ASME B16.33-2012
[Revision of ASME B16.33-2002 (R2007)]

Manually Operated Metallic Gas Valves for Use in Gas Piping Systems Up to 175 psi (Sizes NPS ½ Through NPS 2)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY • 10016 USA

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The next edition of this Standard is scheduled for publication in 2017.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME B16 Committee may be published as Cases. Cases and interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org/ as they are issued.

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

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

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

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FOREWORD

The B16 Standards Committee was organized in the Spring of 1920 and held its organizational meeting on November 21 of that year. The group operated as a Sectional Committee (later redesignated as a Standards Committee) under the authorization of the American Engineering Standards Committee [subsequently named American Standards Association, United States of America Standards Institute, and now, American National Standards Institute (ANSI)]. Sponsors for the group were The American Society of Mechanical Engineers (ASME), Manufacturers Standardization Society of the Valve and Fittings Industry, and the Heating and Piping Contractors National Association (later the Mechanical Contractors Association of America).

The American Gas Association (AGA) determined that standardization of gas shutoff valves used in distribution services was desirable and needed. The AGA Task Committee on Standards for Valves and Shut-Offs was formed, and development work commenced in 1958. In 1968, it was determined that a more acceptable document would result if approval were gained from ANSI and to facilitate such action, the AGA Committee became Subcommittee No. 13 of the B16 activity.

This Standard offers more performance requirements than has been customary in B16 standards. It is expected that this will permit both manufacturers and users greater latitude in producing and using products made to this Standard.

Work was extremely slow as the group gradually developed the document in the desired format. Its efforts were successful when, on July 18, 1973, final approval was granted by ANSI.

The revision incorporated some major revisions to the format. In addition, the scope of the standard was clarified so that the standard could be applicable to all manually operated metallic gas valves for use in gas piping standards up to 125 psig. The revised standard incorporated testing criteria for valves that could have a specific pressure rating within this pressure range. This revision was made to clarify the fact that the standard is also applicable to valves with service designations other than 60 psig and 125 psig. The revision was approved on February 10, 1981.

The 1990 revision deleted the sampling inspection table on the basis that the scope clearly limited the standard to turning torque valves at the time of manufacture. This edition established U.S. customary units as the standard and metric equivalents were deleted.

In 1982, American National Standards Committee B16 was recognized as an ASME Committee operating under procedures accredited by ANSI.

In 2002, a new materials section was added along with several other revisions. Also incorporated were metric values and a nonmandatory quality system program annex. Use of these valves in higher rated systems is outside the scope of this Standard, and is neither permitted nor prohibited.

The 2012 edition of B16.33 brings an updated scope to allow all manually operated metallic gas valves for use in gas piping standards up to 175 psig. This revision also includes revised testing requirements to match this increase in pressure and updates to referenced standards.

Following approval by the ASME B16 Standards Committee, this revision to the 2002 edition of this Standard was approved as an American National Standard by ANSI on August 21, 2012.

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.)

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CORRESPONDENCE WITH THE B16 COMMITTEE

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

Secretary, B16 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

As an alternative, inquiries may be submitted via e-mail to: SecretaryB16@asme.org.

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

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

Interpretations. Upon request, the B16 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B16 Standards Committee.

The request for 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 will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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.

Attending Committee Meetings. The B16 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B16 Standards Committee.

MANUALLY OPERATED METALLIC GAS VALVES FOR USE IN GAS PIPING SYSTEMS UP TO 175 psi (SIZES NPS ½ THROUGH NPS 2)

1 SCOPE

1.1 General

This Standard covers requirements for manually operated metallic valves sizes NPS ½ through NPS 2, for outdoor installation as gas shutoff valves at the end of the gas service line and before the gas regulator and meter where the designated gauge pressure of the gas piping system does not exceed 175 psi (12.1 bar). The Standard applies to valves operated in a temperature environment between −20°F and 150°F (−29°C and 66°C).

1.2 Design

This Standard sets forth the minimum capabilities, characteristics, and properties that a valve at the time of manufacture must possess in order to be considered suitable for use in gas piping systems. Details of design and manufacture (other than those stated in this Standard, including such design and production tests that will produce a valve that will have the required capabilities to meet this Standard) remain the responsibility of the manufacturer.

1.3 Standards and Specifications

Standards and specifications adopted by reference in this Standard and the names and addresses of the sponsoring organizations are shown in Mandatory Appendix I. It is not considered practical to refer to a specific edition of each of the standards and specifications in the individual references. Instead the specific edition references are included in Mandatory Appendix I. A product made in conformance with a prior edition of reference standards and in all other aspects conforming to this Standard will be considered to be in conformance even though the edition reference may be changed in a subsequent revision of this Standard.

1.4 Quality Systems

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

1.5 Convention

For determining conformance with this Standard, the convention 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.

1.6 Codes and Regulations

A valve used under the jurisdiction of the Code of Federal Regulation (CFR), such as Title 49, Part 192; the ASME Code for Pressure Piping, such as ASME B31.8; or the National Fuel Gas Code, NFPA 54, is subject to any limitation of that code or regulation.

2 CONSTRUCTION

2.1 General

Each valve at the time of manufacture shall be capable of meeting the requirements set forth in this Standard. The workmanship employed in the manufacture and assembly of each valve shall provide gas tightness, safety, and reliability of performance, and freedom from injurious imperfections and defects.

2.2 Tamperproof Features

Where valves are specified to be tamperproof, they shall be designed and constructed to minimize the possibility of the removal of the core of the valve with other than specialized tools.

2.3 Configuration

2.3.1 Operating Indication. The valve shall be so marked or constructed that the operator can visually determine

(a) when a ¼ turn valve is in the open or closed position (if flat head, longitudinal axis of the head shall be perpendicular to the longitudinal axis of the valve when valve is in the closed position)

(b) when the valve requires more than ¼ turn to operate valve, turning direction to open or close the valve

2.3.2 Valve End. Valve ends shall comply with the following standards where applicable:

(a) ASME B1.20.1

(b) ASME B16.1

(c) ASME B16.5

2.4 Marking

Except as may be modified herein, valves shall be marked as required in MSS SP-25 and shall include

(a) the manufacturer's name or trademark and, where space permits, the designation "B16.33." The B16.33 mark is the manufacturer's acknowledgement that the valve was manufactured in conformance with ASME B16.33.

(b) marking for pressure ratings such as 60G, 125G, etc., which may be shown on the head, stem, or body.

(c) the designation "T" for tamperproof construction where tamperproof features are not easily identifiable without disassembling the valve. This designation may be shown on the head or stem.

2.5 Lubrication (Sealant)

Valves that require pressure lubrication (by the injection of lubricant through fittings to the sealing surface of the valve) shall be capable of being lubricated while subjected to the pressure rating. Compliance with this provision can be met if lubrication can be accomplished with the valve in both the fully opened and fully closed positions. The design must be such as to minimize entry of lubricant into the gasway when lubricated in accordance with the manufacturer's instructions.

3 MATERIALS

3.1 Metallic Materials for Valve Parts

Metallic materials known to be acceptable for compliance with this Standard are listed in Table 1. Other metallic materials may be used when the product incorporating them meets the requirements of this Standard.

3.2 Lubricants, Sealants, and Seating Materials

3.2.1 Lubricants and Sealants. Lubricants and/or sealants shall be resistant to the action of fuel gases such as natural, manufactured, and LP gases. The valve manufacturer is responsible for the selection of lubricants and sealants, and for the determination of their suitability for the service conditions specified in the scope of this Standard.

3.2.2 Seating and Stem Seal Materials. The valve manufacturer is responsible for selection of seating and stem seal materials and for determination of their suitability for the service conditions specified in the scope of this Standard.

Table 1 Materials for Metallic Valve Parts

Cast iron	ASTM A126	Class B
	ASTM A48	Class 30
Malleable iron	ASTM A47	. . .
	ASTM A197	. . .
Ductile iron	ASTM A395	. . .
	ASTM A536	Grade 60-40-18 or Grade 65-45-12
Steel	ASTM A108	. . .
	ASTM A505	. . .
	ASTM A589	. . .
Cast bronze	ASTM B62	. . .
Cast brass	ASTM B584	Alloy UNS C83600 Alloy UNS C84400
Forged brass	ASTM B283	Alloy UNS C37700
Rod brass	ASTM B16	Alloy UNS C36000
Sintered brass	ASTM B282	. . .
	MPIF Std 35	Code CZP 3002 or CZP 2002

3.2.3 Elastomer Components

3.2.3.1 Air Aging Tests. Elastomer parts that are exposed to fuel gas shall be made from materials that, following 70-hr air aging in accordance with ASTM D573 at 212°F (100°C), meet elongation, tensile, and hardness property requirements as follows:

(a) Tensile tests shall be conducted on six dumbbells in accordance with ASTM D412. Three dumbbells shall be air aged 70 hr in accordance with ASTM D573 at 212°F (100°C). The dumbbells shall have a thickness of 0.080 in. ± 0.008 in. (2.0 mm ± 0.2 mm). The average of the three individual tests for the aged dumbbells shall exceed 60% retention of ultimate elongation and 60% retention of tensile strength at break. The average of the three individual tests for the non-aged dumbbells shall be the basis for percent retention calculation.

(b) Hardness tests shall be conducted using specimens in accordance with ASTM D395, Type 2. Three specimens shall be air aged 70 hr in accordance with ASTM D573 at 212°F (100°C). The average of the three individual tests for the aged specimens shall not show a hardness change of more than ±10 Shore hardness points relative to the average hardness of the non-aged specimens.

3.2.3.2 Swell Tests. Elastomer parts that are exposed to fuel gas shall be made from materials that, after 70-hr exposure in n-hexane at 74°F (23°C), in accordance with ASTM D471, meet the volume change, elongation, and tensile property requirements as follows:

(a) Volume change tests shall be conducted using six specimens in accordance with ASTM D471, Section 8. Three specimens shall be exposed for 70 hr at 74°F (23°C) in n-hexane in accordance with ASTM D471. The average of the three individual n-hexane tests shall not show an increase in volume of more than 25% or a decrease in volume of more than 1%. The average of the three tests for the non-aged specimen shall be the basis for the percent retention change calculation.

(b) Tensile tests shall be conducted on six dumbbells in accordance with ASTM D412. Three of the tensile tests shall be conducted on dumbbells exposed in n-hexane at 74°F (23°C) for 70 hr in accordance with ASTM D471. The dumbbells shall have a thickness of 0.080 in. + 0.008 in. (2.0 mm ± 0.2 mm). The average of the three individual n-hexane tests shall exceed 60% retention of ultimate elongation and 60% retention of tensile strength at break. The average of the three tests for the non-aged specimen shall be the basis for the percent volume change calculation.

3.2.3.3 Compression Set Tests. Elastomer parts that may be exposed to fuel gas shall be made from materials having a compression set of no more than 25% after 22 hr at 212°F (100°C), in accordance with ASTM D395, Method B, using standard test specimen in accordance with ASTM D395, para. 5.2.

3.2.4 Polytetrafluoroethylene (PTFE) Components. PTFE materials shall comply with ASTM D4894 or ASTM D4895.

4 DESIGN QUALIFICATION

4.1 General

4.1.1 Each basic valve design shall be qualified and demonstrated as suitable for the service by testing randomly selected production valves of each size, type, and pressure shell material according to the design qualification tests required by this section.

4.1.2 All tests, unless otherwise specified, shall be conducted at a temperature of 74°F ± 15°F (23°C ± 8°C).

4.1.3 Before each test is conducted, the valve shall be in the condition in which it would be placed in service.

4.2 Gas Tightness

4.2.1 The valve shall provide a shutoff when in the closed position and shall not leak to the atmosphere in the open or closed position when subjected progressively to internal air pressure of first 4 psi ± 2 psi (0.3 bar ± 0.1 bar) and then to at least 1.5 times the pressure rating of the valve.

4.2.2 Method of Test for Gas Tightness. With the valve in the open position and the outlet plugged, the test pressure shall be applied to the inlet of the valve. The valve shall be immersed in a bath containing water at a temperature of 74°F ± 15°F (23°C ± 8°C) for a period of 15 sec. Leakage, as evidenced by flow (breaking away) of bubbles shall be cause for rejection. The valve shall then be turned to the closed position, outlet opened and the test repeated.

4.2.3 Other means of leak detection may be used provided they can be shown to be equivalent in leak detection sensitivity.

Table 2 Torque Values

Nominal Valve Size [Note (1)]	Torque, lbf-in. (N-m)
½	800 (90)
¾	1,000 (113)
1	1,200 (136)
1¼	1,450 (164)
1½	1,550 (175)
2	1,650 (186)

NOTE:
(1) For valves having a different size inlet and outlet, the smaller size shall determine the torque value.

4.3 Temperature Resistance

4.3.1 A valve should be operable at temperatures ranging from −20°F to 150°F (−29°C to 66°C) without affecting the capability of the valve to control the flow of gas.

4.3.2 The valve shall be maintained at a temperature of −20°F (−29°C) for a period long enough to allow all parts to come to equilibrium temperature. With the valve subjected to an internal air pressure at least equal to the pressure rating, and with the outlet end of the valve arranged to vent to atmosphere, it shall be determined that it can be opened and closed.

4.3.3 The valve shall then be maintained at a temperature of 150°F (66°C) for a period long enough to allow all parts to come to equilibrium temperature. With the valve subjected to an internal air pressure at least equal to the pressure rating, it shall be determined that it can be opened and closed.

4.3.4 The valve shall then be allowed to return to a temperature of 74°F ± 15°F (23°C ± 8°C) and satisfactorily pass the test outlined in para. 4.2.

4.4 Structural Provision

4.4.1 General. Each test in which damage to the valve could result (i.e., those described in paras. 4.3 and 4.4.2 through 4.4.5) shall be conducted on new unused samples of the valve.

4.4.2 Strength. A valve in the open position with the outlet plugged shall withstand an internal hydrostatic pressure of 600 psi (41 bar) for a period of 10 min without permanent deformation that would, after release of the pressure, prevent operation of the valve from the fully open position to the fully closed position.

4.4.3 Twist. The valve body, when tested in both the open and closed position, shall withstand the torque specified in Table 2 applied directly to the ends of the valve, without permanent deformation that would, after release of the torque, prevent operation of the valve from the fully open position to the fully closed position. After

this test, the valve must comply with the provisions of para. 4.2.

4.4.4 Bending. A valve in both the open and closed positions shall withstand the bending moment specified in Table 3 when applied as indicated in Fig. 1. After the bending stress is relieved, there shall be no permanent deformation that would prevent operation of the valve from the fully open position to the fully closed position. After this test, the valve must comply with the provisions of para. 4.2.

4.4.5 Tensile Strength. Schedule 80 or heavier steel pipe shall be connected to the valve for the purpose of transmitting the tensile load. A valve in both the open and closed positions shall withstand the tensile load specified in Table 4, when applied gradually to valve ends, without permanent deformation that would, after release of the tensile load, prevent operation of the valve from the fully open position to the fully closed position. After this test, the valve must comply with the provisions of para. 4.2.

4.4.6 Turning Torque. The torque required to operate the valve after breaking loose from its open or closed position shall not exceed the amounts specified in Table 5. At the end of this test, the valve shall be capable of complying with the provisions of para. 4.2.

4.5 Flow Capacity

The valves, when in the full open position, shall meet the minimum gas flow as specified in Table 6. A valve of each size and type shall be tested to verify that the pressure loss is not greater than that specified in Table 6. The test shall be conducted using a technically recognized procedure such as that contained in ISA S75.02. The test fluid and type of test facility and instrumentation are at the discretion of the manufacturer and shall be fully described in their test records.

5 PRODUCTION TESTING

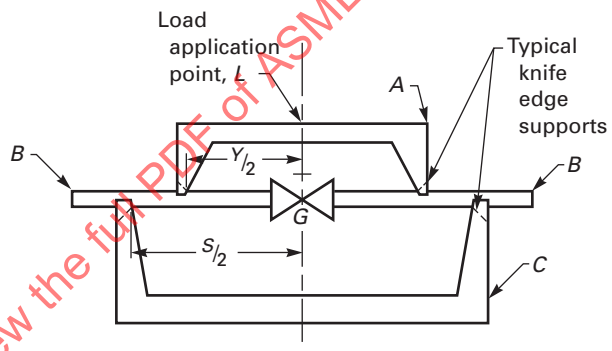
Each valve shall be tested at the time of manufacture at a pressure of at least 1.5 times the pressure rating marked on the valve, according to the method of test for gas tightness in para. 4.2.

Table 3 Bending Moment Values

Nominal Valve Size [Note (1)]	Test	
	Bending, lbf-in. (N-m)	Load, lbf-in. (N-m)
½	1,800 (203)	600 (2 670)
¾	3,200 (362)	1,060 (4 720)
1	6,000 (678)	2,000 (8 900)
1¼	10,600 (1 200)	3,530 (15 700)
1½	14,500 (1 640)	4,830 (21 500)
2	25,200 (2 850)	8,400 (37 400)

NOTE:
(1) For valves having a different size inlet and outlet, the smaller size shall determine the bending moment and load values.

Fig. 1 Test Assembly



A = load application yoke
B = solid steel bars machined to the nominal iron pipe size diameter of the valve ends and firmly connected to the valve ends as a test assembly. [When a threaded end valve is used, the bars shall be threaded with American Standard taper pipe threads (NPT) as described in ASME B1.20.1, coated with thread lubricant and tightened to 50% of the values specified in para. 4.4.2, Table 2.]
C = resistance yoke
G = gas valve
L = load
S = 24 in. (610 mm) span between points for load resistance
Y = 12 in. (305 mm) span between points of load application

GENERAL NOTE: The bending moment, M_b, is determined using the equation $M_b = [L(S - y)]/4$.

Table 4 Tensile Load Values

Nominal Valve Size [Note (1)]	Load, *L*, lbf-in. (N-m)
1/2	4,000 (18 000)
3/4	6,000 (27 000)
1	8,000 (36 000)
1 1/4	8,000 (36 000)
1 1/2	8,000 (36 000)
2	10,000 (44 000)

NOTE:
(1) For valves having a different size inlet and outlet, the smaller size shall determine the tensile load values.

Table 5 Maximum Turning Torque Values

Nominal Valve Size [Note (1)]	Maximum Turning Torque, lbf-in. (N-m) [Note (2)]
1/2	200 (23)
3/4	240 (27)
1	320 (36)
1 1/4	500 (56)
1 1/2	700 (79)
2	1,200 (136)

NOTES:
(1) For valves having a different size inlet and outlet, the smaller size shall determine the maximum turning torque values.
(2) Measured at a temperature of 74°F ± 15°F (23°C ± 8°C).

Table 6 Minimum Gas Flows

Nominal Valve Size [Note (1)]	Minimum Gas Flow at Reference Conditions, ft^3/hr (m^3/h) [Note (2)]
1/2	190 (5.4)
3/4	290 (8.2)
1	600 (17.0)
1 1/4	1,200 (34.0)
1 1/2	1,500 (42.5)
2	2,400 (68.0)

NOTES:
(1) For valves having a different size inlet and outlet, the smaller size shall determine the minimum gas flow.
(2) Minimum gas flow in standard cubic feet per hour (cubic meters per hour) with the valve in the fully open position at an inlet pressure of 0.5 psi (0.035 bar), 70°F (21°C), 0.64 specific gravity, and 0.3 in. (7.6 mm) water column net valve pressure drop, assuming the valve is on Schedule 40 pipe.

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MANDATORY APPENDIX I
REFERENCES

The following is a list of publications referenced in this Standard. Products covered by each ASTM specification are listed for convenience. (See specifications for exact titles and detailed contents.) Materials manufactured to other editions of the referenced ASTM specifications may be used to manufacture valves meeting the requirements of this Standard as long as the valve manufacturer verifies that the material meets the requirements of the referenced edition of the ASTM specification. Unless otherwise specified, the latest edition of ASME publications shall apply.

ASME B1.20.1, Pipe Threads, General Purpose, Inch
ASME B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250
ASME B16.5, Pipe Flanges and Flanged Fittings: NPS ½ Through NPS 24 Metric/Inch Standard
ASME B31.8, Gas Transmission and Distribution Piping Systems

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900 (www.asme.org)

ASTM A47-99 (2009), Standard Specification for Ferritic Malleable Iron Castings
ASTM A48/A48M-03 (2008), Standard Specification for Gray Iron Castings
ASTM A108-07, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A126-04 (2009), Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A197-00 (2011), Standard Specification for Cupola Malleable Iron
ASTM A395-99 (2009), Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A505-00 (2005), Standard Specification for Steel, Sheet and Strip, Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
ASTM A536-84 (2009), Standard Specification for Ductile Iron Castings
ASTM A589-06, Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe
ASTM B16-10, Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines
ASTM B62-09, Standard Specification for Composition Bronze or Ounce Metal Castings
ASTM B283-11a, Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)
ASTM B584-11, Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM D395-03 (2008), Standard Test Methods for Rubber Property-Compression Set
ASTM D412-06a$^{\epsilon 2}$, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
ASTM D471-10, Standard Test Method for Rubber Property-Effect of Liquids
ASTM D573-04 (2010), Standard Test Method for Rubber-Deterioration in an Air Oven
ASTM D4894-07, Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials
ASTM D4895-10, Standard Specification for Polytetrafluoroethylene (PTFE) Resin Produced From Dispersion
ASTM E29-2006b, Standard Practice for Using Significant Digits in Test Data to Determine Conformance With Specifications

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 (www.astm.org)

CFR, Title 49, Part 192 — 2000, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Standards

Publisher: Superintendent of Documents, U.S. Government Printing Office (GPO), 732 North Capitol Street, NW, Washington, DC 20401 (www.gpoaccess.gov/index.html)

ISA S75.02-1996, Control Valve Capacity Test Procedures

Publisher: Instrument Society of America (ISA), 67 T. W. Alexander Drive, P.O. Box 12277, Research Triangle Park, NC 27709 (www.isa.org)

ISO 9000:2005, Quality management systems — Fundamentals and vocabulary[1]
ISO 9001:2008, Quality management systems — Requirements[1]

[1] Publications listed above that have been approved as American National Standards may be obtained from the American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036.

Publisher: International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Genève 20, Switzerland/Suisse (www.iso.org)

MPIF Standard 35, Materials Standards for PM Structural Parts

Publisher: Metal Powder Industries Federation (MPIF), 105 College Road East, Princeton, NJ 08540-6692 (www.mpif.org)

MSS SP-25-2008, Standard Marking System for Valves, Fittings, Flanges, and Unions

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