UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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HANDBOOK H28 (1969)

PART I

SCREW-THREAD STANDARDS FOR FEDERAL SERVICES

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The Bureau comprises the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Center for Radiation Research, the Center for Computer Sciences and Technology, and the Office for Information Programs.

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[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.
[2] Located at Boulder, Colorado 80302.
[3] Located at 5285 Port Royal Road, Springfield, Virginia 22151.

UNITED STATES DEPARTMENT OF COMMERCE • Maurice H. Stans, *Secretary*
NATIONAL BUREAU OF STANDARDS • Lewis M. Branscomb, *Director*

HANDBOOK H28 (1969)
SCREW-THREAD STANDARDS FOR FEDERAL SERVICES

PART I

UNIFIED
UNJ
UNIFIED MINIATURE
SCREW THREADS

NBS Handbook H28 (1969)

Superseding H28 (1957) Part I and that applicable to Part I in the 1963 Supplement to H28

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Foreword

The Interdepartmental Screw Thread Committee (ISTC) was established to promote uniformity in screw-thread standards in the Department of Defense (including the Departments of the Army, Navy, and Air Force) and the Department of Commerce. The organization and functions of the ISTC are shown in its charter.

The ISTC shall be responsible for (1) recommending to appropriate activities research and development efforts relating to screw threads; (2) developing standards for screw threads; (3) participating in the development of standards for gages, dies, taps, and other items associated with the manufacture and use of interchangeable threaded parts employed by Government agencies; and (4) providing advisory services on science, technology, and standards of practice as these relate to screw threads.

The standards developed by the ISTC, on approval by the participating Departments and Agencies, are published in Handbook H28. The standards in Handbook H28 are revised as deemed necessary by the ISTC.

This 1969 issue of Part I is being published essentially to incorporate the changes in Part I made by the 1963 Supplement and to revise the sections on Nomenclature, and Gages and Gaging to be in general agreement with USA B1.7–1965 and USA B1.2–1966.

Handbook H28 is issued in 3 parts. This Part, Part I, contains information on Unified and Unified miniature screw threads. Part II contains information on pipe threads, including dryseal pipe threads; gas cylinder valve threads; hose coupling, including fire-hose coupling threads; and hose connections for welding and cutting equipment. Part III contains information on Acme, Stub-Acme, Buttress, and miscellaneous threads.

At this time, the latest issues of Parts II and III are those of 1957 identified by a block on the cover stating "Reprinted December 1966 with corrections". These two parts include the changes to the respective parts listed in the 1963 Supplement to H28.

In this 1969 issue of Part I, sections are being designated by arabic instead of roman numerals. Appendixes are designated by an arabic number preceded by A. To allow insertion of section 4 on UNJ threads, section I, Introduction, of the 1957 issue is included but without a section designation. Former sections II, III, and IV have been renumbered as sections 1, 2, and 3.

In this 1969 issue of Part I, when designating tables and figures, a number is only used once. For example, if a figure is designated figure 2.1, there will be no table 2.1.

In 1966, the American Standards Association (ASA) changed its name to the United States of America Standards Institute (USASI). In October 1969, USASI changed its name to the American National Standards Institute (ANSI).

All references to USASI herein will apply to the American National Standards Institute (ANSI). Preparation for printing of Handbook H28 has progressed too far to make the changes in name throughout the Handbook.

Arthur G. Strang, Chairman,
Interdepartmental Screw Thread Committee

Metric Translation of Screw Thread Specifications

To facilitate and encourage the use of these unified screw thread standards in metric countries most of the specifications given in this document have been translated into metric language under the sponsorship of ASME and SAE. This translation appears as USA standard B1.1a–1968. The detailed specifications in metric language of the unified screw threads given in B1.1a–1968 is more extensive than is presently available for the ISO metric series of screw threads. Copies of USA standard B1.1a can be obtained for $3.00 from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

Declaration of Accord

with respect to the

Unification of Screw Threads

It is hereby declared that the undersigned, representatives of their Government and Industry Bodies, charged with the development of standards for screw threads, Agree that the standards for the Unified Screw Threads given in the publications of the Committees of the British Standards Institution, Canadian Standards Association, American Standards Association and of the Interdepartmental Screw Thread Committee fulfill all of the basic requirements for general interchangeability of threaded products made in accordance with any of these standards.

The Bodies noted above will maintain continuous cooperation in the further development and extension of these standards.

Signed in Washington, D. C., this 18th day of November, 1948, at the National Bureau of Standards of the United States.

C. D. Howe	Ministry of Trade and Commerce, Dominion of Canada
J. G. Morrow	Canadian Standards Association
T. R. B. Sanders.	Ministry of Supply, United Kingdom
Percy Good	British Standards Institution
Ewart Smith	Representative of British Industry
E. U. Condon	National Bureau of Standards U. S. Department of Commerce Interdepartmental Screw Thread Committee
Fred P. Tisch	American Standards Association The American Society of Mechanical Engineers Society of Automotive Engineers
William L. Batt	Sponsors Council of United States and United Kingdom on the Unification of Screw Threads

APPROVAL BY

THE DEPARTMENTS OF DEFENSE AND COMMERCE

The accompanying Handbook H28 (1969), Part I, on Screw-Thread Standards for Federal Services, submitted by the Interdepartmental Screw Thread Committee, is hereby approved for use by the Departments of Defense and Commerce.

FOR THE DEPARTMENT OF DEFENSE:

Leonard A. Staszak

Lt. Col. LEONARD A. STASZAK, USAF
Director for Standardization
Department of Defense

FOR THE DEPARTMENT OF COMMERCE:

Lewis M. Branscomb

LEWIS M. BRANSCOMB
Director
National Bureau of Standards

Contents

Part I

INTRODUCTION

The purpose of Handbook H28 is to present complete dimensional data for the threads on the threaded products procured by the Federal Services. So far as practicable, these data are intended to conform to generally accepted commercial practice, although certain special requirements of the Federal Services necessitate the inclusion of some standards not generally applicable outside of the Government. References are cited throughout the text to the standards promulgated by the United States of America Standards Institute (USASI) and to such other published standards as are in agreement with the specifications herein.

The personnel of the Interdepartmental Screw Thread Committee is as follows:

Representing the Department of Defense:

Mr. M. A. Ford, Office of the Assistant Secretary of Defense (Installations and Logistics), 6th Floor, Lynn Building, 1111 North 19th Street, Arlington, Virginia 22209

Representing the Department of the Army:

Mr. M. L. Fruechtenicht, Metrology Engineering Division, Army Metrology and Calibration Center, Redstone Arsenal, Alabama 35809

Mr. Irwin S. Rosen, U.S. Army Mobility Equipment Command, SMEFB-RDE-KM, Fort Belvoir, Virginia 22060

Alternate:

Mr. J. William P. Beaver, U.S. Army Mobility Equipment Command, SMEFB-RDE-KC, Fort Belvoir, Virginia 22060

Representing the Department of the Navy:

Mr. Garland Norman, Code: AIR-530323, Naval Air Systems Command, Department of the Navy, Washington, D.C. 20360

Mr. James E. Walter, Code: AIR-52021C, Naval Air Systems Command, Department of the Navy, Washington, D.C. 20360

Alternate:

Mr. Harry L. Breucker, Weapons Engineering Standardization Office, Naval Air Engineering Center (X-22), Department of the Navy, Philadelphia, Pennsylvania 19112

Representing the Department of the Air Force:

Mr. F. L. Calkins, ASD (ASNPS-30), Wright-Patterson AFB, Ohio 45433

Mr. Frank A. Hannon, ASD (ASNFS-30), Wright-Patterson AFB, Ohio 45433

Representing the Department of Commerce:

Mr. A. G. Strang, *Chairman of ISTC*, Chief, Engineering Metrology Section, National Bureau of Standards, Rm. A107, MET Bldg., Washington, D.C. 20234

Mr. J. R. Rees, *Secretary of ISTC*, Engineering Metrology Section, National Bureau of Standards, Rm. A107, MET Bldg., Washington, D.C. 20234

Liaison Representatives of Standards Committees Organized Under the Procedures of the United States of America Standards Institute (USASI) and Sponsored by The American Society of Mechanical Engineers, the Society of Automotive Engineers, and the American Gas Association:

(The membership of the Industry Liaison Representatives on the USA Standards Committees closely allied with Screw Thread Standardization is shown following the representative's name and address. The titles of these USA Standards Committees are:

B1 on the Standardization and Unification of Screw Threads
B2 on the Standardization of Pipe and Hose Coupling Threads
B18 on the Standardization of Bolts, Nuts, Rivets, Screws, and Similar Fasteners.
B47 on the Standardization of Gage Blanks
B87 on Decimalized Measure
B89 on Dimensional Metrology.)

Mr. C. T. Appleton, Causeway Street, Jefferson, Massachusetts 01522 (Member of USASI Committees B1 and B47)

Mr. T. C. Baumgartner, Manager, Engineering, Standard Pressed Steel Co., Jenkintown, Pennsylvania 19046 (Member of USASI Committee B1)

Mr. Richard B. Belford, Technical Director, Industrial Fasteners Institute, 1505 East Ohio Building, 1717 East 9th Street, Cleveland, Ohio 44114 (Member of USASI Committees B1 and B18)

Mr. A. R. Breed, Technical Director, The Lamson & Sessions Co., 5000 Tiedeman Road, Cleveland, Ohio 44144 (Member of USASI Committees B18 and B87)

Mr. John F. Cramer, Chief, Standards and Specifications, The Boeing Company, P.O. Box 3999, Seattle, Washington 98124; Representing the National Aerospace Standards Committee of the Aerospace Industries Association of America, Inc. (Member of USASI Committees B1 and B18)

Mr. D. J. Emanuelli, Greenfield Tap & Die, a United-Greenfield Division of TRW, Inc., Greenfield, Massachusetts 01301 (Member of USASI Committee B1)

Mr. J. K. Emery, The Van Keuren Company, 176 Waltham Street, Watertown, Massachusetts 02172 (Member of USASI Committee B89)

Mr. W. E. Hay, The Pipe Machinery Company, 29100 Lakeland Boulevard, Wickliffe, Ohio 44092 (Member of USASI Committees B1, B2, B47, and B89)

Mr. Ernest J. Heldmann, Chief Engineer and Director, R. & D., The Holo-Krome Company, P.O. Box 98, Elmwood Branch, Hartford, Connecticut 06110 (Member of USASI Committees B1 and B18)

Mr. Stanley G. Johnson, The Johnson Gage Company, 534 Cottage Grove Road, Bloomfield, Connecticut 06002 (Member of USASI Committees B1 and B47)

Mr. S. I. Kanter, Chief Engineer and Research Director, The Hanson-Whitney Company, Hartford, Connecticut 06101 (Member of USASI Committees B1 and B47)

Mr. D. H. Secord, Pratt and Whitney Aircraft Division, Engineering Building 3NW, East Hartford, Connecticut 06108; Representing the Air Breathing Propulsion Committee of the Aerospace Industries Association of America, Inc. (Member of USASI Committee B1)

Mr. F. P. Tisch, Executive Engineer, Voi-Shan, a Division of VSI Corporation, P.O. Box 512, Culver City, California 90231 (Member of USASI Committees B1 and B18)

Mr. R. P. Trowbridge, Director, Engineering Standards Section, Engineering Staff, General Motors Corporation, General Motors Technical Center, Warren, Michigan 48090 (Member of USASI Committees B1 and B18)

Mr. J. E. Watson, Pratt & Whitney, Cutting Tool and Gage Division of Colt Industries, West Hartford, Connecticut 06101 (Member of USASI Committees B1, B2, B47, and B89)

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

SECTION 1

1969

NOMENCLATURE, DEFINITIONS, AND LETTER SYMBOLS FOR SCREW THREADS

CONTENTS

This section is in general agreement with United States of America Standards Institute Standard USA B1.7, Nomenclature, Definitions, and Letter Symbols for Screw Threads, published by The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017. The latest revision should be consulted when referring to this USA standard. As of date of issue of this section, USA B1.7–1965 is the latest revision. For further related definitions, see USA B18.12, Glossary of Terms for Mechanical Fasteners.

1. GENERAL

1.1. The purpose of this section is to establish uniform practices with regard to: (1) Screw-thread nomenclature, and (2) letter symbols for designating dimensions of screw threads for use on drawings, in tables of dimensions which set forth dimensional standards, and in other records, and for expressing mathematical relationships.

1.2. This section consists of a glossary of terms, tables of screw-thread dimensional symbols, illustrations showing the application of dimensional symbols, tables of thread series and dimensional designations, and an index.

1.3. Typography.—In accordance with the usual practice in published text, letter symbols and letter subscripts, whether upper or lower case, should be printed in italic type. An exception is Greek letters; Greek capital letters are always vertical, and lower case always resembles italics. In manuscripts this is indicated by underlining each symbol to be italicized. Coefficients, numeral subscripts, and exponents should be printed in vertical Arabic numerals. Standard mathematical notation should be followed.

2. DEFINITIONS OF TERMS

2.1. The terms commonly applied to screw threads may be classified in four general groups, namely, those relating to: (1) types of screw threads, (2) size and fit of mechanical parts in general, (3) geometrical elements of both straight and taper screw threads, and (4) dimensions of screw threads.

The definitions presented herein apply generally to theoretically correct leads and thread forms but also reflect practical considerations relative to production, gaging, and measurement of threads. With a few obvious exceptions the definitions apply generally to all forms of thread.

3. TERMS RELATING TO TYPES OF SCREW THREADS

3.1. Screw threads and the terms generally applied to designate the types of screw threads, are defined as follows:

3.2. Screw Thread.—A screw thread (hereinafter referred to as a thread), is a ridge, usually of uniform section and produced by forming a groove in the form of a helix on the external or internal surface of a cylinder, or in the form of a conical spiral on the external or internal surface of a cone or frustum of a cone. A screw thread formed on a cylinder is known as a *straight or parallel* thread, to distinguish it from a *taper* thread which is formed on a cone or frustum of a cone.

3.3. Thread.—A thread is a portion of a screw thread encompassed by one pitch. On a single-start thread it is equal to one turn. (See par. 6.5 Threads per Inch and par. 6.6 Turns per Inch.)

3.4. Single-Start Thread.—A single-start thread is one having the lead equal to the pitch. (See par. 6.2 Pitch and par. 6.3 Lead.)

3.5. Multiple-Start Thread.—A multiple-start thread is one in which the lead is an integral multiple (other than one) of the pitch.

3.6. External Thread.—An external thread is one on a cylindrical or conical external surface.

3.7. Internal Thread.—An internal thread is one on a cylindrical or conical internal surface.

3.8. Right-Hand Thread.—A thread is a right-hand thread if, when viewed axially, it winds in a clockwise and receding direction. A thread is considered to be right-hand unless specifically indicated otherwise.

3.9. Left-Hand Thread.—A thread is a left-hand thread if, when viewed axially, it winds in a counterclockwise and receding direction. All left-hand threads are designated *LH*.

3.10. Complete Thread.—The complete or full form thread is that cross section of a threaded length having full form at crest and root. (See par. 3.14 Effective Thread, par. 6.26 Length of Complete Thread.)

NOTE: Formerly in pipe thread terminology this was referred to as "the perfect thread" but that is no longer considered desirable.

3.11. Incomplete Thread.—An incomplete thread is a threaded profile having either crests or roots, or both crests and roots, not fully formed, resulting from their intersection with the cylindrical or end surface of the work or the vanish cone. It may occur at either end of the thread.

NOTE: Formerly in pipe thread terminology this was referred to as "the imperfect thread" but that is no longer considered desirable.

3.12. Lead-Thread.—The lead-thread is that portion of the incomplete thread that is fully formed at root but not fully formed at crest which occurs at the entering end of either external or internal threads. (See note at par. 6.26.)

3.13. Vanish Thread.—(Partial Thread, Washout Thread, or Thread Run-out.) A vanish thread is that portion of the incomplete thread which is not fully formed at root or at crest and root. It is produced by the chamfer at the starting end of the thread forming tool. (See par. 5.28 Vanish Cone.)

NOTE: Threads produced employing a cam actuated single tool process (frequently referred to as the Cridan process) or by a process employing similar type equipment, may have fully formed roots which run out on a vanish cone which is formed by the tool withdrawal pattern.

3.14. Effective Thread.—The effective (or useful) thread includes the complete thread, and those portions of the incomplete thread which are fully formed at the root but not at the crest (in taper pipe threads this includes the so-called black crest threads); thus excluding the vanish thread.

3.15. Total Thread.—The total thread includes the complete and all of the incomplete thread; thus including the vanish thread.

3.16. Classes of Threads.—Classes of threads are distinguished from each other by the amounts of tolerance or tolerance and allowance specified.

3.17. Thread Series.—Thread series are groups of diameter/pitch combinations distinguished from each other by the number of threads per inch applied to specific diameters.

3.18. Structural Thread.—A structural thread is intended to develop a significant amount of the core strength of the externally threaded member before breaking the core of that member or stripping the external or internal threads of a threaded connection. A structural thread is not intended for, but may be used for attaching purposes. (UNC and UNF thread series are examples of Structural Threads with tolerance calculations based on a length of engagement equal to one diameter.)

3.19. Attaching-Purpose Thread (also sometimes referred to as constructional or retaining threads).—An attaching-purpose thread is not intended to develop a significant amount of core strength of the externally or internally threaded member of a threaded connection. An attaching-purpose thread is not normally intended for structural purposes. (12 UN and 16 UN uniform pitch thread series are examples of Attaching-Purpose Threads with tolerance calculations based on a length of engagement equal to nine pitches.)

4. TERMS RELATING TO SIZE AND FIT

(These are definitions applying to mechanical parts, generally.)

4.1. Terms relating to the size and fit of parts, which are generally applicable to mechanical parts, including threads, are defined as follows:

4.2. Dimension.—A dimension is a geometrical characteristic such as diameter, length, angle, or center distance.

4.3. Size.—Size is a designation of magnitude. When a value is assigned to a dimension it is referred to hereinafter as the size of that dimension.

NOTE: It is recognized that the words "dimension" and "size" are both used at times to convey the meaning of magnitude.

4.4. Nominal Size.—The nominal size is the designation which is used for the purpose of general identification.

4.5. Basic Size.—The basic size is that size from which the limits of size are derived by the application of allowances and tolerances.

4.6. Reference Size.—A reference size is a size without tolerance used only for information purposes and does not govern manufacturing or inspection operations.

4.7. Design Size.—The design size is the basic size with allowance applied, from which the limits of size are derived by the application of tolerances. If there is no allowance the design size is the same as the basic size.

4.8. Actual Size.—An actual size is a measured size.

4.9. Limits of Size.—The limits of size are the applicable maximum and minimum sizes. (See par. 4.14.)

4.10. Maximum-Material-Limit.—A maximum-material-limit is that limit of size that provides the maximum amount of material for the part. Normally it is the maximum limit of size of an external dimension or the minimum limit of size of an internal dimension.

4.11. Minimum-Material-Limit.—A minimum-material-limit is that limit of size that provides the minimum amount of material for the part. Normally it is the minimum limit of size of an external dimension or the maximum limit of size of an internal dimension.

NOTE: Examples of exceptions are; an exterior corner radius where the maximum radius is the minimum-material-limit and the minimum radius is the maximum-material-limit.

4.12. Allowance.—An allowance is a prescribed difference between the maximum-material-limits of mating parts. It is the minimum clearance (positive allowance) or maximum interference (negative allowance) between such parts. (See par. 4.17 Fit.)

4.13. Tolerance.—A tolerance is the total permissible variation of a size. The tolerance is the difference between the limits of size.

4.14. Tolerance Limit.—A tolerance limit is the variation, positive or negative, by which a size is permitted to depart from the design size. (See par. 4.9.)

4.15. Unilateral Tolerance.—A unilateral tolerance is a tolerance in which variation is permitted only in one direction from the design size.

4.16. Bilateral Tolerance.—A bilateral tolerance is a tolerance in which variation is permitted in both directions from the design size.

4.17. Fit.—Fit is the general term used to signify the range of tightness or looseness which may result from the application of a specific combination of allowances and tolerances in the design of mating parts.

4.18. Actual Fit.—The actual fit between two mating parts is the relation existing between them with respect to the amount of clearance or interference that is present when they are assembled.

NOTE: Fits are of three general types: clearance, transition, and interference.

4.19. Clearance Fit.—A clearance fit has limits of size so prescribed that a clearance always results when mating parts are assembled.

4.20. Interference Fit.—An interference fit has limits of size so prescribed that an interference always results when mating parts are assembled.

4.21. Transition Fit.—A transition fit has limits of size so prescribed that either a clearance or an interference may result when mating parts are assembled.

4.22. Unilateral Tolerance System.—A design plan which uses only unilateral tolerances is known as a unilateral tolerance system.

4.23. Bilateral Tolerance System.—A design plan which uses only bilateral tolerances is known as a bilateral tolerance system.

4.24. Basic Hole System.—A basic hole system is a system of fits in which the design size of the hole is the basic size and the allowance, if any, is applied to the shaft.

4.25. Basic Shaft System.—A basic shaft system is a system of fits in which the design size of the shaft is the basic size and the allowance, if any, is applied to the hole.

5. TERMS RELATING TO GEOMETRICAL ELEMENTS OF SCREW THREADS

5.1. Terms relating to geometrical elements of both straight and taper threads are defined as follows:

5.2. Thread Axis.—The thread axis is the axis of its pitch cylinder or cone. (See par. 7.2.)

5.3. Major Cylinder.—The major cylinder bounds the crests of an external straight thread or the roots of an internal straight thread.

5.4. Sharp Major Cylinder.—The sharp major cylinder bounds the sharp crests of an external straight thread or the sharp roots of an internal straight thread.

5.5. Major Cone.—The major cone bounds the crests of an external taper thread or the roots of an internal taper thread.

5.6. Sharp Major Cone.—The sharp major cone has an apex angle equal to that of the pitch cone, the surface of which bounds the sharp crests of an external taper thread or the sharp roots of an internal taper thread.

5.7. Pitch Cylinder.—The pitch cylinder is one of such diameter and location of its axis that its surface would pass through a straight thread in such a manner as to make the widths of the thread ridge and the thread groove equal and, therefore, is located equidistantly between the sharp major and minor cylinders of a given thread form. On a theoretically perfect thread these widths are equal to one-half of the basic pitch. (See par. 5.2 Axis of Thread, par. 6.21 Pitch Diameter.)

5.8. Pitch Cone.—The pitch cone is one of such apex angle and location of its vertex and axis that its surface would pass through a taper thread in such a manner as to make the widths of the thread ridge and the thread groove equal and, therefore, is located equidistantly between the sharp major and minor cones of a given thread form. On a theoretically perfect taper thread these widths are equal to one-half of the basic pitch. (See par. 5.2 Axis of Thread and par. 6.21 Pitch Diameter.)

5.9. Minor Cylinder.—The minor cylinder bounds the roots of an external straight thread or the crests of an internal straight thread.

5.10. Sharp Minor Cylinder.—The sharp minor cylinder bounds the sharp roots of an external straight thread or the sharp crests of an internal straight thread.

5.11. Minor Cone.—The minor cone bounds the roots of an external taper thread or the crests of an internal taper thread.

5.12. Sharp Minor Cone.—The sharp minor cone has an apex angle equal to that of the pitch cone, the surface of which bounds the sharp roots of an external taper thread or the sharp crests of an internal taper thread.

5.13. Pitch Line.—The pitch line is a generator of the cylinder or cone specified in the definitions of par. 5.7 Pitch Cylinder and par. 5.8 Pitch Cone.

5.14. Thread Form.—The thread form is the thread profile in an axial plane for a length of one pitch of the complete thread.

5.15. Basic Thread Form.—The basic thread form is the theoretical thread profile for a length of one pitch in an axial plane, from which the design thread forms for both the external and internal threads are developed.

5.16. Design Thread Form.—The design thread form is the maximum material form permitted for the external or internal thread. In practice, however, the form of root is an indeterminate contour not encroaching on the maximum material form of the mating thread when assembled.

5.17. Fundamental Triangle.—The fundamental triangle is the triangle whose corners coincide with three consecutive intersections of the extended flanks of the basic thread form.

5.18. Flank.—The flank (or side) of a thread is either surface connecting the crest with the root. The flank surface intersection with an axial plane is theoretically a straight line.

5.19. Leading Flank.—When a thread is about to be assembled with a mating thread, the leading flank of the thread faces the mating thread.

5.20. Following Flank.—The following flank of a thread faces the leading flank.

5.21. Load Flank.—The load flank takes the externally applied axial load in an assembly. The term is used particularly in relation to buttress and other similar threads.

5.22. Clearance Flank.—The clearance flank faces the load flank.

5.23. Crest.—The crest is that surface of the thread which joins the flanks of the thread and is farthest from the cylinder or cone from which the thread projects.

5.24. Root.—The root is that surface of the thread which joins the flanks of adjacent thread forms and is identical with or immediately adjacent to the cylinder or cone from which the thread projects.

5.25. Sharp Crest (Crest Apex).—The sharp crest is the apex formed by the intersection of the flanks of a thread when extended, if necessary, beyond the crest.

5.26. Sharp Root (Root Apex).—The sharp root is the apex formed by the intersection of the ajdacent flanks of adjacent threads when extended, if necessary, beyond the root.

5.27. Base.—The base of a thread section coincides with the cylindrical or conical surface from which the thread projects.

5.28. Vanish Cone.—The surface of the vanish cone bounds the roots of the vanish thread formed by the lead or chamfer of the threading tool. (See fig. 1.2 and par. 3.13 Vanish Thread.)

5.29. Plane of Vanish Point.—The plane of vanish point of an external thread is the intersection of generators of the vanish cone with generators of the cylinder of the largest major diameter of the thread. (See fig. 1.5.)

5.30. Blunt Start or Blunt End Thread.—"Blunt start" or "blunt end" designates the removal of the incomplete thread at the end of the thread. This is a feature of threaded parts that are repeatedly assembled by hand, such as hose couplings and thread plug gages, to prevent cutting of hands and crossing of threads, and which was formerly known as a *Higbee cut.* (See fig. 1.1.)

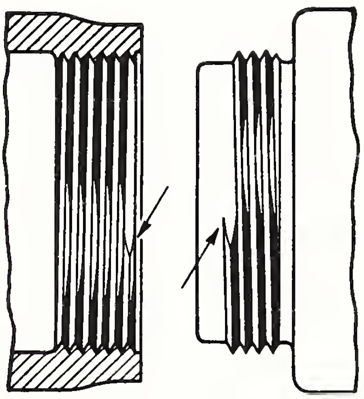

Figure 1.1. *Blunt start*

5.31. Gimlet Point.—A gimlet point is a threaded cone point at the entering end of an external thread.

5.32. Chamfer.—A chamfer is a conical surface at the end of a thread or shaft.

5.33. Countersink.—A countersink is a bevel or flare at the end of a hole.

5.34. Bottom of Chamfer.—On a chamfered internal taper thread, the bottom of the chamfer is defined as the intersection of the chamfer cone and the pitch cone of the thread.

6. TERMS RELATING TO DIMENSIONS OF SCREW THREADS

6.1. Terms relating to dimensions of both straight and taper threads are defined as follows:

6.2. Pitch.—The pitch of a thread having uniform spacing is the distance, measured parallel to its axis, between corresponding points on adjacent thread forms in the same axial plane and on the same side of the axis. The basic pitch is equal to the lead divided by the number of thread starts. (See par. 6.4 Helix Variation, par. 7.4.)

6.3. Lead.—When a threaded part is rotated about its axis with respect to a fixed mating thread, the lead is the axial distance moved by the part in relation to the amount of angular rotation. The basic lead is commonly specified as the distance to be moved in one complete rotation. It is necessary to distinguish measurement of lead from measurement of pitch, as uniformity of pitch measurements does not assure uniformity of lead. Variations in either lead or pitch cause the functional diameter of thread to differ from the pitch diameter. (See par. 7.5.)

6.4. Helix Variation.—Helix variation of a thread is a wavy deviation from true helical advancement. The "helical path" includes the helix with its superimposed variation and is measured either as the maximum deviation from the true helix or as the "cumulative pitch." The cumulative pitch is the distance measured parallel to the axis of the thread between corresponding points on any two thread forms whether or not they are in the same axial plane. (See par. 7.5.)

6.5. Threads per Inch.—The number of threads per inch is the reciprocal of the pitch in inches.

6.6. Turns per Inch.—The number of turns per inch is the reciprocal of the lead in inches.

6.7. Included Angle.—The included angle of a thread (or angle of thread) is the angle between the flanks of the thread measured in an axial plane.

6.8. Flank Angle.—The flank angle is the angle between the flank and the perpendicular to the axis of the thread, measured in an axial plane. A flank angle of a symmetrical thread is commonly termed the *half-angle of thread.* (See par. 7.3.)

6.9. Lead Angle.—On a straight thread, the lead angle is the angle made by the helix of the thread at the pitch line with a plane perpendicular to the axis. On a taper thread, the lead angle at a given axial position is the angle made by the conical spiral of the thread with the plane perpendicular to the axis, at the pitch line. (See fig. 1.2.)

6.10. Helix Angle.—On a straight thread, the helix angle is the angle made by the helix of the thread at the pitch line with the axis. On a taper thread, the helix angle at a given axial position is the angle made by the conical spiral of the thread with the axis at the pitch line. The helix angle is the complement of the lead angle. (See fig. 1.2.)

NOTE: The helix angle was formerly defined in accordance with the present definition of lead angle. (See par. 6.9.)

6.11. Thread Ridge Thickness.—The thread ridge thickness is the distance between the flanks of one thread ridge, normally measured parallel to the axis at the specified pitch radius. The thread ridge thickness may be specified and measured parallel to the axis at any other specified radius.

NOTE: The pitch radius is equal to one-half of the pitch diameter.

6.12. Thread Groove Width.—The thread groove width is the distance between the flanks of adjacent thread ridges normally measured parallel to the axis at the specified pitch radius. The thread groove width may be specified and measured parallel to the axis at any other specified radius.

6.13. Fundamental Triangle Height.—The fundamental triangle height of a thread, that is, the height of a sharp-V thread, is the distance, measured radially, between the sharp major and minor cylinders or cones.

6.14. Thread Height.—The thread height (or depth) is the distance measured radially between the major and minor cylinders or cones.

NOTE: In American practice the thread height is often expressed as a percentage of three-fourths of the fundamental triangle height.

6.15. Addendum.—The addendum of an external thread is the radial distance between the major and pitch cylinders or cones. The addendum of an internal thread is the radial distance between the minor and pitch cylinders or cones.

6.16. Dedendum.—The dedendum of an external thread is the radial distance between the pitch and minor cylinders or cones. The dedendum of an internal thread is the radial distance between the major and pitch cylinders or cones.

6.17. Crest Truncation.—The crest truncation of a thread is the radial distance between the sharp crest (crest apex) and the cylinder or cone that would bound the crest.

6.18. Root Truncation.—The root truncation of a thread is the radial distance between the sharp root (root apex) and the cylinder or cone that would bound the root.

6.19. Major Diameter.—On a straight thread the major diameter is that of the major cylinder. On a taper thread the major diameter at a given position on the thread axis is that of the major cone at that position. (See par. 5.3 Major Cylinder and par. 5.5 Major Cone.)

6.20. Minor Diameter.—On a straight thread the minor diameter is that of the minor cylinder. On a taper thread the minor diameter at a given position on the thread axis is that of the minor cone at that position. (See par. 5.9 Minor Cylinder and par. 5.11 Minor Cone.)

6.21. Pitch Diameter.—On a straight thread the pitch diameter is the diameter of the pitch cylinder. (See par. 5.7.) On a taper thread, the pitch diameter at a given position on the thread axis is the diameter of the pitch cone at that position. (See par. 5.8.) On a single-start thread of perfect form and lead, it is also the length between intercepts of a line which is perpendicular to the thread axis and intersects thread flanks on opposite sides of the thread axis. (See par. 7.6.)

NOTE: When the crest of a thread is truncated beyond the pitch line, the pitch diameter, pitch cylinder, or pitch cone would be based on a theoretical extension of the thread flanks.

NOTE: Pitch diameter on the buttress casing thread is defined by the American Petroleum Institute in API Standard 5B, as being midway between the major and minor diameters.

6.22. Thread Groove Diameter (Simple Effective Diameter).—On a straight thread the thread groove diameter is the diameter of the coaxial cylinder, the surface of which would pass through the thread profiles at such points as to make the width of the thread groove equal to one-half of the basic pitch. It is the diameter yielded by measuring over or under cylinders (wires) or spheres (balls) inserted in the thread groove on opposite sides of the axis and computing the thread groove diameter as thus defined.

On a taper thread the thread groove diameter is the diameter at a given position on the thread axis of the coaxial cone, the surface of which would pass through the thread profiles at such points as to make the width of the thread groove (measured parallel to the axis) equal to one-half of the basic pitch. It is the diameter yielded by measuring over or under cylinders (wires) or spheres (balls) inserted in the thread groove on opposite sides of the axis and computing the thread groove diameter as thus defined. (See par. 7.6.)

6.23. Thread Ridge Diameter.—On a straight thread the thread ridge diameter is the diameter of the coaxial cylinder, the surface of which would pass through the thread profiles at such points as to make the thickness of the thread ridge equal to one-half of the basic pitch.

On a taper thread the thread ridge diameter is the diameter at a given position on the thread axis of the coaxial cone, the surface of which would pass through the thread profiles at such points as to make the thickness of the thread ridge (measured parallel to the axis) equal to one-half of the basic pitch. (See par. 7.6.)

6.24. Functional (Virtual) Diameter.—The functional diameter of an external or internal thread is the pitch diameter of the enveloping thread of perfect pitch, lead, and flank angles, having full depth of engagement but clear at crests and roots, and of a specified length of engagement. It may be derived by adding to the pitch diameter in the case of an external thread, or subtracting from the pitch diameter in the case of an internal thread, the cumulative effects of deviations from specified profile, including variations in lead and flank angle over a specified length of engagement. The effects of taper, out-of-roundness, and surface defects may be positive or negative on either external or internal threads. (A perfect GO thread plug or ring gage, having a pitch diameter equal to that specified for the maximum-material-limit and having clearance at crest and root, is the enveloping thread corresponding to that limit.) (See par. 7.6.)

Note: Also called the Virtual Diameter, Effective Size, or Virtual Effective Diameter.

6.25. Form Diameter.—The form diameter is the diameter at the point nearest the root from which the flank is required to be straight.

6.26. Length of Complete Thread.—The length of complete thread is the axial length of a part where the thread section has full form at both crest and root; that is, the vanish threads are not included. However, on commercial fasteners where there are unfilled crests at the start of rolled threads or a chamfer at the start of a thread, not exceeding two pitches in length, this is traditionally included in the specified thread length. (See par. 3.10 Complete Thread, par. 3.12 Lead Thread and par. 3.14 Effective Thread.)

NOTE: When designing threaded products, it is necessary to take cognizance of: (1) Such permissible length of chamfer and (2) the first threads which by virtue of gaging practice may exceed or be less than the product limits and which may be included within the length of complete thread. However, when the application is such as to require a minimum or maximum number, or length, of complete threads the specification shall so state. Similar specification is required for a definite length of engagement.

6.27. LENGTH OF THREAD ENGAGEMENT.—The length of thread engagement of two mating threads is the axial distance over which two mating threads are designed to contact. (See par. 6.26 Length of Complete Thread.)

6.28. DEPTH OF THREAD ENGAGEMENT.—The depth (or height) of thread engagement between two coaxially assembled mating threads is the radial distance by which their thread forms overlap each other.

6.29. MAJOR CLEARANCE.—The major clearance is the radial distance between the root of the internal thread and the crest of the external thread of the coaxially assembled design forms of mating threads.

6.30. MINOR CLEARANCE.—The minor clearance is the radial distance between the crest of the internal thread and the root of the external thread of the coaxially assembled design forms of mating threads.

6.31. TENSILE STRESS AREA.—The tensile stress area of an externally threaded part is the circular cross-sectional area, normal to the axis, of a theoretical circular cylinder which would fail under tension at the same load at which the threaded part fails, if the materials of both have the same mechanical properties.

6.32. THREAD SHEAR AREA.—The thread shear area of the external thread is the effective area in shear at a specified diameter of the mated internal thread. The thread shear area of the internal thread is the effective area in shear at a specified diameter of the mated external thread.

NOTE: The specified diameters are usually the maximum minor diameter of the mated internal thread and the minimum major diameter of the mated external thread.

6.33. STANDOFF.—The standoff is the axial distance between specified reference points on external and internal taper threaded members or gages, when assembled with a specified torque or under other specified conditions.

7. SCREW THREAD DEFINITIONS IN RELATION TO GAGING AND MEASUREMENT

7.1. The meanings of certain definitions, as given previously, require some explanation in regard to their practical application and the values or results obtained in gaging or measurement of threads. The terms involved are: thread axis, flank angle, pitch, lead, and pitch diameter.

7.2. THREAD AXIS.—The thread axis is the axis of the pitch cylinder or cone. The pitch cylinder is one of such diameter and location of its axis that its surface would pass through a straight thread in such a manner as to make the widths of the thread ridge and the thread groove equal. The pitch cone is one of such apex angle and locations of its vertex and axis that its surface would pass through a taper thread in such a manner as to make the widths of the thread ridge and the thread groove equal.

It is required that measurements of pitch, lead, and flank angle of a thread gage be made in an axial plane, making it necessary that the direction or location of the axis be accurately known. To locate this axis accurately is relatively difficult. Normally the major cylinder or cone of an external thread, or the minor cylinder or cone of an internal thread, may be used as the reference surface, provided that it is round and concentric with the pitch cylinder or cone. The amount of eccentricity of such a surface, if any, may be determined at various points along and around the thread, by measuring the distance from the crest to the top of a cylinder (wire) or sphere (ball) laid in the thread. Also, the axis may be established by conical centers in the ends of a thread plug gage, with respect to which the thread was originally generated.

7.3. FLANK ANGLE.—The flank angle is the angle between the flank and the perpendicular to the axis of the thread, measured in an axial plane. A flank angle of a symmetrical thread is commonly termed the *half-angle of thread*.

A flank angle is generally measured with respect to a reference surface, such surface being an end surface of a thread plug or ring gage or the major or minor cylinder or cone. Prior to using such a surface as a reference it is necessary to determine its actual relationship to the thread axis. The flank angle may also be measured with respect to an axis established by conical centers at the ends of a thread plug gage, with respect to which the thread was originally generated.

7.4. PITCH.—The pitch of a thread is the distance, measured parallel to its axis, between corresponding points on adjacent thread forms in the same axial plane and on the same side of the axis.

Measurements of pitch are commonly made from thread groove to thread groove in an axial plane using a ball contact piece to touch both flanks simultaneously. Such measurements establish the number of threads per unit of length (per inch) when the pitch is uniform, or the variations from the nominal pitch when the pitch is either uniform or periodic throughout the measured length of thread. (See par. 6.2.)

7.5. LEAD AND HELIX VARIATIONS.—When a threaded part is rotated about its axis with respect to a fixed contact piece inserted in a thread groove, the lead is the axial distance moved by the part in relation to the amount of angular rotation. Lead is commonly specified as the distance moved in one complete rotation. It is necessary to distinguish measurement of lead from measurement of pitch, as uniformity of pitch measurements does not assure uniformity of lead. Variations in either lead or pitch cause the functional diameter of a thread to differ from the pitch diameter.

Helix variation is a wavy deviation from true helical advancement.

Accordingly, it is necessary to measure lead or helix variation throughout one or more turns of a thread, in addition to measurements of pitch, in order to obtain full information regarding the dimensional deviations of the thread. (See pars. 6.3, 6.4.)

7.6. Pitch Diameter, Functional (Virtual) Diameter, Thread Ridge Diameter, and Thread Groove Diameter.—(As the definitions of these terms are rather lengthy they are not repeated here, but reference should be made to pars. 6.21 to 6.24, inclusive. For threads of perfect form and lead the numerical value of the diameter defined by any one of these terms is equal to the pitch diameter.)

7.6.1. Because of the nearly perfect flank angles and lead of a thread plug gage, the measurement yielded by employing the three-wire system is considered to be the pitch diameter.

7.6.2. On threads of imperfect form or lead it is generally impracticable to determine accurately the pitch diameter as defined; the result obtained in measuring or gaging the thread is an approximation of either the pitch diameter or the functional (virtual) diameter. This approximation may be regarded as a pitch diameter, functional diameter, thread groove diameter, or thread ridge diameter, as related to respective types of equipment and conditions of verifying or measuring a thread. When a thread size is verified by means of a GO thread plug or ring gage, which is within specified gage limits or tolerances and engages the thread throughout a specified length of engagement, a determination is made by the method of attributes that the functional (virtual) diameter does not exceed the maximum-material-limit. The size limit thus verified may be designated the "GO Functional Diameter." The GO thread plug or thread ring gage is the accepted criterion for verification of threaded product for GO functional diameter. However, various indicating type thread gages or thread snap gages having gaging elements which engage the thread over a length and flank engagement approximately equivalent to that of the GO thread plug or thread ring gage should give comparable results, and when properly correlated with the GO thread plug or thread ring gage may serve satisfactorily to give assurance that the functional diameter does not exceed the specified maximum-material-limit.

7.6.3. When a thread size is verified by means of a HI thread plug gage or LO thread ring gage, which is within specified gage limits or tolerances and enters or is entered with a drag over the length of thread specified, a determination is made that the functional diameter lies within the minimum-material-limit. The size limit thus verified may be designated the "HI Functional Diameter" or the "LO Functional Diameter." The HI thread plug or the LO thread ring gage is the accepted criterion for verification of the HI and LO functional diameters of classes 1A, 2A, 1B, 2B, and 3B threads. However, various types of thread snap gages or indicating type thread gages with thread gaging elements which engage the thread over a length and flank engagement approximately equivalent to that of a HI thread plug gage or a LO thread ring gage should give comparable results, and when properly correlated with the HI thread plug or LO thread ring gage may serve satisfactorily to give assurance that the functional diameter is within the minimum-material-limit.

7.6.4. Gaging practice approximating pitch diameter measurement has been termed "LO Minimum-Material-Limit Gaging" and is the accepted criterion for verifying the minimum-material-limit of class 3A external threads. Such verification is accomplished by means of a limit type thread snap or indicating type thread gage with gaging elements having a thread form equivalent to that of the LO thread ring gage. Many thread snap and indicating type thread gages having gaging elements which contact the thread over a length of approximately two pitches are currently in use for determining the minimum-material-limit of various classes of screw threads. However, optimum results for verification of conformance to specifications utilizing differential analysis require a determination of pitch diameter, and this is achieved by means of gaging elements which contact the thread over a maximum length of one pitch. The size limit thus verified may be designated the "Min Single Element PD."

7.6.5. Indicating type thread gages may serve as suitable alternates for gaging the minimum single element PD. A gage having two gaging elements is preferred for detecting an elliptical condition, while a gage having three gaging elements is preferred for detecting the multi-lobed condition.

7.6.6. Gaging practices employing indicating type thread gages with thread forms of gaging elements suitable for approximating pitch diameter measurement, should give comparable results and serve satisfactorily to give assurance that the pitch diameter lies within the minimum-material-limit. Thread forms of gaging elements such as the cone and vee with radius contacts for pitch diameter or radius rolls (simulating the best wire) for thread groove diameter are employed in these instances, and, dependent on design and length of engagement, approximate pitch diameter measurement. The choice as to a cone and vee arrangement compared to radius rolls is a matter of individual preference, in consideration of including or excluding either flank angle or pitch deviations in the measurement. In general, it may be stated that a minimum length of engagement coupled with minimum flank contact results in the closest approximation of pitch diameter.

Conversely it may be stated that by increasing the length of engagement and the flank contact, the gaging tends toward the LO functional diameter. In practice, the length of engagement varies from less than one to approximately three pitches for various designs of gaging elements.

7.6.7. In order to determine that the deviations in lead or flank angle do not exceed the equivalent of one-half of the pitch diameter tolerance, indicating type thread gages may be employed to indicate the differential between the GO functional diameter and the pitch diameter. When the differential exceeds the equivalent of one-half of the pitch diameter tolerance, it is necessary to make a further analysis to determine whether or not any individual thread element exceeds the equivalent of the allowable specified percentage of the pitch diameter tolerance. Deviations from specified size and profile include variations in lead, uniformity of helix, flank angle, and taper; also out-of-roundness, and surface defects. Indicating type thread gages for determining diameter equivalents of lead deviations have gaging elements of the specified form and length of the GO thread gage, by which a differential reading can be obtained between the measured functional diameter and the first-full-thread pitch diameter measured by a single ridge of the GO gaging element, excluding taper, if any. Indicating type thread gages for determining diameter equivalents of flank angle deviations are those by which a differential reading can be obtained between the first-full-thread pitch diameter determined by a single ridge of the GO gaging element and that determined by the indicating type thread gage for pitch diameter having radius-type gaging elements.

7.6.8. When a thread size of a taper thread is verified by means of a taper thread plug or ring gage, or equivalent, having a basic gaging notch or surface, or limit notches, and which is within specified gage limits or tolerances, a determination is made that the functional diameter throughout the specified length of hand engagement lies within specified size limits. The thread size thus verified may be designated the "Taper Thread Functional Diameter."

8. LETTER SYMBOLS AND DESIGNATIONS

8.1. Symbols associated with screw threads are of two kinds: (1) Letter symbols for designating dimensions of screw threads and threaded products; and (2) abbreviations used as designations for various standard thread forms and thread series.

8.2. Dimensional Symbols.

8.2.1. Standard letter symbols to designate the dimensions of screw threads in text and formulas are given in tables 1.4 and 1.6. General symbols are given in table 1.4 and pipe-thread symbols in table 1.6. The application of general symbols is illustrated in figures 1.2 and 1.3, and pipe-thread symbols in figure 1.5.

8.2.2. ISO symbols to designate screw thread dimensions are given in table 1.7. These symbols are commonly applied in Recommendations for Screw Threads of the International Standardization Organization (ISO).

8.3. Thread Designations.

8.3.1. Thread series designations are capital letter abbreviations of names used on drawings, in tables, and otherwise to designate various forms of thread and thread series, and commonly consist of combinations of such abbreviations. Assembled in tables 1.8 and 1.8a are the names and abbreviations which are now in use, together with references to standards in which they occur, for various standard threads.

8.3.2. Thread element designations are capital letter abbreviations based on names of various thread dimensions in thread designations. Such abbreviations are for use on drawings and are shown in table 1.9.

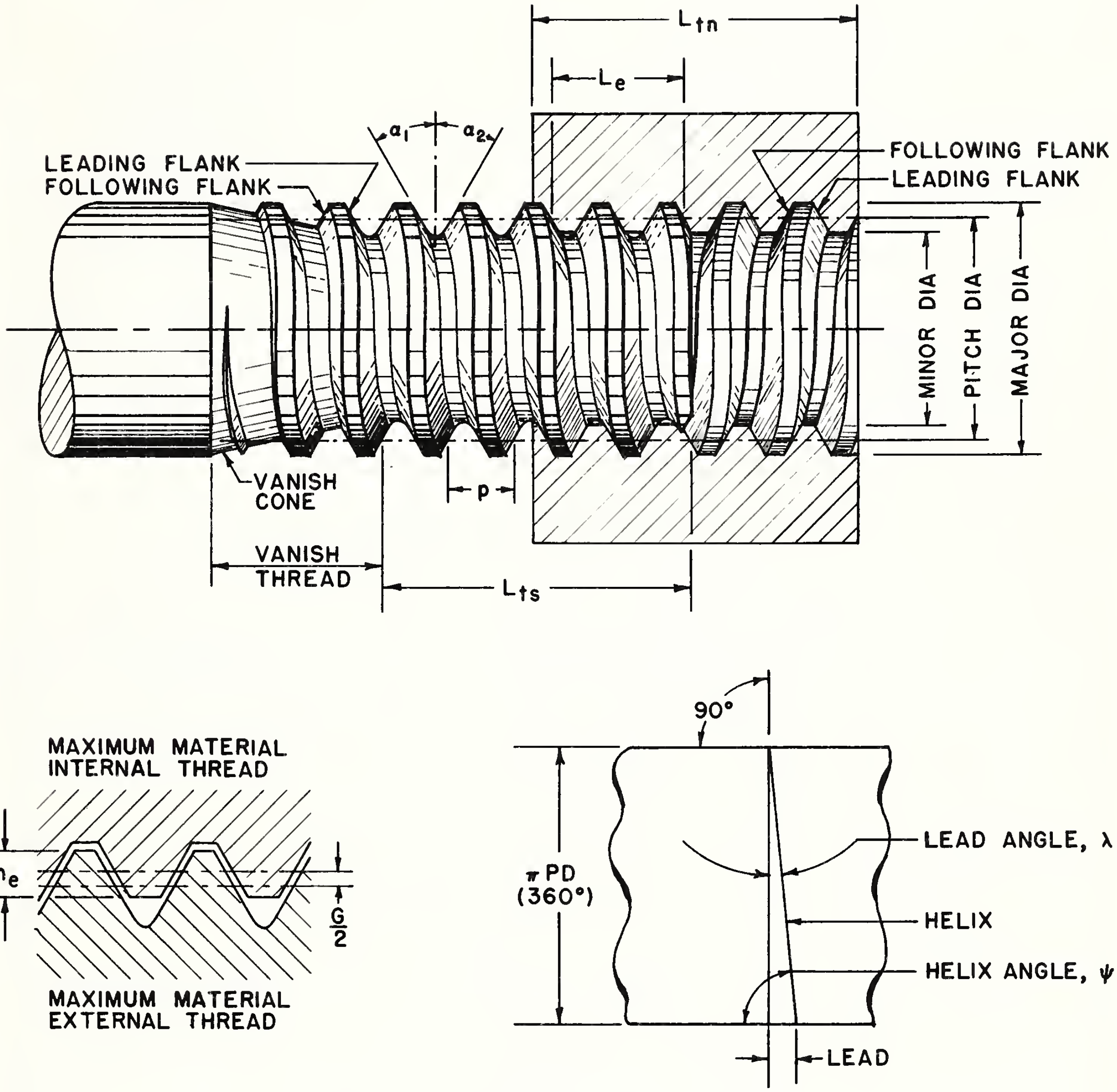

FIGURE 1.2. *General screw thread symbols (see table 1.4).*

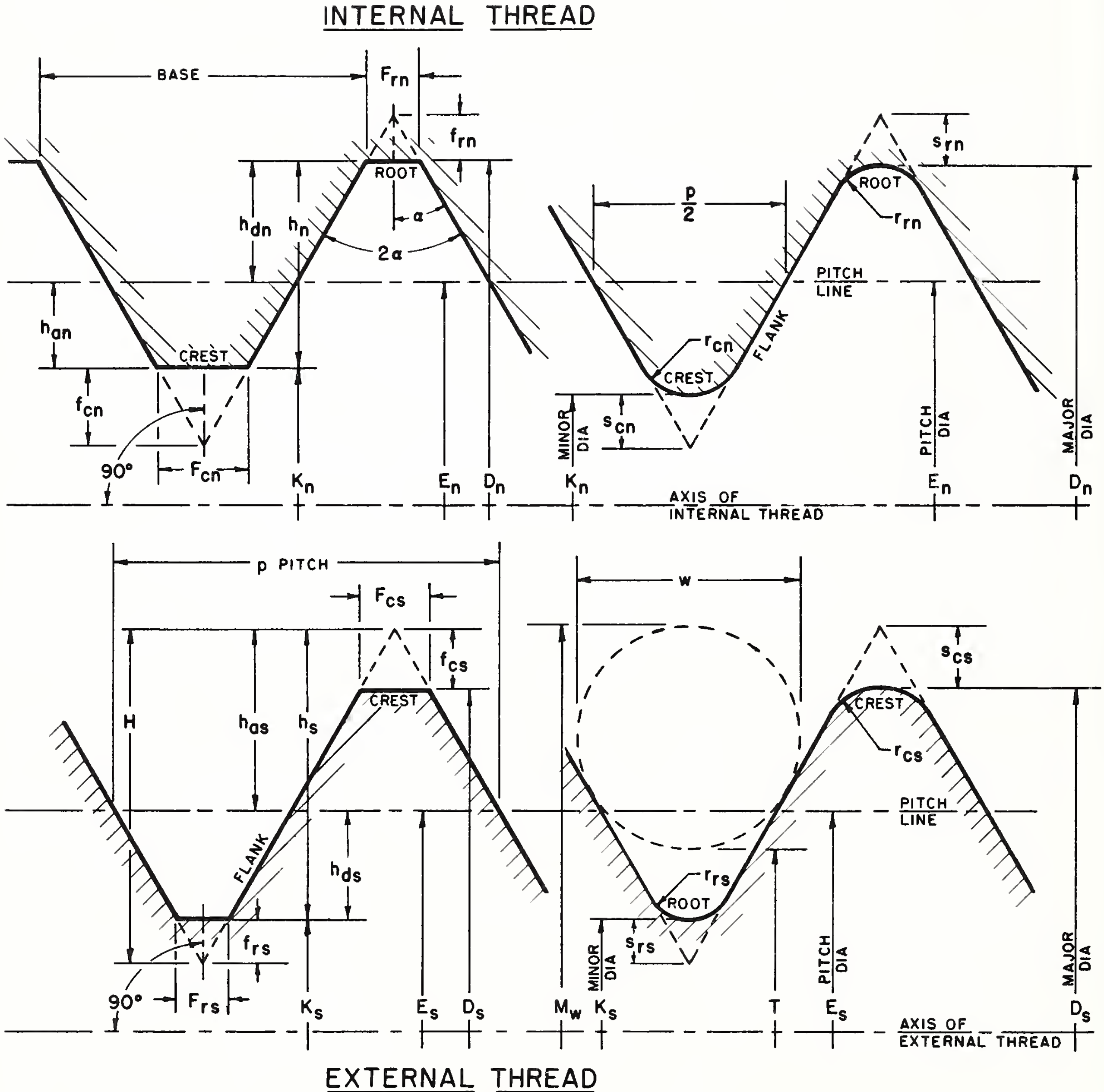

FIGURE 1.3. *General screw thread symbols (see table 1.4).*

NOTE: These diagrams are not intended to show standard forms but illustrate only the applications of symbols.

Table 1.4. *General Symbols (see figs. 1.2 and 1.3)*

Symbol	Dimension
D	Major diameter.[a,b]
E	Pitch diameter.[b]
K	Minor diameter.[b]
p	Pitch (Equals $1/n$).
L	Lead (Equals $1/N$).
n	Number of threads (pitches) per unit of length (per inch) (tpi) (Equals $1/p$).
N	Number of turns per unit of length (per inch) (Equals $1/L$).
H	Fundamental triangle height.
h	Thread height (or depth).[b]
h_a	Addendum.
h_d	Dedendum.
h_b	Symmetrical thread height.[c]
h_e	Depth of thread engagement.
α	Half-angle of symmetrical thread.
α_1	Angle between leading flank of thread and normal to thread axis.
α_2	Angle between following flank of thread and normal to thread axis.
λ	Lead angle ($\tan \lambda = L/\pi E$).
ψ	Helix angle ($\cot \psi = L/\pi E$).
	Radius of rounding at:
r_{cs}	Crest of external thread
r_{rs}	Root of external thread
r_{cn}	Crest of internal thread
r_{rn}	Root of internal thread.
	Radial distance from apex of fundamental triangle to:
s_{cs}	Rounded crest of external thread.[d]
f_{cs}	Flat at crest of external thread.[d]
	Width of:
F	Flat (general).
F_{cs}	Flat at crest of external thread.[d]

Symbol	Dimension
G	Allowance at major, pitch, and minor diameters of external thread.
L_{ts}	Length of complete external thread.
L_{tn}	Length of complete internal thread including chamfer.
L_e	Length of thread engagement.
w	Diameter of measuring wires.
M_w	Measurement over wires.
T	Measurement under wires.
C	Correction to measurement over wires to give pitch diameter, $E = M_w - C - c$; $C = w\,(1 + \operatorname{cosec} \alpha) - (\cot \alpha)/2n$.
P	Correction to measurement under wires to give pitch diameter, $E = T + P - c$; $P = (p \cot \alpha)/2 - (\operatorname{cosec} \alpha - 1)w$.
λ'	Wire angle.
c	Wire angle correction.[e]
δ	Deviation in any dimension. Examples: Deviation in pitch, δp; deviation in flank half-angle, $\delta\alpha_1$ or $\delta\alpha_2$.
ΔE_α	Pitch-diameter equivalent of deviations in flank half-angle.
ΔE_p	Pitch-diameter equivalent of deviation in pitch.

[a] Exception: B is used for basic major diameter when this differs from the nominal major diameter.
[b] Subscripts s (for screw) or n (for nut) designating external and internal thread, respectively, may be used if necessary.
[c] For 60° Unified thread this equals 0.75H = 100 percent thread height.
[d] In addition to the symbol with subscript cs, symbols with subscripts rs, cn, and rn are also applicable as in the r_{cs}, etc., symbols above.
[e] See National Physical Laboratory "Gauging and Measuring Screw Threads," 1951, p. 23; Appendix A4 of H28.

GREEK ALPHABET

Α α Alpha	Δ δ Delta	Η η Eta	Κ κ Kappa	Ν ν Nu	Π π Pi	Τ τ Tau	Χ χ Chi
Β β Beta	Ε ε Epsilon	Θ θ Theta	Λ λ Lambda	Ξ ξ Xi	Ρ ρ Rho	Υ υ Upsilon	Ψ ψ Psi
Γ γ Gamma	Ζ ζ Zeta	Ι ι Iota	Μ μ Mu	Ο ο Omicron	Σ σ Sigma	Φ φ Phi	Ω ω Omega

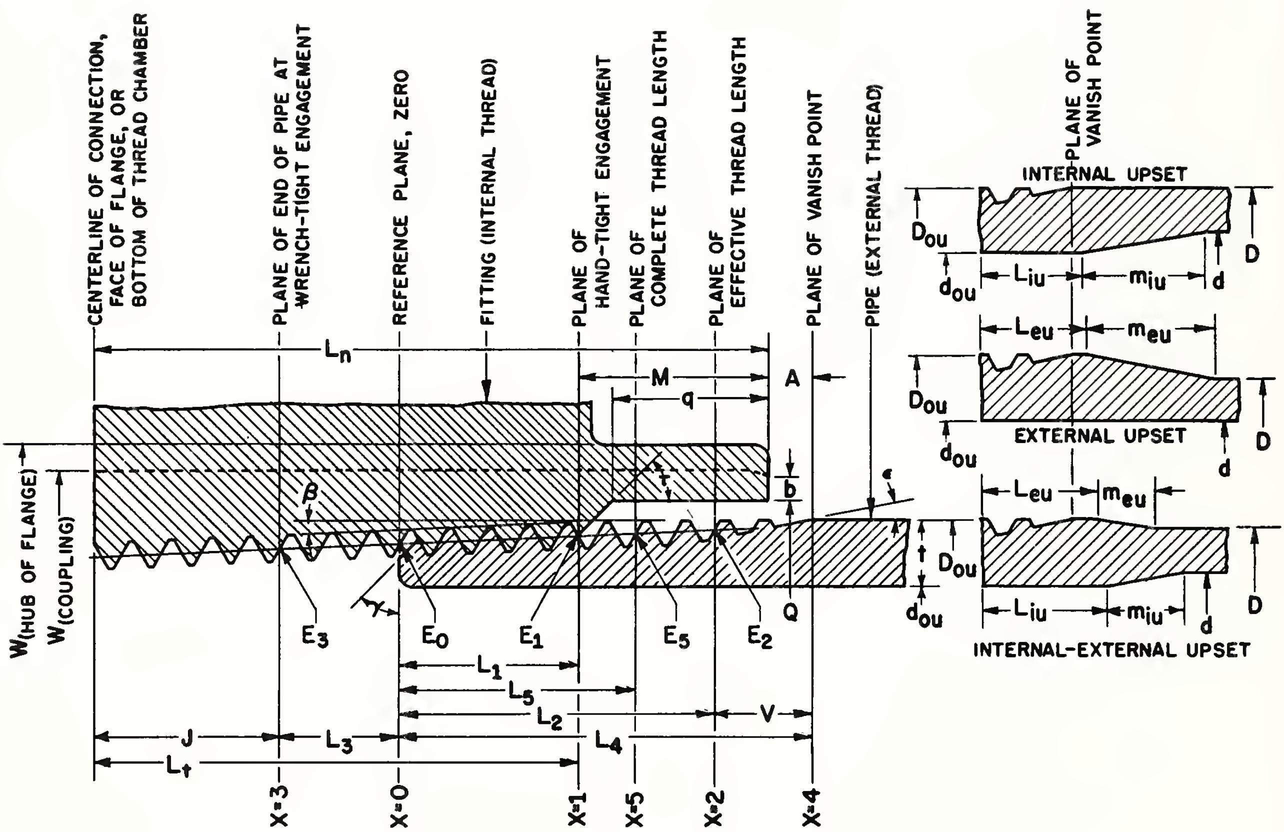

FIGURE 1.5. *Pipe and pipe thread symbols (see table 1.6).*

TABLE 1.6. *Pipe-thread symbols (see fig. 1.5)*

Symbol	Dimension	Symbol	Dimension
D	Outside diameter of pipe.	L_n	Length from center line of coupling, face of flange, or bottom of internal thread chamber to face of fitting.
d	Inside diameter of pipe.	b	Width of bearing face on coupling.
t	Wall thickness of pipe.	τ (tau)	Angle of chamfer at bottom of recess or counterbore measured from the axis.
D_x	Major diameter. (See footnotes a and b)	ϵ (epsilon)	Half apex angle of vanish cone.
E_x	Pitch diameter. (See footnotes a and b)	J	Length from center line of coupling, face of flange, or bottom of internal thread chamber to end of pipe, wrenched engagement.
K_x	Minor diameter. (See footnotes a and b)	L_t	(1) Length of straight full thread (see table 1.4). (2) Length from plane of handtight engagement to small end of full internal taper thread.
L_x	Length of thread from plane of pipe end to plane containing basic diameter D_x, E_x, or K_x.	Q	Diameter of recess or counterbore in fitting.
V	Length of vanish cone (washout) threads.	q	Depth of recess or counterbore in fitting.
β (beta)	Half apex angle of pitch cone of taper thread.	W	Outside diameter of coupling or hub of fitting.
γ (gamma)	Angle of chamfer at end of pipe measured from a plane normal to the axis.		
A	Handtight standoff of face of coupling from a plane containing vanish point on pipe.		
M	Length from plane of handtight engagement to the face of coupling on internally threaded member.		
S	Distance of gaging step of plug gage from face of ring gage for handtight engagement. Standoff.		

[a] Subscript x denotes plane containing the diameter. For axial *positions of planes* see below.
[b] Subscripts s (for screw) or n (for nut) designating external and internal threads, respectively, may also be used if necessary

DEFINITIONS OF PLANES DENOTED BY SUBSCRIPT x

$x = 0$	Plane of pipe end.
$x = 1$	Plane of handtight engagement or plane at mouth of coupling (excluding recess, if present). On British pipe threads this is designated the "gauge plane" and the major diameter in this plane is designated the "gauge diameter."
$x = 2$	Plane at which vanish threads on pipe commence.
$x = 3$	Plane in coupling reached by end of pipe in wrenched condition. (L_3 is measured from plane containing pipe end in position of handtight engagement.)
$x = 4$	Plane containing vanish point of thread on pipe.
$x = 5$	Plane at which major diameter cone of thread intersects outside diameter of pipe.

Additional special subscripts are as follows:

$x = 6$	Plane of the pipe end for railing joints.
$x = 7$	Plane of the API gage point at a specified length from the plane of vanish point.
$x = 8$	Plane of the large end of the "L_8 thread ring gage" for the National Gas Taper (compressed-gas cylinder valve inlet connection) thread.
$x = 9$	Plane of the small end of the "L_9 thread plug gage" for the National Gas Taper (compressed-gas cylinder inlet) thread.

TABLE 1.7 *ISO symbols*

Symbol	Dimension
d	Basic major diameter of bolt thread.
d_2	Basic pitch (effective) diameter of bolt thread.
d_1	Basic minor diameter of bolt thread.
D	Basic major diameter of nut thread.
D_1	Basic minor diameter of nut thread.
D_2	Basic pitch (effective) diameter of nut thread.
P	Pitch.
n	Number of threads per inch.
R	Radius of root of bolt thread.
H_1	Depth of thread engagement.
n_e	Number of threads in engagement.
S	Designation for thread engagement group Short.
N	Designation for thread engagement group Normal.
L	Designation for thread engagement group Long.
T	Tolerance.
T_d, T_{d2}, T_{d1}, T_{D1}, T_{D2}.	Tolerance for major diameter of bolt thread, for pitch (effective) diameter of bolt thread, etc.
ei, EI	Lower deviation.
es, ES	Upper deviation.
A	Allowance.

Table 1.8. *Thread series designations*[a,b]

Designation	Thread series	Reference: United States of America (USA) Standard	Reference: H28
ACME-C	Acme threads, centralizing	B1.5	Part III
ACME-G	Acme threads, general purpose (See also "Stub Acme")	B1.5	Part III
AMO	Microscope Objective threads	B1.11	Part III
ANPT	Aeronautical National form taper pipe threads	MIL-P-7105	
F-PTF	Dryseal (fine) taper pipe threads	B2.2	Part II
M	ISO metric threads		Part III
N BUTT	Buttress threads	B1.9	Part III
N, NC, NF, NEF	See table 1.8a		
	Gas Cylinder Valve Outlet and Inlet Threads:	B57.1	Part II
NGO (b)	Gas outlet threads		
NGS	Gas straight threads		
NGT	Gas taper threads		
SGT	Special gas taper threads		
NH, NPSH	Hose coupling threads	B2.4	Part II
NH	Fire-hose coupling threads		Part II
	Pipe Threads (except Dryseal):		
ANPT	Aeronautical National form taper pipe threads	MIL-P-7105	
NPSC	Straight pipe threads in pipe couplings	B2.1	Part II
NPSL	Straight pipe threads for loose-fitting mechanical joints with locknuts	B2.1	Part II
NPSM	Straight pipe threads for free-fitting mechanical joints for fixtures	B2.1	Part II
NPT	Taper pipe threads for general use	B2.1	Part II
NPTR	Taper pipe threads for railing joints	B2.1	Part II
	Dryseal Pipe Threads:		
F-PTF	Dryseal (fine) taper pipe threads	B2.2	Part II
NPSF	Dryseal fuel internal straight pipe threads	B2.2	Part II
NPSI	Dryseal intermediate internal straight pipe threads	B2.2	Part II
NPTF	Dryseal taper pipe threads	B2.2	Part II
PTF-SAE, SHORT	Dryseal SAE short taper pipe threads	B2.2	Part II
PTF-SPL, SHORT	Dryseal special short taper pipe threads	B2.2	Part II
PTF-SPL, EXTRA SHORT	Dryseal special extra short taper pipe threads	B2.2	Part II
SPL-PTF	Dryseal special taper pipe threads	B2.2	Part II
NR, NS	See table 1.8a		
SGT	Special gas taper threads	B57.1	Part II
SPL-PTF	See under "Dryseal pipe threads"		
STUB ACME	Stub Acme threads	B1.8	Part III
	Surveying instrument mounting threads		Part III
UN series	See table 1.8a (0.06 in. (1.5 mm) and larger)		
UNJ series	See table 1.8a (0.06 in. (1.5 mm) and larger)		
UNM	Unified Miniature thread series (0.055 in. (1.4 mm) and smaller)	B1.10	Section 5

[a] Methods of designating multiple threads are shown in USA B1.5, Acme screw threads, and Part III of Handbook H28.
[b] All threads, except NGO, are right hand unless otherwise designated. For NGO threads, designations "RH" or "LH" are required.

Table 1.8a. *Designations for UN, UNJ, N, NR thread series*

Basic thread series	External thread root	Constant pitch	Coarse	Fine	Extra fine	Special diameters, pitches, or lengths of engagement	Reference: United States of America (USA) Standard	Reference: H28
UN	With optional radius root on external thread.	UN	UNC	UNF	UNEF	UNS	B1.1 B1.1	Section 2 Section 3
UNJ	With 0.15011p to 0.18042p mandatory radius root on external thread.	UNJ	UNJC	UNJF	UNJEF	UNJS		Section 4
N[a]		N	NC	NF	NEF	NS		Appendix A1
NR		NR					MIL-B-7838	

[a] This series superseded by UN series.

TABLE 1.9 *Dimensional designations for use on drawings*

Designation	Dimension	Designation	Dimension
CR	Crest radius.	RR	Root radius.
DR	Differential reading.	T	Tolerance.
FD	Functional diameter.	TGD	Thread groove diameter.
G	Allowance.	TGW	Thread groove width.
L	Lead.	TPI	Threads per inch.
LE	Length of thread engagement.	TRD	Thread ridge diameter.
P	Pitch.	TRT	Thread ridge thickness.
PD	Pitch diameter.		

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UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

SECTION 2

1969

UNIFIED THREAD FORM AND THREAD SERIES FOR BOLTS, SCREWS, NUTS, TAPPED HOLES, AND GENERAL APPLICATIONS

CONTENTS

1. INTRODUCTION

The Unified thread standards shown in this section are in agreement with International Standardization Organization (ISO) Recommendations:

R68 Screw Threads (That part dealing with the ISO Basic Thread Profile), and

R263 ISO Inch Screw Threads, General Plan and Selection for Screws, Bolts, and Nuts (diameter range 0.06 to 6 inch).

This section is in general agreement with United States of America Standard USA B1.1, Unified Screw Threads, published by The American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y. 10017; also with CSA B1.1, Standard for Unified and American Screw Threads, published by the Canadian Standards Association, Ottawa, Canada; and with British Standard 1580, Unified Screw Threads, published by the British Standards Institution, 2 Park Street, London, W.1. The latest revision should be consulted when referring to such standards. As of date of issue of this section of H28, USA B1.1-1960 is the latest revision of B1.1.

The Unified screw thread standards shown in this section constitute the basic thread standards used in the United States for the screw threads used on threaded fasteners. Unified screw threads are a complete and integrated system of threads for fastening purposes in mechanisms and structures. Their outstanding characteristic is general interchangeability of threads achieved through the standardization of thread form, diameter-pitch combinations, and limits of size.

The standards have as their original basis the work done about a century ago by William Sellers in the United States and Sir Joseph Whitworth in Great Britain. Throughout the intervening years there have been many further developments and revisions, culminating in the system of Unified Threads approved and adopted for use by all inch-using countries.

Unification of screw thread standards received its impetus from the need for interchangeability among the billions of fasteners used in the complex equipment of modern warfare which equipment was, and continues to be, made in different countries. Equally important, however, are international trade in mechanisms of all kinds and the servicing of transportation equipment which moves from country to country. These have made unification not only highly advantageous but practically essential.

Unified screw threads had their origin in an Accord signed at Washington, D.C., on November 18, 1948, by representatives of Standardizing Bodies of Canada, the United Kingdom, and the United States. The Unified standard threads generally supersede the American standard threads. Threads are classed as Unified if they have the basic Unified thread form and have limits of size and tolerances based on the Unified formulations. Such threads are identified by the letter combination "UN" in the thread symbol.

In relation to previous American practice, Unified threads have substantially the same thread form and are mechanically interchangeable with American National threads of the same diameter and pitch.

The principal differences between the two systems relate to the application of allowances, the variation of tolerances with size, difference in amount of pitch diameter tolerance on external and internal threads, and differences in thread designations. Under the Unified system, an allowance is provided on both the classes 1A and 2A external threads, whereas under the American National system only the class 1 external thread has an allowance. Under the Unified system, the pitch diameter tolerance of an internal thread is 30 percent greater than that of the external thread, but such tolerances are equal under the American National system. Since the tolerances differ, the letter "A" is used in the thread symbol to denote an external thread and the letter "B" is used to denote an internal thread. Unified tolerances and allowances for both standard and special diameter-pitch combinations are derived from the same formula, but American National tolerances for special threads have a different basis from that for some standard threads.

2. UNIFIED THREAD FORM

2.1. Basic Thread Form.—The Unified thread form is the basis of all thread dimensions given in this section. The formulas for its proportions are given in table 2.1, together with figure 2.2, showing the basic profile from which the design forms are derived. Both the ISO basic profile and the American (U.S.) concept of the basic Unified thread form are shown. These are essentially alike except that in the second illustration the position of the basic minor diameter provides for the long established practice in the U. S. of considering 100 percent thread height as being equal to $0.75H$ measured from the basic major diameter.

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

2.1(b) *Form of crest.*—The form of the crest of external threads is flat. The crest of the basic thread form of the external thread shall be truncated from the sharp crest an amount equal to $0.125\ H$, where H is the depth of the fundamental triangle. The form of the crest of internal threads is flat and the crest shall be truncated from the sharp crest an amount equal to $0.25\ H$.

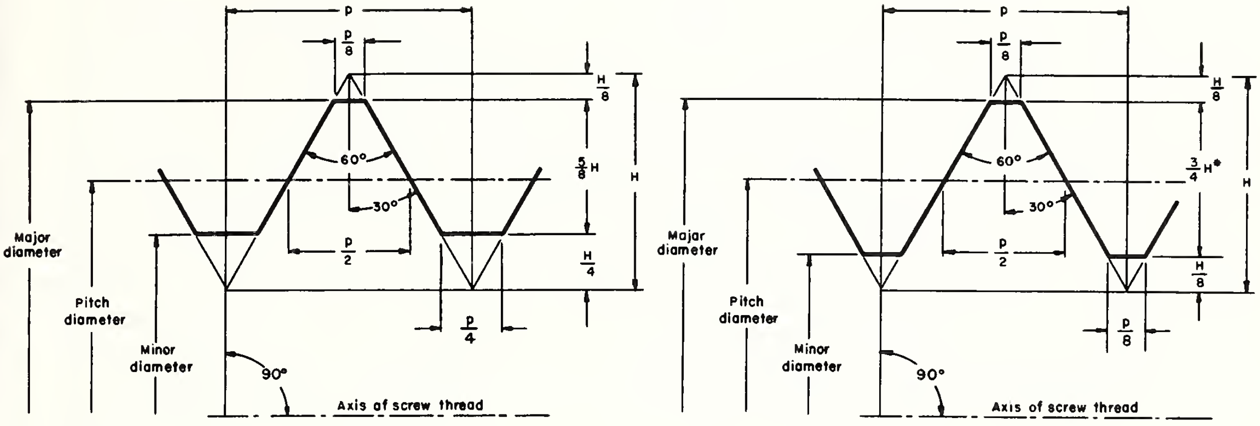
2.1(c) *Rounded root forms.*—The crest clearances allowed are such as to permit rounded root forms in both the external and internal threads. Rounded roots are required in some applications and are made by tools that are purposely rounded. Otherwise, rounded roots may be the result of tool wear.

2.1(d) *Clearance at minor diameter.*—A clearance is provided at the minor diameter of the internal thread by truncating from the sharp crest an amount equal to $0.25\ H$.

TABLE 2.1. *Thread data, Unified thread form (see fig. 2.4.)*

Threads per inch, n	Pitch, $p = 1/n$	Flat at internal thread crest, $F_{cn} = p/4 = 0.25/n$	Flat at internal thread root and external thread crest, $F_{rn} = F_{cs} = p/8 = 0.125/n$	Height of sharp v-thread, $H = .8660254/n$	Twice min truncation of internal thread root, $2f_{rn} = H/12 = 0.0721688/n$	Max truncation of internal thread root and external thread crest, $f_{rn} = f_{cs} = H/8 = 0.108253/n$	Truncation of external thread rounded root, $s_{rs} = H/6 = 0.144338/n$	Half addendum of external thread, $3H/16 = 0.162380/n$	Addendum of internal thread and truncation of internal thread crest, $h_{an} = f_{cn} = H/4 = 0.216506/n$	Dedendum of internal thread and addendum of external thread, $h_{dn} = h_{as} = 3H/8 = 0.324759/n$	Height of internal thread and depth of thread engagement, $h_n = h_e = 5H/8 = 0.541266/n$	Height of external thread and max height of internal thread, $h_s = 17H/24 = 0.613435/n$	([a]) Twice the external thread addendum, $h_b = 2h_{as} = 3H/4 = 0.649519/n$	Thread height from basic flat crest to sharp root, $7H/8 = 0.757772/n$	Difference between max major and pitch diameters of internal thread, $11H/12 = 0.793857/n$	Double height of internal thread, $2h_n = 5H/4 = 1.082532/n$	Double height of external thread, $17H/12 = 1.226868/n$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	0.012500	0.00312	0.00156	0.010825+	0.00090	0.00135+	0.00180	0.00203	0.00271	0.00406	0.00677	0.00767	0.008119	0.00947	0.00992	0.01353	0.01534
72	.013889	.00347	.00174	.012028	.00100	.00150	.00200	.00226	.00301	.00451	.00752	.00852	.009021	.01052	.01103	.01504	.01704
64	.0156250	.00391	.00195+	.013532	.00113	.00169	.00226	.00254	.00338	.00507	.00846	.00958	.010149	.01184	.01240	.01691	.01917
56	.017857	.00446	.00223	.015465−	.00129	.00193	.00258	.00290	.00387	.00580	.00967	.01095+	.011599	.01353	.01418	.01933	.02191
48	.020833	.00521	.00260	.018042	.00150	.00226	.00301	.00338	.00451	.00677	.01128	.01278	.013532	.01579	.01654	.02255+	.02556
44	.022727	.00568	.00284	.019682	.00164	.00246	.00328	.00369	.00492	.00738	.01230	.01394	.014762	.01722	.01804	.02460	.02788
40	.025000	.006250	.00312	.021651	.00180	.00271	.00361	.00406	.00541	.00812	.01353	.01534	.016238	.01894	.01985−	.02706	.03067
36	.027778	.00694	.00347	.024056	.00200	.00301	.00401	.00451	.00601	.00902	.01504	.01704	.018042	.02105−	.02205+	.03007	.03408
32	.031250	.00781	.00391	.027063	.00226	.00338	.00451	.00507	.00677	.01015−	.01691	.01917	.020297	.02368	.02481	.03383	.03834
28	.035714	.00893	.00446	.030929	.00258	.00387	.00515+	.00580	.00773	.01160	.01933	.02191	.023197	.02706	.02835+	.03866	.04382
27	.037037	.00926	.00463	.032075+	.00267	.00401	.00535−	.00601	.00802	.01203	.02005−	.02272	.024056	.02807	.02940	.04009	.04544
24	.041667	.01042	.00521	.036084	.00301	.00451	.00601	.00677	.00902	.01353	.02255+	.02556	.027063	.03157	.03308	.04511	.05112
20	.050000	.01250	.006250	.043301	.00361	.00541	.00722	.00812	.01083	.01624	.02706	.03067	.032476	.03789	.03969	.05413	.06134
18	.055556	.01389	.00694	.048113	.00401	.00601	.00802	.00902	.01203	.01804	.03007	.03408	.036084	.04210	.04410	.06014	.06816
16	.062500	.01562	.00781	.054127	.00451	.00677	.00902	.01015−	.01353	.02030	.03383	.03834	.040595−	.04736	.04962	.06766	.07668
14	.071429	.01786	.00893	.061859	.00515+	.00773	.01031	.01160	.01546	.02320	.03866	.04382	.046394	.05413	.05670	.07732	.08763
13	.076923	.01923	.00962	.066617	.00555+	.00833	.01110	.01249	.01665+	.02498	.04164	.04719	.049963	.05829	.06107	.08327	.09437
12	.083333	.02083	.01042	.072169	.00601	.00902	.01203	.01353	.01804	.02706	.04511	.05112	.054127	.06315−	.06615+	.09021	.10224
11.5	.086957	.02174	.01087	.075307	.00628	.00941	.01255+	.01412	.01883	.02824	.04707	.05334	.056480	.06589	.06903	.09413	.10668
11	.090909	.02273	.01136	.078730	.00656	.00984	.01312	.01476	.01968	.02952	.04921	.05577	.059047	.06889	.07217	.09841	.11153
10	.100000	.02500	.01250	.086603	.00722	.01083	.01443	.01624	.02165+	.03248	.05413	.06134	.064952	.07578	.07939	.10825+	.12269
9	.111111	.02778	.01389	.096225+	.00802	.01203	.01604	.01804	.02406	.03608	.06014	.06816	.072169	.08420	.08821	.12028	.13632
8	.125000	.031250	.01562	.108253	.00902	.01353	.01804	.02030	.02706	.04059	.06766	.07668	.081190	.09472	.09923	.13532	.15336
7	.142857	.03571	.01786	.123718	.01031	.01546	.02062	.02320	.03093	.04639	.07732	.08763	.092788	.10825+	.11341	.15465−	.17527
6	.166667	.04167	.02083	.144338	.01203	.01804	.02406	.02706	.03608	.05413	.09021	.10224	.108253	.12630	.13231	.18042	.20448
5	.200000	.05000	.02500	.173205+	.01443	.02165+	.02887	.03248	.04330	.06495+	.10825+	.12269	.129904	.15155+	.15877	.21651	.24537
4.5	.222222	.05556	.02778	.192450	.01604	.02406	.03208	.03608	.04811	.07217	.12028	.13632	.144338	.16839	.17641	.24056	.27264
4	.250000	.06250	.031250	.216506	.01804	.02706	.03608	.04059	.05413	.08119	.13532	.15336	.162380	.18944	.19846	.27063	.30672

[a] This is taken as 100 percent thread height and is now known as a symmetrical thread form. It is equivalent to the "basic height" h of the original American National form.



ISO basic profile for inch and metric threads.

* 3H/4 = 100 percent thread height

American (U.S.) symmetrical thread form from which percentages of thread height are calculated.

FIGURE 2.2. *Basic unified thread form; ISO basic profile and American (U.S.) symmetrical thread form.*

2.1(e) *Clearance at major diameter.*—A clearance is provided at the major diameter of the internal thread by making the thread form at the root such that its width is less than 0.125 *p*.

2.2. DESIGN FORM OF EXTERNAL THREAD.—The design form for an external Unified thread, i.e., the form of an external thread in its maximum material condition, shown in figure 2.3, is derived from the fundamental triangle. It is truncated at the major diameter to 0.125 *H*. In practice, due to providing for tool crest wear at the thread roots, i.e., the minor diameter, the roots are shown as a rounded contour and cleared beyond the flat width of 0.25 *p* for the minimum minor diameter of the internal thread. Also, in practice, the crests of the external threads may be rounded within the confines established by the major diameter tolerance.

2.3. DESIGN FORM OF INTERNAL THREAD.—The design form for an internal Unified thread, i.e., the form of an internal thread in its maximum material condition, shown in figure 2.3, is derived from the fundamental triangle. It is similar to the basic form except that the truncation at the minor diameter is an amount equal to one-quarter of the fundamental triangle height (0.25*H*). In practice, due to providing for tool crest wear at the thread roots, i.e., the major diameter, the roots are shown as a rounded contour and cleared beyond the flat width of 0.125 *p* for the maximum major diameter of the internal thread.

2.4. BASIC THREAD DATA.—The basic thread data for all standard pitches of the Unified form of thread are given in table 2.1.

3. THREAD SERIES, ORDER OF SELECTION, AND SUGGESTED APPLICATIONS

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 series of specific diameters. The various diameter-pitch combinations of three series with graded pitches and 8 series with constant pitches are given in table 2.7, p. 2.08. The symbols for designating the various thread series are shown in table 2.7. In table 2.21, p. 2.26, the limits of size of the series in table 2.7 are given but the full range is not covered in the case of the 4UN, 6UN, and 8UN series. (See par. 11 Limits of Size, p. 2.25.)

3.2. ORDER OF SELECTION.—Whenever possible, selection should be made from table 2.21, p. 2.26, Standard series limits of size—Unified screw threads, preference being given to the coarse-thread and fine-thread series. If threads in the standard series do not meet the requirements of design, reference should be made to the selected combinations in table 3.1. The third expedient is to compute the limits of size for a special diameter-pitch combination in accordance with table 3.11. The fourth and last resort is calculation by the formulas in section 3.

3.3. UNC, COARSE-THREAD SERIES.—This series is generally utilized for the bulk production of bolts, screws, nuts, and other general engineering applications. It is used in general applications for threading into lower tensile strength materials such as cast iron, mild steel, and softer materials to obtain the optimum resistance to stripping of the internal

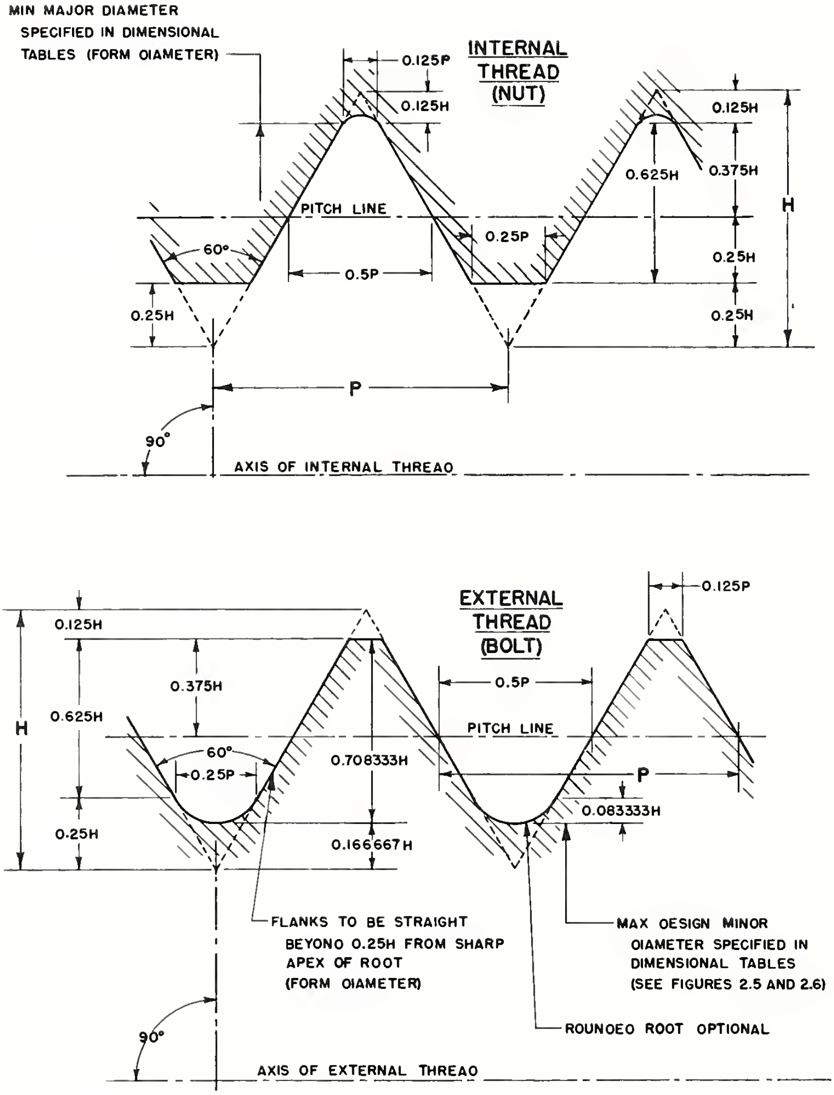


Figure 2.3. *Unified internal and external screw thread design forms (maximum material condition).*

NOTE: See table 2.1 for numerical values. In practice the crests of external threads may be rounded.

thread. It is applicable for rapid assembly or disassembly, or if corrosion or slight damage is possible. The basic dimensions and limits of size for this series are shown in tables 2.8 and 2.21.

3.4. UNF, Fine-Thread Series.—This series is suitable for the production of bolts, screws, nuts, and other applications where the coarse series is not applicable. External threads of this series have greater tensile stress area than comparable sizes of the coarse series. The fine series is suitable when the resistance to stripping of both external and mating internal threads equals or exceeds the tensile load carrying capacity of the externally threaded member. It is also used where the length of engagement is short, where a smaller lead angle is desired, or where the wall thickness demands a fine pitch. It may also be used for threading into lower strength materials where maximum strength of the external thread is not required, otherwise, the length of engagement must be selected to meet the above required strength conditions.

Fine threads up to and including 1 in size are suitable for screw, bolt, and nut, and other threaded fastener applications. Sizes over 1 in may not be suitable unless the mating materials are compatible as outlined above. The basic dimensions and limits of

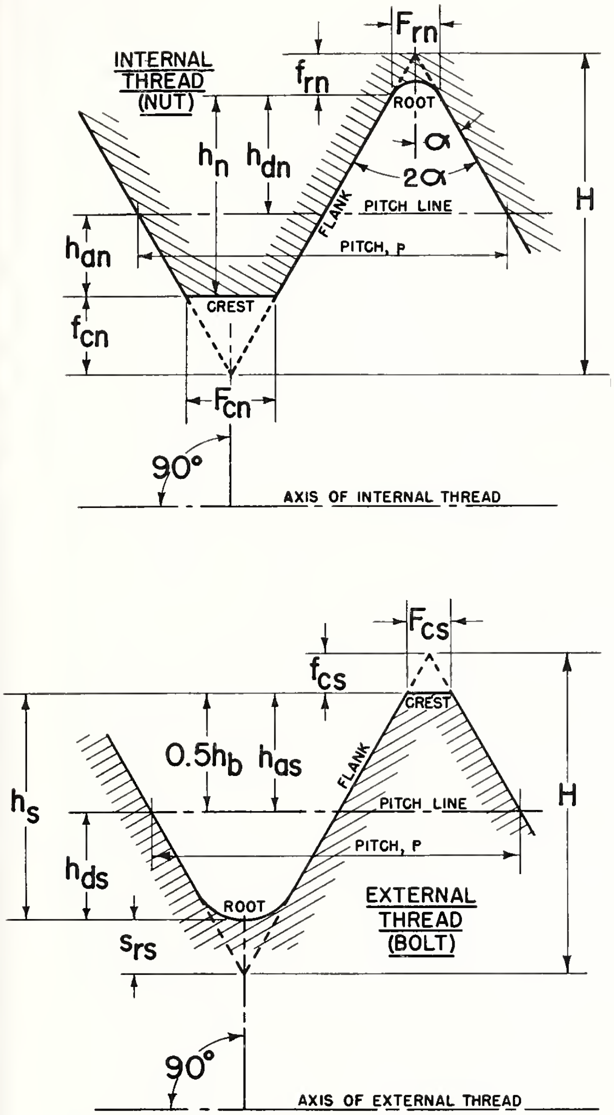


FIGURE 2.4. *Symbols for thread data in table 2.1.*

size for this series are shown in tables 2.9 and 2.21.

3.5. UNEF, EXTRA-FINE THREAD SERIES.—This series is applicable where even finer pitches of threads are desirable for short lengths of engagement and for thin-walled tubes, nuts, ferrules, or couplings. It is also generally applicable under the conditions stated above for the fine threads. The basic dimensions and limits of size for this series are shown in tables 2.10 and 2.21.

3.6. UN, CONSTANT PITCH SERIES.—The various constant-pitch series with 4, 6, 8, 12, 16, 20, 28, and 32 threads per inch, given in table 2.7, offer a comprehensive range of diameter-pitch combinations for those purposes where the threads in the UNC, UNF, and UNEF series do not meet the particular requirements of the design. The constant pitch series have application on parts that are repeatedly assembled and disassembled or where it might be advantageous to rethread oversize to recondition the threaded portions of the parts. Whenever a thread in a constant-pitch series also appears in the UNC, UNF, or UNEF series, the symbols, tolerances, and limits of size of those standard series are applicable. When selecting threads from these constant-pitch series, preference should be given whenever possible to those tabulated in the 8-, 12-, or 16-thread series. The basic dimensions for the 4-, 6-, 20-, 28-, and 32-thread series are shown in tables 2.11, 2.12, 2.16, 2.17, and 2.18.

3.6(a) *8UN, 8-thread series.*—The 8UN series is a uniform-pitch series for large diameters or for use as a compromise between the 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. The basic dimensions for this series are shown in table 2.13.

3.6(b) *12UN, 12-thread series.*—The 12UN series is a uniform-pitch series for large diameters requiring threads of medium-fine pitch. Although originally intended for boiler practice, it is now used as a continuation of the fine-thread series for diameters larger than 1.5 in. The basic dimensions for this series are shown in table 2.14.

3.6(c) *16UN, 16-thread series.*—The 16UN series 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 continutation of the extra-fine-thread series for diameters larger than 1.6875 in. The basic dimensions for this series are shown in table 2.15.

3.7. HIGH-TEMPERATURE, HIGH-STRENGTH APPLICATIONS.—For these applications the coarse-thread series is recommended in sizes from 0.25 to 1 in and the 8-thread series in sizes over 1 in. Limits of size are given in table 2.21. Some high-temperature applications involving special physical characteristics or conditions may require modification of thread dimensions. See italicized part in par. 4.2, p. 2.19, and par. 10.5, p. 2.24.

3.8. SELECTED COMBINATIONS OF UNS THREADS.—These data are tabulated in table 3.1 for some selected combinations of diameter and pitch of Unified special screw threads, designated UNS, with pitch diameter tolerances based on a length of thread engagement of 9 times the pitch. The pitch diameter limits are applicable to a length of engagement of from 5 to 15 times the pitch. (This should not be confused with the length of thread on mating parts, as it may exceed the length of engagement by a considerable amount.)

3.9. FINE THREADS FOR THIN-WALL TUBING.—The limits of size for a 27-thread series, ranging from 0.25 to 1 in nominal size, are included in table 3.1. These threads are recommended for general use on thin-wall tubing. For more detailed information see part II of Handbook H28.

3.10. THREADS OF SPECIAL DIAMETERS, PITCHES, AND LENGTHS OF ENGAGEMENT.—For information on special threads, see section 3.

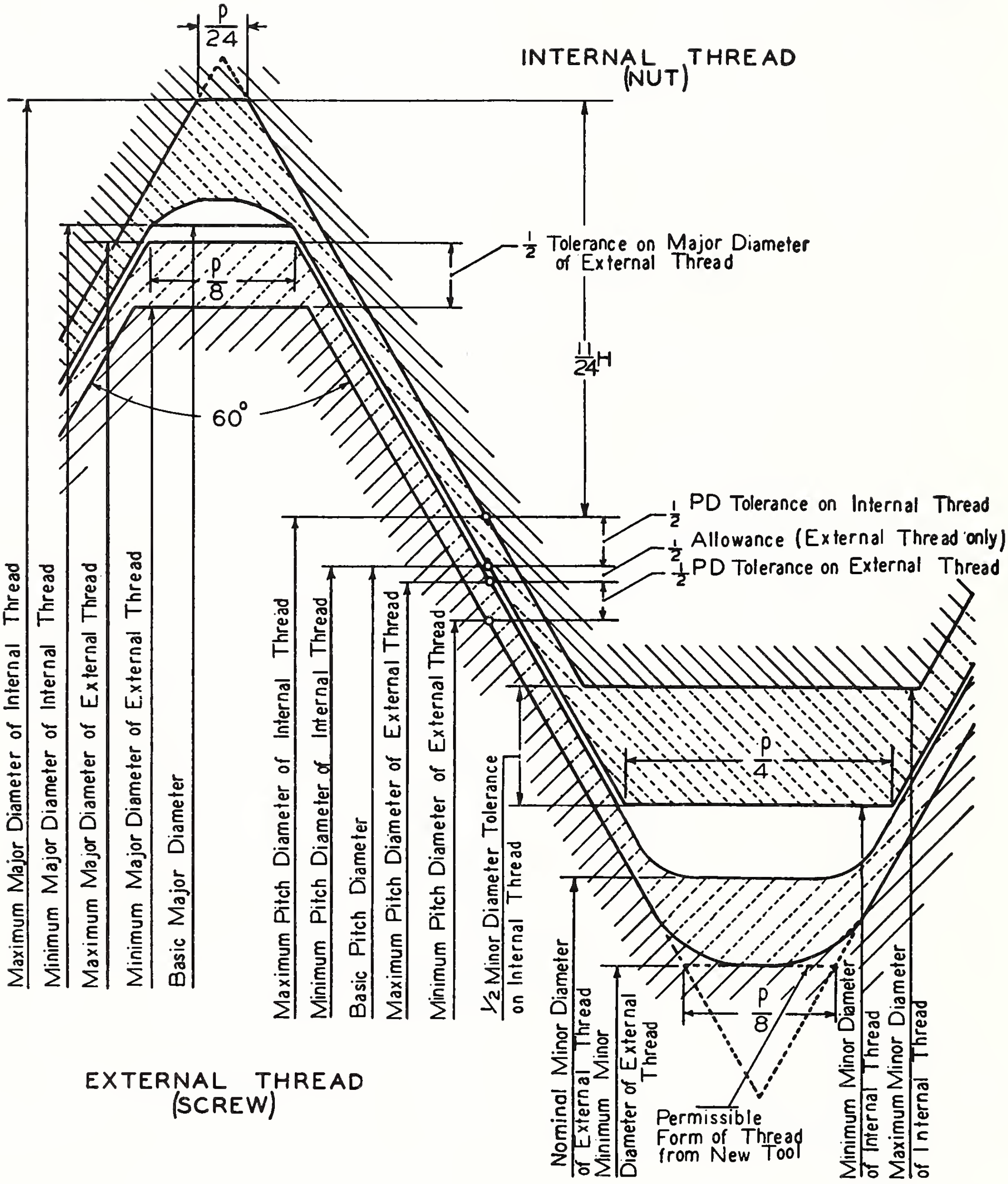


FIGURE 2.5. *Disposition of tolerances, allowances, and crests clearances for classes 1A, 2A, 1B, and 2B.*

NOTE: "Nominal minor diameter of external thread" is that specified in tables.

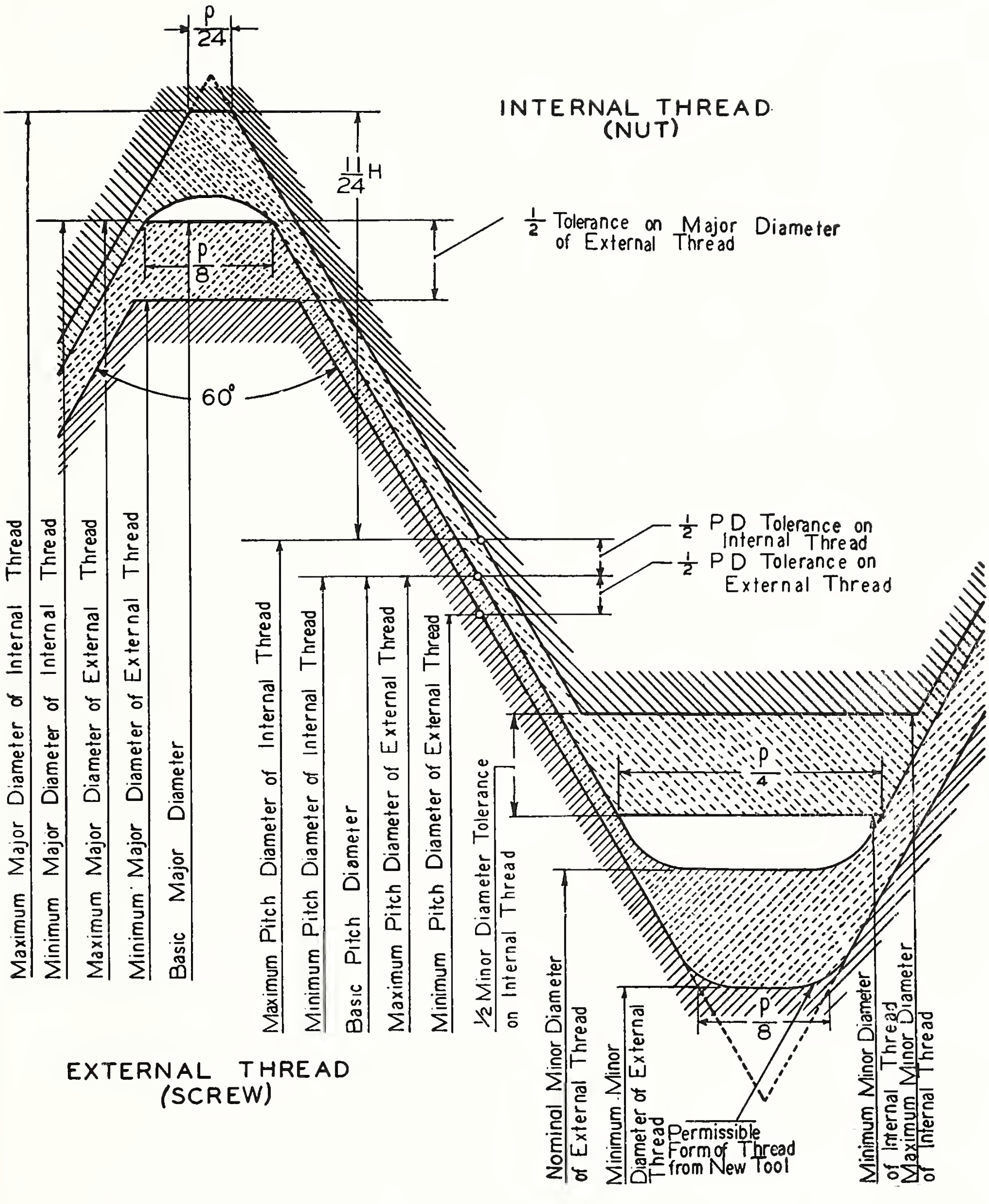


FIGURE 2.6. *Disposition of tolerances and crest clearances for classes 3A and 3B.*

NOTE: "Nominal minor diameter of external thread" is that specified in tables.

TABLE 2.7. *Unified standard screw thread series*

Nominal size and basic major diameter		Threads per inch											Nominal size and basic major diameter
		Series with graded pitches			Series with constant pitches								
Primary	Secondary	Coarse UNC	Fine UNF	Extra fine UNEF	4UN	6UN	8UN	12UN	16UN	20UN	28UN	32UN	
in	*in*												*in*
.060			80										.060
	.073	64	72										.073
.086		56	64										.086
	.099	48	56										.099
.112		40	48										.112
.125		40	44										.125
.138		32	40									UNC	.138
.164		32	36									UNC	.164
.190		24	32									UNF	.190
	.216	24	28	32							UNF	UNEF	.216
.250		20	28	32						UNC	UNF	UNEF	.250
.3125		18	24	32						20	28	UNEF	.3125
.375		16	24	32					UNC	20	28	UNEF	.375
.4375		14	20	28					16	UNF	UNEF	32	.4375
.500		13	20	28					16	UNF	UNEF	32	.500
.5625		12	18	24				UNC	16	20	28	32	.5625
.625		11	18	24				12	16	20	28	32	.625
	.6875			24				12	16	20	28	32	.6875
.750		10	16	20				12	UNF	UNEF	28	32	.750
	.8125			20				12	16	UNEF	28	32	.8125
.875		9	14	20				12	16	UNEF	28	32	.875
	.9375			20				12	16	UNEF	28	32	.9375
1.000		8	12	20			UNC	UNF	16	UNEF	28	32	1.000
	1.0625			18			8	12	16	20	28		1.0625
1.125		7	12	18			8	UNF	16	20	28		1.125
	1.1875			18			8	12	16	20	28		1.1875
1.250		7	12	18			8	UNF	16	20	28		1.250
	1.3125			18			8	12	16	20	28		1.3125
1.375		6	12	18		UNC	8	UNF	16	20	28		1.375
	1.4375			18		6	8	12	16	20	28		1.4375
1.500		6	12	18		UNC	8	UNF	16	20	28		1.500
	1.5625			18		6	8	12	16	20			1.5625
1.625				18		6	8	12	16	20			1.625
	1.6875			18		6	8	12	16	20			1.6875
1.750		5				6	8	12	16	20			1.750
	1.8125					6	8	12	16	20			1.8125
1.875						6	8	12	16	20			1.875
	1.9375					6	8	12	16	20			1.9375
2.000		4.5				6	8	12	16	20			2.000
	2.125					6	8	12	16	20			2.125
2.250		4.5				6	8	12	16	20			2.250
	2.375					6	8	12	16	20			2.375
2.500		4			UNC	6	8	12	16	20			2.500
	2.625				4	6	8	12	16	20			2.625
2.750		4			UNC	6	8	12	16	20			2.750
	2.875				4	6	8	12	16	20			2.875
3.000		4			UNC	6	8	12	16	20			3.000
	3.125				4	6	8	12	16				3.125
3.250		4			UNC	6	8	12	16				3.250
	3.375				4	6	8	12	16				3.375
3.500		4			UNC	6	8	12	16				3.500
	3.625				4	6	8	12	16				3.625
3.750		4			UNC	6	8	12	16				3.750
	3.875				4	6	8	12	16				3.875
4.000		4			UNC	6	8	12	16				4.000
	4.125				4	6	8	12	16				4.125
4.250					4	6	8	12	16				4.250
	4.375				4	6	8	12	16				4.375
4.500					4	6	8	12	16				4.500
	4.625				4	6	8	12	16				4.625
4.750					4	6	8	12	16				4.750
	4.875				4	6	8	12	16				4.875
5.000					4	6	8	12	16				5.000
	5.125				4	6	8	12	16				5.125
5.250					4	6	8	12	16				5.250
	5.375				4	6	8	12	16				5.375
5.500					4	6	8	12	16				5.500
	5.625				4	6	8	12	16				5.625
5.750					4	6	8	12	16				5.750
	5.875				4	6	8	12	16				5.875
6.000					4	6	8	12	16				6.000

TABLE 2.8. *Coarse thread series, basic dimensions, UNC*

Nominal size and basic major diameter, D		Threads per inch, n	Basic pitch diameter, E	Minor[a] diameter, external threads, K_s	Minor[a] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D - 2h_b$	Tensile stress[b] area, $\pi\left(\frac{E}{2} - \frac{3H}{16}\right)^2$
Primary	Secondary								
in	*in*		*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
	.073	64	0.0629	0.0538	0.0561	4	31	0.00218	0.00263
.086		56	.0744	.0641	.0667	4	22	.00310	.00370
	.099	48	.0855	.0734	.0764	4	26	.00406	.00487
.112		40	.0958	.0813	.0849	4	45	.00496	.00604
.125		40	.1088	.0943	.0979	4	11	.00672	.00796
.138		32	.1177	.0997	.1042	4	50	.00745	.00909
.164		32	.1437	.1257	.1302	3	58	.01196	.0140
.190		24	.1629	.1389	.1449	4	39	.01450	.0175
	.216	24	.1889	.1649	.1709	4	1	.0206	.0242
.250		20	.2175	.1887	.1959	4	11	.0269	.0318
.3125		18	.2764	.2443	.2524	3	40	.0454	.0524
.375		16	.3344	.2983	.3073	3	24	.0678	.0775
.4375		14	.3911	.3499	.3602	3	20	.0933	.1063
.500		13	.4500	.4056	.4167	3	7	.1257	.1419
.5625		12	.5084	.4603	.4723	2	59	.162	.182
.625		11	.5660	.5135	.5266	2	56	.202	.226
.750		10	.6850	.6273	.6417	2	40	.302	.334
.875		9	.8028	.7387	.7547	2	31	.419	.462
1.000		8	.9188	.8466	.8647	2	29	.551	.606
1.125		7	1.0322	.9497	.9704	2	31	.693	.763
1.250		7	1.1572	1.0747	1.0954	2	15	.890	.969
1.375		6	1.2667	1.1705	1.1946	2	24	1.054	1.155
1.500		6	1.3917	1.2955	1.3196	2	11	1.294	1.405
1.750		5	1.6201	1.5046	1.5335	2	15	1.74	1.90
2.000		4.5	1.8557	1.7274	1.7594	2	11	2.30	2.50
2.250		4.5	2.1057	1.9774	2.0094	1	55	3.02	3.25
2.500		4	2.3376	2.1933	2.2294	1	57	3.72	4.00
2.750		4	2.5876	2.4433	2.4794	1	46	4.62	4.93
3.000		4	2.8376	2.6933	2.7294	1	36	5.62	5.97
3.250		4	3.0876	2.9433	2.9794	1	29	6.72	7.10
3.500		4	3.3376	3.1933	3.2294	1	22	7.92	8.33
3.750		4	3.5876	3.4433	3.4794	1	16	9.21	9.66
4.000		4	3.8376	3.6933	3.7294	1	11	10.61	11.08

[a] Design form. See fig. 2.3.
[b] See formula under definition of tensile stress area in appendix A5.

TABLE 2.9. *Fine thread series, basic dimensions, UNF*

Nominal size[a] and basic major diameter, D		Threads per inch, n	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D - 2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2} - \frac{3H}{16}\right)^2$
Primary	Secondary								
in	*in*		*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
.060		80	0.0519	0.0447	0.0465	4	23	0.00151	0.00180
	.073	72	.0640	.0560	.0580	3	57	.00237	.00278
.086		64	.0759	.0668	.0691	3	45	.00339	.00394
	.099	56	.0874	.0771	.0797	3	43	.00451	.00523
.112		48	.0985	.0864	.0894	3	51	.00566	.00661
.125		44	.1102	.0971	.1004	3	45	.00716	.00830
.138		40	.1218	.1073	.1109	3	44	.00874	.01015
.164		36	.1460	.1299	.1339	3	28	.01285	.01474
.190		32	.1697	.1517	.1562	3	21	.0175	.0200
	.216	28	.1928	.1722	.1773	3	22	.0226	.0258
.250		28	.2268	.2062	.2113	2	52	.0326	.0364
.3125		24	.2854	.2614	.2674	2	40	.0524	.0580
.375		24	.3479	.3239	.3299	2	11	.0809	.0878
.4375		20	.4050	.3762	.3834	2	15	.1090	.1187
.500		20	.4675	.4387	.4459	1	57	.1486	.1599
.5625		18	.5264	.4943	.5024	1	55	.189	.203
.625		18	.5889	.5568	.5649	1	43	.240	.256
.750		16	.7094	.6733	.6823	1	36	.351	.373
.875		14	.8286	.7874	.7977	1	34	.480	.509
1.000		12	.9459	.8978	.9098	1	36	.625	.663
1.125		12	1.0709	1.0228	1.0348	1	25	.812	.856
1.250		12	1.1959	1.1478	1.1598	1	16	1.024	1.073
1.375		12	1.3209	1.2728	1.2848	1	9	1.260	1.315
1.500		12	1.4459	1.3978	1.4098	1	3	1.521	1.581

[a] For sizes larger than 1.5 inch, use the 12-thread series. See table 2.14.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.10. *Extra-fine thread series, basic dimensions, UNEF*

Nominal size[a] and basic major diameter, D — Primary	Nominal size[a] and basic major diameter, D — Secondary	Threads per inch, n	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
in	*in*		*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
	.216	32	0.1957	0.1777	0.1822	2	55	0.0242	0.0270
.250		32	.2297	.2117	.2162	2	29	.0344	.0379
.3125		32	.2922	.2742	.2787	1	57	.0581	.0625
.375		32	.3547	.3367	.3412	1	36	.0878	.0932
.4375		28	.4143	.3937	.3988	1	34	.1201	.1274
.500		28	.4768	.4562	.4613	1	22	.162	.170
.5625		24	.5354	.5114	.5174	1	25	.203	.214
.625		24	.5979	.5739	.5799	1	16	.256	.268
	.6875	24	.6604	.6364	.6424	1	9	.315	.329
.750		20	.7175	.6887	.6959	1	16	.369	.386
	.8125	20	.7800	.7512	.7584	1	10	.439	.458
.875		20	.8425	.8137	.8209	1	5	.515	.536
	.9375	20	.9050	.8762	.8834	1	0	.598	.620
1.000		20	.9675	.9387	.9459	0	57	.687	.711
	1.0625	18	1.0264	.9943	1.0024	0	59	.770	.799
1.125		18	1.0889	1.0568	1.0649	0	56	.871	.901
	1.1875	18	1.1514	1.1193	1.1274	0	53	.977	1.009
1.250		18	1.2139	1.1818	1.1899	0	50	1.090	1.123
	1.3125	18	1.2764	1.2443	1.2524	0	48	1.208	1.244
1.375		18	1.3389	1.3068	1.3149	0	48	1.333	1.370
	1.4375	18	1.4014	1.3693	1.3774	0	43	1.464	1.503
1.500		18	1.4639	1.4318	1.4399	0	42	1.60	1.64
	1.5625	18	1.5264	1.4943	1.5024	0	40	1.74	1.79
1.625		18	1.5889	1.5568	1.5649	0	38	1.89	1.94
	1.6875	18	1.6514	1.6193	1.6274	0	37	2.05	2.10

[a] For sizes larger than 1.6875 in, use 16-thread series. See table 2.15.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.11. *4-thread series, basic dimensions, 4UN*

Nominal size and basic major diameter, D — Primary	Nominal size and basic major diameter, D — Secondary	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
2.500[a]		2.3376	2.1933	2.2294	1	57	3.72	4.00
	2.625	2.4626	2.3183	2.3544	1	51	4.16	4.45
2.750[a]		2.5876	2.4433	2.4794	1	46	4.62	4.93
	2.875	2.7126	2.5683	2.6044	1	41	5.11	5.44
3.000[a]		2.8376	2.6933	2.7294	1	36	5.62	5.97
	3.125	2.9626	2.8183	2.8544	1	32	6.16	6.52
3.250[a]		3.0876	2.9433	2.9794	1	29	6.72	7.10
	3.375	3.2126	3.0683	3.1044	1	25	7.31	7.70
3.500[a]		3.3376	3.1933	3.2294	1	22	7.92	8.33
	3.625	3.4626	3.3183	3.3544	1	19	8.55	9.00
3.750[a]		3.5876	3.4433	3.4794	1	16	9.21	9.66
	3.875	3.7126	3.5683	3.6044	1	14	9.90	10.36
4.000[a]		3.8376	3.6933	3.7294	1	11	10.61	11.08
	4.125	3.9626	3.8183	3.8544	1	9	11.34	11.83
4.250		4.0876	3.9433	3.9794	1	7	12.10	12.61
	4.375	4.2126	4.0683	4.1044	1	5	12.88	13.41
4.500		4.3376	4.1933	4.2294	1	3	13.69	14.23
	4.625	4.4626	4.3183	4.3544	1	1	14.52	15.1
4.750		4.5876	4.4433	4.4794	1	0	15.4	15.9
	4.875	4.7126	4.5683	4.6044	0	58	16.3	16.8
5.000		4.8376	4.6933	4.7294	0	57	17.2	17.8
	5.125	4.9626	4.8183	4.8544	0	55	18.1	18.7
5.250		5.0876	4.9423	4.9794	0	54	19.1	19.7
	5.375	5.2126	5.0683	5.1044	0	52	20.0	20.7
5.500		5.3376	5.1933	5.2294	0	51	21.0	21.7
	5.625	5.4626	5.3183	5.3544	0	50	22.1	22.7
5.750		5.5876	5.4433	5.4794	0	49	23.1	23.8
	5.875	5.7126	5.5683	5.6044	0	48	24.2	24.9
6.000		5.8376	5.6933	5.7294	0	47	25.3	26.0

[a] These are standard sizes of the UNC series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.12. *6-thread series, basic dimensions, 6UN*

Nominal size and basic major diameter, D — Primary	Nominal size and basic major diameter, D — Secondary	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
1.375[a]		1.2667	1.1705	1.1946	2	24	1.054	1.155
	1.4375	1.3292	1.2330	1.2571	2	17	1.171	1.277
1.500[a]		1.3917	1.2955	1.3196	2	11	1.294	1.405
	1.5625	1.4542	1.3580	1.3821	2	5	1.423	1.54
1.625		1.5167	1.4205	1.4446	2	0	1.56	1.68
	1.6875	1.5792	1.4830	1.5071	1	55	1.70	1.83
1.750		1.6417	1.5455	1.5696	1	51	1.85	1.98
	1.8125	1.7042	1.6080	1.6321	1	47	2.00	2.14
1.875		1.7667	1.6705	1.6946	1	43	2.16	2.30
	1.9375	1.8292	1.7330	1.7571	1	40	2.33	2.47
2.000		1.8917	1.7955	1.8196	1	36	2.50	2.65
	2.125	2.0167	1.9205	1.9446	1	30	2.86	3.05
2.250		2.1417	2 0455	2.0696	1	25	3.25	3.42
	2.375	2.2667	2.1705	2.1946	1	20	3.66	3.85
2.500		2.3917	2.2955	2.3196	1	16	4.10	4.29
	2.625	2.5167	2.4205	2.4446	1	12	4.56	4.76
2.750		2.6417	2.5455	2.5696	1	9	5.04	5.26
	2.875	2.7667	2.6705	2.6946	1	6	5.55	5.78
3.000		2.8917	2.7955	2.8196	1	3	6.09	6.33
	3.125	3.0167	2.9205	2.9446	1	0	6.64	6.89
3.250		3.1417	3.0455	3.0696	0	58	7.23	7.49
	3.375	3.2667	3.1705	3.1946	0	56	7.84	8.11
3.500		3.3917	3.2955	3.3196	0	54	8.47	8.75
	3.625	3.5167	3.4205	3.4446	0	52	9.12	9.42
3.750		3.6417	3.5455	3.5696	0	50	9.81	10.11
	3.875	3.7667	3.6705	3.6946	0	48	10.51	10.83
4.000		3.8917	3.7955	3.8196	0	47	11.24	11.57
	4.125	4.0167	3.9205	3.9446	0	45	12.00	12.33
4.250		4.1417	4.0455	4.0696	0	44	12.78	13.12
	4.375	4.2667	4.1705	4.1946	0	43	13.58	13.94
4.500		4.3917	4.2955	4.3196	0	42	14.41	14.78
	4.625	4.5167	4.4205	4.4446	0	40	15.3	15.6
4.750		4.6417	4.5455	4.5696	0	39	16.1	16.5
	4.875	4.7667	4.6705	4.6946	0	38	17.0	17.5
5.000		4.8917	4.7955	4.8196	0	37	18.0	18.4
	5.125	5.0167	4.9205	4.9446	0	36	18.9	19.3
5.250		5.1417	5.0455	5.0696	0	35	19.9	20.3
	5.375	5.2667	5.1705	5.1946	0	35	20.9	21.3
5.500		5.3917	5.2955	5.3196	0	34	21.9	22.4
	5.625	5.5167	5.4205	5.4446	0	33	23.0	23.4
5.750		5.6417	5.5455	5.5696	0	32	24.0	24.5
	5.875	5.7667	5.6705	5.6946	0	32	25.1	25.6
6.000		5.8917	5.7955	5.8196	0	31	26.3	26.8

[a] These are standard sizes of the UNC series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.13. *8-thread series, basic dimensions, 8UN*

Nominal size and basic major diameter, D		Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
Primary	Secondary							
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*²	*in*²
1.000[a]		0.9188	0.8466	0.8647	2	29	0.551	0.606
	1.0625	.9813	.9091	.9272	2	19	.636	.695
1.125		1.0438	.9716	.9897	2	11	.728	.790
	1.1875	1.1063	1.0341	1.0522	2	4	.825	.892
1.250		1.1688	1.0966	1.1147	1	57	.929	1.000
	1.3125	1.2313	1.1591	1.1772	1	51	1.039	1.114
1.375		1.2938	1.2216	1.2397	1	46	1.155	1.233
	1.4375	1.3563	1.2841	1.3022	1	41	1.277	1.360
1.500		1.4188	1.3466	1.3647	1	36	1.405	1.492
	1.5625	1.4813	1.4091	1.4272	1	32	1.54	1.63
1.625		1.5438	1.4716	1.4897	1	29	1.68	1.78
	1.6875	1.6063	1.5341	1.5522	1	25	1.83	1.93
1.750		1.6688	1.5966	1.6147	1	22	1.98	2.08
	1.8125	1.7313	1.6591	1.6772	1	19	2.14	2.25
1.875		1.7938	1.7216	1.7397	1	16	2.30	2.41
	1.9375	1.8563	1.7841	1.8022	1	14	2.47	2.59
2.000		1.9188	1.8466	1.8647	1	11	2.65	2.77
	2.125	2.0438	1.9716	1.9897	1	7	3.03	3.15
2.250		2.1688	2.0966	2.1147	1	3	3.42	3.56
	2.375	2.2938	2.2216	2.2397	1	0	3.85	3.99
2.500		2.4188	2.3466	2.3647	0	57	4.29	4.44
	2.625	2.5438	2.4716	2.4897	0	54	4.76	4.92
2.750		2.6688	2.5966	2.6147	0	51	5.26	5.43
	2.875	2.7938	2.7216	2.7397	0	49	5.78	5.95
3.000		2.9188	2.8466	2.8647	0	47	6.32	6.51
	3.125	3.0438	2.9716	2.9897	0	45	6.89	7.08
3.250		3.1688	3.0966	3.1147	0	43	7.49	7.69
	3.375	3.2938	3.2216	3.2397	0	42	8.11	8.31
3.500		3.4188	3.3466	3.3647	0	40	8.75	8.96
	3.625	3.5438	3.4716	3.4897	0	39	9.42	9.64
3.750		3.6688	3.5966	3.6147	0	37	10.11	10.34
	3.875	3.7938	3.7216	3.7397	0	36	10.83	11.06
4.000		3.9188	3.8466	3.8647	0	35	11.57	11.81
	4.125	4.0438	3.9716	3.9897	0	34	12.34	12.59
4.250		4.1688	4.0966	4.1147	0	33	13.12	13.38
	4.375	4.2938	4.2216	4.2397	0	32	13.94	14.21
4.500		4.4188	4.3466	4.3647	0	31	14.78	15.1
	4.625	4.5438	4.4716	4.4897	0	30	15.6	15.9
4.750		4.6688	4.5966	4.6147	0	29	16.5	16.8
	4.875	4.7938	4.7216	4.7397	0	29	17.4	17.7
5.000		4.9188	4.8466	4.8647	0	28	18.4	18.7
	5.125	5.0438	4.9716	4.9897	0	27	19.3	19.7
5.250		5.1688	5.0966	5.1147	0	26	20.3	20.7
	5.375	5.2938	5.2216	5.2397	0	26	21.3	21.7
5.500		5.4188	5.3466	5.3647	0	25	22.4	22.7
	5.625	5.5438	5.4716	5.4897	0	25	23.4	23.8
5.750		5.6688	5.5966	5.6147	0	24	24.5	24.9
	5.875	5.7938	5.7216	5.7397	0	24	25.6	26.0
6.000		5.9188	5.8466	5.8647	0	23	26.8	27.1

[a] This is a standard size of the UNC series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.14. *12-thread series, basic dimensions, 12UN*

Nominal size and basic major diameter, D		Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
Primary	Secondary							
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
.5625[a]		0.5084	0.4603	0.4723	2	59	0.162	0.182
.625		.5709	.5228	.5348	2	40	.210	.232
	.6875	.6334	.5853	.5973	2	24	.264	.289
.750		.6959	.6478	.6598	2	11	.323	.351
	.8125	.7584	.7103	.7223	2	0	.390	.420
.875		.8209	.7728	.7848	1	51	.462	.495
	.9375	.8834	.8353	.8473	1	43	.540	.576
1.000[a]		.9459	.8978	.9098	1	36	.625	.663
	1.0625	1.0084	.9603	.9723	1	30	.715	.756
1.125[a]		1.0709	1.0228	1.0348	1	25	.812	.856
	1.1875	1.1334	1.0853	1.0973	1	20	.915	.961
1.250[a]		1.1959	1.1478	1.1598	1	16	1.024	1.073
	1.3125	1.2584	1.2103	1.2223	1	12	1.139	1.191
1.375[a]		1.3209	1.2728	1.2848	1	9	1.260	1.315
	1.4375	1.3834	1.3353	1.3473	1	6	1.388	1.445
1.500[a]		1.4459	1.3978	1.4098	1	3	1.52	1.58
	1.5625	1.5084	1.4603	1.4723	1	0	1.66	1.72
1.625		1.5709	1.5228	1.5348	0	58	1.81	1.87
	1.6875	1.6334	1.5853	1.5973	0	56	1.96	2.03
1.750		1.6959	1.6478	1.6598	0	54	2.12	2.19
	1.8125	1.7584	1.7103	1.7223	0	52	2.28	2.35
1.875		1.8209	1.7728	1.7848	0	50	2.45	2.53
	1.9375	1.8834	1.8353	1.8473	0	48	2.63	2.71
2.000		1.9459	1.8978	1.9098	0	47	2.81	2.89
	2.125	2.0709	2.0228	2.0348	0	44	3.19	3.28
2.250		2.1959	2.1478	2.1598	0	42	3.60	3.69
	2.375	2.3209	2.2728	2.2848	0	39	4.04	4.13
2.500		2.4459	2.3978	2.4098	0	37	4.49	4.60
	2.625	2.5709	2.5228	2.5348	0	35	4.97	5.08
2.750		2.6959	2.6478	2.6598	0	34	5.48	5.59
	2.875	2.8209	2.7728	2.7848	0	32	6.01	6.13
3.000		2.9459	2.8978	2.9098	0	31	6.57	6.69
	3.125	3.0709	3.0228	3.0348	0	30	7.15	7.28
3.250		3.1959	3.1478	3.1598	0	29	7.75	7.89
	3.375	3.3209	3.2728	3.2848	0	27	8.38	8.52
3.500		3.4459	3.3978	3.4098	0	26	9.03	9.18
	3.625	3.5709	3.5228	3.5348	0	26	9.71	9.86
3.750		3.6959	3.6478	3.6598	0	25	10.42	10.57
	3.875	3.8209	3.7728	3.7848	0	24	11.14	11.30
4.000		3.9459	3.8978	3.9098	0	23	11.90	12.06
	4.125	4.0709	4.0228	4.0348	0	22	12.67	12.84
4.250		4.1959	4.1478	4.1598	0	22	13.47	13.65
	4.375	4.3209	4.2728	4.2848	0	21	14.30	14.48
4.500		4.4459	4.3978	4.4098	0	21	15.1	15.3
	4.625	4.5709	4.5228	4.5348	0	20	16.0	16.2
4.750		4.6959	4.6478	4.6598	0	19	16.9	17.1
	4.875	4.8209	4.7728	4.7848	0	19	17.8	18.0
5.000		4.9459	4.8978	4.9098	0	18	18.8	19.0
	5.125	5.0709	5.0228	5.0348	0	18	19.8	20.0
5.250		5.1959	5.1478	5.1598	0	18	20.8	21.0
	5.375	5.3209	5.2728	5.2848	0	17	21.8	22.0
5.500		5.4459	5.3978	5.4098	0	17	22.8	23.1
	5.625	5.5709	5.5228	5.5348	0	16	23.9	24.1
5.750		5.6959	5.6478	5.6598	0	16	25.0	25.2
	5.875	5.8209	5.7728	5.7848	0	16	26.1	26.4
6.000		5.9459	5.8978	5.9098	0	15	27.3	27.5

[a] These are standard sizes of the UNC or UNF series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.15. *16-thread series, basic dimensions, 16UN*

Nominal size and basic major diameter, D — Primary	Nominal size and basic major diameter, D — Secondary	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*²	*in*²
.375[a]		0.3344	0.2983	0.3073	3	24	0.0678	0.0775
.4375		.3969	.3608	.3698	2	52	.0997	.1114
.500		.4594	.4233	.4323	2	29	.1378	.151
.5625		.5219	.4858	.4948	2	11	.182	.198
.625		.5844	.5483	.5573	1	57	.232	.250
	.6875	.6469	.6108	.6198	1	46	.289	.308
.750[a]		.7094	.6733	.6823	1	36	.351	.373
	.8125	.7719	.7358	.7448	1	29	.420	.444
.875		.8344	.7983	.8073	1	22	.495	.521
	.9375	.8969	.8608	.8698	1	16	.576	.604
1.000		.9594	.9233	.9323	1	11	.663	.693
	1.0625	1.0219	.9858	.9948	1	7	.756	.788
1.125		1.0844	1.0483	1.0573	1	3	.856	.889
	1.1875	1.1469	1.1108	1.1198	1	0	.961	.997
1.250		1.2094	1.1733	1.1823	0	57	1.073	1.111
	1.3125	1.2719	1.2358	1.2448	0	54	1.191	1.230
1.375		1.3344	1.2983	1.3073	0	51	1.315	1.356
	1.4375	1.3969	1.3608	1.3698	0	49	1.445	1.488
1.500		1.4594	1.4233	1.4323	0	47	1.58	1.63
	1.5625	1.5219	1.4858	1.4948	0	45	1.72	1.77
1.625		1.5844	1.5483	1.5573	0	43	1.87	1.92
	1.6875	1.6469	1.6108	1.6198	0	42	2.03	2.08
1.750		1.7094	1.6733	1.6823	0	40	2.19	2.24
	1.8125	1.7719	1.7358	1.7448	0	39	2.35	2.41
1.875		1.8344	1.7983	1.8073	0	37	2.53	2.58
	1.9375	1.8969	1.8608	1.8698	0	36	2.71	2.77
2.000		1.9594	1.9233	1.9323	0	35	2.89	2.95
	2.125	2.0844	2.0483	2.0573	0	33	3.28	3.35
2.250		2.2094	2.1733	2.1823	0	31	3.69	3.76
	2.375	2.3344	2.2983	2.3073	0	29	4.13	4.21
2.500		2.4594	2.4233	2.4323	0	28	4.60	4.67
	2.625	2.5844	2.5483	2.5573	0	26	5.08	5.16
2.750		2.7094	2.6733	2.6823	0	25	5.59	5.68
	2.875	2.8344	2.7983	2.8073	0	24	6.13	6.22
3.000		2.9594	2.9233	2.9323	0	23	6.69	6.78
	3.125	3.0844	3.0483	3.0573	0	22	7.28	7.37
3.250		3.2094	3.1733	3.1823	0	21	7.89	7.99
	3.375	3.3344	3.2983	3.3073	0	21	8.52	8.63
3.500		3.4594	3.4233	3.4323	0	20	9.18	9.29
	3.625	3.5844	3.5483	3.5573	0	19	9.86	9.98
3.750		3.7094	3.6733	3.6823	0	18	10.57	10.69
	3.875	3.8344	3.7983	3.8073	0	18	11.30	11.43
4.000		3.9594	3.9233	3.9323	0	17	12.06	12.19
	4.125	4.0844	4.0483	4.0573	0	17	12.84	12.97
4.250		4.2094	4.1733	4.1823	0	16	13.65	13.78
	4.375	4.3344	4.2983	4.3073	0	16	14.48	14.62
4.500		4.4594	4.4233	4.4323	0	15	15.34	15.5
	4.625	4.5844	4.5483	4.5573	0	15	16.2	16.4
4.750		4.7094	4.6733	4.6823	0	15	17.1	17.3
	4.875	4.8344	4.7983	4.8073	0	14	18.0	18.2
5.000		4.9594	4.9233	4.9323	0	14	19.0	19.2
	5.125	5.0844	5.0483	5.0573	0	13	20.0	20.1
5.250		5.2094	5.1733	5.1823	0	13	21.0	21.1
	5.375	5.3344	5.2983	5.3073	0	13	22.0	22.2
5.500		5.4594	5.4233	5.4323	0	13	23.1	23.2
	5.625	5.5844	5.5483	5.5573	0	12	24.1	24.3
5.750		5.7094	5.6733	5.6823	0	12	25.2	25.4
	5.875	5.8344	5.7983	5.8073	0	12	26.4	26.5
6.000		5.9594	5.9233	5.9323	0	11	27.5	27.7

[a] These are standard sizes of the UNC or UNF Series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

Table 2.16. *20-thread series, basic dimensions, 20UN*

Nominal size and basic major diameter, D		Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
Primary	Secondary							
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*²	*in*²
.250[a]		0.2175	0.1887	0.1959	4	11	0.0269	0.0318
.3125		.2800	.2512	.2584	3	15	.0481	.0547
.375		.3425	.3137	.3209	2	40	.0755	.0836
.4375[a]		.4050	.3762	.3834	2	15	.1090	.1187
.500[a]		.4675	.4387	.4459	1	57	.1486	.160
.5625		.5300	.5012	.5084	1	43	.194	.207
.625		.5925	.5637	.5709	1	32	.246	.261
	.6875	.6550	.6262	.6334	1	24	.304	.320
.750[a]		.7175	.6887	.6959	1	16	.369	.386
	.8125[a]	.7800	.7512	.7584	1	10	.439	.458
.875[a]		.8425	.8137	.8209	1	5	.515	.536
	.9375[a]	.9050	.8762	.8834	1	0	.598	.620
1.000[a]		.9675	.9387	.9459	0	57	.687	.711
	1.0625	1.0300	1.0012	1.0084	0	53	.782	.807
1.125		1.0925	1.0637	1.0709	0	50	.882	.910
	1.1875	1.1550	1.1262	1.1334	0	47	.990	1.018
1.250		1.2175	1.1887	1.1959	0	45	1.103	1.133
	1.3125	1.2800	1.2512	1.2584	0	43	1.222	1.254
1.375		1.3425	1.3137	1.3209	0	41	1.348	1.382
	1.4375	1.4050	1.3762	1.3834	0	39	1.479	1.51
1.500		1.4675	1.4387	1.4459	0	37	1.62	1.65
	1.5625	1.5300	1.5012	1.5084	0	36	1.76	1.80
1.625		1.5925	1.5637	1.5709	0	34	1.91	1.95
	1.6875	1.6550	1.6262	1.6334	0	33	2.07	2.11
1.750		1.7175	1.6887	1.6959	0	32	2.23	2.27
	1.8125	1.7800	1.7512	1.7584	0	31	2.40	2.44
1.875		1.8425	1.8137	1.8209	0	30	2.57	2.62
	1.9375	1.9050	1.8762	1.8834	0	29	2.75	2.80
2.000		1.9675	1.9387	1.9459	0	28	2.94	2.99
	2.125	2.0925	2.0637	2.0709	0	26	3.33	3.39
2.250		2.2175	2.1887	2.1959	0	25	3.75	3.81
	2.375	2.3425	2.3137	2.3209	0	23	4.19	4.25
2.500		2.4675	2.4387	2.4459	0	22	4.66	4.72
	2.625	2.5925	2.5637	2.5709	0	21	5.15	5.21
2.750		2.7175	2.6887	2.6959	0	20	5.66	5.73
	2.875	2.8425	2.8137	2.8209	0	19	6.20	6.27
3.000		2.9675	2.9387	2.9459	0	18	6.77	6.84

[a] These are standard sizes of the UNC, UNF, or UNEF series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.17. *28-thread series, basic dimensions, 28UN*

Nominal size and basic major diameter, D — Primary	Nominal size and basic major diameter, D — Secondary	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ (deg)	Lead angle at basic pitch diameter, λ (min)	Sectional area at minor diameter at $D - 2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2} - \frac{3H}{16}\right)^2$
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
	.216[a]	0.1928	0.1722	0.1773	3	22	0.0226	0.0258
.250[a]		.2268	.2062	.2113	2	52	.0326	.0364
.3125		.2893	.2687	.2738	2	15	.0556	.0606
.375		.3518	.3312	.3363	1	51	.0848	.0909
.4375[a]		.4143	.3937	.3988	1	34	.1201	.1274
.500[a]		.4768	.4562	.4613	1	22	.162	.170
.5625		.5393	.5187	.5238	1	12	.209	.219
.625		.6018	.5812	.5863	1	5	.263	.274
	.6875	.6643	.6437	.6488	0	59	.323	.335
.750		.7268	.7062	.7113	0	54	.389	.402
	.8125	.7893	.7687	.7738	0	50	.461	.475
.875		.8518	.8312	.8363	0	46	.539	.554
	.9375	.9143	.8937	.8988	0	43	.624	.640
1.000		.9768	.9562	.9613	0	40	.714	.732
	1.0625	1.0393	1.0187	1.0238	0	38	.811	.830
1.125		1.1018	1.0812	1.0863	0	35	.914	.933
	1.1875	1.1643	1.1437	1.1488	0	34	1.023	1.044
1.250		1.2268	1.2062	1.2113	0	32	1.138	1.160
	1.3125	1.2893	1.2687	1.2738	0	30	1.259	1.282
1.375		1.3518	1.3312	1.3363	0	29	1.386	1.411
	1.4375	1.4143	1.3937	1.3988	0	28	1.52	1.55
1.500		1.4768	1.4562	1.4613	0	26	1.66	1.69

[a] These are standard sizes of the UNF or UNEF series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

TABLE 2.18. *32-thread series, basic dimensions, 32UN*

Nominal size and basic major diameter, D — Primary	Nominal size and basic major diameter, D — Secondary	Basic pitch diameter, E	Minor[b] diameter, external threads, K_s	Minor[b] diameter, internal threads, K_n	Lead angle at basic pitch diameter, λ (deg)	Lead angle at basic pitch diameter, λ (min)	Sectional area at minor diameter at $D - 2h_b$	Tensile stress[c] area, $\pi\left(\frac{E}{2} - \frac{3H}{16}\right)^2$
in	*in*	*in*	*in*	*in*	*deg*	*min*	*in*^{2}	*in*^{2}
.138[a]		0.1177	0.0997	0.1042	4	50	0.00745	0.00909
.164[a]		.1437	.1257	.1302	3	58	.01196	.0140
.190[a]		.1697	.1517	.1562	3	21	.01750	.0200
	.216[a]	.1957	.1777	.1822	2	55	.242	.0270
.250[a]		.2297	.2117	.2162	2	29	.0344	.0379
.3125[a]		.2922	.2742	.2787	1	57	.0581	.0625
.375[a]		.3547	.3367	.3412	1	36	.0878	.0932
.4375		.4172	.3992	.4037	1	22	.1237	.1301
.500		.4797	.4617	.4662	1	11	.166	.173
.5625		.5422	.5242	.5287	1	3	.214	.222
.625		.6047	.5867	.5912	0	57	.268	.278
	.6875	.6672	.6492	.6537	0	51	.329	.339
.750		.7297	.7117	.7162	0	47	.395	.407
	.8125	.7922	.7742	.7787	0	43	.468	.480
.875		.8547	.8367	.8412	0	40	.547	.560
	.9375	.9172	.8992	.9037	0	37	.632	.646
1.000		.9797	.9617	.9662	0	35	.723	.738

[a] These are standard sizes of the UNC, UNF, or UNEF series.
[b] Design form. See fig. 2.3.
[c] See formula under definition of tensile stress area in appendix A5.

4. THREAD CLASSES

Thread classes are distinguished from each other by the amounts of tolerance and allowance. The function of these classes is to assure the interchangeability of threaded parts. Six distinct classes of screw threads have been established for general use. These classes are: 1A, 2A, and 3A (for external threads only) and 1B, 2B, and 3B (for internal threads only). The disposition of the tolerances, allowances, and crest clearances for the various classes is illustrated in figures 2.5 and 2.6, p. 2.06.

The requirements for a screw-thread fit for a specific application can be met by specifying the proper combination of classes for the components. For example, an external thread made to class 2A limits can be used with an internal thread made to classes 1B, 2B, or 3B limits for specific applications. It is not the purpose of this standard to limit applications of the various standard classes.

4.1. Classes 1A and 1B Threads.—Classes 1A and 1B threads replace class 1 for new designs. These classes are intended for ordnance and other special uses. They are used on threaded components where quick and easy assembly is necessary and where a liberal allowance is required to permit ready assembly, even with slightly bruised or dirty threads.

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

Allowances and tolerances for the respective thread series are specified in tables and their application is shown in figure 2.5.

4.2. Classes 2A And 2B Threads.—Class 2A for external threads and 2B for internal threads are the most commonly used thread standards for general applications, including production of bolts, screws, nuts, and similar threaded fasteners.

The maximum diameters of class 2A (external) uncoated threads are less than basic by the amount of the allowance. The allowance minimizes galling and seizing in high-cycle wrench assembly, or it can be used to accommodate plated finishes or other coating. However, for threads with additive finish, the maximum diameters of class 2A may be exceeded by the amount of the allowance; i.e., the 2A maximum diameters apply to an unplated part or to a part before plating whereas the basic diameters (the 2A maximum diameter plus allowance) apply to a part after plating. The minimum diameters of class 2B (internal) threads, whether or not plated or coated, are basic, affording no allowance or clearance in assembly at maximum material limits. See par. 3.7, p. 2.05.

Certain applications require an allowance to permit application of the proper lubricant when making up the assembly, particularly with pressure vessels and steel pipe flanges, fittings, and valves for high-temperature, high-pressure service. For such applications class 2A, which has an allowance, and class 2B are recommended, replacing class 7 which was previously established for such applications but which has been discontinued as a standard. See par. 3.7. In this application, when the thread is coated, the 2A allowance may not be consumed by such coating.

Allowances and tolerances for the respective thread series are specified in the tables and their application is shown in figure 2.5.

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

No allowance is provided, but since the tolerances on GO gages are within the limits of size of the product, the gages will assure a slight clearance between product made to the maximum material limits. Tolerances for the respective thread series are specified in tables and their application is shown in figure 2.6.

5. ALLOWANCES

The allowance is minus and is applied from the basic size to below basic size. Allowance is applied only to the classes 1A and 2A external threads. Values of the allowance for these two classes are obtained by use of a C factor of 0.3 in the formula shown in par. 6.1.

6. TOLERANCES

The internal thread tolerance is plus and is applied from the basic size to above the basic size for all three thread classes.

The external thread tolerance is minus and is applied:

1. from the basic size to below the basic size for class 3A (see fig. 2.6),
2. from the design size (basic size minus allowance) to below design size for classes 1A and 2A (see fig. 2.5).

The tolerances specified represent the extreme variations permitted on the product.

6.1. Pitch Diameter Tolerances.—The basic formula for pitch diameter tolerance is composed of the following increments:

P.D. Tolerance

$$= C(0.0015\sqrt[3]{D} + 0.0015\sqrt[3]{L_e} + 0.015\sqrt[3]{p^2}),$$

TABLE 2.19. *Increments in pitch diameter tolerance formula*[a]

[PD tolerance = $C(0.0015\sqrt[3]{D} + 0.0015\sqrt{L_e} + 0.015\sqrt[3]{p^2})$]

Diameter increments				Length of engagement increments													
D	$0.0015\sqrt[3]{D}$	D	$0.0015\sqrt[3]{D}$	Based on[b] 1D for sizes	Based on[b] 9p for tpi	Based on[b] 20p for tpi	L_e	$0.0015 \times \sqrt{L_e}$	Based on[b] 1D for sizes	Based on[b] 9p for tpi	Based on[b] 20p for tpi	L_e	$0.0015 \times \sqrt{L_e}$	Based on[b] 1D for sizes	Based on[b] 20p for tpi	L_e	$0.0015 \times \sqrt{L_e}$
in	in	in	in	in			in	in	in			in	in	in		in	in
0.0600	0.000587	1.9375	0.001870	.060			0.0600	0.000367	.500	18	40	0.5000	0.001061	2.375		2.3750	0.002312
.0625	.000595	2.0000	.001890	.0625			.0625	.000375	.5556		36	.5556	.001118	2.500	8	2.5000	.002372
.0730	.000627	2.1250	.001928	.073			.0730	.000405	.5625	16		.5625	.001125	2.625		2.6250	.002430
.0860	.000662	2.2500	.001966	.0781			.0781	.000419	.625		32	.6250	.001186	2.750		2.7500	.002487
.0938	.000682	2.3750	.002001	.086			.0860	.000440	.6429	14		.6429	.001203	2.8571	7	2.8571	.002535
.0990	.000694	2.5000	.002036	.0938			.0938	.000459	.6875			.6875	.001244	2.875		2.8750	.002543
.1120	.000723	2.6250	.002069	.099			.0990	.000472	.6923	13		.6923	.001248	3.000		3.0000	.002598
.1250	.000750	2.7500	.002102	.1094			.1094	.000496	.7143		28	.7143	.001268	3.125		3.1250	.002652
.1380	.000775	2.8750	.002133	.112			.1120	.000502	.7407		27	.7407	.001291	3.250		3.2500	.002704
.1640	.000821	3.0000	.002163	.1125	80		.1125	.000503	.750	12		.7500	.001299	3.3333	6	3.3333	.002739
.1875	.000859	3.1250	.002193	.125	72		.1250	.000530	.7826	11.5		.7826	.001327	3.375		3.3750	.002756
.1900	.000862	3.2500	.002222	.138			.1380	.000557	.8125			.8125	.001352	3.500		3.5000	.002806
.2160	.000900	3.3750	.002250	.1406	64		.1406	.000562	.8182	11		.8182	.001357	3.625		3.6250	.002856
.2500	.000945	3.5000	.002277	.1562			.1562	.000593	.8333		24	.8333	.001369	3.750		3.7500	.002905
.3125	.001018	3.6250	.002304	.1607	56		.1607	.000601	.875			.8750	.001403	3.875		3.8750	.002953
.3750	.001082	3.7500	.002330	.164			.1640	.000607	.900	10		.9000	.001423	4.000	5	4.0000	.003000
.4375	.001139	3.8750	.002356	.1719			.1719	.000622	.9375			.9375	.001452	4.125		4.1250	.003047
.5000	.001191	4.0000	.002381	.1875	48		.1875	.000650	1.000	9	20	1.0000	.001500	4.250		4.2500	.003092
.5625	.001238	4.1250	.002406	.190			.1900	.000654	1.0625			1.0625	.001546	4.375		4.3750	.003137
.6250	.001282	4.2500	.002430	.2031			.2031	.000676	1.1111		18	1.1111	.001581	4.4444	4.5	4.4444	.003162
.6875	.001324	4.3750	.002453	.2045	44		.2045	.000678	1.125	8		1.1250	.001591	4.500		4.5000	.003182
.7500	.001363	4.5000	.002476	.216			.2160	.000697	1.1875			1.1875	.001635	4.625		4.6250	.003226
.8125	.001400	4.6250	.002499	.2188			.2188	.000702	1.250		16	1.2500	.001677	4.750		4.7500	.003269
.8750	.001435	4.7500	.002521	.225	40		.2250	.000712	1.2857	7		1.2857	.001701	4.875		4.8750	.003312
.9375	.001468	4.8750	.002543	.2344			.2344	.000726	1.3125			1.3125	.001718	5.000	4	5.0000	.003354
1.0000	.001500	5.0000	.002565	.250	36	80	.2500	.000750	1.375			1.3750	.001759	5.125		5.1250	.003396
1.0625	.001531	5.1250	.002586	.2656			.2656	.000773	1.4286		14	1.4286	.001793	5.250		5.2500	.003437
1.1250	.001560	5.2500	.002607	.2778		72	.2778	.000791	1.4375			1.4375	.001798	5.375		5.3750	.003478
1.1875	.001588	5.3750	.002628	.2812	32		.2812	.000795	1.500	6		1.5000	.001837	5.500		5.5000	.003518
1.2500	.001616	5.5000	.002648	.2969			.2969	.000817	1.5385		13	1.5385	.001861	5.625		5.6250	.003558
1.3125	.001642	5.6250	.002668	.3125		64	.3125	.000839	1.5625			1.5625	.001875	5.750		5.7500	.003597
1.3750	.001668	5.7500	.002687	.3214	28		.3214	.000850	1.625			1.6250	.001912	5.875		5.8750	.003636
1.4375	.001693	5.8750	.002707	.3281			.3281	.000859	1.6667		12	1.6667	.001936	6.000		6.0000	.003674
1.5000	.001717	6.0000	.002726	.3333	27	60	.3333	.000866	1.6875			1.6875	.001949	6.500		6.5000	.003824
1.5625	.001741	7.0000	.002869	.3438			.3438	.000880	1.7391		11.5	1.7391	.001978	7.000		7.0000	.003969
1.6250	.001764	8.0000	.003000	.3571		56	.3571	.000896	1.750			1.7500	.001984	7.500		7.5000	.004108
1.6875	.001786	9.0000	.003120	.3594			.3594	.000899	1.800	5		1.8000	.002012	8.000		8.0000	.004243
1.7500	.001808	10.0000	.003232	.375	24		.3750	.000919	1.8125			1.8125	.002019	8.500		8.5000	.004373
1.8125	.001829	12.0000	.003434	.3906			.3906	.000937	1.8182		11	1.8182	.002023	9.000		9.0000	.004500
1.8750	.001850	14.0000	.003615	.4062			.4062	.000956	1.875			1.8750	.002054	9.500		9.5000	.004623
		16.0000	.003780	.4167		48	.4167	.000968	1.9375			1.9375	.002088	10.000		10.0000	.004743
		18.0000	.003931	.4219			.4219	.000974	2.000	4.5	10	2.0000	.002121	10.500		10.5000	.004861
		20.0000	.004072	.4375			.4375	.000992	2.125			2.1250	.002187	11.000		11.0000	.004975
		24.0000	.004327	.450	20		.4500	.001006	2.2222		9	2.2222	.002236	11.500		11.5000	.005087
				.4545		44	.4545	.001011	2.250	4		2.2500	.002250	12.000		12.0000	.005196

Pitch increments

Threads per inch	$0.015\sqrt[3]{p^2}$	Threads per inch	$0.015\sqrt[3]{p^2}$	Threads per inch	$(0.015)\sqrt[3]{p^2}$	Threads per inch	$0.015\sqrt[3]{p^2}$	Threads per inch	$0.015\sqrt[3]{p^2}$	Threads per inch	$0.015\sqrt[3]{p^2}$	Threads per inch	$0.015\sqrt[3]{p^2}$
	in		*in*		*in*		*in*		*in*		*in*		*in*
80	0.000808	50	0.001105	36	0.001376	27	0.001667	18	0.002184	11.5	0.002944	7	0.004099
72	.000867	48	.001136	34	.001429	26	.001709	16	.002362	11	.003033	6	.004543
64	.000938	44	.001204	32	.001488	24	.001803	14	.002582	10	.003232	5.5	.004814
60	.000979	42	.001241	30	.001554	22	.001910	13	.002713	9	.003467	5	.005130
56	.001025	40	.001282	28	.001627	20	.002036	12	.002862	8	.003750	4.5	.005503
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[a] For class 2A, $C = 1$. For other classes, values of C are given in the table on p. 2.20.
[b] For example: $L_e = 0.5000$ is equivalent to one diameter for the .500 inch size, 9 pitches for 18 threads per inch, and 20 pitches for 40 threads per inch.

where

C = a factor which differs for each class,
D = basic major (nominal) diameter of thread,
L_e = length of thread engagement,
p = pitch of thread.

The values of the factor C for the various thread classes are:

Class	Factor C	Class	Factor C
1A	1.5	1B	1.95
2A	1.0	2B	1.30
3A	0.75	3B	0.975

The incremental values of the above formula are shown in table 2.19. The P. D. tolerances obtained by the use of the formulas are shown in table 2.21. The length of thread engagement (L_e) used in the formula is 1D (diameter) or 9 pitches, depending on the series. (See par. 7, Length of engagement, p. 2.21, for the L_e for the various standard series of Unified threads.)

The factor C is 30 percent greater for internal than for external threads of a given class on account of the greater difficulties encountered in the manufacture of internal threads.

6.2. Major Diameter Tolerances.—The class 1A major diameter tolerance is $0.090\sqrt[3]{p^2}$ and that for classes 2A and 3A is $0.060\sqrt[3]{p^2}$. The tolerance for class 2A coarse and the 8-thread series threads of unfinished, hot-rolled material is $0.090\sqrt[3]{p^2}$.

The internal thread major diameter tolerance for all classes is $H/6$ plus the pitch diameter tolerance of the class of thread involved. The maximum major diameter of the internal thread may be determined by adding $0.793857p$ ($= 11H/12$, table 2.1, p. 2.02) to the maximum pitch diameter of the internal thread. In dimensioning internal threads the maximum major diameter is not specified, being established by the crest of an unworn tool. In practice, the major diameter of an internal thread is satisfactory when accepted by a gage or gaging method that represents the maximum material condition of an external thread which has no allowance.

6.3. Minor Diameter Tolerances.—*External thread* minor diameter tolerances are for reference only. At the nominal minor diameter, that is, at the intersection of the rounded root with its center line (see fig. 2.3, p. 2.04):

$$\text{tolerance} = \text{P.D. tolerance} + H/12$$

and applies only when the rounded root is a design requirement. Otherwise:

$$\text{tolerance} = \text{P.D. tolerance} + 0.25H.$$

The external thread minimum minor diameter is:

$$\text{ext. thread min. P.D.} - 0.649519\,p.$$

$$(0.649519\,p = 0.75H;\ \text{see table 2.1.})$$

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. *Internal thread* minor diameter tolerances are as shown in table 2.20.

Table 2.20. *Minor diameter tolerances for internal threads*

Nominal Size (diameter)	Internal thread minor diameter tolerances for all standard thread series	
	Classes 1B and 2B	Class 3B (all sizes)
in		
Less than 0.25	$0.05\sqrt[3]{p^2}+0.03p/D-0.002$ in *EXCEPT:* Tolerances shall not exceed $0.394p$ Tolerances shall not be less than $0.25p-0.4p^2$	$0.05\sqrt[3]{p^2}+0.03p/D-0.002$ in.
0.25 and larger	$0.25p-0.4p^2$ *EXCEPT:* The formula is not applicable to threads coarser than 4 tpi. For such threads the tolerance is $0.15p$	*EXCEPT:* Tolerances shall not exceed $0.394p$. Tolerances shall not be less than, For 80 to 13 tpi, inclusive: $0.23-1.5p^2$ For 12 tpi and coarser: $0.120p$.

The tolerance of $0.394p$ corresponds to 53 percent of the basic thread height and applies in the range of the smallest sizes of the UNC and UNF thread series.

The tolerance of $0.120p$ corresponds to 74 percent of the basic thread height.

The formulas are suitable for general applications having lengths of engagement up to 1.5D. However, some thread applications require lengths of engagement which are greater than 1.5D or less than D. For such applications it may be advantageous to increase or decrease tolerances, as explained in section 3, or to use recommended hole size limits for different lengths of engagement as specified in appendix A3.

7. LENGTH OF ENGAGEMENT

The pitch diameter tolerances specified in table 2.21 for the UNC, UNF, 4UN, 6UN, and 8UN series 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.

Where the length of engagement exceeds that for which these tolerances are applicable, the pitch diameter tolerances should be computed from the formula (table 2.21) values for the standard lengths of engagement of one diameter, as follows: for lengths of engagement over 1.5 to 3 diameters, the pitch diameter tolerances are 125 percent of the formula values; and for lengths of engagement over 3 diameters, the tolerances are 150 percent of the formula values.

The pitch diameter tolerances specified in table 2.21 for the UNEF, 12UN, 16UN, 20UN, 28UN, and 32UN series are based on a length of engagement of 9 pitches and are applicable for lengths of engagement up to 15 pitches.

Where the length of engagement exceeds that for which these tolerances are applicable, the pitch diameter tolerances should be computed from the formula (table 2.21) values for the standard lengths of engagement of 9 pitches, as follows: for lengths of engagement over 15 to 30 pitches, the pitch diameter tolerances are 125 percent of the formula values; and for lengths of engagement over 30 pitches, the tolerances are 150 percent of the formula values.

8. LIMITS OF SIZE

(For aeronautical applications, practices may deviate from those here specified. See Military Specification MIL-S-7742.)

With respect to the pitch diameter limits of size, it is intended, except as hereinafter qualified, that no portion of the complete thread be permitted to project beyond the envelope defined by the maximum-material limits on the one hand, or beyond that defined by the minimum-material limits on the other, and thus be outside of the tolerance zone as illustrated in figures 2.5 and 2.6.

NOTE: The full tolerance cannot, therefore, be used on pitch diameter unless deviations in all other thread elements are zero.

Diameter equivalents of variations in lead, uniformity of helix, and flank angle are in the direction toward maximum material. Also included in pitch-diameter limits are other variations from size and profile, such as taper, out-of-round, and surface defects. Thus the maximum-material pitch diameter limits are a limitation of the virtual diameter (effective size) *and are so specified herein for all thread classes*. It is intended that diameter equivalents of deviations in any given element except pitch diameter should not exceed 0.5 of the pitch-diameter tolerance. Values are given in table 2.22 for deviations in lead and half-angle equivalent to 0.5 of pitch diameter tolerances. Flank angle equivalents should be based on a depth of thread engagement of $0.625H$.

Variations in taper and roundness of the pitch diameter, together with variations of the pitch diameter as a whole, may be in the direction of minimum material and thus the minimum-material pitch diameter limit may be specified as a limitation of the pitch diameter as a single element. However, in view of the interrelation of the pitch diameter, variations in lead and flank angle, etc., together with practical considerations relating to established production processes, product application and inspection procedures, except for class 3A, for fasteners and some custom threaded parts, it is customary to base acceptance at the minimum-material condition (minimum pitch diameter of the external thread and maximum pitch diameter of the internal thread) on threaded plug and ring gaging, with gages to the thread form and length specified in section 6. See paragraph on Dimensional acceptability of threads in section 6.

8.1. DIAMETER EQUIVALENT OF ANGLE DEVIATION.—The general formula expressing the relation between deviation in the half angle of thread and its diameter equivalent—that is, the amount of the pitch diameter tolerance absorbed by such a deviation—is:

$$\cot \delta\alpha = \frac{h_e}{\delta E \sin \alpha \cos \alpha} \pm \cot \alpha,$$

in which

δE = pitch diameter increment due to deviation in half angle
h_e = depth of thread engagement
α = basic half angle of thread
$\delta\alpha$ = deviation in half angle of thread.

In solving for δE the average value of $\delta\alpha$ for two sides of the thread, regardless of their sign, should be taken. The sign of $\cot \alpha$ is plus when the half angle of thread is less than basic, minus when the half angle is greater than basic. By omitting $\pm \cot \alpha$ from the formula an approximate mean value for $\delta\alpha$ or δE is obtained which differs very little from either extreme value. The Committee has, therefore, adopted for general use the formula

$$\cot \delta\alpha = \frac{h_e}{\delta E \sin \alpha \cos \alpha}.$$

For threads of Unified, American, or American National form, where $h_e = 0.625H$, this formula reduces to

$$\cot \delta\alpha = \frac{5p}{4\delta E} \text{ or } \delta E = 1.25p \tan \delta\alpha.$$

8.2. DIAMETER EQUIVALENT OF LEAD DEVIATION.—The formula expressing the relation between lead deviation between any two threads within the length of engagement, and its diameter equivalent is as follows:

$$\delta E = (\pm \delta p) \cot \alpha,$$

in which

δE = pitch diameter increment due to lead deviation

δp = the maximum pitch deviation between any two of the threads engaged

α = half angle of thread.

The quantity δE is always added to the measured pitch diameter in the case of an external thread, and it is always subtracted in the case of an internal thread, regardless of the sign introduced by the lead deviation δp.

For threads of Unified, American, or American National form, the above formula reduces to

$$\delta E = 1.7321\ \delta p.$$

9. COATED THREADS

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 whenever conditions permit.

It is desirable that the finished threads be within the limits of size established herein. To that end, external threads should not exceed the basic size after coating and internal threads should not be below the basic size after coating. However, it is recognized that there are some commonly used processes, such as hot-dip galvanizing, which are firmly established, and threads coated by such processes do not fall within the scope of this recommendation.

9.1. Guide For Relieving External Threads.—(This does not apply to extremes of diameter, length, and pitch.) Class 2A provides both a tolerance and an allowance. Many requirements are such as those for coatings deposited by electroplating processes. In general the 2A allowance provides adequate relief for coatings up to a minimum thickness[1] of one-sixth of the 2A pitch diameter allowance, inasmuch as there are variables in thickness of coating and symmetry of coating resulting from commercial processes. See par. 4.2, p. 2.17. It should be stressed that threads after coating should be accepted by a basic size GO thread ring gage or equivalent functional gage.

Class 1A provides an allowance, but in this case the allowance is maintained for both coated and uncoated product. Special provisions before coating are necessary where (1) the design requires that the class 2A allowance be available after coating, or (2) the design requires that an allowance be provided for class 3A threads, or (3) the thickness of coating is too great to be accomodated by the class 2A allowance. In these cases it is recommended that the limits of size before coating be reduced by the amount of the 2A allowance whenever that allowance is adequate, or that the maximum limits of the major and pitch diameters be decreased by an amount equal to six times the minimum coating thickness and the minimum limits be decreased by an amount equal to four times the minimum coating thickness.

9.2. Relief Of Internal Threads.—No provision is made for relieving internal threads as coatings on such threads are not generally required. Further, it is very difficult to deposit a significant thickness of coating on the flanks of internal threads. However, where a specific thickness of coating is required in an internal thread, it is suggested that the thread be relieved so that the thread after coating will be accepted by a GO thread plug gage of basic size. It is recommended that (1) the limits of size before coating be increased by the amount of the 2A allowance whenever that allowance is adequate, or (2) the minimum limits of the minor and pitch diameters be increased by an amount equal to six times the minimum coating thickness and the maximum limits be increased by an amount equal to four times the minimum coating thickness.

10. METHOD OF DESIGNATING SCREW THREADS

The basic method of designating screw threads is used when the standard tolerances or limits of size based on the standard length of engagement are applicable as indicated in par. 7, Length of engagement, p. 2.21. The designation specifies in sequence the nominal size in decimals, number of threads per inch, thread series symbol, and thread class symbol. The *nominal size* is the basic major diameter. The nominal size shall be shown in four place decimals unless there is a cipher in the fourth place. A cipher in the fourth place shall be omitted.

The *thread series symbol* is UNC, UNF, UNEF, or UN for any of the series shown in table 2.7 and UNS for any other diameter-pitch combination having tolerances to Unified formulation.

The *thread class symbol* is 1A, 1B, 2A, 2AG, 2B, 3A, or 3B in which the suffixes A and B relate to external and internal threads, respectively. Suffix G in the 2AG symbol indicates that the 2A dimensions are to be met after coating.

Examples:

Nominal size (basic major diameter in decimals)
| *Number of threads per inch*
| | *Thread series symbol (see dimensional tables)*
| | | *Thread class symbol (see par. 4 Thread classes, p. 2.17.)*
.250-20 UNC-2A formerly 1/4-20 UNC-2A
.190-32 UNF-2A formerly 10-32 UNF-2A
.4375-20 UNF-2A formerly 7/16-20 UNF-2A.
.4375-20 UNF-3A formerly 7/16-20 UNF-3A.

For uncoated standard series threads (table 2.7) these designations may optionally be supplemented by the addition of the pitch diameter limits of size.

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[1] The maximum allowance at the maximum material condition of six times the minimum coating thickness is derived by dividing the deposit on the flank of the thread by the sine of the 30 degree half angle and multiplying the result by two for the diameter equivalent, then adding 50 percent for the plater's tolerance. The minimum allowance at the minimum material condition of four times the minimum coating thickness is two-thirds the maximum allowance, inasmuch as the thickness of coating will bring the limits of size within standard limits with the additional allowance for the plater's tolerance omitted.

Example: (PD limits are those in table 2.21 for class 2A.)

.250-20 UNC-2A
PD .2164-2127 (*Optional for uncoated threads*).

UNS threads and threads having special length of engagement require certain additional information as shown on the following pages.

10.1. DESIGNATING COATED (OR PLATED) 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.

The before coating dimensions have a definite bearing on the strength of the screw threads. The after coating dimensions must allow the threads to assemble with their mating threads, as intended.

Recommended methods for designating coated threads under various conditions are described below:

For coated (or plated) class 1A external threads the max major and max pitch diameters may optionally be given followed 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 footnote 1, p. 2.22, shall be given followed by the words "BEFORE COATING."

Example: (Major and PD limits are those in table 2.21 for class 1A for AFTER COATING and for class 1A minus allowance for BEFORE COATING.)

.250-20 UNC-1A
MAJOR DIA .2489 MAX} AFTER COATING
PD .2164 MAX} (*Optional*)
MAJOR DIA .2478-.2356 SPL} BEFORE
PD .2153-.2097 SPL} COATING

For coated (or plated) class 2A external threads the basic (max) major and basic (max) pitch diameters shall be given followed by the words "AFTER COATING." The major and pitch diameter limits of size before coating shall also be given followed by the words "BEFORE COATING."

Example:[2] (Major and PD limits are those in table 2.21 for class 3A (basic) for AFTER COATING and for class 2A for BEFORE COATING.)

.750-10 UNC-2A
MAJOR DIA .7500 MAX} AFTER COATING
PD .6850 MAX}
MAJOR DIA .7482-.7353} BEFORE COATING
PD .6832-.6773}

Certain applications require an allowance for rapid assembly to permit application of the proper lubricant or for residual growth due to high temperature expansion. In these applications, when the thread is coated and the 2A allowance is not permitted to be consumed by such coating, the thread class symbol is qualified by the addition of the letter G (symbol for allowance) following the class symbol and the max major and max pitch diameters are reduced below basic size by the amount of the 2A allowance and followed by the words "AFTER COATING," thereby ensuring that the allowance is maintained. 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 par 9, p. 2.22) shall also be given followed by the words "BEFORE COATING."

Example: (Major and PD limits are those in table 2.21 for class 2A for AFTER COATING and for class 2A minus the allowance for BEFORE COATING.)

.750-10 UNC-2AG
MAJOR DIA .7482 MAX} AFTER COATING
PD .6832 MAX}
MAJOR DIA .7464-.7335 SPL} BEFORE
PD .6814-.6755 SPL} COATING

For coated (or plated) class 3A external threads, the max major and max pitch diameters may optionally be given followed 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 par. 9, p. 2.22) shall be given followed by the words "BEFORE COATING."

Example: (Major and PD limits for AFTER COATING are those in table 2.21 for class 3A.)

.250-28 UNF-3A
MAJOR DIA. .2500 MAX} AFTER COATING
PD .2268 MAX} (*Optional*)
MAJOR DIA .2488-.2427 SPL} BEFORE
PD .2256-.2235 SPL} COATING

For coated (or plated) class 1B, 2B, or 3B internal threads the min minor diameter and min pitch diameter may optionally be given followed by the words "AFTER COATING." The minor and pitch diameter limits of size before coating (calculated in accordance with par. 9, p. 2.22) shall be given followed by the words "BEFORE COATING."

[2] Threads accepted to class 2A limits before coating are accepted after coating by basic size thread gages. The allowance given in the dimensional tables for class 2A threads is sufficient to allow for a limited amount of coating as described in par. 9. Coated threads, p. 2.22, but if a greater coating thickness is required, it will be necessary to calculate the before coating limits in accordance with that paragraph.

Examples: (The after coating limits for all of the examples given are the minor and PD limits in table 2.21 for the respective class of thread. The before coating limits for all of the examples are calculated using the 2A allowance where it is suitable for a minimum coating (or plating) thickness of 0.0002 in. on the thread flanks.)

.250-20 UNC-1B
MINOR DIA .196 MIN } AFTER COATING
PD .2175 MIN } *(Optional)*
MINOR DIA .197-.208 SPL } BEFORE
PD .2186-.2259 SPL } COATING

.750-10 UNC-2B
MINOR DIA .642 MIN } AFTER COATING
PD .6850 MIN } *(Optional)*
MINOR DIA .644-.665 SPL } BEFORE
PD .6868-.6945 SPL } COATING

.250-28 UNF-3B
MINOR DIA .2110 MIN } AFTER COATING
PD .2268 MIN } *(Optional)*
MINOR DIA .2122-.2198 SPL } BEFORE
PD .2280-.2308 SPL } COATING

10.2. Designating Left Hand Threads.—Unless otherwise specified, threads are right-hand; a left-hand thread shall be designated LH as follows:

.250-20 UNC-3A-LH

10.3. Designating UNS Threads (With Unified Tolerance Formulations).—UNS threads have the basic form of designation set out above, supplemented always by the limits of size.

Examples:

.250-24 UNS-3A
MAJOR DIA .2500-.2428
PD .2229-.2201

.495-20 UNS-3A
MAJOR DIA .4950-.4869
PD .4625-.4593

1.200-10 UNS-2B
MINOR DIA 1.092-1.113
PD 1.1350-1.1432

10.4. Designating Threads Having Special Length Of Engagement.—When 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 par. 7, Length of engagement, p. 2.21, 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

.500-13 UNC-SE2A
PD .4485-.4431
LE 1.00

.250-24 UNS-SE3A
MAJOR DIA .2500-.2428
PD .2229-.2198
LE .88

10.5. 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 to fit a specific application but without change in class of thread or pitch diameter limits. (It should be noted that standard pitch diameter gages may be used to accept such threads). Such threads shall be specified with the established thread designation followed by the designation "MOD" and a statement of the modified diameter limits.

Examples:

.375-24 UNF-3A MOD
MAJOR DIA .3720-.3648 MOD

1.500-10 UNS-3B MOD
MINOR DIA 1.398-1.409 MOD
PD 1.4350-1.4412

10.6. Designating Threads For Acceptance By Other Than General Practice.—Threads to be accepted by gaging practices deviating from those outlined in section 6 require additional notes in the thread designation. The recommended methods of designating these threads are described in the following:

10.6.1. *Designating class 3A threads for LO functional (virtual) diameters.*—When it is desired to gage the minimum pitch diameter limits of class 3A external threads as functional (virtual) diameter, instead of as specified in section 6, the words "LO FUNCTIONAL DIAMETER" following the pitch diameter limits should be included in addition to the information normally given, as follows:

.375-24 UNF-3A
PD .3468-.3430
LO FUNCTIONAL DIAMETER

10.6.2. *Designating class 2A threads for LO pitch diameters.*—When it is desired to gage the minimum pitch diameter limits of class 2A external threads as a single element instead of as specified in section 6, the words "LO PITCH DIAMETER" following the pitch diameter limits should be included in addition to the information normally given, as follows:

.375-16 UNC-2A
PD .3331-.3287
LO PITCH DIAMETER

10.7. Designating Other Threads.—Threads having tolerances that do not conform to Unified formulation, and threads having multiple starts or special form, also require additional data in the thread designation. The recommended methods of designating these threads are described in the following:

10.7.1. *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 previously, it is designated in accordance with the following examples:

.500-13 UNIFIED FORM SPECIAL-INT
MINOR DIA .424-.434 SPL
PD .4500-.4580 SPL
LE .50

.4375-24 UNIFIED FORM SPECIAL-EXT
MAJOR DIA .4340-.4280 SPL
PD .4065-.4025 SPL
LE .38

10.7.2. *Designating multiple-start threads.*—If a thread is required with a multiple start, it is designated by specifying sequentially in decimals the nominal size, pitch, and lead as follows: (The number of starts is obtained by dividing the lead by the pitch.)

.75-.0625P-.1875L-(3 START)-UNIFIED
FORM SPECIAL-EXT
MAJOR DIA .7485-.7391
PD .7079-.7003 SPL
LE .75

10.7.3. *Designating special form threads.*—If a thread for design considerations requires a deviation 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 neither include the letters "UN" nor the word "UNIFIED" but shall be as follows:

.875-18 SPECIAL FORM-EXT
THREAD ANGLE 60°
MAJOR DIA .8750-.8668
PD .8384-.8343
MAX MINOR DIA .8068 (as gaged)
LE .69

Note. The "as gaged" diameter describes the maximum minor diameter of the GO thread ring gage.

10.7.4. *Designating threads with long lengths of engagement.*—In the assembly of threads in mating parts, the length of engagement varies according to the design requirements. It should be noted that the length of engagement is not necessarily the same as the full thread length provided on the part, but is the length of assembled thread in the mating parts.

In some instances, the length of engagement may be longer than that which is applicable to the tolerances for the standard length of engagement and additional precautions are necessary to assure proper assembly. In the case of custom parts, this may be taken into consideration when designing the parts. The proper pitch diameter tolerance may be obtained from the step tables in section 3 or computed from the formulas. The length of engagement shall be included in the designation as specified previously.

11. LIMITS OF SIZE FOR UNIFIED STANDARD SCREW THREAD SERIES

The limits of size, allowances, and pitch diameter tolerances for the Unified standard screw thread series are given in table 2.21. The sizes listed in table 2.21 are those shown in table 2.7 except for the omission of the secondary sizes over 2.5 in nominal size in the 4UN series, all sizes over 5 in. in the 6UN series, and all sizes over 4 in. in the 8UN series. However, the basic dimensions for these sizes omitted from table 2.21 are given in tables 2.11, 2.12, and 2.13.

The maximum-material pitch diameter limits (maximum external and minimum internal threads) are a limitation of the virtual diameter (effective size) for all thread classes. The minimum-material pitch diameter limits are to be interpreted in accordance with par. 8 Limits of size, p. 2.21.

Concerning class 2A threads with an additive finish, footnote b of table 2.21 on p. 2.37 should be specifically noted.

12. GAGES

Threads covered by this section shall be gaged in accordance with section 6.

TABLE 2.21. *Standard series limits of size—Unified screw threads*

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
.060-80	UNF	2A	0.0005	0.0595	0.0563	--------	0.0514	0.0496	0.0018	0.0442	2B	0.0465	0.0514	0.0519	0.0542	0.0023	0.0600
		3A	.0000	.0600	.0568	--------	.0519	.0506	.0013	.0447	3B	.0465	.0514	.0519	.0536	.0017	.0600
.073-64	UNC	2A	.0006	.0724	.0686	--------	.0623	.0603	.0020	.0532	2B	.0561	.0623	.0629	.0655	.0026	.0730
		3A	.0000	.0730	.0692	--------	.0629	.0614	.0015	.0538	3B	.0561	.0623	.0629	.0648	.0019	.0730
.073-72	UNF	2A	.0006	.0724	.0689	--------	.0634	.0615	.0019	.0554	2B	.0580	.0635	.0640	.0665	.0025	.0730
		3A	.0000	.0730	.0695	--------	.0640	.0626	.0014	.0560	3B	.0580	.0635	.0640	.0659	.0019	.0730
.086-56	UNC	2A	.0006	.0854	.0813	--------	.0738	.0717	.0021	.0635	2B	.0667	.0737	.0744	.0772	.0028	.0860
		3A	.0000	.0860	.0819	--------	.0744	.0728	.0016	.0641	3B	.0667	.0737	.0744	.0765	.0021	.0860
.086-64	UNF	2A	.0006	.0854	.0816	--------	.0753	.0733	.0020	.0662	2B	.0691	.0753	.0759	.0786	.0027	.0860
		3A	.0000	.0860	.0822	--------	.0759	.0744	.0015	.0668	3B	.0691	.0753	.0759	.0779	.0020	.0860
.099-48	UNC	2A	.0007	.0983	.0938	--------	.0848	.0825	.0023	.0727	2B	.0764	.0845	.0855	.0885	.0030	.0990
		3A	.0000	.0990	.0945	--------	.0855	.0838	.0017	.0734	3B	.0764	.0845	.0855	.0877	.0022	.0990
.099-56	UNF	2A	.0007	.0983	.0942	--------	.0867	.0845	.0022	.0764	2B	.0797	.0865	.0874	.0902	.0028	.0990
		3A	.0000	.0990	.0949	--------	.0874	.0858	.0016	.0771	3B	.0797	.0865	.0874	.0895	.0021	.0990
.112-40	UNC	2A	.0008	.1112	.1061	--------	.0950	.0925	.0025	.0805	2B	.0849	.0939	.0958	.0991	.0033	.1120
		3A	.0000	.1120	.1069	--------	.0958	.0939	.0019	.0813	3B	.0849	.0939	.0958	.0982	.0024	.1120
.112-48	UNF	2A	.0007	.1113	.1068	--------	.0978	.0954	.0024	.0857	2B	.0894	.0968	.0985	.1016	.0031	.1120
		3A	.0000	.1120	.1075	--------	.0985	.0967	.0018	.0864	3B	.0894	.0968	.0985	.1008	.0023	.1120
.125-40	UNC	2A	.0008	.1242	.1191	--------	.1080	.1054	.0026	.0925	2B	.0979	.1062	.1088	.1121	.0033	.1250
		3A	.0000	.1250	.1199	--------	.1088	.1069	.0019	.0943	3B	.0979	.1062	.1088	.1113	.0025	.1250
.125-44	UNF	2A	.0007	.1243	.1195	--------	.1095	.1070	.0025	.0964	2B	.1004	.1079	.1102	.1134	.0032	.1250
		3A	.0000	.1250	.1202	--------	.1102	.1083	.0019	.0971	3B	.1004	.1079	.1102	.1126	.0024	.1250
.138-32	UNC	2A	.0008	.1372	.1312	--------	.1169	.1141	.0028	.0989	2B	.104	.114	.1177	.1214	.0037	.1380
		3A	.0000	.1380	.1320	--------	.1177	.1156	.0021	.0997	3B	.1040	.1140	.1177	.1204	.0027	.1380
.138-40	UNF	2A	.0008	.1372	.1321	--------	.1210	.1184	.0026	.1065	2B	.111	.119	.1218	.1252	.0034	.1380
		3A	.0000	.1380	.1329	--------	.1218	.1198	.0020	.1073	3B	.1110	.1186	.1218	.1243	.0025	.1380
.164-32	UNC	2A	.0009	.1631	.1571	--------	.1428	.1399	.0029	.1248	2B	.130	.139	.1437	.1475	.0038	.1640
		3A	.0000	.1640	.1580	--------	.1437	.1415	.0022	.1257	3B	.1300	.1389	.1437	.1465	.0028	.1640
.164-36	UNF	2A	.0008	.1632	.1577	--------	.1452	.1424	.0028	.1291	2B	.134	.142	.1460	.1496	.0036	.1640
		3A	.0000	.1640	.1585	--------	.1460	.1439	.0021	.1299	3B	.1340	.1416	.1460	.1487	.0027	.1640
.190-24	UNC	2A	.0010	.1890	.1818	--------	.1619	.1586	.0033	.1379	2B	.145	.156	.1629	.1672	.0043	.1900
		3A	.0000	.1900	.1828	--------	.1629	.1604	.0025	.1389	3B	.1450	.1555	.1629	.1661	.0032	.1900
.190-32	UNF	2A	.0009	.1891	.1831	--------	.1688	.1658	.0030	.1508	2B	.156	.164	.1697	.1736	.0039	.1900
		3A	.0000	.1900	.1840	--------	.1697	.1674	.0023	.1517	3B	.1560	.1641	.1697	.1726	.0029	.1900
.216-24	UNC	2A	.0010	.2150	.2078	--------	.1879	.1845	.0034	.1639	2B	.171	.181	.1889	.1933	.0044	.2160
		3A	.0000	.2160	.2088	--------	.1889	.1863	.0026	.1649	3B	.1710	.1807	.1889	.1922	.0033	.2160
.216-28	UNF	2A	.0010	.2150	.2085	--------	.1918	.1886	.0032	.1712	2B	.177	.186	.1928	.1970	.0042	.2160
		3A	.0000	.2160	.2095	--------	.1928	.1904	.0024	.1722	3B	.1770	.1857	.1928	.1959	.0031	.2160
.216-32	UNEF	2A	.0009	.2151	.2091	--------	.1948	.1917	.0031	.1768	2B	.182	.190	.1957	.1998	.0041	.2160
		3A	.0000	.2160	.2100	--------	.1957	.1933	.0024	.1777	3B	.1820	.1895	.1957	.1988	.0031	.2160
.250-20	UNC	1A	.0011	.2489	.2367	--------	.2164	.2108	.0056	.1876	1B	.196	.207	.2175	.2248	.0073	.2500
		2A	.0011	.2489	.2408	0.2367	.2164	.2127	.0037	.1876	2B	.196	.207	.2175	.2224	.0049	.2500
		3A	.0000	.2500	.2419	--------	.2175	.2147	.0028	.1887	3B	.1960	.2067	.2175	.2211	.0036	.2500
.250-28	UNF	1A	.0010	.2490	.2392	--------	.2258	.2208	.0050	.2052	1B	.211	.220	.2268	.2333	.0065	.2500
		2A	.0010	.2490	.2425	--------	.2258	.2225	.0033	.2052	2B	.211	.220	.2268	.2311	.0043	.2500
		3A	.0000	.2500	.2435	--------	.2268	.2243	.0025	.2062	3B	.2110	.2190	.2268	.2300	.0032	.2500
.250-32	UNEF	2A	.0010	.2490	.2430	--------	.2287	.2255	.0032	.2107	2B	.216	.224	.2297	.2339	.0042	.2500
		3A	.0000	.2500	.2440	--------	.2297	.2273	.0024	.2117	3B	.2160	.2229	.2297	.2328	.0031	.2500
.3125-18	UNC	1A	.0012	.3113	.2982	--------	.2752	.2691	.0061	.2431	1B	.252	.265	.2764	.2843	.0079	.3125
		2A	.0012	.3113	.3026	.2982	.2752	.2712	.0040	.2431	2B	.252	.265	.2764	.2817	.0053	.3125
		3A	.0000	.3125	.3038	--------	.2764	.2734	.0030	.2443	3B	.2520	.2630	.2764	.2803	.0039	.3125
.3125-20	UN	2A	.0012	.3113	.3032	--------	.2788	.2748	.0040	.2500	2B	.258	.270	.2800	.2852	.0052	.3125
		3A	.0000	.3125	.3044	--------	.2800	.2770	.0030	.2512	3B	.2580	.2680	.2800	.2839	.0039	.3125
.3125-24	UNF	1A	.0011	.3114	.3006	--------	.2843	.2788	.0055	.2603	1B	.267	.277	.2854	.2925	.0071	.3125
		2A	.0011	.3114	.3042	--------	.2843	.2806	.0037	.2603	2B	.267	.277	.2854	.2902	.0048	.3125
		3A	.0000	.3125	.3053	--------	.2854	.2827	.0027	.2614	3B	.2670	.2754	.2854	.2890	.0036	.3125
.3125-28	UN	2A	.0010	.3115	.3050	--------	.2883	.2849	.0034	.2677	2B	.274	.282	.2893	.2937	.0044	.3125
		3A	.0000	.3125	.3060	--------	.2893	.2867	.0026	.2687	3B	.2740	.2807	.2893	.2926	.0033	.3125

See footnotes at end of table.

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
.3125-32	UNEF	2A	0.0010	0.3115	0.3055	--------	0.2912	0.2880	0.0032	0.2732	2B	0.279	0.286	0.2922	0.2964	0.0042	0.3125
		3A	.0000	.3125	.3065	--------	.2922	.2898	.0024	.2742	3B	.2790	.2847	.2922	.2953	.0031	.3125
.375-16	UNC	1A	.0013	.3737	.3595	--------	.3331	.3266	.0065	.2970	1B	.307	.321	.3344	.3429	.0085	.3750
		2A	.0013	.3737	.3643	0.3595	.3331	.3287	.0044	.2970	2B	.307	.321	.3344	.3401	.0057	.3750
		3A	.0000	.3750	.3656	--------	.3344	.3311	.0033	.2983	3B	.3070	.3182	.3344	.3387	.0043	.3750
.375-20	UN	2A	.0012	.3738	.3657	--------	.3413	.3372	.0041	.3125	2B	.321	.332	.3425	.3479	.0054	.3750
		3A	.0000	.3750	.3669	--------	.3425	.3394	.0031	.3137	3B	.3210	.3297	.3425	.3465	.0040	.3750
.375-24	UNF	1A	.0011	.3739	.3631	--------	.3468	.3411	.0057	.3228	1B	.330	.340	.3479	.3553	.0074	.3750
		2A	.0011	.3739	.3667	--------	.3468	.3430	.0038	.3228	2B	.330	.340	.3479	.3528	.0049	.3750
		3A	.0000	.3750	.3678	--------	.3479	.3450	.0029	.3239	3B	.3300	.3372	.3479	.3516	.0037	.3750
.375-28	UN	2A	.0011	.3739	.3674	--------	.3507	.3471	.0036	.3301	2B	.336	.345	.3518	.3564	.0046	.3750
		3A	.0000	.3750	.3685	--------	.3518	.3491	.0027	.3312	3B	.3360	.3426	.3518	.3553	.0035	.3750
.375-32	UNEF	2A	.0010	.3740	.3680	--------	.3557	.3503	.0034	.3357	2B	.341	.349	.3547	.3591	.0044	.3750
		3A	.0000	.3750	.3690	--------	.3547	.3522	.0025	.3367	3B	.3410	.3469	.3547	.3580	.0033	.3750
.4375-14	UNC	1A	.0014	.4361	.4206	--------	.3897	.3826	.0071	.3485	1B	.360	.376	.3911	.4003	.0092	.4375
		2A	.0014	.4361	.4258	.4206	.3897	.3850	.0047	.3485	2B	.360	.376	.3911	.3972	.0061	.4375
		3A	.0000	.4375	.4272	--------	.3911	.3876	.0035	.3499	3B	.3600	.3717	.3911	.3957	.0046	.4375
.4375-16	UN	2A	.0014	.4361	.4267	--------	.3955	.3909	.0046	.3594	2B	.370	.384	.3969	.4028	.0059	.4375
		3A	.0000	.4375	.4281	--------	.3969	.3935	.0034	.3608	3B	.3700	.3800	.3969	.4014	.0045	.4375
.4375-20	UNF	1A	.0013	.4362	.4240	--------	.4037	.3974	.0063	.3749	1B	.383	.395	.4050	.4131	.0081	.4375
		2A	.0013	.4362	.4281	--------	.4037	.3995	.0042	.3749	2B	.383	.395	.4050	.4104	.0054	.4375
		3A	.0000	.4375	.4294	--------	.4050	.4019	.0031	.3762	3B	.3830	.3916	.4050	.4091	.0041	.4375
.4375-28	UNEF	2A	.0011	.4364	.4299	--------	.4132	.4096	.0036	.3926	2B	.399	.407	.4143	.4189	.0046	.4375
		3A	.0000	.4375	.4310	--------	.4143	.4116	.0027	.3937	3B	.3990	.4051	.4143	.4178	.0035	.4375
.4375-32	UN	2A	.0010	.4365	.4305	--------	.4162	.4128	.0034	.3982	2B	.404	.411	.4172	.4216	.0044	.4375
		3A	.0000	.4375	.4315	--------	.4172	.4147	.0025	.3992	3B	.4040	.4094	.4172	.4205	.0033	.4375
.500-13	UNC	1A	.0015	.4985	.4822	--------	.4485	.4411	.0074	.4041	1B	.417	.434	.4500	.4597	.0097	.5000
		2A	.0015	.4985	.4876	.4822	.4485	.4435	.0050	.4041	2B	.417	.434	.4500	.4565	.0065	.5000
		3A	.0000	.5000	.4891	--------	.4500	.4463	.0037	.4056	3B	.4170	.4284	.4500	.4548	.0048	.5000
.500-16	UN	2A	.0014	.4986	.4892	--------	.4580	.4533	.0047	.4219	2B	.432	.446	.4594	.4655	.0061	.5000
		3A	.0000	.5000	.4906	--------	.4594	.4559	.0035	.4233	3B	.4320	.4419	.4594	.4640	.0046	.5000
.500-20	UNF	1A	.0013	.4987	.4865	--------	.4662	.4598	.0064	.4374	1B	.446	.457	.4675	.4759	.0084	.5000
		2A	.0013	.4987	.4906	--------	.4662	.4619	.0043	.4374	2B	.446	.457	.4675	.4731	.0056	.5000
		3A	.0000	.5000	.4919	--------	.4675	.4643	.0032	.4387	3B	.4460	.4537	.4675	.4717	.0042	.5000
.500-28	UNEF	2A	.0011	.4989	.4924	--------	.4757	.4720	.0037	.4551	2B	.461	.470	.4768	.4816	.0048	.5000
		3A	.0000	.5000	.4935	--------	.4768	.4740	.0028	.4562	3B	.4610	.4676	.4768	.4804	.0036	.5000
.500-32	UN	2A	.0010	.4990	.4930	--------	.4787	.4752	.0035	.4607	2B	.466	.474	.4797	.4842	.0045	.5000
		3A	.0000	.5000	.4940	--------	.4797	.4771	.0026	.4617	3B	.4660	.4719	.4797	.4831	.0034	.5000
.5625-12	UNC	1A	.0016	.5609	.5437	--------	.5068	.4990	.0078	.4587	1B	.472	.490	.5084	.5186	.0102	.5625
		2A	.0016	.5609	.5495	.5437	.5068	.5016	.0052	.4587	2B	.472	.490	.5084	.5152	.0068	.5625
		3A	.0000	.5625	.5511	--------	.5084	.5045	.0039	.4603	3B	.4720	.4843	.5084	.5135	.0051	.5625
.5625-16	UN	2A	.0014	.5611	.5517	--------	.5205	.5158	.0047	.4844	2B	.495	.509	.5219	.5280	.0061	.5625
		3A	.0000	.5625	.5531	--------	.5219	.5184	.0035	.4858	3B	.4950	.5040	.5219	.5265	.0046	.5625
.5625-18	UNF	1A	.0014	.5611	.5480	--------	.5250	.5182	.0068	.4929	1B	.502	.515	.5264	.5353	.0089	.5625
		2A	.0014	.5611	.5524	--------	.5250	.5205	.0045	.4929	2B	.502	.515	.5264	.5323	.0059	.5625
		3A	.0000	.5625	.5538	--------	.5264	.5230	.0034	.4943	3B	.5020	.5106	.5664	.5308	.0044	.5625
.5625-20	UN	2A	.0013	.5612	.5531	--------	.5287	.5245	.0042	.4999	2B	.508	.520	.5300	.5355	.0055	.5625
		3A	.0000	.5625	.5544	--------	.5300	.5268	.0032	.5012	3B	.5080	.5162	.5300	.5341	.0041	.5625
.5625-24	UNEF	2A	.0012	.5613	.5541	--------	.5342	.5303	.0039	.5102	2B	.517	.527	.5354	.5405	.0051	.5625
		3A	.0000	.5625	.5553	--------	.5354	.5325	.0029	.5114	3B	.5170	.5244	.5354	.5392	.0038	.5625
.5625-28	UN	2A	.0011	.5614	.5549	--------	.5382	.5345	.0037	.5176	2B	.524	.532	.5393	.5441	.0048	.5625
		3A	.0000	.5625	.5560	--------	.5393	.5365	.0028	.5187	3B	.5240	.5301	.5393	.5429	.0036	.5625
.5625-32	UN	2A	.0010	.5615	.5555	--------	.5412	.5377	.0035	.5232	2B	.529	.536	.5422	.5467	.0045	.5625
		3A	.0000	.5625	.5565	--------	.5422	.5396	.0026	.5242	3B	.5290	.5344	.5422	.5456	.0034	.5625
.625-11	UNC	1A	.0016	.6234	.6052	--------	.5644	.5561	.0083	.5119	1B	.527	.546	.5660	.5767	.0107	.6250
		2A	.0016	.6234	.6113	.6052	.5644	.5589	.0055	.5119	2B	.527	.546	.5660	.5732	.0072	.6250
		3A	.0000	.6250	.6129	--------	.5660	.5619	.0041	.5135	3B	.5270	.5391	.5660	.5714	.0054	.6250
.625-12	UN	2A	.0016	.6234	.6120	--------	.5693	.5639	.0054	.5112	2B	.535	.553	.5709	.5780	.0071	.6250
		3A	.0000	.6250	.6136	--------	.5709	.5668	.0041	.5228	3B	.5350	.5463	.5709	.5762	.0053	.6250

See footnotes at end of table.

TABLE 2.21. *Standard series limits of size—Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
.625-16	UN	2A	0.0014	0.6236	0.6142		0.5830	0.5782	0.0048	0.5469	2B	0.557	0.571	0.5844	0.5906	0.0062	0.6250
		3A	.0000	.6250	.6156		.5844	.5808	.0036	.5483	3B	.5570	.5662	.5844	.5890	.0046	.6250
.625-18	UNF	1A	.0014	.6236	.6105		.5875	.5805	.0070	.5554	1B	.565	.578	.5889	.5980	.0091	.6250
		2A	.0014	.6236	.6149		.5875	.5828	.0047	.5554	2B	.565	.578	.5889	.5949	.0060	.6250
		3A	.0000	.6250	.6163		.5889	.5854	.0035	.5568	3B	.5650	.5730	.5889	.5934	.0045	.6250
.625-20	UN	2A	.0013	.6237	.6156		.5912	.5869	.0043	.5624	2B	.571	.582	.5925	.5981	.0056	.6250
		3A	.0000	.6250	.6169		.5925	.5893	.0032	.5637	3B	.5710	.5787	.5925	.5967	.0042	.6250
.625-24	UNEF	2A	.0012	.6238	.6166		.5967	.5927	.0040	.5727	2B	.580	.590	.5979	.6031	.0052	.6250
		3A	.0000	.6250	.6178		.5979	.5949	.0030	.5739	3B	.5800	.5869	.5879	.6018	.0039	.6250
.625-28	UN	2A	.0011	.6239	.6174		.6007	.5969	.0038	.5801	2B	.586	.595	.6018	.6067	.0049	.6250
		3A	.0000	.6250	.6185		.6018	.5990	.0028	.5812	3B	.5860	.5926	.6018	.6055	.0037	.6250
.625-32	UN	2A	.0011	.6239	.6179		.6036	.6000	.0036	.5856	2B	.591	.599	.6047	.6093	.0046	.6250
		3A	.0000	.6250	.6190		.6047	.6020	.0027	.5867	3B	.5910	.5969	.6047	.6082	.0035	.6250
.6875-12	UN	2A	.0016	.6859	.6745		.6318	.6264	.0054	.5837	2B	.597	.615	.6334	.6405	.0071	.6875
		3A	.0000	.6875	.6761		.6334	.6293	.0041	.5853	3B	.5970	.6085	.6334	.6387	.0053	.6875
.6875-16	UN	2A	.0014	.6861	.6767		.6455	.6407	.0048	.6094	2B	.620	.634	.6469	.6531	.0062	.6875
		3A	.0000	.6875	.6781		.6469	.6433	.0036	.6108	3B	.6200	.6284	.6469	.6515	.0046	.6875
.6875-20	UN	2A	.0013	.6862	.6781		.6537	.6494	.0043	.6249	2B	.633	.645	.6550	.6606	.0056	.6875
		3A	.0000	.6875	.6794		.6550	.6518	.0032	.6262	3B	.6330	.6412	.6550	.6592	.0042	.6875
.6875-24	UNEF	2A	.0012	.6863	.6791		.6592	.6552	.0040	.6352	2B	.642	.652	.6604	.6656	.0052	.6875
		3A	.0000	.6875	.6803		.6604	.6574	.0030	.6364	3B	.6420	.6494	.6604	.6643	.0039	.6875
.6875-28	UN	2A	.0011	.6864	.6799		.6632	.6594	.0038	.6426	2B	.649	.657	.6643	.6692	.0049	.6875
		3A	.0000	.6875	.6810		.6643	.6615	.0028	.6437	3B	.6490	.6551	.6643	.6680	.0037	.6875
.6875-32	UN	2A	.0011	.6864	.6804		.6661	.6625	.0036	.6481	2B	.654	.661	.6672	.6718	.0046	.6875
		3A	.0000	.6875	.6815		.6672	.6645	.0027	.6492	3B	.6540	.6594	.6672	.6707	.0035	.6875
.750-10	UNC	1A	.0018	.7482	.7288		.6832	.6744	.0088	.6255	1B	.642	.663	.6850	.6965	.0115	.7500
		2A	.0018	.7482	.7353	0.7288	.6832	.6773	.0059	.6255	2B	.642	.663	.6850	.6927	.0077	.7500
		3A	.0000	.7500	.7371		.6850	.6806	.0044	.6273	3B	.6420	.6545	.6850	.6907	.0057	.7500
.750-12	UN	2A	.0017	.7483	.7369		.6942	.6887	.0055	.6461	2B	.660	.678	.6959	.7031	.0072	.7500
		3A	.0000	.7500	.7386		.6959	.6918	.0041	.6478	3B	.6600	.6707	.6959	.7013	.0054	.7500
.750-16	UNF	1A	.0015	.7485	.7343		.7079	.7004	.0075	.6718	1B	.682	.696	.7094	.7192	.0098	.7500
		2A	.0015	.7485	.7391		.7079	.7029	.0050	.6718	2B	.682	.696	.7094	.7159	.0065	.7500
		3A	.0000	.7500	.7406		.7094	.7056	.0038	.6733	3B	.6820	.6908	.7094	.7143	.0049	.7500
.750-20	UNEF	2A	.0013	.7487	.7406		.7162	.7118	.0044	.6874	2B	.696	.707	.7175	.7232	.0057	.7500
		3A	.0000	.7500	.7419		.7175	.7142	.0033	.6887	3B	.6960	.7037	.7175	.7218	.0043	.7500
.750-28	UN	2A	.0012	.7488	.7423		.7256	.7218	.0038	.7050	2B	.711	.720	.7268	.7318	.0050	.7500
		3A	.0000	.7500	.7435		.7268	.7239	.0029	.7062	3B	.7110	.7176	.7268	.7305	.0037	.7500
.750-32	UN	2A	.0011	.7489	.7429		.7286	.7250	.0036	.7106	2B	.716	.724	.7297	.7344	.0047	.7500
		3A	.0000	.7500	.7440		.7297	.7270	.0027	.7117	3B	.7160	.7219	.7297	.7333	.0036	.7500
.8125-12	UN	2A	.0017	.8108	.7994		.7567	.7512	.0055	.7086	2B	.722	.740	.7584	.7656	.0072	.8125
		3A	.0000	.8125	.8011		.7584	.7543	.0041	.7103	3B	.7220	.7329	.7584	.7638	.0054	.8125
.8125-16	UN	2A	.0015	.8110	.8016		.7704	.7655	.0049	.7343	2B	.745	.759	.7719	.7782	.0063	.8125
		3A	.0000	.8125	.8031		.7719	.7683	.0036	.7358	3B	.7450	.7533	.7719	.7766	.0047	.8125
.8125-20	UNEF	2A	.0013	.8112	.8031		.7787	.7743	.0044	.7499	2B	.758	.770	.7800	.7857	.0057	.8125
		3A	.0000	.8125	.8044		.7800	.7767	.0033	.7512	3B	.7580	.7662	.7800	.7843	.0043	.8125
.8125-28	UN	2A	.0012	.8113	.8048		.7881	.7843	.0038	.7675	2B	.774	.782	.7893	.7943	.0050	.8125
		3A	.0000	.8125	.8060		.7893	.7864	.0029	.7687	3B	.7740	.7801	.7893	.7930	.0037	.8125
.8125-32	UN	2A	.0011	.8114	.8054		.7911	.7875	.0036	.7731	2B	.779	.786	.7922	.7969	.0047	.8125
		3A	.0000	.8125	.8065		.7922	.7895	.0027	.7742	3B	.7790	.7844	.7922	.7958	.0036	.8125
.875-9	UNC	1A	.0019	.8731	.8523		.8009	.7914	.0095	.7368	1B	.755	.778	.8028	.8151	.0123	.8750
		2A	.0019	.8731	.8592	.8523	.8009	.7946	.0063	.7368	2B	.755	.778	.8028	.8110	.0082	.8750
		3A	.0000	.8750	.8611		.8028	.7981	.0047	.7387	3B	.7550	.7681	.8028	.8089	.0061	.8750
.875-12	UN	2A	.0017	.8733	.8619		.8192	.8137	.0055	.7711	2B	.785	.803	.8209	.8281	.0072	.8750
		3A	.0000	.8750	.8636		.8209	.8168	.0041	.7728	3B	.7850	.7952	.8209	.8263	.0054	.8750
.875-14	UNF	1A	.0016	.8734	.8579		.8270	.8189	.0081	.7858	1B	.798	.814	.8286	.8392	.0106	.8750
		2A	.0016	.8734	.8631		.8270	.8216	.0054	.7858	2B	.798	.814	.8286	.8356	.0070	.8750
		3A	.0000	.8750	.8647		.8286	.8245	.0041	.7874	3B	.7980	.8068	.8286	.8339	.0053	.8750

See footnotes at end of table.

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
.875-16	UN	2A	0.0015	0.8735	0.8641	--------	0.8329	0.8280	0.0049	0.7968	2B	0.807	0.821	0.8344	0.8407	0.0063	0.8750
		3A	.0000	.8750	.8656	--------	.8344	.8308	.0036	.7983	3B	.8070	.8158	.8344	.8391	.0047	.8750
.875-20	UNEF	2A	.0013	.8737	.8656	--------	.8412	.8368	.0044	.8124	2B	.821	.832	.8425	.8482	.0057	.8750
		3A	.0000	.8750	.8669	--------	.8425	.8392	.0033	.8137	3B	.8210	.8287	.8425	.8468	.0043	.8750
.875-28	UN	2A	.0012	.8738	.8673	--------	.8506	.8468	.0038	.8300	2B	.836	.845	.8518	.8568	.0050	.8750
		3A	.0000	.8750	.8685	--------	.8518	.8489	.0029	.8312	3B	.8360	.8426	.8518	.8555	.0037	.8750
.875-32	UN	2A	.0011	.8739	.8679	--------	.8536	.8500	.0036	.8356	2B	.841	.849	.8547	.8594	.0047	.8750
		3A	.0000	.8750	.8690	--------	.8547	.8520	.0027	.8367	3B	.8410	.8469	.8547	.8583	.0036	.8750
.9375-12	UN	2A	.0017	.9358	.9244	--------	.8817	.8760	.0057	.8336	2B	.847	.865	.8834	.8908	.0074	.9375
		3A	.0000	.9375	.9261	--------	.8834	.8792	.0042	.8353	3B	.8470	.8575	.8834	.8889	.0055	.9375
.9375-16	UN	2A	.0015	.9360	.9266	--------	.8954	.8904	.0050	.8593	2B	.870	.884	.8969	.9034	.0065	.9375
		3A	.0000	.9375	.9281	--------	.8969	.8932	.0037	.8608	3B	.8700	.8783	.8969	.9018	.0049	.9375
.9375-20	UNEF	2A	.0014	.9361	.9280	--------	.9036	.8991	.0045	.8748	2B	.883	.895	.9050	.9109	.0059	.9375
		3A	.0000	.9375	.9294	--------	.9050	.9016	.0034	.8762	3B	.8830	.8912	.9050	.9094	.0044	.9375
.9375-28	UN	2A	.0012	.9363	.9298	--------	.9131	.9091	.0040	.8925	2B	.899	.907	.9143	.9195	.0052	.9375
		3A	.0000	.9375	.9310	--------	.9143	.9113	.0030	.8937	3B	.8990	.9051	.9143	.9182	.0039	.9375
.9375-32	UN	2A	.0011	.9364	.9304	--------	.9161	.9123	.0038	.8981	2B	.904	.911	.9172	.9221	.0049	.9375
		3A	.0000	.9375	.9315	--------	.9172	.9144	.0028	.8992	3B	.9040	.9094	.9172	.9209	.0037	.9375
1.000-8	UNC	1A	.0020	.9980	.9755	--------	.9168	.9067	.0101	.8446	1B	.865	.890	.9188	.9320	.0132	1.0000
		2A	.0020	.9980	.9830	0.9755	.9168	.9100	.0068	.8446	2B	.865	.890	.9188	.9276	.0088	1.0000
		3A	.0000	1.0000	.9850	--------	.9188	.9137	.0051	.8466	3B	.8650	.8797	.9188	.9254	.0066	1.0000
1.000-12	UNF	1A	.0018	.9982	.9810	--------	.9441	.9353	.0088	.8960	1B	.910	.928	.9459	.9573	.0114	1.0000
		2A	.0018	.9982	.9868	--------	.9441	.9382	.0059	.8960	2B	.910	.928	.9459	.9535	.0076	1.0000
		3A	.0000	1.0000	.9886	--------	.9459	.9415	.0044	.8978	3B	.9100	.9198	.9459	.9516	.0057	1.0000
1.000-16	UN	2A	.0015	.9985	.9891	--------	.9579	.9529	.0050	.9218	2B	.932	.946	.9594	.9659	.0065	1.0000
		3A	.0000	1.0000	.9906	--------	.9594	.9557	.0037	.9233	3B	.9320	.9408	.9594	.9643	.0049	1.0000
1.000-20	UNEF	2A	.0014	.9986	.9905	--------	.9661	.9616	.0045	.9373	2B	.946	.957	.9675	.9734	.0059	1.0000
		3A	.0000	1.0000	.9919	--------	.9675	.9641	.0034	.9387	3B	.9460	.9537	.9675	.9719	.0044	1.0000
1.000-28	UN	2A	.0012	.9988	.9923	--------	.9756	.9716	.0040	.9550	2B	.961	.970	.9768	.9820	.0052	1.0000
		3A	.0000	1.0000	.9935	--------	.9768	.9738	.0030	.9562	3B	.9610	.9676	.9768	.9807	.0039	1.0000
1.000-32	UN	2A	.0011	.9989	.9929	--------	.9786	.9748	.0038	.9606	2B	.966	.974	.9797	.9846	.0049	1.0000
		3A	.0000	1.0000	.9940	--------	.9797	.9769	.0028	.9617	3B	.9660	.9719	.9797	.9834	.0037	1.0000
1.0625-8	UN	2A	.0020	1.0605	1.0455	--------	.9793	.9725	.0068	.9071	2B	.927	.952	.9813	.9902	.0089	1.0625
		3A	.0000	1.0625	1.0475	--------	.9813	.9762	.0051	.9091	3B	.9270	.9422	.9813	.9880	.0067	1.0625
1.0625-12	UN	2A	.0017	1.0608	1.0494	--------	1.0067	1.0010	.0057	.9586	2B	.972	.990	1.0084	1.0158	.0074	1.0625
		3A	.0000	1.0625	1.0511	--------	1.0084	1.0042	.0042	.9603	3B	.9720	.9823	1.0084	1.0139	.0055	1.0625
1.0625-16	UN	2A	.0015	1.0610	1.0516	--------	1.0204	1.0154	.0050	.9843	2B	.995	1.009	1.0219	1.0284	.0065	1.0625
		3A	.0000	1.0625	1.0531	--------	1.0219	1.0182	.0037	.9858	3B	.9950	1.0033	1.0219	1.0268	.0049	1.0625
1.0625-18	UNEF	2A	.0014	1.0611	1.0524	--------	1.0250	1.0203	.0047	.9929	2B	1.002	1.015	1.0264	1.0326	.0062	1.0625
		3A	.0000	1.0625	1.0538	--------	1.0264	1.0228	.0036	.9943	3B	1.0020	1.0105	1.0264	1.0310	.0046	1.0625
1.0625-20	UN	2A	.0014	1.0611	1.0530	--------	1.0286	1.0241	.0045	.9998	2B	1.008	1.020	1.0300	1.0359	.0059	1.0625
		3A	.0000	1.0625	1.0544	--------	1.0300	1.0266	.0034	1.0012	3B	1.0080	1.0162	1.0300	1.0344	.0044	1.0625
1.0625-28	UN	2A	.0012	1.0613	1.0548	--------	1.0381	1.0341	.0040	1.0175	2B	1.024	1.032	1.0393	1.0445	.0052	1.0625
		3A	.0000	1.0625	1.0560	--------	1.0393	1.0363	.0030	1.0187	3B	1.0240	1.0301	1.0393	1.0432	.0039	1.0625
1.125-7	UNC	1A	.0022	1.1228	1.0982	--------	1.0300	1.0191	.0109	.9475	1B	0.970	0.998	1.0322	1.0463	.0141	1.1250
		2A	.0022	1.1228	1.1064	1.0982	1.0300	1.0228	.0072	.9475	2B	.970	.998	1.0322	1.0416	.0094	1.1250
		3A	.0000	1.1250	1.1086	--------	1.0322	1.0268	.0054	.9497	3B	.9700	.9875	1.0322	1.0393	.0071	1.1250
1.125-8	UN	2A	.0021	1.1229	1.1079	1.1004	1.0417	1.0348	.0069	.9695	2B	.990	1.015	1.0438	1.0528	.0090	1.1250
		3A	.0000	1.1250	1.1100	--------	1.0438	1.0386	.0052	.9716	3B	.9900	1.0047	1.0438	1.0505	.0067	1.1250
1.125-12	UNF	1A	.0018	1.1232	1.1060	--------	1.0691	1.0601	.0090	1.0210	1B	1.035	1.053	1.0709	1.0826	.0117	1.1250
		2A	.0018	1.1232	1.1118	--------	1.0691	1.0631	.0060	1.0210	2B	1.035	1.053	1.0709	1.0787	.0078	1.1250
		3A	.0000	1.1250	1.1136	--------	1.0709	1.0664	.0045	1.0228	3B	1.0350	1.0448	1.0709	1.0768	.0059	1.1250
1.125-16	UN	2A	.0015	1.1235	1.1141	--------	1.0829	1.0779	.0050	1.0468	2B	1.057	1.071	1.0844	1.0909	.0065	1.1250
		3A	.0000	1.1250	1.1156	--------	1.0844	1.0807	.0037	1.0483	3B	1.0570	1.0658	1.0844	1.0893	.0049	1.1250
1.125-18	UNEF	2A	.0014	1.1236	1.1149	--------	1.0875	1.0828	.0047	1.0554	2B	1.065	1.078	1.0889	1.0951	.0062	1.1250
		3A	.0000	1.1250	1.1163	--------	1.0889	1.0853	.0036	1.0568	3B	1.0650	1.0730	1.0889	1.0935	.0046	1.1250
1.125-20	UN	2A	.0014	1.1236	1.1155	--------	1.0911	1.0866	.0045	1.0623	2B	1.071	1.082	1.0925	1.0984	.0059	1.1250
		3A	.0000	1.1250	1.1169	--------	1.0925	1.0891	.0034	1.0637	3B	1.0710	1.0787	1.0925	1.0969	.0044	1.1250

see footnotes at end of table.

TABLE 2.21. *Standard series limits of size—Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	in	in	in	in	in	in	in		in	in	in	in	in	in
1.125-28	UN	2A	0.0012	1.1238	1.1173	--------	1.1006	1.0966	0.0040	1.0800	2B	1.086	1.095	1.1018	1.1070	0.0052	1.1250
		3A	.0000	1.1250	1.1185	--------	1.1018	1.0988	.0030	1.0812	3B	1.0860	1.0926	1.1018	1.1057	.0039	1.1250
1.1875-8	UN	2A	.0021	1.1854	1.1704	--------	1.1042	1.0972	.0070	1.0320	2B	1.052	1.077	1.1063	1.1154	.0091	1.1875
		3A	.0000	1.1875	1.1725	--------	1.1063	1.1011	.0052	1.0341	3B	1.0520	1.0672	1.1063	1.1131	.0068	1.1875
1.1875-12	UN	2A	.0017	1.1858	1.1744	--------	1.1317	1.1259	.0058	1.0836	2B	1.097	1.115	1.1334	1.1409	.0075	1.1875
		3A	.0000	1.1875	1.1761	--------	1.1334	1.1291	.0043	1.0853	3B	1.0970	1.1073	1.1334	1.1390	.0056	1.1875
1.1875-16	UN	2A	.0015	1.1860	1.1766	--------	1.1454	1.1403	.0051	1.1093	2B	1.120	1.134	1.1469	1.1535	.0066	1.1875
		3A	.0000	1.1875	1.1781	--------	1.1469	1.1431	.0038	1.1108	3B	1.1200	1.1283	1.1469	1.1519	.0050	1.1875
1.1875-18	UNEF	2A	.0015	1.1860	1.1773	--------	1.1499	1.1450	.0049	1.1178	2B	1.127	1.140	1.1514	1.1577	.0063	1.1875
		3A	.0000	1.1875	1.1788	--------	1.1514	1.1478	.0036	1.1193	3B	1.1270	1.1355	1.1514	1.1561	.0047	1.1875
1.1875-20	UN	2A	.0014	1.1861	1.1780	--------	1.1536	1.1489	.0047	1.1248	2B	1.133	1.145	1.1550	1.1611	.0061	1.1875
		3A	.0000	1.1875	1.1794	--------	1.1550	1.1515	.0035	1.1262	3B	1.1330	1.1412	1.1550	1.1595	.0045	1.1875
1.1875-28	UN	2A	.0012	1.1863	1.1798	--------	1.1631	1.1590	.0041	1.1425	2B	1.149	1.157	1.1643	1.1696	.0053	1.1875
		3A	.0000	1.1875	1.1810	--------	1.1643	1.1612	.0031	1.1437	3B	1.1490	1.1551	1.1643	1.1683	.0040	1.1875
1.250-7	UNC	1A	.0022	1.2478	1.2232	--------	1.1550	1.1439	.0111	1.0725	1B	1.095	1.123	1.1572	1.1716	.0144	1.2500
		2A	.0022	1.2478	1.2314	1.2232	1.1550	1.1476	.0074	1.0725	2B	1.095	1.123	1.1572	1.1668	.0096	1.2500
		3A	.0000	1.2500	1.2336	--------	1.1572	1.1517	.0055	1.0747	3B	1.0950	1.1125	1.1572	1.1644	.0072	1.2500
1.250-8	UN	2A	.0021	1.2479	1.2329	1.2254	1.1667	1.1597	.0070	1.0945	2B	1.115	1.140	1.1688	1.1780	.0092	1.2500
		3A	.0000	1.2500	1.2350	--------	1.1688	1.1635	.0053	1.0966	3B	1.1150	1.1297	1.1688	1.1757	.0069	1.2500
1.250-12	UNF	1A	.0018	1.2482	1.2310	--------	1.1941	1.1849	.0092	1.1460	1B	1.160	1.178	1.1959	1.2079	.0120	1.2500
		2A	.0018	1.2482	1.2368	--------	1.1941	1.1879	.0062	1.1460	2B	1.160	1.178	1.1959	1.2039	.0080	1.2500
		3A	.0000	1.2500	1.2386	--------	1.1959	1.1913	.0046	1.1478	3B	1.1600	1.1698	1.1959	1.2019	.0060	1.2500
1.250-16	UN	2A	.0015	1.2485	1.2391	--------	1.2079	1.2028	.0051	1.1718	2B	1.182	1.196	1.2094	1.2160	.0066	1.2500
		3A	.0000	1.2500	1.2406	--------	1.2094	1.2056	.0038	1.1733	3B	1.1820	1.1908	1.2094	1.2144	.0050	1.2500
1.250-18	UNEF	2A	.0015	1.2485	1.2398	--------	1.2124	1.2075	.0049	1.1803	2B	1.190	1.203	1.2139	1.2202	.0063	1.2500
		3A	.0000	1.2500	1.2413	--------	1.2139	1.2103	.0036	1.1818	3B	1.1990	1.1980	1.2139	1.2186	.0047	1.2500
1.250-20	UN	2A	.0014	1.2486	1.2405	--------	1.2161	1.2114	.0047	1.1873	2B	1.196	1.207	1.2175	1.2236	.0061	1.2500
		3A	.0000	1.2500	1.2419	--------	1.2175	1.2140	.0035	1.1887	3B	1.1960	1.2037	1.2175	1.2220	.0045	1.2500
1.250-28	UN	2A	.0012	1.2488	1.2423	--------	1.2256	1.2215	.0041	1.2050	2B	1.211	1.220	1.2268	1.2321	.0053	1.2500
		3A	.0000	1.2500	1.2435	--------	1.2268	1.2237	.0031	1.2062	3B	1.2110	1.2176	1.2268	1.2308	.0040	1.2500
1.3125-8	UN	2A	.0021	1.3104	1.2954	--------	1.2292	1.2221	.0071	1.1570	2B	1.177	1.202	1.2313	1.2405	.0092	1.3125
		3A	.0000	1.3125	1.2975	--------	1.2313	1.2260	.0053	1.1591	3B	1.1770	1.1922	1.2313	1.2382	.0069	1.3125
1.3125-12	UN	2A	.0017	1.3108	1.2994	--------	1.2567	1.2509	.0058	1.2086	2B	1.222	1.240	1.2584	1.2659	.0075	1.3125
		3A	.0000	1.3125	1.3011	--------	1.2584	1.2541	.0043	1.2103	3B	1.2220	1.2323	1.2584	1.2640	.0056	1.3125
1.3125-16	UN	2A	.0015	1.3110	1.3016	--------	1.2704	1.2653	.0051	1.2343	2B	1.245	1.259	1.2719	1.2785	.0066	1.3125
		3A	.0000	1.3125	1.3031	--------	1.2719	1.2681	.0038	1.2358	3B	1.2450	1.2533	1.2719	1.2769	.0050	1.3125
1.3125-18	UNEF	2A	.0015	1.3110	1.3023	--------	1.2749	1.2700	.0049	1.2428	2B	1.252	1.265	1.2764	1.2827	.0063	1.3125
		3A	.0000	1.3125	1.3038	--------	1.2764	1.2728	.0036	1.2443	3B	1.2520	1.2605	1.2764	1.2811	.0047	1.3125
1.3125-20	UN	2A	.0014	1.3111	1.3030	--------	1.2786	1.2739	.0047	1.2498	2B	1.258	1.270	1.2800	1.2861	.0061	1.3125
		3A	.0000	1.3125	1.3044	--------	1.2800	1.2765	.0035	1.2512	3B	1.2580	1.2662	1.2800	1.2845	.0045	1.3125
1.3125-28	UN	2A	.0012	1.3113	1.3048	--------	1.2881	1.2840	.0041	1.2675	2B	1.274	1.282	1.2893	1.2946	.0053	1.3125
		3A	.0000	1.3125	1.3060	--------	1.2893	1.2862	.0031	1.2687	3B	1.2740	1.2801	1.2893	1.2933	.0040	1.3125
1.375-6	UNC	1A	.0024	1.3726	1.3453	--------	1.2643	1.2523	.0120	1.1681	1B	1.195	1.225	1.2667	1.2822	.0155	1.3750
		2A	.0024	1.3726	1.3544	1.3453	1.2643	1.2563	.0080	1.1681	2B	1.195	1.225	1.2667	1.2771	.0104	1.3750
		3A	.0000	1.3750	1.3568	--------	1.2667	1.2607	.0060	1.1705	3B	1.1950	1.2146	1.2667	1.2745	.0078	1.3750
1.375-8	UN	2A	.0022	1.3728	1.3578	1.3503	1.2916	1.2844	.0072	1.2194	2B	1.240	1.265	1.2938	1.3031	.0093	1.3750
		3A	.0000	1.3750	1.3600	--------	1.2938	1.2884	.0054	1.2216	3B	1.2400	1.2547	1.2938	1.3008	.0070	1.3750
1.375-12	UNF	1A	.0019	1.3731	1.3559	--------	1.3190	1.3096	.0094	1.2709	1B	1.285	1.303	1.3209	1.3332	.0123	1.3750
		2A	.0019	1.3731	1.3617	--------	1.3190	1.3127	.0063	1.2709	2B	1.285	1.303	1.3209	1.3291	.0082	1.3750
		3A	.0000	1.3750	1.3636	--------	1.3209	1.3162	.0047	1.2728	3B	1.2850	1.2948	1.3209	1.3270	.0061	1.3750
1.375-16	UN	2A	.0015	1.3735	1.3641	--------	1.3329	1.3278	.0051	1.2968	2B	1.307	1.321	1.3344	1.3410	.0066	1.3750
		3A	.0000	1.3750	1.3656	--------	1.3344	1.3306	.0038	1.2983	3B	1.3070	1.3158	1.3344	1.3394	.0050	1.3750
1.375-18	UNEF	2A	.0015	1.3735	1.3648	--------	1.3374	1.3325	.0049	1.3053	2B	1.315	1.328	1.3389	1.3452	.0063	1.3750
		3A	.0000	1.3750	1.3663	--------	1.3389	1.3353	.0036	1.3068	3B	1.3150	1.3230	1.3389	1.3436	.0047	1.3750
1.375-20	UN	2A	.0014	1.3736	1.3655	--------	1.3411	1.3364	.0047	1.3123	2B	1.321	1.332	1.3425	1.3486	.0061	1.3750
		3A	.0000	1.3750	1.3669	--------	1.3425	1.3390	.0035	1.3137	3B	1.3210	1.3287	1.3425	1.3470	.0045	1.3750

See footnotes at end of table.

TABLE 2.21. *Standard series limits of size—Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External[a] Class	Allowance	Major diameter limits Max[b]	Major diameter limits Min	Major diameter limits Min[c]	Pitch diameter limits Max[b]	Pitch diameter limits Min	Pitch diameter limits Tolerance	Minor diameter[d]	Internal[a] Class	Minor diameter limits Min	Minor diameter limits Max	Pitch diameter limits Min	Pitch diameter limits Max	Pitch diameter limits Tolerance	Major diameter Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
1.375-28	UN	2A	0.0012	1.3738	1.3673	--------	1.3506	1.3465	0.0041	1.3300	2B	1.336	1.345	1.3518	1.3571	0.0053	1.3750
		3A	.0000	1.3750	1.3685	--------	1.3518	1.3487	.0031	1.3312	3B	1.3360	1.3426	1.3518	1.3558	.0040	1.3750
1.4375-6	UN	2A	.0024	1.4351	1.4169	--------	1.3268	1.3188	.0080	1.2306	2B	1.257	1.288	1.3292	1.3396	.0104	1.4375
		3A	.0000	1.4375	1.4193	--------	1.3292	1.3232	.0060	1.2330	3B	1.2570	1.2771	1.3292	1.3370	.0078	1.4375
1.4375-8	UN	2A	.0022	1.4353	1.4203	--------	1.3541	1.3469	.0072	1.2819	2B	1.302	1.327	1.3563	1.3657	.0094	1.4375
		3A	.0000	1.4375	1.4225	--------	1.3563	1.3509	.0054	1.2841	3B	1.3020	1.3172	1.3563	1.3634	.0071	1.4375
1.4375-12	UN	2A	.0018	1.4357	1.4243	--------	1.3816	1.3757	.0059	1.3335	2B	1.347	1.365	1.3834	1.3910	.0076	1.4375
		3A	.0000	1.4375	1.4261	--------	1.3834	1.3790	.0044	1.3353	3B	1.3470	1.3573	1.3834	1.3891	.0057	1.4375
1.4375-16	UN	2A	.0016	1.4359	1.4265	--------	1.3953	1.3901	.0052	1.3592	2B	1.370	1.384	1.3969	1.4037	.0068	1.4375
		3A	.0000	1.4375	1.4281	--------	1.3969	1.3930	.0039	1.3608	3B	1.3700	1.3783	1.3969	1.4020	.0051	1.4375
1.4375-18	UNEF	2A	.0015	1.4360	1.4273	--------	1.3999	1.3949	.0050	1.3678	2B	1.377	1.390	1.4014	1.4079	.0065	1.4375
		3A	.0000	1.4375	1.4288	--------	1.4014	1.3977	.0037	1.3693	3B	1.3770	1.3855	1.4014	1.4062	.0048	1.4375
1.4375-20	UN	2A	.0014	1.4361	1.4280	--------	1.4036	1.3988	.0048	1.3748	2B	1.383	1.395	1.4050	1.4112	.0062	1.4375
		3A	.0000	1.4375	1.4294	--------	1.4050	1.4014	.0036	1.3762	3B	1.3830	1.3912	1.4050	1.4096	.0046	1.4375
1.4375-28	UN	2A	.0013	1.4362	1.4297	--------	1.4130	1.4088	.0042	1.3924	2B	1.399	1.407	1.4143	1.4198	.0055	1.4375
		3A	.0000	1.4375	1.4310	--------	1.4143	1.4112	.0031	1.3937	3B	1.3990	1.4051	1.4143	1.4184	.0041	1.4375
1.500-6	UNC	1A	.0024	1.4976	1.4703		1.3893	1.3772	.0121	1.2931	1B	1.320	1.350	1.3917	1.4075	.0158	1.5000
		2A	.0024	1.4976	1.4794	1.4703	1.3893	1.3812	.0081	1.2931	2B	1.320	1.350	1.3917	1.4022	.0105	1.5000
		3A	.0000	1.5000	1.4818	--------	1.3917	1.3856	.0061	1.2955	3B	1.3200	1.3396	1.3917	1.3996	.0079	1.5000
1.500-8	UN	2A	.0022	1.4978	1.4828	1.4753	1.4166	1.4093	.0073	1.3444	2B	1.365	1.390	1.4188	1.4283	.0095	1.5000
		3A	.0000	1.5000	1.4850	--------	1.4188	1.4133	.0055	1.3466	3B	1.3650	1.3797	1.4188	1.4259	.0071	1.5000
1.500-12	UNF	1A	.0019	1.4981	1.4809	--------	1.4440	1.4344	.0096	1.3959	1B	1.410	1.428	1.4459	1.4584	.0125	1.5000
		2A	.0019	1.4981	1.4867	--------	1.4440	1.4376	.0064	1.3959	2B	1.410	1.428	1.4459	1.4542	.0083	1.5000
		3A	.0000	1.5000	1.4886	--------	1.4459	1.4411	.0048	1.3978	3B	1.4100	1.4198	1.4459	1.4522	.0063	1.5000
1.500-16	UN	2A	.0016	1.4984	1.4890	--------	1.4578	1.4526	.0052	1.4217	2B	1.432	1.446	1.4594	1.4662	.0068	1.5000
		3A	.0000	1.5000	1.4906	--------	1.4594	1.4555	.0039	1.4233	3B	1.4320	1.4408	1.4594	1.4645	.0051	1.5000
1.500-18	UNEF	2A	.0015	1.4985	1.4898	--------	1.4624	1.4574	.0050	1.4303	2B	1.440	1.452	1.4639	1.4704	.0065	1.5000
		3A	.0000	1.5000	1.4913	--------	1.4639	1.4602	.0037	1.4318	3B	1.4400	1.4480	1.4639	1.4687	.0048	1.5000
1.500-20	UN	2A	.0014	1.4986	1.4905	--------	1.4661	1.4613	.0048	1.4373	2B	1.446	1.457	1.4675	1.4737	.0062	1.5000
		3A	.0000	1.5000	1.4919	--------	1.4675	1.4639	.0036	1.4387	3B	1.4460	1.4537	1.4675	1.4721	.0046	1.5000
1.500-28	UN	2A	.0013	1.4987	1.4922	--------	1.4755	1.4713	.0042	1.4549	2B	1.461	1.470	1.4768	1.4823	.0055	1.5000
		3A	.0000	1.5000	1.4935	--------	1.4768	1.4737	.0031	1.4562	3B	1.4610	1.4676	1.4768	1.4809	.0041	1.5000
1.5625-6	UN	2A	.0024	1.5601	1.5419	--------	1.4518	1.4436	.0082	1.3556	2B	1.382	1.413	1.4542	1.4648	.0106	1.5625
		3A	.0000	1.5625	1.5443	--------	1.4542	1.4481	.0061	1.3580	3B	1.3820	1.4021	1.4542	1.4622	.0080	1.5625
1.5625-8	UN	2A	.0022	1.5603	1.5453	--------	1.4791	1.4717	.0074	1.4069	2B	1.427	1.452	1.4813	1.4909	.0096	1.5625
		3A	.0000	1.5625	1.5475	--------	1.4813	1.4758	.0055	1.4091	3B	1.4270	1.4422	1.4813	1.4885	.0072	1.5625
1.5625-12	UN	2A	.0018	1.5607	1.5493	--------	1.5066	1.5007	.0059	1.4585	2B	1.472	1.490	1.5084	1.5160	.0076	1.5625
		3A	.0000	1.5625	1.5511	--------	1.5084	1.5040	.0044	1.4603	3B	1.4720	1.4823	1.5084	1.5141	.0057	1.5625
1.5625-16	UN	2A	.0016	1.5609	1.5515	--------	1.5203	1.5151	.0052	1.4842	2B	1.495	1.509	1.5219	1.5287	.0068	1.5625
		3A	.0000	1.5625	1.5531	--------	1.5219	1.5180	.0039	1.4858	3B	1.4950	1.5033	1.5219	1.5270	.0051	1.5625
1.5625-18	UNEF	2A	.0015	1.5610	1.5523	--------	1.5249	1.5199	.0050	1.4928	2B	1.502	1.515	1.5264	1.5329	.0065	1.5625
		3A	.0000	1.5625	1.5538	--------	1.5264	1.5227	.0037	1.4943	3B	1.5020	1.5105	1.5264	1.5312	.0048	1.5625
1.5625-20	UN	2A	.0014	1.5611	1.5530	--------	1.5286	1.5238	.0048	1.4998	2B	1.508	1.520	1.5300	1.5362	.0062	1.5625
		3A	.0000	1.5625	1.5544	--------	1.5300	1.5264	.0036	1.5012	3B	1.5080	1.5162	1.5300	1.5346	.0046	1.5625
1.625-6	UN	2A	.0025	1.6225	1.6043	--------	1.5142	1.5060	.0082	1.4180	2B	1.445	1.475	1.5167	1.5274	.0107	1.6250
		3A	.0000	1.6250	1.6068	--------	1.5167	1.5105	.0062	1.4205	3B	1.4450	1.4646	1.5167	1.5247	.0080	1.6250
1.625-8	UN	2A	.0022	1.6228	1.6078	1.6003	1.5416	1.5342	.0074	1.4694	2B	1.490	1.515	1.5438	1.5535	.0097	1.6250
		3A	.0000	1.6250	1.6100	--------	1.5438	1.5382	.0056	1.4716	3B	1.4900	1.5047	1.5438	1.5510	.0072	1.6250
1.625-12	UN	2A	.0018	1.6232	1.6118	--------	1.5691	1.5632	.0059	1.5210	2B	1.535	1.553	1.5709	1.5785	.0076	1.6250
		3A	.0000	1.6250	1.6136	--------	1.5709	1.5665	.0044	1.5228	3B	1.5350	1.5448	1.5709	1.5766	.0057	1.6250
1.625-16	UN	2A	.0016	1.6234	1.6140	--------	1.5828	1.5776	.0052	1.5467	2B	1.557	1.571	1.5844	1.5912	.0068	1.6250
		3A	.0000	1.6250	1.6156	--------	1.5844	1.5805	.0039	1.5483	3B	1.5570	1.5658	1.5844	1.5895	.0051	1.6250
1.625-18	UNEF	2A	.0015	1.6235	1.6148	--------	1.5874	1.5824	.0050	1.5553	2B	1.565	1.578	1.5889	1.5954	.0065	1.6250
		3A	.0000	1.6250	1.6163	--------	1.5889	1.5852	.0037	1.5568	3B	1.5650	1.5730	1.5889	1.5937	.0048	1.6250
1.625-20	UN	2A	.0014	1.6236	1.6155	--------	1.5911	1.5863	.0048	1.5623	2B	1.571	1.582	1.5925	1.5987	.0062	1.6250
		3A	.0000	1.6250	1.6169	--------	1.5925	1.5889	.0036	1.5637	3B	1.5710	1.5787	1.5925	1.5971	.0046	1.6250

See footnotes at end of table.

TABLE 2.21. *Standard series limits of size—Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External[a] Class	Allowance	Major diameter limits Max[b]	Major diameter limits Min	Major diameter limits Min[c]	Pitch diameter limits Max[b]	Pitch diameter limits Min	Pitch diameter limits Tolerance	Minor diameter[d]	Internal[a] Class	Minor diameter limits Min	Minor diameter limits Max	Pitch diameter limits Min	Pitch diameter limits Max	Pitch diameter limits Tolerance	Major diameter Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
1.6875–6	UN	2A	.0025	1.6850	1.6668	--------	1.5767	1.5684	0.0083	1.4805	2B	1.507	1.538	1.5792	1.5900	0.0108	1.6875
		3A	.0000	1.6875	1.6693	--------	1.5792	1.5730	.0062	1.4830	3B	1.5070	1.5271	1.5792	1.5873	.0081	1.6875
1.6875–8	UN	2A	.0022	1.6853	1.6703	--------	1.6041	1.5966	.0075	1.5319	2B	1.552	1.577	1.6063	1.6160	.0097	1.6875
		3A	.0000	1.6875	1.6725	--------	1.6063	1.6007	.0056	1.5341	3B	1.5520	1.5672	1.6063	1.6136	.0073	1.6875
1.6875–12	UN	2A	.0018	1.6857	1.6743	--------	1.6316	1.6256	.0060	1.5835	2B	1.597	1.615	1.6334	1.6412	.0078	1.6875
		3A	.0000	1.6875	1.6761	--------	1.6334	1.6289	.0045	1.5853	3B	1.5970	1.6073	1.6334	1.6392	.0058	1.6875
1.6875–16	UN	2A	.0016	1.6859	1.6765	--------	1.6453	1.6400	.0053	1.6092	2B	1.620	1.634	1.6469	1.6538	.0069	1.6875
		3A	.0000	1.6875	1.6781	--------	1.6469	1.6429	.0040	1.6108	3B	1.6200	1.6283	1.6469	1.6521	.0052	1.6875
1.6875–18	UNEF	2A	.0015	1.6860	1.6773	--------	1.6499	1.6448	.0051	1.6178	2B	1.627	1.640	1.6514	1.6580	.0066	1.6875
		3A	.0000	1.6875	1.6788	--------	1.6514	1.6476	.0038	1.6193	3B	1.6270	1.6355	1.6514	1.6563	.0049	1.6875
1.6875–20	UN	2A	.0015	1.6860	1.6779	--------	1.6535	1.6487	.0048	1.6247	2B	1.633	1.645	1.6550	1.6613	.0063	1.6875
		3A	.0000	1.6875	1.6794	--------	1.6550	1.6514	.0036	1.6262	3B	1.6330	1.6412	1.6550	1.6597	.0047	1.6875
1.750–5		1A	.0027	1.7473	1.7165	--------	1.6174	1.6040	.0134	1.5019	1B	1.534	1.568	1.6201	1.6375	.0174	1.7500
	UNC	2A	.0027	1.7473	1.7268	1.7165	1.6174	1.6085	.0089	1.5019	2B	1.534	1.568	1.6201	1.6317	.0116	1.7500
		3A	.0000	1.7500	1.7295	--------	1.6201	1.6134	.0067	1.5046	3B	1.5340	1.5575	1.6201	1.6288	.0087	1.7500
1.750–6	UN	2A	.0025	1.7475	1.7293	--------	1.6392	1.6309	.0083	1.5430	2B	1.570	1.600	1.6417	1.6525	.0108	1.7500
		3A	.0000	1.7500	1.7318	--------	1.6417	1.6354	.0063	1.5455	3B	1.5700	1.5896	1.6417	1.6498	.0081	1.7500
1.750–8	UN	2A	.0023	1.7477	1.7327	1.7252	1.6665	1.6590	.0075	1.5943	2B	1.615	1.640	1.6688	1.6786	.0098	1.7500
		3A	.0000	1.7500	1.7350	--------	1.6688	1.6631	.0057	1.5966	3B	1.6150	1.6297	1.6688	1.6762	.0074	1.7500
1.750–12	UN	2A	.0018	1.7482	1.7368	--------	1.6941	1.6881	.0060	1.6460	2B	1.660	1.678	1.6959	1.7037	.0078	1.7500
		3A	.0000	1.7500	1.7386	--------	1.6959	1.6914	.0045	1.6478	3B	1.6600	1.6698	1.6959	1.7017	.0058	1.7500
1.750–16	UN	2A	.0016	1.7484	1.7390	--------	1.7078	1.7025	.0053	1.6717	2B	1.682	1.696	1.7094	1.7163	.0069	1.7500
		3A	.0000	1.7500	1.7406	--------	1.7094	1.7054	.0040	1.6733	3B	1.6820	1.6908	1.7094	1.7146	.0052	1.7500
1.750–20	UN	2A	.0015	1.7485	1.7404	--------	1.7160	1.7112	.0048	1.6872	2B	1.696	1.707	1.7175	1.7238	.0063	1.7500
		3A	.0000	1.7500	1.7419	--------	1.7175	1.7139	.0036	1.6887	3B	1.6960	1.7037	1.7175	1.7222	.0047	1.7500
1.8125–6	UN	2A	.0025	1.8100	1.7918	--------	1.7017	1.6933	.0084	1.6055	2B	1.632	1.663	1.7042	1.7151	.0109	1.8125
		3A	.0000	1.8125	1.7943	--------	1.7042	1.6979	.0063	1.6080	3B	1.6320	1.6521	1.7042	1.7124	.0082	1.8125
1.8125–8	UN	2A	.0023	1.8102	1.7952	--------	1.7290	1.7214	.0076	1.6568	2B	1.677	1.702	1.7313	1.7412	.0099	1.8125
		3A	.0000	1.8125	1.7975	--------	1.7313	1.7256	.0057	1.6591	3B	1.6770	1.6922	1.7313	1.7387	.0074	1.8125
1.8125–12	UN	2A	.0018	1.8107	1.7993	--------	1.7566	1.7506	.0060	1.7085	2B	1.722	1.740	1.7584	1.7662	.0078	1.8125
		3A	.0000	1.8125	1.8011	--------	1.7584	1.7539	.0045	1.7103	3B	1.7220	1.7323	1.7584	1.7642	.0058	1.8125
1.8125–16	UN	2A	.0016	1.8109	1.8015	--------	1.7703	1.7650	.0053	1.7342	2B	1.745	1.759	1.7719	1.7788	.0069	1.8125
		3A	.0000	1.8125	1.8031	--------	1.7719	1.7679	.0040	1.7358	3B	1.7450	1.7533	1.7719	1.7771	.0052	1.8125
1.8125–20	UN	2A	.0015	1.8110	1.8029	--------	1.7785	1.7737	.0048	1.7497	2B	1.758	1.770	1.7800	1.7863	.0063	1.8125
		3A	.0000	1.8125	1.8044	--------	1.7800	1.7764	.0036	1.7512	3B	1.7580	1.7662	1.7800	1.7847	.0047	1.8125
1.875–6	UN	2A	.0025	1.8725	1.8543	--------	1.7642	1.7558	.0084	1.6680	2B	1.695	1.725	1.7667	1.7777	.0110	1.8750
		3A	.0000	1.8750	1.8568	--------	1.7667	1.7604	.0063	1.6705	3B	1.6950	1.7146	1.7667	1.7749	.0082	1.8750
1.875–8	UN	2A	.0023	1.8727	1.8577	1.8502	1.7915	1.7838	.0077	1.7193	2B	1.740	1.765	1.7938	1.8038	.0100	1.8750
		3A	.0000	1.8750	1.8600	--------	1.7938	1.7881	.0057	1.7216	3B	1.7400	1.7547	1.7938	1.8013	.0075	1.8750
1.875–12	UN	2A	.0018	1.8732	1.8618	--------	1.8191	1.8131	.0060	1.7710	2B	1.785	1.803	1.8209	1.8287	.0078	1.8750
		3A	.0000	1.8750	1.8636	--------	1.8209	1.8164	.0045	1.7728	3B	1.7850	1.7948	1.8209	1.8267	.0058	1.8750
1.875–16	UN	2A	.0016	1.8734	1.8640	--------	1.8328	1.8275	.0053	1.7967	2B	1.807	1.821	1.8344	1.8413	.0069	1.8750
		3A	.0000	1.8750	1.8656	--------	1.8344	1.8304	.0040	1.7983	3B	1.8070	1.8158	1.8344	1.8396	.0052	1.8750
1.875–20	UN	2A	.0015	1.8735	1.8654	--------	1.8410	1.8362	.0048	1.8122	2B	1.821	1.832	1.8425	1.8488	.0063	1.8750
		3A	.0000	1.8750	1.8669	--------	1.8425	1.8389	.0036	1.8137	3B	1.8210	1.8287	1.8425	1.8472	.0047	1.8750
1.9375–6	UN	2A	.0026	1.9349	1.9167	--------	1.8266	1.8181	.0085	1.7304	2B	1.757	1.788	1.8292	1.8403	.0111	1.9375
		3A	.0000	1.9375	1.9193	--------	1.8292	1.8228	.0064	1.7330	3B	1.7570	1.7771	1.8292	1.8375	.0083	1.9375
1.9375–8	UN	2A	.0023	1.9352	1.9202	--------	1.8540	1.8463	.0077	1.7818	2B	1.802	1.827	1.8563	1.8663	.0100	1.9375
		3A	.0000	1.9375	1.9225	--------	1.8563	1.8505	.0058	1.7841	3B	1.8020	1.8172	1.8563	1.8638	.0075	1.9375
1.9375–12	UN	2A	.0018	1.9357	1.9243	--------	1.8816	1.8755	.0061	1.8335	2B	1.847	1.865	1.8834	1.8913	.0079	1.9375
		3A	.0000	1.9375	1.9261	--------	1.8834	1.8789	.0045	1.8353	3B	1.8470	1.8573	1.8834	1.8893	.0059	1.9375
1.9375–16	UN	2A	.0016	1.9359	1.9265	--------	1.8953	1.8899	.0054	1.8592	2B	1.870	1.884	1.8969	1.9039	.0070	1.9375
		3A	.0000	1.9375	1.9281	--------	1.8969	1.8929	.0040	1.8608	3B	1.8700	1.8783	1.8969	1.9021	.0052	1.9375
1.9375–20	UN	2A	.0015	1.9360	1.9279	--------	1.9035	1.8986	.0049	1.8747	2B	1.883	1.895	1.9050	1.9114	.0064	1.9375
		3A	.0000	1.9375	1.9294	--------	1.9050	1.9013	.0037	1.8762	3B	1.8830	1.8912	1.9050	1.9098	.0048	1.9375

See footnotes at end of table.

Nominal size and threads per inch	Series designation	External[a] Class	Allowance	Major diameter limits Max[b]	Min	Min[c]	Pitch diameter limits Max[b]	Min	Tolerance	Minor diameter[d]	Internal[a] Class	Minor diameter limits Min	Max	Pitch diameter limits Min	Max	Tolerance	Major diameter Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	in	in	in	in	in	in	in		in	in	in	in	in	in
2.000-4.5	UNC	1A	0.0029	1.9971	1.9641	--------	1.8528	1.8385	0.0143	1.7245	1B	1.759	1.795	1.8557	1.8743	0.0186	2.0000
		2A	.0029	1.9971	1.9751	1.9641	1.8528	1.8433	.0095	1.7245	2B	1.759	1.795	1.8557	1.8681	.0124	2.0000
		3A	.0000	2.0000	1.9780		1.8557	1.8486	.0071	1.7274	3B	1.7590	1.7861	1.8557	1.8650	.0093	2.0000
2.000-6	UN	2A	.0026	1.9974	1.9792	--------	1.8891	1.8805	.0086	1.7929	2B	1.820	1.850	1.8917	1.9028	.0111	2.0000
		3A	.0000	2.0000	1.9818	--------	1.8917	1.8853	.0064	1.7955	3B	1.8200	1.8396	1.8917	1.9000	.0083	2.0000
2.000-8	UN	2A	.0023	1.9977	1.9827	1.9752	1.9165	1.9087	.0078	1.8443	2B	1.865	1.890	1.9188	1.9289	.0101	2.0000
		3A	.0000	2.0000	1.9850	--------	1.9188	1.9130	.0058	1.8466	3B	1.8650	1.8797	1.9188	1.9264	.0076	2.0000
2.000-12	UN	2A	.0018	1.9982	1.9868	--------	1.9441	1.9380	.0061	1.8960	2B	1.910	1.928	1.9459	1.9538	.0079	2.0000
		3A	.0000	2.0000	1.9886	--------	1.9459	1.9414	.0045	1.8978	3B	1.9100	1.9198	1.9459	1.9518	.0059	2.0000
2.000-16	UN	2A	.0016	1.9984	1.9890	--------	1.9578	1.9524	.0054	1.9217	2B	1.932	1.946	1.9594	1.9664	.0070	2.0000
		3A	.0000	2.0000	1.9906	--------	1.9594	1.9554	.0040	1.9233	3B	1.9320	1.9408	1.9594	1.9646	.0052	2.0000
2.000-20	UN	2A	.0015	1.9985	1.9904	--------	1.9660	1.9611	.0049	1.9372	2B	1.946	1.957	1.9675	1.9739	.0064	2.0000
		3A	.0000	2.0000	1.9919	--------	1.9675	1.9638	.0037	1.9387	3B	1.9460	1.9537	1.9675	1.9723	.0048	2.0000
2.125-6	UN	2A	.0026	2.1224	2.1042	--------	2.0141	2.0054	.0087	1.9179	2B	1.945	1.975	2.0167	2.0280	.0113	2.1250
		3A	.0000	2.1250	2.1068	--------	2.0167	2.0102	.0065	1.9205	3B	1.9450	1.9646	2.0167	2.0251	.0084	2.1250
2.125-8	UN	2A	.0024	2.1226	2.1076	2.1001	2.0414	2.0335	.0079	1.9692	2B	1.990	2.015	2.0438	2.0540	.0102	2.1250
		3A	.0000	2.1250	2.1100	--------	2.0438	2.0379	.0059	1.9716	3B	1.9900	2.0047	2.0438	2.0515	.0077	2.1250
2.125-12	UN	2A	.0018	2.1232	2.1118	--------	2.0691	2.0630	.0061	2.0210	2B	2.035	2.053	2.0709	2.0788	.0079	2.1250
		3A	.0000	2.1250	2.1136	--------	2.0709	2.0664	.0045	2.0228	3B	2.0350	2.0448	2.0709	2.0768	.0059	2.1250
2.125-16	UN	2A	.0016	2.1234	2.1140	--------	2.0828	2.0774	.0054	2.0467	2B	2.057	2.071	2.0844	2.0914	.0070	2.1250
		3A	.0000	2.1250	2.1156	--------	2.0844	2.0804	.0040	2.0483	3B	2.0570	2.0658	2.0844	2.0896	.0052	2.1250
2.125-20	UN	2A	.0015	2.1235	2.1154	--------	2.0910	2.0861	.0049	2.0622	2B	2.071	2.082	2.0925	2.0989	.0064	2.1250
		3A	.0000	2.1250	2.1169	--------	2.0925	2.0888	.0037	2.0637	3B	2.0710	2.0787	2.0925	2.0973	.0048	2.1250
2.250-4.5	UNC	1A	.0029	2.2471	2.2141	--------	2.1028	2.0882	.0146	1.9745	1B	2.009	2.045	2.1057	2.1247	.0190	2.2500
		2A	.0029	2.2471	2.2251	2.2141	2.1028	2.0931	.0097	1.9745	2B	2.009	2.045	2.1057	2.1183	.0126	2.2500
		3A	.0000	2.2500	2.2280		2.1057	2.0984	.0073	1.9774	3B	2.0090	2.0361	2.1057	2.1152	.0095	2.2500
2.250-6	UN	2A	.0026	2.2474	2.2292	--------	2.1391	2.1303	.0088	2.0429	2B	2.070	2.100	2.1417	2.1531	.0114	2.2500
		3A	.0000	2.2500	2.2318	--------	2.1417	2.1351	.0066	2.0455	3B	2.0700	2.0896	2.1417	2.1502	.0085	2.2500
2.250-8	UN	2A	.0024	2.2476	2.2326	2.2251	2.1664	2.1584	.0080	2.0942	2B	2.115	2.140	2.1688	2.1792	.0104	2.2500
		3A	.0000	2.2500	2.2350	--------	2.1688	2.1628	.0060	2.0966	3B	2.1150	2.1297	2.1688	2.1766	.0078	2.2500
2.250-12	UN	2A	.0018	2.2482	2.2368	--------	2.1941	2.1880	.0061	2.1460	2B	2.160	2.178	2.1959	2.2038	.0079	2.2500
		3A	.0000	2.2500	2.2386	--------	2.1959	2.1914	.0045	2.1478	3B	2.1600	2.1698	2.1959	2.2018	.0059	2.2500
2.250-16	UN	2A	.0016	2.2484	2.2390	--------	2.2078	2.2024	.0054	2.1717	2B	2.182	2.196	2.2094	2.2164	.0070	2.2500
		3A	.0000	2.2500	2.2406	--------	2.2094	2.2054	.0040	2.1733	3B	2.1820	2.1908	2.2094	2.2146	.0052	2.2500
2.250-20	UN	2A	.0015	2.2485	2.2404	--------	2.2160	2.2111	.0049	2.1872	2B	2.196	2.207	2.2175	2.2239	.0064	2.2500
		3A	.0000	2.2500	2.2419	--------	2.2175	2.2138	.0037	2.1887	3B	2.1960	2.2037	2.2175	2.2223	.0048	2.2500
2.375-6	UN	2A	.0027	2.3723	2.3541	--------	2.2640	2.2551	.0089	2.1678	2B	2.195	2.226	2.2667	2.2782	.0115	2.3750
		3A	.0000	2.3750	2.3568	--------	2.2667	2.2601	.0066	2.1705	3B	2.1950	2.2146	2.2667	2.2753	.0086	2.3750
2.375-8	UN	2A	.0024	2.3726	2.3576	--------	2.2914	2.2833	.0081	2.2192	2B	2.240	2.265	2.2938	2.3043	.0105	2.3750
		3A	.0000	2.3750	2.3600	--------	2.2938	2.2878	.0060	2.2216	3B	2.2400	2.2547	2.2938	2.3017	.0079	2.3750
2.375-12	UN	2A	.0019	2.3731	2.3617	--------	2.3190	2.3128	.0062	2.2709	2B	2.285	2.303	2.3209	2.3290	.0081	2.3750
		3A	.0000	2.3750	2.3636	--------	2.3209	2.3163	.0046	2.2728	3B	2.2850	2.2948	2.3209	2.3269	.0060	2.3750
2.375-16	UN	2A	.0017	2.3733	2.3639	--------	2.3327	2.3272	.0055	2.2966	2B	2.307	2.321	2.3344	2.3416	.0072	2.3750
		3A	.0000	2.3750	2.3656	--------	2.3344	2.3303	.0041	2.2983	3B	2.3070	2.3158	2.3344	2.3398	.0054	2.3750
2.375-20	UN	2A	.0015	2.3735	2.3654	--------	2.3410	2.3359	.0051	2.3122	2B	2.321	2.332	2.3425	2.3491	.0066	2.3750
		3A	.0000	2.3750	2.3669	--------	2.3425	2.3387	.0038	2.3137	3B	2.3210	2.3287	2.3425	2.3475	.0050	2.3750
2.500-4	UNC	1A	.0031	2.4969	2.4612	--------	2.3345	2.3190	.0155	2.1902	1B	2.229	2.267	2.3376	2.3578	.0202	2.5000
		2A	.0031	2.4969	2.4731	2.4612	2.3345	2.3241	.0104	2.1902	2B	2.229	2.267	2.3376	2.3511	.0135	2.5000
		3A	.0000	2.5000	2.4762	--------	2.3376	2.3298	.0078	2.1933	3B	2.2290	2.2594	2.3376	2.3477	.0101	2.5000
2.500-6	UN	2A	.0027	2.4973	2.4791	--------	2.3890	2.3800	.0090	2.2928	2B	2.320	2.350	2.3917	2.4033	.0116	2.5000
		3A	.0000	2.5000	2.4818	--------	2.3917	2.3850	.0067	2.2955	3B	2.3200	2.3396	2.3917	2.4004	.0087	2.5000
2.500-8	UN	2A	.0024	2.4976	2.4826	2.4751	2.4164	2.4082	.0082	2.3442	2B	2.365	2.390	2.4188	2.4294	.0106	2.5000
		3A	.0000	2.5000	2.4850	--------	2.4188	2.4127	.0061	2.3466	3B	2.3650	2.3797	2.4188	2.4268	.0080	2.5000
2.500-12	UN	2A	.0019	2.4981	2.4867	--------	2.4440	2.4378	.0062	2.3959	2B	2.410	2.428	2.4459	2.4540	.0081	2.5000
		3A	.0000	2.5000	2.4886	--------	2.4459	2.4413	.0046	2.3978	3B	2.4100	2.4198	2.4459	2.4519	.0060	2.5000
2.500-16	UN	2A	.0017	2.4983	2.4889	--------	2.4577	2.4522	.0055	2.4216	2B	2.432	2.446	2.4594	2.4666	.0072	2.5000
		3A	.0000	2.5000	2.4906	--------	2.4594	2.4553	.0041	2.4233	3B	2.4320	2.4408	2.4594	2.4648	.0054	2.5000

See footnotes at end of table.

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
2.500-20	UN	2A	0.0015	2.4985	2.4904		2.4660	2.4609	0.0051	2.4372	2B	2.446	2.457	2.4675	2.4741	0.0066	2.5000
		3A	.0000	2.5000	2.4919		2.4675	2.4637	.0038	2.4387	3B	2.4460	2.4537	2.4675	2.4725	.0050	2.5000
2.625-6	UN	2A	.0027	2.6223	2.6041		2.5140	2.5050	.0090	2.4178	2B	2.445	2.475	2.5167	2.5285	.0118	2.6250
		3A	.0000	2.6250	2.6068		2.5167	2.5099	.0068	2.4205	3B	2.4450	2.4616	2.5167	2.5255	.0088	2.6250
2.625-8	UN	2A	.0025	2.6225	2.6075		2.5413	2.5331	.0082	2.4691	2B	2.490	2.515	2.5438	2.5545	.0107	2.6250
		3A	.0000	2.6250	2.6100		2.5438	2.5376	.0062	2.4716	3B	2.4900	2.5047	2.5438	2.5518	.0080	2.6250
2.625-12	UN	2A	.0019	2.6231	2.6117		2.5690	2.5628	.0062	2.5209	2B	2.535	2.553	2.5709	2.5790	.0081	2.6250
		3A	.0000	2.6250	2.6136		2.5709	2.5663	.0046	2.5228	3B	2.5350	2.5448	2.5709	2.5769	.0060	2.6250
2.625-16	UN	2A	.0017	2.6233	2.6139		2.5827	2.5772	.0055	2.5466	2B	2.557	2.571	2.5844	2.5916	.0072	2.6250
		3A	.0000	2.6250	2.6156		2.5844	2.5803	.0041	2.5483	3B	2.5570	2.5658	2.5844	2.5898	.0054	2.6250
2.625-20	UN	2A	.0015	2.6235	2.6154		2.5910	2.5859	.0051	2.5622	2B	2.571	2.582	2.5925	2.5991	.0066	2.6250
		3A	.0000	2.6250	2.6169		2.5925	2.5887	.0038	2.5637	3B	2.5710	2.5787	2.5925	2.5975	.0050	2.6250
2.750-4	UNC	1A	.0032	2.7468	2.7111		2.5844	2.5686	.0158	2.4401	1B	2.479	2.517	2.5876	2.6082	.0206	2.7500
		2A	.0032	2.7468	2.7230	2.7111	2.5844	2.5739	.0105	2.4401	2B	2.479	2.517	2.5876	2.6013	.0137	2.7500
		3A	.0000	2.7500	2.7262		2.5876	2.5797	.0079	2.4433	3B	2.4790	2.5094	2.5876	2.5979	.0103	2.7500
2.750-6	UN	2A	.0027	2.7473	2.7291		2.6390	2.6299	.0091	2.5428	2B	2.570	2.600	2.6417	2.6536	.0119	2.7500
		3A	.0000	2.7500	2.7318		2.6417	2.6349	.0068	2.5455	3B	2.5700	2.5896	2.6417	2.6506	.0089	2.7500
2.750-8	UN	2A	.0025	2.7475	2.7325	2.7250	2.6663	2.6580	.0083	2.5941	2B	2.615	2.640	2.6688	2.6796	.0108	2.7500
		3A	.0000	2.7500	2.7350		2.6688	2.6625	.0063	2.5966	3B	2.6150	2.6297	2.6688	2.6769	.0081	2.7500
2.750-12	UN	2A	.0019	2.7481	2.7367		2.6940	2.6878	.0062	2.6459	2B	2.660	2.678	2.6959	2.7040	.0081	2.7500
		3A	.0000	2.7500	2.7386		2.6959	2.6913	.0046	2.6478	3B	2.6600	2.6698	2.6959	2.7019	.0060	2.7500
2.750-16	UN	2A	.0017	2.7483	2.7389		2.7077	2.7022	.0055	2.6716	2B	2.682	2.696	2.7094	2.7166	.0072	2.7500
		3A	.0000	2.7500	2.7406		2.7094	2.7053	.0041	2.6733	3B	2.6820	2.6908	2.7094	2.7148	.0054	2.7500
2.750-20	UN	2A	.0015	2.7485	2.7404		2.7160	2.7109	.0051	2.6872	2B	2.696	2.707	2.7175	2.7241	.0066	2.7500
		3A	.0000	2.7500	2.7419		2.7175	2.7137	.0038	2.6887	3B	2.6960	2.7037	2.7175	2.7225	.0050	2.7500
2.875-6	UN	2A	.0028	2.8722	2.8540		2.7639	2.7547	.0092	2.6677	2B	2.695	2.725	2.7667	2.7787	.0120	2.8750
		3A	.0000	2.8750	2.8568		2.7667	2.7598	.0069	2.6705	3B	2.6950	2.7146	2.7667	2.7757	.0090	2.8750
2.875-8	UN	2A	.0025	2.8725	2.8575		2.7913	2.7829	.0084	2.7191	2B	2.740	2.765	2.7938	2.8048	.0110	2.8750
		3A	.0000	2.8750	2.8600		2.7938	2.7875	.0063	2.7216	3B	2.7400	2.7547	2.7938	2.8020	.0082	2.8750
2.875-12	UN	2A	.0019	2.8731	2.8617		2.8190	2.8127	.0063	2.7709	2B	2.785	2.803	2.8209	2.8291	.0082	2.8750
		3A	.0000	2.8750	2.8636		2.8209	2.8162	.0047	2.7728	3B	2.7850	2.7948	2.8209	2.8271	.0062	2.8750
2.875-16	UN	2A	.0017	2.8733	2.8639		2.8327	2.8271	.0056	2.7966	2B	2.807	2.821	2.8344	2.8417	.0073	2.8750
		3A	.0000	2.8750	2.8656		2.8344	2.8302	.0042	2.7983	3B	2.8070	2.8158	2.8344	2.8399	.0055	2.8750
2.875-20	UN	2A	.0016	2.8734	2.8653		2.8409	2.8357	.0052	2.8121	2B	2.821	2.832	2.8425	2.8493	.0068	2.8750
		3A	.0000	2.8750	2.8669		2.8425	2.8386	.0039	2.8137	3B	2.8210	2.8287	2.8425	2.8476	.0051	2.8750
3.000-4	UNC	1A	.0032	2.9968	2.9611		2.8344	2.8183	.0161	2.6901	1B	2.729	2.767	2.8376	2.8585	.0209	3.0000
		2A	.0032	2.9968	2.9730	2.9611	2.8344	2.8237	.0107	2.6901	2B	2.729	2.767	2.8376	2.8515	.0139	3.0000
		3A	.0000	3.0000	2.9762		2.8376	2.8296	.0080	2.6953	3B	2.7290	2.7594	2.8376	2.8480	.0104	3.0000
3.000-6	UN	2A	.0028	2.9972	2.9790		2.8889	2.8796	.0093	2.7927	2B	2.820	2.850	2.8917	2.9038	.0121	3.0000
		3A	.0000	3.0000	2.9818		2.8917	2.8847	.0070	2.7955	3B	2.8200	2.8396	2.8917	2.9008	.0091	3.0000
3.000-8	UN	2A	.0026	2.9974	2.9824	2.9749	2.9162	2.9077	.0085	2.8440	2B	2.865	2.890	2.9188	2.9299	.0111	3.0000
		3A	.0000	3.0000	2.9850		2.9188	2.9124	.0064	2.8466	3B	2.8650	2.8797	2.9188	2.9271	.0083	3.0000
3.000-12	UN	2A	.0019	2.9981	2.9867		2.9440	2.9377	.0063	2.8959	2B	2.910	2.928	2.9459	2.9541	.0082	3.0000
		3A	.0000	3.0000	2.9886		2.9459	2.9412	.0047	2.8978	3B	2.9100	2.9198	2.9459	2.9521	.0062	3.0000
3.000-16	UN	2A	.0017	2.9983	2.9889		2.9577	2.9521	.0056	2.9216	2B	2.932	2.946	2.9594	2.9667	.0073	3.0000
		3A	.0000	3.0000	2.9906		2.9594	2.9552	.0042	2.9233	3B	2.9320	2.9408	2.9594	2.9649	.0055	3.0000
3.000-20	UN	2A	.0016	2.9984	2.9903		2.9659	2.9607	.0052	2.9371	2B	2.946	2.957	2.9675	2.9743	.0068	3.0000
		3A	.0000	3.0000	2.9919		2.9675	2.9636	.0039	2.9387	3B	2.9460	2.9537	2.9675	2.9726	.0051	3.0000
3.125-6	UN	2A	.0028	3.1222	3.1040		3.0139	3.0045	.0094	2.9177	2B	2.945	2.975	3.0167	3.0289	.0122	3.1250
		3A	.0000	3.1250	3.1068		3.0167	3.0097	.0070	2.9205	3B	2.9450	2.9646	3.0167	3.0259	.0092	3.1250
3.125-8	UN	2A	.0026	3.1224	3.1074		3.0412	3.0326	.0086	2.9690	2B	2.990	3.015	3.0438	3.0550	.0112	3.1250
		3A	.0000	3.1250	3.1100		3.0438	3.0374	.0064	2.9716	3B	2.9900	3.0047	3.0438	3.0522	.0084	3.1250
3.125-12	UN	2A	.0019	3.1231	3.1117		3.0690	3.0627	.0063	3.0209	2B	3.035	3.053	3.0709	3.0791	.0082	3.1250
		3A	.0000	3.1250	3.1136		3.0709	3.0662	.0047	3.0228	3B	3.0350	3.0448	3.0709	3.0771	.0062	3.1250
3.125-16	UN	2A	.0017	3.1233	3.1139		3.0827	3.0771	.0056	3.0466	2B	3.057	3.071	3.0844	3.0917	.0073	3.1250
		3A	.0000	3.1250	3.1156		3.0844	3.0802	.0042	3.0483	3B	3.0570	3.0658	3.0844	3.0899	.0055	3.1250

See footnotes at end of table.

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
3.250-4	UNC	1A	0.0033	3.2467	3.2110	--------	3.0843	3.0680	0.0163	2.9400	1B	2.979	3.017	3.0876	3.1088	0.0212	3.2500
		2A	.0033	3.2467	3.2229	3.2110	3.0843	3.0734	.0109	2.9400	2B	2.979	3.017	3.0876	3.1017	.0141	3.2500
		3A	.0000	3.2500	3.2262	--------	3.0876	3.0794	.0082	2.9433	3B	2.9790	3.0094	3.0876	3.0982	.0106	3.2500
3.250-6	UN	2A	.0028	3.2472	3.2290	--------	3.1389	3.1294	.0095	3.0427	2B	3.070	3.100	3.1417	3.1540	.0123	3.2500
		3A	.0000	3.2500	3.2318	--------	3.1417	3.1346	.0071	3.0455	3B	3.0700	3.0896	3.1417	3.1509	.0092	3.2500
3.250-8	UN	2A	.0026	3.2474	3.2324	3.2249	3.1662	3.1575	.0087	3.0940	2B	3.115	3.140	3.1688	3.1801	.0113	3.2500
		3A	.0000	3.2500	3.2350	--------	3.1688	3.1623	.0065	3.0966	3B	3.1150	3.1297	3.1688	3.1773	.0085	3.2500
3.250-12	UN	2A	.0019	3.2481	3.2367	--------	3.1940	3.1877	.0063	3.1459	2B	3.160	3.178	3.1959	3.2041	.0082	3.2500
		3A	.0000	3.2500	3.2386	--------	3.1959	3.1912	.0047	3.1478	3B	3.1600	3.1698	3.1959	3.2021	.0062	3.2500
3.250-16	UN	2A	.0017	3.2483	3.2389	--------	3.2077	3.2021	.0056	3.1716	2B	3.182	3.196	3.2094	3.2167	.0073	3.2500
		3A	.0000	3.2500	3.2406	--------	3.2094	3.2052	.0042	3.1733	3B	3.1820	3.1908	3.2094	3.2149	.0055	3.2500
3.375-6	UN	2A	.0029	3.3721	3.3539	--------	3.2638	3.2543	.0095	3.1676	2B	3.195	3.225	3.2667	3.2791	.0124	3.3750
		3A	.0000	3.3750	3.3568	--------	3.2667	3.2595	.0072	3.1705	3B	3.1950	3.2146	3.2667	3.2760	.0093	3.3750
3.375-8	UN	2A	.0026	3.3724	3.3574	--------	3.2912	3.2824	.0088	3.2190	2B	3.240	3.265	3.2938	3.3052	.0114	3.3750
		3A	.0000	3.3750	3.3600	--------	3.2938	3.2872	.0066	3.2216	3B	3.2400	3.2547	3.2938	3.3023	.0085	3.3750
3.375-12	UN	2A	.0019	3.3731	3.3617	--------	3.3190	3.3126	.0064	3.2709	2B	3.285	3.303	3.3209	3.3293	.0084	3.3750
		3A	.0000	3.3750	3.3636	--------	3.3209	3.3161	.0048	3.2728	3B	3.2850	3.2948	3.3209	3.3272	.0063	3.3750
3.375-16	UN	2A	.0017	3.3733	3.3639	--------	3.3327	3.3269	.0058	3.2966	2B	3.307	3.321	3.3344	3.3419	.0075	3.3750
		3A	.0000	3.3750	3.3656	--------	3.3344	3.3301	.0043	3.2983	3B	3.3070	3.3158	3.3344	3.3400	.0056	3.3750
3.500-4	UNC	1A	.0033	3.4967	3.4610	--------	3.3343	3.3177	.0166	3.1900	1B	3.229	3.267	3.3376	3.3591	.0215	3.5000
		2A	.0033	3.4967	3.4729	3.4610	3.3343	3.3233	.0110	3.1900	2B	3.229	3.267	3.3376	3.3519	.0143	3.5000
		3A	.0000	3.5000	3.4762	--------	3.3376	3.3293	.0083	3.1933	3B	3.2290	3.2594	3.3376	3.3484	.0108	3.5000
3.500-6	UN	2A	.0029	3.4971	3.4789	--------	3.3888	3.3792	.0096	3.2926	2B	3.320	3.350	3.3917	3.4042	.0125	3.5000
		3A	.0000	3.5000	3.4818	--------	3.3917	3.3845	.0072	3.2955	3B	3.3200	3.3396	3.3917	3.4011	.0094	3.5000
3.500-8	UN	2A	.0026	3.4974	3.4824	3.4749	3.4162	3.4074	.0088	3.3440	2B	3.365	3.390	3.4188	3.4303	.0115	3.5000
		3A	.0000	3.5000	3.4850	--------	3.4188	3.4122	.0066	3.3466	3B	3.3650	3.3797	3.4188	3.4274	.0086	3.5000
3.500-12	UN	2A	.0019	3.4981	3.4867	--------	3.4440	3.4376	.0064	3.3959	2B	3.410	3.428	3.4459	3.4543	.0084	3.5000
		3A	.0000	3.5000	3.4886	--------	3.4459	3.4411	.0048	3.3978	3B	3.4100	3.4198	3.4459	3.4522	.0063	3.5000
3.500-16	UN	2A	.0017	3.4983	3.4889	--------	3.4577	3.4519	.0058	3.4216	2B	3.432	3.446	3.4594	3.4669	.0075	3.5000
		3A	.0000	3.5000	3.4906	--------	3.4594	3.4551	.0043	3.4233	3B	3.4320	3.4408	3.4594	3.4650	.0056	3.5000
3.625-6	UN	2A	.0029	3.6221	3.6039	--------	3.5138	3.5041	.0097	3.4176	2B	3.445	3.475	3.5167	4.5293	.0126	3.6250
		3A	.0000	3.6250	3.6068	--------	3.5167	3.5094	.0073	3.4205	3B	3.4450	3.4646	3.5167	3.5262	.0095	3.6250
3.625-8	UN	2A	.0027	3.6223	3.6073	--------	3.5411	3.5322	.0089	3.4689	2B	3.490	3.515	3.5438	3.5554	.0116	3.6250
		3A	.0000	3.6250	3.6100	--------	3.5438	3.5371	.0067	3.4716	3B	3.4900	3.5047	3.5438	3.5525	.0087	3.6250
3.625-12	UN	2A	.0019	3.6231	3.6117	--------	3.5690	3.5626	.0064	3.5209	2B	3.535	3.553	3.5709	3.5793	.0084	3.6250
		3A	.0000	3.6250	3.6136	--------	3.5709	3.5661	.0048	3.5228	3B	3.5350	3.5448	3.5709	3.5772	.0063	3.6250
3.625-16	UN	2A	.0017	3.6233	3.6139	--------	3.5827	3.5769	.0058	3.5466	2B	3.557	3.571	3.5844	3.5919	.0075	3.6250
		3A	.0000	3.6250	3.6156	--------	3.5844	3.5801	.0043	3.5483	3B	3.5570	3.5658	3.5844	3.5900	.0056	3.6250
3.750-4	UNC	1A	.0034	3.7466	3.7109	--------	3.5842	3.5674	.0168	3.4399	1B	3.479	3.517	3.5876	3.6094	.0218	3.7500
		2A	.0034	3.7466	3.7228	3.7109	3.5842	3.5730	.0112	3.4399	2B	3.479	3.517	3.5876	3.6021	.0145	3.7500
		3A	.0000	3.7500	3.7262	--------	3.5876	3.5792	.0084	3.4433	3B	3.4790	3.5094	3.5876	3.5985	.0109	3.7500
3.750-6	UN	2A	.0029	3.7471	3.7289	--------	3.6388	3.6290	.0098	3.5426	2B	3.570	3.600	3.6417	3.6544	.0127	3.7500
		3A	.0000	3.7500	3.7318	--------	3.6417	3.6344	.0073	3.5455	3B	3.5700	3.5896	3.6417	3.6512	.0095	3.7500
3.750-8	UN	2A	.0027	3.7473	3.7323	3.7248	3.6661	3.6571	.0090	3.5939	2B	3.615	3.640	3.6688	3.6805	.0117	3.7500
		3A	.0000	3.7500	3.7350	--------	3.6688	3.6621	.0067	3.5966	3B	3.6150	3.6297	3.6688	3.6776	.0088	3.7500
3.750-12	UN	2A	.0019	3.7481	3.7367	--------	3.6940	3.6876	.0064	3.6459	2B	3.660	3.678	3.6959	3.7043	.0084	3.7500
		3A	.0000	3.7500	3.7386	--------	3.6959	3.6911	.0048	3.6478	3B	3.6600	3.6698	3.6959	3.7022	.0063	3.7500
3.750-16	UN	2A	.0017	3.7483	3.7389	--------	3.7077	3.7019	.0058	3.6716	2B	3.682	3.696	3.7094	3.7169	.0075	3.7500
		3A	.0000	3.7500	3.7406	--------	3.7094	3.7051	.0043	3.6733	3B	3.6820	3.6908	3.7094	3.7150	.0056	3.7500
3.875-6	UN	2A	.0030	3.8720	3.8538	--------	3.7637	3.7538	.0099	3.6675	2B	3.695	3.725	3.7667	3.7795	.0128	3.8750
		3A	.0000	3.8750	3.8568	--------	3.7667	3.7593	.0074	3.6705	3B	3.6950	3.7146	3.7667	3.7763	.0096	3.8750
3.875-8	UN	2A	.0027	3.8723	3.8573	--------	3.7911	3.7820	.0091	3.7189	2B	3.740	3.765	3.7938	3.8056	.0118	3.8750
		3A	.0000	3.8750	3.8600	--------	3.7938	3.7870	.0068	3.7216	3B	3.7400	3.7547	3.7938	3.8026	.0088	3.8750
3.875-12	UN	2A	.0020	3.8730	3.8616	--------	3.8189	3.8124	.0065	3.7708	2B	3.785	3.803	3.8209	3.8294	.0085	3.8750
		3A	.0000	3.8750	3.8636	--------	3.8209	3.8160	.0049	3.7728	3B	3.7850	3.7948	3.8209	3.8273	.0064	3.8750
3.875-16	UN	2A	.0018	3.8732	3.8638	--------	3.8326	3.8267	.0059	3.7965	2B	3.807	3.821	3.8344	3.8420	.0076	3.8750
		3A	.0000	3.8750	3.8656	--------	3.8344	3.8300	.0044	3.7983	3B	3.8070	3.8158	3.8344	3.8401	.0057	3.8750

See footnotes at end of table.

Nominal size and threads per inch	Series designation	External[a]									Internal[a]						
		Class	Allowance	Major diameter limits			Pitch diameter limits			Minor diameter[d]	Class	Minor diameter limits		Pitch diameter limits			Major diameter
				Max[b]	Min	Min[c]	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
4.000-4	UNC	1A	0.0034	3.9966	3.9609	....	3.8342	3.8172	0.0170	3.6899	1B	3.729	3.767	3.8376	3.8597	0.0221	4.0000
		2A	.0034	3.9966	3.9728	3.9609	3.8342	3.8229	.0113	3.6899	2B	3.729	3.767	3.8376	3.8523	.0147	4.0000
		3A	.0000	4.0000	3.9762	....	3.8376	3.8291	.0085	3.6933	3B	3.7290	3.7594	3.8376	3.8487	.0111	4.0000
4.000-6	UN	2A	.0030	3.9970	3.9788	....	3.8887	3.8788	.0099	3.7925	2B	3.820	3.850	3.8917	3.9046	.0129	4.0000
		3A	.0000	4.0000	3.9818	....	3.8917	3.8843	.0074	3.7955	3B	3.8200	3.8396	3.8917	3.9014	.0097	4.0000
4.000-8	UN	2A	.0027	3.9973	3.9823	3.9748	3.9161	3.9070	.0091	3.8439	2B	3.865	3.890	3.9188	3.9307	.0119	4.0000
		3A	.0000	4.0000	3.9850	....	3.9188	3.9120	.0068	3.8466	3B	3.8650	3.8798	3.9188	3.9277	.0089	4.0000
4.000-12	UN	2A	.0020	3.9980	3.9866	....	3.9439	3.9374	.0065	3.8958	2B	3.910	3.928	3.9459	3.9544	.0085	4.0000
		3A	.0000	4.0000	3.9886	....	3.9459	3.9410	.0049	3.8978	3B	3.9100	3.9198	3.9459	3.9523	.0064	4.0000
4.000-16	UN	2A	.0018	3.9982	3.9888	....	3.9576	3.9517	.0059	3.9215	2B	3.932	3.946	3.9594	3.9670	.0076	4.0000
		3A	.0000	4.0000	3.9906	....	3.9594	3.9550	.0044	3.9233	3B	3.9320	3.9408	3.9594	3.9651	.0057	4.0000
4.125-6	UN	2A	.0030	4.1220	4.1038	....	4.0137	4.0037	.0100	3.9175	2B	3.945	3.975	4.0167	4.0297	.0130	4.1250
		3A	.0000	4.1250	4.1068	....	4.0167	4.0092	.0075	3.9205	3B	3.9450	3.9646	4.0167	4.0264	.0097	4.1250
4.125-12	UN	2A	.0020	4.1230	4.1116	....	4.0689	4.0624	.0065	4.0208	2B	4.035	4.053	4.0709	4.0794	.0085	4.1250
		3A	.0000	4.1250	4.1136	....	4.0709	4.0660	.0049	4.0228	3B	4.0350	4.0448	4.0709	4.0773	.0064	4.1250
4.125-16	UN	2A	.0018	4.1232	4.1138	....	4.0826	4.0767	.0059	4.0465	2B	4.057	4.071	4.0844	4.0920	.0076	4.1250
		3A	.0000	4.1250	4.1156	....	4.0844	4.0800	.0044	4.0483	3B	4.0570	4.0658	4.0844	4.0901	.0057	4.1250
4.250-4	UN	2A	.0034	4.2466	4.2228	....	4.0842	4.0727	.0115	3.9399	2B	3.979	4.017	4.0876	4.1025	.0149	4.2500
		3A	.0000	4.2500	4.2262	....	4.0876	4.0790	.0086	3.9433	3B	3.9790	4.0094	4.0876	4.0988	.0112	4.2500
4.250-6	UN	2A	.0030	4.2470	4.2288	....	4.1387	4.1286	.0101	4.0425	2B	4.070	4.100	4.1417	4.1548	.0131	4.2500
		3A	.0000	4.2500	4.2318	....	4.1417	4.1342	.0075	4.0455	3B	4.0700	4.0896	4.1417	4.1515	.0098	4.2500
4.250-12	UN	2A	.0020	4.2480	4.2366	....	4.1939	4.1874	.0065	4.1458	2B	4.160	4.178	4.1959	4.2044	.0085	4.2500
		3A	.0000	4.2500	4.2386	....	4.1959	4.1910	.0049	4.1478	3B	4.1600	4.1698	4.1959	4.2023	.0064	4.2500
4.250-16	UN	2A	.0018	4.2482	4.2388	....	4.2076	4.2017	.0059	4.1715	2B	4.182	4.196	4.2094	4.2170	.0076	4.2500
		3A	.0000	4.2500	4.2406	....	4.2094	4.2050	.0044	4.1733	3B	4.1820	4.1908	4.2094	4.2151	.0057	4.2500
4.375-6	UN	2A	.0030	4.3720	4.3538	....	4.2637	4.2536	.0101	4.1675	2B	4.195	4.225	4.2667	4.2799	.0132	4.3750
		3A	.0000	4.3750	4.3568	....	4.2667	4.2591	.0076	4.1705	3B	4.1950	4.2146	4.2667	4.2766	.0099	4.3750
4.375-12	UN	2A	.0020	4.3730	4.3616	....	4.3189	4.3124	.0065	4.2708	2B	4.285	4.303	4.3209	4.3294	.0085	4.3750
		3A	.0000	4.3750	4.3636	....	4.3209	4.3160	.0049	4.2728	3B	4.2850	4.2948	4.3209	4.3273	.0064	4.3750
4.375-16	UN	2A	.0018	4.3732	4.3638	....	4.3326	4.3267	.0059	4.2965	2B	4.307	4.321	4.3344	4.3420	.0076	4.3750
		3A	.0000	4.3750	4.3656	....	4.3344	4.3300	.0044	4.2983	3B	4.3070	4.3158	4.3344	4.3401	.0057	4.3750
4.500-4	UN	2A	.0035	4.4965	4.4727	....	4.3341	4.3225	.0116	4.1898	2B	4.229	4.267	4.3376	4.3527	.0151	4.5000
		3A	.0000	4.5000	4.4762	....	4.3376	4.3289	.0087	4.1933	3B	4.2290	4.2594	4.3376	4.3489	.0113	4.5000
4.500-6	UN	2A	.0031	4.4969	4.4787	....	4.3886	4.3784	.0102	4.2924	2B	4.320	4.350	4.3917	4.4050	.0133	4.5000
		3A	.0000	4.5000	4.4818	....	4.3917	4.3840	.0077	4.2955	3B	4.3200	4.3396	4.3917	4.4016	.0099	4.5000
4.500-12	UN	2A	.0020	4.4980	4.4866	....	4.4439	4.4374	.0065	4.3958	2B	4.410	4.428	4.4459	4.4544	.0085	4.5000
		3A	.0000	4.5000	4.4886	....	4.4459	4.4410	.0049	4.3978	3B	4.4100	4.4198	4.4459	4.4523	.0064	4.5000
4.500-16	UN	2A	.0018	4.4982	4.4888	....	4.4576	4.4517	.0059	4.4215	2B	4.432	4.446	4.4594	4.4670	.0076	4.5000
		3A	.0000	4.5000	4.4906	....	4.4594	4.4550	.0044	4.4233	3B	4.4320	4.4408	4.4594	4.4651	.0057	4.5000
4.625-6	UN	2A	.0031	4.6219	4.6037	....	4.5136	4.5033	.0103	4.4174	2B	4.445	4.475	4.5167	4.5300	.0133	4.6250
		3A	.0000	4.6250	4.6068	....	4.5167	4.5090	.0077	4.4205	3B	4.4450	4.4646	4.5167	4.5267	.0100	4.6250
4.625-12	UN	2A	.0020	4.6230	4.6116	....	4.5689	4.5622	.0067	4.5208	2B	4.535	4.553	4.5709	4.5796	.0087	4.6250
		3A	.0000	4.6250	4.6136	....	4.5709	4.5659	.0050	4.5228	3B	4.5350	4.5448	4.5709	4.5775	.0066	4.6250
4.625-16	UN	2A	.0018	4.6232	4.6138	....	4.5826	4.5765	.0061	4.5465	2B	4.557	4.571	4.5844	4.5923	.0079	4.6250
		3A	.0000	4.6250	4.6156	....	4.5844	4.5799	.0045	4.5483	3B	4.5570	4.5658	4.5844	4.5903	.0059	4.6250
4.750-4	UN	2A	.0035	4.7465	4.7227	....	4.5841	4.5724	.0117	4.4398	2B	4.479	4.517	4.5876	4.6029	.0153	4.7500
		3A	.0000	4.7500	4.7262	....	4.5876	4.5788	.0088	4.4433	3B	4.4790	4.5094	4.5876	4.5990	.0114	4.7500
4.750-6	UN	2A	.0031	4.7469	4.7287	....	4.6386	4.6283	.0103	4.5424	2B	4.570	4.600	4.6417	4.6551	.0134	4.7500
		3A	.0000	4.7500	4.7318	....	4.6417	4.6340	.0077	4.5455	3B	4.5700	4.5896	4.6417	4.6518	.0101	4.7500
4.750-12	UN	2A	.0020	4.7480	4.7366	....	4.6939	4.6872	.0067	4.6458	2B	4.660	4.678	4.6959	4.7046	.0087	4.7500
		3A	.0000	4.7500	4.7386	....	4.6959	4.6909	.0050	4.6478	3B	4.6600	4.6698	4.6959	4.7025	.0066	4.7500
4.750-16	UN	2A	.0018	4.7482	4.7388	....	4.7076	4.7015	.0061	4.6715	2B	4.682	4.696	4.7094	4.7173	.0079	4.7500
		3A	.0000	4.7500	4.7406	....	4.7094	4.7049	.0045	4.6733	3B	4.6820	4.6908	4.7094	4.7153	.0059	4.7500
4.875-6	UN	2A	.0031	4.8719	4.8537	....	4.7636	4.7532	.0104	4.6674	2B	4.695	4.725	4.7667	4.7802	.0135	4.8750
		3A	.0000	4.8750	4.8568	....	4.7667	4.7589	.0078	4.6705	3B	4.6950	4.7146	4.7667	4.7768	.0101	4.8750
4.875-12	UN	2A	.0020	4.8730	4.8616	....	4.8189	4.8122	.0067	4.7708	2B	4.785	4.803	4.8209	4.8296	.0087	4.8750
		3A	.0000	4.8750	4.8636	....	4.8209	4.8159	.0050	4.7728	3B	4.7850	4.7948	4.8209	4.8275	.0066	4.8750

See footnotes at end of table.

TABLE 2.21. *Standard series limits of size—Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External[a] Class	Allowance	Major diameter limits Max[b]	Min	Min[c]	Pitch diameter limits Max[b]	Min	Tolerance	Minor diameter[d]	Internal[a] Class	Minor diameter limits Min	Max	Pitch diameter limits Min	Max	Tolerance	Major diameter Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
4.875-16	UN	2A	0.0018	4.8732	4.8638	--------	4.8326	4.8265	0.0061	4.7965	2B	4.807	4.821	4.8344	4.8423	0.0079	4.8750
		3A	.0000	4.8750	4.8656	--------	4.8344	4.8299	.0045	4.7983	3B	4.8070	4.8158	4.8344	4.8403	.0059	4.8750
5.000-4	UN	2A	.0036	4.9964	4.9726	--------	4.8340	4.8221	.0119	4.6897	2B	4.729	4.767	4.8376	4.8530	.0154	5.0000
		3A	.0000	5.0000	4.9762	--------	4.8376	4.8287	.0089	4.6933	3B	4.7290	4.7594	4.8376	4.8492	.0116	5.0000
5.000-6	UN	2A	.0031	4.9969	4.9787	--------	4.8886	4.8781	.0105	4.7924	2B	4.820	4.850	4.8917	4.9053	.0136	5.0000
		3A	.0000	5.0000	4.9818	--------	4.8917	4.8839	.0078	4.7955	3B	4.8200	4.8396	4.8917	4.9019	.0102	5.0000
5.000-12	UN	2A	.0020	4.9980	4.9866	--------	4.9439	4.9372	.0067	4.8958	2B	4.910	4.928	4.9459	4.9546	.0087	5.0000
		3A	.0000	5.0000	4.9886	--------	4.9459	4.9409	.0050	4.8978	3B	4.9100	4.9198	4.9459	4.9525	.0066	5.0000
5.000-16	UN	2A	.0018	4.9982	4.9888	--------	4.9576	4.9515	.0061	4.9215	2B	4.932	4.946	4.9594	4.9673	.0079	5.0000
		3A	.0000	5.0000	4.9906	--------	4.9594	4.9549	.0045	4.9233	3B	4.9320	4.9408	4.9594	4.9653	.0059	5.0000
5.125-12	UN	2A	.0020	5.1230	5.1116	--------	5.0689	5.0622	.0067	5.0208	2B	5.035	5.053	5.0709	5.0796	.0087	5.1250
		3A	.0000	5.1250	5.1136	--------	5.0709	5.0659	.0050	5.0228	3B	5.0350	5.0448	5.0709	5.0775	.0066	5.1250
5.125-16	UN	2A	.0018	5.1232	5.1138	--------	5.0826	5.0765	.0061	5.0465	2B	5.057	5.071	5.0844	5.0923	.0079	5.1250
		3A	.0000	5.1250	5.1156	--------	5.0844	5.0799	.0045	5.0483	3B	5.0570	5.0658	4.0844	5.0903	.0059	5.1250
5.250-4	UN	2A	.0036	5.2464	5.2226	--------	5.0840	5.0720	.0120	4.9397	2B	4.979	5.017	5.0876	5.1032	.0156	5.2500
		3A	.0000	5.2500	5.2262	--------	5.0876	5.0786	.0090	4.9433	3B	4.9790	5.0094	5.0876	5.0993	.0117	5.2500
5.250-12	UN	2A	.0020	5.2480	5.2366	--------	5.1939	5.1872	.0067	5.1458	2B	5.160	5.178	5.1959	5.2046	.0087	5.2500
		3A	.0000	5.2500	5.2386	--------	5.1959	5.1909	.0050	5.1478	3B	5.1600	5.1698	5.1959	5.2025	.0066	5.2500
5.250-16	UN	2A	.0018	5.2482	5.2388	--------	5.2076	5.2015	.0061	5.1715	2B	5.182	5.196	5.2094	5.2173	.0079	5.2500
		3A	.0000	5.2500	5.2406	--------	5.2094	5.2049	.0045	5.1733	3B	5.1820	5.1908	5.2094	5.2153	.0059	5.2500
5.375-12	UN	2A	.0020	5.3730	5.3616	--------	5.3189	5.3122	.0067	5.2708	2B	5.285	5.303	5.3209	5.3296	.0087	5.3750
		3A	.0000	5.3750	5.3636	--------	5.3209	5.3159	.0050	5.2728	3B	5.2850	5.2948	5.3209	5.3275	.0066	5.3750
5.375-16	UN	2A	.0018	5.3732	5.3638	--------	5.3326	5.3265	.0061	5.2965	2B	5.307	5.321	5.3344	5.3423	.0079	5.3750
		3A	.0000	5.3750	5.3656	--------	5.3344	5.3299	.0045	5.2983	3B	5.3070	5.3158	5.3344	5.3403	.0059	5.3750
5.500-4	UN	2A	.0036	5.4964	5.4726	--------	5.3340	5.3219	.0121	5.1897	2B	5.229	5.267	5.3376	5.3534	.0158	5.5000
		3A	.0000	5.5000	5.4762	--------	5.3376	5.3285	.0091	5.1933	3B	5.2290	5.2594	5.3376	5.3494	.0118	5.5000
5.500-12	UN	2A	.0020	5.4980	5.4866	--------	5.4439	5.4372	.0067	5.3958	2B	5.410	5.428	5.4459	5.4546	.0087	5.5000
		3A	.0000	5.5000	5.4886	--------	5.4459	5.4409	.0050	5.3978	3B	5.4100	5.4198	5.4459	5.4525	.0066	5.5000
5.500-16	UN	2A	.0018	5.4982	5.4888	--------	5.4576	5.4515	.0061	5.4215	2B	5.432	5.446	5.4594	5.4673	.0079	5.5000
		3A	.0000	5.5000	5.4906	--------	5.4594	5.4549	.0045	5.4233	3B	5.4320	5.4408	5.4594	5.4653	.0059	5.5000
5.625-12	UN	2A	.0021	5.6229	5.6115	--------	5.5688	5.5619	.0069	5.5207	2B	5.535	5.553	5.5709	5.5799	.0090	5.6250
		3A	.0000	5.6250	5.6136	--------	5.5709	5.5657	.0052	5.5228	3B	5.5350	5.5448	5.5709	5.5776	.0067	5.6250
5.625-16	UN	2A	.0019	5.6231	5.6137	--------	5.5825	5.5763	.0062	5.5464	2B	5.557	5.571	5.5844	5.5925	.0081	5.6250
		3A	.0000	5.6250	5.6156	--------	5.5844	5.5797	.0047	5.5483	2B	5.5570	5.5658	5.5844	5.5905	.0061	5.6250
5.750-4	UN	2A	.0037	5.7463	5.7225	--------	5.5839	5.5717	.0122	5.4396	2B	5.479	5.517	5.5876	5.6035	.0159	5.7500
		3A	.0000	5.7500	5.7262	--------	5.5876	5.5784	.0092	5.4433	3B	5.4790	5.5094	5.5876	5.5995	.0119	5.7500
5.750-12	UN	2A	.0021	5.7479	5.7365	--------	5.6938	5.6869	.0069	5.6457	2B	5.660	5.678	5.6959	5.7049	.0090	5.7500
		3A	.0000	5.7500	5.7386	--------	5.6959	5.6907	.0052	5.6478	3B	5.6600	5.6698	5.6959	5.7026	.0067	5.7500
5.750-16	UN	2A	.0019	5.7481	5.7387	--------	5.7075	5.7013	.0062	5.6714	2B	5.682	5.696	5.7094	5.7175	.0081	5.7500
		3A	.0000	5.7500	5.7406	--------	5.7094	5.7047	.0047	5.6733	3B	5.6820	5.6908	5.7094	5.7155	.0061	5.7500
5.875-12	UN	2A	.0021	5.8729	5.8615	--------	5.8188	5.8119	.0069	5.7707	2B	5.785	5.803	5.8209	5.8299	.0090	5.8750
		3A	.0000	5.8750	5.8636	--------	5.8209	5.8157	.0052	5.7728	3B	5.7850	5.7948	5.8200	5.8276	.0067	5.8750
5.875-16	UN	2A	.0019	5.8731	5.8637	--------	5.8325	5.8263	.0062	5.7964	2B	5.807	5.821	5.8344	5.8425	.0081	5.8750
		3A	.0000	5.8750	5.8656	--------	5.8344	5.8297	.0047	5.7983	3B	5.8070	5.8158	5.8344	5.8405	.0061	5.8750
6.000-4	UN	2A	.0037	5.9963	5.9725	--------	5.8338	5.8215	.0124	5.6896	2B	5.729	5.767	5.8376	5.8537	.0161	6.0000
		3A	.0000	6.0000	5.9762	--------	5.8376	5.8283	.0093	5.6933	3B	5.7290	5.7594	5.8376	5.8496	.0120	6.0000
6.000-12	UN	2A	.0021	5.9979	5.9865	--------	5.9438	5.9369	.0069	5.8957	2B	5.910	5.928	5.9459	5.9549	.0090	6.0000
		3A	.0000	6.0000	5.9886	--------	5.9459	5.9407	.0052	5.8978	3B	5.9100	5.9198	5.9459	5.9526	.0067	6.0000
6.000-16	UN	2A	.0019	5.9981	5.9887	--------	5.9575	5.9513	.0062	5.9214	2B	5.932	5.946	5.9594	5.9675	.0081	6.0000
		3A	.0000	6.0000	5.9906	--------	5.9594	5.9547	.0047	5.9233	3B	5.9320	5.9408	5.9594	5.9655	.0061	6.0000

[a] Regarding combinations of thread classes, see par. 4, Thread classes, p. 2.17.
[b] For class 2A threads having an additive finish the maximum is increased to the basic size, the value being the same as for class 3A shown in this column. See par. 4.2, p. 2.17, and par. 9. p. 2.22.
[c] For unfinished hot-rolled material.
[d] See figs. 2.3, 2.5, and 2.6.
NOTE: See par. 11 Limits of Size, p. 2.25.

TABLE 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*

Nominal size and threads per inch	Series designation	External: Class	External: Half of pitch diameter tolerance	External: Equivalent deviation in lead	External: Equivalent deviation in half-angle		Internal: Class	Internal: Half of pitch diameter tolerance	Internal: Equivalent deviation in lead	Internal: Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
.060-80	UNF	2A	0.00090	0.00052	3	18	2B	0.00115	0.00066	4	13
		3A	.00065	.00038	2	23	3B	.00085	.00049	3	7
.073-64	UNC	2A	.00100	.00058	2	56	2B	.00130	.00075	3	48
		3A	.00075	.00043	2	12	3B	.00095	.00055	2	47
.073-72	UNF	2A	.00095	.00055	3	8	2B	.00125	.00072	4	7
		3A	.00070	.00040	2	19	3B	.00095	.00055	3	8
.086-56	UNC	2A	.00105	.00061	2	42	2B	.00140	.00081	3	35
		3A	.00080	.00046	2	3	3B	.00105	.00061	2	42
.086-64	UNF	2A	.00100	.00058	2	56	2B	.00135	.00078	3	57
		3A	.00075	.00043	2	12	3B	.00100	.00058	2	56
.099-48	UNC	2A	.00115	.00066	2	32	2B	.00150	.00087	3	18
		3A	.00085	.00049	1	52	3B	.00110	.00064	2	25
.099-56	UNF	2A	.00110	.00064	2	49	2B	.00140	.00081	3	35
		3A	.00080	.00046	2	3	3B	.00105	.00061	2	42
.112-40	UNC	2A	.00125	.00072	2	17	2B	.00165	.00095	3	1
		3A	.00095	.00055	1	44	3B	.00120	.00069	2	12
.112-48	UNF	2A	.00120	.00069	2	38	2B	.00155	.00089	3	24
		3A	.00090	.00052	1	59	3B	.00115	.00066	2	32
.125-40	UNC	2A	.00130	.00075	2	23	2B	.00165	.00095	3	1
		3A	.00095	.00055	1	44	3B	.00125	.00072	2	17
.125-44	UNF	2A	.00125	.00072	2	31	2B	.00160	.00092	3	13
		3A	.00095	.00055	1	55	3B	.00120	.00069	2	25
.138-32	UNC	2A	.00140	.00081	2	3	2B	.00185	.00107	2	43
		3A	.00105	.00061	1	32	3B	.00135	.00078	1	59
.138-40	UNF	2A	.00130	.00075	2	23	2B	.00170	.00098	3	7
		3A	.00100	.00058	1	50	3B	.00125	.00072	2	17
.164-32	UNC	2A	.00145	.00084	2	8	2B	.00190	.00110	2	47
		3A	.00110	.00064	1	37	3B	.00140	.00081	2	3
.164-36	UNF	2A	.00140	.00081	2	19	2B	.00180	.00104	2	58
		3A	.00105	.00061	1	44	3B	.00135	.00078	2	14
.190-24	UNC	2A	.00165	.00095	1	49	2B	.00215	.00124	2	22
		3A	.00125	.00072	1	22	3B	.00160	.00092	1	46
.190-32	UNF	2A	.00150	.00087	2	12	2B	.00195	.00113	2	51
		3A	.00115	.00066	1	41	3B	.00145	.00084	2	8
.216-24	UNC	2A	.00170	.00098	1	52	2B	.00220	.00127	2	25
		3A	.00130	.00075	1	26	3B	.00165	.00095	1	49
.216-28	UNF	2A	.00160	.00092	2	3	2B	.00210	.00121	2	42
		3A	.00120	.00069	1	32	3B	.00155	.00089	1	59
.216-32	UNEF	2A	.00155	.00089	2	16	2B	.00205	.00118	3	0
		3A	.00120	.00069	1	46	3B	.00155	.00089	2	16
.250-20	UNC	1A	.00280	.00162	2	34	1B	.00365	.00211	3	21
		2A	.00185	.00107	1	42	2B	.00245	.00141	2	15
		3A	.00140	.00081	1	17	3B	.00180	.00104	1	39
.250-28	UNF	1A	.00250	.00144	3	12	1B	.00325	.00188	4	10
		2A	.00165	.00095	2	7	2B	.00215	.00124	2	45
		3A	.00125	.00072	1	36	3B	.00160	.00092	2	3
.250-32	UNEF	2A	.00160	.00092	2	21	2B	.00210	.00121	3	5
		3A	.00120	.00069	1	46	3B	.00155	.00089	2	16
.3125-18	UNC	1A	.00305	.00176	2	31	1B	.00395	.00228	3	15
		2A	.00200	.00115	1	39	2B	.00265	.00153	2	11
		3A	.00150	.00087	1	14	3B	.00195	.00113	1	37
.3125-20	UN	2A	.00200	.00115	1	50	2B	.00260	.00150	2	23
		3A	.00150	.00087	1	22	3B	.00195	.00113	1	47
.3125-24	UNF	1A	.00275	.00159	3	1	1B	.00355	.00205	3	54
		2A	.00185	.00107	2	2	2B	.00240	.00139	2	38
		3A	.00135	.00078	1	29	3B	.00180	.00104	1	59
.3125-28	UN	2A	.00170	.00098	2	11	2B	.00220	.00127	2	49
		3A	.00130	.00075	1	40	3B	.00165	.00095	2	7

Table 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diamter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External: Class	External: Half of pitch diameter tolerance	External: Equivalent deviation in lead	External: Equivalent deviation in half-angle		Internal: Class	Internal: Half of pitch diameter tolerance	Internal: Equivalent deviation in lead	Internal: Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
.3125-32	UNEF	2A	.00160	.00092	2	21	2B	.00210	.00121	3	5
		3A	.00120	.00069	1	46	3B	.00155	.00089	2	16
.375-16	UNC	1A	.00325	.00188	2	23	1B	.00425	.00245	3	7
		2A	.00220	.00127	1	37	2B	.00285	.00165	2	5
		3A	.00165	.00095	1	13	3B	.00215	.00124	1	35
.375-20	UN	2A	.00205	.00118	1	53	2B	.00270	.00156	2	28
		3A	.00155	.00089	1	25	3B	.00200	.00115	1	50
.375-24	UNF	1A	.00285	.00165	3	8	1B	.00370	.00214	4	4
		2A	.00190	.00110	2	5	2B	.00245	.00141	2	42
		3A	.00145	.00084	1	36	3B	.00185	.00107	2	2
.375-28	UN	2A	.00180	.00104	2	19	2B	.00230	.00133	2	57
		3A	.00135	.00078	1	44	3B	.00175	.00101	2	15
.375-32	UNEF	2A	.00170	.00098	2	30	2B	.00220	.00127	3	13
		3A	.00125	.00072	1	50	3B	.00165	.00095	2	25
.4375-14	UNC	1A	.00355	.00205	2	17	1B	.00460	.00266	2	57
		2A	.00235	.00136	1	30	2B	.00305	.00176	1	57
		3A	.00175	.00101	1	7	3B	.00230	.00133	1	29
.4375-16	UN	2A	.00230	.00133	1	41	2B	.00295	.00170	2	10
		3A	.00170	.00098	1	15	3B	.00225	.00130	1	39
.4375-20	UNF	1A	.00315	.00182	2	53	1B	.00405	.00234	3	42
		2A	.00210	.00121	1	55	2B	.00270	.00156	2	28
		3A	.00155	.00089	1	25	3B	.00205	.00118	1	53
.4375-28	UNEF	2A	.00180	.00104	2	19	2B	.00230	.00133	2	57
		3A	.00135	.00078	1	44	3B	.00175	.00101	2	15
.4375-32	UN	2A	.00170	.00098	2	30	2B	.00220	.00127	3	13
		3A	.00125	.00072	1	50	3B	.00165	.00095	2	25
.500-13	UNC	1A	.00370	.00214	2	12	1B	.00485	.00280	2	53
		2A	.00250	.00144	1	29	2B	.00325	.00188	1	56
		3A	.00185	.00107	1	6	3B	.00240	.00139	1	26
.500-16	UN	2A	.00235	.00136	1	43	2B	.00305	.00176	2	14
		3A	.00175	.00101	1	17	3B	.00230	.00133	1	41
.500-20	UNF	1A	.00320	.00185	2	56	1B	.00420	.00242	3	51
		2A	.00215	.00124	1	58	2B	.00280	.00162	2	34
		3A	.00160	.00092	1	28	3B	.00210	.00121	1	55
.500-28	UNEF	2A	.00185	.00107	2	22	2B	.00240	.00139	3	5
		3A	.00140	.00081	1	48	3B	.00180	.00104	2	19
.500-32	UN	2A	.00175	.00101	2	34	2B	.00225	.00130	3	18
		3A	.00130	.00075	1	54	3B	.00170	.00098	2	30
.5625-12	UNC	1A	.00390	.00225	2	9	1B	.00510	.00294	2	48
		2A	.00260	.00150	1	26	2B	.00340	.00196	1	52
		3A	.00195	.00113	1	4	3B	.00255	.00147	1	24
.5625-16	UN	2A	.00235	.00136	1	43	2B	.00305	.00176	2	14
		3A	.00175	.00101	1	17	3B	.00230	.00133	1	41
.5625-18	UNF	1A	.00340	.00196	2	48	1B	.00445	.00257	3	40
		2A	.00225	.00130	1	51	2B	.00295	.00170	2	26
		3A	.00170	.00098	1	24	3B	.00220	.00127	1	49
.5625-20	UN	2A	.00210	.00121	1	55	2B	.00275	.00159	2	31
		3A	.00160	.00092	1	28	3B	.00205	.00118	1	53
.5625-24	UNEF	2A	.00195	.00113	2	9	2B	.00255	.00147	2	48
		3A	.00145	.00084	1	36	3B	.00190	.00110	2	5
.5625-28	UN	2A	.00185	.00107	2	22	2B	.00240	.00139	3	5
		3A	.00140	.00081	1	48	3B	.00180	.00104	2	19
.5625-32	UN	2A	.00175	.00101	2	34	2B	.00225	.00130	3	18
		3A	.00130	.00075	1	54	3B	.00170	.00098	2	30
.625-11	UNC	1A	.00415	.00240	2	5	1B	.00535	.00309	2	42
		2A	.00275	.00159	1	23	2B	.00360	.00208	1	49
		3A	.00205	.00118	1	2	3B	.00270	.00156	1	22
.625-12	UN	2A	.00270	.00156	1	29	2B	.00355	.00205	1	57
		3A	.00205	.00118	1	8	3B	.00265	.00153	1	27

TABLE 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External: Class	External: Half of pitch diameter tolerance	External: Equivalent deviation in lead	External: Equivalent deviation in half-angle		Internal: Class	Internal: Half of pitch diameter tolerance	Internal: Equivalent deviation in lead	Internal: Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
.625–16	UN	2A	.00240	.00139	1	46	2B	.00310	.00179	2	16
		3A	.00180	.00104	1	19	3B	.00230	.00133	1	41
.625–18	UNF	1A	.00350	.00202	2	53	1B	.00455	.00263	3	45
		2A	.00235	.00136	1	56	2B	.00300	.00173	2	28
		3A	.00175	.00101	1	27	3B	.00225	.00130	1	51
.625–20	UN	2A	.00215	.00124	1	58	2B	.00280	.00162	2	34
		3A	.00160	.00092	1	28	3B	.00210	.00121	1	55
.625–24	UNEF	2A	.00200	.00115	2	12	2B	.00260	.00150	2	51
		3A	.00150	.00087	1	39	3B	.00195	.00113	2	9
.625–28	UN	2A	.00190	.00110	2	26	2B	.00245	.00141	3	8
		3A	.00140	.00081	1	48	3B	.00185	.00107	2	22
.625–32	UN	2A	.00180	.00104	2	38	2B	.00230	.00133	3	22
		3A	.00135	.00078	1	59	3B	.00175	.00101	2	34
.6875–12	UN	2A	.00270	.00156	1	29	2B	.00355	.00205	1	57
		3A	.00205	.00118	1	8	3B	.00265	.00153	1	27
.6875–16	UN	2A	.00240	.00139	1	46	2B	.00310	.00179	2	16
		3A	.00180	.00104	1	19	3B	.00230	.00133	1	41
.6875–20	UN	2A	.00215	.00124	1	58	2B	.00280	.00162	2	34
		3A	.00160	.00092	1	28	3B	.00210	.00121	1	55
.6875–24	UNEF	2A	.00200	.00115	2	12	2B	.00260	.00150	2	51
		3A	.00150	.00087	1	39	3B	.00195	.00113	2	9
.6875–28	UN	2A	.00190	.00110	2	26	2B	.00245	.00141	3	8
		3A	.00140	.00081	1	48	3B	.00185	.00107	2	22
.6875–32	UN	2A	.00180	.00104	2	38	2B	.00230	.00133	3	22
		3A	.00135	.00078	1	59	3B	.00175	.00101	2	34
.750–10	UNC	1A	.00440	.00254	2	1	1B	.00575	.00332	2	38
		2A	.00295	.00170	1	21	2B	.00385	.00222	1	46
		3A	.00220	.00127	1	0	3B	.00285	.00165	1	18
.750–12	UN	2A	.00275	.00159	1	31	2B	.00360	.00208	1	59
		3A	.00205	.00118	1	8	3B	.00270	.00156	1	29
.750–16	UNF	1A	.00375	.00217	2	45	1B	.00490	.00283	3	35
		2A	.00250	.00144	1	50	2B	.00325	.00188	2	23
		3A	.00190	.00110	1	24	3B	.00245	.00141	1	48
.750–20	UNEF	2A	.00220	.00127	2	1	2B	.00285	.00165	2	37
		3A	.00165	.00095	1	31	3B	.00215	.00124	1	58
.750–28	UN	2A	.00190	.00110	2	26	2B	.00250	.00144	3	12
		3A	.00145	.00084	1	52	3B	.00185	.00107	2	22
.750–32	UN	2A	.00180	.00104	2	38	2B	.00235	.00136	3	27
		3A	.00135	.00078	1	59	3B	.00180	.00104	2	38
.8125–12	UN	2A	.00275	.00159	1	31	2B	.00360	.00208	1	59
		3A	.00205	.00118	1	8	3B	.00270	.00156	1	29
.8125–16	UN	2A	.00245	.00141	1	48	2B	.00315	.00182	2	19
		3A	.00180	.00104	1	19	3B	.00235	.00136	1	43
.8125–20	UNEF	2A	.00220	.00127	2	1	2B	.00285	.00165	2	37
		3A	.00165	.00095	1	31	3B	.00215	.00124	1	58
.8125–28	UN	2A	.00190	.00110	2	26	2B	.00250	.00144	3	12
		3A	.00145	.00084	1	52	3B	.00185	.00107	2	22
.8125–32	UN	2A	.00180	.00104	2	38	2B	.00235	.00136	3	27
		3A	.00135	.00078	1	59	3B	.00180	.00104	2	38
.875–9	UNC	1A	.00475	.00274	1	58	1B	.00615	.00355	2	32
		2A	.00315	.00182	1	18	2B	.00410	.00237	1	41
		3A	.00235	.00136	0	58	3B	.00305	.00176	1	15
.875–12	UN	2A	.00275	.00159	1	31	2B	.00360	.00208	1	59
		3A	.00205	.00118	1	8	3B	.00270	.00156	1	29
.875–14	UNF	1A	.00405	.00234	2	36	1B	.00530	.00306	3	24
		2A	.00270	.00156	1	44	2B	.00350	.00202	2	15
		3A	.00205	.00118	1	19	3B	.00265	.00153	1	42
.875–16	UN	2A	.00245	.00141	1	48	2B	.00315	.00182	2	19
		3A	.00180	.00104	1	19	3B	.00235	.00136	1	43

Table 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
.875-20	UNEF	2A	.00220	.00127	2	1	2B	.00285	.00165	2	37
		3A	.00165	.00095	1	31	3B	.00215	.00124	1	58
.875-28	UN	2A	.00190	.00110	2	26	2B	.00250	.00144	3	12
		3A	.00145	.00084	1	52	3B	.00185	.00107	2	22
.875-32	UN	2A	.00180	.00104	2	38	2B	.00235	.00136	3	27
		3A	.00135	.00078	1	59	3B	.00180	.00104	2	38
.9375-12	UN	2A	.00285	.00165	1	34	2B	.00370	.00214	2	2
		3A	.00210	.00121	1	9	3B	.00275	.00159	1	31
.9375-16	UN	2A	.00250	.00144	1	50	2B	.00325	.00188	2	23
		3A	.00185	.00107	1	21	3B	.00245	.00141	1	48
.9375-20	UNEF	2A	.00225	.00130	2	4	2B	.00295	.00170	2	42
		3A	.00170	.00098	1	33	3B	.00220	.00127	2	1
.9375-28	UN	2A	.00200	.00115	2	34	2B	.00260	.00150	3	20
		3A	.00150	.00087	1	55	3B	.00195	.00113	2	30
.9375-32	UN	2A	.00190	.00110	2	47	2B	.00245	.00141	3	35
		3A	.00140	.00081	2	3	3B	.00185	.00107	2	43
1.000-8	UNC	1A	.00505	.00292	1	51	1B	.00660	.00381	2	25
		2A	.00340	.00196	1	15	2B	.00440	.00254	1	37
		3A	.00255	.00147	0	56	3B	.00330	.00191	1	13
1.000-12	UNF	1A	.00440	.00254	2	25	1B	.00570	.00329	3	8
		2A	.00295	.00170	1	37	2B	.00380	.00219	2	5
		3A	.00220	.00127	1	13	3B	.00285	.00165	1	34
1.000-16	UN	2A	.00250	.00144	1	50	2B	.00325	.00188	2	23
		3A	.00185	.00107	1	21	3B	.00245	.00141	1	48
1.000-20	UNEF	2A	.00225	.00130	2	4	2B	.00295	.00170	2	42
		3A	.00170	.00098	1	33	3B	.00220	.00127	2	1
1.000-28	UN	2A	.00200	.00115	2	34	2B	.00260	.00150	3	20
		3A	.00150	.00087	1	55	3B	.00195	.00113	2	30
1.000-32	UN	2A	.00190	.00110	2	47	2B	.00245	.00141	3	35
		3A	.00140	.00081	2	3	3B	.00185	.00107	2	43
1.0625-8	UN	2A	.00340	.00196	1	15	2B	.00445	.00257	1	38
		3A	.00255	.00147	0	56	3B	.00335	.00193	1	14
1.0625-12	UN	2A	.00285	.00165	1	34	2B	.00370	.00214	2	2
		3A	.00210	.00121	1	9	3B	.00275	.00159	1	31
1.0625-16	UN	2A	.00250	.00144	1	50	2B	.00325	.00188	2	23
		3A	.00185	.00107	1	21	3B	.00245	.00141	1	48
1.0625-18	UNEF	2A	.00235	.00136	1	56	2B	.00310	.00179	2	33
		3A	.00180	.00104	1	29	3B	.00230	.00133	1	54
1.0625-20	UN	2A	.00225	.00130	2	4	2B	.00295	.00170	2	42
		3A	.00170	.00098	1	33	3B	.00220	.00127	2	1
1.0625-28	UN	2A	.00200	.00115	2	34	2B	.00260	.00150	3	20
		3A	.00150	.00087	1	55	3B	.00195	.00113	2	30
1.125-7	UNC	1A	.00545	.00315	1	45	1B	.00705	.00407	2	16
		2A	.00360	.00208	1	9	2B	.00470	.00271	1	30
		3A	.00270	.00156	0	52	3B	.00355	.00205	1	8
1.125-8	UN	2A	.00345	.00199	1	16	2B	.00450	.00260	1	39
		3A	.00260	.00150	0	57	3B	.00335	.00193	1	14
1.125-12	UNF	1A	.00450	.00260	2	28	1B	.00585	.00338	3	13
		2A	.00300	.00173	1	39	2B	.00390	.00225	2	9
		3A	.00225	.00130	1	14	3B	.00295	.00170	1	37
1.125-16	UN	2A	.00250	.00144	1	50	2B	.00325	.00188	2	23
		3A	.00185	.00107	1	21	3B	.00245	.00141	1	48
1.125-18	UNEF	2A	.00235	.00136	1	56	2B	.00310	.00179	2	33
		3A	.00180	.00104	1	29	3B	.00230	.00133	1	54
1.125-20	UN	2A	.00225	.00130	2	4	2B	.00295	.00170	2	42
		3A	.00170	.00098	1	33	3B	.00220	.00127	2	1

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
1.125-28	UN	2A	.00200	.00115	2	34	2B	.00260	.00150	3	20
		3A	.00150	.00087	1	55	3B	.00195	.00113	2	30
1.1875-8	UN	2A	.00350	.00202	1	17	2B	.00455	.00263	1	40
		3A	.00260	.00150	0	57	3B	.00340	.00196	1	15
1.1875-12	UN	2A	.00290	.00167	1	36	2B	.00375	.00217	2	4
		3A	.00215	.00124	1	11	3B	.00280	.00162	1	32
1.1875-16	UN	2A	.00255	.00147	1	52	2B	.00330	.00191	2	25
		3A	.00190	.00110	1	24	3B	.00250	.00144	1	50
1.1875-18	UNEF	2A	.00245	.00141	2	1	2B	.00315	.00182	2	36
		3A	.00180	.00104	1	29	3B	.00235	.00136	1	56
1.1875-20	UN	2A	.00235	.00136	2	9	2B	.00305	.00176	2	48
		3A	.00175	.00101	1	36	3B	.00225	.00130	2	4
1.1875-28	UN	2A	.00205	.00118	2	38	2B	.00265	.00153	3	24
		3A	.00155	.00089	1	59	3B	.00200	.00115	2	34
1.250-7	UNC	1A	.00555	.00320	1	47	1B	.00720	.00416	2	19
		2A	.00370	.00214	1	11	2B	.00480	.00277	1	32
		3A	.00275	.00159	0	53	3B	.00360	.00208	1	9
1.250-8	UN	2A	.00350	.00202	1	17	2B	.00460	.00266	1	41
		3A	.00265	.00153	0	58	3B	.00345	.00199	1	16
1.250-12	UNF	1A	.00460	.00266	2	32	1B	.00600	.00346	3	18
		2A	.00310	.00179	1	42	2B	.00400	.00231	2	12
		3A	.00230	.00133	1	16	3B	.00300	.00173	1	39
1.250-16	UN	2A	.00255	.00147	1	52	2B	.00330	.00191	2	25
		3A	.00190	.00110	1	24	3B	.00250	.00144	1	50
1.250-18	UNEF	2A	.00245	.00141	2	1	2B	.00315	.00182	2	36
		3A	.00180	.00104	1	29	3B	.00235	.00136	1	56
1.250-20	UN	2A	.00235	.00136	2	9	2B	.00305	.00176	2	48
		3A	.00175	.00101	1	36	3B	.00225	.00130	2	4
1.250-28	UN	2A	.00205	.00118	2	38	2B	.00265	.00153	3	24
		3A	.00155	.00089	1	59	3B	.00200	.00115	2	34
1.3125-8	UN	2A	.00355	.00205	1	18	2B	.00460	.00266	1	41
		3A	.00265	.00153	0	58	3B	.00345	.00199	1	16
1.3125-12	UN	2A	.00290	.00167	1	36	2B	.00375	.00217	2	4
		3A	.00215	.00124	1	11	3B	.00280	.00162	1	32
1.3125-16	UN	2A	.00255	.00147	1	52	2B	.00330	.00191	2	25
		3A	.00190	.00110	1	24	3B	.00250	.00144	1	50
1.3125-18	UNEF	2A	.00245	.00141	2	1	2B	.00315	.00182	2	36
		3A	.00180	.00104	1	29	3B	.00235	.00136	1	56
1.3125-20	UN	2A	.00235	.00136	2	9	2B	.00305	.00176	3	48
		3A	.00175	.00101	1	36	3B	.00225	.00130	2	4
1.3125-28	UN	2A	.00205	.00118	2	38	2B	.00265	.00153	3	24
		3A	.00155	.00089	1	59	3B	.00200	.00115	2	34
1.375-6	UNC	1A	.00600	.00346	1	39	1B	.00775	.00447	2	8
		2A	.00400	.00231	1	6	2B	.00520	.00300	1	26
		3A	.00300	.00173	0	50	3B	.00390	.00225	1	4
1.375-8	UN	2A	.00360	.00208	1	19	2B	.00465	.00268	1	42
		3A	.00270	.00156	0	59	3B	.00350	.00202	1	17
1.375-12	UNF	1A	.00470	.00271	2	35	1B	.00615	.00355	3	23
		2A	.00315	.00182	1	44	2B	.00410	.00237	2	15
		3A	.00235	.00136	1	18	3B	.00305	.00176	1	41
1.375-16	UN	2A	.00255	.00147	1	52	2B	.00330	.00191	2	25
		3A	.00190	.00110	1	24	3B	.00250	.00144	1	50
1.375-18	UNEF	2A	.00245	.00141	2	1	2B	.00315	.00182	2	36
		3A	.00180	.00104	1	29	3B	.00235	.00136	1	56

Table 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
1.375-20	UN	2A	.00235	.00136	2	9	2B	.00305	.00176	2	48
		3A	.00175	.00101	1	36	3B	.00225	.00130	2	4
1.375-28	UN	2A	.00205	.00118	2	38	2B	.00265	.00153	3	24
		3A	.00155	.00089	1	59	3B	.00200	.00115	2	34
1.4375-6	UN	2A	.00400	.00231	1	6	2B	.00520	.00300	1	26
		3A	.00300	.00173	0	50	3B	.00390	.00225	1	4
1.4375-8	UN	2A	.00360	.00208	1	19	2B	.00470	.00271	1	43
		3A	.00270	.00156	0	59	3B	.00355	.00205	1	18
1.4375-12	UN	2A	.00295	.00170	1	37	2B	.00380	.00219	2	5
		3A	.00220	.00127	1	13	3B	.00285	.00165	1	34
1.4375-16	UN	2A	.00260	.00150	1	54	2B	.00340	.00196	2	30
		3A	.00195	.00113	1	26	3B	.00255	.00147	1	52
1.4375-18	UNEF	2A	.00250	.00144	2	4	2B	.00325	.00188	2	41
		3A	.00185	.00107	1	32	3B	.00240	.00139	1	59
1.4375-20	UN	2A	.00240	.00139	2	12	2B	.00310	.00179	2	50
		3A	.00180	.00104	1	39	3B	.00230	.00133	2	6
1.4375-28	UN	2A	.00210	.00121	2	42	2B	.00275	.00159	3	31
		3A	.00155	.00089	1	59	3B	.00205	.00118	2	38
1.500-6	UNC	1A	.00605	.00349	1	40	1B	.00790	.00456	2	10
		2A	.00405	.00234	1	7	2B	.00525	.00303	1	27
		3A	.00305	.00176	0	50	3B	.00395	.00228	1	5
1.500-8	UN	2A	.00365	.00211	1	20	2B	.00475	.00274	1	44
		3A	.00275	.00159	1	0	3B	.00355	.00205	1	18
1.500-12	UNF	1A	.00480	.00277	2	38	1B	.00625	.00361	3	26
		2A	.00320	.00185	1	46	2B	.00415	.00240	2	17
		3A	.00240	.00139	1	19	3B	.00315	.00182	1	44
1.500-16	UN	2A	.00260	.00150	1	54	2B	.00340	.00196	2	30
		3A	.00195	.00113	1	26	3B	.00255	.00147	1	52
1.500-18	UNEF	2A	.00250	.00144	2	4	2B	.00325	.00188	2	41
		3A	.00185	.00107	1	32	3B	.00240	.00139	1	59
1.500-20	UN	2A	.00240	.00139	2	12	2B	.00310	.00179	2	50
		3A	.00180	.00104	1	39	3B	.00230	.00133	2	6
1.500-28	UN	2A	.00210	.00121	2	42	2B	.00275	.00159	3	31
		3A	.00155	.00089	1	59	3B	.00205	.00118	2	38
1.5625-6	UN	2A	.00410	.00237	1	8	2B	.00530	.00306	1	27
		3A	.00305	.00176	0	50	3B	.00400	.00231	1	6
1.5625-8	UN	2A	.00370	.00214	1	21	2B	.00480	.00277	1	46
		3A	.00275	.00159	1	0	3B	.00360	.00208	1	19
1.5625-12	UN	2A	.00295	.00170	1	37	2B	.00380	.00219	2	5
		3A	.00220	.00127	1	13	3B	.00285	.00165	1	34
1.5625-16	UN	2A	.00260	.00150	1	54	2B	.00340	.00196	2	30
		3A	.00195	.00113	1	26	3B	.00255	.00147	1	52
1.5625-18	UNEF	2A	.00250	.00144	2	4	2B	.00325	.00188	2	41
		3A	.00185	.00107	1	32	3B	.00240	.00139	1	59
1.5625-20	UN	2A	.00240	.00139	2	12	2B	.00310	.00179	2	50
		3A	.00180	.00104	1	39	3B	.00230	.00133	2	6
1.625-6	UN	2A	.00410	.00237	1	8	2B	.00535	.00309	1	28
		3A	.00310	.00179	0	51	3B	.00400	.00231	1	6
1.625-8	UN	2A	.00370	.00214	1	21	2B	.00485	.00280	1	47
		3A	.00280	.00162	1	2	3B	.00360	.00208	1	19
1.625-12	UN	2A	.00295	.00170	1	37	2B	.00380	.00219	2	5
		3A	.00220	.00127	1	13	3B	.00285	.00165	1	34
1.625-16	UN	2A	.00260	.00150	1	54	2B	.00340	.00196	2	30
		3A	.00195	.00113	1	26	3B	.00255	.00147	1	52
1.625-18	UNEF	2A	.00250	.00144	2	4	2B	.00325	.00188	2	41
		3A	.00185	.00107	1	32	3B	.00240	.00139	1	59

TABLE 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
1.625–20	UN	2A	.00240	.00139	2	12	2B	.00310	.00179	2	50
		3A	.00180	.00104	1	39	3B	.00230	.00133	2	6
1.6875–6	UN	2A	.00415	.00240	1	8	2B	.00540	.00312	1	29
		3A	.00310	.00179	0	51	3B	.00405	.00234	1	7
1.6875–8	UN	2A	.00375	.00217	1	22	2B	.00485	.00280	1	47
		3A	.00280	.00162	1	2	3B	.00365	.00211	1	20
1.6875–12	UN	2A	.00300	.00173	1	39	2B	.00390	.00225	2	9
		3A	.00225	.00130	1	14	3B	.00290	.00167	1	36
1.6875–16	UN	2A	.00265	.00153	1	57	2B	.00345	.00199	2	32
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
1.6875–18	UNEF	2A	.00255	.00147	2	6	2B	.00330	.00191	2	43
		3A	.00190	.00110	1	34	3B	.00245	.00141	2	1
1.6875–20	UN	2A	.00240	.00139	2	12	2B	.00315	.00182	2	53
		3A	.00180	.00104	1	39	3B	.00235	.00136	2	9
		1A	.00670	.00387	1	32	1B	.00870	.00502	2	0
1.750–5	UNC	2A	.00445	.00257	1	1	2B	.00580	.00335	1	20
		3A	.00335	.00193	0	46	3B	.00435	.00251	1	0
1.750–6	UN	2A	.00415	.00240	1	8	2B	.00540	.00312	1	29
		3A	.00315	.00182	0	52	3B	.00405	.00234	1	7
1.750–8	UN	2A	.00375	.00217	1	22	2B	.00490	.00283	1	48
		3A	.00285	.00165	1	3	3B	.00370	.00214	1	21
1.750–12	UN	2A	.00300	.00173	1	39	2B	.00390	.00225	2	9
		3A	.00225	.00130	1	14	3B	.00290	.00167	1	36
1.750–16	UN	2A	.00265	.00153	1	57	2B	.00345	.00199	2	32
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
1.750–20	UN	2A	.00240	.00139	2	12	2B	.00315	.00182	2	53
		3A	.00180	.00104	1	39	3B	.00235	.00136	2	9
1.8125–6	UN	2A	.00420	.00242	1	9	2B	.00545	.00315	1	30
		3A	.00315	.00182	0	52	3B	.00410	.00237	1	8
1.8125–8	UN	2A	.00380	.00219	1	24	2B	.00495	.00286	1	49
		3A	.00285	.00165	1	3	3B	.00370	.00214	1	21
1.8125–12	UN	2A	.00300	.00173	1	39	2B	.00390	.00225	2	9
		3A	.00225	.00130	1	14	3B	.00290	.00167	1	36
1.8125–16	UN	2A	.00265	.00153	1	57	2B	.00345	.00199	2	32
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
1.8125–20	UN	2A	.00240	.00139	2	12	2B	.00315	.00182	2	53
		3A	.00180	.00104	1	39	3B	.00235	.00136	2	9
1.875–6	UN	2A	.00420	.00242	1	9	2B	.00550	.00318	1	31
		3A	.00315	.00182	0	52	3B	.00410	.00237	1	8
1.875–8	UN	2A	.00385	.00222	1	25	2B	.00500	.00289	1	50
		3A	.00285	.00165	1	3	3B	.00375	.00217	1	22
1.875–12	UN	2A	.00300	.00173	1	39	2B	.00390	.00225	2	9
		3A	.00225	.00130	1	14	3B	.00290	.00167	1	36
1.875–16	UN	2A	.00265	.00153	1	57	2B	.00345	.00199	2	32
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
1.875–20	UN	2A	.00240	.00139	2	12	2B	.00315	.00182	2	53
		3A	.00180	.00104	1	39	3B	.00235	.00136	2	9
1.9375–6	UN	2A	.00425	.00245	1	10	2B	.00555	.00320	1	32
		3A	.00320	.00185	0	53	3B	.00415	.00240	1	8
1.9375–8	UN	2A	.00385	.00222	1	25	2B	.00500	.00289	1	50
		3A	.00290	.00167	1	4	3B	.00375	.00217	1	22
1.9375–12	UN	2A	.00305	.00176	1	41	2B	.00395	.00228	2	10
		3A	.00225	.00130	1	14	3B	.00295	.00170	1	37
1.9375–16	UN	2A	.00270	.00156	1	59	2B	.00350	.00202	2	34
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
1.9375–20	UN	2A	.00245	.00141	2	15	2B	.00320	.00185	2	56
		3A	.00185	.00107	1	42	3B	.00240	.00139	2	12

TABLE 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
2.000–4.5	UNC	1A	.00715	.00413	1	28	1B	.00930	.00537	1	55
		2A	.00475	.00274	0	59	2B	.00620	.00358	1	17
		3A	.00355	.00205	0	44	3B	.00465	.00268	0	58
2.000–6	UN	2A	.00430	.00248	1	11	2B	.00555	.00320	1	32
		3A	.00320	.00185	0	53	3B	.00415	.00240	1	8
2.000–8	UN	2A	.00390	.00225	1	26	2B	.00505	.00292	1	51
		3A	.00290	.00167	1	4	3B	.00380	.00219	1	24
2.000–12	UN	2A	.00305	.00176	1	41	2B	.00395	.00228	2	10
		3A	.00225	.00130	1	14	3B	.00295	.00170	1	37
2.000–16	UN	2A	.00270	.00156	1	59	2B	.00350	.00202	2	34
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
2.000–20	UN	2A	.00245	.00141	2	15	2B	.00320	.00185	2	56
		3A	.00185	.00107	1	42	3B	.00240	.00139	2	12
2.125–6	UN	2A	.00435	.00251	1	12	2B	.00565	.00326	1	33
		3A	.00325	.00188	0	54	3B	.00420	.00242	1	9
2.125–8	UN	2A	.00395	.00228	1	27	2B	.00510	.00294	1	52
		3A	.00295	.00170	1	5	3B	.00385	.00222	1	25
2.125–12	UN	2A	.00305	.00176	1	41	2B	.00395	.00228	2	10
		3A	.00225	.00130	1	14	3B	.00295	.00170	1	37
2.125–16	UN	2A	.00270	.00156	1	59	2B	.00350	.00202	2	34
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
2.125–20	UN	2A	.00245	.00141	2	15	2B	.00320	.00185	2	56
		3A	.00185	.00107	1	42	3B	.00240	.00139	2	12
2.250–4.5	UNC	1A	.00730	.00421	1	30	1B	.00950	.00548	1	58
		2A	.00485	.00280	1	0	2B	.00630	.00364	1	18
		3A	.00365	.00211	0	45	3B	.00475	.00274	0	59
2.250–6	UN	2A	.00440	.00254	1	13	2B	.00570	.00329	1	34
		3A	.00330	.00191	0	54	3B	.00425	.00245	1	10
2.250–8	UN	2A	.00400	.00231	1	28	2B	.00520	.00300	1	54
		3A	.00300	.00173	1	6	3B	.00390	.00225	1	26
2.250–12	UN	2A	.00305	.00176	1	41	2B	.00395	.00228	2	10
		3A	.00225	.00130	1	14	3B	.00295	.00170	1	37
2.250–16	UN	2A	.00270	.00156	1	59	2B	.00350	.00202	2	34
		3A	.00200	.00115	1	28	3B	.00260	.00150	1	54
2.250–20	UN	2A	.00245	.00141	2	15	2B	.00320	.00185	2	56
		3A	.00185	.00107	1	42	3B	.00240	.00139	2	12
2.375–6	UN	2A	.00445	.00257	1	13	2B	.00575	.00332	1	35
		3A	.00330	.00191	0	54	3B	.00430	.00248	1	11
2.375–8	UN	2A	.00405	.00234	1	29	2B	.00525	.00303	1	55
		3A	.00300	.00173	1	6	3B	.00395	.00228	1	27
2.375–12	UN	2A	.00310	.00179	1	42	2B	.00405	.00234	2	14
		3A	.00230	.00133	1	16	3B	.00300	.00173	1	39
2.375–16	UN	2A	.00275	.00159	2	1	2B	.00360	.00208	2	38
		3A	.00205	.00118	1	30	3B	.00270	.00156	1	59
2.375–20	UN	2A	.00255	.00147	2	20	2B	.00330	.00191	3	1
		3A	.00190	.00110	1	44	3B	.00250	.00144	2	17
2.500–4	UNC	1A	.00775	.00447	1	25	1B	.01010	.00583	1	51
		2A	.00520	.00300	0	57	2B	.00675	.00390	1	14
		3A	.00390	.00225	0	43	3B	.00505	.00292	0	56
2.500–6	UN	2A	.00450	.00260	1	14	2B	.00580	.00335	1	36
		3A	.00335	.00193	0	55	3B	.00435	.00251	1	12
2.500–8	UN	2A	.00410	.00237	1	30	2B	.00530	.00306	1	57
		3A	.00305	.00176	1	7	3B	.00400	.00231	1	28
2.500–12	UN	2A	.00310	.00179	1	42	2B	.00405	.00234	2	14
		3A	.00230	.00133	1	16	3B	.00300	.00173	1	39
2.500–16	UN	2A	.00275	.00159	2	1	2B	.00360	.00208	2	38
		3A	.00205	.00118	1	30	3B	.00270	.00156	1	59

Table 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
2.500-20	UN	2A	.00255	.00147	2	20	2B	.00330	.00191	3	1
		3A	.00190	.00110	1	44	3B	.00250	.00144	2	17
2.625-6	UN	2A	.00450	.00260	1	14	2B	.00590	.00341	1	37
		3A	.00340	.00196	0	56	3B	.00440	.00254	1	13
2.625-8	UN	2A	.00410	.00237	1	30	2B	.00535	.00309	1	58
		3A	.00310	.00179	1	8	3B	.00400	.00231	1	28
2.625-12	UN	2A	.00310	.00179	1	42	2B	.00405	.00234	2	14
		3A	.00230	.00133	1	16	3B	.00300	.00173	1	39
2.625-16	UN	2A	.00275	.00159	2	1	2B	.00360	.00208	2	38
		3A	.00205	.00118	1	30	3B	.00270	.00156	1	59
2.625-20	UN	2A	.00255	.00147	2	20	2B	.00330	.00191	3	1
		3A	.00190	.00110	1	44	3B	.00250	.00144	2	17
2.750-4	UNC	1A	.00790	.00456	1	27	1B	.01030	.00595	1	53
		2A	.00525	.00303	0	58	2B	.00685	.00395	1	15
		3A	.00395	.00228	0	43	3B	.00515	.00297	0	57
2.750-6	UN	2A	.00455	.00263	1	15	2B	.00595	.00344	1	38
		3A	.00340	.00196	0	56	3B	.00445	.00257	1	13
2.750-8	UN	2A	.00415	.00240	1	31	2B	.00540	.00312	1	59
		3A	.00315	.00182	1	9	3B	.00405	.00234	1	29
2.750-12	UN	2A	.00310	.00179	1	42	2B	.00405	.00234	2	14
		3A	.00230	.00133	1	16	3B	.00300	.00173	1	39
2.750-16	UN	2A	.00275	.00159	2	1	2B	.00360	.00208	2	38
		3A	.00205	.00118	1	30	3B	.00270	.00156	1	59
2.750-20	UN	2A	.00255	.00147	2	20	2B	.00330	.00191	3	1
		3A	.00190	.00110	1	44	3B	.00250	.00144	2	17
2.875-6	UN	2A	.00460	.00266	1	16	2B	.00600	.00346	1	39
		3A	.00345	.00199	0	57	3B	.00450	.00260	1	14
2.875-8	UN	2A	.00420	.00242	1	32	2B	.00550	.00318	2	1
		3A	.00315	.00182	1	9	3B	.00410	.00237	1	30
2.875-12	UN	2A	.00315	.00182	1	44	2B	.00410	.00237	2	15
		3A	.00235	.00136	1	18	3B	.00310	.00179	1	42
2.875-16	UN	2A	.00280	.00162	2	3	2B	.00365	.00211	2	40
		3A	.00210	.00121	1	32	3B	.00275	.00159	2	1
2.875-20	UN	2A	.00260	.00150	2	23	2B	.00340	.00196	3	7
		3A	.00195	.00113	1	47	3B	.00255	.00147	2	20
3.000-4	UNC	1A	.00805	.00465	1	29	1B	.01045	.00603	1	55
		2A	.00535	.00309	0	59	2B	.00695	.00401	1	16
		3A	.00400	.00231	0	44	3B	.00520	.00300	0	57
3.000-6	UN	2A	.00465	.00268	1	17	2B	.00605	.00349	1	40
		3A	.00350	.00202	0	58	3B	.00455	.00263	1	15
3.000-8	UN	2A	.00425	.00245	1	33	2B	.00555	.00320	2	2
		3A	.00320	.00185	1	10	3B	.00415	.00240	1	31
3.000-12	UN	2A	.00315	.00182	1	44	2B	.00410	.00237	2	15
		3A	.00235	.00136	1	18	3B	.00310	.00179	1	42
3.000-16	UN	2A	.00280	.00162	2	3	2B	.00365	.00211	2	40
		3A	.00210	.00121	1	32	3B	.00275	.00159	2	1
3.000-20	UN	2A	.00260	.00150	2	23	2B	.00340	.00196	3	7
		3A	.00195	.00113	1	47	3B	.00255	.00147	2	20
3.125-6	UN	2A	.00470	.00271	1	18	2B	.00610	.00352	1	41
		3A	.00350	.00202	0	58	3B	.00460	.00266	1	16
3.125-8	UN	2A	.00430	.00248	1	35	2B	.00560	.00323	2	3
		3A	.00320	.00185	1	10	3B	.00420	.00242	1	32
3.125-12	UN	2A	.00315	.00182	1	44	2B	.00410	.00237	2	15
		3A	.00235	.00136	1	18	3B	.00310	.00179	1	42
3.125-16	UN	2A	.00280	.00162	2	3	2B	.00365	.00211	2	40
		3A	.00210	.00121	1	32	3B	.00275	.00159	2	1

TABLE 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
3.250-4	UNC	1A	.00815	.00471	1	30	1B	.01060	.00612	1	57
		2A	.00545	.00315	1	0	2B	.00705	.00407	1	18
		3A	.00410	.00237	0	45	3B	.00530	.00306	0	58
3.250-6	UN	2A	.00475	.00274	1	18	2B	.00615	.00355	1	41
		3A	.00355	.00205	0	59	3B	.00460	.00266	1	16
3.250-8	UN	2A	.00435	.00251	1	36	2B	.00565	.00326	2	4
		3A	.00325	.00188	1	11	3B	.00425	.00245	1	33
3.250-12	UN	2A	.00315	.00182	1	44	2B	.00410	.00237	2	15
		3A	.00235	.00136	1	18	3B	.00310	.00179	1	42
3.250-16	UN	2A	.00280	.00162	2	3	2B	.00365	.00211	2	40
		3A	.00210	.00121	1	32	3B	.00275	.00159	2	1
3.375-6	UN	2A	.00475	.00274	1	18	2B	.00620	.00358	1	42
		3A	.00360	.00208	0	59	3B	.00465	.00268	1	17
3.375-8	UN	2A	.00440	.00254	1	37	2B	.00570	.00329	2	5
		3A	.00330	.00191	1	13	3B	.00425	.00245	1	33
3.375-12	UN	2A	.00320	.00185	1	46	2B	.00420	.00242	2	19
		3A	.00242	.00139	1	19	3B	.00315	.00182	1	44
3.375-16	UN	2A	.00290	.00167	2	8	2B	.00375	.00217	2	45
		3A	.00215	.00124	1	35	3B	.00280	.00162	2	3
3.500-4	UNC	1A	.00830	.00479	1	31	1B	.01075	.00621	1	58
		2A	.00550	.00318	1	0	2B	.00715	.00413	1	19
		3A	.00415	.00240	0	46	3B	.00540	.00312	0	59
3.500-6	UN	2A	.00480	.00277	1	19	2B	.00625	.00361	1	43
		3A	.00360	.00208	0	59	3B	.00470	.00271	1	18
3.500-8	UN	2A	.00440	.00254	1	37	2B	.00575	.00332	2	6
		3A	.00330	.00191	1	13	3B	.00430	.00248	1	35
3.500-12	UN	2A	.00320	.00185	1	46	2B	.00420	.00242	2	19
		3A	.00240	.00139	1	19	3B	.00315	.00182	1	44
3.500-16	UN	2A	.00290	.00167	2	8	2B	.00375	.00217	2	45
		3A	.00215	.00124	1	35	3B	.00280	.00162	2	3
3.625-6	UN	2A	.00485	.00280	1	20	2B	.00630	.00364	1	44
		3A	.00365	.00211	1	0	3B	.00475	.00274	1	18
3.625-8	UN	2A	.00445	.00257	1	38	2B	.00580	.00335	2	8
		3A	.00335	.00193	1	14	3B	.00435	.00251	1	36
3.625-12	UN	2A	.00320	.00185	1	46	2B	.00420	.00242	2	19
		3A	.00240	.00139	1	19	3B	.00315	.00182	1	44
3.625-16	UN	2A	.00290	.00167	2	8	2B	.00375	.00217	2	45
		3A	.00215	.00124	1	35	3B	.00280	.00162	2	3
3.750-4	UNC	1A	.00840	.00485	1	32	1B	.01090	.00629	2	0
		2A	.00560	.00323	1	2	2B	.00725	.00419	1	20
		3A	.00420	.00242	0	46	3B	.00545	.00315	1	0
3.750-6	UN	2A	.00490	.00283	1	21	2B	.00635	.00367	1	45
		3A	.00365	.00211	1	0	3B	.00475	.00274	1	18
3.750-8	UN	2A	.00450	.00260	1	39	2B	.00585	.00338	2	9
		3A	.00335	.00193	1	14	3B	.00440	.00254	1	37
3.750-12	UN	2A	.00320	.00185	1	46	2B	.00420	.00242	2	19
		3A	.00240	.00139	1	19	3B	.00315	.00182	1	44
3.750-16	UN	2A	.00290	.00167	2	8	2B	.00375	.00217	2	45
		3A	.00215	.00124	1	35	3B	.00280	.00162	2	3
3.875-6	UN	2A	.00495	.00286	1	22	2B	.00640	.00369	1	46
		3A	.00370	.00214	1	1	3B	.00480	.00277	1	19
3.875-8	UN	2A	.00455	.00263	1	40	2B	.00590	.00341	2	10
		3A	.00340	.00196	1	15	3B	.00440	.00254	1	37
3.875-12	UN	2A	.00325	.00188	1	47	2B	.00425	.00245	2	20
		3A	.00245	.00141	1	21	3B	.00320	.00185	1	46
3.875-16	UN	2A	.00295	.00170	2	10	2B	.00380	.00219	2	47
		3A	.00220	.00127	1	37	3B	.00285	.00165	2	5

TABLE 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
4.000-4	UNC	1A	.00850	.00491	1	33	1B	.01105	.00638	2	2
		2A	.00565	.00326	1	2	2B	.00735	.00424	1	21
		3A	.00425	.00245	0	47	3B	.00555	.00320	1	1
4.000-6	UN	2A	.00495	.00286	1	22	2B	.00645	.00372	1	46
		3A	.00370	.00214	1	1	3B	.00485	.00280	1	20
4.000-8	UN	2A	.00455	.00263	1	40	2B	.00595	.00344	2	11
		3A	.00340	.00196	1	15	3B	.00445	.00257	1	38
4.000-12	UN	2A	.00325	.00188	1	47	2B	.00425	.00245	2	20
		3A	.00245	.00141	1	21	3B	.00320	.00185	1	46
4.000-16	UN	2A	.00295	.00170	2	10	2B	.00380	.00219	2	47
		3A	.00220	.00127	1	37	3B	.00285	.00165	2	5
4.125-6	UN	2A	.00500	.00289	1	22	2B	.00650	.00375	1	47
		3A	.00375	.00217	1	2	3B	.00485	.00280	1	20
4.125-12	UN	2A	.00325	.00188	1	47	2B	.00425	.00245	2	20
		3A	.00245	.00141	1	21	3B	.00320	.00185	1	46
4.125-16	UN	2A	.00295	.00170	2	10	2B	.00380	.00219	2	47
		3A	.00220	.00127	1	37	3B	.00285	.00165	2	5
4.250-4	UN	2A	.00575	.00332	1	3	2B	.00745	.00430	1	22
		3A	.00430	.00248	0	47	3B	.00560	.00323	1	2
4.250-6	UN	2A	.00505	.00292	1	23	2B	.00655	.00378	1	48
		3A	.00375	.00217	1	2	3B	.00490	.00283	1	21
4.250-12	UN	2A	.00325	.00188	1	47	2B	.00425	.00245	2	20
		3A	.00245	.00141	1	21	3B	.00320	.00185	1	46
4.250-16	UN	2A	.00295	.00170	2	10	2B	.00380	.00219	2	47
		3A	.00220	.00127	1	37	3B	.00285	.00165	2	5
4.375-6	UN	2A	.00505	.00292	1	23	2B	.00660	.00381	1	49
		3A	.00380	.00219	1	3	3B	.00495	.00286	1	22
4.375-12	UN	2A	.00325	.00188	1	47	2B	.00425	.00245	2	20
		3A	.00245	.00141	1	21	3B	.00320	.00185	1	46
4.375-16	UN	2A	.00295	.00170	2	10	2B	.00380	.00219	2	47
		3A	.00220	.00127	1	37	3B	.00285	.00165	2	5
4.500-4	UN	2A	.00580	.00335	1	4	2B	.00755	.00436	1	23
		3A	.00435	.00251	0	48	3B	.00565	.00326	1	2
4.500-6	UN	2A	.00510	.00294	1	24	2B	.00665	.00384	1	50
		3A	.00385	.00222	1	4	3B	.00495	.00286	1	22
4.500-12	UN	2A	.00325	.00188	1	47	2B	.00425	.00245	2	20
		3A	.00245	.00141	1	21	3B	.00320	.00185	1	46
4.500-16	UN	2A	.00295	.00170	2	10	2B	.00380	.00219	2	47
		3A	.00220	.00127	1	37	3B	.00285	.00165	2	5
4.625-6	UN	2A	.00515	.00297	1	25	2B	.00665	.00384	1	50
		3A	.00385	.00222	1	4	3B	.00500	.00289	1	22
4.625-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
4.625-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
4.750-4	UN	2A	.00585	.00338	1	4	2B	.00765	.00442	1	24
		3A	.00440	.00254	0	48	3B	.00570	.00329	1	3
4.750-6	UN	2A	.00515	.00297	1	25	2B	.00670	.00387	1	51
		3A	.00385	.00222	1	4	3B	.00505	.00292	1	23
4.750-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
4.750-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	29	3B	.00295	.00170	2	10
4.875-6	UN	2A	.00520	.00300	1	26	2B	.00675	.00390	1	51
		3A	.00390	.00225	1	4	3B	.00505	.00292	1	23

Table 2.22. *Deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	External					Internal				
		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle		Class	Half of pitch diameter tolerance	Equivalent deviation in lead	Equivalent deviation in half-angle	
1	2	3	4	5	6		7	8	9	10	
			in	*in*	*deg*	*min*		*in*	*in*	*deg*	*min*
4.875-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	1	23
		3A	.00250	.00144	1	22	3B	.00330	.00101	1	49
4.875-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
5.000-4	UN	2A	.00595	.00344	1	5	2B	.00770	.00445	1	25
		3A	.00445	.00257	0	49	3B	.00580	.00335	1	4
5.000-6	UN	2A	.00525	.00303	1	27	2B	.00680	.00393	1	52
		3A	.00390	.00225	1	4	3B	.00510	.00294	1	24
5.000-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
5.000-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
5.125-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
5.125-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
5.250-4	UN	2A	.00600	.00346	1	6	2B	.00780	.00450	1	26
		3A	.00450	.00260	0	50	3B	.00585	.00338	1	4
5.250-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
5.250-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
5.375-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
5.375-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
5.500-4	UN	2A	.00605	.00349	1	7	2B	.00790	.00456	1	27
		3A	.00455	.00263	0	50	3B	.00590	.00341	1	5
5.500-12	UN	2A	.00335	.00193	1	51	2B	.00435	.00251	2	23
		3A	.00250	.00144	1	22	3B	.00330	.00191	1	49
5.500-16	UN	2A	.00305	.00176	2	14	2B	.00395	.00228	2	54
		3A	.00225	.00130	1	39	3B	.00295	.00170	2	10
5.625-12	UN	2A	.00345	.00199	1	54	2B	.00450	.00260	2	28
		3A	.00260	.00150	1	26	3B	.00335	.00193	1	51
5.625-16	UN	2A	.00310	.00179	2	16	2B	.00405	.00234	2	58
		3A	.00235	.00136	1	43	3B	.00305	.00176	2	14
5.750-4	UN	2A	.00610	.00352	1	7	2B	.00795	.00459	1	27
		3A	.00460	.00266	0	51	3B	.00595	.00344	1	5
5.750-12	UN	2A	.00345	.00199	1	54	2B	.00450	.00260	2	28
		3A	.00260	.00150	1	26	3B	.00335	.00193	1	51
5.750-16	UN	2A	.00310	.00179	2	16	2B	.00405	.00234	2	58
		3A	.00235	.00136	1	43	3B	.00305	.00176	2	14
5.875-12	UN	2A	.00345	.00199	1	54	2B	.00450	.00260	2	28
		3A	.00260	.00150	1	26	3B	.00335	.00193	1	51
5.875-16	UN	2A	.00310	.00179	2	16	2B	.00405	.00234	2	58
		3A	.00235	.00136	1	43	3B	.00305	.00176	2	14
6.000-4	UN	2A	.00620	.00358	1	8	2B	.00805	.00465	1	29
		3A	.00465	.00268	0	51	3B	.00600	.00346	1	6
6.000-12	UN	2A	.00345	.00199	1	54	2B	.00450	.00260	2	28
		3A	.00260	.00150	1	26	3B	.00335	.00193	1	51
6.000-16	UN	2A	.00310	.00179	2	16	2B	.00405	.00234	2	58
		3A	.00235	.00136	1	43	3B	.00305	.00176	2	14

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UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

SECTION 3

1969

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

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1. INTRODUCTION

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

2. TYPES OF SPECIAL THREADS

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

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

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

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

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

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

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

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

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

3. UNIFIED FORM OF THREAD

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

4. PREFERRED DIAMETERS AND PITCHES

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

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

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

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

4.2. Preferred Pitches.—Whenever possible, the pitch should be selected from the series 40, 36, 32, 28, 24, 20, 16, 12, 10, 8, 6, and 4 threads per inch. Intermediate pitches should be used only when absolutely necessary. Pitches coarser than 4 threads per inch are not recommended.

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

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

5. THREAD CLASSES

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

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

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

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

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

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

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

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

The maximum diameters of class 2A (external) uncoated threads are less than basic by the amount of the allowance. The allowance minimizes galling and seizing in high-cycle wrench assembly, or it can be used to accommodate plated finishes or other coating. However, for threads with additive finish, the maximum diameters of class 2A may be exceeded by the amount of the allowance; i.e., the 2A maximum diameters apply to an unplated part or to a part before plating, whereas the basic diameters (the 2A maximum diameter plus allowance) apply to a part after plating. The minimum diameters of class 2B (internal) threads, whether or not plated or coated, are basic, affording no allowance or clearance in assembly at maximum material limits.

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

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

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

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

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

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

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

6. ALLOWANCES

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

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

Numerical values of class 1AR allowances are:

Threads per inch (tpi), n	Class 1AR allowance
	in
16	0.0018
14	.0021
12	.0024
10	.0028
8	.0034
6	.0044
4	.0064

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

7. TOLERANCES

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

7.1. Uniform Minimum Internal Thread.—The minimum major, pitch, and minor diameters of the internal thread are, respectively, the same for classes 1B, 2B, and 3B.

7.2. Direction and Scope of Tolerances.—

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

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

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

7.3. Pitch Diameter Tolerances.—The basic formula for pitch diameter tolerance is composed of the following increments:

P.D. Tolerance

$$= C(0.0015\sqrt[3]{D} + 0.0015\sqrt{L_e} + 0.015\sqrt[3]{p^2}),$$

where

C = a factor which differs for each class
D = basic major diameter
L_e = length of engagement
p = pitch.

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

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

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

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

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

Threads per inch	Major diameter tolerance	
	Classes 1A and 1AR, $0.090\sqrt[3]{p^2}$	Classes 2A and 3A, $0.060\sqrt[3]{p^2}$
	in	*in*
80	------------------	0.0032
72	------------------	.0035
64	------------------	.0038
56	------------------	.0041
48	------------------	.0045
44	------------------	.0048
40	0.0077	.0051
36	.0083	.0055
32	.0089	.0060
28	.0098	.0065
27	.0100	.0067
24	.0108	.0072
20	.0122	.0081
18	.0131	.0087
16	.0142	.0094
14	.0155	.0103
12	.0172	.0114
10	.0194	.0129
8	.0225	.0150
6	.0273	.0182
4	.0357	.0238

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

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

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

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

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

8. LENGTH OF ENGAGEMENT

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

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

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

$$0.25p - 0.4p^2.$$

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

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

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

9. LIMITS OF SIZE

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

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

Variations in taper and roundness of the pitch diameter, together with variations of the pitch diameter as a whole, may be in the direction of minimum material and thus the minimum-material pitch diameter limit may be specified as a limitation of the pitch diameter as a single element. However, in view of the interrelation of the pitch diameter, variations in lead and flank angle, etc., together with practical considerations relating to established production processes, product application and inspection procedures, except for class 3A, for fasteners and some custom threaded parts, it is customary to base acceptance at the minimum-material condition (minimum pitch diameter of the external thread and maximum pitch diameter of the internal thread) on threaded plug and ring gaging, with gages to the thread form and length specified in section 6. See Dimensional acceptability of threads in that section.

10. METHOD OF DESIGNATING SPECIAL SCREW THREADS

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

The symbol "UNS" is applicable to any thread,
(1) having the basic Unified thread form,
(2) with limits based on Unified formulations, and
(3) which is not listed in table 2.7.

Selected combinations of UNS threads are listed in table 3.1.

11. DIRECTIONS FOR DETERMINING LIMITS OF SIZE OF SPECIAL THREADS

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

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

Internal thread, 2.500-28UNS-2B
Length of engagement, 1 in.

Min major diameter = 2.5000 in.
Min pitch diameter = basic major diameter − $0.75H$ (table 2.1)
= 2.5000 − 0.0232 = 2.4768
Max pitch diameter = min pitch diameter + tolerance (table 3.7)
= 2.4768 + 0.0064 = 2.4832
Min minor diameter = basic major diameter − $1.25H$ (table 2.1)
= 2.500 − 0.0387 = 2.461
Max minor diameter = min minor diameter + tolerance (table 3.9)
= 2.4613 + 0.0063 = 2.468.

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

Major diameter: 2.5000 min
Pitch diameter: 2.4768 + 0.0064
− 0.0000
Minor diameter: 2.461 + 0.0063
− 0.0000.

Threads per inch	Major diameter tolerance	
	Classes 1A and 1AR, $0.090\sqrt[3]{p^2}$	Classes 2A and 3A, $0.060\sqrt[3]{p^2}$
	in	*in*
80	----------	0.0032
72	----------	.0035
64	----------	.0038
56	----------	.0041
48	----------	.0045
44	----------	.0048
40	0.0077	.0051
36	.0083	.0055
32	.0089	.0060
28	.0098	.0065
27	.0100	.0067
24	.0108	.0072
20	.0122	.0081
18	.0131	.0087
16	.0142	.0094
14	.0155	.0103
12	.0172	.0114
10	.0194	.0129
8	.0225	.0150
6	.0273	.0182
4	.0357	.0238

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

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

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

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

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

8. LENGTH OF ENGAGEMENT

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

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

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

$$0.25p - 0.4p^2.$$

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

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

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

9. LIMITS OF SIZE

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

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

Variations in taper and roundness of the pitch diameter, together with variations of the pitch diameter as a whole, may be in the direction of minimum material and thus the minimum-material pitch diameter limit may be specified as a limitation of the pitch diameter as a single element. However, in view of the interrelation of the pitch diameter, variations in lead and flank angle, etc., together with practical considerations relating to established production processes, product application and inspection procedures, except for class 3A, for fasteners and some custom threaded parts, it is customary to base acceptance at the minimum-material condition (minimum pitch diameter of the external thread and maximum pitch diameter of the internal thread) on threaded plug and ring gaging, with gages to the thread form and length specified in section 6. See Dimensional acceptability of threads in that section.

10. METHOD OF DESIGNATING SPECIAL SCREW THREADS

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

The symbol "UNS" is applicable to any thread,

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

Selected combinations of UNS threads are listed in table 3.1.

11. DIRECTIONS FOR DETERMINING LIMITS OF SIZE OF SPECIAL THREADS

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

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

Internal thread, 2.500-28UNS-2B
Length of engagement, 1 in.

Min major diameter = 2.5000 in.
Min pitch diameter = basic major diameter − $0.75H$ (table 2.1)
= 2.5000 − 0.0232 = 2.4768
Max pitch diameter = min pitch diameter + tolerance (table 3.7)
= 2.4768 + 0.0064 = 2.4832
Min minor diameter = basic major diameter − $1.25H$ (table 2.1)
= 2.500 − 0.0387 = 2.461
Max minor diameter = min minor diameter + tolerance (table 3.9)
= 2.4613 + 0.0063 = 2.468.

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

Major diameter: 2.5000 min
Pitch diameter: 2.4768 + 0.0064 − 0.0000
Minor diameter: 2.461 + 0.0063 − 0.0000.

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

Max major diameter = basic major diameter − allowance (table 3.2)
= 2.5000 − 0.0014 = 2.4986

Min major diameter = max major diameter − tolerance (tabulated on p. 3.04)
= 2.4986 − 0.0065 = 2.4921

Max pitch diameter = max major diameter − $0.75H$ (table 2.1)
= 2.4986 − 0.0232 = 2.4754

Min pitch diameter = max pitch diameter − tolerance (table 3.4)
= 2.4754 − 0.0049 = 2.4705

Nom minor diameter = max major diameter − $17H/12$ ($1.4167H$) (table 2.1)
= 2.4986 − 0.0438 = 2.4548.

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

Major diameter: 2.4986 $\begin{matrix}+0.0000\\-0.0065\end{matrix}$

Pitch diameter: 2.4754 $\begin{matrix}+0.0000\\-0.0049\end{matrix}$

Minor diameter: 2.4548, nominal.

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

12. GAGES

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

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

Nominal size and threads per inch	External[a]								Internal[a]						
	Class	Allowance	Major diameter		Pitch diameter			[c] Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter
			Max[b]	Min	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		in	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
.190–28	2A	0.0010	0.1890	0.1825	0.1658	0.1625	0.0033	0.1452	2B	0.151	0.160	0.1668	0.1711	0.0043	0.1900
.190–36	2A	.0009	.1891	.1836	.1711	.1681	.0030	.1550	2B	.160	.166	.1720	.1759	.0039	.1900
.190–40	2A	.0009	.1891	.1840	.1729	.1700	.0029	.1584	2B	.163	.169	.1738	.1775	.0037	.1900
.190–48	2A	.0008	.1892	.1847	.1757	.1731	.0026	.1636	2B	.167	.172	.1765	.1799	.0034	.1900
.190–56	2A	.0007	.1893	.1852	.1777	.1752	.0025	.1674	2B	.171	.175	.1784	.1816	.0032	.1900
.216–36	2A	.0009	.2151	.2096	.1971	.1941	.0030	.1810	2B	.186	.192	.1980	.2019	.0039	.2160
.216–40	2A	.0009	.2151	.2100	.1989	.1960	.0029	.1844	2B	.189	.195	.1998	.2035	.0037	.2160
.216–48	2A	.0008	.2152	.2107	.2017	.1991	.0026	.1896	2B	.193	.198	.2025	.2059	.0034	.2160
.216–56	2A	.0007	.2153	.2112	.2037	.2012	.0025	.1934	2B	.197	.201	.2044	.2076	.0032	.2160
.250–24	2A	.0011	.2489	.2417	.2218	.2181	.0037	.1978	2B	.205	.215	.2229	.2277	.0048	.2500
.250–27	2A	.0010	.2490	.2423	.2249	.2214	.0035	.2036	2B	.210	.219	.2259	.2304	.0045	.2500
.250–36	2A	.0009	.2491	.2436	.2311	.2280	.0031	.2150	2B	.220	.226	.2320	.2360	.0040	.2500
.250–40	2A	.0009	.2491	.2440	.2329	.2300	.0029	.2184	2B	.223	.229	.2338	.2376	.0038	.2500
.250–48	2A	.0008	.2492	.2447	.2357	.2330	.0027	.2236	2B	.227	.232	.2365	.2401	.0036	.2500
.250–56	2A	.0008	.2492	.2451	.2376	.2350	.0026	.2273	2B	.231	.235	.2384	.2417	.0033	.2500
.3125–27	2A	.0010	.3115	.3048	.2874	.2839	.0035	.2661	2B	.272	.281	.2884	.2929	.0045	.3125
.3125–36	2A	.0009	.3116	.3061	.2936	.2905	.0031	.2775	2B	.282	.289	.2945	.2985	.0040	.3125
.3125–40	2A	.0009	.3116	.3065	.2954	.2925	.0029	.2809	2B	.285	.291	.2963	.3001	.0038	.3125
.3125–48	2A	.0008	.3117	.3072	.2982	.2955	.0027	.2861	2B	.290	.295	.2990	.3026	.0036	.3125
.375–18	2A	.0013	.3737	.3650	.3376	.3333	.0043	.3055	2B	.315	.328	.3389	.3445	.0056	.3750
.375–27	2A	.0011	.3739	.3672	.3498	.3462	.0036	.3285	2B	.335	.344	.3509	.3556	.0047	.3750
.375–36	2A	.0010	.3740	.3685	.3560	.3528	.0032	.3399	2B	.345	.352	.3570	.3612	.0042	.3750
.375–40	2A	.0009	.3741	.3690	.3579	.3548	.0031	.3434	2B	.348	.354	.3588	.3628	.0040	.3750
.390–27	2A	.0011	.3889	.3822	.3648	.3612	.0036	.3435	2B	.350	.359	.3659	.3706	.0047	.3900
.4375–18	2A	.0013	.4362	.4275	.4001	.3958	.0043	.3680	2B	.377	.390	.4014	.4070	.0056	.4375
.4375–24	2A	.0011	.4364	.4292	.4093	.4055	.0038	.3853	2B	.392	.402	.4104	.4153	.0049	.4375
.4375–27	2A	.0011	.4364	.4297	.4123	.4087	.0036	.3910	2B	.397	.406	.4134	.4181	.0047	.4375
.4375–36	2A	.0011	.4365	.4310	.4185	.4153	.0032	.4024	2B	.407	.414	.4195	.4237	.0042	.4375
.4375–40	2A	.0009	.4366	.4315	.4204	.4173	.0031	.4059	2B	.410	.416	.4213	.4253	.0040	.4375
.500–12	2A	.0016	.4984	.4870	.4443	.4389	.0054	.3962	2B	.410	.428	.4459	.4529	.0070	.5000
	3A	.0000	.5000	.4886	.4459	.4419	.0040	.3978	3B	.4100	.4223	.4459	.4511	.0052	.5000
.500–14	2A	.0015	.4985	.4882	.4521	.4471	.0050	.4109	2B	.423	.438	.4536	.4601	.0065	.5000
.500–18	2A	.0013	.4987	.4900	.4626	.4582	.0044	.4305	2B	.440	.453	.4639	.4697	.0058	.5000
.500–24	2A	.0012	.4988	.4916	.4717	.4678	.0039	.4477	2B	.455	.465	.4729	.4780	.0051	.5000
.500–27	2A	.0011	.4989	.4922	.4748	.4711	.0037	.4535	2B	.460	.469	.4759	.4807	.0048	.5000
.500–36	2A	.0010	.4990	.4935	.4810	.4777	.0033	.4649	2B	.470	.476	.4820	.4863	.0043	.5000
.500–40	2A	.0010	.4990	.4939	.4828	.4796	.0032	.4683	2B	.473	.479	.4838	.4879	.0041	.5000
.5625–14	2A	.0015	.5610	.5507	.5146	.5096	.0050	.4734	2B	.485	.501	.5161	.5226	.0065	.5625
.5625–27	2A	.0011	.5614	.5547	.5373	.5336	.0037	.5160	2B	.522	.531	.5384	.5432	.0048	.5625
.5625–36	2A	.0010	.5615	.5560	.5435	.5402	.0033	.5274	2B	.532	.539	.5445	.5488	.0043	.5625
.5625–40	2A	.0010	.5615	.5564	.5453	.5421	.0032	.5308	2B	.535	.541	.5463	.5504	.0041	.5625
.625–14	2A	.0015	.6235	.6132	.5771	.5720	.0051	.5359	2B	.548	.564	.5786	.5852	.0066	.6250

See footnotes at end of table.

Nominal size and threads per inch	External[a]								Internal[a]						
	Class	Allowance	Major diameter		Pitch diameter			(c) Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter
			Max[b]	Min	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		in	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
.625–27	2A	.0011	.6239	.6172	.5998	.5960	.0038	.5785	2B	.585	.594	.6009	.6059	.0050	.6250
.625–36	2A	.0010	.6240	.6185	.6060	.6026	.0034	.5899	2B	.595	.602	.6070	.6114	.0044	.6250
.625–40	2A	.0010	.6240	.6189	.6078	.6045	.0033	.5933	2B	.598	.604	.6088	.6131	.0043	.6250
.750–14	2A	.0015	.7485	.7382	.7021	.6970	.0051	.6609	2B	.673	.688	.7036	.7103	.0067	.7500
.750–18	2A	.0014	.7486	.7399	.7125	.7079	.0046	.6804	2B	.690	.703	.7139	.7199	.0060	.7500
.750–24	2A	.0012	.7488	.7416	.7217	.7176	.0041	.6977	2B	.705	.715	.7229	.7282	.0053	.7500
.750–27	2A	.0012	.7488	.7421	.7247	.7208	.0039	.7034	2B	.710	.719	.7259	.7310	.0051	.7500
.750–36	2A	.0010	.7490	.7435	.7310	.7275	.0035	.7149	2B	.720	.726	.7320	.7365	.0045	.7500
.750–40	2A	.0010	.7490	.7439	.7328	.7294	.0034	.7183	2B	.723	.729	.7338	.7382	.0044	.7500
.875–10	2A	.0018	.8732	.8603	.8082	.8022	.0060	.7505	2B	.767	.788	.8100	.8178	.0078	.8750
.875–18	2A	.0014	.8736	.8649	.8375	.8329	.0046	.8054	2B	.815	.828	.8389	.8449	.0060	.8750
.875–24	2A	.0012	.8738	.8666	.8467	.8426	.0041	.8227	2B	.830	.840	.8479	.8532	.0053	.8750
.875–27	2A	.0012	.8738	.8671	.8497	.8458	.0039	.8284	2B	.835	.844	.8509	.8560	.0051	.8750
.875–36	2A	.0010	.8740	.8685	.8560	.8525	.0035	.8399	2B	.845	.852	.8570	.8615	.0045	.8750
.875–40	2A	.0010	.8740	.8689	.8578	.8544	.0034	.8433	2B	.848	.854	.8588	.8632	.0044	.8750
1.000–10	2A	.0018	.9982	.9853	.9332	.9270	.0062	.8755	2B	.892	.913	.9350	.9430	.0080	1.0000
1.000–14[d]	1A	.0017	.9983	.9828	.9519	.9435	.0084	.9107	1B	.923	.938	.9536	.9645	.0109	1.0000
	2A	.0017	.9983	.9880	.9519	.9463	.0056	.9107	2B	.923	.938	.9536	.9609	.0073	1.0000
	3A	.0000	1.0000	.9897	.9536	.9494	.0042	.9124	3B	.9230	.9315	.9536	.9590	.0054	1.0000
1.000–18	2A	.0014	.9986	.9899	.9625	.9578	.0047	.9304	2B	.940	.953	.9639	.9701	.0062	1.0000
1.000–24	2A	.0013	.9987	.9915	.9716	.9674	.0042	.9476	2B	.955	.965	.9729	.9784	.0055	1.0000
1.000–27	2A	.0012	.9988	.9921	.9747	.9707	.0040	.9534	2B	.960	.969	.9759	.9811	.0052	1.0000
1.000–36	2A	.0011	.9989	.9934	.9809	.9773	.0036	.9648	2B	.970	.976	.9820	.9867	.0047	1.0000
1.000–40	2A	.0010	.9990	.9939	.9828	.9793	.0035	.9683	2B	.973	.979	.9838	.9883	.0045	1.0000
1.125–10	2A	.0018	1.1232	1.1103	1.0582	1.0520	.0062	1.0005	2B	1.017	1.038	1.0600	1.0680	.0080	1.1250
1.125–14	2A	.0016	1.1234	1.1131	1.0770	1.0717	.0053	1.0358	2B	1.048	1.064	1.0786	1.0855	.0069	1.1250
1.125–24	2A	.0013	1.1237	1.1165	1.0966	1.0924	.0042	1.0726	2B	1.080	1.090	1.0979	1.1034	.0055	1.1250
1.250–10	2A	.0019	1.2481	1.2352	1.1831	1.1768	.0063	1.1254	2B	1.142	1.163	1.1850	1.1932	.0082	1.2500
1.250–14	2A	.0016	1.2484	1.2381	1.2020	1.1966	.0054	1.1608	2B	1.173	1.188	1.2036	1.2106	.0070	1.2500
1.250–24	2A	.0013	1.2487	1.2415	1.2216	1.2173	.0043	1.1976	2B	1.205	1.215	1.2229	1.2285	.0056	1.2500
1.375–10	2A	.0019	1.3731	1.3602	1.3081	1.3018	.0063	1.2504	2B	1.267	1.288	1.3100	1.3182	.0082	1.3750
1.375–14	2A	.0016	1.3734	1.3631	1.3270	1.3216	.0054	1.2858	2B	1.298	1.314	1.3286	1.3356	.0070	1.3750
1.375–24	2A	.0013	1.3737	1.3665	1.3466	1.3423	.0043	1.3226	2B	1.330	1.340	1.3479	1.3535	.0056	1.3750
1.500–10	2A	.0019	1.4981	1.4852	1.4331	1.4267	.0064	1.3754	2B	1.392	1.413	1.4350	1.4433	.0083	1.5000
1.500–14	2A	.0017	1.4983	1.4880	1.4519	1.4464	.0055	1.4107	2B	1.423	1.438	1.4536	1.4608	.0072	1.5000
1.500–24	2A	.0013	1.4987	1.4915	1.4716	1.4672	.0044	1.4476	2B	1.455	1.465	1.4729	1.4787	.0058	1.5000
1.625–10	2A	.0019	1.6231	1.6102	1.5581	1.5517	.0064	1.5004	2B	1.517	1.538	1.5600	1.5683	.0083	1.6250
1.625–14	2A	.0017	1.6233	1.6130	1.5769	1.5714	.0055	1.5357	2B	1.548	1.564	1.5786	1.5858	.0072	1.6250
1.625–24	2A	.0013	1.6237	1.6165	1.5966	1.5922	.0044	1.5726	2B	1.580	1.590	1.5979	1.6037	.0058	1.6250
1.750–10	2A	.0019	1.7481	1.7352	1.6831	1.6766	.0065	1.6254	2B	1.642	1.663	1.6850	1.6934	.0084	1.7500
1.750–14	2A	.0017	1.7483	1.7380	1.7019	1.6963	.0056	1.6607	2B	1.673	1.688	1.7036	1.7109	.0073	1.7500

See footnotes at end of table.

Nominal size and threads per inch	External[a]								Internal[a]						
	Class	Allowance	Major diameter		Pitch diameter			(c) Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter
			Max[b]	Min	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		in	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
1.750–18	2A	.0015	1.7485	1.7398	1.7124	1.7073	.0051	1.6803	2B	1.690	1.703	1.7139	1.7205	.0066	1.7500
1.875–10	2A	.0019	1.8731	1.8602	1.8081	1.8016	.0065	1.7504	2B	1.767	1.788	1.8100	1.8184	.0084	1.8750
1.875–14	2A	.0017	1.8733	1.8630	1.8269	1.8213	.0056	1.7857	2B	1.798	1.814	1.8286	1.8359	.0073	1.8750
1.875–18	2A	.0015	1.8735	1.8648	1.8374	1.8323	.0051	1.8053	2B	1.815	1.828	1.8389	1.8455	.0066	1.8750
2.000–10	2A	.0020	1.9980	1.9851	1.9330	1.9265	.0065	1.8753	2B	1.892	1.913	1.9350	1.9435	.0085	2.0000
2.000–14	2A	.0017	1.9983	1.9880	1.9519	1.9462	.0057	1.9107	2B	1.923	1.938	1.9536	1.9610	.0074	2.0000
2.000–18	2A	.0015	1.9985	1.9898	1.9624	1.9573	.0051	1.9303	2B	1.940	1.953	1.9639	1.9706	.0067	2.0000
2.0625–16	2A 3A	.0016 .0000	2.0609 2.0625	2.0515 2.0531	2.0203 2.0219	2.0149 2.0179	.0054 .0040	1.9842 1.9858	2B 3B	1.995 1.9950	2.009 2.0033	2.0219 2.0219	2.0289 2.0271	.0070 .0052	2.0625 2.0625
2.1875–16	2A 3A	.0016 .0000	2.1859 2.1875	2.1765 2.1781	2.1453 2.1469	2.1399 2.1428	.0054 .0041	2.1092 2.1108	2B 3B	2.120 2.1200	2.134 2.1283	2.1469 2.1469	2.1539 2.1521	.0070 .0052	2.1875 2.1875
2.250–10	2A	.0020	2.2480	2.2351	2.1830	2.1765	.0065	2.1253	2B	2.142	2.163	2.1850	2.1935	.0085	2.2500
2.250–14	2A	.0017	2.2483	2.2380	2.2019	2.1962	.0057	2.1607	2B	2.173	2.188	2.2036	2.2110	.0074	2.2500
2.250–18	2A	.0015	2.2485	2.2398	2.2124	2.2073	.0051	2.1803	2B	2.190	2.203	2.2139	2.2206	.0067	2.2500
2.3125–16	2A 3A	.0017 .0000	2.3108 2.3125	2.3014 2.3031	2.2702 2.2719	2.2647 2.2678	.0055 .0041	2.2341 2.2358	2B 3B	2.245 2.2450	2.259 2.2533	2.2719 2.2719	2.2791 2.2773	.0072 .0054	2.3125 2.3125
2.4375–16	2A 3A	.0017 .0000	2.4358 2.4375	2.4264 2.4281	2.3952 2.3969	2.3897 2.3928	.0055 .0041	2.3591 2.3608	2B 3B	2.370 2.3700	2.384 2.3783	2.3969 2.3969	2.4041 2.4023	.0072 .0054	2.4375 2.4375
2.500–10	2A	.0020	2.4980	2.4851	2.4330	2.4263	.0067	2.3753	2B	2.392	2.413	2.4350	2.4437	.0087	2.5000
2.500–14	2A	.0017	2.4983	2.4880	2.4519	2.4461	.0058	2.4107	2B	2.423	2.438	2.4536	2.4612	.0076	2.5000
2.500–18	2A	.0016	2.4984	2.4897	2.4623	2.4570	.0053	2.4302	2B	2.440	2.453	2.4639	2.4708	.0069	2.5000
2.750–10	2A	.0020	2.7480	2.7351	2.6830	2.6763	.0067	2.6253	2B	2.642	2.663	2.6850	2.6937	.0087	2.7500
2.750–14	2A	.0017	2.7483	2.7380	2.7019	2.6961	.0058	2.6607	2B	2.673	2.688	2.7036	2.7112	.0076	2.7500
2.750–18	2A	.0016	2.7484	2.7397	2.7123	2.7070	.0053	2.6802	2B	2.690	2.703	2.7139	2.7208	.0069	2.7500
3.000–10	2A	.0020	2.9980	2.9851	2.9330	2.9262	.0068	2.8753	2B	2.892	2.913	2.9350	2.9439	.0089	3.0000
3.000–14	2A	.0018	2.9982	2.9879	2.9518	2.9459	.0059	2.9106	2B	2.923	2.938	2.9536	2.9613	.0077	3.0000
3.000–18	2A	.0016	2.9984	2.9897	2.9623	2.9569	.0054	2.9302	2B	2.940	2.953	2.9639	2.9709	.0070	3.0000
3.250–10	2A	.0020	3.2480	3.2351	3.1830	3.1762	.0068	3.1253	2B	3.142	3.163	3.1850	3.1939	.0089	3.2500
3.250–14	2A	.0018	3.2482	3.2379	3.2018	3.1959	.0059	3.1606	2B	3.173	3.188	3.2036	3.2113	.0077	3.2500
3.250–18	2A	.0016	3.2484	3.2397	3.2123	3.2069	.0054	3.1802	2B	3.190	3.203	3.2139	3.2209	.0070	3.2500
3.500–10	2A	.0021	3.4979	3.4850	3.4329	3.4260	.0069	3.3752	2B	3.392	3.413	3.4350	3.4440	.0090	3.5000
3.500–14	2A	.0018	3.4982	3.4879	3.4518	3.4457	.0061	3.4106	2B	3.423	3.438	3.4536	3.4615	.0079	3.5000
3.500–18	2A	.0017	3.4983	3.4896	3.4622	3.4567	.0055	3.4301	2B	3.440	3.453	3.4639	3.4711	.0072	3.5000
3.750–10	2A	.0021	3.7479	3.7350	3.6829	3.6760	.0069	3.6252	2B	3.642	3.663	3.6850	3.6940	.0090	3.7500
3.750–14	2A	.0018	3.7482	3.7379	3.7018	3.6957	.0061	3.6606	2B	3.673	3.688	3.7036	3.7115	.0079	3.7500
3.750–18	2A	.0017	3.7483	3.7396	3.7122	3.7067	.0055	3.6801	2B	3.690	3.703	3.7139	3.7211	.0072	3.7500
4.000–10	2A	.0021	3.9979	3.9850	3.9329	3.9259	.0070	3.8752	2B	3.892	3.913	3.9350	3.9441	.0091	4.0000
4.000–14	2A	.0018	3.9982	3.9879	3.9518	3.9456	.0062	3.9106	2B	3.923	3.938	3.9536	3.9616	.0080	4.0000
4.250–10	2A	.0021	4.2479	4.2350	4.1829	4.1759	.0070	4.1252	2B	4.142	4.163	4.1850	4.1941	.0091	4.2500
4.250–14	2A	.0018	4.2482	4.2379	4.2018	4.1956	.0062	4.1606	2B	4.173	4.188	4.2036	4.2116	.0080	4.2500
4.500–10	2A	.0021	4.4979	4.4850	4.4329	4.4259	.0070	4.3752	2B	4.392	4.413	4.4350	4.4441	.0091	4.5000

See footnotes at end of table.

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

Nominal size and threads per inch	External[a]								Internal[a]						
	Class	Allowance	Major diameter		Pitch diameter			[c] Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter
			Max[b]	Min	Max[b]	Min	Tolerance			Min	Max	Min	Max	Tolerance	Min
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		in	*in*	*in*	*in*	*in*	*in*	*in*		*in*	*in*	*in*	*in*	*in*	*in*
4.500-14	2A	.0018	4.4982	4.4879	4.4518	4.4456	.0062	4.4106	2B	4.423	4.438	4.4536	4.4616	.0080	4.5000
4.750-10	2A	.0022	4.7478	4.7349	4.6828	4.6756	.0072	4.6251	2B	4.642	4.663	4.6850	4.6944	.0094	4.7500
4.750-14	2A	.0019	4.7481	4.7378	4.7017	4.6953	.0064	4.6605	2B	4.673	4.688	4.7036	4.7119	.0083	4.7500
5.000-10	2A	.0022	4.9978	4.9849	4.9328	4.9256	.0072	4.8751	2B	4.892	4.913	4.9350	4.9444	.0094	5.0000
5.000-14	2A	.0019	4.9981	4.9878	4.9517	4.9453	.0064	4.9105	2B	4.923	4.938	4.9536	4.9619	.0083	5.0000
5.250-10	2A	.0022	5.2478	5.2349	5.1828	5.1756	.0072	5.1251	2B	5.142	5.163	5.1850	5.1944	.0094	5.2500
5.250-14	2A	.0019	5.2481	5.2378	5.2017	5.1953	.0064	5.1605	2B	5.173	5.188	5.2036	5.2119	.0083	5.2500
5.500-10	2A	.0022	5.4978	5.4849	5.4328	5.4256	.0072	5.3751	2B	5.392	5.413	5.4350	5.4444	.0094	5.5000
5.500-14	2A	.0019	5.4981	5.4878	5.4517	5.4453	.0064	5.4105	2B	5.423	5.438	5.4536	5.4619	.0083	5.5000
5.750-10	2A	.0022	5.7478	5.7349	5.6828	5.6754	.0074	5.6251	2B	5.642	5.663	5.6850	5.6946	.0096	5.7500
5.750-14	2A	.0020	5.7480	5.7377	5.7016	5.6951	.0065	5.6604	2B	5.673	5.688	5.7036	5.7121	.0085	5.7500
6.000-10	2A	.0022	5.9978	5.9849	5.9328	5.9254	.0074	5.8751	2B	5.892	5.913	5.9350	5.9446	.0096	6.0000
6.000-14	2A	.0020	5.9980	5.9877	5.9516	5.9451	.0065	5.9104	2B	5.923	5.938	5.9536	5.9621	.0085	6.0000

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

Table 3.2 *Allowances for external threads of special diameters and pitches, classes 1A and 2A*[a]

(UNS threads. See par. 10, p. 3.05.)

Allowance based on diameter of →	0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1	1.25	1.5
For diameter range Above →	0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125	1.375
To and including →	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125	1.375	1.625
Threads per inch	Major, pitch, and minor diameter allowances											
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	0.0006	0.0006	0.0006	0.0007	0.0007	---	---	---	---	---	---	---
72	.0006	.0006	.0006	.0007	.0007	0.0007	---	---	---	---	---	---
64	.0006	.0007	.0007	.0007	.0007	.0008	0.0008	---	---	---	---	---
56	---	.0007	.0007	.0007	.0008	.0008	.0008	0.0009	.0009	---	---	---
48	---	.0007	.0008	.0008	.0008	.0009	.0009	.0009	.0009	---	---	---
44	---	.0008	.0008	.0008	.0008	.0009	.0009	.0009	.0010	0.0010	---	---
40	---	---	.0008	.0009	.0009	.0009	.0010	.0010	.0010	.0010	---	---
36	---	---	.0009	.0009	.0009	.0010	.0010	.0010	.0010	.0011	0.0011	0.0012
32	---	---	.0009	.0009	.0010	.0010	.0010	.0011	.0011	.0011	.0012	.0012
28	---	---	---	.0010	.0010	.0011	.0011	.0011	.0012	.0012	.0012	.0013
27	---	---	---	.0010	.0010	.0011	.0011	.0011	.0012	.0012	.0012	.0013
24	---	---	---	.0011	.0011	.0011	.0012	.0012	.0012	.0013	.0013	.0013
20	---	---	---	---	.0012	.0012	.0013	.0013	.0013	.0014	.0014	.0014
18	---	---	---	---	---	.0013	.0013	.0014	.0014	.0014	.0015	.0015
16	---	---	---	---	---	.0014	.0014	.0014	.0015	.0015	.0015	.0016
14	---	---	---	---	---	---	.0015	.0015	.0015	.0016	.0016	.0017
12	---	---	---	---	---	---	.0016	.0016	.0017	.0017	.0017	.0018
10	---	---	---	---	---	---	---	---	.0018	.0018	.0019	.0019
8	---	---	---	---	---	---	---	---	---	.0021	.0021	.0021
6	---	---	---	---	---	---	---	---	---	---	---	.0024
4	---	---	---	---	---	---	---	---	---	---	---	---

Allowance based on diameter of →	1.75	2	2.5	3	3.5	4	5	6	8	10	12
For diameter range Above →	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
To and including →	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13
Threads per inch	Major, pitch, and minor diameter allowances										
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	---	---	---	---	---	---	---	---	---	---	---
72	---	---	---	---	---	---	---	---	---	---	---
64	---	---	---	---	---	---	---	---	---	---	---
56	---	---	---	---	Classes 1A and 2A allowances are determined by multiplying class 2A pitch diameter tolerances (computed to six decimal places) by 0.3 and are based on lengths of engagement of nine pitches.						
48	---	---	---	---							
44	---	---	---	---							
40	---	---	---	---	---	---	---	---	---	---	---
36	---	---	---	---	---	---	---	---	---	---	---
32	0.0012	0.0013	0.0013	0.0013	---	---	---	---	---	---	---
28	.0013	.0013	.0014	.0014	0.0014	0.0015	---	---	---	---	---
27	.0013	.0013	.0014	.0014	.0014	.0015	0.0015	0.0016	---	---	---
24	.0014	.0014	.0014	.0015	.0015	.0015	.0016	.0016	---	---	---
20	.0015	.0015	.0015	.0016	.0016	.0016	.0017	.0017	---	---	---
18	.0015	.0015	.0016	.0016	.0017	.0017	.0017	.0018	0.0019	---	---
16	.0016	.0016	.0017	.0017	.0017	.0018	.0018	.0019	.0019	0.0020	---
14	.0017	.0017	.0017	.0018	.0018	.0018	.0019	.0020	.0020	.0021	0.0022
12	.0018	.0018	.0019	.0019	.0019	.0020	.0020	.0021	.0021	.0022	.0023
10	.0019	.0020	.0020	.0020	.0021	.0021	.0022	.0022	.0023	.0024	.0024
8	.0021	.0022	.0022	.0023	.0023	.0023	.0024	.0024	.0025	.0026	.0026
6	.0025	.0025	.0025	.0026	.0026	.0026	.0027	.0027	.0028	.0029	.0029
4	---	.0030	.0031	.0031	.0031	.0032	.0032	.0033	.0034	.0034	.0035

[a] Class 1AR allowances are tabulated on p. 3.03.

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

(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of →			0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above →			0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including →			0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement		Pitch diameter tolerances									
	Number of pitches	Inches										
				in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	5 to 15	0.06 to 0.19										
	16 to 30	0.191 to 0.38										
72	5 to 15	0.07 to 0.21										
	16 to 30	0.211 to 0.42										
64	5 to 15	0.08 to 0.23										
	16 to 30	0.231 to 0.46										
56	5 to 15	0.09 to 0.27										
	16 to 30	0.271 to 0.54										
48	5 to 15	0.10 to 0.31										
	16 to 30	0.311 to 0.62										
44	5 to 15	0.11 to 0.34		0.0038	0.0039	0.0041	0.0042	0.0044	0.0046	0.0047	0.0049	0.0051
	16 to 30	0.341 to 0.68		.0048	.0049	.0051	.0053	.0056	.0058	.0059	.0061	.0063
40	5 to 15	0.12 to 0.38			.0041	.0043	.0044	.0046	.0048	.0049	.0050	.0052
	16 to 30	0.381 to 0.76			.0051	.0053	.0055	.0058	.0060	.0061	.0063	.0066
36	5 to 15	0.14 to 0.42			.0043	.0045	.0046	.0048	.0050	.0051	.0052	.0054
	16 to 30	0.421 to 0.84			.0054	.0056	.0058	.0060	.0062	.0064	.0065	.0068
32	5 to 15	0.16 to 0.47			.0045	.0047	.0048	.0050	.0052	.0053	.0055	.0057
	16 to 30	0.471 to 0.94			.0057	.0059	.0061	.0063	.0065	.0067	.0068	.0071
28	5 to 15	0.18 to 0.54				.0050	.0051	.0053	.0055	.0056	.0058	.0060
	16 to 30	0.541 to 1.08				.0063	.0064	.0067	.0069	.0070	.0072	.0075
27	5 to 15	0.19 to 0.56				.0051	.0052	.0054	.0056	.0057	.0058	.0060
	16 to 30	0.561 to 1.12				.0064	.0065	.0068	.0070	.0072	.0073	.0076
24	5 to 15	0.21 to 0.62				.0054	.0055	.0057	.0059	.0060	.0061	.0063
	16 to 30	0.621 to 1.24				.0067	.0069	.0071	.0073	.0075	.0077	.0079
20	5 to 15	0.25 to 0.75					.0060	.0062	.0063	.0065	.0066	.0068
	16 to 30	0.751 to 1.50					.0075	.0077	.0079	.0081	.0083	.0085
18	5 to 15	0.28 to 0.83						.0065	.0067	.0068	.0069	.0071
	16 to 30	0.831 to 1.66						.0081	.0083	.0085	.0086	.0089
16	5 to 15	0.31 to 0.94						.0069	.0070	.0072	.0073	.0075
	16 to 30	0.941 to 1.88						.0086	.0088	.0089	.0091	.0094
14	5 to 15	0.36 to 1.07							.0075	.0076	.0077	.0079
	16 to 30	1.071 to 2.14							.0093	.0095	.0097	.0099
12	5 to 15	0.42 to 1.25							.0080	.0082	.0083	.0085
	16 to 30	1.251 to 2.50							.0100	.0102	.0104	.0106
10	5 to 15	0.50 to 1.50									.0090	.0092
	16 to 30	1.501 to 3.00									.0113	.0115
8	5 to 15	0.62 to 1.88										.0103
	16 to 30	1.881 to 3.76										.0128
6	5 to 15	0.83 to 2.50										
	16 to 30	2.501 to 5.00										
4	5 to 15	1.25 to 3.75										
	16 to 30	3.751 to 7.50										

1A, 1AR P.D. TOLERANCES

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

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													Threads per inch
in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	
------	------	------	------	------	------	------	------	------	------	------	------	------	
0.0056 .0070	0.0058 .0072	------	------	------	------	------	------	------	------	------	------	------	36
.0058 .0073	.0060 .0075	0.0061 .0077	0.0063 .0078	0.0065 .0081	0.0067 .0083	------	------	------	------	------	------	------	32
.0061 .0077	.0063 .0079	.0064 .0080	.0066 .0082	.0068 .0085	.0070 .0087	0.0071 .0089	0.0073 .0091	------	------	------	------	------	28
.0061 .0078	.0064 .0080	.0065 .0081	.0066 .0083	.0069 .0086	.0070 .0088	.0072 .0090	.0074 .0092	0.0076 .0096	0.0079 .0099	------	------	------	27
.0065 .0081	.0067 .0083	.0068 .0085	.0069 .0086	.0071 .0089	.0073 .0092	.0075 .0094	.0077 .0096	.0079 .0099	.0082 .0102	------	------	------	24
.0070 .0087	.0071 .0089	.0073 .0091	.0074 .0092	.0076 .0095	.0078 .0098	.0080 .0100	.0081 .0102	.0084 .0105	.0087 .0108	------	------	------	20
.0073 .0091	.0074 .0093	.0076 .0095	.0077 .0096	.0079 .0099	.0081 .0101	.0083 .0104	.0084 .0105	.0087 .0109	.0090 .0112	0.0094 .0117	------	------	18
.0077 .0096	.0078 .0098	.0079 .0099	.0081 .0101	.0083 .0104	.0085 .0106	.0086 .0108	.0088 .0110	.0091 .0113	.0093 .0116	.0097 .0122	0.0101 .0126	------	16
.0081 .0101	.0083 .0103	.0084 .0105	.0085 .0106	.0087 .0109	.0089 .0112	.0091 .0114	.0092 .0116	.0095 .0119	.0098 .0122	.0102 .0127	.0105 .0132	0.0108 .0135	14
.0087 .0108	.0088 .0110	.0090 .0112	.0091 .0113	.0093 .0116	.0095 .0119	.0097 .0121	.0098 .0123	.0101 .0126	.0103 .0129	.0107 .0134	.0111 .0139	.0114 .0142	12
.0094 .0118	.0096 .0119	.0097 .0121	.0098 .0123	.0100 .0125	.0102 .0128	.0104 .0130	.0106 .0132	.0108 .0135	.0111 .0138	.0115 .0144	.0118 .0148	.0121 .0152	10
.0104 .0130	.0106 .0132	.0107 .0134	.0108 .0136	.0111 .0138	.0113 .0141	.0114 .0143	.0116 .0145	.0119 .0148	.0121 .0151	.0125 .0156	.0129 .0161	.0132 .0165	8
------	.0121 .0152	.0123 .0154	.0124 .0155	.0126 .0158	.0128 .0160	.0130 .0162	.0131 .0164	.0134 .0168	.0137 .0171	.0141 .0176	.0144 .0180	.0147 .0184	6
------	------	------	.0151 .0189	.0154 .0192	.0155 .0194	.0157 .0196	.0159 .0198	.0162 .0202	.0164 .0205	.0168 .0210	.0172 .0214	.0175 .0218	4

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.21.
2. Classes 1A and 1AR tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places (see table 2.19) by a factor of 1.5.
3. Classes 1A and 1AR tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places (see table 2.19) by a factor of 1.875 (obtained by multiplying the 1.5 factor by 1.25). For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

1A, 1AR P.D. TOLERANCES

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

(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of →			0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above →			0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including →			0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement		Pitch diameter tolerances									
	Number of pitches	Inches										
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	5 to 15	0.06 to 0.19	0.0019	0.0020	0.0021	0.0022	0.0023	----------	----------	----------	----------	----------
	16 to 30	0.191 to 0.38	.0024	.0025	.0026	.0027	.0028	----------	----------	----------	----------	----------
72	5 to 15	0.07 to 0.21	.0020	.0021	.0021	.0023	.0023	0.0025	----------	----------	----------	----------
	16 to 30	0.211 to 0.42	.0025	.0026	.0027	.0028	.0029	.0031	----------	----------	----------	----------
64	5 to 15	0.08 to 0.23	.0021	.0022	.0022	.0024	.0024	.0026	0.0027	----------	----------	----------
	16 to 30	0.231 to 0.46	.0026	.0027	.0028	.0029	.0031	.0032	.0034	----------	----------	----------
56	5 to 15	0.09 to 0.27	----------	.0023	.0024	.0025	.0026	.0027	.0028	0.0029	0.0030	----------
	16 to 30	0.271 to 0.54	----------	.0029	.0030	.0031	.0032	.0034	.0035	.0036	.0037	----------
48	5 to 15	0.10 to 0.31	----------	.0025	.0025	.0026	.0027	.0029	.0030	.0031	.0031	----------
	16 to 30	0.311 to 0.62	----------	.0031	.0032	.0033	.0034	.0036	.0037	.0038	.0039	----------
44	5 to 15	0.11 to 0.34	----------	.0026	.0026	.0027	.0028	.0030	.0031	.0032	.0032	0.0034
	16 to 30	0.341 to 0.68	----------	.0032	.0033	.0034	.0035	.0037	.0038	.0040	.0041	.0042
40	5 to 15	0.12 to 0.38	----------	----------	.0027	.0029	.0029	.0031	.0032	.0033	.0034	.0035
	16 to 30	0.381 to 0.76	----------	----------	.0034	.0036	.0037	.0038	.0040	.0041	.0042	.0044
36	5 to 15	0.14 to 0.42	----------	----------	.0029	.0030	.0031	.0032	.0033	.0034	.0035	.0036
	16 to 30	0.421 to 0.84	----------	----------	.0036	.0037	.0038	.0040	.0041	.0043	.0044	.0045
32	5 to 15	0.16 to 0.47	----------	----------	.0030	.0031	.0032	.0034	.0035	.0036	.0036	.0038
	16 to 30	0.471 to 0.94	----------	----------	.0038	.0039	.0040	.0042	.0043	.0045	.0046	.0047
28	5 to 15	0.18 to 0.54	----------	----------	----------	.0033	.0034	.0036	.0037	.0038	.0038	.0040
	16 to 30	0.541 to 1.08	----------	----------	----------	.0042	.0043	.0044	.0046	.0047	.0048	.0050
27	5 to 15	0.19 to 0.56	----------	----------	----------	.0034	.0035	.0036	.0037	.0038	.0039	.0040
	16 to 30	0.561 to 1.12	----------	----------	----------	.0042	.0043	.0045	.0047	.0048	.0049	.0050
24	5 to 15	0.21 to 0.62	----------	----------	----------	.0036	.0037	.0038	.0039	.0040	.0041	.0042
	16 to 30	0.621 to 1.24	----------	----------	----------	.0045	.0046	.0048	.0049	.0050	.0051	.0053
20	5 to 15	0.25 to 0.75	----------	----------	----------	----------	.0040	.0041	.0042	.0043	.0044	.0045
	16 to 30	0.751 to 1.50	----------	----------	----------	----------	.0050	.0052	.0053	.0054	.0055	.0057
18	5 to 15	0.28 to 0.83	----------	----------	----------	----------	----------	.0043	.0044	.0045	.0046	.0047
	16 to 30	0.831 to 1.66	----------	----------	----------	----------	----------	.0054	.0055	.0057	.0058	.0059
16	5 to 15	0.31 to 0.94	----------	----------	----------	----------	----------	.0046	.0047	.0048	.0049	.0050
	16 to 30	0.941 to 1.88	----------	----------	----------	----------	----------	.0057	.0058	.0060	.0061	.0062
14	5 to 15	0.36 to 1.07	----------	----------	----------	----------	----------	----------	.0050	.0051	.0051	.0053
	16 to 30	1.071 to 2.14	----------	----------	----------	----------	----------	----------	.0062	.0063	.0064	.0066
12	5 to 15	0.42 to 1.25	----------	----------	----------	----------	----------	----------	.0054	.0054	.0055	.0057
	16 to 30	1.251 to 2.50	----------	----------	----------	----------	----------	----------	.0067	.0068	.0069	.0071
10	5 to 15	0.50 to 1.50	----------	----------	----------	----------	----------	----------	----------	----------	.0060	.0062
	16 to 30	1.501 to 3.00	----------	----------	----------	----------	----------	----------	----------	----------	.0075	.0077
8	5 to 15	0.62 to 1.88	----------	----------	----------	----------	----------	----------	----------	----------	----------	.0068
	16 to 30	1.881 to 3.76	----------	----------	----------	----------	----------	----------	----------	----------	----------	.0086
6	5 to 15	0.83 to 2.50	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
	16 to 30	2.501 to 5.00	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
4	5 to 15	1.25 to 3.75	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
	16 to 30	3.751 to 7.50	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------

2A P.D. TOLERANCES

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													Threads per inch
in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	
													40
0.0037 .0047	0.0038 .0048												36
.0039 .0049	.0040 .0050	0.0041 .0051	0.0042 .0052	0.0043 .0054	0.0044 .0056								32
.0041 .0051	.0042 .0052	.0043 .0054	.0044 .0055	.0045 .0056	.0046 .0058	0.0048 .0059	0.0049 .0061						28
.0041 .0052	.0042 .0053	.0043 .0054	.0044 .0055	.0046 .0057	.0047 .0059	.0048 .0060	.0049 .0061	0.0051 .0064	0.0053 .0066				27
.0043 .0054	.0044 .0055	.0045 .0057	.0046 .0058	.0048 .0059	.0049 .0061	.0050 .0062	.0051 .0064	.0053 .0066	.0054 .0068				24
.0047 .0058	.0048 .0059	.0048 .0061	.0049 .0062	.0051 .0063	.0052 .0065	.0053 .0066	.0054 .0068	.0056 .0070	.0058 .0072				20
.0049 .0061	.0050 .0062	.0051 .0063	.0051 .0064	.0053 .0066	.0054 .0068	.0055 .0069	.0056 .0070	.0058 .0073	.0060 .0075	0.0062 .0078			18
.0051 .0064	.0052 .0065	.0053 .0066	.0054 .0067	.0055 .0069	.0056 .0071	.0058 .0072	.0059 .0073	.0061 .0076	.0062 .0078	.0065 .0081	0.0067 .0084		16
.0054 .0068	.0055 .0069	.0056 .0070	.0057 .0071	.0058 .0073	.0059 .0074	.0061 .0076	.0062 .0077	.0064 .0079	.0065 .0081	.0068 .0085	.0070 .0088	0.0072 .0090	14
.0058 .0072	.0059 .0073	.0060 .0075	.0061 .0076	.0062 .0077	.0063 .0079	.0064 .0080	.0065 .0082	.0067 .0084	.0069 .0086	.0072 .0090	.0074 .0092	.0076 .0095	12
.0063 .0078	.0064 .0080	.0065 .0081	.0065 .0082	.0067 .0084	.0068 .0085	.0069 .0087	.0070 .0088	.0072 .0090	.0074 .0092	.0077 .0096	.0079 .0099	.0081 .0101	10
.0070 .0087	.0071 .0088	.0071 .0089	.0072 .0090	.0074 .0092	.0075 .0094	.0076 .0095	.0077 .0097	.0079 .0099	.0081 .0101	.0083 .0104	.0086 .0107	.0088 .0110	8
	.0081 .0101	.0082 .0102	.0083 .0103	.0084 .0105	.0085 .0107	.0087 .0108	.0088 .0110	.0089 .0112	.0091 .0114	.0094 .0117	.0096 .0120	.0098 .0123	6
			.0101 .0126	.0102 .0128	.0104 .0130	.0105 .0131	.0106 .0132	.0108 .0135	.0109 .0137	.0112 .0140	.0114 .0143	.0116 .0145	4

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.21.
2. Formula:
   Class 2A tolerances $= 0.0015\sqrt[3]{D} + 0.0015\sqrt{L_e} + 0.015\sqrt[3]{p^2}$ where
   D = basic major diameter
   L_e = length of engagement
   p = pitch
3. Length of engagement increments included in the tabulated tolerances for lengths of engagement of from 5 to 15 pitches are based on lengths of 9 pitches; those for lengths of engagement greater than 15 to 30 pitches are obtained by multiplying the 9-pitch values taken to six decimal places (see table 2.19) by 1.25. For lengths of engagement not tabulated, the formula in legend 2 should be applied except as modified by par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. When intermediate pitches are specified, the formula in legend 2 should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

2A P.D. TOLERANCES

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

(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of →			0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above →			0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including →			0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement: Number of pitches	Length of engagement: Inches	Pitch diameter tolerances									
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	5 to 15	0.06 to 0.19	0.0014	0.0015	0.0015	0.0016	0.0017	-----	-----	-----	-----	-----
	16 to 30	0.191 to 0.38	.0018	.0019	.0019	.0020	.0021	-----	-----	-----	-----	-----
72	5 to 15	0.07 to 0.21	.0015	.0016	.0016	.0017	.0018	0.0019	-----	-----	-----	-----
	16 to 30	0.211 to 0.42	.0019	.0019	.0020	.0021	.0022	.0023	-----	-----	-----	-----
64	5 to 15	0.08 to 0.23	.0016	.0016	.0017	.0018	.0018	.0019	0.0020	-----	-----	-----
	16 to 30	0.231 to 0.46	.0020	.0020	.0021	.0022	.0023	.0024	.0025	-----	-----	-----
56	5 to 15	0.09 to 0.27	-----	.0017	.0018	.0019	.0019	.0020	.0021	0.0022	0.0022	-----
	16 to 30	0.271 to 0.54	-----	.0022	.0022	.0023	.0024	.0025	.0026	.0027	.0028	-----
48	5 to 15	0.10 to 0.31	-----	.0019	.0019	.0020	.0020	.0022	.0022	.0023	.0024	-----
	16 to 30	0.311 to 0.62	-----	.0023	.0024	.0025	.0026	.0027	.0028	.0029	.0030	-----
44	5 to 15	0.11 to 0.34	-----	.0019	.0020	.0021	.0021	.0022	.0023	.0024	.0024	0.0025
	16 to 30	0.341 to 0.68	-----	.0024	.0025	.0026	.0026	.0028	.0029	.0030	.0030	.0032
40	5 to 15	0.12 to 0.38	-----	-----	.0021	.0021	.0022	.0023	.0024	.0025	.0025	.0026
	16 to 30	0.381 to 0.76	-----	-----	.0026	.0027	.0028	.0029	.0030	.0031	.0031	.0033
36	5 to 15	0.14 to 0.42	-----	-----	.0022	.0022	.0023	.0024	.0025	.0026	.0026	.0027
	16 to 30	0.421 to 0.84	-----	-----	.0027	.0028	.0029	.0030	.0031	.0032	.0033	.0034
32	5 to 15	0.16 to 0.47	-----	-----	.0023	.0024	.0024	.0025	.0026	.0027	.0027	.0028
	16 to 30	0.471 to 0.94	-----	-----	.0028	.0029	.0030	.0032	.0033	.0033	.0034	.0035
28	5 to 15	0.18 to 0.54	-----	-----	-----	.0025	.0026	.0027	.0028	.0028	.0029	.0030
	16 to 30	0.541 to 1.08	-----	-----	-----	.0031	.0032	.0033	.0034	.0035	.0036	.0037
27	5 to 15	0.19 to 0.56	-----	-----	-----	.0025	.0026	.0027	.0028	.0029	.0029	.0030
	16 to 30	0.561 to 1.12	-----	-----	-----	.0032	.0033	.0034	.0035	.0036	.0037	.0038
24	5 to 15	0.21 to 0.62	-----	-----	-----	.0027	.0028	.0029	.0029	.0030	.0031	.0032
	16 to 30	0.621 to 1.24	-----	-----	-----	.0034	.0034	.0036	.0037	.0038	.0038	.0040
20	5 to 15	0.25 to 0.75	-----	-----	-----	-----	.0030	.0031	.0032	.0032	.0033	.0034
	16 to 30	0.751 to 1.50	-----	-----	-----	-----	.0037	.0039	.0040	.0041	.0041	.0043
18	5 to 15	0.28 to 0.83	-----	-----	-----	-----	-----	.0032	.0033	.0034	.0035	.0036
	16 to 30	0.831 to 1.66	-----	-----	-----	-----	-----	.0041	.0042	.0042	.0043	.0044
16	5 to 15	0.31 to 0.94	-----	-----	-----	-----	-----	.0034	.0035	.0036	.0036	.0037
	16 to 30	0.941 to 1.88	-----	-----	-----	-----	-----	.0043	.0044	.0045	.0045	.0047
14	5 to 15	0.36 to 1.07	-----	-----	-----	-----	-----	-----	.0037	.0038	.0039	.0040
	16 to 30	1.071 to 2.14	-----	-----	-----	-----	-----	-----	.0047	.0048	.0048	.0050
12	5 to 15	0.42 to 1.25	-----	-----	-----	-----	-----	-----	.0040	.0041	.0041	.0042
	16 to 30	1.251 to 2.50	-----	-----	-----	-----	-----	-----	.0050	.0051	.0052	.0053
10	5 to 15	0.50 to 1.50	-----	-----	-----	-----	-----	-----	-----	-----	.0045	.0046
	16 to 30	1.501 to 3.00	-----	-----	-----	-----	-----	-----	-----	-----	.0056	.0058
8	5 to 15	0.62 to 1.88	-----	-----	-----	-----	-----	-----	-----	-----	-----	.0051
	16 to 30	1.881 to 3.76	-----	-----	-----	-----	-----	-----	-----	-----	-----	.0064
6	5 to 15	0.83 to 2.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	16 to 30	2.501 to 5.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	5 to 15	1.25 to 3.75	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	16 to 30	3.751 to 7.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

3A P.D. TOLERANCES

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

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													Threads per inch
in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	
---	---	---	---	---	---	---	---	---	---	---	---	---	40
0.0028 .0035	0.0029 .0036	---	---	---	---	---	---	---	---	---	---	---	36
.0029 .0037	.0030 .0038	0.0031 .0038	0.0031 .0039	0.0032 .0040	0.0033 .0042	---	---	---	---	---	---	---	32
.0031 .0038	.0031 .0039	.0032 .0040	.0033 .0041	.0034 .0042	.0035 .0044	0.0036 .0045	0.0036 .0046	---	---	---	---	---	28
.0031 .0039	.0032 .0040	.0033 .0041	.0033 .0041	.0034 .0043	.0035 .0044	.0036 .0045	.0037 .0046	0.0038 .0048	0.0039 .0049	---	---	---	27
.0033 .0041	.0033 .0042	.0034 .0042	.0035 .0043	.0036 .0045	.0037 .0046	.0037 .0047	.0038 .0048	.0040 .0050	.0041 .0051	---	---	---	24
.0035 .0044	.0036 .0045	.0036 .0045	.0037 .0046	.0038 .0048	.0039 .0049	.0040 .0050	.0041 .0051	.0042 .0053	.0043 .0054	---	---	---	20
.0036 .0046	.0037 .0047	.0038 .0047	.0039 .0048	.0040 .0050	.0041 .0051	.0041 .0052	.0042 .0053	.0044 .0054	.0045 .0056	0.0047 .0059	---	---	18
.0038 .0048	.0039 .0049	.0040 .0050	.0040 .0050	.0041 .0052	.0042 .0053	.0043 .0054	.0044 .0055	.0045 .0057	.0047 .0058	.0049 .0061	0.0050 .0063	---	16
.0041 .0051	.0041 .0052	.0042 .0052	.0043 .0053	.0044 .0055	.0045 .0056	.0045 .0057	.0046 .0058	.0048 .0060	.0049 .0061	.0051 .0064	.0053 .0066	0.0054 .0068	14
.0043 .0054	.0044 .0055	.0045 .0056	.0045 .0057	.0046 .0058	.0047 .0059	.0048 .0060	.0049 .0061	.0050 .0063	.0052 .0065	.0054 .0067	.0055 .0069	.0057 .0071	12
.0047 .0059	.0048 .0060	.0048 .0061	.0049 .0061	.0050 .0063	.0051 .0064	.0052 .0065	.0053 .0066	.0054 .0068	.0055 .0069	.0057 .0072	.0059 .0074	.0061 .0076	10
.0052 .0065	.0053 .0066	.0054 .0067	.0054 .0068	.0055 .0069	.0056 .0070	.0057 .0071	.0058 .0072	.0059 .0074	.0061 .0076	.0063 .0078	.0064 .0080	.0066 .0082	8
---	.0061 .0076	.0061 .0077	.0062 .0078	.0063 .0079	.0064 .0080	.0065 .0081	.0066 .0082	.0067 .0084	.0068 .0085	.0070 .0088	.0072 .0090	.0074 .0092	6
---	---	---	.0076 .0095	.0077 .0096	.0078 .0097	.0079 .0098	.0079 .0099	.0081 .0101	.0082 .0102	.0084 .0105	.0086 .0107	.0087 .0109	4

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.21.
2. Class 3A tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerences for 9 pitches taken to six decimal places by a factor of 0.75. (See table 2.19).
3. Class 3A tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.9375 (obtained by multiplying the 0.75 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

3A P.D. TOLERANCES

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

(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of →			0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above →			0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including →			0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement: Number of pitches	Length of engagement: Inches	Pitch diameter tolerances									
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	5 to 15	0.06 to 0.19										
	16 to 30	0.191 to 0.38										
72	5 to 15	0.07 to 0.21										
	16 to 30	0.211 to 0.42										
64	5 to 15	0.08 to 0.23										
	16 to 30	0.231 to 0.46										
56	5 to 15	0.09 to 0.27										
	16 to 30	0.271 to 0.54										
48	5 to 15	0.10 to 0.31										
	16 to 30	0.311 to 0.62										
44	5 to 15	0.11 to 0.34		0.0050	0.0051	0.0053	0.0055	0.0058	0.0060	0.0062	0.0063	0.0066
	16 to 30	0.341 to 0.68		.0062	.0064	.0067	.0069	.0072	.0075	.0077	.0079	.0082
40	5 to 15	0.12 to 0.38			.0054	.0056	.0057	.0060	.0062	.0064	.0065	.0068
	16 to 30	0.381 to 0.76			.0067	.0070	.0072	.0075	.0078	.0080	.0082	.0085
36	5 to 15	0.14 to 0.42			.0056	.0058	.0060	.0063	.0065	.0066	.0068	.0071
	16 to 30	0.421 to 0.84			.0070	.0073	.0075	.0078	.0081	.0083	.0085	.0088
32	5 to 15	0.16 to 0.47			.0059	.0061	.0063	.0066	.0068	.0070	.0071	.0074
	16 to 30	0.471 to 0.94			.0074	.0077	.0079	.0082	.0085	.0087	.0089	.0092
28	5 to 15	0.18 to 0.54				.0065	.0067	.0069	.0072	.0073	.0075	.0078
	16 to 30	0.541 to 1.08				.0081	.0083	.0087	.0089	.0092	.0094	.0097
27	5 to 15	0.19 to 0.56				.0066	.0068	.0070	.0073	.0074	.0076	.0079
	16 to 30	0.561 to 1.12				.0083	.0085	.0088	.0091	.0093	.0095	.0098
24	5 to 15	0.21 to 0.62				.0070	.0072	.0074	.0076	.0078	.0080	.0082
	16 to 30	0.621 to 1.24				.0087	.0089	.0093	.0095	.0098	.0100	.0103
20	5 to 15	0.25 to 0.75					.0078	.0080	.0083	.0084	.0086	.0089
	16 to 30	0.751 to 1.50					.0097	.0101	.0103	.0105	.0107	.0111
18	5 to 15	0.28 to 0.83						.0084	.0087	.0088	.0090	.0093
	16 to 30	0.831 to 1.66						.0105	.0108	.0110	.0112	.0116
16	5 to 15	0.31 to 0.94						.0089	.0091	.0093	.0095	.0097
	16 to 30	0.941 to 1.88						.0111	.0114	.0116	.0118	.0122
14	5 to 15	0.36 to 1.07							.0097	.0099	.0100	.0103
	16 to 30	1.071 to 2.14							.0121	.0124	.0125	.0129
12	5 to 15	0.42 to 1.25							.0104	.0106	.0108	.0110
	16 to 30	1.251 to 2.50							.0130	.0133	.0135	.0138
10	5 to 15	0.50 to 1.50									.0117	.0120
	16 to 30	1.501 to 3.00									.0147	.0150
8	5 to 15	0.62 to 1.88										.0133
	16 to 30	1.881 to 3.76										.0167
6	5 to 15	0.83 to 2.50										
	16 to 30	2.501 to 5.00										
4	5 to 15	1.25 to 3.75										
	16 to 30	3.751 to 7.50										

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													Threads per inch
in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	
---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	40
0.0073 .0091	0.0075 .0094	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	36
.0076 .0095	.0078 .0098	0.0080 .0100	0.0081 .0102	0.0084 .0105	0.0087 .0108	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	32
.0080 .0100	.0082 .0102	.0084 .0104	.0085 .0106	.0088 .0110	.0090 .0113	0.0093 .0116	0.0095 .0118	---------- ----------	---------- ----------	---------- ----------	---------- ----------	---------- ----------	28
.0080 .0101	.0083 .0104	.0085 .0106	.0085 .0108	.0089 .0111	.0092 .0114	.0094 .0117	.0096 .0120	0.0099 .0124	0.0103 .0128	---------- ----------	---------- ----------	---------- ----------	27
.0085 .0106	.0087 .0108	.0088 .0110	.0090 .0112	.0093 .0116	.0095 .0119	.0097 .0122	.0100 .0124	.0103 .0129	.0106 .0133	---------- ----------	---------- ----------	---------- ----------	24
.0091 .0114	.0093 .0116	.0095 .0118	.0096 .0120	.0099 .0124	.0101 .0127	.0104 .0130	.0106 .0132	.0109 .0137	.0112 .0141	---------- ----------	---------- ----------	---------- ----------	20
.0095 .0118	.0097 .0121	.0099 .0123	.0100 .0125	.0103 .0129	.0105 .0132	.0108 .0135	.0110 .0137	.0113 .0142	.0116 .0146	0.0122 .0152	---------- ----------	---------- ----------	18
.0100 .0124	.0101 .0127	.0103 .0129	.0105 .0131	.0108 .0135	.0110 .0138	.0112 .0140	.0114 .0143	.0118 .0148	.0121 .0151	.0126 .0158	0.0131 .0164	---------- ----------	16
.0105 .0132	.0107 .0134	.0109 .0136	.0111 .0138	.0114 .0142	.0116 .0145	.0118 .0148	.0120 .0150	.0124 .0155	.0127 .0159	.0132 .0165	.0137 .0171	0.0141 .0176	14
.0113 .0141	.0115 .0143	.0116 .0145	.0118 .0147	.0121 .0151	.0123 .0154	.0126 .0157	.0128 .0159	.0131 .0164	.0134 .0168	.0140 .0175	.0144 .0180	.0148 .0185	12
.0122 .0153	.0124 .0155	.0126 .0158	.0128 .0160	.0130 .0163	.0133 .0166	.0135 .0169	.0137 .0172	.0141 .0176	.0144 .0180	.0149 .0187	.0154 .0192	.0158 .0197	10
.0136 .0170	.0138 .0172	.0139 .0174	.0141 .0176	.0144 .0180	.0146 .0183	.0149 .0186	.0151 .0188	.0154 .0193	.0157 .0197	.0163 .0203	.0167 .0209	.0171 .0214	8
---------- ----------	.0158 .0197	.0160 .0200	.0161 .0202	.0164 .0205	.0167 .0208	.0169 .0211	.0171 .0214	.0174 .0218	.0178 .0222	.0183 .0229	.0187 .0234	.0191 .0239	6
---------- ----------	---------- ----------	---------- ----------	.0197 .0246	.0200 .0250	.0202 .0253	.0204 .0255	.0206 .0258	.0210 .0262	.0213 .0266	.0218 .0273	.0223 .0279	.0227 .0284	4

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.21.
2. Class 1B (internal thread) tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.95. (See table 2.19.)
3. Class 1B tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 2.4375 (obtained by multiplying the 1.95 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

1B P.D. TOLERANCES

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

(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of →			0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above →			0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including →			0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement		Pitch diameter tolerances									
	Number of pitches	Inches										
			in	in	in	in	in	in	in	in	in	in
80	5 to 15	0.06 to 0.19	0.0025	0.0026	0.0027	0.0028	0.0029	-----	-----	-----	-----	-----
	16 to 30	0.191 to 0.38	.0031	.0032	.0033	.0035	.0037	-----	-----	-----	-----	-----
72	5 to 15	0.07 to 0.21	.0026	.0027	.0028	.0029	.0030	0.0032	-----	-----	-----	-----
	16 to 30	0.211 to 0.42	.0032	.0034	.0035	.0037	.0038	.0040	-----	-----	-----	-----
64	5 to 15	0.08 to 0.23	.0027	.0028	.0029	.0031	.0032	.0034	0.0035	-----	-----	-----
	16 to 30	0.231 to 0.46	.0034	.0035	.0037	.0038	.0040	.0042	.0044	-----	-----	-----
56	5 to 15	0.09 to 0.27	-----	.0030	.0031	.0032	.0033	.0035	.0037	0.0038	0.0039	-----
	16 to 30	0.271 to 0.54	-----	.0037	.0039	.0040	.0042	.0044	.0046	.0047	.0049	-----
48	5 to 15	0.10 to 0.31	-----	.0032	.0033	.0034	.0036	.0037	.0039	.0040	.0041	-----
	16 to 30	0.311 to 0.62	-----	.0040	.0041	.0043	.0044	.0047	.0048	.0050	.0051	-----
44	5 to 15	0.11 to 0.34	-----	.0033	.0034	.0036	.0037	.0039	.0040	.0041	.0042	0.0044
	16 to 30	0.341 to 0.68	-----	.0042	.0043	.0045	.0046	.0048	.0050	.0051	.0053	.0055
40	5 to 15	0.12 to 0.38	-----	-----	.0036	.0037	.0038	.0040	.0041	.0043	.0044	.0045
	16 to 30	0.381 to 0.76	-----	-----	.0045	.0046	.0048	.0050	.0052	.0053	.0055	.0057
36	5 to 15	0.14 to 0.42	-----	-----	.0037	.0039	.0040	.0042	.0043	.0044	.0045	.0047
	16 to 30	0.421 to 0.84	-----	-----	.0047	.0049	.0050	.0052	.0054	.0055	.0057	.0059
32	5 to 15	0.16 to 0.47	-----	-----	.0030	.0041	.0042	.0044	.0045	.0046	.0047	.0049
	16 to 30	0.471 to 0.94	-----	-----	.0049	.0051	.0052	.0055	.0056	.0058	.0059	.0061
28	5 to 15	0.18 to 0.54	-----	-----	-----	.0043	.0044	.0046	.0048	.0049	.0050	.0052
	16 to 30	0.541 to 1.08	-----	-----	-----	.0054	.0056	.0058	.0060	.0061	.0062	.0065
27	5 to 15	0.19 to 0.56	-----	-----	-----	.0044	.0045	.0047	.0048	.0050	.0051	.0052
	16 to 30	0.561 to 1.12	-----	-----	-----	.0055	.0057	.0059	.0061	.0062	.0063	.0066
24	5 to 15	0.21 to 0.62	-----	-----	-----	.0047	.0048	.0049	.0051	.0052	.0053	.0055
	16 to 30	0.621 to 1.24	-----	-----	-----	.0058	.0060	.0062	.0064	.0065	.0066	.0069
20	5 to 15	0.25 to 0.75	-----	-----	-----	-----	.0052	.0054	.0055	.0056	.0057	.0059
	16 to 30	0.751 to 1.50	-----	-----	-----	-----	.0065	.0067	.0069	.0070	.0072	.0074
18	5 to 15	0.28 to 0.83	-----	-----	-----	-----	-----	.0056	.0058	.0059	.0060	.0062
	16 to 30	0.831 to 1.66	-----	-----	-----	-----	-----	.0070	.0072	.0074	.0075	.0077
16	5 to 15	0.31 to 0.94	-----	-----	-----	-----	-----	.0059	.0061	.0062	.0063	.0065
	16 to 30	0.941 to 1.88	-----	-----	-----	-----	-----	.0074	.0076	.0077	.0079	.0081
14	5 to 15	0.36 to 1.07	-----	-----	-----	-----	-----	-----	.0065	.0066	.0067	.0069
	16 to 30	1.071 to 2.14	-----	-----	-----	-----	-----	-----	.0081	.0082	.0084	.0086
12	5 to 15	0.42 to 1.25	-----	-----	-----	-----	-----	-----	.0070	.0071	.0072	.0074
	16 to 30	1.251 to 2.50	-----	-----	-----	-----	-----	-----	.0087	.0088	.0090	.0092
10	5 to 15	0.50 to 1.50	-----	-----	-----	-----	-----	-----	-----	-----	.0078	.0080
	16 to 30	1.501 to 3.00	-----	-----	-----	-----	-----	-----	-----	-----	.0098	.0100
8	5 to 15	0.62 to 1.88	-----	-----	-----	-----	-----	-----	-----	-----	-----	.0089
	16 to 30	1.881 to 3.76	-----	-----	-----	-----	-----	-----	-----	-----	-----	.0111
6	5 to 15	0.83 to 2.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	16 to 30	2.501 to 5.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	5 to 15	1.25 to 3.75	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	16 to 30	3.751 to 7.50	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

2B P.D. TOLERANCES

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													Threads per inch
in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	
													40
0.0049 .0061	0.0050 .0062												36
.0051 .0063	.0052 .0065	0.0053 .0066	0.0054 .0068	0.0056 .0070	0.0058 .0072								32
.0053 .0067	.0055 .0068	.0056 .0070	.0057 .0071	.0059 .0073	.0060 .0075	0.0062 .0077	0.0063 .0079						28
.0053 .0067	.0055 .0069	.0056 .0071	.0057 .0072	.0059 .0074	.0061 .0076	.0063 .0078	.0064 .0080	0.0066 .0083	0.0068 .0085				27
.0056 .0070	.0058 .0072	.0059 .0074	.0060 .0075	.0062 .0077	.0064 .0079	.0065 .0081	.0066 .0083	.0069 .0086	.0071 .0089				24
.0061 .0076	.0062 .0077	.0063 .0079	.0064 .0080	.0066 .0083	.0068 .0085	.0069 .0086	.0070 .0088	.0073 .0091	.0075 .0094				20
.0063 .0079	.0065 .0081	.0066 .0082	.0067 .0083	.0069 .0086	.0070 .0088	.0072 .0090	.0073 .0091	.0076 .0094	.0078 .0097	0.0081 .0101			18
.0066 .0083	.0068 .0085	.0069 .0086	.0070 .0087	.0072 .0090	.0073 .0092	.0075 .0094	.0076 .0095	.0079 .0098	.0081 .0101	.0084 .0105	0.0087 .0109		16
.0070 .0088	.0072 .0089	.0073 .0091	.0074 .0092	.0076 .0095	.0077 .0097	.0079 .0099	.0080 .0100	.0083 .0103	.0085 .0106	.0088 .0110	.0091 .0114	0.0094 .0117	14
.0075 .0094	.0076 .0096	.0078 .0097	.0079 .0098	.0081 .0101	.0082 .0103	.0084 .0105	.0085 .0106	.0087 .0109	.0090 .0112	.0093 .0116	.0096 .0120	.0099 .0123	12
.0082 .0102	.0083 .0104	.0084 .0105	.0085 .0106	.0087 .0109	.0089 .0111	.0090 .0113	.0091 .0114	.0094 .0117	.0096 .0120	.0100 .0124	.0103 .0128	.0105 .0131	10
.0090 .0113	.0092 .0115	.0093 .0116	.0094 .0118	.0096 .0120	.0098 .0122	.0099 .0124	.0100 .0125	.0103 .0128	.0105 .0131	.0108 .0136	.0111 .0139	.0114 .0143	8
	.0105 .0132	.0106 .0133	.0108 .0134	.0109 .0137	.0111 .0139	.0113 .0141	.0114 .0142	.0116 .0145	.0118 .0148	.0122 .0152	.0125 .0156	.0128 .0159	6
			.0131 .0164	.0133 .0166	.0135 .0168	.0136 .0170	.0138 .0172	.0140 .0175	.0142 .0178	.0146 .0182	.0149 .0186	.0151 .0189	4

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.21.
2. Class 2B (internal thread) tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.3. (See table 2.19.)
3. Class 2B tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.625 (obtained by multiplying the 1.3 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

2B P.D. TOLERANCES

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

(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of →			0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above →			0.0470	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875
To and including →			0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement		Pitch diameter tolerances									
	Number of pitches	Inches										
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	5 to 15	0.06 to 0.19	0.0019	0.0019	0.0020	0.0021	0.0022	--------	--------	--------	--------	--------
	16 to 30	0.191 to 0.38	.0023	.0024	.0025	.0026	.0027	--------	--------	--------	--------	--------
72	5 to 15	0.07 to 0.21	.0019	.0020	.0021	.0022	.0023	0.0024	--------	--------	--------	--------
	16 to 30	0.211 to 0.42	.0024	.0025	.0026	.0027	.0029	.0030	--------	--------	--------	--------
64	5 to 15	0.08 to 0.23	.0020	.0021	.0022	.0023	.0024	.0025	0.0026	--------	--------	--------
	16 to 30	0.231 to 0.46	.0026	.0027	.0027	.0029	.0030	.0031	.0033	--------	--------	--------
56	5 to 15	0.09 to 0.27	--------	.0023	.0023	.0024	.0025	.0026	.0027	0.0028	0.0029	--------
	16 to 30	0.271 to 0.54	--------	.0028	.0029	.0030	.0031	.0033	.0034	.0035	.0036	--------
48	5 to 15	0.10 to 0.31	--------	.0024	.0025	.0026	.0027	.0028	.0029	.0030	.0031	--------
	16 to 30	0.311 to 0.62	--------	.0030	.0031	.0032	.0033	.0035	.0036	.0037	.0038	--------
44	5 to 15	0.11 to 0.34	--------	.0025	.0026	.0027	.0028	.0029	.0030	.0031	.0032	0.0033
	16 to 30	0.341 to 0.68	--------	.0031	.0032	.0033	.0034	.0036	.0037	.0039	.0040	.0041
40	5 to 15	0.12 to 0.38	--------	--------	.0027	.0028	.0029	.0030	.0031	.0032	.0033	.0034
	16 to 30	0.381 to 0.76	--------	--------	.0033	.0035	.0036	.0037	.0039	.0040	.0041	.0043
36	5 to 15	0.14 to 0.42	--------	--------	.0028	.0029	.0030	.0031	.0032	.0033	.0034	.0035
	16 to 30	0.421 to 0.84	--------	--------	.0035	.0036	.0037	.0039	.0040	.0042	.0043	.0044
32	5 to 15	0.16 to 0.47	--------	--------	.0030	.0031	.0031	.0033	.0034	.0035	.0036	.0037
	16 to 30	0.471 to 0.94	--------	--------	.0037	.0038	.0039	.0041	.0042	.0043	.0044	.0046
28	5 to 15	0.18 to 0.54	--------	--------	--------	.0033	.0033	.0035	.0036	.0037	.0037	.0039
	16 to 30	0.541 to 1.08	--------	--------	--------	.0041	.0042	.0043	.0045	.0046	.0047	.0048
27	5 to 15	0.19 to 0.56	--------	--------	--------	.0033	.0034	.0035	.0036	.0037	.0038	.0039
	16 to 30	0.561 to 1.12	--------	--------	--------	.0041	.0042	.0044	.0045	.0046	.0047	.0049
24	5 to 15	0.21 to 0.62	--------	--------	--------	.0035	.0036	.0037	.0038	.0039	.0040	.0041
	16 to 30	0.621 to 1.24	--------	--------	--------	.0044	.0045	.0046	.0048	.0049	.0050	.0051
20	5 to 15	0.25 to 0.75	--------	--------	--------	--------	.0039	.0040	.0041	.0042	.0043	.0044
	16 to 30	0.751 to 1.50	--------	--------	--------	--------	.0049	.0050	.0052	.0053	.0054	.0055
18	5 to 15	0.28 to 0.83	--------	--------	--------	--------	--------	.0042	.0043	.0044	.0045	.0046
	16 to 30	0.831 to 1.66	--------	--------	--------	--------	--------	.0053	.0054	.0055	.0056	.0058
16	5 to 15	0.31 to 0.94	--------	--------	--------	--------	--------	.0045	.0046	.0046	.0047	.0049
	16 to 30	0.941 to 1.88	--------	--------	--------	--------	--------	.0056	.0057	.0058	.0059	.0061
14	5 to 15	0.36 to 1.07	--------	--------	--------	--------	--------	--------	.0049	.0049	.0050	.0052
	16 to 30	1.071 to 2.14	--------	--------	--------	--------	--------	--------	.0061	.0062	.0063	.0064
12	5 to 15	0.42 to 1.25	--------	--------	--------	--------	--------	--------	.0052	.0053	.0054	.0055
	16 to 30	1.251 to 2.50	--------	--------	--------	--------	--------	--------	.0065	.0066	.0067	.0069
10	5 to 15	0.50 to 1.50	--------	--------	--------	--------	--------	--------	--------	--------	.0059	.0060
	16 to 30	1.501 to 3.00	--------	--------	--------	--------	--------	--------	--------	--------	.0073	.0075
8	5 to 15	0.62 to 1.88	--------	--------	--------	--------	--------	--------	--------	--------	--------	.0067
	16 to 30	1.881 to 3.76	--------	--------	--------	--------	--------	--------	--------	--------	--------	.0083
6	5 to 15	0.83 to 2.50	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
	16 to 30	2.501 to 5.00	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
4	5 to 15	1.25 to 3.75	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
	16 to 30	3.751 to 7.50	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

3B P.D. TOLERANCES

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

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													Threads per inch
in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	
--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	40
0.0036 .0046	0.0037 .0047	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	36
.0038 .0048	.0039 .0049	0.0040 .0050	0.0041 .0051	0.0042 .0053	0.0043 .0054	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	32
.0040 .0050	.0041 .0051	.0042 .0052	.0043 .0053	.0044 .0055	.0045 .0057	0.0046 .0058	0.0047 .0059	--- ---	--- ---	--- ---	--- ---	--- ---	28
.0040 .0051	.0041 .0052	.0042 .0053	.0043 .0054	.0045 .0056	.0046 .0057	.0047 .0059	.0048 .0060	0.0050 .0062	0.0051 .0064	--- ---	--- ---	--- ---	27
.0042 .0053	.0043 .0054	.0044 .0055	.0045 .0056	.0046 .0058	.0048 .0060	.0049 .0061	.0050 .0062	.0052 .0064	.0053 .0066	--- ---	--- ---	--- ---	24
.0045 .0057	.0046 .0058	.0047 .0059	.0048 .0060	.0050 .0062	.0051 .0063	.0052 .0065	.0053 .0066	.0055 .0068	.0056 .0070	--- ---	--- ---	--- ---	
.0047 .0059	.0048 .0060	.0049 .0062	.0050 .0063	.0051 .0064	.0053 .0066	.0054 .0067	.0055 .0069	.0057 .0071	.0058 .0073	0.0061 .0076	--- ---	--- ---	18
.0050 .0062	.0051 .0063	.0052 .0065	.0052 .0066	.0054 .0067	.0055 .0069	.0056 .0070	.0057 .0072	.0059 .0074	.0061 .0076	.0063 .0079	0.0066 .0082	--- ---	16
.0053 .0066	.0054 .0067	.0055 .0068	.0055 .0069	.0057 .0071	.0058 .0072	.0059 .0074	.0060 .0075	.0062 .0077	.0063 .0079	.0066 .0083	.0068 .0086	0.0070 .0088	14
.0056 .0070	.0057 .0072	.0058 .0073	.0059 .0074	.0060 .0076	.0062 .0077	.0063 .0078	.0064 .0080	.0066 .0082	.0067 .0084	.0070 .0087	.0072 .0090	.0074 .0093	12
.0061 .0076	.0062 .0078	.0063 .0079	.0064 .0080	.0065 .0082	.0066 .0083	.0068 .0084	.0069 .0086	.0070 .0088	.0072 .0090	.0075 .0093	.0077 .0096	.0079 .0099	10
.0068 .0085	.0069 .0086	.0070 .0087	.0071 .0088	.0072 .0090	.0073 .0091	.0074 .0093	.0075 .0094	.0077 .0096	.0079 .0098	.0081 .0102	.0084 .0104	.0086 .0107	8
--- ---	.0079 .0099	.0080 .0100	.0081 .0101	.0082 .0103	.0083 .0104	.0084 .0106	.0085 .0107	.0087 .0109	.0089 .0111	.0091 .0114	.0094 .0117	.0096 .0120	6
--- ---	--- ---	--- ---	.0098 .0123	.0100 .0125	.0101 .0126	.0102 .0128	.0103 .0129	.0105 .0131	.0107 .0133	.0109 .0137	.0111 .0139	.0113 .0142	4

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.21.
2. Class 3B (internal thread) tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.975. (See table 2.19.)
3. Class 3B tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.21875 (obtained by multiplying the 0.975 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

3B P.D. TOLERANCES

TABLE 3.9. *Minor diameter tolerances for internal special screw threads, classes 1B and 2B*

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

Tolerance based on basic major diameter of →				0.060	0.073	0.086	0.099	0.112	0.125	0.138	0.164	0.190	0.216	
For diameter range Above →				0.053	0.066	0.079	0.092	0.105	0.118	0.131	0.151	0.177	0.203	All larger diameters
To and including →				0.066	0.079	0.092	0.105	0.118	0.131	0.151	0.177	0.203	0.233	
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter[a] Above	to and including	1B, 2B			Minor diameter tolerances[b]				1B, 2B			
				in	in	in	in	in	in	in	in	in	in	in
80	0.5	0	0.33*D*	0.0035	0.0029	0.0025	0.0022	0.0020	0.0018	0.0017	0.0016	0.0016	0.0016	0.0016
	0.75	0.33*D*	0.67*D*	.0049	.0044	.0038	.0034	.0030	.0028	.0026	.0023	.0023	.0023	.0023
	1.0	0.67*D*	1.5*D*	.0049	.0049	.0049	.0045	.0040	.0037	.0034	.0031	.0031	.0031	.0031
	1.25	1.5*D*	3*D*	.0049	.0049	.0049	.0049	.0049	.0046	.0043	.0039	.0039	.0039	.0039
72	0.5	0	0.33*D*	.0039	.0033	.0029	.0026	.0023	.0021	.0020	.0017	.0017	.0017	.0017
	0.75	0.33*D*	0.67*D*	.0055	.0049	.0043	.0038	.0035	.0032	.0029	.0026	.0026	.0026	.0026
	1.0	0.67*D*	1.5*D*	.0055	.0055	.0055	.0051	.0046	.0042	.0039	.0034	.0034	.0034	.0034
	1.25	1.5*D*	3*D*	.0055	.0055	.0055	.0055	.0055	.0053	.0049	.0043	.0042	.0042	.0042
64	0.5	0	0.33*D*	.0045	.0038	.0033	.0029	.0027	.0024	.0023	.0020	.0019	.0019	.0019
	0.75	0.33*D*	0.67*D*	.0062	.0057	.0049	.0044	.0040	.0037	.0034	.0030	.0028	.0028	.0028
	1.0	0.67*D*	1.5*D*	.0062	.0062	.0062	.0059	.0053	.0049	.0045	.0040	.0038	.0038	.0038
	1.25	1.5*D*	3*D*	.0062	.0062	.0062	.0062	.0062	.0061	.0057	.0050	.0048	.0048	.0048
56	0.5	0	0.33*D*	—	.0044	.0038	.0034	.0031	.0029	.0026	.0023	.0022	.0022	.0022
	0.75	0.33*D*	0.67*D*	—	.0066	.0057	.0051	.0046	.0043	.0040	.0035	.0032	.0032	.0032
	1.0	0.67*D*	1.5*D*	—	.0070	.0070	.0068	.0062	.0057	.0053	.0047	.0043	.0043	.0043
	1.25	1.5*D*	3*D*	—	.0070	.0070	.0070	.0070	.0070	.0066	.0059	.0054	.0054	.0054
48	0.5	0	0.33*D*	—	—	.0045	.0040	.0037	.0034	.0032	.0028	.0025	.0025	.0025
	0.75	0.33*D*	0.67*D*	—	—	.0068	.0061	.0055	.0051	.0047	.0042	.0038	.0038	.0038
	1.0	0.67*D*	1.5*D*	—	—	.0082	.0081	.0074	.0068	.0063	.0056	.0051	.0050	.0050
	1.25	1.5*D*	3*D*	—	—	.0082	.0082	.0082	.0082	.0079	.0070	.0063	.0062	.0062
44	0.5	0	0.33*D*	—	—	.0050	.0044	.0040	.0037	.0035	.0031	.0028	.0028	.0028
	0.75	0.33*D*	0.67*D*	—	—	.0075	.0067	.0061	.0056	.0052	.0046	.0042	.0041	.0041
	1.0	0.67*D*	1.5*D*	—	—	.0090	.0089	.0081	.0075	.0070	.0062	.0056	.0055	.0055
	1.25	1.5*D*	3*D*	—	—	.0090	.0090	.0090	.0090	.0087	.0077	.0070	.0069	.0069
40	0.5	0	0.33*D*	—	—	—	.0049	.0045	.0041	.0039	.0034	.0031	.0030	.0030
	0.75	0.33*D*	0.67*D*	—	—	—	.0074	.0067	.0062	.0058	.0051	.0047	.0045	.0045
	1.0	0.67*D*	1.5*D*	—	—	—	.0098	.0090	.0083	.0077	.0068	.0062	.0060	.0060
	1.25	1.5*D*	3*D*	—	—	—	.0098	.0098	.0098	.0096	.0086	.0078	.0075	.0075
36	0.5	0	0.33*D*	—	—	—	—	.0050	.0046	.0043	.0038	.0035	.0033	.0033
	0.75	0.33*D*	0.67*D*	—	—	—	—	.0075	.0069	.0065	.0058	.0052	.0050	.0050
	1.0	0.67*D*	1.5*D*	—	—	—	—	.0100	.0093	.0086	.0077	.0070	.0066	.0066
	1.25	1.5*D*	3*D*	—	—	—	—	.0109	.0109	.0108	.0096	.0087	.0082	.0082
32	0.5	0	0.33*D*	—	—	—	—	—	—	.0049	.0043	.0039	.0037	.0037
	0.75	0.33*D*	0.67*D*	—	—	—	—	—	—	.0073	.0065	.0059	.0056	.0056
	1.0	0.67*D*	1.5*D*	—	—	—	—	—	—	.0098	.0087	.0079	.0074	.0074
	1.25	1.5*D*	3*D*	—	—	—	—	—	—	.0122	.0108	.0099	.0092	.0092
28	0.5	0	0.33*D*	—	—	—	—	—	—	—	—	.0045	.0042	.0042
	0.75	0.33*D*	0.67*D*	← Tolerances in this range also apply to class 3B threads. →							—	.0068	.0063	.0063
	1.0	0.67*D*	1.5*D*								—	.0091	.0084	.0084
	1.25	1.5*D*	3*D*								—	.0113	.0105	.0105
27	0.5	0	0.33*D*	—	—	—	—	—	—	—	—	.0047	.0044	.0044
	0.75	0.33*D*	0.67*D*	—	—	—	—	—	—	—	—	.0071	.0065	.0065
	1.0	0.67*D*	1.5*D*	—	—	—	—	—	—	—	—	.0094	.0087	.0087
	1.25	1.5*D*	3*D*	—	—	—	—	—	—	—	—	.0118	.0109	.0109
24	0.5	0	0.33*D*	—	—	—	—	—	—	—	—	.0053	.0049	.0048
	0.75	0.33*D*	0.67*D*	—	—	—	—	—	—	—	—	.0079	.0073	.0073
	1.0	0.67*D*	1.5*D*	—	—	—	—	—	—	—	—	.0106	.0098	.0097
	1.25	1.5*D*	3*D*	—	—	—	—	—	—	—	—	.0132	.0122	.0121

Tolerance ratios	Length of engagement in terms of diameter: Above	to and including	Minor diameter tolerances (Not applicable to diameters less than 0.25 in) 20 tpi	18 tpi	16 tpi	14 tpi	13 tpi	12 tpi	11 tpi	10 tpi	9 tpi	8 tpi	7 tpi	6 tpi	5 tpi	4.5 tpi	4 tpi
			in	in	in	in	in	in	in	in	in	in	in	in	in	in	in
0.5	0	0.33*D*	0.0058	0.0064	0.0070	0.0079	0.0085	0.0090	0.0097	0.0105	0.0114	0.0125	0.0138	0.0153	0.0170	0.0179	0.0188
0.75	0.33*D*	0.67*D*	0.0086	0.0095	0.0106	0.0118	0.0128	0.0135	0.0146	0.0158	0.0171	0.0188	0.0207	0.0230	0.0255	0.0268	0.0281
1.0	0.67*D*	1.5*D*	0.0115	0.0127	0.0141	0.0158	0.0170	0.0180	0.0194	0.0210	0.0228	0.0250	0.0276	0.0306	0.0340	0.0358	0.0375
1.25	1.5*D*	3*D*	0.0144	0.0159	0.0176	0.0198	0.0213	0.0225	0.0242	0.0262	0.0286	0.0312	0.0344	0.0382	0.0425	0.0448	0.0469

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

[b] If the minor diameter tolerance as selected from this table is less than the pitch diameter tolerance, use the latter. See Design of Special Threads in appendix A5.

TABLE 3.10. *Minor diameter tolerances for internal special screw threads, class 3B*

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

Tolerance based on basic major diameter of →					0.164	0.190	0.216	0.250	0.3125	0.375	0.4375	0.500	0.5625	0.625	0.6875	All larger diameters
For diameter range Above →				0.053	0.151	0.177	0.203	0.233	0.281	0.344	0.406	0.469	0.531	0.594	0.656	
To and including→				0.151	0.177	0.203	0.233	0.281	0.344	0.406	0.469	0.531	0.594	0.656	0.719	
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter[a] Above	to and including	3B					Minor diameter tolerances[b]					3B		
				(c)	in	in	in	in	in	in	in	in	in	in	in	in
80	0.5	0	0.33D		0.0015	0.0013	0.0013	0.0013	0.0013							
	0.75	0.33D	0.67D		.0022	.0020	.0020	.0020	.0020							
	1.0	0.67D	1.5D		.0030	.0027	.0026	.0026	.0026							
	1.25	1.5D	3D		.0037	.0033	.0033	.0033	.0033							
72	0.5	0	0.33D		.0017	.0015	.0015	.0015	.0015	0.0015	0.0015					
	0.75	0.33D	0.67D		.0026	.0023	.0022	.0022	.0022	.0022	.0022					
	1.0	0.67D	1.5D		.0034	.0031	.0029	.0029	.0029	.0029	.0029					
	1.25	1.5D	3D		.0043	.0039	.0036	.0036	.0036	.0036	.0036					
64	0.5	0	0.33D		.0020	.0018	.0016	.0016	.0016	.0016	.0016	0.0016	0.0016			
	0.75	0.33D	0.67D		.0030	.0027	.0025	.0024	.0024	.0024	.0024	.0024	.0024			
	1.0	0.67D	1.5D		.0040	.0036	.0033	.0032	.0032	.0032	.0032	.0032	.0032			
	1.25	1.5D	3D		.0050	.0045	.0041	.0040	.0040	.0040	.0040	.0040	.0040			
56	0.5	0	0.33D		.0023	.0021	.0019	.0018	.0018	.0018	.0018	.0018	.0018	0.0018	0.0018	0.0018
	0.75	0.33D	0.67D		.0035	.0032	.0029	.0027	.0027	.0027	.0027	.0027	.0027	.0027	.0027	.0027
	1.0	0.67D	1.5D		.0047	.0042	.0039	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0036
	1.25	1.5D	3D		.0059	.0053	.0049	.0045	.0045	.0045	.0045	.0045	.0045	.0045	.0045	.0045
48	0.5	0	0.33D		.0028	.0025	.0023	.0021	.0021	.0021	.0021	.0021	.0021	.0021	.0021	.0021
	0.75	0.33D	0.67D		.0042	.0038	.0035	.0032	.0031	.0031	.0031	.0031	.0031	.0031	.0031	.0031
	1.0	0.67D	1.5D		.0056	.0051	.0047	.0043	.0041	.0041	.0041	.0041	.0041	.0041	.0041	.0041
	1.25	1.5D	3D		.0070	.0063	.0059	.0054	.0052	.0052	.0052	.0052	.0052	.0052	.0052	.0052
44	0.5	0	0.33D		.0031	.0028	.0026	.0024	.0022	.0022	.0022	.0022	.0022	.0022	.0022	.0022
	0.75	0.33D	0.67D		.0046	.0042	.0039	.0036	.0033	.0033	.0033	.0033	.0033	.0033	.0033	.0033
	1.0	0.67D	1.5D		.0062	.0056	.0052	.0047	.0045	.0045	.0045	.0045	.0045	.0045	.0045	.0045
	1.25	1.5D	3D		.0077	.0070	.0065	.0059	.0056	.0056	.0056	.0056	.0056	.0056	.0056	.0056
40	0.5	0	0.33D		.0034	.0031	.0029	.0026	.0024	.0024	.0024	.0024	.0024	.0024	.0024	.0024
	0.75	0.33D	0.67D		.0051	.0047	.0043	.0040	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0036
	1.0	0.67D	1.5D		.0068	.0062	.0057	.0053	.0048	.0048	.0048	.0048	.0048	.0048	.0048	.0048
	1.25	1.5D	3D		.0086	.0078	.0072	.0066	.0062	.0062	.0060	.0060	.0060	.0060	.0060	.0060
36	0.5	0	0.33D		.0038	.0035	.0032	.0030	.0026	.0026	.0026	.0026	.0026	.0026	.0026	.0026
	0.75	0.33D	0.67D		.0058	.0052	.0048	.0044	.0039	.0039	.0039	.0039	.0039	.0039	.0039	.0039
	1.0	0.67D	1.5D		.0077	.0070	.0064	.0059	.0053	.0052	.0052	.0052	.0052	.0052	.0052	.0052
	1.25	1.5D	3D		.0096	.0087	.0081	.0074	.0066	.0065	.0065	.0065	.0065	.0065	.0065	.0065
32	0.5	0	0.33D		.0043	.0039	.0036	.0034	.0030	.0029	.0029	.0029	.0029	.0029	.0029	.0029
	0.75	0.33D	0.67D		.0065	.0059	.0055	.0050	.0045	.0043	.0043	.0043	.0043	.0043	.0043	.0043
	1.0	0.67D	1.5D		.0087	.0079	.0073	.0067	.0060	.0057	.0057	.0057	.0057	.0057	.0057	.0057
	1.25	1.5D	3D		.0108	.0099	.0091	.0084	.0075	.0072	.0072	.0072	.0072	.0072	.0072	.0072
28	0.5	0	0.33D			.0045	.0042	.0039	.0034	.0032	.0032	.0032	.0032	.0032	.0032	.0032
	0.75	0.33D	0.67D			.0068	.0063	.0058	.0051	.0047	.0047	.0047	.0047	.0047	.0047	.0047
	1.0	0.67D	1.5D			.0091	.0084	.0077	.0069	.0063	.0063	.0063	.0063	.0063	.0063	.0063
	1.25	1.5D	3D			.0113	.0105	.0096	.0086	.0079	.0079	.0079	.0079	.0079	.0079	.0079
27	0.5	0	0.33D			.0047	.0044	.0040	.0036	.0032	.0032	.0032	.0032	.0032	.0032	.0032
	0.75	0.33D	0.67D			.0071	.0065	.0060	.0053	.0048	.0048	.0048	.0048	.0048	.0048	.0048
	1.0	0.67D	1.5D			.0094	.0087	.0080	.0071	.0065	.0065	.0065	.0065	.0065	.0065	.0065
	1.25	1.5D	3D			.0118	.0109	.0100	.0089	.0081	.0081	.0081	.0081	.0081	.0081	.0081
24	0.5	0	0.33D			.0053	.0049	.0045	.0040	.0037	.0035	.0035	.0035	.0035	.0035	.0035
	0.75	0.33D	0.67D			.0079	.0073	.0068	.0060	.0055	.0052	.0052	.0052	.0052	.0052	.0052
	1.0	0.67D	1.5D			.0106	.0098	.0090	.0080	.0073	.0070	.0070	.0070	.0070	.0070	.0070
	1.25	1.5D	3D			.0132	.0122	.0113	.0100	.0092	.0087	.0087	.0087	.0087	.0087	.0087
20	0.5	0	0.33D					.0054	.0048	.0044	.0041	.0039	.0039	.0039	.0039	.0039
	0.75	0.33D	0.67D					.0081	.0072	.0066	.0062	.0058	.0058	.0058	.0058	.0058
	1.0	0.67D	1.5D					.0108	.0096	.0088	.0082	.0078	.0078	.0078	.0078	.0078
	1.25	1.5D	3D					.0135	.0120	.0110	.0103	.0097	.0097	.0097	.0097	.0097
18	0.5	0	0.33D						.0053	.0049	.0045	.0043	.0041	.0041	.0041	.0041
	0.75	0.33D	0.67D						.0080	.0073	.0068	.0065	.0062	.0061	.0061	.0061
	1.0	0.67D	1.5D						.0106	.0097	.0091	.0086	.0082	.0081	.0081	.0081
	1.25	1.5D	3D						.0133	.0122	.0114	.0108	.0103	.0102	.0102	.0102
16	0.5	0	0.33D							.0054	.0051	.0048	.0046	.0044	.0043	.0043
	0.75	0.33D	0.67D							.0082	.0076	.0072	.0069	.0067	.0064	.0064
	1.0	0.67D	1.5D							.0109	.0102	.0096	.0092	.0089	.0086	.0085
	1.25	1.5D	3D							.0136	.0127	.0120	.0115	.0111	.0108	.0106

[a] Tolerances for lengths of engagement in terms of pitch should be selected from equivalent lengths of engagement in terms of diameter ranges.
[b] If the minor-diameter tolerance as selected from the table is less than pitch-diameter tolerance, use the latter. See Design of Special Threads in appendix A5.
[c] For 0.151 in diam sizes and smaller, tolerance values for all three classes are the same. For these smaller sizes, tolerance values are given in table 3.9.

TABLE 3.10. *Minor diameter tolerances for internal special screw threads, class 3B*—Continued

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

Tolerance based on basic major diameter of→				0.375	0.4375	0.500	0.5625	0.625	0.6875	0.750	0.8125	0.875	0.9375	All larger diameters
For diameter range Above →				0.344	0.406	0.469	0.531	0.594	0.656	0.719	0.781	0.844	0.906	
To and including →				0.406	0.469	0.531	0.594	0.656	0.719	0.781	0.844	0.906	0.969	
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter[a]		3B				Minor diameter tolerances[b]				3B		
		Above	to and including											
				in	in	in	in	in	in	in	in	in	in	in
14	0.5	0	0.33D	---------	.0058	.0054	.0052	.0050	.0049	.0047	.0046	.0045	.0044	.0044
	0.75	0.33D	0.67D	---------	.0086	.0082	.0078	.0075	.0073	.0071	.0069	.0068	.0067	.0066
	1.0	0.67D	1.5D	---------	.0115	.0109	.0104	.0100	.0097	.0095	.0092	.0091	.0089	.0088
	1.25	1.5D	3D	---------	.0144	.0136	.0130	.0125	.0122	.0118	.0116	.0113	.0111	.0110
13	0.5	0	0.33D	---------	---------	.0058	.0056	.0054	.0052	.0050	.0050	.0049	.0048	.0047
	0.75	0.33D	0.67D	---------	---------	.0087	.0083	.0080	.0078	.0076	.0074	.0073	.0071	.0070
	1.0	0.67D	1.5D	---------	---------	.0117	.0111	.0107	.0104	.0101	.0099	.0097	.0095	.0094
	1.25	1.5D	3D	---------	---------	.0146	.0139	.0134	.0130	.0126	.0124	.0122	.0119	.0118
12	0.5	0	0.33D	---------	---------	.0063	.0060	.0058	.0056	.0054	.0053	.0052	.0051	.0050
	0.75	0.33D	0.67D	---------	---------	.0094	.0090	.0087	.0084	.0082	.0080	.0078	.0077	.0075
	1.0	0.67D	1.5D	---------	---------	.0125	.0120	.0115	.0112	.0109	.0106	.0104	.0102	.0100
	1.25	1.5D	3D	---------	---------	.0157	.0150	.0144	.0140	.0136	.0133	.0130	.0128	.0125
11	0.5	0	0.33D	---------	---------	---------	---------	.0062	.0060	.0058	.0058	.0056	.0055	.0054
	0.75	0.33D	0.67D	---------	---------	---------	---------	.0094	.0091	.0088	.0086	.0084	.0082	.0082
	1.0	0.67D	1.5D	---------	---------	---------	---------	.0125	.0121	.0117	.0115	.0112	.0110	.0109
	1.25	1.5D	3D	---------	---------	---------	---------	.0156	.0151	.0146	.0144	.0140	.0138	.0136
10	0.5	0	0.33D	---------	---------	---------	---------	---------	.0066	.0064	.0062	.0061	.0060	.0060
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	.0099	.0096	.0093	.0092	.0090	.0090
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	.0131	.0128	.0125	.0122	.0120	.0120
	1.25	1.5D	3D	---------	---------	---------	---------	---------	.0164	.0160	.0156	.0153	.0150	.0150
9	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	.0068	.0067	.0066	.0066
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	.0103	.0100	.0100	.0100
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	.0137	.0134	.0133	.0133
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	.0171	.0168	.0166	.0166
8	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	.0075	.0075	.0075	.0075
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	.0112	.0112	.0112	.0112
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	.0150	.0150	.0150	.0150
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	.0188	.0188	.0188	.0188
7	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0086	.0086
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0129	.0129
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0171	.0171
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0214	.0214
6	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0100
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0150
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0200
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0250
5	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0120
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0180
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0240
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0300
4.5	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0133
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0200
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0267
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0333
4	0.5	0	0.33D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0150
	0.75	0.33D	0.67D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0225
	1.0	0.67D	1.5D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0300
	1.25	1.5D	3D	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	.0375

See previous page for footnotes.

Table 3.11. *Consolidated method for the calculation of dimensions of special threads*

Thread element	External thread: Class 1A	External thread: Class 1AR	External thread: Class 2A	External thread: Class 3A	Internal thread: Class 1B	Internal thread: Class 2B	Internal thread: Class 3B	Thread element
Max major dia	Nominal size minus allowance: Table 3.2	Nominal size minus allowance: Tabulated on p. 3.03	Nominal size minus allowance: Table 3.2	Nominal size	Nominal size			Min major dia
Tolerance on major dia	Use values tabulated on p. 3.04 or compute in accordance with directions for designing special threads in appendix A5. APPLY MINUS.				$H/6(0.1667H)$, table 2.1, col. 8. APPLY PLUS.			Tolerance on major dia
Max pitch dia	Subtract $0.75H$, table 2.1, col. 14, from maximum major diameter shown above.				Subtract $0.75H$, table 2.1, col. 14, from minimum major diameter shown above.			Min pitch dia
Tolerance on pitch dia	Table 3.3 APPLY MINUS	Table 3.3 APPLY MINUS	Table 3.4 APPLY MINUS	Table 3.5 APPLY MINUS	Table 3.6 APPLY PLUS	Table 3.7 APPLY PLUS	Table 3.8 APPLY PLUS	Tolerance on pitch dia
Max minor dia	Subtract $17H/12(1.4167H)$, table 2.1, col. 18, from maximum major diameter. This is a reference dimension only.				Subtract $1.25H$, table 2.1, col. 17, from the basic major diameter and round off to the nearest 0.001 in for sizes 0.138 in and larger. For class 3B a cipher is added to yield four decimal places.			Min minor dia
Tolerance on minor dia	$H/12(0.0833H)$, table 2.1, col. 6. APPLY MINUS				For general applications use value for $0.67D$ to $1.5D$ length of engagement from table 3.9 or 3.10. For specific applications use values for applicable length of engagement or compute in accordance with directions for designing special threads in appendix A5. APPLY PLUS to four-place value of min minor diameter and round off for classes 1B and 2B values to the nearest 0.001 in for sizes 0.138 in and larger; class 3B values are to be rounded off to the nearest 0.0001 in.			Tolerance on minor dia

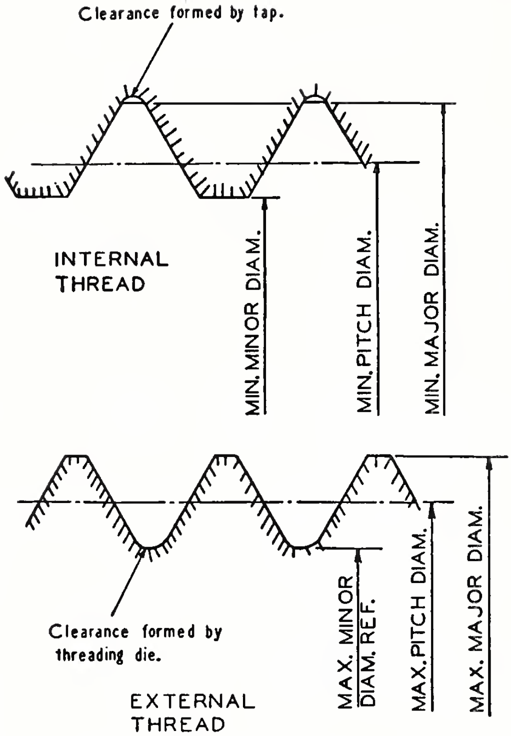

Figure 3.12. *Thread dimensions to be determined for a special thread.*

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UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

SECTION 4

1969

CONTROLLED RADIUS ROOT SCREW THREADS
UNJ SYMBOL

This section of Handbook H28 has not as yet been fully coordinated. As soon as coordination has been completed, it will be issued as a separate document.

Section 4 will be in general agreement with Military Specification MIL-S-8879, Screw Threads, Controlled Radius Root with Increased Minor Diameter; General Specification for.

Also in process of coordination is USAS B1.15 which is the industry standard for the UNJ thread.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

SECTION 5

1969

UNIFIED MINIATURE SCREW THREADS

CONTENTS

1. INTRODUCTION

This section is in general agreement with United States of America Standards Institute (USASI) Standard USA B1.10, Unified Miniature Screw Threads, published by The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017. The latest revision should be consulted when referring to this USA standard. As of date of issue of this part of H28, USA B1.10-1958 is the latest revision.

The thread sizes shown in this section are those endorsed by the American-British-Canadain Conference as the basis for a Unified standard among the inch-using countries.

This section presents a thread series known as Unified Miniature Screw Threads and is intended for general purpose fastening screws and similar uses in watches, instruments, and miniature mechanisms. The series covers a diameter range from 0.30 to 1.40 mm (0.0118 to 0.0551 in) and thus supplements the Unified thread series that begin at 0.060 in.

The 14 sizes are systematically distributed, providing a uniformly proportioned selection over the entire range. They are alternately separated into two categories. The primary sizes are selections made in the interest of simplification and are those to which it is recommended that usage be confined whenever the circumstances of design permit. For more restrictive conditions, the secondary sizes are available.

The diameter-pitch combinations have been determined to provide both maximum strength against stripping and optimum conditions for manufacture on an interchangeable basis.

The values of all dimensions are supplied in both metric and inch units. The standard being basically metric, only the metric values of the nominal diameters and pitches are rational. Consequently, metric units are stipulated for all formulas and the inch dimensions derived by conversion of the unrounded metric values, using the conversion factor 25.4 mm/in.

Use of this series is recommended on all new products in place of the many improvised and unsystematized sizes now in existence that have never arrived at broad acceptance nor recognition by any standardization bodies.

2. THREAD FORM

2.1. Basic Thread Form—The theoretical profile on which the design forms of the threads covered by this section are based is, except for one element, the Unified basic thread form as specified in section 2 and shown in figure 5.1. In exception is thread height, for which a basic value of 0.48p is used instead of

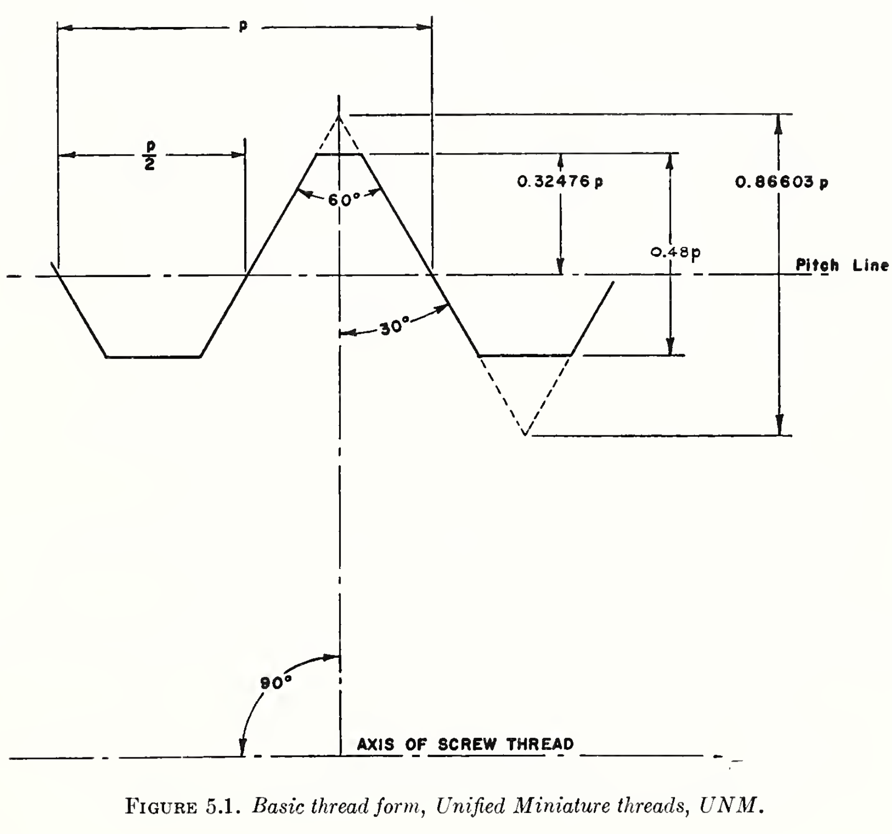


Figure 5.1. *Basic thread form, Unified Miniature threads, UNM.*

0.54127p (=5H/8). Selection of this value is based on the extensive simplification that it affords throughout the calculations for this standard. Resulting coefficients in the formulas for many of the other thread dimensions derived from this property thereby become simple, finite multiples of the lowest common denominator (40) of the fractional equivalents of all but two of the metric pitches, thus yielding values for the majority of metric dimensions that are finite within the decimal place limits of the tables. Also, the calculation of inch equivalents from the terminal metric values is thereby simplified and discrepancies between the metric and inch tables kept to a minimum. This modification will not affect interchangeability with product made to any other standards retaining 0.54127p, as the resulting difference is negligible and completely offset by practical considerations in tapping, full internal thread heights being invariably avoided in these small sizes to escape excessive tap breakage.

2.2. Design Forms of Threads.—The design forms (maximum material condition) of external and internal Unified Miniature threads are shown in figure 5.2.

2.3. Basic Thread Data.—The formulas for the various features of the thread form are as follows:

Dimension	Symbol	Formula [a]
Basic thread form		
Angle of thread	2α	60°.
Half angle of thread	α	30°.
Pitch of thread	p	
No. of threads per inch	n	25.4/p.
Height of sharp-V thread	H	0.866025p.
Addendum of basic thread	h_{ab}	0.32476p.
Height of basic thread (Unified and ISO)[b].	h_b	0.54127p.
Height of basic thread (UNM series)	h_b	0.48p.
Design thread form		
Addendum of external thread	h_{as}	0.32476p.
Height of external thread	h_s	0.56p.
Flat at crest of external thread	F_{cs}	0.125p.
Radius at root of external thread	r_{rs}	0.158p (approx.).
Depth of thread engagement	$h_e = h_b$	0.48p.
Height of internal thread	h_n	0.516p.
Flat at crest of internal thread	F_{cn}	0.32074p.
Radius at root of internal thread	r_{rn}	0.072p (approx.).

[a] The formulas are applied to the metric values of p. Tabulated inch dimensions are derived from the unrounded metric dimensions.

[b] This item is listed for reference only. For the present standard all dependent details of thread form and dimensions are based on a height of 0.48p.

The corresponding thread data for the various standard pitches are shown in table 5.3. The formulas for basic and design thread sizes are as follows:

Dimension	Symbol	Formula
Major diameter, nominal and basic.	D	
Major diameter of external thread.	D_s	D.
Major diameter of internal thread.	D_n	$D - 2h_b + 2h_n = D + 0.072p$.
Pitch diameter, basic	E	$D - 2h_{ab} = D - 0.64952p$.
Pitch diameter of external thread.	E_s	E.
Pitch diameter of internal thread.	E_n	E.
Minor diameter, basic	K	$D - 2h_b = D - 0.96p$.
Minor diameter of external thread.	K_s	$D - 2h_s = D - 1.12p$.
Minor diameter of internal thread.	K_n	K.

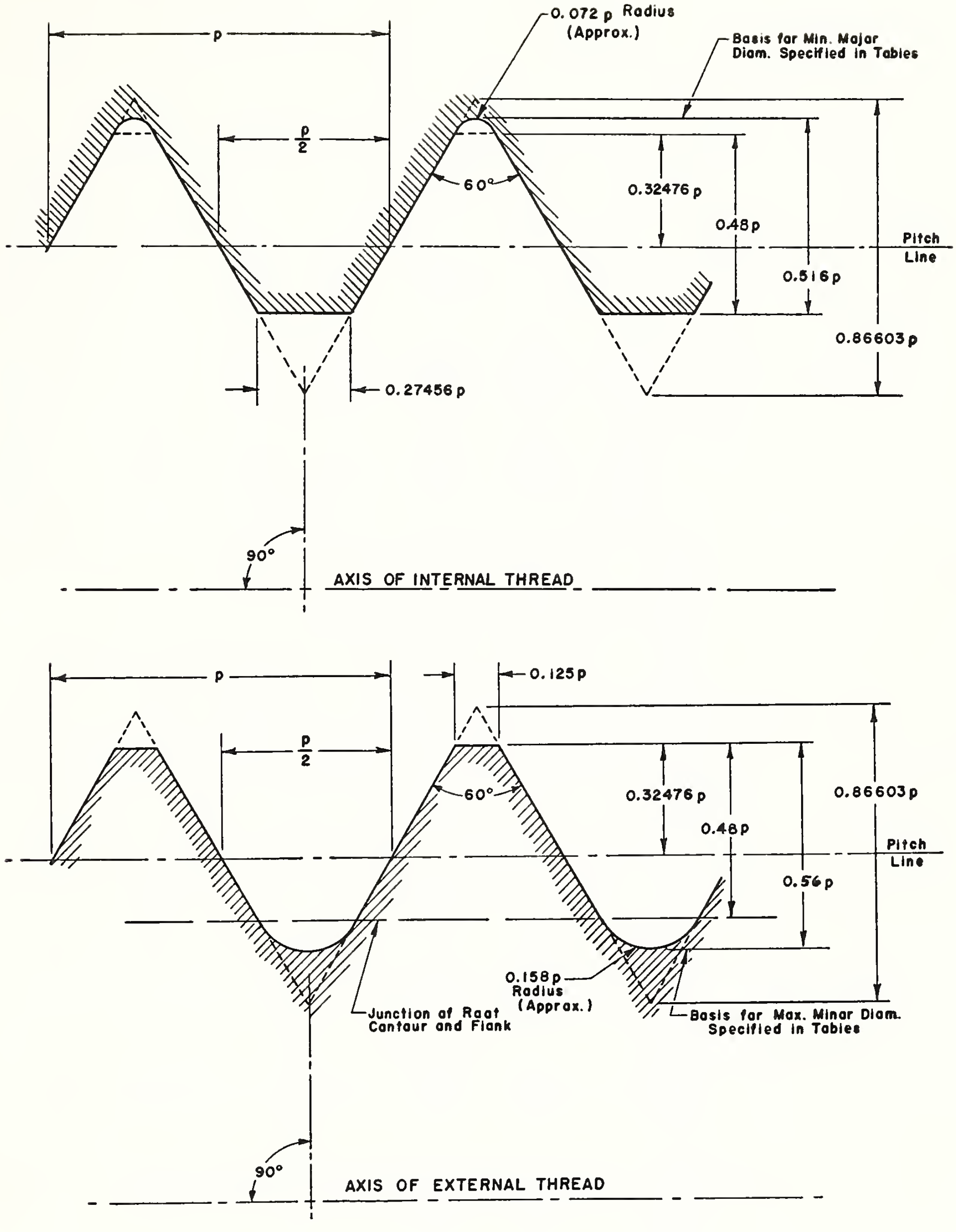


FIGURE 5.2. *Unified Miniature internal and external screw thread design forms (maximum-material condition).*

TABLE 5.3. *Thread form data, Unified Miniature screw threads, UNM*

	Basic				External thread					Internal thread		
Threads per inch[a] n	Pitch, p	Height of sharp V thread, $H = 0.866025p$	Height, $h_b = 0.48p$	Addendum, $h_{ab} = h^a_s = 0.32476p$	Height, $h_s = 0.56p$	Flat at crest, $F_{cs} = 0.125p$	Radius at root, $r_{rs} = 0.158p$	Basis for minimum flat at root, $0.64p$	Min. flat at root, $F_{rs} = 0.136p$	Height, $h_n = 0.516p$	Flat at crest, $F_{cn} = 0.32074p$	Radius at root, $r_{rn} = 0.072p$
1	2	3	4	5	6	7	8	9	10	11	12	13
	mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
	0.080	0.0693	0.0384	0.0260	0.045	0.0100	0.0126	0.0512	0.0109	0.0413	0.0257	0.0058
	.090	.0779	.0432	.0292	.050	.0112	.0142	.0576	.0122	.0464	.0289	.0065
	.100	.0866	.0480	.0325	.056	.0125	.0158	.0640	.0136	.0516	.0321	.0072
	.125	.1083	.0600	.0406	.070	.0156	.0198	.0800	.0170	.0645	.0401	.0090
	.150	.1299	.0720	.0487	.084	.0188	.0237	.0960	.0204	.0774	.0481	.0108
	.175	.1516	.0840	.0568	.098	.0219	.0277	.1120	.0238	.0903	.0561	.0126
	.200	.1732	.0960	.0650	.112	.0250	.0316	.1280	.0272	.1032	.0641	.0144
	.225	.1949	.1080	.0731	.126	.0281	.0356	.1440	.0306	.1161	.0722	.0162
	.250	.2165	.1200	.0812	.140	.0312	.0395	.1600	.0340	.1290	.0802	.0180
	.300	.2598	.1440	.0974	.168	.0375	.0474	.1920	.0408	.1548	.0962	.0216
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
317½	0.003150	0.00273	0.00151	0.00102	0.00176	0.00039	0.00050	0.00202	0.00043	0.00163	0.00101	0.00023
282⅑	.003543	.00307	.00170	.00115	.00198	.00044	.00056	.00227	.00048	.00183	.00114	.00026
254	.003937	.00341	.00189	.00128	.00220	.00049	.00062	.00252	.00054	.00203	.00126	.00028
203⅕	.004921	.00426	.00236	.00160	.00276	.00062	.00078	.00315	.00067	.00254	.00158	.00035
169⅓	.005906	.00511	.00283	.00192	.00331	.00074	.00093	.00378	.00080	.00305	.00189	.00043
145¹⁄₇	.006890	.00597	.00331	.00224	.00386	.00086	.00109	.00441	.00094	.00356	.00221	.00050
127	.007874	.00682	.00378	.00256	.00441	.00098	.00124	.00504	.00107	.00406	.00253	.00057
112⅞	.008858	.00767	.00425	.00288	.00496	.00111	.00140	.00567	.00120	.00457	.00284	.00064
101⅗	.009843	.00852	.00472	.00320	.00551	.00123	.00156	.00630	.00134	.00508	.00316	.00071
84⅔	.011811	.01023	.00567	.00384	.00661	.00148	.00187	.00756	.00161	.00609	.00379	.00085

[a] In all subsequent tables these values are rounded to the nearest whole number.

TABLE 5.4. *Basic and design sizes, Unified Miniature thread series, UNM*

Size designation		Pitch, p	Basic major diameter, D	Basic pitch diameter, $E = D - 0.64952p$	Minor diameter external threads, $K_s = D - 1.12p$	Minor diameter internal threads, $K_n = K = D - 0.96p$	Major diameter internal threads, $D_n = D + 0.072p$	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D - 1.28p$
Primary	Secondary									
1	2	3	4	5	6	7	8	9		10
		mm	*mm*	*mm*	*mm*	*mm*	*mm*	*deg*	*min*	*mm*²
.30UNM		.080	0.300	0.248	0.210	0.223	0.306	5	52	0.0307
	.35UNM	.090	.350	.292	.250	.264	.356	5	37	.0433
.40UNM		.100	.400	.335	.288	.304	.407	5	26	.0581
	.45UNM	.100	.450	.385	.338	.354	.457	4	44	.0814
.50UNM		.125	.500	.419	.360	.380	.509	5	26	.0908
	.55UNM	.125	.550	.469	.410	.430	.559	4	51	.1195
.60UNM		.150	.600	.503	.432	.456	.611	5	26	.1307
	.70UNM	.175	.700	.586	.504	.532	.713	5	26	.1780
.80UNM		.200	.800	.670	.576	.608	.814	5	26	.232
	.90UNM	.225	.900	.754	.648	.684	.916	5	26	.294
1.00UNM		.250	1.000	.838	.720	.760	1.018	5	26	.363
	1.10UNM	.250	1.100	.938	.820	.860	1.118	4	51	.478
1.20UNM		.250	1.200	1.038	.920	.960	1.218	4	23	.608
	1.40UNM	.300	1.400	1.205	1.064	1.112	1.422	4	32	.811
		threads per inch								
			in	*in*	*in*	*in*	*in*	*deg*	*min*	*sq in* × 10^{-4}
.30UNM		318	0.0118	0.0098	0.0083	0.0088	0.0120	5	52	0.475
	.35UNM	282	.0138	.0115	.0098	.0104	.0140	5	37	.671
.40UNM		254	.0157	.0132	.0113	.0120	.0160	5	26	.901
	.45UNM	254	.0177	.0152	.0133	.0139	.0180	4	44	1.262
.50UNM		203	.0197	.0165	.0142	.0150	.0200	5	26	1.407
	.55UNM	203	.0217	.0185	.0161	.0169	.0220	4	51	1.852
.60UNM		169	.0236	.0198	.0170	.0180	.0240	5	26	2.03
	.70UNM	145	.0276	.0231	.0198	.0209	.0281	5	26	2.76
.80UNM		127	.0315	.0264	.0227	.0239	.0321	5	26	3.60
	.90UNM	113	.0354	.0297	.0255	.0269	.0361	5	26	4.56
1.00UNM		102	.0394	.0330	.0283	.0299	.0401	5	26	5.63
	1.10UNM	102	.0433	.0369	.0323	.0339	.0440	4	51	7.41
1.20UNM		102	.0472	.0409	.0362	.0378	.0480	4	23	9.43
	1.40UNM	85	.0551	.0474	.0419	.0438	.0560	4	32	12.57

TABLE 5.5. *Limits of size and tolerances, Unified Miniature thread series, UNM*

Size designation		Pitch	External threads								Internal threads							
			Major diameter limits			Pitch diameter limits			Minor diameter limits		Minor diameter limits			Pitch diameter limits			Major diameter limits	
Primary	Secondary		Max.	Min.	Tol.	Max.	Min.	Tol.	Max.[a]	Min.[b]	Min.	Max.	Tol.	Min.	Max.	Tol.	Min.[c]	Max.[b]
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
.30UNM		0.080	0.300	0.284	0.016	0.248	0.234	0.014	0.210	0.189	0.223	0.260	0.037	0.248	0.262	0.014	0.306	0.327
	.35UNM	.090	.350	.333	.017	.292	.277	.015	.250	.228	.264	.305	.041	.292	.307	.015	.356	.380
.40UNM		.100	.400	.382	.018	.335	.319	.016	.288	.264	.304	.348	.044	.335	.351	.016	.407	.432
	.45UNM	.100	.450	.432	.018	.385	.369	.016	.338	.314	.354	.398	.044	.385	.401	.016	.457	.482
.50UNM		.125	.500	.479	.021	.419	.401	.018	.360	.332	.380	.432	.052	.419	.437	.018	.509	.538
	.55UNM	.125	.550	.529	.021	.469	.451	.018	.410	.382	.430	.482	.052	.469	.487	.018	.559	.588
.60UNM		.150	.600	.576	.024	.503	.483	.020	.432	.400	.456	.516	.060	.503	.523	.020	.611	.644
	.70UNM	.175	.700	.673	.027	.586	.564	.022	.504	.468	.532	.600	.068	.586	.608	.022	.713	.750
.80UNM		.200	.800	.770	.030	.670	.646	.024	.576	.536	.608	.684	.076	.670	.694	.024	.814	.856
	.90UNM	.225	.900	.867	.033	.754	.728	.026	.648	.604	.684	.768	.084	.754	.780	.026	.916	.962
1.00UNM		.250	1.000	.964	.036	.838	.810	.028	.720	.672	.760	.852	.092	.838	.866	.028	1.018	1.068
	1.10UNM	.250	1.100	1.064	.036	.938	.910	.028	.820	.772	.860	.952	.092	.938	.966	.028	1.118	1.168
1.20UNM		.250	1.200	1.164	.036	1.038	1.010	.028	.920	.872	.960	1.052	.092	1.038	1.066	.028	1.218	1.268
	1.40UNM	.300	1.400	1.358	.042	1.205	1.173	.032	1.064	1.008	1.112	1.220	.108	1.205	1.237	.032	1.422	1.480
		threads per in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.30UNM		318	0.0118	0.0112	0.0006	0.0098	0.0092	0.0006	0.0083	0.0074	0.0088	0.0102	0.0014	0.0098	0.0104	0.0006	0.0120	0.0129
	.35UNM	282	.0138	.0131	.0007	.0115	.0109	.0006	.0098	.0090	.0104	.0120	.0016	.0115	.0121	.0006	.0140	.0149
.40UNM		254	.0157	.0150	.0007	.0132	.0126	.0006	.0113	.0104	.0120	.0137	.0017	.0132	.0138	.0006	.0160	.0170
	.45UNM	254	.0177	.0170	.0007	.0152	.0145	.0007	.0133	.0124	.0139	.0157	.0018	.0152	.0158	.0006	.0180	.0190
.50UNM		203	.0197	.0189	.0008	.0165	.0158	.0007	.0142	.0131	.0150	.0170	.0020	.0165	.0172	.0007	.0200	.0212
	.55UNM	203	.0217	.0208	.0009	.0185	.0177	.0008	.0161	.0150	.0169	.0190	.0021	.0185	.0192	.0007	.0220	.0231
.60UNM		169	.0236	.0227	.0009	.0198	.0190	.0008	.0170	.0157	.0180	.0203	.0023	.0198	.0206	.0008	.0240	.0254
	.70UNM	145	.0276	.0265	.0011	.0231	.0222	.0009	.0198	.0184	.0209	.0236	.0027	.0231	.0240	.0009	.0281	.0295
.80UNM		127	.0315	.0303	.0012	.0264	.0254	.0010	.0227	.0211	.0239	.0269	.0030	.0264	.0273	.0009	.0321	.0337
	.90UNM	113	.0354	.0341	.0013	.0297	.0287	.0010	.0255	.0238	.0269	.0302	.0033	.0297	.0307	.0010	.0361	.0379
1.00UNM		102	.0394	.0380	.0014	.0330	.0319	.0011	.0283	.0265	.0299	.0335	.0036	.0330	.0341	.0011	.0401	.0420
	1.10UNM	102	.0433	.0419	.0014	.0369	.0358	.0011	.0323	.0304	.0339	.0375	.0036	.0369	.0380	.0011	.0440	.0460
1.20UNM		102	.0472	.0458	.0014	.0409	.0397	.0012	.0362	.0343	.0378	.0414	.0036	.0409	.0420	.0011	.0480	.0499
	1.40UNM	85	.0551	.0535	.0016	.0474	.0462	.0012	.0419	.0397	.0438	.0480	.0042	.0472	.0487	.0013	.0560	.0583

[a] This limit, in conjunction with root form shown in figure 5.2, is advocated for use when optical projection methods of gaging are employed. For mechanical gaging the minimum minor diameter of the internal thread is applied.
[b] This limit is provided for reference only. In practice, the form of the threading tool is relied upon for this limit. Control by gaging is not imposed.
[c] This limit is provided for reference only, and is not gaged. For gaging, the maximum major diameter of the external thread is applied.
NOTE.—Inch limits in this table have been determined by direct conversion of corresponding metric dimensions prior to rounding off. Inch tolerances are the differences between the inch limits and, consequently, differ in some instances by 0.0001 inch from the inch equivalent of the metric tolerance.

3. UNIFIED MINIATURE THREAD SERIES

The diameter-pitch combinations which constitute the Unified Miniature thread series, and the design sizes, are those shown in table 5.4. All threads are of the single (single-start) type.

4. CLASSIFICATION AND TOLERANCES

4.1. CLASSIFICATION.—There is established herein only one class of thread, with zero allowance on all diameters.

4.2. TOLERANCES.—All tolerances governing limits of size are based on functions of the pitch only and apply to lengths of engagement from 0.67 to 1.5 times the nominal diameter. (See note, table 5.5.) The limits of size resulting from the application of the specified tolerances are illustrated in figure 5.6. Length of engagement and nominal diameter have not been incorporated in any of the tolerance formulas in view of the following: (1) In the small thread sizes covered by this standard, lengths of engagement appreciably below or above the range covered by the formulas are seldom employed. (2) Functional fitness in these small sizes is dependent principally upon the properties of the thread rather than the size of the threaded member. (3) Total tolerances are too small to permit the imposition of minor order modifications.

Tolerances are tabulated in table 5.5 and are based on the following formulas:

	External thread[a]	Internal thread[b]
Major diameter	$0.12p + 0.006$	$0.168p + 0.008$[d]
Pitch diameter	$0.08p + 0.008$	$0.08p + 0.008$
Minor diameter	$0.16p + 0.008$[c]	$0.32p + 0.012$

NOTE: Metric units (millimeters) apply in these formulas. Inch tolerances are not derived by direct conversions of the metric values but are the differences between the rounded-off limits of size in inch units.

[a] Tolerances on external threads are applied to the design sizes in the *minus* direction.

[b] Tolerances on internal threads are applied to the design sizes in the *plus* direction.

[c] This formula is for reference only. In practice, the form of the threading tool is relied upon for controling the minimum minor diameter, and this limit is not gaged, except in confirming new tools.

[d] This formula is for reference only and is comprised of the pitch diameter tolerance and an extension of the thread form of $0.08p$ beyond the basic major diameter. In practice, this limit is applied to the threading tool (tap) and is not gaged on the product.

5. COATED THREADS

It is not within the scope of this standard to make recommendations for thicknesses of, or to specify limits for, coatings. However, it is obvious that in these small sizes any coatings applied must be kept thin because of the smallness of the threads. Generally, the coatings employed in practice are confined to those of the electroplated or oxide types and are limited to a flash thickness. For applications where these coatings are inadequate the product is usually made of a corrosion-resistant material, thereby avoiding the problems attendant to providing for heavier coatings. However, where coatings of a measurable thickness are required, it is essential that they be included within the maximum-material limits since no allowance is provided between these limits of the external and internal thread. In other words, the maximum material limits given in this standard apply to both uncoated and coated threads.

6. THREAD DESIGNATIONS

Screw threads of this series shall be designated on engineering drawings, in specifications, and on tools and gages (when space permits) by the size designations shown in columns 1 and 2 of table 5.4 in which the symbol UNM designates the Unified Miniature series. To these designations may be affixed, in parentheses, the inch equivalent of the basic major diameter, but this addition is optional. Thus, for example, the thread size identified by the designation .80UNM may also be designated .80UNM (.0315).

7. LIMITS OF SIZE

The limits of size of both external and internal threads, resulting from the application of the specified tolerances, are given in table 5.5 in both the metric and English systems and are illustrated in figure 5.6. For hole size limits before tapping, see appendix A3.

8. GAGES AND GAGING

The development of a gaging standard for Unified Miniature threads is anticipated after the accumulation of more experience with this standard. The following procedures are at present being successfully used by some producers:

1. GAGING OF EXTERNAL THREADS.—The major diameter of the external thread is inspected by either contact gaging or optical projection. All other dimensions, such as pitch diameter, lead, thread form, and minor diameter are inspected by optical projection methods. There is presented in figure 5.7 an illustration of a chart which has been found very satisfactory for the optical projection method of

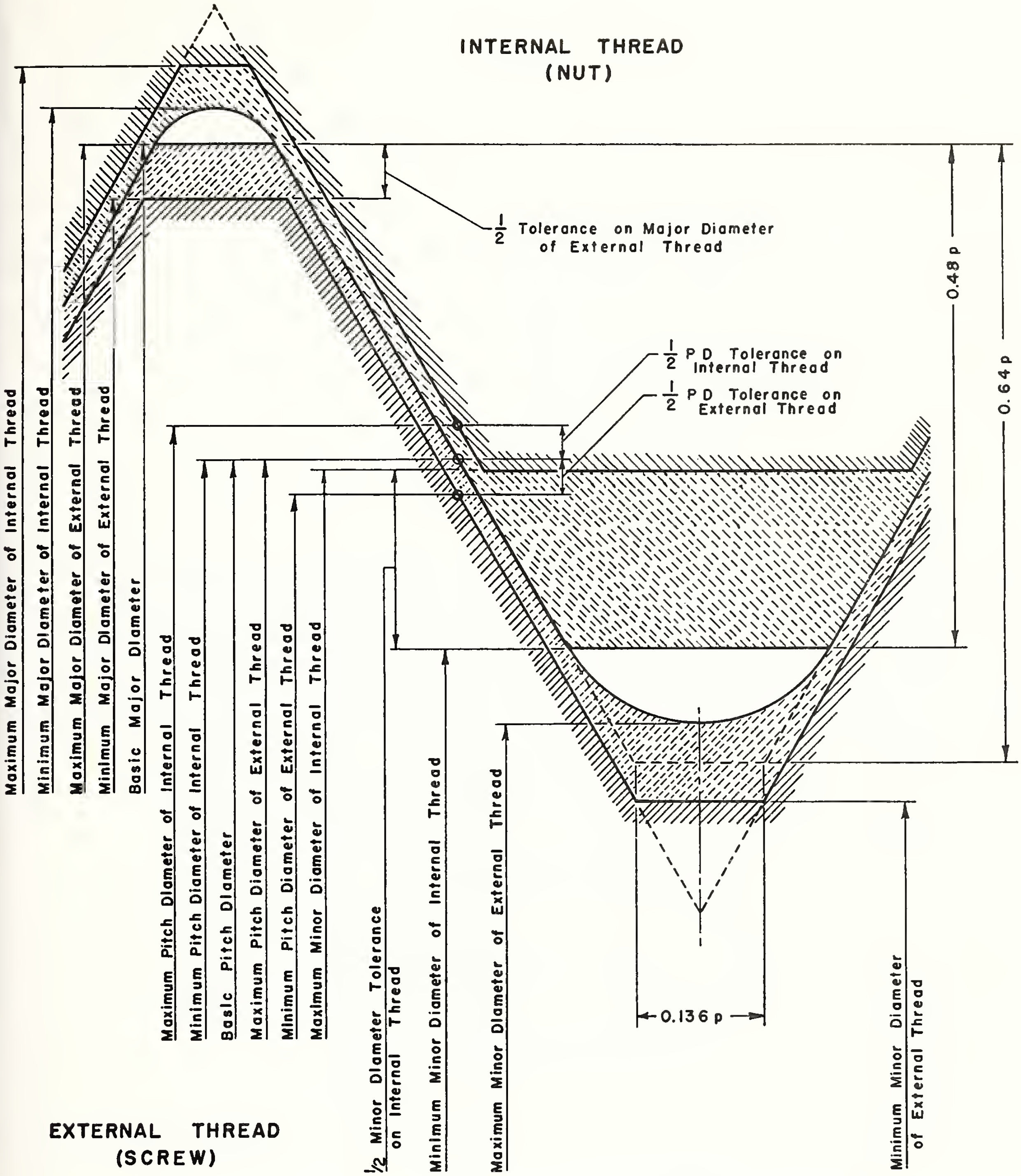


FIGURE 5.6. *Disposition of tolerances and crest clearances, Unified Miniature threads, UNM.*

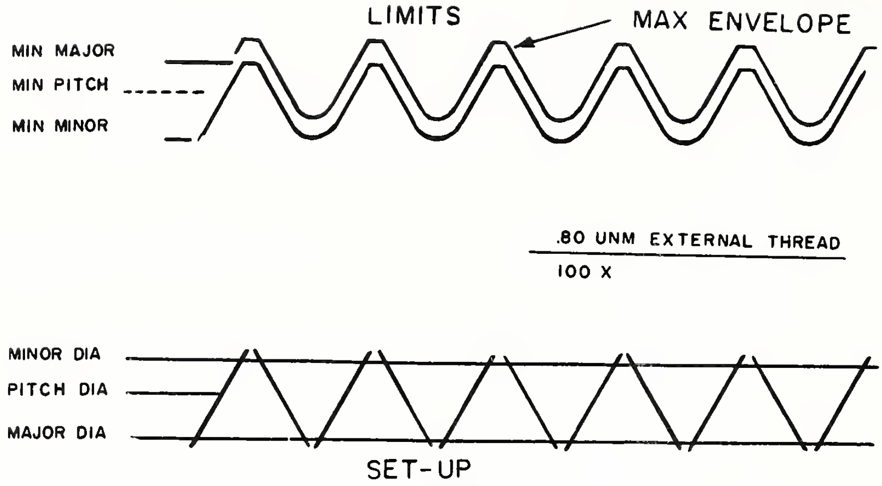


FIGURE 5.7. *Suggested chart for projection inspection of external Unified Miniature threads, UNM.*

inspection of external threads. Inspection at a magnification of 100 is recommended and at this scale the charts should be accurate to within ±0.01 in on all diameters and on pitches cumulatively up to five.

2. GAGING OF INTERNAL THREADS.—The minor diameter of the internal thread is gaged with GO and NOT GO plain cylindrical plug gages. All other elements are checked only for assembleability limits by means of a GO thread plug gage. For the minimum-material limit of the internal thread the accuracy and performance of the tap is relied upon. This implies that the major and pitch diameters of the tap do not exceed the maximum internal thread limits for these elements and disregards overcutting, which is rarely incurred because of the flexibility of these small taps and the manner in which they are generally fluted.

9. WIRE MEASUREMENT OF PITCH DIATETER

For information concerning the wire measurement of pitch diameter, see appendix A4.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

SECTION 6

1969

GAGES AND GAGING FOR UNIFIED SCREW THREADS

CONTENTS

This section is in general agreement with United States of America Standards Institute (USASI) Standard USA B1.2 Gages and Gaging for Unified Screw Threads, published by The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017. The latest revision should be consulted when referring to this USA Standard. As of date of issue of this part of H28, USA B1.2–1966 is the latest revision.

A related standard is Commercial Standard CS8, Gage Blanks which is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Industry standard for Gage Blanks is USA B47.1, published by The American Society of Mechanical Engineers. The latest revision should be consulted when referring to these standards. As of date of issue of this part of H28, CS8-61 and USA B47.1–1962 are the latest revisions.

1. INTRODUCTION

Gaging of screw threads is the process of investigating or determining the extent to which they conform dimensionally to prescribed limits of size. Dimensional gages are the means applied for that purpose.

This section for gages and gaging practice is supplementary to sections 2 and 3 and is intended to facilitate adherence to the limits of size specified therein without in any sense restricting the requirements more severely than those specified. Adherence to the gaging principles laid down, which have been tested by many years of practical use, will assure interchangeable assembly of product threads, the acceptance of satisfactory threads, and the rejection of threads that are outside of prescribed limitations.

This section covers gaging methods for final conformance and provides the essential specifications for the applicable gages required in line with the provisions of par. 5.1, p. 6.17.

It is not the intent to preclude the use of other gaging systems or dimensional control systems provided they are properly correlated by the user to this section and yield comparable results with respect to conformance within specified limits.

This section includes specifications for the following gages used for product inspection:

For Product Internal Thread:

(*a*) GO Thread Plug Gage for functional (virtual) diameter maximum-material limit.

(*b*) HI Thread Plug Gage for HI functional diameter minimum-material limit.

(*c*) GO and NOT GO Plain Plug Gages for minimum and maximum limits of the minor diameter.

For Product External Thread:

(*a*) GO Thread Ring Gage for functional (virtual) diameter maximum-material limit.

(*b*) LO Thread Ring Gage for LO functional diameter minimum-material limit.

(*c*) Indicating Thread Gages to establish numerical values for determining Functional Differential Reading for use in verifying conformance of the thread elements.

(*d*) LO Limit Thread Snap or Indicating Gages for LO minimum-material limit.

(*e*) GO and LO Thread Setting Plug Gages for (a) through (d) above.

(*f*) Plain Gages for minimum and maximum limits of the major diameter.

2. BASIC PRINCIPLES

2.1. Gage Classification.—The limits of size of the threads to be produced should be represented in: (1) Gages used in checking the threads as they are produced, known as "working gages"; (2) gages for use in the acceptance of the product, known as "inspection gages"; and (3) gages used to determine the accuracy of the two preceding classes of gages known as "master" and "setting gages."

2.2. Gages For Reference.—(*a*) *Master gage.*—The master gage is a thread plug gage which represents the physical dimensions of the basic size of the part. It clearly establishes the minimum size of the internal thread and the maximum size of the external thread at the point at which interference between mating parts begins when no allowance is provided. A master gage shall be accompanied by a record of its measurement.

(*b*) *Setting gage (check gage).—Threaded setting gages.*—A setting gage is a thread plug gage to which adjustable thread ring gages, thread snap gages, and other thread comparators are set to size. Threaded setting plug gages are of two standard designs which are designated as "basic-crest setting plugs" and "truncated setting plugs."

The basic-crest setting plug is one having a width of flat at the crest equal to $0.125p$. It is frequently used for setting thread snap gages and indicating type gages. See par. 5.2, p. 6.18.

The truncated setting plug of standard design, as shown in CS8 or B47.1, is similar to the basic-crest setting plug except that the crest of the thread is truncated for half the length of the gage, giving a full-form portion and a truncated portion, as specified in par. 4.6.3, p. 6.16. In setting thread gages to size, the truncated portion controls the pitch diameter, and the full-form portion assures that proper clearance is provided at the major diameter of the ring gage. Also, the use of the full-form portion in conjunction with the truncated portion checks, to some degree, the flank angle of the thread gage.

Plain cylindrical plug acceptance check gages.—GO and NOT GO plain cylindrical plug acceptance check gages are required to check the minor diameter limits of thread ring gages of the smaller sizes, after the gage has been properly set to the thread setting plug gage. Standard measuring equipment is usually employed in lieu of plain cylindrical plug gages for minor diameters larger than 0.375 in.

2.3. Limit Gages.—Limit gages are of two categories: (1) maximum-material-limit gages, designated GO gages and (2) minimum-material-limit gages, designated low limit (LO) gages for the functional diameter of external threads and high limit (HI) gages for internal threads.[1]

(*a*) *Maximum-material-limit or GO gages.*—The maximum-material-limit or GO gages, check or control the extent of the tolerance, as applied to a specific screw thread, in the direction of the limit of maximum material and represent the maximum limit of external threads and the minimum limit of internal threads. The ideal maximum-material-limit or GO gage is a threaded counterpart of the thread, made exactly to its prescribed maximum-material limits and, in length, equal to the length of engagement of the thread with its mating thread. Such gages would most nearly duplicate the assembly conditions of threads. They control the virtual diameter (or effective size) at the maximum-material limit. See par. 5.1, p. 6.17.

(*b*) *Minimum-material-limit or HI/LO gages.*—The minimum-material-limit gages control the ex-

[1] "HI" and "LO" gages were previously shown in H28 as "Not go" gages.

tent of the tolerance in the direction of the limit of minimum material and represent the minimum limit of external threads and the maximum limit of internal threads. The minimum-material pitch diameter limits are necessarily a limitation of the pitch diameter as a single thread element. Also, it is a principle of limit gaging that each element or dimension can be checked only singly by a minimum-material-limit gage. Accordingly, separate gages are required to check pitch, major, and minor diameters at minimum-material limits. That is, for external threads two gages are necessary: one to check the major diameter and another to check the pitch diameter; internal threads require a gage to check the pitch diameter and another to check the minor diameter. A third factor in minimum-material-limit gaging is nontechnical but of practical importance, namely, the economics of the gaging means and procedures, as thorough checking of a thread requires several individual gaging operations along and around the thread. It is not feasible, therefore, to establish an ideal gage design for gaging pitch diameter and approach that ideal closely in practice, as is done for maximum-material-limit gages.

As a result, two distinct gaging practices are widely used, as follows:

(1) The use of minimum-material-limit thread plug and ring gages provides a satisfactory means of gaging when proper functioning of the thread assembly only requires control of the virtual diameter (or effective size) of the threads at the minimum-material limits. The use of such gages is referred to as "virtual diameter (or effective size) gaging practice." See par. 5.1, p. 6.17.

(2) The use of minimum-material-limit thread snap or indicating gages conforming to the thread length requirements stated in paragraphs 4.4.2.2, p. 6.07, and 4.5.2.2, p. 6.12, controls to a close degree the pitch diameter at the minimum-material limit as a single element. Thus, without further checking, their use provides an economical means of control over such other variables as lead, uniformity of helix, flank angle, taper, roundness, and surface condition. The use of such gages, however, is referred to as "single element gaging practice." See par. 5.1, p. 6.17.

2.4. Final Conformance Gaging.—The object of final conformance gaging of product threads is to determine the extent they conform dimensionally to prescribed limits of size, and to segregate or reject product threads that are outside of prescribed limitations.

There are two general methods of approach to dimensional inspection of product threads, namely, inspection by attributes and inspection by variables.

Inspection by attributes involves the application of limit gages to assure that the product threads are within prescribed limits of size. Inspection by attributes forms the basis of final conformance gaging except as noted in the next paragraph.

Inspection by variables forms the basis of final conformance gaging where it is required by supplemental specifications that individual elements of product threads be controlled. Dimensional Inspection by variables is most useful in the control of manufacturing tools and processes and to collect manufacturing data for the analysis of product thread deviations. Inspection by variables involves the application of indicating gages or measuring instruments (optical, mechanical, pneumatic, or electrical) to determine the extent of deviations of product threads and their individual elements relative to prescribed limits.

2.5. Screw Thread Conformance.—Final dimensional acceptance of product threads shall be in accordance with the limits of size as determined by the final conformance gages outlined in par. 5.1, p. 6.17. It is important that the method of final conformance gaging be understood by both the producer and user. See par. 3.2, p. 6.04.

Thread plug gages are controlled by *direct* measuring methods. Thread ring, thread snap limit gages, and indicating thread gages are controlled by reference to the appropriate setting plugs.

2.6. Limitations Of Gaging.—Product threads accepted by a gage of one type may be verified by other types. It is possible, however, that parts which are near either rejection limit may be accepted by one type and rejected by another. Also, it is possible for two individual limit gages of the same type to be at the opposite extremes of the gage tolerances permitted, and borderline product threads accepted by one gage could be rejected by another. See under par. 3 which follows.

Large product external and internal threads may present additional problems for technical and economic reasons. In these instances, verification may be based on use of gages or measurement of thread elements. Various types of gages or measuring devices in addition to those defined in this section are available and acceptable when properly correlated to this section. It is essential to achieve agreement between producer and consumer with respect to method and equipment used.

2.7. Surveillance Of Gages.—Periodic rechecking and surveillance of gages is a necessary precaution to assure satisfactory product thread conformance.

2.8. Measurement Of Gages.

2.8.1. Determining Pitch Diameter.—The three-wire method of determining pitch diameter of thread plug gages is standard for gages in this section. Sizes of ring thread gages are determined by their fit on their respective setting plugs so measured. Other thread gages for product external threads are controlled by reference to appropriate setting plugs so measured. See appendix A4.

2.8.2. Standard Temperature.—The standard temperature used internationally for linear measurements is 68 °F (20 °C). Nominal dimensions of gages and product, as specified, and actual dimensions, as measured, shall be within specified limits at this temperature.

As product threads are frequently checked at temperatures which are not controlled, it is desirable that the coefficient of thermal expansion of gages be the same as that of the product on which they are used. Inasmuch as the majority of threaded product consists of iron or steel, and screw-thread gages are ordinarily made of hardened steel, this condition is usually fulfilled without special attention. When the materials of the product thread and the gage are dissimilar, the differing thermal coefficients can cause serious complications and must be taken into account.

2.8.3. Measuring Force for Wire Measurements of 60 Degree Threads.—In measuring the pitch diameter of screw thread gages by means of wires, the following measuring forces shall be used:

Threads per Inch	Measuring Force in Pounds (±10%)
20 or less	2.5
Above 20 to and including 40	1
Above 40 to and including 80	0.5

The thread wires should be calibrated by the procedure specified in appendix A4.

3. GAGING AND VERIFICATION OF PRODUCT THREADS

Gages are classified as to type and use, together with specific details of gaging practice applicable to each type, in the following paragraphs.

GO thread gages check the maximum-material size, to assure interchangeable assembly. HI and LO thread gages check the minimum-material size.

The thread form of GO thread gages corresponds to maximum product thread depth of engagement to assure clearance at the major diameter of the product internal thread or the minor diameter of the product external thread.

GO and NOT GO plain cylindrical plug gages, snap, or indicating gages, check the limits of size of the minor diameter of product internal threads and the major diameter of product external threads, respectively.

At the product thread maximum-material limit, the gages used for final conformance gaging are within the extreme limits of size of the product thread. At the product thread minimum-material limit the usual practice for gages used for final conformance gaging is to have the gage tolerance within the extreme limits of size of the product thread. However, to assure that usable product thread at the extreme limit of size (minimum-material limit) is not rejected, in border-line cases, the consumer may elect to use HI/LO gages having pitch diameter tolerances outside the product thread limits.

3.1. Use Of Gages.

3.1.1. Threaded and Plain Gages for Verification of Product Internal Threads:

Unless otherwise specified, all thread gages which directly check the product thread shall be X tolerance for all classes.

GO Thread Plug Gages. GO thread plug gages must enter the full threaded length of the product freely. The GO thread plug gage is a cumulative check of all thread elements except the minor diameter.

HI Thread Plug Gages. HI thread plug gages when applied to the product internal thread may engage only the end threads (which may not be representative of the complete thread). Entering threads on product are incomplete and permit gage to start. Starting threads on HI plugs are subject to greater wear than the remaining threads. Such wear in combination with the incomplete product threads permit further entry of the gage. Surveillance facilities ordinarily available in the field are often inadequate for fully determining such gage wear. Also, it is not practical to control nor limit the torque applied by operators, nor that utilized by a specific operator at various times and under varying conditions. For these reasons the following standard practice has been adopted with respect to permissible entry. Threads are acceptable when the HI thread plug gage is applied to the product internal thread if: (a) it does not enter, or if (b) all complete product threads can be entered, provided that a *definite* drag from contact with the product material results on or before the third turn of entry. The gage should not be forced after the drag is definite. Special requirements such as exceptionally thin or ductile material, or small number of threads, may necessitate modification of this practice.

GO and NOT GO Plain Plug Gages for Minor Diameter of Product Internal Thread. GO plain plug gages must completely enter the product internal thread to assure that the minor diameter does not exceed the maximum-material limit. NOT GO plain plug gages must not enter the product internal thread to provide adequate assurance that the minor diameter does not exceed the minimum-material limit.

3.1.2. Thread Setting Plug Gages.

GO and LO Truncated Setting Plugs. W tolerance truncated setting plugs are recommended for setting adjustable thread ring gages up to and including 6.25 inches nominal size and may be used for setting thread snap gages and indicating thread gages. Above 6.25 in. nominal size, the difference in feel between the full form and truncated sections in setting thread ring gages is insignificant, and the basic crest setting plug may be used.

When setting adjustable thread ring gages to size, the truncated portion of the setting plug controls the functional size, and the full form portion assures that adequate clearance is provided at the major diameter of the ring gage. The full form portion, in conjunction with the truncated portion, checks—to some degree—the half-angle accuracy of the gage. The same procedure may be applied to detect uneven angle wear of ring gages in use.

GO and LO Basic-crest (Full Form) Setting Plugs. W tolerance basic crest setting plugs are frequently used for setting thread snap limit gages and indicating thread gages. They may also be used for setting large adjustable thread ring gages, especially those above 6.25 inches nominal size. When they are so used it may be desirable to take a cast of the ring gage thread form to check the half-angle and profile. See par. 5.2.1.1, p. 6.18.

GO and NOT GO Plain Plug Acceptance Check Gages for Checking Minor Diameter of Thread Ring Gages. The GO plain plug gage is made to the minimum minor diameter specified for the thread ring gage (GO or LO), while the NOT GO gage is made to maximum minor diameter specified for the thread ring gage (GO or LO). After the adjustable thread ring gages have been set to the applicable thread setting plugs, the GO and NOT GO plain plug acceptance check gages are applied to check the minor diameter of the ring gage to assure that it is within the specified limits. An alternate method for checking minor diameter of thread ring gages is by the use of measuring equipment.

3.1.3. Threaded and Plain Ring, Snap, and Indicating Thread Gages for Verification of Product External Thread.

GO Thread Ring Gages. GO thread ring gages must be set to the applicable W tolerance setting plugs to assure they are within specified limits. The product thread must freely enter the GO thread ring gage for the entire length of the threaded portion. The GO thread ring gage is a cumulative check of all thread elements except the major diameter.

LO Thread Ring Gages. LO Thread ring gages must be set to the applicable W tolerance setting plugs to assure that they are within specified limits. LO thread ring gages when applied to the product external thread may engage only the end threads (which may not be representative of the complete product thread). Starting threads on LO rings are subject to greater wear than the remaining threads. Such wear in combination with the incomplete threads at the end of the product thread permit further entry in the gage. Surveillance facilities ordinarily available in the field are often inadequate for fully determining such gage wear. Also, it is not practical to control nor limit the torque applied by operators, nor that utilized by a specific operator at various times and under varying conditions. For these reasons the following standard practice has been adopted with respect to permissible entry. Threads are acceptable when the LO thread ring gage is applied to the product external thread if (a) it is not entered, or if (b) all complete product threads can be entered provided that a *definite* drag from contact with the product material results on or before the third turn of entry. The gage should not be forced after the drag is definite. Special requirements such as exceptionally thin or ductile material, small number of threads, etc., may necessitate modification of this practice.

LO Thread Snap Limit Gages or Indicating Thread Gages. LO thread snap limit gages (or indicating thread gages) check Class 3A product external thread LO minimum-material limit. The gages must be set to the applicable W tolerance setting plugs. The gage is then applied to the product thread at various points around the circumference and over the entire length of complete product thread. In applying the thread snap limit gage, threads are dimensionally acceptable when the gaging elements do not pass over the product thread or just pass over the product thread with perceptible drag from contact with the product material and the gage. Indicating thread gages provide a numerical value for the product thread size. Product external threads are dimensionally acceptable when the value derived in applying the gage (as described above) is not less than the specified minimum-material limit.

3.1.4. Check of Effect of Lead and Flank Angle Deviations on Product Thread. When this check is specified, there are two general methods available for the inspection procedures involved, as follows:

Direct Measurement of Deviations. The lead and flank angle of the product thread may be measured by means of available measuring equipment such as projection comparators, measuring microscopes, graduated cone points, lead measuring machines, helix variation measuring machines, and thread flank charting equipment. Formulas for obtaining the diameter equivalents of lead and flank angle deviations are given in subsection "Limits of size" in section 2. See also table 2.22 for such deviations equivalent to half the pitch diameter tolerances for Standard Unified Threads.

Differential gaging utilizing indicating thread gages with appropriate gaging elements as outlined under par. 5.4, p. 6.21, and par. 6, p. 6.27, may be used.

3.1.5. GO and NOT GO Plain Rings and Adjustable Snap Limit and Indicating Gages for Checking Major Diameter of Product External Thread. The GO gage must completely receive or pass over the major diameter of the product external thread to assure that the major diameter does not exceed the maximum-material limit. The NOT GO gage must not pass over the major diameter of the product external thread to assure that the major diameter is not less than the minimum-material limit.

3.2. Limitations.

Product threads accepted by a gage of one type may be verified by other types. It is possible, however, that parts which are near either rejection limit may be accepted by one type and rejected by another. Also, it is possible for two individual limit gages of the same type to be at the opposite extremes of the gage tolerances permitted and borderline product threads accepted by one gage could be rejected by another. In such instances (except when LO limit snap or indicating thread gages are specified) limit plug and ring thread gages that approximate as closely as practicable the extreme maximum-material product-limit and minimum-material product-limit shall be used to determine whether or not the product threads under inspection are within the specified limits of size.

Large product external and internal threads above 6.25 in. nominal size may present additional problems for technical and economic reasons. In these instances verification may be based on use of gages or measurement of thread elements. Various types of indicating thread gages are shown under par. 6, p. 6.27. Producer and user should agree on the method and equipment used.

3.3. Surveillance.

Gages are subject to wear and/or damage from normal usage. Periodic rechecking and surveillance is a necessary precaution to assure product thread conformance.

4. SPECIFICATIONS FOR GAGES

4.1. General Design.

The design of gages is specified herein only to the extent that it affects the results obtained in the gaging of product threads. Moreover, to serve their intended purposes satisfactorily, thread gages should be produced by the latest and best manufacturing techniques. The type of steel or wear-resistant material selected, together with the heat-treating and stabilization processes, should provide wear life and dimensional stability. Thread gaging elements should be precisely manufactured to assure adequate refinement of surface texture, prevention or eliminaton of amorphous or smear metal, and uniformity of thread form over the entire length of the gaging member. Precision lapping of thread flanks of thread plug and ring gages is a commonly used practice in manufacture.

4.2. Design Of Gage Blanks.

Designs of standard blanks for thread plug and ring gages, setting plug gages, plain cylindrical plug and ring gages, and plain snap gages have been developed by the American Gage Design Committee. The designs have proved satisfactory in many years of use and have been published in CS8 and B47.1, Gage Blanks. Also see tables 6.11 and 6.12.

GO gage blanks should theoretically approximate the length of engagement of the product thread with its mating thread, while HI/LO blanks may be shorter.

Where indicating thread gages are used, the length of GO gaging elements should approximate the length of the corresponding GO thread gage.

4 3. Specific Design Requirements.

4.3.1. Thread Form. The specifications for thread form of thread gages applicable to both external and internal threads are stated below for each particular type gage. These specifications for thread form apply over the entire circumference and threaded length of the gaging element.

4.3.2 Limits of Size. The specifications and format for tables of limits of size of thread gages and setting plugs are summarized in tables 6.6 and 6.7. Constants for the various standard thread pitches which are required to determine gage dimensions are tabulated in table 6.5.

4.3.3. Standard Gage Tolerances. Standard tolerances for thread plug and ring gages and thread setting plugs are: (1) W tolerances, shown in table 6.9, which represent the highest commercial grade of accuracy and workmanship, and are specified for truncated setting plugs; (2) X tolerances, shown in table 6.8 are larger than W tolerances.

4.3.3.1. Application of Tolerances. Thread Setting Plugs. Regardless of product thread class, all thread setting plugs for final conformance gaging shall be to W tolerances. For other than final conformance gaging, see par. 5.3.2, p. 6.20.

Thread Gages. Final conformance gages which directly check the product thread shall be to X tolerances for all classes unless otherwise specified.

4.3.3.2. Direction of Tolerances on Gages. At the maximum-material limit (GO), the dimensions of all gages used for final conformance gaging are within the extreme limits of size of the product thread. At the minimum-material limit (HI/LO), the usual practice for gages used for final conformance gaging, unless otherwise specified, is to have the gage tolerance within the extreme limits of size of the product thread. Dimensions for such gages are listed in columns 6 and 15 of table 6.19, p. 6.30, and col. 9 of table 6.20. However in order to assure that usable product thread at the extreme limit of size is not rejected, the consumer may elect to use (HI/LO) gages having pitch diameter tolerances outside of the product thread limit. Dimensions for such gages are listed in columns 7 and 16 of table 6.19, p. 6.30, and col. 10 of table 6.20.

Direction of Tolerances for Individual Gage Elements. The direction of tolerances for the individual elements of the various types of gages are specified in tables 6.6 and 6.7.

4.3.3.3. Tolerance on Lead (cumulative effect of progressive or erratic helix variation and thick-end or thin-end thread deviations) is specified as an allowable variation between any two threads not farther apart than the length of the standard taperlock or trilock gage as shown in CS8 or B47.1, Gage Blanks. In the case of setting plugs, the specified tolerance shall be applicable to the thread length in the mating ring gage or 9 pitches, whichever is smaller. *The tolerance on lead establishes the width of a zone, measured parallel to the axis of the thread, within which the actual helical path must lie for the specified length of the thread. Measurements will be taken from a fixed reference point located at the start of the first full thread to a sufficient number of positions along the entire helix to detect all types of lead deviations. The amounts that these positions deviate from their basic (theoretical) positions will be recorded with due respect to sign. The greatest deviation in each direction (+ and −) will be selected and the sum of their values, *disregarding sign,* shall not exceed the specified tolerance. If the deviations are all in one direction, the maximum

*NOTE: It has been customary in the past to specify tolerances on lead as plus or minus (±) values. Under the requirement established above, the width of the tolerance zone is the nominal tolerance value specified *regardless of sign.* In view of the preceding, the tolerance symbols, plus or minus, (±), should be omitted in referencing lead tolerances. The omission of the plus and minus does not change the total tolerance.

value governs conformance. In the case of truncated setting plugs, the lead deviations present on the full-form portion and the truncated portion of an individual gage shall not differ from each other by more than 0.0001 in. over any portion equivalent to the length of the thread ring gage, or nine pitches, whichever is smaller.

4.3.3.4. Tolerances on Half-Angle. Tolerances are specified for the half-angle rather than the included angle to assure that the bisector of the included angle will be perpendicular to the axis of the thread within proper limits. The equivalent of the deviation from the true thread form caused by such irregularities as convex or concave flanks, rounded crests, or slight projections on the thread form, shall not exceed the tolerance permitted on half-angle.

4.3.3.5. Interpretation of Tolerances. Tolerances on lead, half-angle, and pitch diameter are deviations which may be taken independently for each of these elements and may be taken to the full extent allowed by respective tabulated tolerances. The tabulated tolerance on any one element must not be exceeded even though deviations in the other two elements are smaller than the respective tabulated tolerances.

4.3.3.6. Tolerances for Plain Gages. Standard tolerances for plain plug gages for checking minor diameter of product internal threads and for gages for checking major diameter of product external threads are Z tolerances, as shown in table 6.10.

4.3.4. Identification. Each gage shall be plainly and permanently marked with the minimum marking essential for positive identification.

For multi-piece gages it may be desirable to identify individual components and handles or frames.

When it is impracticable to identify the gaging elements, due to size and/or lack of suitable space for marking, and they are packaged separately, it is suggested that identification be accomplished by a tag suitably attached or by marking the container.

4.4. Specifications For Gages Applicable To Product Internal Threads.

4.4.1. GO Thread Plug Gages.

4.4.1.1. Purpose. The GO thread plug gage checks the limit of tolerance of product internal thread in the direction of maximum material. The GO thread plug gage represents the minimum size limit of the product internal thread and its purpose is to achieve interchangeable assembly of maximum material mating parts. (See par. 4.4.3, p. 6.09, for gaging of minor diameter.) For gaging practice, see par. 3.1.1, p. 6.03.

4.4.1.2. Basic Design. Ideally, the maximum-material-limit or GO thread plug gage should be made to the prescribed maximum-material limit of the product internal thread, and, in length, be at least equal to the length of engagement of the mating product thread.

Gage Blanks. For practical and economic reasons, the design and lengths of the gaging members and handles have been standardized for various size ranges and pitches. (See CS8 or B47.1 and table 6.11.)

4.4.1.3. Thread Form. The specifications for thread form are stated in detail below and are summarized in table 6.6 and figure 6.1.

Thread Crests. The major diameter of the GO thread plug gage shall be the same as the minimum (basic) major diameter of the product internal thread, with a plus gage tolerance. The thread crests shall be flat in an axial section and parallel to the axis.

Thread Roots. The minor diameter of the GO thread plug gage shall be cleared beyond a $p/8$ width of flat either by an extension of the sides of the thread toward a sharp V or by an undercut no greater than $p/8$ maximum width and approximately central. (See fig. 6.1.)

Concentricity of Pitch and Major Cylinders. The pitch and major cylinders of GO thread plug gages should be concentric as stated hereafter. On thread plug gages, an eccentric condition produces an oversize effective major diameter, having a width of flat less than $p/8$, which may encroach on the minimum permissible limit for the root profile of the product internal thread. The permissible maximum effective major diameter, as determined by measurement of runout (total indicator variation) with respect to the pitch cylinder, shall not exceed the maximum major diameter specified.

Pitch Cylinder. The pitch cylinder shall be round and straight within the gage pitch diameter limits specified.

4.4.1.4. Lead and Half-Angle Deviations. Lead and half-angle deviations shall be within the limits specified. (See table 2.22.)

4.4.1.5. End Threads. The feather edge at both ends of the threaded section of the gaging member shall be removed. On pitches coarser than 28 threads per inch, not more than one complete turn of the end threads shall be removed to obtain a full thread form blunt start. See figure 6.4. On pitches 28 threads per inch and finer a 60° chamfer from the axis of the gage is acceptable in lieu of the blunt start.

4.4.1.6. Chip Grooves. Each GO thread plug gage, except in sizes No. 8(0.164) and smaller, shall be provided with a chip groove at the entering end. On reversible gages, a chip groove shall be provided at each end. Chip grooves are acceptable that are in accordance with commercial practice, such as a groove cut at an angle with the axis or a longitudinal groove cut parallel with the axis and extending the complete length of the gaging member. The groove shall be located circumferentially at the start of the full thread, and in all cases the depth shall extend below the root of the first full thread. The distance from the major diameter of the thread plug to the crest of the convolution rise in front of the chip groove, due to the radius of the convoluting tool, shall be a minimum of $H/2$ as shown in figure 6.4. The beginning of the first thread shall be of full form. The recommended widths for chip grooves are as follows:

Nominal diameter (inches)	Chip groove width (inches) Max	Min
.164 and smaller	No chip groove required	
Above .164 to and including .216	0.036	0.026
Above .216 to and including .375	0.052	0.042
Above .375 to and including .500	0.067	0.057
Above .500 to and including 1.000	0.083	0.067
Above 1.000 to and including 1.750	0.130	0.067
Above 1.750	0.193	0.067

4.4.1.7. Identification. The GO thread plug gage is basic and common to all classes of thread for any particular nominal size and series. Accordingly, it is recommended that the gage be identified by nominal size, threads per inch, series, and GO pitch diameter.

Example:

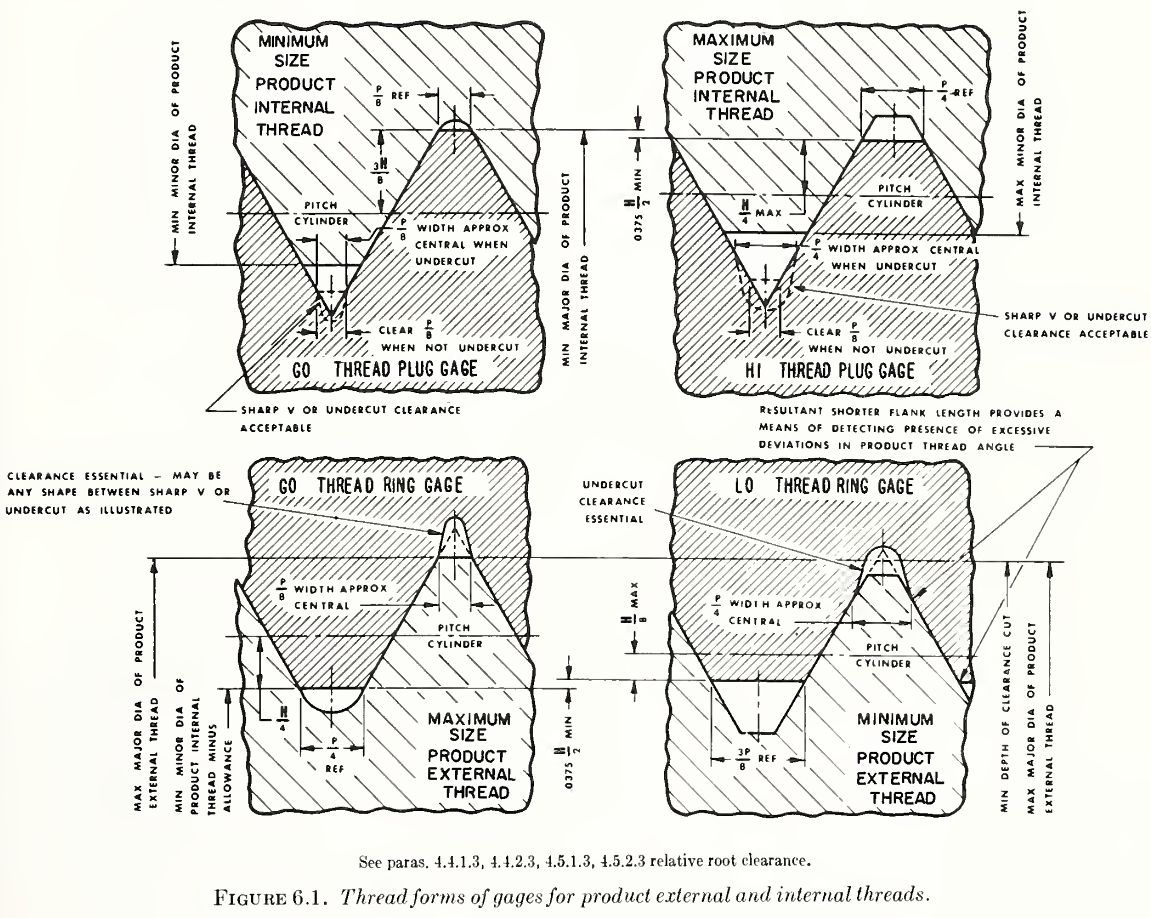
.250–20 (or 1/4–20) UNC GO PD .2175
.190–32 (or 10–32) UNF GO PD .1697

4.4.2. HI Thread Plug Gages.

4.4.2.1. Purpose. The HI thread plug gage checks the limit of tolerance of a product internal thread in the direction of minimum-material. The HI thread plug gage represents the maximum size limit of the product internal thread and provides a satisfactory method of gaging the functional diameter at the minimum-material limit. For gaging practice, see par. 3.1.1, p. 6.03.

4.4.2.2. Basic Design. In order that the HI thread plug gage may effectively check the minimum-material functional diameter, the half-angle contact should be reduced by truncating the major diameter and the length of the gaging element, where practical, should be less than that of the GO gage.

Gage Blanks. For practical and economic reasons the designs and lengths of the gaging members and handles have been standardized for various size



See paras. 4.4.1.3, 4.4.2.3, 4.5.1.3, 4.5.2.3 relative root clearance.

FIGURE 6.1. *Thread forms of gages for product external and internal threads.*

ranges and pitches. (See CS8 or B47.1 and table 6.11.)

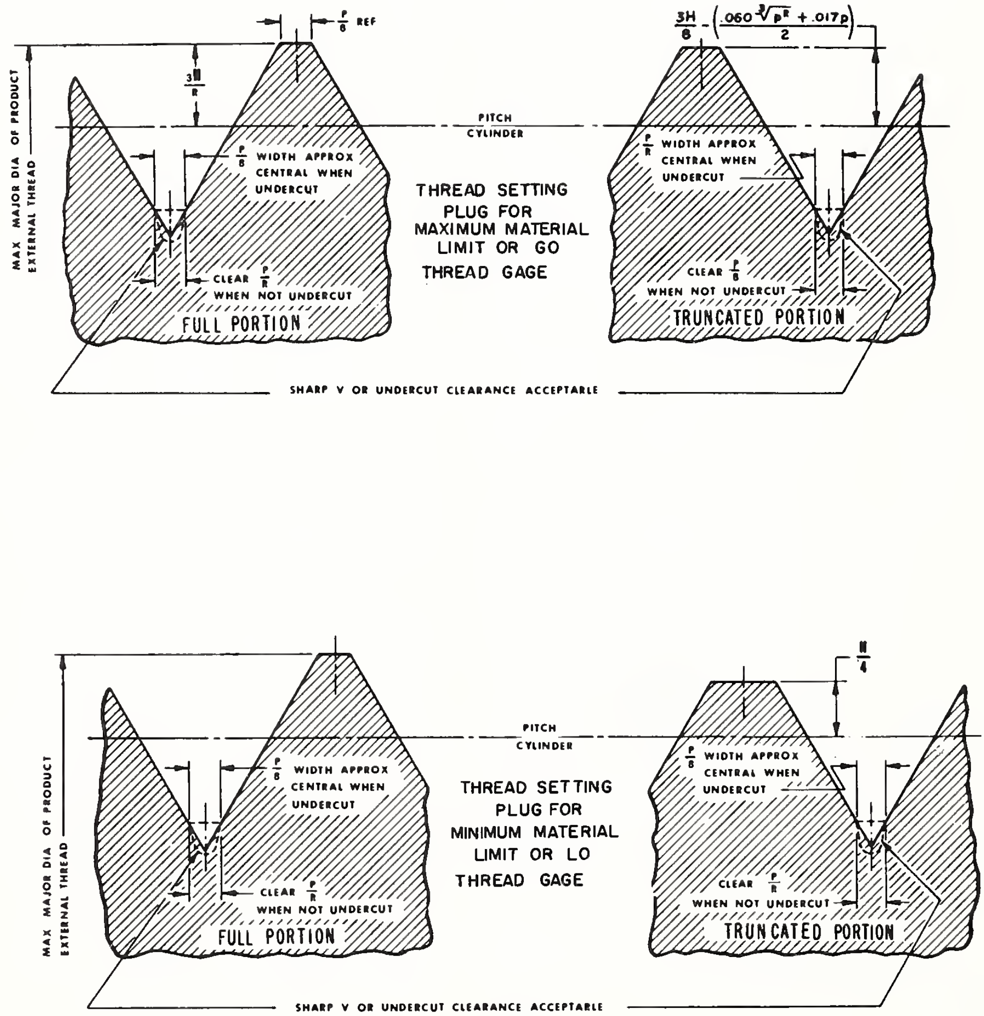
4.4.2.3. Thread Form. The specifications for thread form are stated in detail below and are summarized in table 6.6 and figure 6.1.

Thread Crests. The maximum major diameter of the HI thread plug gage shall be equal to the maximum pitch diameter of the product internal thread plus $H/2$ with the gage tolerance minus. This corresponds to a width of flat at the crest of the gage equal to $p/4$. However, the maximum major diameter of the HI thread plug gage shall not exceed the minimum major diameter of the product internal thread minus $0.0375H$ or $0.05h_b$. (See col. 16 of table 6.5.)

Thread Roots. The minor diameter of the HI thread plug gage shall be cleared beyond a $p/4$ width of flat by an extension toward a sharp V of the sides of the thread from the position corresponding to this approximate width or by an undercut to any dimension no wider than the width resulting from $p/8$ maximum width either side of and approximately central with the center line of the thread groove.

Concentricity of Pitch and Major Cylinders. The pitch and major cylinders of HI thread plug gages shall be concentric as stated hereafter. On thread plug gages an eccentric condition produces an oversize effective major diameter, having a width of flat less than $p/4$. The permissible maximum effective major diameter, as determined by measurements of runout (total indicator variation) with respect to the pitch cylinder, shall not exceed the maximum major diameter specified.

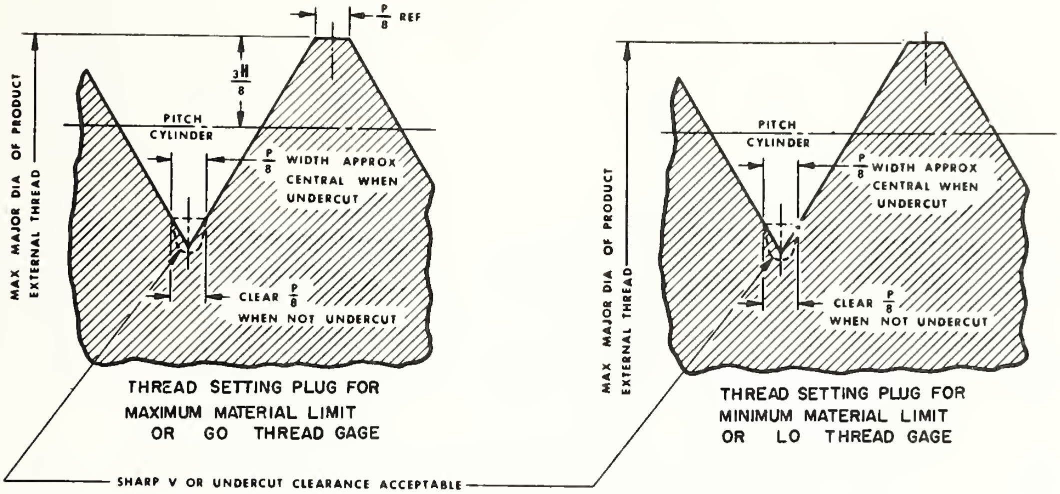
Pitch Cylinder. The pitch cylinder shall be round and straight within the gage pitch diameter limits specified.



See paras. 4.4.1.3, 4.4.2.3, 4.6.3.3 relative root clearance.

See col. 13 of table 6.7 relative crest of full portion of LO thread gage.

FIGURE 6.2. *Thread form of truncated thread setting plug gages.*



See paras. 4.4.1.2, 4.4.2.2, 4.6.3.3 relative root clearance.

See col. 13 of table 6.7 relative crest of LO thread gage.

FIGURE 6.3. *Thread forms of basic crest thread setting plug gages.*

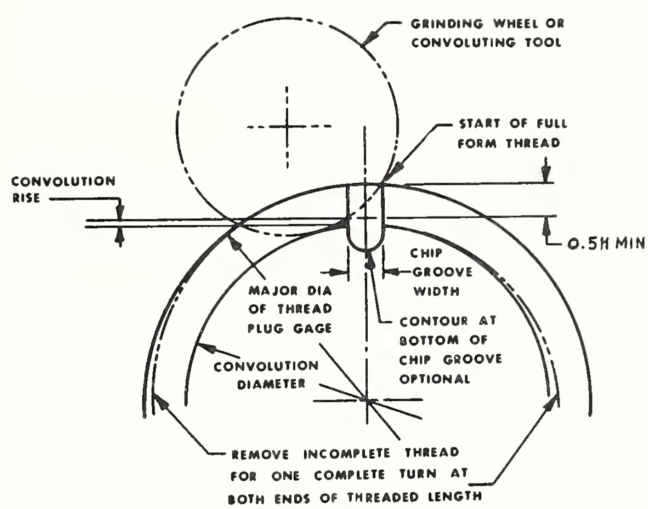


FIGURE 6.4. *Removal of partial thread and chip groove.*

4.4.2.4. Lead and Half-Angle Deviations. Lead and half-angle deviations shall be within the limits specified. See table 2.22.

4.4.2.5. End Threads. The feather edge at both ends of the threaded section of the gaging member shall be removed. On pitches coarser than 28 threads per inch, not more than one complete turn of the end threads shall be removed to obtain a full thread blunt start. On pitches 28 threads per inch and finer, a 60° chamfer from the axis of the gage is acceptable in lieu of the blunt start.

4.4.2.6. Identification. The HI thread plug gage should be marked with the nominal size, threads per inch, thread series, class, HI, and pitch diameter.

Example:

.250–20 UNC-2B HI PD .2224
.190–32 UNF-2B HI PD .1736

4.4.3. Plain Plug Gages for Minor Diameters.

4.4.3.1. Purpose and Basic Design. The GO and HI thread plug gages are cleared at the root and do not check the minor diameter of the product internal thread. Accordingly, GO and NOT GO plain plug gages are necessary to check the maximum-material and minimum-material limits at the minor diameter. For gaging practice, see par. 3.1.1, p. 6.03.

Gage Blanks. The designs of the gaging elements and handles have been standardized. (See CS8 or B47.1, Gage Blanks.)

TABLE 6.5. *Constants for computing thread gage dimensions*

Threads per inch, n	Pitch, p	$\frac{3}{4}p=0.75p$	$p/4=0.25p$	$p/8=0.125p$	$0.067p$	$0.10048p$	$0.060\sqrt[3]{p^2}$	$0.017p$	$0.060\sqrt[3]{p^2}+0.017p$	Height of sharp V-thread, $H=0.866025p$	$\frac{3}{4}H=0.649519p$	$H/2=0.43301p$	$H/4=0.21651p$	$0.13395H=0.116p=(2\times 0.058p)$	$0.0375H=0.05h_b=0.03248p$
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	0.012500	0.00938	0.00312	0.00156	0.00084	0.00126	0.00323	0.00021	0.0034	0.010825	0.008119	0.00541	0.00271	0.00145	0.00041
72	.013889	.01042	.00347	.00174	.00093	.00140	.00347	.00024	.0037	.012028	.009021	.00601	.00301	.00161	.00045
64	.015625	.01172	.00391	.00195	.00105	.00157	.00375	.00027	.0040	.013532	.010149	.00677	.00338	.00181	.00051
56	.017857	.01339	.00446	.00223	.00120	.00179	.00410	.00030	.0044	.015465	.011599	.00773	.00387	.00207	.00058
48	.020833	.01562	.00521	.00260	.00140	.00209	.00454	.00035	.0049	.018042	.013532	.00902	.00451	.00242	.00068
44	.022727	.01705	.00568	.00284	.00152	.00228	.00482	.00039	.0052	.019682	.014762	.00984	.00492	.00264	.00074
40	.025000	.01875	.00625	.00312	.00168	.00251	.00513	.00042	.0056	.021651	.016238	.01083	.00541	.00290	.00081
36	.027778	.02083	.00694	.00347	.00186	.00279	.00550	.00047	.0060	.024056	.018042	.01203	.00601	.00322	.00090
32	.031250	.02344	.00781	.00391	.00209	.00314	.00595	.00053	.0065	.027063	.020297	.01353	.00677	.00362	.00101
28	.035714	.02679	.00893	.00446	.00239	.00359	.00651	.00061	.0071	.030929	.023197	.01546	.00773	.00414	.00116
27	.037037	.02778	.00926	.00463	.00248	.00372	.00667	.00063	.0073	.032075	.024056	.01604	.00802	.00430	.00120
24	.041667	.03125	.01042	.00521	.00279	.00419	.00721	.00071	.0079	.036084	.027063	.01804	.00902	.00483	.00135
20	.050000	.03750	.01250	.00625	.00335	.00502	.00814	.00085	.0090	.043301	.032476	.02165	.01083	.00580	.00162
18	.055556	.04167	.01389	.00694	.00372	.00558	.00874	.00094	.0097	.048113	.036084	.02406	.01203	.00644	.00180
16	.062500	.04688	.01562	.00781	.00419	.00628	.00945	.00106	.0105	.054127	.040595	.02706	.01353	.00725	.00203
14	.071429	.05357	.01786	.00893	.00479	.00718	.01033	.00121	.0115	.061859	.046394	.03093	.01546	.00829	.00232
13	.076923	.05769	.01923	.00962	.00515	.00773	.01085	.00131	.0122	.066617	.049963	.03331	.01665	.00892	.00250
12	.083333	.06250	.02083	.01042	.00558	.00837	.01145	.00142	.0129	.072169	.054127	.03608	.01804	.00967	.00271
11.5	.086957	.06522	.02174	.01087	.00583	.00874	.01178	.00148	.0133	.075307	.056480	.03765	.01883	.01009	.00282
11	.090909	.06818	.02273	.01136	.00609	.00913	.01213	.00155	.0137	.078730	.059047	.03936	.01968	.01055	.00295
10	.100000	.07500	.02500	.01250	.00670	.01005	.01293	.00170	.0146	.086603	.064952	.04330	.02165	.01160	.00325
9	.111111	.08333	.02778	.01389	.00744	.01116	.01387	.00189	.0158	.096225	.072169	.04811	.02406	.01289	.00361
8	.125000	.09375	.03125	.01562	.00838	.01256	.01500	.00212	.0171	.108253	.081190	.05413	.02706	.01450	.00406
7	.142857	.10714	.03571	.01786	.00957	.01435	.01640	.00243	.0188	.123718	.092788	.06186	.03093	.01657	.00464
6	.166667	.12500	.04167	.02083	.01117	.01675	.01817	.00283	.0210	.144338	.108253	.07217	.03608	.01933	.00541
5	.200000	.15000	.05000	.02500	.01340	.02010	.02052	.00340	.0239	.173205	.129904	.08660	.04330	.02320	.00650
4.5	.222222	.16667	.05556	.02778	.01489	.02233	.02201	.00378	.0258	.192450	.144338	.09623	.04811	.02578	.00722
4	.250000	.18750	.06250	.03125	.01675	.02512	.02381	.00425	.0281	.216506	.162380	.10825	.05413	.02900	.00812

4.4.3.2. Identification. The GO plain plug gage members for Unified threads are common to all classes of Unified threads, and as such should be marked with: Nominal size, threads per inch, thread designation, GO, and minor diameter.

Example:

.250–20 UNC GO .1960

The NOT GO plain plug gage members are not common to all classes, and should be marked with: Nominal size, threads per inch, thread designation, tolerance, class, NOT GO, and minor diameter. Example:

.250–20 UNC-3B NOT GO .2067.

4.5. SPECIFICATIONS FOR GAGES APPLICABLE TO PRODUCT EXTERNAL THREADS.

4.5.1. GO Thread Ring Gages.

4.5.1.1. Purpose. The GO thread ring gage checks the limit of tolerance of a product external thread in the direction of maximum material. The GO thread ring gage, when properly set on its respective thread setting plug, represents the maximum size limit of the product external thread and its purpose is to achieve interchangeable assembly of maximum material mating parts. For gaging practice, see par. 3.1.3, p. 6.04. See par. 4.5.5, p. 6.16, for gaging of major diameter.

4.5.1.2. Basic Design. Ideally, the maximum-material-limit or GO thread ring gage should be made to the prescribed maximum-material limit of the product external thread and, in length, equal to the length of engagement of the mating product thread.

Gage Blanks. For practical and economic reasons, the designs and thicknesses of thread ring gages have been standardized for various size ranges and pitches. (See CS8 or B47.1 and table 6.12.) The AGD (American Gage Design Standard) thread ring gage is adjustable to facilitate manufacturing and setting.

4.5.1.3. Thread Form. The specifications for thread form are stated in detail below and are summarized in table 6.6 and figure 6.1.

Thread Crests. The minor diameter of the GO thread ring gage shall be equal to the maximum pitch diameter of the product external thread minus $H/2$ with a minus gage tolerance. This corresponds to a width of flat of $p/4$. The thread crests shall be flat in an axial section and parallel to the axis.

Thread Roots. The major diameter of the GO thread ring gage shall be cleared by a clearance cut of substantially $p/8$ width and approximately central. The root clearance must be such that the maximum major diameter of the full form section of the thread setting plug gage is cleared after the gage has been properly set to size.

Concentricity of Pitch and Minor Cylinders. The pitch and minor cylinders of the GO thread ring gage shall be concentric as stated hereinafter. On thread ring gages an eccentric condition results in

Table 6.6. *Specifications and format for tables of limits of size of threaded and plain gages for Unified external and internal threads*

Nominal size and threads per inch	Series desig-nation	Class	Gages for external threads								Gages for internal threads							Class	Series desig-nation	Nominal size and threads per inch
			Thread gages					Plain gages for major diameter			Thread gages					Plain gages for minor diameter				
			GO		LO			GO	NOT GO *		GO		HI			GO	NOT GO*			
			Pitch diameter	Minor diameter	Pitch diameter, Plus tol.gage	Pitch diameter, Minus tol.gage	Minor diameter		Semi-finished	Unfinished hot-rolled material	Major diameter	Pitch diameter	Major diameter	Pitch diameter, Minus tol. gage	Pitch diameter, Plus tol. gage					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			Max. pitch diameter of external thread. Gage tolerance minus. When wear allowance is required, subtract the applicable wear allowance from the max. pitch diameter and then apply the gage tolerance minus.	Max. pitch diameter of external thread minus 0.5*H*. Gage tolerance minus.	Min. pitch diameter of external thread. Gage tolerance plus.	Min. pitch diameter of external thread. Gage tolerance minus, (optional)	Min. pitch diameter of external thread minus 0.25*H* but not less than min. minor diameter of GO thread gage for external thread plus 0.0375*H* (=0.05*hb*). Gage tolerance plus.	Max. major diameter of external thread. Gage tolerance minus.	Min. major diameter of external thread. Gage tolerance plus.	Min. major diameter of external thread of hot-rolled material in UNC-2A, and 8UN. Gage tolerance plus.	Min. major diameter of internal thread. Gage tolerance plus.	Min. pitch diameter of internal thread. Gage tolerance plus. When wear allowance is required, add the applicable wear allowance to the min. pitch diameter and then apply the gage tolerance plus.	Max. pitch diameter of internal thread plus 0.5*H* but not to exceed min. major diameter of GO thread gage for internal thread minus 0.0375*H* (=0.05*hb*). Gage tolerance minus.	Max. pitch diameter of internal thread. Gage tolerance minus.	Max. pitch diameter of internal thread. Gage tolerance plus, (optional)	Min. minor diameter of internal thread. Gage tolerance plus.	Max. minor diameter of internal thread. Gage tolerance minus.			

* Plain minimum-material-limit gages retain the term NOT GO as customarily they are not permitted to enter or be entered by acceptable product.

NOTE: While the maximum diameters of Class 2A uncoated threads are less than basic by the amount of the allowance, the allowance may be used to accommodate additive finishes. It follows that unless specifically specified otherwise, for threads with additive finish, the maximum diameters of Class 2A may be exceeded by the amount of the allowance. In this event GO gages to basic pitch diameter would be applicable. Such gages are made to the same dimensions as listed in the tables for Class 3A threads.

TABLE 6.7. *Specifications and format for tables of limits of size of threaded setting plug gages for Unified, external threads*

Nominal size and threads per inch	Series designation	Class	Truncated setting plugs							Basic-crest setting plugs				
			Plug for GO			Plug for LO				Plug for GO		Plug for LO		
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Major diameter	Pitch diameter	Major diameter	Pitch diameter	
			Truncated	Full-form		Truncated	Full-form	Plus tol. gage.	Minus tol. gage.				Plus tol. gage	Minus tol. gage
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			Max. major diameter of external thread (=min. major diameter of full portion of GO setting plug, see col. 5) minus ($0.060\sqrt[3]{p^2} + 0.017p$). Gage tolerance minus.	Max. major diameter of external thread. Gage tolerance plus.	Max. pitch diameter of external thread. Gage tolerance minus. When wear allowance is required, subtract the applicable wear allowance from the max. pitch diameter and then apply the gage tolerance minus.	Min. pitch diameter of external thread plus 0.5*H*. Gage tolerance minus.	Same as column 13.	Min. pitch diameter of external thread. Gage tolerance plus.	Min. pitch diameter of external thread. Gage tolerance minus (optional).	Max. major diameter of external thread. Gage tolerance plus.	Same as column 6.	Max. major diameter of external thread provided that, after applying the X major diameter tolerance, the max. major diameter of the gage corresponds to a truncation of not less than 0.067*H* or 0.0009 in., whichever is the greater. Gage tolerance plus. See par. 4.6.3.2, p. 000, and accompanying note.	Min. pitch diameter of external thread. Gage tolerance plus.	Min. pitch diameter of external thread. Gage tolerance minus (optional).

an undersize effective minor diameter having a width of flat less than $p/4$, which may encroach on the maximum permissible limit for the root profile of the product external thread. The permissible minimum effective minor diameter, as determined by measurements of runout (total indicator variation) with respect to the pitch cylinder, shall not be less than the specified minimum minor diameter minus the sum of the gage tolerances for the pitch and minor diameters.

Pitch Cylinder, Lead, and Half-Angle. Satisfactory conformance of these elements is normally determined by the setting of the thread ring gage to the applicable truncated setting plug gage.

4.5.1.4. End Threads. The feather edge at both ends of the thread ring gage shall be removed. On gages larger than 0.5 in. nominal size or on those having less than 20 threads per inch, from half to one pitch of the partially formed thread at each end shall be removed to obtain a full thread blunt start. On gages 0.5 in. nominal size and smaller or on those having 20 or more threads per inch, a 60° chamfer on the end threads from the axis of the gage to a depth of half to one pitch is acceptable in lieu of the blunt start.

4.5.1.5. Chip Grooves. GO thread ring gages of the adjustable type (AGD standard) do not require chip grooves as the adjusting slots serve this purpose.

4.5.1.6. Identification. The GO Thread Ring Gage for Class 3A is basic, and also is applicable for acceptance of Class 2A after coating. Accordingly, it is recommended that the gage be identified by nominal size, threads per inch, series, and GO pitch diameter. Example:

.250–20 UNC GO PD .2175.

The GO gages for Classes 1A and 2A are below basic size, having a common allowance. Accordingly, it is recommended that the gage be identified by nominal size, threads per inch, series, class, and GO pitch diameter. Example:

.250–20 UNC 1A-2A GO PD .2164.

4.5.2. LO Thread Ring Gages.

4.5.2.1. Purpose. The LO thread ring gage checks the limit of tolerance of a product external thread in the direction of minimum material. The LO thread ring gage when properly set on its respective set plug represents the minimum size limit of the product external thread and provides a satisfactory method of gaging the functional diameter at the minimum-material limit. For Gaging Practice, see par. 3.1.3, p. 6.04.

4.5.2.2. Basic Design. In order that the LO thread ring gage may effectively check the minimum-material functional diameter, the half-angle contact should be less than that of the GO gage and the length of the gaging element, where practical, should be less than that of the GO gage.

Gage Blanks. For practical and economic reasons, the thicknesses of thread ring gages have been standardized for various size ranges and pitches. (See CS8 or B47.1 and table 6.12.)

Table 6.8. *X Tolerances for GO, HI, and LO Thread Gages*

Threads per inch	Tolerance on lead [a]	Tolerance on half-angle of thread	Tolerance on major or minor diameters		Tolerance on pitch diameter			
			To and including 4 in dia	Above 4 in dia	To and including 1.5 in dia	Above 1.5 to 4 in dia	Above 4 to 8 in dia	Above 8 to 12 in dia [b]
1	2	3	4	5	6	7	8	9
	in	*deg min* ±	*in*	*in*	*in*	*in*	*in*	*in*
80	0.0002	0 30	0.0003	-------	0.0002	-------	-------	-------
72	.0002	0 30	.0003	-------	.0002	-------	-------	-------
64	.0002	0 30	.0004	-------	.0002	-------	-------	-------
56	.0002	0 30	.0004	-------	.0002	0.0003	-------	-------
48	.0002	0 30	.0004	-------	.0002	.0003	-------	-------
44	.0002	0 20	.0004	-------	.0002	.0003	-------	-------
40	.0002	0 20	.0004	-------	.0002	.0003	-------	-------
36	.0002	0 20	.0004	-------	.0002	.0003	-------	-------
32	.0003	0 15	.0005	0.0007	.0003	.0004	0.0005	0.0006
28	.0003	0 15	.0005	.0007	.0003	.0004	.0005	.0006
27	.0003	0 15	.0005	.0007	.0003	.0004	.0005	.0006
24	.0003	0 15	.0005	.0007	.0003	.0004	.0005	.0006
20	.0003	0 15	.0005	.0007	.0003	.0004	.0005	.0006
18	.0003	0 10	.0005	.0007	.0003	.0004	.0005	.0006
16	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
14	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
13	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
12	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
11.5	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
11	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
10	.0003	0 10	.0006	.0009	.0003	.0004	.0006	.0008
9	.0003	0 10	.0007	.0011	.0003	.0004	.0006	.0008
8	.0004	0 5	.0007	.0011	.0004	.0005	.0006	.0008
7	.0004	0 5	.0007	.0011	.0004	.0005	.0006	.0008
6	.0004	0 5	.0008	.0013	.0004	.0005	.0006	.0008
5	.0004	0 5	.0008	.0013	--------	.0005	.0006	.0008
4.5	.0004	0 5	.0008	.0013	--------	.0005	.0006	.0008
4	.0004	0 5	.0009	.0015	--------	.0005	.0006	.0008

[a] Allowable variation in lead between any two threads not farther apart than the length of the standard gage, shown in CS8 or B47.1.

It has been customary in the past to specify tolerances on lead as plus or minus (±) values. Under the requirement established above, the width of the tolerance zone is the nominal tolerance value specified *regardless of sign.* In view of the preceding, the tolerance symbols, plus or minus (±), should be removed in referencing lead tolerances. The omission of the plus and minus does not change the total tolerance.

[b] Above 12 in, the tolerance is directly proportional to the tolerance in column 9, in the ratio of the diameter to 12 in.

4.5.2.3. Thread Form. The specifications for thread form are stated in detail below and are summarized in table 6.6 and figure 6.1.

Thread Crests. The minimum minor diameter of the LO thread ring gage shall be equal to the minimum pitch diameter of the external thread minus $0.25H$. This corresponds to a width of flat at the crest of the gage equal to $0.375p$. However, the minimum minor diameter of the LO thread ring gage shall not be less than the minimum minor diameter of the GO thread ring gage plus $0.0375H$ or $0.05h_b$. See col. 16 of table 6.5. This requirement is necessary to assure that the minor diameter of the gage is not less than the minor diameter of the GO thread ring gage which may occur with a $0.375p$ flat on the LO ring thread crest when there is a pitch diameter allowance on the product external thread combined with a large pitch diameter tolerance.

Thread Roots. The major diameter of the LO thread ring gage shall be cleared by a clearance cut of substantially $0.25p$ width, approximately central. The LO thread ring gage shall clear the maximum major diameter of the product external thread or the maximum major diameter of the full-form portion of the truncated thread setting plug for the LO thread ring gage, whichever is the greater. Thus, contact of the thread gage can occur on the sides of the threads but not on the crest or root. Also, the effect of angle deviation on the fit of the gage with the product thread is minimized.

Concentricity of Pitch and Minor Diameter Cylinders. The pitch and minor cylinders of the LO thread ring gage shall be concentric as stated hereinafter. On thread ring gages, an eccentric condition results in an undersize effective minor diameter having a width of flat less than $0.375p$. The permissible minimum effective minor diameter as determined by runout (total indicator variation) with respect to the pitch cylinder shall not be less than the specified minimum minor diameter minus twice the sum of the gage tolerances for pitch and minor diameter.

Pitch Cylinder, Lead, and Half-Angle. Satisfactory conformance of these elements is normally determined by the setting of the thread ring gage to the applicable truncated setting plug gage.

4.5.2.4. End Threads. The feather edge at both ends of the thread ring gage shall be removed. On gages larger than 0.5 in. nominal size or on those having less than 20 threads per in., not more than one complete turn of the end threads shall be removed to obtain a full thread blunt start. On gages 0.5 in. nominal size and smaller or on those having 20 or more threads per inch, a 60° chamfer on the end threads from the axis of the gage, is acceptable in lieu of the blunt start.

4.5.2.5. Identification. The LO thread ring gage should be identified by nominal size, threads per inch, series, class, and LO pitch diameter. Example:

.250–20 UNC 2A LO PD .2127.

4.5.3. Thread Snap Limit Gages or Indicating Thread Gages for LO Minimum-material limit.

4.5.3.1. Purpose. Thread snap limit gages or indicating thread gages having gaging elements as specified in par. 4.5.3.3, check Class 3A LO minimum-material limit. For gaging practices, see par. 3.1.3, p. 6.04.

4.5.3.2. Basic Design. The design is specified only to the extent that it affects the results obtained in gaging. Design details, etc., are optional and not included herein.

Thread snap limit gages are adjustable, and the gaging elements are adjusted and set to setting plugs and locked in proper position. Indicating thread gages are adjusted and set with reference to the applicable thread setting plugs.

4.5.3.3. Gaging Elements. The gaging elements should engage the thread over a length of approximately two pitches. The profile of the gaging element should be that of the LO thread ring gage.

4.5.3.4. Identification. Where practicable, the gaging elements should be marked with the minimum marking essential for identification. When space available for marking is inadequate and the gages

Table 6.9. *W Tolerances for GO, HI, and LO Thread Gages*

Threads per inch	Tolerance on lead[a]		Tolerance on half-angle of thread	Tolerance on major or minor diameters			Tolerance on pitch diameter				
	To and including 0.5 in dia	Above 0.5 in dia		To and including 0.5 in dia	Above 0.5 in. to 4 in. dia	Above 4 in. dia	To and including 0.5 in dia	Above 0.5 in. to 1.5 in dia	Above 1.5 in. to 4 in. dia	Above 4 in. to 8 in. dia	Above 8 in. to 12 in. dia [b]
1	2	3	4	5	6	7	8	9	10	11	12
	in	*in*	*deg min* ±	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
80	0. 0001	0. 00015	0 20	0. 0003	0. 0003	------------	0. 0001	0. 00015	------------	------------	------------
72	. 0001	. 00015	0 20	. 0003	. 0003	------------	. 0001	. 00015	------------	------------	------------
64	. 0001	. 00015	0 20	. 0003	. 0004	------------	. 0001	. 00015	------------	------------	------------
56	. 0001	. 00015	0 20	. 0003	. 0004	------------	. 0001	. 00015	0. 0002	------------	------------
48	. 0001	. 00015	0 18	. 0003	. 0004	------------	. 0001	. 00015	. 0002	------------	------------
44	. 0001	. 00015	0 15	. 0003	. 0004	------------	. 0001	. 00015	. 0002	------------	------------
40	. 0001	. 00015	0 15	. 0003	. 0004	------------	. 0001	. 00015	. 0002	------------	------------
36	. 0001	. 00015	0 12	. 0003	. 0004	------------	. 0001	. 00015	. 0002	------------	------------
32	. 0001	. 00015	0 12	. 0003	. 0005	0. 0007	. 9001	. 00015	. 0002	0. 00025	0. 0003
28	. 00015	. 00015	0 8	. 0005	. 0005	. 0007	. 0001	. 00015	. 0002	. 00025	. 0003
27	. 00015	. 00015	0 8	. 0005	. 0005	. 0007	. 0001	. 00015	. 0002	. 00025	. 0003
24	. 00015	. 00015	0 8	. 0005	. 0005	. 0007	. 0001	. 00015	. 0002	. 00025	. 0003
20	. 00015	. 00015	0 8	. 0005	. 0005	. 0007	. 0001	. 00015	. 0002	. 00025	. 0003
18	. 00015	. 00015	0 8	. 0006	. 0005	. 0007	. 0001	. 00015	. 0002	. 00025	. 0003
16	. 00015	. 00015	0 8	. 0006	. 0006	. 0009	. 0001	. 0002	. 00025	. 0003	. 0004
14	. 0002	. 0002	0 6	. 0006	. 0006	. 0009	. 00015	. 0002	. 00025	. 0003	. 0004
13	. 0002	. 0002	0 6	. 0006	. 0006	. 0009	. 00015	. 0002	. 00025	. 0003	. 0004
12	. 0002	. 0002	0 6	. 0006	. 0006	. 0009	. 00015	. 0002	. 90025	. 0003	. 0004
11. 5	. 0002	. 0002	0 6	. 0006	. 0006	. 0009	. 00015	. 0002	. 00025	. 0003	. 0004
11	. 0002	. 0002	0 6	. 0006	. 0006	0009	. 00015	. 0002	. 00025	. 0003	. 0004
10	------------	. 00025	0 6	------------	. 0006	. 0009	------------	. 0002	. 00025	. 0003	. 0004
9	------------	. 00025	0 6	------------	. 0007	. 0011	------------	. 0002	. 00025	. 0003	. 0004
8	------------	. 00025	0 5	------------	. 0007	. 0011	------------	. 0002	. 00025	. 0003	. 0004
7	------------	. 0003	0 5	------------	. 0007	. 0011	------------	. 0002	. 00025	. 0003	. 0004
6	------------	. 0003	0 5	------------	. 0008	. 0013	------------	. 0002	. 00025	. 0003	. 0004
5	------------	. 0003	0 4	------------	. 0008	. 0013	------------	------------	. 00025	. 0003	. 0004
4. 5	------------	. 0003	0 4	------------	. 0008	. 0013	------------	------------	. 00025	. 0003	. 0004
4	------------	. 0003	0 4	------------	. 0009	. 0015	------------	------------	. 00025	. 0003	. 0004

[a] Allowable variation in lead between any 2 threads not farther apart than the length of the standard gage, shown in CS8 or B47.1.
It has been customary in the past to specify tolerances on lead as plus or minus (±) values. Under the requirement established above, the width of the toleranee zone is the nominal tolerance value specified *regardless of sign*. In view of the preeeding, the tolerance symbols, plus or minus (±), should be removed in referencing lead toleranees. The omission of the plus and minus does not change the total tolerance.
[b] Above 12 inehes the tolerance is directly proportional to the toleranee in column 12, in the ratio of the diameter to 12 inches.

Table 6.10. *Tolerances for Plain Gages*

Size range		Tolerances				
Above—	To and including—	XX	X	Y	Z	ZZ
1	2	3	4	5	6	7
in	*in*	*in*	*in*	*in*	*in*	*in*
0. 029	0. 825	0. 00002	0. 00004	0. 00007	0. 00010	0. 00020
. 825	1. 510	. 00003	. 00006	. 00009	. 00012	. 00024
1. 510	2. 510	. 00004	. 00008	. 00012	. 00016	. 00032
2. 510	4. 510	. 00005	. 00010	. 00015	. 00020	. 00040
4. 510	6. 510	. 000065	. 00013	. 00019	. 00025	. 00050
6. 510	9. 010	. 00008	. 00016	. 00024	. 00032	. 00064
9. 010	12. 010	. 00010	. 00020	. 00030	. 00040	. 00080

Table 6.11. *Lengths of AGD taperlock and trilock thread plug gage blanks selected from CS8 or B47.1*

Thread sizes		Thread lengths					
Decimal range		Thread plug gages				Fine pitch instrument thread plug gages	
Above	To and including	GO			HI	GO	HI
1	2	3			4	5	6
in	*in*	*in*			*in*	*in*	*in*
0.059	0.105	0.25			0.1875	0.1875	0.125
.105	.150	.3125			.21875	0.21875	0.15625
.150	.240	.40625			.28125	0.28125	0.21875
.240	.365	.5			.3125	0.3125	0.25
.365	.510	.75			.375	.375	0.3125
.510	.825	.875			.5	0.5	0.375
.825	1.135	1			.625	0.625	0.4375
		12 tpi and finer		Coarser than 12 tpi			
1.135	1.510	1		1.25	.75	0.75	0.5
		7 tpi and Coarser	Finer than 7 tpi and Coarser than 16 tpi	16 tpi and finer			
1.510	2.010	1.875	1.25	0.875	.875	0.75	0.625
2.010	2.510	2	1.375	.875	.875	0.75	0.625
2.510	3.010	2.125	1.5	1	1	----------	----------
3.010	12.010	2.25	1.5	1	1	----------	----------

NOTE 1: For Trilock Plug Blanks above 0.760 to and including 1.510, see CS8 or B47.1.
NOTE 2: For Wire Type Plug Blanks in sizes below 0.760, see CS8 or B47.1.

Table 6.12. *Lengths of AGD thread ring gage blanks and total thread lengths of standard truncated setting plug gage blanks selected from CS8 or B47.1*

Thread sizes		Thread lengths Thread ring gages			Total thread lengths of truncated thread setting plugs		
Decimal range							
Above	To and including	Thin Ring	Thick Ring	Fine-pitch instrument ring	For thin ring	For thick ring	For fine-pitch instrument ring
1	2	3	4	5	6	7	8
0.059	0.090	0.09375	----------	----------	0.21875	----------	----------
.090	.150	.15625	----------	----------	.375	----------	----------
.150	.240	.1875	----------	----------	.40625	----------	----------
.240	.365	.34375	----------	.25	.75	----------	0.5625
.365	.510	.4375	----------	.3125	1.	----------	.6875
.510	.825	.5625	0.75	.46875	1.25	1.875	1.
.825	1.135	.6875	.9375	.53125	1.5	2.125	1.125
1.135	1.510	.75	1.125	.625	1.625	2.375	1.3125
1.510	2.010	.8125	1.25	.625	1.875	2.875	1.3125
2.010	2.510	.875	1.3125	.6875	2.	3.	2.4375
2.510	3.010	.875	1.375	----------	1.875	3.	----------
3.010	3.510	.9375	1.4375	----------	2.	3.125	----------
3.510	4.010	.9375	1.5	----------	2.	3.25	----------
4.010	6.260	1.	1.5	----------	2.125	3.25	----------

NOTE 3: For diameters 0.059 to 0.510 in, use thin blank for all pitches, recessing sides where applicable.
Above 0.510 to 1.135 in, use thick blank for pitches coarser than 12 TPI, thin blank for pitches 12 to 28 TPI, and fine pitch instrument blank for pitches 30 and finer.
Above 1.135 to 6.260 in incl., use thick blank for pitches coarser than 10 TPI, thin blank for pitches 10 to 28 TPI, and fine pitch instrument blank for pitches 30 and finer.

and gaging elements are packaged separately, the containers should be suitably marked and/or the gaging elements suitably tagged.

4.5.4. Indicating Thread Gages for Differential Gaging.

4.5.4.1. Purpose. The purpose of indicating thread gages used in differential gaging within this standard is two-fold. The gages are used: (a) by consumers, but only where it is required by supplemental specifications to determine final conformance, (b) by manufacturers, to determine cumulative effect of deviations of product thread elements as an aid in control of manufacturing. For gaging practice, see par. 3.1.4, p. 6.04.

4.5.4.2. Basic Design. The design is specified only to the extent that it affects the results obtained in gaging. Other design details pertaining to frame construction, method of operation, readout, etc., are not included herein.

4.5.4.3. Gaging Elements. The gaging elements for functional differential reading to verify conformance of product thread elements shall be so designed that:

(a) The first set shall engage over a length which approximates the thickness of the GO thread ring blank. The thread form of the gaging elements shall be the same as that of the applicable GO thread ring gage.

(b) The second set shall engage over a length of approximately two pitches and contact the thread flanks $0.375H$ (i.e. the same as that of the comparable LO thread snap gage).

NOTE: Some representative gaging elements in current use are shown in subsection 6, p. 6.27. See the fourth paragraph under subsection 1, p. 6.01, par. 5.4, p. 6.21, par. 5.5, regarding use of gaging elements.

4.5.4.4. Identification. Where practicable, the gaging elements should be marked with the minimum marking essential for identification. When space available for marking is inadequate and the comparators and gaging elements are packaged separately, the containers should be suitably marked and/or the gaging elements suitably tagged.

4.5.5. Plain Gages for Major Diameter.

4.5.5.1. Purpose. The GO and LO thread ring gages clear the major diameter of the product external thread. To check the major diameter limits, plain ring, snap, or indicating gages are required. For gaging practice, see par. 3.1.5, p. 6.04.

4.5.5.2. Basic Design. To assure that the maximum-material limit is not exceeded, a plain cylindrical ring gage is used for the GO gage while a snap or indicating gage is preferred to assure conformance within the minimum-material limit. Plain progressive snap or indicating gages may be used.

Gage Blanks. Plain cylindrical ring blanks and plain progressive adjustable snap gages have been standardized for various size ranges. See CS8 or B47.1.

4.5.5.3. Identification. Fixed limit gages for major diameter of product external threads are to be identified by GO and the major diameter as follows: GO .2500.

4.6. Thread Setting Plug Gages.

4.6.1. Purpose. Thread setting plug gages are used to set adjustable thread ring gages, thread snap limit gages, and indicating thread gages to specified size. Thread setting plug gages are also applied to detect wear on gages and gaging elements in use. GO thread setting plug gages are made to the maximum-material limit of the thread specification while LO thread setting plug gages are made to the minimum-material limit of the thread specification. For gaging practice, see par. 3.1.2, p. 6.03.

4.6.2. Basic Design. Thread setting plug gages are of two standard designs which are designated as basic-crest (full form) and truncated setting plugs. The basic-crest GO setting plug is one having a width of flat at the crest equal to $0.125p$. The truncated GO setting plug is the same as the basic-crest setting plug except that it is longer and the crest of the thread is truncated a greater amount for half the length of the gage giving a full form portion and a truncated portion.

Gage Blanks. For practical and economic reasons the lengths of setting plug gages have been standardized for various size ranges and pitches. See CS8 or B47.1 and table 6.12. The length of the full form and the length of the truncated sections are each at least equal in length to the thickness of the corresponding thread ring gage.

4.6.3. Thread Form. The specifications for thread form of setting plug gages are stated in detail below and are summarized in table 6.7 and figure 6.2.

4.6.3.1. Thread Crests of Truncated and Basic-Crest Maximum-Material-Limit (GO) Thread Setting Plugs.

The major diameter of the basic-crest setting plug and of the full form portion of the truncated maximum-material-limit (GO) thread setting plug is equal to the maximum major diameter of the product external thread.

The major diameter of the truncated portion of the truncated maximum-material-limit (GO) thread setting plug is equal to the maximum major diameter of the product external thread minus ($0.060 \sqrt[3]{p^2} + 0.017p$). See col. 10 of table 6.5.

4.6.3.2. Thread Crests of Truncated and Basic-Crest Minimum-Material-Limit (LO) Thread Setting Plugs.

The major diameter of the basic-crest setting plug and of the full form portion of the truncated minimum-material-limit (LO) thread setting plug is equal to the maximum major diameter of the product external thread. (Same as GO thread setting plug.) The maximum major diameter of the gage must correspond to a truncation that is not less than $0.067H$ ($0.067p$ flat) or 0.0009 in. (0.001 in flat) whichever is the greatest truncation.

NOTE: Method of Computation. Select the smallest of following three values. (a) Maximum major diameter of the product external thread (Max pitch diameter of product external thread plus $0.75H$ (b) Minimum pitch dimaeter of the product external thread plus ($H - 0.00173$) minus gage tolerance. (c) Minimum pitch diameter of the product external thread plus $0.75p$.

The major diameter of the truncated portion of the truncated minimum-material-limit (LO) thread setting plug is equal to the minimum pitch diameter of the product external thread plus $0.5H$.

4.6.3.3. Thread Roots. The minor diameter of thread setting plug gages shall be cleared beyond a $0.125p$ width of flat either by an extension of the sides of the thread toward a sharp V or by an undercut no wider than $0.125p$. See figures 6.2 and 6.3.

4.6.3.4. Pitch Diameter, Limitation of Taper. To effect proper setting of a thread gage, the maximum permissible taper over the entire length of the setting plug shall be within the following limits: For sizes to and including 1.50 in. nominal diameter, maximum taper equals 0.0001 in., except that for threads coarser than 16 threads per inch the maximum taper equals 0.00015 in. For sizes larger than 1.50 in. to and including 6.25 in. nominal-diameter, maximum taper equals 0.0002 in. The permissible taper shall be back taper (largest diameter at entering end) and shall be confined within the gage pitch diameter limits.

4.6.3.5. End Threads. The feather edge at both ends of the threaded section of the setting plug shall be removed. On pitches coarser than 28 threads per inch, not more than one complete turn of the end threads shall be removed to obtain a full thread blunt start. On pitches 28 threads per inch and finer, a 60° chamfer from the axis of the gage is acceptable in lieu of the blunt start.

4.6.3.6. Lead Deviation. Deviation in lead shall be within the limits specified. See table 2.22, par. 4.3.3.3, p. 6.05.

4.6.3.7. Half-Angle Deviations. Deviations in half-angle shall be within the limits specified. See table 2.22.

4.6.4. Identification. The GO thread setting plug for Class 3A gage is basic and is applicable to Class 2A after coating. Accordingly, it is recommended that the gage be identified by set plug, nominal size, threads per inch, series, and GO pitch diameter.

Example:

SET PLUG .250–20 UNC GO PD .2175

The GO thread setting plug gages for Classes 1A and 2A are under basic, having a common allowance. Accordingly, it is recommended that the gage be identified by set plug, nominal size, threads per inch, series, class, and GO pitch diameter.

Example:

SET PLUG .250–20 UNC 1A-2A GO PD .2164

The LO thread setting plug gage is different for each class and accordingly should be identified by set plug, nominal size, threads per inch, series, class, and LO pitch diameter.

Example:

SET PLUG .250–20 UNC-2A LO PD .2127

4.7. Plain Plug Acceptance Check Gages.

4.7.1. Purpose. GO and NOT GO plain plug acceptance check gages verify the minor diameter limits of size of thread ring gages after the thread rings have been properly set with the applicable thread setting plug gages. For gaging practice, see par. 3.1.2, p. 6.03.

4.7.2. Basic Design. The direction of the gage tolerances on plain plug acceptance check gages is reversed as follows: The GO plain plug gage is made to the minimum minor diameter of the thread ring gage with the tolerance *taken minus*. See table 6.10. The NOT GO plain plug gage is made to the maximum minor diameter of the thread ring gage with the tolerance *taken plus*.

Gage Blanks. For standardization and economic reasons the gaging members and handles have been standardized for various size ranges. See CS8 or B47.1.

4.7.3. Identification.

The GO and NOT GO plain plug acceptance check gages for the GO thread ring gage should be identified as GO and NOT GO Acceptance Checks for GO Thread Ring Minor Dia XXXX–XXXX.

The GO and NOT GO plain plug acceptance check gages for the LO thread ring gage should be identified as GO and NOT GO Acceptance Checks for LO Thread Ring Minor Dia XXXX–XXXX.

5. RECOMMENDED GAGING PRACTICES

5.1. Dimensional Acceptability Of Threads.—General practice as to the dimensional acceptability of threads shall be based on the interpretations of pitch diameter limits of size in subsection on Limits of size in section 3 and the following specifications of gages and gaging practices:

(*a*) *At maximum-material limits*[2]—For referee purposes, the dimensional acceptability of threads at the maximum-material limits shall be based on gaging with GO thread plug and ring gages conforming as closely as practicable to the limits of size of the thread and to the thread form and length specified for such gages. (See par. 2.3, p. 6.01.)

(*b*) *At minimum-material limits.*—Unless otherwise specified on the drawing or procurement document, dimensional acceptability at the minimum-material pitch-diameter limits shall be based on the following accepted practices:

(1) *Functional (virtual) diameter gaging practice*—Functional (virtual) diameter gaging practice, involving the use of thread plug gages and thread ring gages, conforming as closely as practicable to the limits of size of the thread and to the thread form and lengths specified in this section for such gages, is specified for the minimum-material limits of classes 1A and 2A external threads, and classes 1B, 2B, and 3B internal threads.

[2] External and internal threads larger than 6 in nominal diameter present additional problems for technical and economical reasons. It is recommended that acceptance of these be alternatively based on measurement of the thread elements. A clear understanding of requirements and method of gaging should be reached between supplier and consumer.

(2) *Single element gaging practice.*—Single element gaging practice, involving the use of thread snap gages or indicating type gages having thread form in accordance with this section, or its equivalent, engaging the thread over a length of two pitches, is specified for the minimum-material limits of class 3A external threads.

5.2. Procedure In Setting Adjustable Limit And Indicating Thread Gages.—The size of adjustable limit or indicating thread gages is controlled by utilizing the applicable W tolerance thread setting plugs. The observance of uniform setting procedures will aid in the proper setting and surveillance of the thread gages and facilitate correlation of gaging results.

5.2.1. Adjustable Thread Ring Gages.—In setting an AGD adjustable thread ring gage, the sealing compound should be removed and the locking screw loosened. Turning the adjusting screw to the right enlarges the ring so that it turns freely onto the thread setting plug. Alternately adjusting the adjusting screw and tightening the locking screw, a firm fit on the smallest portion of the thread in the ring should result. While making the adjustment, the knurled outside diameter and both sides of the ring should be lightly tapped with a soft-tip or plastic hammer to permit the threads of the ring to wrap themselves around the threads of the setting plug.

Care should be taken to assure that there is no lateral displacement of the sectors comprising the ring gage that would produce a lead deviation beyond the prescribed tolerance zone. After satisfactory adjustment has been obtained, the ring is to be removed from the plug and the same procedure of tapping is repeated with slightly greater emphasis to the sides. If the thread ring gage possesses proper rigidity, the same feel should be still there when the setting gage again is turned into the ring. A tighter fit or inability to reenter the setting gage denotes a fault of the locking device, that should then be taken apart and checked for dimensional conformity to CS8 or B47.1. It is often advisable to do this before even attempting to adjust the thread ring gage. When proper adjustment has been obtained, the gage should be sealed.

In setting to a truncated setting plug, the ring gage may be set to either the full or the truncated portion. It is common practice to set slightly freer than a snug fit to the truncated portion and then to check the root clearance and wear of flank angle by screwing the ring onto the full portion. Extreme caution is required when this practice is followed to prevent damage to the thread crest of the setting plug. The opposite practice is to adjust and set the ring to the full portion and then determine the fit of the gage on the truncated portion. If the thread form of the ring gage is satisfactory, there will be slight or no change of fit. In the case of a worn thread ring gage, the presence of shake or play when on the truncated portion indicates that the sides of the thread are no longer straight near the root and the gage should be relapped or discarded.

In order to provide maximum wear life of a setting plug, the plug should be threaded into a ring as few times as possible. This will prevent uneven wear and a taper on the truncated end of the plug. When setting plugs are thus used properly they do not wear unevenly. However, when setting plugs are applied repeatedly to check thread ring gages, the criteria for acceptability will vary with the type and application of the ring. A LO ring, for example, should be a snug fit at full engagement and provide some resistance to turning at one or two turns engagement. GO thread ring gages should also be a snug fit at full engagement. When the length of the product thread permits engagement with the full length of the GO ring, the requirement as to partial engagement may be relaxed to permit a slightly freer fit. However, there should be no relaxation in the requirements when short product threads, that only partly engage the GO ring, are being engaged.

If a basic-crest setting plug is used to set a thread ring gage, root clearance of the thread in the ring should be determined by the procedure outlined below.

The ring gage should be given further inspection to determine whether or not the minor diameter is within the specified limits. The minor diameter may be inspected by means of GO and NOT GO plain cylindrical plug acceptance check gages or by direct measurement.

5.2.1.1. Procedure for Determining the Clearance in Thread Ring Gages.—The roots of threads of ring gages, particularly LO ring gages, frequently do not clear the maximum major diameter of the external thread. To assist the gage maker and gage inspector, the recommended procedure for determining the clearance at root of thread of ring gages is given to supplement, or substitute for, the use of truncated setting plugs described in par. 5.2.1. For this purpose an optical examination of a sulfur-graphite, plaster of Paris, copper-amalgam, or other suitable cast of the thread is made by means of a projection comparator, toolmaker's microscope, or universal measuring microscope. The actual magnification of the instrument as used must be known.

(*a*) *Methods of making sulfur-graphite casts.*—Sulfur-graphite casts are made from a thorough mixture of finely powdered graphite and crushed lump sulfur which is heated in a ladle until the sulfur is completely melted and becomes viscous. This mixture may be used repeatedly by crushing and remelting. The graphite should constitute about 7 percent of the mixture by weight, although in the practice of various users, the proportion varies from 4 to 20 percent. The graphite is added to eliminate reflections that would be produced by a plain sulfur cast, and to reduce the tendency to shrink upon cooling.

The casting mold may be formed by holding the ring gage between thin plates in the jaws of a vise, the top edge of the plate on one side being well below the thread axis. For small sizes of threads, a convenient arrangement is to use a taper mandrel that is provided with a lengthwise groove having smooth surfaces and an included angle of about 90°, into which the mixture is poured, and in which the cast is later mounted for examination. The bottom of the slot has a slight taper toward the axis at the small end. A square metal stop clamped in the groove serves as a wall in casting. The mandrel is also useful in making copper-amalgam casts, in which case the casting mixture is pressed in.

The sulfur-graphite casting mixture is poured into the mold when the temperature is from 260° to 266° F, and allowed to solidify with slow cooling. The cast may be marked with an identification number with a steel stylus. Sulfur-graphite casts warp considerably after a few hours.

(b) *Method of making plaster of Paris casts.*—A plaster of Paris cast is usually made to determine errors in thread angle, and this cast can usually be used to determine clearance. Such a cast is made by mixing 5 parts (28 g or 1 oz) of a good grade of dental plaster of Paris with from 4 to 5 (26 ml) parts by weight of potassium-bichromate solution made by dissolving 40 g in 1 liter of water. The potassium bichromate inhibits rusting of the gage. This mixture is applied to the threads inside a mold which may be fashioned from cardboard or a strip of copper, with modeling clay pressed into the threads along the outside bottom edges of the mold. It should be allowed to harden completely before removal. Plaster of Paris casts have less shrinkage than sulfur-graphite, but do not retain dimensions over extended periods of time. They are difficult to remove from rough finish threads without damage.

(c) *Determining clearance of GO thread ring gages.*—The flat at the crest of the *maximum* external thread is $0.125p$, therefore, if the root of thread of the GO ring is relieved to a width of $0.125p$, the ring threads clear the maximum major diameter of the thread. If the roots of the GO ring gage threads are not relieved, they must be to a sharp enough V to clear a flat of $0.125p$. The flanks of the thread should be straight to the point where the $0.125p$ flat will make contact with the flanks of the thread. The width of flat on the chart or template used should be $0.125p$ times the magnification of the comparator.

(d) *Determining clearance of LO thread ring gages.*—The flat at the crest of a screw with maximum major diameter and minimum pitch diameter is determined by the formula:

$$\text{Flat} = \frac{p}{2} - h' \tan 30° = \frac{p}{2} - 0.57735h'$$

for the Unified form of thread, where h' = maximum major diameter minus minimum pitch diameter.

If the LO ring gage has a relief of $0.25p$ as recommended, it is necessary to determine whether or not the relief is deep enough. To do this, make a chart or template representing a 60° thread with a flat at the crest equal to the flat, as determined by the above formula, times the magnification of the comparator. This chart or template should fit the image of the thread and contact the flanks of the thread image without contacting in the relief. If the ring threads are not relieved, they must be sharp enough to permit the chart or template to contact on the flanks of the image rather than in the root.

5.2.2. Thread Snap Gages.—The gaging elements of most types of thread snap gages are mounted on eccentric pins or studs which can be securely locked in position by means of locking screws or nuts. Since thread snap gages may be of different designs, the above description is used only to illustrate a general classification.

It is essential that proper setting procedures be utilized to assure uniform contact pressure between the gaging elements and their applicable thread setting plugs. The gaging elements should be adjusted so that the thread setting plug will have a minimum perceptible drag when passing it through the gaging elements. One method is to adjust the gage so that the pressure between the gaging elements and the thread setting plug will just support the weight of the thread snap gage and, as the setting plug is slowly rotated, the thread snap gage will drop off by its own weight.

In setting large diameter thread snap gages, it may be desirable to support the thread snap gage in a vise or other holding means. Care should be taken to avoid deformation of the gage frame. Uniform gaging pressure can be attained by holding the gage frame in a vertical position and adjusting the gaging elements so that the thread setting plug will have perceptible drag and will just drop through the gaging elements by its own weight.

Care should be taken not to use too much force when checking or setting thread snap gages so that deformation, brinelling, or permanent damage to the gaging elements, gage frame, or thread setting plug does not occur.

Standard AGD truncated or basic-crest thread setting plugs may be used for setting thread snap gages. Large diameter thread snap gages are sometimes adjusted and set to the proper pitch diameter by direct measurement, size blocks, or various types of setting bars. Details of design and specific instructions covering the use of various types of setting means for large diameter thread snap gages are available directly from the gage manufacturer.

5.2.3. Indicating Thread Gages.—Indicating thread gages are of various designs but most of them are of the comparator type which compare and indicate the variation in size between a thread setting plug of known size and the size of the product thread being checked. Indicating thread gages provide an adjustable gaging force as an inherent part of the gage body construction. This gaging force may be varied according to the particular characteristics (i.e., weight, size, shape, etc.) of the product being checked. The accuracy of the setting and gaging is not normally influenced by variations in the gaging force as the gage is set and used with the same force applied in both instances. Care should be used in selecting the gaging force to be applied in relation to the deformability of product threads.

Usually the applicable GO and LO AGD truncated or basic crest thread setting plugs are used to set the indicating thread gages. However, a thread setting plug of other than the applicable size is sometimes used and the tolerance zone for the product thread is established with reference to the size of the thread setting plug employed. This practice is advantageous as it eliminates the necessity for having applicable setting plugs for each of the various classes of thread as well as special limits. Modification of limits of size to provide allowance for coating and limits of size after coating may be readily established with reference to the size of a thread setting plug gage.

Gage manufacturers usually offer specific information regarding the operation, checking, setting, and surveillance to cover their particular designs of indicating type thread gages.

5.3. Limit Gages For Use In Manufacturing.

5.3.1. In the manufacture of product threads it is necessary to control the limits of size and the various individual thread elements so that the threads produced will be acceptable with final conformance gages. Adoption and use of specific manufacturing gages is the prerogative of individual organizations. If the producer uses gages other than those described in this section, he should evaluate the results obtained to assure correlation with the final conformance gages specified in this section and final conformance within the specifications in section 2.

5.3.2. Limit gages used in manufacturing checking may be of the same general design of thread plug and ring gages used in final conformance gaging. It is important, however, that thread plug and ring gages used in manufacturing checking have pitch diameter tolerances so applied as to be within the product limits of size: i.e., GO thread plugs with tolerance plus, HI thread plugs with tolerance minus, GO thread rings and GO setting plugs with tolerance minus, LO thread rings and LO setting plugs with tolerance plus. Whereas final conformance gages should be as close as practical to the extreme limits of size of the product threads, gages for manufacturing checking should be as far removed from those extremes as is practicable while still within X gage tolerances. When X pitch diameter tolerance is specified for setting plugs, it is recommended that W tolerances for lead and half-angle be specified. (See par. 4.3.3.1, p. 6.05.)

5.3.3. A practice sometimes utilized is to check the pitch diameter of new gages as received, to assign for final conformance gaging those closest to the extreme sizes of the product thread and to assign for manufacturing checking those farthest from the extreme limits of size of the product thread.

5.3.4. Periodic surveillance of both final conformance and manufacturing gages will disclose when the manufacturing gages, due to wear, approach approximately the same size as those used as final conformance gages. At such time either of two courses of action is suggested.

(a) Manufacturing gages (GO) may be transferred to the final conformance application, and be replaced with new gages from the manufacturing gage stock, or

(b) Final conformance gages (HI/LO) may be transferred to the manufacturing gage application, and vice versa.

Perhaps the most difficult point to reconcile in such a program is that of deviations resulting from normal use. Starting threads of both plugs and rings bear the brunt of use when making an inspection. Wear is seldom uniformly distributed over the gaging length and the thread flanks, resulting in inaccuracies of flank angle and pitch diameter. It is important for the success of such a program that inspection and manufacturing personnel agree on the position for the pitch diameter check and the degree of taper which may be tolerated before that gage should be taken out of service. The HI/LO gaging practice which permits the minimum-material-limit gages to assemble for their entire length, provided a definite drag is achieved on or before the third thread of entry, has alleviated appreciably the problem of worn end threads.

5.3.5. There are a number of other styles of limit thread gages utilized as manufacturing gages for technical or economic reasons. Among these are caliper or snap gages using gaging elements of various configurations. Included are those utilizing rolls, segments, serrated anvils, wires, probes, and ball points. Whereas all of these would accept perfect threads with little or no appreciable difference, they may react quite differently on threads having acceptable deviations.

5.3.6. There is an additional problem, primarily stemming from economics, where a relatively few parts with threads are involved, when neither limit nor indicating gages are available and it is economically impracticable to procure them. Such situations are daily problems in model shops, experimental and research departments, tool rooms, and job shops. A discussion of some commonly used practices follows:

5.3.7. Adequate means for determining accuracy of thread angle, thread form, and lead (both linear and helical) are essential. Optical projection or mechanical gages of a general nature are used frequently for such checking.

5.3.8. Numerical values for groove diameter may be determined by use of the three-wire method or for LO minimum-material limit by the use of thread micrometers. The accuracy of these values is affected by the following factors.

5.3.9. Values obtained from three-wire measurement are influenced by:

Deviation in geometry and pitch of product thread.

Product thread characteristics (cleanliness, surface texture, hardness, etc.).

Measuring force exerted over the wires.

Operating skill in handling part, wires, and micrometer.

5.3.10. Values obtained with thread micrometers are influenced by factors enumerated in par. 5.3.9, as applicable, and accuracy of the cone and vee contact elements.

5.3.11. To make use of the values covered in par. 5.3.8 (as applicable to the maximum-material limit, i.e., functional diameter), the diameter equivalents of deviations in lead and half-angle must be taken into account.

5.3.12. For use as a manufacturing check at minimum-material limit the values covered in par. 5.3.8 may be used without change. However, one must realize that these values may be more restrictive of pitch diameter limits than would be experienced with limit gages.

5.4. Differential Gaging.

5.4.1. Differential Gaging provides an economical method of checking for thread element deviations of product complete threads. The principle involved is the determination of values for two essential features or characteristics and by subtraction to determine the difference, i.e., the differential reading. This principle as utilized in checking Unified Screw Threads is a convenient and effective manner of evaluating the effect of deviations of the several elements and some other characteristics. It is helpful to the manufacturer in control of tools and processes. It is not intended that values determined for Differential Gaging be utilized for verification of size conformance.

5.4.2. The following differential readings determined thru the use of appropriate gaging elements are utilized for final conformance gaging of thread elements when specified. See par. 4.5.4.3, p. 6.16, and par. 5.5.

5.4.3. Functional Differential Reading Par. 4.5.4.3, p. 6.16, utilizes Gaging Elements 6.5(a), p. 6.27, for determination of GO functional size, and 6.5(b) for determination of LO minimum-material limit. When the difference between values so determined (Functional Differential Reading) exceeds the specified percentage of the applicable pitch diameter tolerance, it is necessary to make a further analysis to determine if either lead or flank angle exceeds the allowable tolerance. Functional Differential Reading may not be used in thread analysis. (See par. 5.5.)

NOTE 1: The numerical value determined for the Functional Differential Reading will not correlate with that determined by measurement, nor that determined in Thread Analysis except in the case of a perfect thread. Reason is that the contour of the gaging elements 6.5(b), p. 6.27, engage a significant portion of the flank angle and approximately two pitches length of engagement. To be completely assured that no single element exceeds the specified tolerance, the Functional Differential Reading should not exceed one-half of the specified tolerance.

5.4.4. Cumulative Differential Reading.—The size (using gaging elements 6.5(d), (f), (g), or (i) with (j), (k), (l), or (m), p. 6.28, profile) devoid of any effect from lead or angle deviations is subtracted from the value for functional size (using gaging elements 6.5(a)) to establish the CUMULATIVE DIFFERENTIAL READING. When this differential reading does not exceed the specified percentage of the applicable pitch diameter tolerance, the thread elements (lead and flank angle) are well within tolerance. If differential reading exceeds the specified percentage of the applicable pitch diameter tolerance, it is necessary to make a further analysis of lead and flank angle separately. See pars. 5.4.5, 5.4.6, and 5.5. The values determined and utilized in Differential Gaging should not be used for verification of size conformance.

5.4.5. Lead Differential Reading.—Lead Deviation is evaluated using gaging elements as provided in subsection 6, p. 6.27. Gaging elements 6.5(a) engage the thread over approximately the normal length of engagement. Gaging elements 6.7(n) engage the thread over a length not exceeding one pitch. Both contact the thread with a flank engagement of $0.625H$. Care must be taken to avoid any error in product thread cylindricity affecting the readings. The difference between the values is used to determine the LEAD DIFFERENTIAL READING. It is intended that this reading should not exceed the specified percentage of the applicable pitch diameter tolerance.

5.4.6. Flank Angle Differential Reading.—Flank Angle Deviation is evaluated using gaging elements as provided in subsection 6, p. 6.27. Gaging elements 6.5(c) engage the thread flank $0.375H$ (i.e., that which is available at minimum-material condition of the major diameter). Gaging elements 6.6(l) contact the gage flank with curved contacts, or contacts having a slight flat. Both gaging elements engage the thread not over one pitch in length. Care must be taken to avoid any effect of product thread cylindricity affecting the reading. The difference between the values so determined, multiplied by two, is the FLANK ANGLE DIFFERENTIAL READING. It is intended that this reading should not exceed the specified percentage of the applicable pitch diameter tolerance.

5.5. Thread Analysis Utilizing Indicating Thread Gages.

5.5.1. Differential Gaging provides an economical method of checking to verify conformance of thread elements of product complete threads. However, when a numerical value for deviations in each of the several elements is desired, more comprehensive Differential Gaging and Thread Analysis are utilized as covered in the following paragraphs.

The most effective manner by which to convey and understand Thread Analysis utilizing Indicating Thread Gages is to outline the procedures and interpretations. The following applies to gages for product external threads. Comparable techniques and procedures are utilized for checking product internal threads but are not covered in detail herein. Details of gaging elements are presented in subsection 6, p. 6.27.

5.5.2. Differential Gaging Procedures.—The value yielded for the product complete thread, when checked with an indicating thread gage utilizing gaging elements 6.5(a), p. 6.27, to determine Functional Diameter, should at no point along the thread exceed the specified maximum-material limit.

On a perfect thread, the reading obtained when utilizing applicable indicating thread gages would be identical for Functional, Pitch, Groove, and Ridge Diameters.

The deviation in any single thread element, such as lead and flank angle, may not exceed the diameter equivalent of the allowable specified percentage of the pitch diameter tolerance. This is interpreted to mean that no deviation in any single thread element may exceed the allowable specified percentage of the pitch diameter tolerance even though the size of the thread falls within the specified maximum and minimum-material limits.

Any deviations in lead and flank angle of product threads are reflected in the direction of maximum material. Thus, the numerical value for Functional Diameter will differ from the numerical values for LO Minimum-Material Size or Pitch Diameter, as applicable. This difference in numerical values is referred to as the Differential Reading of which there are four as covered in par. 5.4. These numerical values are affected by some features of the gaging elements and some conditions of the product threads which are overlooked all too frequently. The following examples in this category and explanations may be of assistance in evaluating and selecting the applicable gaging elements.

NOTE 1: Pitch Diameter.—It is recognized that numerical values determined by various gaging elements reflect deviations in pitch and flank angle. (See subsection 6, p. 6.27.)
When pitch and flank angle of product threads are *within* acceptable deviations (see par. 5.5.2.1) the difference in numerical values *between gaging elements engaging in the groove or engaging both the thread ridge and groove is of negligible magnitude.* A few examples are given below to illustrate the magnitude of this difference on product threads having maximum permissible progressive lead deviation for Unified Threads over a length of engagement comparable to the thickness of the applicable GO thread ring gage. See par. 4.5.4.3., p. 6.16. These values are yielded by the following formula:

$$V = 0.866 LT/NTR$$

where: V = Variation between pitch diameter and groove diameter values
LT = max acceptable lead deviation in product thread
NTR = number of threads in thread ring gage.

	1A	2A	3A
.250–20 UNC	0.00021	0.00014	0.00010
.250–28 UNF	.00013	.00009	.00007
.250–32 UNEF	----------	.00007	.00005
.750–10 UNC	.00029	.00020	.00015
.750–16 UNF	.00021	.00014	.00010
.750–20 UNEF	----------	.00011	.00007

NOTE 2: Flank Angle
(a) Effect of engagement of gaging contacts on thread flanks. Functional Differential Reading utilizes $0.625H$ and $0.375H$ flank engagements for verifying conformance, whereas Cumulative Differential Reading utilizes $0.625H$ and curved (or slight flat) contacts to determine a numerical value representative of the extent of the deviation. Values achieved are significantly different as illustrated by the formulas and tabulation which follow.

Formulas:

Plus Angle
$$\begin{cases} A = 0.10825\, p \tan 30° \\ B = A \cot(\alpha +) \\ \text{Variation} = 2(0.10825\, p - B) \end{cases}$$

Minus Angle
$$\begin{cases} A = 0.10825\, p \tan 30° \\ B = A \cot(\alpha -) \\ \text{Variation} = 4(B - 0.10825\, p) \end{cases}$$

	1A		2A		3A	
	+ angle	− angle	+ angle	− angle	+ angle	− angle
.250–20 UNC	0.00106	0.00240	0.00072	0.00164	0.00056	0.00112
.250–28 UNF	.00092	.00216	.00064	.00136	.00050	.00100
.250–32 UNEF	---------	---------	.00060	.00136	.00046	.00100
.750–10 UNC	.00166	.00372	.00104	.00244	.00086	.00180
.750–16 UNF	.00142	.00370	.00098	.00204	.00076	.00156
.750–20 UNEF	---------	---------	.00082	.00184	.00064	.00156

(b) Effect of deviations in plus direction and minus direction. The dual formulas and sets of values in the table result from the unequal heights above and below the pitch line (addendum and dedendum). This complexity may be resolved by locating the curved (or slight flat) contacts above the pitch line as shown in 6.6(l) and (m), p. 6.29.
(c) Effect of deviations in major diameter. A specific deviation in flank angle yields significantly different values when the major diameter is at maximum and when it is at minimum when using $0.625H$ and curved (or slight flat) contacts. This complexity may be resolved by using 6.5(c), p.6.28, ($0.375H$) which bears on flank length and 6.5(d), 6.6(l), or (m) (curved or slight flat) contacts. Multiplying the resultant figure by two converts the reading to that which is applicable to the full $0.625H$ length of flank.

5.5.2.1. When the Cumulative Differential Reading is not greater than the allowable specified percentage of the pitch diameter tolerance, the product thread is verified as well within the specification. (See par. 5.4.4, p. 6.21.) When the Cumulative Differential Reading is greater than the allowable specified percentage of the pitch diameter tolerance, the product thread must be analyzed further to assure that the diameter equivalent of the deviation of either lead or flank angle does not exceed the allowable percentage of the pitch diameter tolerance. Lead equivalent deviation, for practical purposes, applies over the length of the applicable GO thread ring blank in CS8 or B47.1.

5.5.3. Analysis of Deviations in Product Threads.

5.5.3.1. Deviation in Lead. Deviation in lead is especially important since it affects pitch diameter in the ratio of 1.732 to 1 in a 60° thread. To check deviation in lead:

(a) Determine the straightness of the product thread by checking at different positions along the product thread using the 6.5(d), (e), (g), or (i), p. 6.28, gaging elements and note the position of the first full thread.

(b) Determine and note the functional diameter of the product thread.

(c) Engage the product thread at the position of the first full product thread as determined in (a) with the first thread of the functional diameter gaging elements 6.5(a) or with 6.7(n) single rib gaging elements, and note the difference in readings. This is the Lead Differential Reading. If the difference is greater than the allowable percentage of pitch diameter tolerance, exclusive of taper, it signifies that the lead deviation is excessive.

NOTE 3: In steps (b) and (c) the results are not affected by deviation in flank angle since the length of flank angle contact in both steps is the same. The only difference in contact is in the length of engagement. Lead deviation may be wholly compensated for by taper deviation since the diameter equivalent of lead deviation will not influence the reading until it exceeds the taper deviation. The extent of taper deviation is known as measured in step (a). If the lead differential reading exceeds this taper deviation by more than the pitch diameter equivalent for lead deviation, the lead deviation is excessive. If the lead differential reading does not exceed the permissible taper deviation, it indicates that the pitch diameter equivalent for lead deviation is less than the maximum taper deviation. If the taper deviation is within the required percentage of pitch diameter tolerance, then it would follow that the lead deviation is also within the required percentage of pitch diameter tolerance and in conformance with specified tolerance.

5.5.3.2. Deviation in Flank Angle. Deviation in flank angle may be revealed by engaging the first full product thread with the 6.5(d), (f), (g), or (i) gaging elements (see 6.5, p. 6.28) and then engaging the same thread with 6.7(n) single rib gaging elements or 6.5(a) gaging elements. If this Flank Angle Differential Reading exceeds the specified percentage of pitch diameter tolerance, it may be that the product thread has excessive flank angle deviation. (See Note 6.)

Analysis of Thread Flank Deviation. With the above types of elements, there are two product deviations which can affect the differential reading. These are: direction of angle deviation (Note 4) and actual major diameter of product thread (Note 5). To reduce these effects, the gaging elements may consist of 6.6(l) or (m) limited contact elements used in conjunction with $0.375H$ LO single element profile elements 6.5c. The difference between readings obtained using this combination of gaging elements, multiplied by two, is the diameter equivalent of flank angle variation present in that product thread.

NOTE 4: The reading for a plus angle deviation on the product thread checked, will be greater than that for a minus angle deviation of the same angular mangitude. This results from unequal height of profile, above and below the pitch line (addendum and dedendum) for Unified threads.

NOTE 5: The differential so obtained is greater for a product thread having maximum major diameter than for one having minimum major diameter.

5.5.3.3. Taper. Taper is determined by checking at several positions along and over the length of engagement of the product thread using the 6.5(d), (e), (f), (g), or (i) gaging elements, p. 6.28.

5.5.3.4. Deviation in Minor Diameter or Root Fillet. Oversized minor diameter or root fillet may be revealed by engaging the first full product thread in the 6.5(d), (f), (g), or (i) gaging elements and then engaging the same thread in the 6.7(n) single rib gaging elements or 6.5(a) gaging elements. If this Flank Angle Differential Reading exceeds the specified percentage of pitch diameter tolerance, it may be that the product thread has an oversized minor diameter or root fillet. (See Note 6.)

NOTE 6: For further analysis of product thread profile and control of threading tools, optical projection methods are suggested. They are particularly useful in checking thread form, flank angle, and pitch deviations of product threads and manufacturing tools.

5.5.3.5. Out-of-Round. Out-of-Round in a product thread may be elliptical, oval, egg-shaped, or lobed (frequently called clover leaf). Ovality is detected most effectively with two-point gaging contacts in an indicating thread gage. Lobing can be detected most effectively with three-point gaging contacts in an indicating thread gage. See figures 6.13, 6.14, and 6.15, p. 6.24, and notes 7 and 8.

NOTE 7: A gage having two gaging elements is preferred for detecting an elliptical condition, while a gage having three gaging elements is preferred for detecting the multi-lobed condition.

NOTE 8: Any helix variation (deviation in helical path or "drunkenness") may be reflected in the check for roundness. When an excessive deviation from roundness is detected, further analysis should be made utilizing equipment of a universal nature capable of differentiating and evaluating helix variation, or equipment especially made for evaluating helical path deviation. This check is applicable when the product thread call-out specifies control and inspection of thread elements.

5.5.4. Determining Allowances on Pitch Diameter to Compensate for Lead Deviation in Product Threads with Long Length of Engagement.

5.5.4.1. Determine the straightness of the product thread and note the location of the first full product thread with reference to the starting thread using the pitch diameter gaging elements with an indicating thread gage.

5.5.4.2. Determine and note the functional diameter of the product thread using the functional diameter indicating thread gage.

5.5.4.3. Engage the first full product thread (as determined in par. 5.5.4.1) in the first thread of the functional diameter gaging elements and note the size indication.

5.5.4.4. Subtract the first full product thread diameter numerical value (par. 5.5.4.3) from the functional diameter numerical value (par. 5.5.4.2). This difference in readings is the differential numerical value and represents the pitch diameter equivalent of the lead deviation in the product thread over a length equal to the length of the functional diameter gaging elements.

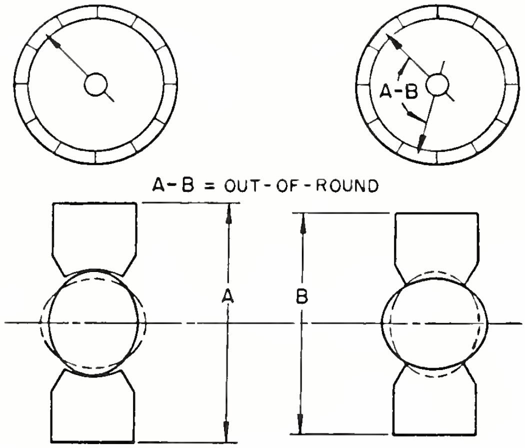


Figure 6.13. *Out-of-round: elliptical, oval, or egg-shaped. (Utilizing segments for gaging elements).*

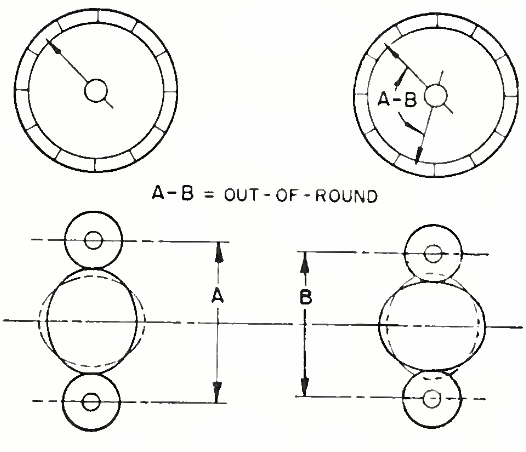


Figure 6.14. *Out-of-round: elliptical, oval, or egg-shaped. (Utilizing rolls for gaging elements).*

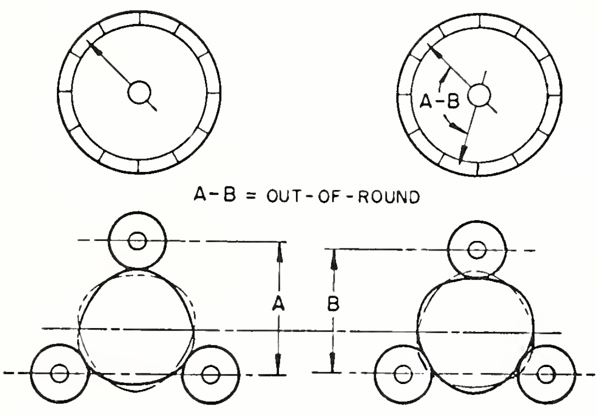


Figure 6.15. *Out-of-round: Lobed. (Utilizing rolls for gaging elements).*

5.5.4.5. Divide the length of engagement of the product thread by the length of the functional diameter gaging elements. This result is the Length Factor.

5.5.4.6. Multiply the differential reading (par. 5.5.4.4) by the length factor (par. 5.5.4.5). This result is the amount by which the specified maximum-material functional diameter of that external product thread must be below the specified maximum-material limit. This will compensate for the lead deviation in that product thread and will assure acceptance over full length engagement with a mating product thread made to its specified maximum-material size.

5.6. Gaging Functional Depth Limits Of Product Internal Threads.

5.6.1. The data herein represents current practice and should be helpful in specifying depth limit steps on thread plug gages. Specifications for the location of depth limit steps on GO thread plug gages, which are otherwise made in accordance with details in this section, are as follows.

5.6.2. Object of Depth Limit Steps. The object of depth limit steps on GO plug thread gages is to determine the extent a product functionally conforms to the specified thread depth.

There are two types of specifications referring to depth of internal threads. One type specifies minimum depth only and therefore requires only one depth limit step on the gage. The other type specifies minimum and maximum values for depth of thread and requires two depth limit steps on the gage.

5.6.3. Use of Gages with Depth Limit Steps. The step limit GO thread plug gage is applied to the product as far as it will go without the application of significant force which would tend to deform the product material. The position of the limit steps in relation to the face of the product is noted to determine conformance.

5.6.4. Location of Limit Steps. Limit steps shall be located with reference to the front end face of the gage as shown in figures 6.16 and 6.17 and at a point on the circumference that will approximately bisect the crest flat of the gage.

The first full crest of the GO thread plug gage with a depth limit step shall start at a location $0.5p$ from the front end face of the gage as shown in figures 6.16 and 6.18.

The limit step face shall be straight for the depth of thread and shall be ground at 90 degrees to the axis of the gage.

Reversible style thread gages are generally made with only one set of limit steps from one end of the gage in order to eliminate confusion and error from runout of one set of steps running into steps from the other end.

The design of the depth step is based on the length from the centerline of the crest on the first full thread ridge (which is untouched by removal of the thread convolution or chamfer at the end of the thread plug gage). The length from the end of the thread gage to the depth step is calculated by adding $0.5p$ to the functional depth of the full depth thread form required in the product.

When measuring the step length over the end of the gage, the step length tolerance will apply only if the exact $0.5p$ length is held from the first full thread ridge centerline to the end. This dimension may vary without affecting the function, so long as the variation from $0.5p$ is taken into account, when measuring the step length over the end of the thread plug gage. Variation of the $0.5p$ dimension should be in a minus direction only and should not be of such magnitude as to infringe on the engaging flank of the first full thread ridge.

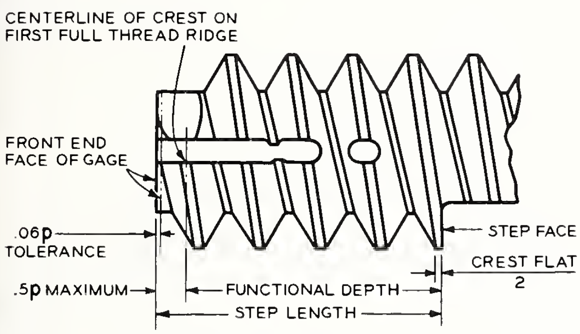


FIGURE 6.16. *Depth limit thread plug gage.*

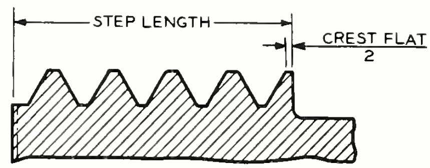


FIGURE 6.17. *Location of depth step on gage (in plane which bisects crest flat).*

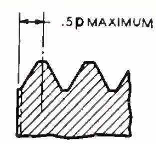


FIGURE 6.18. *Start of perfect thread on gage.*

5.7. DETERMINATION OF LIMITS OF SIZE OF GAGES

An example of limits of size and tolerances of gages required for an external and an internal thread is presented below. A diameter/pitch size was chosen from table 3.1. All calculations were made from the specifications and formulas in tables 6.6, 6.7, 6.8, and 6.9, p. 6.11.

Example: 2–18 UNS-2A

GAGES FOR PRODUCT EXTERNAL THREADS

	Max	Min	Tolerance
GO Thread Ring Gage			
Major Dia	Cleared		
Pitch Dia	1.9624	1.9620	0.0004
Minor Dia	1.9383	1.9378	0.0005
Truncated Setting Plug for GO Thread Ring Gage			
Major Dia:			
—Truncated Portion	1.9888	1.9883	0.0005
—Full Portion	1.9990	1.9985	0.0005
Pitch Dia	1.9624	1.9622	0.0002
Minor Dia	Cleared		
LO Thread Ring Gage			
Major Dia	Cleared		
Pitch Dia:			
—Tolerance plus	1.9577	1.9573	0.0004
—Tolerance minus	1.9573	1.9569	0.0004
Minor Dia	1.9458	1.9453	0.0005
Truncated Setting Plug for LO Thread Ring Gage			
Major Dia:			
—Truncated Portion	1.9814	1.9809	0.0005
—Full Portion	1.9990	1.9985	0.0005
Pitch Dia:			
—Tolerance plus	1.9575	1.9573	0.0002
—Tolerance minus	1.9573	1.9571	0.0002
Minor Dia	Cleared		
Basic-Crest Setting Plug for GO Thread Snap Gage			
Major Dia	1.9990	1.9985	0.0005
Pitch Dia	1.9624	1.9622	0.0002
Minor Dia	Cleared		
Basic-Crest Setting Plug for LO Thread Snap Gage			
Major Dia	1.9990	1.9985	0.0005
Pitch Dia:			
—Tolerance plus	1.9575	1.9573	0.0002
—Tolerance minus	1.9573	1.9571	0.0002
Minor Dia	Cleared		
GO Plain Ring or Snap Gage for Major Diameter			
Diameter	1.99850	1.99834	0.00016
NOT GO Plain Ring or Snap Gage for Major Diameter			
Diameter	1.98996	1.98980	0.00016

Example: 2–18 UNS-2B

GAGES FOR PRODUCT INTERNAL THREADS

	Max	Min	Tolerance
GO Thread Plug Gage			
Major Dia	2.0005	2.0000	0.0005
Pitch Dia	1.9643	1.9639	0.0004
Minor Dia	Cleared		
HI Thread Plug Gage			
Major Dia	1.9947	1.9942	0.0005
Pitch Dia:			
—Tolerance minus	1.9706	1.9702	0.0004
—Tolerance plus	1.9710	1.9706	0.0004
Minor Dia	Cleared		
GO Plain Plug Gage for Minor Diameter			
Diameter	1.94016	1.94000	0.00016
NOT GO Plain Plug Gage for Minor Diameter			
Diameter	1.95300	1.95284	0.00016

6. INDICATING THREAD GAGES

6.1. Many types of indicating thread gages have been designed to meet specific needs in gaging both external and internal threads. The following descriptions apply to gages for checking external threads. Comparable techniques and principles are utilized for checking internal threads but are not covered in detail herein.

6.2. There were many factors which encouraged the development of indicating thread gages such as:

(1) A need for a numerical value for size to facilitate adjustments of manufacturing tools or processes.

(2) Means for a faster method of gaging.

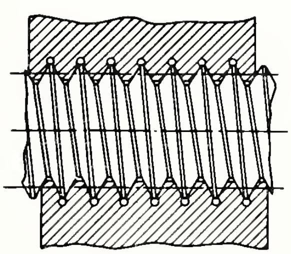
(3) Flexibility in application to accommodate the several tolerance classes both before and after coating.

(4) Ability to determine numerical values for deviations in the essential thread elements to serve more effectively the needs of statistical quality control techniques.

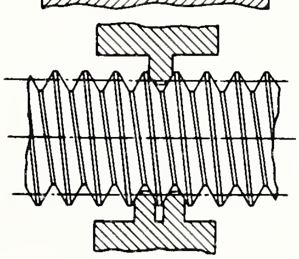
6.3. Practically all indicating thread gages utilize mechanisms which facilitate application of the gage to the product thread or application of the product thread to the gage. Gages are set to a thread setting plug or pair of thread setting plugs of known size. Deviations are read from a scale when utilizing mechanical, electronic, or pneumatic amplification, or from an enlarged image when utilizing optical projection.

6.4. It is generally impracticable to determine precisely the pitch diameter of product threads as defined because of variations in form and/or lead. However, the result obtained with many types of gages in gaging product threads is a close approximation of either pitch diameter or functional diameter. Certain types of gaging elements consisting of two or more rolls, segments, probes, or wires, with configurations as described and illustrated are in general use.

(a)



(b)

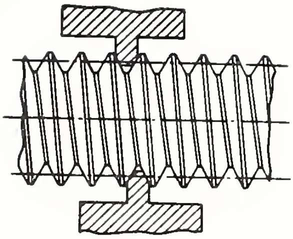


6.5. Some Representative Gaging Elements in Current Use.

(a) Gaging elements which, in length, approximate the width of the applicable GO thread ring gage blank and which, in contour, engage the product thread flank 0.625*H* (approximating the flank contact of the GO thread ring gage) check Functional Diameter (Defined in section 1).

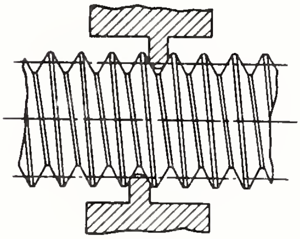
(b) Gaging elements which, in length, approximate two pitches and in contour, engage the product thread flank 0.375*H* (approximating the flank contact of the LO thread ring gage) check LO Minimum-Material Limit (Defined in section 1). (Deviation in product thread flank angle and lead affects this determination. See Notes 2 and 3 in par. 5.5, p. 6.21).

(c)



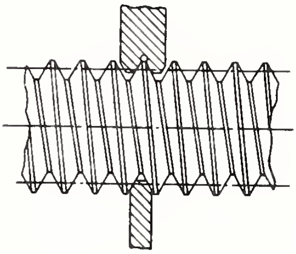
(c) Gaging elements which engage not over one pitch in length and in contour engage the product thread flank 0.375H (approximating the flank contact of the LO thread ring gage) check Groove Diameter to yield LO Minimum-Material Size. (Deviation in product thread flank angle affects this determination. See Note 2 in par. 5.5, p. 6.21.)

(d)



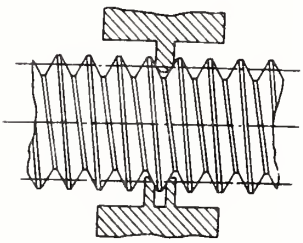
(d) Gaging elements which engage not over one pitch in length and have a curved contact simulating best wire size or contacts having a slight flat, check Thread Groove Diameter (Defined in section 1) closely approximating pitch diameter.[3] (See 6.6 j, k, l, or m).

(e)



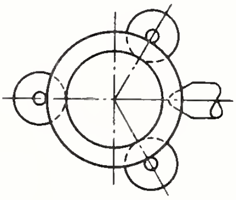
(e) Cone and vee[4] gaging elements which engage not over one pitch in length and in contour engage the flank 0.375H (approximating the flank contact of the LO thread ring gage) check groove and ridge diameter to yield LO Minimum-Material Size. (Deviation in product thread flank angle affects this determination. See Note 2 in par. 5.5, p. 6.21.)

(f)



(f) Cone and vee gaging elements which engage not over one pitch in length and have curved contacts simulating best wire size or contacts having a slight flat, check groove and ridge diameter closely approximating pitch diameter. (See 6.6 j, k, l, or m).

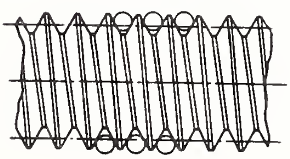
(g)



(g) Single radial probe contacting not more than one pitch, with ball point contact (simulating best size wire) checks Groove Diameter closely approximating pitch diameter. (See 6.6 k, j, l, or m).

(h) Same as (g) except with angular cone contact of the LO ring thread gage. Checks Groove Diameter to yield LO Minimum-Material Size. (Deviation in product thread flank angle affects this determination. See Note 2 in par. 5.5, p. 6.21).

(i)



(i) Wire gaging contacts (simulating best size wire) check Groove Diameter closely approximating pitch diameter.

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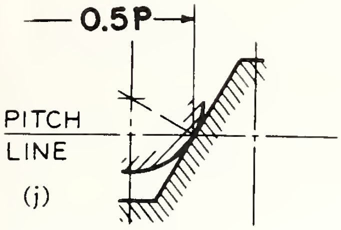
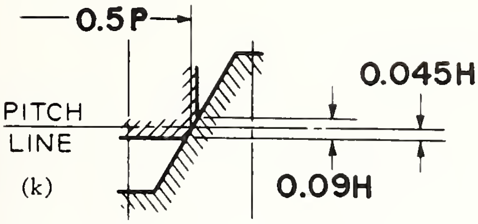
[3] The values obtained by the use of gaging elements shown above (Types d, f, g, and i) may be used to determine deviations from the size of respective setting plugs and may, through calculation, yield pitch diameter of the product threads.

[4] "Cone" signifies a single contact design which engages the product thread groove and complete reference must also state profile of contact. "Vee" signifies a double contact design which engages the product thread ridge and complete reference must also state profile of contact.

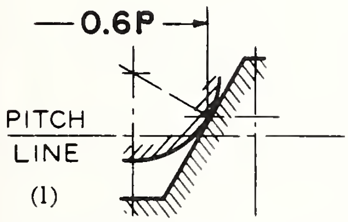
6.6. Typical cross sections of limited contact gaging elements are as follows:



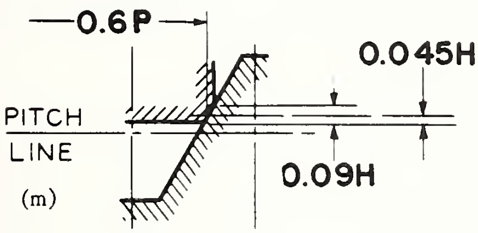
(j) Gaging elements with curved contacts simulating best wire size, designed to contact approximately at the pitch line.



(k) Gaging elements with short straight flank contacts, designed to straddle contact approximately at the pitch line.

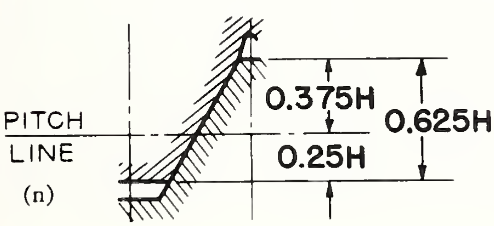


(l) Gaging elements with curved contacts designed to contact above the pitch line approximately midway on available flank (i.e., that flank which is engaged when using 6.7(o) gaging elements.)

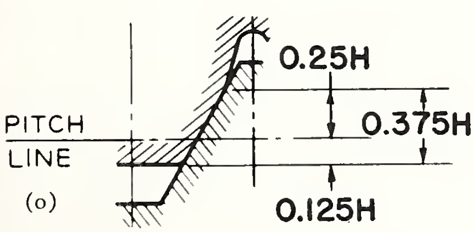


(m) Gaging elements with short straight flank contacts, designed to straddle contact above the pitch line approximately midway on available flank.

6.7. Cross sections of full and LO flank angle gaging elements are as follows:



(n) Gaging elements with full length flank contact, (approximating the flank contact of the GO thread ring gage) designed to contact for full depth of thread engagement.



(o) Gaging elements with LO (0.375H) flank contacts, (approximating the flank contact of the LO thread ring gage) designed to contact for partial depth of thread engagement.

6.8. The several designs of gages and multiplicity of gaging elements embrace developments over many years. Each was conceived to meet a specific need, and to the degree which that need was valid, and the gage filled it, that design has been utilized.

Table 6.19. *Gages for standard thread series, Unified screw threads*

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	Gages for external threads: X thread ring gages: GO: Minor diameter	Gages for external threads: X thread ring gages: LO: Pitch diameter: Plus tolerance gage	Gages for external threads: X thread ring gages: LO: Pitch diameter: Minus tolerance gage	Gages for external threads: X thread ring gages: LO: Minor diameter	Gages for external threads: Z plain ring gages for major diameter: GO	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Semi-finished	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	Gages for internal threads: X thread plug gages: GO: Pitch diameter	Gages for internal threads: X thread plug gages: HI: Major diameter	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Minus tolerance gage	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Gages for internal threads: Z plain plug gages for minor diameter: GO	Gages for internal threads: Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
.060-80	UNF	2A	0.0514	0.0460	0.0496	0.9496	0.0469	0.0595	0.0563	----------	0.0600	0.0519	0.0596	0.0542	0.0542	0.0465	0.0514	2B	UNF	.060-80
			.0512	.0457	.0498	.0494	.0472	.0594	.0564	----------	.0603	.0521	.0593	.0540	.0544	.0466	.0513			
		3A	.0519	.0465	.0506	.0506	.0479	.0600	.0568	----------	.0600	.0519	.0590	.0536	.0536	.0465	.0514	3B		
			.0517	.0462	.0508	.0504	.0482	.0599	.0569	----------	.0603	.0521	.0587	.0534	.0538	.0466	.0513			
.073-64	UNC	2A	.0623	.0555	.0603	.0603	.0569	.0724	.0686	----------	.0730	.0629	.0723	.0655	.0655	.0561	.0623	2B	UNC	.073-64
			.0621	.0551	.0605	.0601	.0573	.0723	.0687	----------	.0734	.0631	.0719	.0653	.0657	.0562	.0622			
		3A	.0629	.0561	.0614	.0614	.0580	.0730	.0692	----------	.0730	.0629	.0716	.0648	.0648	.0561	.0623	3B		
			.0627	.0557	.0616	.0612	.0584	.0729	.0693	----------	.0734	.0631	.0712	.0646	.0650	.0562	.0622			
.073-72	UNF	2A	.0634	.0574	.0615	.0615	.0585	.0724	.0689	----------	.0730	.0640	.0725	.0665	.0665	.0580	.0635	2B	UNF	.073-72
			.0632	.0571	.0617	.0613	.0588	.0723	.0690	----------	.0733	.0642	.0722	.0663	.0667	.0581	.0634			
		3A	.0640	.0580	.0626	.0626	.0596	.0730	.0695	----------	.0730	.0640	.0719	.0659	.0659	.0580	.0635	3B		
			.0638	.0577	.0628	.0624	.0599	.0729	.0696	----------	.0733	.0642	.0716	.0657	.0661	.0581	.0534			
.086-56	UNC	2A	.0738	.0661	.0717	.0717	.0678	.0854	.0813	----------	.0860	.0744	.0849	.0772	.0772	.0667	.0737	2B	UNC	.086-56
			.0736	.0657	.0719	.0715	.0682	.0853	.0814	----------	.0864	.0746	.0845	.0770	.0774	.0668	.0736			
		3A	.0744	.0667	.0728	.0728	.0689	.0860	.0819	----------	.0860	.0744	.0842	.0765	.0765	.0667	.0737	3B		
			.0742	.0663	.0730	.0726	.0693	.0859	.0820	----------	.0864	.0746	.0838	.0763	.0767	.0668	.0736			
.086-64	UNF	2A	.0753	.0685	.0733	.0733	.0699	.0854	.0816	----------	.0860	.0759	.0854	.0786	.0786	.0691	.0753	2B	UNF	.086-64
			.0751	.0681	.0735	.0731	.0703	.0853	.0817	----------	.0864	.0761	.0850	.0784	.0788	.0692	.0752			
		3A	.0759	.0691	.0744	.0744	.0710	.0860	.0822	----------	.0860	.0759	.0847	.0779	.0779	.0691	.0753	3B		
			.0757	.0687	.0746	.0742	.0714	.0859	.0823	----------	.0864	.0761	.0843	.0777	.0781	.0692	.0752			
.099-48	UNC	2A	.0848	.0758	.0825	.0825	.0780	.0983	.0938	----------	.0990	.0855	.0975	.0885	.0885	.0764	.0845	2B	UNC	.099-48
			.0846	.0754	.0827	.0823	.0784	.0982	.0939	----------	.0994	.0857	.0971	.0883	.0887	.0765	.0844			
		3A	.0855	.0765	.0838	.0838	.0793	.0990	.0945	----------	.0990	.0855	.0967	.0877	.0877	.0764	.0845	3B		
			.0853	.0761	.0840	.0836	.0797	.0989	.0946	----------	.0994	.0857	.0963	.0875	.0879	.0765	.0844			
.099-56	UNF	2A	.0867	.0790	.0845	.0845	.0806	.0983	.0942	----------	.0990	.0874	.0979	.0902	.0902	.0797	.0865	2B	UNF	.099-56
			.0865	.0786	.0847	.0843	.0810	.0982	.0943	----------	.0994	.0876	.0975	.0900	.0904	.0798	.0864			
		3A	.0874	.0797	.0858	.0858	.0819	.0990	.0949	----------	.0990	.0874	.0972	.0895	.0895	.0797	.0865	3B		
			.0872	.0793	.0860	.0856	.0823	.0989	.0950	----------	.0994	.0876	.0968	.0893	.0897	.0798	.0864			
.112-40	UNC	2A	.0950	.0842	.0925	.0925	.0871	.1112	.1061	----------	.1120	.0958	.1099	.0991	.0991	.0849	.0939	2B	UNC	.112-40
			.0948	.0838	.0927	.0923	.0875	.1111	.1062	----------	.1124	.0960	.1095	.0989	.0993	.0850	.0938			
		3A	.0958	.0850	.0939	.0939	.0885	.1120	.1069	----------	.1120	.0958	.1090	.0982	.0982	.0849	.0939	3B		
			.0956	.0846	.0941	.0937	.0889	.1119	.1070	----------	.1124	.0960	.1086	.0980	.0984	.0850	.0938			
.112-48	UNF	2A	.0978	.0888	.0954	.0954	.0909	.1113	.1068	----------	.1120	.0985	.1106	.1016	.1016	.0894	.0968	2B	UNF	.112-48
			.0976	.0884	.0956	.0952	.0913	.1112	.1069	----------	.1124	.0987	.1102	.1014	.1018	.0895	.0967			
		3A	.0985	.0895	.0967	.0967	.0922	.1120	.1075	----------	.1120	.0985	.1098	.1008	.1008	.0894	.0968	3B		
			.0983	.0891	.0969	.0965	.0926	.1119	.1076	----------	.1124	.0987	.1094	.1006	.1010	.0895	.0967			
.125-40	UNC	2A	.1080	.0972	.1054	.1054	.1000	.1242	.1191	----------	.1250	.1088	.1229	.1121	.1121	.0979	.1062	2B	UNC	.125-40
			.1078	.0968	.1056	.1052	.1004	.1241	.1192	----------	.1254	.1090	.1225	.1119	.1123	.0980	.1061			
		3A	.1088	.0980	.1069	.1069	.1015	.1250	.1199	----------	.1250	.1088	.1221	.1113	.1113	.0979	.1062	3B		
			.1086	.0976	.1071	.1067	.1019	.1249	.1200	----------	.1254	.1090	.1217	.1111	.1115	.0980	.1061			

.125-44	UNF	2A	.1095	.0997	.1070	.1070	.1021	.1243	.1195	---------	.1250	.1102	.1232	.1134	.1134	.1004	.1079	2B	UNF	.125-44
			.1093	.0993	.1072	.1068	.1025	.1242	.1196	---------	.1254	.1104	.1228	.1132	.1136	.1005	.1078			
		3A	.1102	.1004	.1083	.1083	.1034	.1250	.1202	---------	.1250	.1102	.1224	.1126	.1126	.1004	.1079	3B		
			.1100	.1090	.1085	.1081	.1038	.1249	.1203	---------	.1254	.1104	.1220	.1124	.1128	.1005	.1078			
.138-32	UNC	2A	.1169	.1034	.1141	.1141	.1073	.1372	.1312	---------	.1380	.1177	.1349	.1214	.1214	.1040	.1140	2B	UNC	.138-32
			.1166	.1029	.1144	.1138	.1078	.1371	.1313	---------	.1385	.1180	.1344	.1211	.1217	.1041	.1139			
		3A	.1177	.1042	.1156	.1156	.1088	.1380	.1320	---------	.1380	.1177	.1339	.1204	.1204	.1040	.1140	3B		
			.1174	.1037	.1159	.1153	.1093	.1379	.1321	---------	.1385	.1180	.1334	.1201	.1207	.1041	.1139			
.138-40	UNF	2A	.1210	.1102	.1184	.1184	.1130	.1372	.1321	---------	.1380	.1218	.1360	.1252	.1252	.1110	.1190	2B	UNF	.138-40
			.1208	.1098	.1186	.1182	.1134	.1371	.1322	---------	.1384	.1220	.1356	.1250	.1254	.1111	.1189			
		3A	.1218	.1110	.1198	.1198	.1144	.1380	.1329	---------	.1380	.1218	.1351	.1243	.1243	.1110	.1186	3B		
			.1216	.1106	.1200	.1196	.1148	.1379	.1330	---------	.1384	.1220	.1347	.1241	.1245	.1111	.1185			
.164-32	UNC	2A	.1428	.1293	.1399	.1399	.1331	.1631	.1571	---------	.1640	.1437	.1610	.1475	.1475	.1300	.1390	2B	UNC	.164-32
			.1425	.1288	.1402	.1396	.1336	.1630	.1572	---------	.1645	.1440	.1605	.1472	.1478	.1301	.1389			
		3A	.1437	.1302	.1415	.1415	.1347	.1640	.1580	---------	.1640	.1437	.1600	.1465	.1465	.1300	.1389	3B		
			.1434	.1297	.1418	.1412	.1352	.1639	.1581	---------	.1645	.1440	.1595	.1462	.1468	.1301	.1388			
.164-36	UNF	2A	.1452	.1332	.1424	.1424	.1364	.1632	.1577	---------	.1640	.1460	.1616	.1496	.1496	.1340	.1420	2B	UNF	.164-36
			.1450	.1328	.1426	.1422	.1368	.1631	.1578	---------	.1644	.1462	.1612	.1494	.1498	.1341	.1419			
		3A	.1460	.1340	.1439	.1439	.1379	.1640	.1585	---------	.1640	.1460	.1607	.1487	.1487	.1340	.1416	3B		
			.1458	.1336	.1441	.1437	.1383	.1639	.1586	---------	.1644	.1462	.1603	.1485	.1489	.1341	.1415			
.190-24	UNC	2A	.1619	.1439	.1586	.1586	.1496	.1890	.1818	---------	.1900	.1629	.1852	.1672	.1672	.1450	.1560	2B	UNC	.190-24
			.1616	.1434	.1589	.1583	.1501	.1889	.1819	---------	.1905	.1632	.1847	.1669	.1675	.1451	.1559			
		3A	.1629	.1449	.1604	.1604	.1514	.1900	.1828	---------	.1900	.1629	.1841	.1661	.1661	.1450	.1555	3B		
			.1626	.1444	.1607	.1601	.1519	.1899	.1829	---------	.1905	.1632	.1836	.1658	.1664	.1451	.1554			
.190-32	UNF	2A	.1688	.1553	.1658	.1658	.1590	.1891	.1831	---------	.1900	.1697	.1871	.1736	.1736	.1560	.1640	2B	UNF	.190-32
			.1685	.1548	.1661	.1655	.1595	.1890	.1832	---------	.1905	.1700	.1866	.1733	.1739	.1561	.1639			
		3A	.1697	.1562	.1674	.1674	.1606	.1900	.1840	---------	.1900	.1697	.1861	.1726	.1726	.1560	.1641	3B		
			.1694	.1557	.1677	.1671	.1611	.1899	.1841	---------	.1905	.1700	.1856	.1723	.1729	.1561	.1640			
.216-24	UNC	2A	.1879	.1699	.1845	.1845	.1755	.2150	.2078	---------	.2160	.1889	.2113	.1933	.1933	.1710	.1810	2B	UNC	.216-24
			.1876	.1694	.1848	.1842	.1760	.2149	.2079	---------	.2165	.1892	.2108	.1930	.1936	.1711	.1809			
		3A	.1889	.1709	.1863	.1863	.1773	.2160	.2088	---------	.2160	.1889	.2102	.1922	.1922	.1710	.1807	3B		
			.1886	.1704	.1866	.1860	.1778	.2159	.2089	---------	.2165	.1892	.2097	.1919	.1925	.1711	.1806			
.216-28	UNF	2A	.1918	.1763	.1886	.1886	.1809	.2150	.2085	---------	.2160	.1928	.2125	.1970	.1970	.1770	.1860	2B	UNF	.216-28
			.1915	.1758	.1889	.1883	.1814	.2149	.2086	---------	.2165	.1931	.2120	.1967	.1973	.1771	.1859			
		3A	.1928	.1773	.1904	.1904	.1827	.2160	.2095	---------	.2160	.1928	.2114	.1959	.1959	.1770	.1857	3B		
			.1925	.1768	.1907	.1901	.1832	.2159	.2096	---------	.2165	.1931	.2109	.1956	.1962	.1771	.1856			
.216-32	UNEF	2A	.1948	.1813	.1917	.1917	.1849	.2151	.2091	---------	.2160	.1957	.2133	.1998	.1998	.1820	.1900	2B	UNEF	.216-32
			.1945	.1808	.1920	.1914	.1854	.2150	.2092	---------	.2165	.1960	.2128	.1995	.2001	.1821	.1899			
		3A	.1957	.1822	.1933	.1933	.1865	.2160	.2100	---------	.2160	.1957	.2123	.1988	.1988	.1820	.1895	3B		
			.1954	.1817	.1936	.1930	.1870	.2159	.2101	---------	.2165	.1960	.2118	.1985	.1991	.1821	.1894			
.250-20	UNC	1A	.2164	.1947	.2108	.2108	.2000	.2489	.2367	---------	.2500	.2175	.2465	.2248	.2248	.1960	.2070	1B	UNC	.250-20
			.2161	.1942	.2111	.2105	.2005	.2488	.2368	---------	.2505	.2178	.2460	.2245	.2251	.1961	.2069			
		2A	.2164	.1947	.2127	.2127	.2019	.2489	.2408	0.2367	.2500	.2175	.2441	.2224	.2224	.1960	.2070	2B		
			.2161	.1942	.2130	.2124	.2024	.2488	.2409	.2368	.2505	.2178	.2436	.2221	.2227	.1961	.2069			
		3A	.2175	.1958	.2147	.2147	.2039	.2500	.2419	---------	.2500	.2175	.2428	.2211	.2211	.1960	.2067	3B		
			.2172	.1953	.2150	.2144	.2044	.2499	.2420	---------	.2505	.2178	.2423	.2208	.2214	.1961	.2066			
.250-28	UNF	1A	.2258	.2103	.2208	.2208	.2131	.2490	.2392	---------	.2500	.2268	.2488	.2333	.2333	.2110	.2200	1B	UNF	.250-28
			.2255	.2098	.2211	.2205	.2136	.2489	.2393	---------	.2505	.2271	.2483	.2330	.2336	.2111	.2199			
		2A	.2258	.2103	.2225	.2225	.2148	.2490	.2425	---------	.2500	.2268	.2466	.2311	.2311	.2110	.2200	2B		
			.2255	.2098	.2228	.2222	.2153	.2489	.2426	---------	.2505	.2271	.2461	.2308	.2314	.2111	.2199			
		3A	.2268	.2113	.2243	.2243	.2166	.2500	.2435	---------	.2500	.2268	.2455	.2300	.2300	.2110	.2190	3B		
			.2265	.2108	.2246	.2240	.2171	.2499	.2436	---------	.2505	.2271	.2450	.2297	.2303	.2111	.2189			
.250-32	UNEF	2A	.2287	.2152	.2255	.2255	.2187	.2490	.2430	---------	.2500	.2297	.2474	.2339	.2339	.2160	.2240	2B	UNEF	.250-32
			.2284	.2147	.2258	.2252	.2192	.2489	.2431	---------	.2505	.2300	.2469	.2336	.2342	.2161	.2239			
		3A	.2297	.2162	.2273	.2273	.2205	.2500	.2440	---------	.2500	.2297	.2463	.2328	.2328	.2160	.2229	3B		
			.2294	.2157	.2276	.2270	.2210	.2499	.2441	---------	.2505	.2300	.2458	.2325	.2331	.2161	.2228			
.3125-18	UNC	1A	.2752	.2511	.2691	.2691	.2571	.3113	.2982	---------	.3125	.2764	.3084	.2843	.2843	.2520	.2650	1B	UNC	.3125-18
			.2749	.2506	.2694	.2688	.2576	.3112	.2983	---------	.3130	.2767	.3079	.2840	.2846	.2521	.2649			
		2A	.2752	.2511	.2712	.2712	.2592	.3113	.3026	.2982	.3125	.2764	.3058	.2817	.2817	.2520	.2650	2B		
			.2749	.2506	.2715	.2709	.2597	.3112	.3027	.2983	.3130	.2767	.3053	.2814	.2820	.2521	.2649			
		3A	.2764	.2523	.2734	.2734	.2614	.3125	.3038	---------	.3125	.2764	.3044	.2803	.2803	.2520	.2630	3B		
			.2761	.2518	.2737	.2731	.2619	.3124	.3039	---------	.3130	.2767	.3039	.2800	.2806	.2521	.2629			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	X thread ring gages: GO: Minor diameter	X thread ring gages: LO: Pitch diameter: Plus tolerance gage	X thread ring gages: LO: Pitch diameter: Minus tolerance gage	X thread ring gages: LO: Minor diameter	Z plain ring gages for major diameter: GO	Z plain ring gages: NOT GO: Semi-finished	Z plain ring gages: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	X thread plug gages: GO: Pitch diameter	X thread plug gages: HI: Major diameter	X thread plug gages: HI: Pitch diameter: Minus tolerance gage	X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Z plain plug gages for minor diameter: GO	Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
.3125–20	UN	2A	0.2788	0.2571	0.2748	0.2748	0.2640	0.3113	0.3032	--------	0.3125	0.2800	0.3069	0.2852	0.2852	0.2580	0.2700	2B	UN	.3125–20
			.2785	.2566	.2751	.2745	.2645	.3112	.3033	--------	.3130	.2803	.3064	.2849	.2855	.2581	.2699			
		3A	.2800	.2583	.2770	.2770	.2662	.3125	.3044	--------	.3125	.2800	.3056	.2839	.2839	.2580	.2680	3B		
			.2797	.2578	.2773	.2767	.2667	.3124	.3045	--------	.3130	.2803	.3051	.2836	.2842	.2581	.2679			
.3125–24	UNF	1A	.2843	.2663	.2788	.2788	.2698	.3114	.3006	--------	.3125	.2854	.3105	.2925	.2925	.2670	.2770	1B	UNF	.3125–24
			.2840	.2658	.2791	.2785	.2703	.3113	.3007	--------	.3130	.2857	.3100	.2922	.2928	.2671	.2769			
		2A	.2843	.2663	.2806	.2806	.2716	.3114	.3042	--------	.3125	.2854	.3082	.2902	.2902	.2670	.2770	2B		
			.2840	.2658	.2809	.2803	.2721	.3113	.3043	--------	.3130	.2857	.3077	.2899	.2905	.2671	.2769			
		3A	.2854	.2674	.2827	.2827	.2737	.3125	.3053	--------	.3125	.2854	.3070	.2890	.2890	.2670	.2754	3B		
			.2851	.2669	.2830	.2824	.2742	.3124	.3054	--------	.3130	.2857	.3065	.2887	.2893	.2671	.2753			
.3125–28	UN	2A	.2883	.2728	.2849	.2849	.2772	.3115	.3050	--------	.3125	.2893	.3092	.2937	.2937	.2740	.2820	2B	UN	.3125–28
			.2880	.2723	.2852	.2846	.2777	.3114	.3051	--------	.3130	.2896	.3087	.2934	.2940	.2741	.2819			
		3A	.2893	.2738	.2867	.2867	.2790	.3125	.3060	--------	.3125	.2893	.3081	.2926	.2926	.2740	.2807	3B		
			.2890	.2733	.2870	.2864	.2795	.3124	.3061	--------	.3130	.2896	.3076	.2923	.2929	.2741	.2806			
.3125–32	UNEF	2A	.2912	.2777	.2880	.2880	.2812	.3115	.3055	--------	.3125	.2922	.3099	.2964	.2964	.2790	.2860	2B	UNEF	.3125–32
			.2909	.2772	.2883	.2877	.2817	.3114	.3056	--------	.3130	.2925	.3094	.2961	.2967	.2791	.2859			
		3A	.2922	.2787	.2898	.2898	.2830	.3125	.3065	--------	.3125	.2922	.3088	.2953	.2953	.2790	.2847	3B		
			.2919	.2782	.2901	.2895	.2835	.3124	.3066	--------	.3130	.2925	.3083	.2950	.2956	.2791	.2846			
.375–16	UNC	1A	.3331	.3060	.3266	.3266	.3131	.3737	.3595	--------	.3750	.3344	.3700	.3429	.3429	.3070	.3210	1B	UNC	.375–16
			.3328	.3054	.3269	.3263	.3137	.3736	.3596	--------	.3756	.3347	.3694	.3426	.3432	.3071	.3209			
		2A	.3331	.3060	.3287	.3287	.3152	.3737	.3643	0.3595	.3750	.3344	.3672	.3401	.3401	.3070	.3210	2B		
			.3328	.3054	.3290	.3284	.3158	.3736	.3644	.3596	.3756	.3347	.3666	.3398	.3404	.3071	.3209			
		3A	.3344	.3073	.3311	.3311	.3176	.3750	.3656	--------	.3750	.3344	.3658	.3387	.3387	.3070	.3182	3B		
			.3341	.3067	.3314	.3308	.3182	.3749	.3657	--------	.3756	.3347	.3652	.3384	.3390	.3071	.3181			
.375–20	UN	2A	.3413	.3196	.3372	.3372	.3264	.3738	.3657	--------	.3750	.3425	.3696	.3479	.3479	.3210	.3320	2B	UN	.375–20
			.3410	.3191	.3375	.3369	.3269	.3737	.3658	--------	.3755	.3428	.3691	.3476	.3482	.3211	.3319			
		3A	.3425	.3208	.3394	.3394	.3286	.3750	.3669	--------	.3750	.3425	.3682	.3465	.3465	.3210	.3297	3B		
			.3422	.3203	.3397	.3391	.3291	.3749	.3670	--------	.3755	.3428	.3677	.3462	.3468	.3211	.3296			
.375–24	UNF	1A	.3468	.3288	.3411	.3411	.3321	.3739	.3631	--------	.3750	.3479	.3733	.3553	.3553	.3300	.3400	1B	UNF	.375–24
			.3465	.3283	.3414	.3408	.3326	.3738	.3632	--------	.3755	.3482	.3728	.3550	.3556	.3301	.3399			
		2A	.3468	.3288	.3430	.3430	.3340	.3739	.3667	--------	.3750	.3479	.3708	.3528	.3528	.3300	.3400	2B		
			.3465	.3283	.3433	.3427	.3345	.3738	.3668	--------	.3755	.3482	.3703	.3525	.3531	.3301	.3399			
		3A	.3479	.3299	.3450	.3450	.3360	.3750	.3678	--------	.3750	.3479	.3696	.3516	.3516	.3300	.3372	3B		
			.3476	.3294	.3453	.3447	.3365	.3749	.3679	--------	.3755	.3482	.3691	.3513	.3519	.3301	.3371			
.375–28	UN	2A	.3507	.3352	.3471	.3471	.3394	.3739	.3674	--------	.3750	.3518	.3719	.3564	.3564	.3360	.3450	2B	UN	.375–28
			.3504	.3347	.3474	.3468	.3399	.3738	.3675	--------	.3755	.3521	.3714	.3561	.3567	.3361	.3449			
		3A	.3518	.3363	.3491	.3491	.3414	.3750	.3685	--------	.3750	.3518	.3708	.3553	.3553	.3360	.3426	3B		
			.3515	.3358	.3494	.3488	.3419	.3749	.3686	--------	.3755	.3521	.3703	.3550	.3556	.3361	.3425			
.375–32	UNEF	2A	.3537	.3402	.3503	.3503	.3435	.3740	.3680	--------	.3750	.3547	.3726	.3591	.3591	.3410	.3490	2B	UNEF	.375–32
			.3534	.3397	.3506	.3500	.3440	.3739	.3681	--------	.3755	.3550	.3721	.3588	.3594	.3411	.3489			
		3A	.3547	.3412	.3522	.3522	.3454	.3750	.3690	--------	.3750	.3547	.3715	.3580	.3580	.3410	.3469	3B		
			.3544	.3407	.3525	.3519	.3459	.3749	.3691	--------	.3755	.3550	.3710	.3577	.3583	.3411	.3468			

.4375–14	UNC	1A	.3897	.3588	.3826	.3826	.3671	.4361	.4206	--------	.4375	.3911	.4312	.4003	.4003	.3600	.3760	1B	UNC	.4375–14
			.3894	.3582	.3829	.3823	.3677	.4360	.4207	--------	.4381	.3914	.4306	.4000	.4006	.3601	.3759			
		2A	.3897	.3588	.3850	.3850	.3695	.4361	.4258	.4206	.4375	.3911	.4281	.3972	.3972	.3600	.3760	2B		
			.3894	.3582	.3853	.3847	.3701	.4360	.4259	.4207	.4381	.3914	.4275	.3969	.3975	.3601	.3759			
		3A	.3911	.3602	.3876	.3876	.3721	.4375	.4272	--------	.4375	.3911	.4266	.3957	.3957	.3600	.3717	3B		
			.3908	.3596	.3879	.3873	.3727	.4374	.4273	--------	.4381	.3914	.4260	.3954	.3960	.3601	.3716			
.4375–16	UN	2A	.3955	.3684	.3909	.3909	.3774	.4361	.4267	--------	.4375	.3969	.4299	.4028	.4028	.3700	.3840	2B	UN	.4375–16
			.3952	.3678	.3912	.3906	.3780	.4360	.4268	--------	.4381	.3972	.4293	.4025	.4031	.3701	.3839			
		3A	.3969	.3698	.3935	.3935	.3800	.4375	.4281	--------	.4375	.3969	.4285	.4014	.4014	.3700	.3800	3B		
			.3966	.3692	.3938	.3932	.3806	.4374	.4282	--------	.4381	.3972	.4279	.4011	.4017	.3701	.3799			
.4375–20	UNF	1A	.4037	.3820	.3974	.3974	.3866	.4362	.4240	--------	.4375	.4050	.4348	.4131	.4131	.3830	.3950	1B	UNF	.4375–20
			.4034	.3815	.3977	.3971	.3871	.4361	.4241	--------	.4380	.4053	.4343	.4128	.4134	.3831	.3949			
		2A	.4037	.3820	.3995	.3995	.3887	.4362	.4281	--------	.4375	.4050	.4321	.4104	.4104	.3830	.3950	2B		
			.4034	.3815	.3998	.3992	.3892	.4361	.4282	--------	.4380	.4053	.4316	.4101	.4107	.3831	.3949			
		3A	.4050	.3833	.4019	.4019	.3911	.4375	.4294	--------	.4375	.4050	.4308	.4091	.4091	.3830	.3916	3B		
			.4047	.3828	.4022	.4016	.3916	.4374	.4295	--------	.4380	.4053	.4303	.4088	.4094	.3831	.3915			
.4375–28	UNEF	2A	.4132	.3977	.4096	.4096	.4019	.4364	.4299	--------	.4375	.4143	.4344	.4189	.4189	.3990	.4070	2B	UNEF	.4375–28
			.4129	.3972	.4099	.4093	.4024	.4363	.4300	--------	.4380	.4146	.4339	.4186	.4192	.3991	.4069			
		3A	.4143	.3988	.4116	.4116	.4039	.4375	.4310	--------	.4375	.4143	.4333	.4178	.4178	.3990	.4051	3B		
			.4140	.3983	.4119	.4113	.4044	.4374	.4311	--------	.4380	.4146	.4328	.4175	.4181	.3991	.4050			
.4375–32	UN	2A	.4162	.4027	.4128	.4128	.4060	.4365	.4305	--------	.4375	.4172	.4351	.4216	.4216	.4040	.4110	2B	UN	.4375–32
			.4159	.4022	.4131	.4125	.4065	.4364	.4306	--------	.4380	.4175	.4346	.4213	.4219	.4041	.4109			
		3A	.4172	.4037	.4147	.4147	.4079	.4375	.4315	--------	.4375	.4172	.4340	.4205	.4205	.4040	.4094	3B		
			.4169	.4032	.4150	.4144	.4084	.4374	.4316	--------	.4380	.4175	.4335	.4202	.4208	.4041	.4093			
.500–13	UNC	1A	.4485	.4152	.4411	.4411	.4245	.4985	.4822	--------	.5000	.4500	.4930	.4597	.4597	.4170	.4340	1B	UNC	.500–13
			.4482	.4146	.4414	.4408	.4251	.4984	.4823	--------	.5006	.4503	.4924	.4594	.4600	.4171	.4339			
		2A	.4485	.4152	.4435	.4435	.4269	.4985	.4876	.4822	.5000	.4500	.4898	.4565	.4565	.4170	.4340	2B		
			.4482	.4146	.4438	.4432	.4275	.4984	.4877	.4823	.5006	.4503	.4892	.4562	.4568	.4171	.4339			
		3A	.4500	.4167	.4463	.4463	.4297	.5000	.4891	--------	.5000	.4500	.4881	.4548	.4548	.4170	.4284	3B		
			.4497	.4161	.4466	.4460	.4303	.4999	.4892	--------	.5006	.4503	.4875	.4545	.4551	.4171	.4283			
.500–16	UN	2A	.4580	.4309	.4533	.4533	.4398	.4986	.4892	--------	.5000	.4594	.4926	.4655	.4655	.4320	.4460	2B	UN	.500–16
			.4577	.4303	.4536	.4530	.4404	.4985	.4893	--------	.5006	.4597	.4920	.4652	.4658	.4321	.4459			
		3A	.4594	.4323	.4559	.4559	.4424	.5000	.4906	--------	.5000	.4594	.4911	.4640	.4640	.4320	.4419	3B		
			.4591	.4317	.4562	.4556	.4430	.4999	.4907	--------	.5006	.4597	.4905	.4637	.4643	.4321	.4418			
.500–20	UNF	1A	.4662	.4445	.4598	.4598	.4490	.4987	.4865	--------	.5000	.4675	.4976	.4759	.4759	.4460	.4570	1B	UNF	.500–20
			.4659	.4440	.4601	.4595	.4495	.4986	.4866	--------	.5005	.4678	.4971	.4756	.4762	.4461	.4569			
		2A	.4662	.4445	.4619	.4619	.4511	.4987	.4906	--------	.5000	.4675	.4948	.4731	.4731	.4460	.4570	2B		
			.4659	.4440	.4622	.4616	.4516	.4986	.4907	--------	.5005	.4678	.4943	.4728	.4734	.4161	.4569			
		3A	.4675	.4458	.4643	.4643	.4535	.5000	.4919	--------	.5000	.4675	.4934	.4717	.4717	.4460	.4537	3B		
			.4672	.4453	.4646	.4640	.4540	.4999	.4920	--------	.5005	.4678	.4929	.4714	.4720	.4461	.4536			
.500–28	UNEF	2A	.4757	.4602	.4720	.4720	.4643	.4989	.4924	--------	.5000	.4768	.4971	.4816	.4816	.4610	.4700	2B	UNEF	.500–28
			.4754	.4597	.4723	.4717	.4648	.4988	.4925	--------	.5005	.4771	.4966	.4813	.4819	.4611	.4699			
		3A	.4768	.4613	.4740	.4740	.4663	.5000	.4935	--------	.5000	.4768	.4959	.4804	.4804	.4610	.4676	3B		
			.4765	.4608	.4743	.4737	.4668	.4999	.4936	--------	.5005	.4771	.4954	.4801	.4807	.4611	.4675			
.500–32	UN	2A	.4787	.4652	.4752	.4752	.4684	.4990	.4930	--------	.5000	.4797	.4977	.4842	.4842	.4660	.4740	2B	UN	.500–32
			.4784	.4647	.4755	.4749	.4689	.4989	.4931	--------	.5005	.4800	.4972	.4839	.4845	.4661	.4739			
		3A	.4797	.4662	.4771	.4771	.4703	.5000	.4940	--------	.5000	.4797	.4966	.4831	.4831	.4660	.4719	3B		
			.4794	.4657	.4774	.4768	.4708	.4999	.4941	--------	.5005	.4800	.4961	.4828	.4834	.4661	.4718			
.5625–12	UNC	1A	.5068	.4707	.4990	.4990	.4810	.5609	.5437	--------	.5625	.5084	.5547	.5186	.5186	.4720	.4900	1B	UNC	.5625–12
			.5065	.4701	.4993	.4987	.4816	.5608	.5438	--------	.5631	.5087	.5541	.5183	.5189	.4721	.4899			
		2A	.5068	.4707	.5016	.5016	.4836	.5609	.5495	.5437	.5625	.5084	.5513	.5152	.5152	.4720	.4900	2B		
			.5065	.4701	.5019	.5013	.4842	.5608	.5496	.5438	.5631	.5087	.5507	.5149	.5155	.4721	.4899			
		3A	.5084	.4723	.5045	.5045	.4865	.5625	.5511	--------	.5625	.5084	.5496	.5135	.5135	.4720	.4843	3B		
			.5081	.4717	.5048	.5042	.4871	.5624	.5512	--------	.5631	.5087	.5490	.5132	.5138	.4721	.4842			
.5625–16	UN	2A	.5205	.4934	.5158	.5158	.5023	.5611	.5517	--------	.5625	.5219	.5551	.5280	.5280	.4950	.5090	2B	UN	.5625–16
			.5202	.4928	.5161	.5155	.5029	.5610	.5518	--------	.5631	.5222	.5545	.5277	.5283	.4951	.5089			
		3A	.5219	.4948	.5184	.5184	.5049	.5625	.5531	--------	.5625	.5219	.5536	.5265	.5265	.4950	.5040	3B		
			.5216	.4942	.5187	.5181	.5055	.5624	.5532	--------	.5631	.5222	.5530	.5262	.5268	.4951	.5039			
.5625–18	UNF	1A	.5250	.5009	.5182	.5182	.5062	.5611	.5480	--------	.5625	.5264	.5594	.5353	.5353	.5020	.5150	1B	UNF	.5625–18
			.5247	.5004	.5185	.5179	.5067	.5610	.5481	--------	.5630	.5267	.5589	.5350	.5356	.5021	.5149			
		2A	.5250	.5009	.5205	.5205	.5085	.5611	.5524	--------	.5625	.5264	.5564	.5323	.5323	.5020	.5150	2B		
			.5247	.5004	.5208	.5202	.5090	.5610	.5525	--------	.5630	.5267	.5559	.5320	.5326	.5021	.5149			
		3A	.5264	.5023	.5230	.5230	.5110	.5625	.5538	--------	.5625	.5264	.5549	.5308	.5308	.5020	.5106	3B		
			.5261	.5018	.5233	.5227	.5115	.5624	.5539	--------	.5630	.5267	.5544	.5305	.5311	.5021	.5105			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	Gages for external threads: X thread ring gages: GO: Minor diameter	Gages for external threads: X thread ring gages: LO: Pitch diameter: Plus tolerance gage	Gages for external threads: X thread ring gages: LO: Pitch diameter: Minus tolerance gage	Gages for external threads: X thread ring gages: LO: Minor diameter	Gages for external threads: Z plain ring gages for major diameter: GO	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Semi-finished	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	Gages for internal threads: X thread plug gages: GO: Pitch diameter	Gages for internal threads: X thread plug gages: HI: Major diameter	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Minus tolerance gage	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Gages for internal threads: Z plain plug gages for minor diameter: GO	Gages for internal threads: Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
.5625–20	UN	2A	0.5287	0.5070	0.5245	0.5245	0.5137	0.5612	0.5531	--------	0.5625	0.5300	0.5572	0.5355	0.5355	0.5080	0.5200	2B	UN	.5625–20
			.5284	.5065	.5248	.5242	.5142	.5611	.5532	--------	.5630	.5303	.5567	.5352	.5358	.5081	.5199			
		3A	.5300	.5083	.5268	.5268	.5160	.5625	.5544	--------	.5625	.5300	.5558	.5341	.5341	.5080	.5162	3B		
			.5297	.5078	.5271	.5265	.5165	.5624	.5545	--------	.5630	.5303	.5553	.5338	.5344	.5081	.5161			
.5625–24	UNEF	2A	.5342	.5162	.5303	.5303	.5213	.5613	.5541	--------	.5625	.5354	.5585	.5405	.5405	.5170	.5270	2B	UNEF	.5625–24
			.5339	.5157	.5306	.5300	.5218	.5612	.5542	--------	.5630	.5357	.5580	.5402	.5408	.5171	.5269			
		3A	.5354	.5174	.5325	.5325	.5235	.5625	.5553	--------	.5625	.5354	.5572	.5392	.5392	.5170	.5244	3B		
			.5351	.5169	.5328	.5322	.5240	.5624	.5554	--------	.5630	.5357	.5567	.5389	.5395	.5171	.5243			
.5625–28	UN	2A	.5382	.5227	.5345	.5345	.5268	.5614	.5549	--------	.5625	.5393	.5596	.5441	.5441	.5240	.5320	2B	UN	.5625–28
			.5379	.5222	.5348	.5342	.5273	.5613	.5550	--------	.5630	.5396	.5591	.5438	.5444	.5241	.5319			
		3A	.5393	.5238	.5365	.5365	.5288	.5625	.5560	--------	.5625	.5393	.5584	.5429	.5429	.5240	.5301	3B		
			.5390	.5233	.5368	.5362	.5293	.5624	.5561	--------	.5630	.5396	.5579	.5426	.5432	.5241	.5300			
.5625–32	UN	2A	.5412	.5277	.5377	.5377	.5309	.5615	.5555	--------	.5625	.5422	.5602	.5467	.5467	.5290	.5360	2B	UN	.5625–32
			.5409	.5272	.5380	.5374	.5314	.5614	.5556	--------	.5630	.5425	.5597	.5464	.5470	.5291	.5359			
		3A	.5422	.5287	.5396	.5396	.5328	.5625	.5565	--------	.5625	.5422	.5591	.5456	.5456	.5290	.5344	3B		
			.5419	.5282	.5399	.5393	.5333	.5624	.5566	--------	.5630	.5425	.5586	.5453	.5459	.5291	.5343			
.625–11	UNC	1A	.5644	.5250	.5561	.5561	.5364	.6234	.6052	--------	.6250	.5660	.6161	.5767	.5767	.5270	.5460	1B	UNC	.625–11
			.5641	.5244	.5564	.5558	.5370	.6233	.6053	--------	.6256	.5663	.6155	.5764	.5770	.5271	.5459			
		2A	.5644	.5250	.5589	.5589	.5392	.6234	.6113	0.6052	.6250	.5660	.6126	.5732	.5732	.5270	.5460	2B		
			.5641	.5244	.5592	.5586	.5398	.6233	.6114	.6053	.6256	.5663	.6120	.5729	.5735	.5271	.5459			
		3A	.5660	.5266	.5619	.5619	.5422	.6250	.6129	--------	.6250	.5660	.6108	.5714	.5714	.5270	.5391	3B		
			.5657	.5260	.5622	.5616	.5428	.6249	.6130	--------	.6256	.5663	.6102	.5711	.5717	.5271	.5390			
.625–12	UN	2A	.5693	.5332	.5639	.5639	.5459	.6234	.6120	--------	.6250	.5709	.6141	.5780	.5780	.5350	.5530	2B	UN	.625–12
			.5690	.5326	.5642	.5636	.5465	.6233	.6121	--------	.6256	.5712	.6135	.5777	.5783	.5351	.5529			
		3A	.5709	.5348	.5668	.5668	.5488	.6250	.6136	--------	.6250	.5709	.6123	.5762	.5762	.5350	.5463	3B		
			.5706	.5342	.5671	.5665	.5494	.6249	.6137	--------	.6256	.5712	.6117	.5759	.5765	.5351	.5462			
.625–16	UN	2A	.5830	.5559	.5782	.5782	.5647	.6236	.6142	--------	.6250	.5844	.6177	.5906	.5906	.5570	.5710	2B	UN	.625–16
			.5827	.5553	.5785	.5779	.5653	.6235	.6143	--------	.6256	.5847	.6171	.5903	.5909	.5571	.5709			
		3A	.5844	.5573	.5808	.5808	.5673	.6250	.6156	--------	.6250	.5844	.6161	.5890	.5890	.5570	.5662	3B		
			.5841	.5567	.5811	.5805	.5679	.6249	.6157	--------	.6256	.5847	.6155	.5887	.5893	.5571	.5661			
.625–18	UNF	1A	.5875	.5634	.5805	.5805	.5685	.6236	.6105	--------	.6250	.5889	.6221	.5980	.5980	.5650	.5780	1B	UNF	.625–18
			.5872	.5629	.5808	.5802	.5690	.6235	.6106	--------	.6255	.5892	.6216	.5977	.5983	.5651	.5779			
		2A	.5875	.5634	.5828	.5828	.5708	.6236	.6149	--------	.6250	.5889	.6190	.5949	.5949	.5650	.5780	2B		
			.5872	.5629	.5831	.5825	.5713	.6235	.6150	--------	.6255	.5892	.6185	.5946	.5952	.5651	.5779			
		3A	.5889	.5648	.5854	.5854	.5734	.6250	.6163	--------	.6250	.5889	.6175	.5934	.5934	.5650	.5730	3B		
			.5886	.5643	.5857	.5851	.5739	.6249	.6164	--------	.6255	.5892	.6170	.5931	.5937	.5651	.5729			
.625–20	UN	2A	.5912	.5695	.5869	.5869	.5761	.6237	.6156	--------	.6250	.5925	.6198	.5981	.5981	.5710	.5820	2B	UN	.625–20
			.5909	.5690	.5872	.5866	.5766	.6236	.6157	--------	.6255	.5928	.6193	.5978	.5984	.5711	.5819			
		3A	.5925	.5708	.5893	.5893	.5785	.6250	.6169	--------	.6250	.5925	.6184	.5967	.5967	.5710	.5787	3B		
			.5922	.5703	.5896	.5890	.5790	.6249	.6170	--------	.6255	.5928	.6179	.5964	.5970	.5711	.5786			

.625–24	UNEF	2A	.5967	.5787	.5927	.5927	.5837	.6238	.6166		.6250	.5979	.6211	.6031	.6031	.5800	.5900	2B	UNEF	.625–24
			.5964	.5782	.5930	.5924	.5842	.6237	.6167		.6255	.5982	.6206	.6028	.6034	.5801	.5899			
		3A	.5979	.5799	.5949	.5949	.5859	.6250	.6178		.6250	.5979	.6198	.6018	.6018	.5800	.5869	3B		
			.5976	.5794	.5952	.5946	.5864	.6249	.6179		.6255	.5982	.6193	.6015	.6021	.5801	.5868			
.625–28	UN	2A	.6007	.5852	.5969	.5969	.5892	.6239	.6174		.6250	.6018	.6222	.6067	.6067	.5860	.5950	2B	UN	.625–28
			.6004	.5847	.5972	.5966	.5897	.6238	.6175		.6255	.6021	.6217	.6064	.6070	.5861	.5949			
		3A	.6018	.5863	.5990	.5990	.5913	.6250	.6185		.6250	.6018	.6210	.6055	.6055	.5860	.5926	3B		
			.6015	.5858	.5993	.5987	.5918	.6249	.6186		.6255	.6021	.6205	.6052	.6058	.5861	.5925			
.625–32	UN	2A	.6036	.5901	.6000	.6000	.5932	.6239	.6179		.6250	.6047	.6228	.6093	.6093	.5910	.5990	2B	UN	.625–32
			.6033	.5896	.6003	.5997	.5937	.6238	.6180		.6255	.6050	.6223	.6090	.6096	.5911	.5989			
		3A	.6047	.5912	.6020	.6020	.5952	.6250	.6190		.6250	.6047	.6217	.6082	.6082	.5910	.5969	3B		
			.6044	.5907	.6023	.6017	.5957	.6249	.6191		.6255	.6050	.6212	.6079	.6085	.5911	.5968			
.6875–12	UN	2A	.6318	.5957	.6264	.6264	.6084	.6859	.6745		.6875	.6334	.6766	.6405	.6405	.5970	.6150	2B	UN	.6875–12
			.6315	.5951	.6267	.6261	.6090	.6858	.6746		.6881	.6337	.6760	.6402	.6408	.5971	.6149			
		3A	.6334	.5973	.6293	.6293	.6113	.6875	.6761		.6875	.6334	.6748	.6387	.6387	.5970	.6085	3B		
			.6331	.5967	.6296	.6290	.6119	.6874	.6762		.6881	.6337	.6742	.6384	.6390	.5971	.6084			
.6875–16	UN	2A	.6455	.6184	.6407	.6407	.6272	.6861	.6767		.6875	.6469	.6802	.6531	.6531	.6200	.6340	2B	UN	.6875–16
			.6462	.6178	.6410	.6404	.6278	.6860	.6768		.6881	.6472	.6796	.6528	.6534	.6201	.6339			
		3A	.6469	.6198	.6433	.6433	.6298	.6875	.6781		.6875	.6469	.6786	.6515	.6515	.6200	.6284	3B		
			.6466	.6192	.6436	.6430	.6304	.6874	.6782		.6881	.6472	.6780	.6512	.6518	.6201	.6283			
.6875–20	UN	2A	.6537	.6320	.6494	.6494	.6386	.6862	.6781		.6875	.6550	.6823	.6606	.6606	.6330	.6450	2B	UN	.6875–20
			.6534	.6315	.6497	.6491	.6391	.6861	.6782		.6880	.6553	.6818	.6603	.6609	.6331	.6449			
		3A	.6550	.6333	.6518	.6518	.6410	.6875	.6794		.6875	.6550	.6809	.6592	.6592	.6330	.6412	3B		
			.6547	.6328	.6521	.6515	.6415	.6874	.6795		.6880	.6553	.6804	.6589	.6595	.6331	.6411			
.6875–24	UNEF	2A	.6592	.6412	.6552	.6552	.6462	.6863	.6791		.6875	.6604	.6836	.6656	.6656	.6420	.6520	2B	UNEF	.6875–24
			.6589	.6407	.6555	.6549	.6467	.6862	.6792		.6880	.6607	.6831	.6653	.6659	.6421	.6519			
		3A	.6604	.6424	.6574	.6574	.6484	.6875	.6803		.6875	.6604	.6823	.6643	.6643	.6420	.6494	3B		
			.6601	.6419	.6577	.6571	.6489	.6874	.6804		.6880	.6607	.6818	.6640	.6646	.6421	.6493			
.6875–28	UN	2A	.6632	.6477	.6594	.6594	.6517	.6864	.6799		.6875	.6643	.6847	.6692	.6692	.6490	.6570	2B	UN	.6875–28
			.6629	.6472	.6597	.6591	.6522	.6863	.6800		.6880	.6646	.6842	.6689	.6695	.6491	.6569			
		3A	.6643	.6488	.6615	.6615	.6538	.6875	.6810		.6875	.6643	.6835	.6680	.6680	.6490	.6551	3B		
			.6640	.6483	.6618	.6612	.6543	.6874	.6811		.6880	.6646	.6830	.6677	.6683	.6491	.6550			
.6875–32	UN	2A	.6661	.6526	.6625	.6625	.6557	.6864	.6804		.6875	.6672	.6853	.6718	.6718	.6540	.6610	2B	UN	.6875–32
			.6658	.6521	.6628	.6622	.6562	.6863	.6805		.6880	.6675	.6848	.6715	.6721	.6541	.6609			
		3A	.6672	.6537	.6645	.6645	.6577	.6875	.6815		.6875	.6672	.6842	.6707	.6707	.6540	.6594	3B		
			.6669	.6532	.6648	.6642	.6582	.6874	.6816		.6880	.6675	.6837	.6704	.6710	.6541	.6593			
.750–10	UNC	1A	.6832	.6399	.6744	.6744	.6528	.7482	.7288		.7500	.6850	.7398	.6965	.6965	.6420	.6630	1B	UNC	.750–10
			.6829	.6393	.6747	.6741	.6534	.7481	.7289		.7506	.6853	.7392	.6962	.6968	.6421	.6629			
		2A	.6832	.6399	.6773	.6773	.6557	.7482	.7353	.7288	.7500	.6850	.7360	.6927	.6927	.6420	.6630	2B		
			.6829	.6393	.6776	.6770	.6563	.7481	.7354	.7289	.7506	.6853	.7354	.6924	.6930	.6421	.6629			
		3A	.6850	.6417	.6806	.6806	.6590	.7500	.7371		.7500	.6850	.7340	.6907	.6907	.6420	.6545	3B		
			.6847	.6411	.6809	.6803	.6596	.7499	.7372		.7506	.6853	.7334	.6904	.6910	.6421	.6544			
.750–12	UN	2A	.6942	.6581	.6887	.6887	.6707	.7483	.7369		.7500	.6959	.7392	.7031	.7031	.6600	.6780	2B	UN	.750–12
			.6939	.6575	.6890	.6884	.6713	.7482	.7370		.7506	.6962	.7386	.7028	.7034	.6601	.6779			
		3A	.6959	.6598	.6918	.6918	.6738	.7500	.7386		.7500	.6959	.7374	.7013	.7013	.6600	.6707	3B		
			.6956	.6592	.6921	.6915	.6744	.7499	.7387		.7506	.6962	.7368	.7010	.7016	.6601	.6706			
.750–16	UNF	1A	.7079	.6808	.7004	.7004	.6869	.7485	.7343		.7500	.7094	.7463	.7192	.7192	.6820	.6960	1B	UNF	.750–16
			.7076	.6802	.7007	.7001	.6875	.7484	.7344		.7506	.7097	.7457	.7189	.7195	.6821	.6959			
		2A	.7079	.6808	.7029	.7029	.6894	.7485	.7391		.7500	.7094	.7430	.7159	.7159	.6820	.6960	2B		
			.7076	.6802	.7032	.7026	.6900	.7484	.7392		.7506	.7097	.7424	.7156	.7162	.6821	.6959			
		3A	.7094	.6823	.7056	.7056	.6921	.7500	.7406		.7500	.7094	.7414	.7143	.7143	.6820	.6908	3B		
			.7091	.6817	.7059	.7053	.6927	.7499	.7407		.7506	.7097	.7408	.7140	.7146	.6821	.6907			
.750–20	UNEF	2A	.7162	.6945	.7118	.7118	.7010	.7487	.7406		.7500	.7175	.7449	.7232	.7232	.6960	.7070	2B	UNEF	.750–20
			.7159	.6940	.7121	.7115	.7015	.7486	.7407		.7505	.7178	.7444	.7229	.7235	.6961	.7069			
		3A	.7175	.6958	.7142	.7142	.7034	.7500	.7419		.7500	.7175	.7435	.7218	.7218	.6960	.7037	3B		
			.7172	.6953	.7145	.7139	.7039	.7499	.7420		.7505	.7178	.7430	.7215	.7221	.6961	.7036			
.750–28	UN	2A	.7256	.7101	.7218	.7218	.7141	.7488	.7423		.7500	.7268	.7473	.7318	.7318	.7110	.7200	2B	UN	.750–28
			.7253	.7096	.7221	.7215	.7146	.7487	.7424		.7505	.7271	.7468	.7315	.7321	.7111	.7199			
		3A	.7268	.7113	.7239	.7239	.7162	.7500	.7435		.7500	.7268	.7460	.7305	.7305	.7110	.7176	3B		
			.7265	.7108	.7242	.7236	.7167	.7499	.7436		.7505	.7271	.7455	.7302	.7308	.7111	.7175			
.750–32	UN	2A	.7286	.7151	.7250	.7250	.7182	.7489	.7429		.7500	.7297	.7479	.7344	.7344	.7160	.7240	2B	UN	.750–32
			.7283	.7146	.7253	.7247	.7187	.7488	.7430		.7505	.7300	.7474	.7341	.7347	.7161	.7239			
		3A	.7297	.7162	.7270	.7270	.7202	.7500	.7440		.7500	.7297	.7468	.7333	.7333	.7160	.7219	3B		
			.7294	.7157	.7273	.7267	.7207	.7499	.7441		.7505	.7300	.7463	.7330	.7336	.7161	.7218			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads								Gages for internal threads							Class	Series designation	Nominal size and threads per inch
			X thread ring gages					Z plain ring gages for major diameter			X thread plug gages					Z plain plug gages for minor diameter				
			GO		LO			GO	NOT GO		GO		HI			GO	NOT GO			
			Pitch diameter	Minor diameter	Pitch diameter Plus tolerance gage	Pitch diameter Minus tolerance gage	Minor diameter		Semi-finished	Unfinished hot-rolled material	Major diameter	Pitch diameter	Major diameter	Pitch diameter Minus tolerance gage	Pitch diameter Plus tolerance gage					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
.8125-12	UN	2A	0.7567	0.7206	0.7512	0.7512	0.7332	0.8108	0.7994	--------	0.8125	0.7584	0.8017	0.7656	0.7656	0.7220	0.7400	2B	UN	.8125-12
			.7564	.7200	.7515	.7509	.7338	.8107	.7995	--------	.8131	.7587	.8011	.7653	.7659	.7221	.7399			
		3A	.7584	.7223	.7543	.7543	.7363	.8125	.8011	--------	.8125	.7584	.7999	.7638	.7638	.7220	.7329	3B		
			.7581	.7217	.7546	.7540	.7369	.8124	.8012	--------	.8131	.7587	.7993	.7635	.7641	.7221	.7328			
.8125-16	UN	2A	.7704	.7433	.7655	.7655	.7520	.8110	.8016	--------	.8125	.7719	.8053	.7782	.7782	.7450	.7590	2B	UN	.8125-16
			.7701	.7427	.7658	.7652	.7526	.8109	.8017	--------	.8131	.7722	.8047	.7779	.7785	.7451	.7589			
		3A	.7719	.7448	.7683	.7683	.7548	.8125	.8031	--------	.8125	.7719	.8037	.7766	.7766	.7450	.7533	3B		
			.7716	.7442	.7686	.7680	.7554	.8124	.8032	--------	.8131	.7722	.8031	.7763	.7769	.7451	.7532			
.8125-20	UNEF	2A	.7787	.7570	.7743	.7743	.7635	.8112	.8031	--------	.8125	.7800	.8074	.7857	.7857	.7580	.7700	2B	UNEF	.8125-20
			.7784	.7565	.7746	.7740	.7640	.8111	.8032	--------	.8130	.7803	.8069	.7854	.7860	.7581	.7699			
		3A	.7800	.7583	.7767	.7767	.7659	.8125	.8044	--------	.8125	.7800	.8060	.7843	.7843	.7580	.7662	3B		
			.7797	.7578	.7770	.7764	.7664	.8124	.8045	--------	.8130	.7803	.8055	.7840	.7846	.7581	.7661			
.8125-28	UN	2A	.7881	.7726	.7843	.7843	.7766	.8113	.8048	--------	.8125	.7893	.8098	.7943	.7943	.7740	.7820	2B	UN	.8125-28
			.7878	.7721	.7846	.7840	.7771	.8112	.8049	--------	.8130	.7896	.8093	.7940	.7946	.7741	.7819			
		3A	.7893	.7738	.7864	.7864	.7787	.8125	.8060	--------	.8125	.7893	.8085	.7930	.7930	.7740	.7801	3B		
			.7890	.7733	.7867	.7861	.7792	.8124	.8061	--------	.8130	.7896	.8080	.7927	.7933	.7741	.7800			
.8125-32	UN	2A	.7911	.7776	.7875	.7875	.7807	.8114	.8054	--------	.8125	.7922	.8104	.7969	.7969	.7790	.7860	2B	UN	.8125-32
			.7908	.7771	.7878	.7872	.7812	.8113	.8055	--------	.8130	.7925	.8099	.7966	.7972	.7791	.7859			
		3A	.7922	.7787	.7895	.7895	.7827	.8125	.8065	--------	.8125	.7922	.8093	.7958	.7958	.7790	.7844	3B		
			.7919	.7782	.7898	.7892	.7832	.8124	.8066	--------	.8130	.7925	.8088	.7955	.7961	.7791	.7843			
.875-9	UNC	1A	.8009	.7528	.7914	.7914	.7673	.87310	.85230	--------	.8750	.8028	.8632	.8151	.8151	.75500	.77800	1B	UNC	.875-9
			.8006	.7521	.7917	.7911	.7680	.87298	.85242	--------	.8757	.8031	.8625	.8148	.8154	.75512	.77788			
		2A	.8009	.7528	.7946	.7946	.7705	.87310	.85920	0.85230	.8750	.8028	.8591	.8110	.8110	.75500	.77800	2B		
			.8006	.7521	.7949	.7943	.7712	.87298	.85932	.85242	.8757	.8031	.8584	.8107	.8113	.75512	.77788			
		3A	.8028	.7547	.7981	.7981	.7740	.87500	.86110	--------	.8750	.8028	.8570	.8089	.8089	.75500	.76810	3B		
			.8025	.7540	.7984	.7978	.7747	.87488	.86122	--------	.8757	.8031	.8563	.8086	.8092	.75512	.76798			
.875-12	UN	2A	.8192	.7831	.8137	.8137	.7957	.87330	.86190	--------	.8750	.8209	.8642	.8281	.8281	.78500	.80300	2B	UN	.875-12
			.8189	.7825	.8140	.8134	.7963	.87318	.86202	--------	.8756	.8212	.8636	.8278	.8284	.78512	.80288			
		3A	.8209	.7848	.8168	.8168	.7988	.87500	.86360	--------	.8750	.8209	.8624	.8263	.8263	.78500	.79520	3B		
			.8206	.7842	.8171	.8165	.7994	.87488	.86372	--------	.8756	.8212	.8618	.8260	.8266	.78512	.79508			
.875-14	UNF	1A	.8270	.7961	.8189	.8189	.8034	.87340	.85790	--------	.8750	.8286	.8701	.8392	.8392	.79800	.81400	1B	UNF	.875-14
			.8267	.7955	.8192	.8186	.8040	.87328	.85802	--------	.8756	.8289	.8695	.8389	.8395	.79812	.81388			
		2A	.8270	.7961	.8216	.8216	.8061	.87340	.86310	--------	.8750	.8286	.8665	.8356	.8356	.79800	.81400	2B		
			.8267	.7955	.8219	.8213	.8067	.87328	.86322	--------	.8756	.8289	.8659	.8353	.8359	.79812	.81388			
		3A	.8286	.7977	.8245	.8245	.8090	.87500	.86470	--------	.8750	.8286	.8648	.8339	.8339	.79800	.80680	3B		
			.8283	.7971	.8248	.8242	.8096	.87488	.86482	--------	.8756	.8289	.8642	.8336	.8342	.79812	.80668			
.875-16	UN	2A	.8329	.8058	.8280	.8280	.8145	.87350	.86410	--------	.8750	.8344	.8678	.8407	.8407	.80700	.82100	2B	UN	.875-16
			.8326	.8052	.8283	.8277	.8151	.87338	.86422	--------	.8756	.8347	.8672	.8404	.8410	.80712	.82088			
		3A	.8344	.8073	.8308	.8308	.8173	.87500	.86560	--------	.8750	.8344	.8662	.8391	.8391	.80700	.81580	3B		
			.8341	.8067	.8311	.8305	.8179	.87488	.86572	--------	.8756	.8347	.8656	.8388	.8394	.80712	.81568			
.875-20	UNEF	2A	.8412	.8195	.8368	.8368	.8260	.87370	.86560	--------	.8750	.8425	.8699	.8482	.8482	.82100	.83200	2B	UNEF	.875-20
			.8409	.8190	.8371	.8365	.8265	.87358	.86572	--------	.8755	.8428	.8694	.8479	.8485	.82112	.83188			
		3A	.8425	.8208	.8392	.8392	.8284	.87500	.86690	--------	.8750	.8425	.8685	.8468	.8468	.82100	.82870	3B		
			.8422	.8203	.8395	.8389	.8289	.87488	.86702	--------	.8755	.8428	.8680	.8465	.8471	.82112	.82858			

.875–28	UN	2A	.8506	.8351	.8468	.8468	.8391	.87380	.86730	---------	.8750	.8518	.8723	.8568	.8568	83600	.84500	2B	UN	.875–28
			.8503	.8346	.8471	.8465	.8396	.87368	.86742	---------	.8755	.8521	.8718	.8565	.8571	.83612	.84488			
		3A	.8518	.8363	.8489	.8489	.8412	.87500	.86850	---------	.8750	.8518	.8710	.8555	.8555	.83600	.84260	3B		
			.8515	.8358	.8492	.8486	.8417	.87488	.86862	---------	.8755	.8521	.8705	.8552	.8558	.83612	.84248			
.875–32	UN	2A	.8536	.8401	.8500	.8500	.8432	.87390	.86790	---------	.8750	.8547	.8729	.8594	.8594	.84100	.84900	2B	UN	.875–32
			.8533	.8396	.8503	.8497	.8437	.87378	.86802	---------	.8755	.8550	.8724	.8591	.8597	.84112	.84888			
		3A	.8547	.8412	.8520	.8520	.8452	.87500	.86900	---------	.8750	.8547	.8718	.8583	.8583	.84100	.84690	3B		
			.8544	.8407	.8523	.8517	.8457	.87488	.86912	---------	.8755	.8550	.8713	.8580	.8586	.84112	.84678			
.9375–12	UN	2A	.8817	.8456	.8760	.8760	.8580	.93580	.92440	---------	.9375	.8834	.9269	.8908	.8908	.84700	.86500	2B	UN	.9375–12
			.8814	.8450	.8763	.8757	.8586	.93568	.92452	---------	.9381	.8837	.9263	.8905	.8911	.84712	.86488			
		3A	.8834	.8473	.8792	.8792	.8612	.93750	.92610	---------	.9375	.8834	.9250	.8889	.8889	.84700	.85750	3B		
			.8831	.8467	.8795	.8789	.8618	.93738	.92622	---------	.9381	.8837	.9244	.8886	.8892	.84712	.85738			
.9375–16	UN	2A	.8954	.8683	.8904	.8904	.8769	.93600	.92660	---------	.9375	.8969	.9305	.9034	.9034	.87000	.88400	2B	UN	.9375–16
			.8951	.8677	.8907	.8901	.8775	.93588	.92672	---------	.9381	.8972	.9299	.9031	.9037	.87012	.88388			
		3A	.8969	.8698	.8932	.8932	.8797	.93750	.92810	---------	.9375	.8969	.9289	.9018	.9018	.87000	.87830	3B		
			.8966	.8692	.8935	.8929	.8803	.93738	.92822	---------	.9381	.8972	.9283	.9015	.9021	.87012	.87818			
.9375–20	UNEF	2A	.9036	.8819	.8991	.8991	.8883	.93610	.92800	---------	.9375	.9050	.9326	.9109	.9109	.88300	.89500	2B	UNEF	.9375–20
			.9033	.8814	.8994	.8988	.8888	.93598	.92812	---------	.9380	.9053	.9321	.9106	.9112	.88312	.89488			
		3A	.9050	.8833	.9016	.9016	.8908	.93750	.92940	---------	.9375	.9050	.9311	.9094	.9094	.88300	.89120	3B		
			.9047	.8828	.9019	.9013	.8913	.93738	.92952	---------	.9380	.9053	.9306	.9091	.9097	.88312	.89108			
.9375–28	UN	2A	.9131	.8976	.9091	.9091	.9014	.93630	.92980	---------	.9375	.9143	.9350	.9195	.9195	.89900	.90700	2B	UN	.9375–28
			.9128	.8971	.9094	.9088	.9019	.93618	.92992	---------	.9380	.9146	.9315	.9192	.9198	.89912	.90688			
		3A	.9143	.8988	.9113	.9113	.9036	.93750	.93100	---------	.9375	.9143	.9337	.9182	.9182	.89900	.90510	3B		
			.9140	.8983	.9116	.9110	.9041	.93738	.93112	---------	.9380	.9146	.9332	.9179	.9185	.89912	.90498			
.9375–32	UN	2A	.9161	.9026	.9123	.9123	.9055	.93640	.93040	---------	.9375	.9172	.9356	.9221	.9221	.90400	.91100	2B	UN	.9375–32
			.9158	.9021	.9126	.9120	.9060	.93628	.93052	---------	.9380	.9175	.9351	.9218	.9224	.90412	.91088			
		3A	.9172	.9037	.9144	.9144	.9076	.93750	.93150	---------	.9375	.9172	.9344	.9209	.9209	.90400	.90940	3B		
			.9169	.9032	.9147	.9141	.9081	.93738	.93162	---------	.9380	.9175	.9339	.9206	.9212	.90412	.90928			
1.000–8	UNC	1A	.9168	.8627	.9067	.9067	.8796	.99800	.97550	---------	1.0000	.9188	.9861	.9320	.9320	.86500	.89000	1B	UNC	1.000–8
			.9164	.8620	.9071	.9063	.8803	.99788	.97562	---------	1.0007	.9192	.9854	.9316	.9324	.86512	.88988			
		2A	.9168	.8627	.9100	.9100	.8829	.99800	.98300	.97550	1.0000	.9188	.9817	.9276	.9276	.86500	.89000	2B		
			.9164	.8620	.9104	.9096	.8836	.99788	.98312	.97562	1.0007	.9192	.9810	.9272	.9280	.86512	.88988			
		3A	.9188	.8647	.9137	.9137	.8866	1.00000	.98500	---------	1.0000	.9188	.9795	.9254	.9254	.86500	.87970	3B		
			.9184	.8640	.9141	.9133	.8873	.99988	.98512	---------	1.0007	.9192	.9788	.9250	.9258	.86512	.87958			
1.000–12	UNF	1A	.9441	.9080	.9353	.9353	.9173	.99820	.98100	---------	1.0000	.9459	.9934	.9573	.9573	.91000	.92800	1B	UNF	1.000–12
			.9438	.9074	.9356	.9350	.9179	.99808	.98112	---------	1.0006	.9462	.9928	.9570	.9576	.91012	.92788			
		2A	.9441	.9080	.9382	.9382	.9202	.99820	.98680	---------	1.0000	.9459	.9896	.9535	.9535	.91000	.92800	2B		
			.9438	.9074	.9385	.9379	.9208	.99808	.98692	---------	1.0006	.9462	.9890	.9532	.9538	.91012	.92788			
		3A	.9459	.9098	.9415	.9415	.9235	1.00000	.98860	---------	1.0000	.9459	.9877	.9516	.9516	.91000	.91980	3B		
			.9456	.9092	.9418	.9412	.9241	.99988	.98872	---------	1.0006	.9462	.9871	.9513	.9519	.91012	.91968			
1.000–16	UN	2A	.9579	.9308	.9529	.9529	.9394	.99850	.98910	---------	1.0000	.9594	.9930	.9659	.9659	.93200	.94600	2B	UN	1.000–16
			.9576	.9302	.9532	.9526	.9400	.99838	.98922	---------	1.0006	.9597	.9924	.9656	.9662	.93212	.94588			
		3A	.9594	.9323	.9557	.9557	.9422	1.00000	.99060	---------	1.0000	.9594	.9914	.9643	.9643	.93200	.94080	3B		
			.9591	.9317	.9560	.9554	.9428	.99988	.99072	---------	1.0006	.9597	.9908	.9640	.9646	.93212	.94068			
1.000–20	UNEF	2A	.9661	.9444	.9616	.9616	.9508	.99860	.99050	---------	1.0000	.9675	.9951	.9734	.9734	.94600	.95700	2B	UNEF	1.000–20
			.9658	.9439	.9619	.9613	.9513	.99848	.99062	---------	1.0005	.9678	.9946	.9731	.9737	.94612	.95688			
		3A	.9675	.9458	.9641	.9641	.9533	1.00000	.99190	---------	1.0000	.9675	.9936	.9719	.9719	.94600	.95370	3B		
			.9672	.9453	.9644	.9638	.9538	.99988	.99202	---------	1.0005	.9678	.9931	.9716	.9722	.94612	.95358			
1.000–28	UN	2A	.9756	.9601	.9716	.9716	.9639	.99880	.99230	---------	1.0000	.9768	.9975	.9820	.9820	.96100	.97000	2B	UN	1.000–28
			.9753	.9596	.9719	.9713	.9644	.99868	.99242	---------	1.0005	.9771	.9970	.9817	.9823	.96112	.96988			
		3A	.9768	.9613	.9738	.9738	.9661	1.00000	.99350	---------	1.0000	.9768	.9962	.9807	.9807	.96100	.96760	3B		
			.9765	.9608	.9741	.9735	.9666	.99988	.99362	---------	1.0005	.9771	.9957	.9804	.9810	.96112	.96748			
1.000–32	UN	2A	.9786	.9651	.9748	.9748	.9680	.99890	.99290	---------	1.0000	.9797	.9981	.9846	.9846	.96600	.97400	2B	UN	1.000–32
			.9783	.9646	.9751	.9745	.9685	.99878	.99302	---------	1.0005	.9800	.9976	.9843	.9849	.96612	.97388			
		3A	.9797	.9662	.9769	.9769	.9701	1.00000	.99400	---------	1.0000	.9797	.9969	.9834	.9834	.96600	.97190	3B		
			.9794	.9657	.9772	.9766	.9706	.99988	.99412	---------	1.0005	.9800	.9964	.9831	.9837	.96612	.97178			
1.0625–8	UN	2A	.9793	.9252	.9725	.9725	.9454	1.06050	1.04550	---------	1.0625	.9813	1.0443	.9902	.9902	.92700	.95200	2B	UN	1.0625–8
			.9789	.9245	.9729	.9721	.9461	1.06038	1.04562	---------	1.0632	.9817	1.0436	.9898	.9906	.92712	.95188			
		3A	.9813	.9272	.9762	.9762	.9491	1.06250	1.04750	---------	1.0625	.9813	1.0421	.9880	.9880	.92700	.94220	3B		
			.9809	.9265	.9766	.9758	.9498	1.06238	1.04762	---------	1.0632	.9817	1.0414	.9876	.9884	.92712	.94208			
1.0625–12	UN	2A	1.0067	.9706	1.0010	1.0010	.9830	1.06080	1.04940	---------	1.0625	1.0084	1.0519	1.0158	1.0158	.97200	.99000	2B	UN	1.0625–12
			1.0064	.9700	1.0013	1.0007	.9836	1.06068	1.04952	---------	1.0631	1.0087	1.0513	1.0155	1.0161	.97212	.98988			
		3A	1.0084	.9723	1.0042	1.0042	.9862	1.06250	1.05110	---------	1.0625	1.0084	1.0500	1.0139	1.0139	.97200	.98230	3B		
			1.0081	.9717	1.0045	1.0039	.9868	1.06238	1.05122	---------	1.0631	1.0087	1.0494	1.0136	1.0142	.97212	.98218			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	X thread ring gages: GO: Minor diameter	X thread ring gages: LO: Pitch diameter: Plus tolerance gage	X thread ring gages: LO: Pitch diameter: Minus tolerance gage	X thread ring gages: LO: Minor diameter	Z plain ring gages for major diameter: GO	Z plain ring gages for major diameter: NOT GO: Semi-finished	Z plain ring gages for major diameter: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	X thread plug gages: GO: Pitch diameter	X thread plug gages: HI: Major diameter	X thread plug gages: HI: Pitch diameter: Minus tolerance gage	X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Z plain plug gages for minor diameter: GO	Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
1.6625–16	UN	2A	1.0204	.9933	1.0154	1.0154	1.0019	1.06100	1.05160	---	1.0625	1.0219	1.0555	1.0284	1.0284	.99500	1.00900	2B	UN	1.0625–16
			1.0201	.9927	1.0157	1.0151	1.0025	1.06088	1.05172	---	1.0631	1.0222	1.0549	1.0281	1.0287	.99512	1.00888			
		3A	1.0219	.9948	1.0182	1.0182	1.0047	1.06250	1.05310	---	1.0625	1.0219	1.0539	1.0268	1.0268	.99500	1.00330	3B		
			1.0216	.9942	1.0185	1.0179	1.0053	1.06238	1.05322	---	1.0631	1.0222	1.0533	1.0265	1.0271	.99512	1.00318			
1.0625–18	UNEF	2A	1.0250	1.0009	1.0203	1.0203	1.0083	1.06110	1.05240	---	1.0625	1.0264	1.0567	1.0326	1.0326	1.00200	1.01500	2B	UNEF	1.0625–18
			1.0247	1.0004	1.0206	1.0200	1.0088	1.06098	1.05252	---	1.0630	1.0267	1.0562	1.0323	1.0329	1.00212	1.01488			
		3A	1.0264	1.0023	1.0228	1.0228	1.0108	1.06250	1.05380	---	1.0625	1.0264	1.0551	1.0310	1.0310	1.00200	1.01050	3B		
			1.0261	1.0018	1.0231	1.0225	1.0113	1.06238	1.05392	---	1.0630	1.0267	1.0546	1.0307	1.0313	1.00212	1.01038			
1.0625–20	UN	2A	1.0286	1.0069	1.0241	1.0241	1.0133	1.06110	1.05300	---	1.0625	1.0300	1.0576	1.0359	1.0359	1.00800	1.02000	2B	UN	1.0625–20
			1.0283	1.0064	1.0244	1.0238	1.0138	1.06098	1.05312	---	1.0630	1.0303	1.0571	1.0356	1.0362	1.00812	1.01988			
		3A	1.0300	1.0083	1.0266	1.0266	1.0158	1.06250	1.05440	---	1.0625	1.0300	1.0561	1.0344	1.0344	1.00800	1.01620	3B		
			1.0297	1.0078	1.0269	1.0263	1.0163	1.06238	1.05452	---	1.0630	1.0303	1.0556	1.0341	1.0347	1.00812	1.01608			
1.0625–28	UN	2A	1.0381	1.0226	1.0341	1.0341	1.0264	1.06130	1.05480	---	1.0625	1.0393	1.0600	1.0445	1.0445	1.02400	1.03200	2B	UN	1.0625–28
			1.0378	1.0221	1.0344	1.0338	1.0269	1.06118	1.05492	---	1.0630	1.0396	1.0595	1.0442	1.0448	1.02412	1.03188			
		3A	1.0393	1.0238	1.0363	1.0363	1.0286	1.06250	1.05600	---	1.0625	1.0393	1.0587	1.0432	1.0432	1.02400	1.03010	3B		
			1.0390	1.0233	1.0366	1.0360	1.0291	1.06238	1.05612	---	1.0630	1.0396	1.0582	1.0429	1.0435	1.02412	1.02998			
1.125–7	UNC	1A	1.0300	.9681	1.0191	1.0191	.9882	1.12280	1.09820	---	1.1250	1.0322	1.1082	1.0463	1.0463	.97000	.99800	1B	UNC	1.125–7
			1.0296	.9674	1.0195	1.0187	.9889	1.12268	1.09832	---	1.1257	1.0326	1.1075	1.0459	1.0467	.97012	.99788			
		2A	1.0300	.9681	1.0228	1.0228	.9919	1.12280	1.10640	1.09820	1.1250	1.0322	1.1035	1.0416	1.0416	.97000	.99800	2B		
			1.0296	.9674	1.0232	1.0224	.9926	1.12268	1.10652	1.09832	1.1257	1.0326	1.1028	1.0412	1.0420	.97012	.99788			
		3A	1.0322	.9703	1.0268	1.0268	.9959	1.12500	1.10860	---	1.1250	1.0322	1.1012	1.0393	1.0393	.97000	.98750	3B		
			1.0318	.9696	1.0272	1.0264	.9966	1.12488	1.10872	---	1.1257	1.0326	1.1005	1.0389	1.0397	.97012	.98738			
1.125–8	UN	2A	1.0417	.9876	1.0348	1.0348	1.0077	1.12290	1.10790	1.10040	1.1250	1.0438	1.1069	1.0528	1.0528	.99000	1.01500	2B	UN	1.125–8
			1.0413	.9869	1.0352	1.0344	1.0084	1.12278	1.10802	1.10052	1.1257	1.0442	1.1062	1.0524	1.0532	.99012	1.01488			
		3A	1.0438	.9897	1.0386	1.0386	1.0115	1.12500	1.11000	---	1.1250	1.0438	1.1046	1.0505	1.0505	.99000	1.00470	3B		
			1.0434	.9890	1.0390	1.0382	1.0122	1.12488	1.11012	---	1.1257	1.0442	1.1039	1.0501	1.0509	.99012	1.00458			
1.125–12	UNF	1A	1.0691	1.0330	1.0601	1.0601	1.0421	1.12320	1.10600	---	1.1250	1.0709	1.1187	1.0826	1.0826	1.03500	1.05300	1B	UNF	1.125–12
			1.0688	1.0324	1.0604	1.0598	1.0427	1.12308	1.10612	---	1.1256	1.0712	1.1181	1.0823	1.0829	1.03512	1.05288			
		2A	1.0691	1.0330	1.0631	1.0631	1.0451	1.12320	1.11180	---	1.1250	1.0709	1.1148	1.0787	1.0787	1.03500	1.05300	2B		
			1.0688	1.0324	1.0634	1.0628	1.0457	1.12308	1.11192	---	1.1256	1.0712	1.1142	1.0784	1.0790	1.03512	1.05288			
		3A	1.0709	1.0348	1.0664	1.0664	1.0484	1.12500	1.11360	---	1.1250	1.0709	1.1129	1.0768	1.0768	1.03500	1.04480	3B		
			1.0706	1.0342	1.0667	1.0661	1.0490	1.12488	1.11372	---	1.1256	1.0712	1.1123	1.0765	1.0771	1.03512	1.04468			
1.125–16	UN	2A	1.0829	1.0558	1.0779	1.0779	1.0644	1.12350	1.11410	---	1.1250	1.0844	1.1180	1.0909	1.0909	1.05700	1.07100	2B	UN	1.125–16
			1.0826	1.0552	1.0782	1.0776	1.0650	1.12338	1.11422	---	1.1256	1.0847	1.1174	1.0906	1.0912	1.05712	1.07088			
		3A	1.0844	1.0573	1.0807	1.0807	1.0672	1.12500	1.11560	---	1.1250	1.0844	1.1164	1.0893	1.0893	1.05700	1.06580	3B		
			1.0841	1.0567	1.0810	1.0804	1.0678	1.12488	1.11572	---	1.1256	1.0847	1.1158	1.0890	1.0896	1.05712	1.06568			
1.125–18	UNEF	2A	1.0875	1.0634	1.0828	1.0828	1.0708	1.12360	1.11490	---	1.1250	1.0889	1.1192	1.0951	1.0951	1.06500	1.07800	2B	UNEF	1.125–18
			1.0872	1.0629	1.0831	1.0825	1.0713	1.12348	1.11502	---	1.1255	1.0892	1.1187	1.0948	1.0954	1.06512	1.07788			
		3A	1.0889	1.0648	1.0853	1.0853	1.0733	1.12500	1.11630	---	1.1250	1.0889	1.1176	1.0935	1.0935	1.06500	1.07300	3B		
			1.0886	1.0643	1.0856	1.0850	1.0738	1.12488	1.11642	---	1.1255	1.0892	1.1171	1.0932	1.0938	1.06512	1.07288			
1.125–20	UN	2A	1.0911	1.0694	1.0866	1.0866	1.0758	1.12360	1.11550	---	1.1250	1.0925	1.1201	1.0984	1.0984	1.07100	1.08200	2B	UN	1.125–20
			1.0908	1.0689	1.0869	1.0863	1.0763	1.12348	1.11562	---	1.1255	1.0928	1 1196	1.0981	1.0987	1.07112	1.08188			
		3A	1.0925	1.0708	1.0891	1.0891	1.0783	1.12500	1.11690	---	1.1250	1.0925	1.1186	1.0969	1.0969	1.07100	1.07870	3B		
			1.0922	1.0703	1.0894	1.0888	1.0788	1.12488	1.11702	---	1.1255	1.0928	1.1181	1.0966	1.0972	1.07112	1.07858			

1.125-28	UN	2A	1.1006	1.0851	1.0966	1.0966	1.0889	1.12380	1.11730	---------	1.1250	1.1018	1.1225	1.1070	1.1070	1.08600	1.09500	2B	UN	1.125-28
			1.1003	1.0846	1.0969	1.0963	1.0894	1.12368	1.11742	---------	1.1255	1.1021	1.1220	1.1067	1.1073	1.08612	1.09488			
		3A	1.1018	1.0863	1.0988	1.0988	1.0911	1.12500	1.11850	---------	1.1250	1.1018	1.1212	1.1057	1.1057	1.08600	1.09260	3B		
			1.1015	1.0858	1.0991	1.0985	1.0916	1.12488	1.11862	---------	1.1255	1.1021	1.1207	1.1054	1.1060	1.08612	1.09248			
1.1875-8	UN	2A	1.1042	1.0501	1.0972	1.0972	1.0701	1.18540	1.17040	---------	1.1875	1.1063	1.1695	1.1154	1.1154	1.05200	1.07700	2B	UN	1.1875-8
			1.1038	1.0494	1.0976	1.0968	1.0708	1.18528	1.17052	---------	1.1882	1.1067	1.1688	1.1150	1.1158	1.05212	1.07688			
		3A	1.1063	1.0522	1.1011	1.1011	1.0740	1.18750	1.17250	---------	1.1875	1.1063	1.1672	1.1131	1.1131	1.05200	1.06720	3B		
			1.1059	1.0515	1.1015	1.1007	1.0747	1.18738	1.17262	---------	1.1882	1.1067	1.1665	1.1127	1.1135	1.05212	1.06708			
1.1875-12	UN	2A	1.1317	1.0956	1.1259	1.1259	1.1079	1.18580	1.17440	---------	1.1875	1.1334	1.1770	1.1409	1.1409	1.09700	1.11500	2B	UN	1.1875-12
			1.1314	1.0950	1.1262	1.1256	1.1085	1.18568	1.17452	---------	1.1881	1.1337	1.1764	1.1406	1.1412	1.09712	1.11488			
		3A	1.1334	1.0973	1.1291	1.1291	1.1111	1.18750	1.17610	---------	1.1875	1.1334	1.1751	1.1390	1.1390	1.09700	1.10730	3B		
			1.1331	1.0967	1.1294	1.1288	1.1117	1.18738	1.17622	---------	1.1881	1.1337	1.1745	1.1387	1.1393	1.09712	1.10718			
1.1875-16	UN	2A	1.1454	1.1183	1.1403	1.1403	1.1268	1.18600	1.17660	---------	1.1875	1.1469	1.1806	1.1535	1.1535	1.12000	1.13400	2B	UN	1.1875-16
			1.1451	1.1177	1.1406	1.1400	1.1274	1.18588	1.17672	---------	1.1881	1.1472	1.1800	1.1532	1.1538	1.12012	1.13388			
		3A	1.1469	1.1198	1.1431	1.1431	1.1296	1.18750	1.17810	---------	1.1875	1.1469	1.1790	1.1519	1.1519	1.12000	1.12830	3B		
			1.1466	1.1192	1.1434	1.1428	1.1302	1.18738	1.17822	---------	1.1881	1.1472	1.1784	1.1516	1.1522	1.12012	1.12818			
1.1875-18	UNEF	2A	1.1499	1.1258	1.1450	1.1450	1.1330	1.18600	1.17730	---------	1.1875	1.1514	1.1818	1.1577	1.1577	1.12700	1.14000	2B	UNEF	1.1875-18
			1.1496	1.1253	1.1453	1.1447	1.1335	1.18588	1.17742	---------	1.1880	1.1517	1.1813	1.1574	1.1580	1.12712	1.13988			
		3A	1.1514	1.1273	1.1478	1.1478	1.1358	1.18750	1.17880	---------	1.1875	1.1514	1.1802	1.1561	1.1561	1.12700	1.13550	3B		
			1.1511	1.1268	1.1481	1.1475	1.1363	1.18738	1.17892	---------	1.1880	1.1517	1.1797	1.1558	1.1564	1.12712	1.13538			
1.1875-20	UN	2A	1.1536	1.1319	1.1489	1.1489	1.1381	1.18610	1.17800	---------	1.1875	1.1550	1.1828	1.1611	1.1611	1.13300	1.14500	2B	UN	1.1875-20
			1.1533	1.1314	1.1492	1.1486	1.1386	1.18598	1.17812	---------	1.1880	1.1553	1.1823	1.1608	1.1614	1.13312	1.14488			
		3A	1.1550	1.1333	1.1515	1.1515	1.1407	1.18750	1.17940	---------	1.1875	1.1550	1.1812	1.1595	1.1595	1.13300	1.14120	3B		
			1.1547	1.1328	1.1518	1.1512	1.1412	1.18738	1.17952	---------	1.1880	1.1553	1.1807	1.1592	1.1598	1.13312	1.14108			
1.1875-28	UN	2A	1.1631	1.1476	1.1590	1.1590	1.1513	1.18630	1.17980	---------	1.1875	1.1643	1.1851	1.1696	1.1696	1.14900	1.15700	2B	UN	1.1875-28
			1.1628	1.1471	1.1593	1.1587	1.1518	1.18618	1.17992	---------	1.1880	1.1646	1.1846	1.1693	1.1699	1.14912	1.15688			
		3A	1.1643	1.1488	1.1612	1.1612	1.1535	1.18750	1.18100	---------	1.1875	1.1643	1.1838	1.1683	1.1683	1.14900	1.15510	3B		
			1.1640	1.1483	1.1615	1.1609	1.1540	1.18738	1.18112	---------	1.1880	1.1646	1.1833	1.1680	1.1686	1.14912	1.15498			
1.250-7	UNC	1A	1.1550	1.0931	1.1439	1.1439	1.1130	1.24780	1.22320	---------	1.2500	1.1572	1.2335	1.1716	1.1716	1.09500	1.12300	1B	UNC	1.250-7
			1.1546	1.0924	1.1443	1.1435	1.1137	1.24768	1.22332	---------	1.2507	1.1576	1.2328	1.1720	1.1720	1.09512	1.12288			
		2A	1.1550	1.0931	1.1476	1.1476	1.1167	1.24780	1.23140	1.22320	1.2500	1.1572	1.2287	1.1668	1.1668	1.09500	1.12300	2B		
			1.1546	1.0924	1.1480	1.1472	1.1174	1.24768	1.23152	1.22332	1.2507	1.1576	1.2280	1.1664	1.1672	1.09512	1.12288			
		3A	1.1572	1.0953	1.1517	1.1517	1.1208	1.25000	1.23360	---------	1.2500	1.1572	1.2263	1.1644	1.1644	1.09500	1.11250	3B		
			1.1568	1.0946	1.1521	1.1513	1.1215	1.24988	1.23372	---------	1.2507	1.1576	1.2256	1.1640	1.1648	1.09512	1.11238			
2.250-8	UN	2A	1.1667	1.1126	1.1597	1.1597	1.1326	1.24790	1.23290	1.22540	1.2500	1.1688	1.2321	1.1780	1.1780	1.11500	1.14000	2B	UN	1.250-8
			1.1663	1.1119	1.1601	1.1593	1.1333	1.24778	1.23302	1.22552	1.2507	1.1692	1.2314	1.1776	1.1784	1.11512	1.13988			
		3A	1.1688	1.1147	1.1635	1.1635	1.1364	1.25000	1.23500	---------	1.2500	1.1688	1.2298	1.1757	1.1757	1.11500	1.12970	3B		
			1.1684	1.1140	1.1639	1.1631	1.1371	1.24988	1.23512	---------	1.2507	1.1692	1.2291	1.1753	1.1761	1.11512	1.12958			
1.250-12	UNF	1A	1.1941	1.1580	1.1849	1.1849	1.1669	1.24820	1.23100	---------	1.2500	1.1959	1.2440	1.2079	1.2079	1.16000	1.17800	1B	UNF	1.250-12
			1.1938	1.1574	1.1852	1.1846	1.1675	1.24808	1.23112	---------	1.2506	1.1962	1.2434	1.2076	1.2082	1.16012	1.17788			
		2A	1.1941	1.1580	1.1879	1.1879	1.1699	1.24820	1.23680	---------	1.2500	1.1959	1.2400	1.2039	1.2039	1.16000	1.17800	2B		
			1.1938	1.1574	1.1882	1.1876	1.1705	1.24808	1.23692	---------	1.2506	1.1962	1.2394	1.2036	1.2042	1.16012	1.17788			
		3A	1.1959	1.1598	1.1913	1.1913	1.1733	1.25000	1.23860	---------	1.2500	1.1959	1.2380	1.2019	1.2019	1.16000	1.16980	3B		
			1.1956	1.1592	1.1916	1.1910	1.1739	1.24988	1.23872	---------	1.2506	1.1962	1.2374	1.2016	1.2022	1.16012	1.16968			
1.250-16	UN	2A	1.2079	1.1808	1.2028	1.2028	1.1893	1.24850	1.23910	---------	1.2500	1.2094	1.2431	1.2160	1.2160	1.18200	1.19600	2B	UN	1.250-16
			1.2076	1.1802	1.2031	1.2025	1.1899	1.24838	1.23922	---------	1.2506	1.2097	1.2425	1.2157	1.2163	1.18212	1.19588			
		3A	1.2094	1.1823	1.2056	1.2056	1.1921	1.25000	1.24060	---------	1.2500	1.2094	1.2415	1.2144	1.2144	1.18200	1.19080	3B		
			1.2091	1.1817	1.2059	1.2053	1.1927	1.24988	1.24072	---------	1.2506	1.2097	1.2409	1.2141	1.2147	1.18212	1.19068			
1.250-18	UNEF	2A	1.2124	1.1883	1.2075	1.2075	1.1955	1.24850	1.23980	---------	1.2500	1.2139	1.2443	1.2202	1.2202	1.19000	1.20300	2B	UNEF	1.250-18
			1.2121	1.1878	1.2078	1.2072	1.1960	1.24838	1.23992	---------	1.2505	1.2142	1.2438	1.2199	1.2205	1.19012	1.20288			
		3A	1.2139	1.1898	1.2103	1.2103	1.1983	1.25000	1.24130	---------	1.2500	1.2139	1.2427	1.2186	1.2186	1.19000	1.19800	3B		
			1.2136	1.1893	1.2106	1.2100	1.1988	1.24988	1.25142	---------	1.2505	1.2142	1.2422	1.2183	1.2189	1.19012	1.19788			
1.250-20	UN	2A	1.2161	1.1944	1.2114	1.2114	1.2006	1.24860	1.24050	---------	1.2500	1.2175	1.2453	1.2236	1.2236	1.19600	1.20700	2B	UN	1.250-20
			1.2158	1.1939	1.2117	1.2111	1.2011	1.24848	1.24062	---------	1.2505	1.2178	1.2448	1.2233	1.2239	1.19612	1.20688			
		3A	1.2175	1.1958	1.2140	1.2140	1.2032	1.25000	1.24190	---------	1.2500	1.2175	1.2437	1.2220	1.2220	1.19600	1.20370	3B		
			1.2172	1.1953	1.2143	1.2137	1.2037	1.24988	1.24202	---------	1.2505	1.2178	1.2432	1.2217	1.2223	1.19612	1.20358			
1.250-28	UN	2A	1.2256	1.2101	1.2215	1.2215	1.2138	1.24880	1.24230	---------	1.2500	1.2268	1.2476	1.2321	1.2321	1.21100	1.22000	2B	UN	1.250-28
			1.2253	1.2096	1.2218	1.2212	1.2143	1.24868	1.24242	---------	1.2505	1.2271	1.2471	1.2318	1.2324	1.21112	1.21988			
		3A	1.2268	1.2113	1.2237	1.2237	1.2160	1.25000	1.24350	---------	1.2500	1.2268	1.2463	1.2308	1.2308	1.21100	1.21760	3B		
			1.2265	1.2108	1.2240	1.2234	1.2165	1.24988	1.24362	---------	1.2505	1.2271	1.2458	1.2305	1.2311	1.21112	1.21748			
1.3125-8	UN	2A	1.2292	1.1751	1.2221	1.2221	1.1950	1.31040	1.29540	---------	1.3125	1.2313	1.2946	1.2405	1.2405	1.17700	1.20200	2B	UN	1.3125-8
			1.2288	1.1744	1.2225	1.2217	1.1957	1.31028	1.29552	---------	1.3132	1.2317	1.2939	1.2401	1.2409	1.17712	1.20188			
		3A	1.2313	1.1772	1.2260	1.2260	1.1989	1.31250	1.29750	---------	1.3125	1.2313	1.2923	1.2382	1.2382	1.17700	1.19220	3B		
			1.2309	1.1765	1.2264	1.2256	1.1996	1.31238	1.29762	---------	1.3132	1.2317	1.2916	1.2378	1.2386	1.17712	1.19208			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	X thread ring gages: GO: Minor diameter	X thread ring gages: LO: Pitch diameter: Plus tolerance gage	X thread ring gages: LO: Pitch diameter: Minus tolerance gage	X thread ring gages: LO: Minor diameter	Z plain ring gages for major diameter: GO	Z plain ring gages for major diameter: NOT GO: Semi-finished	Z plain ring gages for major diameter: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	X thread plug gages: GO: Pitch diameter	X thread plug gages: HI: Major diameter	X thread plug gages: HI: Pitch diameter: Minus tolerance gage	X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Z plain plug gages for minor diameter: GO	Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
1.3125–12	UN	2A	1.2567	1.2206	1.2509	1.2509	1.2329	1.31080	1.29940	--------	1.3125	1.2584	1.3020	1.2659	1.2659	1.22200	1.24000	2B	UN	1.3125–12
			1.2564	1.2200	1.2512	1.2506	1.2335	1.31068	1.29952	--------	1.3131	1.2587	1.3014	1.2656	1.2662	1.22212	1.23988			
		3A	1.2584	1.2223	1.2541	1.2541	1.2361	1.31250	1.30110	--------	1.3125	1.2584	1.3001	1.2640	1.2640	1.22200	1.23230	3B		
			1.2581	1.2217	1.2544	1.2538	1.2367	1.31238	1.30122	--------	1.3131	1.2587	1.2995	1.2637	1.2643	1.22212	1.23218			
1.3125–16	UN	2A	1.2704	1.2433	1.2653	1.2653	1.2518	1.31100	1.30160	--------	1.3125	1.2719	1.3056	1.2785	1.2785	1.24500	1.25900	2B	UN	1.3125–16
			1.2701	1.2427	1.2656	1.2650	1.2524	1.31088	1.30172	--------	1.3131	1.2722	1.3050	1.2782	1.2788	1.24512	1.25888			
		3A	1.2719	1.2448	1.2681	1.2681	1.2546	1.31250	1.30310	--------	1.3125	1.2719	1.3040	1.2769	1.2769	1.24500	1.25330	3B		
			1.2716	1.2442	1.2684	1.2678	1.2552	1.31238	1.30322	--------	1.3131	1.2722	1.3034	1.2766	1.2772	1.24512	1.25318			
1.3125–18	UNEF	2A	1.2749	1.2508	1.2700	1.2700	1.2580	1.31100	1.30230	--------	1.3125	1.2764	1.3068	1.2827	1.2827	1.25200	1.26500	2B	UNEF	1.3125–18
			1.2746	1.2503	1.2703	1.2697	1.2585	1.31088	1.30242	--------	1.3130	1.2767	1.3063	1.2824	1.2830	1.25212	1.26488			
		3A	1.2764	1.2523	1.2728	1.2728	1.2608	1.31250	1.30380	--------	1.3125	1.2764	1.3052	1.2811	1.2811	1.25200	1.26050	3B		
			1.2761	1.2518	1.2731	1.2725	1.2613	1.31238	1.30392	--------	1.3130	1.2767	1.3047	1.2808	1.2814	1.25212	1.26038			
1.3125–20	UN	2A	1.2786	1.2569	1.2739	1.2739	1.2631	1.31110	1.30300	--------	1.3125	1.2800	1.3078	1.2861	1.2861	1.25800	1.27000	2B	UN	1.3125–20
			1.2783	1.2564	1.2742	1.2736	1.2636	1.31098	1.30312	--------	1.3130	1.2803	1.3073	1.2858	1.2864	1.25812	1.26988			
		3A	1.2800	1.2583	1.2765	1.2765	1.2657	1.31250	1.30440	--------	1.3125	1.2800	1.3062	1.2845	1.2845	1.25800	1.26620	3B		
			1.2797	1.2578	1.2768	1.2762	1.2662	1.31238	1.30452	--------	1.3130	1.2803	1.3057	1.2842	1.2848	1.25812	1.26608			
1.3125–28	UN	2A	1.2881	1.2726	1.2840	1.2840	1.2763	1.31130	1.30480	--------	1.3125	1.2893	1.3101	1.2946	1.2946	1.27400	1.28200	2B	UN	1.3125–28
			1.2878	1.2721	1.2843	1.2837	1.2768	1.31118	1.30492	--------	1.3130	1.2896	1.3096	1.2943	1.2949	1.27412	1.28188			
		3A	1.2893	1.2738	1.2862	1.2862	1.2785	1.31250	1.30600	--------	1.3125	1.2893	1.3088	1.2933	1.2933	1.27400	1.28010	3B		
			1.2890	1.2733	1.2865	1.2859	1.2790	1.31238	1.30612	--------	1.3130	1.2896	1.3083	1.2930	1.2936	1.27412	1.27998			
1.375–6	UNC	1A	1.2643	1.1921	1.2523	1.2523	1.2162	1.37260	1.34530	--------	1.3750	1.2667	1.3544	1.2822	1.2822	1.19500	1.22500	1B	UNC	1.375–6
			1.2639	1.1913	1.2527	1.2519	1.2170	1.37248	1.34542	--------	1.3758	1.2671	1.3536	1.2818	1.2826	1.19512	1.22488			
		2A	1.2643	1.1921	1.2563	1.2563	1.2202	1.37260	1.35440	1.34530	1.3750	1.2667	1.3493	1.2771	1.2771	1.19500	1.22500	2B		
			1.2639	1.1913	1.2567	1.2559	1.2210	1.37248	1.35452	1.34542	1.3758	1.2671	1.3485	1.2767	1.2775	1.19512	1.22488			
		3A	1.2667	1.1945	1.2607	1.2607	1.2246	1.37500	1.35680	--------	1.3750	1.2667	1.3467	1.2745	1.2745	1.19500	1.21460	3B		
			1.2663	1.1937	1.2611	1.2603	1.2254	1.37488	1.35692	--------	1.3758	1.2671	1.3459	1.2741	1.2749	1.19512	1.21448			
1.375–8	UN	2A	1.2916	1.2375	1.2844	1.2844	1.2573	1.37280	1.35780	1.35030	1.3750	1.2938	1.3572	1.3031	1.3031	1.24000	1.26500	2B	UN	1.375–8
			1.2912	1.2368	1.2848	1.2840	1.2580	1.37268	1.35792	1.35042	1.3757	1.2942	1.3565	1.3027	1.3035	1.24012	1.26488			
		3A	1.2938	1.2397	1.2884	1.2884	1.2613	1.37500	1.36000	--------	1.3750	1.2938	1.3549	1.3008	1.3008	1.24000	1.25470	3B		
			1.2934	1.2390	1.2888	1.2880	1.2620	1.37488	1.36012	--------	1.3757	1.2942	1.3542	1.3004	1.3012	1.24012	1.25458			
1.375–12	UNF	1A	1.3190	1.2829	1.3096	1.3096	1.2916	1.37310	1.35590	--------	1.3750	1.3209	1.3693	1.3332	1.3332	1.28500	1.30300	1B	UNF	1.375–12
			1.3187	1.2823	1.3099	1.3093	1.2922	1.37298	1.35602	--------	1.3756	1.3212	1.3687	1.3329	1.3335	1.28512	1.30288			
		2A	1.3190	1.2829	1.3127	1.3127	1.2947	1.37310	1.36170	--------	1.3750	1.3209	1.3652	1.3291	1.3291	1.28500	1.30300	2B		
			1.3187	1.2823	1.3130	1.3124	1.2953	1.37298	1.36182	--------	1.3756	1.3212	1.3646	1.3288	1.3294	1.28512	1.30288			
		3A	1.3209	1.2848	1.3162	1.3162	1.2982	1.37500	1.36360	--------	1.3750	1.3209	1.3631	1.3270	1.3270	1.28500	1.29480	3B		
			1.3206	1.2842	1.3165	1.3159	1.2988	1.37488	1.36372	--------	1.3756	1.3212	1.3625	1.3267	1.3273	1.28512	1.29468			
1.375–16	UN	2A	1.3329	1.3058	1.3278	1.3278	1.3143	1.37350	1.36410	--------	1.3750	1.3344	1.3681	1.3410	1.3410	1.30700	1.32100	2B	UN	1.375–16
			1.3326	1.3052	1.3281	1.3275	1.3149	1.37338	1.36422	--------	1.3756	1.3347	1.3675	1.3407	1.3413	1.30712	1.32088			
		3A	1.3344	1.3073	1.3306	1.3306	1.3171	1.37500	1.36560	--------	1.3750	1.3344	1.3665	1.3394	1.3394	1.30700	1.31580	3B		
			1.3341	1.3067	1.3309	1.3303	1.3177	1.37488	1.36572	--------	1.3756	1.3347	1.3659	1.3391	1.3397	1.30712	1.31568			
1.375–18	UNEF	2A	1.3374	1.3133	1.3325	1.3325	1.3205	1.37350	1.36480	--------	1.3750	1.3389	1.3693	1.3452	1.3452	1.31500	1.32800	2B	UNEF	1.375–18
			1.3371	1.3128	1.3328	1.3322	1.3210	1.37338	1.36492	--------	1.3755	1.3392	1.3688	1.3449	1.3455	1.31512	1.32788			
		3A	1.3389	1.3148	1.3353	1.3353	1.3233	1.37500	1.36630	--------	1.3750	1.3389	1.3677	1.3436	1.3436	1.31500	1.32300	3B		
			1.3386	1.3143	1.3356	1.3350	1.3238	1.37488	1.36642	--------	1.3755	1.3392	1.3672	1.3433	1.3439	1.31512	1.32288			

1.375-20	UN	2A	1.3411	1.3194	1.3364	1.3364	1.3256	1.37360	1.36550	---------	1.3750	1.3425	1.3703	1.3486	1.3486	1.32100	1.33200	2B	UN	1.375-20
			1.3408	1.3189	1.3367	1.3361	1.3261	1.37348	1.36562	---------	1.3755	1.3428	1.3698	1.3483	1.3489	1.32112	1.33188			
		3A	1.3425	1.3208	1.3390	1.3390	1.3282	1.37500	1.36690	---------	1.3750	1.3425	1.3687	1.3470	1.3470	1.32100	1.32870	3B		
			1.3422	1.3203	1.3393	1.3387	1.3287	1.37488	1.36702	---------	1.3755	1.3428	1.3682	1.3467	1.3473	1.32112	1.32858			
1.375-28	UN	2A	1.3506	1.3351	1.3465	1.3465	1.3388	1.37380	1.36730	---------	1.3750	1.3518	1.3726	1.3571	1.3571	1.33600	1.34500	2B	UN	1.375-28
			1.3503	1.3346	1.3468	1.3462	1.3393	1.37368	1.36742	---------	1.3755	1.3521	1.3721	1.3568	1.3574	1.33612	1.34488			
		3A	1.3518	1.3363	1.3487	1.3487	1.3410	1.37500	1.36850	---------	1.3750	1.3518	1.3713	1.3558	1.3558	1.33600	1.34260	3B		
			1.3515	1.3358	1.3490	1.3484	1.3415	1.37488	1.36862	---------	1.3755	1.3521	1.3708	1.3555	1.3561	1.33612	1.34248			
1.4375-6	UN	2A	1.3268	1.2546	1.3188	1.3188	1.2827	1.43510	1.41690	---------	1.4375	1.3292	1.4118	1.3396	1.3396	1.25700	1.28800	2B	UN	1.4375-6
			1.3264	1.2538	1.3192	1.3184	1.2835	1.43498	1.41702	---------	1.4383	1.3296	1.4110	1.3392	1.3400	1.25712	1.28788			
		3A	1.3292	1.2570	1.3232	1.3232	1.2871	1.43750	1.41930	---------	1.4375	1.3292	1.4092	1.3370	1.3370	1.25700	1.27710	3B		
			1.3288	1.2562	1.3236	1.3228	1.2879	1.43738	1.41942	---------	1.4383	1.3296	1.4084	1.3366	1.3374	1.25712	1.27698			
1.4375-8	UN	2A	1.3541	1.3000	1.3469	1.3469	1.3198	1.43530	1.42030	---------	1.4375	1.3563	1.4198	1.3657	1.3657	1.30200	1.32700	2B	UN	1.4375-8
			1.3537	1.2993	1.3473	1.3465	1.3205	1.43518	1.42042	---------	1.4382	1.3567	1.4191	1.3653	1.3661	1.30212	1.32688			
		3A	1.3563	1.3022	1.3509	1.3509	1.3238	1.43750	1.42250	---------	1.4375	1.3563	1.4175	1.3634	1.3634	1.30200	1.31720	3B		
			1.3559	1.3015	1.3513	1.3505	1.3245	1.43738	1.42262	---------	1.4382	1.3567	1.4168	1.3630	1.3638	1.30212	1.31708			
1.4375-12	UN	2A	1.3816	1.3455	1.3757	1.3757	1.3577	1.43570	1.42430	---------	1.4375	1.3834	1.4271	1.3910	1.3910	1.34700	1.36500	2B	UN	1.4375-12
			1.3813	1.3449	1.3760	1.3754	1.3583	1.43558	1.42442	---------	1.4381	1.3837	1.4265	1.3907	1.3913	1.34712	1.36488			
		3A	1.3834	1.3473	1.3790	1.3790	1.3610	1.43750	1.42610	---------	1.4375	1.3834	1.4252	1.3891	1.3891	1.34700	1.35730	3B		
			1.3831	1.3467	1.3793	1.3787	1.3616	1.43738	1.42622	---------	1.4381	1.3837	1.4246	1.3888	1.3894	1.34712	1.35718			
1.4375-16	UN	2A	1.3953	1.3682	1.3901	1.3901	1.3766	1.43590	1.42650	---------	1.4375	1.3969	1.4308	1.4037	1.4037	1.37000	1.38400	2B	UN	1.4375-16
			1.3950	1.3676	1.3904	1.3898	1.3772	1.43578	1.42662	---------	1.4381	1.3972	1.4302	1.4034	1.4040	1.37012	1.38388			
		3A	1.3969	1.3698	1.3930	1.3930	1.3795	1.43750	1.42810	---------	1.4375	1.3969	1.4291	1.4020	1.4020	1.37000	1.37830	3B		
			1.3966	1.3692	1.3933	1.3927	1.3801	1.43738	1.42822	---------	1.4381	1.3972	1.4285	1.4017	1.4023	1.37012	1.37818			
1.4375-18	UNEF	2A	1.3999	1.3758	1.3949	1.3949	1.3829	1.43600	1.42730	---------	1.4375	1.4014	1.4320	1.4079	1.4079	1.37700	1.39000	2B	UNEF	1.4375-18
			1.3996	1.3753	1.3952	1.3946	1.3834	1.43588	1.42742	---------	1.4380	1.4017	1.4315	1.4076	1.4082	1.37712	1.38988			
		3A	1.4014	1.3773	1.3977	1.3977	1.3857	1.43750	1.42880	---------	1.4375	1.4014	1.4303	1.4062	1.4062	1.37700	1.38550	3B		
			1.4011	1.3768	1.3980	1.3974	1.3862	1.43738	1.42892	---------	1.4380	1.4017	1.4298	1.4059	1.4065	1.37712	1.38538			
1.4375-20	UN	2A	1.4036	1.3819	1.3988	1.3988	1.3880	1.43610	1.42800	---------	1.4375	1.4050	1.4329	1.4112	1.4112	1.38300	1.39500	2B	UN	1.4375-20
			1.4033	1.3814	1.3991	1.3985	1.3885	1.43598	1.42812	---------	1.4380	1.4053	1.4324	1.4109	1.4115	1.38312	1.39488			
		3A	1.4050	1.3833	1.4014	1.4014	1.3906	1.43750	1.42940	---------	1.4375	1.4050	1.4313	1.4096	1.4096	1.38300	1.39120	3B		
			1.4047	1.3828	1.4017	1.4011	1.3911	1.43738	1.42952	---------	1.4380	1.4053	1.4308	1.4093	1.4099	1.38312	1.39108			
1.4375-28	UN	2A	1.4130	1.3975	1.4088	1.4088	1.4011	1.43620	1.42970	---------	1.4375	1.4143	1.4353	1.4198	1.4198	1.39900	1.40700	2B	UN	1.4375-28
			1.4127	1.3970	1.4091	1.4085	1.4016	1.43608	1.42982	---------	1.4380	1.4146	1.4348	1.4195	1.4201	1.39912	1.40688			
		3A	1.4143	1.3988	1.4112	1.4112	1.4035	1.43750	1.43100	---------	1.4375	1.4143	1.4339	1.4184	1.4184	1.39900	1.40510	3B		
			1.4140	1.3983	1.4115	1.4109	1.4040	1.43738	1.43112	---------	1.4380	1.4146	1.4334	1.4181	1.4187	1.39912	1.40498			
1.500-6	UNC	1A	1.3893	1.3171	1.3772	1.3772	1.3411	1.49760	1.47030	---------	1.5000	1.3917	1.4797	1.4075	1.4075	1.32000	1.35000	1B	UNC	1.500-6
			1.3889	1.3163	1.3776	1.3768	1.3419	1.49748	1.47042	---------	1.5008	1.3921	1.4789	1.4071	1.4079	1.32012	1.34988			
		2A	1.3893	1.3171	1.3812	1.3812	1.3451	1.49760	1.47940	1.47030	1.5000	1.3917	1.4744	1.4022	1.4022	1.32000	1.35000	2B		
			1.3889	1.3163	1.3816	1.3808	1.3459	1.49748	1.47952	1.47042	1.5008	1.3921	1.4736	1.4018	1.4026	1.32012	1.34988			
		3A	1.3917	1.3195	1.3856	1.3856	1.3495	1.50000	1.48180	---------	1.5000	1.3917	1.4718	1.3996	1.3996	1.32000	1.33960	3B		
			1.3913	1.3187	1.3860	1.3852	1.3503	1.49988	1.48192	---------	1.5008	1.3921	1.4710	1.3992	1.4000	1.32012	1.33948			
1.500-8	UN	2A	1.4166	1.3625	1.4093	1.4093	1.3822	1.49780	1.48280	1.47530	1.5000	1.4188	1.4824	1.4283	1.4283	1.36500	1.39000	2B	UN	1.500-8
			1.4162	1.3618	1.4097	1.4089	1.3829	1.49768	1.48292	1.47542	1.5007	1.4192	1.4817	1.4279	1.4287	1.36512	1.38988			
		3A	1.4188	1.3647	1.4133	1.4133	1.3862	1.50000	1.48500	---------	1.5000	1.4188	1.4800	1.4259	1.4259	1.36500	1.37970	3B		
			1.4184	1.3640	1.4137	1.4129	1.3869	1.49988	1.48512	---------	1.5007	1.4192	1.4793	1.4255	1.4263	1.36512	1.37958			
1.500-12	UNF	1A	1.4440	1.4079	1.4344	1.4344	1.4164	1.49810	1.48090	---------	1.5000	1.4459	1.4945	1.4584	1.4584	1.41000	1.42800	1B	UNF	1.500-12
			1.4437	1.4073	1.4347	1.4341	1.4170	1.49798	1.48102	---------	1.5006	1.4462	1.4939	1.4581	1.4587	1.41012	1.42788			
		2A	1.4440	1.4079	1.4376	1.4376	1.4196	1.49810	1.48670	---------	1.5000	1.4459	1.4903	1.4542	1.4542	1.41000	1.42800	2B		
			1.4437	1.4073	1.4379	1.4373	1.4202	1.49798	1.48682	---------	1.5006	1.4462	1.4897	1.4539	1.4545	1.41012	1.42788			
		3A	1.4459	1.4098	1.4411	1.4411	1.4231	1.50000	1.48860	---------	1.5000	1.4459	1.4883	1.4522	1.4522	1.41000	1.41980	3B		
			1.4456	1.4092	1.4414	1.4408	1.4237	1.49988	1.48872	---------	1.5006	1.4462	1.4877	1.4519	1.4525	1.41012	1.41968			
1.500-16	UN	2A	1.4578	1.4307	1.4526	1.4526	1.4391	1.49840	1.48900	---------	1.5000	1.4594	1.4933	1.4662	1.4662	1.43200	1.44600	2B	UN	1.500-16
			1.4575	1.4301	1.4529	1.4523	1.4397	1.49828	1.48912	---------	1.5006	1.4597	1.4927	1.4659	1.4665	1.43212	1.44588			
		3A	1.4594	1.4323	1.4555	1.4555	1.4420	1.50000	1.49060	---------	1.5000	1.4594	1.4916	1.4645	1.4645	1.43200	1.44080	3B		
			1.4591	1.4317	1.4558	1.4552	1.4426	1.49988	1.49072	---------	1.5006	1.4597	1.4910	1.4642	1.4648	1.43212	1.44068			
1.500-18	UNEF	2A	1.4624	1.4383	1.4574	1.4574	1.4454	1.49850	1.48980	---------	1.5000	1.4639	1.4945	1.4704	1.4704	1.44000	1.45200	2B	UNEF	1.500-18
			1.4621	1.4378	1.4577	1.4571	1.4459	1.49838	1.48992	---------	1.5005	1.4642	1.4940	1.4701	1.4707	1.44012	1.45188			
		3A	1.4639	1.4398	1.4602	1.4602	1.4482	1.50000	1.49130	---------	1.5000	1.4639	1.4928	1.4687	1.4687	1.44000	1.44800	3B		
			1.4636	1.4393	1.4605	1.4599	1.4487	1.49988	1.49142	---------	1.5005	1.4642	1.4923	1.4684	1.4690	1.44012	1.44788			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads								Gages for internal threads							Class	Series designation	Nominal size and threads per inch
			X thread ring gages					Z plain ring gages for major diameter			X thread plug gages					Z plain plug gages for minor diameter				
			GO		LO			GO	NOT GO		GO		HI			GO	NOT GO			
			Pitch diameter	Minor diameter	Pitch diameter: Plus tolerance gage	Pitch diameter: Minus tolerance gage	Minor diameter		Semi-finished	Unfinished hot-rolled material	Major diameter	Pitch diameter	Major diameter	Pitch diameter: Minus tolerance gage	Pitch diameter: Plus tolerance gage					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
1.500–20	UN	2A	1.4661	1.4444	1.4613	1.4613	1.4505	1.49860	1.49050	--------	1.5000	1.4675	1.4954	1.4737	1.4737	1.44600	1.45700	2B	UN	1.500–20
			1.4658	1.4439	1.4616	1.4610	1.4510	1.49848	1.49062	--------	1.5005	1.4678	1.4949	1.4734	1.4740	1.44612	1.45688			
		3A	1.4675	1.4458	1.4639	1.4639	1.4531	1.50000	1.49190	--------	1.5000	1.4675	1.4938	1.4721	1.4721	1.44600	1.45370	3B		
			1.4672	1.4453	1.4642	1.4636	1.4536	1.49988	1.49202	--------	1.5005	1.4678	1.4933	1.4718	1.4724	1.44612	1.45358			
1.500–28	UN	2A	1.4755	1.4600	1.4713	1.4713	1.4636	1.49870	1.49220	--------	1.5000	1.4768	1.4978	1.4823	1.4823	1.46100	1.47000	2B	UN	1.500–28
			1.4752	1.4595	1.4716	1.4710	1.4641	1.49858	1.49232	--------	1.5005	1.4771	1.4973	1.4820	1.4826	1.46112	1.46988			
		3A	1.4768	1.4613	1.4737	1.4737	1.4660	1.50000	1.49350	--------	1.5000	1.4768	1.4964	1.4809	1.4809	1.46100	1.46760	3B		
			1.4765	1.4608	1.4740	1.4734	1.4665	1.49988	1.49362	--------	1.5005	1.4771	1.4959	1.4806	1.4812	1.46112	1.46748			
1.5625–6	UN	2A	1.4518	1.3796	1.4436	1.4436	1.4075	1.56010	1.54190	--------	1.5625	1.4542	1.5370	1.4648	1.4648	1.38200	1.41300	2B	UN	1.5625–6
			1.4513	1.3788	1.4441	1.4431	1.4083	1.55994	1.54206	--------	1.5633	1.4547	1.5362	1.4643	1.4653	1.38216	1.41284			
		3A	1.4542	1.3820	1.4481	1.4481	1.4120	1.56250	1.54430	--------	1.5625	1.4542	1.5344	1.4622	1.4622	1.38200	1.40210	3B		
			1.4537	1.3812	1.4486	1.4476	1.4128	1.56234	1.54446	--------	1.5633	1.4547	1.5336	1.4617	1.4627	1.38216	1.40194			
1.5625–8	UN	2A	1.4791	1.4250	1.4717	1.4717	1.4446	1.56030	1.54530	--------	1.5625	1.4813	1.5450	1.4909	1.4909	1.42700	1.45200	2B	UN	1.5625–8
			1.4786	1.4243	1.4722	1.4712	1.4453	1.56014	1.54546	--------	1.5632	1.4818	1.5443	1.4904	1.4914	1.42716	1.45184			
		3A	1.4813	1.4272	1.4758	1.4758	1.4487	1.56250	1.54750	--------	1.5625	1.4813	1.5426	1.4885	1.4885	1.42700	1.44220	3B		
			1.4808	1.4265	1.4763	1.4753	1.4494	1.56234	1.54766	--------	1.5632	1.4818	1.5419	1.4880	1.4890	1.42716	1.44204			
1.5625–12	UN	2A	1.5066	1.4705	1.5007	1.5007	1.4827	1.56070	1.54930	--------	1.5625	1.5084	1.5521	1.5160	1.5160	1.47200	1.49000	2B	UN	1.5625–12
			1.5062	1.4699	1.5011	1.5003	1.4833	1.56054	1.54946	--------	1.5631	1.5088	1.5515	1.5156	1.5164	1.47216	1.48984			
		3A	1.5084	1.4723	1.5040	1.5040	1.4860	1.56250	1.55110	--------	1.5625	1.5084	1.5502	1.5141	1.5141	1.47200	1.48230	3B		
			1.5080	1.4717	1.5044	1.5036	1.4866	1.56234	1.55126	--------	1.5631	1.5088	1.5496	1.5137	1.5145	1.47216	1.48214			
1.5625–16	UN	2A	1.5203	1.4932	1.5151	1.5151	1.5016	1.56090	1.55150	--------	1.5625	1.5219	1.5558	1.5287	1.5287	1.49500	1.50900	2B	UN	1.5625–16
			1.5199	1.4926	1.5155	1.5147	1.5022	1.56074	1.55166	--------	1.5631	1.5223	1.5552	1.5283	1.5291	1.49516	1.50884			
		3A	1.5219	1.4948	1.5180	1.5180	1.5045	1.56250	1.55310	--------	1.5625	1.5219	1.5541	1.5270	1.5270	1.49500	1.50330	3B		
			1.5215	1.4942	1.5184	1.5176	1.5051	1.56234	1.55326	--------	1.5631	1.5223	1.5535	1.5266	1.5274	1.49516	1.50314			
1.5625–18	UNEF	2A	1.5249	1.5008	1.5199	1.5199	1.5079	1.56100	1.55230	--------	1.5625	1.5264	1.5570	1.5329	1.5329	1.50200	1.51500	2B	UNEF	1.5625–18
			1.5245	1.5003	1.5203	1.5195	1.5084	1.56084	1.55246	--------	1.5630	1.5268	1.5565	1.5325	1.5333	1.50216	1.51484			
		3A	1.5264	1.5023	1.5227	1.5227	1.5107	1.56250	1.55380	--------	1.5625	1.5264	1.5553	1.5312	1.5312	1.50200	1.51050	3B		
			1.5260	1.5018	1.5231	1.5223	1.5112	1.56234	1.55396	--------	1.5630	1.5268	1.5548	1.5308	1.5316	1.50216	1.51034			
1.5625–20	UN	2A	1.5286	1.5069	1.5238	1.5238	1.5130	1.56110	1.55300	--------	1.5625	1.5300	1.5579	1.5362	1.5362	1.50800	1.52000	2B	UN	1.5625–20
			1.5282	1.5064	1.5242	1.5234	1.5135	1.56094	1.55316	--------	1.5630	1.5304	1.5574	1.5358	1.5366	1.50816	1.51984			
		3A	1.5300	1.5083	1.5264	1.5264	1.5156	1.56250	1.55440	--------	1.5625	1.5300	1.5563	1.5346	1.5346	1.50800	1.51620	3B		
			1.5296	1.5078	1.5268	1.5260	1.5161	1.56234	1.55456	--------	1.5630	1.5304	1.5558	1.5342	1.5350	1.50816	1.51604			
1.625–6	UN	2A	1.5142	1.4420	1.5060	1.5060	1.4699	1.62250	1.60430	--------	1.6250	1.5167	1.5996	1.5274	1.5274	1.44500	1.47500	2B	UN	1.625–6
			1.5137	1.4412	1.5065	1.5055	1.4707	1.62234	1.60446	--------	1.6258	1.5172	1.5988	1.5269	1.5279	1.44516	1.47484			
		3A	1.5167	1.4445	1.5105	1.5105	1.4744	1.62500	1.60680	--------	1.6250	1.5167	1.5969	1.5247	1.5247	1.44500	1.46460	3B		
			1.5162	1.4437	1.5110	1.5100	1.4752	1.62484	1.60696	--------	1.6258	1.5172	1.5961	1.5242	1.5252	1.44516	1.46444			
1.625–8	UN	2A	1.5416	1.4875	1.5342	1.5342	1.5071	1.62280	1.60780	1.60030	1.6250	1.5438	1.6076	1.5535	1.5535	1.49000	1.51500	2B	UN	1.625–8
			1.5411	1.4868	1.5347	1.5337	1.5078	1.62264	1.60796	1.60046	1.6257	1.5443	1.6069	1.5530	1.5540	1.49016	1.51484			
		3A	1.5438	1.4897	1.5382	1.5382	1.5111	1.62500	1.61000	--------	1.6250	1.5438	1.6051	1.5510	1.5510	1.49000	1.50470	3B		
			1.5433	1.4890	1.5387	1.5377	1.5118	1.62484	1.61016	--------	1.6257	1.5443	1.6044	1.5505	1.5515	1.49016	1.50454			

1.625-12	UN	2A	1.5691	1.5330	1.5632	1.5632	1.5452	1.62320	1.61180	---------	1.6250	1.5709	1.6146	1.5785	1.5785	1.53500	1.55300	2B	UN	1.625-12
			1.5687	1.5324	1.5636	1.5628	1.5458	1.62304	1.61196	---------	1.6256	1.5713	1.6140	1.5781	1.5789	1.53516	1.55284			
		3A	1.5709	1.5348	1.5665	1.5665	1.5485	1.62500	1.61360	---------	1.6250	1.5709	1.6127	1.5766	1.5766	1.53500	1.54480	3B		
			1.5705	1.5342	1.5669	1.5661	1.5491	1.62484	1.61376	---------	1.6256	1.5713	1.6121	1.5762	1.5770	1.53516	1.54464			
1.625-16	UN	2A	1.5828	1.5557	1.5776	1.5776	1.5641	1.62340	1.61400	---------	1.6250	1.5844	1.6183	1.5912	1.5912	1.55700	1.57100	2B	UN	1.625-16
			1.5824	1.5551	1.5780	1.5772	1.5647	1.62324	1.61416	---------	1.6256	1.5848	1.6177	1.5908	1.5916	1.55716	1.57084			
		3A	1.5844	1.5573	1.5805	1.5805	1.5670	1.62500	1.61560	---------	1.6250	1.5844	1.6166	1.5895	1.5895	1.55700	1.56580	3B		
			1.5840	1.5567	1.5809	1.5801	1.5676	1.62484	1.61576	---------	1.6256	1.5848	1.6160	1.5891	1.5899	1.55716	1.56564			
1.625-18	UNEF	2A	1.5874	1.5633	1.5824	1.5824	1.5704	1.62350	1.61480	---------	1.6250	1.5889	1.6195	1.5954	1.5954	1.56500	1.57800	2B	UNEF	1.625-18
			1.5870	1.5628	1.5828	1.5820	1.5709	1.62334	1.61496	---------	1.6255	1.5893	1.6190	1.5950	1.5958	1.56516	1.57784			
		3A	1.5889	1.5648	1.5852	1.5852	1.5732	1.62500	1.61630	---------	1.6250	1.5889	1.6178	1.5937	1.5937	1.56500	1.57300	3B		
			1.5885	1.5643	1.5856	1.5848	1.5737	1.62484	1.61646	---------	1.6255	1.5893	1.6173	1.5933	1.5941	1.56516	1.57284			
1.625-20	UN	2A	1.5911	1.5694	1.5863	1.5863	1.5755	1.62360	1.61550	---------	1.6250	1.5925	1.6204	1.5987	1.5987	1.57100	1.58200	2B	UN	1.625-20
			1.5907	1.5689	1.5867	1.5859	1.5760	1.62344	1.61566	---------	1.6255	1.5929	1.6199	1.5983	1.5991	1.57116	1.58184			
		3A	1.5925	1.5708	1.5889	1.5889	1.5781	1.62500	1.61690	---------	1.6250	1.5925	1.6188	1.5971	1.5971	1.57100	1.57870	3B		
			1.5921	1.5703	1.5893	1.5885	1.5786	1.62484	1.61706	---------	1.6255	1.5929	1.6183	1.5967	1.5975	1.57116	1.57854			
1.6875-6	UN	2A	1.5767	1.5045	1.5684	1.5684	1.5323	1.68500	1.66680	---------	1.6875	1.5792	1.6622	1.5900	1.5900	1.50700	1.53800	2B	UN	1.6875-6
			1.5762	1.5037	1.5689	1.5679	1.5331	1.68484	1.66696	---------	1.6883	1.5797	1.6614	1.5895	1.5905	1.50716	1.53784			
		3A	1.5792	1.5070	1.5730	1.5730	1.5369	1.68750	1.66930	---------	1.6875	1.5792	1.6595	1.5873	1.5873	1.50700	1.52710	3B		
			1.5787	1.5062	1.5735	1.5725	1.5377	1.68734	1.66946	---------	1.6883	1.5797	1.6587	1.5868	1.5878	1.50716	1.52694			
1.6875-8	UN	2A	1.6041	1.5500	1.5966	1.5966	1.5695	1.68530	1.67030	---------	1.6875	1.6063	1.6701	1.6160	1.6160	1.55200	1.57700	2B	UN	1.6875-8
			1.6036	1.5493	1.5971	1.5961	1.5702	1.68514	1.67046	---------	1.6882	1.6068	1.6694	1.6155	1.6165	1.55216	1.57684			
		3A	1.6063	1.5522	1.6007	1.6007	1.5736	1.68750	1.67250	---------	1.6875	1.6063	1.6677	1.6136	1.6136	1.55200	1.56720	3B		
			1.6058	1.5515	1.6012	1.6002	1.5743	1.68734	1.67266	---------	1.6882	1.6068	1.6670	1.6131	1.6141	1.55216	1.56704			
1.6875-12	UN	2A	1.6316	1.5955	1.6256	1.6256	1.6076	1.68570	1.67430	---------	1.6875	1.6334	1.6773	1.6412	1.6412	1.59700	1.61500	2B	UN	1.6875-12
			1.6312	1.5949	1.6260	1.6252	1.6082	1.68554	1.67446	---------	1.6881	1.6338	1.6767	1.6408	1.6416	1.59716	1.61484			
		3A	1.6334	1.5973	1.6289	1.6289	1.6109	1.68750	1.67610	---------	1.6875	1.6334	1.6753	1.6392	1.6392	1.59700	1.60730	3B		
			1.6330	1.5967	1.6293	1.6285	1.6115	1.68734	1.67626	---------	1.6881	1.6338	1.6747	1.6388	1.6396	1.59716	1.60714			
1.6875-16	UN	2A	1.6453	1.6182	1.6400	1.6400	1.6265	1.68590	1.67650	---------	1.6875	1.6469	1.6809	1.6538	1.6538	1.62000	1.63400	2B	UN	1.6875-16
			1.6449	1.6176	1.6404	1.6396	1.6271	1.68574	1.67666	---------	1.6881	1.6473	1.6803	1.6534	1.6542	1.62016	1.63384			
		3A	1.6469	1.6198	1.6429	1.6429	1.6294	1.68750	1.67810	---------	1.6875	1.6469	1.6792	1.6521	1.6521	1.62000	1.62830	3B		
			1.6465	1.6192	1.6433	1.6425	1.6300	1.68734	1.67826	---------	1.6881	1.6473	1.6786	1.6517	1.6525	1.62016	1.62814			
1.6875-18	UNEF	2A	1.6499	1.6258	1.6448	1.6448	1.6328	1.68600	1.67730	---------	1.6875	1.6514	1.6821	1.6580	1.6580	1.62700	1.64000	2B	UNEF	1.6875-18
			1.6495	1.6253	1.6452	1.6444	1.6333	1.68584	1.67746	---------	1.6880	1.6518	1.6816	1.6576	1.6584	1.62716	1.63984			
		3A	1.6514	1.6273	1.6476	1.6476	1.6356	1.68750	1.67880	---------	1.6875	1.6514	1.6804	1.6563	1.6563	1.62700	1.63550	3B		
			1.6510	1.6268	1.6480	1.6472	1.6361	1.68734	1.67896	---------	1.6880	1.6518	1.6799	1.6559	1.6567	1.62716	1.63534			
1.6875-20	UN	2A	1.6535	1.6318	1.6487	1.6487	1.6379	1.68600	1.67790	---------	1.6875	1.6550	1.6830	1.6613	1.6613	1.63300	1.64500	2B	UN	1.6875-20
			1.6531	1.6313	1.6491	1.6483	1.6384	1.68584	1.67806	---------	1.6880	1.6554	1.6825	1.6609	1.6617	1.63316	1.64484			
		3A	1.6550	1.6333	1.6514	1.6514	1.6406	1.68750	1.67940	---------	1.6875	1.6550	1.6814	1.6597	1.6597	1.63300	1.64120	3B		
			1.6546	1.6328	1.6518	1.6510	1.6411	1.68734	1.67956	---------	1.6880	1.6554	1.6809	1.6593	1.6601	1.63316	1.64104			
1.750-5	UNC	1A	1.6174	1.5308	1.6040	1.6040	1.5607	1.74730	1.71650	---------	1.7500	1.6201	1.7241	1.6375	1.6375	1.53400	1.56800	1B	UNC	1.750-5
			1.6169	1.5300	1.6045	1.6035	1.5615	1.74714	1.71666	---------	1.7508	1.6206	1.7233	1.6370	1.6380	1.53416	1.56784			
		2A	1.6174	1.5308	1.6085	1.6085	1.5652	1.74730	1.72680	1.71650	1.7500	1.6201	1.7183	1.6317	1.6317	1.53400	1.56800	2B		
			1.6169	1.5300	1.6090	1.6080	1.5660	1.74714	1.72696	1.71666	1.7508	1.6206	1.7175	1.6312	1.6322	1.53416	1.56784			
		3A	1.6201	1.5335	1.6134	1.6134	1.5701	1.75000	1.72950	---------	1.7500	1.6201	1.7154	1.6288	1.6288	1.53400	1.55750	3B		
			1.6196	1.5327	1.6139	1.6129	1.5709	1.74984	1.72966	---------	1.7508	1.6206	1.7146	1.6283	1.6293	1.53416	1.55734			
1.750-6	UN	2A	1.6392	1.5670	1.6309	1.6309	1.5948	1.74750	1.72930	---------	1.7500	1.6417	1.7247	1.6525	1.6525	1.57000	1.60000	2B	UN	1.750-6
			1.6387	1.5662	1.6314	1.6304	1.5956	1.74734	1.72946	---------	1.7508	1.6422	1.7239	1.6520	1.6530	1.57016	1.59984			
		3A	1.6417	1.5695	1.6354	1.6354	1.5993	1.75000	1.73180	---------	1.7500	1.6417	1.7220	1.6498	1.6498	1.57000	1.58960	3B		
			1.6412	1.5687	1.6359	1.6349	1.6001	1.74984	1.73196	---------	1.7508	1.6422	1.7212	1.6493	1.6503	1.57016	1.58944			
1.750-8	UN	2A	1.6665	1.6124	1.6590	1.6590	1.6319	1.74770	1.73270	1.72520	1.7500	1.6688	1.7327	1.6786	1.6786	1.61500	1.64000	2B	UN	1.750-8
			1.6660	1.6117	1.6595	1.6585	1.6326	1.74754	1.73286	1.72536	1.7507	1.6693	1.7320	1.6781	1.6791	1.61516	1.63984			
		3A	1.6688	1.6147	1.6631	1.6631	1.6360	1.75000	1.73500	---------	1.7500	1.6688	1.7303	1.6762	1.6762	1.61500	1.62970	3B		
			1.6683	1.6140	1.6636	1.6626	1.6367	1.74984	1.73516	---------	1.7507	1.6693	1.7296	1.6757	1.6767	1.61516	1.62954			
1.750-12	UN	2A	1.6941	1.6580	1.6881	1.6881	1.6701	1.74820	1.73680	---------	1.7500	1.6959	1.7398	1.7037	1.7037	1.66000	1.67800	2B	UN	1.750-12
			1.6937	1.6574	1.6885	1.6877	1.6707	1.74804	1.73696	---------	1.7506	1.6963	1.7392	1.7033	1.7041	1.66016	1.67784			
		3A	1.6959	1.6598	1.6914	1.6914	1.6734	1.75000	1.73860	---------	1.7500	1.6959	1.7378	1.7017	1.7017	1.66000	1.66980	3B		
			1.6955	1.6592	1.6918	1.6910	1.6740	1.74984	1.73876	---------	1.7506	1.6963	1.7372	1.7013	1.7021	1.66016	1.66964			
1.750-16	UN	2A	1.7078	1.6807	1.7025	1.7025	1.6890	1.74840	1.73900	---------	1.7500	1.7094	1.7434	1.7163	1.7163	1.68200	1.69600	2B	UN	1.750-16
			1.7074	1.6801	1.7029	1.7021	1.6896	1.74824	1.73916	---------	1.7506	1.7098	1.7428	1.7159	1.7167	1.68216	1.69584			
		3A	1.7094	1.6823	1.7054	1.7054	1.6919	1.75000	1.74060	---------	1.7500	1.7094	1.7417	1.7146	1.7146	1.68200	1.69080	3B		
			1.7090	1.6817	1.7058	1.7050	1.6925	1.74984	1.74076	---------	1.7506	1.7098	1.7411	1.7142	1.7150	1.68216	1.69064			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages, GO, Pitch diameter	Gages for external threads: X thread ring gages, GO, Minor diameter	Gages for external threads: X thread ring gages, LO, Pitch diameter, Plus tolerance gage	Gages for external threads: X thread ring gages, LO, Pitch diameter, Minus tolerance gage	Gages for external threads: X thread ring gages, LO, Minor diameter	Gages for external threads: Z plain ring gages for major diameter, GO	Gages for external threads: Z plain ring gages for major diameter, NOT GO, Semi-finished	Gages for external threads: Z plain ring gages for major diameter, NOT GO, Unfinished hot-rolled material	Gages for internal threads: X thread plug gages, GO, Major diameter	Gages for internal threads: X thread plug gages, GO, Pitch diameter	Gages for internal threads: X thread plug gages, HI, Major diameter	Gages for internal threads: X thread plug gages, HI, Pitch diameter, Minus tolerance gage	Gages for internal threads: X thread plug gages, HI, Pitch diameter, Plus tolerance gage	Gages for internal threads: Z plain plug gages for minor diameter, GO	Gages for internal threads: Z plain plug gages for minor diameter, NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	in	in	in	in	in	in	in	in	in	in	in	in	in	in			
1.750–20	UN	2A	1.7160	1.6943	1.7112	1.7112	1.7004	1.74850	1.74040	--------	1.7500	1.7175	1.7455	1.7238	1.7238	1.69600	1.70700	2B	UN	1.750–20
			1.7156	1.6938	1.7116	1.7108	1.7009	1.74834	1.74056	--------	1.7505	1.7179	1.7450	1.7234	1.7242	1.69616	1.70684			
		3A	1.7175	1.6958	1.7139	1.7139	1.7031	1.75000	1.74190	--------	1.7500	1.7175	1.7439	1.7222	1.7222	1.69600	1.70370	3B		
			1.7171	1.6953	1.7143	1.7135	1.7036	1.74984	1.74206	--------	1.7505	1.7179	1.7434	1.7218	1.7226	1.69616	1.70354			
1.8125–6	UN	2A	1.7017	1.6295	1.6933	1.6933	1.6572	1.81000	1.79180	--------	1.8125	1.7042	1.7873	1.7151	1.7151	1.63200	1.66300	2B	UN	1.8125–6
			1.7012	1.6287	1.6938	1.6928	1.6580	1.80984	1.79196	--------	1.8133	1.7047	1.7865	1.7146	1.7156	1.63216	1.66284			
		3A	1.7042	1.6320	1.6979	1.6979	1.6618	1.81250	1.79430	--------	1.8125	1.7042	1.7846	1.7124	1.7124	1.63200	1.65210	3B		
			1.7037	1.6312	1.6984	1.6974	1.6626	1.81234	1.79446	--------	1.8133	1.7047	1.7838	1.7119	1.7129	1.63216	1.65194			
1.8125–8	UN	2A	1.7290	1.6749	1.7214	1.7214	1.6943	1.81020	1.79520	--------	1.8125	1.7313	1.7953	1.7412	1.7412	1.67700	1.70200	2B	UN	1.8125–8
			1.7285	1.6742	1.7219	1.7209	1.6950	1.81004	1.79536	--------	1.8132	1.7318	1.7946	1.7407	1.7417	1.67716	1.70184			
		3A	1.7313	1.6772	1.7256	1.7256	1.6985	1.81250	1.79750	--------	1.8125	1.7313	1.7928	1.7387	1.7387	1.67700	1.69220	3B		
			1.7308	1.6765	1.7261	1.7251	1.6992	1.81234	1.79766	--------	1.8132	1.7318	1.7921	1.7382	1.7392	1.67716	1.69204			
1.8125–12	UN	2A	1.7566	1.7205	1.7506	1.7506	1.7326	1.81070	1.79930	--------	1.8125	1.7584	1.8023	1.7662	1.7662	1.72200	1.74000	2B	UN	1.8125–12
			1.7562	1.7199	1.7510	1.7502	1.7332	1.81054	1.79946	--------	1.8131	1.7588	1.8017	1.7658	1.7666	1.72216	1.73984			
		3A	1.7584	1.7223	1.7539	1.7539	1.7359	1.81250	1.80110	--------	1.8125	1.7584	1.8003	1.7642	1.7642	1.72200	1.73230	3B		
			1.7580	1.7217	1.7543	1.7535	1.7365	1.81234	1.80126	--------	1.8131	1.7588	1.7997	1.7638	1.7646	1.72216	1.73214			
1.8125–16	UN	2A	1.7703	1.7432	1.7650	1.7650	1.7515	1.81090	1.80150	--------	1.8125	1.7719	1.8059	1.7788	1.7788	1.74500	1.75900	2B	UN	1.8125–16
			1.7699	1.7426	1.7654	1.7646	1.7521	1.81074	1.80166	--------	1.8131	1.7723	1.8053	1.7784	1.7792	1.74516	1.75884			
		3A	1.7719	1.7448	1.7679	1.7679	1.7544	1.81250	1.80310	--------	1.8125	1.7719	1.8042	1.7771	1.7771	1.74500	1.75330	3B		
			1.7715	1.7442	1.7683	1.7675	1.7550	1.81234	1.80326	--------	1.8131	1.7723	1.8036	1.7767	1.7775	1.74516	1.75314			
1.8125–20	UN	2A	1.7785	1.7568	1.7737	1.7737	1.7629	1.81100	1.80290	--------	1.8125	1.7800	1.8080	1.7863	1.7863	1.75800	1.77000	2B	UN	1.8125–20
			1.7781	1.7563	1.7741	1.7733	1.7634	1.81084	1.80306	--------	1.8130	1.7804	1.8075	1.7859	1.7867	1.75816	1.76984			
		3A	1.7800	1.7583	1.7764	1.7764	1.7656	1.81250	1.80440	--------	1.8125	1.7800	1.8064	1.7847	1.7847	1.75800	1.76620	3B		
			1.7796	1.7578	1.7768	1.7760	1.7661	1.81234	1.80456	--------	1.8130	1.7804	1.8059	1.7843	1.7851	1.75816	1.76604			
1.875–6	UN	2A	1.7642	1.6920	1.7558	1.7558	1.7197	1.87250	1.85430	--------	1.8750	1.7667	1.8499	1.7777	1.7777	1.69500	1.72500	2B	UN	1.875–6
			1.7637	1.6912	1.7563	1.7553	1.7205	1.87234	1.85446	--------	1.8758	1.7672	1.8491	1.7772	1.7782	1.69516	1.72484			
		3A	1.7667	1.6945	1.7604	1.7604	1.7243	1.87500	1.85680	--------	1.8750	1.7667	1.8471	1.7749	1.7749	1.69500	1.71460	3B		
			1.7662	1.6937	1.7609	1.7599	1.7251	1.87484	1.85696	--------	1.8758	1.7672	1.8463	1.7744	1.7754	1.69516	1.71444			
1.875–8	UN	2A	1.7915	1.7374	1.7838	1.7838	1.7567	1.87270	1.85770	1.85020	1.8750	1.7938	1.8579	1.8038	1.8038	1.74000	1.76500	2B	UN	1.875–8
			1.7910	1.7367	1.7843	1.7833	1.7574	1.87254	1.85786	1.85036	1.8757	1.7943	1.8572	1.8033	1.8043	1.74016	1.76484			
		3A	1.7938	1.7397	1.7881	1.7881	1.7610	1.87500	1.86000	--------	1.8750	1.7938	1.8554	1.8013	1.8013	1.74000	1.75470	3B		
			1.7933	1.7390	1.7886	1.7876	1.7617	1.87484	1.86016	--------	1.8757	1.7943	1.8547	1.8008	1.8018	1.74016	1.75454			
1.875–12	UN	2A	1.8191	1.7830	1.8131	1.8131	1.7951	1.87320	1.86180	--------	1.8750	1.8209	1.8648	1.8287	1.8287	1.78500	1.80300	2B	UN	1.875–12
			1.8187	1.7824	1.8135	1.8127	1.7957	1.87304	1.86196	--------	1.8756	1.8213	1.8642	1.8283	1.8291	1.78516	1.80284			
		3A	1.8209	1.7848	1.8164	1.8164	1.7984	1.87500	1.86360	--------	1.8750	1.8209	1.8628	1.8267	1.8267	1.78500	1.79480	3B		
			1.8205	1.7842	1.8168	1.8160	1.7990	1.87484	1.86376	--------	1.8756	1.8213	1.8622	1.8263	1.8271	1.78516	1.79464			
1.875–16	UN	2A	1.8328	1.8057	1.8275	1.8275	1.8140	1.87340	1.86400	--------	1.8750	1.8344	1.8684	1.8413	1.8413	1.80700	1.82100	2B	UN	1.875–16
			1.8324	1.8051	1.8279	1.8271	1.8146	1.87324	1.86416	--------	1.8756	1.8348	1.8678	1.8409	1.8417	1.80716	1.82084			
		3A	1.8344	1.8073	1.8304	1.8304	1.8169	1.87500	1.86560	--------	1.8750	1.8344	1.8667	1.8396	1.8396	1.80700	1.81580	3B		
			1.8340	1.8067	1.8308	1.8300	1.8175	1.87484	1.86576	--------	1.8756	1.8348	1.8661	1.8392	1.8400	1.80716	1.81564			
1.875–20	UN	2A	1.8410	1.8193	1.8362	1.8362	1.8254	1.87350	1.86540	--------	1.8750	1.8425	1.8705	1.8488	1.8488	1.82100	1.83200	2B	UN	1.875–20
			1.8406	1.8188	1.8366	1.8358	1.8259	1.87334	1.86556	--------	1.8755	1.8429	1.8700	1.8484	1.8492	1.82116	1.83184			
		3A	1.8425	1.8208	1.8389	1.8389	1.8281	1.87500	1.86690	--------	1.8750	1.8425	1.8689	1.8472	1.8472	1.82100	1.82870	3B		
			1.8421	1.8203	1.8393	1.8385	1.8286	1.87484	1.86706	--------	1.8755	1.8429	1.8684	[illegible]	[illegible]	[illegible]	[illegible]			

1.9375–6	UN	2A	1.8266	1.7544	1.8181	1.8181	1.7820	1.93490	1.91670	----------	1.9375	1.8292	1.9125	1.8403	1.8403	1.75700	1.78800	2B	UN	1.9375–6
			1.8261	1.7536	1.8186	1.8176	1.7828	1.93474	1.91686	----------	1.9383	1.8297	1.9117	1.8398	1.8408	1.75716	1.78784			
		3A	1.8292	1.7570	1.8228	1.8228	1.7867	1.93750	1.91930	----------	1.9375	1.8292	1.9097	1.8375	1.8375	1.75700	1.77710	3B		
			1.8287	1.7562	1.8233	1.8223	1.7875	1.93734	1.91946	----------	1.9383	1.8297	1.9089	1.8370	1.8380	1.75716	1.77694			
1.9375–8	UN	2A	1.8540	1.7999	1.8463	1.8463	1.8192	1.93520	1.92020	----------	1.9375	1.8563	1.9204	1.8663	1.8663	1.80200	1.82700	2B	UN	1.9375–8
			1.8535	1.7992	1.8468	1.8458	1.8199	1.93504	1.92036	----------	1.9382	1.8568	1.9197	1.8658	1.8668	1.80216	1.82684			
		3A	1.8563	1.8022	1.8505	1.8505	1.8234	1.93750	1.92250	----------	1.9375	1.8563	1.9179	1.8638	1.8638	1.80200	1.81720	3B		
			1.8558	1.8015	1.8510	1.8500	1.8241	1.93734	1.92266	----------	1.9382	1.8568	1.9172	1.8633	1.8643	1.80216	1.81704			
1.9375–12	UN	2A	1.8816	1.8455	1.8755	1.8755	1.8575	1.93570	1.92430	----------	1.9375	1.8834	1.9274	1.8913	1.8913	1.84700	1.86500	2B	UN	1.9375–12
			1.8812	1.8449	1.8759	1.8751	1.8581	1.93554	1.92446	----------	1.9381	1.8838	1.9268	1.8909	1.8917	1.84716	1.86484			
		3A	1.8834	1.8473	1.8789	1.8789	1.8609	1.93750	1.92610	----------	1.9375	1.8834	1.9254	1.8893	1.8893	1.84700	1.85730	3B		
			1.8830	1.8467	1.8793	1.8785	1.8615	1.93734	1.92626	----------	1.9381	1.8838	1.9248	1.8889	1.8897	1.84716	1.85714			
1.9375–16	UN	2A	1.8953	1.8682	1.8899	1.8899	1.8764	1.93590	1.92650	----------	1.9375	1.8969	1.9310	1.9039	1.9039	1.87000	1.88400	2B	UN	1.9735–16
			1.8949	1.8676	1.8903	1.8895	1.8770	1.93574	1.92666	----------	1.9381	1.8973	1.9304	1.9035	1.9043	1.87016	1.88384			
		3A	1.8969	1.8698	1.8929	1.8929	1.8794	1.93750	1.92810	----------	1.9375	1.8969	1.9292	1.9021	1.9021	1.87000	1.87830	3B		
			1.8965	1.8692	1.8933	1.8925	1.8800	1.93734	1.92826	----------	1.9381	1.8973	1.9286	1.9017	1.9025	1.87016	1.87814			
1.9375–20	UN	2A	1.9035	1.8818	1.8986	1.8986	1.8878	1.93600	1.92790	----------	1.9375	1.9050	1.9331	1.9114	1.9114	1.88300	1.89500	2B	UN	1.9375–20
			1.9031	1.8813	1.8990	1.8982	1.8883	1.93584	1.92806	----------	1.9380	1.9054	1.9326	1.9110	1.9118	1.88316	1.89484			
		3A	1.9050	1.8833	1.9013	1.9013	1.8905	1.93750	1.92940	----------	1.9375	1.9050	1.9315	1.9098	1.9098	1.88300	1.89120	3B		
			1.9046	1.8828	1.9017	1.9009	1.8910	1.93734	1.92956	----------	1.9380	1.9054	1.9310	1.9094	1.9102	1.88316	1.89104			
2.000–4.5	UNC	1A	1.8528	1.7566	1.8385	1.8385	1.7904	1.99710	1.96410	----------	2.0000	1.8557	1.9705	1.8743	1.8743	1.75900	1.79500	1B	UNC	2.000–4.5
			1.8523	1.7558	1.8390	1.8380	1.7912	1.99694	1.96426	----------	2.0008	1.8562	1.9697	1.8738	1.8748	1.75916	1.79484			
		2A	1.8528	1.7566	1.8433	1.8433	1.7952	1.99710	1.97510	1.96410	2.0000	1.8557	1.9643	1.8681	1.8681	1.75900	1.79500	2B		
			1.8523	1.7558	1.8438	1.8428	1.7960	1.99694	1.97526	1.96426	2.0008	1.8562	1.9635	1.8676	1.8686	1.75916	1.79484			
		3A	1.8557	1.7595	1.8486	1.8486	1.8005	2.00000	1.97800	----------	2.0000	1.8557	1.9612	1.8650	1.8650	1.75900	1.78610	3B		
			1.8552	1.7587	1.8491	1.8481	1.8013	1.99984	1.97816	----------	2.0008	1.8562	1.9604	1.8645	1.8655	1.75916	1.78594			
2.000–6	UN	2A	1.8891	1.8169	1.8805	1.8805	1.8444	1.99740	1.97920	----------	2.0000	1.8917	1.9750	1.9028	1.9028	1.82000	1.85000	2B	UN	2.000–6
			1.8886	1.8161	1.8810	1.8800	1.8452	1.99724	1.97936	----------	2.0008	1.8922	1.9742	1.9023	1.9033	1.82016	1.84984			
		3A	1.8917	1.8195	1.8853	1.8853	1.8492	2.00000	1.98180	----------	2.0000	1.8917	1.9722	1.9000	1.9000	1.82000	1.83960	3B		
			1.8912	1.8187	1.8858	1.8848	1.8500	1.99984	1.98196	----------	2.0008	1.8922	1.9714	1.8995	1.9005	1.82016	1.83944			
2.000–8	UN	2A	1.9165	1.8624	1.9087	1.9087	1.8816	1.99770	1.98270	1.97520	2.0000	1.9188	1.9830	1.9289	1.9289	1.86500	1.89000	2B	UN	2.000–8
			1.9160	1.8617	1.9092	1.9082	1.8823	1.99754	1.98286	1.97536	2.0007	1.9193	1.9823	1.9284	1.9294	1.86516	1.88984			
		3A	1.9188	1.8647	1.9130	1.9130	1.8859	2.00000	1.98500	----------	2.0000	1.9188	1.9805	1.9264	1.9264	1.86500	1.87970	3B		
			1.9183	1.8640	1.9135	1.9125	1.8866	1.99984	1.98516	----------	2.0007	1.9193	1.9798	1.9259	1.9269	1.86516	1.87954			
2.000–12	UN	2A	1.9441	1.9080	1.9380	1.9380	1.9200	1.99820	1.98680	----------	2.0000	1.9459	1.9899	1.9538	1.9538	1.91000	1.92800	2B	UN	2.000–12
			1.9437	1.9074	1.9384	1.9376	1.9206	1.99804	1.98696	----------	2.0006	1.9463	1.9893	1.9534	1.9542	1.91016	1.92784			
		3A	1.9459	1.9098	1.9414	1.9414	1.9234	2.00000	1.98860	----------	2.0000	1.9459	1.9879	1.9518	1.9518	1.91000	1.91980	3B		
			1.9455	1.9092	1.9418	1.9410	1.9240	1.99984	1.98876	----------	2.0006	1.9463	1.9873	1.9514	1.9522	1.91016	1.91964			
2.000–16	UN	2A	1.9578	1.9307	1.9524	1.9524	1.9389	1.99840	1.98900	----------	2.0000	1.9594	1.9935	1.9664	1.9664	1.93200	1.94600	2B	UN	2.000–16
			1.9574	1.9301	1.9528	1.9520	1.9395	1.99824	1.98916	----------	2.0006	1.9598	1.9929	1.9660	1.9668	1.93216	1.94584			
		3A	1.9594	1.9323	1.9554	1.9554	1.9419	2.00000	1.99060	----------	2.0000	1.9594	1.9917	1.9646	1.9643	1.93200	1.94080	3B		
			1.9590	1.9317	1.9558	1.9550	1.9425	1.99984	1.99076	----------	2.0006	1.9598	1.9911	1.9642	1.9650	1.93216	1.94064			
2.000–20	UN	2A	1.9660	1.9443	1.9611	1.9611	1.9503	1.99850	1.99040	----------	2.0000	1.9675	1.9956	1.9739	1.9739	1.94600	1.95700	2B	UN	2.000–20
			1.9656	1.9438	1.9615	1.9607	1.9508	1.99834	1.99056	----------	2.0005	1.9679	1.9951	1.9735	1.9743	1.94616	1.95684			
		3A	1.9675	1.9458	1.9638	1.9638	1.9530	2.00000	1.99190	----------	2.0000	1.9675	1.9940	1.9723	1.9723	1.94600	1.95370	3B		
			1.9671	1.9453	1.9642	1.9634	1.9535	1.99984	1.99206	----------	2.0005	1.9679	1.9935	1.9719	1.9727	1.94616	1.95354			
2.125–6	UN	2A	2.0141	1.9419	2.0054	2.0054	1.9693	2.12240	2.10420	----------	2.1250	2.0167	2.1002	2.0280	2.0280	1.94500	1.97500	2B	UN	2.125–6
			2.0136	1.9411	2.0059	2.0049	1.9701	2.12224	2.10436	----------	2.1258	2.0172	2.0994	2.0275	2.0285	1.94516	1.97484			
		3A	2.0167	1.9445	2.0102	2.0102	1.9741	2.12500	2.10680	----------	2.1250	2.0167	2.0973	2.0251	2.0251	1.94500	1.96460	3B		
			2.0162	1.9437	2.0107	2.0097	1.9749	2.12484	2.10696	----------	2.1258	2.0172	2.0965	2.0246	2.0256	1.94516	1.96444			
2.125–8	UN	2A	2.0414	1.9873	2.0335	2.0335	2.0064	2.12260	2.10760	2.10010	2.1250	2.0438	2.1081	2.0540	2.0540	1.99000	2.01500	2B	UN	2.125–8
			2.0409	1.9866	2.0340	2.0330	2.0071	2.12244	2.10776	2.10026	2.1257	2.0443	2.1074	2.0535	2.0545	1.99016	2.01484			
		3A	2.0438	1.9897	2.0379	2.0379	2.0108	2.12500	2.11000	----------	2.1250	2.0438	2.1056	2.0515	2.0515	1.99000	2.00470	3B		
			2.0433	1.9890	2.0384	2.0374	2.0115	2.12484	2.11016	----------	2.1257	2.0443	2.1049	2.0510	2.0520	1.99016	2.00454			
2.125–12	UN	2A	2.0691	2.0330	2.0630	2.0630	2.0450	2.12320	2.11180	----------	2.1250	2.0709	2.1149	2.0788	2.0788	2.03500	2.05300	2B	UN	2.125–12
			2.0687	2.0324	2.0634	2.0626	2.0456	2.12304	2.11196	----------	2.1256	2.0713	2.1143	2.0784	2.0792	2.03516	2.05284			
		3A	2.0709	2.0348	2.0664	2.0664	2.0484	2.12500	2.11360	----------	2.1250	2.0709	2.1129	2.0768	2.0768	2.03500	2.04480	3B		
			2.0705	2.0342	2.0668	2.0660	2.0490	2.12484	2.11376	----------	2.1256	2.0713	2.1123	2.0764	2.0772	2.03516	2.04464			
2.125–16	UN	2A	2.0828	2.0557	2.0774	2.0774	2.0639	2.12340	2.11400	----------	2.1250	2.0844	2.1185	2.0914	2.0914	2.05700	2.07100	2B	UN	2.125–16
			2.0824	2.0551	2.0778	2.0770	2.0645	2.12324	2.11416	----------	2.1256	2.0848	2.1179	2.0910	2.0918	2.05716	2.07084			
		3A	2.0844	2.0573	2.0804	2.0804	2.0669	2.12500	2.11560	----------	2.1250	2.0844	2.1167	2.0896	2.0896	2.05700	2.06580	3B		
			2.0840	2.0567	2.0808	2.0800	2.0675	2.12484	2.11576	----------	2.1256	2.0848	2.1161	2.0892	2.0900	2.05716	2.06564			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	Gages for external threads: X thread ring gages: GO: Minor diameter	Gages for external threads: X thread ring gages: LO: Pitch diameter: Plus tolerance gage	Gages for external threads: X thread ring gages: LO: Pitch diameter: Minus tolerance gage	Gages for external threads: X thread ring gages: LO: Minor diameter	Gages for external threads: Z plain ring gages for major diameter: GO	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Semi-finished	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	Gages for internal threads: X thread plug gages: GO: Pitch diameter	Gages for internal threads: X thread plug gages: HI: Major diameter	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Minus tolerance gage	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Gages for internal threads: Z plain plug gages for minor diameter: GO	Gages for internal threads: Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
2.125-20	UN	2A	2.0910	2.0693	2.0861	2.0861	2.0753	2.12350	2.11540	---------	2.1250	2.0925	2.1206	2.0989	2.0989	2.07100	2.08200	2B	UN	2.125-20
			2.0906	2.0688	2.0865	2.0857	2.0758	2.12334	2.11556	---------	2.1255	2.0929	2.1201	2.0985	2.0993	2.07116	2.08184			
		3A	2.0925	2.0708	2.0888	2.0888	2.0780	2.12500	2.11690	---------	2.1250	2.0925	2.1190	2.0973	2.0973	2.07100	2.07870	3B		
			2.0921	2.0703	2.0892	2.0884	2.0785	2.12484	2.11706	---------	2.1255	2.0929	2.1185	2.0969	2.0977	2.07116	2.07854			
2.250-4.5	UNC	1A	2.1028	2.0066	2.0882	2.0882	2.0401	2.24710	2.21410	---------	2.2500	2.1057	2.2209	2.1247	2.1247	2.00900	2.04500	1B	UNC	2.250-4.5
			2.1023	2.0058	2.0887	2.0877	2.0409	2.24694	2.21426	---------	2.2508	2.1062	2.2201	2.1242	2.1252	2.00916	2.04484			
		2A	2.1028	2.0066	2.0931	2.0931	2.0450	2.24700	2.22510	2.21410	2.2500	2.1057	2.2145	2.1183	2.1183	2.00900	2.04500	2B		
			2.1023	2.0058	2.0936	2.0926	2.0458	2.24694	2.22526	2.21426	2.2508	2.1062	2.2137	2.1178	2.1188	2.00916	2.04484			
		3A	2.1057	2.0095	2.0984	2.0984	2.0503	2.25040	2.22800	---------	2.2500	2.1057	2.2114	2.1152	2.1152	2.00900	2.03610	3B		
			2.1052	2.0087	2.0989	2.0979	2.0511	2.24984	2.22816	---------	2.2508	2.1062	2.2106	2.1147	2.1157	2.00916	2.03594			
2.250-6	UN	2A	2.1391	2.0669	2.1303	2.1303	2.0942	2.24740	2.22920	---------	2.2500	2.1417	2.2253	2.1531	2.1531	2.07000	2.10000	2B	UN	2.250-6
			2.1386	2.0661	2.1308	2.1298	2.0950	2.24724	2.22936	---------	2.2508	2.1422	2.2245	2.1526	2.1536	2.07016	2.09984			
		3A	2.1417	2.0695	2.1351	2.1351	2.0990	2.25000	2.23180	---------	2.2500	2.1417	2.2224	2.1502	2.1502	2.07000	2.08960	3B		
			2.1412	2.0687	2.1356	2.1346	2.0998	2.24984	2.23196	---------	2.2508	2.1422	2.2216	2.1497	2.1507	2.07016	2.08944			
2.250-8	UN	2A	2.1664	2.1123	2.1584	2.1584	2.1313	2.24760	2.23260	2.22510	2.2500	2.1688	2.2333	2.1792	2.1792	2.11500	2.14000	2B	UN	2.250-8
			2.1659	2.1116	2.1589	2.1579	2.1320	2.24744	2.23276	2.22526	2.2507	2.1693	2.2326	2.1787	2.1797	2.11516	2.13984			
		3A	2.1688	2.1147	2.1628	2.1628	2.1357	2.25000	2.23500	---------	2.2500	2.1688	2.2307	2.1766	2.1766	2.11500	2.12970	3B		
			2.1683	2.1140	2.1633	2.1623	2.1364	2.24984	2.23516	---------	2.2507	2.1693	2.2300	2.1761	2.1771	2.11516	2.12954			
2.250-12	UN	2A	2.1941	2.1580	2.1880	2.1880	2.1700	2.24820	2.23680	---------	2.2500	2.1959	2.2399	2.2038	2.2038	2.16000	2.17800	2B	UN	2.250-12
			2.1937	2.1574	2.1884	2.1876	2.1706	2.24804	2.23696	---------	2.2506	2.1963	2.2393	2.2034	2.2042	2.16016	2.17784			
		3A	2.1959	2.1598	2.1914	2.1914	2.1734	2.25000	2.23860	---------	2.2500	2.1959	2.2379	2.2018	2.2018	2.16000	2.16980	3B		
			2.1955	2.1592	2.1918	2.1910	2.1740	2.24984	2.23876	---------	2.2506	2.1963	2.2373	2.2014	2.2022	2.16016	2.16964			
2.250-16	UN	2A	2.2078	2.1807	2.2024	2.2024	2.1889	2.24840	2.23900	---------	2.2500	2.2094	2.2435	2.2164	2.2164	2.18200	2.19600	2B	UN	2.250-16
			2.2074	2.1801	2.2028	2.2020	2.1895	2.24824	2.23916	---------	2.2506	2.2098	2.2429	2.2160	2.2168	2.18216	2.19584			
		3A	2.2094	2.1823	2.2054	2.2054	2.1919	2.25000	2.24060	---------	2.2500	2.2094	2.2417	2.2146	2.2146	2.18200	2.19080	3B		
			2.2090	2.1817	2.2058	2.2050	2.1925	2.24984	2.24076	---------	2.2506	2.2098	2.2411	2.2142	2.2150	2.18216	2.19064			
2.250-20	UN	2A	2.2160	2.1943	2.2111	2.2111	2.2003	2.24850	2.24040	---------	2.2500	2.2175	2.2456	2.2239	2.2239	2.19600	2.20700	2B	UN	2.250-20
			2.2156	2.1938	2.2115	2.2107	2.2008	2.24834	2.24056	---------	2.2505	2.2179	2.2451	2.2235	2.2243	2.19616	2.20684			
		3A	2.2175	2.1958	2.2138	2.2138	2.2030	2.25000	2.24190	---------	2.2500	2.2175	2.2440	2.2223	2.2223	2.19600	2.20370	3B		
			2.2171	2.1953	2.2142	2.2134	2.2035	2.24984	2.24206	---------	2.2505	2.2179	2.2435	2.2219	2.2227	2.19616	2.20354			
2.375-6	UN	2A	2.2640	2.1918	2.2551	2.2551	2.2190	2.37230	2.35410	---------	2.3750	2.2667	2.3504	2.2782	2.2782	2.19500	2.22600	2B	UN	2.375-6
			2.2635	2.1910	2.2556	2.2546	2.2198	2.37214	2.35426	---------	2.3758	2.2672	2.3496	2.2777	2.2787	2.19516	2.22584			
		3A	2.2667	2.1945	2.2601	2.2601	2.2240	2.37500	2.35680	---------	2.3750	2.2667	2.3475	2.2753	2.2753	2.19500	2.21460	3B		
			2.2662	2.1937	2.2606	2.2596	2.2248	2.37484	2.35696	---------	2.3758	2.2672	2.3467	2.2748	2.2758	2.19516	2.21444			
2.375-8	UN	2A	2.2914	2.2373	2.2833	2.2833	2.2562	2.37260	2.35760	---------	2.3750	2.2938	2.3584	2.3043	2.3043	2.24000	2.26500	2B	UN	2.375-8
			2.2909	2.2366	2.2838	2.2828	2.2569	2.37244	2.35776	---------	2.3757	2.2943	2.3577	2.3038	2.3048	2.24016	2.26484			
		3A	2.2938	2.2397	2.2878	2.2878	2.2607	2.37500	2.36000	---------	2.3750	2.2938	2.3558	2.3017	2.3017	2.24000	2.25470	3B		
			2.2933	2.2390	2.2883	2.2873	2.2614	2.37484	2.36016	---------	2.3757	2.2943	2.3551	2.3012	2.3022	2.24016	2.25454			
2.375-12	UN	2A	2.3190	2.2829	2.3128	2.3128	2.2948	2.37310	2.36170	---------	2.3750	2.3209	2.3651	2.3290	2.3290	2.28500	2.30300	2B	UN	2.375-12
			2.3186	2.2823	2.3132	2.3124	2.2954	2.37294	2.36186	---------	2.3756	2.3213	2.3645	2.3286	2.3294	2.28516	2.30284			
		3A	2.3209	2.2848	2.3163	2.3163	2.2983	2.37500	2.36360	---------	2.3750	2.3209	2.3630	2.3269	2.3269	2.28500	2.29480	3B		
			2.3205	2.2842	2.3167	2.3159	2.2989	2.37484	2.36376	---------	2.3756	2.3213	2.3624	2.3265	2.3273	2.28516	2.29464			

2.375-16	UN	2A	2.3327	2.3056	2.3272	2.3272	2.3137	2.37330	2.36390	---------	2.3750	2.3344	2.3687	2.3416	2.3416	2.30700	2.32100	2B	UN	2.375-16
			2.3323	2.3050	2.3276	2.3268	2.3143	2.37314	2.36406	---------	2.3756	2.3348	2.3681	2.3412	2.3420	2.30716	2.32084			
		3A	2.3344	2.3073	2.3303	2.3303	2.3168	2.37500	2.36560	---------	2.3750	2.3344	2.3669	2.3398	2.3398	2.30700	2.31580	3B		
			2.3340	2.3067	2.3307	2.3299	2.3174	2.37484	2.36576	---------	2.3756	2.3348	2.3663	2.3394	2.3402	2.30716	2.31564			
2.375-20	UN	2A	2.3410	2.3193	2.3359	2.3359	2.3251	2.37350	2.36540	---------	2.3750	2.3425	2.3708	2.3491	2.3491	2.32100	2.33200	2B	UN	2.375-20
			2.3406	2.3188	2.3363	2.3355	2.3256	2.37334	2.36556	---------	2.3755	2.3429	2.3703	2.3487	2.3495	2.32116	2.33184			
		3A	2.3425	2.3208	2.3387	2.3387	2.3279	2.37500	2.36690	---------	2.3750	2.3425	2.3692	2.3475	2.3475	2.32100	2.32870	3B		
			2.3421	2.3203	2.3391	2.3383	2.3284	2.37484	2.36706	---------	2.3755	2.3429	2.3687	2.3471	2.3479	2.32116	2.32854			
2.500-4	UNC	1A	2.3345	2.2262	2.3190	2.3190	2.2649	2.49690	2.46120	---------	2.5000	2.3376	2.4661	2.3578	2.3578	2.22900	2.26700	1B	UNC	2.500-4
			2.3340	2.2253	2.3195	2.3185	2.2658	2.49674	2.46136	---------	2.5009	2.3381	2.4652	2.3573	2.3583	2.22916	2.26684			
		2A	2.3345	2.2262	2.3241	2.3241	2.2700	2.49690	2.47310	2.46120	2.5000	2.3376	2.4594	2.3511	2.3511	2.22900	2.26700	2B		
			2.3340	2.2253	2.3246	2.3236	2.2709	2.49674	2.47326	2.46136	2.5009	2.3381	2.4585	2.3506	2.3516	2.22916	2.26684			
		3A	2.3376	2.2293	2.3298	2.3298	2.2757	2.50000	2.47620	---------	2.5000	2.3376	2.4560	2.3477	2.3477	2.22900	2.25940	3B		
			2.3371	2.2284	2.3303	2.3293	2.2766	2.49984	2.47636	---------	2.5009	2.3381	2.4551	2.3472	2.3482	2.22916	2.25924			
2.500-6	UN	2A	2.3890	2.3168	2.3800	2.3800	2.3439	2.49730	2.47910	---------	2.5000	2.3917	2.4755	2.4033	2.4033	2.32000	2.35000	2B	UN	2.500-6
			2.3885	2.3160	2.3805	2.3795	2.3447	2.49714	2.47926	---------	2.5008	2.3922	2.4747	2.4028	2.4038	2.32016	2.34984			
		3A	2.3917	2.3195	2.3850	2.3850	2.3489	2.50000	2.48180	---------	2.5000	2.3917	2.4726	2.4004	2.4004	2.32000	2.33960	3B		
			2.3912	2.3187	2.3855	2.3845	2.3497	2.49984	2.48196	---------	2.5008	2.3922	2.4718	2.3999	2.4009	2.32016	2.33944			
2.500-8	UN	2A	2.4164	2.3623	2.4082	2.4082	2.3811	2.49760	2.48260	2.47510	2.5000	2.4188	2.4835	2.4294	2.4294	2.36500	2.39000	2B	UN	2.500-8
			2.4159	2.3616	2.4087	2.4077	2.3818	2.49744	2.48276	2.47526	2.5007	2.4193	2.4828	2.4289	2.4299	2.36516	2.38984			
		3A	2.4188	2.3647	2.4127	2.4127	2.3856	2.50000	2.48500	---------	2.5000	2.4188	2.4809	2.4268	2.4268	2.36500	2.37970	3B		
			2.4183	2.3640	2.4132	2.4122	2.3863	2.49984	2.48516	---------	2.5007	2.4193	2.4802	2.4263	2.4273	2.36516	2.37954			
2.500-12	UN	2A	2.4440	2.4079	2.4378	2.4378	2.4198	2.49810	2.48670	---------	2.5000	2.4459	2.4901	2.4540	2.4540	2.41000	2.42800	2B	UN	2.500-12
			2.4436	2.4073	2.4382	2.4374	2.4204	2.49794	2.48686	---------	2.5006	2.4463	2.4895	2.4536	2.4544	2.41016	2.42784			
		3A	2.4459	2.4098	2.4413	2.4413	2.4233	2.50000	2.48860	---------	2.5000	2.4459	2.4880	2.4519	2.4519	2.41000	2.41980	3B		
			2.4455	2.4092	2.4417	2.4409	2.4239	2.49984	2.48876	---------	2.5006	2.4463	2.4874	2.4515	2.4523	2.41016	2.41964			
2.500-16	UN	2A	2.4577	2.4306	2.4522	2.4522	2.4387	2.49830	2.48890	---------	2.5000	2.4594	2.4937	2.4666	2.4666	2.43200	2.44600	2B	UN	2.500-16
			2.4573	2.4300	2.4526	2.4518	2.4393	2.49814	2.48906	---------	2.5006	2.4598	2.4931	2.4662	2.4670	2.43216	2.44584			
		3A	2.4594	2.4323	2.4553	2.4553	2.4418	2.50000	2.49060	---------	2.5000	2.4594	2.4919	2.4648	2.4648	2.43200	2.44080	3B		
			2.4590	2.4317	2.4557	2.4549	2.4424	2.49984	2.49076	---------	2.5006	2.4598	2.4913	2.4644	2.4652	2.43216	2.44064			
2.500-20	UN	2A	2.4660	2.4443	2.4609	2.4609	2.4501	2.49850	2.49040	---------	2.5000	2.4675	2.4958	2.4741	2.4741	2.44600	2.45700	2B	UN	2.500-20
			2.4656	2.4438	2.4613	2.4605	2.4506	2.49834	2.49056	---------	2.5005	2.4679	2.4953	2.4737	2.4745	2.44616	2.45684			
		3A	2.4675	2.4458	2.4637	2.4637	2.4529	2.50000	2.49190	---------	2.5000	2.4675	2.4942	2.4725	2.4725	2.44600	2.45370	3B		
			2.4671	2.4453	2.4641	2.4633	2.4534	2.49984	2.49206	---------	2.5005	2.4679	2.4937	2.4721	2.4729	2.44616	2.45354			
2.625-6	UN	2A	2.5140	2.4418	2.5050	2.5050	2.4689	2.6223	2.6041	---------	2.6250	2.5167	2.6007	2.5285	2.5285	2.4450	2.4750	2B	UN	2.625-6
			2.5135	2.4410	2.5055	2.5045	2.4697	2.6221	2.6043	---------	2.6258	2.5172	2.5999	2.5280	2.5290	2.4452	2.4748			
		3A	2.5167	2.4445	2.5099	2.5099	2.4738	2.6250	2.6068	---------	2.6250	2.5167	2.5977	2.5255	2.5255	2.4450	2.4646	3B		
			2.5162	2.4437	2.5104	2.5094	2.4746	2.6248	2.6070	---------	2.6258	2.5172	2.5969	2.5250	2.5260	2.4452	2.4644			
2.625-8	UN	2A	2.5413	2.4872	2.5331	2.5331	2.5060	2.6225	2.6075	---------	2.6250	2.5438	2.6086	2.5545	2.5545	2.4900	2.5150	2B	UN	2.625-8
			2.5408	2.4865	2.5336	2.5326	2.5067	2.6223	2.6077	---------	2.6257	2.5443	2.6079	2.5540	2.5550	2.4902	2.5148			
		3A	2.5438	2.4897	2.5376	2.5376	2.5105	2.6250	2.6100	---------	2.6250	2.5438	2.6059	2.5518	2.5518	2.4900	2.5047	3B		
			2.5433	2.4890	2.5381	2.5371	2.5112	2.6248	2.6102	---------	2.6257	2.5443	2.6052	2.5513	2.5523	2.4902	2.5045			
2.625-12	UN	2A	2.5690	2.5329	2.5628	2.5628	2.5448	2.6231	2.6117	---------	2.6250	2.5709	2.6151	2.5790	2.5790	2.5350	2.5530	2B	UN	2.625-12
			2.5686	2.5323	2.5632	2.5624	2.5454	2.6229	2.6119	---------	2.6256	2.5713	2.6145	2.5786	2.5794	2.5352	2.5528			
		3A	2.5709	2.5348	2.5663	2.5663	2.5483	2.6250	2.6136	---------	2.6250	2.5709	2.6130	2.5769	2.5769	2.5350	2.5448	3B		
			2.5705	2.5342	2.5667	2.5659	2.5489	2.6248	2.6138	---------	2.6256	2.5713	2.6124	2.5765	2.5773	2.5352	2.5446			
2.625-16	UN	2A	2.5827	2.5556	2.5772	2.5772	2.5637	2.6233	2.6139	---------	2.6250	2.5844	2.6187	2.5916	2.5916	2.5570	2.5710	2B	UN	2.625-16
			2.5823	2.5550	2.5776	2.5768	2.5643	2.6231	2.6141	---------	2.6256	2.5848	2.6181	2.5912	2.5920	2.5572	2.5708			
		3A	2.5844	2.5573	2.5803	2.5803	2.5668	2.6250	2.6156	---------	2.6250	2.5844	2.6169	2.5898	2.5898	2.5570	2.5658	3B		
			2.5840	2.5567	2.5807	2.5799	2.5674	2.6248	2.6158	---------	2.6256	2.5848	2.6163	2.5894	2.5902	2.5572	2.5656			
2.625-20	UN	2A	2.5910	2.5693	2.5859	2.5859	2.5751	2.6235	2.6154	---------	2.6250	2.5925	2.6208	2.5991	2.5991	2.5710	2.5820	2B	UN	2.625-20
			2.5906	2.5688	2.5863	2.5855	2.5756	2.6233	2.6156	---------	2.6255	2.5929	2.6203	2.5987	2.5995	2.5712	2.5818			
		3A	2.5925	2.5708	2.5887	2.5887	2.5779	2.6250	2.6169	---------	2.6250	2.5925	2.6192	2.5975	2.5975	2.5710	2.5787	3B		
			2.5921	2.5703	2.5891	2.5883	2.5784	2.6248	2.6171	---------	2.6255	2.5929	2.6187	2.5971	2.5979	2.5712	2.5785			
2.750-4	UNC	1A	2.5844	2.4761	2.5686	2.5686	2.5145	2.7468	2.7111	---------	2.7500	2.5876	2.7165	2.6082	2.6082	2.4790	2.5170	1B	UNC	2.750-4
			2.5839	2.4752	2.5691	2.5681	2.5154	2.7466	2.7113	---------	2.7509	2.5881	2.7156	2.6077	2.6087	2.4792	2.5168			
		2A	2.5844	2.4761	2.5739	2.5739	2.5198	2.7468	2.7230	2.7111	2.7500	2.5876	2.7096	2.6013	2.6013	2.4790	2.5170	2B		
			2.5839	2.4752	2.5744	2.5734	2.5207	2.7466	2.7232	2.7113	2.7509	2.5881	2.7087	2.6008	2.6018	2.4792	2.5168			
		3A	2.5876	2.4793	2.5797	2.5797	2.5256	2.7500	2.7262	---------	2.7500	2.5876	2.7062	2.5979	2.5879	2.4790	2.5094	3B		
			2.5871	2.4784	2.5802	2.5792	2.5265	2.7498	2.7264	---------	2.7509	2.5881	2.7053	2.5974	2.5984	2.4792	2.5092			
2.750-6	UN	2A	2.6390	2.5668	2.6299	2.6299	2.5938	2.7473	2.7291	---------	2.7500	2.6417	2.7258	2.6536	2.6536	2.5700	2.6000	2B	UN	2.750-6
			2.6385	2.5660	2.6304	2.6294	2.5946	2.7471	2.7293	---------	2.7508	2.6422	2.7250	2.6531	2.6541	2.5702	2.5998			
		3A	2.6417	2.5695	2.6349	2.6349	2.5988	2.7500	2.7318	---------	2.7500	2.6417	2.7228	2.6506	2.6506	2.5700	2.5896	3B		
			2.6412	2.5687	2.6354	2.6344	2.5996	2.7498	2.7320	---------	2.7508	2.6422	2.7220	2.6501	2.6511	2.5702	2.5894			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads								Gages for internal threads							Class	Series designation	Nominal size and threads per inch
			X thread ring gages					Z plain ring gages for major diameter			X thread plug gages					Z plain plug gages for minor diameter				
			GO		LO			GO	NOT GO		GO		HI			GO	NOT GO			
			Pitch diameter	Minor diameter	Pitch diameter: Plus tolerance gage	Pitch diameter: Minus tolerance gage	Minor diameter		Semi-finished	Unfinished hot-rolled material	Major diameter	Pitch diameter	Major diameter	Pitch diameter: Minus tolerance gage	Pitch diameter: Plus tolerance gage					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
2.750–8	UN	2A	2.6663	2.6122	2.6580	2.6580	2.6309	2.7475	2.7325	2.7250	2.7500	2.6688	2.7337	2.6796	2.6796	2.6150	2.6400	2B	UN	2.750–8
			2.6658	2.6115	2.6585	2.6575	2.6316	2.7473	2.7327	2.7252	2.7507	2.6693	2.7330	2.6791	2.6801	2.6152	2.6398			
		3A	2.6688	2.6147	2.6625	2.6625	2.6354	2.7500	2.7350		2.7500	2.6688	2.7310	2.6769	2.6769	2.6150	2.6297	3B		
			2.6683	2.6140	2.6630	2.6620	2.6361	2.7498	2.7352		2.7507	2.6693	2.7303	2.6764	2.6774	2.6152	2.6295			
2.750–12	UN	2A	2.6940	2.6579	2.6878	2.6878	2.6698	2.7481	2.7367		2.7500	2.6959	2.7401	2.7040	2.7040	2.6600	2.6780	2B	UN	2.750–12
			2.6936	2.6573	2.6882	2.6874	2.6704	2.7479	2.7369		2.7506	2.6963	2.7395	2.7036	2.7044	2.6602	2.6778			
		3A	2.6959	2.6598	2.6913	2.6913	2.6733	2.7500	2.7386		2.7500	2.6959	2.7380	2.7019	2.7019	2.6600	2.6698	3B		
			2.6955	2.6592	2.6917	2.6909	2.6739	2.7498	2.7388		2.7506	2.6963	2.7374	2.7015	2.7023	2.6602	2.6696			
2.750–16	UN	2A	2.7077	2.6806	2.7022	2.7022	2.6887	2.7483	2.7389		2.7500	2.7094	2.7437	2.7166	2.7166	2.6820	2.6960	2B	UN	2.750–16
			2.7073	2.6800	2.7026	2.7018	2.6893	2.7481	2.7391		2.7506	2.7098	2.7431	2.7162	2.7170	2.6822	2.6958			
		3A	2.7094	2.6823	2.7053	2.7053	2.6918	2.7500	2.7406		2.7500	2.7094	2.7419	2.7148	2.7148	2.6820	2.6908	3B		
			2.7090	2.6817	2.7057	2.7049	2.6924	2.7498	2.7408		2.7506	2.7098	2.7413	2.7144	2.7152	2.6822	2.6906			
2.750–20	UN	2A	2.7160	2.6943	2.7109	2.7109	2.7001	2.7485	2.7404		2.7500	2.7175	2.7458	2.7241	2.7241	2.6960	2.7070	2B	UN	2.750–20
			2.7156	2.6938	2.7113	2.7105	2.7006	2.7483	2.7406		2.7505	2.7179	2.7453	2.7237	2.7245	2.6962	2.7068			
		3A	2.7175	2.6958	2.7137	2.7137	2.7029	2.7500	2.7419		2.7500	2.7175	2.7442	2.7225	2.7225	2.6960	2.7037	3B		
			2.7171	2.6953	2.7141	2.7133	2.7034	2.7498	2.7421		2.7505	2.7179	2.7437	2.7221	2.7229	2.6962	2.7035			
2.875–6	UN	2A	2.7639	2.6917	2.7547	2.7547	2.7186	2.8722	2.8540		2.8750	2.7667	2.8509	2.7787	2.7787	2.6950	2.7250	2B	UN	2.875–6
			2.7634	2.6909	2.7552	2.7542	2.7194	2.8720	2.8542		2.8758	2.7672	2.8501	2.7782	2.7792	2.6952	2.7248			
		3A	2.7667	2.6945	2.7598	2.7598	2.7237	2.8750	2.8568		2.8750	2.7667	2.8479	2.7757	2.7757	2.6950	2.7146	3B		
			2.7662	2.6937	2.7603	2.7593	2.7245	2.8748	2.8570		2.8758	2.7672	2.8471	2.7752	2.7762	2.6952	2.7144			
2.875–8	UN	2A	2.7913	2.7372	2.7829	2.7829	2.7558	2.8725	2.8575		2.8750	2.7938	2.8589	2.8048	2.8048	2.7400	2.7650	2B	UN	2.875–8
			2.7908	2.7365	2.7834	2.7824	2.7565	2.8723	2.8577		2.8757	2.7943	2.8582	2.8043	2.8053	2.7402	2.7648			
		3A	2.7938	2.7397	2.7875	2.7875	2.7604	2.8750	2.8600		2.8750	2.7938	2.8561	2.8020	2.8020	2.7400	2.7547	3B		
			2.7933	2.7390	2.7880	2.7870	2.7611	2.8748	2.8602		2.8757	2.7943	2.8554	2.8015	2.8025	2.7402	2.7545			
2.875–12	UN	2A	2.8190	2.7829	2.8127	2.8127	2.7947	2.8731	2.8617		2.8750	2.8209	2.8652	2.8291	2.8291	2.7850	2.8030	2B	UN	2.875–12
			2.8186	2.7823	2.8131	2.8123	2.7953	2.8729	2.8619		2.8756	2.8213	2.8646	2.8287	2.8295	2.7852	2.8028			
		3A	2.8209	2.7848	2.8162	2.8162	2.7982	2.8750	2.8636		2.8750	2.8209	2.8632	2.8271	2.8271	2.7850	2.7948	3B		
			2.8205	2.7842	2.8166	2.8158	2.7988	2.8748	2.8638		2.8756	2.8213	2.8626	2.8267	2.8275	2.7852	2.7946			
2.875–16	UN	2A	2.8327	2.8056	2.8271	2.8271	2.8136	2.8733	2.8639		2.8750	2.8344	2.8688	2.8417	2.8417	2.8070	2.8210	2B	UN	2.875–16
			2.8323	2.8050	2.8275	2.8267	2.8142	2.8731	2.8641		2.8756	2.8348	2.8682	2.8413	2.8421	2.8072	2.8208			
		3A	2.8344	2.8073	2.8302	2.8302	2.8167	2.8750	2.8656		2.8750	2.8344	2.8670	2.8399	2.8399	2.8070	2.8158	3B		
			2.8340	2.8067	2.8306	2.8298	2.8173	2.8748	2.8658		2.8756	2.8348	2.8664	2.8395	2.8403	2.8072	2.8156			
2.875–20	UN	2A	2.8409	2.8192	2.8357	2.8357	2.8249	2.8734	2.8653		2.8750	2.8425	2.8710	2.8493	2.8493	2.8210	2.8320	2B	UN	2.875–20
			2.8405	2.8187	2.8361	2.8353	2.8254	2.8732	2.8655		2.8755	2.8429	2.8705	2.8489	2.8497	2.8212	2.8318			
		3A	2.8425	2.8208	2.8386	2.8386	2.8278	2.8750	2.8669		2.8750	2.8425	2.8693	2.8476	2.8476	2.8210	2.8287	3B		
			2.8421	2.8203	2.8390	2.8382	2.8283	2.8748	2.8671		2.8755	2.8429	2.8688	2.8472	2.8480	2.8212	2.8285			
3.000–4	UNC	1A	2.8344	2.7261	2.8183	2.8183	2.7642	2.9968	2.9611		3.0000	2.8376	2.9668	2.8585	2.8585	2.7290	2.7670	1B	UNC	3.000–4
			2.8339	2.7252	2.8188	2.8178	2.7651	2.9966	2.9613		3.0009	2.8381	2.9659	2.8580	2.8590	2.7292	2.7668			
		2A	2.8344	2.7261	2.8237	2.8237	2.7696	2.9968	2.9730	2.9611	3.0000	2.8376	2.9598	2.8515	2.8515	2.7290	2.7670	2B		
			2.8339	2.7252	2.8242	2.8232	2.7705	2.9966	2.9732	2.9613	3.0009	2.8381	2.9589	2.8510	2.8520	2.7292	2.7668			
		3A	2.8376	2.7293	2.8296	2.8296	2.7755	3.0000	2.9762		3.0000	2.8376	2.9563	2.8480	2.8480	2.7290	2.7594	3B		
			2.8371	2.7284	2.8301	2.8291	2.7764	2.9998	2.9764		3.0009	2.8381	2.9554	2.8475	2.8485	2.7292	2.7592			

3.000-6	UN	2A	2.8889	2.8167	2.8796	2.8796	2.8435	2.9972	2.9790	---------	3.0000	2.8917	2.9760	2.9038	2.9038	2.8200	2.8500	2B	UN	3.000-6
			2.8884	2.8159	2.8801	2.8791	2.8443	2.9970	2.9792	---------	3.0008	2.8922	2.9752	2.9033	2.9043	2.8202	2.8498			
		3A	2.8917	2.8195	2.8847	2.8847	2.8486	3.0000	2.9818	---------	3.0000	2.8917	2.9730	2.9008	2.9008	2.8200	2.8396	3B		
			2.8912	2.8187	2.8852	2.8842	2.8494	2.9998	2.9820	---------	3.0008	2.8922	2.9722	2.9003	2.9013	2.8202	2.8394			
3.000-8	UN	2A	2.9162	2.8621	2.9077	2.9077	2.8806	2.9974	2.9824	2.9749	3.0000	2.9188	2.9840	2.9299	2.9299	2.8650	2.8900	2B	UN	3.000-8
			2.9157	2.8614	2.9082	2.9072	2.8813	2.9972	2.9826	2.9751	3.0007	2.9193	2.9833	2.9294	2.9304	2.8652	2.8898			
		3A	2.9188	2.8647	2.9124	2.9124	2.8853	3.0000	2.9850	---------	3.0000	2.9188	2.9812	2.9271	2.9271	2.8650	2.8797	3B		
			2.9183	2.8640	2.9129	2.9119	2.8860	2.9998	2.9852	---------	3.0007	2.9193	2.9805	2.9266	2.9276	2.8652	2.8795			
3.000-12	UN	2A	2.9440	2.9079	2.9377	2.9377	2.9197	2.9981	2.9867	---------	3.0000	2.9459	2.9902	2.9541	2.9541	2.9100	2.9280	2B	UN	3.000-12
			2.9436	2.9073	2.9381	2.9373	2.9203	2.9979	2.9869	---------	3.0006	2.9463	2.9896	2.9537	2.9545	2.9102	2.9278			
		3A	2.9459	2.9098	2.9412	2.9412	2.9232	3.0000	2.9886	---------	3.0000	2.9459	2.9882	2.9521	2.9521	2.9100	2.9198	3B		
			2.9455	2.9092	2.9416	2.9408	2.9238	2.9998	2.9888	---------	3.0006	2.9463	2.9876	2.9517	2.9525	2.9102	2.9196			
3.000-16	UN	2A	2.9577	2.9306	2.9521	2.9521	2.9386	2.9983	2.9889	---------	3.0000	2.9594	2.9938	2.9667	2.9667	2.9320	2.9460	2B	UN	3.000-16
			2.9573	2.9300	2.9525	2.9517	2.9392	2.9981	2.9891	---------	3.0006	2.9598	2.9932	2.9663	2.9671	2.9322	2.9458			
		3A	2.9594	2.9323	2.9552	2.9552	2.9417	3.0000	2.9906	---------	3.0000	2.9594	2.9920	2.9649	2.9649	2.9320	2.9408	3B		
			2.9590	2.9317	2.9556	2.9548	2.9423	2.9998	2.9908	---------	3.0006	2.9598	2.9914	2.9645	2.9653	2.9322	2.9406			
3.000-20	UN	2A	2.9659	2.9442	2.9607	2.9607	2.9499	2.9984	2.9903	---------	3.0000	2.9675	2.9960	2.9743	2.9743	2.9460	2.9570	2B	UN	3.000-20
			2.9655	2.9437	2.9611	2.9603	2.9504	2.9982	2.9905	---------	3.0005	2.9679	2.9955	2.9739	2.9747	2.9462	2.9568			
		3A	2.9675	2.9458	2.9636	2.9636	2.9528	3.0000	2.9919	---------	3.0000	2.9675	2.9943	2.9726	2.9726	2.9460	2.9537	3B		
			2.9671	2.9453	2.9640	2.9632	2.9533	2.9998	2.9921	---------	3.0005	2.9679	2.9938	2.9722	2.9730	2.9462	2.9535			
3.125-6	UN	2A	3.0139	2.9417	3.0045	3.0045	2.9684	3.1222	3.1040	---------	3.1250	3.0167	3.1011	3.0289	3.0289	2.9450	2.9750	2B	UN	3.125-6
			3.0134	2.9409	3.0050	3.0040	2.9692	3.1220	3.1042	---------	3.1258	3.0172	3.1003	3.0284	3.0294	2.9452	2.9748			
		3A	3.0167	2.9445	3.0097	3.0097	2.9736	3.1250	3.1068	---------	3.1250	3.0167	3.0981	3.0259	3.0259	2.9450	2.9646	3B		
			3.0162	2.9437	3.0102	3.0092	2.9744	3.1248	3.1070	---------	3.1258	3.0172	3.0973	3.0254	3.0264	2.9452	2.9644			
3.125-8	UN	2A	3.0412	2.9871	3.0326	3.0326	3.0055	3.1224	3.1074	---------	3.1250	3.0438	3.1091	3.0550	3.0550	2.9900	3.0150	2B	UN	3.125-8
			3.0407	2.9864	3.0331	3.0321	3.0062	3.1222	3.1076	---------	3.1257	3.0443	3.1084	3.0545	3.0555	2.9902	3.0148			
		3A	3.0438	2.9897	3.0374	3.0374	3.0103	3.1250	3.1100	---------	3.1250	3.0438	3.1063	3.0522	3.0522	2.9900	3.0047	3B		
			3.0433	2.9890	3.0379	3.0369	3.0110	3.1248	3.1102	---------	3.1257	3.0443	3.1056	3.0517	3.0527	2.9902	3.0045			
3.125-12	UN	2A	3.0690	3.0329	3.0627	3.0627	3.0447	3.1231	3.1117	---------	3.1250	3.0709	3.1152	3.0791	3.0791	3.0350	3.0530	2B	UN	3.125-12
			3.0686	3.0323	3.0631	3.0623	3.0453	3.1229	3.1119	---------	3.1256	3.0713	3.1146	3.0787	3.0795	3.0352	3.0528			
		3A	3.0709	3.0348	3.0662	3.0662	3.0482	3.1250	3.1136	---------	3.1250	3.0709	3.1132	3.0771	3.0771	3.0350	3.0448	3B		
			3.0705	3.0342	3.0666	3.0658	3.0488	3.1248	3.1138	---------	3.1256	3.0713	3.1126	3.0767	3.0775	3.0352	3.0446			
3.125-16	UN	2A	3.0827	3.0556	3.0771	3.0771	3.0636	3.1233	3.1139	---------	3.1250	3.0844	3.1188	3.0917	3.0917	3.0570	3.0710	2B	UN	3.125-16
			3.0823	3.0550	3.0775	3.0767	3.0642	3.1231	3.1141	---------	3.1256	3.0848	3.1182	3.0913	3.0921	3.0572	3.0708			
		3A	3.0844	3.0573	3.0802	3.0802	3.0667	3.1250	3.1156	---------	3.1250	3.0844	3.1170	3.0899	3.0899	3.0570	3.0658	3B		
			3.0840	3.0567	3.0806	3.0798	3.0673	3.1248	3.1158	---------	3.1256	3.0848	3.1164	3.0895	3.0903	3.0572	3.0656			
3.250-4	UNC	1A	3.0843	2.9760	3.0680	3.0680	3.0139	3.2467	3.2110	---------	3.2500	3.0876	3.2171	3.1088	3.1088	2.9790	3.0170	1B	UNC	3.250-4
			3.0838	2.9751	3.0685	3.0675	3.0148	3.2465	3.2112	---------	3.2509	3.0881	3.2162	3.1083	3.1093	2.9792	3.0168			
		2A	3.0843	2.9760	3.0734	3.0734	3.0193	3.2467	3.2229	3.2110	3.2500	3.0876	3.2100	3.1017	3.1017	2.9790	3.0170	2B		
			3.0838	2.9751	3.0739	3.0729	3.0202	3.2465	3.2231	3.2112	3.2509	3.0881	3.2091	3.1012	3.1022	2.9792	3.0168			
		3A	3.0876	2.9793	3.0794	3.0794	3.0253	3.2500	3.2262	---------	3.2500	3.0876	3.2065	3.0982	3.0982	2.9790	3.0094	3B		
			3.0871	2.9784	3.0799	3.0789	3.0262	3.2498	3.2264	---------	3.2509	3.0881	3.2056	3.0977	3.0987	2.9792	3.0092			
3.250-6	UN	2A	3.1389	3.0667	3.1294	3.1294	3.0933	3.2472	3.2290	---------	3.2500	3.1417	3.2262	3.1540	3.1540	3.0700	3.1000	2B	UN	3.250-6
			3.1384	3.0659	3.1299	3.1289	3.0941	3.2470	3.2292	---------	3.2508	3.1422	3.2254	3.1535	3.1545	3.0702	3.0998			
		3A	3.1417	3.0695	3.1346	3.1346	3.0985	3.2500	3.2318	---------	3.2500	3.1417	3.2231	3.1509	3.1509	3.0700	3.0896	3B		
			3.1412	3.0687	3.1351	3.1341	3.0993	3.2498	3.2320	---------	3.2508	3.1422	3.2223	3.1504	3.1514	3.0702	3.0894			
3.250-8	UN	2A	3.1662	3.1121	3.1575	3.1575	3.1304	3.2474	3.2324	3.2249	3.2500	3.1688	3.2342	3.1801	3.1801	3.1150	3.1400	2B	UN	3.250-8
			3.1657	3.1114	3.1580	3.1570	3.1311	3.2472	3.2326	3.2251	3.2507	3.1693	3.2335	3.1796	3.1806	3.1152	3.1398			
		3A	3.1688	3.1147	3.1623	3.1623	3.1352	3.2500	3.2350	---------	3.2500	3.1688	3.2314	3.1773	3.1773	3.1150	3.1297	3B		
			3.1683	3.1140	3.1628	3.1618	3.1359	3.2498	3.2352	---------	3.2507	3.1693	3.2307	3.1768	3.1778	3.1152	3.1295			
3.250-12	UN	2A	3.1940	3.1579	3.1877	3.1877	3.1697	3.2481	3.2367	---------	3.2500	3.1959	3.2402	3.2041	3.2041	3.1600	3.1780	2B	UN	3.250-12
			3.1936	3.1573	3.1881	3.1873	3.1703	3.2479	3.2369	---------	3.2506	3.1963	3.2396	3.2037	3.2045	3.1602	3.1778			
		3A	3.1959	3.1598	3.1912	3.1912	3.1732	3.2500	3.2386	---------	3.2500	3.1959	3.2382	3.2021	3.2021	3.1600	3.1698	3B		
			3.1955	3.1592	3.1916	3.1908	3.1738	3.2498	3.2388	---------	3.2506	3.1963	3.2376	3.2017	3.2025	3.1602	3.1696			
3.250-16	UN	2A	3.2077	3.1806	3.2021	3.2021	3.1886	3.2483	3.2389	---------	3.2500	3.2094	3.2438	3.2167	3.2167	3.1820	3.1960	2B	UN	3.250-16
			3.2073	3.1800	3.2025	3.2017	3.1892	3.2481	3.2391	---------	3.2506	3.2098	3.2432	3.2163	3.2171	3.1822	3.1958			
		3A	3.2094	3.1823	3.2052	3.2052	3.1917	3.2500	3.2406	---------	3.2500	3.2094	3.2420	3.2149	3.2149	3.1820	3.1908	3B		
			3.2090	3.1817	3.2056	3.2048	3.1923	3.2498	3.2408	---------	3.2506	3.2098	3.2414	3.2145	3.2153	3.1822	3.1906			
3.375-6	UN	2A	3.2638	3.1916	3.2543	3.2543	3.2182	3.3721	3.3539	---------	3.3750	3.2667	3.3513	3.2791	3.2791	3.1950	3.2250	2B	UN	3.375-6
			3.2633	3.1908	3.2548	3.2538	3.2190	3.3719	3.3541	---------	3.3758	3.2672	3.3505	3.2786	3.2796	3.1952	3.2248			
		3A	3.2667	3.1945	3.2595	3.2595	3.2234	3.3750	3.3568	---------	3.3750	3.2667	3.3482	3.2760	3.2760	3.1950	3.2146	3B		
			3.2662	3.1937	3.2600	3.2590	3.2242	3.3748	3.3570	---------	3.3758	3.2672	3.3474	3.2755	3.2765	3.1952	3.2144			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages, GO, Pitch diameter	X thread ring gages, GO, Minor diameter	X thread ring gages, LO, Pitch diameter, Plus tolerance gage	X thread ring gages, LO, Pitch diameter, Minus tolerance gage	X thread ring gages, LO, Minor diameter	Z plain ring gages for major diameter, GO	Z plain ring gages for major diameter, NOT GO, Semifinished	Z plain ring gages for major diameter, NOT GO, Unfinished hot-rolled material	Gages for internal threads: X thread plug gages, GO, Major diameter	X thread plug gages, GO, Pitch diameter	X thread plug gages, HI, Major diameter	X thread plug gages, HI, Pitch diameter, Minus tolerance gage	X thread plug gages, HI, Pitch diameter, Plus tolerance gage	Z plain plug gages for minor diameter, GO	Z plain plug gages for minor diameter, NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
3. 375–8	UN	2A	3. 2912	3. 2371	3. 2824	3. 2824	3. 2553	3. 3724	3. 3574	---------	3. 3750	3. 2938	3. 3593	3. 3052	3. 3052	3. 2400	3. 2650	2B	UN	3. 375–8
			3. 2907	3. 2364	3. 2829	3. 2819	3. 2560	3. 3722	3. 3576	---------	3. 3757	3. 2943	3. 3586	3. 3047	3. 3057	3. 2402	3. 2648			
		3A	3. 2938	3. 2397	3. 2872	3. 2872	3. 2601	3. 3750	3. 3600	---------	3. 3750	3. 2938	3. 3564	3. 3023	3. 3023	3. 2400	3. 2547	3B		
			3. 2933	3. 2390	3. 2877	3. 2867	3. 2608	3. 3748	3. 3602	---------	3. 3757	3. 2943	3. 3557	3. 3018	3. 3028	3. 2402	3. 2545			
3. 375–12	UN	2A	3. 3190	3. 2829	3. 3126	3. 3126	3. 2946	3. 3731	3. 3617	---------	3. 3750	3. 3209	3. 3654	3. 3293	3. 3293	3. 2850	3. 3030	2B	UN	3. 375–12
			3. 3186	3. 2823	3. 3130	3. 3122	3. 2952	3. 3729	3. 3619	---------	3. 3756	3. 3213	3. 3648	3. 3289	3. 3297	3. 2852	3. 3028			
		3A	3. 3209	3. 2848	3. 3161	3. 3161	3. 2981	3. 3750	3. 3636	---------	3. 3750	3. 3209	3. 3633	3. 3272	3. 3272	3. 2850	3 2948	3B		
			3. 3205	3. 2842	3. 3165	3. 3157	3. 2987	3. 3748	3. 3638	---------	3. 3756	3. 3213	3. 3627	3. 3268	3. 3276	3. 2852	3. 2946			
3. 375–16	UN	2A	3. 3327	3. 3056	3. 3269	3. 3269	3. 3134	3. 3733	3. 3639	---------	3. 3750	3. 3344	3. 3690	3. 3419	3. 3419	3. 3070	3. 3210	2B	UN	3. 375–16
			3. 3323	3. 3050	3. 3273	3. 3265	3. 3140	3. 3731	3. 3641	---------	3. 3756	3. 3348	3. 3684	3. 3415	3. 3423	3. 3072	3. 3208			
		3A	3. 3344	3. 3073	3. 3301	3. 3301	3. 3166	3. 3750	3. 3656	---------	3. 3750	3. 3344	3. 3671	3. 3400	3. 3400	3. 3070	3. 3158	3B		
			3. 3340	3. 3067	3. 3305	3. 3297	3. 3172	3. 3748	3. 3658	---------	3. 3756	3. 3348	3. 3665	3. 3396	3. 3404	3. 3072	3. 3156			
3. 500–4	UNC	1A	3. 3343	3. 2260	3. 3177	3. 3177	3. 2636	3. 4967	3. 4610	---------	3. 5000	3. 3376	3. 4674	3. 3591	3. 3591	3. 2290	3. 2670	1B	UNC	3. 500–4
			3. 3338	3. 2251	3. 3182	3. 3172	3. 2645	3. 4965	3. 4612	---------	3. 5009	3. 3381	3. 4665	3. 3586	3. 3596	3. 2292	3. 2668			
		2A	3. 3343	3. 2260	3. 3233	3. 3233	3. 2692	3. 4967	3. 4729	3. 4610	3. 5000	3. 3376	3. 4602	3. 3519	3. 3519	3. 2290	3. 2670	2B		
			3. 3338	3. 2251	3. 3238	3. 3228	3. 2701	3. 4965	3. 4731	3. 4612	3. 5009	3. 3381	3. 4593	3. 3514	3. 3524	3. 2292	3. 2668			
		3A	3. 3376	3. 2293	3. 3293	3. 3293	3. 2752	3. 5000	3. 4762	---------	3. 5000	3. 3376	3. 4567	3. 3484	3. 3484	3. 2290	3. 2594	3B		
			3. 3371	3. 2284	3. 3298	3. 3288	3. 2761	3. 4998	3. 4764	---------	3. 5009	3. 3381	3. 4558	3. 3479	3. 3489	3. 2292	3. 2592			
3. 500–6	UN	2A	3. 3888	3. 3166	3. 3792	3. 3792	3. 3431	3. 4971	3. 4789	---------	3. 5000	3. 3917	3. 4764	3. 4042	3. 4042	3. 3200	3. 3500	2B	UN	3. 500–6
			3. 3883	3. 3158	3. 3797	3. 3787	3. 3439	3. 4969	3. 4791	---------	3. 5008	3. 3922	3. 4756	3. 4037	3. 4047	3. 3202	3. 3498			
		3A	3. 3917	3. 3195	3. 3845	3. 3845	3. 3484	3. 5000	3. 4818	---------	3. 5000	3. 3917	3. 4733	3. 4011	3. 4011	3. 3200	3. 3396	3B		
			3. 3912	3. 3187	3. 3850	3. 3840	3. 3492	3. 4998	3. 4820	---------	3. 5008	3. 3922	3. 4725	3. 4006	3. 4016	3. 3202	3. 3394			
3. 500–8	UN	2A	3. 4162	3. 3621	3. 4074	3. 4074	3. 3803	3. 4974	3. 4824	3. 4749	3. 5000	3. 4188	3. 4844	3. 4303	3. 4303	3. 3650	3. 3900	2B	UN	3. 500–8
			3. 4157	3. 3614	3. 4079	3. 4069	3. 3810	3. 4972	3. 4826	3. 4751	3. 5007	3. 4193	3. 4837	3. 4298	3. 4308	3. 3652	3. 3898			
		3A	3. 4188	3. 3647	3. 4122	3. 4122	3. 3851	3. 5000	3. 4850	---------	3. 5000	3. 4188	3. 4815	3. 4274	3. 4274	3. 3650	3. 3797	3B		
			3. 4183	3. 3640	3. 4127	3. 4117	3. 3858	3. 4998	3. 4852	---------	3. 5007	3. 4193	3. 4808	3. 4269	3. 4279	3. 3652	3. 3795			
3. 500–12	UN	2A	3. 4440	3. 4079	3. 4376	3. 4376	3. 4196	3. 4981	3. 4867	---------	3. 5000	3. 4459	3. 4904	3. 4543	3. 4543	3. 4100	3. 4280	2B	UN	3. 500–12
			3. 4436	3. 4073	3. 4380	3. 4372	3. 4202	3. 4979	3. 4869	---------	3. 5006	3. 4463	3. 4898	3. 4539	3. 4547	3. 4102	3. 4278			
		3A	3. 4459	3. 4098	3. 4411	3. 4411	3. 4231	3. 5000	3. 4886	---------	3. 5000	3. 4459	3. 4883	3. 4522	3. 4522	3. 4100	3. 4198	3B		
			3. 4455	3. 4092	3. 4415	3. 4407	3. 4237	3. 4998	3. 4888	---------	3. 5006	3. 4463	3. 4877	3. 4518	3. 4526	3. 4102	3. 4196			
3. 500–16	UN	2A	3. 4577	3. 4306	3. 4519	3. 4519	3. 4384	3. 4983	3. 4889	---------	3. 5000	3. 4594	3. 4940	3. 4669	3. 4669	3. 4320	3. 4460	2B	UN	3. 500–16
			3. 4573	3. 4300	3. 4523	3. 4515	3. 4390	3. 4981	3. 4891	---------	3. 5006	3. 4598	3. 4934	3. 4665	3. 4673	3. 4322	3. 4458			
		3A	3. 4594	3. 4323	3. 4551	3. 4551	3. 4416	3. 5000	3. 4906	---------	3. 5000	3. 4594	3. 4921	3. 4650	3. 4650	3. 4320	3. 4408	3B		
			3. 4590	3. 4317	3. 4555	3. 4547	3. 4422	3. 4998	3. 4908	---------	3. 5006	3. 4598	3. 4915	3. 4646	3. 4654	3. 4322	3. 4406			
3. 625–6	UN	2A	3. 5138	3. 4416	3. 5041	3. 5041	3. 4680	3. 6221	3. 6039	---------	3. 6250	3. 5167	3. 6015	3. 5293	3. 5293	3. 4450	3. 4750	2B	UN	3. 625–6
			3. 5133	3. 4408	3. 5046	3. 5036	3. 4688	3. 6219	3. 6041	---------	3. 6258	3. 5172	3. 6007	3. 5288	3. 5298	3. 4452	3. 4748			
		3A	3. 5167	3. 4445	3. 5094	3. 5094	3. 4733	3. 6250	3. 6068	---------	3. 6250	3. 5167	3. 5984	3. 5262	3. 5262	3. 4450	3. 4646	3B		
			3. 5162	3. 4437	3. 5099	3. 5089	3. 4741	3. 6248	3. 6070	---------	3. 6258	3. 5172	3. 5976	3. 5257	3. 5267	3. 4452	3. 4644			
3. 625–8	UN	2A	3. 5411	3. 4870	3. 5322	3. 5322	3. 5051	3. 6223	3. 6073	---------	3. 6250	3. 5438	3. 6095	3. 5554	3. 5554	3. 4900	3. 5150	2B	UN	3. 625–8
			3. 5406	3. 4863	3. 5327	3. 5317	3. 5058	3. 6221	3. 6075	---------	3. 6257	3. 5443	3. 6088	3. 5549	3. 5559	3. 4902	3. 5148			
		3A	3. 5438	3. 4897	3. 5371	3. 5371	3. 5100	3. 6250	3. 6100	---------	3. 6250	3. 5438	3. 6066	3. 5525	3. 5525	3. 4900	3. 5047	3B		
			3. 5433	3. 4890	3. 5376	3. 5366	3. 5107	3. 6248	3. 6102	---------	3. 6257	3. 5443	3. 6059	3. 5520	3. 5530	3. 4902	3. 5045			

3.625-12	UN	2A	3.5690	3.5329	3.5626	3.5626	3.5446	3.6231	3.6117	--------	3.6250	3.5709	3.6154	3.5793	3.5793	3.5350	3.5530	2B	UN	3.625-12
			3.5686	3.5323	3.5630	3.5622	3.5452	3.6229	3.6119	--------	3.6256	3.5713	3.6148	3.5789	3.5797	3.5352	3.5528			
		3A	3.5709	3.5348	3.5661	3.5661	3.5481	3.6250	3.6136	--------	3.6250	3.5709	3.6133	3.5772	3.5772	3.5350	3.5448	3B		
			3.5705	3.5342	3.5665	3.5657	3.5487	3.6248	3.6138	--------	3.6256	3.5713	3.6127	3.5768	3.5776	3.5352	3.5446			
3.625-16	UN	2A	3.5827	3.5556	3.5769	3.5769	3.5634	3.6233	3.6139	--------	3.6250	3.5844	3.6190	3.5919	3.5919	3.5570	3.5710	2B	UN	3.625-16
			3.5823	3.5550	3.5773	3.5765	3.5640	3.6231	3.6141	--------	3.6256	3.5848	3.6184	3.5915	3.5923	3.5572	3.5708			
		3A	3.5844	3.5573	3.5801	3.5801	3.5666	3.6250	3.6156	--------	3.6250	3.5844	3.6171	3.5900	3.5900	3.5570	3.5658	3B		
			3.5840	3.5567	3.5805	3.5797	3.5672	3.6248	3.6158	--------	3.6256	3.5848	3.6165	3.5896	3.5904	3.5572	3.5656			
3.750-4	UNC	1A	3.5842	3.4759	3.5674	3.5674	3.5133	3.7466	3.7109	--------	3.7500	3.5876	3.7177	3.6094	3.6094	3.4790	3.5170	1B	UNC	3.750-4
			3.5837	3.4750	3.5679	3.5669	3.5142	3.7464	3.7111	--------	3.7509	3.5881	3.7168	3.6089	3.6099	3.4792	3.5168			
		2A	3.5842	3.4759	3.5730	3.5730	3.5189	3.7466	3.7228	3.7109	3.7500	3.5876	3.7104	3.6021	3.6021	3.4790	3.5170	2B		
			3.5837	3.4750	3.5735	3.5725	3.5198	3.7464	3.7230	3.7111	3.7509	3.5881	3.7095	3.6016	3.6026	3.4792	3.5168			
		3A	3.5876	3.4793	3.5792	3.5792	3.5251	3.7500	3.7262	--------	3.7500	3.5876	3.7068	3.5985	3.5985	3.4790	3.5094	3B		
			3.5871	3.4784	3.5797	3.5787	3.5260	3.7498	3.7264	--------	3.7509	3.5881	3.7059	3.5980	3.5990	3.4792	3.5092			
3.750-6	UN	2A	3.6388	3.5666	3.6290	3.6290	3.5929	3.7471	3.7289	--------	3.7500	3.6417	3.7266	3.6544	3.6544	3.5700	3.6000	2B	UN	3.750-6
			3.6383	3.5658	3.6295	3.6285	3.5937	3.7469	3.7291	--------	3.7508	3.6422	3.7258	3.6539	3.6549	3.5702	3.5998			
		3A	3.6417	3.5695	3.6344	3.6344	3.5983	3.7500	3.7318	--------	3.7500	3.6417	3.7234	3.6512	3.6512	3.5700	3.5896	3B		
			3.6412	3.5687	3.6349	3.6339	3.5991	3.7498	3.7320	--------	3.7508	3.6422	3.7226	3.6507	3.6517	3.5702	3.5894			
3.750-8	UN	2A	3.6661	3.6120	3.6571	3.6571	3.6300	3.7473	3.7323	3.7248	3.7500	3.6688	3.7346	3.6805	3.6805	3.6150	3.6400	2B	UN	3.750-8
			3.6656	3.6113	3.6576	3.6566	3.6307	3.7471	3.7325	3.7250	3.7507	3.6693	3.7339	3.6800	3.6810	3.6152	3.6398			
		3A	3.6688	3.6147	3.6621	3.6621	3.6350	3.7500	3.7350	--------	3.7500	3.6688	3.7317	3.6776	3.6776	3.6150	3.6297	3B		
			3.6683	3.6140	3.6626	3.6616	3.6357	3.7498	3.7352	--------	3.7507	3.6693	3.7310	3.6771	3.6781	3.6152	3.6295			
3.750-12	UN	2A	3.6940	3.6579	3.6876	3.6876	3.6696	3.7481	3.7367	--------	3.7500	3.6959	3.7404	3.7043	3.7043	3.6600	3.6780	2B	UN	3.750-12
			3.6936	3.6573	3.6880	3.6872	3.6702	3.7479	3.7369	--------	3.7506	3.6963	3.7398	3.7039	3.7047	3.6602	3.6778			
		3A	3.6959	3.6598	3.6911	3.6911	3.6731	3.7500	3.7386	--------	3.7500	3.6959	3.7383	3.7022	3.7022	3.6600	3.6698	3B		
			3.6955	3.6592	3.6915	3.6907	3.6737	3.7498	3.7388	--------	3.7506	3.6963	3.7377	3.7018	3.7026	3.6602	3.6696			
3.750-16	UN	2A	3.7077	3.6806	3.7019	3.7019	3.6884	3.7483	3.7389	--------	3.7500	3.7094	3.7440	3.7169	3.7169	3.6820	3.6960	2B	UN	3.750-16
			3.7073	3.6800	3.7023	3.7015	3.6890	3.7481	3.7391	--------	3.7506	3.7098	3.7434	3.7165	3.7173	3.6822	3.6958			
		3A	3.7094	3.6823	3.7051	3.7051	3.6916	3.7500	3.7406	--------	3.7500	3.7094	3.7421	3.7150	3.7150	3.6820	3.6908	3B		
			3.7090	3.6817	3.7055	3.7047	3.6922	3.7498	3.7408	--------	3.7506	3.7098	3.7415	3.7146	3.7154	3.6822	3.6906			
3.875-6	UN	2A	3.7637	3.6915	3.7538	3.7538	3.7177	3.8720	3.8538	--------	3.8750	3.7667	3.8517	3.7795	3.7795	3.6950	3.7250	2B	UN	3.875-6
			3.7632	3.6907	3.7543	3.7533	3.7185	3.8718	3.8540	--------	3.8758	3.7672	3.8509	3.7790	3.7800	3.6952	3.7248			
		3A	3.7667	3.6945	3.7593	3.7593	3.7232	3.8750	3.8568	--------	3.8750	3.7667	3.8485	3.7763	3.7763	3.6950	3.7146	3B		
			3.7662	3.6937	3.7598	3.7588	3.7240	3.8748	3.8570	--------	3.8758	3.7672	3.8477	3.7758	3.7768	3.6952	3.7144			
3.875-8	UN	2A	3.7911	3.7370	3.7820	3.7820	3.7549	3.8723	3.8573	--------	3.8750	3.7938	3.8597	3.8056	3.8056	3.7400	3.7650	2B	UN	3.875-8
			3.7906	3.7363	3.7825	3.7815	3.7556	3.8721	3.8575	--------	3.8757	3.7943	3.8590	3.8051	3.8061	3.7402	3.7648			
		3A	3.7938	3.7397	3.7870	3.7870	3.7599	3.8750	3.8600	--------	3.8750	3.7938	3.8567	3.8026	3.8026	3.7400	3.7547	3B		
			3.7933	3.7390	3.7875	3.7865	3.7606	3.8748	3.8602	--------	3.8757	3.7943	3.8560	3.8021	3.8031	3.7402	3.7545			
3.875-12	UN	2A	3.8189	3.7828	3.8124	3.8124	3.7944	3.8730	3.8616	--------	3.8750	3.8209	3.8655	3.8294	3.8294	3.7850	3.8030	2B	UN	3.875-12
			3.8185	3.7822	3.8128	3.8120	3.7950	3.8728	3.8618	--------	3.8756	3.8213	3.8649	3.8290	3.8298	3.7852	3.8028			
		3A	3.8209	3.7848	3.8160	3.8160	3.7980	3.8750	3.8636	--------	3.8750	3.8209	3.8634	3.8273	3.8273	3.7850	3.7948	3B		
			3.8205	3.7842	3.8164	3.8156	3.7986	3.8748	3.8638	--------	3.8756	3.8213	3.8628	3.8269	3.8277	3.7852	3.7946			
3.875-16	UN	2A	3.8326	3.8055	3.8267	3.8267	3.8132	3.8732	3.8638	--------	3.8750	3.8344	3.8691	3.8420	3.8420	3.8070	3.8210	2B	UN	3.875-16
			3.8322	3.8049	3.8271	3.8263	3.8138	3.8730	3.8640	--------	3.8756	3.8348	3.8685	3.8416	3.8424	3.8072	3.8208			
		3A	3.8344	3.8073	3.8300	3.8300	3.8165	3.8750	3.8656	--------	3.8750	3.8344	3.8672	3.8401	3.8401	3.8070	3.8158	3B		
			3.8340	3.8067	3.8304	3.8296	3.8171	3.8748	3.8658	--------	3.8756	3.8348	3.8666	3.8397	3.8405	3.8072	3.8156			
4.000-4	UNC	1A	3.8342	3.7259	3.8172	3.8172	3.7631	3.9966	3.9609	--------	4.0000	3.8376	3.9680	3.8597	3.8597	3.7290	3.7670	1B	UNC	4.000-4
			3.8337	3.7250	3.8177	3.8167	3.7640	3.9964	3.9611	--------	4.0009	3.8381	3.9671	3.8592	3.8602	3.7292	3.7668			
		2A	3.8342	3.7259	3.8229	3.8229	3.7688	3.9966	3.9728	3.9609	4.0000	3.8376	3.9606	3.8523	3.8523	3.7290	3.7670	2B		
			3.8337	3.7250	3.8234	3.8224	3.7697	3.9964	3.9730	3.9611	4.0009	3.8381	3.9597	3.8518	3.8528	3.7292	3.7668			
		3A	3.8376	3.7293	3.8291	3.8291	3.7750	4.0000	3.9762	--------	4.0000	3.8376	3.9570	3.8487	3.8487	3.7290	3.7594	3B		
			3.8371	3.7284	3.8296	3.8286	3.7759	3.9998	3.9764	--------	4.0009	3.8381	3.9561	3.8482	3.8492	3.7292	3.7592			
4.000-6	UN	2A	3.8887	3.8165	3.8788	3.8788	3.8427	3.9970	3.9788	--------	4.0000	3.8917	3.9768	3.9046	3.9046	3.8200	3.8500	2B	UN	4.000-6
			3.8882	3.8157	3.8793	3.8783	3.8435	3.9968	3.9790	--------	4.0008	3.8922	3.9760	3.9041	3.9051	3.8202	3.8498			
		3A	3.8917	3.8195	3.8843	3.8843	3.8482	4.0000	3.9818	--------	4.0000	3.8917	3.9736	3.9014	3.9014	3.8200	3.8396	3B		
			3.8912	3.8187	3.8848	3.8838	3.8490	3.9998	3.9820	--------	4.0008	3.8922	3.9728	3.9009	3.9019	3.8202	3.8394			
4.000-8	UN	2A	3.9161	3.8620	3.9070	3.9070	3.8799	3.9973	3.9823	3.9748	4.0000	3.9188	3.9848	3.9307	3.9307	3.8650	3.8900	2B	UN	4.000-8
			3.9156	3.8613	3.9075	3.9065	3.8806	3.9971	3.9825	3.9750	4.0007	3.9193	3.9841	3.9302	3.9312	3.8652	3.8898			
		3A	3.9188	3.8647	3.9120	3.9120	3.8849	4.0000	3.9850	--------	4.0000	3.9188	3.9818	3.9277	3.9277	3.8650	3.8797	3B		
			3.9183	3.8640	3.9125	3.9115	3.8856	3.9998	3.9852	--------	4.0007	3.9193	3.9811	3.9272	3.9282	3.8652	3.8795			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	Gages for external threads: X thread ring gages: GO: Minor diameter	Gages for external threads: X thread ring gages: LO: Pitch diameter: Plus tolerance gage	Gages for external threads: X thread ring gages: LO: Pitch diameter: Minus tolerance gage	Gages for external threads: X thread ring gages: LO: Minor diameter	Gages for external threads: Z plain ring gages for major diameter: GO	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Semi-finished	Gages for external threads: Z plain ring gages for major diameter: NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	Gages for internal threads: X thread plug gages: GO: Pitch diameter	Gages for internal threads: X thread plug gages: HI: Major diameter	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Minus tolerance gage	Gages for internal threads: X thread plug gages: HI: Pitch diameter: Plus tolerance gage	Gages for internal threads: Z plain plug gages for minor diameter: GO	Gages for internal threads: Z plain plug gages for minor diameter: NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
4.000–12	UN	2A	3.9439	3.9078	3.9374	3.9374	3.9194	3.9980	3.9866	---------	4.0000	3.9459	3.9905	3.9544	3.9544	3.9100	3.9280	2B	UN	4.000–12
			3.9435	3.9072	3.9378	3.9370	3.9200	3.9978	3.9868	---------	4.0006	3.9463	3.9899	3.9540	3.9548	3.9102	3.9278			
		3A	3.9459	3.9098	3.9410	3.9410	3.9230	4.0000	3.9886	---------	4.0000	3.9459	3.9884	3.9523	3.9523	3.9100	3.9198	3B		
			3.9455	3.9092	3.9414	3.9406	3.9236	3.9998	3.9888	---------	4.0006	3.9463	3.9878	3.9519	3.9527	3.9102	3.9196			
4.000–16	UN	2A	3.9576	3.9305	3.9517	3.9517	3.9382	3.9982	3.9888	---------	4.0000	3.9594	3.9941	3.9670	3.9670	3.9320	3.9460	2B	UN	4.000–16
			3.9572	3.9299	3.9521	3.9513	3.9388	3.9980	3.9890	---------	4.0006	3.9598	3.9935	3.9666	3.9674	3.9322	3.9458			
		3A	3.9594	3.9323	3.9550	3.9550	3.9415	4.0000	3.9906	---------	4.0000	3.9594	3.9922	3.9651	3.9651	3.9320	3.9408	3B		
			3.9590	3.9317	3.9554	3.9546	3.9421	3.9998	3.9908	---------	4.0006	3.9598	3.9916	3.9647	3.9655	3.9322	3.9406			
4.125–6	UN	2A	4.0137	3.9415	4.0037	4.0037	3.9676	4.1220	4.1038	---------	4.1250	4.0167	4.1019	4.0297	4.0297	3.9450	3.9750	2B	UN	4.125–6
			4.0131	3.9402	4.0043	4.0031	3.9689	4.1218	4.1040	---------	4.1263	4.0173	4.1006	4.0291	4.0303	3.9452	3.9748			
		3A	4.0167	3.9445	4.0092	4.0092	3.9731	4.1250	4.1068	---------	4.1250	4.0167	4.0986	4.0264	4.0264	3.9450	3.9646	3B		
			4.0161	3.9432	4.0098	4.0086	3.9744	4.1248	4.1070	---------	4.1263	4.0173	4.0973	4.0258	4.0270	3.9452	3.9644			
4.125–12	UN	2A	4.0689	4.0328	4.0624	4.0624	4.0444	4.1230	4.1116	---------	4.1250	4.0709	4.1155	4.0794	4.0794	4.0350	4.0530	2B	UN	4.125–12
			4.0683	4.0319	4.0630	4.0618	4.0453	4.1228	4.1118	---------	4.1259	4.0715	4.1146	4.0788	4.0800	4.0352	4.0528			
		3A	4.0709	4.0348	4.0660	4.0660	4.0480	4.1250	4.1136	---------	4.1250	4.0709	4.1134	4.0773	4.0773	4.0350	4.0448	3B		
			4.0703	4.0339	4.0666	4.0654	4.0489	4.1248	4.1138	---------	4.1259	4.0715	4.1125	4.0767	4.0779	4.0352	4.0446			
4.125–16	UN	2A	4.0826	4.0555	4.0767	4.0767	4.0632	4.1232	4.1138	---------	4.1250	4.0844	4.1191	4.0920	4.0920	4.0570	4.0710	2B	UN	4.125–16
			4.0820	4.0546	4.0773	4.0761	4.0641	4.1230	4.1140	---------	4.1259	4.0850	4.1182	4.0914	4.0926	4.0572	4.0708			
		3A	4.0844	4.0573	4.0800	4.0800	4.0665	4.1250	4.1156	---------	4.1250	4.0844	4.1172	4.0901	4.0901	4.0570	4.0658	3B		
			4.0838	4.0564	4.0806	4.0794	4.0674	4.1248	4.1158	---------	4.1259	4.0850	4.1163	4.0895	4.0907	4.0572	4.0656			
4.250–4	UN	2A	4.0842	3.9759	4.0727	4.0727	4.0186	4.2466	4.2228	---------	4.2500	4.0876	4.2108	4.1025	4.1025	3.9790	4.0170	2B	UN	4.250–4
			4.0836	3.9744	4.0733	4.0721	4.0201	4.2464	4.2230	---------	4.2515	4.0882	4.2093	4.1019	4.1031	3.9792	4.0168			
		3A	4.0876	3.9793	4.0790	4.0790	4.0249	4.2500	4.2262	---------	4.2500	4.0876	4.2071	4.0988	4.0988	3.9790	4.0094	3B		
			4.0870	3.9778	4.0796	4.0784	4.0264	4.2498	4.2264	---------	4.2515	4.0882	4.2056	4.0982	4.0994	3.9792	4.0092			
4.250–6	UN	2A	4.1387	4.0665	4.1286	4.1286	4.0925	4.2470	4.2288	---------	4.2500	4.1417	4.2270	4.1548	4.1548	4.0700	4.1000	2B	UN	4.250–6
			4.1381	4.0652	4.1292	4.1280	4.0938	4.2468	4.2290	---------	4.2513	4.1423	4.2257	4.1542	4.1554	4.0702	4.0998			
		3A	4.1417	4.0695	4.1342	4.1342	4.0981	4.2500	4.2318	---------	4.2500	4.1417	4.2237	4.1515	4.1515	4.0700	4.0896	3B		
			4.1411	4.0682	4.1348	4.1336	4.0994	4.2498	4.2320	---------	4.2513	4.1423	4.2224	4.1509	4.1521	4.0702	4.0894			
4.250–12	UN	2A	4.1939	4.1578	4.1874	4.1874	4.1694	4.2480	4.2366	---------	4.2500	4.1959	4.2405	4.2044	4.2044	4.1600	4.1780	2B	UN	4.250–12
			4.1933	4.1569	4.1880	4.1868	4.1703	4.2478	4.2368	---------	4.2509	4.1965	4.2396	4.2038	4.2050	4.1602	4.1778			
		3A	4.1959	4.1598	4.1910	4.1910	4.1730	4.2500	4.2386	---------	4.2500	4.1959	4.2384	4.2023	4.2023	4.1600	4.1698	3B		
			4.1953	4.1589	4.1916	4.1904	4.1739	4.2498	4.2388	---------	4.2509	4.1965	4.2375	4.2017	4.2029	4.1602	4.1696			
4.250–16	UN	2A	4.2076	4.1805	4.2017	4.2017	4.1882	4.2482	4.2388	---------	4.2500	4.2094	4.2441	4.2170	4.2170	4.1820	4.1960	2B	UN	4.250–16
			4.2070	4.1796	4.2023	4.2011	4.1891	4.2480	4.2390	---------	4.2509	4.2100	4.2432	4.2164	4.2176	4.1822	4.1958			
		3A	4.2094	4.1823	4.2050	4.2050	4.1915	4.2500	4.2406	---------	4.2500	4.2094	4.2422	4.2151	4.2151	4.1820	4.1908	3B		
			4.2088	4.1814	4.2056	4.2044	4.1924	4.2498	4.2408	---------	4.2509	4.2100	4.2413	4.2145	4.2157	4.1822	4.1906			
4.375–6	UN	2A	4.2637	4.1915	4.2536	4.2536	4.2175	4.3720	4.3538	---------	4.3750	4.2667	4.3521	4.2799	4.2799	4.1950	4.2250	2B	UN	4.375–6
			4.2631	4.1902	4.2542	4.2530	4.2188	4.3718	4.3540	---------	4.3763	4.2673	4.3508	4.2793	4.2805	4.1952	4.2248			
		3A	4.2667	4.1945	4.2591	4.2591	4.2230	4.3750	4.3568	---------	4.3750	4.2667	4.3488	4.2766	4.2766	4.1950	4.2146	3B		
			4.2661	4.1932	4.2597	4.2585	4.2243	4.3748	4.3570	---------	4.3763	4.2673	4.3475	4.2760	4.2772	4.1952	4.2144			

4.375-12	UN	2A	4.3189	4.2828	4.3124	4.3124	4.2944	4.3730	4.3616	----------	4.3750	4.3209	4.3655	4.3294	4.3294	4.2850	4.3030	2B	UN	4.375-12
			4.3183	4.2819	4.3130	4.3118	4.2953	4.3728	4.3618	----------	4.3759	4.3215	4.3646	4.3288	4.3300	4.2852	4.3028			
		3A	4.3209	4.2848	4.3160	4.3160	4.2980	4.3750	4.3636	----------	4.3750	4.3209	4.3634	4.3273	4.3273	4.2850	4.2948	3B		
			4.3203	4.2839	4.3166	4.3154	4.2989	4.3748	4.3638	----------	4.3759	4.3215	4.3625	4.3267	4.3279	4.2852	4.2946			
4.375-16	UN	2A	4.3326	4.3055	4.3267	4.3267	4.3132	4.3732	4.3638	----------	4.3750	4.3344	4.3691	4.3420	4.3420	4.3070	4.3210	2B	UN	4.375-16
			4.3320	4.3046	4.3273	4.3261	4.3141	4.3730	4.3640	----------	4.3759	4.3350	4.3682	4.3414	4.3426	4.3072	4.3208			
		3A	4.3344	4.3073	4.3300	4.3300	4.3165	4.3750	4.3656	----------	4.3750	4.3344	4.3672	4.3401	4.3401	3.3070	4.3158	3B		
			4.3338	4.3064	4.3306	4.3294	4.3174	4.3748	4.3658	----------	4.3759	4.3350	4.3663	4.3395	4.3407	4.3072	4.3156			
4.500-4	UN	2A	4.3341	4.2258	4.3225	4.3225	4.2684	4.4965	4.4727	----------	4.5000	4.3376	4.4610	4.3527	4.3527	4.2290	4.2670	2B	UN	4.500-4
			4.3335	4.2243	4.3231	4.3219	4.2699	4.4963	4.4729	----------	4.5015	4.3382	4.4595	4.3521	4.3533	4.2292	4.2668			
		3A	4.3376	4.2293	4.3289	4.3289	4.2748	4.5000	4.4762	----------	4.5000	4.3376	4.4572	4.3489	4.3489	4.2290	4.2594	3B		
			4.3370	4.2278	4.3295	4.3283	4.2763	4.4998	4.4764	----------	4.5015	4.3382	4.4557	4.3483	4.3495	4.2292	4.2592			
4.500-6	UN	2A	4.3886	4.3164	4.3784	4.3784	4.3423	4.4969	4.4787	----------	4.5000	4.3917	4.4772	4.4050	4.4050	4.3200	4.3500	2B	UN	4.500-6
			4.3880	4.3151	4.3790	4.3778	4.3436	4.4967	4.4789	----------	4.5013	4.3923	4.4759	4.4044	4.4056	4.3202	4.3498			
		3A	4.3917	4.3195	4.3840	4.3840	4.3479	4.5000	4.4818	----------	4.5000	4.3917	4.4738	4.4016	4.4016	4.3200	4.3396	3B		
			4.3911	4.3182	4.3846	4.3834	4.3492	4.4998	4.4820	----------	4.5013	4.3923	4.4725	4.4010	4.4022	4.3202	4.3394			
4.500-12	UN	2A	4.4439	4.4078	4.4374	4.4374	4.4194	4.4980	4.4866	----------	4.5000	4.4459	4.4905	4.4544	4.4544	4.4100	4.4280	2B	UN	4.500-12
			4.4433	4.4069	4.4380	4.4368	4.4203	4.4978	4.4868	----------	4.5009	4.4465	4.4896	4.4538	4.4550	4.4102	4.4278			
		3A	4.4459	4.4098	4.4410	4.4410	4.4230	4.5000	4.4886	----------	4.5000	4.4459	4.4884	4.4523	4.4523	4.4100	4.4198	3B		
			4.4453	4.4089	4.4416	4.4404	4.4239	4.4998	4.4888	----------	4.5009	4.4465	4.4875	4.4517	4.4529	4.4102	4.4196			
4.500-16	UN	2A	4.4576	4.4305	4.4517	4.4517	4.4382	4.4982	4.4888	----------	4.5000	4.4594	4.4941	4.4670	4.4670	4.4320	4.4460	2B	UN	4.500-16
			4.4570	4.4296	4.4523	4.4511	4.4391	4.4980	4.4890	----------	4.5009	4.4600	4.4932	4.4664	4.4676	4.4322	4.4458			
		3A	4.4594	4.4323	4.4550	4.4550	4.4415	4.5000	4.4906	----------	4.5000	4.4594	4.4922	4.4651	4.4651	4.4320	4.4408	3B		
			4.4588	4.4314	4.4556	4.4544	4.4424	4.4998	4.4908	----------	4.5009	4.4600	4.4913	4.4645	4.4657	4.4322	4.4406			
4.625-6	UN	2A	4.5136	4.4414	4.5033	4.5033	4.4672	4.62190	4.60370	----------	4.6250	4.5167	4.6022	4.5300	4.5300	4.44500	4.47500	2B	UN	4.625-6
			4.5130	4.4401	4.5039	4.5027	4.4685	4.62165	4.60395	----------	4.6263	4.5173	4.6009	4.5294	4.5306	4.44525	4.47475			
		3A	4.5167	4.4445	4.5090	4.5090	4.4729	4.62500	4.60680	----------	4.6250	4.5167	4.5989	4.5267	4.5267	4.44500	4.46460	3B		
			4.5161	4.4432	4.5096	4.5084	4.4742	4.62475	4.60705	----------	4.6263	4.5173	4.5976	4.5261	4.5273	4.44525	4.46435			
4.625-12	UN	2A	4.5689	4.5328	4.5622	4.5622	4.5442	4.62300	4.61160	----------	4.6250	4.5709	4.6157	4.5796	4.5796	4.53500	4.55300	2B	UN	4.625-12
			4.5683	4.5319	4.5628	4.5616	4.5451	4.62275	4.61185	----------	4.6259	4.5715	4.6148	4.5790	4.5802	4.53525	4.55275			
		3A	4.5709	4.5348	4.5659	4.5659	4.5479	4.62500	4.61360	----------	4.6250	4.5709	4.6136	4.5775	4.5775	4.53500	4.54480	3B		
			4.5703	4.5339	4.5665	4.5653	4.5488	4.62475	4.61385	----------	4.6259	4.5715	4.6127	4.5769	4.5781	4.53525	4.54455			
4.625-16	UN	2A	4.5826	4.5555	4.5765	4.5765	4.5630	4.62320	4.61380	----------	4.6250	4.5844	4.6194	4.5923	4.5923	4.55700	4.57100	2B	UN	4.625-16
			4.5820	4.5546	4.5771	4.5759	4.5639	4.62295	4.61405	----------	4.6259	4.5850	4.6185	4.5917	4.5929	4.55725	4.57075			
		3A	4.5844	4.5573	4.5799	4.5799	4.5664	4.62500	4.61560	----------	4.6250	4.5844	4.6174	4.5903	4.5903	4.55700	4.56580	3B		
			4.5838	4.5564	4.5805	4.5793	4.5673	4.62475	4.61585	----------	4.6259	4.5850	4.6165	4.5897	4.5909	4.55725	4.56555			
4.750-4	UN	2A	4.5841	4.4758	4.5724	4.5724	4.5183	4.74650	4.72270	----------	4.7500	4.5876	4.7112	4.6029	4.6029	4.47900	4.51700	2B	UN	4.750-4
			4.5835	4.4743	4.5730	4.5718	4.5198	4.74625	4.72295	----------	4.7515	4.5882	4.7097	4.6023	4.6035	4.47925	4.51675			
		3A	4.5876	4.4793	4.5788	4.5788	4.5247	4.75000	4.72620	----------	4.7500	4.5876	4.7073	4.5990	4.5990	4.47900	4.50940	3B		
			4.5870	4.4778	4.5794	4.5782	4.5262	4.74975	4.72645	----------	4.7515	4.5882	4.7058	4.5984	4.5996	4.47925	4.50915			
4.750-6	UN	2A	4.6386	4.5664	4.6283	4.6283	4.5922	4.74690	4.72870	----------	4.7500	4.6417	4.7273	3.6551	4.6551	4.57000	4.60000	2B	UN	4.750-6
			4.6380	4.5651	4.6289	4.6277	4.5935	4.74665	4.72895	----------	4.7513	4.6423	4.7260	4.6545	4.6557	4.57025	4.59975			
		3A	4.6417	4.5695	4.6340	4.6340	4.5979	4.75000	4.73180	----------	4.7500	4.6417	4.7240	4.6518	4.6518	4.57000	4.58960	3B		
			4.6411	4.5682	4.6346	4.6334	4.5992	4.74975	4.73205	----------	4.7513	4.6423	4.7227	4.6512	4.6524	4.57025	4.58935			
4.750-12	UN	2A	4.6939	4.6578	4.6872	4.6872	4.6692	4.74800	4.73660	----------	4.7500	4.6959	4.7407	4.7046	4.7046	4.66000	4.67800	2B	UN	4.750-12
			4.6933	4.6569	4.6878	4.6866	4.6701	4.74775	4.73685	----------	4.7509	4.6965	4.7398	4.7040	4.7052	4.66025	4.67775			
		3A	4.6959	4.6598	4.6909	4.6909	4.6729	4.75000	4.73860	----------	4.7500	4.6959	4.7386	4.7025	4.7025	4.66000	4.66980	3B		
			4.6953	4.6589	4.6915	4.6903	4.6738	4.74975	4.73885	----------	4.7509	4.6965	4.7377	4.7019	4.7031	4.66025	4.66955			
4.750-16	UN	2A	4.7076	4.6805	4.7015	4.7015	4.6880	4.74820	4.73880	----------	4.7500	4.7094	4.7444	4.7173	4.7173	4.68200	4.69600	2B	UN	4.750-16
			4.7070	4.6796	4.7021	4.7009	4.6889	4.74795	4.73905	----------	4.7509	4.7100	4.7435	4.7167	4.7179	4.68225	2.69575			
		3A	4.7094	4.6823	4.7049	4.7049	4.6914	4.75000	4.74060	----------	4.7500	4.7094	4.7424	4.7153	4.7153	4.68200	4.69080	3B		
			4.7088	4.6814	4.7055	4.7043	4.6923	4.74975	4.74085	----------	4.7509	4.7100	4.7415	4.7147	4.7159	4.68225	4.69055			
4.875-6	UN	2A	4.7636	4.6914	4.7532	4.7532	4.7171	4.87190	4.85370	----------	4.8750	4.7667	4.8524	4.7802	4.7802	4.69500	4.72500	2B	UN	4.875-6
			4.7630	4.6901	4.7538	4.7526	4.7184	4.87165	4.85395	----------	4.8763	4.7673	4.8511	4.7796	4.7808	4.69525	4.72475			
		3A	4.7667	4.6945	4.7589	4.7589	4.7228	4.87500	4.85680	----------	4.8750	4.7667	4.8490	4.7768	4.7768	4.69500	4.71460	3B		
			4.7661	4.6932	4.7595	4.7583	4.7241	4.87475	4.85705	----------	4.8763	4.7673	4.8477	4.7762	4.7774	4.69525	4.71435			
4.875-12	UN	2A	4.8189	4.7828	4.8122	4.8122	4.7942	4.87300	4.86160	----------	4.8750	4.8209	4.8657	4.8296	4.8296	4.78500	4.80300	2B	UN	4.875-12
			4.8183	4.7819	4.8128	4.8116	4.7951	4.87275	4.86185	----------	4.8759	4.8215	4.8648	4.8290	4.8302	4.78525	4.80275			
		3A	4.8209	4.7848	4.8159	4.8159	4.7979	4.87500	4.86360	----------	4.8750	4.8209	4.8636	4.8275	4.8275	4.78500	4.79480	3B		
			4.8203	4.7839	4.8165	4.8153	4.7988	4.87475	4.86385	----------	4.8759	4.8215	4.8627	4.8269	4.8281	4.78525	4.79455			
4.875-16	UN	2A	4.8326	4.8055	4.8265	4.8265	4.8130	4.87320	4.86380	----------	4.8750	4.8344	4.8694	4.8423	4.8423	4.80700	4.82100	2B	UN	4.875-16
			4.8320	4.8046	4.8271	4.8259	4.8139	4.87295	4.86405	----------	4.8759	4.8350	4.8685	4.8417	4.8429	4.80725	4.82075			
		3A	4.8344	4.8073	4.8299	4.8299	4.8164	4.87500	4.86560	----------	4.8750	4.8344	4.8674	4.8403	4.8403	4.80700	4.81580	3B		
			4.8338	4.8064	4.8305	4.8293	4.8173	4.87475	4.86585	----------	4.8759	4.8350	4.8665	4.8397	4.8409	4.80725	4.81555			

TABLE 6.19. *Gages for standard thread series, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads: X thread ring gages: GO: Pitch diameter	GO: Minor diameter	LO: Pitch diameter: Plus tolerance gage	LO: Pitch diameter: Minus tolerance gage	LO: Minor diameter	Z plain ring gages for major diameter: GO	NOT GO: Semifinished	NOT GO: Unfinished hot-rolled material	Gages for internal threads: X thread plug gages: GO: Major diameter	GO: Pitch diameter	HI: Major diameter	HI: Pitch diameter: Minus tolerance gage	HI: Pitch diameter: Plus tolerance gage	Z plain plug gages for minor diameter: GO	NOT GO	Class	Series designation	Nominal size and threads per inch
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*			
5.000-4	UN	2A	4.8340	4.7257	4.8221	4.8221	4.7680	4.99640	4.97260		5.0000	4.8376	4.9613	4.8530	4.8530	4.72900	4.76700	2B	UN	5.000-4
			4.8334	4.7242	4.8227	4.8215	4.7695	4.99615	4.97285		5.0015	4.8382	4.9598	4.8524	4.8536	4.72925	4.76675			
		3A	4.8376	4.7293	4.8287	4.8287	4.7746	5.00000	4.97620		5.0000	4.8376	4.9575	4.8492	4.8492	4.72900	4.75940	3B		
			4.8370	4.7278	4.8293	4.8281	4.7761	4.99975	4.97645		5.0015	4.8382	4.9560	4.8486	4.8498	4.72925	4.75915			
5.000-6	UN	2A	4.8886	4.8164	4.8781	4.8781	4.8420	4.99690	4.97870		5.0000	4.8917	4.9775	4.9053	4.9053	4.82000	4.85000	2B	UN	5.000-6
			4.8880	4.8151	4.8787	4.8775	4.8433	4.99665	4.97895		5.0013	4.8923	4.9762	4.9047	4.9059	4.82025	4.84975			
		3A	4.8917	4.8195	4.8839	4.8839	4.8478	5.00000	4.98180		5.0000	4.8917	4.9741	4.9019	4.9019	4.82000	4.83960	3B		
			4.8911	4.8182	4.8845	4.8833	4.8491	4.99975	4.98205		5.0013	4.8923	4.9728	4.9013	4.9025	4.82025	4.83935			
5.000-12	UN	2A	4.9439	4.9078	4.9372	4.9372	4.9192	4.99800	4.98660		5.0000	4.9459	4.9907	4.9546	4.9546	4.91000	4.92800	2B	UN	5.000-12
			4.9433	4.9069	4.9378	4.9366	4.9201	4.99775	4.98685		5.0009	4.9465	4.9898	4.9540	4.9552	4.91025	4.92775			
		3A	4.9459	4.9098	4.9409	4.9409	4.9229	5.00000	4.98860		5.0000	4.9459	4.9886	4.9525	4.9525	4.91000	4.91980	3B		
			4.9453	4.9089	4.9415	4.9403	4.9238	4.99975	4.98885		5.0009	4.9465	4.9877	4.9519	4.9531	4.91025	4.91955			
5.000-16	UN	2A	4.9576	4.9305	4.9515	4.9515	4.9380	4.99820	4.98880		5.0000	4.9594	4.9944	4.9673	4.9673	4.93200	4.94600	2B	UN	5.000-16
			4.9570	4.9296	4.9521	4.9509	4.9389	4.99795	4.98905		5.0009	4.9600	4.9935	4.9667	4.9679	4.93225	4.94575			
		3A	4.9594	4.9323	4.9549	4.9549	4.9414	5.00000	4.99060		5.0000	4.9594	4.9924	4.9653	4.9653	4.93200	4.94080	3B		
			4.9588	4.9314	4.9555	4.9543	4.9423	4.99975	4.99085		5.0009	4.9600	4.9915	4.9647	4.9659	4.93225	4.94055			
5.125-12	UN	2A	5.0689	5.0328	5.0622	5.0622	5.0442	5.12300	5.11160		5.1250	5.0709	5.1157	5.0796	5.0796	5.03500	5.05300	2B	UN	5.125-12
			5.0683	5.0319	5.0628	5.0616	5.0451	5.12275	5.11185		5.1259	5.0715	5.1148	5.0790	5.0802	5.03525	5.05275			
		3A	5.0709	5.0348	5.0659	5.0659	5.0479	5.12500	5.11360		5.1250	5.0709	5.1136	5.0775	5.0775	5.03500	5.04480	3B		
			5.0703	5.0339	5.0655	5.0653	5.0488	5.12475	5.11385		5.1259	5.0715	5.1127	5.0769	5.0781	5.03525	5.04455			
5.125-16	UN	2A	5.0826	5.0555	5.0765	5.0765	5.0630	5.12320	5.11380		5.1250	5.0844	5.1194	5.0923	5.0923	5.05700	5.07100	2B	UN	5.125-16
			5.0820	5.0546	5.0771	5.0759	5.0639	5.12295	5.11405		5.1259	5.0850	5.1185	5.0917	5.0929	5.05725	5.07075			
		3A	5.0844	5.0573	5.0799	5.0799	5.0664	5.12500	5.11560		5.1250	5.0844	5.1174	5.0903	5.0903	5.05700	5.06580	3B		
			5.0838	5.0564	5.0805	5.0793	5.0673	5.12475	5.11585		5.1259	5.0850	5.1165	5.0897	5.0909	5.05725	5.06555			
5.250-4	UN	2A	5.0840	4.9757	5.0720	5.0720	5.0179	5.24640	5.22260		5.2500	5.0876	5.2115	5.1032	5.1032	4.97900	5.01700	2B	UN	5.250-4
			5.0834	4.9742	5.0726	5.0714	5.0194	5.24615	5.22285		5.2515	5.0882	5.2100	5.1026	5.1038	4.97925	5.01675			
		3A	5.0876	4.9793	5.0786	5.0786	5.0245	5.25000	5.22620		5.2500	5.0876	5.2076	5.0993	5.0993	4.97900	5.00940	3B		
			5.0870	4.9778	5.0792	5.0780	5.0260	5.24975	5.22645		5.2515	5.0882	5.2061	5.0987	5.0999	4.97925	5.00915			
5.250-12	UN	2A	5.1939	5.1578	5.1872	5.1872	5.1692	5.24800	5.23660		5.2500	5.1959	5.2407	5.2046	5.2046	5.16000	5.17800	2B	UN	5.250-12
			5.1933	5.1569	5.1878	5.1866	5.1701	5.24775	5.23685		5.2509	5.1965	5.2398	5.2040	5.2052	5.16025	5.17775			
		3A	5.1959	5.1598	5.1909	5.1909	5.1729	5.25000	5.23860		5.2500	5.1959	5.2386	5.2025	5.2025	5.16000	5.16980	3B		
			5.1953	5.1589	5.1915	5.1903	5.1738	5.24975	5.23885		5.2509	5.1965	5.2377	5.2019	5.2031	5.16025	5.16955			
5.250-16	UN	2A	5.2076	5.1805	5.2015	5.2015	5.1880	5.24820	5.23880		5.2500	5.2094	5.2444	5.2173	5.2173	5.18200	5.19600	2B	UN	5.250-16
			5.2070	5.1796	5.2021	5.2009	5.1889	5.24795	5.23905		5.2509	5.2100	5.2435	5.2167	5.2179	5.18225	5.19575			
		3A	5.2094	5.1823	5.2049	5.2049	5.1914	5.25000	5.24060		5.2500	5.2094	5.2424	5.2153	5.2153	5.18200	5.19080	3B		
			5.2088	5.1814	5.2055	5.2043	5.1923	5.24975	5.24085		5.2509	5.2100	5.2415	5.2147	5.2159	5.18225	5.19055			
5.375-12	UN	2A	5.3189	5.2828	5.3122	5.3122	5.2942	5.37300	5.36160		5.3750	5.3209	5.3657	5.3296	5.3296	5.28500	5.30300	2B	UN	5.375-12
			5.3183	5.2819	5.3128	5.3116	5.2951	5.37275	5.36185		5.3759	5.3215	5.3648	5.3290	5.3302	5.28525	5.30275			
		3A	5.3209	5.2848	5.3159	5.3159	5.2979	5.37500	5.36360		5.3750	5.3209	5.3636	5.3275	5.3275	5.28500	5.29480	3B		
			5.3203	5.2839	5.3165	5.3153	5.2988	5.37475	5.36385		5.3759	5.3215	5.3627	5.3269	5.3281	5.28525	5.29455			

5.375-16	UN	2A	5.3326	5.3055	5.3265	5.3265	5.3130	5.37320	5.36380	---------	5.3750	5.3344	5.3694	5.3423	5.3423	5.30700	5.32100	2B	UN	5.375-16
			5.3320	5.3046	5.3271	5.3259	5.3139	5.37295	5.36405	---------	5.3759	5.3350	5.3685	5.3417	5.3429	5.30725	5.32075			
		3A	5.3344	5.3073	5.3299	5.3299	5.3164	5.37500	5.36560	---------	5.3750	5.3344	5.3674	5.3403	5.3403	5.30700	5.31580	3B		
			5.3338	5.3064	5.3305	5.3293	5.3173	5.37475	5.36585	---------	5.3759	5.3350	5.3665	5.3397	5.3409	5.30725	5.31555			
5.500-4	UN	2A	5.3340	5.2257	5.3219	5.3219	5.2678	5.49640	5.47260	---------	5.5000	5.3376	5.4617	5.3534	5.3534	5.22900	5.26700	2B	UN	5.500-4
			5.3334	5.2242	5.3225	5.3213	5.2693	5.49615	5.47285	---------	5.5015	5.3382	5.4602	5.3528	4.3540	5.22925	5.26675			
		3A	5.3376	5.2293	5.3285	5.3285	5.2744	5.50000	5.47620	---------	5.5000	5.3376	5.4577	5.3494	5.3494	5.22900	5.25940	3B		
			5.3370	5.2278	5.3291	5.3279	5.2759	5.49975	5.47645	---------	5.5015	5.3382	5.4562	5.3488	5.3500	5.22925	5.25915			
5.500-12	UN	2A	5.4439	5.4078	5.4372	5.4372	5.4192	5.49800	5.48660	---------	5.5000	5.4459	5.4907	5.4546	5.4546	5.41000	5.42800	2B	UN	5.500-12
			5.4433	5.4069	5.4378	5.4366	5.4201	5.49775	5.48685	---------	5.5009	5.4465	5.4898	5.4540	5.4552	5.41025	5.42775			
		3A	5.4459	5.4098	5.4409	5.4409	5.4229	5.50000	5.48860	---------	5.5000	5.4459	5.4886	5.4525	5.4525	5.41000	5.41980	3B		
			5.4453	5.4089	5.4415	5.4403	5.4238	5.49975	5.48885	---------	5.5009	5.4465	5.4877	5.4519	5.4531	5.41025	5.41955			
5.500-16	UN	2A	5.4576	5.4305	5.4515	5.4515	5.4380	5.49820	5.48880	---------	5.5000	5.4594	5.4944	5.4673	5.4673	5.43200	5.44600	2B	UN	5.500-16
			5.4570	5.4296	5.4521	5.4509	5.4389	5.49795	5.48905	---------	5.5009	5.4600	5.4935	5.4667	5.4679	5.43225	5.44575			
		3A	5.4594	5.4323	5.4549	5.4549	5.4414	5.50000	4.49060	---------	5.5000	5.4594	5.4924	5.4653	5.4653	5.43200	5.44080	3B		
			5.4588	5.4314	5.4555	5.4543	5.4423	5.49975	5.49085	---------	5.5009	5.4600	5.4915	5.4647	5.4659	5.43225	5.44055			
5.625-12	UN	2A	5.5688	5.5327	5.5619	5.5619	5.5439	5.62290	5.61150	---------	5.6250	5.5709	5.6160	5.5799	5.5799	5.53500	5.55300	2B	UN	5.625-12
			5.5682	5.5318	5.5625	5.5613	5.5448	5.62265	5.61175	---------	5.6259	5.5715	5.6151	5.5793	5.5805	5.53525	5.55275			
		3A	5.5709	5.5348	5.5657	5.5657	5.5477	5.62500	5.61360	---------	5.6250	5.5709	5.6137	5.5776	5.5776	5.53500	5.54480	3B		
			5.5703	5.5339	5.5663	5.5651	5.5486	5.62475	5.61385	---------	5.6259	5.5715	5.6128	5.5770	5.5782	5.53525	5.54455			
5.625-16	UN	2A	5.5825	5.5554	5.5763	5.5763	5.5628	5.62310	5.61370	---------	5.6250	5.5844	5.6196	5.5925	5.5925	5.55700	5.57100	2B	UN	5.625-16
			5.5819	5.5545	5.5769	5.5757	5.5637	5.62285	5.61395	---------	5.6259	5.5850	5.6187	5.5919	5.5931	5.55725	5.57075			
		3A	5.5844	5.5573	5.5797	5.5797	5.5662	5.62500	5.61560	---------	5.6250	5.5844	5.6176	5.5905	5.5905	5.55700	5.56580	3B		
			5.5838	5.5564	5.5803	5.5791	5.5671	5.62475	5.61585	---------	5.6259	5.5850	5.6167	5.5899	5.5911	5.55725	5.56555			
5.750-4	UN	2A	5.5839	5.4756	5.5717	5.5717	5.5176	5.74630	5.72250	---------	5.7500	5.5876	5.7118	5.6035	5.6035	5.47900	5.51700	2B	UN	5.750-4
			5.5833	5.4741	5.5723	5.5711	5.5191	5.74605	5.72275	---------	5.7515	5.5882	5.7103	5.6029	5.6041	5.47925	5.51675			
		3A	5.5876	5.4793	5.5784	5.5784	5.5243	5.75000	5.72620	---------	5.7500	5.5876	5.7078	5.5995	5.5995	5.47900	5.50940	3B		
			5.5870	5.4778	5.5790	5.5778	5.5258	5.74975	5.72645	---------	5.7515	5.5882	5.7063	5.5989	5.6001	5.47925	5.50915			
5.750-12	UN	2A	5.6938	5.6577	5.6869	5.6869	5.6689	5.74790	5.73650	---------	5.7500	5.6959	5.7410	5.7049	5.7049	5.66000	5.67800	2B	UN	5.750-12
			5.6932	5.6568	5.6875	5.6863	5.6698	5.74765	5.73675	---------	5.7509	5.6965	5.7401	5.7043	5.7055	5.66025	5.67775			
		3A	5.6959	5.6598	5.6907	5.6907	5.6727	5.75000	5.73860	---------	5.7500	5.6959	5.7387	5.7026	5.7026	5.66000	5.66980	3B		
			5.6953	5.6589	5.6913	5.6901	5.6736	5.74975	5.73885	---------	5.7509	5.6965	5.7378	5.7020	5.7032	5.66025	5.66955			
5.750-16	UN	2A	5.7075	5.6804	5.7013	5.7013	5.6878	5.74810	5.73870	---------	5.7500	5.7094	5.7446	5.7175	5.7175	5.68200	5.69600	2B	UN	5.750-16
			5.7069	5.6795	5.7019	5.7007	5.6887	5.74785	5.73895	---------	5.7509	5.7100	5.7437	5.7169	5.7181	5.68225	5.69575			
		3A	5.7094	5.6823	5.7047	5.7047	5.6912	5.75000	5.74060	---------	5.7500	5.7094	5.7426	5.7155	5.7155	5.68200	5.69080	3B		
			5.7088	5.6814	5.7053	5.7041	5.6921	5.74975	5.74085	---------	5.7509	5.7100	5.7417	5.7149	5.7161	5.68225	5.69055			
5.875-12	UN	2A	5.8188	5.7827	5.8119	5.8119	5.7939	5.87290	5.86150	---------	5.8750	5.8209	5.8660	5.8299	5.8299	5.78500	5.80300	2B	UN	5.875-12
			5.8182	5.7818	5.8125	5.8113	5.7948	5.87265	5.86175	---------	5.8759	5.8215	5.8651	5.8293	5.8305	5.78525	5.80275			
		3A	5.8209	5.7848	5.8157	5.8157	5.7977	5.87500	5.86360	---------	5.8750	5.8209	5.8637	5.8276	5.8276	5.78500	5.79480	3B		
			5.8203	5.7839	5.8163	5.8151	5.7986	5.87475	5.86385	---------	5.8759	5.8215	5.8628	5.8270	5.8282	5.78525	5.79455			
5.875-16	UN	2A	5.8325	5.8054	5.8263	5.8263	5.8128	5.87310	5.86370	---------	5.8750	5.8344	5.8696	5.8425	5.8425	5.80700	5.82100	2B	UN	5.875-16
			5.8319	5.8045	5.8269	5.8257	5.8137	5.87285	5.86395	---------	5.8759	5.8350	5.8687	5.8419	5.8431	5.80725	5.82075			
		3A	5.8344	5.8073	5.8297	5.8297	5.8162	5.87500	5.86560	---------	5.8750	5.8344	5.8676	5.8405	5.8405	5.80700	5.81580	3B		
			5.8338	5.8064	5.8303	5.8291	5.8171	5.87475	5.86585	---------	5.8759	5.8350	5.8667	5.8399	5.8411	5.80725	5.81555			
6.000-4	UN	2A	5.8339	5.7256	5.8215	5.8215	5.7674	5.99630	5.97250	---------	6.0000	5.8376	5.9620	5.8537	5.8537	5.72900	5.76700	2B	UN	6.000-4
			5.8333	5.7241	5.8221	5.8209	5.7689	5.99605	5.97275	---------	6.0015	5.8382	5.9605	5.8531	5.8543	5.72925	5.76675			
		3A	5.8376	5.7293	5.8283	5.8283	5.7742	6.00000	5.97620	---------	6.0000	5.8376	5.9579	5.8496	5.8496	5.72900	5.75940	3B		
			5.8370	5.7278	5.8289	5.8277	5.7757	5.99975	5.97645	---------	6.0015	5.8382	5.9564	5.8490	5.8502	5.72925	5.75915			
6.000-12	UN	2A	5.9438	5.9077	5.9369	5.9369	5.9189	5.99790	5.98650	---------	6.0000	5.9459	5.9910	5.9549	5.9549	5.91000	5.92800	2B	UN	6.000-12
			5.9432	5.9068	5.9375	5.9363	5.9198	5.99765	5.98675	---------	6.0009	5.9465	5.9901	5.9543	5.9555	5.91025	5.92775			
		3A	5.9459	5.9098	5.9407	5.9407	5.9227	6.00000	5.98860	---------	6.0000	5.9459	5.9887	5.9526	5.9526	5.91000	5.91980	3B		
			5.9453	5.9089	5.9413	5.9401	5.9236	5.99975	5.98885	---------	6.0009	5.9465	5.9878	5.9520	5.9532	5.91025	5.91955			
6.000-16	UN	2A	5.9575	5.9304	5.9513	5.9513	5.9378	5.99810	5.98870	---------	6.0000	5.9594	5.9946	5.9675	5.9675	5.93200	5.94600	2B	UN	6.000-16
			5.9569	5.9295	5.9519	5.9507	5.9387	5.99785	5.98895	---------	6.0009	5.9600	5.9937	5.9669	5.9681	5.93225	5.94575			
		3A	5.9594	5.9323	5.9547	5.9547	5.9412	6.00000	5.99060	---------	6.0000	5.9594	5.9926	5.9655	5.9655	5.93200	5.94080	3B		
			5.9588	5.9314	5.9553	5.9541	5.9421	5.99975	5.99085	---------	6.0009	5.9600	5.9917	5.9649	5.9661	5.93225	5.94055			

Table 6.20. *Setting plug gages, Unified screw threads*

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs			
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter			
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]		Plug for LO thread gage [a,c]	
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W tolerance	X tolerance	W tolerance	X tolerance
1	2	3	4	5	6	7	8	9	10	11A	11B	12A	12B
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.060-80	UNF	2A	0.0561	0.0595	0.0514	0.0550	0.0584	0.0496	0.0496	0.0595	0.0595	0.0584	0.0584
			.0558	.0598	.0513	.0547	.0587	.0497	.0495	.0598	.0598	.0587	.0587
		3A	.0566	.0600	.0519	.0560	0594	.0506	.0506	.0600	.0600	.0594	.0594
			.0563	.0603	.0518	.0557	.0597	.0507	.0505	.0603	.0603	.0597	.0597
.073-64	UNC	2A	.0684	.0724	.0623	.0671	.0717	.0603	.0603	.0724	.0724	.0717	.0717
			.0681	.0727	.0622	.0668	.0720	.0604	.0602	.0727	.0728	.0720	.0721
		3A	.0690	.0730	.0629	.0682	.0728	.0614	.0614	.0730	.0730	.0728	.0728
			.0687	.0733	.0628	.0679	.0731	.0615	.0613	.0733	.0734	.0731	.0732
.073-72	UNF	2A	.0687	.0724	.0634	.0675	.0715	.0615	.0615	.0724	.0724	.0715	.0715
			.0684	.0727	.0633	.0672	.0718	.0616	.0614	.0727	.0727	.0718	.0718
		3A	.0693	.0730	.0640	.0686	.0726	.0626	.0626	.0730	.0730	.0726	.0726
			.0690	.0733	.0639	.0683	.0729	.0627	.0625	.0733	.0733	.0729	.0729
.086-56	UNC	2A	.0810	.0854	.0738	.0794	.0850	.0717	.0717	.0854	.0854	.0850	.0850
			.0807	.0857	.0737	.0791	.0853	.0718	.0716	.0857	.0858	.0853	.0854
		3A	.0816	.0860	.0744	.0805	.0860	.0728	.0728	.0860	.0860	.0860	.0860
			.0813	.0863	.0743	.0802	.0863	.0729	.0727	.0863	.0864	.0863	.0864
.086-64	UNF	2A	.0814	.0854	.0753	.0801	.0847	.0733	.0733	.0854	.0854	.0847	.0847
			.0811	.0857	.0752	.0798	.0850	.0734	.0732	.0857	.0858	.0850	.0851
		3A	.0820	.0860	.0759	.0812	.0858	.0744	.0744	.0860	.0860	.0858	.0858
			.0817	.0863	.0758	.0809	.0861	.0745	.0743	.0863	.0864	.0861	.0862
.099-48	UNC	2A	.0934	.0983	.0848	.0915	.0981	.0825	.0825	.0983	.0983	.0981	.0981
			.0931	.0986	.0847	.0912	.0984	.0826	.0824	.0986	.0987	.0984	.0985
		3A	.0941	.0990	.0855	.0928	.0990	.0838	.0838	.0990	.0990	.0990	.0990
			.0938	.0993	.0854	.0925	.0993	.0839	.0837	.0993	.0994	.0993	.0994
.099-56	UNF	2A	.0939	.0983	.0867	.0922	.0978	.0845	.0845	.0983	.0983	.0978	.0978
			.0936	.0986	.0866	.0919	.0981	.0846	.0844	.0986	.0987	.0981	.0982
		3A	.0946	.0990	.0874	.0935	.0990	.0858	.0858	.0990	.0990	.0990	.0990
			.0943	.0993	.0873	.0932	.0993	.0859	.0857	.0993	.0994	.0993	.0994
.112-40	UNC	2A	.1056	.1112	.0950	.1033	.1112	.0925	.0925	.1112	.1112	.1112	.1112
			.1053	.1115	.0949	.1030	.1115	.0926	.0924	.1115	.1116	.1115	.1116
		3A	.1064	.1120	.0958	.1047	.1120	.0939	.0939	.1120	.1120	.1120	.1120
			.1061	.1123	.0957	.1044	.1123	.0940	.0938	.1123	.1124	.1123	.1124
.112-48	UNF	2A	.1064	.1113	.0978	.1044	.1110	.0954	.0954	.1113	.1113	.1110	.1110
			.1061	.1116	.0977	.1041	.1113	.0955	.0953	.1116	.1117	.1113	.1114
		3A	.1071	.1120	.0985	.1057	.1120	.0967	.0967	.1120	.1120	.1120	.1120
			.1068	.1123	.0984	.1054	.1123	.0968	.0966	.1123	.1124	.1123	.1124
.125-40	UNC	2A	.1186	.1242	.1080	.1162	.1242	.1054	.1054	.1242	.1242	.1242	.1242
			.1183	.1245	.1079	.1159	.1245	.1055	.1053	.1245	.1246	.1245	.1246
		3A	.1194	.1250	.1088	.1177	.1250	.1069	.1069	.1250	.1250	.1250	.1250
			.1191	.1253	.1087	.1174	.1253	.1070	.1068	.1253	.1254	.1253	.1254
.125-44	UNF	2A	.1191	.1243	.1095	.1168	.1240	.1070	.1070	.1243	.1243	.1240	.1240
			.1188	.1246	.1094	.1165	.1243	.1071	.1069	.1246	.1247	.1243	.1244
		3A	.1198	.1250	.1102	.1181	.1250	.1083	.1083	.1250	.1250	.1250	.1250
			.1195	.1253	.1101	.1178	.1253	.1084	.1082	.1253	.1254	.1253	.1254
.138-32	UNC	2A	.1307	.1372	.1169	.1276	.1372	.1141	.1141	.1372	.1372	.1372	.1372
			.1304	.1375	.1168	.1273	.1375	.1142	.1140	.1375	.1377	.1375	.1377
		3A	.1315	.1380	.1177	.1291	.1380	.1156	.1156	.1380	.1380	.1380	.1380
			.1312	.1383	.1176	.1288	.1383	.1157	.1155	.1383	.1385	.1383	.1385
.138-40	UNF	2A	.1316	.1372	.1210	.1292	.1372	.1184	.1184	.1372	.1372	.1372	.1372
			.1313	.1375	.1209	.1289	.1375	.1185	.1183	.1375	.1376	.1375	.1376
		3A	.1324	.1380	.1218	.1306	.1380	.1198	.1198	.1380	.1380	.1380	.1380
			.1321	.1383	.1217	.1303	.1383	.1199	.1197	.1383	.1384	.1383	.1384
.164-32	UNC	2A	.1566	.1631	.1428	.1534	.1631	.1399	.1399	.1631	.1631	.1631	.1631
			.1563	.1634	.1427	.1531	.1634	.1400	.1398	.1634	.1636	.1634	.1636
		3A	.1575	.1640	.1437	.1550	.1640	.1415	.1415	.1640	.1640	.1640	.1640
			.1572	.1643	.1436	.1547	.1643	.1416	.1414	.1643	.1645	.1643	.1645
.164-36	UNF	2A	.1572	.1632	.1452	.1544	.1632	.1424	.1424	.1632	.1632	.1632	.1632
			.1569	.1635	.1451	.1541	.1635	.1425	.1423	.1635	.1636	.1635	.1636
		3A	.1580	.1640	.1460	.1559	.1640	.1439	.1439	.1640	.1640	.1640	.1640
			.1577	.1643	.1459	.1556	.1643	.1440	.1438	.1643	.1644	.1643	.1644
.190-24	UNC	2A	.1811	.1890	.1619	.1766	.1890	.1586	.1586	.1890	.1890	.1890	.1890
			.1806	.1895	.1618	.1761	.1895	.1587	.1585	.1895	.1895	.1895	.1895
		3A	.1821	.1900	.1629	.1784	.1900	.1604	.1604	.1900	.1900	.1900	.1900
			.1816	.1905	.1628	.1779	.1905	.1605	.1603	.1905	.1905	.1905	.1905

See footnotes at end of table.

TABLE 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W tolerance	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: X tolerance	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W tolerance	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: X tolerance
1	2	3	4	5	6	7	8	9	10	11A	11B	12A	12B
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.190–32	UNF	2A	0.1826	0.1891	0.1688	0.1793	0.1891	0.1658	0.1658	0.1891	0.1891	0.1891	0.1891
			.1823	.1894	.1687	.1790	.1894	.1659	.1657	.1894	.1896	.1894	.1896
		3A	.1835	.1900	.1697	.1809	.1900	.1674	.1674	.1900	.1900	.1900	.1900
			.1832	.1903	.1696	.1806	.1903	.1675	.1673	.1903	.1905	.1903	.1905
.216–24	UNC	2A	.2071	.2150	.1879	.2025	.2150	.1845	.1845	.2150	.2150	.2150	.2150
			.2066	.2155	.1878	.2020	.2155	.1846	.1844	.2155	.2155	.2155	.2155
		3A	.2081	.2160	.1889	.2043	.2160	.1863	.1863	.2160	.2160	.2160	.2160
			.2076	.2165	.1888	.2038	.2165	.1864	.1862	.2165	.2165	.2165	.2165
.216–28	UNF	2A	.2079	.2150	.1918	.2041	.2150	.1886	.1886	.2150	.2150	.2150	.2150
			.2074	.2155	.1917	.2036	.2155	.1887	.1885	.2155	.2155	.2155	.2155
		3A	.2089	.2160	.1928	.2059	.2160	.1904	.1904	.2160	.2160	.2160	.2160
			.2084	.2165	.1927	.2054	.2165	.1905	.1903	.2165	.2165	.2165	.2165
.216–32	UNEF	2A	.2086	.2151	.1948	.2052	.2151	.1917	.1917	.2151	.2151	.2151	.2151
			.2083	.2154	.1947	.2049	.2154	.1918	.1916	.2154	.2156	.2154	.2156
		3A	.2095	.2160	.1957	.2068	.2160	.1933	.1933	.2160	.2160	.2160	.2160
			.2092	.2163	.1956	.2065	.2163	.1934	.1932	.2163	.2165	.2163	.2165
.250–20	UNC	1A	.2399	.2489	.2164	.2325	.2483	.2108	.2108	.2489	.2489	.2483	.2483
			.2394	.2494	.2163	.2320	.2488	.2109	.2107	.2494	.2494	.2488	.2488
		2A	.2399	.2489	.2164	.2344	.2489	.2127	.2127	.2489	.2489	.2489	.2489
			.2394	.2494	.2163	.2339	.2494	.2128	.2126	.2494	.2494	.2494	.2494
		3A	.2410	.2500	.2175	.2364	.2500	.2147	.2147	.2500	.2500	.2500	.2500
			.2405	.2505	.2174	.2359	.2505	.2148	.2146	.2505	.2505	.2505	.2505
.250–28	UNF	1A	.2419	.2490	.2258	.2363	.2476	.2208	.2208	.2490	.2490	.2476	.2476
			.2414	.2495	.2257	.2358	.2481	.2209	.2207	.2495	.2495	.2481	.2481
		2A	.2419	.2490	.2258	.2380	.2490	.2225	.2225	.2490	.2490	.2490	.2490
			.2414	.2495	.2257	.2375	.2495	.2226	.2224	.2495	.2495	.2495	.2495
		3A	.2429	.2500	.2268	.2398	.2500	.2243	.2243	.2500	.2500	.2500	.2500
			.2424	.2505	.2267	.2393	.2505	.2244	.2242	.2505	.2505	.2505	.2505
.250–32	UNEF	2A	.2425	.2490	.2287	.2390	.2489	.2255	.2255	.2490	.2490	.2489	.2489
			.2422	.2493	.2286	.2387	.2492	.2256	.2254	.2493	.2495	.2492	.2494
		3A	.2435	.2500	.2297	.2408	.2500	.2273	.2273	.2500	.2500	.2500	.2500
			.2432	.2503	.2296	.2405	.2503	.2274	.2272	.2503	.2505	.2503	.2505
.3125–18	UNC	1A	.3016	.3113	.2752	.2932	.3108	.2691	.2691	.3113	.3113	.3108	.3108
			.3011	.3118	.2751	.2927	.3113	.2692	.2690	.3118	.3118	.3113	.3113
		2A	.3016	.3113	.2752	.2953	.3113	.2712	.2712	.3113	.3113	.3113	.3113
			.3011	.3118	.2751	.2948	.3118	.2713	.2711	.3118	.3118	.3118	.3118
		3A	.3028	.3125	.2764	.2975	.3125	.2734	.2734	.3125	.3125	.3125	.3125
			.3023	.3130	.2763	.2970	.3130	.2735	.2733	.3130	.3130	.3130	.3130
.3125–20	UN	2A	.3023	.3113	.2788	.2965	.3113	.2748	.2748	.3113	.3113	.3113	.3113
			.3018	.3118	.2787	.2960	.3118	.2749	.2747	.3118	.3118	.3118	.3118
		3A	.3035	.3125	.2800	.2987	.3125	.2770	.2770	.3125	.3125	.3125	.3125
			.3030	.3130	.2799	.2982	.3130	.2771	.2769	.3130	.3130	.3130	.3130
.3125–24	UNF	1A	.3035	.3114	.2843	.2968	.3100	.2788	.2788	.3114	.3114	.3100	.3100
			.3030	.3119	.2842	.2963	.3105	.2789	.2787	.3119	.3119	.3105	.3105
		2A	.3035	.3114	.2843	.2986	.3114	.2806	.2806	.3114	.3114	.3114	.3114
			.3030	.3119	.2842	.2981	.3119	.2807	.2805	.3119	.3119	.3119	.3119
		3A	.3046	.3125	.2854	.3007	.3125	.2827	.2827	.3125	.3125	.3125	.3125
			.3041	.3130	.2853	.3002	.3130	.2828	.2826	.3130	.3130	.3130	.3130
.3125–28	UN	2A	.3044	.3115	.2883	.3004	.3115	.2849	.2849	.3115	.3115	.3115	.3115
			.3039	.3120	.2882	.2999	.3120	.2850	.2848	.3120	.3120	.3120	.3120
		3A	.3054	.3125	.2893	.3022	.3125	.2867	.2867	.3125	.3125	.3125	.3125
			.3049	.3130	.2892	.3017	.3130	.2868	.2866	.3130	.3130	.3130	.3130
.3125–32	UNEF	2A	.3050	.3115	.2912	.3015	.3114	.2880	.2880	.3115	.3115	.3114	.3114
			.3047	.3118	.2911	.3012	.3117	.2881	.2879	.3118	.3120	.3117	.3119
		3A	.3060	.3125	.2922	.3033	.3125	.2898	.2898	.3125	.3125	.3125	.3125
			.3057	.3128	.2921	.3030	.3128	.2899	.2897	.3128	.3130	.3128	.3130
.375–16	UNC	1A	.3632	.3737	.3331	.3537	.3735	.3266	.3266	.3737	.3737	.3735	.3735
			.3626	.3743	.3330	.3531	.3741	.3267	.3265	.3743	.3743	.3741	.3741
		2A	.3632	.3737	.3331	.3558	.3737	.3287	.3287	.3737	.3737	.3737	.3737
			.3626	.3743	.3330	.3552	.3743	.3288	.3286	.3743	.3743	.3743	.3743
		3A	.3645	.3750	.3344	.3582	.3750	.3311	.3311	.3750	.3750	.3750	.3750
			.3639	.3756	.3343	.3576	.3756	.3312	.3310	.3756	.3756	.3756	.3756
.375–20	UN	2A	.3648	.3738	.3413	.3589	.3738	.3372	.3372	.3738	.3738	.3738	.3738
			.3643	.3743	.3412	.3584	.3743	.3373	.3371	.3743	.3743	.3743	.3743
		3A	.3660	.3750	.3425	.3611	.3750	.3394	.3394	.3750	.3750	.3750	.3750
			.3655	.3755	.3424	.3606	.3755	.3395	.3393	.3755	.3755	.3755	.3755

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated: Plug for GO [a]: Major diameter: Full	W truncated: Plug for GO [a]: Pitch diameter	W truncated: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated: Plug for LO [a]: Major diameter: Full	W truncated: Plug for LO [a]: Pitch diameter: Plus tolerance gage	W truncated: Plug for LO [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W tolerance	Basic-crest: Plug for GO [a,b]: X tolerance	Basic-crest: Plug for LO thread gage [a,c]: W tolerance	Basic-crest: Plug for LO [a,c]: X tolerance
1	2	3	4	5	6	7	8	9	10	11A	11B	12A	12B
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.375–24	UNF	1A	0.3660	0.3739	0.3468	0.3591	0.3724	0.3411	0.3411	0.3739	0.3739	0.3724	0.3724
			.3655	.3744	.3467	.3586	.3729	.3412	.3410	.3744	.3744	.3729	.3729
		2A	.3660	.3739	.3468	.3610	.3739	.3430	.3430	.3739	.3739	.3739	.3739
			.3655	.3744	.3467	.3605	.3744	.3431	.3429	.3744	.3744	.3744	.3744
		3A	.3671	.3750	.3479	.3630	.3750	.3450	.3450	.3750	.3750	.3750	.3750
			.3666	.3755	.3478	.3625	.3755	.3451	.3449	.3755	.3755	.3755	.3755
.375–28	UN	2A	.3668	.3739	.3507	.3626	.3739	.3471	.3471	.3739	.3739	.3739	.3739
			.3663	.3744	.3506	.3621	.3744	.3472	.3470	.3744	.3744	.3744	.3744
		3A	.3679	.3750	.3518	.3646	.3750	.3491	.3491	.3750	.3750	.3750	.3750
			.3674	.3755	.3517	.3641	.3755	.3492	.3490	.3755	.3755	.3755	.3755
.375–32	UNEF	2A	.3675	.3740	.3537	.3638	.3737	.3503	.3503	.3740	.3740	.3737	.3737
			.3672	.3743	.3536	.3635	.3740	.3504	.3502	.3743	.3745	.3740	.3742
		3A	.3685	.3750	.3547	.3657	.3750	.3522	.3522	.3750	.3750	.3750	.3750
			.3682	.3753	.3546	.3654	.3753	.3523	.3521	.3753	.3755	.3753	.3755
.4375–14	UNC	1A	.4246	.4361	.38970	.4135	.4361	.38260	.38260	.4361	.4361	.4361	.4361
			.4240	.4367	.38955	.4129	.4367	.38275	.38245	.4367	.4367	.4367	.4367
		2A	.4246	.4361	.38970	.4159	.4361	.38500	.38500	.4361	.4361	.4361	.4361
			.4240	.4367	.38955	.4153	.4367	.38515	.38485	.4367	.4367	.4367	.4367
		3A	.4260	.4375	.39110	.4185	.4375	.38760	.38760	.4375	.4375	.4375	.4375
			.4254	.4381	.39095	.4179	.4381	.38775	.38745	.4381	.4381	.4381	.4381
.4375–16	UN	2A	.4256	.4361	.3955	.4180	.4361	.3909	.3909	.4361	.4361	.4361	.4361
			.4250	.4367	.3954	.4174	.4367	.3910	.3908	.4367	.4367	.4367	.4367
		3A	.4270	.4375	.3969	.4206	.4375	.3935	.3935	.4375	.4375	.4375	.4375
			.4264	.4381	.3968	.4200	.4381	.3936	.3934	.4381	.4381	.4381	.4381
.4375–20	UNF	1A	.4272	.4362	.4037	.4191	.4350	.3974	.3974	.4362	.4362	.4350	.4350
			.4267	.4367	.4036	.4186	.4355	.3975	.3973	.4367	.4367	.4355	.4355
		2A	.4272	.4362	.4037	.4212	.4362	.3995	.3995	.4362	.4362	.4362	.4362
			.4267	.4367	.4036	.4207	.4367	.3996	.3994	.4367	.4367	.4367	.4367
		3A	.4285	.4375	.4050	.4236	.4375	.4019	.4019	.4375	.4375	.4375	.4375
			.4280	.4380	.4049	.4231	.4380	.4020	.4018	.4380	.4380	.4380	.4380
.4375–28	UNEF	2A	.4293	.4364	.4132	.4251	.4364	.4096	.4096	.4364	.4364	.4364	.4364
			.4288	.4369	.4131	.4246	.4369	.4097	.4095	.4369	.4369	.4369	.4369
		3A	.4304	.4375	.4143	.4271	.4375	.4116	.4116	.4375	.4375	.4375	.4375
			.4299	.4380	.4142	.4266	.4380	.4117	.4115	.4380	.4380	.4380	.4380
.4375–32	UN	2A	.4300	.4365	.4162	.4263	.4362	.4128	.4128	.4365	.4365	.4362	.4362
			.4297	.4368	.4161	.4260	.4365	.4129	.4127	.4368	.4370	.4365	.4367
		3A	.4310	.4375	.4172	.4282	.4375	.4147	.4147	.4375	.4375	.4375	.4375
			.4307	.4378	.4171	.4279	.4378	.4148	.4146	.4378	.4380	.4378	.4380
.500–13	UNC	1A	.4863	.4985	.44850	.4744	.4985	.44110	.44110	.4985	.4985	.4985	.4985
			.4857	.4991	.44835	.4738	.4991	.44125	.44095	.4991	.4991	.4991	.4991
		2A	.4863	.4985	.44850	.4768	.4985	.44350	.44350	.4985	.4985	.4985	.4985
			.4857	.4991	.44835	.4762	.4991	.44365	.44335	.4991	.4991	.4991	.4991
		3A	.4878	.5000	.45000	.4796	.5000	.44630	.44630	.5000	.5000	.5000	.5000
			.4872	.5006	.44985	.4790	.5006	.44645	.44615	.5006	.5006	.5006	.5006
.500–16	UN	2A	.4881	.4986	.4580	.4804	.4986	.4533	.4533	.4986	.4986	.4986	.4986
			.4875	.4992	.4579	.4798	.4992	.4534	.4532	.4992	.4992	.4992	.4992
		3A	.4895	.5000	.4594	.4830	.5000	.4559	.4559	.5000	.5000	.5000	.5000
			.4889	.5006	.4593	.4824	.5006	.4560	.4558	.5006	.5006	.5006	.5006
.500–20	UNF	1A	.4897	.4987	.4662	.4815	.4973	.4598	.4598	.4987	.4987	.4973	.4973
			.4892	.4992	.4661	.4810	.4978	.4599	.4597	.4992	.4992	.4978	.4978
		2A	.4897	.4987	.4662	.4836	.4987	.4619	.4619	.4987	.4987	.4987	.4987
			.4892	.4992	.4661	.4831	.4992	.4620	.4618	.4992	.4992	.4992	.4992
		3A	.4910	.5000	.4675	.4860	.5000	.4643	.4643	.5000	.5000	.5000	.5000
			.4905	.5005	.4674	.4855	.5005	.4644	.4642	.5005	.5005	.5005	.5005
.500–28	UNEF	2A	.4918	.4989	.4757	.4875	.4988	.4720	.4720	.4989	.4989	.4988	.4988
			.4913	.4994	.4756	.4870	.4993	.4721	.4719	.4994	.4994	.4993	.4993
		3A	.4929	.5000	.4768	.4895	.5000	.4740	.4740	.5000	.5000	.5000	.5000
			.4924	.5005	.4767	.4890	.5005	.4741	.4739	.5005	.5005	.5005	.5005
.500–32	UN	2A	.4925	.4990	.4787	.4887	.4986	.4752	.4752	.4990	.4990	.4986	.4986
			.4922	.4993	.4786	.4884	.4989	.4753	.4751	.4993	.4995	.4989	.4991
		3A	.4935	.5000	.4797	.4906	.5000	.4771	.4771	.5000	.5000	.5000	.5000
			.4932	.5003	.4796	.4903	.5003	.4772	.4770	.5003	.5005	.5003	.5005

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.5625–12	UNC	1A	0.5480	0.5609	0.5068	0.5351	0.5609	0.4990	0.4990	0.5609	0.5609
			.5474	.5615	.5066	.5345	.5615	.4992	.4988	.5615	.5615
		2A	.5480	.5609	.5068	.5377	.5609	.5016	.5016	.5609	.5609
			.5474	.5615	.5066	.5371	.5615	.5018	.5014	.5615	.5615
		3A	.5496	.5625	.5084	.5406	.5625	.5045	.5045	.5625	.5625
			.5490	.5631	.5082	.5400	.5631	.5047	.5043	.5631	.5631
.5625–16	UN	2A	.5506	.5611	.5205	.5429	.5611	.5158	.5158	.5611	.5611
			.5500	.5617	.5203	.5423	.5617	.5160	.5156	.5617	.5617
		3A	.5520	.5625	.5219	.5455	.5625	.5184	.5184	.5625	.5625
			.5514	.5631	.5217	.5449	.5631	.5186	.5182	.5631	.5631
.5625–18	UNF	1A	.5514	.5611	.52500	.5423	.5599	.51820	.51820	.5611	.5599
			.5509	.5616	.52485	.5418	.5604	.51835	.51805	.5616	.5604
		2A	.5514	.5611	.52500	.5446	.5611	.52050	.52050	.5611	.5611
			.5509	.5616	.52485	.5441	.5616	.52065	.52035	.5616	.5616
		3A	.5528	.5625	.52640	.5471	.5625	.52300	.52300	.5625	.5625
			.5523	.5630	.52625	.5466	.5630	.52315	.52285	.5630	.5630
.5625–20	UN	2A	.5522	.5612	.52870	.5462	.5612	.52450	.52450	.5612	.5612
			.5517	.5617	.52855	.5457	.5617	.52465	.52435	.5617	.5617
		3A	.5535	.5625	.53000	.5485	.5625	.52680	.52680	.5625	.5625
			.5530	.5630	.52985	.5480	.5630	.52695	.52665	.5630	.5630
.5625–24	UNEF	2A	.5534	.5613	.53420	.5483	.5613	.53030	.53030	.5613	.5613
			.5529	.5618	.53405	.5478	.5618	.53045	.53015	.5618	.5618
		3A	.5546	.5625	.53540	.5505	.5625	.53250	.53250	.5625	.5625
			.5541	.5630	.53525	.5500	.5630	.53265	.53235	.5630	.5630
.5625–28	UN	2A	.5543	.5614	.53820	.5500	.5613	.53450	.53450	.5614	.5613
			.5538	.5619	.53805	.5495	.5618	.53465	.53435	.5619	.5618
		3A	.5554	.5625	.53930	.5520	.5625	.53650	.53650	.5625	.5625
			.5549	.5630	.53915	.5515	.5630	.53665	.53635	.5630	.5630
.5625–32	UN	2A	.5550	.5615	.54120	.5512	.5611	.53770	.53770	.5615	.5611
			.5545	.5620	.54105	.5507	.5616	.53785	.53755	.5620	.5616
		3A	.5560	.5625	.54220	.5531	.5625	.53960	.53960	.5625	.5625
			.5555	.5630	.54205	.5526	.5630	.53975	.53945	.5630	.5630
.625–11	UNC	1A	.6097	.6234	.5644	.5955	.6234	.5561	.5561	.6234	.6234
			.6091	.6240	.5642	.5949	.6240	.5563	.5559	.6240	.6240
		2A	.6097	.6234	.5644	.5983	.6234	.5589	.5589	.6234	.6234
			.6091	.6240	.5642	.5977	.6240	.5591	.5587	.6240	.6240
		3A	.6113	.6250	.5660	.6013	.6250	.5619	.5619	.6250	.6250
			.6107	.6256	.5658	.6007	.6256	.5621	.5617	.6256	.6256
.625–12	UN	2A	.6105	.6234	.5693	.6000	.6234	.5639	.5639	.6234	.6234
			.6099	.6240	.5691	.5994	.6240	.5641	.5637	.6240	.6240
		3A	.6121	.6250	.5709	.6029	.6250	.5668	.5668	.6250	.6250
			.6115	.6256	.5707	.6023	.6256	.5670	.5666	.6256	.6256
.625–16	UN	2A	.6131	.6236	.5830	.6053	.6236	.5782	.5782	.6236	.6236
			.6125	.6242	.5828	.6047	.6242	.5784	.5780	.6242	.6242
		3A	.6145	.6250	.5844	.6079	.6250	.5808	.5808	.6250	.6250
			.6139	.6256	.5842	.6073	.6256	.5810	.5806	.6256	.6256
.625–18	UNF	1A	.6139	.6236	.58750	.6046	.6222	.58050	.58050	.6236	.6222
			.6134	.6241	.58735	.6041	.6227	.58065	.58035	.6241	.6227
		2A	.6139	.6236	.58750	.6069	.6236	.58280	.58280	.6236	.6236
			.6134	.6241	.58735	.6064	.6241	.58295	.58265	.6241	.6241
		3A	.6153	.6250	.58890	.6095	.6250	.58540	.58540	.6250	.6250
			.6148	.6255	.58875	.6090	.6255	.58555	.58525	.6255	.6255
.625–20	UN	2A	.6147	.6237	.59120	.6086	.6237	.58690	.58690	.6237	.6237
			.6142	.6242	.59105	.6081	.6242	.58705	.58675	.6242	.6242
		3A	.6160	.6250	.59250	.6110	.6250	.58930	.58930	.6250	.6250
			.6155	.6255	.59235	.6105	.6255	.58945	.58915	.6255	.6255
.625–24	UNEF	2A	.6159	.6238	.59670	.6107	.6238	.59270	.59270	.6238	.6238
			.6154	.6243	.59655	.6102	.6243	.59285	.59255	.6243	.6243
		3A	.6171	.6250	.59790	.6129	.6250	.59490	.59490	.6250	.6250
			.6166	.6255	.59775	.6124	.6255	.59505	.59475	.6255	.6255
.625–28	UN	2A	.6168	.6239	.60070	.6124	.6237	.59690	.59690	.6239	.6237
			.6163	.6244	.60055	.6119	.6242	.59705	.59675	.6244	.6242
		3A	.6179	.6250	.60180	.6145	.6250	.59900	.59900	.6250	.6250
			.6174	.6255	.60165	.6140	.6255	.59915	.59885	.6255	.6255

See footnotes at end of table.

TABLE 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.625-32	UN	2A	.6174	.6239	.60360	.6135	.6234	.60000	.60000	.6239	.6234
			.6169	.6244	.60345	.6130	.6239	.60015	.59985	.6244	.6239
		3A	.6185	.6250	.60470	.6155	.6250	.60200	.60200	.6250	.6250
			.6180	.6255	.60455	.6150	.6255	.60215	.60185	.6255	.6255
.6875-12	UN	2A	.6730	.6859	.6318	.6625	.6859	.6264	.6264	.6859	.6859
			.6724	.6865	.6316	.6619	.6865	.6266	.6262	.6865	.6865
		3A	.6746	.6875	.6334	.6654	.6875	.6293	.6293	.6875	.6875
			.6740	.6881	.6332	.6648	.6881	.6295	.6291	.6881	.6881
.6875-16	UN	2A	.6756	.6861	.6455	.6678	.6861	.6407	.6407	.6861	.6861
			.6750	.6867	.6453	.6672	.6867	.6409	.6405	.6867	.6867
		3A	.6770	.6875	.6469	.6704	.6875	.6433	.6433	.6875	.6875
			.6764	.6881	.6467	.6698	.6881	.6435	.6431	.6881	.6881
.6875-20	UN	2A	.6772	.6862	.65370	.6711	.6862	.64940	.64940	.6862	.6862
			.6767	.6867	.65355	.6706	.6867	.64955	.64925	.6867	.6867
		3A	.6785	.6875	.65500	.6735	.6875	.65180	.65180	.6875	.6875
			.6780	.6880	.65485	.6730	.6880	.65195	.65165	.6880	.6880
.6875-24	UNEF	2A	.6784	.6863	.65920	.6732	.6863	.65520	.65520	.6863	.6863
			.6779	.6868	.65905	.6727	.6868	.65535	.65505	.6868	.6868
		3A	.6796	.6875	.66040	.6754	.6875	.65740	.65740	.6875	.6875
			.6791	.6880	.66025	.6749	.6880	.65755	.65725	.6880	.6880
.6875-28	UN	2A	.6793	.6864	.66320	.6749	.6862	.65940	.65940	.6864	.6862
			.6788	.6869	.66305	.6744	.6867	.65955	.65925	.6869	.6865
		3A	.6804	.6875	.66430	.6770	.6875	.66150	.66150	.6875	.6877
			.6799	.6880	.66415	.6765	.6880	.66165	.66135	.6880	.6880
.6875-32	UN	2A	.6799	.6864	.66610	.6760	.6859	.66250	.66250	.6864	.6859
			.6794	.6869	.66595	.6755	.6864	.66265	.66235	.6869	.6864
		3A	.6810	.6875	.66720	.6780	.6875	.66450	.66450	.6875	.6875
			.6805	.6880	.66705	.6775	.6880	.66465	.66435	.6880	.6880
.750-10	UNC	1A	.7336	.7482	.6832	.7177	.7482	.6744	.6744	.7482	.7482
			.7330	.7488	.6830	.7171	.7488	.6746	.6742	.7488	.7488
		2A	.7336	.7482	.6832	.7206	.7482	.6773	.6773	.7482	.7482
			.7330	.7488	.6830	.7200	.7488	.6775	.6771	.7488	.7488
		3A	.7354	.7500	.6850	.7239	.7500	.6806	.6806	.7500	.7500
			.7348	.7506	.6848	.7233	.7506	.6808	.6804	.7506	.7506
.750-12	UN	2A	.7354	.7483	.6942	.7248	.7483	.6887	.6887	.7483	.7483
			.7348	.7489	.6940	.7242	.7489	.6889	.6885	.7489	.7489
		3A	.7371	.7500	.6959	.7279	.7500	.6918	.6918	.7500	.7500
			.7365	.7506	.6957	.7273	.7506	.6920	.6916	.7506	.7506
.750-16	UNF	1A	.7380	.7485	.7079	.7275	.7473	.7004	.7004	.7485	.7473
			.7374	.7491	.7077	.7269	.7479	.7006	.7002	.7491	.7479
		2A	.7380	.7485	.7079	.7300	.7485	.7029	.7029	.7485	.7485
			.7374	.7491	.7077	.7294	.7491	.7031	.7027	.7491	.7491
		3A	.7395	.7500	.7094	.7327	.7500	.7056	.7056	.7500	.7500
			.7389	.7506	.7092	.7321	.7506	.7058	.7054	.7506	.7506
.750-20	UNEF	2A	.7397	.7487	.71620	.7335	.7487	.71180	.71180	.7487	.7487
			.7392	.7492	.71605	.7330	.7492	.71195	.71165	.7492	.7492
		3A	.7410	.7500	.71750	.7359	.7500	.71420	.71420	.7500	.7500
			.7405	.7505	.71735	.7354	.7505	.71435	.71405	.7505	.7505
.750-28	UN	2A	.7417	.7488	.72560	.7373	.7486	.72180	.72180	.7488	.7486
			.7412	.7493	.72545	.7368	.7491	.72195	.72165	.7493	.7491
		3A	.7429	.7500	.72680	.7394	.7500	.72390	.72390	.7500	.7500
			.7424	.7505	.72665	.7389	.7505	.72405	.72375	.7505	.7505
.750-32	UN	2A	.7424	.7489	.72860	.7385	.7484	.72500	.72500	.7489	.7484
			.7419	.7494	.72845	.7380	.7489	.72515	.72485	.7494	.7489
		3A	.7435	.7500	.72970	.7405	.7500	.72700	.72700	.7500	.7500
			.7430	.7505	.72955	.7400	.7505	.72715	.72685	.7505	.7505
.8125-12	UN	2A	.7979	.8108	.7567	.7873	.8108	.7512	.7512	.8108	.8108
			.7973	.8114	.7565	.7867	.8114	.7514	.7510	.8114	.8114
		3A	.7996	.8125	.7584	.7904	.8125	.7543	.7543	.8125	.8125
			.7990	.8131	.7582	.7898	.8131	.7545	.7541	.8131	.8131
.8125-16	UN	2A	.8005	.8110	.7704	.7926	.8110	.7655	.7655	.8110	.8110
			.7999	.8116	.7702	.7920	.8116	.7657	.7653	.8116	.8116
		3A	.8020	.8125	.7719	.7954	.8125	.7683	.7683	.8125	.8125
			.8014	.8131	.7717	.7948	.8131	.7685	.7681	.8131	.8131

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.8125-20	UNEF	2A	.8022	.8112	.77870	.7960	.8112	.77430	.77430	.8112	.8112
			.8017	.8117	.77855	.7955	.8117	.77445	.77415	.8117	.8117
		3A	.8035	.8125	.78000	.7984	.8125	.77670	.77670	.8125	.8125
			.8030	.8130	.77985	.7979	.8130	.77685	.77655	.8130	.8130
.8125-28	UN	2A	.8042	.8113	.78810	.7998	.8111	.78430	.78430	.8113	.8111
			.8037	.8118	.78795	.7993	.8116	.78445	.78415	.8118	.8116
		3A	.8054	.8125	.78930	.8019	.8125	.78640	.78640	.8125	.8125
			.8049	.8130	.78915	.8014	.8130	.78655	.78625	.8130	.8130
.8125-32	UN	2A	.8049	.8114	.79110	.8010	.8109	.78750	.78750	.8114	.8109
			.8044	.8119	.79095	.8005	.8114	.78765	.78735	.8119	.8114
		3A	.8060	.8125	.79220	.8030	.8125	.78950	.78950	.8125	.8125
			.8055	.8130	.79205	.8025	.8130	.78965	.78935	.8130	.8130
.875-9	UNC	1A	.8573	.8731	.8009	.8395	.8731	.7914	.7914	.8731	.8731
			.8566	.8738	.8007	.8388	.8738	.7916	.7912	.8738	.8738
		2A	.8573	.8731	.8009	.8427	.8731	.7946	.7946	.8731	.8731
			.8566	.8738	.8007	.8420	.8738	.7948	.7944	.8738	.8738
		3A	.8592	.8750	.8028	.8462	.8750	.7981	.7981	.8750	.8750
			.8585	.8757	.8026	.8455	.8757	.7983	.7979	.8757	.8757
.875-12	UN	2A	.8604	.8733	.8192	.8498	.8733	.8137	.8137	.8733	.8733
			.8598	.8739	.8190	.8492	.8739	.8139	.8135	.8739	.8739
		3A	.8621	.8750	.8209	.8529	.8750	.8168	.8168	.8750	.8750
			.8615	.8756	.8207	.8523	.8756	.8170	.8166	.8756	.8756
.875-14	UNF	1A	.8619	.8734	.8270	.8498	.8725	.8189	.8189	.8734	.8725
			.8613	.8740	.8268	.8492	.8731	.8191	.8187	.8740	.8731
		2A	.8619	.8734	.8270	.8525	.8734	.8216	.8216	.8734	.8734
			.8613	.8740	.8268	.8519	.8740	.8218	.8214	.8740	.8740
		3A	.8635	.8750	.8286	.8554	.8750	.8245	.8245	.8750	.8750
			.8629	.8756	.8284	.8548	.8756	.8247	.8243	.8756	.8756
.875-16	UN	2A	.8630	.8735	.8329	.8551	.8735	.8280	.8280	.8735	.8735
			.8624	.8741	.8327	.8545	.8741	.8282	.8278	.8741	.8741
		3A	.8645	.8750	.8344	.8579	.8750	.8308	.8308	.8750	.8750
			.8639	.8756	.8342	.8573	.8756	.8310	.8306	.8756	.8756
.875-20	UNEF	2A	.8647	.8737	.84120	.8585	.8737	.83680	.83680	.8737	.8737
			.8642	.8742	.84105	.8580	.8742	.83695	.83665	.8742	.8742
		3A	.8660	.8750	.84250	.8609	.8750	.83920	.83920	.8750	.8750
			.8655	.8755	.84235	.8604	.8755	.83935	.83905	.8755	.8755
.875-28	UN	2A	.8667	.8738	.85060	.8623	.8736	.84680	.84680	.8738	.8736
			.8662	.8743	.85045	.8618	.8741	.84695	.84665	.8743	.8741
		3A	.8679	.8750	.85180	.8644	.8750	.84890	.84890	.8750	.8750
			.8674	.8755	.85165	.8639	.8755	.84905	.84875	.8755	.8755
.875-32	UN	2A	.8674	.8739	.85360	.8635	.8734	.85000	.85000	.8739	.8734
			.8669	.8744	.85345	.8630	.8739	.85015	.84985	.8744	.8739
		3A	.8685	.8750	.85470	.8655	.8750	.85200	.85200	.8750	.8750
			.8680	.8755	.85455	.8650	.8755	.85215	.85185	.8755	.8755
.9375-12	UN	2A	.9229	.9358	.8817	.9121	.9358	.8760	.8760	.9358	.9358
			.9223	.9364	.8815	.9115	.9364	.8762	.8758	.9364	.9364
		3A	.9246	.9375	.8834	.9153	.9375	.8792	.8792	.9375	.9375
			.9240	.9381	.8832	.9147	.9381	.8794	.8790	.9381	.9381
.9375-16	UN	2A	.9255	.9360	.8954	.9175	.9360	.8904	.8904	.9360	.9360
			.9249	.9366	.8952	.9169	.9366	.8906	.8902	.9366	.9366
		3A	.9270	.9375	.8969	.9203	.9375	.8932	.8932	.9375	.9375
			.9264	.9381	.8967	.9197	.9381	.8934	.8930	.9381	.9381
.9375-20	UNEF	2A	.9271	.9361	.90360	.9208	.9361	.89910	.89910	.9361	.9361
			.9266	.9366	.90345	.9203	.9366	.89925	.89895	.9366	.9366
		3A	.9285	.9375	.90500	.9233	.9375	.90160	.90160	.9375	.9375
			.9280	.9380	.90485	.9228	.9380	.90175	.90145	.9380	.9380
.9375-28	UN	2A	.9292	.9363	.91310	.9246	.9359	.90910	.90910	.9363	.9359
			.9287	.9368	.91295	.9241	.9364	.90925	.90895	.9368	.9364
		3A	.9304	.9375	.91430	.9268	.9375	.91130	.91130	.9375	.9375
			.9299	.9380	.91415	.9263	.9380	.91145	.91115	.9380	.9380
.9375-32	UN	2A	.9299	.9364	.91610	.9258	.9357	.91230	.91230	.9364	.9357
			.9294	.9369	.91595	.9253	.9362	.91245	.91215	.9369	.9362
		3A	.9310	.9375	.91720	.9279	.9375	.91440	.91440	.9375	.9375
			.9305	.9380	.91705	.9274	.9380	.91455	.91425	.9380	.9380

See footnotes at end of table.

Table 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.000-8	UNC	1A	.9809	.9980	.9168	.9608	.9980	.9067	.9067	.9980	.9980
			.9802	.9987	.9166	.9601	.9987	.9069	.9065	.9987	.9987
		2A	.9809	.9980	.9168	.9641	.9980	.9100	.9100	.9980	.9980
			.9802	.9987	.9166	.9634	.9987	.9102	.9098	.9987	.9987
		3A	.9829	1.0000	.9188	.9678	1.0000	.9137	.9137	1.0000	1.0000
			.9822	1.0007	.9186	.9671	1.0007	.9139	.9135	1.0007	1.0007
1.000-12	UNF	1A	.9853	.9982	.9441	.9714	.9978	.9353	.9353	.9982	.9978
			.9847	.9988	.9439	.9708	.9984	.9355	.9351	.9988	.9984
		2A	.9853	.9982	.9441	.9743	.9982	.9382	.9382	.9982	.9982
			.9847	.9988	.9439	.9737	.9988	.9384	.9380	.9988	.9988
		3A	.9871	1.0000	.9459	.9776	1.0000	.9415	.9415	1.0000	1.0000
			.9865	1.0006	.9457	.9770	1.0006	.9417	.9413	1.0006	1.0006
1.000-16	UN	2A	.9880	.9985	.9579	.9800	.9985	.9529	.9529	.9985	.9985
			.9874	.9991	.9577	.9794	.9991	.9531	.9527	.9991	.9991
		3A	.9895	1.0000	.9594	.9828	1.0000	.9557	.9557	1.0000	1.0000
			.9889	1.0006	.9592	.9822	1.0006	.9559	.9555	1.0006	1.0006
1.000-20	UNEF	2A	.9896	.9986	.96610	.9833	.9986	.96160	.96160	.9986	.9986
			.9891	.9991	.96595	.9828	.9991	.96175	.96145	.9991	.9991
		3A	.9910	1.0000	.96750	.9858	1.0000	.96410	.96410	1.0000	1.0000
			.9905	1.0005	.96735	.9853	1.0005	.96425	.96395	1.0005	1.0005
1.000-28	UN	2A	.9917	.9988	.97560	.9871	.9984	.97160	.97160	.9988	.9984
			.9912	.9993	.97545	.9866	.9989	.97175	.97145	.9993	.9989
		3A	.9929	1.0000	.97680	.9893	1.0000	.97380	.97380	1.0000	1.0000
			.9924	1.0005	.97665	.9888	1.0005	.97395	.97365	1.0005	1.0005
1.000-32	UN	2A	.9924	.9989	.97860	.9883	.9982	.97480	.97480	.9989	.9982
			.9919	.9994	.97845	.9878	.9987	.97495	.97465	.9994	.9987
		3A	.9935	1.0000	.97970	.9904	1.0000	.97690	.97690	1.0000	1.0000
			.9930	1.0005	.97955	.9899	1.0005	.97705	.97675	1.0005	1.0005
1.0625-8	UN	2A	1.0434	1.0605	.9793	1.0266	1.0605	.9725	.9725	1.0605	1.0605
			1.0427	1.0612	.9791	1.0259	1.0612	.9727	.9723	1.0612	1.0612
		3A	1.0454	1.0625	.9813	1.0303	1.0625	.9762	.9762	1.0625	1.0625
			1.0447	1.0632	.9811	1.0296	1.0632	.9764	.9760	1.0632	1.0632
1.0625-12	UN	2A	1.0479	1.0608	1.0067	1.0371	1.0608	1.0010	1.0010	1.0608	1.0608
			1.0473	1.0614	1.0065	1.0365	1.0614	1.0012	1.0008	1.0614	1.0614
		3A	1.0496	1.0625	1.0084	1.0403	1.0625	1.0042	1.0042	1.0625	1.0625
			1.0490	1.0631	1.0082	1.0397	1.0631	1.0044	1.0040	1.0631	1.0631
1.0625-16	UN	2A	1.0505	1.0610	1.0204	1.0425	1.0610	1.0154	1.0154	1.0610	1.0610
			1.0499	1.0616	1.0202	1.0419	1.0616	1.0156	1.0152	1.0616	1.0616
		3A	1.0520	1.0625	1.0219	1.0453	1.0625	1.0182	1.0182	1.0625	1.0625
			1.0514	1.0631	1.0217	1.0447	1.0631	1.0184	1.0180	1.0631	1.0631
1.0625-18	UNEF	2A	1.0514	1.0611	1.02500	1.0444	1.0611	1.02030	1.02030	1.0611	1.0611
			1.0509	1.0616	1.02485	1.0439	1.0616	1.02045	1.02015	1.0616	1.0616
		3A	1.0528	1.0625	1.02640	1.0469	1.0625	1.02280	1.02280	1.0625	1.0625
			1.0523	1.0630	1.02625	1.0464	1.0630	1.02295	1.02265	1.0630	1.0630
1.0625-20	UN	2A	1.0521	1.0611	1.02860	1.0458	1.0611	1.02410	1.02410	1.0611	1.0611
			1.0516	1.0616	1.02845	1.0453	1.0616	1.02425	1.02395	1.0616	1.0616
		3A	1.0535	1.0625	1.03000	1.0483	1.0625	1.02660	1.02660	1.0625	1.0625
			1.0530	1.0630	1.02985	1.0478	1.0630	1.02675	1.02645	1.0630	1.0630
1.0625-28	UN	2A	1.0542	1.0613	1.03810	1.0496	1.0609	1.03410	1.03410	1.0613	1.0609
			1.0537	1.0618	1.03795	1.0491	1.0614	1.03425	1.03395	1.0618	1.0614
		3A	1.0554	1.0625	1.03930	1.0518	1.0625	1.03630	1.03630	1.0625	1.0625
			1.0549	1.0630	1.03915	1.0513	1.0630	1.03645	1.03615	1.0630	1.0630
1.125-7	UNC	1A	1.1040	1.1228	1.0300	1.0810	1.1228	1.0191	1.0191	1.1228	1.1228
			1.1033	1.1235	1.0298	1.0803	1.1235	1.0193	1.0189	1.1235	1.1235
		2A	1.1040	1.1228	1.0300	1.0847	1.1228	1.0228	1.0228	1.1228	1.1228
			1.1033	1.1235	1.0298	1.0840	1.1235	1.0230	1.0226	1.1235	1.1235
		3A	1.1062	1.1250	1.0322	1.0887	1.1250	1.0268	1.0268	1.1250	1.1250
			1.1055	1.1257	1.0320	1.0880	1.1257	1.0270	1.0266	1.1257	1.1257
1.125-8	UN	2A	1.1058	1.1229	1.0417	1.0889	1.1229	1.0348	1.0348	1.1229	1.1229
			1.1051	1.1236	1.0415	1.0882	1.1236	1.0350	1.0346	1.1236	1.1236
		3A	1.1079	1.1250	1.0438	1.0927	1.1250	1.0386	1.0386	1.1250	1.1250
			1.1072	1.1257	1.0436	1.0920	1.1257	1.0388	1.0384	1.1257	1.1257
1.125-12	UNF	1A	1.1103	1.1232	1.0691	1.0962	1.1226	1.0601	1.0601	1.1232	1.1226
			1.1097	1.1238	1.0689	1.0956	1.1232	1.0603	1.0599	1.1238	1.1232
		2A	1.1103	1.1232	1.0691	1.0992	1.1232	1.0631	1.0631	1.1232	1.1232
			1.1097	1.1238	1.0689	1.0986	1.1238	1.0633	1.0629	1.1238	1.1238
		3A	1.1121	1.1250	1.0709	1.1025	1.1250	1.0664	1.0664	1.1250	1.1250
			1.1115	1.1256	1.0707	1.1019	1.1256	1.0666	1.0662	1.1256	1.1256

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.125–16	UN	2A	1.1130	1.1235	1.0829	1.1050	1.1235	1.0779	1.0779	1.1235	1.1235
			1.1124	1.1241	1.0827	1.1044	1.1241	1.0781	1.0777	1.1241	1.1241
		3A	1.1145	1.1250	1.0844	1.1078	1.1250	1.0807	1.0807	1.1250	1.1250
			1.1139	1.1256	1.0842	1.1072	1.1256	1.0809	1.0805	1.1256	1.1256
1.125–18	UNEF	2A	1.1139	1.1236	1.08750	1.1069	1.1236	1.08280	1.08280	1.1236	1.1236
			1.1134	1.1241	1.08735	1.1064	1.1241	1.08295	1.08265	1.1241	1.1241
		3A	1.1153	1.1250	1.08890	1.1094	1.1250	1.08530	1.08530	1.1250	1.1250
			1.1148	1.1255	1.08875	1.1089	1.1255	1.08545	1.08515	1.1255	1.1255
1.125–20	UN	2A	1.1146	1.1236	1.09110	1.1083	1.1236	1.08660	1.08660	1.1236	1.1236
			1.1141	1.1241	1.09095	1.1078	1.1241	1.08675	1.08645	1.1241	1.1241
		3A	1.1160	1.1250	1.09250	1.1108	1.1250	1.08910	1.08910	1.1250	1.1250
			1.1155	1.1255	1.09235	1.1103	1.1255	1.08925	1.08895	1.1255	1.1255
1.125–28	UN	2A	1.1167	1.1238	1.10060	1.1121	1.1234	1.09660	1.09660	1.1238	1.1234
			1.1162	1.1243	1.10045	1.1116	1.1239	1.09675	1.09645	1.1243	1.1239
		3A	1.1179	1.1250	1.10180	1.1143	1.1250	1.09880	1.09880	1.1250	1.1250
			1.1174	1.1255	1.10165	1.1138	1.1255	1.09895	1.09865	1.1255	1.1255
1.1875–8	UN	2A	1.1683	1.1854	1.1042	1.1513	1.1854	1.0972	1.0972	1.1854	1.1854
			1.1676	1.1861	1.1040	1.1506	1.1861	1.0974	1.0970	1.1861	1.1861
		3A	1.1704	1.1875	1.1063	1.1552	1.1875	1.1011	1.1011	1.1875	1.1875
			1.1697	1.1882	1.1061	1.1545	1.1882	1.1013	1.1009	1.1882	1.1882
1.1875–12	UN	2A	1.1729	1.1858	1.1317	1.1620	1.1858	1.1259	1.1259	1.1858	1.1858
			1.1723	1.1864	1.1315	1.1614	1.1864	1.1261	1.1257	1.1864	1.1864
		3A	1.1746	1.1875	1.1334	1.1652	1.1875	1.1291	1.1291	1.1875	1.1875
			1.1740	1.1881	1.1332	1.1646	1.1881	1.1293	1.1289	1.1881	1.1881
1.1875–16	UN	2A	1.1755	1.1860	1.1454	1.1674	1.1860	1.1403	1.1403	1.1860	1.1860
			1.1749	1.1866	1.1452	1.1668	1.1866	1.1405	1.1401	1.1866	1.1866
		3A	1.1770	1.1875	1.1469	1.1702	1.1875	1.1431	1.1431	1.1875	1.1875
			1.1764	1.1881	1.1467	1.1696	1.1881	1.1433	1.1429	1.1881	1.1881
1.1875–18	UNEF	2A	1.1763	1.1860	1.14990	1.1691	1.1860	1.14500	1.14500	1.1860	1.1860
			1.1758	1.1865	1.14975	1.1686	1.1865	1.14515	1.14485	1.1865	1.1865
		3A	1.1778	1.1875	1.15140	1.1719	1.1875	1.14780	1.14780	1.1875	1.1875
			1.1773	1.1880	1.15125	1.1714	1.1880	1.14795	1.14765	1.1880	1.1880
1.1875–20	UN	2A	1.1771	1.1861	1.15360	1.1706	1.1861	1.14890	1.14890	1.1861	1.1861
			1.1766	1.1866	1.15345	1.1701	1.1866	1.14905	1.14875	1.1866	1.1866
		3A	1.1785	1.1875	1.15500	1.1732	1.1875	1.15150	1.15150	1.1875	1.1875
			1.1780	1.1880	1.15485	1.1727	1.1880	1.15165	1.15135	1.1880	1.1880
1.1875–28	UN	2A	1.1792	1.1863	1.16310	1.1745	1.1858	1.15900	1.15900	1.1863	1.1858
			1.1787	1.1868	1.16295	1.1740	1.1863	1.15915	1.15885	1.1868	1.1863
		3A	1.1804	1.1875	1.16430	1.1767	1.1875	1.16120	1.16120	1.1875	1.1875
			1.1799	1.1880	1.16415	1.1762	1.1880	1.16135	1.16105	1.1880	1.1880
1.250–7	UNC	1A	1.2290	1.2478	1.1550	1.2058	1.2478	1.1439	1.1439	1.2478	1.2478
			1.2283	1.2485	1.1548	1.2051	1.2485	1.1441	1.1437	1.2485	1.2485
		2A	1.2290	1.2478	1.1550	1.2095	1.2478	1.1476	1.1476	1.2478	1.2478
			1.2283	1.2485	1.1548	1.2088	1.2485	1.1478	1.1474	1.2485	1.2485
		3A	1.2312	1.2500	1.1572	1.2136	1.2500	1.1517	1.1517	1.2500	1.2500
			1.2305	1.2507	1.1570	1.2129	1.2507	1.1519	1.1515	1.2507	1.2507
1.250–8	UN	2A	1.2308	1.2479	1.1667	1.2138	1.2479	1.1597	1.1597	1.2479	1.2479
			1.2301	1.2486	1.1665	1.2131	1.2486	1.1599	1.1595	1.2486	1.2486
		3A	1.2329	1.2500	1.1688	1.2176	1.2500	1.1635	1.1635	1.2500	1.2500
			1.2322	1.2507	1.1686	1.2169	1.2507	1.1637	1.1633	1.2507	1.2507
1.250–12	UNF	1A	1.2353	1.2482	1.1941	1.2210	1.2474	1.1849	1.1849	1.2482	1.2474
			1.2347	1.2488	1.1939	1.2204	1.2480	1.1851	1.1847	1.2488	1.2480
		2A	1.2353	1.2482	1.1941	1.2240	1.2482	1.1879	1.1879	1.2482	1.2482
			1.2347	1.2488	1.1939	1.2234	1.2488	1.1881	1.1877	1.2488	1.2488
		3A	1.2371	1.2500	1.1959	1.2274	1.2500	1.1913	1.1913	1.2500	1.2500
			1.2365	1.2506	1.1957	1.2268	1.2506	1.1915	1.1911	1.2506	1.2506
1.250–16	UN	2A	1.2380	1.2485	1.2079	1.2299	1.2485	1.2028	1.2028	1.2485	1.2485
			1.2374	1.2491	1.2077	1.2293	1.2491	1.2030	1.2026	1.2491	1.2491
		3A	1.2395	1.2500	1.2094	1.2327	1.2500	1.2056	1.2056	1.2500	1.2500
			1.2389	1.2506	1.2092	1.2321	1.2506	1.2058	1.2054	1.2506	1.2506
1.250–18	UNEF	2A	1.2388	1.2485	1.21240	1.2316	1.2485	1.20750	1.20750	1.2485	1.2485
			1.2383	1.2490	1.21225	1.2311	1.2490	1.20765	1.20735	1.2490	1.2490
		3A	1.2403	1.2500	1.21390	1.2344	1.2500	1.21030	1.21030	1.2500	1.2500
			1.2398	1.2505	1.21375	1.2339	1.2505	1.21045	1.21015	1.2505	1.2505

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs	
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter	
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]	Plug for LO thread gage [a,c]
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W and X tolerances	W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.250–20	UN	2A	1.2396	1.2486	1.21610	1.2331	1.2486	1.21140	1.21140	1.2486	1.2486
			1.2391	1.2491	1.21595	1.2326	1.2491	1.21155	1.21125	1.2491	1.2491
		3A	1.2410	1.2500	1.21750	1.2357	1.2500	1.21400	1.21400	1.2500	1.2500
			1.2405	1.2505	1.21735	1.2352	1.2505	1.21415	1.21385	1.2505	1.2505
1.250–28	UN	2A	1.2417	1.2488	1.22560	1.2370	1.2483	1.22150	1.22150	1.2488	1.2483
			1.2412	1.2493	1.22545	1.2365	1.2488	1.22165	1.22135	1.2493	1.2488
		3A	1.2429	1.2500	1.22680	1.2332	1.2500	1.22370	1.22370	1.2500	1.2500
			1.2424	1.2505	1.22665	1.2387	1.2505	1.22385	1.22355	1.2505	1.2505
1.3125–8	UN	2A	1.2933	1.3104	1.2292	1.2762	1.3104	1.2221	1.2221	1.3104	1.3104
			1.2926	1.3111	1.2290	1.2755	1.3111	1.2223	1.2219	1.3111	1.3111
		3A	1.2954	1.3125	1.2313	1.2801	1.3125	1.2260	1.2260	1.3125	1.3125
			1.2947	1.3132	1.2311	1.2794	1.3132	1.2262	1.2258	1.3132	1.3132
1.3125–12	UN	2A	1.2979	1.3108	1.2567	1.2870	1.3108	1.2509	1.2509	1.3108	1.3108
			1.2973	1.3114	1.2565	1.2864	1.3114	1.2511	1.2507	1.3114	1.3114
		3A	1.2996	1.3125	1.2584	1.2902	1.3125	1.2541	1.2541	1.3125	1.3125
			1.2990	1.3131	1.2582	1.2896	1.3131	1.2543	1.2539	1.3131	1.3131
1.3125–16	UN	2A	1.3005	1.3110	1.2704	1.2924	1.3110	1.2653	1.2653	1.3110	1.3110
			1.2999	1.3116	1.2702	1.2918	1.3116	1.2655	1.2651	1.3116	1.3116
		3A	1.3020	1.3125	1.2719	1.2952	1.3125	1.2681	1.2681	1.3125	1.3125
			1.3014	1.3131	1.2717	1.2946	1.3131	1.2683	1.2679	1.3131	1.3131
1.3125–18	UNEF	2A	1.3013	1.3110	1.27490	1.2941	1.3110	1.27000	1.27000	1.3110	1.3110
			1 3008	1.3115	1.27475	1.2936	1.3115	1.27015	1.26985	1.3115	1.3115
		3A	1.3028	1.3125	1.27640	1.2969	1.3125	1.27280	1.27280	1.3125	1.3125
			1.3023	1.3130	1.27625	1.2964	1.3130	1.27295	1.27265	1.3130	1.3130
1.3125–20	UN	2A	1.3021	1.3111	1.27860	1.2956	1.3111	1.27390	1.27390	1.3111	1.3111
			1.3016	1.3116	1.27845	1.2951	1.3116	1.27405	1.27375	1.3116	1.3116
		3A	1.3035	1.3125	1.28000	1.2982	1.3125	1.27650	1.27650	1.3125	1.3125
			1.3030	1.3130	1.27985	1.2977	1.3130	1.27665	1.27635	1.3130	1.3130
1.3125–28	UN	2A	1.3042	1.3113	1.28810	1.2995	1.3108	1.28400	1.28400	1.3113	1.3108
			1.3037	1.3118	1.28795	1.2990	1.3113	1.28415	1.28385	1.3118	1.3113
		3A	1.3054	1.3125	1.28930	1.3017	1.3125	1.28620	1.28620	1.3125	1.3125
			1.3049	1.3130	1.28915	1.3012	1.3130	1.28635	1.28605	1.3130	1.3130
1.375–6	UNC	1A	1.3516	1.3726	1.2643	1.3245	1.3726	1.2523	1.2523	1.3726	1.3726
			1.3508	1.3734	1.2641	1.3237	1.3734	1.2525	1.2521	1.3734	1.3734
		2A	1.3516	1.3726	1.2643	1.3285	1.3726	1.2563	1.2563	1.3726	1.3726
			1.3508	1.3734	1.2641	1.3277	1.3734	1.2565	1.2561	1.3734	1.3734
		3A	1.3540	1.3750	1.2667	1.3329	1.3750	1.2607	1.2607	1.3750	1.3750
			1.3532	1.3758	1.2665	1.3321	1.3758	1.2609	1.2605	1.3758	1.3758
1.375–8	UN	2A	1.3557	1.3728	1.2916	1.3385	1.3728	1.2844	1.2844	1.3728	1.3728
			1.3550	1.3735	1.2914	1.3378	1.3735	1.2846	1.2842	1.3735	1.3735
		3A	1.3579	1.3750	1.2938	1.3425	1.3750	1.2884	1.2884	1.3750	1.3750
			1.3572	1.3757	1.2936	1.3418	1.3757	1.2886	1.2882	1.3757	1.3757
1.375–12	UNF	1A	1.3602	1.3731	1.3190	1.3457	1.3721	1.3096	1.3096	1.3731	1.3721
			1.3596	1.3737	1.3188	1.3451	1.3727	1.3098	1.3094	1.3737	1.3727
		2A	1.3602	1.3731	1.3190	1.3488	1.3731	1.3127	1.3127	1.3731	1.3731
			1.3596	1.3737	1.3188	1.3482	1.3737	1.3129	1.3125	1.3737	1.3737
		3A	1.3621	1.3750	1.3209	1.3523	1.3750	1.3162	1.3162	1.3750	1.3750
			1.3615	1.3756	1.3207	1.3517	1.3756	1.3164	1.3160	1.3756	1.3756
1.375–16	UN	2A	1.3630	1.3735	1.3329	1.3549	1.3735	1.3278	1.3278	1.3735	1.3735
			1.3624	1.3741	1.3327	1.3543	1.3741	1.3280	1.3276	1.3741	1.3741
		3A	1.3645	1.3750	1.3344	1.3577	1.3750	1.3306	1.3306	1.3750	1.3750
			1.3639	1.3756	1.3342	1.3571	1.3756	1.3308	1.3304	1.3756	1.3756
1.375–18	UNEF	2A	1.3638	1.3735	1.33740	1.3566	1.3735	1.33250	1.33250	1.3735	1.3735
			1.3633	1.3740	1.33725	1.3561	1.3740	1.33265	1.33235	1.3740	1.3740
		3A	1.3653	1.3750	1.33890	1.3594	1.3750	1.33530	1.33530	1.3750	1.3750
			1.3648	1.3755	1.33875	1.3589	1.3755	1.33545	1.33515	1.3755	1.3755
1.375–20	UN	2A	1.3646	1.3736	1.34110	1.3581	1.3736	1.33640	1.33640	1.3736	1.3736
			1.3641	1.3741	1.34095	1.3576	1.3741	1.33655	1.33625	1.3741	1.3741
		3A	1.3660	1.3750	1.34250	1.3607	1.3750	1.33900	1.33900	1.3750	1.3750
			1.3655	1.3755	1.34235	1.3602	1.3755	1.33915	1.33885	1.3755	1.3755
1.375–28	UN	2A	1.3667	1.3738	1.35060	1.3620	1.3733	1.34650	1.34650	1.3738	1.3733
			1.3662	1.3743	1.35045	1.3615	1.3738	1.34665	1.34635	1.3743	1.3738
		3A	1.3679	1.3750	1.35180	1.3642	1.3750	1.34870	1.34870	1.3750	1.3750
			1.3674	1.3755	1.35165	1.3637	1.3755	1.34885	1.34855	1.3755	1.3755
1.4375–6	UN	2A	1.4141	1.4351	1.3268	1.3910	1.4351	1.3188	1.3188	1.4351	1.4351
			1.4133	1.4359	1.3266	1.3902	1.4359	1.3190	1.3186	1.4359	1.4359
		3A	1.4165	1.4375	1.3292	1.3954	1.4375	1.3232	1.3232	1.4375	1.4375
			1.4157	1.4383	1.3290	1.3946	1.4383	1.3234	1.3230	1.4383	1.4383

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	Major diameter: Full	Pitch diameter	Plug for LO thread gage [a]: Major diameter: Truncated	Major diameter: Full	Pitch diameter: Plus tolerance gage	Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.4375-8	UN	2A	1.4182	1.4353	1.3541	1.4010	1.4353	1.3469	1.3469	1.4353	1.4353
			1.4175	1.4360	1.3539	1.4003	1.4360	1.3471	1.3467	1.4360	1.4360
		3A	1.4204	1.4375	1.3563	1.4050	1.4375	1.3509	1.3509	1.4375	1.4375
			1.4197	1.4382	1.3561	1.4043	1.4382	1.3511	1.3507	1.4382	1.4382
1.4375-12	UN	2A	1.4228	1.4357	1.3816	1.4118	1.4357	1.3757	1.3757	1.4357	1.4357
			1.4222	1.4363	1.3814	1.4112	1.4363	1.3759	1.3755	1.4363	1.4363
		3A	1.4246	1.4375	1.3834	1.4151	1.4375	1.3790	1.3790	1.4375	1.4375
			1.4240	1.4381	1.3832	1.4145	1.4381	1.3792	1.3788	1.4381	1.4381
1.4375-16	UN	2A	1.4254	1.4359	1.3953	1.4172	1.4359	1.3901	1.3901	1.4359	1.4359
			1.4248	1.4365	1.3951	1.4166	1.4365	1.3903	1.3899	1.4365	1.4365
		3A	1.4270	1.4375	1.3969	1.4201	1.4375	1.3930	1.3930	1.4375	1.4375
			1.4264	1.4381	1.3967	1.4195	1.4381	1.3932	1.3928	1.4381	1.4381
1.4375-18	UNEF	2A	1.4263	1.4360	1.39990	1.4190	1.4360	1.39490	1.39490	1.4360	1.4360
			1.4258	1.4365	1.39975	1.4185	1.4365	1.39505	1.39475	1.4365	1.4365
		3A	1.4278	1.4375	1.40140	1.4218	1.4375	1.39770	1.39770	1.4375	1.4375
			1.4273	1.4380	1.40125	1.4213	1.4380	1.39785	1.39755	1.4380	1.4380
1.4375-20	UN	2A	1.4271	1.4361	1.40360	1.4205	1.4361	1.39880	1.39880	1.4361	1.4361
			1.4266	1.4366	1.40345	1.4200	1.4366	1.39895	1.39865	1.4366	1.4366
		3A	1.4285	1.4375	1.40500	1.4231	1.4375	1.40140	1.40140	1.4375	1.4375
			1.4280	1.4380	1.40485	1.4226	1.4380	1.40155	1.40125	1.4380	1.4380
1.4375-28	UN	2A	1.4291	1.4362	1.41300	1.4243	1.4356	1.40880	1.40880	1.4362	1.4356
			1.4286	1.4367	1.41285	1.4238	1.4361	1.40895	1.40865	1.4367	1.4361
		3A	1.4304	1.4375	1.41430	1.4267	1.4375	1.41120	1.41120	1.4375	1.4375
			1.4299	1.4380	1.41415	1.4262	1.4380	1.41135	1.41105	1.4380	1.4380
1.500-6	UNC	1A	1.4766	1.4976	1.3893	1.4494	1.4976	1.3772	1.3772	1.4976	1.4976
			1.4758	1.4984	1.3891	1.4486	1.4984	1.3774	1.3770	1.4984	1.4984
		2A	1.4766	1.4976	1.3893	1.4534	1.4976	1.3812	1.3812	1.4976	1.4976
			1.4758	1.4984	1.3891	1.4526	1.4984	1.3814	1.3810	1.4984	1.4984
		3A	1.4790	1.5000	1.3917	1.4578	1.5000	1.3856	1.3856	1.5000	1.5000
			1.4782	1.5008	1.3915	1.4570	1.5008	1.3858	1.3854	1.5008	1.5008
1.500-8	UN	2A	1.4807	1.4978	1.4166	1.4634	1.4978	1.4093	1.4093	1.4978	1.4978
			1.4800	1.4985	1.4164	1.4627	1.4985	1.4095	1.4091	1.4985	1.4985
		3A	1.4829	1.5000	1.4188	1.4674	1.5000	1.4133	1.4133	1.5000	1.5000
			1.4822	1.5007	1.4186	1.4667	1.5007	1.4135	1.4131	1.5007	1.5007
1.500-12	UNF	1A	1.4852	1.4981	1.4440	1.4705	1.4969	1.4344	1.4344	1.4981	1.4969
			1.4846	1.4987	1.4438	1.4699	1.4975	1.4346	1.4342	1.4987	1.4975
		2A	1.4852	1.4981	1.4440	1.4737	1.4981	1.4376	1.4376	1.4981	1.4981
			1.4846	1.4987	1.4438	1.4731	1.4987	1.4378	1.4374	1.4987	1.4987
		3A	1.4871	1.5000	1.4459	1.4772	1.5000	1.4411	1.4411	1.5000	1.5000
			1.4865	1.5006	1.4457	1.4766	1.5006	1.4413	1.4409	1.5006	1.5006
1.500-16	UN	2A	1.4879	1.4984	1.4578	1.4797	1.4984	1.4526	1.4526	1.4984	1.4984
			1.4873	1.4990	1.4576	1.4791	1.4990	1.4528	1.4524	1.4990	1.4990
		3A	1.4895	1.5000	1.4594	1.4826	1.5000	1.4555	1.4555	1.5000	1.5000
			1.4889	1.5006	1.4592	1.4820	1.5006	1.4557	1.4553	1.5006	1.5006
1.500-18	UNEF	2A	1.4888	1.4985	1.46240	1.4815	1.4984	1.45740	1.45740	1.4985	1.4985
			1.4883	1.4990	1.46225	1.4810	1.4990	1.45755	1.45725	1.4990	1.4990
		3A	1.4903	1.5000	1.46390	1.4843	1.5000	1.46020	1.46020	1.5000	1.5000
			1.4898	1.5005	1.46375	1.4838	1.5005	1.46035	1.46005	1.5005	1.5005
1.500-20	UN	2A	1.4896	1.4986	1.46610	1.4830	1.4986	1.46130	1.46130	1.4986	1.4986
			1.4891	1.4991	1.46595	1.4825	1.4991	1.46145	1.46115	1.4991	1.4991
		3A	1.4910	1.5000	1.46750	1.4856	1.5000	1.46390	1.46390	1.5000	1.5000
			1.4905	1.5005	1.46735	1.4851	1.5005	1.46405	1.46375	1.5005	1.5005
1.500-28	UN	2A	1.4916	1.4987	1.47550	1.4868	1.4981	1.47130	1.47130	1.4987	1.4981
			1.4911	1.4992	1.47535	1.4863	1.4986	1.47145	1.47115	1.4992	1.4986
		3A	1.4929	1.5000	1.47680	1.4892	1.5000	1.47370	1.47370	1.5000	1.5000
			1.4924	1.5005	1.47665	1.4887	1.5005	1.47385	1.47355	1.5005	1.5005
1.5625-6	UN	2A	1.5391	1.5601	1.45180	1.5158	1.5601	1.44360	1.44360	1.5601	1.5601
			1.5383	1.5609	1.45155	1.5150	1.5609	1.44385	1.44335	1.5609	1.5609
		3A	1.5415	1.5625	1.45420	1.5203	1.5625	1.44810	1.44810	1.5625	1.5625
			1.5407	1.5633	1.45395	1.5195	1.5633	1.44835	1.44785	1.5633	1.5633
1.5625-8	UN	2A	1.5432	1.5603	1.47910	1.5258	1.5603	1.47170	1.47170	1.5603	1.5603
			1.5425	1.5610	1.47885	1.5251	1.5610	1.47195	1.47145	1.5610	1.5610
		3A	1.5454	1.5625	1.48130	1.5299	1.5625	1.47580	1.47580	1.5625	1.5625
			1.5447	1.5632	1.48105	1.5292	1.5632	1.47605	1.47555	1.5632	1.5632

See footnotes at end of table.

TABLE 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs	
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter	
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]	Plug for LO thread gage [a,c]
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W and X tolerances	W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1. 5625–12	UN	2A	1. 5478	1. 5607	1. 50660	1. 5368	1. 5607	1. 50070	1. 50070	1. 5607	1. 5607
			1. 5472	1. 5613	1. 50635	1. 5362	1. 5613	1. 50095	1. 50045	1. 5613	1. 5613
		3A	1. 5496	1. 5625	1. 50840	1. 5401	1. 5625	1. 50400	1. 50400	1. 5625	1. 5625
			1. 5490	1. 5631	1. 50815	1. 5395	1. 5631	1. 50425	1. 50375	1. 5631	1. 5631
1. 5625–16	UN	2A	1. 5504	1. 5609	1. 52030	1. 5422	1. 5609	1. 51510	1. 51510	1. 5609	1. 5609
			1. 5498	1. 5615	1. 52005	1. 5416	1. 5615	1. 51535	1. 51485	1. 5615	1. 5619
		3A	1. 5520	1. 5625	1. 52190	1. 5451	1. 5625	1. 51800	1. 51800	1. 5625	1. 5625
			1. 5514	1. 5631	1. 52165	1. 5445	1. 5631	1. 51825	1. 51775	1. 5631	1. 5631
1. 5625–18	UNEF	2A	1. 5513	1. 5610	1. 5249	1. 5440	1. 5610	1. 5199	1. 5199	1. 5610	1. 5610
			1. 5508	1. 5615	1. 5247	1. 5435	1. 5615	1. 5201	1. 5197	1. 5615	1. 5615
		3A	1. 5528	1. 5625	1. 5264	1. 5468	1. 5625	1. 5227	1. 5227	1. 5625	1. 5625
			1. 5523	1. 5630	1. 5262	1. 5463	1. 5630	1. 5229	1. 5225	1. 5630	1. 5630
1. 5625–20	UN	2A	1. 5521	1. 5611	1. 5286	1. 5455	1. 5611	1. 5238	1. 5238	1. 5611	1. 5611
			1. 5516	1. 5616	1. 5284	1. 5450	1. 5616	1. 5240	1. 5236	1. 5616	1. 5616
		3A	1. 5535	1. 5625	1. 5300	1. 5481	1. 5625	1. 5264	1. 5264	1. 5625	1. 5625
			1. 5530	1. 5630	1. 5298	1. 5476	1. 5630	1. 5266	1. 5262	1. 5630	1. 5630
1. 625–6	UN	2A	1. 6015	1. 6225	1. 51420	1. 5782	1. 6225	1. 50600	1. 50600	1. 6225	1. 6225
			1. 6007	1. 6233	1. 51395	1. 5774	1. 6233	1. 50625	1. 50575	1. 6233	1. 6233
		3A	1. 6040	1. 6250	1. 51670	1. 5827	1. 6250	1. 51050	1. 51050	1. 6250	1. 6250
			1. 6032	1. 6258	1. 51645	1. 5819	1. 6258	1. 51075	1. 51025	1. 6258	1. 6258
1. 625–8	UN	2A	1. 6057	1. 6228	1. 54160	1. 5883	1. 6228	1. 53420	1. 53420	1. 6228	1. 6228
			1. 6050	1. 6235	1. 54135	1. 5876	1. 6235	1. 53445	1. 53395	1. 6235	1. 6235
		3A	1. 6079	1. 6250	1. 54380	1. 5923	1. 6250	1. 53820	1. 53820	1. 6250	1. 6250
			1. 6072	1. 6257	1. 54355	1. 5916	1. 6257	1. 53845	1. 53795	1. 6257	1. 6257
1. 625–12	UN	2A	1. 6103	1. 6232	1. 56910	1. 5993	1. 6232	1. 56320	1. 56320	1. 6232	1. 6232
			1. 6097	1. 6238	1. 56885	1. 5987	1. 6238	1. 56345	1. 56295	1. 6238	1. 6238
		5A	1. 6121	1. 6250	1. 57090	1. 6026	1. 6250	1. 56650	1. 56650	1. 6250	1. 6250
			1. 6115	1. 6256	1. 57065	1. 6020	1. 6256	1. 56675	1. 56625	1. 6256	1. 6256
1. 625–16	UN	2A	1. 6129	1. 6234	1. 58280	1. 6047	1. 6234	1. 57760	1. 57760	1. 6234	1. 6234
			1. 6123	1. 6240	1. 58255	1. 6041	1. 6240	1. 57785	1. 57735	1. 6240	1. 6240
		3A	1. 6145	1. 6250	1. 58440	1. 6076	1. 6250	1. 58050	1. 58050	1. 6250	1. 6250
			1. 6139	1. 6256	1. 58415	1. 6070	1. 6256	1. 58075	1. 58025	1. 6256	1. 6256
1. 625–18	UNEF	2A	1. 6138	1. 6235	1. 5874	1. 6065	1. 6235	1. 5824	1. 5824	1. 6235	1. 6235
			1. 6133	1. 6240	1. 5872	1. 6060	1. 6240	1. 5826	1. 5822	1. 6240	1. 6240
		3A	1. 6153	1. 6250	1. 5889	1. 6093	1. 6250	1. 5852	1. 5852	1. 6250	1. 6250
			1. 6148	1. 6255	1. 5887	1. 6088	1. 6255	1. 5854	1. 5850	1. 6255	1. 6255
1. 625–20	UN	2A	1. 6146	1. 6236	1. 5911	1. 6080	1. 6236	1. 5863	1. 5863	1. 6236	1. 6236
			1. 6141	1. 6241	1. 5909	1. 6075	1. 6241	1. 5865	1. 5861	1. 6241	1. 6241
		3A	1. 6160	1. 6250	1. 5925	1. 6106	1. 6250	1. 5889	1. 5889	1. 6250	1. 6250
			1. 6155	1. 6255	1. 5923	1. 6101	1. 6255	1. 5891	1. 5887	1. 6255	1. 6255
1. 6875–6	UN	2A	1. 6640	1. 6850	1. 57670	1. 6406	1. 6850	1. 56840	1. 56840	1. 6850	1. 6850
			1. 6632	1. 6858	1. 57645	1. 6398	1. 6858	1. 56865	1. 56815	1. 6858	1. 6858
		3A	1. 6665	1. 6875	1. 57920	1. 6452	1. 6875	1. 57300	1. 57300	1. 6875	1. 6875
			1. 6657	1. 6883	1. 57895	1. 6444	1. 6883	1. 57325	1. 57275	1. 6883	1. 6883
1. 6875–8	UN	2A	1. 6682	1. 6853	1. 60410	1. 6507	1. 6853	1. 59660	1. 59660	1. 6853	1. 6853
			1. 6675	1. 6860	1. 60385	1. 6500	1. 6860	1. 59685	1. 59635	1. 6860	1. 6860
		3A	1. 6704	1. 6875	1. 60630	1. 6548	1. 6875	1. 60070	1. 60070	1. 6875	1. 6875
			1. 6697	1. 6882	1. 60605	1. 6541	1. 6882	1. 60095	1. 60045	1. 6882	1. 6882
1. 6875–12	UN	2A	1. 6728	1. 6857	1. 63160	1. 6617	1. 6857	1. 62560	1. 62560	1. 6857	1. 6857
			1. 6722	1. 6863	1. 63135	1. 6611	1. 6863	1. 62585	1. 62535	1. 6863	1. 6863
		3A	1. 6746	1. 6875	1. 63340	1. 6650	1. 6875	1. 62890	1. 62890	1. 6875	1. 6875
			1. 6740	1. 6881	1. 63315	1. 6644	1. 6881	1. 62915	1. 62865	1. 6881	1. 6881
1. 6875–16	UN	2A	1. 6754	1. 6859	1. 64530	1. 6671	1. 6859	1. 64000	1. 64000	1. 6859	1. 6859
			1. 6748	1. 6865	1. 64505	1. 6665	1. 6865	1. 64025	1. 63975	1. 6865	1. 6865
		3A	1. 6770	1. 6875	1. 64690	1. 6700	1. 6875	1. 64290	1. 64290	1. 6875	1. 6875
			1. 6764	1. 6881	1. 64665	1. 6694	1. 6881	1. 64315	1. 64265	1. 6881	1. 6881
1. 6875–18	UNEF	2A	1. 6763	1. 6860	1. 6499	1. 6689	1. 6860	1. 6448	1. 6448	1. 6860	1. 6860
			1. 6758	1. 6865	1. 6497	1. 6684	1. 6865	1. 6450	1. 6446	1. 6865	1. 6865
		3A	1. 6778	1. 6875	1. 6514	1. 6717	1. 6875	1. 6476	1. 6476	1. 6875	1. 6875
			1. 6773	1. 6880	1. 6512	1. 6712	1. 6880	1. 6478	1. 6474	1. 6880	1. 6880
1. 6875–20	UN	2A	1. 6770	1. 6860	1. 6535	1. 6704	1. 6860	1. 6487	1. 6487	1. 6860	1. 6860
			1. 6765	1. 6865	1. 6533	1. 6699	1. 6865	1. 6489	1. 6485	1. 6865	1. 6865
		3A	1. 6785	1. 6875	1. 6550	1. 6731	1. 6875	1. 6514	1. 6514	1. 6875	1. 6875
			1. 6780	1. 6880	1. 6548	1. 6726	1. 6880	1. 6516	1. 6512	1. 6880	1. 6880

See footnotes at end of table.

Table 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs — Plug for GO thread gage [a] — Major diameter — Truncated	W truncated setting plugs — Plug for GO thread gage [a] — Major diameter — Full	W truncated setting plugs — Plug for GO thread gage [a] — Pitch diameter	W truncated setting plugs — Plug for LO thread gage [a] — Major diameter — Truncated	W truncated setting plugs — Plug for LO thread gage [a] — Major diameter — Full	W truncated setting plugs — Plug for LO thread gage [a] — Pitch diameter — Plus tolerance gage	W truncated setting plugs — Plug for LO thread gage [a] — Pitch diameter — Minus tolerance gage	Basic-crest setting plugs — Major diameter — Plug for GO thread gage [a,b] — W and X tolerances	Basic-crest setting plugs — Major diameter — Plug for LO thread gage [a,c] — W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.750–5	UNC	1A	1.7234	1.7473	1.61740	1.6906	1.7473	1.60400	1.60400	1.7473	1.7473
			1.7226	1.7481	1.61715	1.6898	1.7481	1.60425	1.60375	1.7481	1.7481
		2A	1.7234	1.7473	1.61740	1.6951	1.7473	1.60850	1.60850	1.7473	1.7473
			1.7226	1.7481	1.61715	1.6943	1.7481	1.60875	1.60825	1.7481	1.7481
		3A	1.7261	1.7500	1.62010	1.7000	1.7500	1.61340	1.61340	1.7500	1.7500
			1.7253	1.7508	1.61985	1.6992	1.7508	1.61365	1.61315	1.7508	1.7508
1.750–6	UN	2A	1.7265	1.7475	1.63920	1.7031	1.7475	1.63090	1.63090	1.7475	1.7475
			1.7257	1.7483	1.63895	1.7023	1.7483	1.63115	1.63065	1.7483	1.7483
		3A	1.7290	1.7500	1.64170	1.7076	1.7500	1.63540	1.63540	1.7500	1.7500
			1.7282	1.7508	1.64145	1.7068	1.7508	1.63565	1.63515	1.7508	1.7508
1.750–8	UN	2A	1.7306	1.7477	1.66650	1.7131	1.7477	1.65900	1.65900	1.7477	1.7477
			1.7299	1.7484	1.66625	1.7124	1.7484	1.65925	1.65875	1.7484	1.7484
		3A	1.7329	1.7500	1.66880	1.7172	1.7500	1.66310	1.66310	1.7500	1.7500
			1.7322	1.7507	1.66855	1.7165	1.7507	1.66335	1.66285	1.7507	1.7507
1.750–12	UN	2A	1.7353	1.7482	1.69410	1.7242	1.7482	1.68810	1.68810	1.7482	1.7482
			1.7347	1.7488	1.69385	1.7236	1.7488	1.68835	1.68785	1.7488	1.7488
		3A	1.7371	1.7500	1.69500	1.7275	1.7500	1.69140	1.69140	1.7500	1.7509
			1.7365	1.7506	1.69565	1.7269	1.7506	1.69165	1.69115	1.7506	1.7500
1.750–16	UN	2A	1.7379	1.7484	1.70780	1.7296	1.7484	1.70250	1.70250	1.7484	1.7484
			1.7373	1.7490	1.70755	1.7290	1.7490	1.70275	1.70225	1.7490	1.7490
		3A	1.7395	1.7500	1.70940	1.7325	1.7500	1.70540	1.70540	1.7500	1.7500
			1.7389	1.7506	1.70915	1.7319	1.7506	1.70565	1.70515	1.7506	1.7506
1.750–20	UN	2A	1.7395	1.7485	1.7160	1.7329	1.7485	1.7112	1.7112	1.7485	1.7485
			1.7390	1.7490	1.7158	1.7324	1.7490	1.7114	1.7110	1.7490	1.7490
		3A	1.7410	1.7500	1.7175	1.7356	1.7500	1.7139	1.7139	1.7500	1.7500
			1.7405	1.7505	1.7173	1.7351	1.7505	1.7141	1.7137	1.7505	1.7505
1.8125–6	UN	2A	1.7890	1.8100	1.70170	1.7655	1.8100	1.69330	1.69330	1.8100	1.8100
			1.7882	1.8108	1.70145	1.7647	1.8108	1.69355	1.69305	1.8108	1.8108
		3A	1.7915	1.8125	1.70420	1.7701	1.8125	1.69790	1.69790	1.8125	1.8125
			1.7907	1.8133	1.70395	1.7693	1.8133	1.69815	1.69765	1.8133	1.8133
1.8125–8	UN	2A	1.7931	1.8102	1.72900	1.7755	1.8102	1.72140	1.72140	1.8102	1.8102
			1.7924	1.8109	1.72875	1.7748	1.8109	1.72165	1.72115	1.8109	1.8109
		3A	1.7954	1.8125	1.73130	1.7797	1.8125	1.72560	1.72560	1.8125	1.8125
			1.7947	1.8132	1.73105	1.7790	1.8132	1.72585	1.72535	1.8132	1.8132
1.8125–12	UN	2A	1.7978	1.8107	1.75660	1.7867	1.8107	1.75060	1.75060	1.8107	1.8107
			1.7972	1.8113	1.75635	1.7861	1.8113	1.75085	1.75035	1.8113	1.8113
		3A	1.7996	1.8125	1.75840	1.7900	1.8125	1.75390	1.75390	1.8125	1.8125
			1.7990	1.8131	1.75815	1.7894	1.8131	1.75415	1.75365	1.8131	1.8131
1.8125–16	UN	2A	1.8004	1.8109	1.77030	1.7921	1.8109	1.76500	1.76500	1.8109	1.8109
			1.7998	1.8115	1.77005	1.7915	1.8115	1.76525	1.76475	1.8115	1.8115
		3A	1.8020	1.8125	1.77190	1.7950	1.8125	1.76790	1.76790	1.8125	1.8125
			1.8014	1.8131	1.77165	1.7944	1.8131	1.76815	1.76765	1.8131	1.8131
1.8125–20	UN	2A	1.8020	1.8110	1.7785	1.7954	1.8110	1.7737	1.7737	1.8110	1.8110
			1.8015	1.8115	1.7783	1.7949	1.8115	1.7739	1.7735	1.8115	1.8115
		3A	1.8035	1.8125	1.7800	1.7981	1.8125	1.7764	1.7764	1.8125	1.8125
			1.8030	1.8130	1.7798	1.7976	1.8130	1.7766	1.7762	1.8130	1.8130
1.875–6	UN	2A	1.8515	1.8725	1.76420	1.8280	1.8725	1.75580	1.75580	1.8725	1.8725
			1.8507	1.8733	1.76395	1.8272	1.8733	1.75605	1.75555	1.8733	1.8733
		3A	1.8540	1.8750	1.76670	1.8326	1.8750	1.76040	1.76040	1.8750	1.8750
			1.8532	1.8758	1.76645	1.8318	1.8758	1.76065	1.76015	1.8758	1.8758
1.875–8	UN	2A	1.8556	1.8727	1.79150	1.8379	1.8727	1.78380	1.78380	1.8727	1.8727
			1.8549	1.8734	1.79125	1.8372	1.8734	1.78405	1.78355	1.8734	1.8734
		3A	1.8579	1.8750	1.79380	1.8422	1.8750	1.78810	1.78810	1.8750	1.8750
			1.8572	1.8757	1.79355	1.8415	1.8757	1.78835	1.78785	1.8757	1.8757
1.875–12	UN	2A	1.8603	1.8732	1.81910	1.8492	1.8732	1.81310	1.81310	1.8732	1.8732
			1.8597	1.8738	1.81885	1.8486	1.8738	1.81335	1.81285	1.8738	1.8738
		3A	1.8621	1.8750	1.82090	1.8525	1.8750	1.81640	1.81640	1.8750	1.8750
			1.8615	1.8756	1.82065	1.8519	1.8756	1.81665	1.81615	1.8756	1.8756
1.875–16	UN	2A	1.8629	1.8734	1.83280	1.8546	1.8734	1.82750	1.82750	1.8734	1.8734
			1.8623	1.8740	1.83255	1.8540	1.8740	1.82775	1.82725	1.8740	1.8740
		3A	1.8645	1.8750	1.83440	1.8575	1.8750	1.83040	1.83040	1.8750	1.8750
			1.8639	1.8756	1.83415	1.8569	1.8756	1.83065	1.83015	1.8756	1.8756
1.875–20	UN	2A	1.8645	1.8735	1.8410	1.8579	1.8735	1.8362	1.8362	1.8735	1.8735
			1.8640	1.8740	1.8408	1.8574	1.8740	1.8364	1.8360	1.8740	1.8740
		3A	1.8660	1.8750	1.8425	1.8606	1.8750	1.8389	1.8389	1.8750	1.8750
			1.8655	1.8755	1.8423	1.8601	1.8755	1.8391	1.8387	1.8755	1.8755
1.9375–6	UN	2A	1.9139	1.9349	1.82660	1.8903	1.9349	1.81810	1.81810	1.9349	1.9349
			1.9131	1.9357	1.82635	1.8895	1.9357	1.81835	1.81785	1.9357	1.9357
		3A	1.9165	1.9375	1.82920	1.8950	1.9375	1.82280	1.82280	1.9375	1.9375
			1.9157	1.9383	1.82895	1.8942	1.9383	1.82305	1.82255	1.9383	1.9383

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs	
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter	
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]	Plug for LO thread gage [a,c]
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W and X tolerances	W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.9375–8	UN	2A	1.9181	1.9352	1.85400	1.9004	1.9352	1.84630	1.84630	1.9352	1.9352
			1.9174	1.9359	1.85375	1.8997	1.9359	1.84655	1.84605	1.9359	1.9359
		3A	1.9204	1.9375	1.85630	1.9046	1.9375	1.85050	1.85050	1.9375	1.9375
			1.9197	1.9382	1.85605	1.9039	1.9382	1.85075	1.85025	1.9382	1.9382
1.9375–12	UN	2A	1.9228	1.9357	1.88160	1.9116	1.9357	1.87550	1.87550	1.9357	1.9357
			1.9222	1.9363	1.88135	1.9110	1.9363	1.87575	1.87525	1.9363	1.9363
		3A	1.9246	1.9375	1.88340	1.9150	1.9375	1.87890	1.87890	1.9375	1.9375
			1.9240	1.9381	1.88315	1.9144	1.9381	1.87915	1.87865	1.9381	1.9381
1.9375–16	UN	2A	1.9254	1.9359	1.89530	1.9170	1.9359	1.88990	1.88990	1.9359	1.9359
			1.9248	1.9365	1.89505	1.9164	1.9365	1.89015	1.88965	1.9365	1.9365
		3A	1.9270	1.9375	1.89690	1.9200	1.9375	1.89290	1.89290	1.9375	1.9375
			1.9264	1.9381	1.89665	1.9194	1.9381	1.89315	1.89265	1.9381	1.9381
1.9375–20	UN	2A	1.9270	1.9360	1.9035	1.9203	1.9360	1.8986	1.8986	1.9360	1.9360
			1.9265	1.9365	1.9033	1.9198	1.9365	1.8988	1.8984	1.9365	1.9365
		3A	1.9285	1.9375	1.9050	1.9230	1.9375	1.9013	1.9013	1.9375	1.9375
			1.9280	1.9380	1.9048	1.9225	1.9380	1.9015	1.9011	1.9380	1.9380
2.000–4.5	UNC	1A	1.9713	1.9971	1.85280	1.9347	1.9971	1.83850	1.83850	1.9971	1.9971
			1.9705	1.9979	1.85255	1.9339	1.9979	1.83875	1.83825	1.9979	1.9979
		2A	1.9713	1.9971	1.85280	1.9395	1.9971	1.84330	1.84330	1.9971	1.9971
			1.9705	1.9979	1.85255	1.9387	1.9979	1.84355	1.84305	1.9979	1.9979
		3A	1.9742	2.0000	1.85570	1.9448	2.0000	1.84860	1.84860	2.0000	2.0000
			1.9734	2.0008	1.85545	1.9440	2.0008	1.84885	1.84835	2.0008	2.0008
2.000–6	UN	2A	1.9764	1.9974	1.88910	1.9527	1.9974	1.88050	1.88050	1.9974	1.9974
			1.9756	1.9982	1.88885	1.9519	1.9982	1.88075	1.88025	1.9982	1.9982
		3A	1.9790	2.0000	1.89170	1.9575	2.0000	1.88530	1.88530	2.0000	2.0000
			1.9782	2.0008	1.89145	1.9567	2.0008	1.88555	1.88505	2.0008	2.0008
2.000–8	UN	2A	1.9806	1.9977	1.91650	1.9628	1.9977	1.90870	1.90870	1.9977	1.9977
			1.9799	1.9984	1.91625	1.9621	1.9984	1.90895	1.90845	1.9984	1.9984
		3A	1.9829	2.0000	1.91880	1.9671	2.0000	1.91300	1.91300	2.0000	2.0000
			1.9822	2.0007	1.91855	1.9664	2.0007	1.91325	1.91275	2.0007	2.0007
2.000–12	UN	2A	1.9853	1.9982	1.94410	1.9741	1.9982	1.93800	1.93800	1.9982	1.9982
			1.9847	1.9988	1.94385	1.9735	1.9988	1.93825	1.93775	1.9988	1.9988
		3A	1.9871	2.0000	1.94500	1.9775	2.0000	1.94140	1.94140	2.0000	2.0000
			1.9865	2.0006	1.94565	1.9769	2.0006	1.94165	1.94115	2.0006	2.0006
2.000–16	UN	2A	1.9879	1.9984	1.95780	1.9795	1.9984	1.95240	1.95240	1.9984	1.9984
			1.9873	1.9990	1.95755	1.9789	1.9990	1.95265	1.95215	1.9990	1.9990
		3A	1.9895	2.0000	1.95940	1.9825	2.0000	1.95540	1.95540	2.0000	2.0000
			1.9889	2.0006	1.95915	1.9819	2.0006	1.95565	1.95515	2.0006	2.0006
2.000–20	UN	2A	1.9895	1.9985	1.9660	1.9828	1.9985	1.9611	1.9611	1.9985	1.9985
			1.9890	1.9990	1.9658	1.9823	1.9900	1.9613	1.9609	1.9990	1.9990
		3A	1.9910	2.0000	1.9675	1.9855	2.0000	1.9638	1.9638	2.0000	2.0000
			1.9905	2.0005	1.9673	1.9850	2.0005	1.9640	1.9636	2.0005	2.0005
2.125–6	UN	2A	2.1014	2.1224	2.01410	2.0776	2.1224	2.00540	2.00540	2.1224	2.1224
			2.1006	2.1232	2.01385	2.0768	2.1232	2.00565	2.00515	2.1232	2.1232
		3A	2.1040	2.1250	2.01670	2.0824	2.1250	2.01020	2.01020	2.1250	2.1250
			2.1032	2.1258	2.01645	2.0816	2.1258	2.01045	2.00995	2.1258	2.1258
2.125–8	UN	2A	2.1055	2.1226	2.04140	2.0876	2.1226	2.03350	2.03350	2.1226	2.1226
			2.1048	2.1233	2.04115	2.0869	2.1233	2.03375	2.03325	2.1233	2.1233
		3A	2.1079	2.1250	2.04380	2.0920	2.1250	2.03790	2.03790	2.1250	2.1250
			2.1072	2.1257	2.04355	2.0913	2.1257	2.03815	2.03765	2.1257	2.1257
2.125–12	UN	2A	2.1103	2.1232	2.06910	2.0991	2.1232	2.06300	2.06300	2.1232	2.1232
			2.1097	2.1238	2.06885	2.0985	2.1238	2.06325	2.06275	2.1238	2.1238
		3A	2.1121	2.1250	2.07090	2.1025	2.1250	2.06640	2.06640	2.1250	2.1250
			2.1115	2.1256	2.07065	2.1019	2.1256	2.06665	2.06615	2.1256	2.1256
2.125–16	UN	2A	2.1129	2.1234	2.08280	2.1045	2.1234	2.07740	2.07740	2.1234	2.1234
			2.1123	2.1240	2.08255	2.1039	2.1240	2.07765	2.07715	2.1240	2.1240
		3A	2.1145	2.1250	2.08440	2.1075	2.1250	2.08040	2.08040	2.1250	2.1250
			2.1139	2.1256	2.08415	2.1069	2.1256	2.08065	2.08015	2.1256	2.1256
2.125–20	UN	2A	2.1145	2.1235	2.0910	2.1078	2.1235	2.0861	2.0861	2.1235	2.1235
			2.1140	2.1240	2.0908	2.1073	2.1240	2.0863	2.0859	2.1240	2.1240
		3A	2.1160	2.1250	2.0925	2.1105	2.1250	2.0888	2.0888	2.1250	2.1250
			2.1155	2.1255	2.0923	2.1100	2.1255	2.0890	2.0886	2.1255	2.1255

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs	
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter	
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]	Plug for LO thread gage [a,c]
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W and X tolerances	W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
2.250-4.5	UNC	1A	2.2213	2.2471	2.10280	2.1844	2.2471	2.08820	2.08820	2.2471	2.2471
			2.2205	2.2479	2.10255	2.1836	2.2479	2.08845	2.08795	2.2479	2.2479
		2A	2.2213	2.2471	2.10280	2.1893	2.2471	2.09310	2.09310	2.2471	2.2471
			2.2205	2.2479	2.10255	2.1885	2.2479	2.09335	2.09285	2.2479	2.2479
		3A	2.2242	2.2500	2.10570	2.1946	2.2500	2.09840	2.09840	2.2500	2.2500
			2.2234	2.2508	2.10545	2.1938	2.2508	2.09865	2.09815	2.2508	2.2508
2.250-6	UN	2A	2.2264	2.2474	2.13910	2.2025	2.2474	2.13030	2.13030	2.2474	2.2474
			2.2256	2.2482	2.13885	2.2017	2.2482	2.13055	2.13005	2.2482	2.2482
		3A	2.2290	2.2500	2.14170	2.2073	2.2500	2.13510	2.13510	2.2500	2.2500
			2.2282	2.2508	2.14145	2.2065	2.2508	2.13535	2.13485	2.2508	2.2508
2.250-8	UN	2A	2.2305	2.2476	2.16640	2.2125	2.2476	2.15840	2.15840	2.2476	2.2476
			2.2298	2.2483	2.16615	2.2118	2.2483	2.15865	2.15815	2.2483	2.2483
		3A	2.2329	2.2500	2.16880	2.2169	2.2500	2.16280	2.16280	2.2500	2.2500
			2.2322	2.2507	2.16855	2.2162	2.2507	2.16305	2.16255	2.2507	2.2507
2.250-12	UN	2A	2.2353	2.2482	2.19410	2.2241	2.2482	2.18800	2.18800	2.2482	2.2482
			2.2347	2.2488	2.19385	2.2235	2.2488	2.18825	2.18775	2.2488	2.2488
		3A	2.2371	2.2500	2.19590	2.2275	2.2500	2.19140	2.19140	2.2500	2.2500
			2.2365	2.2506	2.19565	2.2269	2.2506	2.19165	2.19115	2.2506	2.2506
2.250-16	UN	2A	2.2379	2.2484	2.20780	2.2295	2.2484	2.20240	2.20240	2.2484	2.2484
			2.2373	2.2490	2.20755	2.2289	2.2490	2.20265	2.20215	2.2490	2.2490
		3A	2.2395	2.2500	2.20940	2.2325	2.2500	2.20540	2.20540	2.2500	2.2500
			2.2389	2.2506	2.20915	2.2319	2.2506	2.20565	2.20515	2.2506	2.2506
2.250-20	UN	2A	2.2395	2.2485	2.2160	2.2328	2.2485	2.2111	2.2111	2.2485	2.2485
			2.2390	2.2490	2.2158	2.2323	2.2490	2.2113	2.2109	2.2490	2.2490
		3A	2.2410	2.2500	2.2175	2.2355	2.2500	2.2138	2.2138	2.2500	2.2500
			2.2405	2.2505	2.2173	2.2350	2.2505	2.2140	2.2136	2.2505	2.2505
2.375-6	UN	2A	2.3513	2.3723	2.26400	2.3273	2.3723	2.25510	2.25510	2.3723	2.3723
			2.3505	2.3731	2.26375	2.3265	2.3731	2.25535	2.25485	2.3731	2.3731
		3A	2.3540	2.3750	2.26670	2.3323	2.3750	2.26010	2.26010	2.3750	2.3750
			2.3532	2.3758	2.26645	2.3315	2.3758	2.26035	2.25985	2.3758	2.3758
2.375-8	UN	2A	2.3555	2.3726	2.29140	2.3374	2.3726	2.28330	2.28330	2.3726	2.3726
			2.3548	2.3733	2.29115	2.3367	2.3733	2.28355	2.28305	2.3733	2.3733
		3A	2.3579	2.3750	2.29380	2.3419	2.3750	2.28780	2.28780	2.3750	2.3750
			2.3572	2.3757	2.29355	2.3412	2.3757	2.28805	2.28755	2.3757	2.3757
2.375-12	UN	2A	2.3602	2.3731	2.31900	2.3489	2.3731	2.31280	2.31280	2.3731	2.3731
			2.3596	2.3737	2.31875	2.3483	2.3737	2.31305	2.31255	2.3737	2.3737
		3A	2.3621	2.3750	2.32090	2.3524	2.3750	2.31630	2.31630	2.3750	2.3750
			2.3615	2.3756	2.32065	2.3518	2.3756	2.31655	2.31605	2.3756	2.3756
2.375-16	UN	2A	2.3628	2.3733	2.33270	2.3543	2.3733	2.32720	2.32720	2.3733	2.3733
			2.3622	2.3739	2.33245	2.3537	2.3739	2.32745	2.32695	2.3739	2.3739
		3A	2.3645	2.3750	2.33440	2.3574	2.3750	2.33030	2.33030	2.3750	2.3750
			2.3639	2.3756	2.33415	2.3568	2.3756	2.33055	2.33005	2.3756	2.3756
2.375-20	UN	2A	2.3645	2.3735	2.3410	2.3576	2.3734	2.3359	2.3359	2.3735	2.3734
			2.3640	2.3740	2.3408	2.3571	2.3739	2.3361	2.3357	2.3740	2.3739
		3A	2.3660	2.3750	2.3425	2.3604	2.3750	2.3387	2.3387	2.3750	2.3750
			2.3655	2.3755	2.3423	2.3599	2.3755	2.3389	2.3385	2.3755	2.3755
2.500-4	UNC	1A	2.4688	2.4969	2.33450	2.4273	2.4969	2.31900	2.31900	2.4969	2.4969
			2.4679	2.4978	2.33425	2.4264	2.4978	2.31925	2.31875	2.4978	2.4978
		2A	2.4688	2.4969	2.33450	2.4324	2.4969	2.32410	2.32410	2.4969	2.4969
			2.4679	2.4978	2.33425	2.4315	2.4978	2.32435	2.32385	2.4978	2.4978
		3A	2.4719	2.5000	2.33760	2.4381	2.5000	2.32980	2.32980	2.5000	2.5000
			2.4710	2.5009	2.33735	2.4372	2.5009	2.33005	2.32955	2.5009	2.5009
2.500-6	UN	2A	2.4763	2.4973	2.38900	2.4522	2.4973	2.38000	2.38000	2.4973	2.4973
			2.4755	2.4981	2.38875	2.4514	2.4981	2.38025	2.37975	2.4981	2.4981
		3A	2.4790	2.5000	2.39170	2.4572	2.5000	2.38500	2.38500	2.5000	2.5000
			2.4782	2.5008	2.39145	2.4564	2.5008	2.38525	2.38475	2.5008	2.5008
2.500-8	UN	2A	2.4805	2.4976	2.41640	2.4623	2.4976	2.40820	2.40820	2.4976	2.4976
			2.4798	2.4983	2.41615	2.4616	2.4983	2.40845	2.40795	2.4983	2.4983
		3A	2.4829	2.5000	2.41880	2.4668	2.5000	2.41270	2.41270	2.5000	2.5000
			2.4822	2.5007	2.41855	2.4661	2.5007	2.41295	2.41245	2.5007	2.5007
2.500-12	UN	2A	2.4852	2.4981	2.44400	2.4739	2.4981	2.43780	2.43780	2.4981	2.4981
			2.4846	2.4987	2.44375	2.4733	2.4987	2.43805	2.43755	2.4987	2.4987
		3A	2.4871	2.5000	2.44590	2.4774	2.5000	2.44130	2.44130	2.5000	2.5000
			2.4865	2.5006	2.44565	2.4768	2.5006	2.44155	2.44105	2.5006	2.5006

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs — Plug for GO thread gage [a] — Major diameter — Truncated	W truncated setting plugs — Plug for GO thread gage [a] — Major diameter — Full	W truncated setting plugs — Plug for GO thread gage [a] — Pitch diameter	W truncated setting plugs — Plug for LO thread gage [a] — Major diameter — Truncated	W truncated setting plugs — Plug for LO thread gage [a] — Major diameter — Full	W truncated setting plugs — Plug for LO thread gage [a] — Pitch diameter — Plus tolerance gage	W truncated setting plugs — Plug for LO thread gage [a] — Pitch diameter — Minus tolerance gage	Basic-crest setting plugs — Major diameter — Plug for GO thread gage [a,b] — W and X tolerances	Basic-crest setting plugs — Major diameter — Plug for LO thread gage [a,c] — W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
2.500–16	UN	2A	2.4878	2.4983	2.45770	2.4793	2.4983	2.45220	2.45220	2.4983	2.4983
			2.4872	2.4989	2.45745	2.4787	2.4989	2.45245	2.45195	2.4989	2.4989
		3A	2.4895	2.5000	2.45940	2.4824	2.5000	2.45530	2.45530	2.5000	2.5000
			2.4889	2.5006	2.45915	2.4818	2.5006	2.45555	2.45505	2.5006	2.5006
2.500–20	UN	2A	2.4895	2.4985	2.4660	2.4826	2.4984	2.4609	2.4609	2.4985	2.4984
			2.4890	2.4990	2.4658	2.4821	2.4989	2.4611	2.4607	2.4990	2.4989
		3A	2.4910	2.5000	2.4675	2.4854	2.5000	2.4637	2.4637	2.5000	2.5000
			2.4905	2.5005	2.4673	2.4849	2.5005	2.4639	2.4635	2.5005	2.5005
2.625–6	UN	2A	2.6013	2.6223	2.51400	2.5772	2.6223	2.50500	2.50500	2.6223	2.6223
			2.6005	2.6231	2.51375	2.5764	2.6231	2.50525	2.50475	2.6231	2.6231
		3A	2.6040	2.6250	2.51670	2.5821	2.6250	2.50990	2.50990	2.6250	2.6250
			2.6032	2.6258	2.51645	2.5813	2.6258	2.51015	2.50965	2.6258	2.6258
2.625–8	UN	2A	2.6054	2.6225	2.54130	2.5872	2.6225	2.53310	2.53310	2.6225	2.6225
			2.6047	2.6232	2.54105	2.5865	2.6232	2.53335	2.53285	2.6232	2.6232
		3A	2.6079	2.6250	2.54380	2.5917	2.6250	2.53760	2.53760	2.6250	2.6250
			2.6072	2.6257	2.54355	2.5910	2.6257	2.53785	2.53735	2.6257	2.6257
2.625–12	UN	2A	2.6102	2.6231	2.56900	2.5989	2.6231	2.56280	2.56280	2.6231	2.6231
			2.6096	2.6237	2.56875	2.5983	2.6237	2.56305	2.56255	2.6237	2.6237
		3A	2.6121	2.6250	2.57090	2.6024	2.6250	2.56630	2.56630	2.6250	2.6250
			2.6115	2.6256	2.57065	2.6018	2.6256	2.56655	2.56605	2.6256	2.6256
2.625–16	UN	2A	2.6128	2.6233	2.58270	2.6043	2.6233	2.57720	2.57720	2.6233	2.6233
			2.6122	2.6239	2.58245	2.6037	2.6239	2.57745	2.57695	2.6239	2.6239
		3A	2.6145	2.6250	2.58440	2.6074	2.6250	2.58030	2.58030	2.6250	2.6250
			2.6139	2.6256	2.58415	2.6068	2.6256	2.58055	2.58005	2.6256	2.6256
2.625–20	UN	2 A	2.6145	2.6235	2.5910	2.6076	2.6234	2.5859	2.5859	2.6235	2.6234
			2.6140	2.6240	2.5008	2.6071	2.6239	2.5861	2.5857	2.6240	2.6239
		3A	2.6160	2.6250	2.5925	2.6104	2.6250	2.5887	2.5887	2.6250	2.6250
			2.6155	2.6255	2.5923	2.6099	2.6255	2.5889	2.5885	2.6255	2.6255
2.750–4	UNC	1A	2.7187	2.7468	2.58440	2.6769	2.7468	2.56860	2.56860	2.7468	2.7468
			2.7178	2.7477	2.58415	2.6760	2.7477	2.56885	2.56835	2.7477	2.7477
		2A	2.7187	2.7468	2.58440	2.6822	2.7468	2.57390	2.57390	2.7468	2.7468
			2.7178	2.7477	2.58415	2.6813	2.7477	2.57415	2.57365	2.7477	2.4777
		3A	2.7219	2.7500	2.58760	2.6880	2.7500	2.57970	2.57970	2.7500	2.7500
			2.7210	2.7509	2.58735	2.6871	2.7509	2.57995	2.57945	2.7509	2.7509
2.750–6	UN	2A	2.7263	2.7473	2.63900	2.7021	2.7473	2.62990	2.62990	2.7473	2.7473
			2.7255	2.7481	2.63875	2.7013	2.7481	2.63015	2.62965	2.7481	2.7481
		3A	2.7290	2.7500	2.64170	2.7071	2.7500	2.63490	2.63490	2.7500	2.7500
			2.7282	2.7508	2.64145	2.7063	2.7508	2.63515	2.63465	2.7508	2.7508
2.750–8	UN	2A	2.7304	2.7475	2.66630	2.7121	2.7475	2.65800	2.65800	2.7475	2.7475
			2.7297	2.7482	2.66605	2.7114	2.7482	2.65825	2.65775	2.7482	2.7482
		3A	2.7329	2.7500	2.66880	2.7167	2.7500	2.66250	2.66250	2.7500	2.7500
			2.7322	2.7507	2.66855	2.7160	2.7507	2.66275	2.66225	2.7507	2.7507
2.750–12	UN	2A	2.7352	2.7481	2.69400	2.7239	2.7481	2.68780	2.68780	2.7481	2.7481
			2.7346	2.7487	2.69375	2.7233	2.7487	2.68805	2.68755	2.7487	2.7487
		3A	2.7371	2.7500	2.69590	2.7274	2.7500	2.69130	2.69130	2.7500	2.7500
			2.7365	2.7506	2.69565	2.7268	2.7506	2.69155	2.69105	2.7506	2.7506
2.750–16	UN	2A	2.7378	2.7483	2.70770	2.7293	2.7483	2.70220	2.70220	2.7483	2.7483
			2.7372	2.7489	2.70745	2.7287	2.7489	2.70245	2.70195	2.7489	2.7489
		3A	2.7395	2.7500	2.70940	2.7324	2.7500	2.70530	2.70530	2.7500	2.7500
			2.7389	2.7506	2.70915	2.7318	2.7506	2.70555	2.70505	2.7506	2.7506
2.750–20	UN	2A	2.7395	2.7485	2.7160	2.7326	2.7484	2.7109	2.7109	2.7485	2.7484
			2.7390	2.7490	2.7158	2.7321	2.7489	2.7111	2.7107	2.7490	2.7489
		3A	2.7410	2.7500	2.7175	2.7354	2.7500	2.7137	2.7137	2.7500	2.7500
			2.7405	2.7505	2.7173	2.7349	2.7505	2.7139	2.7135	2.7505	2.7505
2.875–6	UN	2A	2.8512	2.8722	2.76390	2.8269	2.8722	2.75470	2.75470	2.8722	2.8722
			2.8504	2.8730	2.76365	2.8261	2.8730	2.75495	2.75445	2.8730	2.8730
		3A	2.8540	2.8750	2.76670	2.8320	2.8750	2.75980	2.75980	2.8750	2.8750
			2.8532	2.8758	2.76645	2.8312	2.8758	2.76005	2.75955	2.8758	2.8758
2.875–8	UN	2A	2.8554	2.8725	2.79130	2.8370	2.8725	2.78290	2.78290	2.8725	2.8725
			2.8547	2.8732	2.79105	2.8363	2.8732	2.78315	2.78265	2.8732	2.8732
		3A	2.8579	2.8750	2.79380	2.8416	2.8750	2.78750	2.78750	2.8750	2.8750
			2.8572	2.8757	2.79355	2.8409	2.8757	2.78775	2.78725	2.8757	2.8757
2.875–12	UN	2A	2.8602	2.8731	2.81900	2.8488	2.8731	2.81270	2.81270	2.8731	2.8731
			2.8596	2.8737	2.81875	2.8482	2.8737	2.81295	2.81245	2.8737	2.8737
		3A	2.8621	2.8750	2.82090	2.8523	2.8750	2.81620	2.81620	2.8750	2.8750
			2.8615	2.8756	2.82065	2.8517	2.8756	2.81645	2.81595	2.8756	2.8756

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs	
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter	
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]	Plug for LO thread gage [a,c]
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W and X tolerances	W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
2.875–16	UN	2A	2.8628	2.8733	2.83270	2.8542	2.8733	2.82710	2.82710	2.8733	2.8733
			2.8622	2.8739	2.83245	2.8536	2.8739	2.82735	2.82685	2.8739	2.8739
		3A	2.8645	2.8750	2.83440	2.8573	2.8750	2.83020	2.83020	2.8750	2.8750
			2.8639	2.8756	2.83415	2.8567	2.8756	2.83045	2.82995	2.8756	2.8756
2.875–20	UN	2A	2.8644	2.8734	2.8409	2.8574	2.8732	2.8357	2.8357	2.8734	2.8732
			2.8639	2.8739	2.8407	2.8569	2.8737	2.8359	2.8355	2.8739	2.8737
		3A	2.8660	2.8750	2.8425	2.8603	2.8750	2.8386	2.8386	2.8750	2.8750
			2.8655	2.8755	2.8423	2.8598	2.8755	2.8388	2.8384	2.8755	2.8755
3.000–4	UNC	1A	2.9687	2.9968	2.83440	2.9266	2.9968	2.81830	2.81830	2.9968	2.9968
			2.9678	2.9977	2.83415	2.9257	2.9977	2.81855	2.81805	2.9977	2.9977
		2A	2.9687	2.9968	2.83440	2.9320	2.9968	2.82370	2.82370	2.9968	2.9968
			2.9678	2.9977	2.83415	2.9311	2.9977	2.82395	2.82345	2.9977	2.9977
		3A	2.9719	3.0000	2.83760	2.9379	3.0000	2.82960	2.82960	3.0000	3.0000
			2.9710	3.0009	2.83735	2.9370	3.0009	2.82985	2.82935	3.0009	3.0009
3.000–6	UN	2A	2.9762	2.9972	2.88890	2.9518	2.9972	2.87960	2.87960	2.9972	2.9972
			2.9754	2.9980	2.88865	2.9510	2.9980	2.87985	2.87935	2.9980	2.9980
		3A	2.9790	3.0000	2.89170	2.9569	3.0000	2.88470	2.88470	3.0000	3.0000
			2.9782	3.0008	2.89145	2.9561	3.0008	2.88495	2.88445	3.0008	3.0008
3.000–8	UN	2A	2.9803	2.9974	2.91620	2.9618	2.9974	2.90770	2.90770	2.9974	2.9974
			2.9796	2.9981	2.91595	2.9611	2.9981	2.90795	2.90745	2.9981	2.9981
		3A	2.9829	3.0000	2.91880	2.9665	3.0000	2.91240	2.91240	3.0000	3.0000
			2.9822	3.0007	2.91855	2.9658	3.0007	2.91265	2.91215	3.0007	3.0007
3.000–12	UN	2A	2.9852	2.9981	2.94400	2.9738	2.9981	2.93770	2.93770	2.9981	2.9981
			2.9846	2.9987	2.94375	2.9732	2.9987	2.93795	2.93745	2.9987	2.9987
		3A	2.9871	3.0000	2.94590	2.9773	3.0000	2.94120	2.94120	3.0000	3.0000
			2.9865	3.0006	2.94565	2.9767	3.0006	2.94145	2.94095	3.0006	3.0006
3.000–16	UN	2A	2.9878	2.9983	2.95770	2.9792	2.9983	2.95210	2.95210	2.9983	2.9983
			2.9872	2.9989	2.95745	2.9786	2.9989	2.95235	2.95185	2.9989	2.9989
		3A	2.9895	3.0000	2.95940	2.9823	3.0000	2.95520	2.95520	3.0000	3.0000
			2.9889	3.0006	2.95915	2.9817	3.0006	2.95545	2.95495	3.0006	3.0006
3.000–20	UN	2A	2.9894	2.9984	2.9659	2.9824	2.9982	2.9607	2.9607	2.9984	2.9982
			2.9889	2.9989	2.9657	2.9819	2.9987	2.9609	2.9605	2.9989	2.9987
		3A	2.9910	3.0000	2.9675	2.9853	3.0000	2.9636	2.9636	3.0000	3.0000
			2.9905	3.0005	2.9673	2.9848	3.0005	2.9638	2.9634	3.0005	3.0005
3.125–6	UN	2A	3.1012	3.1222	3.01390	3.0767	3.1222	3.00450	3.00450	3.1222	3.1222
			3.1004	3.1230	3.01365	3.0759	3.1230	3.00475	3.00425	3.1230	3.1230
		3A	3.1040	3.1250	3.01670	3.0819	3.1250	3.00970	3.00970	3.1250	3.1250
			3.1032	3.1258	3.01645	3.0811	3.1258	3.00995	3.00945	3.1258	3.1258
3.125–8	UN	2A	3.1053	3.1224	3.04120	3.0867	3.1224	3.03260	3.03260	3.1224	3.1224
			3.1046	3.1231	3.04095	3.0860	3.1231	3.03285	3.03235	3.1231	3.1231
		3A	3.1079	3.1250	3.04380	3.0915	3.1250	3.03740	3.03740	3.1250	3.1250
			3.1072	3.1257	3.04355	3.0908	3.1257	3.03765	3.03715	3.1257	3.1257
3.125–12	UN	2A	3.1102	3.1231	3.06900	3.0988	3.1231	3.06270	3.06270	3.1231	3.1231
			3.1096	3.1237	3.06875	3.0982	3.1237	3.06295	3.06245	3.1237	3.1237
		3A	3.1121	3.1250	3.07090	3.1023	3.1250	3.06620	3.06620	3.1250	3.1250
			3.1115	3.1256	3.07065	3.1017	3.1256	3.06645	3.06595	3.1256	3.1256
3.125–16	UN	2A	3.1128	3.1233	3.08270	3.1042	3.1233	3.07710	3.07710	3.1233	3.1233
			3.1122	3.1239	3.08245	3.1036	3.1239	3.07735	3.07685	3.1239	3.1239
		3A	3.1145	3.1250	3.08440	3.1073	3.1250	3.08020	3.08020	3.1250	3.1250
			3.1139	3.1256	3.08415	3.1067	3.1256	3.08045	3.07995	3.1256	3.1256
3.250–4	UNC	1A	3.2186	3.2467	3.08340	3.1763	3.2467	3.06800	3.06800	3.2467	3.2467
			3.2177	3.2476	3.08405	3.1754	3.2476	3.06825	3.06775	3.2476	3.2476
		2A	3.2186	3.2467	3.08430	3.1817	3.2467	3.07340	3.07340	3.2467	3.2467
			3.2177	3.2476	3.08405	3.1808	3.2476	3.07365	3.07315	3.2476	3.2476
		3A	3.2219	3.2500	3.08760	3.1877	3.2500	3.07940	3.07940	3.2500	3.2500
			3.2210	3.2509	3.08735	3.1868	3.2509	3.07965	3.07915	3.2509	3.2509
3.250–6	UN	2A	3.2262	3.2472	3.13890	3.2016	3.2472	3.12940	3.12940	3.2472	3.2472
			3.2254	3.2480	3.13865	3.2008	3.2480	3.12965	3.12915	3.2480	3.2480
		3A	3.2290	3.2500	3.14170	3.2068	3.2500	3.13460	3.13460	3.2500	3.2500
			3.2282	3.2508	3.14145	3.2060	3.2508	3.13485	3.13435	3.2508	3.2508
3.250–8	UN	2A	3.2303	3.2474	3.16620	3.2116	3.2474	3.15750	3.15750	3.2474	3.2474
			3.2296	3.2481	3.16595	3.2109	3.2481	3.15775	3.15725	3.2481	3.2481
		3A	3.2329	3.2500	3.16880	3.2164	3.2500	3.16230	3.16230	3.2500	3.2500
			3.2322	3.2507	3.16855	3.2157	3.2507	3.16255	3.16205	3.2507	3.2507
3.250–12	UN	2A	3.2352	3.2481	3.19400	3.2238	3.2481	3.18770	3.18770	3.2481	3.2481
			3.2346	3.2487	3.19375	3.2232	3.2487	3.18795	3.18745	3.2487	3.2487
		3A	3.2371	3.2500	3.19590	3.2273	3.2500	3.19120	3.19120	3.2500	3.2500
			3.2365	3.2506	3.19565	3.2267	3.2506	3.19145	3.19095	3.2506	3.2506

See footnotes at end of table.

Table 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
3.250–16	UN	2A	3.2378	3.2483	3.20770	3.2292	3.2483	3.20210	3.20210	3.2483	3.2483
			3.2372	3.2489	3.20745	3.2286	3.2489	3.20235	3.20185	3.2489	3.2489
		3A	3.2395	3.2500	3.20940	3.2323	3.2500	3.20520	3.20520	3.2500	3.2500
			3.2389	3.2506	3.20915	3.2317	3.2506	3.20545	3.20495	3.2506	3.2506
3.375–6	UN	2A	3.3511	3.3721	3.26380	3.3265	3.3721	3.25430	3.25430	3.3721	3.3721
			3.3503	3.3729	3.26355	3.3257	3.3729	3.25455	3.25405	3.3729	3.3729
		3A	3.3540	3.3750	3.26670	3.3317	3.3750	3.25950	3.25950	3.3750	3.3750
			3.3532	3.3758	3.26645	3.3309	3.3758	3.25975	3.25925	3.3758	3.3758
3.375–8	UN	2A	3.3553	3.3724	3.29120	3.3365	3.3724	3.28240	3.28240	3.3724	3.3724
			3.3546	3.3731	3.29095	3.3358	3.3731	3.28265	3.28215	3.3731	3.3731
		3A	3.3579	3.3750	3.29380	3.3413	3.3750	3.28720	3.28720	3.3750	3.3750
			3.3572	3.3757	3.29355	3.3406	3.3757	3.28745	3.28695	3.3757	3.3757
3.375–12	UN	2A	3.3602	3.3731	3.31900	3.3487	3.3731	3.31260	3.31260	3.3731	3.3731
			3.3596	3.3737	3.31875	3.3481	3.3737	3.31285	3.31235	3.3737	3.3737
		3A	3.3621	3.3750	3.32090	3.3522	3.3750	3.31610	3.31610	3.3750	3.3750
			3.3615	3.3756	3.32065	3.3516	3.3756	3.31635	3.31585	3.3756	3.3756
3.375–16	UN	2A	3.3628	3.3733	3.33270	3.3540	3.3733	3.32690	3.32690	3.3733	3.3733
			3.3622	3.3739	3.33245	3.3534	3.3739	3.32715	3.32665	3.3739	3.3739
		3A	3.3645	3.3750	3.33440	3.3572	3.3750	3.33010	3.33010	3.3750	3.3750
			3.3639	3.3756	3.33415	3.3566	3.3756	3.33035	3.32985	3.3756	3.3756
3.500–4	UNC	1A	3.4686	3.4967	3.33430	3.4260	3.4967	3.31770	3.31770	3.4967	3.4967
			3.4677	3.4976	3.33405	3.4251	3.4976	3.31795	3.31745	3.4976	3.4976
		2A	3.4686	3.4967	3.33430	3.4316	3.4967	3.32330	3.32330	3.4967	3.4967
			3.4677	3.4976	3.33405	3.4307	3.4976	3.32355	3.32305	3.4976	3.4976
		3A	3.4719	3.5000	3.33760	3.4376	3.5000	3.32930	3.32930	3.5000	3.5000
			3.4710	3.5009	3.33735	3.4367	3.5009	3.32955	3.32905	3.5009	3.5009
3.500–6	UN	2A	3.4761	3.4971	3.38880	3.4514	3.4971	3.37920	3.37920	3.4971	3.4971
			3.4753	3.4979	3.38855	3.4506	3.4979	3.37945	3.37895	3.4979	3.4979
		3A	3.4790	3.5000	3.39170	3.4567	3.5000	3.38450	3.38450	3.5000	3.5000
			3.4782	3.5008	3.39145	3.4559	3.5008	3.38475	3.38425	3.5008	3.5008
3.500–8	UN	2A	3.4803	3.4974	3.41620	3.4615	3.4974	3.40740	3.40740	3.4974	3.4974
			3.4796	3.4981	3.41595	3.4608	3.4981	3.40765	3.40715	3.4981	3.4981
		3A	3.4829	3.5000	3.41880	3.4663	3.5000	3.41220	3.41220	3.5000	3.5000
			3.4822	3.5007	3.41855	3.4656	3.5007	3.41245	3.41195	3.5007	3.5007
3.500–12	UN	2A	3.4852	3.4981	3.44400	3.4737	3.4981	3.43760	3.43760	3.4981	3.4981
			3.4846	3.4987	3.44375	3.4731	3.4987	3.43785	3.43735	3.4987	3.4987
		3A	3.4871	3.5000	3.44590	3.4772	3.5000	3.44110	3.44110	3.5000	3.5000
			3.4865	3.5006	3.44565	3.4766	3.5006	3.44135	3.44085	3.5006	3.5006
3.500–16	UN	2A	3.4878	3.4983	3.45770	3.4790	3.4983	3.45190	3.45190	3.4983	3.4983
			3.4872	3.4989	3.45745	3.4784	3.4989	3.45215	3.45165	3.4989	3.4989
		3A	3.4895	3.5000	3.45940	3.4822	3.5000	3.45510	3.45510	3.5000	3.5000
			3.4889	3.5006	3.45915	3.4816	3.5006	3.45535	3.45485	3.5006	3.5006
3.625–6	UN	2A	3.6011	3.6221	3.51380	3.5763	3.6221	3.50410	3.50410	3.6221	3.6221
			3.6003	3.6229	3.51355	3.5755	3.6229	3.50435	3.50385	3.6229	3.6229
		3A	3.6040	3.6250	3.51670	3.5816	3.6250	3.50940	3.50940	3.6250	3.6250
			3.6032	3.6258	3.51645	3.5808	3.6258	3.50965	3.50915	3.6258	3.6258
3.625–8	UN	2A	3.6052	3.6223	3.54110	3.5863	3.6223	3.53220	3.53220	3.6223	3.6223
			3.6045	3.6230	3.54085	3.5856	3.6230	3.53245	3.53195	3.6230	3.6230
		3A	3.6079	3.6250	3.54380	3.5912	3.6250	3.53710	3.53710	3.6250	3.6250
			3.6072	3.6257	3.54355	3.5905	3.6257	3.53735	3.53685	3.6257	3.6257
3.625–12	UN	2A	3.6102	3.6231	3.56900	3.5987	3.6231	3.56260	3.56260	3.6231	3.6231
			3.6096	3.6237	3.56875	3.5981	3.6237	3.56285	3.56235	3.6237	3.6237
		3A	3.6121	3.6250	3.57090	3.6022	3.6250	3.56610	3.56610	3.6250	3.6250
			3.6115	3.6256	3.57065	3.6016	3.6256	3.56635	3.56585	3.6256	3.6256
3.625–16	UN	2A	3.6128	3.6233	3.58270	3.6040	3.6233	3.57690	3.57690	3.6233	3.6233
			3.6122	3.6239	3.58245	3.6034	3.6239	3.57715	3.57665	3.6239	3.6239
		3A	3.6145	3.6250	3.58440	3.6072	3.6250	3.58010	3.58010	3.6250	3.6250
			3.6139	3.6256	3.58415	3.6066	3.6256	3.58035	3.57985	3.6256	3.6256
3.750–4	UNC	1A	3.7185	3.7466	3.58420	3.6757	3.7466	3.56740	3.56740	3.7466	3.7466
			3.7176	3.7475	3.58395	3.6748	3.7475	3.56765	3.56715	3.7475	3.7475
		2A	3.7185	3.7466	3.58420	3.6813	3.7466	3.57300	3.57300	3.7466	3.7466
			3.7176	3.7475	3.58395	3.6804	3.7475	3.57325	3.57275	3.7475	3.7475
		3A	3.7219	3.7500	3.58760	3.6875	3.7500	3.57920	3.57920	3.7500	3.7500
			3.7210	3.7509	3.58735	3.6866	3.7509	3.57945	3.57895	3.7509	3.7509

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
3.750–6	UN	2A	3.7261	3.7471	3.63880	3.7012	3.7471	3.62900	3.62900	3.7471	3.7471
			3.7253	3.7479	3.63855	3.7004	3.7479	3.62925	3.62875	3.7479	3.7479
		3A	3.7290	3.7500	3.64170	3.7066	3.7500	3.63440	3.63440	3.7500	3.7500
			3.7282	3.7508	3.64145	3.7058	3.7508	3.63465	3.63415	3.7508	3.7508
3.750–8	UN	2A	3.7302	3.7473	3.66610	3.7112	3.7473	3.65710	3.65710	3.7473	3.7473
			3.7295	3.7480	3.66585	3.7105	3.7480	3.65735	3.65685	3.7480	3.7480
		3A	3.7329	3.7500	3.66880	3.7162	3.7500	3.66210	3.66210	3.7500	3.7500
			3.7322	3.7507	3.66855	3.7155	3.7507	3.66235	3.66185	3.7507	3.7507
3.750–12	UN	2A	3.7352	3.7481	3.69400	3.7237	3.7481	3.68760	3.68760	3.7481	3.7481
			3.7346	3.7487	3.69375	3.7231	3.7487	3.68785	3.68735	3.7487	3.7487
		3A	3.7371	3.7500	3.69590	3.7272	3.7500	3.69110	3.69110	3.7500	3.7500
			3.7365	3.7506	3.69565	3.7266	3.7506	3.69135	3.69085	3.7506	3.7506
3.750–16	UN	2A	3.7378	3.7483	3.70770	3.7290	3.7483	3.70190	3.70190	3.7483	3.7483
			3.7372	3.7489	3.70745	3.7284	3.7489	3.70215	3.70165	3.7489	3.7489
		3A	3.7395	3.7500	3.70940	3.7322	3.7500	3.70510	3.70510	3.7500	3.7500
			3.7389	3.7506	3.70915	3.7316	3.7506	3.70535	3.70485	3.7506	3.7506
3.875–6	UN	2A	3.8510	3.8720	3.76370	3.8260	3.8720	3.75380	3.75380	3.8720	3.8720
			3.8502	3.8728	3.76345	3.8252	3.8728	3.75405	3.75355	3.8728	3.8728
		3A	3.8540	3.8750	3.76670	3.8315	3.8750	3.75930	3.75930	3.8750	3.8750
			3.8532	3.8758	3.76645	3.8307	3.8758	3.75955	3.75905	3.8758	3.8758
3.875–8	UN	2A	3.8552	3.8723	3.79110	3.8361	3.8723	3.78200	3.78200	3.8723	3.8723
			3.8545	3.8730	3.79085	3.8354	3.8730	3.78225	3.78175	3.8730	3.8730
		3A	3.8579	3.8750	3.79380	3.8411	3.8750	3.78700	3.78700	3.8750	3.8750
			3.8572	3.8757	3.79355	3.8404	3.8757	3.78725	3.78675	3.8757	3.8757
3.875–12	UN	2A	3.8601	3.8730	3.81890	3.8485	3.8730	3.81240	3.81240	3.8730	3.8730
			3.8595	3.8736	3.81865	3.8479	3.8736	3.81265	3.81215	3.8736	3.8736
		3A	3.8621	3.8750	3.82090	3.8521	3.8750	3.81600	3.81600	3.8750	3.8750
			3.8615	3.8756	3.82065	3.8515	3.8756	3.81625	3.81575	3.8756	3.8756
3.875–16	UN	2A	3.8627	3.8732	3.83260	3.8538	3.8732	3.82670	3.82670	3.8732	3.8732
			3.8621	3.8738	3.83235	3.8532	3.8738	3.82695	3.82645	3.8738	3.8738
		3A	3.8645	3.8750	3.83440	3.8571	3.8750	3.83000	3.83000	3.8750	3.8750
			3.8639	3.8756	3.83415	3.8565	3.8756	3.83025	3.82975	3.8756	3.8756
4.000–4	UNC	1A	3.9685	3.9966	3.83420	3.9255	3.9966	3.81720	3.81720	3.9966	3.9966
			3.9676	3.9975	3.83395	3.9246	3.9975	3.81745	3.81695	3.9975	3.9975
		2A	3.9685	3.9966	3.83420	3.9312	3.9966	3.82290	3.82290	3.9966	3.9966
			3.9676	3.9975	3.83395	3.9303	3.9975	3.82315	3.82265	3.9975	3.9975
		3A	3.9719	4.0000	3.83760	3.9374	4.0000	3.82910	3.82910	4.0000	4.0000
			3.9710	4.0009	3.83735	3.9365	4.0009	3.82935	3.82885	4.0009	4.0009
4.000–6	UN	2A	3.9760	3.9970	3.88870	3.9510	3.9970	3.87880	3.87880	3.9970	3.9970
			3.9752	3.9978	3.88845	3.9502	3.9978	3.87905	3.87855	3.9978	3.9978
		3A	3.9790	4.0000	3.89170	3.9565	4.0000	3.88430	3.88430	4.0000	4.0000
			3.9782	4.0008	3.89145	3.9557	4.0008	3.88455	3.88405	4.0008	4.0008
4.000–8	UN	2A	3.9802	3.9973	3.91610	3.9611	3.9973	3.90700	3.90700	3.9973	3.9973
			3.9795	3.9980	3.91585	3.9604	3.9980	3.90725	3.90675	3.9980	3.9980
		3A	3.9829	4.0000	3.91880	3.9661	4.0000	3.91200	3.91200	4.0000	4.0000
			3.9822	4.0007	3.91855	3.9654	4.0007	3.91225	3.91175	4.0007	4.0007
4.000–12	UN	2A	3.9851	3.9980	3.94390	3.9735	3.9980	3.93740	3.93740	3.9980	3.9980
			3.9845	3.9986	3.94365	3.9729	3.9986	3.93765	3.93715	3.9986	3.9986
		3A	3.9871	4.0000	3.94590	3.9771	4.0000	3.94100	3.94100	4.0000	4.0000
			3.9865	4.0006	3.94565	3.9765	4.0006	3.94125	3.94075	4.0006	4.0006
4.000–16	UN	2A	3.9877	3.9982	3.95760	3.9788	3.9982	3.95170	3.95170	3.9982	3.9982
			3.9871	3.9988	3.95735	3.9782	3.9988	3.95195	3.95145	3.9988	3.9988
		3A	3.9895	4.0000	3.95940	3.9821	4.0000	3.95500	3.95500	4.0030	4.0000
			3.9889	4.0006	3.95915	3.9815	4.0006	3.95525	3.95475	4.0006	4.0006
4.125–6	UN	2A	4.1010	4.1220	4.0137	4.0759	4.1220	4.0037	4.0037	4.1220	4.1220
			4.0997	4.1233	4.0134	4.0746	4.1233	4.0040	4.0034	4.1233	4.1233
		3A	4.1040	4.1250	4.0167	4.0814	4.1250	4.0092	4.0092	4.1250	4.1250
			4.1027	4.1263	4.0164	4.0801	4.1263	4.0095	4.0089	4.1263	4.1263
4.125–12	UN	2A	4.1101	4.1230	4.0689	4.0985	4.1230	4.0624	4.0624	4.1230	4.1230
			4.1092	4.1239	4.0686	4.0976	4.1239	4.0627	4.0621	4.1239	4.1239
		3A	4.1121	4.1250	4.0709	4.1021	4.1250	4.0660	4.0660	4.1250	4.1250
			4.1112	4.1259	4.0706	4.1012	4.1259	4.0663	4.0657	4.1259	4.1259
4.125–16	UN	2A	4.1127	4.1232	4.0826	4.1038	4.1232	4.0767	4.0767	4.1232	4.1232
			4.1118	4.1241	4.0823	4.1029	4.1241	4.0770	4.0764	4.1241	4.1241
		3A	4.1145	4.1250	4.0844	4.1071	4.1250	4.0800	4.0800	4.1250	4.1250
			4.1136	4.1259	4.0841	4.1062	4.1259	4.0803	4.0797	4.1259	4.1259

See footnotes at end of table.

Table 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage [a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage [a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage [a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage [a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage [a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
4. 250–4	UN	2A	4. 2185	4. 2466	4. 0842	4. 1810	4. 2466	4. 0727	4. 0727	4. 2466	4. 2466
			4. 2170	4. 2481	4. 0839	4. 1795	4. 2481	4. 0730	4. 0724	4. 2481	4. 2481
		3A	4. 2219	4. 2500	4. 0876	4. 1873	4. 2500	4. 0790	4. 0790	4. 2500	4. 2500
			4. 2204	4. 2515	4. 0873	4. 1858	4. 2515	4. 0793	4. 0787	4. 2515	4. 2515
4. 250–6	UN	2A	4. 2260	4. 2470	4. 1387	4. 2008	4. 2470	4. 1286	4. 1286	4. 2470	4. 2470
			4. 2247	4. 2483	4. 1384	4. 1995	4. 2483	4. 1289	4. 1283	4. 2483	4. 2483
		3A	4. 2290	4. 2500	4. 1417	4. 2064	4. 2500	4. 1342	4. 1342	4. 2500	4. 2500
			4. 2277	4. 2513	4. 1414	4. 2051	4. 2513	4. 1345	4. 1339	4. 2513	4. 2513
4. 250–12	UN	2A	4. 2351	4. 2480	4. 1939	4. 2235	4. 2480	4. 1874	4. 1874	4. 2480	4. 2480
			4. 2342	4. 2489	4. 1936	4. 2226	4. 2489	4. 1877	4. 1871	4. 2489	4. 2489
		3A	4. 2371	4. 2500	4. 1959	4. 2271	4. 2500	4. 1910	4. 1910	4. 2500	4. 2500
			4. 2362	4. 2509	4. 1956	4. 2262	4. 2509	4. 1913	4. 1907	4. 2509	4. 2509
4. 250–16	UN	2A	4. 2377	4. 2482	4. 2076	4. 2288	4. 2482	4. 2017	4. 2017	4. 2482	4. 2482
			4. 2368	4. 2491	4. 2073	3. 2279	4. 2491	4. 2020	4. 2014	4. 2491	4. 2491
		3A	4. 2395	4. 2500	4. 2094	4. 2321	4. 2500	4. 2050	4. 2050	4. 2500	4. 2500
			4. 2386	4. 2509	4. 2091	4. 2312	4. 2509	4. 2053	4. 2047	4. 2509	4. 2509
4. 375–6	UN	2A	4. 3510	4. 3720	4. 2637	4. 3258	4. 3720	4. 2536	4. 2536	4. 3720	4. 3720
			4. 3497	4. 3733	4. 2634	4. 3245	4. 3733	4. 2539	4. 2533	4. 3733	4. 3733
		3A	4. 3540	4. 3750	4. 2667	4. 3313	4. 3750	4. 2591	4. 2591	4. 3750	4. 3750
			4. 3527	4. 3763	4. 2664	4. 3300	4. 3763	4. 2594	4. 2588	4. 3763	4. 3763
4. 375–12	UN	2A	4. 3601	4. 3730	4. 3189	4. 3485	4. 3730	4. 3124	4. 3124	4. 3730	4. 3730
			4. 3592	4. 3739	4. 3186	4. 3476	4. 3739	4. 3127	4. 3121	4. 3739	4. 3739
		3A	4. 3621	4. 3750	4. 3209	4. 3521	4. 3750	4. 3160	4. 3160	4. 3750	4. 3750
			4. 3612	4. 3759	4. 3206	4. 3512	4. 3759	4. 3163	4. 3157	4. 3759	4. 3759
4. 375–16	UN	2A	4. 3627	4. 3732	4. 3326	4. 3538	4. 3732	4. 3267	4. 3267	4. 3732	4. 3732
			4. 3618	4. 3741	4. 3323	4. 3529	4. 3741	4. 3270	4. 3264	4. 3741	4. 3741
		3A	4. 3645	4. 3750	4. 3344	4. 3571	4. 3750	4. 3300	4. 3300	4. 3750	4. 3750
			4. 3636	4. 3759	4. 3341	4. 3562	4. 3759	4. 3303	4. 3297	4. 3759	4. 3759
4. 500–4	UN	2A	4. 4684	4. 4965	4. 3341	4. 4308	4. 4965	4. 3225	4. 3225	4. 4965	4. 4965
			4. 4669	4. 4980	4. 3338	4. 4293	4. 4980	4. 3228	4. 3222	4. 4980	4. 4980
		3A	4. 4719	4. 5000	4. 3376	4. 4372	4. 5000	4. 3289	4. 3289	4. 5000	4. 5000
			4. 4704	4. 5015	4. 3373	4. 4357	4. 5015	4. 3292	4. 3286	4. 5015	4. 5015
4. 500–6	UN	2A	4. 4759	4. 4969	4. 3886	4. 4506	4. 4969	4. 3784	4. 3784	4. 4969	4. 4969
			4. 4746	4. 4982	4. 3883	4. 4493	4. 4982	4. 3787	4. 3781	4. 4982	4. 4982
		3A	4. 4790	4. 5000	4. 3917	4. 4562	4. 5000	4. 3840	4. 3840	4. 5000	4. 5000
			4. 4777	4. 5013	4. 3914	4. 4549	4. 5013	4. 3843	4. 3837	4. 5013	4. 5013
4. 500–12	UN	2A	4. 4851	4. 4980	4. 4439	4. 4735	4. 4980	4. 4374	4. 4374	4. 4980	4. 4980
			4. 4842	4. 4989	4. 4436	4. 4726	4. 4989	4. 4377	4. 4371	4. 4989	4. 4989
		3A	4. 4871	4. 5000	4. 4459	4. 4771	4. 5000	4. 4410	4. 4410	4. 5000	4. 5000
			4. 4862	4. 5009	4. 4456	4. 4762	4. 5009	4. 4413	4. 4407	4. 5009	4. 5009
4. 500–16	UN	2A	4. 4877	4. 4982	4. 4576	4. 4788	4. 4982	4. 4517	4. 4517	4. 4982	4. 4982
			4. 4868	4. 4991	4. 4573	4. 4779	4. 4991	4. 4520	4. 4514	4. 4991	4. 4991
		3A	4. 4895	4. 5000	4. 4594	4. 4821	4. 5000	4. 4550	4. 4550	4. 5000	4. 5000
			4. 4886	4. 5009	4. 4591	4. 4812	4. 5009	4. 4553	4. 4547	4. 5009	4. 5009
4. 625–6	UN	2A	4. 6009	4. 6219	4. 5136	4. 5755	4. 6219	4. 5033	4. 5033	4. 6219	4. 6219
			4. 5996	4. 6232	4. 5133	4. 5742	4. 6232	4. 5036	4. 5030	4. 6232	4. 6232
		3A	4. 6040	4. 6250	4. 5167	4. 5812	4. 6250	4. 5090	4. 5090	4. 6250	4. 6250
			4. 6027	4. 6263	4. 5164	4. 5799	4. 6263	4. 5093	4. 5087	4. 6263	4. 6263
4. 625–12	UN	2A	4. 6101	4. 6230	4. 5689	4. 5983	4. 6230	4. 5622	4. 5622	4. 6230	4. 6230
			4. 6092	4. 6239	4. 5686	4. 5974	4. 6239	4. 5625	4. 5619	4. 6239	4. 6239
		3A	4. 6121	4. 6250	4. 5709	4. 6020	4. 6250	4. 5659	4. 5659	4. 6250	4. 6250
			4. 6112	4. 6259	4. 5706	4. 6011	4. 6259	4. 5662	4. 5656	4. 6259	4. 6259
4. 625–16	UN	2A	4. 6127	4. 6232	4. 5826	4. 6036	4. 6232	4. 5765	4. 5765	4. 6232	4. 6232
			4. 6118	4. 6241	4. 5823	4. 6027	4. 6241	4. 5768	4. 5762	4. 6241	4. 6241
		3A	4. 6145	4. 6250	4. 5844	4. 6070	4. 6250	4. 5799	4. 5799	4. 6250	4. 6250
			4. 6136	4. 6259	4. 5841	4. 6061	4. 6259	4. 5802	4. 5796	4. 6259	4. 6259
4. 750–4	UN	2A	4. 7184	4. 7465	4. 5841	4. 6807	4. 7465	4. 5724	4. 5724	4. 7465	4. 7465
			4. 7169	4. 7480	4. 5838	4. 6792	4. 7480	4. 5727	4. 5721	4. 7480	4. 7480
		3A	4. 7219	4. 7500	4. 5876	4. 6871	4. 7500	4. 5788	4. 5788	4. 7500	4. 7500
			4. 7204	4. 7515	4. 5873	4. 6856	4. 7515	4. 5791	4. 5785	4. 7515	4. 7515

See footnotes at end of table.

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for GO thread gage[a]: Major diameter: Truncated	W truncated setting plugs: Plug for GO thread gage[a]: Major diameter: Full	W truncated setting plugs: Plug for GO thread gage[a]: Pitch diameter	W truncated setting plugs: Plug for LO thread gage[a]: Major diameter: Truncated	W truncated setting plugs: Plug for LO thread gage[a]: Major diameter: Full	W truncated setting plugs: Plug for LO thread gage[a]: Pitch diameter: Plus tolerance gage	W truncated setting plugs: Plug for LO thread gage[a]: Pitch diameter: Minus tolerance gage	Basic-crest setting plugs: Major diameter: Plug for GO thread gage[a,b]: W and X tolerances	Basic-crest setting plugs: Major diameter: Plug for LO thread gage[a,c]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
4.750–6	UN	2A	4.7259	4.7469	4.6386	4.7005	4.7469	4.6283	4.6283	4.7469	4.7469
			4.7246	4.7482	4.6383	4.6992	4.7482	4.6286	4.6280	4.7482	4.7482
		3A	4.7290	4.7500	4.6417	4.7062	4.7500	4.6340	4.6340	4.7500	4.7500
			4.7277	4.7513	4.6414	4.7049	4.7513	4.6343	4.6337	4.7513	4.7513
4.750–12	UN	2A	4.7351	4.7480	4.6939	4.7233	4.7480	4.6872	4.6872	4.7480	4.7480
			4.7342	4.7489	4.6936	4.7224	4.7489	4.6875	4.6869	4.7489	4.7489
		3A	4.7371	4.7500	4.6959	4.7270	4.7500	4.6909	4.6909	4.7500	4.7500
			4.7362	4.7509	4.6956	4.7261	4.7509	4.6912	4.6906	4.7509	4.7509
4.750–16	UN	2A	4.7377	4.7482	4.7076	4.7286	4.7482	4.7015	4.7015	4.7482	4.7482
			4.7368	4.7491	4.7073	4.7277	4.7491	4.7018	4.7012	4.7491	4.7491
		3A	4.7395	4.7500	4.7094	4.7320	4.7500	4.7049	4.7049	4.7500	4.7500
			4.7386	4.7509	4.7091	4.7311	4.7509	4.7052	4.7046	4.7509	4.7509
4.875–6	UN	2A	4.8509	4.8719	4.7636	4.8254	4.8719	4.7532	4.7532	4.8719	4.8719
			4.8496	4.8732	4.7633	4.8241	4.8732	4.7535	4.7529	4.8732	4.8732
		3A	4.8540	4.8750	4.7667	4.8311	4.8750	4.7589	4.7589	4.8750	4.8750
			4.8527	4.8763	4.7664	4.8298	4.8763	4.7592	4.7586	4.8763	4.8763
4.875–12	UN	2A	4.8601	4.8730	4.8189	4.8483	4.8730	4.8122	4.8122	4.8730	4.8730
			4.8592	4.8739	4.8186	4.8474	4.8739	4.8125	4.8119	4.8739	4.8739
		3A	4.8621	4.8750	4.8209	4.8520	4.8750	4.8159	4.8159	4.8750	4.8750
			4.8612	4.8759	4.8206	4.8511	4.8759	4.8162	4.8156	4.8759	4.8759
4.875–16	UN	2A	4.8627	4.8732	4.8326	4.8536	4.8732	4.8265	4.8265	4.8732	4.8732
			4.8618	4.8741	4.8323	4.8527	4.8741	4.8268	4.8262	4.8741	4.8741
		3A	4.8645	4.8750	4.8344	4.8570	4.8750	4.8299	4.8299	4.8750	4.8750
			4.8636	4.8759	4.8341	4.8561	4.8759	4.8302	4.8296	4.8759	4.8759
5.000–4	UN	2A	4.9683	4.9964	4.8340	4.9304	4.9964	4.8221	4.8221	4.9964	4.9964
			4.9668	4.9979	4.8337	4.9289	4.9979	4.8224	4.8218	4.9979	4.9979
		3A	4.9719	5.0000	4.8376	4.9370	5.0000	4.8287	4.8287	5.0000	5.0000
			4.9704	5.0015	4.8373	4.9355	5.0015	4.8290	4.8284	5.0015	5.0015
5.000–6	UN	2A	4.9759	4.9969	4.8886	4.9503	4.9969	4.8781	4.8781	4.9969	4.9969
			4.9746	4.9982	4.8883	4.9490	4.9982	4.8784	4.8778	4.9982	4.9982
		3A	4.9790	5.0000	4.8917	4.9561	5.0000	4.8839	4.8839	5.0000	5.0000
			4.9777	5.0013	4.8914	4.9548	5.0013	4.8842	4.8836	5.0013	5.0013
5.000–12	UN	2A	4.9851	4.9980	4.9439	4.9733	4.9980	4.9372	4.9372	4.9980	4.9980
			4.9842	4.9989	4.9436	4.9724	4.9989	4.9375	4.9369	4.9989	4.9989
		3A	4.9871	5.0000	4.9459	4.9770	5.0000	4.9409	4.9409	5.0000	5.0000
			4.9862	5.0009	4.9456	4.9761	5.0009	4.9412	4.9406	5.0009	5.0009
5.000–16	UN	2A	4.9877	4.9982	4.9576	4.9786	4.9982	4.9515	4.9515	4.9982	4.9982
			4.9868	4.9991	4.9573	4.9777	4.9991	4.9518	4.9512	4.9991	4.9991
		3A	4.9895	5.0000	4.9594	4.9820	5.0000	4.9549	4.9549	5.0000	5.0000
			4.9886	5.0009	4.9591	4.9811	5.0009	4.9552	4.9546	5.0009	5.0009
5.125–12	UN	2A	5.1101	5.1230	5.0689	5.0983	5.1230	5.0622	5.0622	5.1230	5.1230
			5.1092	5.1239	5.0686	5.0974	5.1239	5.0625	5.0619	5.1239	5.1239
		3A	5.1121	5.1250	5.0709	5.1020	5.1250	5.0659	5.0659	5.1250	5.1250
			5.1112	5.1259	5.0706	5.1011	5.1259	5.0662	5.0656	5.1259	5.1259
5.125–16	UN	2A	5.1127	5.1232	5.0826	5.1036	5.1232	5.0765	5.0765	5.1232	5.1232
			5.1118	5.1241	5.0823	5.1027	5.1241	5.0768	5.0762	5.1241	5.1241
		3A	5.1145	5.1250	5.0844	5.1070	5.1250	5.0799	5.0799	5.1250	5.1250
			5.1136	5.1259	5.0841	5.1061	5.1259	5.0802	5.0796	5.1259	5.1259
5.250–4	UN	2A	5.2183	5.2464	5.0840	5.1803	5.2464	5.0720	5.0720	5.2464	5.2464
			5.2168	5.2479	5.0837	5.1788	5.2479	5.0723	5.0717	5.2479	5.2479
		3A	5.2219	5.2500	5.0876	5.1869	5.2500	5.0786	5.0786	5.2500	5.2500
			5.2204	5.2515	5.0873	5.1854	5.2515	5.0789	5.0783	5.2515	5.2515
5.250–12	UN	2A	5.2351	5.2480	5.1939	5.2233	5.2480	5.1872	5.1872	5.2480	5.2480
			5.2342	5.2489	5.1936	5.2224	5.2489	5.1875	5.1869	5.2489	5.2489
		3A	5.2371	5.2500	5.1959	5.2270	5.2500	5.1909	5.1909	5.2500	5.2500
			5.2362	5.2509	5.1956	5.2261	5.2509	5.1912	5.1906	5.2509	5.2509
5.250–16	UN	2A	5.2377	5.2482	5.2076	5.2286	5.2482	5.2015	5.2015	5.2482	5.2482
			5.2368	5.2491	5.2073	5.2277	5.2491	5.2018	5.2012	5.2491	5.2491
		3A	5.2395	5.2500	5.2094	5.2320	5.2500	5.2049	5.2049	5.2500	5.2500
			5.2386	5.2509	5.2091	5.2311	5.2509	5.2052	5.2046	5.2509	5.2509
5.375–12	UN	2A	5.3601	5.3730	5.3189	5.3483	5.3730	5.3122	5.3122	5.3730	5.3730
			5.3592	5.3739	5.3186	5.3474	5.3739	5.3125	5.3119	5.3739	5.3739
		3A	5.3621	5.3750	5.3209	5.3520	5.3750	5.3159	5.3159	5.3750	5.3750
			5.3612	5.3759	5.3206	5.3511	5.3759	5.3162	5.3156	5.3759	5.3759

See footnotes at end of table.

TABLE 6.20. *Setting plug gages, Unified screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs							Basic-crest setting plugs	
			Plug for GO thread gage [a]			Plug for LO thread gage [a]				Major diameter	
			Major diameter		Pitch diameter	Major diameter		Pitch diameter		Plug for GO thread gage [a,b]	Plug for LO thread gage [a,c]
			Truncated	Full		Truncated	Full	Plus tolerance gage	Minus tolerance gage	W and X tolerances	W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
5. 375–16	UN	2A	5. 3627	5. 3732	5. 3326	5. 3536	5. 3732	5. 3265	5. 3265	5. 3732	5. 3732
			5. 3618	5. 3741	5. 3323	5. 3527	5. 3741	5. 3268	5. 3262	5. 3741	5. 3741
		3A	5. 3645	5. 3750	5. 3344	5. 3570	5. 3750	5. 3299	5. 3299	5. 3750	5. 3750
			5. 3636	5. 3759	5. 3341	5. 3561	5. 3759	5. 3302	5. 3296	5. 3759	5. 3759
5. 500–4	UN	2A	5. 4683	5. 4964	5. 3340	5. 4302	5. 4964	5. 3219	5. 3219	5. 4964	5. 4964
			5. 4668	5. 4979	5. 3337	5. 4287	5. 4979	5. 3222	5. 3216	5. 4979	5. 4979
		3A	5. 4719	5. 5000	5. 3376	5. 4368	5. 5000	5. 3285	5. 3285	5. 5000	5. 5000
			5. 4704	5. 5015	5. 3373	5. 4353	5. 5015	5. 3288	5. 3282	5. 5015	5. 5009
5. 500–12	UN	2A	5. 4851	5. 4980	5. 4439	5. 4733	5. 4980	5. 4372	5. 4372	5. 4980	5. 4980
			5. 4842	5. 4989	5. 4436	5. 4724	5. 4989	5. 4375	5. 4369	5. 4989	5. 4989
		3A	5. 4871	5. 5000	5. 4459	5. 4770	5. 5000	5. 4409	5. 4409	5. 5000	5. 5000
			5. 4862	5. 5009	5. 4456	5. 4761	5. 5009	5. 4412	5. 4406	5. 5009	5. 5009
5. 500–16	UN	2A	5. 4877	5. 4982	5. 4576	5. 4786	5. 4982	5. 4515	5. 4515	5. 4982	5. 4982
			5. 4868	5. 4991	5. 4573	5. 4777	5. 4991	5. 4518	5. 4512	5. 4991	5. 4991
		3A	5. 4895	5. 5000	5. 4594	5. 4820	5. 5000	5. 4549	5. 4549	5. 5000	5. 5000
			5. 4886	5. 5009	5. 4591	5. 4811	5. 5009	5. 4552	5. 4546	5. 5009	5. 5009
5. 625–12	UN	2A	5. 6100	5. 6229	5. 5688	5. 5980	5. 6229	5. 5619	5. 5619	5. 6229	5. 6229
			5. 6091	5. 6238	5. 5685	5. 5971	5. 6238	5. 5622	5. 5616	5. 6238	5. 6238
		3A	5. 6121	5. 6250	5. 5709	5. 6018	5. 6250	5. 5657	5. 5657	5. 6250	5. 6250
			5. 6112	5. 6259	5. 5706	5. 6009	5. 6259	5. 5660	5. 5654	5. 6259	5. 6259
5. 625–16	UN	2A	5. 6126	5. 6231	5. 5825	5. 6034	5. 6231	5. 5763	5. 5763	5. 6231	5. 6231
			5. 6117	5. 6240	5. 5822	5. 6025	5. 6240	5. 5766	5. 5760	5. 6240	5. 6240
		3A	5. 6145	5. 6250	5. 5844	5. 6068	5. 6250	5. 5797	5. 5797	5. 6250	5. 6250
			5. 6136	5. 6259	5. 5841	5. 6059	5. 6259	5. 5800	5. 5794	5. 6259	5. 6259
5. 750–4	UN	2A	5. 7182	5. 7463	5. 5839	5. 6800	5. 7463	5. 5717	5. 5717	5. 7463	5. 7463
			5. 7167	5. 7478	5. 5836	5. 6785	5. 7478	5. 5720	5. 5714	5. 7478	5. 7478
		3A	5. 7219	5. 7500	5. 5876	5. 6867	5. 7500	5. 5784	5. 5784	5. 7500	5. 7500
			5. 7204	5. 7515	5. 5873	5. 6852	5. 7515	5. 5787	5. 5781	5. 7515	5. 7515
5. 750–12	UN	2A	5. 7350	5. 7479	5. 6938	5. 7230	5. 7479	5. 6869	5. 6869	5. 7479	5. 7479
			5. 7341	5. 7488	5. 6935	5. 7221	5. 7488	5. 6872	5. 6866	5. 7488	5. 7488
		3A	5. 7371	5. 7500	5. 6959	5. 7268	5. 7500	5. 6907	5. 6907	5. 7500	5. 7500
			5. 7362	5. 7509	5. 6956	5. 7259	5. 7509	5. 6910	5. 6904	5. 7509	5. 7509
5. 750–16	UN	2A	5. 7376	5. 7481	5. 7075	5. 7284	5. 7481	5. 7013	5. 7013	5. 7481	5. 7481
			5. 7367	5. 7490	5. 7072	5. 7275	5. 7490	5. 7016	5. 7010	5. 7490	5. 7490
		3A	5. 7395	5. 7500	5. 7094	5. 7318	5. 7500	5. 7047	5. 7047	5. 7500	5. 7500
			5. 7386	5. 7509	5. 7091	5. 7309	5. 7509	5. 7050	5. 7044	5. 7509	5. 7509
5. 875–12	UN	2A	5. 8600	5. 8729	5. 8188	5. 8480	5. 8729	5. 8119	5. 8119	5. 8729	5. 8729
			4. 8591	5. 8738	5. 8185	5. 8471	5. 8738	5. 8122	5. 8116	5. 8738	5. 8738
		3A	5. 8621	5. 8750	5. 8209	5. 8518	5. 8750	5. 8157	5. 8157	5. 8750	5. 8750
			5. 8612	5. 8759	5. 8206	5. 8509	5. 8759	5. 8160	5. 8154	5. 8759	5. 8759
5. 875–16	UN	2A	5. 8626	5. 8731	5. 8325	5. 8534	5. 8731	5. 8263	5. 8263	5. 8731	5. 8731
			5. 8617	5. 8740	5. 8322	5. 8525	5. 8740	5. 8266	5. 8260	5. 8740	5. 8740
		3A	5. 8645	5. 8750	5. 8344	5. 8568	5. 8750	5. 8297	5. 8297	5. 8750	5. 8750
			5. 8636	5. 8759	5. 8341	5. 8559	5. 8759	5. 8300	5. 8294	5. 8759	5. 8759
6. 000–4	UN	2A	5. 9682	5. 9963	5. 8339	5. 9298	5. 9963	5. 8215	5. 8215	5. 9963	5. 9963
			5. 9667	5. 9978	5. 8336	5. 9283	5. 9978	5. 8218	5. 8212	5. 9978	5. 9978
		3A	5. 9719	6. 0000	5. 8376	5. 9366	6. 0000	5. 8283	5. 8283	6. 0000	6. 0000
			5. 9704	6. 0015	5. 8373	5. 9351	6. 0015	5. 8286	5. 8280	6. 0015	6. 0015
6. 000–12	UN	2A	5. 9850	5. 9979	5. 9438	5. 9730	5. 9979	5. 9369	5. 9369	5. 9979	5. 9979
			5. 9841	5. 9988	5. 9435	5. 9721	5. 9988	5. 9372	5. 9366	5. 9988	5. 9988
		3A	5. 9871	6. 0000	5. 9459	5. 9768	6. 0000	5. 9407	5. 9407	6. 0000	6. 0000
			5. 9862	6. 0009	5. 9456	5. 9759	6. 0009	5. 9410	5. 9404	6. 0009	6. 0009
6. 000–16	UN	2A	5. 9876	5. 9981	5. 9575	5. 9784	5. 9981	5. 9513	5. 9513	5. 9981	5. 9981
			5. 9867	5. 9990	5. 9572	5. 9775	5. 9990	5. 9516	5. 9510	5. 9990	5. 9990
		3A	5. 9895	6. 0000	5. 9594	5. 9818	6. 0000	5. 9547	5. 9547	6. 0000	6. 0000
			5. 9886	6. 0009	5. 9591	5. 9809	6. 0009	5. 9550	5. 9544	6. 0009	6. 0009

[a] These setting plugs are applicable to thread snap and indicating gages as well as to thread ring gages.
[b] Pitch diameter limits of W basic-crest setting plug gages are given in column 6 of this table. Pitch diameter limits of X basic-crest setting plug gages are given in column 4 of table 6.19.
[c] Pitch diameter limits of W basic-crest setting plug gages are given in columns 9 and 10 of this table. Pitch diameter limits of X basic-crest setting plug gages are given in columns 6 and 7 of table 6.19.

INDEX

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

APPENDIX A1

1969

AMERICAN NATIONAL FORM OF THREAD AND THREAD SERIES FOR BOLTS, MACHINE SCREWS, NUTS, TAPPED HOLES, AND GENERAL APPLICATIONS

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3 i

Since the American National threads have been superseded by the Unified threads, most of appendix 1, as shown in the previous (1957) issue of Part I, has been deleted. Shown herein is data on the class 3 internal threads in the Coarse Thread Series in nominal sizes from 0.25 to one inch as there is still a need for this information. Data shown is from tables 1.2, 1.8, 1.16, and 1.17 of the 1957 issue. (Appendix number and table numbers now preceded by an A.)

Table A1.2. *American National coarse-thread series, NC*

Identification		Basic diameters			Thread data								
Sizes	Threads per inch, n	Major diameter, D	Pitch diameter, E	Minor diameter, K	Metric equivalent of major diameter	Pitch, p	Depth of thread, h	Basic width of flat, $p/8$	Minimum width of flat at major diameter of nut, $p/24$	Lead angle at basic pitch diameter, λ		Sectional area at minor diameter at $D-2h$, $=\frac{\pi K^2}{4}$	Tensile stress area, $\pi\left(\frac{E}{2}-\frac{3H}{16}\right)^2$
1	2	3	4	5	6	7	8	9	10	11		12	13
in		*in*	*in*	*in*	*mm*	*in*	*in*	*in*	*in*	*deg*	*min*	*in*²	*in*²
1/4	20	0.2500	0.2175	0.1850	6.350	0.05000	0.03248	0.00625	0.00208	4	11	0.0269	0.0318
5/16	18	.3125	.2764	.2403	7.938	.05556	.03608	.00694	.00231	3	40	.0454	.0524
3/8	16	.3750	.3344	.2938	9.525	.06250	.04059	.00781	.00260	3	24	.0678	.0775
7/16	14	.4375	.3911	.3447	11.113	.07143	.04639	.00893	.00298	3	20	.0933	.1063
1/2	13	.5000	.4500	.4001	12.700	.07692	.04996	.00962	.00321	3	7	.1257	.1419
9/16	12	.5625	.5084	.4542	14.288	.08333	.05413	.01042	.00347	2	59	.162	.182
5/8	11	.6250	.5660	.5069	15.875	.09091	.05905	.01136	.00379	2	56	.202	.226
3/4	10	.7500	.6850	.6201	19.050	.10000	.06495	.01250	.00417	2	40	.302	.334
7/8	9	.8750	.8028	.7307	22.225	.11111	.07217	.01389	.00463	2	31	.419	.462
1	8	1.0000	.9188	.8376	25.400	.12500	.08119	.01562	.00521	2	29	.551	.606

Table A1.8. *Limits of size and tolerances, classes 1, 2, 3, and 4, American National coarse-thread series, NC*

Limits of size and tolerances		1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
	Threads per inch	20	18	16	14	13	12	11	10	9	8
External Threads		*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
Class 1, major diameter	Max	0.2485	0.3109	0.3732	0.4354	0.4978	0.5601	0.6224	0.7472	0.8719	0.9966
	Min	.2383	.2995	.3606	.4214	.4830	.5443	.6054	.7288	.8519	.9744
	Tol	.0102	.0114	.0126	.0140	.0148	.0158	.0170	.0184	.0200	.0222
Classes 2, 3, and 4, major diameter	Max	.2500	.3125	.3750	.4375	.5000	.5625	.6250	.7500	.8750	1.0000
	Min	.2428	.3043	.3660	.4277	.4896	.5513	.6132	.7372	.8610	.9848
	Tol	.0072	.0082	.0090	.0098	.0104	.0112	.0118	.0128	.0140	.0152
Class 2, major diameter (threaded parts of unfinished, hot-rolled material)	Max	.2500	.3125	.3750	.4375	.5000	.5625	.6250	.7500	.8750	1.0000
	Min	.2398	.3011	.3624	.4235	.4852	.5467	.6080	.7316	.8550	.9778
	Tol	.0102	.0114	.0126	.0140	.0148	.0158	.0170	.0184	.0200	.0222
Class 1, minor diameter	Max[1]	.1872	.2427	.2965	.3478	.4034	.4579	.5109	.6245	.7356	.8432
Classes 2, 3, and 4, minor diameter	Max[1]	.1887	.2443	.2983	.3499	.4056	.4603	.5135	.6273	.7387	.8466
Class 1, pitch diameter	Max[3]	.2160	.2748	.3326	.3890	.4478	.5060	.5634	.6822	.7997	.9154
	Min	.2109	.2691	.3263	.3820	.4404	.4981	.5549	.6730	.7897	.9043
	Tol	.0051	.0057	.0063	.0070	.0074	.0079	.0085	.0092	.0100	.0111
Class 2, pitch diameter	Max[3]	.2175	.2764	.3344	.3911	.4500	.5084	.5660	.6850	.8028	.9188
	Min	.2139	.2723	.3299	.3862	.4448	.5028	.5601	.6786	.7958	.9112
	Tol	.0036	.0041	.0045	.0049	.0052	.0056	.0059	.0064	.0070	.0076
Class 3, pitch diameter	Max[3]	.2175	.2764	.3344	.3911	.4500	.5084	.5660	.6850	.8028	.9188
	Min	.2149	.2734	.3312	.3875	.4463	.5044	.5618	.6805	.7979	.9134
	Tol	.0026	.0030	.0032	.0036	.0037	.0040	.0042	.0045	.0049	.0054
Class 4, pitch diameter	Max[3]	.2178	.2767	.3348	.3915	.4504	.5089	.5665	.6856	.8034	.9195
	Min	.2165	.2752	.3332	.3897	.4485	.5069	.5644	.6833	.8010	.9168
	Tol	.0013	.0015	.0016	.0018	.0019	.0020	.0021	.0023	.0024	.0027
Internal Threads											
Classes 1, 2, 3, and 4, major diameter	Min[2]	.2500	.3125	.3750	.4375	.5000	.5625	.6250	.7500	.8750	1.0000
Classes 1, 2, 3, and 4, minor diameter	Min	.1959	.2524	.3073	.3602	.4167	.4723	.5266	.6417	.7547	.8647
	Max	.2060	.2630	.3184	.3721	.4290	.4850	.5397	.6553	.7689	.8795
	Tol	.0101	.0106	.0111	.0119	.0123	.0127	.0131	.0136	.0142	.0148
Classes 1, 2, 3, and 4, pitch diameter	Min[3]	.2175	.2764	.3344	.3911	.4500	.5084	.5660	.6860	.8028	.9188
Class 1, pitch diameter	Max	.2226	.2821	.3407	.3981	.4574	.5163	.5745	.6942	.8128	.9299
	Tol	.0051	.0057	.0063	.0070	.0074	.0079	.0085	.0092	.0100	.0111
Class 2, pitch diameter	Max	.2211	.2805	.3389	.3960	.4552	.5140	.5719	.6914	.8098	.9264
	Tol	.0036	.0041	.0045	.0049	.0052	.0056	.0059	.0064	.0070	.0076
Class 3, pitch diameter	Max	.2201	.2794	.3376	.3947	.4537	.5124	.5702	.6895	.8077	.9242
	Tol	.0026	.0030	.0032	.0036	.0037	.0040	.0042	.0045	.0049	.0054
Class 4, pitch diameter	Max	.2188	.2779	.3360	.3929	.4519	.5104	.5681	.6873	.8052	.9215
	Tol	.0013	.0015	.0016	.0018	.0019	.0020	.0021	.0023	.0024	.0027

[1] Dimensions given for the maximum minor diameter of the external thread are figured to the intersection of the worn tool arc with a center line through crest and root. The minimum minor diameter of the external thread shall be that corresponding to a flat at the minor diameter of the minimum external thread equal to $\frac{1}{8} \times p$, and may be determined by subtracting the basic thread depth, h (or $0.6495p$), from the minimum pitch diameter of the external thread.

[2] Dimensions for the minimum major diameter of the internal thread correspond to the basic flat ($\frac{1}{8} \times p$) and the profile at the major diameter produced by a worn tool must not fall below the basic outline. The maximum major diameter of the internal thread shall be that corresponding to a flat at the major diameter of the maximum internal thread equal to $\frac{1}{24} \times p$, and may be determined by adding $11h/9$ (or $0.7939p$) to the maximum pitch diameter of the internal thread.

[3] These dimensions are the maximum material or "go" size and are those which should be placed on the component drawing with the tolerances.

Table A1.16. *Gages for standard thread series, American National screw threads*

Nominal size and threads per inch	Series designation	Class	Gages for external threads								Gages for internal threads						
			Thread gages					Z plain gages for major diameter			Thread gages					Z plain gages for minor diameter	
			Go		Not go			Go	Not go		Go		Not go				
			Pitch diameter	Minor diameter	Pitch diameter		Minor diameter		Semi-finished	Unfinished hot-rolled material	Major diameter	Pitch diameter	Major diameter	Pitch diameter		Go	Not go
					Plus tol. gage	Minus tol. gage								Minus tol. gage	Plus tol. gage		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
¼-20	NC	1	0.2160	0.1944	0.2109	0.2109	0.2001	0.2485	0.2383		0.2500	0.2175	0.2443	0.2226	0.2226	0.1959	0.2060
			.2157	.1939	.2112	.2106	.2006	.2484	.2384		.2505	.2178	.2438	.2223	.2229	.1960	.2059
		2	.2175	.1959	.2139	.2139	.2031	.2500	.2428	0.2398	.2500	.2175	.2428	.2211	.2211	.1959	.2060
			.2172	.1954	.2142	.2136	.2036	.2499	.2429	.2399	.2505	.2178	.2423	.2208	.2214	.1960	.2059
		3	.2175	.1959	.2149	.2149	.2041	.2500	.2428		.2500	.2175	.2418	.2201	.2201	.1959	.2060
			.2172	.1954	.2152	.2146	.2046	.2499	.2429		.2505	.2178	.2413	.2198	.2204	.1960	.2059
		4	.2178	.1962	.2165	.2165	.2057	.2500	.2428		.2500	.2175	.2405	.2188	.2188	.1959	.2060
			.2177	.1957	.2166	.2164	.2062	.2499	.2429		.2505	.2176	.2400	.2187	.2189	.1960	.2059
5⁄16-18	NC	1	.2748	.2507	.2691	.2691	.2571	.3109	.2995		.3125	.2764	.3062	.2821	.2821	.2524	.2630
			.2745	.2502	.2694	.2688	.2576	.3108	.2996		.3130	.2767	.3057	.2818	.2824	.2525	.2629
		2	.2764	.2523	.2723	.2723	.2603	.3125	.3043	.3011	.3125	.2764	.3046	.2805	.2805	.2524	.2630
			.2761	.2518	.2726	.2720	.2608	.3124	.3044	.3012	.3130	.2767	.3041	.2802	.2808	.2525	.2629
		3	.2764	.2523	.2734	.2734	.2614	.3125	.3043		.3125	.2764	.3035	.2794	.2794	.2524	.2630
			.2761	.2518	.2737	.2731	.2619	.3124	.3044		.3130	.2767	.3030	.2791	.2797	.2525	.2629
		4	.2767	.2526	.2752	.2752	.2632	.3125	.3043		.3125	.2764	.3020	.2779	.2779	.2524	.2630
			.2766	.2521	.2753	.2751	.2637	.3124	.3044		.3130	.2765	.3015	.2778	.2780	.2525	.2629
⅜-16	NC	1	.3326	.3055	.3263	.3263	.3128	.3732	.3606		.3750	.3344	.3678	.3407	.3407	.3073	.3184
			.3323	.3049	.3266	.3260	.3134	.3731	.3607		.3756	.3347	.3672	.3404	.3410	.3074	.3183
		2	.3344	.3073	.3299	.3299	.3164	.3750	.3660	.3624	.3750	.3344	.3660	.3389	.3389	.3073	.3184
			.3341	.3067	.3302	.3296	.3170	.3749	.3661	.3625	.3756	.3347	.3654	.3386	.3392	.3074	.3183
		3	.3344	.3073	.3312	.3312	.3177	.3750	.3660		.3750	.3344	.3647	.3376	.3376	.3073	.3184
			.3341	.3067	.3315	.3309	.3183	.3749	.3661		.3756	.3347	.3641	.3373	.3379	.3074	.3183
		4	.3348	.3077	.3332	.3332	.3197	.3750	.3660		.3750	.3344	.3631	.3360	.3360	.3073	.3184
			.3347	.3071	.3333	.3331	.3203	.3749	.3661		.3756	.3345	.3625	.3359	.3361	.3074	.3183
7⁄16-14	NC	1	.3890	.3581	.3820	.3820	.3665	.4354	.4214		.4375	.3911	.4290	.3981	.3981	.3602	.3721
			.3887	.3575	.3823	.3817	.3671	.4353	.4215		.4381	.3914	.4284	.3978	.3984	.3603	.3720
		2	.3911	.3602	.3862	.3862	.3707	.4375	.4277	.4235	.4375	.3911	.4269	.3960	.3960	.3602	.3721
			.3908	.3596	.3865	.3859	.3713	.4374	.4278	.4236	.4381	.3914	.4263	.3957	.3963	.3603	.3720
		3	.3911	.3602	.3875	.3875	.3720	.4375	.4277		.4375	.3911	.4256	.3947	.3947	.3602	.3721
			.3908	.3596	.3878	.3872	.3726	.4374	.4278		.4381	.3914	.4250	.3944	.3950	.3603	.3720
		4	.39150	.3606	.38970	.38970	.3742	.4375	.4277		.4375	.39110	.4238	.39290	.39290	.3602	.3721
			.39135	.3600	.38985	.38955	.3748	.4374	.4278		.4381	.39125	.4232	.39275	.39305	.3603	.3720
½-13	NC	1	.4478	.4145	.4404	.4404	.4238	.4978	.4830		.5000	.4500	.4907	.4574	.4574	.4167	.4290
			.4475	.4139	.4407	.4401	.4244	.4977	.4831		.5006	.4503	.4901	.4571	.4577	.4168	.4289
		2	.4500	.4167	.4448	.4448	.4282	.5000	.4896	.4852	.5000	.4500	.4885	.4552	.4552	.4167	.4290
			.4497	.4161	.4451	.4445	.4288	.4999	.4897	.4853	.5006	.4503	.4879	.4549	.4555	.4168	.4289
		3	.4500	.4167	.4463	.4463	.4297	.5000	.4896		.5000	.4500	.4870	.4537	.4537	.4167	.4290
			.4497	.4161	.4460	.4460	.4303	.4999	.4897		.5006	.4503	.4864	.4534	.4540	.4168	.4289
		4	.45040	.4171	.44850	.44850	.4319	.5000	.4896		.5000	.45000	.4852	.45190	.45190	.4167	.4290
			.45025	.4165	.44865	.44835	.4325	.4999	.4897		.5006	.45015	.4846	.45175	.45205	.4168	.4289

TABLE A1.16. *Gages for standard thread series, American National screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	Gages for external threads								Gages for internal threads						
			Thread gages					Z plain gages for major diameter			Thread gages					Z plain gages for minor diameter	
			Go		Not go			Go	Not go		Go		Not go				
			Pitch diameter	Minor diameter	Pitch diameter		Minor diameter		Semi-finished	Unfinished hot-rolled material	Major diameter	Pitch diameter	Major diameter	Pitch diameter		Go	Not go
					Plus tol. gage	Minus tol. gage								Minus tol. gage	Plus tol. gage		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
9/16-12	NC	1	.5060	.4699	.4981	.4981	.4801	.5601	.5443		.5625	.5084	.5524	.5163	.5163	.4723	.4850
			.5057	.4693	.4984	.4978	.4807	.5600	.5444		.5631	.5087	.5518	.5160	.5166	.4724	.4849
		2	.5084	.4723	.5028	.5028	.4848	.5625	.5513	.5467	.5625	.5084	.5501	.5140	.5140	.4723	.4850
			.5081	.4717	.5031	.5025	.4854	.5624	.5514	.5468	.5631	.5087	.5495	.5137	.5143	.4724	.4849
		3	.5084	.4723	.5044	.5044	.4864	.5625	.5513		.5625	.5084	.5485	.5124	.5124	.4723	.4850
			.5081	.4717	.5047	.5041	.4870	.5624	.5514		.5631	.5087	.5479	.5121	.5127	.4724	.4849
		4	.5089	.4728	.5069	.5069	.4889	.5625	.5513		.5625	.5084	.5465	.5104	.5104	.4723	.4850
			.5087	.4722	.5071	.5067	.4895	.5624	.5514		.5631	.5086	.5459	.5102	.5106	.4724	.4849
5/8-11	NC	1	.5634	.5240	.5549	.5549	.5352	.6224	.6054		.6250	.5660	.6139	.5745	.5745	.5266	.5397
			.5631	.5234	.5552	.5546	.5358	.6223	.6055		.6256	.5663	.6133	.5742	.5748	.5267	.5396
		2	.5660	.5266	.5601	.5601	.5404	.6250	.6132	.6080	.6250	.5660	.6113	.5719	.5719	.5266	.5397
			.5657	.5260	.5604	.5598	.5410	.6249	.6133	.6081	.6256	.5663	.6107	.5716	.5722	.5267	.5396
		3	.5660	.5266	.5618	.5618	.5421	.6250	.6132		.6250	.5660	.6096	.5702	.5702	.5266	.5397
			.5657	.5260	.5621	.5615	.5427	.6249	.6133		.6556	.5663	.6090	.5699	.5705	.5267	.5396
		4	.5665	.5271	.5644	.5644	.5447	.6250	.6132		.6250	.5660	.6075	.5681	.5681	.5266	.5397
			.5663	.5265	.5646	.5642	.5453	.6249	.6133		.6256	.5662	.6069	.5679	.5683	.5267	.5396
3/4-10	NC	1	.6822	.6389	.6730	.6730	.6514	.7472	.7288		.7500	.6850	.7375	.6942	.6942	.6417	.6553
			.6819	.6383	.6733	.6727	.6520	.7471	.7289		.7506	.6853	.7369	.6939	.6945	.6418	.6552
		2	.6850	.6417	.6786	.6786	.6570	.7500	.7372	.7316	.7500	.6850	.7347	.6914	.6914	.6417	.6553
			.6847	.6411	.6789	.6783	.6576	.7499	.7373	.7317	.7506	.6853	.7341	.6911	.6917	.6418	.6552
		3	.6850	.6417	.6805	.6805	.6589	.7500	.7372		.7500	.6850	.7328	.6895	.6895	.6417	.6553
			.6847	.6411	.6808	.6802	.6595	.7499	.7373		.7506	.6853	.7322	.6892	.6898	.6418	.6552
		4	.6856	.6423	.6833	.6833	.6617	.7500	.7372		.7500	.6850	.7306	.6873	.6873	.6417	.6553
			.6854	.6417	.6835	.6831	.6623	.7499	.7373		.7506	.6852	.7300	.6871	.6875	.6418	.6552
7/8-9	NC	1	.7997	.7516	.7897	.7897	.7656	.87190	.85190		.8750	.8028	.8609	.8128	.8128	.75470	.76890
			.7994	.7509	.7900	.7894	.7663	.87178	.85202		.8757	.8031	.8602	.8125	.8131	.75482	.76878
		2	.8028	.7547	.7958	.7958	.7717	.87500	.86100	.85500	.8750	.8028	.8579	.8098	.8098	.75470	.76890
			.8025	.7540	.7961	.7955	.7724	.87488	.86112	.85512	.8757	.8031	.8572	.8095	.8101	.75482	.76878
		3	.8028	.7547	.7979	.7979	.7738	.87500	.86100		.8750	.8028	.8558	.8077	.8077	.75470	.76890
			.8025	.7540	.7982	.7976	.7745	.87488	.86112		.8757	.8031	.8551	.8074	.8080	.75482	.76878
		4	.8034	.7553	.8010	.8010	.7769	.87500	.86100		.8750	.8028	.8533	.8052	.8052	.75470	.76890
			.8032	.7546	.8012	.8008	.7776	.87488	.86112		.8757	.8030	.8526	.8050	.8054	.75482	.76878
1-8	NC	1	.9154	.8613	.9043	.9043	.8772	.99660	.97440		1.0000	.9188	.9840	.9299	.9299	.86470	.87950
			.9150	.8606	.9047	.9039	.8779	.99648	.97452		1.0007	.9192	.9833	.9295	.9303	.86482	.87938
		2	.9188	.8647	.9112	.9112	.8841	1.00000	.98480	0.97780	1.0000	.9188	.9805	.9264	.9264	.86470	.87950
			.9184	.8640	.9116	.9108	.8848	.99988	.98492	.97792	1.0007	.9192	.9798	.9260	.9268	.86482	.87938
		3	.9188	.8647	.9134	.9134	.8863	1.00000	.98480		1.0000	.9188	.9783	.9242	.9242	.86470	.87950
			.9184	.8640	.9138	.9130	.8870	.99988	.98492		1.0007	.9192	.9776	.9238	.9246	.86482	.87938
		4	.9195	.8654	.9168	.9168	.8897	1.00000	.98480		1.0000	.9188	.9756	.9215	.9215	.86470	.87950
			.9193	.8647	.9170	.9166	.8904	.99988	.98492		1.0007	.9190	.9749	.9213	.9217	.86482	.87938

TABLE A1.17. *Setting plug gages, American National screw threads*

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for "Go": Major diameter: Truncated	W truncated setting plugs: Plug for "Go": Major diameter: Full	W truncated setting plugs: Plug for "Go": Pitch diameter	W truncated setting plugs: Plug for "Not go": Major diameter: Truncated	W truncated setting plugs: Plug for "Not go": Major diameter: Full	W truncated setting plugs: Plug for "Not go": Pitch diameter: Plus tol. gage	W truncated setting plugs: Plug for "Not go": Pitch diameter: Minus tol. gage	Basic-crest setting plugs: Major diameter: Go[1]: *W* tolerance	Basic-crest setting plugs: Major diameter: Go[1]: *X* tolerance	Basic-crest setting plugs: Major diameter: Not go[2]: *W* tolerance	Basic-crest setting plugs: Major diameter: Not go[2]: *X* tolerance
1	2	3	4	5	6	7	8	9	10	11A	11B	12A	12B
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
¼-20	NC	1	0.2395	0.2485	0.2160	0.2326	0.2484	0.2109	0.2109	0.2485	0.2485	0.2484	0.2484
			.2390	.2490	.2159	.2321	.2489	.2110	.2108	.2490	.2490	.2489	.2489
		2	.2410	.2500	.2175	.2356	.2500	.2139	.2139	.2500	.2500	.2500	.2500
			.2405	.2505	.2174	.2351	.2505	.2140	.2138	.2505	.2505	.2505	.2505
		3	.2410	.2500	.2175	.2366	.2500	.2149	.2149	.2500	.2500	.2500	.2500
			.2405	.2505	.2174	.2361	.2505	.2150	.2148	.2505	.2505	.2505	.2505
		4	.2413	.2503	.2178	.2382	.2503	.2165	.2165	.2500	.2500	.2500	.2500
			.2408	.2508	.2177	.2377	.2508	.2166	.2164	.2505	.2505	.2505	.2505
5/16-18	NC	1	.3012	.3109	.2748	.2932	.3108	.2691	.2691	.3109	.3109	.3108	.3108
			.3007	.3114	.2747	.2927	.3113	.2692	.2690	.3114	.3114	.3113	.3113
		2	.3028	.3125	.2764	.2964	.3125	.2723	.2723	.3125	.3125	.3125	.3125
			.3023	.3130	.2763	.2959	.3130	.2724	.2722	.3130	.3130	.3130	.3130
		3	.3028	.3125	.2764	.2975	.3125	.2734	.2734	.3125	.3125	.3125	.3125
			.3023	.3130	.2763	.2970	.3130	.2735	.2733	.3130	.3130	.3130	.3130
		4	.3031	.3128	.2767	.2993	.3128	.2752	.2752	.3125	.3125	.3125	.3125
			.3026	.3133	.2766	.2988	.3133	.2753	.2751	.3130	.3130	.3130	.3130
⅜-16	NC	1	.3627	.3732	.3326	.3534	.3732	.3263	.3263	.3732	.3732	.3732	.3732
			.3621	.3738	.3325	.3528	.3738	.3264	.3262	.3738	.3738	.3738	.3738
		2	.3645	.3750	.3344	.3570	.3750	.3299	.3299	.3750	.3750	.3750	.3750
			.3639	.3756	.3343	.3564	.3756	.3300	.3298	.3756	.3756	.3756	.3756
		3	.3645	.3750	.3344	.3583	.3750	.3312	.3312	.3750	.3750	.3750	.3750
			.3639	.3756	.3343	.3577	.3756	.3313	.3311	.3756	.3756	.3756	.3756
		4	.3649	.3754	.3348	.3603	.3754	.3332	.3332	.3750	.3750	.3750	.3750
			.3643	.3760	.3347	.3597	.3760	.3333	.3331	.3756	.3756	.3756	.3756

See footnotes at end of table.

TABLE A1.17. *Setting plug gages, American National screw threads*—Continued

Nominal size and threads per inch	Series designation	Class	W truncated setting plugs: Plug for "Go": Major diameter: Truncated	W truncated setting plugs: Plug for "Go": Major diameter: Full	W truncated setting plugs: Plug for "Go": Pitch diameter	W truncated setting plugs: Plug for "Not go": Major diameter: Truncated	W truncated setting plugs: Plug for "Not go": Major diameter: Full	W truncated setting plugs: Plug for "Not go": Pitch diamteter: Plus tol. gage	W truncated setting plugs: Plug for "Not go": Pitch diamteter: Minus tol. gage	Basic-crest setting plugs: Major diameter: Go[1]: W and X tolerances	Basic-crest setting plugs: Major diameter: Not go[2]: W and X tolerances
1	2	3	4	5	6	7	8	9	10	11	12
			in	*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
7/16-14	NC	1	0.4239	0.4354	0.38900	0.4129	0.4354	0.38200	0.38200	0.4354	0.4354
			.4233	.4360	.38885	.4123	.4360	.38215	.38185	.4360	.4360
		2	.4260	.4375	.39110	.4171	.4375	.38620	.38620	.4375	.4375
			.4254	.4381	.39095	.4165	.4381	.38635	.38605	.4381	.4381
		3	.4260	.4375	.39110	.4184	.4375	.38750	.38750	.4375	.4375
			.4354	.4381	.39095	.4178	.4381	.38765	.38735	.4381	.4381
		4	.4264	.4379	.39150	.4206	.4379	.38970	.38970	.4375	.4375
			.4258	.4385	.39135	.4200	.4385	.38985	.38955	.4381	.4381
1/2-13	NC	1	.4856	.4978	.44780	.4737	.4978	.44040	.44040	.4978	.4978
			.4850	.4984	.44765	.4731	.4984	.44055	.44025	.4984	.4984
		2	.4878	.5000	.45000	.4781	.5000	.44480	.44480	.5000	.5000
			.4872	.5006	.44985	.4775	.5006	.44495	.44465	.5006	.5006
		3	.4878	.5000	.45000	.4796	.5000	.44630	.44630	.5000	.5000
			.4872	.5006	.44985	.4790	.5006	.44645	.44615	.5006	.5006
		4	.4882	.5004	.45040	.4818	.5004	.44850	.44850	.5000	.5000
			.4876	.5010	.45025	.4812	.5010	.44865	.44835	.5006	.5006
9/16-12	NC	1	.5472	.5601	.5060	.5342	.5601	.4981	.4981	.5601	.5601
			.5466	.5607	.5058	.5336	.5607	.4983	.4979	.5607	.5607
		2	.5496	.5625	.5084	.5389	.5625	.5028	.5028	.5625	.5625
			.5490	.5631	.5082	.5383	.5631	.5030	.5026	.5631	.5631
		3	.5496	.5625	.5084	.5405	.5625	.5044	.5044	.5625	.5625
			.5490	.5631	.5082	.5399	.5631	.5046	.5042	.5631	.5631
		4	.5501	.5630	.5089	.5430	.5630	.5069	.5069	.5625	.5625
			.5495	.5636	.5087	.5424	.5636	.5071	.5067	.5631	.5631
5/8-11	NC	1	.6087	.6224	.5634	.5943	.6224	.5549	.5549	.6224	.6224
			.6081	.6230	.5632	.5937	.6230	.5551	.5547	.6230	.6230
		2	.6113	.6250	.5660	.5995	.6250	.5601	.5601	.6250	.6250
			.6107	.6256	.5658	.5989	.6556	.5603	.5599	.6256	.6256
		3	.6113	.6250	.5660	.6012	.6250	.5618	.5618	.6250	.6250
			.6107	.6256	.5658	.6006	.6256	.5620	.5616	.6256	.6256
		4	.6118	.6255	.5665	.6038	.6255	.5644	.5644	.6250	.6250
			.6112	.6261	.5663	.6032	.6261	.5646	.5642	.6256	.6256
3/4-10	NC	1	.7326	.7472	.6822	.7163	.7472	.6730	.6730	.7472	.7472
			.7320	.7478	.6820	.7157	.7478	.6732	.6728	.7478	.7478
		2	.7354	.7500	.6850	.7219	.7500	.6786	.6786	.7500	.7500
			.7348	.7506	.6848	.7213	.7506	.6788	.6784	.7506	.7506
		3	.7354	.7500	.6850	.7238	.7500	.6805	.6805	.7500	.7500
			.7348	.7506	.6848	.7232	.7506	.6807	.6803	.7506	.7506
		4	.7360	.7506	.6856	.7266	.7506	.6833	.6833	.7500	.7500
			.7354	.7512	.6854	.7260	.7512	.6835	.6831	.7506	.7506
7/8-9	NC	1	.8561	.8719	.7997	.8378	.8719	.7897	.7897	.8719	.8719
			.8554	.8726	.7995	.8371	.8726	.7899	.7895	.8726	.8726
		2	.8592	.8750	.8028	.8439	.8750	.7958	.7958	.8750	.8750
			.8585	.8757	.8026	.8432	.8757	.7960	.7956	.8757	.8757
		3	.8592	.8750	.8028	.8460	.8750	.7979	.7979	.8750	.8750
			.8585	.8757	.8026	.8453	.8757	.7981	.7977	.8757	.8757
		4	.8598	.8756	.8034	.8491	.8756	.8010	.8010	.8750	.8750
			.8591	.8763	.8032	.8484	.8763	.8012	.8008	.8757	.8757
1-8	NC	1	.9795	.9966	.9154	.9584	.9966	.9043	.9043	.9966	.9966
			.9788	.9973	.9152	.9577	.9973	.9045	.9041	.9973	.9973
		2	.9829	1.0000	.9188	.9653	1.0000	.9112	.9112	1.0000	1.0000
			.9822	1.0007	.9186	.9646	1.0007	.9114	.9110	1.0007	1.0007
		3	.9829	1.0000	.9188	.9675	1.0000	.9134	.9134	1.0000	1.0000
			.9822	1.0007	.9186	.9668	1.0007	.9136	.9132	1.0007	1.0007
		4	.9836	1.0007	.9195	.9709	1.0007	.9168	.9168	1.0000	1.0000
			.9829	1.0014	.9193	.9702	1.0014	.9170	.9166	1.0007	1.0007

[1] Pitch diameter limits of W basic-crest setting plug gages are given in column 6 of this table. Pitch diameter limits of X basic-crest setting plug gages are given in column 4 of table A1.16.

[2] Pitch diameter limits of W basic-crest setting plug gages are given in columns 9 and 10 of this table. Pitch diameter limits of X basic-crest setting plug gages are given in columns 6 and 7 of table A1.16.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

APPENDIX 2

1957

AMERICAN NATIONAL SCREW THREADS OF SPECIAL DIAMETERS, PITCHES, AND LENGTHS OF ENGAGEMENT

APPENDIX 2 IS BEING DELETED FROM THE 1969 ISSUE OF HANDBOOK H28

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

APPENDIX A3

1969

TAP DRILL SIZES FOR UNIFIED SCREW THREADS AND RECOMMENDED HOLE SIZE LIMITS BEFORE THREADING

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1. TAP DRILL SIZES FOR UNIFIED SCREW THREADS

When it is important that the minor diameter of an internal thread conform to specified limits it may be necessary to use a reamer to finish the hole. However, a drill often can be made to cut with a sufficient accuracy for this requirement. A variety of factors enter into the production of a clean, round, straight hole of the correct diameter. For a discussion of these and other data on drilling and tapping, reference should be made to "Drilled Holes for Tapping," published by the Drill and Reamer Division and the Tap and Die Division of the Metal Cutting Tool Institute, 405 Lexington Avenue, New York, N.Y. 10017.

Table A3.1. gives minor diameter limits and corresponding percentages of basic thread height, $0.75H$, for all standard series threads up to and including 3.75 inch diameter for classes 1B and 2B. Table A3.2 is a similar table for class 3B. These tables also list sizes of drills that may be expected to drill holes within or near the specified minor diameter limits. The diameter of the drill, the probable hole size, and the corresponding percentages of basic thread height are tabulated.

As a drill may normally be expected to cut oversize, probable hole sizes are tabulated that are derived from probable mean oversizes, also tabulated. The following is quoted from the above-mentioned report: "These oversizes were determined from a series of tests conducted by a number of drill manufacturers. Using six sizes of drills ranging from 1/16 to 1 in. a total of 2,808 holes were drilled in cast iron and steel. Commercial high speed drills were used and the drilling equipment was of the same type and condition that is normally encountered in metal working shops. The average depth of hole drilled was equal to 1.5 times the drill diameter and the measurement of the hole was made at the midpoint of the depth drilled. . . . . With good drilling practices and with reasonable care in the resharpening of drills the average user may expect to drill oversize in the same manner."

2. RECOMMENDED HOLE SIZE LIMITS BEFORE THREADING

Recommended hole size limits before threading and the corresponding tolerances are derived from the minimum and maximum minor diameters of the internal thread to provide for optimum strength of fastenings and tapping conditions. The following rules as illustrated in figure A3.3 are used.

For the range to and including $0.33D$, the minimum hole size is equal to the minimum minor diameter of the internal thread and the maximum hole size is larger by half the minor diameter tolerance.

For the range from $0.33D$ to $0.67D$, the minimum and maximum hole sizes are each one quarter of the minor diameter tolerance larger than the corresponding limits for the length of engagement to and including $0.33D$.

For the range from $0.67D$ to $1.5D$, the minimum hole size is larger than the minimum minor diameter of the internal thread by half the minor diameter tolerance and the maximum hole size is equal to the maximum minor diameter.

For the range from $1.5D$ to $3D$, the minimum and maximum hole sizes are each one quarter of the minor diameter tolerance of the internal thread larger than the corresponding limits for the $0.67D$ to $1.5D$ length of engagement.

From the foregoing it will be seen that the difference between limits in each range is the same and equal to half of the minor diameter tolerance. This is a general rule. However, the minimum differences for sizes below 0.25 in are equal to the minor diameter tolerances given in tables 3.9 and 3.10 for lengths of engagement to and including $0.33D$. For lengths of engagement greater than $0.33D$ for sizes 0.25 in and larger, the values are adjusted so that the difference between limits is never less than 0.0040 in.

2.1. Recommended Hole Size Limits for Standard Unified Threads and Some UNS Threads are Given in Tables A3.5 and A3.6.—For diameter-pitch combinations other than those given in these tables, the tolerances given in table 2.21 or the tolerance derived from the formula, should be similarly applied to determine the hole size limits.

Internal threads requiring modified minor diameters for lengths of engagement less than $0.67D$ to develop the optimum strength of the fastening, or longer than $1.5D$ to reduce tapping difficulties, should be designated as specified in section 2. (See under "Designating threads having modified crests" in that section.)

2.2. For Unified Miniature threads, the distribution of hole size limits differs from the above, to accord with conditions peculiar to miniature threads and is shown in figure A3.4. The maximum limits are based on providing a functionally adequate fastening for the most common applications, where the material of the externally threaded member is of a strength essentially equal to or greater than that of its mating part. In applications where, because of considerations other than the fastening, the screw is made of an appreciably weaker material, the use of smaller hole sizes is usually necessary to extend thread engagement to a greater depth on the external thread. However, hole sizes down to the minimum limit of the minor diameters must be avoided to allow for the spin-up developed as the result of the negative rake with which these small taps are ground.

Recommended hole size limits for these threads are tabulated in table A3.7.

Table A3.1. *Tap drill sizes, Unified screw threads, classes 1B and 2B*

Thread size	Threads per inch	Designation	Classes 1B and 2B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
.060	80	UNF	0.0465	83.1	0.0514	53.0	#56	0.0465	83	0.0015	0.0480	74
							3/64	.0469	81	.0015	.0484	71
.073	64	UNC	.0561	83.3	.0623	52.7	#54	.0550	89	.0015	.0565	81
							#53	.0595	67	.0015	.0610	59
.073	72	UNF	.0580	83.1	.0635	52.7	#53	.0595	75	.0015	.0610	67
							1/16	.0625	58	.0015	.0640	50
.086	56	UNC	.0667	83.2	.0737	53.0	#51	.0670	82	.0017	.0687	75
							#50	.0700	69	.0017	.0717	62
							#49	.0730	56	.0017	.0747	49
.086	64	UNF	.0691	83.3	.0753	52.7	#50	.0700	79	.0017	.0717	70
							#49	.0730	64	.0017	.0747	56
.099	48	UNC	.0764	83.5	.0845	53.6	#48	.0760	85	.0019	.0779	78
							5/64	.0781	77	.0019	.0800	70
							#47	.0785	76	.0019	.0804	69
							#46	.0810	67	.0019	.0829	60
							#45	.0820	63	.0019	.0839	56
.099	56	UNF	.0797	83.2	.0865	53.9	#46	.0810	78	.0019	.0829	69
							#45	.0820	73	.0019	.0839	65
							#44	.0860	56	.0019	.0879	48
.112	40	UNC	.0849	83.4	.0939	55.7	#44	.0860	80	.0019	.0879	74
							#43	.0890	71	.0020	.0910	65
							#42	.0935	57	.0020	.0955	51
							3/32	.0938	56	.0020	.0958	50
.112	48	UNF	.0894	83.5	.0968	56.2	#43	.0890	85	.0020	.0910	78
							#42	.0935	68	.0020	.0955	61
							3/32	.0938	67	.0020	.0958	60
							#41	.0960	59	.0020	.0980	52
.125	40	UNC	.0979	83.4	.1062	57.9	#40	.0980	83	.0023	.1003	76
							#39	.0995	79	.0023	.1018	71
							#38	.1015	72	.0023	.1038	65
							#37	.1040	65	.0023	.1063	58
.125	44	UNF	.1004	83.3	.1079	57.9	#38	.1015	80	.0023	.1038	72
							#37	.1040	71	.0023	.1063	63
							#36	.1065	63	.0023	.1088	55
.138	32	UNC	.104	83.8	.114	59.1	#37	.1040	84	.0023	.1063	78
							#36	.1065	78	.0023	.1088	72
							7/64	.1094	70	.0026	.1120	64
							#35	.1100	69	.0026	.1126	63
							#34	.1110	67	.0026	.1136	60
							#33	.1130	62	.0026	.1156	55
.138	40	UNF	.111	83.1	.119	58.5	#34	.1110	83	.0026	.1136	75
							#33	.1130	77	.0026	.1156	69
							#32	.1160	68	.0026	.1186	60
.164	32	UNC	.130	83.8	.139	61.6	#29	.1360	69	.0029	.1389	62
.164	36	UNF	.134	83.1	.142	61.0	#29	.1360	78	.0029	.1389	70
							#28	.1405	65	.0029	.1434	57
							9/64	.1406	65	.0029	.1435	57
.190	24	UNC	.145	83.1	.156	62.8	#27	.1440	85	.0032	.1472	79
							#26	.1470	79	.0032	.1502	74
							#25	.1495	75	.0032	.1527	69
							#24	.1520	70	.0032	.1552	64
							#23	.1540	66	.0032	.1572	61
.190	32	UNF	.156	83.8	.164	64.0	5/32	.1562	83	.0032	.1594	75
							#22	.1570	81	.0032	.1602	73
							#21	.1590	76	.0032	.1622	68
							#20	.1610	71	.0032	.1642	64
.216	24	UNC	.171	83.1	.181	64.7	11/64	.1719	82	.0035	.1754	75
							#17	.1730	79	.0035	.1765	73
							#16	.1770	72	.0035	.1805	66
							#15	.1800	67	.0035	.1835	60
.216	28	UNF	.177	84.1	.186	64.7	#16	.1770	84	.0035	.1805	77
							#15	.1800	78	.0035	.1835	70
							#14	.1820	73	.0035	.1855	66
							#13	.1850	67	.0035	.1885	59
.216	32	UNEF	.182	83.8	.190	64.0	#14	.1820	84	.0035	.1855	75
							#13	.1850	76	.0035	.1885	68
							3/16	.1875	70	.0035	.1910	62
							#12	.1890	67	.0035	.1925	58

See footnotes at end of table.

TABLE A3.1. *Tap drill sizes, Unified screw threads, classes 1B and 2B*—Continued

Thread size	Threads per inch	Designation	Classes 1B and 2B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			in		in		in	in		in	in	
.250	20	UNC	.196	83.1	.207	66.2	#9	.1960	83	.0038	.1998	77
							#8	.1990	79	.0038	.2028	73
							#7	.2010	75	.0038	.2048	70
							13/64	.2031	72	.0038	.2069	66
							#6	.2040	71	.0038	.2078	65
							#5	.2055	69	.0038	.2093	63
.250	28	UNF	.211	84.1	.220	64.7	#3	.2130	80	.0038	.2168	72
							7/32	.2188	67	.0038	.2226	59
.250	32	UNEF	.216	83.8	.224	64.0	7/32	.2188	77	.0038	.2226	67
							#2	.2210	71	.0038	.2248	62
.250	36	UNS	.220	83.1	.226	66.5	#2	.2210	80	.0038	.2248	70
.3125	18	UNC	.252	83.8	.265	65.8	F	.2570	77	.0038	.2608	72
							G	.2610	71	.0041	.2651	66
.3125	20	UN	.258	83.9	.270	65.4	F	.2570	85	.0038	.2608	80
							G	.2610	79	.0041	.2651	73
							H	.2660	72	.0041	.2701	65
.3125	24	UNF	.267	84.1	.277	65.6	H	.2660	86	.0041	.2701	78
							I	.2720	75	.0041	.2761	67
							J	.2770	66	.0041	.2811	58
.3125	28	UN	.274	83.0	.282	65.7	J	.2770	77	.0041	.2811	68
							K	.2810	68	.0042	.2852	59
							9/32	.2812	67	.0042	.2854	58
.3125	32	UNEF	.279	82.5	.286	65.3	K	.2810	78	.0042	.2852	67
							9/32	.2812	77	.0042	.2854	67
.3125	36	UNS	.282	84.5	.289	65.1	7.25 mm	.2854	75	.0042	.2896	63
.375	16	UNC	.307	83.8	.321	66.5	5/16	.3125	77	.0044	.3169	72
							O	.3160	73	.0044	.3204	67
.375	20	UN	.321	83.1	.332	66.2	P	.3230	80	.0044	.3274	73
							Q	.3320	66	.0044	.3364	59
.375	24	UNF	.330	83.1	.340	64.7	Q	.3320	79	.0044	.3364	71
							R	.3390	67	.0044	.3434	58
.375	28	UN	.336	84.1	.345	64.7	R	.3390	78	.0044	.3434	68
							11/32	.3438	67	.0045	.3483	58
.375	32	UNEF	.341	83.8	.349	64.0	11/32	.3438	77	.0045	.3483	66
							S	.3480	67	.0045	.3525	55
.375	36	UNS	.345	83.1	.352	63.7	S	.3480	75	.0045	.3525	62
.4375	14	UNC	.360	83.5	.376	66.3	T	.3580	86	.0046	.3626	81
							23/64	.3594	84	.0046	.3640	79
.4375	16	UN	.370	83.1	.384	65.9	3/8	.3750	77	.0046	.3796	71
							V	.3770	75	.0046	.3816	69
.4375	20	UNF	.383	83.9	.395	65.4	W	.3860	79	.0046	.3906	72
							25/64	.3906	72	.0046	.3952	65
.4375	28	UNEF	.399	83.0	.407	65.7	Y	.4040	72	.0046	.4086	62
.4375	32	UN	.404	82.5	.411	65.3	Y	.4040	83	.0046	.4086	71
							13/32	.4062	77	.0046	.4108	66
.500	12	UNS	.410	83.1	.428	66.5	Z	.4130	80	.0047	.4177	76
							27/64	.4219	72	.0047	.4266	68
.500	13	UNC	.417	83.1	.434	66.0	27/64	.4219	78	.0047	.4266	73
.500	16	UN	.432	83.8	.446	66.5	7/16	.4375	77	.0047	.4422	71
.500	20	UNF	.446	83.1	.457	66.2	29/64	.4531	72	.0047	.4578	65
.500	28	UNEF	.461	84.1	.470	64.7	15/32	.4688	67	.0048	.4736	57
.500	32	UN	.466	83.8	.474	64.0	15/32	.4688	77	.0048	.4736	65
.5625	12	UNC	.472	83.6	.490	67.0	15/32	.4688	87	.0048	.4736	82
							31/64	.4844	72	.0048	.4892	68
.5625	16	UN	.495	83.1	.509	65.9	1/2	.5000	77	.0048	.5048	71
							0.5062	.5062	69	.0048	.5110	63
.5625	18	UNF	.502	83.8	.515	65.8	1/2	.5000	87	.0048	.5048	80
							0.5062	.5062	78	.0048	.5110	71
.5625	20	UN	.508	83.9	.520	65.4	33/64	.5156	72	.0048	.5204	65
.5625	24	UNEF	.517	84.1	.527	65.6	33/64	.5156	87	.0048	.5204	78
							0.5203	.5203	78	.0048	.5251	69
.5625	28	UN	.524	83.0	.532	65.7	17/32	.5312	67	.0049	.5361	57
							0.5263	.5263	78	.0049	.5312	67
.5625	32	UN	.529	82.5	.536	65.3	17/32	.5312	77	.0049	.5361	65
.625	11	UNC	.527	83.0	.546	66.9	17/32	.5312	79	.0049	.5361	75
.625	12	UN	.535	83.1	.553	66.5	35/64	.5469	72	.0049	.5518	68
.625	16	UN	.557	83.8	.571	66.5	9/16	.5625	77	.0049	.5674	71
							0.5687	.5687	69	.0049	.5736	63
.625	18	UNF	.565	83.1	.578	65.1	9/16	.5625	87	.0049	.5674	80
							0.5687	.5687	78	.0049	.5736	71
.625	20	UN	.571	83.1	.582	66.2	37/64	.5781	72	.0049	.5830	65
.625	24	UNEF	.580	83.1	.590	64.7	37/64	.5781	87	.0049	.5830	78
							0.5828	.5828	78	.0049	.5877	69
.625	28	UN	.586	84.1	.595	64.7	19/32	.5938	67	.0049	.5987	57
.625	32	UN	.591	83.8	.599	64.0	19/32	.5938	77	.0049	.5987	65

See footnotes at end of table.

Table A3.1. *Tap drill sizes, Unified screw threads, classes 1B and 2B*—Continued

Thread size	Threads per inch	Designation	Classes 1B and 2B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size	Drill size	Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
.6875	12	UN	.597	83.6	.615	67.0	19/32	.5938	87	.0049	.5987	82
							39/64	.6094	72	.0049	.6143	68
.6875	16	UN	.620	83.1	.634	65.9	5/8	.6250	77	.0050	.6300	71
.6875	20	UN	.633	83.9	.645	65.4	41/64	.6406	72	.0050	.6456	65
.6875	24	UNEF	.642	84.1	.652	65.6	41/64	.6406	87	.0050	.6456	77
.6875	28	UN	.649	83.0	.657	65.7	21/32	.6562	67	.0050	.6612	57
.6875	32	UN	.654	82.5	.661	65.3	21/32	.6562	77	.0050	.6612	65
.750	10	UNC	.642	83.1	.663	67.0	41/64	.6406	84	.0050	.6456	80
							21/32	.6562	72	.0050	.6612	68
.750	12	UN	.660	83.1	.678	66.5	21/32	.6562	87	.0050	.6612	82
							43/64	.6719	72	.0050	.6769	68
.750	16	UNF	.682	83.8	.696	66.5	11/16	.6875	77	.0050	.6925	71
.750	20	UNEF	.696	83.1	.707	66.2	45/64	.7031	72	.0051	.7082	64
.750	28	UN	.711	84.1	.720	64.7	23/32	.7188	67	.0051	.7239	56
.750	32	UN	.716	83.8	.724	64.0	23/32	.7188	77	.0051	.7239	64
.8125	12	UN	.722	83.6	.740	67.0	47/64	.7344	72	.0051	.7395	67
.8125	16	UN	.745	83.1	.759	65.9	3/4	.7500	77	.0052	.7552	71
.8125	20	UNEF	.758	83.9	.770	65.4	49/64	.7656	72	.0052	.7708	64
.8125	28	UN	.774	83.0	.782	65.7	25/32	.7812	67	.0052	.7864	56
.8125	32	UN	.779	82.5	.786	65.3	25/32	.7812	77	.0052	.7864	64
.875	9	UNC	.755	83.1	.778	67.2	49/64	.7656	76	.0052	.7708	72
.875	12	UN	.785	83.1	.803	66.5	25/32	.7812	87	.0052	.7864	82
							51/64	.7969	72	.0052	.8021	67
.875	14	UNF	.798	83.0	.814	65.7	51/64	.7969	84	.0052	.8021	79
							0.8024	.8024	78	.0052	.8076	73
							13/16	.8125	67	.0052	.8177	62
.875	16	UN	.807	83.8	.821	66.5	13/16	.8125	77	.0053	.8178	70
.875	20	UNEF	.821	83.1	.832	66.2	53/64	.8281	72	.0054	.8335	64
.875	28	UN	.836	84.1	.845	64.7	27/32	.8438	67	.0055	.8493	55
.875	32	UN	.841	83.8	.849	64.0	27/32	.8438	77	.0055	.8493	63
.9375	12	UN	.847	83.6	.865	67.0	27/32	.8438	87	.0055	.8493	81
							55/64	.8594	72	.0056	.8650	67
.9375	16	UN	.870	83.1	.884	65.9	7/8	.8750	77	.0057	.8807	70
.9375	20	UNEF	.883	83.9	.895	65.4	57/64	.8906	72	.0059	.8965	63
.9375	28	UN	.899	83.0	.907	65.7	29/32	.9062	67	.0060	.9122	55
.9375	32	UN	.904	82.5	.911	65.3	29/32	.9062	77	.0060	.9122	62
1.000	8	UNC	.865	83.1	.890	67.7	55/64	.8594	87	.0059	.8653	83
							7/8	.8750	77	.0059	.8809	73
1.000	12	UNF	.910	83.1	.928	66.5	29/32	.9062	87	.0060	.9122	81
							59/64	.9219	72	.0060	.9279	67
1.000	14	UNS	.923	83.0	.938	66.8	59/64	.9219	84	.0060	.9279	78
							0.9274	.9274	78	.0061	.9335	72
1.000	16	UN	.932	83.8	.946	66.5	15/16	.9375	77	.0062	.9437	69
1.000	20	UNEF	.946	83.1	.957	66.2	61/64	.9531	72	.0063	.9594	63
1.000	28	UN	.961	84.1	.970	64.7	31/32	.9688	67	.0065	.9753	53
1.000	32	UN	.966	83.8	.974	64.0	31/32	.9688	77	.0065	.9753	61
1.0625	8	UN	.927	83.4	.952	68.0	59/64	.9219	87	.0060	.9279	83
							0.9274	.9274	83	.0061	.9335	79
							15/16	.9375	77	.0062	.9437	73
1.0625	12	UN	.972	83.6	.990	67.0	31/32	.9688	87	.0065	.9753	81
							63/64	.9844	72	.0067	.9911	66
1.0625	16	UN	.995	83.1	1.009	65.9	1	1.0000	77	.0069	1.0069	68
1.0625	18	UNEF	1.002	83.8	1.015	65.8	1	1.0000	87	.0069	1.0069	77
1.0625	20	UN	1.008	83.9	1.020	65.4	1 1/64	1.0156	72	.0070	1.0226	61
1.0625	28	UN	1.024	83.0	1.032	65.7	1 1/32	1.0312	67	.0071	1.0383	52
1.125	7	UNC	.970	83.5	.998	68.4	31/32	.9688	84	.0062	.9750	81
							63/64	.9844	76	.0067	.9911	72
1.125	8	UN	.990	83.1	1.015	67.7	1	1.0000	77	.0069	1.0069	73
1.125	12	UNF	1.035	83.1	1.053	66.5	1 1/32	1.0312	87	.0071	1.0383	80
							1 3/64	1.0469	72	.0072	1.0541	65
1.125	16	UN	1.057	83.8	1.071	66.5	1 1/16	1.0625	77	.0074	1.0699	68
1.125	18	UNEF	1.065	83.1	1.078	65.1	1 1/16	1.0625	87	- - -	- - -	- - -
							1 5/64	1.0781	65	- - -	- - -	- - -
1.125	20	UN	1.071	83.1	1.082	66.2	1 5/64	1.0781	72	- - -	- - -	- - -
1.125	28	UN	1.086	84.1	1.095	64.7	1 3/32	1.0938	67	- - -	- - -	- - -
1.1875	8	UN	1.052	83.4	1.077	68.0	1 1/16	1.0625	77	- - -	- - -	- - -
1.1875	12	UN	1.097	83.6	1.115	67.0	1 3/32	1.0938	87	- - -	- - -	- - -
1.1875	16	UN	1.120	83.1	1.134	65.9	1 1/8	1.1250	77	- - -	- - -	- - -
1.1875	18	UNEF	1.127	83.8	1.140	65.8	1 1/8	1.1250	87	- - -	- - -	- - -
							1 9/64	1.1406	65	- - -	- - -	- - -
1.1875	20	UN	1.133	83.9	1.145	65.4	1 9/64	1.1406	72	- - -	- - -	- - -
1.1875	28	UN	1.149	83.0	1.157	65.7	1 5/32	1.1562	67	- - -	- - -	- - -
1.250	7	UNC	1.095	83.5	1.123	68.4	1 3/32	1.0938	84	- - -	- - -	- - -
1.250	8	UN	1.115	83.1	1.140	67.7	1 1/8	1.1250	77	- - -	- - -	- - -
1.250	12	UNF	1.160	83.1	1.178	66.5	1 5/32	1.1562	87	- - -	- - -	- - -
							1 11/64	1.1719	72	- - -	- - -	- - -
1.250	16	UN	1.182	83.8	1.196	66.5	1 3/16	1.1875	77	- - -	- - -	- - -
1.250	18	UNEF	1.190	83.1	1.203	65.1	1 3/16	1.1875	87	- - -	- - -	- - -
							1 13/64	1.2031	65	- - -	- - -	- - -
1.250	20	UN	1.196	83.1	1.207	66.2	1 13/64	1.2031	72	- - -	- - -	- - -
1.250	28	UN	1.211	84.1	1.220	64.7	1 7/32	1.2188	67	- - -	- - -	- - -

See footnotes at end of table.

Thread size	Threads per inch	Designation	Classes 1B and 2B minor diameter, internal threads				Tap drills and percent basic thread height					
			Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
1.3125	8	UN	1.177	83.4	1.202	68.0	1 11/64	1.1719	87	--------	--------	--------
							1 3/16	1.1875	77	--------	--------	--------
1.3125	12	UN	1.222	83.6	1.240	67.0	1 7/32	1.2188	87	--------	--------	--------
							1 15/64	1.2344	72	--------	--------	--------
1.3125	16	UN	1.245	83.1	1.259	65.9	1 1/4	1.2500	77	--------	--------	--------
1.3125	18	UNEF	1.252	83.8	1.265	65.8	1 1/4	1.2500	87	--------	--------	--------
							1 17/64	1.2656	65	--------	--------	--------
1.3125	20	UN	1.258	83.9	1.270	65.4	1 17/64	1.2656	72	--------	--------	--------
1.3125	28	UN	1.274	83.0	1.282	65.7	1 9/32	1.2812	67	--------	--------	--------
1.375	6	UNC	1.195	83.1	1.225	69.3	1 3/16	1.1875	87	--------	--------	--------
							1 13/64	1.2031	79	--------	--------	--------
							1 15/64	1.2188	72	--------	--------	--------
1.375	8	UN	1.240	83.1	1.265	67.7	1 15/64	1.2344	87	--------	--------	--------
							1 1/4	1.2500	77	--------	--------	--------
1.375	12	UNF	1.285	83.1	1.303	66.5	1 9/32	1.2812	87	--------	--------	--------
							1 19/64	1.2969	72	--------	--------	--------
1.375	16	UN	1.307	83.8	1.321	66.5	1 5/16	1.3125	77	--------	--------	--------
1.375	18	UNEF	1.315	83.1	1.328	65.1	1 5/16	1.3125	87	--------	--------	--------
							1 21/64	1.3281	65	--------	--------	--------
1.375	20	UN	1.321	83.1	1.332	66.2	1 21/64	1.3281	72	--------	--------	--------
1.375	28	UN	1.336	84.1	1.345	64.7	1 11/32	1.3438	67	--------	--------	--------
1.4375	6	UN	1.257	83.4	1.288	69.1	1 17/64	1.2656	79	--------	--------	--------
							1 9/32	1.2812	72	--------	--------	--------
1.4375	8	UN	1.302	83.4	1.327	68.0	1 19/64	1.2969	87	--------	--------	--------
							1 5/16	1.3125	77	--------	--------	--------
1.4375	12	UN	1.347	83.6	1.365	67.0	1 11/32	1.3438	87	--------	--------	--------
							1 23/64	1.3594	72	--------	--------	--------
1.4375	16	UN	1.370	83.1	1.384	65.9	1 3/8	1.3750	77	--------	--------	--------
1.4375	18	UNEF	1.377	83.8	1.390	65.8	1 3/8	1.3750	87	--------	--------	--------
1.4375	20	UN	1.383	83.9	1.395	65.4	1 25/64	1.3906	72	--------	--------	--------
1.4375	28	UN	1.399	83.0	1.407	65.7	1 13/32	1.4062	67	--------	--------	--------
1.500	6	UNC	1.320	83.1	1.350	69.3	1 5/16	1.3125	87	--------	--------	--------
							1 21/64	1.3281	79	--------	--------	--------
1.500	8	UN	1.365	83.1	1.390	67.7	1 23/64	1.3594	87	--------	--------	--------
							1 3/8	1.3750	77	--------	--------	--------
1.500	12	UNF	1.410	83.1	1.428	66.5	1 13/32	1.4062	87	--------	--------	--------
							1 27/64	1.4219	72	--------	--------	--------
1.500	16	UN	1.432	83.8	1.446	66.5	1 7/16	1.4375	77	--------	--------	--------
1.500	18	UNEF	1.440	83.1	1.452	66.5	1 7/16	1.4375	87	--------	--------	--------
1.500	20	UN	1.446	83.1	1.457	66.2	1 29/64	1.4531	72	--------	--------	--------
1.500	28	UN	1.461	84.1	1.470	64.7	1 15/32	1.4688	67	--------	--------	--------
1.5625	6	UN	1.382	83.4	1.413	69.1	1 25/64	1.3906	79	--------	--------	--------
							1 13/32	1.4062	72	--------	--------	--------
1.5625	8	UN	1.427	83.4	1.452	68.0	1 27/64	1.4219	87	--------	--------	--------
							1 7/16	1.4375	77	--------	--------	--------
1.5625	12	UN	1.472	83.6	1.490	67.0	1 15/32	1.4688	87	--------	--------	--------
							1 31/64	1.4844	72	--------	--------	--------
1.5625	16	UN	1.495	83.1	1.509	65.9	1 1/2	1.5000	77	--------	--------	--------
1.5625	18	UNEF	1.502	83.8	1.515	65.8	1 1/2	1.5000	87	--------	--------	--------
							1 33/64	1.5156	65	--------	--------	--------
1.5625	20	UN	1.508	83.9	1.520	65.4	1 33/64	1.5156	72	--------	--------	--------
1.625	6	UN	1.445	83.1	1.475	69.3	1 29/64	1.4531	79	--------	--------	--------
							1 15/32	1.4688	72	--------	--------	--------
1.625	8	UN	1.490	83.1	1.515	67.7	1 31/64	1.4844	87	--------	--------	--------
							1 1/2	1.5000	77	--------	--------	--------
1.625	12	UN	1.535	83.1	1.553	66.5	1 17/32	1.5312	87	--------	--------	--------
							1 35/64	1.5469	72	--------	--------	--------
1.625	16	UN	1.557	83.8	1.571	66.5	1 9/16	1.5625	77	--------	--------	--------
1.625	18	UNEF	1.565	83.1	1.578	65.1	1 9/16	1.5625	87	--------	--------	--------
							1 37/64	1.5781	65	--------	--------	--------
1.625	20	UN	1.571	83.1	1.582	66.2	1 37/64	1.5781	72	--------	--------	--------
1.6875	6	UN	1.507	83.4	1.538	69.1	1 1/2	1.5000	87	--------	--------	--------
							1 33/64	1.5156	79	--------	--------	--------
							1 17/32	1.5312	72	--------	--------	--------
1.6875	8	UN	1.552	83.4	1.577	68.0	1 9/16	1.5625	77	--------	--------	--------
1.6875	12	UN	1.597	83.6	1.615	67.0	1 19/32	1.5938	87	--------	--------	--------
							1 39/64	1.6094	72	--------	--------	--------
1.6875	16	UN	1.620	83.1	1.634	65.9	1 5/8	1.6250	77	--------	--------	--------
1.6875	18	UNEF	1.627	83.8	1.640	65.8	1 5/8	1.6250	87	--------	--------	--------
							1 41/64	1.6406	65	--------	--------	--------
1.6875	20	UN	1.633	83.9	1.645	65.4	1 41/64	1.6406	72	--------	--------	--------
1.750	5	UNC	1.534	83.1	1.568	70.1	1 17/32	1.5312	84	--------	--------	--------
							1 35/64	1.5469	78	--------	--------	--------
1.750	6	UN	1.570	83.1	1.600	69.3	1 9/16	1.5625	87	--------	--------	--------
							1 37/64	1.5781	79	--------	--------	--------
							1 19/32	1.5938	72	--------	--------	--------
1.750	8	UN	1.615	83.1	1.640	67.7	1 39/64	1.6094	87	--------	--------	--------
							1 5/8	1.6250	77	--------	--------	--------
							1 41/64	1.6406	67	--------	--------	--------
1.750	12	UN	1.660	83.1	1.678	66.5	1 21/32	1.6562	87	--------	--------	--------
							1 43/64	1.6719	72	--------	--------	--------
1.750	16	UN	1.682	83.8	1.696	66.5	1 11/16	1.6875	77	--------	--------	--------
1.750	20	UN	1.696	83.1	1.707	66.2	1 45/64	1.7031	72	--------	--------	--------

See footnotes at end of table.

Table A3.1. *Tap drill sizes, Unified screw threads, classes 1B and 2B*—Continued

Thread size	Threads per inch	Designation	Classes 1B and 2B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			in		in		in	in				
1.8125	6	UN	1.632	83.4	1.663	69.1	1 5/8	1.6250	87			
							1 41/64	1.6406	79			
							1 21/32	1.6562	72			
1.8125	8	UN	1.677	83.4	1.702	68.0	1 43/64	1.6719	87			
							1 11/16	1.6875	77			
1.8125	12	UN	1.722	83.6	1.740	67.0	1 23/32	1.7188	87			
							1 47/64	1.7344	72			
1.8125	16	UN	1.745	83.1	1.759	65.9	1 3/4	1.7500	77			
1.8125	20	UN	1.758	83.9	1.770	65.4	1 49/64	1.7656	72			
1.875	6	UN	1.695	83.1	1.725	69.3	1 45/64	1.7031	79			
							1 23/32	1.7188	72			
1.875	8	UN	1.740	83.1	1.765	67.7	1 3/4	1.7500	77			
1.875	12	UN	1.785	83.1	1.803	66.5	1 25/32	1.7812	87			
							1 51/64	1.7969	72			
1.875	16	UN	1.807	83.8	1.821	66.5	1 13/16	1.8125	77			
1.875	20	UN	1.821	83.1	1.832	66.2	1 53/64	1.8281	72			
1.9375	6	UN	1.757	83.4	1.788	69.1	1 49/64	1.7656	79			
							1 25/32	1.7812	72			
1.9375	8	UN	1.802	83.4	1.827	68.0	1 51/64	1.7969	87			
							1 13/16	1.8125	77			
1.9375	12	UN	1.847	83.6	1.865	67.0	1 27/32	1.8438	87			
							1 55/64	1.8594	72			
1.9375	16	UN	1.870	83.1	1.884	65.9	1 7/8	1.8750	77			
1.9375	20	UN	1.883	83.9	1.895	65.4	1 57/64	1.8906	72			
2.000	4.5	UNC	1.759	83.5	1.795	71.0	1 25/32	1.7812	76			
2.000	6	UN	1.820	83.1	1.850	69.3	1 53/64	1.8281	79			
							1 27/32	1.8438	72			
2.000	8	UN	1.865	83.1	1.890	67.7	1 7/8	1.8750	77			
2.000	12	UN	1.910	83.1	1.928	66.5	1 29/32	1.9062	87			
							1 59/64	1.9219	72			
2.000	16	UN	1.932	83.8	1.946	66.5	1 15/16	1.9375	77			
2.000	20	UN	1.946	83.1	1.957	66.2	1 61/64	1.9531	72			
2.0625	16	UNS	1.995	83.1	2.009	65.9	2	2.0000	77			
2.125	6	UN	1.945	83.1	1.975	69.3	1 61/64	1.9531	79			
							1 31/32	1.9688	72			
2.125	8	UN	1.990	83.1	2.015	67.7	2	2.0000	77			
2.125	12	UN	2.035	83.1	2.053	66.5	2 1/32	2.0312	87			
2.125	16	UN	2.057	83.8	2.071	66.5	2 1/16	2.0625	77			
2.125	20	UN	2.071	83.1	2.082	66.2	2 1/16	2.0625	96			
2.1875	16	UNS	2.120	83.1	2.134	65.9	2 1/8	2.1250	77			
2.250	4.5	UNC	2.090	83.5	2.045	71.0	2	2.0000	87			
							2 1/32	2.0312	76			
2.250	6	UN	2.070	83.1	2.100	69.3	2 1/16	2.0625	87			
2.250	8	UN	2.115	83.1	2.140	67.7	2 1/8	2.1250	77			
2.250	12	UN	2.160	83.1	2.178	66.5	2 5/32	2.1562	87			
2.250	16	UN	2.182	83.8	2.196	66.5	2 3/16	2.1875	77			
2.250	20	UN	2.196	83.1	2.207	66.2	2 3/16	2.1875	96			
2.3125	16	UNS	2.245	83.1	2.259	65.9	2 1/4	2.2500	77			
2.375	6	UN	2.195	83.1	2.226	68.8	2 3/16	2.1875	87			
2.375	8	UN	2.240	83.1	2.265	67.7	2 1/4	2.2500	77			
2.375	12	UN	2.285	83.1	2.303	66.5	58 mm	2.2835	85			
2.375	16	UN	2.307	83.8	2.321	66.5	2 5/16	2.3125	77			
2.375	20	UN	2.321	83.1	2.332	66.2	2 5/16	2.3125	96			
2.4375	16	UNS	2.370	83.1	2.384	65.9	2 3/8	2.3750	77			
2.500	4	UNC	2.229	83.4	2.267	71.7	2 7/32	2.2188	87			
							2 1/4	2.2500	77			
2.500	6	UN	2.320	83.1	2.350	69.3	2 5/16	2.3125	87			
2.500	8	UN	2.365	83.1	2.390	67.7	2 3/8	2.3750	77			
2.500	12	UN	2.410	83.1	2.428	66.5	2 13/32	2.4062	87			
2.500	16	UN	2.432	83.8	2.446	66.5	2 7/16	2.4375	77			
2.500	20	UN	2.446	83.1	2.457	66.2	2 7/16	2.4375	96			
2.625	4	UN	2.354	83.4	2.392	71.7	2 11/32	2.3438	87			
							2 3/8	2.3750	77			
2.625	6	UN	2.445	83.1	2.475	69.3	2 7/16	2.4375	87			
2.625	8	UN	2.490	83.1	2.515	67.7	2 1/2	2.5000	77			
2.625	12	UN	2.535	83.1	2.553	66.5	2 17/32	2.5312	87			
2.625	16	UN	2.557	83.8	2.571	66.5	2 9/16	2.5625	77			
2.625	20	UN	2.571	83.1	2.582	66.2	2 9/16	2.5625	96			
2.750	4	UNC	2.479	83.4	2.517	71.7	2 1/2	2.5000	77			
2.750	6	UN	2.570	83.1	2.600	69.3	2 9/16	2.5625	87			
2.750	8	UN	2.615	83.1	2.640	67.7	2 5/8	2.6250	77			
2.750	12	UN	2.660	83.1	2.678	66.5	2 21/32	2.6562	87			
2.750	16	UN	2.682	83.8	2.696	66.5	2 11/16	2.6875	77			
2.750	20	UN	2.696	83.1	2.707	66.2	2 11/16	2.6875	96			

See footnotes at end of table.

Table A3.1. *Tap drill sizes, Unified screw threads, classes 1B and 2B*—Continued

Thread size	Threads per inch	Designation	Classes 1B and 2B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*				
2.875	4	UN	2.604	83.4	2.642	71.7	2 5/8	2.6250	77	---------	---------	---------
2.875	6	UN	2.695	83.1	2.725	69.3	2 11/16	2.6875	87	---------	---------	---------
2.875	8	UN	2.740	83.1	2.765	67.7	2 3/4	2.7500	77	---------	---------	---------
2.875	12	UN	2.785	83.1	2.803	66.5	2 25/32	2.7812	87	---------	---------	---------
2.875	16	UN	2.807	83.8	2.821	66.5	2 13/16	2.8125	77	---------	---------	---------
2.875	20	UN	2.821	83.1	2.832	66.2	2 13/16	2.8125	96	---------	---------	---------
3.000	4	UNC	2.729	83.4	2.767	71.7	2 3/4	2.7500	77	---------	---------	---------
3.000	6	UN	2.820	83.1	2.850	69.3	2 13/16	2.8125	87	---------	---------	---------
3.000	8	UN	2.865	83.1	2.890	67.7	2 7/8	2.8750	77	---------	---------	---------
3.000	12	UN	2.910	83.1	2.928	66.5	74 mm	2.9134	80	---------	---------	---------
3.000	16	UN	2.932	83.8	2.946	66.5	2 15/16	2.9375	77	---------	---------	---------
3.000	20	UN	2.946	83.1	2.957	66.2	2 15/16	2.9375	96	---------	---------	---------
3.250	4	UNC	2.979	83.4	3.017	71.7	3	3.0000	77	---------	---------	---------
3.500	4	UNC	3.229	83.4	3.267	71.7	3 1/4	3.2500	77	---------	---------	---------
3.750	4	UNC	3.479	83.4	3.517	71.7	3 1/2	3.5000	77	---------	---------	---------

[a] 100% basic thread height = $0.75H$ (values of $0.75H$ are shown in col. 14, table 2.1).

Table A3.2. *Tap drill sizes, Unified screw threads, class 3B*

Thread size	Threads per inch	Designation	Class 3B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
.060	80	UNF	0.0465	83.1	0.0514	52.9	#56	0.0465	83	0.0015	0.0480	74
							3/64	.0469	81	.0015	.0484	71
.073	64	UNC	.0561	83.3	.0623	52.7	#54	.0550	89	.0015	.0565	81
							#53	.0595	67	.0015	.0610	59
.073	72	UNF	.0580	83.1	.0635	52.7	#53	.0595	75	.0015	.0610	67
							1/16	.0625	58	.0015	.0640	50
.086	56	UNC	.0667	83.2	.0737	53.0	#51	.0670	82	.0017	.0687	75
							#50	.0700	69	.0017	.0717	62
							#49	.0730	56	.0017	.0747	49
.086	64	UNF	.0691	83.3	.0753	52.7	#50	.0700	79	.0017	.0717	70
							#49	.0730	64	.0017	.0747	56
.099	48	UNC	.0764	83.5	.0845	53.6	#48	.0760	85	.0019	.0779	78
							5/64	.0781	77	.0019	.0800	70
							#47	.0785	76	.0019	.0804	69
							#46	.0810	67	.0019	.0829	60
							#45	.0820	63	.0019	.0839	56
.099	56	UNF	.0797	83.2	.0865	53.9	#46	.0810	78	.0019	.0829	69
							#45	.0820	73	.0019	.0839	65
							#44	.0860	56	.0019	.0879	48
.112	40	UNC	.0849	83.4	.0939	55.7	#44	.0860	80	.0019	.0879	74
							#43	.0890	71	.0020	.0910	65
							#42	.0935	57	.0020	.0955	51
							3/32	.0938	56	.0020	.0958	50
.112	48	UNF	.0894	83.5	.0968	56.2	#43	.0890	85	.0020	.0910	78
							#42	.0935	68	.0020	.0955	61
							3/32	.0938	67	.0020	.0958	60
							#41	.0960	59	.0020	.0980	52
.125	40	UNC	.0979	83.4	.1062	57.9	#40	.0980	83	.0023	.1003	76
							#39	.0995	79	.0023	.1018	71
							#38	.1015	72	.0023	.1038	65
							#37	.1040	65	.0023	.1063	58
.125	44	UNF	.1004	83.3	.1079	57.9	#38	.1015	80	.0023	.1038	72
							#37	.1049	71	.0023	.1063	63
							#36	.1065	63	.0023	.1088	55
.138	32	UNC	.1040	83.8	.1140	59.1	#37	.1040	84	.0023	.1063	78
							#36	.1065	78	.0023	.1088	72
							7/64	.1094	70	.0026	.1120	64
							#35	.1100	69	.0026	.1126	63
							#34	.1110	67	.0026	.1136	60
							#33	.1130	62	.0026	.1156	55
.138	40	UNF	.1110	83.1	.1186	59.7	#34	.1110	83	.0026	.1136	75
							#33	.1130	77	.0026	.1156	69
							#32	.1160	68	.0026	.1186	60

See footnotes at end of table.

TABLE A3.2. *Tap drill sizes, Unified screw threads, class 3B*—Continued

Thread size	Threads per inch	Designation	Class 3B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
.164	32	UNC	.1300	83.8	.1389	61.8	#29	.1360	69	.0029	.1389	62
							#29	.1360	78	.0029	.1389	70
.164	36	UNF	.1340	83.1	.1416	62.1	#28	.1405	65	.0029	.1434	57
							9/64	.1406	65	.0029	.1435	57
							#27	.1440	85	.0032	.1472	79
							#26	.1470	79	.0032	.1502	74
.190	24	UNC	.1450	83.1	.1555	63.7	#25	.1495	75	.0032	.1527	69
							#24	.1520	70	.0032	.1552	64
							#23	.1540	66	.0032	.1572	61
							5/32	.1562	83	.0032	.1594	75
.190	32	UNF	.1560	83.8	.1641	63.8	#22	.1570	81	.0032	.1602	73
							#21	.1590	76	.0032	.1622	68
							#20	.1610	71	.0032	.1642	64
							11/64	.1719	82	.0035	.1754	75
.216	24	UNC	.1710	83.1	.1807	65.2	#17	.1730	79	.0035	.1765	73
							#16	.1770	72	.0035	.1805	66
							#15	.1800	67	.0035	.1835	60
							#16	.1770	84	.0035	.1805	77
.216	28	UNF	.1770	84.1	.1857	65.3	#15	.1800	78	.0035	.1835	70
							#14	.1820	73	.0035	.1855	66
							#13	.1850	67	.0035	.1885	59
							#14	.1820	84	.0035	.1855	75
.216	32	UNEF	.1820	83.8	.1895	65.3	#13	.1850	76	.0035	.1885	68
							3/16	.1875	70	.0035	.1910	62
							#12	.1890	67	.0035	.1925	58
							#9	.1960	83	.0038	.1998	77
							#8	.1990	79	.0038	.2028	73
.250	20	UNC	.1960	83.1	.2067	66.7	#7	.2010	75	.0038	.2048	70
							13/64	.2031	72	.0038	.2069	66
							#6	.2040	71	.0038	.2078	65
							#5	.2055	69	.0038	.2093	63
.250	28	UNF	.2110	84.1	.2190	66.8	#3	.2130	80	.0038	.2168	72
							7/32	.2188	67	.0038	.2226	59
.250	32	UNEF	.2160	83.8	.2229	66.8	7/32	.2188	77	.0038	.2226	67
							#2	.2210	71	.0038	.2248	62
.3125	18	UNC	.2520	83.8	.2630	68.6	F	.2570	77	.0038	.2608	72
							G	.2610	71	.0041	.2651	66
							F	.2570	85	.0038	.2608	80
.3125	20	UN	.2580	83.9	.2680	68.5	G	.2610	79	.0041	.2651	73
							H	.2660	72	.0041	.2701	65
.3125	24	UNF	.2670	84.1	.2754	68.5	H	.2660	86	.0041	.2701	78
							I	.2720	75	.0041	.2761	67
.3125	28	UN	.2740	83.0	.2807	68.5	J	.2770	77	.0041	.2811	68
.3125	32	UNEF	.2790	82.5	.2847	68.5	K	.2810	78	.0042	.2852	67
							9/32	.2812	77	.0042	.2854	67
.375	16	UNC	.3070	83.8	.3182	70.0	5/16	.3125	77	.0044	.3169	72
							O	.3160	73	.0044	.3204	67
.375	20	UN	.3210	83.1	.3297	69.7	P	.3230	80	.0044	.3274	73
.375	24	UNF	.3300	83.1	.3372	69.8	Q	.3320	79	.0044	.3364	71
.375	28	UN	.3360	84.1	.3426	69.8	R	.3390	78	.0044	.3434	68
.375	32	UNEF	.3410	83.8	.3469	69.2	11/32	.3438	77	.0045	.3483	66
.4375	14	UNC	.3600	83.5	.3717	70.9	T	.3580	86	.0046	.3626	81
							23/64	.3594	84	.0046	.3640	79
.4375	16	UN	.3700	83.1	.3800	70.8	3/8	.3750	77	.0046	.3796	71
							V	.3770	75	.0046	.3816	69
.4375	20	UNF	.3830	83.9	.3916	70.7	W	.3860	79	.0046	.3906	72
							25/64	.3906	72	.0046	.3952	65
.4375	28	UNEF	.3990	83.0	.4051	69.8	Y	.4040	72	.0046	.4086	62
.4375	32	UN	.4040	82.5	.4094	69.2	Y	.4040	83	.0046	.4086	71
							13/32	.4062	77	.0046	.4108	66
.500	12	UNS	.4100	83.1	.4223	71.8	Z	.4130	80	.0047	.4177	76
							27/64	.4219	72	.0047	.4266	68
.500	13	UNC	.4170	83.1	.4284	71.7	27/64	.4219	78	.0047	.4266	73
.500	16	UN	.4320	83.8	.4419	71.6	7/16	.4375	77	.0047	.4422	71
.500	20	UNF	.4460	83.1	.4537	71.3	29/64	.4531	72	.0047	.4578	65
.500	28	UNEF	.4610	84.1	.4676	69.8	11.8 mm	.4646	76	.0047	.4693	66
.500	32	UN	.4660	83.8	.4719	69.2	15/32	.4688	77	.0048	.4736	65
.5625	12	UNC	.4720	83.6	.4843	72.2	15/32	.4688	87	.0048	.4736	82
							31/64	.4844	72	.0048	.4892	68
.5625	16	UN	.4950	83.1	.5040	72.1	1/2	.5000	77	.0048	.5048	71
.5625	18	UNF	.5020	83.8	.5106	71.9	1/2	.5000	87	.0048	.5048	80
							0.5062	.5062	78	.0048	.5110	71
.5625	20	UN	.5080	83.9	.5162	71.3	33/64	.5156	72	.0048	.5204	65
.5625	24	UNEF	.5170	84.1	.5244	70.4	33/64	.5156	87	.0048	.5204	78
							0.5203	.5203	78	.0048	.5251	69
.5625	28	UN	.5240	83.0	.5301	69.8	0.5263	.5263	78	.0049	.5312	67
.5625	32	UN	.5290	82.5	.5344	69.2	17/32	.5312	77	.0049	.5361	65

See footnotes at end of table.

TABLE A3.2. *Tap drill sizes, Unified screw threads, class 3B*—Continued

Thread size	Threads per inch	Designation	Class 3B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
.625	11	UNC	.5270	83.0	.5391	72.7	17/32	.5312	79	.0049	.5361	75
.625	12	UN	.5350	83.1	.5463	72.7	35/64	.5469	72	.0049	.5518	68
.625	16	UN	.5570	83.8	.5662	72.4	9/16	.5625	77	.0049	.5674	71
.625	18	UNF	.5650	83.1	.5730	72.1	9/16	.5625	87	.0049	.5674	80
							0.5687	.5687	78	.0049	.5736	71
.625	20	UN	.5710	83.1	.5787	71.3	37/64	.5781	72	.0049	.5830	65
.625	24	UNEF	.5800	83.1	.5869	70.4	37/64	.5781	87	.0049	.5830	78
							0.5828	.5828	78	.0049	.5877	69
.625	28	UN	.5860	84.1	.5926	69.8	0.5828	.5828	91	.0049	.5877	80
.625	32	UN	.5910	83.8	.5969	69.2	19/32	.5938	77	.0049	.5987	65
.6875	12	UN	.5970	83.6	.6085	73.0	19/32	.5938	87	.0049	.5987	82
.6875	16	UN	.6200	83.1	.6284	72.8	5/8	.6250	77	.0050	.6300	71
.6875	20	UN	.6330	83.9	.6412	71.3	41/64	.6406	72	.0050	.6456	65
.6875	24	UNEF	.6420	84.1	.6494	70.4	41/64	.6406	87	.0050	.6456	77
.6875	28	UN	.6490	83.0	.6551	69.8	16.5 mm	.6496	82	.0050	.6546	71
.6875	32	UN	.6540	82.5	.6594	69.2	21/32	.6562	77	.0050	.6612	65
.750	10	UNC	.6420	83.1	.6545	73.5	41/64	.6406	84	.0050	.6456	80
.750	12	UN	.6600	83.1	.6707	73.3	21/32	.6562	87	.0050	.6612	82
.750	16	UNF	.6820	83.8	.6908	72.9	11/16	.6875	77	.0050	.6925	71
.750	20	UNEF	.6960	83.1	.7037	71.3	45/64	.7031	72	.0051	.7082	64
.750	28	UN	.7110	84.1	.7176	69.8	18 mm	.7087	89	.0051	.7138	78
.750	32	UN	.7160	83.8	.7219	69.2	23/32	.7188	77	.0051	.7239	64
.8125	12	UN	.7220	83.6	.7329	73.5	18.5 mm	.7283	78	.0051	.7334	73
.8125	16	UN	.7450	83.1	.7533	72.9	3/4	.7500	77	.0052	.7552	71
.8125	20	UNEF	.7580	83.9	.7662	71.3	49/64	.7656	72	.0052	.7708	64
.8125	28	UN	.7740	83.0	.7801	69.8	19.75 mm	.7776	75	.0052	.7828	64
.8125	32	UN	.7790	82.5	.7844	69.2	25/32	.7812	77	.0052	.7864	64
.875	9	UNC	.7550	83.1	.7681	74.1	49/64	.7656	76	.0052	.7708	72
.875	12	UN	.7850	83.1	.7952	73.7	25/32	.7812	87	.0052	.7864	82
.875	14	UNF	.7980	83.0	.8068	73.5	51/64	.7969	84	.0052	.8021	79
							0.8024	.8024	78	.0052	.8076	73
.875	16	UN	.8070	83.8	.8158	72.9	13/16	.8125	77	.0053	.8178	70
.875	20	UNEF	.8210	83.1	.8287	71.3	53/64	.8281	72	.0054	.8335	64
.875	28	UN	.8360	84.1	.8426	69.8	21.25 mm	.8366	83	.0054	.8420	71
.875	32	UN	.8410	83.8	.8469	69.2	27/32	.8438	77	.0055	.8493	63
.9375	12	UN	.8470	83.6	.8575	73.9	27/32	.8438	87	.0055	.8493	81
.9375	16	UN	.8700	83.1	.8783	72.9	7/8	.8750	77	.0057	.8807	70
.9375	20	UNEF	.8830	83.9	.8912	71.3	57/64	.8906	72	.0059	.8965	63
.9375	28	UN	.8990	83.0	.9051	69.8	22.75 mm	.8957	90	.0060	.9017	77
.9375	32	UN	.9040	82.5	.9094	69.2	29/32	.9062	77	.0060	.9122	62
1.000	8	UNC	.8650	83.1	.8797	74.1	55/64	.8594	87	.0059	.8653	83
							7/8	.8750	77	.0059	.8809	73
1.000	12	UNF	.9100	83.1	.9198	74.1	29/32	.9062	87	.0060	.9122	81
1.000	14	UNS	.9230	83.0	.9315	73.8	59/64	.9219	84	.0060	.9279	78
							0.9274	.9274	78	.0061	.9335	72
1.000	16	UN	.9320	83.8	.9408	72.9	15/16	.9375	77	.0062	.9437	69
1.000	20	UNEF	.9460	83.1	.9537	71.3	61/64	.9531	72	.0063	.9594	63
1.000	28	UN	.9610	84.1	.9676	69.8	24.5 mm	.9645	77	.0064	.9709	63
1.000	32	UN	.9660	83.8	.9719	69.2	31/32	.9688	77	.0065	.9753	61
1.0625	8	UN	.9270	83.4	.9422	74.1	59/64	.9219	87	.0060	.9279	83
							0.9274	.9274	83	.0061	.9335	79
							15/16	.9375	77	.0062	.9437	73
1.0625	12	UN	.9720	83.6	.9823	74.1	31/32	.9688	87	.0065	.9753	81
1.0625	16	UN	.9950	83.1	1.0033	72.9	1	1.0000	77	.0069	1.0069	68
1.0625	18	UNEF	1.0020	83.8	1.0105	72.1	1	1.0000	87	.0069	1.0069	77
1.0625	20	UN	1.0080	83.9	1.0162	71.3	1 1/64	1.0156	72	.0070	1.0226	61
1.0625	28	UN	1.0240	83.0	1.0301	69.8	1 1/32	1.0312	67	.0071	1.0383	52
1.125	7	UNC	.9700	83.5	.9875	74.1	31/32	.9688	84	.0062	.9750	81
							63/64	.9844	76	.0067	.9911	72
1.125	8	UN	.9900	83.1	1.0047	74.1	1	1.0000	77	.0069	1.0069	73
1.125	12	UNF	1.0350	83.1	1.0448	74.1	1 1/32	1.0312	87	.0071	1.0383	80
1.125	16	UN	1.0570	83.8	1.0658	72.9	1 1/16	1.0625	77	.0074	1.0699	68
1.125	18	UNEF	1.0650	83.1	1.0730	72.1	1 1/16	1.0625	87	--------	--------	--------
1.125	20	UN	1.0710	83.1	1.0787	71.3	1 5/64	1.0781	72	--------	--------	--------
1.125	28	UN	1.0860	84.1	1.0926	69.8	1 3/32	1.0938	67	--------	--------	--------
1.1875	8	UN	1.0520	83.4	1.0672	74.1	1 1/16	1.0625	77	--------	--------	--------
1.1875	12	UN	1.0970	83.6	1.1073	74.1	1 3/32	1.0938	87	--------	--------	--------
1.1875	16	UN	1.1200	83.1	1.1283	72.9	1 1/8	1.1250	77	--------	--------	--------
1.1875	18	UNEF	1.1270	83.8	1.1355	72.1	1 1/8	1.1250	87	--------	--------	--------
1.1875	20	UN	1.1330	83.9	1.1412	71.3	1 9/64	1.1406	72	--------	--------	--------
1.1875	28	UN	1.1490	83.0	1.1551	69.8	29.25 mm	1.1516	77	--------	--------	--------
1.250	7	UNC	1.0950	83.5	1.1125	74.1	1 3/32	1.0938	84	--------	--------	--------
1.250	8	UN	1.1150	83.1	1.1297	74.1	1 1/8	1.1250	77	--------	--------	--------
1.250	12	UNF	1.1600	83.1	1.1698	74.1	1 5/32	1.1562	87	--------	--------	--------
1.250	16	UN	1.1820	83.8	1.1908	72.9	1 3/16	1.1875	77	--------	--------	--------
1.250	18	UNEF	1.1900	83.1	1.1980	72.1	1 3/16	1.1875	87	--------	--------	--------
1.250	20	UN	1.1960	83.1	1.2037	71.3	1 13/64	1.2031	72	--------	--------	--------
1.250	28	UN	1.2110	84.1	1.2176	69.8	30.75 mm	1.2106	85	--------	--------	--------

See footnotes at end of table.

TABLE A3.2. *Tap drill sizes, Unified screw threads, class 3B*—Continued

Thread size	Threads per inch	Designation	Class 3B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size	Drill size	Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
1.3125	8	UN	1.1770	83.4	1.1922	74.1	1 11/64	1.1719	87			
							1 3/16	1.1875	77			
1.3125	12	UN	1.2220	83.6	1.2323	74.1	1 7/32	1.2188	87			
1.3125	16	UN	1.2450	83.1	1.2533	72.9	1 1/4	1.2500	77			
1.3125	18	UNEF	1.2520	83.8	1.2605	72.1	1 1/4	1.2500	87			
1.3125	20	UN	1.2580	83.9	1.2662	71.3	1 17/64	1.2656	72			
1.3125	28	UN	1.2740	83.0	1.2801	69.8	32.5 mm	1.2795	71			
1.375	6	UNC	1.1950	83.1	1.2146	74.1	1 3/16	1.1875	87			
							1 13/64	1.2031	79			
1.375	8	UN	1.2400	83.1	1.2547	74.1	1 15/64	1.2344	87			
							1 1/4	1.2500	77			
1.375	12	UNF	1.2850	83.1	1.2948	74.1	1 9/32	1.2812	87			
1.375	16	UN	1.3070	83.8	1.3158	72.9	1 5/16	1.3125	77			
1.375	18	UNEF	1.3150	83.1	1.3230	72.1	1 5/16	1.3125	87			
1.375	20	UN	1.3210	83.1	1.3287	71.3	1 21/64	1.3281	72			
1.375	28	UN	1.3360	84.1	1.3426	69.8	34 mm	1.3386	78			
1.4375	6	UN	1.2570	83.4	1.2771	74.1	1 17/64	1.2656	79			
1.4375	8	UN	1.3020	83.4	1.3172	74.1	1 19/64	1.2969	87			
							1 5/16	1.3125	77			
1.4375	12	UN	1.3470	83.6	1.3573	74.1	1 11/32	1.3438	87			
1.4375	16	UN	1.3700	83.1	1.3783	72.9	1 3/8	1.3750	77			
1.4375	18	UNEF	1.3770	83.8	1.3855	72.1	1 3/8	1.3750	87			
1.4375	20	UN	1.3830	83.9	1.3912	71.3	1 25/64	1.3906	72			
1.4375	28	UN	1.3990	83.0	1.4051	69.8	35.5 mm	1.3976	86			
1.500	6	UNC	1.3200	83.1	1.3396	74.1	1 5/16	1.3125	87			
							1 21/64	1.3281	79			
1.500	8	UN	1.3650	83.1	1.3797	74.1	1 23/64	1.3594	87			
							1 3/8	1.3750	77			
1.500	12	UNF	1.4100	83.1	1.4198	74.1	1 13/32	1.4062	87			
1.500	16	UN	1.4320	83.8	1.4408	72.9	1 7/16	1.4375	77			
1.500	18	UNEF	1.4400	83.1	1.4480	72.1	1 7/16	1.4375	87			
1.500	20	UN	1.4460	83.1	1.4537	71.3	1 29/64	1.4531	72			
1.500	28	UN	1.4610	84.1	1.4676	69.8	37 mm	1.4567	93			
1.5625	6	UN	1.3820	83.4	1.4021	74.1	1 25/64	1.3906	79			
1.5625	8	UN	1.4270	83.4	1.4422	74.1	1 27/64	1.4219	87			
							1 7/16	1.4375	77			
1.5625	12	UN	1.4720	83.6	1.4823	74.1	1 15/32	1.4688	87			
1.5625	16	UN	1.4950	83.1	1.5033	72.9	1 1/2	1.5000	77			
1.5625	18	UNEF	1.5020	83.8	1.5105	72.1	1 1/2	1.5000	87			
1.5625	20	UN	1.5080	83.9	1.5162	71.3	1 33/64	1.5156	72			
1.625	6	UN	1.4450	83.1	1.4646	74.1	1 29/64	1.4531	79			
1.625	8	UN	1.4900	83.1	1.5047	74.1	1 31/64	1.4844	87			
							1 1/2	1.5000	77			
1.625	12	UN	1.5350	83.1	1.5448	74.1	1 17/32	1.5312	87			
1.625	16	UN	1.5570	83.8	1.5658	72.9	1 9/16	1.5625	77			
1.625	18	UNEF	1.5650	83.1	1.5730	72.1	1 9/16	1.5625	87			
1.625	20	UN	1.5710	83.1	1.5787	71.3	1 37/64	1.5781	72			
1.6875	6	UN	1.5070	83.4	1.5271	74.1	1 1/2	1.5000	87			
							1 33/64	1.5156	79			
1.6875	8	UN	1.5520	83.4	1.5672	74.1	1 9/16	1.5625	77			
1.6875	12	UN	1.5970	83.6	1.6073	74.1	1 19/32	1.5938	87			
1.6875	16	UN	1.6200	83.1	1.6283	72.9	1 5/8	1.6250	77			
1.6875	18	UNEF	1.6270	83.8	1.6355	72.1	1 5/8	1.6250	87			
1.6875	20	UN	1.6330	83.9	1.6412	71.3	1 41/64	1.6406	72			
1.750	5	UNC	1.5340	83.1	1.5575	74.1	1 17/32	1.5312	84			
							1 35/64	1.5469	78			
1.750	6	UN	1.5700	83.1	1.5896	74.1	1 9/16	1.5625	87			
							1 37/64	1.5781	79			
1.750	8	UN	1.6150	83.1	1.6297	74.1	1 39/64	1.6094	87			
							1 5/8	1.6250	77			
1.750	12	UN	1.6600	83.1	1.6698	74.1	1 21/32	1.6562	87			
1.750	16	UN	1.6820	83.8	1.6908	72.9	1 11/16	1.6875	77			
1.750	20	UN	1.6960	83.1	1.7037	71.3	1 45/64	1.7031	72			
1.8125	6	UN	1.6320	83.4	1.6521	74.1	1 5/8	1.6250	87			
							1 41/64	1.6406	79			
1.8125	8	UN	1.6770	83.4	1.6922	74.1	1 43/64	1.6719	87			
							1 11/16	1.6875	77			
1.8125	12	UN	1.7220	83.6	1.7323	74.1	1 23/32	1.7188	87			
1.8125	16	UN	1.7450	83.1	1.7533	72.9	1 3/4	1.7500	77			
1.8125	20	UN	1.7580	83.9	1.7662	71.3	1 49/64	1.7656	72			
1.875	6	UN	1.6950	83.1	1.7146	74.1	1 45/64	1.7031	79			
1.875	8	UN	1.7400	83.1	1.7547	74.1	1 3/4	1.7500	77			
1.875	12	UN	1.7850	83.1	1.7948	74.1	1 25/32	1.7812	87			
1.875	16	UN	1.8070	83.8	1.8158	72.9	1 13/16	1.8125	77			
1.875	20	UN	1.8210	83.1	1.8287	71.3	1 53/64	1.8281	72			
1.9375	6	UN	1.7570	83.4	1.7771	74.1	1 49/64	1.7656	79			
1.9375	8	UN	1.8020	83.4	1.8172	74.1	1 51/64	1.7969	87			
							1 13/16	1.8125	77			
1.9375	12	UN	1.8470	83.6	1.8573	74.1	1 27/32	1.8438	87			
1.9375	16	UN	1.8700	83.1	1.8783	72.9	1 7/8	1.8750	77			
1.9375	20	UN	1.8830	83.9	1.8912	71.3	1 57/64	1.8906	72			

See footnotes at end of table.

TABLE A3.2. *Tap drill sizes, Unified screw threads, class 3B*—Continued

Thread size	Threads per inch	Designation	Class 3B minor diameter, internal threads: Minimum	Percent [a] basic thread height	Maximum	Percent [a] basic thread height	Tap drills and percent basic thread height: Drill size		Percent of thread	Probable oversize, mean	Probable hole size	Percent of thread
in			*in*		*in*		*in*	*in*		*in*	*in*	
2.000	4.5	UNC	1.7590	83.5	1.7861	74.1	1 25/32	1.7812	76	--------	--------	--------
2.000	6	UN	1.8200	83.1	1.8396	74.1	1 53/64	1.8281	79	--------	--------	--------
2.000	8	UN	1.8650	83.1	1.8797	74.1	1 7/8	1.8750	77	--------	--------	--------
2.000	12	UN	1.9100	83.1	1.9198	74.1	1 29/32	1.9062	87	--------	--------	--------
2.000	16	UN	1.9320	83.8	1.9408	72.9	1 15/16	1.9375	77	--------	--------	--------
2.000	20	UN	1.9460	83.1	1.9537	71.3	1 61/64	1.9531	72	--------	--------	--------
2.0625	16	UNS	1.9950	83.1	2.0033	72.9	2	2.0000	77	--------	--------	--------
2.125	6	UN	1.9450	83.1	1.9646	74.1	1 61/64	1.9531	79	--------	--------	--------
2.125	8	UN	1.9900	83.1	2.0047	74.1	2	2.0000	77	--------	--------	--------
2.125	12	UN	2.0350	83.1	2.0448	74.1	2 1/32	2.0312	87	--------	--------	--------
2.125	16	UN	2.0570	83.8	2.0658	72.9	2 1/16	2.0625	77	--------	--------	--------
2.125	20	UN	2.0710	83.1	2.0787	71.3	2 1/16	2.0625	96	--------	--------	--------
2.1875	16	UNS	2.1200	83.1	2.1283	72.9	2 1/8	2.1250	77	--------	--------	--------
2.250	4.5	UNC	2.0090	83.5	2.0361	74.1	2 2 1/32	2.0000 2.0312	87 76	--------	--------	--------
2.250	6	UN	2.0700	83.1	2.0896	74.1	2 1/16	2.0625	87	--------	--------	--------
2.250	8	UN	2.1150	83.1	2.1297	74.1	2 1/8	2.1250	77	--------	--------	--------
2.250	12	UN	2.1600	83.1	2.1698	74.1	2 5/32	2.1562	87	--------	--------	--------
2.250	16	UN	2.1820	83.8	2.1908	72.9	2 3/16	2.1875	77	--------	--------	--------
2.250	20	UN	2.1960	83.1	2.2037	71.3	2 3/16	2.1875	96	--------	--------	--------
2.3125	16	UNS	2.2450	83.1	2.2533	72.9	2 1/4	2.2500	77	--------	--------	--------
2.375	6	UN	2.1950	83.1	2.2146	74.1	2 3/16	2.1875	87	--------	--------	--------
2.375	8	UN	2.2400	83.1	2.2547	74.1	2 1/4	2.2500	77	--------	--------	--------
2.375	12	UN	2.2850	83.1	2.2948	74.1	58 mm	2.2835	85	--------	--------	--------
2.375	16	UN	2.3070	83.8	2.3158	72.9	2 5/16	2.3125	77	--------	--------	--------
2.375	20	UN	2.3210	83.1	2.3287	71.3	2 5/16	2.3125	96	--------	--------	--------
2.4375	16	UNS	2.3700	83.1	2.3783	72.9	2 3/8	2.3750	77	--------	--------	--------
2.500	4	UNC	2.2290	83.4	2.2594	74.1	2 7/32 2 1/4	2.2188 2.2500	87 77	--------	--------	--------
2.500	6	UN	2.3200	83.1	2.3396	74.1	2 5/16	2.3125	87	--------	--------	--------
2.500	8	UN	2.3650	83.1	2.3797	74.1	2 3/8	2.3750	77	--------	--------	--------
2.500	12	UN	2.4100	83.1	2.4198	74.1	2 13/32	2.4062	87	--------	--------	--------
2.500	16	UN	2.4320	83.8	2.4408	72.9	2 7/16	2.4375	77	--------	--------	--------
2.500	20	UN	2.4460	83.1	2.4537	71.3	2 7/16	2.4375	96	--------	--------	--------
2.625	4	UN	2.3540	83.4	2.3844	74.1	2 11/32 2 3/8	2.3438 2.3750	87 77	--------	--------	--------
2.625	6	UN	2.4450	83.1	2.4646	74.1	2 7/16	2.4375	87	--------	--------	--------
2.625	8	UN	2.4900	83.1	2.5047	74.1	2 1/2	2.5000	77	--------	--------	--------
2.625	12	UN	2.5350	83.1	2.5448	74.1	2 17/32	2.5312	87	--------	--------	--------
2.625	16	UN	2.5570	83.8	2.5658	72.9	2 9/16	2.5625	77	--------	--------	--------
2.625	20	UN	2.5710	83.1	2.5787	71.3	2 9/16	2.5625	96	--------	--------	--------
2.750	4	UNC	2.4790	83.4	2.5094	74.1	2 1/2	2.5000	77	--------	--------	--------
2.750	6	UN	2.5700	83.1	2.5896	74.1	2 9/16	2.5625	87	--------	--------	--------
2.750	8	UN	2.6150	83.1	2.6297	74.1	2 5/8	2.6250	77	--------	--------	--------
2.750	12	UN	2.6600	83.1	2.6698	74.1	2 21/32	2.6562	87	--------	--------	--------
2.750	16	UN	2.6820	83.8	2.6908	72.9	2 11/16	2.6875	77	--------	--------	--------
2.750	20	UN	2.6960	83.1	2.7037	71.3	2 11/16	2.6875	96	--------	--------	--------
2.875	4	UN	2.6040	83.4	2.6344	74.1	2 5/8	2.6250	77	--------	--------	--------
2.875	6	UN	2.6950	83.1	2.7146	74.1	2 11/16	2.6875	87	--------	--------	--------
2.875	8	UN	2.7400	83.1	2.7547	74.1	2 3/4	2.7500	77	--------	--------	--------
2.875	12	UN	2.7850	83.1	2.7948	74.1	2 25/32	2.7812	87	--------	--------	--------
2.875	16	UN	2.8070	83.8	2.8158	72.9	2 13/16	2.8125	77	--------	--------	--------
2.875	20	UN	2.8210	83.1	2.8287	71.3	2 13/16	2.8125	96	--------	--------	--------
3.000	4	UNC	2.7290	83.4	2.7594	74.1	2 3/4	2.7500	77	--------	--------	--------
3.000	6	UN	2.8200	83.1	2.8396	74.1	2 13/16	2.8125	87	--------	--------	--------
3.000	8	UN	2.8650	83.1	2.8797	74.1	2 7/8	2.8750	77	--------	--------	--------
3.000	12	UN	2.9100	83.1	2.9198	74.1	74 mm	2.9134	80	--------	--------	--------
3.000	16	UN	2.9320	83.8	2.9408	72.9	2 15/16	2.9375	77	--------	--------	--------
3.000	20	UN	2.9460	83.1	2.9537	71.3	2 15/16	2.9375	96	--------	--------	--------
3.250	4	UNC	2.9790	83.4	3.0094	74.1	3	3.0000	77	--------	--------	--------
3.500	4	UNC	3.2290	83.4	3.2594	74.1	3 1/4	3.2500	77	--------	--------	--------
3.750	4	UNC	3.4790	83.4	3.5094	74.1	3 1/2	3.5000	77	--------	--------	--------

[a] 100% basic thread height = 0.75H (values of 0.75H are shown in col. 14, table 2.1).

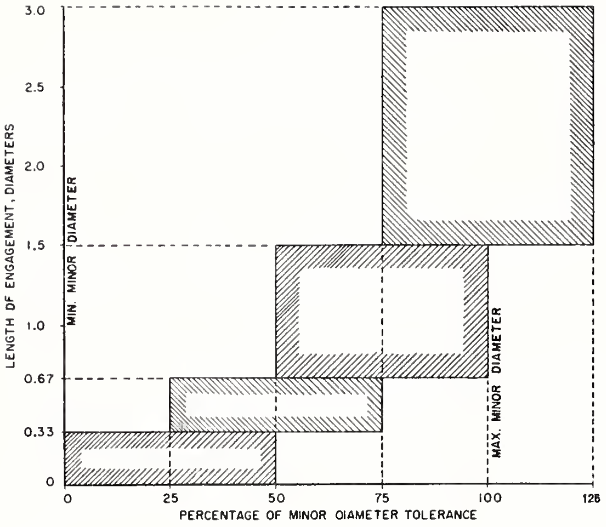

FIGURE A3.3. *Distribution of hole size limits before tapping, Unified threads.*

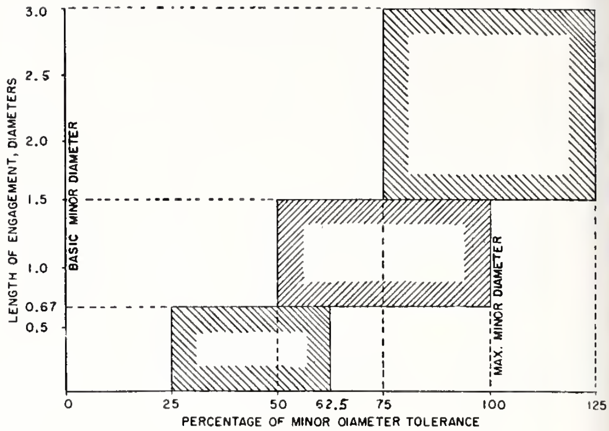

FIGURE A3.4. *Distribution of hole size limits before tapping, Unified Miniature threads.*

Table A3.5. *Recommended hole size limits before threading for different lengths of engagement, standard Unified and some UNS threads, classes 1B and 2B (based on table 3.9 [a])*

Nominal size in inches and threads per inch	Series designation	Minor diameter of internal threads: Min	Percent basic thread height [b]	Max [c]	Percent basic thread height [b]	To and including 0.33*D*: Min	To and including 0.33*D*: Max	Above 0.33*D* thru 0.67*D*: Min	Above 0.33*D* thru 0.67*D*: Max	Above 0.67*D* thru 1.5*D*: Min	Above 0.67*D* thru 1.5*D*: Max	Above 1.5*D* thru 3*D*: Min	Above 1.5*D* thru 3*D*: Max
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		in		*in*		*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.060-80 or No. 0-80	UNF	0.0465	83.1	0.0514	53.0	0.0465	0.0500	0.0479	0.0514	0.0479	0.0514	0.0479	0.0514
.073-64 or No. 1-64	UNC	.0561	83.3	.0623	52.7	.0561	.0599	.0580	.0618	.0585	.0623	.0585	.0623
.073-72 or No. 1-72	UNF	.0580	83.1	.0635	52.7	.0580	.0613	.0596	.0629	.0602	.0635	.0602	.0635
.086-56 or No. 2-56	UNC	.0667	83.2	.0737	53.0	.0667	.0705	.0686	.0724	.0699	.0737	.0699	.0737
.086-64 or No. 2-64	UNF	.0691	83.3	.0753	52.7	.0691	.0724	.0707	.0740	.0720	.0753	.0720	.0753
.099-48 or No. 3-48	UNC	.0764	83.5	.0845	53.6	.0764	.0804	.0785	.0825	.0805	.0845	.0806	.0846
.099-56 or No. 3-56	UNF	.0797	83.2	.0865	53.9	.0797	.0831	.0814	.0848	.0831	.0865	.0833	.0867
.112-40 or No. 4-40	UNC	.0849	83.4	.0939	55.7	.0849	.0894	.0871	.0916	.0894	.0939	.0902	.0947
.112-48 or No. 4-48	UNF	.0894	83.5	.0968	56.2	.0894	.0931	.0912	.0949	.0931	.0968	.0939	.0976
.125-40 or No. 5-40	UNC	.0979	83.4	.1062	57.9	.0979	.1020	.1000	.1041	.1021	.1062	.1036	.1077
.125-44 or No. 5-44	UNF	.1004	83.3	.1079	57.9	.1004	.1041	.1023	.1060	.1042	.1079	.1057	.1094
.138-32 or No. 6-32	UNC	.104	83.8	.114	59.1	.104	.109	.106	.112	.109	.114	.111	.117
.138-40 or No. 6-40	UNF	.111	83.1	.119	58.5	.111	.115	.113	.117	.115	.119	.116	.121
.164-32 or No. 8-32	UNC	.130	83.8	.139	61.6	.130	.135	.132	.137	.134	.139	.137	.141
.164-36 or No. 8-36	UNF	.134	83.1	.142	61.0	.134	.138	.136	.140	.138	.142	.140	.144
.190-24 or No. 10-24	UNC	.145	83.1	.156	62.8	.145	.150	.147	.153	.150	.156	.153	.158
.190-32 or No. 10-32	UNF	.156	83.8	.164	64.0	.156	.160	.158	.162	.160	.164	.162	.166
.216-24 or No. 12-24	UNC	.171	83.1	.181	64.7	.171	.176	.173	.178	.176	.181	.178	.183
.216-28 or No. 12-28	UNF	.177	84.1	.186	64.7	.177	.182	.179	.184	.181	.186	.183	.188
.216-32 or No. 12-32	UNEF	.182	83.8	.190	64.0	.182	.186	.184	.188	.186	.190	.188	.192
.250-20 or 1/4-20	UNC	.196	83.1	.207	66.2	.196	.202	.199	.204	.202	.207	.204	.210
.250-28 or 1/4-28	UNF	.211	84.1	.220	64.7	.211	.216	.213	.218	.216	.220	.218	.222
.250-32 or 1/4-32	UNEF	.216	83.8	.224	64.0	.216	.220	.218	.222	.220	.224	.221	.225
.250-36 or 1/4-36	UNS	.220	83.1	.226	66.5	.220	.223	.221	.225	.222	.226	.224	.228
.3125-18 or 5/16-18	UNC	.252	83.8	.265	65.8	.252	.259	.256	.262	.259	.265	.262	.268
.3125-20 or 5/16-20	20UN	.258	83.9	.270	65.4	.258	.264	.261	.267	.264	.270	.267	.273
.3125-24 or 5/16-24	UNF	.267	84.1	.277	65.6	.267	.272	.270	.275	.272	.277	.275	.280
.3125-28 or 5/16-28	28UN	.274	83.0	.282	65.7	.274	.278	.276	.280	.278	.282	.280	.284
.3125-32 or 5/16-32	UNEF	.279	82.5	.286	65.3	.279	.282	.280	.284	.282	.286	.284	.288
.3125-36 or 5/16-36	UNS	.282	84.5	.289	65.1	.282	.286	.283	.287	.285	.289	.287	.291
.375-16 or 3/8-16	UNC	.307	83.8	.321	66.5	.307	.314	.311	.318	.314	.321	.318	.325
.375-20 or 3/8-20	20UN	.321	83.1	.332	66.2	.321	.327	.324	.330	.327	.332	.330	.335
.375-24 or 3/8-24	UNF	.330	83.1	.340	64.7	.330	.335	.332	.337	.335	.340	.337	.342
.375-28 or 3/8-28	28UN	.336	84.1	.345	64.7	.336	.340	.338	.343	.340	.345	.343	.347
.375-32 or 3/8-32	UNEF	.341	83.8	.349	64.0	.341	.345	.343	.347	.345	.349	.346	.350
.375-36 or 3/8-36	UNS	.345	83.1	.352	63.7	.345	.348	.346	.350	.348	.352	.349	.353
.4375-14 or 7/16-14	UNC	.360	83.5	.376	66.3	.360	.368	.364	.372	.368	.376	.372	.380
.4375-16 or 7/16-16	16UN	.370	83.1	.384	65.9	.370	.377	.373	.380	.377	.384	.380	.387
.4375-20 or 7/16-20	UNF	.383	83.9	.395	65.4	.383	.389	.386	.392	.389	.395	.392	.398
.4375-28 or 7/16-28	UNEF	.399	83.0	.407	65.7	.399	.403	.401	.405	.403	.407	.405	.409
.4375-32 or 7/16-32	32UN	.404	82.5	.411	65.3	.404	.407	.405	.409	.407	.411	.409	.413
.500-12 or 1/2-12	UNS	.410	83.1	.428	66.5	.410	.419	.414	.423	.419	.428	.423	.432
.500-13 or 1/2/13	UNC	.417	83.1	.434	66.0	.417	.425	.421	.430	.425	.434	.430	.438
.500-16 or 1/2-16	16UN	.432	83.8	.446	66.5	.432	.439	.436	.443	.439	.446	.443	.450
.500-20 or 1/2-20	UNF	.446	83.1	.457	66.2	.446	.452	.449	.454	.452	.457	.454	.460
.500-28 or 1/2-28	UNEF	.461	84.1	.470	64.7	.461	.466	.463	.468	.466	.470	.468	.472
.500-32 or 1/2-32	32UN	.466	83.8	.474	64.0	.466	.470	.468	.472	.470	.474	.471	.475

See footnotes at end of table.

TABLE A3.5. *Recommended hole size limits before threading for different lengths of engagement, standard Unified and some UNS threads, classes 1B and 2B (based on table 3.9[a])*—Continued

Nominal size in inches and threads per inch	Series designation	Minor diameter of internal threads				Recommended hole size limits for different lengths of engagement							
		Min	Percent basic thread height [b]	Max [c]	Percent basic thread height [b]	To and including 0.33*D*		Above 0.33*D* thru 0.67*D*		Above 0.67*D* thru 1.5*D*		Above 1.5*D* thru 3*D*	
						Min	Max	Min	Max	Min	Max	Min	Max
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		in		*in*		*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.5625–12 or 9/16–12	UNC	.472	83.6	.490	67.0	.472	.481	.477	.486	.481	.490	.486	.495
.5625–16 or 9/16–16	16UN	.495	83.1	.509	65.9	.495	.502	.498	.505	.502	.509	.505	.512
.5625–18 or 9/16–18	UNF	.502	83.8	.515	65.8	.502	.509	.506	.512	.509	.515	.512	.518
.5625–20 or 9/16–20	20UN	.508	83.9	.520	65.4	.508	.514	.511	.517	.514	.520	.517	.523
.5625–24 or 9/16–24	UNEF	.517	84.1	.527	65.6	.517	.522	.520	.525	.522	.527	.525	.530
.5625–28 or 9/16–28	28UN	.524	83.0	.532	65.7	.524	.528	.526	.530	.528	.532	.530	.534
.5625–32 or 9/16–32	32UN	.529	82.5	.536	65.3	.529	.532	.530	.534	.532	.536	.534	.538
.625–11 or 5/8–11	UNC	.527	83.0	.546	66.9	.527	.536	.532	.541	.536	.546	.541	.551
.625–12 or 5/8–12	12UN	.535	83.1	.553	66.5	.535	.544	.539	.548	.544	.553	.548	.557
.625–16 or 5/8–16	16UN	.557	83.8	.571	66.5	.557	.564	.561	.568	.564	.571	.568	.575
.625–18 or 5/8–18	UNF	.565	83.1	.578	65.1	.565	.571	.568	.574	.571	.578	.574	.581
.625–20 or 5/8–20	20UN	.571	83.1	.582	66.2	.571	.577	.574	.580	.577	.582	.580	.585
.625–24 or 5/8–24	UNEF	.580	83.1	.590	64.7	.580	.585	.582	.587	.585	.590	.587	.592
.625–28 or 5/8–28	28UN	.586	84.1	.595	64.7	.586	.590	.588	.593	.590	.595	.593	.597
.625–32 or 5/8–32	32UN	.591	83.8	.599	64.0	.591	.595	.593	.597	.595	.599	.596	.600
.6875–12 or 11/16–12	12UN	.597	83.6	.615	67.0	.597	.606	.602	.611	.606	.615	.611	.620
.6875–16 or 11/16–16	16UN	.620	83.1	.634	65.9	.620	.627	.623	.630	.627	.634	.630	.637
.6875–18 or 11/16–18	UNS	.627	83.8	.640	65.8	.627	.634	.630	.637	.634	.640	.637	.643
.6875–20 or 11/16–20	20UN	.633	83.9	.645	65.4	.633	.639	.636	.642	.639	.645	.642	.648
.6875–24 or 11/16–24	UNEF	.642	84.1	.652	65.6	.642	.647	.645	.650	.647	.652	.650	.654
.6875–28 or 11/16–28	28UN	.649	83.0	.657	65.7	.649	.653	.651	.655	.653	.657	.655	.659
.6875–32 or 11/16–32	32UN	.654	82.5	.661	65.3	.654	.657	.655	.659	.657	.661	.659	.663
.750–10 or 3/4–10	UNC	.642	83.1	.663	67.0	.642	.652	.647	.658	.652	.663	.657	.668
.750–12 or 3/4–12	12UN	.660	83.1	.678	66.5	.660	.669	.664	.673	.669	.678	.673	.682
.750–16 or 3/4–16	UNF	.682	83.8	.696	66.5	.682	.689	.686	.693	.689	.696	.693	.700
.750–18 or 3/4–18	UNS	.690	83.1	.703	65.1	.690	.696	.693	.699	.696	.703	.699	.706
.750–20 or 3/4–20	UNEF	.696	83.1	.707	66.2	.696	.702	.699	.704	.702	.707	.704	.710
.750–28 or 3/4–28	28UN	.711	84.1	.720	64.7	.711	.716	.713	.718	.716	.720	.718	.722
.750–32 or 3/4–32	32UN	.716	83.8	.724	64.0	.716	.720	.718	.722	.720	.724	.721	.725
.8125–12 or 13/16–12	12UN	.722	83.6	.740	67.0	.722	.731	.727	.736	.731	.740	.736	.745
.8125–16 or 13/16–16	16UN	.745	83.1	.759	65.9	.745	.752	.748	.755	.752	.795	.755	.762
.8125–18 or 13/16–18	UNS	.752	83.8	.765	65.8	.752	.759	.756	.762	.759	.765	.762	.768
.8125–20 or 13/16–20	UNEF	.758	83.9	.770	65.4	.758	.764	.761	.767	.764	.770	.767	.773
.8125–28 or 13/16–28	28UN	.774	83.0	.782	65.7	.774	.778	.776	.780	.778	.782	.780	.784
.8125–32 or 13/16–32	32UN	.779	82.5	.786	65.3	.779	.782	.780	.784	.782	.786	.784	.788
.875–9 or 7/8–9	UNC	.755	83.1	.778	67.2	.755	.766	.760	.772	.766	.778	.772	.783
.875–12 or 7/8–12	12UN	.785	83.1	.803	66.5	.785	.794	.789	.798	.794	.803	.798	.807
.875–14 or 7/8–14	UNF	.798	83.0	.814	65.7	.798	.806	.802	.810	.806	.814	.810	.818
.875–16 or 7/8–16	16UN	.807	83.8	.821	66.5	.807	.814	.811	.818	.814	.821	.818	.825
.875–18 or 7/8–18	UNS	.815	83.1	.828	65.1	.815	.821	.818	.824	.821	.828	.824	.831
.875–20 or 7/8–20	UNEF	.821	83.1	.832	66.2	.821	.827	.824	.830	.827	.832	.830	.835
.875–28 or 7/8–28	28UN	.836	84.1	.845	64.7	.836	.840	.838	.843	.840	.845	.843	.847
.875–32 or 7/8–32	32UN	.841	83.8	.849	64.0	.841	.845	.843	.847	.845	.849	.846	.850
.9375–12 or 15/16–12	12UN	.847	83.6	.865	67.0	.847	.856	.852	.861	.856	.865	.861	.870
.9375–16 or 15/16–16	16UN	.870	83.1	.884	65.9	.870	.877	.873	.880	.877	.884	.880	.887
.9375–20 or 15/16–20	UNEF	.883	83.9	.895	65.4	.883	.889	.886	.892	.889	.895	.892	.898
.9375–28 or 15/16–28	28UN	.899	83.0	.907	65.7	.899	.903	.901	.905	.903	.907	.905	.909
.9375–32 or 15/16–32	32UN	.904	82.5	.911	65.3	.904	.907	.905	.909	.907	.911	.909	.913

1.000–8	UNC	.865	83.1	.890	67.7	.865	.877	.871	.884	.877	.890	.883	.896
1.000–12	UNF	.910	83.1	.928	66.5	.910	.919	.914	.923	.919	.928	.923	.932
1.000–14	UNS	.923	83.0	.938	66.8	.923	.931	.927	.934	.931	.938	.935	.942
1.000–16	16UN	.932	83.8	.946	66.5	.932	.939	.936	.943	.939	.946	.943	.950
1.000–18	UNS	.940	83.1	.953	65.1	.940	.946	.943	.949	.946	.953	.949	.956
1.000–20	UNEF	.946	83.1	.957	66.2	.946	.952	.949	.954	.952	.957	.954	.960
1.000–28	28UN	.961	84.1	.970	64.7	.961	.966	.963	.968	.966	.970	.968	.972
1.000–32	32UN	.966	83.8	.974	64.0	.966	.970	.968	.972	.970	.974	.971	.975
1.0625–8	8UN	.927	83.4	.952	68.1	.927	.940	.934	.946	.940	.952	.946	.958
1.0625–12	12UN	.972	83.6	.990	67.0	.972	.981	.977	.986	.981	.990	.986	.995
1.0625–14	UNS	.985	83.5	1.001	66.3	.985	.993	.989	.997	.993	1.001	.997	1.005
1.0625–16	16UN	.995	83.1	1.009	65.9	.995	1.002	.998	1.005	1.002	1.009	1.005	1.012
1.0625–18	UNEF	1.002	83.8	1.015	65.8	1.002	1.009	1.006	1.012	1.009	1.015	1.012	1.018
1.0625–20	20UN	1.008	83.9	1.020	65.4	1.008	1.014	1.011	1.017	1.014	1.020	1.017	1.023
1.0625–28	28UN	1.024	83.0	1.032	65.7	1.024	1.028	1.026	1.030	1.028	1.032	1.030	1.034
1.125–7	UNC	0.970	83.5	0.998	68.4	0.970	0.984	0.977	0.991	0.984	0.998	0.991	1.005
1.125–8	8UN	.990	83.1	1.015	67.7	.990	1.002	.996	1.008	1.002	1.015	1.008	1.021
1.125–12	UNF	1.035	83.1	1.053	66.5	1.035	1.044	1.039	1.048	1.044	1.053	1.048	1.057
1.125–16	16UN	1.057	83.8	1.071	66.5	1.057	1.064	1.061	1.068	1.064	1.071	1.068	1.075
1.125–18	UNEF	1.065	83.1	1.078	65.1	1.065	1.071	1.068	1.074	1.071	1.078	1.074	1.081
1.125–20	20UN	1.071	83.1	1.082	66.2	1.071	1.077	1.074	1.080	1.077	1.082	1.080	1.085
1.125–28	28UN	1.086	84.1	1.095	64.7	1.086	1.090	1.088	1.093	1.090	1.095	1.093	1.097
1.1875–8	8UN	1.052	83.4	1.077	68.1	1.052	1.065	1.058	1.071	1.065	1.077	1.071	1.083
1.1875–12	12UN	1.097	83.6	1.115	67.0	1.097	1.106	1.102	1.111	1.106	1.115	1.111	1.120
1.1875–16	16UN	1.120	83.1	1.134	65.9	1.120	1.127	1.123	1.130	1.127	1.134	1.130	1.137
1.1875–18	UNEF	1.127	83.8	1.140	65.8	1.127	1.134	1.130	1.137	1.134	1.140	1.137	1.143
1.1875–20	20UN	1.133	83.9	1.145	65.4	1.133	1.139	1.136	1.142	1.139	1.145	1.142	1.148
1.1875–28	28UN	1.149	83.0	1.157	65.7	1.149	1.153	1.151	1.155	1.153	1.157	1.155	1.159
1.250–7	UNC	1.095	83.5	1.123	68.4	1.095	1.109	1.102	1.116	1.109	1.123	1.116	1.130
1.250–8	8UN	1.115	83.1	1.140	67.7	1.115	1.127	1.121	1.134	1.127	1.140	1.133	1.146
1.250–12	UNF	1.160	83.1	1.178	66.5	1.160	1.169	1.164	1.173	1.169	1.178	1.173	1.182
1.250–16	16UN	1.182	83.8	1.196	66.5	1.182	1.189	1.186	1.193	1.189	1.196	1.193	1.200
1.250–18	UNEF	1.190	83.1	1.203	65.1	1.190	1.196	1.193	1.199	1.196	1.203	1.199	1.206
1.250–20	20UN	1.196	83.1	1.207	66.2	1.196	1.202	1.199	1.204	1.202	1.207	1.204	1.210
1.250–28	28UN	1.211	84.1	1.220	64.7	1.211	1.216	1.213	1.218	1.216	1.220	1.218	1.222
1.3125–8	8UN	1.177	83.4	1.202	68.1	1.177	1.190	1.184	1.196	1.190	1.202	1.196	1.208
1.3125–12	12UN	1.222	83.6	1.240	67.0	1.222	1.231	1.227	1.236	1.231	1.240	1.236	1.245
1.3125–16	16UN	1.245	83.1	1.259	65.9	1.245	1.252	1.248	1.255	1.252	1.259	1.255	1.262
1.3125–18	UNEF	1.252	83.8	1.265	65.8	1.252	1.259	1.256	1.262	1.259	1.265	1.262	1.268
1.3125–20	20UN	1.258	83.9	1.270	65.4	1.258	1.264	1.261	1.267	1.264	1.270	1.267	1.273
1.3125–28	28UN	1.274	83.0	1.282	65.7	1.274	1.278	1.276	1.280	1.278	1.282	1.280	1.284
1.375–6	UNC	1.195	83.1	1.225	69.3	1.195	1.210	1.202	1.218	1.210	1.225	1.218	1.233
1.375–8	8UN	1.240	83.1	1.265	67.7	1.240	1.252	1.246	1.258	1.252	1.265	1.258	1.271
1.375–12	UNF	1.285	83.1	1.303	66.5	1.285	1.294	1.289	1.298	1.294	1.303	1.298	1.307
1.375–16	16UN	1.307	83.8	1.321	66.5	1.307	1.314	1.311	1.318	1.314	1.321	1.318	1.325
1.375–18	UNEF	1.315	83.1	1.328	65.1	1.315	1.321	1.318	1.324	1.321	1.328	1.324	1.331
1.375–20	20UN	1.321	83.1	1.332	66.2	1.321	1.327	1.324	1.330	1.327	1.332	1.330	1.335
1.375–28	28UN	1.336	84.1	1.345	64.7	1.336	1.340	1.338	1.343	1.340	1.345	1.343	1.347
1.4375–6	6UN	1.257	83.4	1.288	69.1	1.257	1.272	1.265	1.280	1.272	1.288	1.280	1.295
1.4375–8	8UN	1.302	83.4	1.327	68.1	1.302	1.315	1.308	1.321	1.315	1.327	1.321	1.333
1.4375–12	12UN	1.347	83.6	1.365	67.0	1.347	1.356	1.352	1.361	1.356	1.365	1.361	1.370
1.4375–16	16UN	1.370	83.1	1.384	65.9	1.370	1.377	1.373	1.380	1.377	1.384	1.380	1.387
1.4375–18	UNEF	1.377	83.8	1.390	65.8	1.377	1.384	1.380	1.387	1.384	1.390	1.387	1.393
1.4375–20	20UN	1.383	83.9	1.395	65.4	1.383	1.389	1.386	1.392	1.389	1.395	1.392	1.398
1.4375–28	28UN	1.399	83.0	1.407	65.7	1.399	1.403	1.401	1.405	1.403	1.407	1.405	1.409
1.500–6	UNC	1.320	83.1	1.350	69.3	1.320	1.335	1.327	1.343	1.335	1.350	1.342	1.358
1.500–8	8UN	1.365	83.1	1.390	67.7	1.365	1.377	1.371	1.384	1.377	1.390	1.383	1.396
1.500–12	UNF	1.410	83.1	1.428	66.5	1.410	1.419	1.414	1.423	1.419	1.428	1.423	1.432
1.500–16	16UN	1.432	83.8	1.446	66.5	1.432	1.439	1.436	1.443	1.439	1.446	1.443	1.450
1.500–18	UNEF	1.440	83.1	1.453	65.1	1.440	1.446	1.443	1.449	1.446	1.453	1.449	1.456
1.500–20	20UN	1.446	83.1	1.457	66.2	1.446	1.452	1.449	1.454	1.452	1.457	1.454	1.460
1.500–28	28UN	1.461	84.1	1.470	64.7	1.461	1.466	1.463	1.468	1.466	1.470	1.468	1.472
1.5625–6	6UN	1.382	83.4	1.413	69.1	1.382	1.397	1.390	1.405	1.397	1.413	1.405	1.420
1.5625–8	8UN	1.427	83.4	1.452	68.1	1.427	1.440	1.434	1.446	1.440	1.452	1.446	1.458
1.5625–12	12UN	1.472	83.6	1.490	67.0	1.472	1.481	1.477	1.486	1.481	1.490	1.486	1.495
1.5625–16	16UN	1.495	83.1	1.509	65.9	1.495	1.502	1.498	1.505	1.502	1.509	1.505	1.512
1.5625–18	UNEF	1.502	83.8	1.515	65.8	1.502	1.509	1.506	1.512	1.509	1.515	1.512	1.518
1.5625–20	20UN	1.508	83.9	1.520	65.4	1.508	1.514	1.511	1.517	1.514	1.520	1.517	1.523

See footnotes at end of table.

TABLE A3.5. *Recommended hole size limits before threading for different lengths of engagement, standard Unified and some UNS threads, classes 1B and 2B (based on table 3.9*[a]*)*—Continued

Nominal size in inches and threads per inch	Series designation	Minor diameter of internal threads				Recommended hole size limits for different lengths of engagement							
		Min	Percent basic thread height [b]	Max [c]	Percent basic thread height [b]	To and including 0.33*D*		Above 0.33*D* thru 0.67*D*		Above 0.67*D* thru 1.5*D*		Above 1.5*D* thru 3*D*	
						Min	Max	Min	Max	Min	Max	Min	Max
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		in		*in*		*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.625–6	6UN	1.445	83.1	1.475	69.3	1.445	1.460	1.452	1.468	1.460	1.475	1.468	1.483
1.625–8	8UN	1.490	83.1	1.515	67.7	1.490	1.502	1.496	1.508	1.502	1.515	1.508	1.521
1.625–12	12UN	1.535	83.1	1.553	66.5	1.535	1.544	1.539	1.548	1.544	1.553	1.548	1.557
1.625–16	16UN	1.557	83.8	1.571	66.5	1.557	1.564	1.561	1.568	1.564	1.571	1.568	1.575
1.625–18	UNEF	1.565	83.1	1.578	65.1	1.565	1.571	1.568	1.574	1.571	1.578	1.574	1.581
1.625–20	20UN	1.571	83.1	1.582	66.2	1.571	1.577	1.574	1.580	1.577	1.582	1.580	1.585
1.6875–6	6UN	1.507	83.4	1.538	69.1	1.507	1.522	1.515	1.530	1.522	1.538	1.530	1.545
1.6875–8	8UN	1.552	83.4	1.577	68.1	1.552	1.565	1.558	1.571	1.565	1.577	1.571	1.583
1.6875–12	12UN	1.597	83.6	1.615	67.0	1.597	1.606	1.602	1.611	1.606	1.615	1.611	1.620
1.6875–16	16UN	1.620	83.1	1.634	65.9	1.620	1.627	1.623	1.630	1.627	1.634	1.630	1.637
1.6875–18	UNEF	1.627	83.8	1.640	65.8	1.627	1.634	1.630	1.637	1.634	1.640	1.637	1.643
1.6875–20	20UN	1.633	83.9	1.645	65.4	1.633	1.639	1.636	1.642	1.639	1.645	1.642	1.648
1.750–5	UNC	1.534	83.1	1.568	70.1	1.534	1.550	1.542	1.559	1.550	1.568	1.559	1.576
1.750–6	6UN	1.570	83.1	1.600	69.3	1.570	1.585	1.577	1.593	1.585	1.600	1.592	1.608
1.750–8	8UN	1.615	83.1	1.640	67.7	1.615	1.627	1.621	1.634	1.627	1.640	1.633	1.646
1.750–12	12UN	1.660	83.1	1.678	66.5	1.660	1.669	1.664	1.673	1.669	1.678	1.673	1.682
1.750–16	16UN	1.682	83.8	1.696	66.5	1.682	1.689	1.686	1.693	1.689	1.696	1.693	1.700
1.750–20	20UN	1.696	83.1	1.707	66.2	1.696	1.702	1.699	1.704	1.702	1.707	1.704	1.710
1.8125–6	6UN	1.632	83.4	1.663	69.1	1.632	1.647	1.640	1.655	1.647	1.663	1.655	1.670
1.8125–8	8UN	1.677	83.4	1.702	68.1	1.677	1.690	1.684	1.696	1.690	1.702	1.696	1.708
1.8125–12	12UN	1.722	83.6	1.740	67.0	1.722	1.731	1.727	1.736	1.731	1.740	1.736	1.745
1.8125–16	16UN	1.745	83.1	1.759	65.9	1.745	1.752	1.748	1.755	1.752	1.759	1.755	1.762
1.8125–20	20UN	1.758	83.9	1.770	65.4	1.758	1.764	1.761	1.767	1.764	1.770	1.767	1.773
1.875–6	6UN	1.695	83.1	1.725	69.3	1.695	1.710	1.702	1.718	1.710	1.725	1.718	1.733
1.875–8	8UN	1.740	83.1	1.765	67.7	1.740	1.752	1.746	1.758	1.752	1.765	1.758	1.771
1.875–12	12UN	1.785	83.1	1.803	66.5	1.785	1.794	1.789	1.798	1.794	1.803	1.798	1.807
1.875–16	16UN	1.807	83.8	1.821	66.5	1.807	1.814	1.811	1.818	1.814	1.821	1.818	1.825
1.875–20	20UN	1.821	83.1	1.832	66.2	1.821	1.827	1.824	1.830	1.827	1.832	1.830	1.835
1.9375–6	6UN	1.757	83.4	1.788	69.1	1.757	1.772	1.765	1.780	1.772	1.788	1.780	1.795
1.9375–8	8UN	1.802	83.4	1.827	68.1	1.802	1.815	1.808	1.821	1.815	1.827	1.821	1.833
1.9375–12	12UN	1.847	83.6	1.865	67.0	1.847	1.856	1.852	1.861	1.856	1.865	1.861	1.870
1.9375–16	16UN	1.870	83.1	1.884	65.9	1.870	1.877	1.873	1.880	1.877	1.884	1.880	1.887
1.9375–20	20UN	1.883	83.9	1.895	65.4	1.883	1.889	1.886	1.892	1.889	1.895	1.892	1.898
2.000–4.5	UNC	1.759	83.5	1.795	71.0	1.759	1.777	1.768	1.786	1.777	1.795	1.786	1.804
2.000–6	6UN	1.820	83.1	1.850	69.3	1.820	1.835	1.827	1.843	1.835	1.850	1.842	1.858
2.000–8	8UN	1.865	83.1	1.890	67.7	1.865	1.877	1.871	1.884	1.877	1.890	1.883	1.896
2.000–12	12UN	1.910	83.1	1.928	66.5	1.910	1.919	1.914	1.923	1.919	1.928	1.923	1.932
2.000–16	16UN	1.932	83.8	1.946	66.5	1.932	1.939	1.936	1.943	1.939	1.946	1.943	1.950
2.000–20	20UN	1.946	83.1	1.957	66.2	1.946	1.952	1.949	1.954	1.952	1.957	1.954	1.960

2.0625–16	UNS	1.995	83.1	2.009	65.9	1.995	2.002	1.998	2.005	2.002	2.009	2.005	2.012
2.125–6	6UN	1.945	83.1	1.975	69.3	1.945	1.960	1.952	1.968	1.960	1.975	1.968	1.983
2.125–8	8UN	1.990	83.1	2.015	67.7	1.990	2.002	1.996	2.008	2.002	2.015	2.008	2.021
2.125–12	12UN	2.035	83.1	2.053	66.5	2.035	2.044	2.039	2.048	2.044	2.053	2.048	2.057
2.125–16	16UN	2.057	83.8	2.071	66.5	2.057	2.064	2.061	2.068	2.064	2.071	2.068	2.075
2.125–20	20UN	2.071	83.1	2.082	66.2	2.071	2.077	2.074	2.080	2.077	2.082	2.080	2.085
2.1875–16	UNS	2.120	83.1	2.134	65.9	2.120	2.127	2.123	2.130	2.127	2.134	2.130	2.137
2.250–4.5	UNC	2.009	83.5	2.045	71.0	2.009	2.027	2.018	2.036	2.027	2.045	2.036	2.054
2.250–6	6UN	2.070	83.1	2.100	69.3	2.070	2.085	2.077	2.093	2.085	2.100	2.092	2.108
2.500–4	UNC	2.229	83.4	2.267	71.7	2.229	2.248	2.239	2.258	2.248	2.267	2.258	2.276
2.750–4	UNC	2.479	83.4	2.517	71.7	2.479	2.498	2.489	2.508	2.498	2.517	2.508	2.526
3.000–4	UNC	2.729	83.4	2.767	71.7	2.729	2.748	2.739	2.758	2.748	2.767	2.758	2.776
3.250–4	UNC	2.979	83.4	3.017	71.7	2.979	2.998	2.989	3.008	2.998	3.017	3.008	3.026

[a] The differences between limits are equal to the minor diameter tolerances given in table 3.9 for lengths of engagement to and including $0.33D$. However, the minimum values for lengths of engagement greater than $0.33D$ in sizes 0.25 in. and larger are adjusted so that the difference between limits is never less than 0.0040 in. For diameter-pitch combinations other than those given in this table, the tolerances given in table 3.9 should be similarly applied to determine hole size limits.

Hole size limits for diameter-pitch combinations which do not appear in this table may be obtained by use of values in this table provided there is a diameter-pitch combination in the table:
(1) with the same pitch and
(2) with a diameter that is less by an integral amount than the diameter of the diameter-pitch combination for which hole size values are desired. (NOTE: Values in the table for nominal sizes less than 0.25 in. cannot be used for this purpose.)

EXAMPLE: To obtain the values for the 4.000–8UN–1B or –2B thread, add 2.000 to values for the 2.000–8UN thread shown in the table. These values would then become: 3.865, 3.877, 3.871, 3.884, 3.877, 3.890, 3.883, 3.896. The percentages of basic thread height will remain unchanged.

[b] Based on values as rounded off in the preceding column. 100 percent basic thread height = $0.75H$ (values of $0.75H$ are shown in col. 14, table 2.1).

[c] Based on a length of engagement equal to the nominal diameter.

TABLE A3.6. *Recommended hole size limits before threading for different lengths of engagement, standard Unified and some UNS threads, class 3B (based on table 3.10[a])*

Nominal size in inches and threads per inch	Series designation	Minor diameter of internal threads				Recommended hole size limits for different lengths of engagement							
		Min	Percent basic thread height [b]	Max [c]	Percent basic thread height [b]	To and including 0.33*D*		Above 0.33*D* thru 0.67*D*		Above 0.67*D* thru 1.5*D*		Above 1.5*D* thru 3*D*	
						Min	Max	Min	Max	Min	Max	Min	Max
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		in		*in*		*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
.060–80 or No. 0–80	UNF	0.0465	83.1	0.0514	53.0	0.0465	0.0500	0.0479	0.0514	0.0479	0.0514	0.0479	0.0514
.073–64 or No. 1–64	UNC	.0561	83.3	.0623	52.7	.0561	.0599	.0580	.0618	.0585	.0623	.0585	.0623
.073–72 or No. 1–72	UNF	.0580	83.1	.0635	52.7	.0580	.0613	.0596	.0629	.0602	.0635	.0602	.0635
.086–56 or No. 2–56	UNC	.0667	83.2	.0737	53.0	.0667	.0705	.0686	.0724	.0699	.0737	.0699	.0737
.086–64 or No. 2–64	UNF	.0691	83.3	.0753	52.7	.0691	.0724	.0707	.0740	.0720	.0753	.0720	.0753
.099–48 or No. 3–48	UNC	.0764	83.5	.0845	53.6	.0764	.0804	.0785	.0825	.0805	.0845	.0806	.0846
.099–56 or No. 3–56	UNF	.0797	83.2	.0865	53.9	.0797	.0831	.0814	.0848	.0831	.0865	.0833	.0867
.112–40 or No. 4–40	UNC	.0849	83.4	.0939	55.7	.0849	.0894	.0871	.0916	.0894	.0939	.0902	.0947
.112–48 or No. 4–48	UNF	.0894	83.5	.0968	56.2	.0894	.0931	.0912	.0949	.0931	.0968	.0939	.0976
.125–40 or No. 5–40	UNC	.0979	83.4	.1062	57.9	.0979	.1020	.1000	.1041	.1021	.1062	.1036	.1077
.125–44 or No. 5–44	UNF	.1004	83.3	.1079	57.9	.1004	.1041	.1023	.1060	.1042	.1079	.1057	.1094
.138–32 or No. 6–32	UNC	.1040	83.8	.1140	59.1	.1040	.1091	.1066	.1115	.1091	.1140	.1115	.1164
.138–40 or No. 6–40	UNF	.1110	83.1	.1186	59.7	.1110	.1148	.1128	.1167	.1147	.1186	.1166	.1205
.164–32 or No. 8–32	UNC	.1300	83.8	.1389	61.8	.1300	.1345	.1324	.1367	.1346	.1389	.1367	.1410
.164–36 or No. 8–36	UNF	.1340	83.1	.1416	62.1	.1340	.1377	.1359	.1397	.1378	.1416	.1397	.1435
.190–24 or No. 10–24	UNC	.1450	83.1	.1555	63.7	.1450	.1502	.1475	.1528	.1502	.1555	.1528	.1581
.190–32 or No. 10–32	UNF	.1560	83.8	.1641	63.8	.1560	.1601	.1582	.1621	.1602	.1641	.1622	.1661
.216–24 or No. 12–24	UNC	.1710	83.1	.1807	65.2	.1710	.1758	.1733	.1782	.1758	.1807	.1782	.1831
.216–28 or No. 12–28	UNF	.1770	84.1	.1857	65.3	.1770	.1815	.1794	.1836	.1815	.1857	.1836	.1878
.216–32 or No. 12–32	UNEF	.1820	83.8	.1895	65.3	.1820	.1858	.1841	.1877	.1859	.1895	.1877	.1913
.250–20	UNC	.1960	83.1	.2067	66.7	.1960	.2013	.1986	.2040	.2013	.2067	.2040	.2094
.250–28	UNF	.2110	84.1	.2190	66.8	.2110	.2152	.2131	.2171	.2150	.2190	.2169	.2209
.250–32	UNEF	.2160	83.8	.2229	66.8	.2160	.2196	.2172	.2212	.2189	.2229	.2206	.2246
.250–36	UNS	.2200	83.1	.2258	67.1	.2200	.2229	.2203	.2243	.2218	.2258	.2233	.2273
.3125–18	UNC	.2520	83.8	.2630	68.6	.2520	.2577	.2551	.2604	.2577	.2630	.2604	.2657
.3125–20	20UN	.2580	83.9	.2680	68.5	.2580	.2632	.2608	.2656	.2632	.2680	.2656	.2704
.3125–24	UNF	.2670	84.1	.2754	68.5	.2670	.2714	.2694	.2734	.2714	.2754	.2734	.2774
.3125–28	28UN	.2740	83.0	.2807	68.5	.2740	.2772	.2749	.2789	.2767	.2807	.2784	.2824
.3125–32	UNEF	.2790	82.5	.2847	68.5	.2790	.2817	.2792	.2832	.2807	.2847	.2822	.2862
.3125–36	UNS	.2820	84.5	.2877	68.7	.2820	.2850	.2823	.2863	.2837	.2877	.2850	.2890
.375–16	UNC	.3070	83.8	.3182	70.0	.3070	.3127	.3101	.3155	.3128	.3182	.3155	.3209
.375–20	20UN	.3210	83.1	.3297	69.7	.3210	.3253	.3231	.3275	.3253	.3297	.3275	.3319
.375–24	UNF	.3300	83.1	.3372	69.8	.3300	.3336	.3314	.3354	.3332	.3372	.3351	.3391
.375–28	28UN	.3360	84.1	.3426	69.8	.3360	.3395	.3370	.3410	.3386	.3426	.3402	.3442
.375–32	UNEF	.3410	83.8	.3469	69.2	.3410	.3441	.3415	.3455	.3429	.3469	.3444	.3484
.375–36	UNS	.3450	83.1	.3501	69.0	.3450	.3475	.3450	.3490	.3461	.3501	.3474	.3514
.4375–14	UNC	.3600	83.5	.3717	70.9	.3600	.3660	.3630	.3688	.3659	.3717	.3688	.3746
.4375–16	16UN	.3700	83.1	.3800	70.8	.3700	.3749	.3723	.3774	.3749	.3800	.3774	.3825
.4375–20	UNF	.3830	83.9	.3916	70.7	.3830	.3875	.3855	.3896	.3875	.3916	.3896	.3937
.4375–28	UNEF	.3990	83.0	.4051	69.8	.3990	.4020	.3995	.4035	.4011	.4051	.4027	.4067
.4375–32	32UN	.4040	82.5	.4094	69.2	.4040	.4066	.4040	.4080	.4054	.4094	.4069	.4109

.500–12	UNS	.4100	83.1	.4223	71.8	.4100	.4161	.4129	.4192	.4160	.4223	.4192	.4255
.500–13	UNC	.4170	83.1	.4284	71.7	.4170	.4225	.4196	.4254	.4226	.4284	.4255	.4313
.500–16	16UN	.4320	83.8	.4419	71.6	.4320	.4371	.4347	.4395	.4371	.4419	.4395	.4443
.500–20	UNF	.4460	83.1	.4537	71.3	.4460	.4498	.4477	.4517	.4497	.4537	.4516	.4556
.500–28	UNEF	.4610	84.1	.4676	69.8	.4610	.4645	.4620	.4660	.4636	.4676	.4652	.4692
.500–32	32UN	.4660	83.8	.4719	69.2	.4660	.4691	.4665	.4705	.4679	.4719	.4694	.4734
.5625–12	UNC	.4720	83.6	.4843	72.2	.4720	.4783	.4753	.4813	.4783	.4843	.4813	.4873
.5625–16	16UN	.4950	83.1	.5040	72.1	.4950	.4994	.4971	.5017	.4994	.5040	.5017	.5063
.5625–18	UNF	.5020	83.8	.5106	71.9	.5020	.5065	.5045	.5086	.5065	.5106	.5086	.5127
.5625–20	20UN	.5080	83.9	.5162	71.3	.5080	.5123	.5102	.5142	.5122	.5162	.5141	.5181
.5625–24	UNEF	.5170	84.1	.5244	70.4	.5170	.5209	.5186	.5226	.5204	.5244	.5221	.5261
.5625–28	28UN	.5240	83.0	.5301	69.8	.5240	.5270	.5245	.5285	.5261	.5301	.5277	.5317
.5625–32	32UN	.5290	82.5	.5344	69.2	.5290	.5316	.5290	.5330	.5304	.5344	.5319	.5359
.625–11	UNC	.5270	83.0	.5391	72.7	.5270	.5328	.5298	.5360	.5329	.5391	.5360	.5422
.625–12	12UN	.5350	83.1	.5463	72.7	.5350	.5406	.5377	.5435	.5405	.5463	.5434	.5492
.625–16	16UN	.5570	83.8	.5662	72.4	.5570	.5617	.5596	.5640	.5618	.5662	.5640	.5684
.625–18	UNF	.5650	83.1	.5730	72.1	.5650	.5690	.5669	.5710	.5689	.5730	.5710	.5751
.625–20	20UN	.5710	83.1	.5787	71.3	.5710	.5748	.5727	.5767	.5747	.5787	.5766	.5806
.625–24	UNEF	.5800	83.1	.5869	70.4	.5800	.5834	.5811	.5851	.5829	.5869	.5846	.5886
.625–28	28UN	.5860	84.1	.5926	69.8	.5860	.5895	.5870	.5910	.5886	.5926	.5902	.5942
.625–32	32UN	.5910	83.8	.5969	69.2	.5910	.5941	.5915	.5955	.5929	.5969	.5944	.5984
.6875–12	12UN	.5970	83.6	.6085	73.0	.5970	.6029	.6001	.6057	.6029	.6085	.6057	.6113
.6875–16	16UN	.6200	83.1	.6284	72.8	.6200	.6241	.6219	.6262	.6241	.6284	.6263	.6306
.6875–18	UNS	.6270	83.8	.6355	72.1	.6270	.6315	.6294	.6335	.6314	.6355	.6335	.6376
.6875–20	20UN	.6330	83.9	.6412	71.3	.6330	.6373	.6352	.6392	.6372	.6412	.6391	.6431
.6875–24	UNEF	.6420	84.1	.6494	70.4	.6420	.6459	.6436	.6476	.6454	.6494	.6471	.6511
.6875–28	28UN	.6490	83.0	.6551	69.8	.6490	.6520	.6495	.6535	.6511	.6551	.6527	.6567
.6875–32	32UN	.6540	82.5	.6594	69.2	.6540	.6566	.6540	.6580	.6554	.6594	.6569	.6609
.750–10	UNC	.6420	83.1	.6545	73.5	.6420	.6481	.6449	.6513	.6481	.6545	.6513	.6577
.750–12	12UN	.6600	83.1	.6707	73.3	.6600	.6652	.6626	.6680	.6653	.6707	.6680	.6734
.750–16	UNF	.6820	83.8	.6908	72.9	.6820	.6866	.6844	.6887	.6865	.6908	.6886	.6929
.750–18	UNS	.6900	83.1	.6980	72.1	.6900	.6940	.6919	.6960	.6939	.6980	.6960	.7001
.750–20	UNEF	.6960	83.1	.7037	71.3	.6960	.6998	.6977	.7017	.6997	.7037	.7016	.7056
.750–28	28UN	.7110	84.1	.7176	69.8	.7110	.7145	.7120	.7160	.7136	.7176	.7152	.7192
.750–32	32UN	.7160	83.8	.7219	69.2	.7160	.7191	.7165	.7205	.7179	.7219	.7194	.7234
.8125–12	12UN	.7220	83.6	.7329	73.5	.7220	.7276	.7250	.7303	.7276	.7329	.7303	.7356
.8125–16	16UN	.7450	83.1	.7533	72.9	.7450	.7491	.7469	.7512	.7490	.7533	.7511	.7554
.8125–18	UNS	.7520	83.8	.7605	72.1	.7520	.7565	.7544	.7585	.7564	.7605	.7585	.7626
.8125–20	UNEF	.7580	83.9	.7662	71.3	.7580	.7623	.7602	.7642	.7622	.7662	.7641	.7681
.8125–28	28UN	.7740	83.0	.7801	69.8	.7740	.7770	.7745	.7785	.7761	.7801	.7777	.7817
.8125–32	32UN	.7790	82.5	.7844	69.2	.7790	.7816	.7790	.7830	.7804	.7844	.7819	.7859
.875–9	UNC	.7550	83.1	.7681	74.1	.7550	.7614	.7580	.7647	.7614	.7681	.7647	.7714
.875–12	12UN	.7850	83.1	.7952	73.7	.7850	.7900	.7874	.7926	.7900	.7952	.7926	.7978
.875–14	UNF	.7980	83.0	.8068	73.5	.7980	.8022	.8000	.8045	.8023	.8068	.8045	.8090
.875–16	16UN	.8070	83.8	.8158	72.9	.8070	.8116	.8094	.8137	.8115	.8158	.8136	.8179
.875–18	UNS	.8150	83.1	.8230	72.1	.8150	.8190	.8169	.8210	.8189	.8230	.8210	.8251
.875–20	UNEF	.8210	83.1	.8287	71.3	.8210	.8248	.8227	.8267	.8247	.8287	.8266	.8306
.875–28	28UN	.8360	84.1	.8426	69.8	.8360	.8395	.8370	.8410	.8386	.8426	.8402	.8442
.875–32	32UN	.8410	83.8	.8469	69.2	.8410	.8441	.8415	.8455	.8429	.8469	.8444	.8484
.9375–12	12UN	.8470	83.6	.8575	73.9	.8470	.8524	.8499	.8550	.8524	.8575	.8550	.8601
.9375–16	16UN	.8700	83.1	.8783	72.9	.8700	.8741	.8719	.8762	.8740	.8783	.8761	.8804
.9375–20	UNEF	.8830	83.9	.8912	71.3	.8830	.8873	.8852	.8892	.8872	.8912	.8891	.8931
.9375–28	28UN	.8990	83.0	.9051	69.8	.8990	.9020	.8995	.9035	.9011	.9051	.9027	.9067
.9375–32	32UN	.9040	82.5	.9094	69.2	.9040	.9066	.9040	.9080	.9054	.9094	.9069	.9109
1.000–8	UNC	.8650	83.1	.8797	74.1	.8650	.8722	.8684	.8759	.8722	.8797	.8760	.8835
1.000–12	UNF	.9100	83.1	.9198	74.1	.9100	.9148	.9123	.9173	.9148	.9198	.9173	.9223
1.000–14	UNS	.9230	83.0	.9315	73.8	.9230	.9271	.9249	.9293	.9271	.9315	.9293	.9337
1.000–16	16UN	.9320	83.8	.9408	72.9	.9320	.9366	.9344	.9387	.9365	.9408	.9386	.9429
1.000–18	UNS	.9400	83.1	.9480	72.1	.9400	.9440	.9419	.9460	.9439	.9480	.9460	.9501
1.000–20	UNEF	.9460	83.1	.9537	71.3	.9460	.9498	.9477	.9517	.9497	.9537	.9516	.9556
1.000–28	28UN	.9610	84.1	.9676	69.8	.9610	.9645	.9620	.9660	.9636	.9676	.9652	.9692
1.000–32	32UN	.9660	83.8	.9719	69.2	.9660	.9691	.9665	.9705	.9679	.9719	.9694	.9734

See footnotes at end of table.

TABLE A3.6. *Recommended hole size limits before threading for different lengths of engagement, standard Unified and some UNS threads, class 3B (based on table 3.10[a])*—Continued

Nominal size in inches and threads per inch	Series designation	Minor diameter of internal threads				Recommended hole size limits for different lengths of engagement							
		Min	Percent basic thread height [b]	Max [c]	Percent basic thread height [b]	To and including 0.33*D*		Above 0.33*D* thru 0.67*D*		Above 0.67*D* thru 1.5*D*		Above 1.5*D* thru 3*D*	
						Min	Max	Min	Max	Min	Max	Min	Max
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		in		*in*		*in*	*in*	*in*	*in*	*in*	*in*	*in*	*in*
1.0625–8	8UN	.9270	83.4	.9422	74.1	.9270	.9347	.9309	.9384	.9347	.9422	.9385	.9460
1.0625–12	12UN	.9720	83.6	.9823	74.1	.9720	.9773	.9748	.9798	.9773	.9823	.9798	.9848
1.0625–14	UNS	.9850	83.5	.9940	73.8	.9850	.9896	.9874	.9918	.9896	.9940	.9918	.9962
1.0625–16	16UN	.9950	83.1	1.0033	72.9	.9950	.9991	.9969	1.0012	.9990	1.0033	1.0011	1.0054
1.0625–18	UNEF	1.0020	83.8	1.0105	72.1	1.0020	1.0065	1.0044	1.0085	1.0064	1.0105	1.0085	1.0126
1.0625–20	20UN	1.0080	83.9	1.0162	71.3	1.0080	1.0123	1.0102	1.0142	1.0122	1.0162	1.0141	1.0181
1.0625–28	28UN	1.0240	83.0	1.0301	69.8	1.0240	1.0270	1.0245	1.0285	1.0261	1.0301	1.0277	1.0317
1.125–7	UNC	0.9700	83.5	0.9875	74.1	0.9700	0.9790	0.9747	0.9833	0.9789	0.9875	0.9832	0.9918
1.125–8	8UN	.9900	83.1	1.0047	74.1	.9900	.9972	.9934	1.0009	.9972	1.0047	1.0010	1.0085
1.125–12	UNF	1.0350	83.1	1.0448	74.1	1.0350	1.0398	1.0373	1.0423	1.0398	1.0448	1.0423	1.0473
1.125–16	16UN	1.0570	83.8	1.0658	72.9	1.0570	1.0616	1.0594	1.0637	1.0615	1.0658	1.0636	1.0679
1.125–18	UNEF	1.0650	83.1	1.0730	72.1	1.0650	1.0690	1.0669	1.0710	1.0689	1.0730	1.0710	1.0751
1.125–20	20UN	1.0710	83.1	1.0787	71.3	1.0710	1.0748	1.0727	1.0767	1.0747	1.0787	1.0766	1.0806
1.125–28	28UN	1.0860	84.1	1.0926	69.8	1.0860	1.0895	1.0870	1.0910	1.0886	1.0926	1.0902	1.0942
1.1875–8	8UN	1.0520	83.4	1.0672	74.1	1.0520	1.0597	1.0559	1.0634	1.0597	1.0672	1.0635	1.0710
1.1875–12	12UN	1.0970	83.6	1.1073	74.1	1.0970	1.1023	1.0998	1.1048	1.1023	1.1073	1.1048	1.1098
1.1875–16	16UN	1.1200	83.1	1.1283	72.9	1.1200	1.1241	1.1219	1.1262	1.1240	1.1283	1.1261	1.1304
1.1875–18	UNEF	1.1270	83.8	1.1355	72.1	1.1270	1.1315	1.1294	1.1335	1.1314	1.1355	1.1335	1.1376
1.1875–20	20UN	1.1330	83.9	1.1412	71.3	1.1330	1.1373	1.1352	1.1392	1.1372	1.1412	1.1391	1.1431
1.1875–28	28UN	1.1490	83.0	1.1551	69.8	1.1490	1.1520	1.1495	1.1535	1.1511	1.1551	1.1527	1.1567
1.250–7	UNC	1.0950	83.5	1.1125	74.1	1.0950	1.1040	1.0997	1.1083	1.1039	1.1125	1.1082	1.1168
1.250–8	8UN	1.1150	83.1	1.1297	74.1	1.1150	1.1222	1.1184	1.1259	1.1222	1.1297	1.1260	1.1335
1.250–12	UNF	1.1600	83.1	1.1698	74.1	1.1600	1.1648	1.1623	1.1673	1.1648	1.1698	1.1673	1.1723
1.250–16	16UN	1.1820	83.8	1.1908	72.9	1.1820	1.1866	1.1844	1.1887	1.1865	1.1908	1.1886	1.1929
1.250–18	UNEF	1.1900	83.1	1.1980	72.1	1.1900	1.1940	1.1919	1.1960	1.1939	1.1980	1.1960	1.2001
1.250–20	20UN	1.1960	83.1	1.2037	71.3	1.1960	1.1998	1.1977	1.2017	1.1997	1.2037	1.2016	1.2056
1.250–28	28UN	1.2110	84.1	1.2176	69.8	1.2110	1.2145	1.2120	1.2160	1.2136	1.2176	1.2152	1.2192
1.3125–8	8UN	1.1770	83.4	1.1922	74.1	1.1770	1.1847	1.1809	1.1884	1.1847	1.1922	1.1885	1.1960
1.3125–12	12UN	1.2220	83.6	1.2323	74.1	1.2220	1.2273	1.2248	1.2298	1.2273	1.2323	1.2298	1.2348
1.3125–16	16UN	1.2450	83.1	1.2533	72.9	1.2450	1.2491	1.2469	1.2512	1.2490	1.2533	1.2511	1.2554
1.3125–18	UNEF	1.2520	83.8	1.2605	72.1	1.2520	1.2565	1.2544	1.2585	1.2564	1.2605	1.2585	1.2626
1.3125–20	20UN	1.2580	83.9	1.2662	71.3	1.2580	1.2623	1.2602	1.2642	1.2622	1.2662	1.2641	1.2681
1.3125–28	28UN	1.2740	83.0	1.2801	69.8	1.2740	1.2770	1.2745	1.2785	1.2761	1.2801	1.2777	1.2817
1.375–6	UNC	1.1950	83.1	1.2146	74.1	1.1950	1.2046	1.1996	1.2096	1.2046	1.2146	1.2096	1.2196
1.375–8	8UN	1.2400	83.1	1.2547	74.1	1.2400	1.2472	1.2434	1.2509	1.2472	1.2547	1.2510	1.2585
1.375–12	UNF	1.2850	83.1	1.2948	74.1	1.2850	1.2898	1.2873	1.2923	1.2898	1.2948	1.2923	1.2973
1.375–16	16UN	1.3070	83.8	1.3158	72.9	1.3070	1.3116	1.3094	1.3137	1.3115	1.3158	1.3136	1.3179
1.375–18	UNEF	1.3150	83.1	1.3230	72.1	1.3150	1.3190	1.3169	1.3210	1.3189	1.3230	1.3210	1.3251
1.375–20	20UN	1.3210	83.1	1.3287	71.3	1.3210	1.3248	1.3227	1.3267	1.3247	1.3287	1.3266	1.3306
1.375–28	28UN	1.3360	84.1	1.3426	69.8	1.3360	1.3395	1.3370	1.3410	1.3386	1.3426	1.3402	1.3442
1.4375–6	6UN	1.2570	83.4	1.2771	74.1	1.2570	1.2671	1.2621	1.2721	1.2671	1.2771	1.2721	1.2821
1.4375–8	8UN	1.3020	83.4	1.3172	74.1	1.3020	1.3097	1.3059	1.3134	1.3097	1.3172	1.3135	1.3210
1.4375–12	12UN	1.3470	83.6	1.3573	74.1	1.3470	1.3523	1.3498	1.3548	1.3523	1.3573	1.3548	1.3598
1.4375–16	16UN	1.3700	83.1	1.3783	72.9	1.3700	1.3741	1.3719	1.3762	1.3740	1.3783	1.3761	1.3804
1.4375–18	UNEF	1.3770	83.8	1.3855	72.1	1.3770	1.3815	1.3794	1.3835	1.3814	1.3855	1.3835	1.3876
1.4375–20	20UN	1.3830	83.9	1.3912	71.3	1.3830	1.3873	1.3852	1.3892	1.3872	1.3912	1.3891	1.3931
1.4375–28	28UN	1.3990	83.0	1.4051	69.8	1.3990	1.4020	1.3995	1.4035	1.4011	1.4051	1.4027	1.4067
1.500–6	UNC	1.3200	83.1	1.3396	74.1	1.3200	1.3296	1.3246	1.3346	1.3296	1.3396	1.3346	1.3446
1.500–8	8UN	1.3650	83.1	1.3797	74.1	1.3650	1.3722	1.3684	1.3759	1.3722	1.3797	1.3760	1.3835
1.500–12	UNF	1.4100	83.1	1.4198	74.1	1.4100	1.4148	1.4123	1.4173	1.4148	1.4198	1.4173	1.4223
1.500–16	16UN	1.4320	83.8	1.4408	72.9	1.4320	1.4366	1.4344	1.4387	1.4365	1.4408	1.4386	1.4429
1.500–18	UNEF	1.4400	83.1	1.4480	72.1	1.4400	1.4440	1.4419	1.4460	1.4439	1.4480	1.4460	1.4501
1.500–20	20UN	1.4460	83.1	1.4537	71.3	1.4460	1.4498	1.4477	1.4517	1.4497	1.4537	1.4516	1.4556
1.500–28	28UN	1.4610	84.1	1.4676	69.8	1.4610	1.4645	1.4620	1.4660	1.4636	1.4676	1.4652	1.4692

1.5625–6	6UN	1.3820	83.4	1.4021	74.1	1.3820	1.3921	1.3871	1.3971	1.3921	1.4021	1.3971	1.4071
1.5625–8	8UN	1.4270	83.4	1.4422	74.1	1.4270	1.4347	1.4309	1.4384	1.4347	1.4422	1.4385	1.4460
1.5625–12	12UN	1.4720	83.6	1.4823	74.1	1.4720	1.4773	1.4748	1.4798	1.4773	1.4823	1.4798	1.4848
1.5625–16	16UN	1.4950	83.1	1.5033	72.9	1.4950	1.4991	1.4969	1.5012	1.4990	1.5033	1.5011	1.5054
1.5625–18	UNEF	1.5020	83.8	1.5105	72.1	1.5020	1.5065	1.5044	1.5085	1.5064	1.5105	1.5085	1.5126
1.5625–20	20UN	1.5080	83.9	1.5162	71.3	1.5080	1.5123	1.5102	1.5142	1.5122	1.5162	1.5141	1.5181
1.625–6	6UN	1.4450	83.1	1.4646	74.1	1.4450	1.4546	1.4496	1.4596	1.4546	1.4646	1.4596	1.4696
1.625–8	8UN	1.4900	83.1	1.5047	74.1	1.4900	1.4972	1.4934	1.5009	1.4972	1.5047	1.5010	1.5085
1.625–12	12UN	1.5350	83.1	1.5448	74.1	1.5350	1.5398	1.5373	1.5423	1.5398	1.5448	1.5423	1.5473
1.625–16	16UN	1.5570	83.8	1.5658	72.9	1.5570	1.5616	1.5594	1.5637	1.5615	1.5658	1.5636	1.5679
1.625–18	UNEF	1.5650	83.1	1.5730	72.1	1.5650	1.5690	1.5669	1.5710	1.5689	1.5730	1.5710	1.5751
1.625–20	20UN	1.5710	83.1	1.5787	71.3	1.5710	1.5748	1.5727	1.5767	1.5747	1.5787	1.5766	1.5806
1.6875–6	6UN	1.5070	83.4	1.5271	74.1	1.5070	1.5171	1.5121	1.5221	1.5171	1.5271	1.5221	1.5321
1.6875–8	8UN	1.5520	83.4	1.5672	74.1	1.5520	1.5597	1.5559	1.5634	1.5597	1.5672	1.5635	1.5710
1.6875–12	12UN	1.5970	83.6	1.6073	74.1	1.5970	1.6023	1.5998	1.6048	1.6023	1.6073	1.6048	1.6098
1.6875–16	16UN	1.6200	83.1	1.6283	72.9	1.6200	1.6241	1.6219	1.6262	1.6240	1.6283	1.6261	1.6304
1.6875–18	UNEF	1.6270	83.8	1.6355	72.1	1.6270	1.6315	1.6294	1.6335	1.6314	1.6355	1.6335	1.6376
1.6875–20	20UN	1.6330	83.9	1.6412	71.3	1.6330	1.6373	1.6352	1.6392	1.6372	1.6412	1.6391	1.6431
1.750–5	UNC	1.5340	83.1	1.5575	74.1	1.5340	1.5455	1.5395	1.5515	1.5455	1.5575	1.5515	1.5635
1.750–6	6UN	1.5700	83.1	1.5896	74.1	1.5700	1.5796	1.5746	1.5846	1.5796	1.5896	1.5846	1.5946
1.750–8	8UN	1.6150	83.1	1.6297	74.1	1.6150	1.6222	1.6184	1.6259	1.6222	1.6297	1.6260	1.6335
1.750–12	12UN	1.6600	83.1	1.6698	74.1	1.6600	1.6648	1.6623	1.6673	1.6648	1.6698	1.6673	1.6723
1.750–16	16UN	1.6820	83.8	1.6908	72.9	1.6820	1.6866	1.6844	1.6887	1.6865	1.6908	1.6886	1.6929
1.750–20	20UN	1.6960	83.1	1.7037	71.3	1.6960	1.6998	1.6977	1.7017	1.6997	1.7037	1.7016	1.7056
1.8125–6	6UN	1.6320	83.4	1.6521	74.1	1.6320	1.6421	1.6371	1.6471	1.6421	1.6521	1.6471	1.6571
1.8125–8	8UN	1.6770	83.4	1.6922	74.1	1.6770	1.6847	1.6809	1.6884	1.6847	1.6922	1.6885	1.6960
1.8126–12	12UN	1.7220	83.6	1.7323	74.1	1.7220	1.7273	1.7248	1.7298	1.7273	1.7323	1.7298	1.7348
1.8125–16	16UN	1.7450	83.1	1.7533	72.9	1.7450	1.7491	1.7469	1.7512	1.7490	1.7533	1.7511	1.7554
1.8125–20	20UN	1.7580	83.9	1.7662	71.3	1.7580	1.7623	1.7602	1.7642	1.7622	1.7662	1.7641	1.7681
1.875–6	6UN	1.6950	83.1	1.7146	74.1	1.6950	1.7046	1.6996	1.7096	1.7046	1.7146	1.7096	1.7196
1.875–8	8UN	1.7400	83.1	1.7547	74.1	1.7400	1.7472	1.7434	1.7509	1.7472	1.7547	1.7510	1.7585
1.875–12	12UN	1.7850	83.1	1.7948	74.1	1.7850	1.7898	1.7873	1.7923	1.7898	1.7948	1.7923	1.7973
1.875–16	16UN	1.8070	83.8	1.8158	72.9	1.8070	1.8116	1.8094	1.8137	1.8115	1.8158	1.8136	1.8179
1.875–20	20UN	1.8210	83.1	1.8287	71.3	1.8210	1.8248	1.8227	1.8267	1.8247	1.8287	1.8266	1.8306
1.9375–6	6UN	1.7570	83.4	1.7771	74.1	1.7570	1.7671	1.7621	1.7721	1.7671	1.7771	1.7721	1.7821
1.9375–8	8UN	1.8020	83.4	1.8172	74.1	1.8020	1.8097	1.8059	1.8134	1.8097	1.8172	1.8135	1.8210
1.9375–12	12UN	1.8470	83.6	1.8573	74.1	1.8470	1.8523	1.8498	1.8548	1.8523	1.8573	1.8548	1.8598
1.9375–16	16UN	1.8700	83.1	1.8783	72.9	1.8700	1.8741	1.8719	1.8762	1.8740	1.8783	1.8761	1.8804
1.9375–20	20UN	1.8830	83.9	1.8912	71.3	1.8830	1.8873	1.8852	1.8892	1.8872	1.8912	1.8891	1.8931
2.000–4.5	UNC	1.7590	83.5	1.7861	74.1	1.7590	1.7727	1.7661	1.7794	1.7728	1.7861	1.7794	1.7927
2.000–6	6UN	1.8200	83.1	1.8396	74.1	1.8200	1.8296	1.8246	1.8346	1.8296	1.8396	1.8346	1.8446
2.000–8	8UN	1.8650	83.1	1.8797	74.1	1.8650	1.8722	1.8684	1.8759	1.8722	1.8797	1.8760	1.8835
2.000–12	12UN	1.9100	83.1	1.9198	74.1	1.9100	1.9148	1.9123	1.9173	1.9148	1.9198	1.9173	1.9223
2.000–16	16UN	1.9320	83.8	1.9408	72.9	1.9320	1.9366	1.9344	1.9387	1.9365	1.9408	1.9386	1.9429
2.000–20	20UN	1.9460	83.1	1.9537	71.3	1.9460	1.9498	1.9477	1.9517	1.9497	1.9537	1.9516	1.9556
2.0625–16	UNS	1.9950	83.1	2.0033	72.9	1.9950	1.9991	1.9969	2.0012	1.9990	2.0033	2.0011	2.0054
2.125–6	6UN	1.9450	83.1	1.9646	74.1	1.9450	1.9546	1.9496	1.9596	1.9546	1.9646	1.9596	1.9696
2.125–8	8UN	1.9900	83.1	2.0047	74.1	1.9900	1.9972	1.9934	2.0009	1.9972	2.0047	2.0010	2.0085
2.125–12	12UN	2.0350	83.1	2.0448	74.1	2.0350	2.0398	2.0373	2.0423	2.0398	2.0448	2.0423	2.0473
2.125–16	16UN	2.0570	83.8	2.0658	72.9	2.0570	2.0616	2.0594	2.0637	2.0615	2.0658	2.0636	2.0679
2.125–20	20UN	2.0710	83.1	2.0787	71.3	2.0710	2.0748	2.0727	2.0767	2.0747	2.0787	2.0766	2.0806
2.1875–16	UNS	2.1200	83.1	2.1283	72.9	2.1200	2.1241	2.1219	2.1262	2.1240	2.1283	2.1261	2.1304
2.250–4.5	UNC	2.0090	83.5	2.0361	74.1	2.0090	2.0227	2.0161	2.0294	2.0228	2.0361	2.0294	2.0427
2.250–6	6UN	2.0700	83.1	2.0896	74.1	2.0700	2.0796	2.0746	2.0846	2.0796	2.0896	2.0846	2.0946
2.500–4	UNC	2.2290	83.4	2.2594	74.1	2.2290	2.2444	2.2369	2.2519	2.2444	2.2594	2.2519	2.2669
2.750–4	UNC	2.4790	83.4	2.5094	74.1	2.4790	2.4944	2.4869	2.5019	2.4944	2.5094	2.5019	2.5169
3.000–4	UNC	2.7290	83.4	2.7594	74.1	2.7290	2.7444	2.7369	2.7519	2.7444	2.7594	2.7519	2.7669
3.250–4	UNC	2.9790	83.4	3.0094	74.1	2.9790	2.9944	2.9869	3.0019	2.9944	3.0094	3.0019	3.0169

[a] The differences between limits are equal to the minor diameter tolerances given in table 3.10 for lengths of engagement to and including 0.33*D*. However, the minimum values for lengths of engagement greater than 0.33*D* in sizes 0.25 in. and larger are adjusted so that the difference between limits is never less than 0.0040 in. For diameter-pitch combinations other than those given in this table, the tolerances given in table 3.10 should be similarly applied to determine hole size limits.

Hole size limits for diameter-pitch combinations which do not appear in this table may be obtained by use of values in this table provided there is a diameter-pitch combination in the table:

(1) with the same pitch and

(2) with a diameter that is less by an integral amount than the diameter of the diameter-pitch combination for which hole size values are desired. (NOTE: Values in the table for nominal sizes less than 1.00 in. cannot be used for this purpose.)

EXAMPLE: To obtain the values for the 4.000–8UN–3B thread, add 2.000 to the values for the 2.000–8UN thread shown in the table. These values would then become: 3.8650, 3.8722, 3.8684, 3.8759, 3.8722, 3.8797, 3.8760, 3.8835. The percentages of basic thread height will remain unchanged.

[b] Based on values as rounded off in the preceding column. 100 percent basic thread height = $0.75H$ (values of $0.75H$ are shown in col. 14, table 2.1).

[c] Based on a length of engagement equal to the nominal diameter.

TABLE A3.7. *Recommended hole size limits before threading for different lengths of engagement, Unified National Miniature, UNM, thread series*

Thread designation			Minor diameter of internal threads				Recommended hole size limits for different lengths of engagement [a]					
							To and including 0.67*D*		Above 0.67*D* to 1.5*D*		Above 1.5*D* to 3*D*	
Preferred	Secondary		Min	Percent basic thread height	Max	Percent basic thread height	Min	Max	Min	Max	Min	Max
		Pitch *mm*	*mm*		*mm*		*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
.30UNM		0.080	0.223	100	0.260	51.9	0.232	0.246	0.241	0.260	0.251	0.269
	.35UNM	.090	.264	100	.305	52.3	.274	.290	.284	.305	.295	.315
.40UNM		.100	.304	100	.348	54.2	.315	.332	.326	.348	.337	.359
	.45UNM	.100	.354	100	.398	54.2	.365	.382	.376	.398	.387	.409
.50UNM		.125	.380	100	.432	56.7	.393	.412	.406	.432	.419	.445
	.55UNM	.125	.430	100	.482	56.7	.443	.462	.456	.482	.469	.495
.60UNM		.150	.456	100	.516	58.3	.471	.494	.486	.516	.501	.531
	.70UNM	.175	.532	100	.600	59.5	.549	.574	.566	.600	.583	.617
.80UNM		.200	.608	100	.684	60.4	.627	.656	.646	.684	.665	.703
	.90UNM	.225	.684	100	.768	61.1	.705	.736	.726	.768	.747	.789
1.00UNM		.250	.760	100	.852	61.7	.783	.818	.806	.852	.829	.875
	1.10UNM	.250	.860	100	.952	61.7	.883	.918	.906	.952	.929	.975
1.20UNM		.250	.960	100	1.052	61.7	.983	1.018	1.006	1.052	1.029	1.075
	1.40UNM	.300	1.112	100	1.220	62.5	1.139	1.180	1.166	1.220	1.193	1.247
		Thds per inch	*in*		*in*		*in*	*in*	*in*	*in*	*in*	*in*
.30UNM		318	0.0088	100	0.0102	51.9	0.0092	0.0097	0.0095	0.0102	0.0098	0.0106
	.35UNM	282	.0104	100	.0120	52.3	.0108	.0114	.0112	.0120	.0116	.0124
.40UNM		254	.0120	100	.0137	54.2	.0124	.0131	.0128	.0137	.0133	.0141
	.45UNM	254	.0139	100	.0157	54.2	.0143	.0150	.0148	.0157	.0153	.0161
.50UNM		203	.0150	100	.0170	56.7	.0155	.0162	.0160	.0170	.0165	.0175
	.55UNM	203	.0169	100	.0190	56.7	.0174	.0182	.0179	.0190	.0185	.0195
.60UNM		169	.0180	100	.0203	58.3	.0186	.0194	.0192	.0203	.0197	.0209
	.70UNM	145	.0209	100	.0236	59.5	.0216	.0226	.0223	.0236	.0229	.0243
.80UNM		127	.0239	100	.0269	60.4	.0247	.0258	.0254	.0269	.0261	.0277
	.90UNM	113	.0269	100	.0302	61.1	.0277	.0290	.0285	.0302	.0294	.0310
1.00UNM		102	.0299	100	.0335	61.7	.0308	.0321	.0317	.0335	.0326	.0344
	1.10UNM	102	.0339	100	.0375	61.7	.0348	.0361	.0357	.0375	.0366	.0384
1.20UNM		102	.0378	100	.0414	61.7	.0387	.0400	.0396	.0414	.0405	.0423
	1.40UNM	85	.0438	100	.0480	62.5	.0448	.0464	.0459	.0480	.0470	.0490

[a] Limited experience indicates these sizes to be suitable for easily machineable materials (brass, nickel-silver, etc.). For materials more difficult to machine, hole size limits in the next larger category are suggested. In instances where hole sizes in excess of the maximum minor diameter are necessary, the excess is usually recovered in the thread form by the spin-up resulting from the negative rake with which these small taps must be ground.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

APPENDIX A4

1969

METHODS OF WIRE MEASUREMENT OF PITCH DIAMETER OF 60° THREADS

On a straight thread, the pitch diameter is the diameter of the cylinder whose surface passes through the thread profiles at such points as to make the widths of thread groove and thread ridge equal.

On a taper thread, the pitch diameter at a given position on the thread axis is the diameter of the pitch cone at that position.

The degree of accuracy to which the pitch diameter can be measured will depend on the accuracy of lead, helix, and form of thread. As thread plug gages and thread setting plug gages have highly accurate threads, their pitch diameters may be measured to a correspondingly high degree of accuracy by applying the methods described in this appendix. In turn, the *virtual diameters* (*or effective sizes*) of thread ring, most snap, and most indicating gages may be determined by fitting or comparison with such setting plug gages. Those snap and indicating gages which utilize elements with curved contacts have a pitch (simple effective) diameter determined by comparison to the applicable setting plug gages.

As most threads of mechanical fasteners and components are made to a lesser degree of accuracy than gage threads, their pitch diameters are not susceptible to accurate determination by direct measuring methods. Therefore, it is not recommended that such threads be measured by the use of wires. On such threads, the pitch diameter is to be regarded as the pitch cylinder or cone which would bound, on the maximum-material side, the approximately cylindrical or conical surface which would pass through the thread profiles at all points such that the widths of the thread and groove are equal. Accordingly, the conformity of such threads with specified pitch diameter limits is determined by gaging means and methods specified in section 6.

The accurate measurement of pitch diameter of a thread, which may be perfect as to form and lead, presents certain difficulties which result in some uncertainty as to its true value. The adoption of a standard uniform practice in making such measurements is, therefore, desirable in order to reduce such uncertainty of measurement to a minimum. The so-called "three-wire method" of measuring pitch diameter of straight thread plug gages, as outlined herein, has been found to be the most generally satisfactory method when properly carried out, and is recommended for universal use in the direct measurement of thread plug and thread setting plug gages. (See fig. A4.1.)

1. SIZE OF WIRES

In the three-wire method of measuring pitch diameter, small hardened steel cylinders or wires of correct size are placed in the thread groove, two on one side of the screw and one on the opposite side, as shown in figure A4.1. The contact face of the comparator, measuring machine, or micrometer anvil or spindle over the two wires must be sufficiently large in diameter to touch both wires; that is, the diameter must be greater than the pitch of the thread. It is best to select wires of such size that they touch the flanks of the thread at the midslope since the measurement of pitch diameter is least affected by any deviation in thread angle that may be present when such size is used. The size of wire that touches exactly at the midslope of a perfect thread of a given pitch is termed the "best-size" wire for that pitch. Any size, however, may be used that will permit the wires to rest on the flanks of the thread and also project above the crest of the thread.

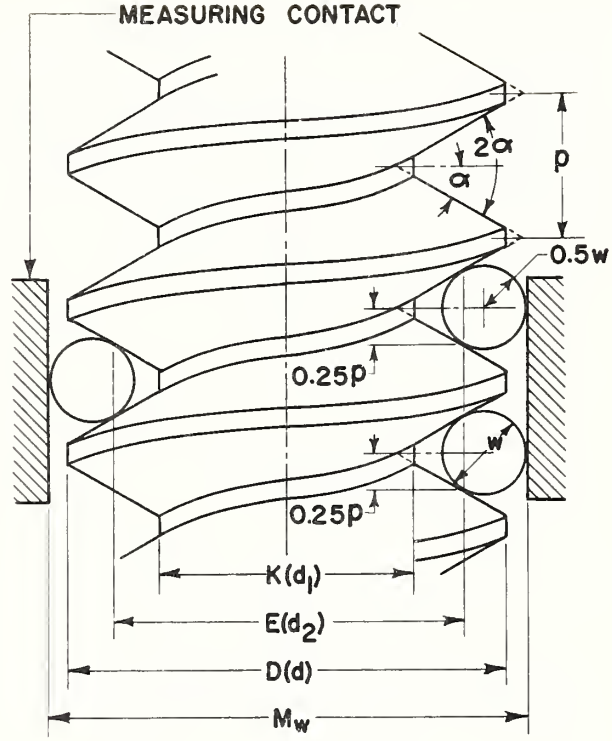

FIGURE A4.1. *Three-wire method of measuring pitch diameter of straight thread plug gages.*

The depth at which a wire of given diameter will rest in a thread groove depends primarily on the pitch and included angle of the thread and, secondarily, on the angle made by the helix at the point of contact of the wire and the thread, with a plane perpendicular to the axis of the screw. Inasmuch as variation in the lead angle has a very small effect in determining the diameter of the wire that touches at the midslope of the thread, and as it is desirable to use one size of wire to measure all threads of a given pitch and included angle, the best-size wire is taken as that size which will touch at the midslope of a groove cut around a cylinder perpendicular to the axis of the cylinder, and of the same angle and depth as the thread of the given pitch. This is equivalent to a thread of zero lead angle. The size of wire touching at the midslope, or "best-size" wire, is given by the formula:

$$W = \frac{p}{2} \sec \alpha$$

in which

W = diameter of wire

p = pitch

α = half included angle of thread.

This formula reduces to—

$$W = 0.57735p, \text{ for } 60° \text{ threads.}$$

TABLE A4.2. *Wire sizes and constants for all USA Standard 60° threads (Unified, hose-coupling, and pipe)*

Threads per inch, n	Pitch, $p = \frac{1}{n}$	Pitch/2, $\frac{p}{2} = \frac{1}{2n}$	Depth of V thread, $\frac{\cot 30°}{2n}$	Wire sizes[a] Best, $0.577350p$	Maximum, $1.010363p$	Minimum, $0.505182p$
1	2	3	4	5	6	7
	in	*in*	*in*	*in*	*in*	*in*
80	0.012500	0.00625	0.010825	0.00722	0.01263	0.00631
72	.013889	.00694	.012028	.00802	.01403	.00702
64	.015625	.00781	.013532	.00902	.01579	.00789
56	.017857	.00893	.015465	.01031	.01804	.00902
50	.020000	.01000	.017321	.01155	.02021	.01010
48	.020833	.01042	.018042	.01203	.02105	.01052
44	.022727	.01136	.019682	.01312	.02296	.01148
40	.025000	.01250	.021651	.01443	.02526	.01263
36	.027778	.01389	.024056	.01604	.02807	.01403
32	.031250	.01562	.027063	.01804	.03157	.01579
30	.033333	.01667	.028868	.01925	.03368	.01684
28	.035714	.01786	.030929	.02062	.03608	.01804
27	.037037	.01852	.032075	.02138	.03742	.01871
26	.038462	.01923	.033309	.02221	.03886	.01943
24	.041667	.02083	.036084	.02406	.04210	.02105
22	.045445	.02273	.039365	.02624	.04592	.02296
20	.050000	.02500	.043301	.02887	.05052	.02526
18	.055556	.02778	.048113	.03208	.05613	.02807
16	.062500	.03125	.054127	.03608	.06315	.03157
14	.071429	.03571	.061859	.04124	.07217	.03608
13	.076923	.03846	.066617	.04441	.07772	.03886
12	.083333	.04167	.072169	.04811	.08420	.04210
11.5	.086957	.04348	.075307	.05020	.08786	.04393
11	.090909	.04545	.078730	.05249	.09185	.04593
10	.100000	.05000	.086603	.05774	.10104	.05052
9	.111111	.05556	.096225	.06415	.11226	.05613
8	.125000	.06250	.108253	.07217	.12630	.06315
7.5	.133333	.06667	.115470	.07698	.13472	.06736
7	.142857	.07143	.123718	.08248	.14434	.07217
6	.166667	.08333	.144338	.09623	.16839	.08420
5.5	.181818	.09091	.157459	.10497	.18370	.09185
5	.200000	.10000	.173205	.11547	.20207	.10104
4.5	.222222	.11111	.192450	.12830	.22453	.11226
4	.250000	.12500	.216506	.14434	.25259	.12630

[a] These wire sizes are based on zero lead angle. Also maximum and minimum sizes are based on a width of flat at the crest equal to $0.125p$. The width of flat of USA Standard pipe thread gages is slightly less than this, so that the minimum size listed is slightly too small for such gages. In any case the use of wires of either extreme size is to be avoided.

It is frequently desirable, as, for example, when a best-size wire is not available, to measure pitch diameter by means of wires of other than the best size. The minimum size that may be used is limited to that permitting the wire to project above the crest of the thread, and the maximum to that permitting the wire to rest on the flanks of the thread just below the crest, and not ride on the crest of the thread. The diameters of the best size, maximum, and minimum wires for all USA Standard 60° threads are given in tables A4.2 and A4.3.

When using wires of other than the best-size, precautions must be observed in the calculation of pitch diameter. Actual measured values for half-angles and the angle between the axis of the wire and a plane perpendicular to the axis of the thread must be used for the calculation of pitch diameter when using wires other than best-size. The uncertainties of the values used and the different wire contact conditions will increase the uncertainty of the pitch diameter measurement.

2. METHODS OF MEASURING AND USING WIRES

The computed value for the pitch diameter of a screw thread gage obtained from readings over wires will depend upon the accuracy of the measuring instrument used, the contact force, and the value of the diameter of the wires used in the computations. In order to measure the pitch diameter of a 60° screw-thread gage to an accuracy within 0.0001 in by means of wires, it is necessary to know the wire diameters to within 0.00002 in. Accordingly, it is necessary to use a measuring instrument that reads accurately to 0.00001 in.

Variations in diameter around the wire should be determined by rotating the wire between a flat measuring contact and an anvil having the form of a 60° V-groove. Variations in diameter along the wire should be determined by measuring between a flat contact and a cylindrical anvil.

A wire presses on the flanks of a 60° thread with the force that is applied to the wire by the measuring instrument. Inasmuch as the wire and thread deform at the contact areas, it is desirable to determine the size of the wire under conditions which will compensate for this deformation. It is recommended for standard practice that diameters of wires be measured between a flat contact and a hardened and accurately ground and lapped steel cylinder having a diameter of 0.125 in. for wires used on threads having more than 40 up to and including 80 tpi and 0.750 in. for wires used on threads having 40 and fewer tpi with the force used in measuring the pitch diameter of the gage. The plane of the

Table A4.3. *Relation of best wire diameters to pitches for all USA Standard 60° threads (Unified, hose-coupling, and pipe)*[a]

Best wire sizes (in inches)	Threads per inch (tpi)																																	
	80	72	64	56	50	48	44	40	36	32	30	28	27	26	24	22	20	18	16	14	13	12	11.5	11	10	9	8	7.5	7	6	5.5	5	4.5	4
0.00722	⊗	×																																
.00802	×	⊗	×																															
.00902	×	×	⊗																															
.01031	×	×	×	⊗	×																													
.01155	×	×	×	×	⊗	×	×																											
.01203	×	×	×	×	×	⊗	×																											
.01312		×	×	×	×	×	⊗	×																										
.01443			×	×	×	×	×	⊗	×																									
.01604				×	×	×	×	×	⊗	×																								
.01804					×	×	×	×	×	⊗	×																							
.01925					×	×	×	×	×	×	⊗	×	×																					
.02062						×	×	×	×	×	×	⊗	×	×																				
.02138							×	×	×	×	×	×	⊗	×	×																			
.02221							×	×	×	×	×	×	×	⊗	×																			
.02406								×	×	×	×	×	×	×	⊗	×																		
.02624									×	×	×	×	×	×	×	⊗	×																	
.02887										×	×	×	×	×	×	×	⊗	×																
.03208											×	×	×	×	×	×	×	⊗	×															
.03608													×	×	×	×	×	×	⊗															
.04124															×	×	×	×	×	⊗	×													
.04441																×	×	×	×	×	⊗	×	×											
.04811																	×	×	×	×	×	⊗	×	×										
.05020																	×	×	×	×	×	×	⊗	×										
.05249																		×	×	×	×	×	×	⊗	×									
.05774																			×	×	×	×	×	×	⊗	×								
.06415																				×	×	×	×	×	×	⊗	×							
.07217																					×	×	×	×	×	×	⊗	×						
.07698																					×	×	×	×	×	×	×	⊗	×					
.08248																						×	×	×	×	×	×	×	⊗					
.09623																									×	×	×	×	×	⊗	×			
.10497																										×	×	×	×	×	⊗	×		
.11547																											×	×	×	×	×	⊗	×	
.12830																												×	×	×	×	×	⊗	×
.14434																														×	×	×	×	⊗

[a] The crosses (×) indicate those wire diameters which can be used for each pitch. An encircled cross (⊗) indicates the "best wire" diameter for that tpi which heads the column.

flat contact should be parallel to the contact element of the cylinder within 0.000005 in.

To avoid a permanent deformation of the material of the wires or gages, it is necessary to limit the contact force and, for consistent results, a uniform practice as to contact force in making wire measurements of hardened screw threads gages is necessary. The practice recommended is to use the following forces:

Threads per inch	Measuring force (±10%)
20 or less	2.5 pounds
Above 20 thru 40	1 pound
Above 40 thru 80	8 ounces
Above 80 thru 140	4 ounces
Above 140	2 ounces

The use of other contact forces will cause a difference in the reading over the wires and to completely compensate for such errors is impractical.

The practice of using holding means, such as rubber bands, which has a tendency to prevent the wires from adjusting themselves to the proper position in the thread grooves, will result in false measurements. In some cases it has also been the practice to support the gage being measured on two wires, which are in turn supported on a horizontal surface, and measuring from this surface to the top of a wire placed over and between the other wires. If the gage is of large diameter, its weight causes an increase in the elastic deformation at the contact points and an inaccurate reading is obtained. Tests on a 1–12 UNF setting plug gage showed a 0.00001 in. error when measured in this manner. This practice should therefore be avoided for gages of such size and larger. Wires from different sets of the same nominal diameter should not be mixed unless calibrated because thread wires in different sets may not have the same diameter. (See par. 3.2.)

In order to minimize the deviation of the measured pitch diameter from the true pitch diameter (neglecting the effect of lead angle) and reduce the chance of permanently deforming the gages and wires, this revision contains a change in the recommended measuring practice for threads and wires for threads having more than 40 up to and including 80 tpi. The new recommended practice reduces the force for measuring gages and wires from one to 0.5 lb and the size of the cylinder over which the wires are measured from 0.750 to 0.125 in. As a result of this change, the measured pitch diameters of threads in this range will be approximately 0.00005 in. larger than they were under the previous recommended practice.

The measured value will be much closer to the true pitch diameter, however. *Plug gages manu-*

factured prior to this revision and within tolerance when measured under the previous recommended practice but not within tolerance when measured under the new recommended practice should be considered as within tolerance for a transition period. With the new recommended practice, it can be shown that for all sizes of threads up to 1.500 in. in the fine thread series (UNF) and all sizes up to 2.000 in. in the coarse thread series (UNC), the measured pitch diameter will not differ from the true pitch diameter (neglecting the effect of lead angle) in excess of 0.000035 in. Slightly larger discrepancies in the 2 to 4 in. size range are relatively unimportant because these sizes have larger tolerances. The measured diameter of the thread wires for threads having more than 40 up to and including 80 tpi under the new recommended practice differ by less than two microinches from the measured diameter under the previous recommended practice. Therefore, neither wire diameters nor corrections for computing pitch diameter need be changed.

Measurements of a thread plug gage made in accordance with these instructions, with wires that conform to the following specifications, should be accurate to within 0.0001 in.

3. STANDARD SPECIFICATION FOR WIRES AND STANDARD PRACTICE IN MEASUREMENT OF WIRES

The following specifications represent present practice relative to thread measuring wires:

3.1. Composition.—The wires shall be accurately finished, hardened steel cylinders of the maximum possible hardness without being brittle. The hardness shall not be less than that corresponding to a Knoop indentation number of 630. A wire of this hardness can be cut with a file only with difficulty. The surface shall not be rougher than the equivalent of one having a surface roughness rating of 2 microinches arithmetical average.

3.2. Diameter of Wires.—One set of wires shall consist of three wires that shall have the same diameter within 0.00001 in., and this common diameter shall be within 0.00002 in of that corresponding to the best size for the tpi for which the wire is to be used. Wires shall be measured between a flat contact and a hardened and accurately finished cylinder having a surface roughness rating not in excess of 2 microinches arithmetical average. The measuring forces and cylinder diameters shall be as follows:

Threads per inch	Measuring force ($\pm$10%)	Cylinder diameter
20 or less	2.5 pounds	0.750 inch
Above 20 thru 40	1 pound	0.750 inch
Above 40 thru 80	8 ounces	0.125 inch
Above 80 thru 140	4 ounces	0.050 inch
Above 140	2 ounces	0.020 inch

Using these conditions, the uncertainties of the wire diameter measurement due to other metrological considerations should be limited and not exceed 0.000010 in.

An acceptable technique for the measurement of the diameter of each set of thread measuring wires is to compare them to a reference master wire with a suitable comparison measuring instrument having any anvil shape or measuring force consistent with good metrological practice. The diameter of each reference master wire, however, must be calibrated by the specified technique with an uncertainty not in excess of 0.000005 in.

Wires which are to be used where the contact of the wire is a line contact, such as in gear wires, should not be used for measuring thread gages. The recommended practice for measuring such wires is between flat parallel contacts with a one pound force.

3.3. Variations in Diameter.—Variations in diameter along a wire (taper) over the 1 in. interval at the center of its length shall not exceed 0.000010 in as determined by measuring between a flat contact and a cylindrical contact. Variations from true cylindrical contour of a wire (out-of-roundness or noncircular cross section) over its 1 in. central interval shall not exceed 0.000010 in as determined by measuring between a flat measuring contact and a well finished 60° V-groove.

Tests for compliance of thread measuring wires with the above specifications are made by the National Bureau of Standards for a stated fee.

4. GENERAL FORMULA FOR MEASUREMENT OF PITCH DIAMETER

The general formula for determining the pitch diameter of any thread whose flanks are symmetrical with respect to a line drawn through the vertex and perpendicular to the axis of the thread, in which the slight effect of lead angle is taken into account, is

$$E=M_w+\frac{\cot \alpha}{2n}-w[1+(\operatorname{cosec}^2 \alpha+\cot^2 \alpha \tan^2 \lambda')^{1/2}], \tag{1}$$

in which

E = pitch diameter
M_w = measurement over wires
α = half angle of thread
n = number of threads per inch = $1/p$
w = mean diameter of wires
λ' = angle between axis of wire and plane perpendicular to axis of thread.

This formula is a very close approximation, being based on certain assumptions regarding the positions of the points of contact between the wire and the thread.

Formula (1) can be converted to the following simplified form, which is particularly useful when measuring threads of large lead angle:

$$E = M_w + \frac{\cot \alpha}{2n} - w(1 + \operatorname{cosec} \alpha'), \qquad (2)$$

in which α' = the angle whose tangent = $\tan \alpha \cos \lambda'$.

When formula (1) is used, the usual practice is to expand the square root term as a series, retaining only the first and second terms, which gives the following:

$$E = M_w + \frac{\cot \alpha}{2n} - w\left(1 + \operatorname{cosec} \alpha + \frac{\tan^2 \lambda' \cos \alpha \cot \alpha}{2}\right). \qquad (3)$$

For large lead angles it is necessary to measure the wire angle, λ', but for lead angles of 5° or less, if the "best-size" wire is used, this angle may be assumed to be equal to the lead angle of the thread at the pitch line, λ. The value of $\tan \lambda$, the tangent of the lead angle, is given by the formula

$$\tan \lambda = \frac{L}{3.1416E} = \frac{1}{3.1416NE}$$

in which

L = lead

N = number of turns per inch

E = nominal pitch diameter, or an approximation of the measured pitch diameter.

5. MEASUREMENT OF PITCH DIAMETER OF ALL USA STANDARD 60° STRAIGHT THREADS (UNIFIED, HOSE-COUPLING, AND PIPE)

For threads of the Unified standard series, the term

$$\frac{w \tan^2 \lambda' \cos \alpha \cot \alpha}{2}$$

is neglected, as its value is small, being in all cases less than 0.00015 in for standard fastening screws when the best-size wire is used, and the above formula (3) takes the simplified form

$$E = M_w + \frac{\cot \alpha}{2n} - w(1 + \operatorname{cosec} \alpha). \qquad (4)$$

This practice is permissible provided that it is uniformly followed, and in order to maintain uniformity of practice, and thus avoid confusion, the National Bureau of Standards uses formula (4) for such threads. The Bureau also uses formula (4) for special 60° threads, except when the value of the term

$$\frac{w \tan^2 \lambda' \cos \alpha \cot \alpha}{2}$$

exceeds 0.00015 in., as in the case of multiple threads, or other threads having exceptionally large lead angles. For 60° threads this term exceeds 0.00015 when $NE\sqrt{n}$ is less than 17.1.

For a 60° thread of correct angle and thread form formula (4) simplifies to

$$E = M_w + \frac{0.86603}{n} - 3w. \qquad (5)$$

For a given set of best-size wires

$$E = M_w - C$$

when

$$C = w(1 + \operatorname{cosec} \alpha) - \frac{\cot \alpha}{2n}$$

The quantity C is a constant for a given thread angle, and, when the wires are used for measuring threads of the pitch and angle for which they are the best size, the pitch diameter is obtained by the simple operation of subtracting this constant from the measurement taken over the wires. In fact, when best-size wires are used, this constant is changed very little by a moderate deviation in the angle of the thread. Consequently, the constants for the various sets of wires in use may be tabulated, thus saving a considerable amount of time in the inspection of gages. However, when wires of other than the best size are used, this constant changes appreciably with a deviation in the angle of the thread.

It has been shown that, with the exception of coarse pitch screws, variation in angle from the basic size causes no appreciable change in the quantity C for the best-size wires. On the other hand, when a wire near the maximum or minimum allowable size is used, a considerable change occurs, and the values of the cotangent and cosecant of the actual measured half angle are to be used. It is apparent, therefore, that there is a great advantage in using wires very closely approximating the best size. For convenience in carrying out computations, the values of $\cot \alpha/2n$ for standard pitches are given in table A4.2.

When the value of the term

$$\left(\frac{w \tan^2 \lambda' \cos \alpha \cot \alpha}{2}\right)$$

exceeds 0.00015 in., the following pitch diameter formula should be used:

$$E = M_w - (C+c)$$

Tabular values for $(C+c)_1$ for a 1-in axial pitch screw for 60° threads are given in table A4.4 which values should be divided by the threads per inch for a given case. (See appendix in Part III, titled "Three-wire method of measurement of pitch diameter of 29° Acme, 29° Stub Acme, and Buttress threads," for further details.)

TABLE A4.4. *Best wire diameters and constants for large lead angles, 1-in axial pitch 60° threads*

Lead angle, λ	1-start threads		2-start threads		Lead angle, λ	2-start threads		3-start threads	
	w_1	$(C+c)_1$	w_1	$(C+c)_1$		w_1	$(C+c)_1$	w_1	$(C+c)_1$
1	2	3	4	5	1	4	5	6	7
deg	*in*	*in*	*in*	*in*	*deg*	*in*	*in*	*in*	*in*
5.0	0.57493	0.86181	0.57477	0.86145	10.0	0.56767	0.84918	0.56728	0.84830
5.1	.57483	.86165	.57467	.86127	10.1	.56749	.84887	.56709	.84797
5.2	.57474	.86149	.57456	.86109	10.2	.56730	.84856	.56689	.84763
5.3	.57465	.86133	.57446	.86091	10.3	.56711	.84824	.56669	.84729
5.4	.57456	.86117	.57435	.86072	10.4	.56693	.84793	.56649	.84695
5.5	.57446	.86100	.57425	.86053	10.5	.56674	.84761	.56629	.84660
5.6	.57436	.86083	.57414	.86034	10.6	.56656	.84729	.56609	.84625
5.7	.57426	.86066	.57403	.86015	10.7	.56637	.84697	.56589	.84589
5.8	.57416	.86049	.57392	.85995	10.8	.56617	.84664	.56568	.84553
5.9	.57406	.86032	.57381	.85976	10.9	.56598	.84631	.56547	.84517
6.0	.57395	.86014	.57369	.85956	11.0	.56578	.84598	.56526	.84481
6.1	.57385	.85996	.57358	.85936	11.1	.56558	.84564	.56506	.84445
6.2	.57374	.85978	.57346	.85915	11.2	.56538	.84530	.56485	.84409
6.3	.57363	.85960	.57333	.85893	11.3	.56518	.84497	.56463	.84372
6.4	.57352	.85942	.57320	.85871	11.4	.56498	.84463	.56441	.84335
6.5	.57341	.85923	.57308	.85850	11.5	.56478	.84429	.56420	.84298
6.6	.57330	.85904	.57295	.85828	11.6	.56457	.84394	.56398	.84260
6.7	.57318	.85885	.57282	.85805	11.7	.56437	.84360	.56375	.84221
6.8	.57307	.85866	.57269	.85782	11.8	.56416	.84325	.56353	.84183
6.9	.57295	.85847	.57256	.85760	11.9	.56396	.84290	.56331	.84145
7.0	.57284	.85828	.57242	.85737	12.0	.56375	.84255	.56308	.84106
7.1	.57272	.85808	.57228	.85713	12.1	.56353	.84219	.56285	.84067
7.2	.57260	.85788	.57215	.85689	12.2	.56332	.84183	.56263	.84028
7.3	.57248	.85768	.57201	.85664	12.3	.56311	.84147	.56240	.83989
7.4	.57236	.85747	.57187	.85640	12.4	.56289	.84111	.56217	.83949
7.5	.57223	.85727	.57173	.85616	12.5	.56267	.84075	.56193	.83908
7.6	.57211	.85706	.57159	.85591	12.6	.56245	.84038	.56170	.83868
7.7	.57198	.85685	.57144	.85566	12.7	.56223	.84001	.56147	.83828
7.8	.57185	.85664	.57129	.85540	12.8	.56201	.83964	.56123	.83787
7.9	.57171	.85642	.57114	.85515	12.9	.56179	.83927	.56099	.83746
8.0	.57158	.85620	.57100	.85490	13.0	.56157	.83890	.56075	.83705
8.1	.57144	.85598	.57085	.85464	13.1	.56135	.83853	.56051	.83664
8.2	.57131	.85576	.57070	.85438	13.2	.56113	.83815	.56027	.83622
8.3	.57117	.85554	.57054	.85411	13.3	.56090	.83777	.56002	.83579
8.4	.57104	.85533	.57038	.85383	13.4	.56067	.83739	.55977	.83537
8.5	.57090	.85511	.57022	.85356	13.5	.56044	.83701	.55952	.83495
8.6	.57076	.85489	.57007	.85329	13.6	.56021	.83662	.55927	.83452
8.7	.57063	.85466	.56991	.85301	13.7	.55997	.83623	.55902	.83409
8.8	.57049	.85444	.56974	.85273	13.8	.55974	.83584	.55877	.83366
8.9	.57035	.85421	.56958	.85245	13.9	.55950	.83545	.55852	.83323
9.0	.57021	.85398	.56941	.85217	14.0	.55926	.83506	.55827	.83280
9.1	.57007	.85375	.56924	.85188	14.1	.55903	.83467	.55802	.83237
9.2	.56993	.85352	.56907	.85159	14.2	.55880	.83428	.55776	.83193
9.3	.56978	.85329	.56890	.85130	14.3	.55856	.83388	.55750	.83149
9.4	.56964	.85305	.56873	.85100	14.4	.55831	.83347	.55724	.83105
9.5	.56949	.85282	.56856	.85070	14.5	.55807	.83307	.55698	.83060
9.6	.56935	.85258	.56838	.85040	14.6	.55782	.83266	.55671	.83014
9.7	.56920	.85235	.56820	.85010	14.7	.55757	.83225	.55645	.82969
9.8	.56905	.85211	.56803	.84980	14.8	.55733	.83185	.55618	.82923
9.9	.56890	.85187	.56785	.84949	14.9	.55709	.83145	.55590	.82877
10.0	.56875	.85163	.56767	.84918	15.0	.55684	.83104	.55563	.82831

TABLE A4.4. *Best wire diameters and constants for large lead angles, 1-in axial pitch 60° threads*—Continued

Lead angle, λ	3-start threads		4-start threads		Lead angle, λ	3-start threads		4-start threads	
	w_1	$(C+c)_1$	w_1	$(C+c)_1$		w_1	$(C+c)_1$	w_1	$(C+c)_1$
1	6	7	8	9	1	6	7	8	9
deg	*in*	*in*	*in*	*in*	*deg*	*in*	*in*	*in*	*in*
13.0	.56075	.83705	.56033	.83609	18.0	.54682	.81344	.54579	.81109
13.1	.56051	.83664	.56008	.83566	18.1	.54651	.81291	.54546	.81053
13.2	.56027	.83622	.55982	.83522	18.2	.54619	.81238	.54513	.80997
13.3	.56002	.83579	.55956	.83477	18.3	.54588	.81185	.54480	.80940
13.4	.55977	.83537	.55931	.83433	18.4	.54556	.81132	.54447	.80883
13.5	.55952	.83495	.55905	.83388	18.5	.54524	.81078	.54414	.80826
13.6	.55927	.83452	.55879	.83342	18.6	.54492	.81024	.54380	.80768
13.7	.55902	.83409	.55853	.83297	18.7	.54459	.80970	.54345	.80710
13.8	.55877	.83366	.55827	.83252	18.8	.54427	.80916	.54311	.80652
13.9	.55852	.83323	.55800	.83207	18.9	.54394	.80861	.54277	.80594
14.0	.55827	.83280	.55774	.83161	19.0	.54361	.80805	.54242	.80535
14.1	.55802	.83237	.55747	.83115	19.1	.54328	.80749	.54208	.80477
14.2	.55776	.83193	.55720	.83068	19.2	.54295	.80694	.54173	.80418
14.3	.55750	.83149	.55693	.83022	19.3	.54261	.80638	.54138	.80358
14.4	.55724	.83105	.55666	.82975	19.4	.54227	.80582	.54103	.80298
14.5	.55698	.83060	.55639	.82928	19.5	.54193	.80526	.54067	.80238
14.6	.55671	.83014	.55611	.82880	19.6	.54160	.80470	.54032	.80178
14.7	.55645	.82969	.55583	.82831	19.7	.54126	.80414	.53997	.80118
14.8	.55618	.82923	.55555	.82783	19.8	.54092	.80358	.53961	.80057
14.9	.55590	.82877	.55527	.82735	19.9	.54058	.80301	.53925	.79997
15.0	.55563	.82831	.55499	.82687	20.0	.54025	.80245	.53889	.79936
15.1	.55536	.82784	.55471	.82638	20.1	—	—	.53852	.79874
15.2	.55509	.82737	.55442	.82589	20.2	—	—	.53816	.79812
15.3	.55481	.82690	.55414	.82540	20.3	—	—	.53779	.79750
15.4	.55453	.82643	.55385	.82490	20.4	—	—	.53743	.79689
15.5	.55425	.82596	.55356	.82440	20.5	—	—	.53706	.79627
15.6	.55397	.82549	.55327	.82390	20.6	—	—	.53669	.79564
15.7	.55369	.82501	.55297	.82339	20.7	—	—	.53632	.79502
15.8	.55340	.82453	.55268	.82289	20.8	—	—	.53595	.79440
15.9	.55312	.82405	.55239	.82238	20.9	—	—	.53558	.79377
16.0	.55283	.82356	.55209	.82187	21.0	—	—	.53521	.79314
16.1	.55254	.82307	.55179	.82135	21.1	—	—	.53484	.79251
16.2	.55225	.82258	.55148	.82083	21.2	—	—	.53446	.79187
16.3	.55196	.82209	.55117	.82031	21.3	—	—	.53408	.79123
16.4	.55167	.82160	.55087	.81979	21.4	—	—	.53370	.79059
16.5	.55138	.82110	.55057	.81926	21.5	—	—	.53332	.78994
16.6	.55109	.82061	.55026	.81873	21.6	—	—	.53294	.78930
16.7	.55079	.82011	.54995	.81821	21.7	—	—	.53255	.78865
16.8	.55050	.81962	.54964	.81768	21.8	—	—	.53217	.78801
16.9	.55020	.81912	.54933	.81715	21.9	—	—	.53178	.78736
17.0	.54990	.81862	.54902	.81661	22.0	—	—	.53139	.78670
17.1	.54960	.81811	.54870	.81607	22.1	—	—	.53100	.78604
17.2	.54929	.81759	.54839	.81552	22.2	—	—	.53061	.78539
17.3	.54898	.81707	.54807	.81497	22.3	—	—	.53022	.78473
17.4	.54867	.81655	.54774	.81442	22.4	—	—	.52983	.78406
17.5	.54837	.81604	.54742	.81387	22.5	—	—	.52943	.78339
17.6	.54806	.81552	.54710	.81333	22.6	—	—	.52903	.78272
17.7	.54775	.81500	.54677	.81277	22.7	—	—	.52863	.78205
17.8	.54744	.81448	.54645	.81222	22.8	—	—	.52823	.78138
17.9	.54713	.81396	.54612	.81166	22.9	—	—	.52783	.78071
18.0	.54682	.81344	.54579	.81109	23.0	—	—	.52743	.78004

NOTE.—This table courtesy of the Van Keuren Co.

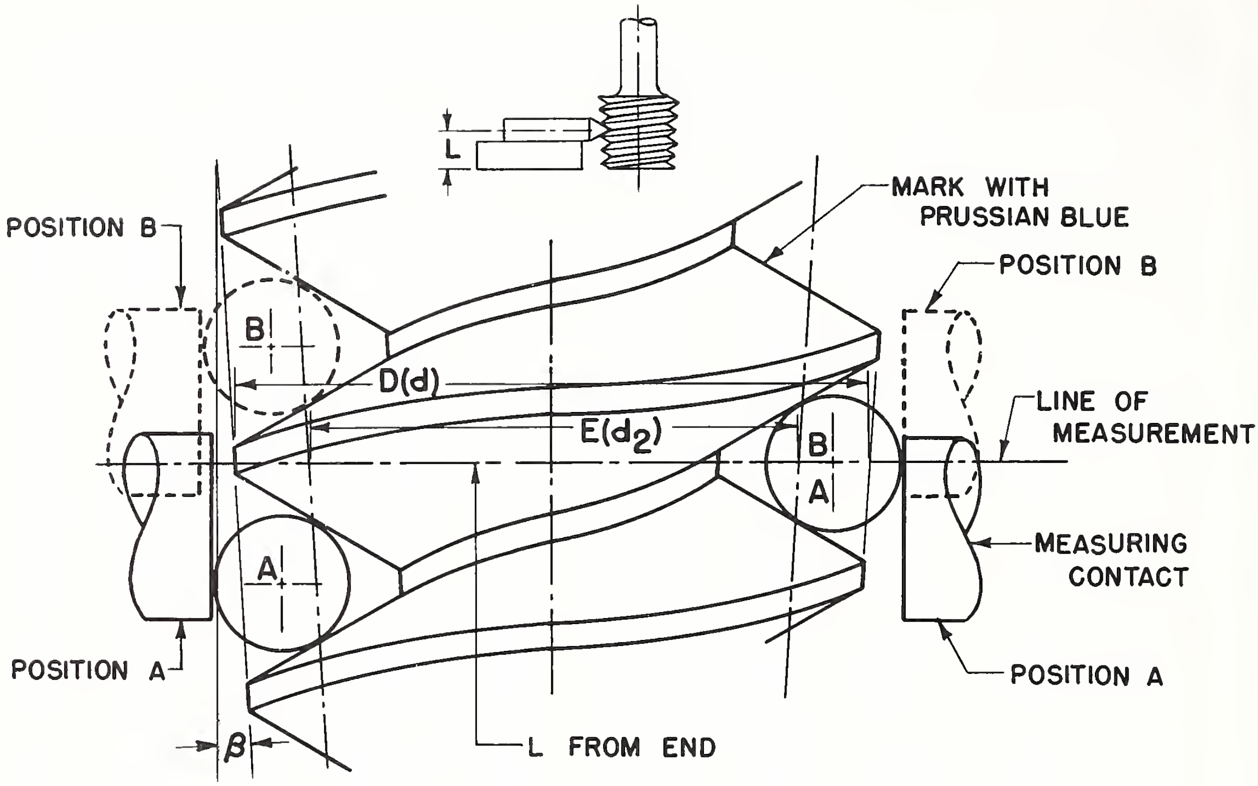

FIGURE A4.5. *Measurement of pitch diameter of taper thread gages by the 2-wire method.*

6. MEASUREMENT OF PITCH DIAMETER OF USA STANDARD TAPER THREADS

The pitch diameter of a taper thread plug gage is measured in much the same manner as that of a straight thread gage, except that a definite position at which the measurement is to be made must be located. A point at a known distance, L, from the reference end of the gage is located by means of a combination of precision gage blocks and the cone point furnished as an accessory with these blocks, as shown in the inset in figure A4.5. The gage is set vertically on a surface plate, the cone point is placed with its axis horizontal at the desired height, and the plug is turned until the point fits accurately into the thread. The position of this point is marked carefully with a pencil or a bit of prussian blue.

6.1. TWO-WIRE METHOD.—Assuming that the measurement is to be made with a horizontal comparator, the gage is set in the comparator with its axis vertical, that is, the line of measurement and the thread axis are perpendicular to each other. The measurement is made with two wires, as shown in figure A4.5, one of which is placed in the thread to make contact at the same axial section of the thread as was touched by the cone point. This wire is designated the fixed wire. The second wire is placed in the thread groove, on the opposite side of the gage, which is next above the fixed wire, and the measurement over the wires is made. The second wire is then placed in the thread groove next below the fixed wire, and a second measurement is made. The average of these two measurements is M_w, the measurement over the wires at the position of the fixed wire.

The general formula for a taper thread, corresponding to formula (3) is

$$E = M_w + \frac{\cot\alpha - \tan^2\beta\tan\alpha}{2n} - w\left(1 + \operatorname{cosec}\alpha + \frac{\tan^2\lambda'\cos\alpha\cot\alpha}{2}\right) \qquad (6)$$

in which

E = pitch diameter
M_w = measurement over wires
β = half angle of taper of thread
n = number of threads per inch $= 1/p$
α = half angle of thread
w = mean diameter of wires
λ' = wire angle.

The term

$$\frac{\cot \alpha - \tan^2 \beta \tan \alpha}{2n}$$

is the exact value of the depth of the fundamental triangle of a taper thread, which is less than that of the same-pitch thread cut on a cylinder. For steep-tapered thread gages, having an included taper larger than 0.75 in/ft this more accurate term should be applied. For such a thread, which has a small lead angle, formula (6) takes the form

$$E = M_w + \frac{\cot \alpha - \tan^2 \beta \tan \alpha}{2n} - w(1 + \operatorname{cosec} \alpha) \quad (7)$$

Otherwise, as for USA Standard taper pipe threads having an included taper of 0.75 in/ft, the simplified formula (5)

$$E = M_w + \frac{0.86603}{n} - 3w$$

for 60° threads may be used. This simplified formula gives a value of E that is 0.00005 in larger than that given by the above general formula (6) for the 2.5–8 USA Standard taper pipe thread, the worst case in this thread series.

The pitch diameter at any other point along the thread, as at the gaging notch, is obtained by multiplying the distance parallel to the axis of the thread, between this point and the point at which the measurement was taken, by the taper per inch, then adding the product to or subtracting it from the measured pitch diameter according to the direction in which the second point is located with respect to the first.

6.2. Three-Wire Method.—Depending on the measuring facilities available or other circumstances, it is sometimes more convenient to use three wires. In such cases measurement is made in the usual manner, but care must be taken that the measuring contacts touch all three wires, as the line of measurement is not perpendicular to the axis of the screw when there is proper contact. (See fig. A4.6.)

On account of this inclination, the measured distance between the axes of the wires must be multiplied by the secant of the half angle of the taper of

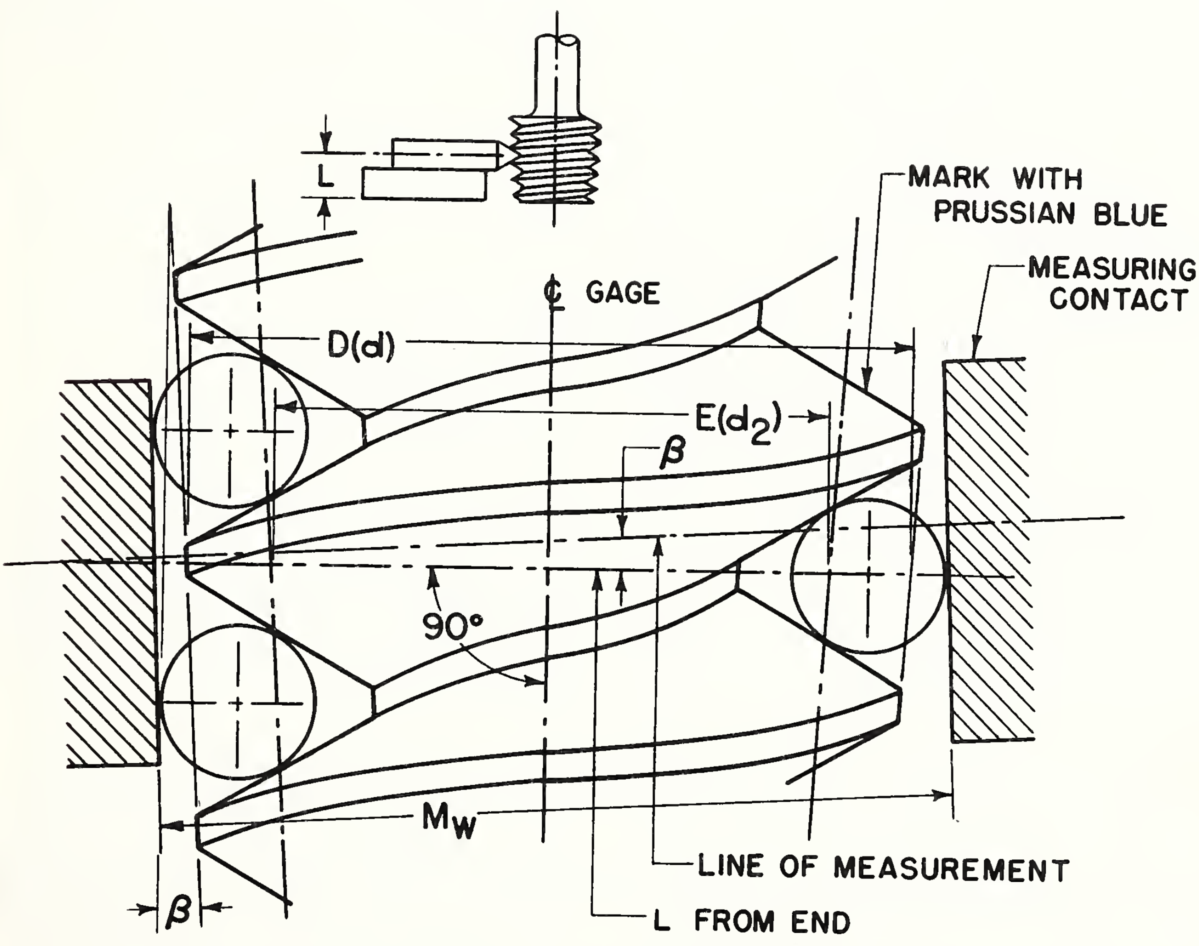

Figure A4.6. *Measurement of pitch diameter of taper thread gages by the 3-wire method.*

the thread. The formula for the pitch diameter of any taper thread plug gage, the threads of which are symmetrical with respect to a line perpendicular to the axis, then has the form corresponding to formula (4):

$$E=(M_w-w)\sec\beta+\frac{\cot\alpha}{2n}-w\operatorname{cosec}\alpha \qquad (8)$$

in which β = half-angle of taper of thread. Thus the pitch diameter of a USA Standard pipe-thread gage having correct angle (60°) and taper (0.75 in/ft) is then given by the formula

$$E=1.000\,49(M_w-w)+0.866\,03p-2w \qquad (9)$$

An adaption of the three-wire method is frequently used to reduce the time required when the pitch diameter of a number of gages of the same size is to be measured. Only light gages, up to about 1 in nominal size, can be measured accurately by this method. The gage is supported on two wires placed several threads apart, which are in turn supported on a taper thread testing fixture. The third wire is placed in the threads at the top of the gage and measurement is made from the top of this wrie to the bottom of the fixture with a vertical comparator having a flat anvil, using a gage block combination as the standard. The fixture consists of a block, the upper surface of which is at an angle to the base plane equal to the nominal angle of taper of the thread, 2β. Thus the element of the cone at the top of the thread gage is made parallel to the base of the instrument. The direction of measurement is not perpendicular to the axis of the gage but at an angle, β, from perpendicularity. A stop is provided at the thick end of the block with respect to which the gage is positioned on the fixture. As the plane of the end of the gage may not be perpendicular to the axis, a roll approximately equal to the diameter of the gage should be inserted between the stop and the gage to assure contact at the axis of the gage. For a given fixture and roll, a constant is computed which, when subtracted from the measured distance from the top of the upper wire to the base plane, gives M corresponding to the pitch diameter, E_0, at the small end of the gage. E_0 is then determined by applying formula (8) or (9).

6.3. Four-Wire Method.—A four-wire method of measurement that yields measurements of the pitch diameter, E_0, at the small end of the gage, and the half-angle of taper, β, is also sometimes used. This method is illustrated in figure A4.7 and requires four thread wires of equal diameter, a pair of gage

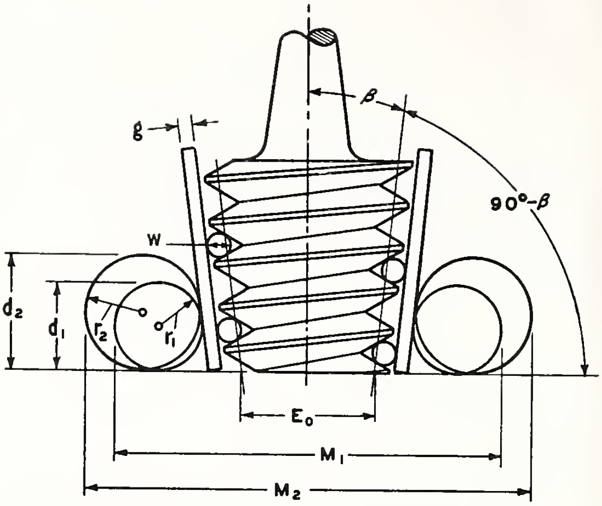

Figure A4.7. *Measurement of pitch diameter of taper thread gages by the 4-wire method.*

blocks of equal thickness, and two pairs of rolls of different diameters, the rolls of each pair being equal in diameter. Two measurements, M_1 and M_2, are made over the rolls and formulas are applied as follows:

$$\cot\frac{90-\beta}{2}=\frac{M_2-M_1+d_1-d_2}{d_2-d_1} \qquad (10)$$

$$M_w=M_2-d_2\left(1+\cot\frac{90°-\beta}{2}\right)-2g\sec\beta \qquad (11)$$

in which

M_2 = measurement over larger rolls
M_1 = measurement over smaller rolls
d_2 = diameter of larger rolls
d_1 = diameter of smaller rolls
β = actual half-angle of taper of thread
g = thickness of each gage block.

To determine E_0, the pitch diameter at the small end of the gage, M_w, as determined from formula (11), is substituted in formula (6) or (7).

The errors of measurement by this method may be slightly but not significantly larger than by the other methods described, on account of elastic deformations of the rolls and gage blocks under the measuring force, and differing conditions of loading of the thread wires.

7. MEASUREMENT OF PITCH DIAMETER OF THREAD RING GAGES

The application of direct methods of measurement to determine the pitch diameter of thread ring gages presents serious difficulties, particularly in securing proper contact load when a high degree of precision is required. The usual practice is to fit the ring gage to a threaded setting plug. When the thread ring gage is of correct lead, angle, and thread form, within close limits, this method is satisfactory and represents standard practice in the United States. It is the only method available for small sizes of threads. For the larger sizes, various more or less satisfactory methods have been devised, but none of these have found wide application.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

APPENDIX A5

1969

DESIGN OF SPECIAL THREADS

1. GENERAL

In general, any given problem in thread design may be susceptible to several more or less satisfactory solutions based on the preliminary selection of certain elements of the design and the proper adjustment of the other elements. In other words, thread design is to a large extent empirical and is partially based on previous experience with similar designs and the judgment of the designer. Accordingly, it is not practicable to present a definite system of approach to the design of a threaded assembly but merely to present a discussion of various design factors.

The interrelation of length of engagement, minimum major diameter of the external thread, maximum minor diameter of the internal thread, and the strength of the assembled thread needs to be understood and carefully considered in order to produce the optimum design of a special thread. It is not economical to use either a length of thread engagement which is longer than required or shorter than that which will develop the full strength of the externally threaded member. Other factors, such as control of tap breakage, proper seating of a threaded part on a shoulder, the prevention of cross threading, conditions of loading when the assembled parts are not concentric, and possible collapse of a hollow externally threaded member, require careful analysis and adjustment of the design with respect to selection of the diameter-pitch combination, the class of thread, length of engagement, and major and minor diameter tolerances.

In redesigning threads from American National to Unified standards, it should be remembered that exact correspondence between the old and new class numbers does not exist. For most, but not all, diameter-pitch combinations, the combined tolerances and allowances of the Unified classes are somewhat larger than American National classes of corresponding number. Recommended procedure is to convert the thread to the corresponding class of Unified thread, compare the new major, pitch, and minor diameter tolerances with the old tolerances, and then give careful consideration to the desirability of the new limits of size.

Taking, for example, the conversion of a class 1 thread to classes 1A and 1B: Under ordinary conditions where the thread is being used only as a simple fastener and the length of engagement is normal, such substitution may be made. If, for any reason, the previously specified tolerances may not be exceeded, it may be necessary to specify class 2A or 2B or both. Also, if the thread must carry a high axial stress or if concentricity of the two mating parts is a factor, the conversion should be from class 1 to classes 2A and 2B.

A close fitting thread assembly under some conditions may fail, whereas the cause of failure may be eliminated by providing a looser fit. A cap screw that seats only on one side of the bearing surface under the head may break off when the screw is tightened. When a screw has a large bearing surface under the head or when the head must be square with a projecting pin, sufficient pitch diameter clearance must be provided to allow for any out-of-squareness of the screw axis with the bearing surface under the head. Thus, as large a pitch diameter tolerance as possible, together with providing proper tolerances on squareness of face with the thread axis where seating is required, may avoid the necessity for specifying a heat treated bolt.

2. ECCENTRICITY OF ASSEMBLY AND CROSS THREADING

In assembly and use, the combined tolerances and allowances on both mating parts should not allow threads to disengage on one side when assembly is eccentric. The axis of the internal thread can be displaced radially from coincidence with the axis of the external thread by an amount equal to the sum of the pitch diameter tolerances and the allowance. This radial displacement may be sufficient so that the flank contact is entirely on one side and on the opposite side the crest of the external thread will be in line with the crest of the internal thread with the following results when the screw is constrained in such a position in a tapped hole: (1) There will be danger of crossing the threads in starting, and (2) the screw may pull out of the hole when tension is exerted in this constrained position. The minimum amount of overlap is arbitrary and controversial, but the following general rule can be used in lieu of more specific data:

As the first step to assure the minimum safe overlap on both sides when the assembly is concentric, the difference between the minimum major diameter of the external thread and the maximum minor diameter of the internal thread should not be less than twice the addendum of the external thread ($0.75H$, table 2.1). Otherwise stated, the sum of the major-diameter tolerance and allowance, if any, of the external thread and the minor-diameter tolerance of the internal thread should not be greater than 4/3 the addendum of the external thread, $0.5H$, table 2.1. This provides for a minimum of 50 percent thread engagement. As the second step, to assure the minimum safe overlap on one side when the assembly is eccentric, the difference between the maximum pitch diameter of the internal thread and the minimum pitch diameter of the external thread should not be greater than twice the addendum of the external thread (0.75H, table 2.1). Otherwise stated, the sum of the pitch-diameter tolerances of both threads and the allowance, if any, should not be greater than twice the addendum of the external thread, (0.75H, table 2.1). This provides for an eccentric assembly condition equal to the addendum of external thread (0.375H, table 2.1) and zero minimum overlap on one side. If the results from the limits of size selected violate the above rules, the tolerances should be reduced by using a closer class of tolerance, assuming tolerances consistent with manufacturing possibility, or a coarser pitch should be used to increase the amount of overlap. The major-diameter tolerance of the external thread or minor-diameter tolerance of the internal thread should not be less than the pitch-diameter tolerance of the respective thread to maintain thread form.

It should be noted that, if the tolerance on the minor diameter of the internal thread must necessarily be large, the major diameter of the external thread must be held close to the maximum major diameter and vice versa.

3. STRENGTH FACTORS

Critical Areas—The critical areas of mating threads, as related to the tensile strength of the thread assembly, are: The effective cross-sectional area, or stress area, of the external thread, (2) the shear area of the external thread that depends principally on the minor diameter of the tapped hole, and (3) the shear area of the internal thread that depends principally on the major diameter of the external thread. The formulas for tensile stress area and thread shear area are shown below. These areas are indicated in figure A5.1.

Tensile Stress Area.—The tensile stress area is the assumed area of an external threaded part that is used for the purpose of computing the tensile strength.

Direct Tensile Stress.—When parts are subjected only to a direct tensile stress the assumed area applicable to steel parts *up to 180,000 psi* used in calculating the ultimate strength is computed from the following formula:

$$A_s=3.1416\left(\frac{E}{2}-\frac{3H}{16}\right)^2$$

or

$$A_s=0.7854(D-0.9743/n)^2$$

where

E = basic pitch diameter
D = basic major diameter
n = threads per inch

For $3H/16$, see table 2.1. Tabulated stress areas are listed in tables 2.8 through 2.18.

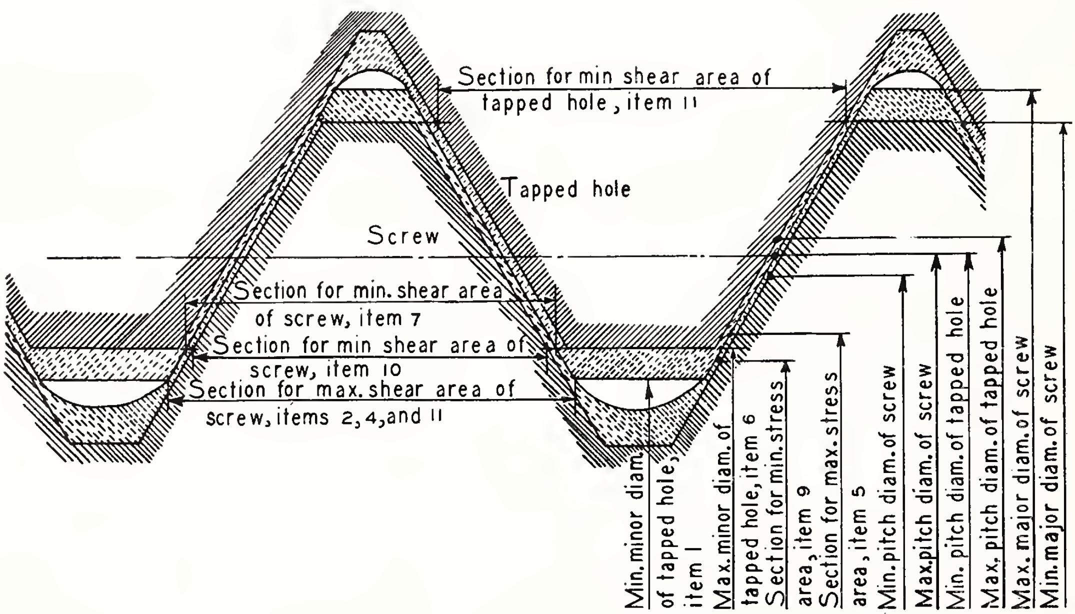

Figure A5.1. *Critical sections in a thread assembly.*
See table A5.2 for formulas corresponding to item numbers.

Table A5.2. *Data for determining strength factors in special thread design*

NOTATION

D = basic major diameter.
D_s = major diameter of external thread.
K_n = minor diameter of internal thread.
T_{Kn} = tolerance on minor diameter of internal thread.
T_{Es} = tolerance on pitch diameter of external thread.

G = allowance on all diameters of external thread.
L_e = length of thread engagement.
A_s = stress area of external thread.
S_s = area in shear on external thread in line with K_n.
S_n = area in shear in internal thread in line with D_n.

CONSTANTS

$C_1 = \frac{3}{4}\pi = 2.356$	Threads per inch, n														
	40	36	32	28	27	24	20	18	16	14	12	10	8	6	4
$C_2 = \frac{5}{8}\frac{\cot 30°}{n} = \frac{1.08253}{n}$ =	0.0271	0.0301	0.0338	0.0387	0.0401	0.0451	0.0541	0.0601	0.0677	0.0773	0.0902	0.1083	0.1353	0.1804	0.02706
$C_3 = \frac{9}{16}\frac{\cot 30°}{n} = \frac{0.974279}{n}$ =	.0244	.0271	.0304	.0348	.0361	.0406	.0487	.0541	.0609	.0696	.0812	.0974	.1218	.1624	.2436
$C_4 = n \tan 30° = 0.57735n$ =	23.09	20.78	18.48	16.17	15.59	13.86	11.55	10.39	9.328	8.083	6.928	5.774	4.619	3.464	2.309
$C_5 = \pi n \tan 30° = 1.8138n$	72.55	65.30	58.04	50.79	48.97	43.53	36.25	32.65	29.02	25.39	21.76	18.14	14.51	10.88	7.255

FORMULAS

MAXIMUM MATERIAL FOR BOTH EXTERNAL AND INTERNAL THREADS

Item

1. $K_n \min = D - C_2$.
2. Max area in shear of external thread per inch = S_s max per inch = $C_1 K_n$ min.
3. Min length of thread engagement, $L_e \min = \frac{L_e}{D} \times D_s \max$, with $\frac{L_e}{D}$ taken from graph, figure A5.3.
4. Area in shear of external thread in length L_e min = S_s max per inch $\times L_e$ min (= item 2 × item 3).
5. Max stress area of external thread = $A_s \max = \frac{S_s \max \text{ per inch} \times L_e \min}{2} \left(= \frac{1}{2} \text{ item 4}\right) = \frac{C_1 K_n \min \times \frac{L_e}{D} \times D_s \max}{2}$.

MAXIMUM MATERIAL EXTERNAL THREAD, K_n MAXIMUM

6. $K_n \max = K_n \min + T_{Kn}$.
7. Min area in shear of external thread per inch = S_s min per inch = $K_n \max (C_1 - C_5 T_{Kn})$.
8. L_e required to develop full strength of external thread for T_{Kn} selected $= \frac{2 A_s \max}{S_s \min \text{ per inch}} = \left(\frac{2 \times \text{item 5}}{\text{item 7}}\right)$ or $= \left(\frac{\text{item 4}}{\text{item 7}}\right)$.

MINIMUM MATERIAL FOR BOTH EXTERNAL AND INTERNAL THREADS

9. Min stress area of external thread = $A_s \min = 0.7854 [D - C_3 - (T_{Es} + G)]^2$.
10. Min area in shear of external thread in length $L_e = S_s \min = K_n \max [C_1 - C_5(T_{Kn} + T_{Es} + G)] L_e$, or $= \pi K_n \max [0.75 - C_4(T_{Kn} + T_{Es} + G)] L_e$.
11. Min area in shear of internal thread in length $L_e = S_n \min = \pi D_s \min [0.875 - C_4(T_{Ds} + T_{En} + G)] L_e$.

MINIMUM TAPPED HOLE, D_s MINIMUM, WHEN TAPPED MATERIAL IS WEAKER THAN SCREW MATERIAL

12. $R_1 = \frac{\text{area in shear of screw in length } L_e}{\text{area in shear of tapped hole in length } L_e} = \left(\frac{\text{item 4}}{\text{item 11}}\right) = \frac{0.75 K_n \min}{D_s \min [0.875 - C_4 (T_{Ds} + T_{En} + G)]}$
13. $R_2 = \frac{\text{ultimate tensile strength of tapped material}}{\text{ultimate tensile strength of screw material}}$.
14. If $R_2 < R_1$, then L_e required = L_e for T_{Kn} selected $\times \frac{R_1}{R_2} = \left(\frac{\text{item 8} \times \text{item 12}}{\text{item 13}}\right)$.

Combined Tensile Stress.—When parts are subject to a direct tensile stress plus a torsional stress due to tightening the nut or bolt head, it is necessary to consider the combined shear and tensile stresses when calculating the strength of the externally threaded part. It is recommended that the combined stresses be computed on the basis of the section at the minimum minor diameter of the external thread. The direct tensile stress is given by the formulas:

$$S_t = F/A$$
$$A_r = 0.7854[(K_s \min)^2 - d^2]$$

where

A_r = area in sq in at the minimum minor diameter.
F = axial load on externally threaded parts in lb.

The direct torsional stress is given by the formulas:

$$S_s = T_1/Z_p$$

$$Z_p = 0.1963 \frac{[(K_s \min)^4 - d^4]}{K_s \min}$$

where

T_1 = wrench torque transmitted through the threaded section, approximately equal to half of the total wrench torque in lb-in.
Z_p = polar section modulus in in^3
K_s min = minimum minor diameter of external thread in in.
d = inside diameter of externally threaded part in in; if part is solid, d = zero.

The combined shear stress in psi is given by the formula:

$$S_s' = \sqrt{\left(\frac{S_t}{2}\right)^2 + (S_s)^2}$$

The combined tensile stress in psi is given by the formula:

$$S_t' = S_s' + S_t/2$$

Having once determined the combined stresses due to a given set of conditions for wrench torque and coefficient of friction, other combined stresses will be directly proportional to the wrench torque.

Thread Shear Area.—The diameter corresponding to the effective thread shear area will vary with the relative unit tensile strengths of the materials of the internal and external threads. When the external and internal threads are manufactured from materials of equal unit tensile strength, failure will usually take place simultaneously in both threads at or near a diameter equal to the basic pitch diameter. The shear area (AS) for external and internal threads made of such materials can be computed from the following formula:

$$AS = 3.1416E\,\frac{L_e}{2}$$

where

E = basic pitch diameter
L_e = length of engagement at basic pitch diameter.

When the unit tensile strength of the external thread material greatly exceeds that of the internal thread material, as in the case of a threaded hole in a cast aluminum block mated with a 100,000 psi ultimate strength material bolt, the shear area of the internal thread (AS_n) can be computed from the following formulas:

(1) For simplified calculations that will provide shear areas within about 5 percent of those given by the precise formula shown below, the shear area of the internal thread may be computed as follows:

$$AS_n = 3.1416E\,\frac{3L_e}{4}$$

where L_e = length of engagement at the basic pitch diameter.

(2) The precise equation for shear area of the internal thread at a diameter equal to the minimum major diameter of the external thread is as follows:

$$AS_n = 3.1416nL_eD_s\min\left[\frac{1}{2n}+0.57735(D_s\min - E_n\max)\right]$$

where

n = number of threads per inch
D_s min = minimum major diameter of external thread
E_n max = maximum pitch diameter of internal thread
L_e = length of engagement at minimum major diameter of external thread. (Use L_e at basic pitch diameter for simplicity; this is conservative.)

When the unit tensile strength of the internal thread material greatly exceeds that of the external thread material, the shear area of the external thread (AS_s) can be computed from the following formulas:

(1) For simplified calculations for diameters 0.250 in and larger, that will provide shear areas within about 5 percent of those given by the precise formula shown below, the shear area of the external thread may be computed as follows:

$$AS_s = 3.1416E\,\frac{5L_e}{5}$$

where L_e = length of engagement at the basic pitch diameter.

(2) The precise equation for shear area of the external thread at a diameter equal to the maximum minor diameter of the internal thread is as follows:

$$AS_s = 3.1416nL_eK_n\max\left[\frac{1}{2n}+0.57735(E_s\min - K_n\max)\right]$$

where

K_n max = maximum minor diameter of internal thread.
E_s min = minimum pitch diameter of external thread.

If failure of a thread assembly should occur it is desirable that the external thread (screw) will break rather than that either the external or internal thread will strip. In other words, the length of thread engagement shall be sufficient to develop the full strength of the screw. Thus, the length of internal thread and the dimensions of this thread, particularly its minor diameter, should be such that, taking into account a possible difference in strength of material of the internal and external threads, the threaded portion of the external thread will break before either the external or internal threads strip.

Length of Thread Engagement—The length of engagement of a threaded unit that will develop maximum strength of an assembly threaded with external and internal threads manufactured from materials of near or equal unit tensile strength may be computed from the following formula, which incorporates the factor "half" relation of unit shearing strength to unit tensile strength:

$$L_e = 4A_s/3.1416E$$

where

$$A_s = 3.1416\left(\frac{E}{2}-\frac{3H}{16}\right)^2$$

When the unit tensile strength of the external thread materially exceeds that of the internal thread, the required length of engagement to develop maximum strength may be computed from the following formula, which is also based on the shear area being twice the tensile stress area:

$$L_e = \frac{2A_s}{3.1416nD_s\min\left[\frac{1}{2n}+0.57735(D_s\min - E_n\max)\right]}$$

Likewise, when the unit tensile strength of the internal thread materially exceeds that of the external thread, the following formula should be used:

$$L_e = \frac{2A_s}{3.1416nK_n\max\left[\frac{1}{2n}+0.57735(E_s\min-K_n\max)\right]}$$

The factor 2 used in the numerator of this formula means that it is assumed that the area in shear must be twice the tensile stress area to develop the full strength of the screw. This assumption is based on experiments made by the National Bureau of Standards in 1929, in which it was found that for hot-rolled and cold-rolled steel, and brass screws and nuts, this factor varied from 1.7 to 2.0. Taking the factor as 2 provides in general a small factor of safety against stripping of the threads.

To facilitate the application of this formula various notations, constants, and formulas applicable to the determination of the relation of critical areas to thread dimensions are given in table A5.2 and are discussed below.

(*a*) *Length of engagement determined by shear area of external thread.*—Formula 8, table A5.2, gives the length of engagement required to develop the full strength of the screw when the strength of the material in which the hole is tapped is the same as, or slightly less than, the strength of the material of the screw. The value of L_e thus obtained is sufficient for a permanently-fastened connection. If, however, the screw is an adjusting or lead screw, or if the connection will be frequently unscrewed, L_e should be increased to allow for the expected wear on the flanks of the threads during the useful life of the components.

For tapped holes in sheet metal, the maximum size of the screw to be specified should be such that the thickness of sheet equals the L_e required to develop full strength. In order to use the largest possible screw, it is necessary that the tolerance, T_{Kn}, on the minor diameter of the hole should be the practical minimum. If it should prove to be impracticable to reduce the minor diameter tolerance to such a value, it may be necessary to decrease the minimum minor diameter of the internal thread and to increase the minor diameter tolerance by the same amount. If this is done, the maximum minor diameter of the screw must be reduced by the same amount to prevent interference, and the minor diameter of the "go" thread ring gage must likewise be decreased, as this is the only control of the minor diameter of the screw. In all such cases, where dimensions are altered from those calculated according to the standard, the threads should be designated as specified in section 2. (See under "Designating threads having modified crests" in that section.)

(*b*) *Length of engagement determined by shear area of internal thread.*—The ratio of the area in shear in the screw and the area in shear in the tapped hole is given by formula 12, table A5.2. This ratio, R_1, will usually be less than 1 and the strength of the material of the tapped hole can be less than the strength of the material of the screw by this ratio with no indicated increase in L_e by formula 8. If, however, the ratio

$$R_2 = \frac{\text{ultimate tensile strength of tapped material}}{\text{ultimate tensile strength of screw material}}$$

is less than R_1, then L_e should be multiplied by R_1/R_2 to provide sufficient length of thread to prevent stripping of the threads in the tapped hole.

For retaining collars on shafts where the expected axial force resisted by the collar is appreciably less than the tensile force that the shaft itself is capable of resisting, L_e need only be long enough to withstand the expected axial force on the collar. If F_c is the axial force to be carried by the collar and *uts* is the tensile strength of the material of the shaft in pounds per square inch, then the length of thread engagement required on the shaft is equal to $2F_c/(uts \times S_s \min)$, where S_s min is given by formula 7, when the strength of material of the collar is the same or slightly less than the strength of material of the shaft. Ratios R_1 and R_2 should be computed as previously explained to determine whether or not a greater length is required to prevent stripping of the threads in the collar.

(*c*) *Hollow externally threaded parts.*—For screws with through axial holes, the length of engagement required is of course less than if the screw is solid. For this condition, formula 8 becomes

$$L_e\max = \frac{2(A_s\max - A_n\max)}{S_s\min\text{ per inch}}$$

where A_n is the cross-sectional area of the hole.

However, as the wall thickness of either or both the internal and external members becomes thin, the tendency of the external member to enlarge and the internal member to neck down in the thread means that an L_e greater than given by the above formula must be used, also that the tolerances on minor diameter of the internal thread and major diameter of the external thread, T_{Kn} and T_{Ds}, must be small to obtain the maximum practicable depth of thread engagement. For components having threads on thin-wall tubing, tests under actual working conditions should be made to determine proper selection of wall thicknesses, length of engagement, and pitch of thread.

4. THREAD PROPORTIONS IN RELATION TO TAPPING

In the production of threads it is considered impractical to tap a thread unless its diameter is greater than six times the basic thread height; therefore, when the ratio of D to H is less than 4.5, the use of a larger diameter, a finer pitch of thread, or both, should be considered.

The size of K_n is a factor in controlling tap breakage. Tap breakage is infrequent if the diameter of the tap is over 0.5 in or if the length of thread to be tapped is less than $0.5D$. For sizes less than 0.5 in and length of thread over $0.5D$, tap breakage can be minimized by use of a large K_n, that is T_{Kn} maximum. However, this means that L_e may have to be increased to develop the full strength of the screw.

5. EXAMPLES OF THREAD DESIGN

The design of special threads for particular purposes is illustrated by the following examples:

Example: A gun barrel is subjected to an internal explosive pressure that produces a tensile stress in the threaded end. The length of engagement of the threads should be sufficient to produce a minimum area in shear on the threads of the screw in line with the minor diameter of the tapped hole threads equal to twice the maximum stress area of the threaded portion of the barrel.

Assume that the thread on the barrel is 1.500–8UN–2A and the minimum internal diameter of the barrel at the threaded end is 0.792 in.

In table 2.21 will be found the following maximum dimensions of the external thread:

$$D_s \max = 1.4978 \text{ in}$$
$$E_s \max = 1.4166 \text{ in}$$
$$K_s \max = 1.3444 \text{ in.}$$

From table 2.21, $K_n \min = 1.365$ in. If we select the tolerance for minor diameter of hole $T_{Kn} = 0.0250$ in, K_n max will equal $1.365 + 0.025 = 1.390$, which will permit the use of a 1.375 in tap drill.

The minimum area in shear per inch can be computed, using formula 7, table A5.2:

$$S_s \min = K_n \max (C_1 - C_5 T_{Kn})$$
$$= 1.390(2.356 - 14.51 \times 0.025)$$
$$= 2.7706 \text{ in.}^2$$

The maximum stress area of the external thread, if solid, using formula 5, table A5.2, is

$$A_s \max = 0.5\left(C_1 K_n \min \times \frac{L_e}{D} \times D_s \max\right)$$

$\frac{L_e}{D}$ from chart, fig. A5.3 = 0.6185,

$$= 0.5(2.356 \times 1.365 \times 0.6185 \times 1.4978)$$
$$= 1.4896$$

Area of minimum center hole

$$= (\pi/4) \times 0.792^2 = 0.4926$$

Max stress area of external threaded member

$$1.4896 - 0.4926 = 0.9970$$

Length of thread engagement required

$$= L_e = \frac{2 \times \max A_s}{S_s \min}$$
$$= \frac{2 \times 0.997}{2.7706}$$
$$= 0.7197 \text{ in.}$$

If a length of engagement of 0.72 in cannot be obtained, the tolerance on minor diameter, T_{Kn}, of the internal thread should be reduced. If a space for a longer length of engagement is available, T_{Kn} can be increased.

Example: The dimension is required of the largest steel cap screw that can be used to hold a bracket on a cast iron body. The tensile strength of the steel is 60,000 psi, the tensile strength of the cast iron 20,000 psi, and the thickness of the cast iron is such that the length of thread engagement cannot exceed 1.750 in. The screws on the top side of the bracket will be in tension. From the ratio of the tensile strengths of the two materials, $R_2 = 20{,}000/60{,}000 = 0.333$, it is evident that the length of the tapped hole thread must be considerably longer than the length of thread engagement required to develop the full strength of the screw. R_1 will be of the order of 0.85 and the length of thread in the tapped hole will be approximately $R_1/R_2 = 0.85/0.333 = 2.55$ times as long as the length required to develop the full strength of the screw. L_e required to develop the full strength of the screw must be of the order of $1.750/2.55 = 0.686$ in.

Inasmuch as the hole is tapped in cast iron, a relatively coarse thread would be required, that is UNC or coarser. For such threads L_e/D, as shown on the chart, figure A5.3, varies between 0.57 and 0.61. Taking $L_e/D = 0.59$, the approximate diameter required is $0.686/0.59 = 1.163$. Try $D = 1\frac{1}{16} = 1.0625$ in. The selected pitch could be either 10 or 8 threads per inch with 8 threads per inch preferred. For a bracket screw, class 2A would be the preferred class.

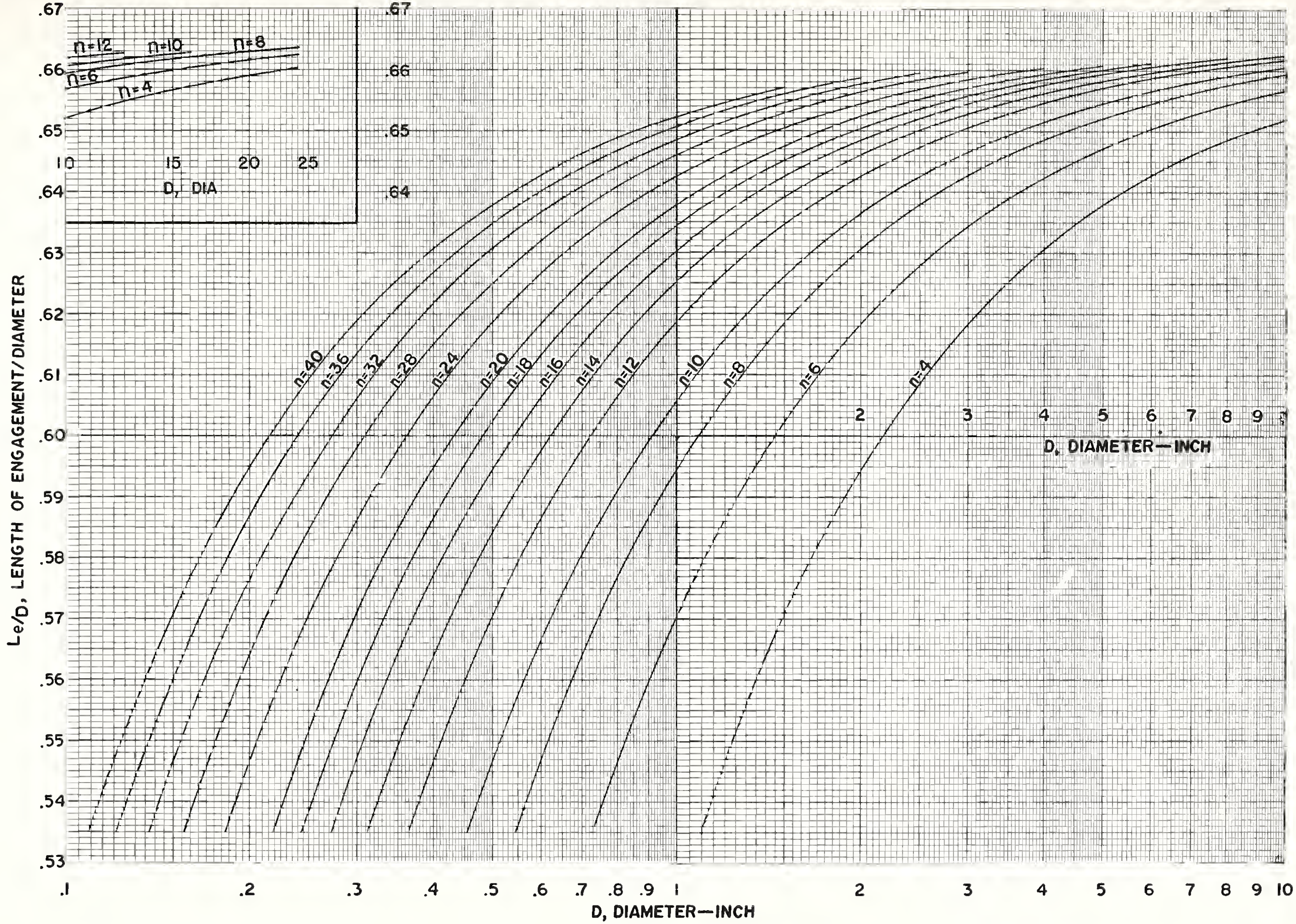

Figure A5.3. *Chart for determining minimum length of thread engagement.*

Thus, the screw is 1.0625–8UN–2A and the hole 1.0625–8UN–2B.

Next, read the dimensions of the screw and hole from table 2.21 to determine whether or not the above selection is correct.

Max major diameter of screw, D_s max = 1.0605
Min major diameter of screw, D_s min = 1.0455
Min minor diameter of tapped hole, K_n min = 0.927

The number of 1.0625–8 screws required will depend on the torque that may develop on the bracket that will produce tension in the screws. It should be possible to tighten these screws to the yield strength of the steel without stripping the cast iron threads.

The complete table of dimensions of the tapped hole and screw is (From table 2.21)

Internal thread, 1.0625–8UN–2B

Min major diameter = 1.0625
Min pitch diameter = 0.9813
Max pitch diameter = 0.9902
Min minor diameter = 0.927
Max minor diameter = 0.952

External thread, 1.0625–8UN–2A

Max major diameter = 1.0605
Min major diameter = 1.0455
Max pitch diameter = 0.9793
Min pitch diameter = 0.9725
Max minor diameter = 0.9071

L_e/D from chart, figure A5.3 = 0.5990

$$L_e \min = L_e/D \times D_s \max = 0.5990 \times 1.0605 = 0.6352$$

$$T_{E_n} \text{ (table 2.21)} = 0.0089$$

R_1, table A5.2, formula 12

$$= \frac{0.75 K_n \min}{D_s \min[0.875 - C_4(T_{E_n} + T_{D_s} + G)]}$$

$$= \frac{0.75 \times 0.927}{1.0455[0.875 - 4.619(0.0089 + 0.0150 + 0.0020)]}$$

$$= 0.8803$$

L_e required in hole

$$= L_e \min \times \frac{R_1}{R_2} = 0.6352 \times 0.8803/0.3333 = 1.6777 \text{ in,}$$

which is less than the L_e (1.750 in.) permitted.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

HANDBOOK H28

SCREW-THREAD STANDARDS

FOR FEDERAL SERVICES

APPENDIX 6

1957

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