ASME B36.10-2022

(Revision of ASME B36.10M-2018)

Welded and Seamless Wrought Steel Pipe

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Two Park Avenue • New York, NY • 10016 USA

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The American Society of Mechanical Engineers
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FOREWORD

In March 1927, the American Standards Association (ASA) authorized the organization of a Sectional Committee on Standardization of Dimensions and Material of Wrought Steel and Wrought Iron Pipe and Tubing for the purpose of unifying the standards of these commodities in force in this country. The American Society for Testing and Materials (ASTM) and The American Society of Mechanical Engineers (ASME) were designated as sponsors, and the first meeting of the Sectional Committee was held in Pittsburgh, Pennsylvania, on May 18, 1928.

The dimensions of commercial pipe in general use in the United States, at the time, conformed generally to those recommended by the ASME Committee on Standard Pipe and Pipe Threads published in 1886 (ASME Transactions, Vol. VIII, p. 29). On these standards, an enormous industry has been built and the satisfactory use of this product proves the soundness of the original design and specification.

Increasingly severe service demands, at the time of the Committee's organization, had been met by using the nearest available pipe or tubing for heavier sections such as casing and mechanical tubing, with resulting uneconomical multiplicity of wall thicknesses.

Subsequently, the Committee, with the cooperation of the industry, completed a survey of existing practice as the logical starting point for the development of an American Standard. From this survey, a table was designed to provide a selection of wall thicknesses of pipe to cover the power piping requirements of industry where strength to resist internal pressure governs selection and was later expanded to include pipe diameters and thicknesses used in other industries.

The original intent of the Committee was to establish a system of Schedule Numbers for pipe size/wall thickness combinations that would have an approximately uniform relationship equal to 1,000 times the *P/S* expression contained in the modified Barlow formula for pipe wall thickness that was defined in the Appendix to this Standard. The resulting Numbers departed so far from existing wall thicknesses in common use that the original intent could not be accomplished. The Schedule Numbers were then adopted strictly as a convenient designation system for use in ordering.

In all cases, the designer must base his selection on the rules and allowable stresses set by the code that governs his particular construction. The table is dimensionally complete for all sizes and wall thicknesses within its scope, but some of the larger, heavier wall sections are beyond the capability of seamless mill production and must be obtained from forged and bored billets or other sources.

The first issue of this Standard was designated American Standard "tentative" by ASA in November 1935. Subsequent slight revisions to the table and the footnotes of the dimensional tables were approved and the ASA changed the designation to American Standard; the date of ASA approval was April 28, 1939.

Further revisions were made by the Sectional Committee. The list of specifications in the table was revised where necessary and slight revisions in wall thicknesses of some of the large sizes of the heavy schedules were made where P/S values were out of line.

It was the hope in 1939 that the designation of pipe used commercially by all industry as Standard weight, Extra-Strong, and Double Extra-Strong would gradually be replaced by Schedule Number designation. However, owing to customs of over 50 years' standing, demand and production of pipe to these traditional dimensions was undiminished. Consequently, in response to a demand from users, accepted practice for dimensions and weights of commercial wrought steel and welded wrought iron pipe were added. These changes were designated an American Standard on February 23, 1950.

Subcommittee No. 1 was reorganized in 1957. In addition to necessary editorial changes, a simplified format was selected for the tables of weights and dimensions to include and identify the sizes and weights of API Standards 5L and 5LX. These changes to the Standard were approved, and it was designated an American Standard on December 21, 1959.

The Standard was revised in 1969 to include a uniform method to calculate the plain end weight of steel pipe and minor adjustments were made in the tabulated weights of steel pipe to conform to this new method. Additional sizes and thicknesses of steel pipe that had come into common use were also added. Inasmuch as API Standard 5L no longer included wrought iron pipe, reference to that Standard was deleted. These changes to the Standard were approved and it was designated an American National Standard on February 3, 1970.

The Standard was revised in 1975 to include additional sizes and thicknesses of steel pipe that had been added to API specifications. The table with dimensions and weights of welded wrought iron pipe was deleted in its entirety since wrought iron pipe was no longer produced. These changes in the Standard were approved and it was designated an American National Standard on June 5, 1975.

The Standard was revised in 1978 to include SI (metric) dimensions. The outside diameter and wall thicknesses were converted to millimeters by multiplying the inch dimensions by 25.4. Outside diameters larger than 16 in. were rounded to the nearest millimeter, and outside diameters 16 in. and smaller were rounded to the nearest 0.1 mm. Wall thicknesses were rounded to the nearest 0.01 mm. These converted and rounded SI dimensions were added. A formula to calculate the SI plain end mass, in kilograms per meter, using SI diameters and thicknesses added. The SI plain end mass was calculated and added. These changes in the Standard were approved, and it was designated an American National Standard on July 18, 1979.

Further revisions were made in 1984. The American National Standards Institute (ANSI) designations, which were no longer in use, were deleted, and the list of specifications was revised to agree with current ASTM and API specifications. Additional sizes and thicknesses that had been added to API specifications were added. That edition was approved as an American National Standard on August 19, 1985.

The 1995 edition included additional wall thicknesses and was approved by ANSI on August 24, 1995.

The 1996 edition contained table revisions that included the addition of pipe sizes, changing some plain end weights and masses, identifying metric pipe by the dimensionless designator DN, and eliminating the API Specification column in one table. The 1996 edition was approved as an American National Standard on September 23, 1996.

The 2000 edition contained revisions to the density for steel that were incorporated previously. Other editorial changes to the sections were made. The 2000 edition was approved as an American National Standard on December 1, 2000.

The 2004 edition contained revisions that corrected the equation for nominal plain end weight and added the missing DN schedule numbers. The 2004 edition was approved as an American National Standard on June 23, 2004.

The 2015 edition contained revisions to table notes and references. The 2015 edition was approved as an American National Standard on June 16, 2015.

The 2018 edition expanded Table 2-1 (formerly Table 1) by adding Schedule 160 and Double Extra Strong (XXS) rows for NPS $\frac{1}{8}$ (DN 6), NPS $\frac{1}{4}$ (DN 8), and NPS $\frac{3}{8}$ (DN 10); these data were adapted from ASME B16.11-2011. A plain end weight (mass) was changed in Table 2-1 and a number of editorial revisions were made to Table 2-1 and sections 1, 2, 5, 7, and 8. The 2018 edition was approved as an American National Standard on September 6, 2018.

This Standard is available for public review on a continuing basis. This provides an opportunity for additional public review input from industry, academia, regulatory agencies, and the public-at-large.

The 2022 edition modifies the SI outside diameter rounding rules, updates the calculated plain end mass listings in Table 2-1, and adds new nominal wall thicknesses for some standard sizes from NPS 8 to NPS 28 (DN 200 to DN 700). ASME B36.10-2022 was approved by ANSI on February 18, 2022.

ASME B36 COMMITTEE
Nominal Wrought Pipe Sizes and Wall Thicknesses

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

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CORRESPONDENCE WITH THE B36 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 or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B36 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

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.

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 documentation.

Proposing a Case. Cases may be issued to provide alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the B36 Standards 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 B36 Standards Committee.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at http://go.asme.org/InterpretationRequest. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may mail the request to the Secretary of the B36 Standards Committee at the above address. The request for an 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 in one or two words.
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. Please provide a condensed and precise question, composed in such a way that a “yes” or “no” reply is acceptable.
Proposed Reply(ies):	Provide a proposed reply(ies) in the form of “Yes” or “No,” with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information:	Provide the Committee with any background information that will assist the Committee in understanding the inquiry. 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 the format described above may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

Moreover, 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 inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

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 B36 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B36 Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at http://go.asme.org/B36committee.

ASME B36.10-2022
SUMMARY OF CHANGES

Following approval by the ASME B36 Committee and ASME, and after public review, ASME B36.10-2022 was approved by the American National Standards Institute on February 18, 2022.

ASME B36.10-2022 includes the following changes identified by a margin note, **(22)**.

Page	*Location*	*Change*
1	2	Last paragraph revised
1	3	Added and subsequent paragraphs redesignated
1	6	Nomenclature for *D* revised for both U.S. Customary and SI units
2	10	Revised
3	Table 2-1	Revised

WELDED AND SEAMLESS WROUGHT STEEL PIPE

1 SCOPE

This Standard covers the standardization of dimensions of welded and seamless wrought steel pipe for high or low temperatures and pressures.

The word "pipe" is used, as distinguished from "tube", to apply to tubular products of dimensions commonly used for pipeline and piping systems.

(22) 2 SIZE

The size of all pipe in Table 2-1 is identified by the dimensionless designator nominal pipe size (NPS) [diamètre nominal (DN)]. Pipe NPS 12 (DN 300) and smaller have outside diameters numerically larger than their corresponding sizes. In contrast, the outside diameters of tubes are numerically identical to the size number for all sizes.

The manufacture of pipe NPS $\frac{1}{8}$ (DN 6) to NPS 12 (DN 300), inclusive, is based on a standardized outside diameter (O.D.). This O.D. was originally selected so that pipe with a standard O.D. and having a wall thickness that was typical of the period would have an inside diameter (I.D.) approximately equal to the nominal size. Although there is no such relation between the existing standard thickness — O.D. and nominal size — these nominal sizes and standard O.D.s continue in use as "standard."

The manufacture of pipe NPS 14 (DN 350) and larger is based on the O.D. being the same as the nominal pipe size.

(22) 3 REFERENCES

The following publications are referenced in this Standard. Unless otherwise specified, the latest edition applies:

API 5L, Specification for Line Pipe
Publisher: American Petroleum Institute (API), 200 Massachusetts Avenue NW, Suite 1100, Washington, DC 20001-5571 (www.api.org)

ASME B1.20.1, Pipe Threads, General Purpose (Inch)
Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

4 MATERIALS

The dimensional standards for pipe described in this Standard are for products covered in ASTM specifications.

5 WALL THICKNESS

The nominal wall thicknesses are given in Table 2-1.

6 WEIGHTS/MASSES (22)

The nominal weights (masses) of steel pipe are calculated values and are given in Table 2-1.

The nominal plain end weight, in pounds per foot, is calculated using the following equation:

$$W_{pe} = 10.69(D - t)t$$

where

D = outside diameter to the nearest 0.001 in. for NPS 8 and smaller, to the nearest 0.01 in. for NPS 10 to NPS 30, inclusive, and to the nearest 0.1 in. for NPS 32 and larger (the symbol D is to be used for O.D. only in mathematical equations or formulas)

t = specified wall thickness, rounded to the nearest 0.001 in.

W_{pe} = nominal plain end weight, rounded to the nearest 0.01 lb/ft

The nominal plain end mass, in kilograms per meter, is calculated using the following equation:

$$M_{pe} = 0.0246615(D - t)t$$

where

D = outside diameter to the nearest 0.01 mm for DN 200 and smaller, to the nearest 0.1 mm for DN 250 to DN 750, inclusive, and to the nearest 1 mm for DN 800 and larger (the symbol D is to be used for O.D. only in mathematical equations or formulas)

M_{pe} = nominal plain end mass, rounded to the nearest 0.01 kg/m

t = specified wall thickness, rounded to the nearest 0.01 mm