | 4 |
| 4 | Root Radius of UNJ External Thread | 4 |
| 5 | Disposition of Diametral Tolerances, Allowance, and Crest Clearance for Unified Inch Screw Thread Series UN, Classes 1A, 2A, 1B, and 2B | 6 |
| 6 | Disposition of Diametral Tolerances and Crest Clearance for Unified Inch Screw Thread Series UN, Classes 3A and 3B | 7 |
| 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 | 8 |
| 8 | Disposition of Diametral Tolerances and Crest Clearance for Unified Inch Screw Thread Series UNR, Class 3A and Series UN, Class 3B | 9 |
| 9 | External UNJ Thread Design Profile and Tolerances | 10 |

| | | |
|-----|---|-----|
| 10 | Disposition of Diametral Tolerances, Allowance, and Crest Clearance for Unified Inch Screw Thread Series UNJ, Classes 2A and 2B | 11 |
| 11 | Disposition of Diametral Tolerances and Crest Clearance for Unified Inch Screw Thread Series UNJ, Classes 3A and 3B | 12 |
| 12 | Internal UNJ Thread Design Profile and Tolerances | 78 |
| 13 | Basic Method of Designating Screw Threads | 107 |
| 14 | Ratio of Pitch Diameter Change to Thickness of Coating on 60-deg Threads | 112 |
| 15 | Effect of Electrodeposited Coating on 60-deg External Threads | 113 |
| 16 | Application of General Thread Symbols | 143 |
| A-1 | Identification of 60-deg Inch Screw Threads Within the Scope of the ASME B1 Committee | 148 |

Tables

| | | |
|-----|---|-----|
| 1 | Standard Series Threads (UN, UNR, and UNJ) | 13 |
| 2A | Limits of Size for Standard Series External Threads (UN, UNR, and UNJ) | 15 |
| 2B | Limits of Size for Standard Series Internal Threads (UN and UNJ) | 45 |
| 3 | Allowable Variations in Lead and Equivalent Change in Functional Diameter | 80 |
| 4 | Increments in Pitch Diameter Tolerance — Class 2A (PD Tolerance = $0.0015 \sqrt[3]{D} + 0.0015\sqrt{LE} + 0.015 \sqrt[3]{p^2}$) | 100 |
| 5 | Basic Profile and Constants for Calculation Formulas of Thread Dimensions, in. | 102 |
| 6 | Basic Dimensions for Coarse-Thread Series (UNC, UNRC, and UNJC) | 118 |
| 7 | Basic Dimensions for Fine-Thread Series (UNF, UNRF, and UNJF) | 119 |
| 8 | Basic Dimensions for Extra-Fine-Thread Series (UNEF, UNREF, and UNJEF) | 120 |
| 9 | Basic Dimensions for 4-Thread Series (UN, UNR, and UNJ) | 121 |
| 10 | Basic Dimensions for 6-Thread Series (UN, UNR, and UNJ) | 123 |
| 11 | Basic Dimensions for 8-Thread Series (UN, UNR, and UNJ) | 125 |
| 12 | Basic Dimensions for 12-Thread Series (UN, UNR, and UNJ) | 127 |
| 13 | Basic Dimensions for 16-Thread Series (UN, UNR, and UNJ) | 130 |
| 14 | Basic Dimensions for 20-Thread Series (UN, UNR, and UNJ) | 133 |
| 15 | Basic Dimensions for 28-Thread Series (UN, UNR, and UNJ) | 135 |
| 16 | Basic Dimensions for 32-Thread Series (UN, UNR, and UNJ) | 136 |
| 17A | Outline Guide for Determining Limits of Size of External Threads | 137 |
| 17B | Outline Guide for Determining Limits of Size of Internal Threads | 137 |
| 18A | Examples of External Screw Threads | 138 |
| 18B | Examples of Internal Screw Threads | 140 |
| 19 | Allowable Variation in 30-deg Basic Half Angle of External and Internal Screw Threads | 145 |
| 20 | Nomenclature | 146 |
| A-1 | Identification of 60-deg Inch Screw Threads Within the Scope of the ASME B1 Committee | 149 |
| D-1 | Limits of Size for Selected Combinations of UNS/UNRS Series Threads | 153 |
| E-1 | Limits of Size for Standard Series Internal and External Threads as Listed in Table 3A of ASME B1.1-1989 | 162 |
| E-2 | Limits as Listed in Table D-1 (Formerly 3B) Prior to ASME B1.1-2003 Edition | 174 |

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 $0.7500H$ to $0.62500H$ 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](#)).

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 (NASAC), 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.

ASME B1 COMMITTEE

Standardization and Unification of Screw Threads

(The following is the roster of the Committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

A. L. Barrows, *Chair*
D. S. George, *Vice Chair*
D. Papert, *Secretary*

STANDARDS COMMITTEE PERSONNEL

| | |
|--|--|
| A. L. Barrows , Swanson Tool Manufacturing, Inc. | D. Miskinis , Consultant |
| K. Bly , Vermont Thread Gage | D. Papert , The American Society of Mechanical Engineers |
| L. Borowski , Greenslade & Co., Inc. | J. R. Popovic , Cleveland Specialty Inspection Services, Inc. |
| H. J. Cox , Frank Cox Metrology, Ltd. | M. W. Rose , Glastonbury Southern Gage |
| G. A. Cuccio , Capitol Manufacturing Co. | P. Larouche , <i>Alternate</i> , Johnson Gage Co. |
| R. Dodge , Pennoyer Dodge Co. | R. J. Hukari , <i>Contributing Member</i> , SPS Technologies |
| D. Everett , National Institute of Standards and Technology | R. P. Knittel , <i>Contributing Member</i> , Consultant |
| J. O. Gehret III , Gehret Gage, LLC | D. R. Oas , <i>Contributing Member</i> , Seaway Bolt & Specials Corp. |
| D. S. George , Michigan Metal Coating | E. Schwartz , <i>Contributing Member</i> , Consultant |
| J. R. Gervasi , Kerr Lakeside, Inc. | B. F. Sheffler , <i>Contributing Member</i> , Consultant |
| P. Holahan , Fastenal Co. | D. Skierski , <i>Contributing Member</i> , Sterling Gage & Calibration, LLC |
| L. C. Johnson , Johnson Gage Co. | R. D. Strong , <i>Contributing Member</i> , Lear Corp. |
| D. D. Katz , Precision Fittings | C. J. Wilson , <i>Contributing Member</i> , Consultant |
| D. R. Maisch , PMC Lone Star | |

SUBCOMMITTEE 1 — UNIFIED SCREW THREADS

| | |
|--|--|
| A. L. Barrows , <i>Chair</i> , Swanson Tool Manufacturing, Inc. | S. Brahimi , <i>Contributing Member</i> , Industrial Fasteners Institute |
| D. Miskinis , <i>Vice Chair</i> , Consultant | M. Cox , <i>Contributing Member</i> , Consultant |
| K. Bly , Vermont Thread Gage | R. J. Hukari , <i>Contributing Member</i> , SPS Technologies |
| L. Borowski , Greenslade & Co., Inc. | J. C. Jennings , <i>Contributing Member</i> , Naval Surface Warfare Center, Philadelphia Division |
| R. Dodge , Pennoyer Dodge Co. | X. Li , <i>Contributing Member</i> , China Productivity Center for Machinery Industry |
| D. S. George , Michigan Metal Coating | E. Schwartz , <i>Contributing Member</i> , Consultant |
| J. R. Gervasi , Kerr Lakeside, Inc. | B. F. Sheffler , <i>Contributing Member</i> , Consultant |
| P. Holahan , Fastenal Co. | R. D. Strong , <i>Contributing Member</i> , Lear Corp. |
| L. C. Johnson , Johnson Gage Co. | C. J. Wilson , <i>Contributing Member</i> , Consultant |
| P. Larouche , Johnson Gage Co. | |
| M. Oliver , M. Oliver Consulting | |

CORRESPONDENCE WITH THE B1 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B1 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
<http://go.asme.org/Inquiry>

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

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.

Proposing a Case. Cases may be issued to provide alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Attending Committee Meetings. The B1 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B1 Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at <http://go.asme.org/B1committee>.

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 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.

1.4.2 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](#).

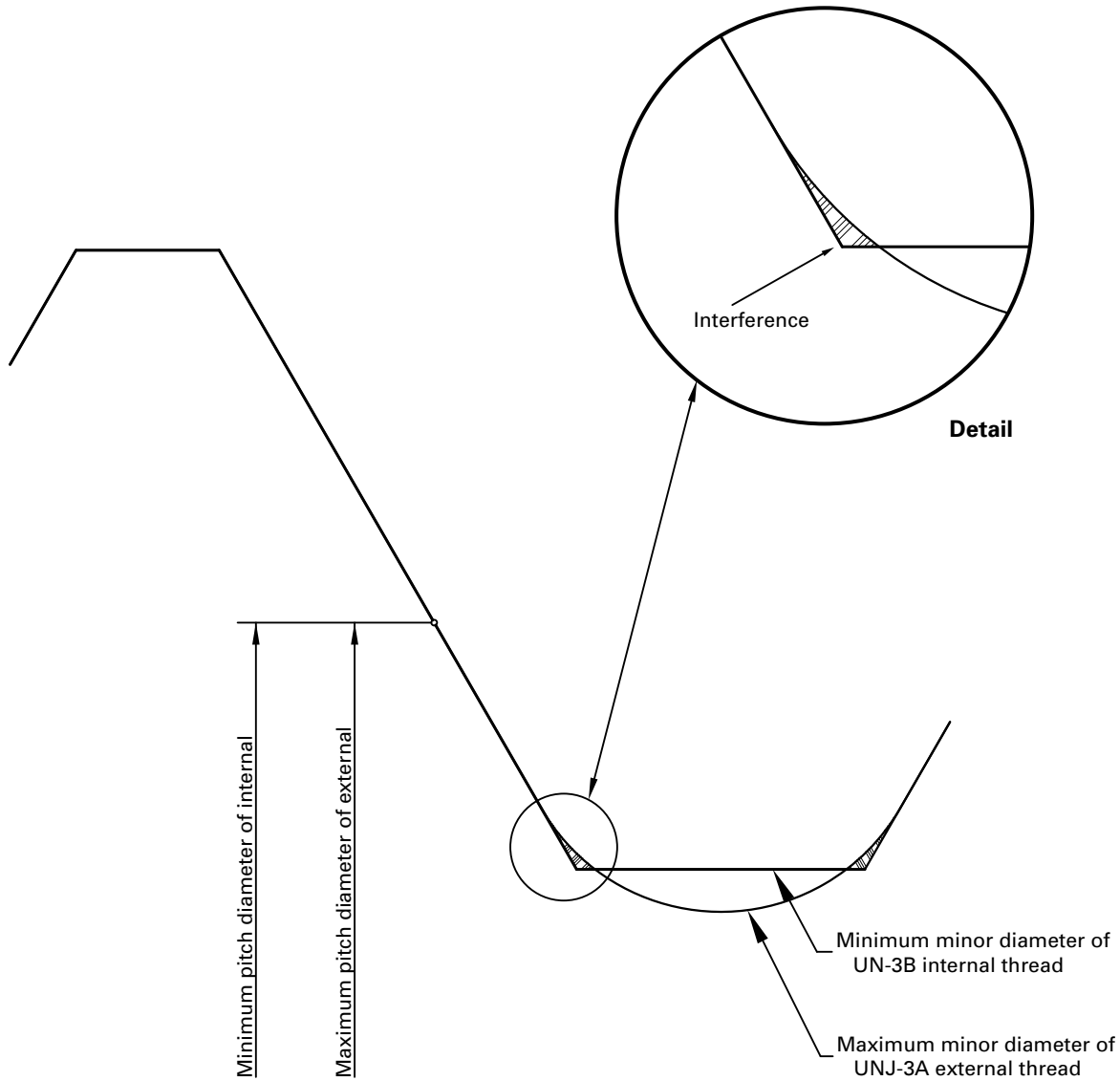
1.6 References

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

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



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)

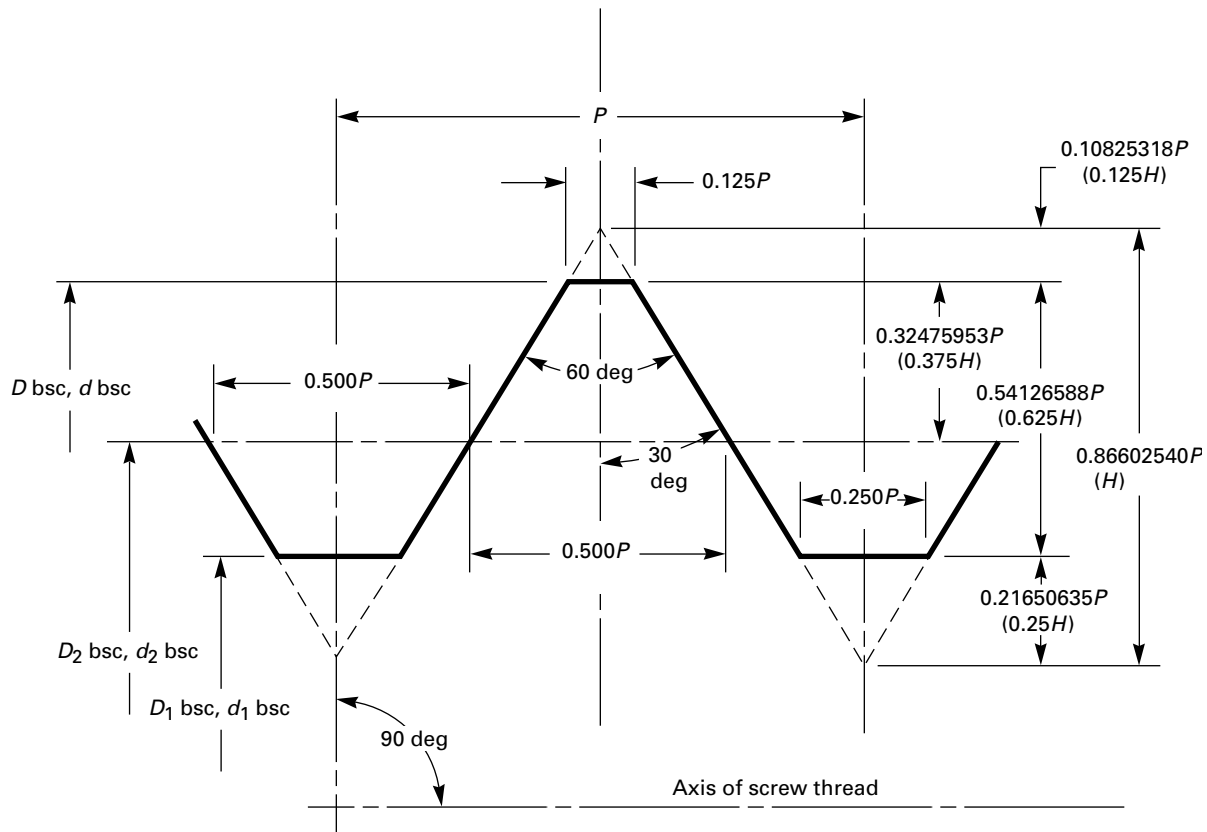
1.7 Acceptability

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



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.

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 $0.2500P$ 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 $0.10825318P$. 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 $0.14433757P$, which makes the point of tangency between the radius and the flanks at a point $0.54126588P$ below the basic major diameter (the equivalent of a $0.2500P$ width of flat).

(2) a “rounded form” consisting of a combination of flats and radii not less than $0.10825318P$, as shown in [Figures 7 and 8](#). When the root is the rounded form, the radii may exceed $0.14433757P$ so long as the point of tangency between the radii and the flanks is no less than $0.54126588P$ below the basic major diameter (the equivalent of a $0.2500P$ 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 $0.12500P$ 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 $0.15011107P$ and which is tangent to the thread flanks at not less than $0.48713929P$ 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 $0.12500P$ 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.)

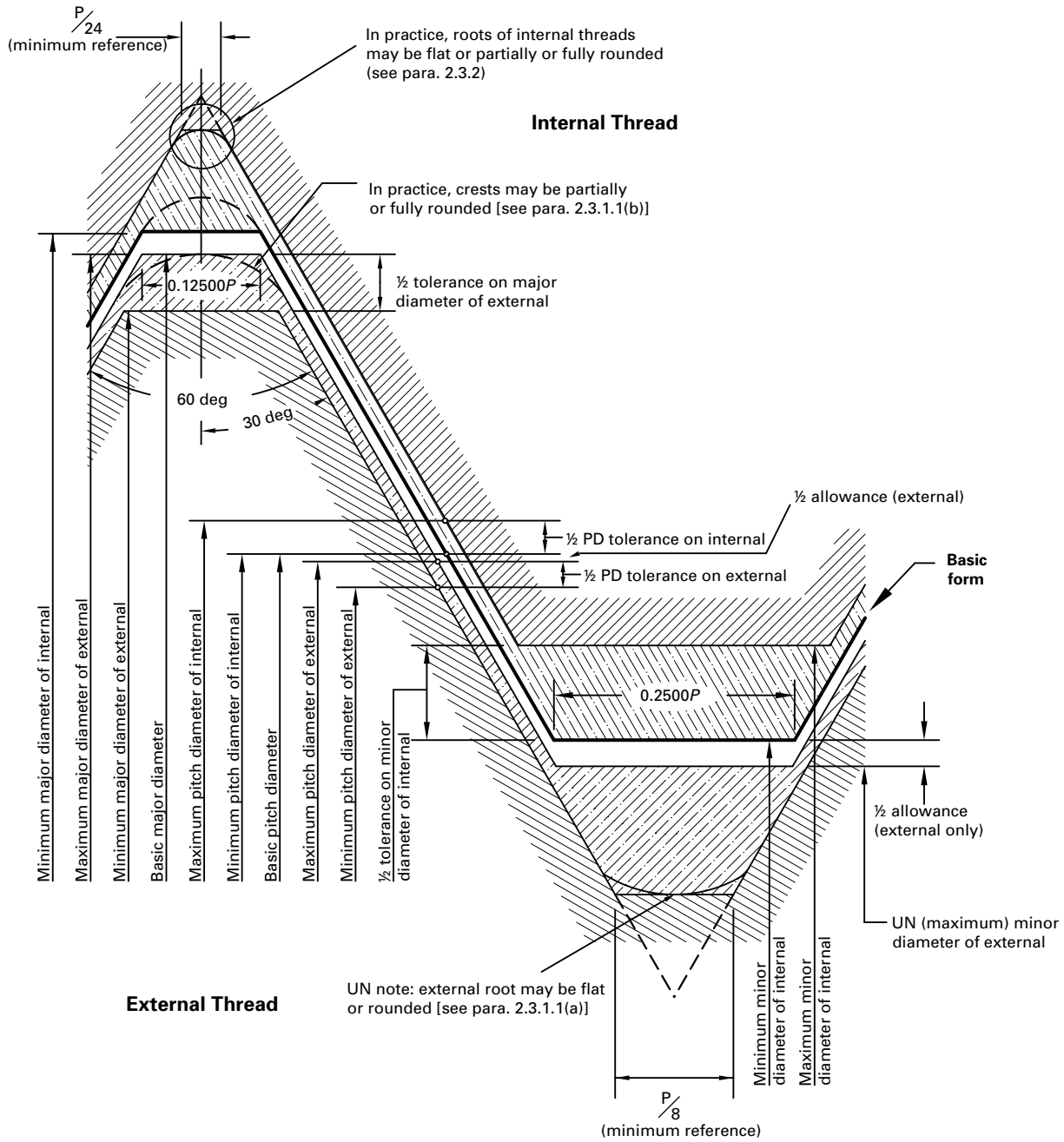
3.2 Order of Selection

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

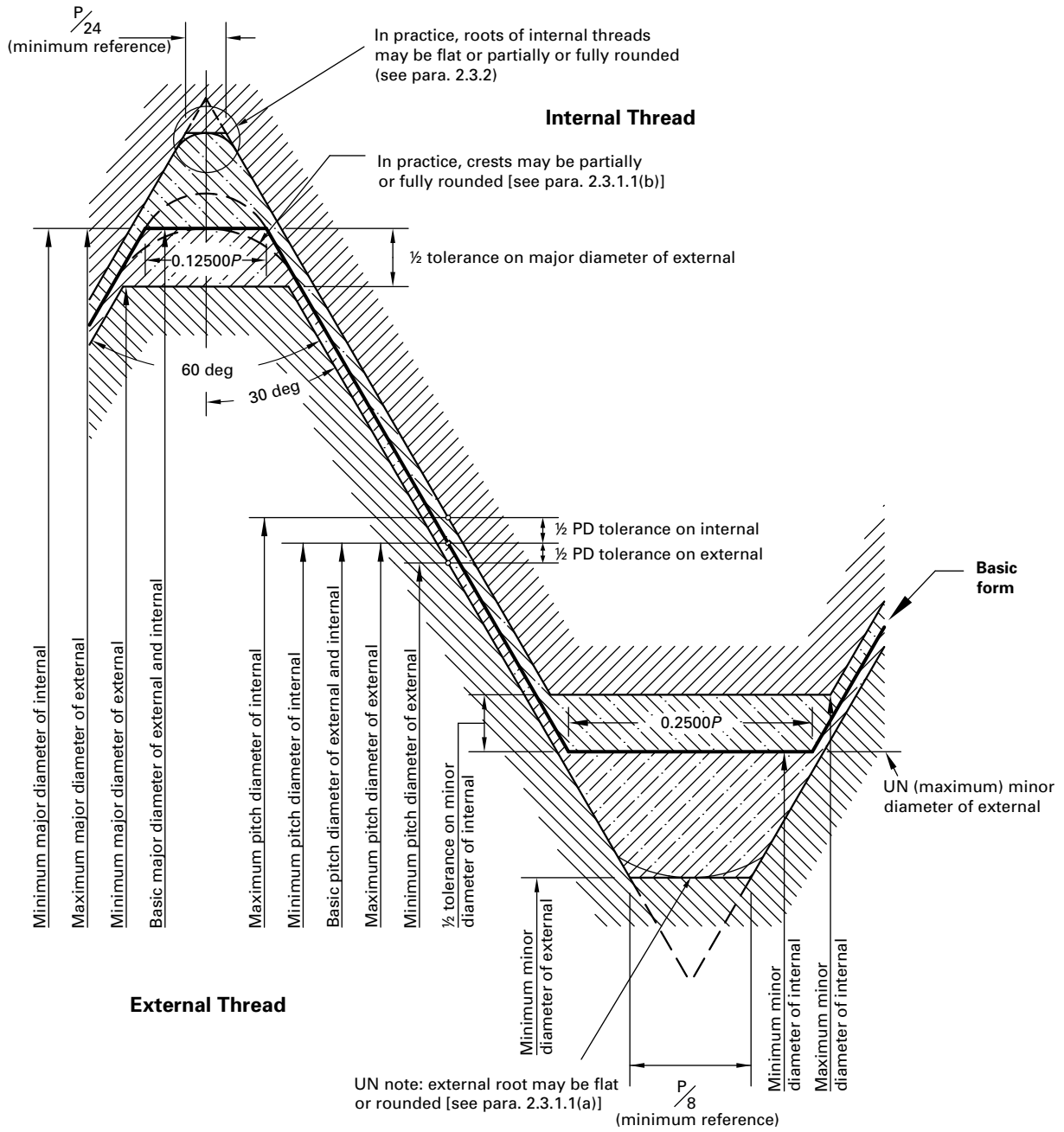
The coarse-thread series (UNC, UNRC, or UNJC) is generally used for the bulk production of screws, bolts, and nuts. It is commonly used in materials such as cast iron, aluminum, magnesium, brass, bronze, and plastic, because the coarse-thread series provides more resistance to internal thread stripping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

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



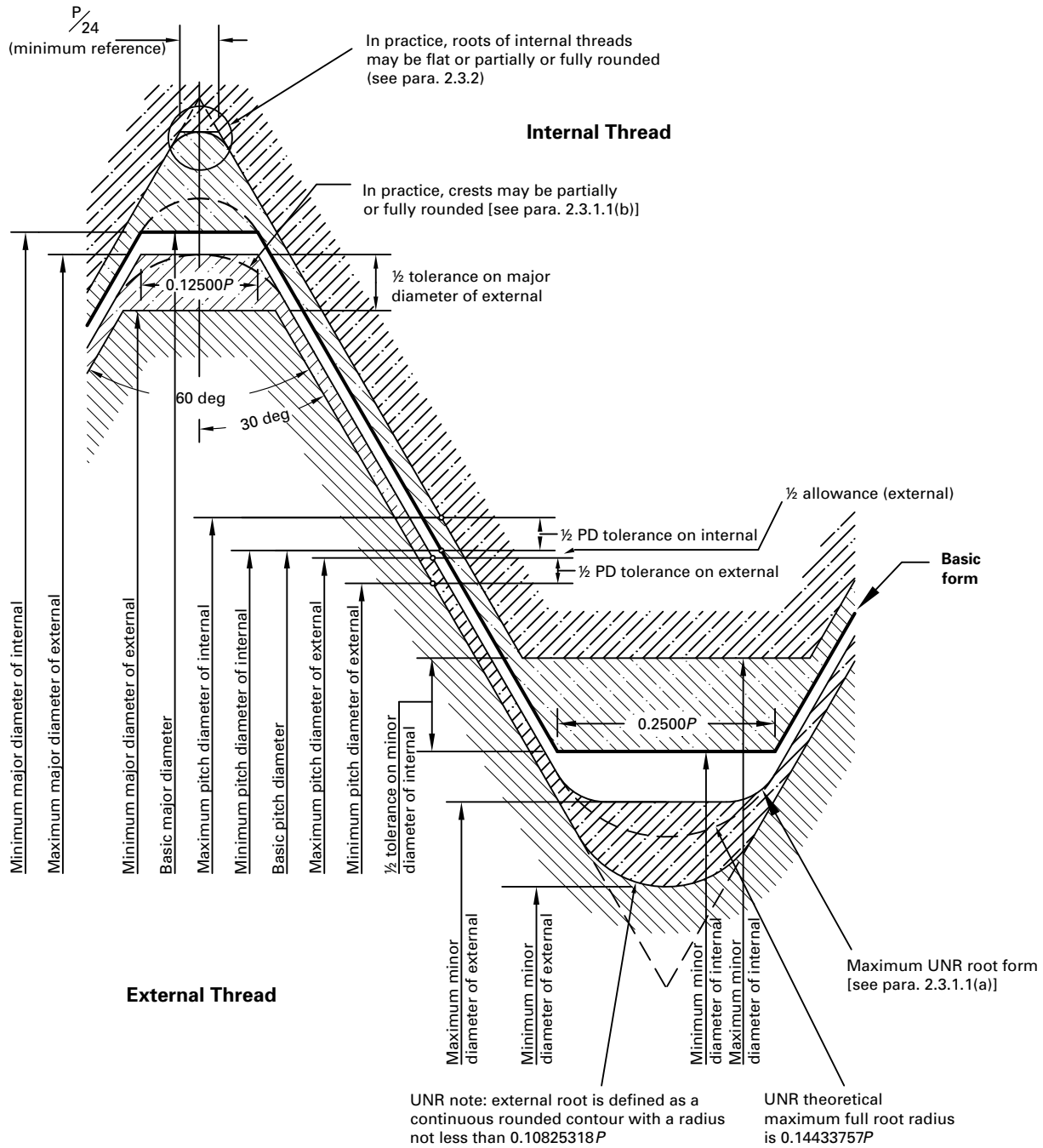
GENERAL NOTE: Lead and angle tolerances are defined in section 9.

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



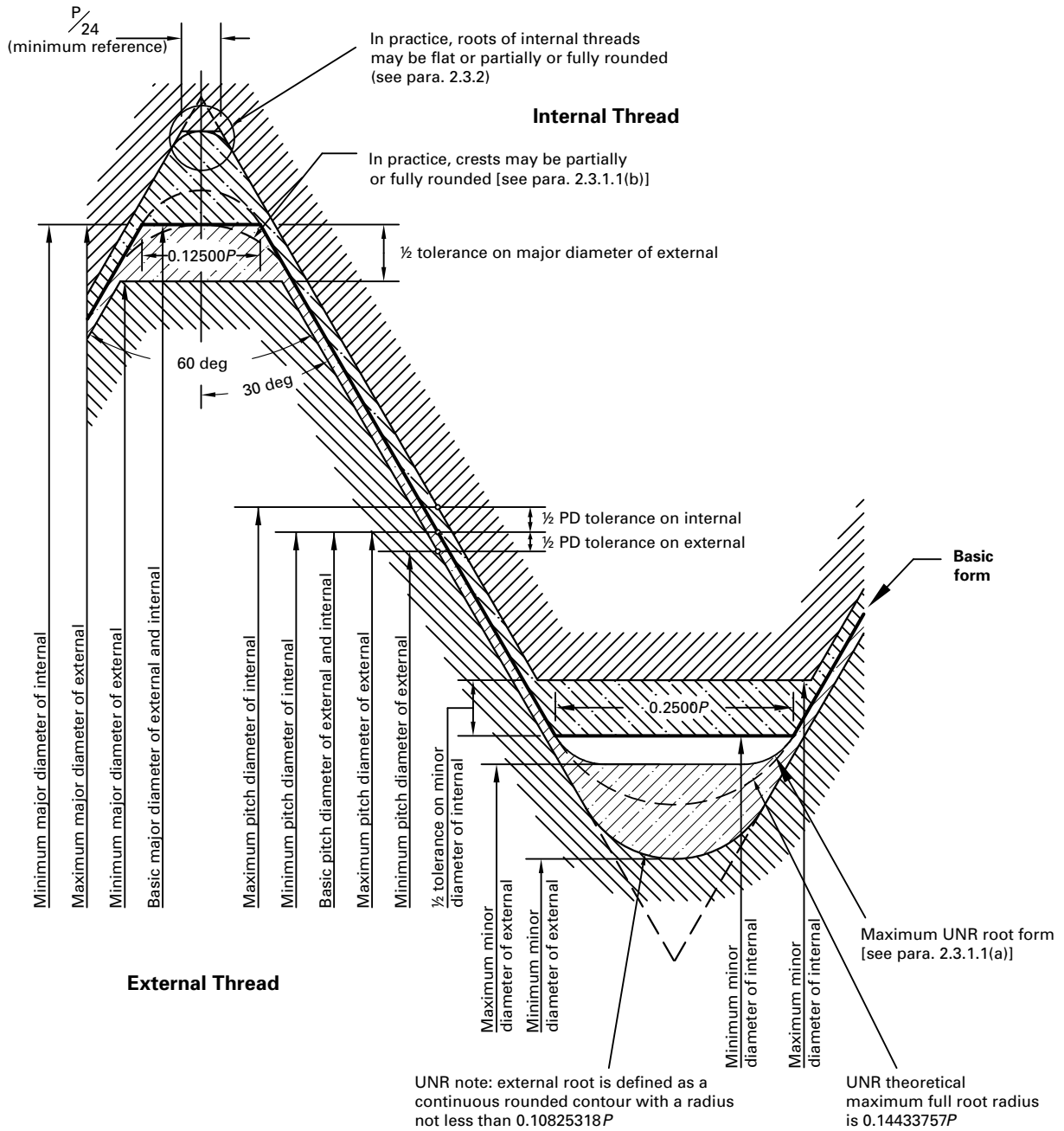
GENERAL NOTE: Lead and angle tolerances are defined in [section 9](#).

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



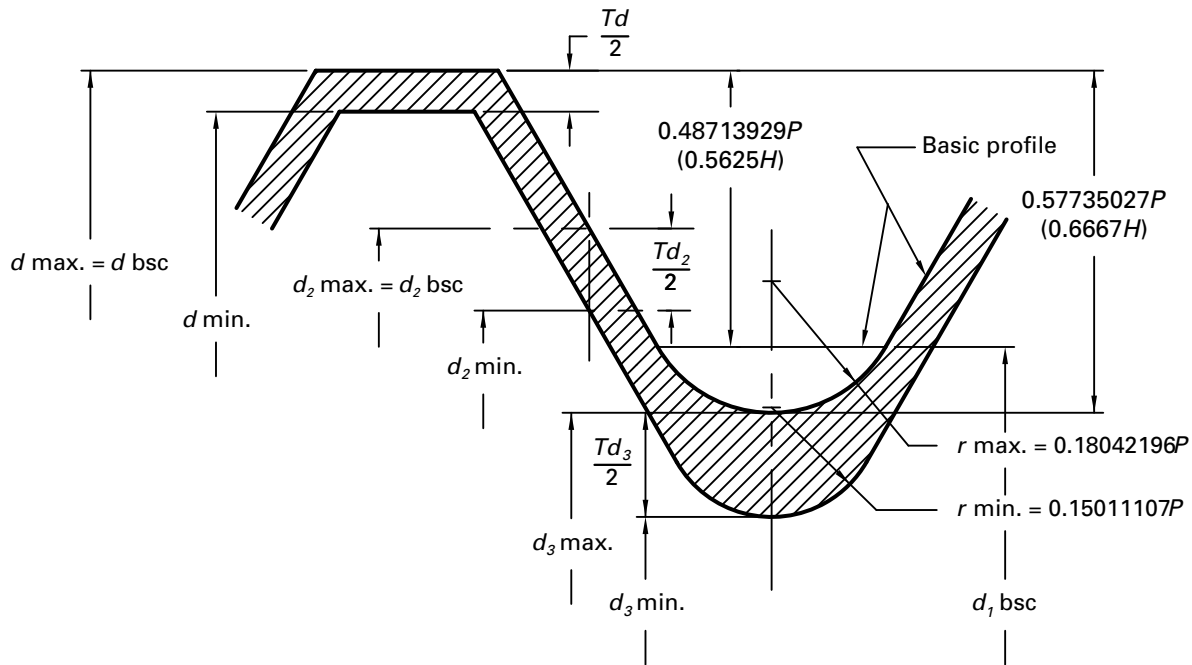
GENERAL NOTE: Lead and angle tolerances are defined in [section 9](#).

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



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

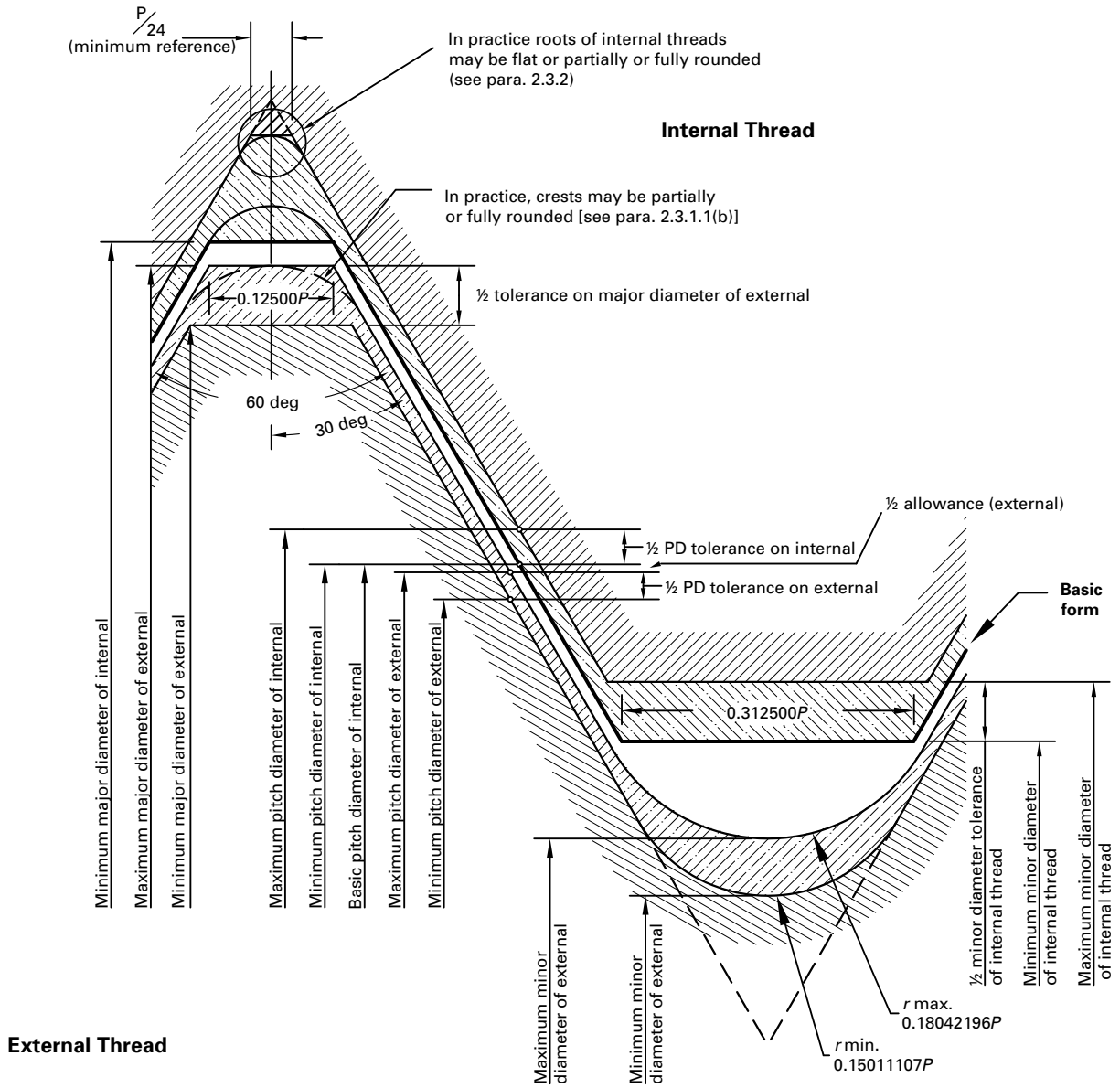
The various constant-pitch series (UN, UNR, or UNJ) with 4, 6, 8, 12, 16, 20, 28, and 32 threads per inch (see Table 1) offers a comprehensive range of diameter-pitch combinations for those purposes where the threads in the coarse-, fine-, and extra-fine-thread series do not meet the particular requirements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

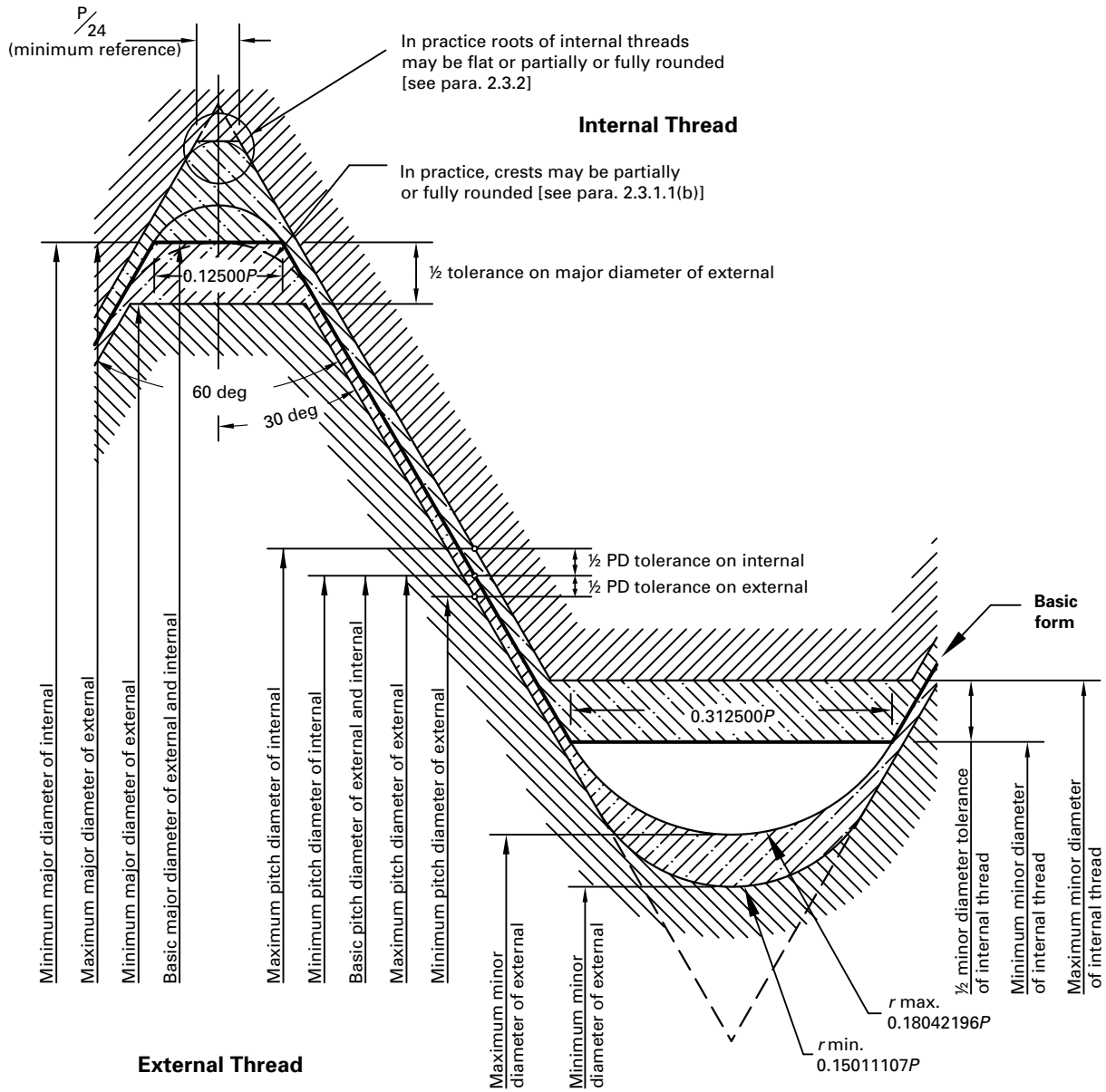
3.6.2 12-Thread Series. The 12-thread series (12-UN) is a uniform-pitch series for large diameters requiring threads of medium-fine pitch. Although originally intended for boiler practice, it is now used as a continuation of the fine-thread series for diameters larger than 1½ in.

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](#).

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.

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 | 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 | |
| ... | 11/16 | 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 | |
| ... | 13/16 | 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 | |
| ... | 15/16 | 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 | |
| ... | 17/16 | 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 | |
| ... | 19/16 | 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 | |
| ... | 111/16 | 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 | |
| ... | 113/16 | 1.8125 | ... | ... | ... | ... | 6 | 8 | 12 | 16 | 20 | ... | ... | 1 13/16 | |
| 1 7/8 | ... | 1.8750 | ... | ... | ... | ... | 6 | 8 | 12 | 16 | 20 | ... | ... | 1 7/8 | |
| ... | 115/16 | 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 | |

Copyrighted material. Licensed to University of Toronto by Clarivate Analytics (US) LLC, subscription: techstreet.com, downloaded on 2020-08-15 07:29:54 +0000 by University of Toronto User. No further reproduction or distribution is permitted.

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

| 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 | |
| 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.

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

| Nominal Size and Threads/in. | Series Designation | Class [Note (1)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|--------------------|------------------|------------|--------------------------|-----------------|---|-----------------|---|-------------------------------|--------|--------|----------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| (8) 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 |
| | | 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 |
| | | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|--------------------|------------------|------------|--------------------------|-----------------|---|-----------------|---|-------------------------------|--------|--------|----------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | 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) 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 |
| | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|------------------------------|--------------------|------------------|------------|--------------------------|-----------------|--|-----------------|--|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | | | | | Max. | Min. | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|------------------------------|--------------------|------------------|------------|--------------------------|-----------------|--|-----------------|--|-------------------------------|--------|----------|--------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| (8) 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| (8) 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|--------|--|--------|--|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. | Min. | 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 | ... | ... | ... | ... |
| | 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 |
| | | 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 |
| | | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|---|------------------|------------|--------------------------|--------|---|--------|---|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | | | | | Max. | Min. | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|------------------------------|---|------------------|------------|--------------------------|-----------------|--|-----------------|--|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Max. | Min. | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|---|------------------|------------|---|--------|---|--------|---|-------------------------------|--------|--------|----------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | |
| | | | | Tolerance, <i>T_{d2}</i> [Note (5)] | Max. | Min. | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 / ₁₆ - 8 or 1.0625 - 8 | UN | 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 / ₁₆ - 12 or 1.0625 - 12 | UN | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|--|------------------|------------|--------------------------|-----------------|---|-----------------|---|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Max. | Min. | 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 ¹ / ₁₆ - 16 or 1.0625 - 16 | UN | 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 ¹ / ₁₆ - 18 or 1.0625 - 18 | UNEF | 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 ¹ / ₁₆ - 20 or 1.0625 - 20 | UN | 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 ¹ / ₁₆ - 28 or 1.0625 - 28 | UN | 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 ¹ / ₈ - 7 or 1.1250 - 7 | UNC | 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 ¹ / ₈ - 8 or 1.1250 - 8 | UN | 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 ¹ / ₈ - 12 or 1.1250 - 12 | UNF | 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 ¹ / ₈ - 16 or 1.1250 - 16 | UN | 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 ¹ / ₈ - 18 or 1.1250 - 18 | UNEF | 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 ¹ / ₈ - 20 or 1.1250 - 20 | UN | 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 ¹ / ₈ - 28 or 1.1250 - 28 | UN | 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 ³ / ₁₆ - 8 or 1.1875 - 8 | UN | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|------------------------------|----------------------------|------------------|------------|--------------------------|--------|--|--------|--|----------|-------------------------------|--------|-----------------|------|-----------------|--------|-----------------|--------|-----------------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] |
| | 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 3/16 - 12 or 1.1875 - 12 | UN | 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 3/16 - 16 or 1.1875 - 16 | UN | 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 3/16 - 18 or 1.1875 - 18 | UNEF | 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 3/16 - 20 or 1.1875 - 20 | UN | 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 3/16 - 28 or 1.1875 - 28 | UN | 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 1/4 - 7 or 1.2500 - 7 | UNC | 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 1/4 - 8 or 1.2500 - 8 | UN | 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 1/4 - 12 or 1.2500 - 12 | UNF | 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 1/4 - 16 or 1.2500 - 16 | UN | 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 1/4 - 18 or 1.2500 - 18 | UNEF | 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 1/4 - 20 or 1.2500 - 20 | UN | 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 1/4 - 28 or 1.2500 - 28 | UN | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|--|------------------|------------|--------------------------|-----------------|---|--------|---|-------------------------------|--------|----------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | UNJ | | | | | | | |
| | | | | Min. | Min. [Note (3)] | Min. | Min. | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| 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 ⁵ / ₁₆ - 8 or 1.3125 - 8 | UN | 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 ⁵ / ₁₆ - 12 or 1.3125 - 12 | UN | 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 |
| | 1 ⁵ / ₁₆ - 16 or 1.3125 - 16 | UN | 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 |
| | 1 ⁵ / ₁₆ - 18 or 1.3125 - 18 | UNEF | 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 ⁵ / ₁₆ - 20 or 1.3125 - 20 | UN | 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 |
| | 1 ⁵ / ₁₆ - 28 or 1.3125 - 28 | UN | 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 ³ / ₈ - 6 or 1.3750 - 6 | UNC | 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 ³ / ₈ - 8 or 1.3750 - 8 | UN | 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 ³ / ₈ - 12 or 1.3750 - 12 | UNF | 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 |
| | 1 ³ / ₈ - 16 or 1.3750 - 16 | UN | 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 |
| | 1 ³ / ₈ - 18 or 1.3750 - 18 | UNEF | 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 ³ / ₈ - 20 or 1.3750 - 20 | UN | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|--|--------------------|------------------|------------|--------------------------|--------|---|--------|---|----------|---|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance, <i>T_{d2}</i> [Note (5)] | Max. | Min. | 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) 1 ³ / ₈ - 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 |
| 1 ⁷ / 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 |
| 1 ⁷ / 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 |
| 1 ⁷ / 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) 1 ⁷ / 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) 1 ⁷ / 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) 1 ⁷ / 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) 1 ⁷ / 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 |
| 1 ¹ / ₂ - 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 |
| 1 ¹ / ₂ - 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 |
| 1 ¹ / ₂ - 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) 1 ¹ / ₂ - 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|------------------------|------------------|------------|--------------------------|-----------------|---|-----------------|---|-------------------------------|--------|----------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| 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) | 1½ - 18 or 1.5000 - 18 | UNEF | 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 |
| | 1½ - 20 or 1.5000 - 20 | UN | 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 |
| | 1½ - 28 or 1.5000 - 28 | UN | 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 |
| | 1⅞ - 6 or 1.5625 - 6 | UN | 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 |
| | 1⅞ - 8 or 1.5625 - 8 | UN | 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) | 1⅞ - 12 or 1.5625 - 12 | UN | 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 |
| | 1⅞ - 16 or 1.5625 - 16 | UN | 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 |
| | 1⅞ - 18 or 1.5625 - 18 | UNEF | 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 |
| | 1⅞ - 20 or 1.5625 - 20 | UN | 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 |
| | 1⅝ - 6 or 1.6250 - 6 | UN | 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 |
| | 1⅝ - 8 or 1.6250 - 8 | UN | 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) | 1⅝ - 12 or 1.6250 - 12 | UN | 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) | 1⅝ - 16 or 1.6250 - 16 | UN | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|--------|---|--------|---|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---------------------------------|--------------------|------------------|------------|---|--------|---|-------------------------------------|---|----------|----------|--------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | UNJ | | | | | | | |
| | | | | Tolerance, <i>T_{d2}</i> [Note (5)] | Max. | Min. | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| (8) 1 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 |
| | | 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 |
| (8) 1 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 |
| (8) 1 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 |
| | | 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 |
| (8) 1 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 |
| (8) 1 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 | 1.7740 | ... | 0.0120 | 0.0090 | 1.7770 | 1.7660 | 0.0150 | 0.0125 |
| | | 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 |
| (8) 1 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 |
| | | 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 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 |
| | | 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 5/16 - 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 |
| | | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|--------|--|--------|--|-------------------------------|--------|--------|----------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | 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 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 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 |
| (8) 1 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 |
| | 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 |
| (8) 1 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 |
| | 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 |
| (8) 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 |
| | 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 |
| (8) 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 |
| | 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|-----------------|---|-----------------|---|-------------------------------|--------|----------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|-----------------|---|-----------------|---|-------------------------------|--------|----------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| (8) 2 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|--------|---|--------|---|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. | Min. | 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|-------------------------------|--------------------|------------------|------------|---|--------|--|--------|--|----------|-------------------------------|--------|--------|------|----------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | | Reference Diameter [Note (6)] | | Radius | | Diameter | | Radius | | | |
| | | | | Tolerance, <i>T</i> _{d₂} [Note (5)] | Max. | Min. | Max. | Min. | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| (8) 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |

34

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|--------------------|------------------|------------|--------------------------|-----------------|---|--------|---|----------|--------|--------|--------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Reference Diameter [Notes (6), (7)] | | UNR | | UNJ | | | | | | | |
| | | | | Min. | Min. [Note (3)] | Max. [Note (2)] | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | | | |
|------------------------------|---|------------------|------------|--------------------------|--------|---|--------|---|-------------------------------|----------|----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | | | |
| | | | | | | | | | | 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 | | |
| (8) | 3 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 | |
| | 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 | | |
| (8) | 3 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 | | |
| (8) | 3 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 | | |
| (8) | 3 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 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 | | |
| (8) | 3 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 | |
| | 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 | | |
| (8) | 3 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 | | |
| (8) | 3 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 | | |
| (8) | 3 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 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 | |
| | 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 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 | |
| | 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 | | |
| (8) | 3 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 | | |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|-----------------|--|-----------------|--|-------------------------------|--------|----------|--------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | | | | |
| 3 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 | ... | ... | ... | ... |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| (8) 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |
| | | 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | | | |
|------------------------------|---|------------------|------------|--------------------------|--------|---|---|-------------------------------|-----------------|----------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | | | | Max. [Note (2)] | Min. | | UN | | UNR | | | | UNJ | | | | | | | |
| | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | | | |
| | | | | Max. [Note (2)] | Min. | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Max. [Note (2)] |
| | 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 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d</i> ₂ , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d</i> ₁ /Root Radius | | | | | | | | | | | |
|------------------------------|------------------------|------------------|------------|--------------------------|-----------------|--|-----------------|--|-------------------------------|--------|----------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| 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 |
| | 4½ - 8 or 4.5000 - 8 | UN | 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) | 4½ - 12 or 4.5000 - 12 | UN | 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) | 4½ - 16 or 4.5000 - 16 | UN | 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 |
| | 4⅝ - 4 or 4.6250 - 4 | UN | 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 |
| | 4⅝ - 6 or 4.6250 - 6 | UN | 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) | 4⅝ - 8 or 4.6250 - 8 | UN | 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) | 4⅝ - 12 or 4.6250 - 12 | UN | 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) | 4⅝ - 16 or 4.6250 - 16 | UN | 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 |
| | 4¾ - 4 or 4.7500 - 4 | UNC | 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 |
| | 4¾ - 6 or 4.7500 - 6 | UN | 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 |
| | 4¾ - 8 or 4.7500 - 8 | UN | 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 |
| (8) | 4¾ - 12 or 4.7500 - 12 | UN | 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) | 4¾ - 16 or 4.7500 - 16 | UN | 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|--------|---|--------|---|-------------------------------|--------|--------|----------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | UN | | UNR | | | | UNJ | | | | | |
| | | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | |
| | | | | | | | | | | 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|---|--------------------|------------------|------------|--------------------------|-----------------|---|--------|---|----------|--------|--------|--------|------|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Reference Diameter [Notes (6), (7)] | | UNR | | UNJ | | | | | | | |
| | | | | Min. | Min. [Note (3)] | Min. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | | |
| | 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 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | | | |
|------------------------------|--------------------|------------------|------------|--------------------------|--------|---|---|-------------------------------|---|--------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| | | | | Max. [Note (2)] | Min. | | UN | | UNR | | | | UNJ | | | | | | | |
| | | | | | | | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | | Diameter | | Radius | | | | | | | |
| | | | | Max. [Note (2)] | Min. | | Max. [Note (2)] | Min. | Tolerance, <i>Td₂</i> [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 | |

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)] | Allowances | Major Diameter, <i>d</i> | | Pitch Diameter, <i>d₂</i> , and Functional Diameter [Note (4)] | | Minor Diameter, <i>d₁</i> /Root Radius | | | | | | | | | | | |
|------------------------------|---|------------------|------------|--------------------------|-----------------|---|-----------------|---|-------------------------------|--------|----------|--------|-----|--------|--------|--------|--------|--------|--------|
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | UN | | UNR | | UNJ | | | | | | | |
| | | | | Max. [Note (2)] | Min. [Note (3)] | Max. [Note (2)] | Min. [Note (3)] | Reference Diameter [Notes (6), (7)] | Reference Diameter [Note (6)] | Radius | Diameter | Radius | | | | | | | |
| 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 ³ / ₄ - 16 or 5.7500 - 16 | UN | 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 ⁷ / ₈ - 4 or 5.8750 - 4 | UN | 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 ⁷ / ₈ - 6 or 5.8750 - 6 | UN | 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 ⁷ / ₈ - 8 or 5.8750 - 8 | UN | 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 ⁷ / ₈ - 12 or 5.8750 - 12 | UN | 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 ⁷ / ₈ - 16 or 5.8750 - 16 | UN | 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 | 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 | 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 | 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 | 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 | 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.

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.

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 | | | | | |
|------------------------------|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 |
| | | 3B | 0.1380 | ... | 0.1218 | 0.1243 | 0.0025 | 0.1110 | 0.1186 | ... | ... | 0.1136 | 0.1201 |
| (6) 8 - 32 or 0.1640 - 32 | UNC | 2B | 0.1640 | ... | 0.1437 | 0.1475 | 0.0038 | 0.130 | 0.139 | ... | ... | 0.134 | 0.142 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 3B | 0.2160 | ... | 0.1957 | 0.1988 | 0.0031 | 0.1820 | 0.1895 | ... | ... | 0.1856 | 0.1929 |
| 1/4 - 20 or 0.2500 - 20 | UNC | 1B | 0.2500 | ... | 0.2175 | 0.2248 | 0.0073 | 0.196 | 0.207 | ... | ... | ... | ... |
| | | 2B | 0.2500 | ... | 0.2175 | 0.2224 | 0.0049 | 0.196 | 0.207 | ... | ... | 0.201 | 0.212 |
| | | 3B | 0.2500 | ... | 0.2175 | 0.2211 | 0.0036 | 0.1960 | 0.2067 | ... | ... | 0.2013 | 0.2121 |
| 1/4 - 28 or 0.2500 - 28 | UNF | 1B | 0.2500 | ... | 0.2268 | 0.2333 | 0.0065 | 0.211 | 0.220 | ... | ... | ... | ... |
| | | 2B | 0.2500 | ... | 0.2268 | 0.2311 | 0.0043 | 0.211 | 0.220 | ... | ... | 0.215 | 0.223 |
| | | 3B | 0.2500 | ... | 0.2268 | 0.2300 | 0.0032 | 0.2110 | 0.2190 | ... | ... | 0.2152 | 0.2229 |
| 1/4 - 32 or 0.2500 - 32 | UNEF | 2B | 0.2500 | ... | 0.2297 | 0.2339 | 0.0042 | 0.216 | 0.224 | ... | ... | 0.220 | 0.226 |
| | | 3B | 0.2500 | ... | 0.2297 | 0.2328 | 0.0031 | 0.2160 | 0.2229 | ... | ... | 0.2196 | 0.2263 |

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 | | | | | |
|--|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 | ... | ... | ... | ... |
| | | 2B | 0.4375 | ... | 0.3911 | 0.3972 | 0.0061 | 0.360 | 0.376 | ... | ... | 0.368 | 0.379 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 2B | 0.4375 | ... | 0.4050 | 0.4104 | 0.0054 | 0.383 | 0.395 | ... | ... | 0.389 | 0.397 |
| | | 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 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 2B | 0.5000 | ... | 0.4500 | 0.4565 | 0.0065 | 0.417 | 0.434 | ... | ... | 0.425 | 0.437 |
| | | 3B | 0.5000 | ... | 0.4500 | 0.4548 | 0.0048 | 0.4170 | 0.4284 | ... | ... | 0.4251 | 0.4368 |
| (6) 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 |
| | | 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 | ... | ... | ... | ... |
| | | 2B | 0.5000 | ... | 0.4675 | 0.4731 | 0.0056 | 0.446 | 0.457 | ... | ... | 0.451 | 0.459 |
| | | 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 |
| | | 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 |
| | | 3B | 0.5000 | ... | 0.4797 | 0.4831 | 0.0034 | 0.4660 | 0.4719 | ... | ... | 0.4696 | 0.4744 |

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 | | | | | |
|--|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| $\frac{9}{16}$ - 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 |
| (6) $\frac{9}{16}$ - 16 or 0.5625 - 16 | UN | 2B | 0.5625 | ... | 0.5219 | 0.5280 | 0.0061 | 0.495 | 0.509 | ... | ... | 0.502 | 0.511 |
| | 16 | 3B | 0.5625 | ... | 0.5219 | 0.5265 | 0.0046 | 0.4950 | 0.5040 | ... | ... | 0.5016 | 0.5108 |
| $\frac{9}{16}$ - 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) $\frac{9}{16}$ - 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) $\frac{9}{16}$ - 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 |
| $\frac{9}{16}$ - 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) $\frac{9}{16}$ - 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) $\frac{5}{8}$ - 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 |
| | (6) 11 | 3B | 0.6250 | ... | 0.5660 | 0.5714 | 0.0054 | 0.5270 | 0.5391 | ... | ... | 0.5364 | 0.5473 |
| $\frac{5}{8}$ - 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 |
| $\frac{5}{8}$ - 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 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|-------------------------------|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 | ... | ... | ... | ... |
| | | 2B | 0.6250 | ... | 0.5889 | 0.5949 | 0.0060 | 0.565 | 0.578 | ... | ... | 0.571 | 0.579 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 3B | 0.6875 | ... | 0.6604 | 0.6643 | 0.0039 | 0.6420 | 0.6494 | ... | ... | 0.6469 | 0.6527 |
| (6) 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 |
| | | 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 |
| | | 3B | 0.6875 | ... | 0.6672 | 0.6707 | 0.0035 | 0.6540 | 0.6594 | ... | ... | 0.6571 | 0.6614 |

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

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|---|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 | ... | ... | ... | ... |
| | | 2B | 0.8750 | ... | 0.8028 | 0.8110 | 0.0082 | 0.755 | 0.778 | ... | ... | 0.767 | 0.780 |
| | | 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 |
| | | 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 | ... | ... | ... | ... |
| | | 2B | 0.8750 | ... | 0.8286 | 0.8356 | 0.0070 | 0.798 | 0.813 | ... | ... | 0.805 | 0.815 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 3B | 0.9375 | ... | 0.8969 | 0.9017 | 0.0048 | 0.8700 | 0.8783 | ... | ... | 0.8766 | 0.8851 |
| (6) $\frac{15}{16}$ - 20 or 0.9375 - 20 | UNEF | 2B | 0.9375 | ... | 0.9050 | 0.9109 | 0.0059 | 0.883 | 0.895 | ... | ... | 0.889 | 0.896 |
| | | 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 |
| | | 3B | 0.9375 | ... | 0.9143 | 0.9181 | 0.0038 | 0.8990 | 0.9051 | ... | ... | 0.9027 | 0.9075 |

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 | | | | | | |
|--|-----------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | | |
| | | | | | | | | 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 | |
| | | 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 | ... | ... | ... | ... | |
| | | 2B | 1.0000 | ... | 0.9188 | 0.9276 | 0.0088 | 0.865 | 0.890 | ... | ... | 0.878 | 0.893 | |
| | | 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 | ... | ... | ... | ... | |
| | | 2B | 1.0000 | ... | 0.9459 | 0.9535 | 0.0076 | 0.910 | 0.928 | ... | ... | 0.919 | 0.929 | |
| | | 3B | 1.0000 | ... | 0.9459 | 0.9516 | 0.0057 | 0.9100 | 0.9198 | ... | ... | 0.9188 | 0.9288 | |
| (6), (7) (6) | 1 - 14 or 1.0000 - 14 | UNS | 2B | 1.0000 | ... | 0.9536 | 0.9605 | 0.0069 | 0.923 | 0.938 | ... | ... | 0.930 | 0.940 |
| | | | 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 | |
| | | 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 | |
| | | 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 | |
| | | 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 | |
| | | 3B | 1.0000 | ... | 0.9797 | 0.9834 | 0.0037 | 0.9660 | 0.9719 | ... | ... | 0.9696 | 0.9738 | |
| $1\frac{1}{16}$ - 8 or 1.0625 - 8 | UN | 2B | 1.0625 | ... | 0.9813 | 0.9902 | 0.0089 | 0.927 | 0.952 | ... | ... | 0.941 | 0.956 | |
| | | 3B | 1.0625 | ... | 0.9813 | 0.9880 | 0.0067 | 0.9270 | 0.9422 | ... | ... | 0.9407 | 0.9557 | |
| (6) $1\frac{1}{16}$ - 12 or 1.0625 - 12 | UN | 2B | 1.0625 | ... | 1.0084 | 1.0158 | 0.0074 | 0.972 | 0.990 | ... | ... | 0.981 | 0.991 | |
| | | 3B | 1.0625 | ... | 1.0084 | 1.0139 | 0.0055 | 0.9720 | 0.9823 | ... | ... | 0.9813 | 0.9913 | |
| (6) $1\frac{1}{16}$ - 16 or 1.0625 - 16 | UN | 2B | 1.0625 | ... | 1.0219 | 1.0284 | 0.0065 | 0.995 | 1.009 | ... | ... | 1.002 | 1.010 | |
| | | 3B | 1.0625 | ... | 1.0219 | 1.0268 | 0.0049 | 0.9950 | 1.0033 | ... | ... | 1.0016 | 1.0101 | |
| (6) $1\frac{1}{16}$ - 18 or 1.0625 - 18 | UNEF | 2B | 1.0625 | ... | 1.0264 | 1.0326 | 0.0062 | 1.002 | 1.015 | ... | ... | 1.008 | 1.016 | |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|--|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 ¹ / ₁₆ - 20 or 1.0625 - 20 | UN | 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 ¹ / ₁₆ - 28 or 1.0625 - 28 | UN | 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 ¹ / ₈ - 7 or 1.1250 - 7 | UNC | 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 ¹ / ₈ - 8 or 1.1250 - 8 | UN | 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 ¹ / ₈ - 12 or 1.1250 - 12 | UNF | 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 ¹ / ₈ - 16 or 1.1250 - 16 | UN | 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 ¹ / ₈ - 18 or 1.1250 - 18 | UNEF | 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 ¹ / ₈ - 20 or 1.1250 - 20 | UN | 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 ¹ / ₈ - 28 or 1.1250 - 28 | UN | 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 ³ / ₁₆ - 8 or 1.1875 - 8 | UN | 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 ³ / ₁₆ - 12 or 1.1875 - 12 | UN | 1.1875 | ... | 1.1334 | 1.1409 | 0.0075 | 1.097 | 1.115 | ... | ... | 1.106 | 1.116 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|--|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 |
| (6) | 1 ³ / ₁₆ - 16 or 1.1875 - 16 | UN | 1.1875 | ... | 1.1469 | 1.1535 | 0.0066 | 1.120 | 1.134 | ... | ... | 1.127 | 1.135 |
| | 16 | 3B | 1.1875 | ... | 1.1469 | 1.1518 | 0.0049 | 1.1200 | 1.1283 | ... | ... | 1.1266 | 1.1351 |
| (6) | 1 ³ / ₁₆ - 18 or 1.1875 - 18 | UNEF | 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 ³ / ₁₆ - 20 or 1.1875 - 20 | UN | 1.1875 | ... | 1.1550 | 1.1610 | 0.0060 | 1.133 | 1.145 | ... | ... | 1.139 | 1.146 |
| | 20 | 3B | 1.1875 | ... | 1.1550 | 1.1595 | 0.0045 | 1.1330 | 1.1412 | ... | ... | 1.1388 | 1.1456 |
| (6) | 1 ³ / ₁₆ - 28 or 1.1875 - 28 | UN | 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 |
| 55 | 1 ¹ / ₄ - 7 or 1.2500 - 7 | UNC | 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 |
| (6) | 1 ¹ / ₄ - 8 or 1.2500 - 8 | UN | 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 |
| (6) | 1 ¹ / ₄ - 12 or 1.2500 - 12 | UNF | 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 |
| (6) | 1 ¹ / ₄ - 16 or 1.2500 - 16 | UN | 1.2500 | ... | 1.2094 | 1.2160 | 0.0066 | 1.182 | 1.196 | ... | ... | 1.189 | 1.198 |
| | 16 | 3B | 1.2500 | ... | 1.2094 | 1.2144 | 0.0050 | 1.1820 | 1.1908 | ... | ... | 1.1891 | 1.1976 |
| (6) | 1 ¹ / ₄ - 18 or 1.2500 - 18 | UNEF | 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 |
| (6) | 1 ¹ / ₄ - 20 or 1.2500 - 20 | UN | 1.2500 | ... | 1.2175 | 1.2236 | 0.0061 | 1.196 | 1.207 | ... | ... | 1.201 | 1.208 |
| | 20 | 3B | 1.2500 | ... | 1.2175 | 1.2220 | 0.0045 | 1.1960 | 1.2037 | ... | ... | 1.2013 | 1.2081 |
| (6) | 1 ¹ / ₄ - 28 or 1.2500 - 28 | UN | 1.2500 | ... | 1.2268 | 1.2321 | 0.0053 | 1.211 | 1.220 | ... | ... | 1.215 | 1.220 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | | |
|------------------------------|--|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | | |
| | | | | | | | | 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 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 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 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 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 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 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 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 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 | 1.2400 | 1.2547 | ... | ... | 1.2532 | 1.2682 |
| | 1 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 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 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 |

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 | | | | | |
|------------------------------|-------------------------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|--|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1½ - 12 or 1.5000 - 12 | UNF | 1B | 1.5000 | ... | 1.4459 | 1.4584 | 0.0125 | 1.410 | 1.428 | ... | ... | ... | ... |
| | | 2B | 1.5000 | ... | 1.4459 | 1.4542 | 0.0083 | 1.410 | 1.428 | ... | ... | 1.419 | 1.429 |
| | | 3B | 1.5000 | ... | 1.4459 | 1.4522 | 0.0063 | 1.4100 | 1.4198 | ... | ... | 1.4188 | 1.4288 |
| (6) 1½ - 16 or 1.5000 - 16 | UN | 2B | 1.5000 | ... | 1.4594 | 1.4662 | 0.0068 | 1.432 | 1.446 | ... | ... | 1.439 | 1.448 |
| | | 3B | 1.5000 | ... | 1.4594 | 1.4645 | 0.0051 | 1.4320 | 1.4408 | ... | ... | 1.4391 | 1.4476 |
| (6) 1½ - 18 or 1.5000 - 18 | UNEF | 2B | 1.5000 | ... | 1.4639 | 1.4704 | 0.0065 | 1.440 | 1.453 | ... | ... | 1.446 | 1.453 |
| | | 3B | 1.5000 | ... | 1.4639 | 1.4687 | 0.0048 | 1.4400 | 1.4480 | ... | ... | 1.4459 | 1.4534 |
| (6) 1½ - 20 or 1.5000 - 20 | UN | 2B | 1.5000 | ... | 1.4675 | 1.4737 | 0.0062 | 1.446 | 1.457 | ... | ... | 1.451 | 1.458 |
| | | 3B | 1.5000 | ... | 1.4675 | 1.4721 | 0.0046 | 1.4460 | 1.4537 | ... | ... | 1.4513 | 1.4581 |
| 1½ - 28 or 1.5000 - 28 | UN | 2B | 1.5000 | ... | 1.4768 | 1.4823 | 0.0055 | 1.461 | 1.470 | ... | ... | 1.465 | 1.470 |
| | | 3B | 1.5000 | ... | 1.4768 | 1.4809 | 0.0041 | 1.4610 | 1.4676 | ... | ... | 1.4652 | 1.4700 |
| 1 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 |
| | | 3B | 1.5625 | ... | 1.4542 | 1.4622 | 0.0080 | 1.3820 | 1.4021 | ... | ... | 1.4001 | 1.4201 |
| 1 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 |
| | | 3B | 1.5625 | ... | 1.4813 | 1.4885 | 0.0072 | 1.4270 | 1.4422 | ... | ... | 1.4407 | 1.4557 |
| (6) 1 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 |
| | | 3B | 1.5625 | ... | 1.5084 | 1.5142 | 0.0058 | 1.4720 | 1.4823 | ... | ... | 1.4813 | 1.4913 |
| (6) 1 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 |
| | | 3B | 1.5625 | ... | 1.5219 | 1.5270 | 0.0051 | 1.4950 | 1.5033 | ... | ... | 1.5016 | 1.5101 |
| (6) 1 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 |
| | | 3B | 1.5625 | ... | 1.5264 | 1.5313 | 0.0049 | 1.5020 | 1.5105 | ... | ... | 1.5084 | 1.5159 |
| (6) 1 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 |
| | | 3B | 1.5625 | ... | 1.5300 | 1.5347 | 0.0047 | 1.5080 | 1.5162 | ... | ... | 1.5138 | 1.5206 |
| 1 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 |
| | | 3B | 1.6250 | ... | 1.5167 | 1.5247 | 0.0080 | 1.4450 | 1.4646 | ... | ... | 1.4626 | 1.4826 |

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 | | | | | |
|--|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|--------|-------|-------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 |
| | | | 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 | ... | ... |
| $1\frac{11}{16}$ - 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 | ... | ... |
| $1\frac{11}{16}$ - 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 |
| (6) $1\frac{11}{16}$ - 16 or 1.6875 - 16 | UN | 2B | 1.6875 | ... | 1.6469 | 1.6538 | 0.0069 | 1.620 | 1.634 | ... | ... | 1.627 | 1.635 |
| | | | 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 |
| | | | 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 | ... | ... | ... | ... |
| | | | 5 | 2B | 1.7500 | ... | 1.6201 | 1.6317 | 0.0116 | 1.533 | 1.567 | ... | ... | 1.555 | 1.579 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|---|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 ³ / ₄ - 6 or 1.7500 - 6 | UN | 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 ³ / ₄ - 8 or 1.7500 - 8 | UN | 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 ³ / ₄ - 12 or 1.7500 - 12 | UN | 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 ³ / ₄ - 16 or 1.7500 - 16 | UN | 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 ³ / ₄ - 20 or 1.7500 - 20 | UN | 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 ¹³ / ₁₆ - 6 or 1.8125 - 6 | UN | 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 ¹³ / ₁₆ - 8 or 1.8125 - 8 | UN | 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 ¹³ / ₁₆ - 12 or 1.8125 - 12 | UN | 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 ¹³ / ₁₆ - 16 or 1.8125 - 16 | UN | 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 ¹³ / ₁₆ - 20 or 1.8125 - 20 | UN | 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 ⁷ / ₈ - 6 or 1.8750 - 6 | UN | 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 ⁷ / ₈ - 8 or 1.8750 - 8 | UN | 1.8750 | ... | 1.7938 | 1.8038 | 0.0100 | 1.740 | 1.765 | ... | ... | 1.753 | 1.768 |

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 | | | | | |
|------------------------------|---|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 |
| (6) | 1 ⁷ / ₈ - 12 or 1.8750 - 12 | UN | 1.8750 | ... | 1.8209 | 1.8287 | 0.0078 | 1.785 | 1.803 | ... | ... | 1.794 | 1.804 |
| | 12 | 3B | 1.8750 | ... | 1.8209 | 1.8268 | 0.0059 | 1.7850 | 1.7948 | ... | ... | 1.7938 | 1.8038 |
| (6) | 1 ⁷ / ₈ - 16 or 1.8750 - 16 | UN | 1.8750 | ... | 1.8344 | 1.8413 | 0.0069 | 1.807 | 1.821 | ... | ... | 1.814 | 1.823 |
| | 16 | 3B | 1.8750 | ... | 1.8344 | 1.8396 | 0.0052 | 1.8070 | 1.8158 | ... | ... | 1.8141 | 1.8226 |
| (6) | 1 ⁷ / ₈ - 20 or 1.8750 - 20 | UN | 1.8750 | ... | 1.8425 | 1.8489 | 0.0064 | 1.821 | 1.832 | ... | ... | 1.826 | 1.833 |
| | 20 | 3B | 1.8750 | ... | 1.8425 | 1.8473 | 0.0048 | 1.8210 | 1.8287 | ... | ... | 1.8263 | 1.8331 |
| (6) | 1 ¹⁵ / ₁₆ - 6 or 1.9375 - 6 | UN | 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 |
| (6) | 1 ¹⁵ / ₁₆ - 8 or 1.9375 - 8 | UN | 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 ¹⁵ / ₁₆ - 12 or 1.9375 - 12 | UN | 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 |
| (6) | 1 ¹⁵ / ₁₆ - 16 or 1.9375 - 16 | UN | 1.9375 | ... | 1.8969 | 1.9039 | 0.0070 | 1.870 | 1.884 | ... | ... | 1.877 | 1.885 |
| | 16 | 3B | 1.9375 | ... | 1.8969 | 1.9021 | 0.0052 | 1.8700 | 1.8783 | ... | ... | 1.8766 | 1.8851 |
| (6) | 1 ¹⁵ / ₁₆ - 20 or 1.9375 - 20 | UN | 1.9375 | ... | 1.9050 | 1.9114 | 0.0064 | 1.883 | 1.895 | ... | ... | 1.889 | 1.896 |
| | 20 | 3B | 1.9375 | ... | 1.9050 | 1.9098 | 0.0048 | 1.8830 | 1.8912 | ... | ... | 1.8888 | 1.8956 |
| (6) | 2 - 4.5 or 2.0000 - 4.5 | UNC | 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 |
| (6) | 2 - 6 or 2.0000 - 6 | UN | 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 |
| (6) | 2 - 8 or 2.0000 - 8 | UN | 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 |

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

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 | | | | | |
|------------------------------|---|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 ¹ / ₄ - 16 or 2.2500 - 16 | UN | 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 ¹ / ₄ - 20 or 2.2500 - 20 | UN | 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 ³ / ₈ - 6 or 2.3750 - 6 | UN | 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 ³ / ₈ - 8 or 2.3750 - 8 | UN | 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 ³ / ₈ - 12 or 2.3750 - 12 | UN | 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 ³ / ₈ - 16 or 2.3750 - 16 | UN | 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 ³ / ₈ - 20 or 2.3750 - 20 | UN | 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 ¹ / ₂ - 4 or 2.5000 - 4 | UNC | 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 ¹ / ₂ - 6 or 2.5000 - 6 | UN | 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 ¹ / ₂ - 8 or 2.5000 - 8 | UN | 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 ¹ / ₂ - 12 or 2.5000 - 12 | UN | 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 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| (6) 2½ - 16 or 2.5000 - 16 | UN | 2B | 2.5000 | ... | 2.4594 | 2.4666 | 0.0072 | 2.432 | 2.446 | ... | ... | 2.439 | 2.448 |
| | 16 | 3B | 2.5000 | ... | 2.4594 | 2.4648 | 0.0054 | 2.4320 | 2.4408 | ... | ... | 2.4391 | 2.4476 |
| (6) 2½ - 20 or 2.5000 - 20 | UN | 2B | 2.5000 | ... | 2.4675 | 2.4741 | 0.0066 | 2.446 | 2.457 | ... | ... | 2.451 | 2.458 |
| | 20 | 3B | 2.5000 | ... | 2.4675 | 2.4725 | 0.0050 | 2.4460 | 2.4537 | ... | ... | 2.4513 | 2.4581 |
| 2⅝ - 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 |
| 2⅝ - 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 |
| 2⅝ - 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) 2⅝ - 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) 2⅝ - 16 or 2.6250 - 16 | UN | 2B | 2.6250 | ... | 2.5844 | 2.5916 | 0.0072 | 2.557 | 2.571 | ... | ... | 2.564 | 2.573 |
| | 16 | 3B | 2.6250 | ... | 2.5844 | 2.5898 | 0.0054 | 2.5570 | 2.5658 | ... | ... | 2.5641 | 2.5726 |
| (6) 2⅝ - 20 or 2.6250 - 20 | UN | 2B | 2.6250 | ... | 2.5925 | 2.5991 | 0.0066 | 2.571 | 2.582 | ... | ... | 2.576 | 2.583 |
| | 20 | 3B | 2.6250 | ... | 2.5925 | 2.5975 | 0.0050 | 2.5710 | 2.5787 | ... | ... | 2.5763 | 2.5831 |
| 2¾ - 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 |
| 2¾ - 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 |
| 2¾ - 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) 2¾ - 12 or 2.7500 - 12 | UN | 2B | 2.7500 | ... | 2.6959 | 2.7040 | 0.0081 | 2.660 | 2.678 | ... | ... | 2.669 | 2.679 |
| | 12 | 3B | 2.7500 | ... | 2.6959 | 2.7020 | 0.0061 | 2.6600 | 2.6698 | ... | ... | 2.6688 | 2.6788 |

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 | | | | | | | |
|------------------------------|---|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|--------|------|-------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | | | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| (6) | 2 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) | | | | 3B | 2.7500 | ... | 2.7094 | 2.7148 | 0.0054 | 2.6820 | 2.6908 | ... | ... | 2.6891 | 2.6976 |
| (6) | 2 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) | | | | 3B | 2.7500 | ... | 2.7175 | 2.7225 | 0.0050 | 2.6960 | 2.7037 | ... | ... | 2.7013 | 2.7081 |
| | 2 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 | |
| | | | | 3B | 2.8750 | ... | 2.7126 | 2.7230 | 0.0104 | 2.6040 | 2.6344 | ... | ... | 2.6314 | 2.6614 |
| | 2 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 | |
| | | | | 3B | 2.8750 | ... | 2.7667 | 2.7757 | 0.0090 | 2.6950 | 2.7146 | ... | ... | 2.7126 | 2.7326 |
| | 2 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 | |
| | | | | 3B | 2.8750 | ... | 2.7938 | 2.8020 | 0.0082 | 2.7400 | 2.7547 | ... | ... | 2.7532 | 2.7682 |
| | 2 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 | |
| | | | | 3B | 2.8750 | ... | 2.8209 | 2.8270 | 0.0061 | 2.7850 | 2.7948 | ... | ... | 2.7938 | 2.8038 |
| (6) | 2 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) | | | | 3B | 2.8750 | ... | 2.8344 | 2.8399 | 0.0055 | 2.8070 | 2.8158 | ... | ... | 2.8141 | 2.8226 |
| (6) | 2 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) | | | | 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 | ... | ... | ... | ... | |
| | | | | 2B | 3.0000 | ... | 2.8376 | 2.8515 | 0.0139 | 2.729 | 2.767 | ... | ... | 2.756 | 2.786 |
| | | | | 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 | |
| | | | | 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 | |
| | | | | 3B | 3.0000 | ... | 2.9188 | 2.9271 | 0.0083 | 2.8650 | 2.8797 | ... | ... | 2.8782 | 2.8932 |

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

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

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|---|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 ⁵ / ₈ - 6 or 3.6250 - 6 | UN | 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 ⁵ / ₈ - 8 or 3.6250 - 8 | UN | 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 ⁵ / ₈ - 12 or 3.6250 - 12 | UN | 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 ⁵ / ₈ - 16 or 3.6250 - 16 | UN | 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 ³ / ₄ - 4 or 3.7500 - 4 | UNC | 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 ³ / ₄ - 6 or 3.7500 - 6 | UN | 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 ³ / ₄ - 8 or 3.7500 - 8 | UN | 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 ³ / ₄ - 12 or 3.7500 - 12 | UN | 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 ³ / ₄ - 16 or 3.7500 - 16 | UN | 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 ⁷ / ₈ - 4 or 3.8750 - 4 | UN | 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 ⁷ / ₈ - 6 or 3.8750 - 6 | UN | 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 |

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 | | | | | |
|---|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 3 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 |
| | | 3B | 3.8750 | ... | 3.7938 | 3.8026 | 0.0088 | 3.7400 | 3.7547 | ... | ... | 3.7532 | 3.7682 |
| 3 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 |
| | | 3B | 3.8750 | ... | 3.8209 | 3.8273 | 0.0064 | 3.7850 | 3.7948 | ... | ... | 3.7938 | 3.8038 |
| (6) 3 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 |
| | | 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 | ... | ... | ... | ... |
| | | 2B | 4.0000 | ... | 3.8376 | 3.8523 | 0.0147 | 3.729 | 3.767 | ... | ... | 3.7560 | 3.7860 |
| | | 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 |
| | | 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 |
| | | 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 |
| | | 3B | 4.0000 | ... | 3.9459 | 3.9523 | 0.0064 | 3.9100 | 3.9198 | ... | ... | 3.9188 | 3.9288 |
| (6) 4 – 16 or 4.0000 – 16 | UN | 2B | 4.0000 | ... | 3.9594 | 3.9670 | 0.0076 | 3.932 | 3.946 | ... | ... | 3.939 | 3.948 |
| | | 3B | 4.0000 | ... | 3.9594 | 3.9651 | 0.0057 | 3.9320 | 3.9408 | ... | ... | 3.9391 | 3.9476 |
| 4 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 |
| | | 3B | 4.1250 | ... | 3.9626 | 3.9738 | 0.0112 | 3.8540 | 3.8844 | ... | ... | 3.8814 | 3.9114 |
| 4 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 |
| | | 3B | 4.1250 | ... | 4.0167 | 4.0264 | 0.0097 | 3.9450 | 3.9646 | ... | ... | 3.9626 | 3.9826 |
| 4 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 |
| | | 3B | 4.1250 | ... | 4.0438 | 4.0528 | 0.0090 | 3.9900 | 4.0047 | ... | ... | 4.0032 | 4.0182 |
| (6) 4 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 |
| | | 3B | 4.1250 | ... | 4.0709 | 4.0773 | 0.0064 | 4.0350 | 4.0448 | ... | ... | 4.0438 | 4.0538 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|------------------------------|---|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| (6) | 4 ¹ / ₈ - 16 or 4.1250 - 16 | UN | 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 ¹ / ₄ - 4 or 4.2500 - 4 | UNC | 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 ¹ / ₄ - 6 or 4.2500 - 6 | UN | 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 ¹ / ₄ - 8 or 4.2500 - 8 | UN | 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 ¹ / ₄ - 12 or 4.2500 - 12 | UN | 4.2500 | ... | 4.1959 | 4.2045 | 0.0086 | 4.160 | 4.178 | ... | ... | 4.169 | 4.179 |
| (6) | 12 | 3B | 4.2500 | ... | 4.1959 | 4.2023 | 0.0064 | 4.1600 | 4.1698 | ... | ... | 4.1688 | 4.1788 |
| (6) | 4 ¹ / ₄ - 16 or 4.2500 - 16 | UN | 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 ³ / ₈ - 4 or 4.3750 - 4 | UN | 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 ³ / ₈ - 6 or 4.3750 - 6 | UN | 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 ³ / ₈ - 8 or 4.3750 - 8 | UN | 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 ³ / ₈ - 12 or 4.3750 - 12 | UN | 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 ³ / ₈ - 16 or 4.3750 - 16 | UN | 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 ¹ / ₂ - 4 or 4.5000 - 4 | UNC | 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 |

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

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|---|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| (6) 4 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 |
| | | 3B | 4.7500 | ... | 4.6959 | 4.7024 | 0.0065 | 4.6600 | 4.6698 | ... | ... | 4.6688 | 4.6788 |
| (6) 4 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 |
| | | 3B | 4.7500 | ... | 4.7094 | 4.7153 | 0.0059 | 4.6820 | 4.6908 | ... | ... | 4.6891 | 4.6976 |
| 4 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 |
| | | 3B | 4.8750 | ... | 4.7126 | 4.7242 | 0.0116 | 4.6040 | 4.6344 | ... | ... | 4.6314 | 4.6614 |
| 4 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 |
| | | 3B | 4.8750 | ... | 4.7667 | 4.7768 | 0.0101 | 4.6950 | 4.7146 | ... | ... | 4.7126 | 4.7326 |
| 4 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 |
| | | 3B | 4.8750 | ... | 4.7938 | 4.8032 | 0.0094 | 4.7400 | 4.7547 | ... | ... | 4.7532 | 4.7682 |
| (6) 4 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 |
| | | 3B | 4.8750 | ... | 4.8209 | 4.8274 | 0.0065 | 4.7850 | 4.7948 | ... | ... | 4.7938 | 4.8038 |
| (6) 4 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 |
| | | 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 |
| | | 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 |
| | | 3B | 5.0000 | ... | 4.8917 | 4.9019 | 0.0102 | 4.8200 | 4.8396 | ... | ... | 4.8376 | 4.8576 |
| (6) 5 - 8 or 5.0000 - 8 | UN | 2B | 5.0000 | ... | 4.9188 | 4.9314 | 0.0126 | 4.865 | 4.890 | ... | ... | 4.878 | 4.893 |
| | | 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 |
| | | 3B | 5.0000 | ... | 4.9459 | 4.9525 | 0.0066 | 4.9100 | 4.9198 | ... | ... | 4.9188 | 4.9288 |
| (6) 5 - 16 or 5.0000 - 16 | UN | 2B | 5.0000 | ... | 4.9594 | 4.9673 | 0.0079 | 4.932 | 4.946 | ... | ... | 4.939 | 4.948 |
| | | 3B | 5.0000 | ... | 4.9594 | 4.9653 | 0.0059 | 4.9320 | 4.9408 | ... | ... | 4.9391 | 4.9476 |

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 | | | | | |
|---|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 5 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 |
| | | 3B | 5.1250 | ... | 4.9626 | 4.9743 | 0.0117 | 4.8540 | 4.8844 | ... | ... | 4.8814 | 4.9114 |
| 5 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 |
| | | 3B | 5.1250 | ... | 5.0167 | 5.0270 | 0.0103 | 4.9450 | 4.9646 | ... | ... | 4.9626 | 4.9826 |
| (6) 5 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 |
| | | 3B | 5.1250 | ... | 5.0438 | 5.0533 | 0.0095 | 4.9900 | 5.0047 | ... | ... | 5.0032 | 5.0182 |
| (6) 5 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 |
| | | 3B | 5.1250 | ... | 5.0709 | 5.0775 | 0.0066 | 5.0350 | 5.0448 | ... | ... | 5.0438 | 5.0538 |
| (6) 5 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 |
| | | 3B | 5.1250 | ... | 5.0844 | 5.0903 | 0.0059 | 5.0570 | 5.0658 | ... | ... | 5.0641 | 5.0726 |
| 5 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 |
| | | 3B | 5.2500 | ... | 5.0876 | 5.0993 | 0.0117 | 4.9790 | 5.0094 | ... | ... | 5.0064 | 5.0364 |
| 5 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 |
| | | 3B | 5.2500 | ... | 5.1417 | 5.1520 | 0.0103 | 5.0700 | 5.0896 | ... | ... | 5.0876 | 5.1076 |
| (6) 5 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 |
| | | 3B | 5.2500 | ... | 5.1688 | 5.1783 | 0.0095 | 5.1150 | 5.1297 | ... | ... | 5.1282 | 5.1432 |
| (6) 5 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 |
| | | 3B | 5.2500 | ... | 5.1959 | 5.2025 | 0.0066 | 5.1600 | 5.1698 | ... | ... | 5.1688 | 5.1788 |
| (6) 5 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 |
| | | 3B | 5.2500 | ... | 5.2094 | 5.2153 | 0.0059 | 5.1820 | 5.1908 | ... | ... | 5.1891 | 5.1976 |
| 5 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 |
| | | 3B | 5.3875 | ... | 5.2251 | 5.2368 | 0.0117 | 5.1170 | 5.1469 | ... | ... | 5.1439 | 5.1739 |
| 5 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 |
| | | 3B | 5.3750 | ... | 5.2667 | 5.2771 | 0.0104 | 5.1950 | 5.2146 | ... | ... | 5.2126 | 5.2326 |

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, <i>D</i> | | Pitch Diameter, <i>D</i> ₂ , and Functional Diameter [Note (3)] | | | Minor Diameter, <i>D</i> ₁ | | | | | |
|---|--------------------|------------------|--------------------------|-----------------|--|--------|-----------------------------------|---------------------------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, <i>TD</i> ₂ | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| (6) 5 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 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 |
| (6) 5 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 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 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 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 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 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 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 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 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 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 |

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 | | | | | |
|---|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| (6) 5 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 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 |
| (6) 4 | | 3B | 5.7500 | ... | 5.5876 | 5.5995 | 0.0119 | 5.4790 | 5.5094 | ... | ... | 5.5064 | 5.5364 |
| 5 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) 6 | | 3B | 5.7500 | ... | 5.6417 | 5.6523 | 0.0106 | 5.5700 | 5.5896 | ... | ... | 5.5876 | 5.6076 |
| 5 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 |
| (6) 8 | | 3B | 5.7500 | ... | 5.6688 | 5.6786 | 0.0098 | 5.6150 | 5.6297 | ... | ... | 5.6282 | 5.6432 |
| 5 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 |
| 5 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 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 |
| (6) 4 | | 3B | 5.8750 | ... | 5.7126 | 5.7246 | 0.0120 | 5.6040 | 5.6344 | ... | ... | 5.6314 | 5.6614 |
| 5 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) 6 | | 3B | 5.8750 | ... | 5.7667 | 5.7773 | 0.0106 | 5.6950 | 5.7146 | ... | ... | 5.7126 | 5.7326 |
| 5 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 |
| (6) 8 | | 3B | 5.8750 | ... | 5.7938 | 5.8036 | 0.0098 | 5.7400 | 5.7547 | ... | ... | 5.7532 | 5.7682 |
| 5 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 |
| (6) 12 | | 3B | 5.8750 | ... | 5.8209 | 5.8276 | 0.0067 | 5.7850 | 5.7948 | ... | ... | 5.7938 | 5.8038 |
| 5 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 |
| (6) 4 | | 3B | 6.0000 | ... | 5.8376 | 5.8496 | 0.0120 | 5.7290 | 5.7594 | ... | ... | 5.7564 | 5.7864 |

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 | | | | | |
|-------------------------------------|--------------------|------------------|---------------------|-----------------|--|--------|-------------------|-----------------------|--------|----------------|------|--------|--------|
| | | | Min. | Max. [Note (2)] | Min. | Max. | Tolerance, TD_2 | UN [Note (4)] | | UNR [Note (5)] | | UNJ | |
| | | | | | | | | 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 6 | UN | 2B | 6.0000 | ... | 5.8917 | 5.9059 | 0.0142 | 5.820 | 5.850 | ... | ... | 5.838 | 5.858 |
| | | 3B | 6.0000 | ... | 5.8917 | 5.9024 | 0.0107 | 5.8200 | 5.8396 | ... | ... | 5.8376 | 5.8576 |
| (6) 6 – 8 or 6.0000 – 8 (6) 8 | UN | 2B | 6.0000 | ... | 5.9188 | 5.9320 | 0.0132 | 5.865 | 5.890 | ... | ... | 5.878 | 5.893 |
| | | 3B | 6.0000 | ... | 5.9188 | 5.9287 | 0.0099 | 5.8650 | 5.8797 | ... | ... | 5.8782 | 5.8932 |
| 6 – 12 or 6.0000 – 12 12 | UN | 2B | 6.0000 | ... | 5.9459 | 5.9549 | 0.0090 | 5.910 | 5.928 | ... | ... | 5.919 | 5.929 |
| | | 3B | 6.0000 | ... | 5.9459 | 5.9526 | 0.0067 | 5.9100 | 5.9198 | ... | ... | 5.9188 | 5.9288 |
| (6) 6 – 16 or 6.0000 – 16 (6) 16 | UN | 2B | 6.0000 | ... | 5.9594 | 5.9675 | 0.0081 | 5.932 | 5.946 | ... | ... | 5.939 | 5.948 |
| | | 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.

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

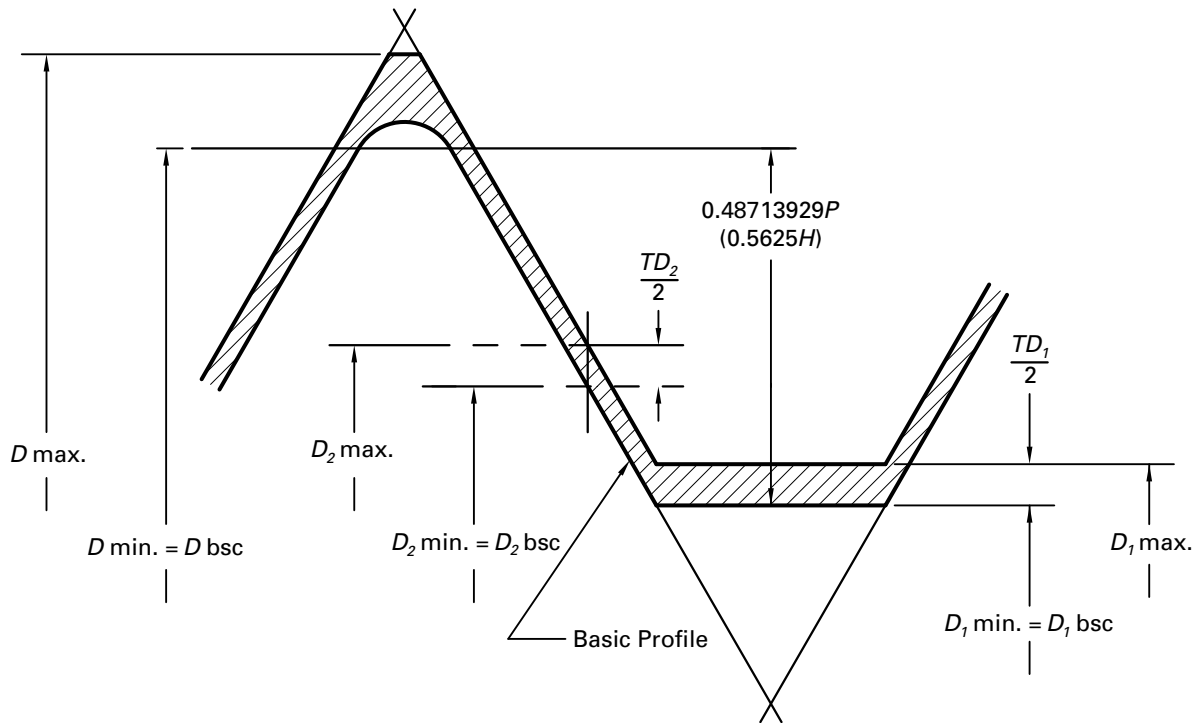
Therefore, $es = 0.300 \times 0.006070 = 0.001821$, or 0.0018 in. when rounded.

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 [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

Figure 12 Internal UNJ Thread Design Profile and Tolerances



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]

$$Td_2 = 0.0015 \sqrt[3]{D} + 0.0015 \sqrt{LE} + 0.015 \sqrt[3]{P^2}$$

$$Td_2 = 0.0015 \sqrt[3]{2.0625} + 0.0015 \sqrt{9/12} + 0.015 \sqrt[3]{0.08333333^2}$$

$$Td_2 = 0.001909 + 0.001299 + 0.002862$$

$$Td_2 = 0.006070$$

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

$$Td_2 = 0.0015 \sqrt[3]{D} + 0.0015 \sqrt{LE} + 0.015 \sqrt[3]{P^2}$$

$$Td_2 = 0.0015 \sqrt[3]{2.0625} + 0.0015 \sqrt{1.500} + 0.015 \sqrt[3]{0.08333333^2}$$

$$Td_2 = 0.001909 + 0.001837 + 0.002862$$

$$Td_2 = 0.006608$$

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 1/2-in.-wide threaded nut when fully assembled with a 2-in.-long threaded bolt has 1/2 in. (0.500 in.) of thread engagement. However, a 2-in.-wide threaded nut when fully assembled with a 1/2-in.-long threaded bolt also has 1/2 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 partic-

ularly 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.

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | 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 |

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | 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 |
| $\frac{1}{4}$ -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 |
| $\frac{1}{4}$ -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 |
| $\frac{1}{4}$ -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 |
| $\frac{5}{16}$ -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 |
| $\frac{5}{16}$ -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 |
| $\frac{5}{16}$ -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 |
| $\frac{5}{16}$ -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 |
| $\frac{5}{16}$ -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 |
| $\frac{3}{8}$ -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 |
| $\frac{3}{8}$ -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 |
| $\frac{3}{8}$ -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 |
| $\frac{3}{8}$ -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 |
| $\frac{3}{8}$ -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 |
| $\frac{7}{16}$ -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 |
| $\frac{7}{16}$ -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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (\pm) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (\pm) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| $\frac{7}{16}$ -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 |
| $\frac{7}{16}$ -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 |
| $\frac{7}{16}$ -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 |
| $\frac{1}{2}$ -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 |
| $\frac{1}{2}$ -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 |
| $\frac{1}{2}$ -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 |
| $\frac{1}{2}$ -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 |
| $\frac{1}{2}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{9}{16}$ -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 |
| $\frac{5}{8}$ -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 |
| $\frac{5}{8}$ -12 or 0.6250-12 | UN | 2A | 0.00156 | 0.00270 | 2B | 0.00205 | 0.00355 |

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | 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 |
| $\frac{5}{8}$ -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 |
| $\frac{5}{8}$ -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 |
| $\frac{5}{8}$ -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 |
| $\frac{5}{8}$ -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 |
| $\frac{5}{8}$ -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 |
| $\frac{5}{8}$ -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 |
| $\frac{11}{16}$ -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 |
| $\frac{11}{16}$ -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 0.7500-10 | 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 |
| $\frac{3}{4}$ -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 |
| $\frac{3}{4}$ -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 |
| $\frac{3}{4}$ -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 |
| $\frac{3}{4}$ -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 |

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 |
| $\frac{3}{4}$ -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 |
| $\frac{13}{16}$ -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 0.8750-9 | 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 |
| $\frac{7}{8}$ -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 |
| $\frac{7}{8}$ -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 |
| $\frac{7}{8}$ -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 |
| $\frac{7}{8}$ -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 |
| $\frac{7}{8}$ -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 |
| $\frac{7}{8}$ -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 |
| $\frac{15}{16}$ -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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (\pm) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (\pm) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (±) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (±) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 1 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (\pm) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (\pm) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 1 $\frac{1}{2}$ -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 | 0.00305 |
| 1 $\frac{1}{2}$ -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 |
| 1 $\frac{1}{2}$ -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 |
| 1 $\frac{1}{2}$ -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 |
| 1 $\frac{1}{2}$ -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 |
| 1 $\frac{1}{2}$ -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 |
| 1 $\frac{1}{2}$ -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 |
| 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 1.6250-6 | 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 1.6250-8 | 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 1.6250-12 | UN | 2A | 0.00170 | 0.00295 | 2B | 0.00219 | 0.0038 |
| | | 3A | 0.00127 | 0.00220 | 3B | 0.00165 | 0.00285 |
| 1 $\frac{5}{8}$ -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 |
| 1 $\frac{5}{8}$ -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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|--|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (\pm) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (\pm) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 1 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 ⁷ / ₈ -6 or 1.8750-6 | UN | 2A | 0.00242 | 0.00420 | 2B | 0.00318 | 0.00550 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (±) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (±) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| | | 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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|--|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (\pm) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (\pm) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 2 $\frac{1}{8}$ -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 $\frac{1}{8}$ -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 $\frac{1}{4}$ -4 $\frac{1}{2}$ 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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{3}{8}$ -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 $\frac{3}{8}$ -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 $\frac{3}{8}$ -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 $\frac{3}{8}$ -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 $\frac{3}{8}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 |

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 |

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | 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 |
| 3 $\frac{1}{8}$ -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 |
| 3 $\frac{1}{8}$ -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 |
| 3 $\frac{1}{8}$ -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 |
| 3 $\frac{1}{8}$ -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 |
| 3 $\frac{1}{4}$ -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 |
| 3 $\frac{1}{4}$ -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 |
| 3 $\frac{1}{4}$ -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 |
| 3 $\frac{1}{4}$ -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 |
| 3 $\frac{1}{4}$ -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 |
| 3 $\frac{3}{8}$ -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 |
| 3 $\frac{3}{8}$ -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 |
| 3 $\frac{3}{8}$ -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 |
| 3 $\frac{3}{8}$ -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 |
| 3 $\frac{1}{2}$ -4 or 3.5000-4 | UNC | 1A | 0.00479 | 0.00830 | 1B | 0.00621 | 0.01075 |

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 |
| 3 $\frac{1}{2}$ -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 |
| 3 $\frac{1}{2}$ -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 |
| 3 $\frac{1}{2}$ -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 |
| 3 $\frac{1}{2}$ -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 |
| 3 $\frac{5}{8}$ -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 |
| 3 $\frac{5}{8}$ -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 |
| 3 $\frac{5}{8}$ -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 |
| 3 $\frac{5}{8}$ -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 |
| 3 $\frac{3}{4}$ -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 |
| 3 $\frac{3}{4}$ -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 |
| 3 $\frac{3}{4}$ -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 |
| 3 $\frac{3}{4}$ -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 |
| 3 $\frac{3}{4}$ -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 |
| 3 $\frac{7}{8}$ -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 |
| 3 $\frac{7}{8}$ -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 |
| 3 $\frac{7}{8}$ -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 |
| 3 $\frac{7}{8}$ -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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (\pm) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (\pm) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| | | 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 |
| 4 $\frac{1}{8}$ -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 |
| 4 $\frac{1}{8}$ -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 |
| 4 $\frac{1}{8}$ -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 |
| 4 $\frac{1}{8}$ -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 |
| 4 $\frac{1}{4}$ -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 |
| 4 $\frac{1}{4}$ -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 |
| 4 $\frac{1}{4}$ -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 |
| 4 $\frac{1}{4}$ -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 |
| 4 $\frac{1}{4}$ -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 |
| 4 $\frac{3}{8}$ -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 |
| 4 $\frac{3}{8}$ -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 |
| 4 $\frac{3}{8}$ -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 |
| 4 $\frac{3}{8}$ -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 |
| 4 $\frac{1}{2}$ -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 |

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

| 1 Nominal Size and Threads/in. | 2 Series Designation | External | | | Internal | | |
|---|----------------------------|------------|--|--|------------|--|--|
| | | 3 Class | 4 Allowable Variation in Lead, in. (±) | 5 Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | 6 Class | 7 Allowable Variation in Lead, in. (±) | 8 Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (-) |
| 4 $\frac{1}{2}$ -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 |
| 4 $\frac{1}{2}$ -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 |
| 4 $\frac{1}{2}$ -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 |
| 4 $\frac{1}{2}$ -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 |
| 4 $\frac{5}{8}$ -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 |
| 4 $\frac{5}{8}$ -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 |
| 4 $\frac{5}{8}$ -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 |
| 4 $\frac{5}{8}$ -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 |
| 4 $\frac{3}{4}$ -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 |
| 4 $\frac{3}{4}$ -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 |
| 4 $\frac{3}{4}$ -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 |
| 4 $\frac{3}{4}$ -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 |
| 4 $\frac{3}{4}$ -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 |
| 4 $\frac{7}{8}$ -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 |
| 4 $\frac{7}{8}$ -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 |
| 4 $\frac{7}{8}$ -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 |
| 4 $\frac{7}{8}$ -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 |

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}TD_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | 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 $\frac{1}{8}$ -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 $\frac{1}{8}$ -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 $\frac{1}{8}$ -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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{1}{4}$ -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 $\frac{3}{8}$ -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 $\frac{3}{8}$ -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 $\frac{3}{8}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 $\frac{5}{8}$ -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 $\frac{5}{8}$ -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 |

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. (\pm) | Equivalent Change in Functional Diameter, in., $\frac{1}{2}Td_2$ (+) | Class | Allowable Variation in Lead, in. (\pm) | 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.

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

$$es = 0.300 \times \text{Class 2A } Td_2$$

(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

$$Td_2 = 1.5000 \times \text{Class 2A } Td_2$$

(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

$$Td_2 = 0.7500 \times \text{Class 2A } Td_2$$

(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

$$TD_2 = 1.9500 \times \text{Class 2A } TD_2^1$$

(2) for Class 2B

$$TD_2 = 1.3000 \times \text{Class 2A } TD_2^1$$

(3) for Class 3B

$$TD_2 = 0.9750 \times \text{Class 2A } TD_2^1$$

(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 $0.2500P - 0.400P^2$

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

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

| <i>D</i> | Increments in <i>Td</i> ₂ due to <i>D</i> 0.0015 $\sqrt[3]{D}$ | | Increments in <i>Td</i> ₂ due to <i>D</i> 0.0015 $\sqrt[3]{D}$ | | | Increments in <i>Td</i> ₂ due to LE 0.0015 \sqrt{LE} | | | Increments in <i>Td</i> ₂ due to LE 0.0015 \sqrt{LE} | | | Increments in <i>Td</i> ₂ due to LE 0.0015 \sqrt{LE} | | Increments in <i>Td</i> ₂ due to LE 0.0015 \sqrt{LE} | | Increments in <i>Td</i> ₂ due to TPI 0.015 $\sqrt[3]{P^2}$ | | | |
|----------|---|---------------|---|---------------|--------------|---|-------------|-----------|---|--------------|------------|---|-----------|---|--------------|---|-----------|-------------|----------|
| | <i>D</i> | $\sqrt[3]{D}$ | <i>D</i> | $\sqrt[3]{D}$ | 1D for sizes | 9P for TPI | 20P for TPI | <i>LE</i> | \sqrt{LE} | 1D for sizes | 9P for TPI | 20P for TPI | <i>LE</i> | \sqrt{LE} | 1D for sizes | 20P for TPI | <i>LE</i> | \sqrt{LE} | TPI | $\sqrt[3]{P^2}$ |
| 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 | 1 1/16 | ... | ... | 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 | 1 3/16 | ... | ... | 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 | 1 1/64 | ... | ... | 0.171900 | 0.000622 | 1 5/16 | ... | ... | 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 | 1 3/64 | ... | ... | 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 | 1 5/64 | ... | ... | 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 | 1 7/64 | ... | ... | 0.265600 | 0.000773 | ... | ... | 14 | 1.428571 | 0.001793 | 5 1/4 | ... | 5.250000 | 0.003437 | 11 | 0.003033 |

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)

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

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 |
| | | 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 |

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

| 0.20833333H | 0.2500H | 0.2886H | 0.3125H | 0.3608H | 0.375H | 0.5000H |
|---|---|--|---|-----------------------------------|---|---|
| UNJ Max. External Thread Root Radius, r max. = 0.18042196P | UN External Thread Root and Truncation of Internal Thread Crest, $f_{rs} = f_{cn} =$ 0.21650635P | UN Basic Flat at Internal Thread Crest and External UN Thread Root, $F_{rs} = F_{cn} = P/4 =$ 0.25000000P | Truncation of UNJ Internal Thread Crest | Flat at UNJ Internal Thread Crest | UN, UNR, UNJ Addendum of External Thread, $h_{as} =$ 0.32475953P | Half the Height of Sharp V-UN, UNR, and UNJ Thread 0.43301270P |
| 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 |

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 |

Copyrighted material. Licensed to University of Toronto by Clarivate Analytics (US) LLC, subscription: techstreet.com, downloaded on 2020-08-15 07:29:54 +0000 by University of Toronto User. No further reproduction or distribution is permitted.

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 | |
|--|--|---|--------------------|--|--|---|--|--|
| | | UN, UNR, and UNJ Twice the External Thread Addendum, $h_b = 2h_{as} =$ | | UN, UNR, and UNJ Difference Between Max. Major and Pitch Diameters of Internal Thread = | UN, UNR, and UNJ Height of Sharp V-Thread = | Double Height of UNJ Internal Thread | Double Height of Internal Thread and External UN Thread, $2h_n =$ | Double Height of External UNR Thread, $2h_s =$ |
| UNJ Height of External Thread, $h_s = 0.57735027P$ | Height of UNR External Thread, $h_s = 0.59539247P$ | 0.64951905P | 0.79385662P | 0.86602540P | 0.97427858P | 1.08253175P | 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 | |

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

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

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

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

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

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

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.

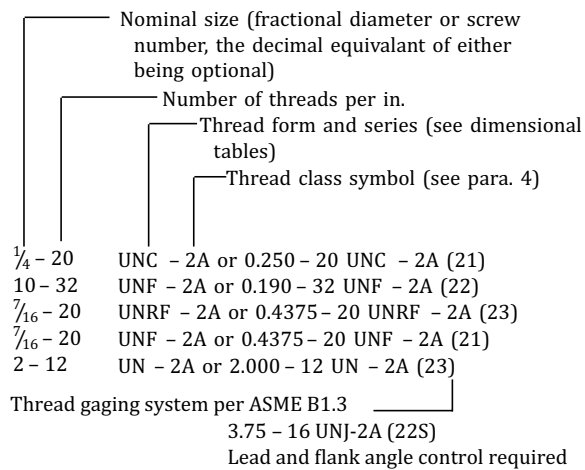
5.11.2 Internal Thread. Maximum runout, which will maintain the crest inside the basic thread profile, is the difference between the measured minor diameter and the basic minor diameter. An out-of-round functional diameter cylinder may reduce the available runout.

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

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: $\frac{3}{4}$ -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: $\frac{1}{4}$ -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

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: $\frac{1}{4}$ -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 δ - 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: $\frac{1}{4}$ -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: $\frac{3}{4}$ -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: $\frac{1}{4}$ -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: $\frac{1}{4}$ -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: $\frac{1}{4}$ -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

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

EXAMPLE: $\frac{7}{16}$ -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: $\frac{1}{2}$ -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: $\frac{3}{4}$ -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: $\frac{3}{4}$ -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, $\frac{3}{4}$ -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: $\frac{7}{8}$ -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: $\frac{1}{2}$ -13-UNC-SE2A (23)
PD 0.4485 - 0.4431
LE 1.00

EXAMPLE: $\frac{1}{4}$ -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: $\frac{3}{8}$ -24-UNF-3A MOD (21)
Major diameter 0.3720 - 0.3648 MOD

EXAMPLE: $1\frac{1}{2}$ -10-UNS-3B MOD (21)
Minor diameter 1.3980 - 1.4090 MOD
PD 1.4350 - 1.4412
Minimum major diameter 1.5000

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.

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: $\frac{3}{8}$ -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

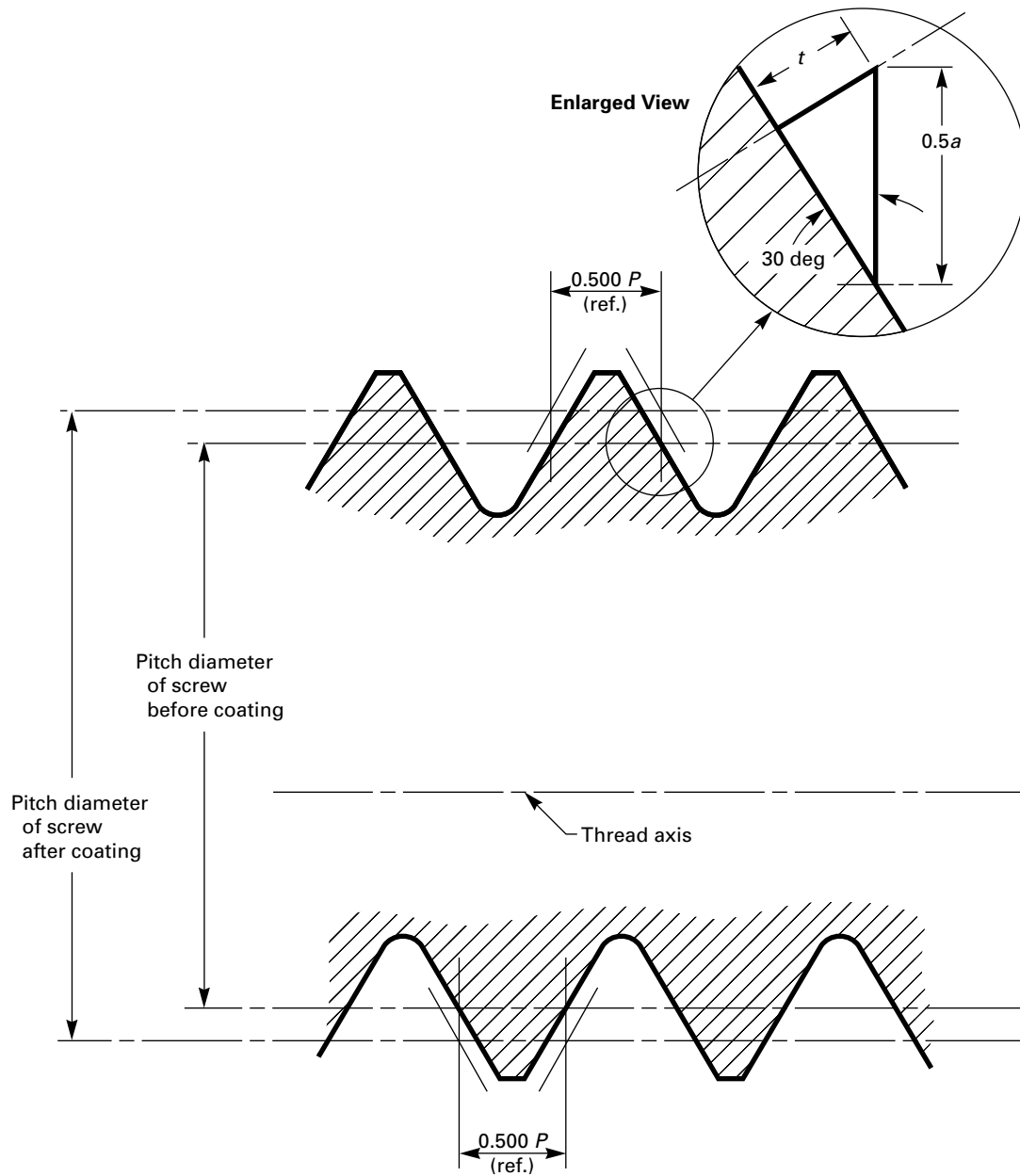
0.3287 after coating minimum pitch diameter
– 0.0008 (4 × .0002 minimum coating thickness)
= 0.3279 before coating minimum pitch diameter

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

7.8.1.2 EXAMPLE: $\frac{3}{8}$ -16-UNJC-2A AFTER COATING

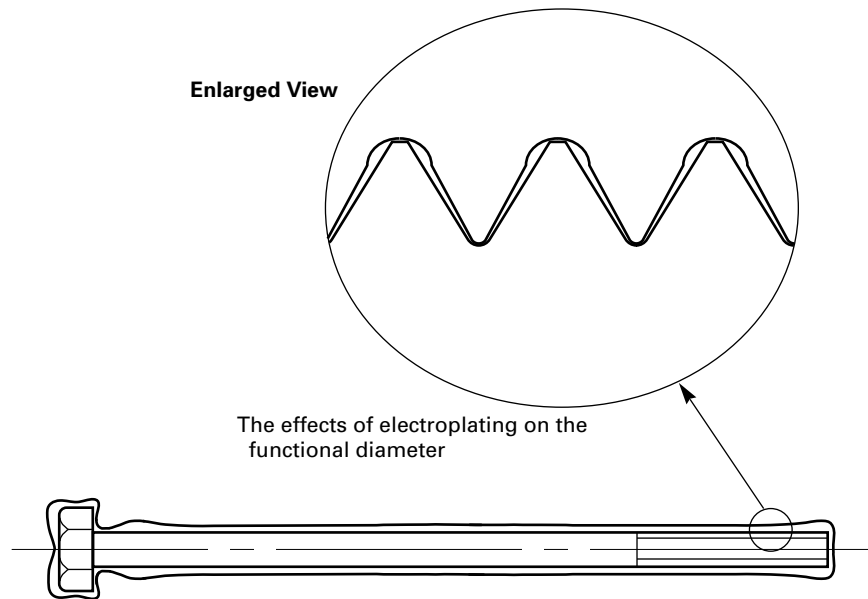
Coating thickness 0.0002 in. – 0.0003 in.

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
 $\text{Sine } 30 \text{ deg} = \frac{1}{2} = 0.5$
 $0.25a = t$ and $a = 4t$ or the pitch diameter of a 60-deg thread changes 4 times the thickness of coating

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:

$$\begin{aligned} &0.3737 \text{ after coating maximum major diameter} \\ &- 0.0006 (2 \times 0.0003 \text{ maximum coating thickness}) \\ &= 0.3731 \text{ before coating maximum major diameter} \end{aligned}$$

$$\begin{aligned} &0.3331 \text{ after coating maximum pitch diameter} \\ &- 0.0012 (4 \times 0.0003 \text{ maximum coating thickness}) \\ &= 0.3319 \text{ before coating maximum pitch diameter} \end{aligned}$$

$$\begin{aligned} &0.3015 \text{ after coating maximum minor diameter} \\ &- 0.0006 (2 \times 0.0003 \text{ maximum coating thickness}) \\ &= 0.3009 \text{ before coating maximum minor diameter} \end{aligned}$$

$$\begin{aligned} &0.0113 \text{ after coating maximum root radius} \\ &+ 0.0002 (1 \times 0.0002 \text{ minimum coating thickness}) \\ &= 0.0115 \text{ before coating maximum root radius} \end{aligned}$$

To determine the before coating minimum material sizes:

$$\begin{aligned} &0.3643 \text{ after coating minimum major diameter} \\ &- 0.0004 (2 \times 0.0002 \text{ minimum coating thickness}) \\ &= 0.3639 \text{ before coating minimum major diameter} \end{aligned}$$

$$\begin{aligned} &0.3287 \text{ after coating minimum pitch diameter} \\ &- 0.0008 (4 \times 0.0002 \text{ minimum coating thickness}) \\ &= 0.3279 \text{ before coating minimum pitch diameter} \end{aligned}$$

$$\begin{aligned} &0.2933 \text{ after coating minimum minor diameter} \\ &- 0.0004 (2 \times 0.0002 \text{ minimum coating thickness}) \\ &= 0.2929 \text{ before coating minimum minor diameter} \end{aligned}$$

$$\begin{aligned} &0.0094 \text{ after coating minimum root radius} \\ &+ 0.0003 (1 \times 0.0003 \text{ maximum coating thickness}) \\ &= 0.0097 \text{ before coating minimum root radius} \end{aligned}$$

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

(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: $\frac{1}{2}$ -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 (4×0.0004 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: $\frac{1}{2}$ -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: $\frac{3}{8}$ -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

$$\begin{aligned}
 &+ 0.0012 (4 \times 0.0003 \text{ maximum coating thickness}) \\
 &= 0.3356 \text{ before coating minimum pitch diameter}
 \end{aligned}$$

$$\begin{aligned}
 &0.3070 \text{ after coating minimum minor diameter} \\
 &+ 0.0006 (2 \times 0.0003 \text{ maximum coating thickness}) \\
 &= 0.3076 \text{ before coating minimum minor diameter}
 \end{aligned}$$

To determine the before-coating maximum material sizes:

$$\begin{aligned}
 &0.3401 \text{ after coating maximum pitch diameter} \\
 &+ 0.0008 (4 \times 0.0002 \text{ minimum coating thickness}) \\
 &= 0.3409 \text{ before coating maximum pitch diameter}
 \end{aligned}$$

$$\begin{aligned}
 &0.3210 \text{ after coating maximum minor diameter} \\
 &+ 0.0004 (2 \times 0.0002 \text{ minimum coating thickness}) \\
 &= 0.3214 \text{ before coating maximum minor diameter}
 \end{aligned}$$

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: $\frac{1}{2}$ -13-UNJC-3B

Coating thickness: 0.0002 in.

To determine the before-coating maximum material sizes:

$$\begin{aligned}
 &0.5000 \text{ after coating minimum major diameter} \\
 &+ 0.0006 (3 \times 0.0002 \text{ coating thickness}) \\
 &= 0.5006 \text{ before coating minimum major diameter}
 \end{aligned}$$

$$\begin{aligned}
 &0.4500 \text{ after coating minimum pitch diameter} \\
 &+ 0.0012 (6 \times 0.0002 \text{ coating thickness}) \\
 &= 0.4512 \text{ before coating minimum pitch diameter}
 \end{aligned}$$

$$\begin{aligned}
 &0.4251 \text{ after coating minimum minor diameter} \\
 &+ 0.0006 (3 \times 0.0002 \text{ coating thickness}) \\
 &= 0.4257 \text{ before coating minimum minor diameter}
 \end{aligned}$$

To determine the before-coating minimum material sizes:

$$\begin{aligned}
 &0.4548 \text{ after coating maximum pitch diameter} \\
 &+ 0.0008 (4 \times 0.0002 \text{ coating thickness})
 \end{aligned}$$

$$= 0.4556 \text{ before coating maximum pitch diameter}$$

$$0.4368 \text{ after coating maximum minor diameter}$$

$$+ 0.0004 (2 \times 0.0002 \text{ coating thickness})$$

$$= 0.4372 \text{ before coating maximum minor diameter}$$

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

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

$$d \text{ max.} = D \text{ bsc} - es$$

(2) for Class 3A

$$d \text{ max.} = D \text{ bsc}$$

(b) *Minimum Major Diameter (External Threads)*

(1) for all classes

$$d \text{ min.} = d \text{ max.} - Td \text{ for respective class of thread}$$

(c) *Maximum Pitch Diameter (External Threads)*

(1) for Classes 1A and 2A

$$d_2 = D_2 \text{ bsc} - es$$

(2) for Class 3A

$$d_2 = D_2 \text{ bsc}$$

(d) *Minimum Pitch Diameter (External Threads)*

(1) for all classes

$$d_2 \text{ min.} = d_2 \text{ max.} - Td_2 \text{ for respective class of thread}$$

(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

$$d_1 \text{ max.} = D_1 \text{ bsc} - es$$

(-b) for Class 3A

$$d_1 \text{ max.} = D_1 \text{ bsc}$$

(2) for UNR series threads, the formulas are

(-a) for Classes 1A and 2A

$$d_3 \text{ max.} = D_1 \text{ bsc} - es - 0.10825318P$$

(-b) for Class 3A

$$d_3 \text{ max.} = D_1 \text{ bsc} - 0.10825318P$$

(3) for UNJ series threads, the formulas are

(-a) for Class 2A

$$d_3 \text{ max.} = d_2 \text{ max. (for Class 2A UN)} - 0.5051800P$$

(see Table 5)

(-b) for Class 3A

$$d_3 \text{ max.} = d_2 \text{ max. (for Class 3A UN)} - 0.5051800P$$

(see Table 5)

$$(-c) r \text{ max.} = 0.18042196P$$

(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

$$d_1 \text{ min.} = d_2 \text{ min.} - 0.64951905P$$

(2) for UNJ series threads, the formulas are

(-a) for Class 2A

$$d_3 \text{ min.} = d_2 \text{ min. (for Class 2A UN)} - 0.565800P \text{ (see Table 5)}$$

(-b) for Class 3A

$$d_3 \text{ min.} = d_2 \text{ min. (for Class 3A UN)} - 0.565800P \text{ (see Table 5)}$$

(see Table 5)

$$(-c) r \text{ min.} = 0.15011107P$$

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

$$D \text{ min.} = D \text{ bsc}$$

(c) *Minimum Pitch Diameter (Internal Threads)*

(1) For all classes

$$D_2 \text{ min.} = D_2 \text{ bsc}$$

(d) *Maximum Pitch Diameter (Internal Threads)*

(1) For all classes

$$D_2 \text{ max.} = D_2 \text{ min.} + Td_2 \text{ for respective class of thread}$$

(e) *Minimum Minor Diameter (Internal Threads)*

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

$D_1 \text{ min.} = D_{\text{bsc}} - 2h_n$ or $D_{\text{bsc}} - 1.08253175P$, 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

$$D_1 \text{ min.} = D \text{ min.} - 0.97427858P, \text{ rounded as follows:}$$

(-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

$D_1 \text{ max.} = D_1 \text{ min. (six decimal-place value)} + TD_1$ [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 $\frac{1}{2}$ 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

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 | UNJ | Basic UN Minor Diam. Internal, D_1 bsc | Basic UNJ Minor Diam. Internal, D_1 min. = | Lead Angle at Basic Pitch Diam., λ | | Area at Minor Diam. $D - 2h_b$, in. ² | UN/UNR Tensile Stress Area, in. ² |
|--------------|-----------|----------------------------|-------------|------------------------------|------------------------|------------------------|--|--|--|-----------------------|---|--|
| Primary | Secondary | | | | External, d_3 (Ref.) | External, d_3 (Ref.) | | deg | Min. | [Notes (1), (2), (3)] | [Notes (1), (3), (4)] | |
| ... | 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](#).

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](#).

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 | UNJ | Basic UN Minor Diam. Internal, D_1 bsc | Basic UNJ Minor Diam. Internal, D_1 min. = | Lead Angle at Basic Pitch Diam., λ | | Area at Minor Diam. $D - 2h_b$, in. ² | UN/UNR Tensile Stress Area, in. ² |
|--------------|-----------|----------------------------|-------------|------------------------------|------------------------|------------------------|--|--|--|-----------------------|---|--|
| Primary | Secondary | | | | External, d_3 (Ref.) | External, d_3 (Ref.) | | deg | Min. | [Notes (1), (2), (3)] | [Notes (1), (3), (4)] | |
| ... | 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.

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 |

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.

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 | UNJ Design | Basic UN | Basic UNJ | 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 | | | Minor Diameter External, d_3 (Ref.) | Minor Diameter External, d_3 (Ref.) | Minor Diameter Internal, D_1 bsc | Minor Diameter Internal, D_1 min. = D_1 bsc | 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 |

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 | UNJ Design | Basic UN | Basic UNJ | 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 | | | Minor Diameter External, d_3 (Ref.) | Minor Diameter External, d_3 (Ref.) | Minor Diameter Internal, D_1 bsc | Minor Diameter Internal, D_1 min. = D_1 bsc | deg | Min. | | |
| 4½ | ... | 4.5000 | 4.3917 | 4.3015 | 4.3075 | 4.3196 | 4.3376 | 0 | 42 | 14.4107 | 14.7769 |
| ... | 4⅝ | 4.6250 | 4.5167 | 4.4265 | 4.4325 | 4.4446 | 4.4626 | 0 | 40 | 15.2641 | 15.6409 |
| 4¾ | ... | 4.7500 | 4.6417 | 4.5515 | 4.5575 | 4.5696 | 4.5876 | 0 | 39 | 16.1419 | 16.5294 |
| ... | 4⅞ | 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 |
| ... | 5⅛ | 5.1250 | 5.0167 | 4.9265 | 4.9325 | 4.9446 | 4.9626 | 0 | 36 | 18.9228 | 19.3421 |
| 5¼ | ... | 5.2500 | 5.1417 | 5.0515 | 5.0575 | 5.0696 | 5.0876 | 0 | 35 | 19.8989 | 20.3288 |
| ... | 5⅜ | 5.3750 | 5.2667 | 5.1765 | 5.1825 | 5.1946 | 5.2126 | 0 | 35 | 20.8995 | 21.3400 |
| 5½ | ... | 5.5000 | 5.3917 | 5.3015 | 5.3075 | 5.3196 | 5.3376 | 0 | 34 | 21.9246 | 22.3758 |
| ... | 5⅝ | 5.6250 | 5.5167 | 5.4265 | 5.4325 | 5.4446 | 5.4626 | 0 | 33 | 22.9743 | 23.4361 |
| 5¾ | ... | 5.7500 | 5.6417 | 5.5515 | 5.5575 | 5.5696 | 5.5876 | 0 | 32 | 24.0485 | 24.5209 |
| ... | 5⅞ | 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.

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

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 ³ / ₄ | ... | 3.7500 | 3.6688 | 3.6012 | 3.6057 | 3.6147 | 3.6282 | 0 | 37 | 10.11 | 10.34 |
| ... | 3 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 ¹ / ₈ | 4.1250 | 4.0438 | 3.9762 | 3.9807 | 3.9897 | 4.0032 | 0 | 34 | 12.33 | 12.59 |
| 4 ¹ / ₄ | ... | 4.2500 | 4.1688 | 4.1012 | 4.1057 | 4.1147 | 4.1282 | 0 | 33 | 13.12 | 13.38 |
| ... | 4 ³ / ₈ | 4.3750 | 4.2938 | 4.2262 | 4.2307 | 4.2397 | 4.2532 | 0 | 32 | 13.94 | 14.21 |
| 4 ¹ / ₂ | ... | 4.5000 | 4.4188 | 4.3512 | 4.3557 | 4.3647 | 4.3782 | 0 | 31 | 14.8 | 15.1 |
| ... | 4 ⁵ / ₈ | 4.6250 | 4.5438 | 4.4762 | 4.4807 | 4.4897 | 4.5032 | 0 | 30 | 15.6 | 15.9 |
| 4 ³ / ₄ | ... | 4.7500 | 4.6688 | 4.6012 | 4.6057 | 4.6147 | 4.6282 | 0 | 29 | 16.5 | 16.8 |
| ... | 4 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 ¹ / ₈ | 5.1250 | 5.0438 | 4.9762 | 4.9807 | 4.9897 | 5.0032 | 0 | 27 | 19.3 | 19.7 |
| 5 ¹ / ₄ | ... | 5.2500 | 5.1688 | 5.1012 | 5.1057 | 5.1147 | 5.1282 | 0 | 26 | 20.3 | 20.7 |
| ... | 5 ³ / ₈ | 5.3750 | 5.2938 | 5.2262 | 5.2307 | 5.2397 | 5.2532 | 0 | 26 | 21.3 | 21.7 |
| 5 ¹ / ₂ | ... | 5.5000 | 5.4188 | 5.3512 | 5.3557 | 5.3647 | 5.3782 | 0 | 25 | 22.4 | 22.7 |
| ... | 5 ⁵ / ₈ | 5.6250 | 5.5438 | 5.4762 | 5.4807 | 5.4897 | 5.5032 | 0 | 25 | 23.4 | 23.8 |
| 5 ³ / ₄ | ... | 5.7500 | 5.6688 | 5.6012 | 5.6057 | 5.6147 | 5.6282 | 0 | 24 | 24.5 | 24.9 |
| ... | 5 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.

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 |

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 ³ / ₄ | ... | 2.7500 | 2.6959 | 2.6508 | 2.6538 | 2.6598 | 2.6688 | 0 | 34 | 5.480 | 5.590 |
| ... | 2 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 ¹ / ₈ | 3.1250 | 3.0709 | 3.0258 | 3.0288 | 3.0348 | 3.0438 | 0 | 30 | 7.150 | 7.280 |
| 3 ¹ / ₄ | ... | 3.2500 | 3.1959 | 3.1508 | 3.1538 | 3.1598 | 3.1688 | 0 | 29 | 7.800 | 7.900 |
| ... | 3 ³ / ₈ | 3.3750 | 3.3209 | 3.2758 | 3.2788 | 3.2848 | 3.2938 | 0 | 27 | 8.400 | 8.500 |
| 3 ¹ / ₂ | ... | 3.5000 | 3.4459 | 3.4008 | 3.4038 | 3.4098 | 3.4188 | 0 | 26 | 9.000 | 9.200 |
| ... | 3 ⁵ / ₈ | 3.6250 | 3.5709 | 3.5258 | 3.5288 | 3.5348 | 3.5438 | 0 | 26 | 9.700 | 9.900 |
| 3 ³ / ₄ | ... | 3.7500 | 3.6959 | 3.6508 | 3.6538 | 3.6598 | 3.6688 | 0 | 25 | 10.400 | 10.600 |
| ... | 3 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 ¹ / ₈ | 4.1250 | 4.0709 | 4.0258 | 4.0288 | 4.0348 | 4.0438 | 0 | 22 | 12.700 | 12.800 |
| 4 ¹ / ₄ | ... | 4.2500 | 4.1959 | 4.1508 | 4.1538 | 4.1598 | 4.1688 | 0 | 22 | 13.500 | 13.600 |
| ... | 4 ³ / ₈ | 4.3750 | 4.3209 | 4.2758 | 4.2788 | 4.2848 | 4.2938 | 0 | 21 | 14.300 | 14.500 |
| 4 ¹ / ₂ | ... | 4.5000 | 4.4459 | 4.4008 | 4.4038 | 4.4098 | 4.4188 | 0 | 21 | 15.100 | 15.300 |
| ... | 4 ⁵ / ₈ | 4.6250 | 4.5709 | 4.5258 | 4.5288 | 4.5348 | 4.5438 | 0 | 20 | 16.000 | 16.200 |
| 4 ³ / ₄ | ... | 4.7500 | 4.6959 | 4.6508 | 4.6538 | 4.6598 | 4.6688 | 0 | 19 | 16.900 | 17.100 |
| ... | 4 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 ¹ / ₈ | 5.1250 | 5.0709 | 5.0258 | 5.0288 | 5.0348 | 5.0438 | 0 | 18 | 19.800 | 20.000 |
| 5 ¹ / ₄ | ... | 5.2500 | 5.1959 | 5.1508 | 5.1538 | 5.1598 | 5.1688 | 0 | 18 | 20.800 | 21.000 |
| ... | 5 ³ / ₈ | 5.3750 | 5.3209 | 5.2758 | 5.2788 | 5.2848 | 5.2938 | 0 | 17 | 21.800 | 22.000 |
| 5 ¹ / ₂ | ... | 5.5000 | 5.4459 | 5.4008 | 5.4038 | 5.4098 | 5.4188 | 0 | 17 | 22.800 | 23.100 |
| ... | 5 ⁵ / ₈ | 5.6250 | 5.5709 | 5.5258 | 5.5288 | 5.5348 | 5.5438 | 0 | 16 | 23.900 | 24.100 |
| 5 ³ / ₄ | ... | 5.7500 | 5.6959 | 5.6508 | 5.6538 | 5.6598 | 5.6688 | 0 | 16 | 25.000 | 25.200 |
| ... | 5 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 |

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.

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. | | |
| $\frac{3}{8}$ [Note (5)] | ... | 0.3750 | 0.3344 | 0.3006 | 0.3028 | 0.3073 | 0.3141 | 3 | 25 | 0.0678 | 0.0775 |
| $\frac{7}{16}$ | ... | 0.4375 | 0.3969 | 0.3631 | 0.3653 | 0.3698 | 0.3766 | 2 | 52 | 0.0997 | 0.1114 |
| $\frac{1}{2}$ | ... | 0.5000 | 0.4594 | 0.4256 | 0.4278 | 0.4323 | 0.4391 | 2 | 29 | 0.1378 | 0.1514 |
| $\frac{9}{16}$ | ... | 0.5625 | 0.5219 | 0.4881 | 0.4903 | 0.4948 | 0.5016 | 2 | 11 | 0.1819 | 0.1976 |
| $\frac{5}{8}$ | ... | 0.6250 | 0.5844 | 0.5506 | 0.5528 | 0.5573 | 0.5641 | 1 | 57 | 0.2320 | 0.2500 |
| ... | $\frac{11}{16}$ | 0.6875 | 0.6469 | 0.6131 | 0.6153 | 0.6198 | 0.6266 | 1 | 46 | 0.2890 | 0.3080 |
| $\frac{3}{4}$ [Note (5)] | ... | 0.7500 | 0.7094 | 0.6756 | 0.6778 | 0.6823 | 0.6891 | 1 | 36 | 0.3510 | 0.3730 |
| ... | $\frac{13}{16}$ | 0.8125 | 0.7719 | 0.7381 | 0.7403 | 0.7448 | 0.7516 | 1 | 29 | 0.4200 | 0.4440 |
| $\frac{7}{8}$ | ... | 0.8750 | 0.8344 | 0.8006 | 0.8028 | 0.8073 | 0.8141 | 1 | 22 | 0.4950 | 0.5210 |
| ... | $\frac{15}{16}$ | 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 |
| ... | $\frac{1}{16}$ | 1.0625 | 1.0219 | 0.9881 | 0.9903 | 0.9948 | 1.0016 | 1 | 7 | 0.7560 | 0.7880 |
| $\frac{1}{8}$ | ... | 1.1250 | 1.0844 | 1.0506 | 1.0528 | 1.0573 | 1.0641 | 1 | 3 | 0.8560 | 0.8890 |
| ... | $\frac{3}{16}$ | 1.1875 | 1.1469 | 1.1131 | 1.1153 | 1.1198 | 1.1266 | 0 | 60 | 0.9610 | 0.9970 |
| $\frac{1}{4}$ | ... | 1.2500 | 1.2094 | 1.1756 | 1.1778 | 1.1823 | 1.1891 | 0 | 57 | 1.0730 | 1.1110 |
| ... | $\frac{5}{16}$ | 1.3125 | 1.2719 | 1.2381 | 1.2403 | 1.2448 | 1.2516 | 0 | 54 | 1.1910 | 1.2300 |
| $\frac{3}{8}$ | ... | 1.3750 | 1.3344 | 1.3006 | 1.3028 | 1.3073 | 1.3141 | 0 | 51 | 1.3150 | 1.3560 |
| ... | $\frac{7}{16}$ | 1.4375 | 1.3969 | 1.3631 | 1.3653 | 1.3698 | 1.3766 | 0 | 49 | 1.4450 | 1.4880 |
| $\frac{1}{2}$ | ... | 1.5000 | 1.4594 | 1.4256 | 1.4278 | 1.4323 | 1.4391 | 0 | 47 | 1.5800 | 1.6300 |
| ... | $\frac{9}{16}$ | 1.5625 | 1.5219 | 1.4881 | 1.4903 | 1.4948 | 1.5016 | 0 | 45 | 1.7200 | 1.7700 |
| $\frac{5}{8}$ | ... | 1.6250 | 1.5844 | 1.5506 | 1.5528 | 1.5573 | 1.5641 | 0 | 43 | 1.8700 | 1.9200 |
| ... | $\frac{11}{16}$ | 1.6875 | 1.6469 | 1.6131 | 1.6153 | 1.6198 | 1.6266 | 0 | 42 | 2.0300 | 2.0800 |
| $\frac{3}{4}$ | ... | 1.7500 | 1.7094 | 1.6756 | 1.6778 | 1.6823 | 1.6891 | 0 | 40 | 2.1900 | 2.2400 |
| ... | $\frac{13}{16}$ | 1.8125 | 1.7719 | 1.7381 | 1.7403 | 1.7448 | 1.7516 | 0 | 39 | 2.3500 | 2.4100 |
| $\frac{7}{8}$ | ... | 1.8750 | 1.8344 | 1.8006 | 1.8028 | 1.8073 | 1.8141 | 0 | 37 | 2.5300 | 2.5800 |
| ... | $\frac{15}{16}$ | 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 |
| ... | $\frac{1}{8}$ | 2.1250 | 2.0844 | 2.0506 | 2.0528 | 2.0573 | 2.0641 | 0 | 33 | 3.2800 | 3.3500 |
| $\frac{1}{4}$ | ... | 2.2500 | 2.2094 | 2.1756 | 2.1778 | 2.1823 | 2.1891 | 0 | 31 | 3.6900 | 3.7600 |
| ... | $\frac{3}{8}$ | 2.3750 | 2.3344 | 2.3006 | 2.3028 | 2.3073 | 2.3141 | 0 | 29 | 4.1300 | 4.2100 |

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. | | |
| 2½ | ... | 2.5000 | 2.4594 | 2.4256 | 2.4278 | 2.4323 | 2.4391 | 0 | 28 | 4.6000 | 4.6700 |
| ... | 2⅝ | 2.6250 | 2.5844 | 2.5506 | 2.5528 | 2.5573 | 2.5641 | 0 | 26 | 5.0800 | 5.1600 |
| 2¾ | ... | 2.7500 | 2.7094 | 2.6756 | 2.6778 | 2.6823 | 2.6891 | 0 | 25 | 5.5900 | 5.6800 |
| ... | 2⅞ | 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 |
| ... | 3⅛ | 3.1250 | 3.0844 | 3.0506 | 3.0528 | 3.0573 | 3.0641 | 0 | 22 | 7.2800 | 7.3700 |
| 3¼ | ... | 3.2500 | 3.2094 | 3.1756 | 3.1778 | 3.1823 | 3.1891 | 0 | 21 | 7.8900 | 7.9900 |
| ... | 3⅜ | 3.3750 | 3.3344 | 3.3006 | 3.3028 | 3.3073 | 3.3141 | 0 | 21 | 8.5200 | 8.6300 |
| 3½ | ... | 3.5000 | 3.4594 | 3.4256 | 3.4278 | 3.4323 | 3.4391 | 0 | 20 | 9.1800 | 9.2900 |
| ... | 3⅝ | 3.6250 | 3.5844 | 3.5506 | 3.5528 | 3.5573 | 3.5641 | 0 | 19 | 9.8600 | 9.9800 |
| 3¾ | ... | 3.7500 | 3.7094 | 3.6756 | 3.6778 | 3.6823 | 3.6891 | 0 | 18 | 10.5700 | 10.6900 |
| ... | 3⅞ | 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 |
| ... | 4⅛ | 4.1250 | 4.0844 | 4.0506 | 4.0528 | 4.0573 | 4.0641 | 0 | 17 | 12.8400 | 12.9700 |
| 4¼ | ... | 4.2500 | 4.2094 | 4.1756 | 4.1778 | 4.1823 | 4.1891 | 0 | 16 | 13.6500 | 13.7800 |
| ... | 4⅜ | 4.3750 | 4.3344 | 4.3006 | 4.3028 | 4.3073 | 4.3141 | 0 | 16 | 14.4800 | 14.6200 |
| 4½ | ... | 4.5000 | 4.4594 | 4.4256 | 4.4278 | 4.4323 | 4.4391 | 0 | 15 | 15.3000 | 15.5000 |
| ... | 4⅝ | 4.6250 | 4.5844 | 4.5506 | 4.5528 | 4.5573 | 4.5641 | 0 | 15 | 16.2000 | 16.4000 |
| 4¾ | ... | 4.7500 | 4.7094 | 4.6756 | 4.6778 | 4.6823 | 4.6891 | 0 | 15 | 17.1000 | 17.3000 |
| ... | 4⅞ | 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 |
| ... | 5⅛ | 5.1250 | 5.0844 | 5.0506 | 5.0528 | 5.0573 | 5.0641 | 0 | 13 | 20.0000 | 20.1000 |
| 5¼ | ... | 5.2500 | 5.2094 | 5.1756 | 5.1778 | 5.1823 | 5.1891 | 0 | 13 | 21.0000 | 21.1000 |
| ... | 5⅜ | 5.3750 | 5.3344 | 5.3006 | 5.3028 | 5.3073 | 5.3141 | 0 | 13 | 22.0000 | 22.2000 |
| 5½ | ... | 5.5000 | 5.4594 | 5.4256 | 5.4278 | 5.4323 | 5.4391 | 0 | 13 | 23.1000 | 23.2000 |
| ... | 5⅝ | 5.6250 | 5.5844 | 5.5506 | 5.5528 | 5.5573 | 5.5641 | 0 | 12 | 24.1000 | 24.3000 |
| 5¾ | ... | 5.7500 | 5.7094 | 5.6756 | 5.6778 | 5.6823 | 5.6891 | 0 | 12 | 25.2000 | 25.4000 |
| ... | 5⅞ | 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 |

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.

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)] |
|-----------------|------------------|-------------------------------|---------------------------------|--|--|---|---|---|------|--|--|
| | | | | | | | | 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 |

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 ¹ / ₄ | ... | 2.2500 | 2.2175 | 2.1905 | 2.1922 | 2.1959 | 2.2013 | 0 | 25 | 3.7498 | 3.8057 |
| ... | 2 ³ / ₈ | 2.3750 | 2.3425 | 2.3155 | 2.3172 | 2.3209 | 2.3263 | 0 | 23 | 4.1911 | 4.2502 |
| 2 ¹ / ₂ | ... | 2.5000 | 2.4675 | 2.4405 | 2.4422 | 2.4459 | 2.4513 | 0 | 22 | 4.6570 | 4.7192 |
| ... | 2 ⁵ / ₈ | 2.6250 | 2.5925 | 2.5655 | 2.5672 | 2.5709 | 2.5763 | 0 | 21 | 5.1474 | 5.2128 |
| 2 ³ / ₄ | ... | 2.7500 | 2.7175 | 2.6905 | 2.6922 | 2.6959 | 2.7013 | 0 | 20 | 5.6623 | 5.7309 |
| ... | 2 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.

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.

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 | UNJ Design | 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)] |
|---------------------------|-----------------|-------------------------------|---------------------------------|---------------------------------------|---------------------------------------|---|---|---|----|--|--|
| | | | | Minor Diameter External, d_3 (Ref.) | Minor Diameter External, d_3 (Ref.) | | 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 |
| $\frac{1}{4}$ [Note (5)] | ... | 0.2500 | 0.2297 | 0.2128 | 0.2139 | 0.2162 | 0.2196 | 2 | 29 | 0.03440 | 0.03790 |
| $\frac{5}{16}$ [Note (5)] | ... | 0.3125 | 0.2922 | 0.2753 | 0.2764 | 0.2787 | 0.2821 | 1 | 57 | 0.05810 | 0.06250 |
| $\frac{3}{8}$ [Note (5)] | ... | 0.3750 | 0.3547 | 0.3378 | 0.3389 | 0.3412 | 0.3446 | 1 | 36 | 0.08780 | 0.09320 |
| $\frac{7}{16}$ | ... | 0.4375 | 0.4172 | 0.4003 | 0.4014 | 0.4037 | 0.4071 | 1 | 22 | 0.12370 | 0.13010 |
| $\frac{1}{2}$ | ... | 0.5000 | 0.4797 | 0.4628 | 0.4639 | 0.4662 | 0.4696 | 1 | 11 | 0.16600 | 0.17300 |
| $\frac{9}{16}$ | ... | 0.5625 | 0.5422 | 0.5253 | 0.5264 | 0.5287 | 0.5321 | 1 | 3 | 0.21400 | 0.22200 |
| $\frac{5}{8}$ | ... | 0.6250 | 0.6047 | 0.5878 | 0.5889 | 0.5912 | 0.5946 | 0 | 57 | 0.26800 | 0.27800 |
| ... | $\frac{11}{16}$ | 0.6875 | 0.6672 | 0.6503 | 0.6514 | 0.6537 | 0.6571 | 0 | 51 | 0.32900 | 0.33900 |
| $\frac{3}{4}$ | ... | 0.7500 | 0.7297 | 0.7128 | 0.7139 | 0.7162 | 0.7196 | 0 | 47 | 0.39500 | 0.40700 |
| ... | $\frac{13}{16}$ | 0.8125 | 0.7922 | 0.7753 | 0.7764 | 0.7787 | 0.7821 | 0 | 43 | 0.46800 | 0.48000 |
| $\frac{7}{8}$ | ... | 0.8750 | 0.8547 | 0.8378 | 0.8389 | 0.8412 | 0.8446 | 0 | 40 | 0.54700 | 0.56000 |
| ... | $\frac{15}{16}$ | 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.

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 |

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

$$\text{Lead tolerance} = (0.5Td_2)/1.732051$$

$$Td_2 = 0.0050$$

$$\text{Lead tolerance} = (0.5 \times 0.0050)/1.732051 = 0.0014 \text{ in.}$$

Angle tolerance (for 32 TPI and coarser) = $30 + (1.875 \times \text{TPI})$

$$\text{Angle tolerance} = 30 + (1.875 \times 8.5)$$

$$= 45.94 \text{ min}$$

$$= 45 \text{ min when rounded to nearest 5 min}$$

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

$$\text{Lead tolerance} = (0.5Td_2)/1.732051$$

Pitch diameter tolerance, $Td_2 = 0.0031$

$$\text{Lead tolerance} = (0.5 \times 0.0031)/1.732051 = 0.0009 \text{ in.}$$

Angle tolerance (for finer than 32 TPI) = $62 + (0.775 \times \text{TPI})$

$$\text{Angle tolerance} = 62 + (0.775 \times 41)$$

$$= 93.78 \text{ min}$$

$$= 1 \text{ deg and } 35 \text{ min when rounded to nearest 5 min}$$

(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 = 1/2 - 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 $\sqrt[3]{(0.03571429)^2}$ | ... |
| | 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. - $2h_{as}$ | ... |
| | $2h_{as}$ = 0.64951905 P | ... |
| | $2h_{as}$ = 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 | ... |

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

| Thread Size = 1/2 - 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) $P = 1/n = 1/28 = 0.03571429$.

Table 18B Examples of Internal Screw Threads

| Thread Size = 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 – $2h_n$ | ... | |
| | $2h_n = 1.08253175 P$ | ... | |
| | $2h_n = 1.08253175 (0.03571429)$ | All thread calculations are to be performed using P rounded to eight decimal places. | |
| | $2h_n = 0.038662$ | ... | |
| | D_1 min. = $0.5000 - 0.038662$ | ... | |
| (1) Minimum internal minor diameter, D_1 min. = Basic major diameter, D bsc – double height of internal thread, $2h_n$ | 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. | |
| (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 | $TD_1 = 0.25 (0.03571429) - 0.4 (0.001276)$ | ... | |
| | $TD_1 = 0.008929 - 0.000510$ | ... | |
| | $TD_1 = 0.008419$ | ... | |
| | $TD_1 = 0.0084$ | This figure is rounded to four decimal places to obtain the final value of TD_1 . | |
| | D_1 max. = $0.461338 + 0.0084$ | ... | |
| (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. = 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. = 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. | |
| (3) Minimum internal pitch diameter, D_2 min. = Basic major diameter, D bsc – twice the external thread addendum, h_b | $h_b = 0.023197$ | ... | |
| | D_2 min. = $0.5000 - 0.023197$ | ... | |
| | D_2 min. = 0.476803 | ... | |

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 |
| | $D_2 \text{ min.} = 0.4768$ | ... |
| (4) Maximum internal pitch diameter, $D_2 \text{ max.}$ = Minimum internal pitch diameter, $D_2 \text{ min.}$ + internal pitch diameter tolerance, TD_2 | $D_2 \text{ max.} = D_2 \text{ min.} + TD_2$ $TD_2 = 1.300$ (Td_2 for Class 2A) $TD_2 = 1.300$ (0.003668) $TD_2 = 0.004768$ $TD_2 = 0.0048$ $D_2 \text{ max.} = 0.4768 + 0.0048$ $D_2 \text{ max.} = 0.4816$ | This figure is rounded to four decimal places to obtain the final value of $D_2 \text{ min.}$... The constant 1.300 is for this Class 2B example and will be different for Classes 1B and 3B. See para. 5.8.2. For the Td_2 Class 2A pitch diameter tolerance, see Table 18A, (4) . The six-place decimal place value is used. ... This figure is rounded to four decimal places to obtain the final value of TD_2 |
| (5) Minimum internal major diameter, $D \text{ min.}$ = Basic major diameter, $D \text{ bsc}$ | $D \text{ min.} = D \text{ bsc}$ $D \text{ bsc} = 0.5000$ $D \text{ min.} = 0.5000$ | ... ... ... |

GENERAL NOTES:

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

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

$$2\alpha = 60 \text{ deg}$$

(b) Half angle of thread

$$\alpha = 30 \text{ deg}$$

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

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

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

$$H = 0.86602540P \text{ (see Table 5, column 24)}$$

(e) Height of UNR external thread, design form

$$h_s \text{ (for UNR)} = 0.59539247P = (0.6875H \text{ or } \frac{11}{16}H) \text{ (see Table 5, column 21)}$$

(f) Height of internal thread and UN external thread

$$h_s \text{ (for UN)} = h_n = 0.54126588P = (0.6250H \text{ or } \frac{5}{8}H) \text{ (see Table 5, column 18)}$$

(g) Height of thread engagement

$$h_s \text{ (for UN)} = 0.54126588P = (0.6250H \text{ or } \frac{5}{8}H) \text{ (see Table 5, column 18)}$$

(h) Flat at crest of external thread

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

(i) Truncation of UN external thread crest

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

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

$$S_{rs} = 0.16237976P = (0.1875H \text{ or } \frac{3}{16}H) \text{ (see Table 5, column 7)}$$

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

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

(l) Truncation of internal thread crest

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

(m) Flat at root of internal thread

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

(n) Truncation of internal thread root

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

(o) Addendum of external thread

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

(p) Major diameter of external thread

$$d = D - es$$

(q) Pitch diameter of external thread

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

(r) Minor diameter of UNR external thread

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

(s) Minor diameter of UN external thread

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

(t) Major diameter of internal thread is D

$$D = D \text{ bsc}$$

(u) Pitch diameter of internal thread is D_2

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

(v) Minor diameter of internal thread D_1

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

11 TABLES OF BASIC DIMENSIONS

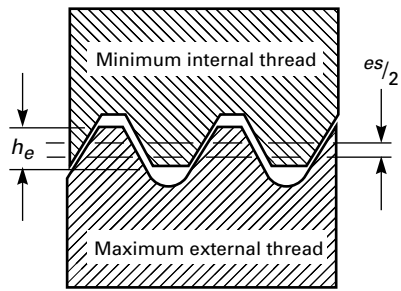
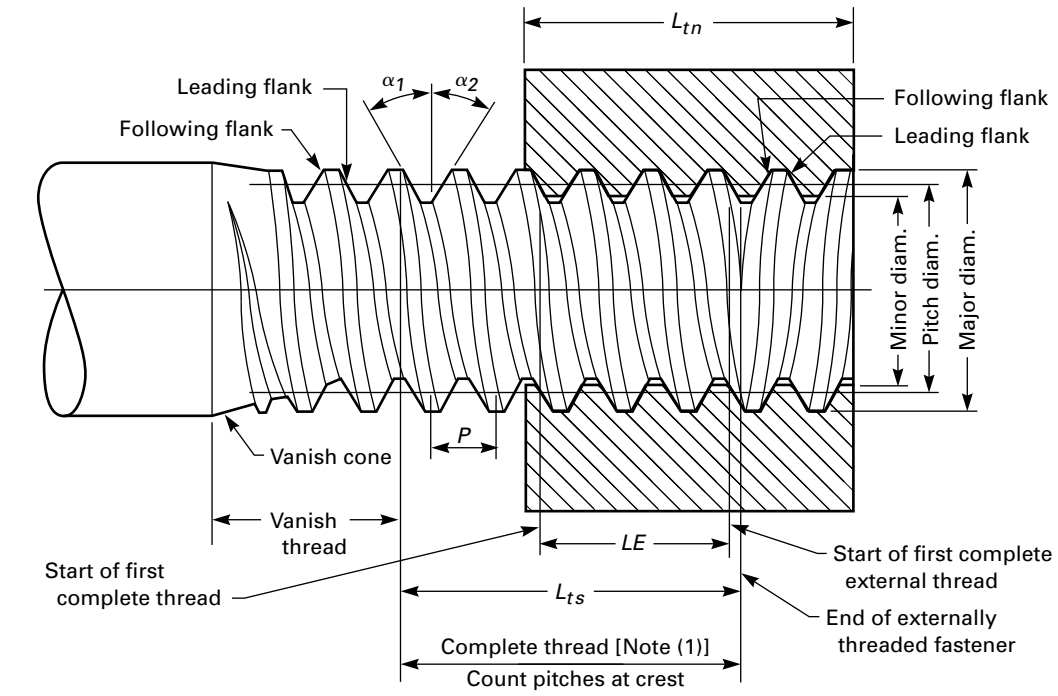
11.1 Table Content

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.

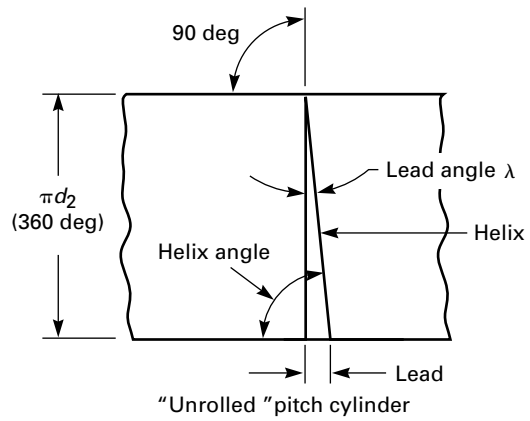
11.2 Thread Series

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

Figure 16 Application of General Thread Symbols

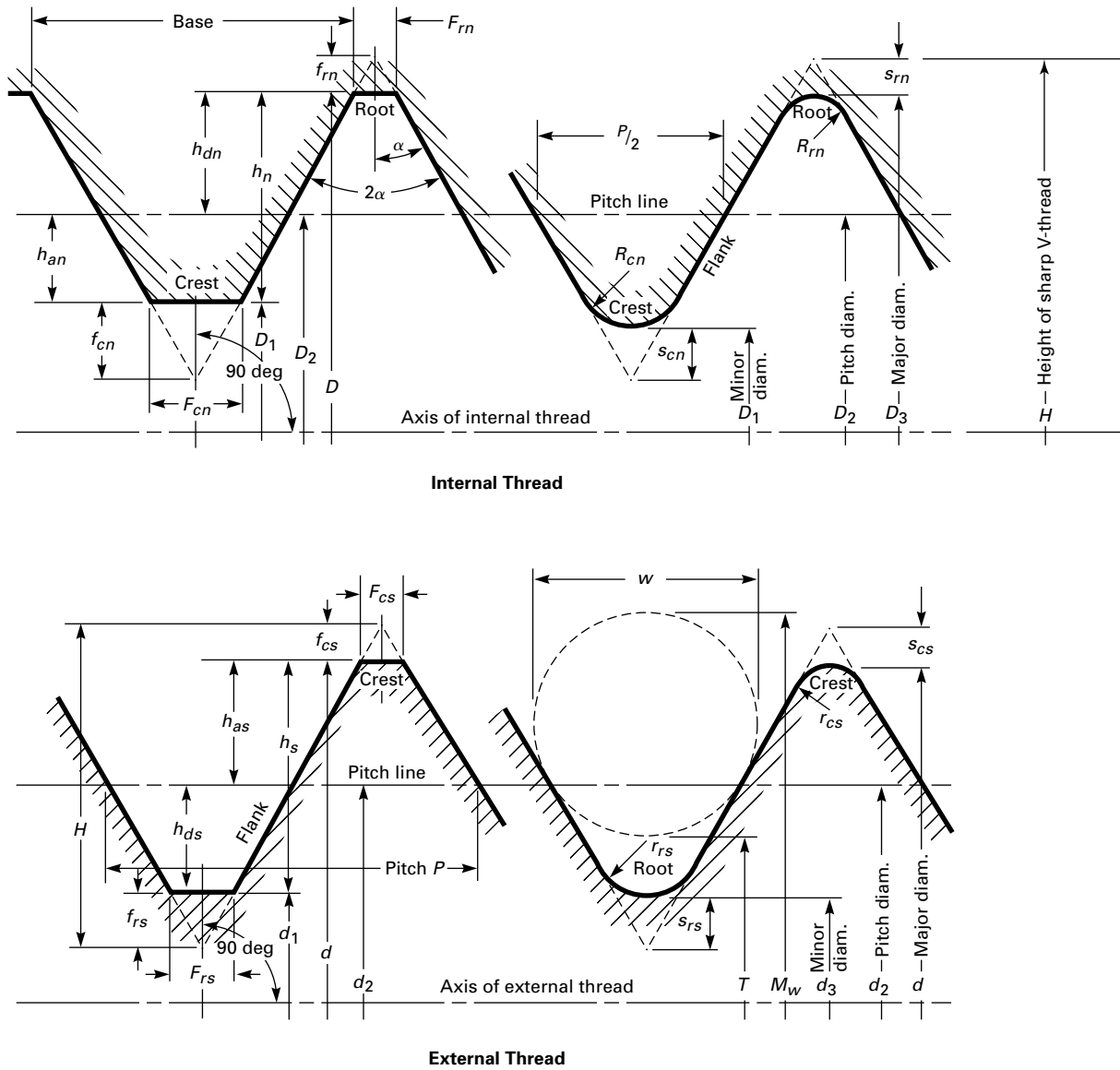


Thread With an Allowance



Lead and Helix Angles

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



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.

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

| Threads/in. | Allowable Variation in Half Angle of Thread | |
|-------------|---|---------|
| | ±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.

Table 20 Nomenclature

| Symbol | Dimension | Remarks |
|------------|--|---|
| C | Correction to measurement over best size wires to give pitch diameter | d_2 or $D_2 = M_w - C - c$ $C = W(1 + \operatorname{cosec} \alpha) - (\cot \alpha)/2n$ |
| 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 | ... |

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 | $\tan \lambda = L \pi (d_2 \text{ or } D_2)$ |
| 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 | Λ , λ = Lambda | π = Pi | Φ , ϕ = Phi |
| B, β = Beta | H, η = Eta | M, μ = Mu | P, ρ = Rho | X, χ = Chi |
| Γ , 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, \omicron = Omicron | Υ , υ = Upsilon | |

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](#).

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

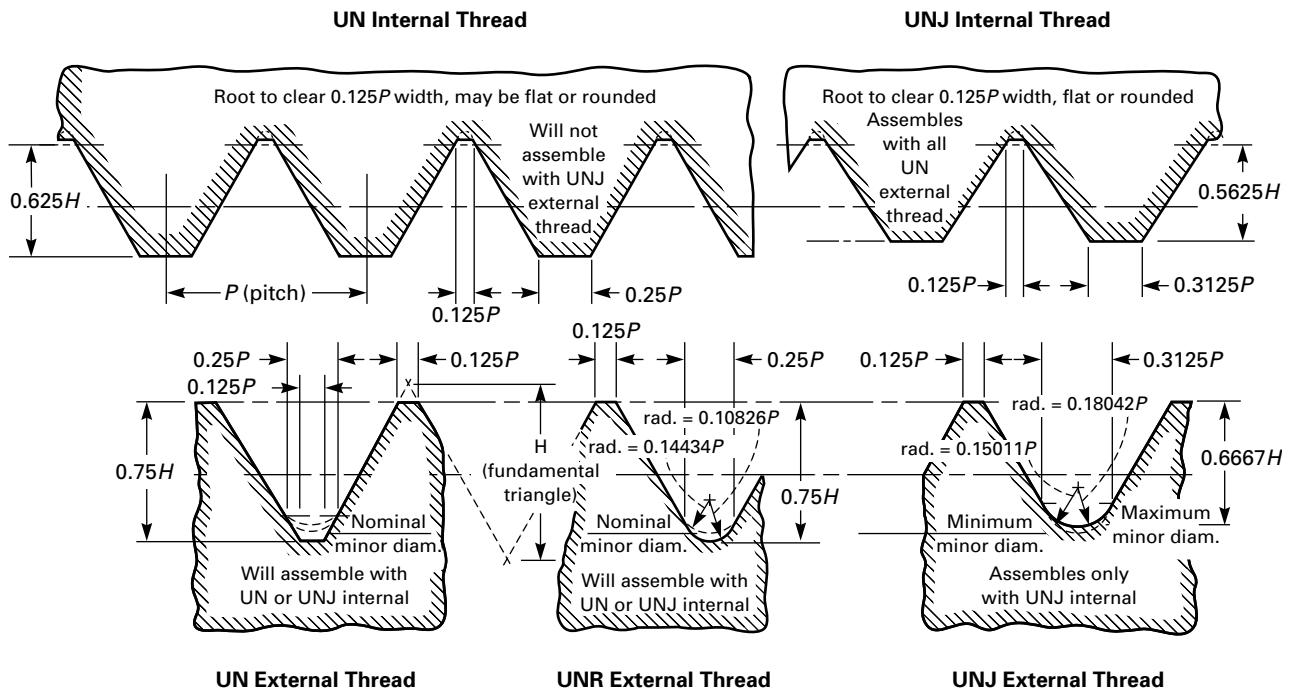


Table A-1 Identification of 60-deg Inch Screw Threads Within the Scope of the ASME B1 Committee

| 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.

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

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

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

$$AS_n = 3.1416(1/P)(LE)(d_{min.}) \times [1/(2(1/P)) + 0.57735 (d_{min.} - D_2max.)]$$

$$AS_s = 3.1416 (1/P)(LE)(D_1max.) \times [1/(2(1/P)) + 0.57735 (d_2min. - D_1max.)]$$

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 = $S_t A_s$

(b) shear strength of threads = $0.5S_t (AS_n \text{ or } AS_s)$

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 Technical Paper 770420, "Analysis and Design of Threaded Assemblies," by E. M. Alexander.

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.

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.

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | | Internal [Note (1)] | | | | | |
|------------------------------|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|----------------|---------------------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | 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)] | | | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | Min. | Max. | Min. | Max. | Tolerance | | |
| (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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | | Internal [Note (1)] | | | | | |
|------------------------------|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|-------|---------------------|--------|---|--------|-----------|------------------------|
| | | Class | Allowance | Major Diameter | | Pitch Diameter and Functional Diameter [Note (3)] | | | Maximum UNR Minor Diameter [Note (5)] (Ref.) | Class | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (3)] | | | Minimum Major Diameter |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | | Min. | Max. | Min. | Max. | Tolerance | |
| (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) 1/2 - 14 or 0.5000 - 14 | UNS | 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 - 18 or 0.5000 - 18 | 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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | Internal [Note (1)] | | | | | | |
|------------------------------|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|---------------------|-------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | 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)] | | | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | Min. | Max. | Min. | Max. | Tolerance | | |
| 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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | Internal [Note (1)] | | | | | | |
|---|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|---------------------|-------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | Major Diameter | | Pitch Diameter and Functional Diameter [Note (3)] | | Tolerance [Note (4)] | Maximum UNR Minor Diameter [Note (5)] (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (3)] | | Tolerance | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | | | Min. | Max. | Min. | Max. | | | |
| 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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | | Internal [Note (1)] | | | | | |
|--|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|----------------|---------------------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | 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)] | | | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | Min. | Max. | Min. | Max. | Tolerance | | |
| (6) 1 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 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 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 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 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 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 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 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 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 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 ¹ / ₄ - 10 or 2.2500 - 10 | UNS | 2A | 0.0020 | 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 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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | | Internal [Note (1)] | | | | | |
|--|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|----------------|---------------------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | 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)] | | | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | Min. | Max. | Min. | Max. | Tolerance | | |
| (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 |
| | | 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 |
| | | 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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | | Internal [Note (1)] | | | | | |
|---|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|----------------|---------------------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | 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)] | | | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | Min. | Max. | Min. | Max. | Tolerance | | |
| (6) 3 ¹ / ₄ - 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) 3 ¹ / ₂ - 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) 3 ¹ / ₂ - 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) 3 ¹ / ₂ - 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) 3 ³ / ₄ - 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) 3 ³ / ₄ - 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) 3 ³ / ₄ - 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) 4 ¹ / ₄ - 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) 4 ¹ / ₄ - 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) 4 ¹ / ₂ - 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) 4 ¹ / ₂ - 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) 4 ³ / ₄ - 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) 4 ³ / ₄ - 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 |

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

| Nominal Size and Threads/in. | Series Designation | External [Note (1)] | | | | | | | | | Internal [Note (1)] | | | | | |
|------------------------------|--------------------|---------------------|-----------|-----------------|--------|---|--------|----------------------|--|----------------|---------------------|---|--------|-----------|------------------------|--------|
| | | Class | Allowance | 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)] | | | Minimum Major Diameter | |
| | | | | Max. [Note (2)] | Min. | Max. [Note (2)] | Min. | Tolerance [Note (4)] | | Min. | Max. | Min. | Max. | Tolerance | | |
| (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) 5¼ - 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) 5¼ - 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) 5½ - 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) 5½ - 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) 5¾ - 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) 5¾ - 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.

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.

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

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | External | | | | | | | Internal | | | | | Minimum Major Diameter | | |
|------------------------------|--------------------|-------|-----------|----------------|--------|------|---|--------|-----------|-------|-----------------------------------|----------------|------|---|--------|------------------------|-----------|--------|
| | | | | Major Diameter | | | Pitch Diameter and Functional Diameter [Note (1)] | | | | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | | | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Class | | Min. | Max. | Min. | Max. | | Tolerance | |
| 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 |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | External | | | | | | Internal | | | | | | | |
|------------------------------|--------------------|-------|-----------|----------------|--------|---|--------|-----------|-----------------------------------|----------------|------|---|--------|-----------|------------------------|--------|-----|
| | | | | Major Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Tolerance | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Tolerance | Minimum Major Diameter | | |
| | | | | Max. | Min. | Min. | Max. | | | Min. | Max. | Min. | Max. | | | | |
| 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 | ... |
| | | 2A | 0.0016 | 0.6234 | 0.6052 | 0.5644 | 0.5561 | ... | ... | ... | 1B | ... | ... | ... | ... | ... | ... |
| 5/8 - 11 or 0.6250 - 11 | UNC | 2A | 0.0016 | 0.6234 | 0.6113 | ... | 0.5644 | 0.5589 | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| | | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | 0.590 | ... | ... | ... | ... |
| 5/8 - 32 or 0.6250 - 32 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| 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 | ... | ... | ... | ... | ... | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | 0.7512 | 0.0055 | ... | 2B | ... | ... | ... | ... | ... |
| 13/16 - 12 or 0.8125 - 12 | UN | 3A | ... | ... | ... | ... | ... | 0.7543 | 0.0041 | ... | 3B | ... | ... | ... | ... | ... | ... |
| | | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 0.7782 | 0.0063 | ... |
| 13/16 - 16 or 0.8125 - 16 | UN | 3A | ... | ... | ... | ... | ... | 0.7683 | 0.0036 | ... | 3B | ... | 0.7533 | ... | ... | 0.0047 | ... |
| | | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 0.7857 | 0.0057 | ... |
| 13/16 - 20 or 0.8125 - 20 | UNEF | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 0.7662 | ... | ... | ... | ... |
| | | 2A | ... | ... | ... | ... | ... | ... | 0.7843 | 0.0038 | ... | 2B | ... | ... | ... | ... | ... |
| 13/16 - 28 or 0.8125 - 28 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 0.7930 | 0.0037 | ... |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | External | | | | | | | Internal | | | | | Minimum Major Diameter | |
|--|--------------------|-------|-----------|----------------|--------|------|---|--------|-----------|------|-----------------------------------|----------------|--------|---|-----------|------------------------|-----|
| | | | | Major Diameter | | | Pitch Diameter and Functional Diameter [Note (1)] | | | | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Min. | | Max. | Min. | Max. | Tolerance | | |
| 1 ³ / 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 / 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 / ₈ - 14 or 0.8750 - 14 | UNF | 1A | ... | ... | ... | ... | ... | ... | ... | ... | 1B | ... | 0.814 | ... | ... | ... | ... |
| | | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | 0.814 | ... | ... | ... | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 0.8068 | ... | ... | ... | ... |
| 7 ⁸ / 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 / 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 / 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 / ₈ - 32 or 0.8750 - 32 | UN | 2A | ... | ... | ... | ... | ... | 0.8500 | 0.0036 | ... | 2B | ... | ... | ... | 0.8594 | 0.0047 | ... |
| | | 3A | ... | ... | ... | ... | ... | 0.8520 | 0.0027 | ... | 3B | ... | ... | ... | ... | ... | ... |
| 1 ⁵ / ₁₆ - 12 or 0.9375 - 12 | UN | 2A | ... | ... | ... | ... | ... | 0.8760 | 0.0057 | ... | 2B | ... | ... | ... | 0.8908 | 0.0074 | ... |
| | | 3A | ... | ... | ... | ... | ... | 0.8793 | 0.0041 | ... | 3B | ... | ... | ... | ... | ... | ... |
| 1 ⁵ / ₁₆ - 16 or 0.9375 - 16 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 0.9034 | 0.0065 | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 0.8783 | ... | 0.9018 | 0.0049 | ... |
| 1 ⁵ / ₁₆ - 20 or 0.9375 - 20 | UNEF | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 0.8912 | ... | ... | ... | ... |
| 1 ⁵ / 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 | ... |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | 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 | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | | Class | Min. | Max. | Min. | Max. | | Tolerance |
| 1 1/16 - 12 or 1.0625 - 12 | UN | 3A | ... | ... | ... | ... | ... | 1.0042 | 0.0042 | ... | 3B | ... | ... | ... | ... | ... | ... |
| 1 1/16 - 16 or 1.0625 - 16 | UN | 3A | ... | ... | ... | ... | ... | 1.0182 | 0.0037 | ... | 3B | ... | 1.0033 | ... | ... | ... | ... |
| 1 1/16 - 18 or 1.0625 - 18 | UNEF | 2A | ... | ... | ... | ... | ... | 1.0203 | 0.0047 | ... | 2B | ... | ... | ... | ... | ... | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 1.0310 | 0.0046 | ... |
| 1 1/16 - 20 or 1.0625 - 20 | UN | 2A | ... | ... | ... | ... | ... | 1.0241 | 0.0045 | ... | 2B | ... | ... | ... | ... | ... | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.0162 | ... | 1.0344 | 0.0044 | ... |
| 1 1/8 - 7 or 1.1250 - 7 | UNC | 2A | ... | ... | ... | ... | ... | ... | 0.0072 | ... | 2B | ... | ... | ... | ... | ... | ... |
| 1 1/8 - 16 or 1.1250 - 16 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 1.0909 | 0.0065 | ... |
| | | 3A | ... | ... | ... | ... | ... | 1.0807 | 0.0037 | ... | 3B | ... | 1.0658 | ... | ... | ... | ... |
| 1 1/8 - 18 or 1.1250 - 18 | UNEF | 2A | ... | ... | ... | ... | ... | 1.0828 | 0.0047 | ... | 2B | ... | ... | ... | ... | ... | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 1.0935 | 0.0046 | ... |
| 1 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 3/16 - 12 or 1.1875 - 12 | UN | 2A | ... | ... | ... | ... | ... | 1.1259 | 0.0058 | ... | 2B | ... | ... | ... | ... | ... | ... |
| 1 3/16 - 16 or 1.1875 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.1283 | ... | 1.1519 | 0.0050 | ... |
| 1 3/16 - 18 or 1.1875 - 18 | UNEF | 2A | 0.0015 | 1.1860 | 1.1773 | ... | 1.1499 | 1.1450 | 0.0049 | ... | 2B | ... | ... | ... | ... | ... | ... |
| 1 3/16 - 20 or 1.1875 - 20 | UN | 2A | ... | ... | ... | ... | ... | 1.1489 | 0.0047 | ... | 2B | ... | ... | ... | 1.1611 | 0.0061 | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.1412 | ... | ... | ... | ... |
| 1 1/4 - 16 or 1.2500 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.1908 | ... | ... | ... | ... |
| 1 1/4 - 20 or 1.2500 - 20 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.2037 | ... | ... | ... | ... |
| 1 5/16 - 12 or 1.3125 - 12 | UN | 3A | ... | ... | ... | ... | ... | 1.2541 | 0.0045 | ... | 3B | ... | ... | ... | 1.2640 | 0.0056 | ... |
| 1 5/16 - 16 or 1.3125 - 16 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 1.2785 | 0.0066 | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.2533 | ... | ... | ... | ... |
| 1 5/16 - 18 or 1.3125 - 18 | UNEF | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 1.2827 | 0.0063 | ... |

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)

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

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | 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 | | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | | Class | Min. | Max. | Min. | Max. | | Tolerance | |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 1.5766 | 0.0057 | ... |
| 1 ⁵ / ₈ - 16 or 1.6250 - 16 | UN | 2A | ... | ... | ... | ... | ... | 1.5776 | 0.0052 | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| 1 ⁵ / ₈ - 18 or 1.6250 - 18 | UN | 3A | ... | ... | ... | ... | ... | 1.5852 | 0.0037 | ... | ... | 3B | ... | ... | ... | 1.5937 | 0.0048 | ... |
| 1 ⁵ / ₈ - 20 or 1.6250 - 20 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.5787 | ... | 1.5971 | 0.0046 | ... |
| 1 ¹¹ / ₁₆ - 12 or 1.6875 - 12 | UN | 2A | ... | ... | ... | ... | ... | 1.6256 | 0.0060 | ... | ... | 2B | ... | ... | ... | 1.6412 | 0.0076 | ... |
| 1 ¹¹ / ₁₆ - 16 or 1.6875 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.6283 | ... | 1.6521 | 0.0052 | ... |
| 1 ¹¹ / ₁₆ - 18 or 1.6875 - 18 | UNEF | 2A | ... | ... | ... | ... | ... | 1.6448 | 0.0051 | ... | ... | 2B | ... | ... | ... | 1.6580 | 0.0066 | ... |
| 1 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 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 ³ / ₄ - 8 or 1.7500 - 8 | UN | 3A | ... | ... | ... | ... | ... | 1.6632 | 0.0056 | ... | ... | 3B | ... | ... | ... | ... | ... | ... |
| 1 ³ / ₄ - 16 or 1.7500 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.6908 | ... | ... | ... | ... |
| 1 ³ / ₄ - 20 or 1.7500 - 20 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.7037 | ... | ... | ... | ... |
| 1 ¹³ / ₁₆ - 16 or 1.8125 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.7533 | ... | ... | ... | ... |
| 1 ¹³ / ₁₆ - 20 or 1.8125 - 20 | UN | 3A | ... | ... | ... | ... | ... | 1.7764 | 0.0036 | ... | ... | 3B | ... | 1.7662 | ... | ... | ... | ... |
| 1 ⁷ / ₈ - 12 or 1.8750 - 12 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 1.8267 | 0.0058 | ... |
| 1 ⁷ / ₈ - 16 or 1.8750 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.8158 | ... | ... | ... | ... |
| 1 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 ¹⁵ / ₁₆ - 12 or 1.9375 - 12 | UN | 2A | ... | ... | ... | ... | ... | 1.8755 | 0.0061 | ... | ... | 2B | ... | ... | ... | 1.8913 | 0.0079 | ... |
| 1 ¹⁵ / ₁₆ - 16 or 1.9375 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.8785 | ... | ... | ... | ... |
| 1 ¹⁵ / ₁₆ - 20 or 1.9375 - 20 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 1.8912 | ... | ... | ... | ... |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | External | | | | | | | Internal | | | | | Minimum Major Diameter | |
|------------------------------|--------------------|-------|-----------|----------------|--------|------|---|--------|-----------|------|-----------------------------------|----------------|--------|---|-----------|------------------------|-----|
| | | | | Major Diameter | | | Pitch Diameter and Functional Diameter [Note (1)] | | | | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Min. | | Max. | Min. | Max. | Tolerance | | |
| 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 | ... | ... | ... | ... |

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)

| Nominal Size and Threads/in. | Series Designa- tion | Class | Allow- ance | 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 |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Class | | Min. | Max. | Min. | Max. | Tolerance | | |
| 2 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 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 ³ / ₄ - 20 or 2.7500 - 20 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 2.7241 | 0.0066 | ... | |
| | | 3A | ... | ... | ... | ... | ... | 2.7137 | 0.0038 | ... | 3B | ... | 2.7037 | ... | ... | ... | ... | |
| 2 ⁷ / ₈ - 12 or 2.8750 - 12 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 2.8271 | 0.0062 | ... | |
| 2 ⁷ / ₈ - 16 or 2.8750 - 16 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 2.8158 | ... | ... | ... | ... | |
| 2 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 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 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 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 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 ³ / ₈ - 12 or 3.3750 - 12 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 3.3293 | 0.0084 | ... | |
| 3 ³ / ₈ - 16 or 3.3750 - 16 | UN | 2A | ... | ... | ... | ... | ... | 3.3269 | 0.0058 | ... | 2B | ... | ... | ... | ... | ... | ... | |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 3.3158 | ... | ... | ... | ... | |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | External | | | | | | | Internal | | | | | Minimum Major Diameter | | |
|------------------------------|--------------------|-------|-----------|----------------|------|------|---|--------|-----------|-------|-----------------------------------|----------------|------|---|------|------------------------|-----------|-----|
| | | | | Major Diameter | | | Pitch Diameter and Functional Diameter [Note (1)] | | | | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | | | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Class | | Min. | Max. | Min. | Max. | | Tolerance | |
| 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 | ... |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | 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 |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Min. | | Max. | Min. | Max. | Tolerance | | | |
| 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 | ... | ... | ... | ... | ... | ... | |

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)

| Nominal Size and Threads/in. | Series Designation | Class | Allowance | External | | | | | | | Internal | | | | | Minimum Major Diameter | | |
|---|--------------------|-------|-----------|----------------|--------|------|---|--------|-----------|------|-----------------------------------|----------------|------|---|-----------|------------------------|--------|-----|
| | | | | Major Diameter | | | Pitch Diameter and Functional Diameter [Note (1)] | | | | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | | | |
| | | | | Max. | Min. | Min. | Max. | Min. | Tolerance | Min. | | Max. | Min. | Max. | Tolerance | | | |
| 5 ³ / ₈ - 8 or 5.3750 - 8 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 5.3067 | 0.0129 | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 5.3035 | 0.0097 | ... |
| 5 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 ³ / ₈ - 16 or 5.3750 - 16 | UN | 3A | ... | ... | ... | ... | ... | 5.3299 | 0.0045 | ... | ... | 3B | ... | 5.3158 | ... | 5.3403 | 0.0059 | ... |
| 5 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 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 ⁵ / ₈ - 8 or 5.6250 - 8 | UN | 3A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3B | ... | ... | ... | 5.5536 | 0.0098 | ... |
| 5 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 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 ³ / ₄ - 8 or 5.7500 - 8 | UN | 2A | ... | ... | 5.7250 | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| 5 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 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 ⁷ / ₈ - 8 or 5.8750 - 8 | UN | 2A | 0.0031 | 5.8719 | 5.8569 | ... | 5.7907 | 5.7806 | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| 5 ⁷ / ₈ - 12 or 5.8750 - 12 | UN | 2A | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | 5.8299 | 0.0090 | ... |
| 5 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 | ... | ... | ... | ... |

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.

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

| Nominal Size and Threads/in. | Series Designation | External | | | | | | | | Internal | | | | | | |
|------------------------------|--------------------|----------|-----------|----------------|--------|---|--------|-----------|-----------------------------------|----------------|------|---|------|------------------------|--------|-----|
| | | Class | Allowance | Major Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Tolerance | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Minimum Major Diameter | | |
| | | | | Max. | Min. | Max. | Min. | | | Min. | Max. | Min. | Max. | | | |
| 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 | ... | ... | ... | ... | ... | ... |

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

| Nominal Size and Threads/in. | Series Designation | External | | | | | | | | Internal | | | | | | |
|------------------------------------|--------------------|----------|-----------|----------------|--------|---|--------|-----------|-----------------------------------|----------------|------|---|------|-----------|------------------------|-----|
| | | Class | Allowance | 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 | |
| | | | | Max. | Min. | Max. | Min. | Tolerance | | Min. | Max. | Min. | Max. | Tolerance | | |
| $\frac{3}{8}$ - 40 or 0.3750 - 40 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| 0.390 - 27 or 0.3900 - 27 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{7}{16}$ - 18 or 0.4375 - 18 | UNS | 2A | ... | ... | ... | ... | 0.3958 | 0.0043 | 0.3701 | 2B | ... | ... | ... | 0.4070 | 0.0056 | ... |
| $\frac{7}{16}$ - 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 | ... |
| $\frac{7}{16}$ - 27 or 0.4375 - 27 | UNS | 2A | ... | ... | ... | ... | 0.4087 | 0.0036 | ... | 2B | ... | ... | ... | 0.4181 | 0.0047 | ... |
| $\frac{1}{2}$ - 12 or 0.5000 - 12 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| | | 3A | ... | ... | ... | ... | ... | ... | ... | 3B | ... | 0.422 | ... | ... | ... | ... |
| $\frac{1}{2}$ - 14 or 0.5000 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 0.4135 | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{1}{2}$ - 18 or 0.5000 - 18 | UNS | 2A | ... | ... | ... | ... | ... | ... | 0.4326 | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{1}{2}$ - 24 or 0.5000 - 24 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{1}{2}$ - 27 or 0.5000 - 27 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{9}{16}$ - 14 or 0.5625 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 0.4760 | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{9}{16}$ - 27 or 0.5625 - 27 | UNS | 2A | ... | ... | ... | ... | 0.5336 | 0.0037 | ... | 2B | ... | ... | ... | 0.5432 | 0.0048 | ... |
| $\frac{5}{8}$ - 14 or 0.625 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 0.5385 | 2B | ... | 0.564 | ... | ... | ... | ... |
| $\frac{5}{8}$ - 27 or 0.6250 - 27 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{3}{4}$ - 14 or 0.7500 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 0.6635 | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{3}{4}$ - 18 or 0.7500 - 18 | UNS | 2A | ... | ... | ... | ... | ... | ... | 0.6825 | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{3}{4}$ - 24 or 0.7500 - 24 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{3}{4}$ - 27 or 0.7500 - 27 | UNS | 2A | ... | ... | ... | ... | ... | ... | ... | 2B | ... | ... | ... | ... | ... | ... |
| $\frac{7}{8}$ - 10 or 0.8750 - 10 | UNS | 2A | ... | ... | ... | ... | 0.8022 | 0.0060 | 0.7542 | 2B | ... | ... | ... | 0.8178 | 0.0078 | ... |
| $\frac{7}{8}$ - 18 or 0.8750 - 18 | UNS | 2A | ... | ... | ... | ... | 0.8329 | 0.0046 | 0.8075 | 2B | ... | ... | ... | 0.8449 | 0.0060 | ... |
| $\frac{7}{8}$ - 24 or 0.8750 - 24 | UNS | 2A | ... | ... | ... | ... | 0.8426 | 0.0041 | ... | 2B | ... | ... | ... | 0.8532 | 0.0052 | ... |

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

| Nominal Size and Threads/in. | Series Designation | External | | | | | | | | Internal | | | | | | |
|---------------------------------|-----------------------|----------|-----------|-------------------|--------|---|--------|-----------|--|-------------------|------|---|------|------------------------------|--------|-----|
| | | Class | Allowance | Major Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Tolerance | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Minimum Major Diameter | | |
| | | | | Max. | Min. | Max. | Min. | | | Min. | Max. | Min. | Max. | | | |
| 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 | ... | ... | ... | ... | ... | ... |

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

| Nominal Size and Threads/in. | Series Designation | External | | | | | | | | Internal | | | | | | |
|--|--------------------|----------|-----------|----------------|--------|---|--------|-----------|-----------------------------------|----------------|------|---|------|-----------|------------------------|-----|
| | | Class | Allowance | 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 | |
| | | | | Max. | Min. | Max. | Min. | Tolerance | | Min. | Max. | Min. | Max. | Tolerance | | |
| 1 ³ / ₄ - 18 or 1.7500 - 18 | UNS | 2A | ... | ... | ... | ... | ... | ... | 1.6824 | 2B | ... | ... | ... | ... | ... | ... |
| 1 ⁷ / ₈ - 10 or 1.8750 - 10 | UNS | 2A | 0.0019 | 1.8731 | 1.8602 | 1.8081 | 1.8016 | ... | 1.7534 | 2B | ... | ... | ... | 1.8184 | 0.0084 | ... |
| 1 ⁷ / ₈ - 14 or 1.8750 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 1.7883 | 2B | ... | 1.814 | ... | ... | ... | ... |
| 1 ⁷ / ₈ - 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 | ... |
| 2 ¹ / ₄ - 10 or 2.2500 - 10 | UNS | 2A | ... | ... | ... | ... | 2.1765 | 0.0065 | 2.1290 | 2B | ... | ... | ... | 2.1935 | 0.0085 | ... |
| 2 ¹ / ₄ - 14 or 2.2500 - 14 | UNS | 2A | ... | ... | ... | ... | 2.1962 | 0.0057 | 2.1633 | 2B | ... | ... | ... | 2.2110 | 0.0074 | ... |
| 2 ¹ / ₄ - 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 | ... | ... | ... | ... |
| 2 ¹ / ₂ - 10 or 2.5000 - 10 | UNS | 2A | ... | ... | ... | ... | ... | ... | 2.3790 | 2B | ... | ... | ... | ... | ... | ... |
| 2 ¹ / ₂ - 14 or 2.5000 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 2.4133 | 2B | ... | ... | ... | ... | ... | ... |
| 2 ¹ / ₂ - 18 or 2.5000 - 18 | UNS | 2A | ... | ... | ... | ... | ... | ... | 2.4323 | 2B | ... | ... | ... | ... | ... | ... |
| 2 ³ / ₄ - 10 or 2.7500 - 10 | UNS | 2A | ... | ... | ... | ... | 2.6763 | 0.0067 | 2.6290 | 2B | ... | ... | ... | 2.6837 | 0.0087 | ... |
| 2 ³ / ₄ - 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 | ... |

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

| Nominal Size and Threads/in. | Series Designation | External | | | | | | | | Internal | | | | | | |
|---|-----------------------|----------|-----------|-------------------|--------|---|--------|-----------|--|-------------------|------|---|------|------------------------------|--------|-----|
| | | Class | Allowance | Major Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Tolerance | Maximum UNR Minor Diameter (Ref.) | Minor Diameter | | Pitch Diameter and Functional Diameter [Note (1)] | | Minimum Major Diameter | | |
| | | | | Max. | Min. | Max. | Min. | | | Min. | Max. | Min. | Max. | | | |
| 2 ³ / ₄ - 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 | ... | ... | ... | ... | ... | ... |
| 3 ¹ / ₄ - 10 or 3.2500 - 10 | UNS | 2A | 0.0020 | 3.2480 | 3.2351 | 3.1830 | 3.1762 | 0.0068 | 3.1290 | 2B | ... | ... | ... | ... | ... | ... |
| 3 ¹ / ₄ - 14 or 3.2500 - 14 | UNS | 2A | ... | ... | ... | ... | 3.1959 | 0.0059 | 3.1632 | 2B | ... | ... | ... | 3.2113 | 0.0077 | ... |
| 3 ¹ / ₄ - 18 or 3.2500 - 18 | UNS | 2A | ... | ... | ... | ... | 3.2069 | 0.0054 | 3.1823 | 2B | ... | ... | ... | 3.2209 | 0.0070 | ... |
| 3 ¹ / ₂ - 10 or 3.5000 - 10 | UNS | 2A | ... | ... | ... | ... | ... | ... | 3.3789 | 2B | ... | ... | ... | ... | ... | ... |
| 3 ¹ / ₂ - 14 or 3.5000 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 3.4132 | 2B | ... | ... | ... | ... | ... | ... |
| 3 ¹ / ₂ - 18 or 3.5000 - 18 | UNS | 2A | ... | ... | ... | ... | ... | ... | 3.4322 | 2B | ... | ... | ... | ... | ... | ... |
| 3 ³ / ₄ - 10 or 3.7500 - 10 | UNS | 2A | ... | ... | ... | ... | 3.6760 | 0.0069 | 3.6289 | 2B | ... | ... | ... | 3.6940 | 0.0090 | ... |
| 3 ³ / ₄ - 14 or 3.7500 - 14 | UNS | 2A | ... | ... | ... | ... | ... | ... | 3.6632 | 2B | ... | ... | ... | ... | ... | ... |
| 3 ³ / ₄ - 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 | ... | ... | ... | ... | ... | ... |
| 4 ¹ / ₄ - 10 or 4.2500 - 10 | UNS | 2A | ... | ... | ... | ... | 4.1759 | 0.0070 | 4.1289 | 2B | ... | ... | ... | 4.1941 | 0.0091 | ... |
| 4 ¹ / ₄ - 14 or 4.2500 - 14 | UNS | 2A | 0.0018 | 4.2482 | 4.2379 | 4.2018 | 4.1956 | ... | 4.1632 | 2B | ... | ... | ... | 4.2116 | 0.0080 | ... |
| 4 ¹ / ₂ - 10 or 4.5000 - 10 | UNS | 2A | ... | ... | ... | ... | 4.4259 | 0.0070 | 4.3789 | 2B | ... | ... | ... | 4.4441 | 0.0091 | ... |
| 4 ¹ / ₂ - 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 | ... |
| 4 ³ / ₄ - 10 or 4.7500 - 10 | UNS | 2A | ... | ... | ... | ... | ... | ... | 4.6288 | 2B | ... | ... | ... | 4.6944 | 0.0094 | ... |
| 4 ³ / ₄ - 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 | ... | ... | ... | ... | ... | ... |

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

| Nominal Size and Threads/in. | Series Designation | External | | | | | | | | Internal | | | | | | |
|------------------------------|--------------------|----------|-----------|----------------|--------|---|--------|-----------|-----------------------------------|----------------|------|---|------|-----------|------------------------|-----|
| | | Class | Allowance | 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 | |
| | | | | Max. | Min. | Max. | Min. | Tolerance | | Min. | Max. | Min. | Max. | Tolerance | | |
| 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 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.

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.

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) $\frac{1}{2}$ - 13 UNC-SE2A (23)

PD 0.4485 - 0.4431

LE 1.00

(b) $\frac{1}{4}$ - 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 designa-

tion 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

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.

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 |

The ASME Publications Catalog shows a complete list of all the Standards published by the Society. For a complimentary catalog, or the latest information about our publications, call 1-800-THE-ASME (1-800-843-2763).

ASME Services

ASME is committed to developing and delivering technical information. At ASME's Customer Care, we make every effort to answer your questions and expedite your orders. Our representatives are ready to assist you in the following areas:

| | | |
|------------------------------|----------------------------|----------------------------------|
| ASME Press | Member Services & Benefits | Public Information |
| <i>Codes & Standards</i> | Other ASME Programs | Self-Study Courses |
| Credit Card Orders | Payment Inquiries | Shipping Information |
| IMEchE Publications | Professional Development | Subscriptions/Journals/Magazines |
| Meetings & Conferences | Short Courses | Symposia Volumes |
| Member Dues Status | Publications | Technical Papers |

How can you reach us? It's easier than ever!

There are four options for making inquiries* or placing orders. Simply mail, phone, fax, or E-mail us and a Customer Care representative will handle your request.

| | | | |
|---------------------------|--------------------------------------|---------------------|------------------------|
| <i>Mail</i> | <i>Call Toll Free</i> | <i>Fax—24 hours</i> | <i>E-Mail—24 hours</i> |
| ASME | US & Canada: 800-THE-ASME | 973-882-1717 | customercare@asme.org |
| 150 Clove Road, 6th Floor | (800-843-2763) | 973-882-5155 | |
| Little Falls, New Jersey | Mexico: 95-800-THE-ASME | | |
| 07424-2139 | (95-800-843-2763) | | |

*Customer Care staff are not permitted to answer inquiries about the technical content of this code or standard. Information as to whether or not technical inquiries are issued to this code or standard is shown on the copyright page. All technical inquiries must be submitted in writing to the staff secretary. Additional procedures for inquiries may be listed within.

ASME B1.1-2019

ISBN 978-0-7918-7309-0



9 780791 873090



M 0 2 8 1 9