

ASME B16.10-2009
(Revision of ASME B16.10-2000)

Face-to-Face and End-to-End Dimensions of Valves

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers



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FOREWORD

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

Pioneer work on standardization of end-to-end dimensions of valves began in 1917 under the direction of J. A. Stevens. It was put aside at the end of World War I and interest did not revive until 1926. ASA and ASME agreed to include the topic in the scope of the B16 Committee, and Subcommittee 5 (now Subcommittee E) was established for the purpose. Work began in 1928 and covered ferrous flanged-end gate, globe, angle, and check valves.

Development of a national standard was hindered by the diversity of existing practices and by adverse economic conditions in the early 1930s. A proposed 1933 American Standard for face-to-face dimensions of ferrous flanged valves did not gain acceptance, even though it was largely based on a 1931 Standard Practice of MSS. Further work and industry developments led to a meeting in May 1937, which undertook to reconcile differences among the draft ASA standard, two American Petroleum Institute (API) standards (5-G-1 on pipeline valves and 600A on flanged OS&Y steel wedge gate valves), and a newly updated MSS Standard.

A revised B16 proposal was voted favorably in June 1938, was approved by ASA, and was published in 1939. The standard was reaffirmed in 1947. Work began on a revision in 1953 to include butt-welding end valves, plug valves, and control valves in both cast iron and steel. That edition was published as ASA B16.10-1957. Further revision was begun in 1964. After reorganization of ASA, first as the United States of America Standards Institute (USASI), then as American National Standards Institute (ANSI), with the Sectional Committee being redesignated as an American National Standards Committee, a new edition adding ball valves was approved and published as ANSI B16.10-1975.

In 1982, American National Standards Committee B16 was reorganized as an ASME Committee operating under procedures accredited by ANSI. In the 1986 Edition, ductile iron and the alloys covered by ANSI B16.34 were added to the materials covered. Wafer type gate and check valves, Class 150 Y-pattern globe and check valves, and several patterns of butterfly valves were added to the types covered. Inch dimensions were converted from common to two-place decimal fractions.

In 1991, Subcommittee E—Face-to-Face and End-to-End Dimensions of Valves, was combined with Subcommittee A—Steel Valves. In the 1992 Edition, steel offset seat and grooved end butterfly valves were added. Globe and flangeless style control valves, which previously had been included, were removed from the Standard. Information regarding control valve dimensions may be obtained from Instrument Society of America, 67 Alexandria Drive, Research Triangle Park, NC 27709.

In the 2000 Edition, metric dimension tables were added. All tables and references to Class 400 steel and Class 800 cast iron were removed. All tables were renumbered. Following the approvals of the Standards Committee and ASME, approval for the new edition was granted by the American National Standards Institute on June 7, 2000.

In this 2009 Edition, Nonmandatory Appendix A was revised and updated. Also, all affected regions of this Standard were updated to reflect the changes in Nonmandatory Appendix A. PN values and references to API 605 have been removed from the Standard.

Following approval by the B16 Standards Committee and the ASME Supervisory Board, this Standard was approved as an American National Standard by ANSI on June 15, 2009.



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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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.



FACE-TO-FACE AND END-TO-END DIMENSIONS OF VALVES

1 SCOPE

1.1 General

1.1.1 Application. This Standard covers face-to-face and end-to-end dimensions of straightway valves, and center-to-face and center-to-end dimensions of angle valves. Its purpose is to ensure installation interchangeability for valves of a given material, type, size, rating class, and end connection. Face-to-face and center-to-face dimensions apply to flanged end valves with facings defined in para. 2.3.1 and to other valves intended for assembly between flat face or raised face flanges. End-to-end dimensions apply to grooved end, buttwelding end, and flanged end valves with facings defined in para. 2.3.3. Center-to-end dimensions apply to buttwelding end and to flanged end valves with facings defined in para. 2.3.3.

1.1.2 Data Source Reference. Throughout this Standard, data references are cited, e.g., “extracted from” and “compatible with.” These data are relevant to the reference standard in place at the date shown in the Foreword for American National Standards Institute approval of this Standard.

1.2 Standard Units

The values stated in either millimeter units (Tables 1 through 10) or inch units¹ (Tables I-1 through I-10) are to be regarded separately as standard. Within the text, the inch units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

¹ Linear inch dimensions in this Standard are expressed using two-place decimal fractions. These values are actually common fractions of an inch rounded to the nearest two-place decimal value as follows:

0.03 = $\frac{1}{32}$	0.44 = $\frac{7}{16}$
0.06 = $\frac{1}{16}$	0.50 = $\frac{1}{2}$
0.12 = $\frac{1}{8}$	0.56 = $\frac{9}{16}$
0.16 = $\frac{5}{32}$	0.62 = $\frac{5}{8}$
0.19 = $\frac{3}{16}$	0.69 = $\frac{11}{16}$
0.22 = $\frac{7}{32}$	0.75 = $\frac{3}{4}$
0.25 = $\frac{1}{4}$	0.88 = $\frac{7}{8}$
0.31 = $\frac{5}{16}$	0.94 = $\frac{15}{16}$
0.38 = $\frac{3}{8}$	

1.3 Cast Iron Valves

Only flanged end valves (and others intended for assembly between flanges) are covered by this standard. Mating dimensions and facings of flanged ends conform to those in ASME B16.1. Dimensional tables for various types and sizes of valves are specified in paras. 1.3.1 through 1.3.4.

1.3.1 Gate, Plug, and Check Valves

- (a) Class 125 — Tables 1 and I-1
- (b) Class 250 — Tables 2 and I-2

1.3.2 Globe and Angle Valves

- (a) Class 125 — Tables 1 and I-1
- (b) Class 250 — Tables 2 and I-2

1.3.3 Wafer Swing Check Valves

- (a) Class 125 — Tables 7 and I-7
- (b) Class 250 — Tables 7 and I-7

1.3.4 Butterfly Valves

- (a) Class 25 — Tables 8 and I-8
- (b) Class 125 — Tables 8 and I-8

1.4 Ductile Iron Valves

Only flanged end valves (and others intended for assembly between flanges) are covered. Mating dimensions and facings of flanged ends conform to those in ASME B16.42. Valves are rated Class 150 and Class 300. The following cast iron and steel dimensional tables are also used for ductile valves:

- (a) Class 150 — Tables 1 and I-1
- (b) Class 300 — Tables 2 and I-2

1.5 Steel and Alloy Valves

This category includes carbon, alloy, and stainless steels, and the nonferrous materials listed in ASME B16.34. It includes flanged, buttwelding, and grooved ends, as well as the types of valves intended for assembly between flanges. Mating dimensions and facings of flanged ends conform to those in ASME B16.5, ASME B16.47, Series A, or MSS SP-44. [For flanged end butterfly valves, refer to Note (2) of Table 8 (Table I-8) for flange information.] For flangeless or wafer valves intended for assembly between flanges, refer to Tables 7 and 8 (Tables I-7 and I-8) for flange information. Only buttwelding end valves in rating Classes 150 through 2500 are included in this Standard. Dimensional tables

