ASME B36.10M-2018
(Revision of ASME B36.10M-2015)

Welded and Seamless Wrought Steel Pipe

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME B36.10M-2018
(Revision of ASME B36.10M-2015)

Welded and Seamless Wrought Steel Pipe

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: October 12, 2018

This Standard will be revised when the Society approves the issuance of a new edition.

Periodically certain actions of the ASME B32 Committee may be published as Cases. Cases are published on the ASME website under the B32 Committee Page at http://go.asme.org/B32committee as they are issued.

Errata to codes and standards may be posted on the ASME website 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 B32 Committee Page can be found at http://go.asme.org/B32committee. 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.

ASME is the registered trademark of the American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that the determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

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

Copyright © 2018 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

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 rather 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 is 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 metric dimensions were added. A formula to calculate the SI metric plain end mass, in kilograms per meter, using SI metric diameters and thicknesses was added. The SI metric plain end mass was calculated and was 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 are 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 next 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 was 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 expands 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) has been changed in Table 2-1 and a number of editorial revisions have been 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.

ASME B32 COMMITTEE
Metal and Metal Alloy
Wrought Mill Product Nominal Sizes

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

STANDARDS COMMITTEE OFFICERS

F. W. Tatar, *Chair*
A. R. Amaral, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. R. Amaral, The American Society of Mechanical Engineers
D. O. Bankston, Jr., Bechtel
D. Frikken, Becht Engineering Co.
J. A. Gruber, J A Gruber & Associates
R. A. McLeod, General Electric Co.
M. L. Nayyar, NICE
A. P. Rangus, Bechtel
R. Reamy, Turner Industries Group
F. W. Tatar, FM Global

CORRESPONDENCE WITH THE B32 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, B32 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.

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.

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.

Attending Committee Meetings. The B32 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 B32 Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at http://go.asme.org/B32committee.

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.

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 $^1/_8$ (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 proceeds on the basis of an O.D. corresponding to the nominal size.

3 MATERIALS

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

4 WALL THICKNESS

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

5 WEIGHTS/MASSES

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

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

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

where

D = outside diameter to the nearest 0.001 in. (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 formula:

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

where

D = outside diameter to the nearest 0.1 mm for outside diameters that are 16 in. (406.4 mm) and smaller and to the nearest 1.0 mm for outside diameters larger than 16 in. (406.4 mm) (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

6 PERMISSIBLE VARIATIONS

Variations in dimensions differ depending upon the method of manufacture employed in making the pipe to the various specifications available. Permissible variations for dimensions are indicated in each specification.

7 PIPE THREADS

Unless otherwise specified, the threads of threaded pipe shall conform to ASME B1.20.1, Pipe Threads, General Purpose (Inch).

Schedules 5 and 10 wall thicknesses do not permit threading in accordance with ASME B1.20.1.

8 WALL-THICKNESS DESIGNATIONS

The wall-thickness designations Standard, Extra-Strong, and Double Extra-Strong have been commercially used designations for many years. As explained in the Foreword, the Schedule Numbers were subsequently added as a convenient designation for use in ordering pipe. Standard and Schedule 40 are identical for up to NPS 10 (DN 250), inclusive. All larger sizes of Standard have $^3/_8$ in. (9.53 mm) wall thicknesses. Extra-Strong and Schedule 80 are identical for up to NPS 8 (DN 200), inclusive. All larger sizes of Extra-Strong have $^1/_2$ in. (12.70 mm) wall thicknesses.

Pipe of sizes and wall thicknesses other than those of Standard, Extra-Strong, and Double Extra-Strong, and Schedule Number, were adopted from API Specification