ASME B16.14-2024
(Revision of ASME B16.14-2018)

Ferrous Pipe Plugs, Bushings, and Locknuts With Pipe Threads

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME B16.14-2024
(Revision of ASME B16.14-2018)

Ferrous Pipe Plugs, Bushings, and Locknuts With Pipe Threads

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
150 Clove Road • Little Falls, NJ • 07424 USA

Date of Issuance: August 23, 2024

The next edition of this Standard is scheduled for publication in 2029.

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

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

Participation by federal agency representatives or persons affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

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

The endnotes and preamble in this document (if any) are part of this American National Standard.

ASME Collective Membership Mark

The American Society of Mechanical Engineers
150 Clove Road, Little Falls, NJ 07424

CONTENTS

FOREWORD

In 1921, the American Engineering Standards Committee [later the American Standards Association (ASA)] organized Sectional Committee B16 to unify and develop standards for pipe flanges and fittings. Cosponsors of the B16 Committee were The American Society of Mechanical Engineers (ASME), the Heating and Piping Contractors National Association [now Mechanical Contractors Association of America (MCAA)], and the Manufacturers Standardization Society of the Valve and Fitting Industry (MSS). Cosponsors were later designated as Co-Secretariat organizations.

Threaded fittings were also included in the scope of the B16 Committee, and Subcommittee 2 (now Subcommittee B) was made responsible for threaded fittings other than steel.

The American Standard for Pipe Plugs was originally published as ASA B16e2-1936. It had been developed by Subcommittee 2 from material assembled and published by MSS as a standard practice in April 1929.

From the beginning, pipe plugs have been made with the American Standard Taper Pipe Thread, but the design of the square heads necessary to screw them into fittings or any tapped hole has been a matter of manufacturers' and users' individual design. However, the use of pipe plugs soon broadened, and they came to be employed in many other service applications, e.g., automotive and industrial machinery. Accordingly, it was natural for the dimensions of the square heads and the sockets to conform to standard open wrench sizes and to maximum dimensions of standard hot-rolled steel bars.

Pipe bushing and locknut dimensions were originally included in ASA B16c-1939, American Standard for 150 lb Malleable Iron Screwed Fittings. ASA B16c-1939 was adapted from information assembled and published by MSS in 1929.

In response to a demand for inclusion under one cover, B16.14-1943, American Standard for Ferrous Plugs, Bushings, Locknuts, and Caps, was developed from ASA B16c-1939 and ASA B16d-1941, American Standard for Cast Iron Screwed Fittings, 125 lb and 250 lb, and approved by ASA in October 1943. The section of B16.14 covering pipe caps was later removed because of differences in pressure ratings between caps made of cast iron and malleable iron.

This Standard was revised in 1948 and approved by letter ballot vote of the Sectional Committee. Following the approval by the sponsor bodies, it was presented to ASA, now the American National Standards Institute (ANSI), with recommendations for approval as an American Standard. This approval and designation was given on April 6, 1949.

Subcommittee 2 began a review of the document in 1963 and completed its work in 1964. The Sectional Committee approved a number of minor changes in format and wording. Following approval by the sponsor organizations, ANSI approval was granted on November 12, 1965.

In 1970, a review was initiated by Subcommittee 2 that resulted in the proposal to revise the document in several minor areas and update referenced standards. Following approvals by the B16 Standards Committee and Co-Secretariat, ANSI granted approval on November 1, 1971.

In 1975, review was again initiated by Subcommittee B (formerly Subcommittee 2), and it was determined that the only significant changes needed were the updating of referenced standards and the addition of metric equivalents. Approvals were granted by the B16 Standards Committee, Co-Secretariat, and ANSI, the latter on February 4, 1977.

In 1982, the American National Standards Committee was reorganized as an ASME Committee operating under procedures accredited by ANSI. That same year, Subcommittee B once again began review of the Standard. The only changes made were the dates of the referenced standards. After approval by the B16 Standards Committee and ASME, final approval was granted by ANSI in July 1983.

In the 1991 edition of B16.14, U.S. Customary units were established as the standard and updates were made to the referenced standards and minimum specifications for steel fittings. Following approval by the B16 Standards Committee and ASME, approval as an American National Standard was given by ANSI on January 4, 1991, with the new designation ASME B16.14-1991.

In the 2010 edition of B16.14, SI units became the primary units, and U.S. Customary units were incorporated into the Standard as secondary units and shown in parentheses. Following approval by the B16 Standards Committee and the ASME Board, the revision to the 1991 edition of the Standard was approved as an American National Standard by ANSI on April 1, 2010, and designated as ASME B16.14-2010.

In the 2013 edition, section 8 was revised to require threads and gaging practices to be as per, and identical with, ASME B1.20.1 and other B16 standards. Following approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on July 29, 2013, with the new designation ASME B16.14-2013.

In the 2018 edition, the U.S. Customary tables formerly in Mandatory Appendix I were merged with the SI tables in the main text; the tables were redesignated, Mandatory Appendix I was deleted, and the cross-references were updated accordingly. In addition, all reference standards in what was formerly Mandatory Appendix II were updated. Following approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on August 3, 2018, with the new designation ASME B16.14-2018.

In the 2024 edition, all references to steel materials have been deleted as the focus of this Standard is on cast iron. Additionally, the references have been updated and new definitions have been added.

Following approval by the ASME B16 Committee, ASME B16.14-2024 was approved by ANSI as an American National Standard on July 2, 2024.

ASME B16 COMMITTEE
Standardization of Valves, Flanges, Fittings, and Gaskets

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

STANDARDS COMMITTEE OFFICERS

C. Davila, *Chair*
R. Bojarczuk, *Vice Chair*
S. J. Rossi, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. Appleton, Appleton Quality Concepts, LLC
J. E. Barker, DeZURIK, Inc.
R. Barnes, ANRIC Enterprises, Inc.
D. C. Bayreuther, Neles USA, Inc.
W. Bedesem, Consultant
R. Bojarczuk, Consultant
A. Cheta, Shell Global Solutions
G. A. Cuccio, Capitol Manufacturing Co.
C. E. Davila, Consultant
J. G. Dominguez, Welding Outlets, Inc.
B. G. Fabian, Pennsylvania Machine Works, LLC
K. S. Felder, Consultant
D. Frikken, Becht Engineering Co.
J. Holstrom, Val-Matic Valve and Manufacturing Corp.
D. Hunt, Jr., Fastenal Co.
G. Jolly, Samshin Ltd.
A. Kireta, Copper Development Association, Inc.
E. J. Lain, Constellation
T. A. McMahon, Emerson Process Management
R. C. Merrick, Consultant
W. H. Patrick, The Dow Chemical Co.
D. W. Rahoi, Consultant
D. F. Reid, VSP Technologies
S. J. Rossi, The American Society of Mechanical Engineers
R. A. Schmidt, Canadoil
J. Sekerak, CSA America Standards, Inc.
F. Feng, *Delegate,* China Productivity Center for Machinery
J. D. Grant, *Alternate,* DeZURIK, Inc.
P. V. Craig, *Contributing Member,* Jomar Group, Ltd.

SUBCOMMITTEE B — THREADED FITTINGS (EXCEPT STEEL), FLANGES, AND FLANGED FITTINGS

D. Hunt, Jr., *Chair,* Fastenal Co.
J. R. Holstrom, *Vice Chair,* Val-Matic Valve & Manufacturing Corp.
D. Weiner, *Secretary,* The American Society of Mechanical Engineers
J. Atkinson, Mueller Industries, Inc.
W. Bliss, McWane, Inc.
M. C. Coffey, Consultant
R. Kelsey, Consultant
W. LeVan, Cast Iron Soil Pipe Institute
G. L. Simmons, Charlotte Pipe & Foundry
G. T. Walden, Ferguson
C. Mueller, *Alternate,* Mueller Industries, Inc.

CORRESPONDENCE WITH THE B16 COMMITTEE

General. ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Standard should be sent to the staff secretary noted on the committee's web page, accessible at https://go.asme.org/B16committee.

Revisions and Errata. The committee processes revisions to this Standard on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Inquiry Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at https://go.asme.org/Interpretations.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Interpretations are published in the ASME Interpretations Database at https://go.asme.org/Interpretations as they are issued.

Committee Meetings. The B16 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B16committee.

ASME B16.14-2024
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.14-2024 was approved by the American National Standards Institute on July 2, 2024.

ASME B16.14-2024 includes the following changes identified by a margin note, **(24)**. The Record Numbers listed below are explained in more detail in the "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
1	2.7	Added *(23-2140)*
1	3	In subpara. (a), first sentence revised *(19-921)*
2	6	Revised *(19-921)*
6	Table 7-4	Note (1) revised *(19-921)*
9	Table 7-5	Third column head revised *(19-921)*
10	Mandatory Appendix I	Updated *(23-2138)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
19-921	Deleted references to steel material in paras. 3(a), 6(a), and 6(b); Table 7-4, Note (1); and Table 7-5. Revised para. 3(a) to specify gray, malleable, or ductile iron material.
23-2138	Updated references.
23-2140	Added para. 2.7 to define *may, shall*, and *should*.

FERROUS PIPE PLUGS, BUSHINGS, AND LOCKNUTS WITH PIPE THREADS

1 SCOPE

This Standard covers the following:
(a) pressure–temperature ratings
(b) size
(c) marking
(d) materials
(e) dimensions and tolerances
(f) threading
(g) pattern taper

2 GENERAL

2.1 References

Standards and specifications adopted by reference are shown in Mandatory Appendix I. It is not considered practical to identify the edition of each referenced standard and specification in the text. Instead, the editions of the referenced standards and specifications are listed in Mandatory Appendix I.

2.2 Quality Systems

Requirements relating to the product manufacturer's quality system program are described in Nonmandatory Appendix A.

2.3 Relevant Units

This Standard states values in both SI (metric) units and U.S. Customary units. These systems of units are to be regarded separately as standard. Within the text, the U.S. Customary units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, it is required that each system of units be used independently of the other. Combining values from the two systems constitutes nonconformance with the Standard.

2.4 Service Conditions

Criteria for selection of materials suitable for particular fluid service are not within the scope of this Standard.

2.5 Convention

For determining conformance with this Standard, the onvention for fixing significant digits where limits (maximum and minimum values) are specified shall be as defined in ASTM E29. This requires that an observed or calculated value be rounded off to the nearest unit in the last right-hand digit used for expressing the limit. Decimal values and tolerances do not imply a particular method of measurement.

2.6 Denotation

2.6.1 Pressure Rating Designation. Class followed by a dimensionless number is the designation for pressure–temperature ratings.

2.6.2 Size. Nominal pipe size (NPS) followed by a dimensionless number is the designation for nominal flange or flange fitting size. NPS is related to the reference nominal diameter, DN, used in international standards. The relationship is, typically, as follows:

NPS	DN
1	25
1¼	32
1½	40
2	50
2½	65
3	80
3½	90
4	100

For NPS ≥ 4, the related DN = 25 × (NPS)

2.7 Definitions (24)

may: the term used to denote permission, neither a requirement nor a recommendation.

shall: the term used to denote a requirement.

should: the term used to denote a recommendation.

3 PRESSURE–TEMPERATURE RATINGS (24)

(a) Pressure–temperature ratings for plugs and bushings shall be in accordance with ASME B16.4 if made of cast iron, or ASME B16.3 if made of malleable iron or ductile iron. Use of cored plugs or hexagon head bushings should be limited to Class 125 cast iron and Class 150 malleable iron threaded fittings. Solid plugs and face bushings are recommended for use with Class 250 cast iron fittings and Class 300 malleable iron fittings.

(b) Locknuts are not pressure–temperature rated.

4 NOMINAL PIPE SIZE

As applied in this Standard, the use of the phrase "nominal pipe size" or the designation NPS followed by a dimensionless number is for identifying the end connection of fittings. The number is not necessarily the same as the fitting inside diameter.

5 MARKING

Each fitting shall be marked for identification with the manufacturer's name or trademark, except where a marking is impractical.

(24) 6 MATERIALS

(a) The fittings covered by this Standard are furnished in gray iron, malleable iron, or ductile iron.

(b) The chemical and mechanical properties of cast gray, malleable, or ductile iron material shall equal or exceed those properties listed in ASTM A126, as applicable. The fittings manufacturer shall be prepared to certify conformance based on test data.

7 DIMENSIONS AND TOLERANCES

(a) Dimensions in metric units are given in Tables 7-1 through 7-5 for various types of fittings.

(b) At no point in the component wall shall the metal thickness be less than 90% of the values listed in the tables.

8 THREADS

8.1 Thread Form

All threads shall be in accordance with ASME B1.20.1.

8.1.1 Countersinks and Chamfers. All internal taper pipe threads shall be countersunk or chamfered at a distance of not less than one-half the pitch of the thread at an angle of approximately 45 deg with the axis of the thread. External taper pipe threads shall be chamfered at an angle between 30 deg and 45 deg with the axis, for easier entrance in making a joint and protection of the thread. Countersinking and chamfering shall be concentric with the threads. The length of threads specified in all tables shall be measured to include the countersink or chamfer.

8.1.2 Alignment. The maximum allowable variation in the alignment of threads of all openings shall be 5.0 mm/m (0.06 in./ft).

8.1.3 Internal Threading. All fittings with internal threads, except locknuts, shall be threaded with ASME B1.20.1 NPT threads. The reference point for gaging is the starting end of the fitting, provided the chamfer does not exceed the major diameter of the internal thread. When a chamfer on the internal thread exceeds this limit, the reference point becomes the last thread scratch on the chamfer cone.

8.1.4 External Threading. All externally threaded fittings shall be threaded with ASME B1.20.1 NPT threads. The reference point for gaging is the end of the thread, provided the chamfer is not smaller than the minor diameter of the external thread. When a chamfer on the external thread exceeds this limit, the reference point becomes the last thread scratch on the chamfer cone.

8.1.5 Locknuts. Locknuts shall be threaded with ASME B1.20.1 NPSL threads.

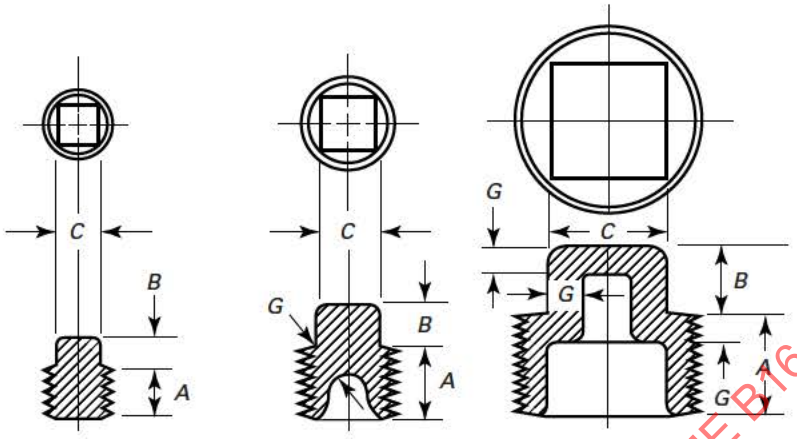
8.2 Gaging Tolerances

For taper pipe threads, the variation in threading shall be limited to one turn large or small from the gaging notch on the plug or the gaging face of the ring when using working gages.

9 PATTERN TAPER

Plug squares or hexagons, raised or countersunk, may have opposite sides tapered a maximum of 4 deg total.

Table 7-1
Dimensions of Square Head Plugs



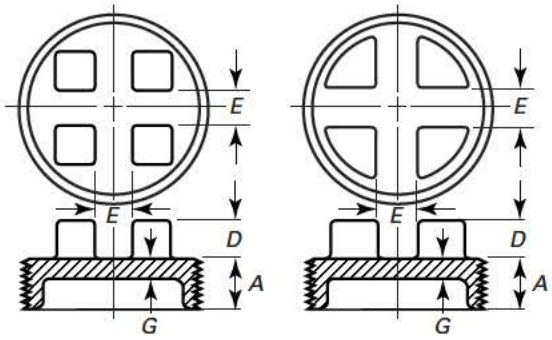
(a) Solid Plugs (b) Cored Plugs

NPS [Notes (1), (2)]	Minimum Thread Length, *A*, mm (in.)	Minimum Height of Square, *B*, mm (in.)	Nominal Width Across Flats, *C*, in. [Note (3)]	Nominal Metal Thickness, *G*, mm (in.) [Note (4)]
1/8	9.4 (0.37)	6.1 (0.24)	9/32	...
1/4	11.2 (0.44)	7.1 (0.28)	3/8	...
3/8	12.2 (0.48)	7.9 (0.31)	7/16	...
1/2	14.2 (0.56)	9.7 (0.38)	9/16	4.1 (0.16)
3/4	16.0 (0.63)	11.2 (0.44)	5/8	4.6 (0.18)
1	19.1 (0.75)	12.7 (0.50)	13/16	5.1 (0.20)
1 1/4	20.3 (0.80)	14.2 (0.56)	15/16	5.6 (0.22)
1 1/2	21.1 (0.83)	15.8 (0.62)	1 1/8	6.1 (0.24)
2	22.4 (0.88)	17.3 (0.68)	15/16	6.6 (0.26)
2 1/2	27.2 (1.07)	18.8 (0.74)	1 1/2	7.4 (0.29)
3	28.7 (1.13)	20.3 (0.80)	1 11/16	7.9 (0.31)
3 1/2	30.0 (1.18)	21.8 (0.86)	1 7/8	8.6 (0.34)

GENERAL NOTE: Nominal width across flats is given in inches.

NOTES:
(1) Solid plugs are provided in NPS 1/8 to NPS 3 1/2, inclusive; cored plugs, NPS 1/2 to NPS 3 1/2, inclusive.
(2) For NPS 4 and larger, slotted or bar pattern plugs are provided (see Table 7-2).
(3) These dimensions are the nominal width across flats as given in ASME B18.2.1, Table 1. Square head plugs are designed to fit these wrenches.
(4) Cored plugs have metal thickness at all points equal to dimension *G*, except at the end of the thread. For tolerance, see para. 7(b).

Table 7-2
Dimensions of Bar or Slotted Head Plugs



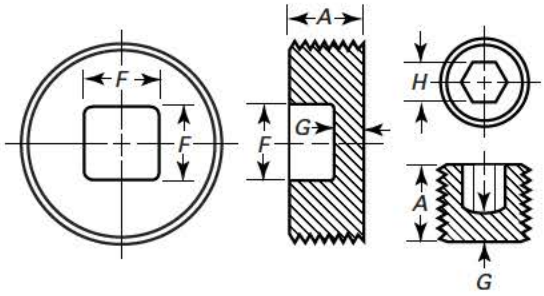
Optional Designs

NPS	Minimum Thread Length, *A*, mm (in.)	Minimum Height of Lug, *D*, mm (in.)	Minimum Distance Between Lugs, *E*, mm (in.)	Metal Thickness, *G*, mm (in.) [Note (1)]
4	31.0 (1.22)	25.4 (1.00)	22.4 (0.88)	9.4 (0.37)
5	33.3 (1.31)	25.4 (1.00)	22.4 (0.88)	11.7 (0.46)
6	35.6 (1.40)	31.8 (1.25)	31.8 (1.25)	13.2 (0.52)
8	39.9 (1.57)	35.1 (1.38)	38.1 (1.50)	16.8 (0.66)

GENERAL NOTE: For NPS 3½ and smaller, square head plugs are provided (see Table 7-1).

NOTE: (1) Cored plugs have metal thickness at all points equal to dimension *G*, except at the end of the thread. For tolerance, see para. 7(b).

Table 7-3
Dimensions of Countersunk Plugs



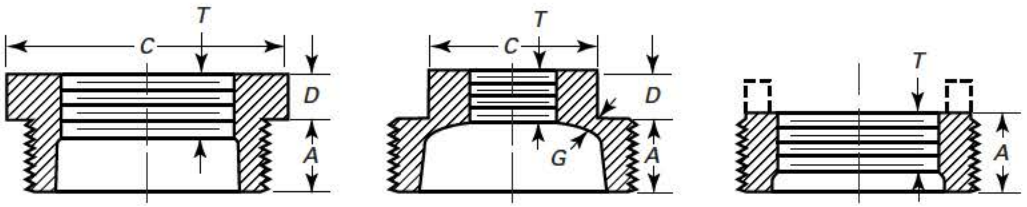
NPS	Minimum Thread Length, *A*, mm (in.)	Nominal Size of Square Socket, *F*, in. [Note (1)]	Size of Hexagon, *H*, in. [Note (2)]	Metal Thickness, *G*, mm (in.) [Note (3)]
1/8	9.4 (0.37)	...	3/16	1.5 (0.06)
1/4	11.2 (0.44)	...	1/4	2.3 (0.09)
3/8	12.2 (0.48)	...	5/16	3.3 (0.13)
1/2	14.2 (0.56)	3/8	3/8	4.1 (0.16)
3/4	16.0 (0.63)	1/2	9/16	4.6 (0.18)
1	19.1 (0.75)	1/2	5/8	5.1 (0.20)
1 1/4	20.3 (0.80)	3/4	...	5.6 (0.22)
1 1/2	21.1 (0.83)	3/4	...	6.1 (0.24)
2	22.4 (0.88)	7/8	...	6.6 (0.26)
2 1/2	27.2 (1.07)	1 1/8	...	7.4 (0.29)
3	28.7 (1.13)	1 3/8	...	7.9 (0.31)
3 1/2	30.0 (1.18)	1 1/2	...	8.6 (0.34)
4	31.0 (1.22)	2	...	9.4 (0.37)

GENERAL NOTE: Nominal sizes of square sockets and sizes of hexagons are given in inches.

NOTES:
(1) Square socket within countersunk pattern shall have dimensions to fit commercial square bars of sizes indicated.
(2) Hexagon socket within countersunk pattern shall have dimensions to fit regular wrenches used with hexagon socket set screws.
(3) For metal thickness tolerance, see para. 7(b).

(24)

Table 7-4
Dimensions of Outside Head, Inside Head, and Face Bushings



(a) Outside Head (b) Inside Head (c) Face

NPS [Note (1)]	Minimum Length of External Thread, *A*, mm (in.) [Note (2)]	Minimum Length of Internal Thread, *T*, mm (in.)	Minimum Height of Head, *D*, mm (in.)	Minimum Width of Head, *C*, mm (in.) [Note (3)]		Nominal Metal Thickness, *G*, mm (in.) [Note (4)]
				Outside	Inside	
1/4 × 1/8	11.2 (0.44)	6.6 (0.26) [Note (5)]	3.6 (0.14)	16.3 (0.64) [Note (6)]	...	...
3/8 × 1/4	12.2 (0.48)	10.2 (0.40) [Note (5)]	4.1 (0.16)	17.3 (0.68) [Note (6)]	...	...
3/8 × 1/8	12.2 (0.48)	6.4 (0.25)	4.1 (0.16)	17.3 (0.68) [Note (6)]	...	...
1/2 × 3/8	14.2 (0.56)	10.4 (0.41) [Note (5)]	4.8 (0.19)	22.1 (0.87) [Note (6)]	...	...
1/2 × 1/4	14.2 (0.56)	8.1 (0.32)	4.8 (0.19)	22.1 (0.87) [Note (6)]	...	...
1/2 × 1/8	14.2 (0.56)	6.4 (0.25)	4.8 (0.19)	22.1 (0.87) [Note (6)]	...	...
3/4 × 1/2	16.0 (0.63)	13.5 (0.53) [Note (5)]	5.6 (0.22)	29.2 (1.15) [Note (6)]	...	...
3/4 × 3/8	16.0 (0.63)	9.1 (0.36)	5.6 (0.22)	29.2 (1.15) [Note (6)]	...	...
3/4 × 1/4	16.0 (0.63)	8.1 (0.32)	5.6 (0.22)	29.2 (1.15) [Note (6)]	...	...
3/4 × 1/8	16.0 (0.63)	6.4 (0.25)	5.6 (0.22)	29.2 (1.15) [Note (6)]	...	...
1 × 3/4	19.1 (0.75)	12.7 (0.50)	6.4 (0.25)	36.1 (1.42) [Note (6)]	...	...
1 × 1/2	19.1 (0.75)	10.9 (0.43)	6.4 (0.25)	36.1 (1.42) [Note (6)]	...	...
1 × 3/8	19.1 (0.75)	9.1 (0.36)	7.6 (0.30)	...	28.5 (1.12)	...
1 × 1/4	19.1 (0.75)	8.1 (0.32)	7.6 (0.30)	...	28.5 (1.12)	...
1 × 1/8	19.1 (0.75)	6.4 (0.25)	7.6 (0.30)	...	28.5 (1.12)	...
1 1/4 × 1	20.3 (0.80)	14.7 (0.58)	7.1 (0.28)	44.7 (1.76)	...	...
1 1/4 × 3/4	20.3 (0.80)	12.7 (0.50)	7.1 (0.28)	44.7 (1.76)	...	...
1 1/4 × 1/2	20.3 (0.80)	10.9 (0.43)	8.6 (0.34)	...	34.0 (1.34)	4.8 (0.18)
1 1/4 × 3/8	20.3 (0.80)	9.1 (0.36)	8.6 (0.34)	...	28.5 (1.12)	4.8 (0.18)
1 1/4 × 1/4	20.3 (0.80)	8.1 (0.32)	8.6 (0.34)	...	28.5 (1.12)	4.8 (0.18)
1 1/2 × 1 1/4	21.1 (0.83)	18.0 (0.77) [Note (5)]	7.9 (0.31)	50.8 (2.00)	...	...
1 1/2 × 1	21.1 (0.83)	14.7 (0.58)	7.9 (0.31)	50.8 (2.00)	...	...
1 1/2 × 3/4	21.1 (0.83)	12.7 (0.50)	9.4 (0.37)	...	41.4 (1.63)	5.1 (0.20)
1 1/2 × 1/2	21.1 (0.83)	10.9 (0.43)	9.4 (0.37)	...	34.0 (1.34)	5.1 (0.20)
1 1/2 × 3/8	21.1 (0.83)	9.1 (0.36)	9.4 (0.37)	...	28.5 (1.12)	5.1 (0.20)
1 1/2 × 1/4	21.1 (0.83)	8.1 (0.32)	9.4 (0.37)	...	28.5 (1.12)	5.1 (0.20)
2 × 1 1/2	22.4 (0.88)	17.8 (0.70)	8.6 (0.34)	63.0 (2.48)	...	...
2 × 1 1/4	22.4 (0.88)	17.0 (0.67)	8.6 (0.34)	63.0 (2.48)	...	...
2 × 1	22.4 (0.88)	14.7 (0.58)	10.4 (0.41)	...	49.5 (1.95)	5.6 (0.22)
2 × 3/4	22.4 (0.88)	12.7 (0.50)	10.4 (0.41)	...	41.4 (1.63)	5.6 (0.22)
2 × 1/2	22.4 (0.88)	10.9 (0.43)	10.4 (0.41)	...	34.0 (1.34)	5.6 (0.22)

Table 7-4
Dimensions of Outside Head, Inside Head, and Face Bushings (Cont'd)

NPS [Note (1)]	Minimum Length of External Thread, *A*, mm (in.) [Note (2)]	Minimum Length of Internal Thread, *T*, mm (in.)	Minimum Height of Head, *D*, mm (in.)	Minimum Width of Head, *C*, mm (in.) [Note (3)]		Nominal Metal Thickness, *G*, mm (in.) [Note (4)]
				Outside	Inside	
2 × 3/8	22.4 (0.88)	9.1 (0.36)	10.4 (0.41)	...	28.5 (1.12)	5.6 (0.22)
2 × 1/4	22.4 (0.88)	8.1 (0.32)	10.4 (0.41)	...	28.5 (1.12)	5.6 (0.22)
2 1/2 × 2	27.2 (1.07)	19.1 (0.75)	9.4 (0.37)	75.7 (2.98)	...	...
2 1/2 × 1 1/2	27.2 (1.07)	17.8 (0.70)	11.2 (0.44)	68.1 (2.68)	...	...
2 1/2 × 1 1/4	27.2 (1.07)	17.0 (0.67)	11.2 (0.44)	...	60.7 (2.39)	6.1 (0.24)
2 1/2 × 1	27.2 (1.07)	14.7 (0.58)	11.2 (0.44)	...	49.5 (1.95)	6.1 (0.24)
2 1/2 × 3/4	27.2 (1.07)	12.7 (0.50)	11.2 (0.44)	...	41.4 (1.63)	6.1 (0.24)
2 1/2 × 1/2	27.2 (1.07)	10.9 (0.43)	11.2 (0.44)	...	34.0 (1.34)	6.1 (0.24)
3 × 2 1/2	28.7 (1.13)	23.4 (0.92)	10.2 (0.40)	98.0 (3.86)	...	...
3 × 2	28.7 (1.13)	19.1 (0.75)	12.2 (0.48)	83.3 (3.28)	...	...
3 × 1 1/2	28.7 (1.13)	17.8 (0.70)	12.2 (0.48)	...	68.1 (2.68)	6.6 (0.26)
3 × 1 1/4	28.7 (1.13)	17.0 (0.67)	12.2 (0.48)	...	60.7 (2.39)	6.6 (0.26)
3 × 1	28.7 (1.13)	14.7 (0.58)	12.2 (0.48)	...	49.5 (1.95)	6.6 (0.26)
3 × 3/4	28.7 (1.13)	12.7 (0.50)	12.2 (0.48)	...	41.4 (1.63)	6.6 (0.26)
3 × 1/2	28.7 (1.13)	10.9 (0.43)	12.2 (0.48)	...	34.0 (1.34)	6.6 (0.26)
3 1/2 × 3	30.0 (1.18)	24.9 (0.98)	10.9 (0.43)	117.3 (4.62)	...	...
3 1/2 × 2 1/2	30.0 (1.18)	23.4 (0.92)	13.2 (0.52)	98.0 (3.86)	...	...
3 1/2 × 2	30.0 (1.18)	19.1 (0.75)	13.2 (0.52)	...	83.3 (3.28)	7.1 (0.28)
3 1/2 × 1 1/2	30.0 (1.18)	17.8 (0.70)	13.2 (0.52)	...	68.1 (2.68)	7.1 (0.28)
3 1/2 × 1 1/4	30.0 (1.18)	17.0 (0.67)	13.2 (0.52)	...	60.7 (2.39)	7.1 (0.28)
3 1/2 × 1	30.0 (1.18)	14.7 (0.58)	13.2 (0.52)	...	49.5 (1.95)	7.1 (0.28)
4 × 3 1/2	31.0 (1.22)	26.2 (1.03)	12.7 (0.50)	132.1 (5.20)	...	...
4 × 3	31.0 (1.22)	24.9 (0.98)	12.7 (0.50)	117.3 (4.62)	...	...
4 × 2 1/2	31.0 (1.22)	23.4 (0.92)	15.2 (0.60)	...	98.0 (3.86)	7.9 (0.31)
4 × 2	31.0 (1.22)	19.1 (0.75)	15.2 (0.60)	...	83.3 (3.28)	7.9 (0.31)
4 × 1 1/2	31.0 (1.22)	17.8 (0.70)	15.2 (0.60)	...	68.1 (2.68)	7.9 (0.31)
4 × 1 1/4	31.0 (1.22)	17.0 (0.67)	15.2 (0.60)	...	60.7 (2.39)	7.9 (0.31)
4 × 1	31.0 (1.22)	14.7 (0.58)	15.2 (0.60)	...	49.5 (1.95)	7.9 (0.31)
5 × 4	33.3 (1.31)	27.4 (1.08)	12.7 (0.50)	147.1 (5.79)	...	...
5 × 3 1/2	33.3 (1.31)	26.2 (1.03)	15.2 (0.60)	132.1 (5.20)	...	...
5 × 3	33.3 (1.31)	24.9 (0.98)	15.2 (0.60)	...	117.3 (4.62)	9.7 (0.38)
5 × 2 1/2	33.3 (1.31)	23.4 (0.92)	15.2 (0.60)	...	98.0 (3.86)	9.7 (0.38)
5 × 2	33.3 (1.31)	19.1 (0.75)	15.2 (0.60)	...	83.3 (3.28)	9.7 (0.38)
6 × 5	35.6 (1.40)	30.0 (1.18)	16.0 (0.63)	179.1 (7.05)	...	...
6 × 4	35.6 (1.40)	27.4 (1.08)	19.1 (0.75)	...	147.1 (5.79)	10.9 (0.43)
6 × 3 1/2	35.6 (1.40)	26.2 (1.03)	19.1 (0.75)	...	132.1 (5.20)	10.9 (0.43)
6 × 3	35.6 (1.40)	24.9 (0.98)	19.1 (0.75)	...	117.3 (4.62)	10.9 (0.43)
6 × 2 1/2	35.6 (1.40)	23.4 (0.92)	19.1 (0.75)	...	98.0 (3.86)	10.9 (0.43)
6 × 2	35.6 (1.40)	19.1 (0.75)	19.1 (0.75)	...	83.3 (3.28)	10.9 (0.43)

Table 7-4
Dimensions of Outside Head, Inside Head, and Face Bushings (Cont'd)

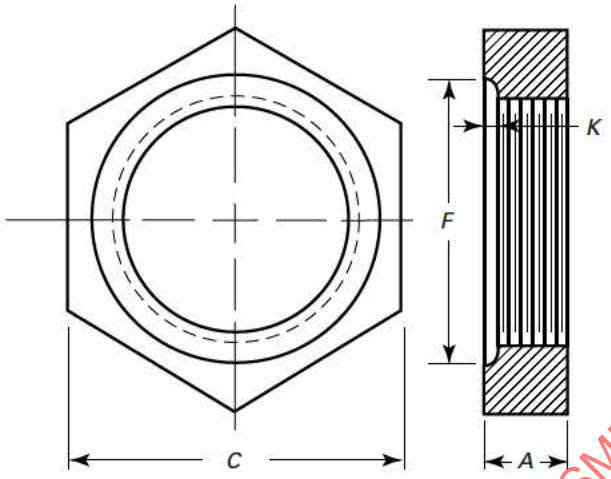
NPS [Note (1)]	Minimum Length of External Thread, *A*, mm (in.) [Note (2)]	Minimum Length of Internal Thread, *T*, mm (in.)	Minimum Height of Head, *D*, mm (in.)	Minimum Width of Head, *C*, mm (in.) [Note (3)]		Nominal Metal Thickness, *G*, mm (in.) [Note (4)]
				Outside	Inside	
8 × 6	39.9 (1.57)	32.5 (1.28)	21.1 (0.83)	210.3 (8.28)	...	...
8 × 5	39.9 (1.57)	30.0 (1.18)	21.1 (0.83)	...	179.1 (7.05)	14.0 (0.55)
8 × 4	39.9 (1.57)	27.4 (1.08)	21.1 (0.83)	...	147.1 (5.79)	14.0 (0.55)
8 × 3½	39.9 (1.57)	26.2 (1.03)	21.1 (0.83)	...	132.1 (5.20)	14.0 (0.55)
8 × 3	39.9 (1.57)	24.9 (0.98)	21.1 (0.83)	...	117.3 (4.62)	14.0 (0.55)

GENERAL NOTE: Cored bushings have minimum metal thickness at all points equal to dimension *G*, except at the end of the thread.

NOTES:
(1) Hexagon head or octagon head bushings NPS 2½ and smaller reducing one NPS shall not be made of gray cast iron. Other NPS may be made of either cast iron, malleable iron, or ductile iron. Face bushings NPS 2½ and smaller shall not be made of gray cast iron. Face bushings NPS 3 and larger reducing one NPS shall not be made of gray cast iron. Face bushings NPS 3 and larger reducing two NPS or more may be made of either cast iron, malleable iron, or ductile iron.
(2) In the case of outside head bushings, length *A* includes provisions for imperfect threads (see also section 8).
(3) Heads of bushings shall be hexagonal or octagonal, except that on the larger sizes of outside head bushings, the heads may be made round with lugs instead of hexagonal or octagonal.
(4) *G* is the same as metal thickness for Class 125 Cast Iron Threaded Fittings (ASME B16.4). For tolerance, see para. 7(b).
(5) To provide proper metal thickness, these NPS shall not be cored out to diameters greater than the root diameter of the internal thread. The length of the internal thread may be equal to the minimum dimension, *T*, or greater up to the full length of bushing.
(6) When made of bar stock, the dimensions may be ⅝ in., 11⁄16 in., ⅞ in., 1⅛ in., and 1 7⁄16 in., respectively, in order to use regular bar stock sizes.

Table 7-5
Dimensions of Locknuts

(24)



NPS	Minimum Nominal Thickness, *A*, mm (in.)	Minimum Width Across Flats, *C*, mm (in.) [Note (1)]		Minimum Diameter of Packing Recess, *F*, mm (in.) [Note (2)]	Depth of Packing Recess, *K*, mm (in.) [Note (2)]
		Malleable Iron or Ductile Iron	Cast Iron		
1/8	4.8 (0.19)	17.5 (0.69) [Note (3)]	...	12.7 (0.50)	1.0 (0.04)
1/4	6.4 (0.25)	21.3 (0.84) [Note (3)]	...	16.8 (0.66)	1.5 (0.06)
3/8	7.1 (0.28)	25.4 (1.00) [Note (3)]	...	19.6 (0.77)	1.5 (0.06)
1/2	7.9 (0.31)	30.0 (1.18) [Note (3)]	...	24.6 (0.97)	1.5 (0.06)
3/4	8.6 (0.34)	36.3 (1.43) [Note (3)]	...	31.2 (1.23)	1.5 (0.06)
1	9.7 (0.38)	44.5 (1.75)	...	38.1 (1.50)	1.5 (0.06)
1 1/4	10.7 (0.42)	53.3 (2.10)	...	47.2 (1.86)	1.5 (0.06)
1 1/2	11.9 (0.47)	59.7 (2.35)	...	53.9 (2.12)	1.5 (0.06)
2	13.5 (0.53)	73.2 (2.88)	...	66.8 (2.63)	2.3 (0.09)
2 1/2	15.0 (0.59)	88.9 (3.50)	98.0 (3.86)	80.8 (3.18)	2.3 (0.09)
3	17.0 (0.67)	108.5 (4.27)	117.3 (4.62)	97.5 (3.84)	2.3 (0.09)
3 1/2	18.5 (0.73)	122.9 (4.84)	132.1 (5.20)	111.3 (4.38)	3.3 (0.13)
4	20.3 (0.80)	136.7 (5.38)	147.1 (5.79)	127.0 (5.00)	3.3 (0.13)

NOTES:
(1) NPS 3 1/2 and smaller are hexagonal; NPS 4 may be either hexagonal or octagonal.
(2) The packing recess surface may be as cast. When made from bar stock, the recess may be tool finished.
(3) Locknuts in these NPS may be made from bar stock, in which case dimension *C* may be 11/16 in., 7/8 in., 1 in., 1 3/16 in., and 1 7/16 in., respectively, in order to conform with regular hexagon bar stock sizes.