ASME B16.49-2023
(Revision of ASME B16.49-2017)

Factory-Made, Wrought Steel, Buttwelding Induction Bends for Transportation and Distribution Systems

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

In 1993, members of the ASME B31.8 Code for Pressure Piping, Gas Transmission and Distribution Piping Systems Committee approached the B16 Committee to develop a standard that covers pipeline bends produced by the induction bending process.

Subcommittee F reviewed the request and identified that no current specification covered this product to the satisfaction of the users. It was also determined that this Standard would need to be more performance-based than most other B16 standards, which are normally product standards with set dimensional requirements.

At the 1994 meeting of Subcommittee F, the project to develop a standard was accepted. Through the cooperation of producers and users familiar with the process, and with approval by the Standards Committee and ASME, ASME B16.49-2000 received approval as an American National Standard on April 25, 2000.

In 2005, the Committee undertook a general review of this document. Based on the usage of this Standard over the last 5 years, a number of revisions, clarifications, and additions were determined to be needed to make the document more user friendly. Some requirements were dropped, revised, and clarified to reflect the desires of the users and manufacturers. The reference data were updated and the interpretation section was removed from the Standard. These revisions were incorporated into the B16.49-2007 edition.

In 2012, the Committee reviewed this document and made revisions to requirements in hardness testing and updated the references found in Mandatory Appendix I. ASME B16.49-2012 was approved by the American National Standards Institute (ANSI) on October 22, 2012.

In the 2017 edition, provisions were made to update verbiage and reading. Following the approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on September 7, 2017, with the new designation ASME B16.49-2017.

In ASME B16.49-2023, the tables and figures have been redesignated. Cross-references have been updated accordingly. Also, the references in Mandatory Appendix I have been updated. Revisions were made to address quality systems, specimen sizes, and starting materials. Revisions were also made to sections referring to heat treatment, tensile testing, the applicability of NDE, and section 14 on certification. Table 10.1-1 (formerly Table 3) was revised by adding bending temperature. Para. SR15.5 has been revised, and paras. SR15.9 and SR15.10 have been added. Following approval by the ASME B16 Standards Committee, ASME B16.49-2023 was approved by ANSI on September 25, 2023.

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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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 edition 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 B16.49-2023
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.49-2023 was approved by the American National Standards Institute on September 25, 2023.

In ASME B16.49-2023, the tables and figures have been redesignated. Cross-references have been updated accordingly. In addition, ASME B16.49-2023 includes the following changes identified by a margin note, **(23)**. 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	1.9	Revised *(18-2466)*
4	5.1	Revised *(18-2466)*
5	8.2	Revised *(18-2466)*
6	9.2	Added and subsequent paragraphs redesignated *(18-2466)*
7	9.3	Former para. 9.2 redesignated and revised *(18-2466)*
8	Table 10.1-1	Formerly Table 3; entry for "Bending Temperature" added *(18-2466)*
8	11.1.1	Revised *(18-2466)*
11	13.2	Revised *(18-2466)*
11	14	Revised *(18-2466)*
11	SR15.5	Revised *(18-2466)*
12	SR15.9	Added *(18-2466)*
12	SR15.10	Added *(18-2466)*
13	Mandatory Appendix I	Updated *(18-2466, 21-2646)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
18-2466	Revised para. 1.9 on quality systems, para. 5.1 on starting materials, para. 8.2 on specimen sizes, para. 9.2 on heat treatment, para. 11.1.1 on tensile testing, para. 13.2 on applicability of NDE, and section 14 on certification. Added SR15.9 and SR15.10 and revised SR15.5. Added ASTM A991/A991M to Mandatory Appendix I. Revised Table 10.1-1 by adding bending temperature.
21-2646	Updated references in Mandatory Appendix I.

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FACTORY-MADE, WROUGHT STEEL, BUTTWELDING INDUCTION BENDS FOR TRANSPORTATION AND DISTRIBUTION SYSTEMS

1 SCOPE AND DEFINITIONS

1.1 General

This Standard covers design, material, manufacturing, testing, marking, and inspection requirements for factory-made pipeline bends of carbon steel materials having controlled chemistry and mechanical properties, produced by the induction bending process, with or without tangents. This Standard covers induction bends for transportation and distribution piping applications (e.g., ASME B31.4 and ASME B31.8). Process and power piping have differing requirements and materials that may not be appropriate for the restrictions and examinations described herein and, therefore, are not included in this Standard.

1.2 Manufacturing Process

This process uses induction heating to heat a narrow band 360 deg around a pipe or cylinder at the point of bending as the pipe or cylinder is being pushed through the inductor coil at a constant velocity. After the material passes through the coil, it may be cooled by forced air or water spray, or it may be allowed to cool in still air. Bends in any producible wall thickness and diameter are covered. Induction bends covered by this Standard may be produced from seamless pipe, welded pipe, or cylinders.

1.3 Fabricated Bends

Larger angle bends obtained by girth welding two or more smaller angle bends together are considered pipe fabrications and as such, are not within the scope of this Standard.

1.4 Standard 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.

1.5 References

Standards and specifications adopted by reference in this Standard are shown in Mandatory Appendix I. It is not 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 reference standards and in all other respects conforming to this Standard will be considered to be in compliance.

1.6 Codes and Regulations

A bend used under the jurisdiction of a referencing code or governmental regulation is subject to any limitation of that code or regulation. This includes any maximum temperature limitation or rule governing the use of a material at low temperature.

1.7 Service Conditions

Criteria for selection of bend material for a particular fluid service are not within the scope of this Standard.

1.8 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.

1.9 Quality Systems (23)

Requirements relating to the manufacturers' quality system programs are described in Nonmandatory Appendix A. The Quality System shall specify controls for the manufacturing process, heat treatment process, testing, inspection, material traceability from starting material to final bend, and documentation requirements necessary to ensure compliance with this Standard. The