

AMERICAN NATIONAL STANDARD

Stainless Steel Pipe

ANSI B36.19 - 1976

(REVISION OF ANSI B36.19-1965 (R1971))

SECRETARIAT

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FOREWORD

This standard for corrosion resistant piping, designated categorically as *Stainless*, is based on the same principles that formed the background for the development of American Standard for Welded and Seamless Wrought Steel Pipe (ANSI B36.10) and reference is made to this source of information.

The wall thicknesses shown for Schedules 40S and 80S are identical with those of Schedules 40 and 80 in ANSI B36.10 except in the 12-in. size in Schedule 40S and the 10- and 12-in. sizes in Schedule 80S. The thickness for these three sizes corresponds to wall thicknesses of standard wall and extra strong wall.

The more recent development of the highly alloyed stainless steels have brought about a minor conflict with convention. With these newer materials, the need for standards is just as great and the present types of threads are just as satisfactory, but the basic cost of the metal is much higher and the art of fusion-welding has developed concurrently. The character of stainless steel permits the design of thin wall piping systems without fear of early failure due to corrosion, and the use of fusion welding to join such piping has eliminated the necessity of threading it. For these reasons, the wall thickness dimensions shown under Schedule 10S have been developed, based on the conventional formula, but then modified to correspond to the nearest Birmingham Wire Gage (B.W.G.) number.

Following publication of the 1949 edition there developed a demand for a still lighter wall pipe. A Schedule 5S was determined cooperatively by representatives of chemical companies, processing industries, and manufacturers of welding fittings. This was endorsed by the ASA Chemical Industry Correlating Committee and the Manufacturers Standardization Society of the Valve and Fittings Industry. The new schedule was included in the revised standard which was approved by ASA (now ANSI) on April 7, 1952.

In 1956 it was recommended that the wall thickness of 12-in. 5S be lessened and a new revision of the standard was issued shortly after its approval by ASA (now ANSI) on February 27, 1957.

In this fourth edition, dimensions were expanded beyond 12-inch pipe size by inclusion of, and reference to, ASTM Specification A409. This revision was approved by ASA (now ANSI) on October 29, 1965.

The B36 Standards Committee membership was asked in March 1970 for recommendations as to what action should be taken on ANSI B36.19-1965 since according to ANSI procedures this standard was due for revision or reaffirmation. The B36 Standards Committee recommended reaffirmation. This action was approved by the Secretariat and by the American National Standards Institute on May 26, 1971.

In 1975 the B36 Standards Committee undertook a review of the standard, considering its acceptability and usefulness. The results were favorable so some editorial refinements and updating were proposed along with the incorporation of factors for conversion to SI (Metric) Units. The revision was approved by the Standards Committee, the Secretariat and subsequently by the American National Standards Institute on October 4, 1976.

CONTENTS

	Page
Foreword.	iii
1. Scope	1
2. Size	1
3. Materials	1
4. Permissible Variations	1
5. Weights	1
6. Pipe Threads.	1
7. Wall Thickness Selection.	2
Table 1. Specifications for Pipe with ANSI Designations and Titles of Standard Specifications	3
Table 2. Dimensions of Welded and Seamless Stainless Steel Pipe	4
Table 3. Nominal Weights of Steel Pipe, Plain Ends	5

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AMERICAN NATIONAL STANDARD

STAINLESS STEEL PIPE

1. SCOPE

This Standard covers the standardization of dimensions of welded and seamless wrought stainless steel pipe.

The word pipe is used as distinguished from tube to apply to tubular products of dimensions commonly used for pipeline and piping systems. Pipe dimensions of sizes 12 and smaller have outside diameters numerically larger than the corresponding size. In contrast, the outside diameters of tubes are numerically identical to the size number for all sizes.

The wall thicknesses for sizes 14 through 22 inclusive of Schedule 10S, for size 12 of Schedule 40S, and for sizes 10 and 12 of Schedule 80S are not the same as those of ANSI B36.10. The suffix "S" in the Schedule Number is used to differentiate B36.19 pipe from pipe of B36.10. ANSI B36.10 includes other pipe thicknesses which are also commercially available with stainless steel material.

2. SIZE

The size of all pipe in Tables 2 and 3 is identified by the nominal pipe size.

The manufacture of pipe in the nominal sizes of 1/8-12 inclusive is based on a standardized outside diameter (OD). This OD was originally selected so that pipe with a standard OD and having a wall thickness which was typical of the period would have an inside diameter (ID) approximately equal to the nominal size. Although there is no such relation between the existing standard thicknesses—OD and nominal

size—these nominal sizes and standard ODs continue in use as "standard".

The manufacture of pipe in nominal sizes of 14 and larger proceeds on the basis of an OD corresponding to the nominal size.

3. MATERIALS

The dimensional standards for pipe described here are for products covered in the ASTM specifications listed in Table 1.

4. PERMISSIBLE VARIATIONS

Variations in dimensions differ depending upon the method of manufacture employed in making the pipe to the various specifications listed in Table 1. Permissible variations for dimensions are indicated in each specification.

5. WEIGHTS

The nominal weights* of steel pipe are calculated values and are tabulated in Table 3. The nominal plain end weights are calculated using the following formula:

$$W_{pe} = 10.68 (D - t) t$$

where

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

D = outside diameter to the nearest 0.001 in. (The symbol D is to be used for OD only in mathematical equations or formulas.)

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

6. PIPE THREADS

Unless otherwise specified, the threads of threaded pipe shall conform to ANSI B2.1 Pipe Threads (Except Dryseal).

1 in. = 25.4 mm

1 lb/ft = 1.4895 kg/m

*The different grades of stainless steel have different specific densities and hence may weigh more or less than the values listed in this table would indicate (see Footnote 2, Table 3).

Schedules 5S and 10S wall thicknesses do not permit threading in accordance with ANSI B2.1.

7. WALL THICKNESS SELECTION

When the selection of wall thickness depends primarily upon capacity to resist internal pressure under given conditions, the designer shall compute the exact value of wall thickness suitable for conditions for

which the pipe is required as prescribed in detail in the ASME Boiler and Pressure Vessel Code, ANSI B31 Standard Code for Pressure Piping, or other similar codes, whichever governs the construction. A thickness will then be selected from the schedules of nominal thickness contained in Table 2 to suit the value computed to fulfill the conditions for which the pipe is desired.

AMERICAN NATIONAL STANDARD
STAINLESS STEEL PIPE

Table 1 Specifications for Pipe with ANSI Designations and Titles of Standard Specifications

ASTM Designation	ANSI Designation	Title
A312	B125.16	Specification for Seamless and Welded Austenitic Stainless Steel Pipe
A358	B125.57	Specification for Electric-Fusion-Welded Austenitic Chromium-Nickel Alloy Steel Pipe for High-Temperature Service
A376	B125.25	Specifications for Steamless Austenitic Steel Pipe for High-Temperature Central-Station Service
A409	B125.36	Specification for Welded Large Diameter Austenitic Steel Pipe for Corrosive or High-Temperature Service

Table 2 Dimensions of Welded and Seamless Stainless Steel Pipe

Nominal Pipe Size	Outside Diameter	Nominal Wall Thickness			
		Schedule 5S**	Schedule 10S**	Schedule 40S	Schedule 80S
1/8	0.405	...	0.049	0.068	0.095
1/4	0.540	...	0.065	0.088	0.119
3/8	0.675	...	0.065	0.091	0.126
1/2	0.840	0.065	0.083	0.109	0.147
3/4	1.050	0.065	0.083	0.113	0.154
1	1.315	0.065	0.109	0.133	0.179
1 1/4	1.660	0.065	0.109	0.140	0.191
1 1/2	1.900	0.065	0.109	0.145	0.200
2	2.375	0.065	0.109	0.154	0.218
2 1/2	2.875	0.083	0.120	0.203	0.276
3	3.500	0.083	0.120	0.216	0.300
3 1/2	4.000	0.083	0.120	0.226	0.318
4	4.500	0.083	0.120	0.237	0.337
5	5.563	0.109	0.134	0.258	0.375
6	6.625	0.109	0.134	0.280	0.432
8	8.625	0.109	0.148	0.322	0.500
10	10.750	0.134	0.165	0.365	0.500*
12	12.750	0.156	0.180	0.375*	0.500*
14	14.000	0.156	0.188*	...	...
16	16.000	0.165	0.188*	...	...
18	18.000	0.165	0.188*	...	...
20	20.000	0.188	0.218*	...	...
22	22.000	0.188	0.218*	...	...
24	24.000	0.218	0.250	...	...
30	30.000	0.250	0.312	...	...

All dimensions are given in inches.

1 inch (in.) = 25.4 millimeters (mm) exactly.

For tolerances, see Par. 4, Introductory Notes.

*These do not conform to ANSI B36.10.

**Schedules 5S and 10S wall thicknesses do not permit threading in accordance with ANSI B2.1.

Table 3 Nominal Weights of Steel Pipe, Plain Ends^{1,2}

Nominal Pipe Size	Weight of Steel Pipe, Plain Ends			
	Schedule 5S	Schedule 10S	Schedule 40S	Schedule 80S
1/8	...	0.19	0.24	0.31
1/4	...	0.33	0.42	0.54
3/8	...	0.42	0.57	0.74
1/2	0.54	0.67	0.85	1.09
3/4	0.69	0.86	1.13	1.47
1	0.87	1.40	1.68	2.17
1 1/4	1.11	1.81	2.27	3.00
1 1/2	1.28	2.09	2.72	3.63
2	1.61	2.64	3.65	5.02
2 1/2	2.48	3.53	5.79	7.66
3	3.03	4.33	7.58	10.25
3 1/2	3.48	4.97	9.11	12.51
4	3.92	5.61	10.79	14.98
5	6.36	7.77	14.62	20.78
6	7.60	9.29	18.97	28.57
8	9.93	13.40	28.55	43.39
10	15.19	18.65	40.48	54.74
12	20.98	24.17	49.56	65.42
14	23.07	27.73	...	...
16	27.90	31.75	...	...
18	31.43	35.76	...	...
20	39.78	46.06	...	...
22	43.80	50.71	...	...
24	55.37	63.41	...	...
30	79.43	98.93	...	...

All dimensions are given in inches.

1 pound per foot (lb/ft) = 1.4895 kilograms per meter (kg/m).

¹Weights are given in pounds per linear foot and are for carbon steel pipe with plain ends.

²The different grades of stainless steel permit considerable variations in weight. The ferritic stainless steels may be about 5 per cent less, and the austenitic stainless steels about 2 per cent greater than the values shown in this table which are based on weights for carbon steel.

AMERICAN NATIONAL STANDARDS FOR PIPING, PIPE THREADS, PIPE FLANGES, FITTINGS, GASKETS, AND VALVES

Pipe Threads (Except Dryseal)	B2.1-1968
Dryseal Pipe Threads	B2.2-1968
Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800	B16.1-1975
Malleable-Iron Threaded Fittings, 150 and 300 lb	B16.3-1971
Cast Iron Threaded Fittings, 125 and 250 lb	B16.4-1971
Steel Pipe Flanges, Flanged Valves and Fittings (Including Ratings for Class 150, 300, 400, 600, 900, 1500 and 2500)	B16.5-1973
Factory-Made Wrought Steel Butt welding Fittings	B16.9-1971
Face-to-Face and End-to-End Dimensions of Ferrous Valves	B16.10-1973
Forged Steel Fittings, Socket-Welding and Threaded	B16.11-1973
Cast Iron Threaded Drainage Fittings	B16.12-1971
Ferrous Pipe Plugs, Bushings and Locknuts with Pipe Threads	B16.14-1971
Cast Bronze Threaded Fittings, 125 and 250 lb	B16.15-1971
Cast Bronze Solder Joint Pressure Fittings	B16.18-1972
Ring-Joint Gaskets and Grooves for Steel Pipe Flanges	B16.20-1973
Nonmetallic Gaskets for Pipe Flanges	B16.21-1962
Wrought-Copper and Bronze Solder-Joint Pressure Fittings	B16.22-1973
Cast Copper Alloy Solder Joint Drainage Fittings DWV	B16.23-1976
Bronze Flanges and Flanged Fittings, 150 and 300 lb	B16.24-1971
Butt welding Ends	B16.25-1972
Cast Copper Alloy Fittings for Flared Copper Tubes	B16.26-1975
Wrought Steel Butt welding Short Radius Elbows and Returns	B16.28-1964(R1972)
Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings	B16.29-1973
Non-ferrous Pipe Flanges, 150, 300, 400, 600, 900, 1500 and 2500 lb	B16.31-1971
Cast Bronze Solder Joint Fittings for Solvent Drainage Systems	B16.32-1973
Small Manually Operated Metallic Gas Valves in Gas Distribution Systems Whose Maximum Allowable Operating Pressure Does Not Exceed 60 PSIG or 125 PSIG	B16.33-1973
Steel Butt-Welding End Valves	B16.34-1973
Steel Orifice Flanges, Class 300, 600, 900, 1500, and 2500	B16.36-1975
Power Piping	B31.1-1973
Fuel Gas Piping	B31.2-1968
Petroleum Refinery Piping	B31.3-1973
Liquid Petroleum Transportation Piping Systems	B31.4-1974
Refrigeration Piping	B31.5-1975
Nuclear Power Piping	B31.7-1969
Gas Transmission and Distribution Piping Systems	B31.8-1975
Welded and Seamless Wrought Steel Pipe	B36.10-1975
Stainless Steel Pipe	B36.19-1976

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