ASME B16.25-2022

(Revision of ASME B16.25-2017)

Buttwelding Ends

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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CONTENTS

FOREWORD

In July 1953, the American Welding Society presented a proposal on Welding End Preparation to Sectional Committee B16 of the American Standards Association (ASA), with the recommendation that it be considered as a candidate for an American Standard. The proposal was expanded to include welding preparation for flanges and valves covered by ASA B16.5, Steel Pipe Flanges and Flanged Fittings, and for fittings covered by ASA B16.9, Buttwelding Fittings. Consideration was also given to Pipe Fabrication Institute Standard ES-1.

The third draft reviewed by Subcommittee 3, Subgroup 6 (now Subcommittee F), of the B16 Sectional Committee was forwarded to the Committee, cosponsor organizations, and then ASA for approval. Final approval was given on September 14, 1955, with the designation ASA B16.25-1955.

Revisions were developed as a need for clarification and improvements became known and were approved as ASA B16.25-1958 and ASA B16.25-1964. After ASA reorganized as the American National Standards Institute (ANSI) and the Sectional Committee became American National Standards Committee B16, a further revision was approved as ANSI B16.25-1972.

Subcommittee F immediately began work on a major expansion and updating of the Standard, adding illustrations and requirements for welding end configurations applicable to a number of specific circumstances, including cast steel and alloy valves. When a draft had been developed that overcame the many problems and conflicting demands, the Standards Committee, cosecretariat organizations, and ANSI concurred in approval of ANSI B16.25-1979 on July 18, 1979.

In 1982, American National Standards Committee B16 was reorganized as a committee of The American Society of Mechanical Engineers (ASME) operating under procedures accredited by ANSI. In the 1986 edition, inch dimensions were established as the standard, and numerous changes in text and format were made. Notes for illustrations were also clarified. Following approval by the Standards Committee and ASME, approval as an American National Standard was given by ANSI on October 8, 1986, with the new designation ASME/ANSI B16.25-1986.

In 1992, the subcommittee revised the requirements for the preparation of the inside diameter of welding end. The references in Annex B were also updated. After public review and approval by ASME, this edition was approved by ANSI on October 26, 1992, with the new designation ASME B16.25-1992.

In the 1997 edition, metric dimensions were added as an independent but equal standard to the inch units. An Annex was also added to reference quality system requirements. Following approval by the Standards Committee and ASME, this revision to the 1992 edition of B16.25 was approved as an American National Standard by ANSI on April 17, 1997, with the new designation ASME B16.25-1997.

In the 2003 edition, the reference standard dates were updated. There were clarifications to text made to address inquiries. Tolerances on bevel angles were modified slightly. Following approval by the Standards Committee and ASME, this revision to the 1997 edition of B16.25 was approved as an American National Standard by ANSI on December 17, 2003, with the new designation ASME B16.25-2003.

In the 2007 edition, buttwelding end data were extended to cover requirements for sizes up to NPS 48 (DN 1200). The reference data were updated, and the interpretation section was removed from the Standard.

In the 2012 edition, the references in Mandatory Appendix II were updated, and notes were updated in the included tables.

In the 2017 edition, provisions were made to update verbiage and readings. Following the approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on September 7, 2017.

In ASME B16.25-2022, the U.S. Customary table in former Mandatory Appendix I has been merged with the SI table in the main text. The tables and figures have been redesignated, former Mandatory Appendix I has been deleted, and the subsequent Mandatory Appendix has been redesignated. Cross-references have been updated accordingly. Also, in this edition, the references in Mandatory Appendix I (formerly Mandatory Appendix II) have been updated and reformatted. Following approval by the ASME B16 Standards Committee, ASME B16.25-2022 was approved by ANSI on November 28, 2022.

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 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(s), 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(s)

(4) the edition(s) 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 Interpretation 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 B16.25-2022
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.25-2022 was approved by the American National Standards Institute on November 28, 2022.

In ASME B16.25-2022, the U.S. Customary table in former Mandatory Appendix I has been merged with the SI table in the main text. The table and figures have been redesignated, former Mandatory Appendix I has been deleted, and the subsequent Mandatory Appendix has been redesignated. Cross-references have been updated accordingly. In addition, this edition includes the following change identified by a margin note, (22). The Record Number listed below is explained in more detail in the "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
16	Mandatory Appendix I	Updated *(22-812)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
22-812	Updated references in Mandatory Appendix I (former Mandatory Appendix II).

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BUTTWELDING ENDS

1 SCOPE

1.1 General

This Standard covers the preparation of buttwelding ends of piping components to be joined into a piping system by welding. It includes requirements for welding bevels, for external and internal shaping of heavy-wall components, and for preparation of internal ends (including dimensions and tolerances). Coverage includes preparation for joints with the following:

(a) no backing rings
(b) split or noncontinuous backing rings
(c) solid or continuous backing rings
(d) consumable insert rings
(e) gas tungsten arc welding (GTAW) of the root pass

Details of preparation for any backing ring must be specified when ordering the component.

1.2 Application

This Standard applies to any metallic materials for which a welding procedure can be satisfactorily qualified but does not prescribe specific welding processes or procedures. Unless otherwise specified by the purchaser, it does not apply to welding ends conforming to ASME B16.5, ASME B16.9, or ASME B16.47.

1.3 Relevant Units

This Standard states values in both SI (Metric) 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.

1.4 Size

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

NPS	DN
1/2	15
3/4	20
1	25
1 1/4	32
1 1/2	40
2	50
2 1/2	65
3	80
4	100

For NPS ≥ 4, the related DN = 25 × NPS.

1.5 Referenced Standards

Standards and specifications adopted by reference in this Standard are shown in Mandatory Appendix I. It is not considered practical to identify the specific edition of each standard and specification in the individual references. Instead, the specific edition reference is identified in Mandatory Appendix I. A product made in conformance with a prior edition of referenced standards will be considered to be in conformance, even though the edition reference may be changed in a subsequent revision of the standard.

1.6 Quality Systems

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

1.7 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.

2 TRANSITION CONTOURS

Figure 2-1 delineates the maximum envelope in which transitions from welding bevel to the outer surface of the component and from the root face to the inner surface of the component must lie. Except as specified in Figure 2-1,