

Threaded Rods (Inch Series)

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers



ASME B18.31.3-2009

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CONTENTS

Foreword	iv
Committee Roster	v
Correspondence With the B18 Committee	vi
1 Introduction	1
2 General Data	1
Figure	
1 Threaded Rod Dimensions	2

FOREWORD

There was significant interest in developing this Standard due to the antidumping investigations by the U.S. Department of Commerce and the U.S. International Trade Commission that were taking place simultaneously. The investigations resulted in anti-dumping tariffs being applied to a significant portion of threaded rods used in the United States.

Members of the Subcommittee recognized that there would be a lot of new threaded rod manufacturers appearing in the market and that the industry needed a standard to reference on purchasing documents. The Fastener Industry Education Group cites referencing standards as one of the most important criteria for preventing a poor quality or wrong product from entering the supply chain.

On June 19, 2009, ASME B18.31.3 was approved by B18 Subcommittee 31 and by the B18 Standards Committee. This Standard was approved by the American National Standards Institute on November 10, 2009.



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Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

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

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The request for an interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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THREADED RODS (INCH SERIES)

1 INTRODUCTION

1.1 Scope

This Standard covers the complete general and dimensional data for inch series threaded rods recognized as American National Standard. Included are diameters #4 through 4 in. UNC, UNF, 8UN, and ACME in both right- and left-handed threads.

At this time, there are no ISO standards for inch threaded rods.

The inclusion of dimensional data in this Standard is not intended to imply that all of the products described herein are stock production sizes. Consumers should consult with suppliers concerning lists of stock production sizes.

1.2 Dimensions

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

1.3 Terminology

All terms used in this Standard are defined in ASME B18.12.

1.4 Referenced Standards

Unless otherwise specified, the standards referenced shall be the most recent at the time of order placement.

ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B1.3M, Screw Thread Gaging Systems for Dimensional Acceptability — Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)

ASME B1.5, Acme Screw Threads

ASME B18.12, Glossary of Terms for Mechanical Fasteners

ASME B18.18.2, Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners

ASME B18.24, Part Identifying Number (PIN) Code System Standard for B18 Fastener Products

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300 (www.asme.org)

ASTM A 193/A 193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications

ASTM A 307, Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

ASTM A 380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems

ASTM F 468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

ASTM F 593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

ASTM F 788/F 788M, Standard Specification for Surface Discontinuities of Bolts, Screws, and Studs, Inch and Metric Series

ASTM F 1470, Standard Practice for Fastener Sampling for Specified Mechanical Properties and Performance Inspection

ASTM F 1554, Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

ASTM F 1941, Electrodeposited Coatings on Threaded Fasteners (Unified Inch Screw Threads (UN/UNR))

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428 (www.astm.org)

2 GENERAL DATA

2.1 Length

Threaded rods are commonly produced in, but not limited to, 3-ft, 6-ft, 10-ft, and 12-ft lengths. The length of the threaded rod shall be measured, overall, from end to end. The length tolerance on all threaded rods in nominal lengths of 6 ft and longer shall be $\pm\frac{1}{2}$ in. and $\pm\frac{1}{4}$ in. for nominal lengths less than 6 ft. See Fig. 1.

2.2 Threads

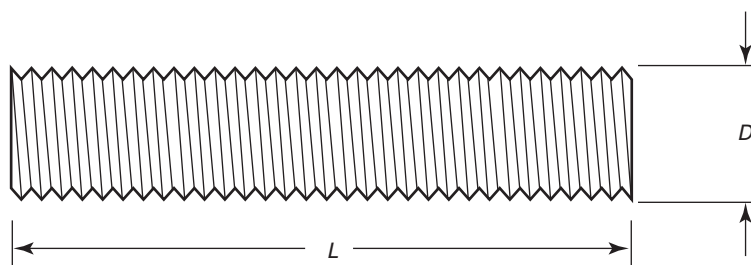
Unified threads shall conform to the requirements of ASME B1.1. For UNC and UNF threads, Class 1A will be furnished unless otherwise specified. Plated threads shall conform to ASME B1.1, Class 3A high limit (basic) and the low limit requirement of the before-coated or plated thread class. Class 2A threads shall be used on 8 UN threads and at the manufacturer's option for other series, and for sizes where 1A is not applicable.

ACME threads shall meet the requirements of ASME B1.5, Class 2G, unless otherwise specified.

2.3 Thread Acceptance Gaging

Unless otherwise specified by the purchaser, gaging for screw thread dimensional acceptability shall be in accordance with Gaging System 21 as specified in ASME B1.3M.



Fig. 1 Threaded Rod Dimensions

2.4 Ends

The ends shall be of sufficient workmanship to allow for easy assembly with an appropriate mating nut.

2.5 Straightness

When required, straightness limits and the inspection technique to be used to evaluate straightness shall be agreed upon between the purchaser and the supplier.

2.6 Materials and Mechanical Requirements

There are four primary designations for threaded rod materials. Other materials may be specified by the purchaser.

2.6.1 Steel. Unless otherwise specified, Steel shall designate low carbon steel meeting the minimum requirements of ASTM A 307, Grade A.

2.6.2 A36. Materials shall meet the requirements of ASTM F 1554, Grade 36.

2.6.3 B7. B7 shall designate the material and mechanical properties of ASTM A 193/A 193M, Grade B7.

2.6.4 CRES. Unless otherwise specified, CRES shall designate corrosion resistant steel of either 18-8 (302, 303, or 304) or 316 as designated by the purchaser. Rods designated as 18-8 shall meet the tensile and yield strength requirements of Alloy Group 1, condition CW per ASTM F 593. Rods designated as 316 shall meet the tensile and yield strength requirements of Alloy Group 2, condition CW per ASTM F 593.

2.6.5 Nonferrous Materials. Nonferrous materials shall conform to ASTM F 468.

2.7 Finishes

The purchaser shall designate the required finish. Unless otherwise specified, plain finish steel rods shall be coated with a light oil to protect it from corrosion during transportation and storage.

Electroplated rods shall be finished in accordance with ASTM F 1941.

CRES rods shall be cleaned and descaled in accordance with ASTM A 380.

2.8 Workmanship

Threaded rods shall be visually, without magnification, free from burrs, seams, laps, loose scales, irregular surfaces, and any defects affecting their serviceability. When control of surface discontinuities is required, the purchaser shall specify conformance to ASTM F 788/ F 788M.

2.9 Designation

2.9.1 Threaded rods shall be designated by data in the following sequential order:

- (a) product name
- (b) designation of standard
- (c) nominal size (fractional or decimal equivalent) and threads per inch
- (d) thread class, if other than specified in para. 2.2, and LH for left-hand thread, if applicable
- (e) product length (specified in feet and inches)
- (f) material, including specification where necessary
- (g) finish (material, standard, and thickness when applicable)

2.9.2 See the following examples:

- (a) threaded rod per ASME B18.31.3, $\frac{1}{2}$ -13 \times 10, low carbon steel, Fe/Zn 3A per ASTM F 1941
- (b) threaded rod per ASME B18.31.3, $\frac{5}{16}$ -18 \times 6, ASTM A 193, Grade B7, plain finish
- (c) threaded rod per ASME B18.31.3, $\frac{3}{8}$ -16 \times 6, CRES, 18-8 SS

2.10 Grade Symbol and Manufacturer's Marking

Unless otherwise specified by the purchaser, threaded rods shall be exempt from the marking requirements of the associated material specification. Packaging and label requirements as mandated in applicable material specifications are not exempt.

2.11 Inspection and Quality Assurance

2.11.1 Dimensional Conformance. Threaded rods shall have the following designated characteristics inspected to ASME B18.18.2 levels shown:

<u>Characteristic</u>	<u>Inspection Level</u>
Thread acceptability	C
Length	C

2.12 Materials and Mechanical Conformance

Threaded rods shall comply with the material, mechanical, and test requirements as specified in the material portion of the threaded rod's description on the purchase order. Unless otherwise specified, sampling will be as specified in ASTM F 1470.



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B18 AMERICAN NATIONAL STANDARDS FOR BOLTS, NUTS, RIVETS, SCREWS, WASHERS, AND SIMILAR FASTENERS

Small Solid Rivets	B18.1.1-1972 (R2006)
Large Rivets	B18.1.2-1972 (R2006)
Metric Small Solid Rivets	B18.1.3M-1983 (R2006)
Square and Hex Bolts and Screws (Inch Series)	B18.2.1-1996 (R2005)
Square and Hex Nuts (Inch Series)	B18.2.2-1987 (R2005)
Metric Hex Cap Screws	B18.2.3.1M-1999 (R2005)
Metric Formed Hex Screws	B18.2.3.2M-2005
Metric Heavy Hex Screws	B18.2.3.3M-1979 (R2001)
Metric Hex Flange Screws	B18.2.3.4M-2001 (R2006)
Metric Hex Bolts	B18.2.3.5M-1979 (R2006)
Metric Heavy Hex Bolts	B18.2.3.6M-1979 (R2006)
Metric Heavy Hex Structural Bolts	B18.2.3.7M-1979 (R2006)
Metric Hex Lag Screws	B18.2.3.8M-1981 (R2005)
Metric Heavy Hex Flange Screws	B18.2.3.9M-2001 (R2006)
Metric Hex Nuts, Style 1	B18.2.4.1M-2002 (R2007)
Metric Hex Nuts, Style 2	B18.2.4.2M-2005
Metric Slotted Hex Nuts	B18.2.4.3M-1979 (R2006)
Metric Hex Flange Nuts	B18.2.4.4M-1982 (R2005)
Metric Hex Jam Nuts	B18.2.4.5M-2008
Metric Heavy Hex Nuts	B18.2.4.6M-1979 (R2003)
Metric Flanged 12-Point Head Screws	B18.2.5M-2009
Fasteners for Use in Structural Applications	B18.2.6-2009
Metric 12-Spline Flange Screws	B18.2.7.1M-2002 (R2007)
Clearance Holes for Bolt, Screws, and Studs	B18.2.8-1999 (R2005)
Straightness Gage and Gaging for Bolts and Screws	B18.2.9-2007
Socket Cap, Shoulder, and Set Screws, Hex and Spline Keys (Inch Series)	B18.3-2003 (R2008)
Socket Head Cap Screws (Metric Series)	B18.3.1M-1986 (R2008)
Metric Series Hexagon Keys and Bits	B18.3.2M-1979 (R2008)
Hexagon Socket Head Shoulder Screws (Metric Series)	B18.3.3M-1986 (R2008)
Hexagon Socket Button Head Cap Screws (Metric Series)	B18.3.4M-1986 (R2008)
Hexagon Socket Flat Countersunk Head Cap Screws (Metric Series)	B18.3.5M-1986 (R2008)
Metric Series Socket Set Screws	B18.3.6M-1986 (R2008)
Round Head Bolts (Inch Series)	B18.5-1990 (R2003)
Metric Round Head Short Square Neck Bolts	B18.5.2.1M-2006
Metric Round Head Square Neck Bolts	B18.5.2.2M-1982 (R2005)
Wood Screws (Inch Series)	B18.6.1-1981 (R2008)
Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws (Inch Series)	B18.6.2-1998 (R2005)
Machine Screws and Machine Screw Nuts	B18.6.3-2003 (R2008)
Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series)	B18.6.4-1998
Metric Thread-Forming and Thread-Cutting Tapping Screws	B18.6.5M-2000 (R2005)
Metric Machine Screws	B18.6.7M-1999 (R2005)
General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Split Rivets and Rivet Caps	B18.7-2007
Metric General Purpose Semi-Tubular Rivets	B18.7.1M-2007
Clevis Pins and Cotter Pins (Inch Series)	B18.8.1-1994 (R2000)
Taper Pins, Dowel Pins, Straight Pins, Grooved Pins, and Spring Pins (Inch Series)	B18.8.2-2000
Spring Pins: Coiled Type, Spring Pins: Slotted, Machine Dowel Pins: Hardened Ground, and Grooved Pins (Metric Series)	B18.8.100M-2000 (R2005)
Cotter Pins, Headless Clevis Pins, and Headed Clevis Pins (Metric Series)	B18.8.200M-2000 (R2005)
Plow Bolts	B18.9-2007
Track Bolts and Nuts	B18.10-1982 (R2005)
Miniature Screws	B18.11-1961 (R2005)
Glossary of Terms for Mechanical Fasteners	B18.12-2001 (R2006)
Screw and Washer Assemblies — Sems (Inch Series)	B18.13-1996 (R2008)
Screw and Washer Assemblies: Sems (Metric Series)	B18.13.1M-1998 (R2003)
Forged Eyebolts	B18.15-1985 (R2008)
Prevailing-Torque Type Steel Metric Hex Nuts and Hex Flange Nuts	B18.16M-2004 (R2009)

Serrated Hex Flange Locknuts 90,000 psi (Inch Series)	B18.16.4-2008
Nylon Insert Locknuts (Inch Series)	B18.16.6-2008
Inspection and Quality Assurance for General Purpose Fasteners	B18.18.1-2007
Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners	B18.18.2-2009
Inspection and Quality Assurance for Special Purpose Fasteners	B18.18.3M-1987 (R2005)
Inspection and Quality Assurance for Fasteners for Highly Specialized Engineered Applications	B18.18.4M-1987 (R2005)
Inspection and Quality Assurance Plan Requiring In-Process Inspection and Controls.	B18.18.5M-1998 (R2009)
Quality Assurance Plan for Fasteners Produced in a Third Party Accreditation System	B18.18.6M-1998 (R2009)
Quality Assurance Plan for Fasteners Produced in a Customer Approved Control Plan	B18.18.7M-1998 (R2009)
Washers: Helical Sprin-Lock, Tooth Lock, and Plain Washers (Inch Series).	B18.21.1-2009
Lock Washers (Metric Series)	B18.21.2M-1999 (R2005)
Double Coil Helical Spring Lock Washers for Wood Structures	B18.21.3-2008
Metric Plain Washers.	B18.22M-1981 (R2005)
Part Identifying Number (PIN) Code System for B18 Fastener Products	B18.24-2004
Square and Rectangular Keys and Keyways.	B18.25.1M-1996 (R2008)
Woodruff Keys and Keyways	B18.25.2M-1996 (R2008)
Square and Rectangular Keys and Keyways: Width Tolerances and Deviations Greater Than Basic Size	B18.25.3M-1998 (R2008)
Tapered and Reduced Cross Section Retaining Rings (Inch Series)	B18.27-1998 (R2005)
Helical Coil Screw Thread Inserts — Free Running and Screw Locking (Inch Series).	B18.29.1-1993 (R2007)
Helical Coil Screw Thread Inserts: Free Running and Screw Locking (Metric Series)	B18.29.2M-2005
Open-End Blind Rivets With Break Mandrels (Metric Series)	B18.30.1M-2000 (R2005)
Metric Continuous and Double-End Studs.	B18.31.1M-2008
Continuous and Double-End Studs.	B18.31.2-2008
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