

Specification for

**Dimensions of steel pipe
for the petroleum
industry**

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Piping Systems Components Standards Policy Committee (PSE/-) to Technical Committee PSE/8, upon which the following bodies were represented:

Adhesive Tape Manufacturers' Association
 British Compressed Air Society
 British Gas plc
 British Malleable Tube Fittings Association
 British Steel Industry
 British Valve and Actuator Manufacturers' Association
 British Welded Steel Tube Association
 Engineering Equipment and Materials Users' Association
 Food and Drink Federation
 Institution of Civil Engineers
 Institution of Gas Engineers
 Institution of Water and Environmental Management
 Large Diameter Steel Tube Association
 Mechanical Handling Engineers' Association
 Stainless Steel Fabricators' Association of Great Britain
 Steel Tube Fittings Manufacturers' Technical Association
 TI (Group Services) Ltd.
 Water Companies Association
 Water Research Centre
 Water Services Association of England and Wales

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Foreword

This British Standard has been prepared under the direction of the Piping Systems Components Standards Policy Committee, and supersedes BS 1600 : Part 2 : 1970 which is withdrawn. BS 1600 : Part 1 : 1970, which specified Imperial units, was withdrawn previously. This British Standard lists dimensions of steel pipe commonly used in the petroleum and petrochemical industry.

In this standard identity has been maintained with the following American standards, published by the American National Standards Institute (ANSI) and the American Society of Mechanical Engineers (ASME), ANSI/ASME B.36.10M, 'Welded and seamless wrought steel pipe' and ANSI/ASME B.36.19M 'Stainless steel pipe', to ensure that pipe ordered for use in the petroleum industry are dimensionally interchangeable, irrespective of origin. The designation of pipe thicknesses by schedule numbers has been retained.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Specification

1 Scope

This British Standard specifies the dimensions in metric units for steel pipe commonly used by the petroleum industry.

NOTE. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Nominal size and wall thickness

Pipes of all wall thicknesses shall be identified by the nominal pipe sizes given in table 1.

Pipe wall thickness shall be designated by a schedule number (an established practice widely used in the petroleum industry), or expressed in millimetres as given in table 1.

NOTE 1. Schedule numbers with the additional designation 'S' (i.e. 5S, 10S, 40S, 80S) apply only to austenitic chromium-nickel steel pipe.

NOTE 2. Certain wall thicknesses of carbon steel pipe have traditionally been known in the petroleum industry as 'standard wall', 'extra strong' and 'double extra strong' and are sometimes still referred to as such. For the convenience of users of this British Standard these wall thicknesses are shown in table 1 under their appropriate headings. Where they do not correspond to a wall thickness listed under one of the schedule numbers they have been marked with the symbol ⁺.

NOTE 3. It is one of the aims of this British Standard to limit the range of wall thicknesses applicable to pipe used in refinery process plant. Therefore, although ANSI/ASME B.36.10M and ANSI/ASME B.36.19 cover a large number of thicknesses, only schedule number pipe thicknesses have been included in this British Standard.

NOTE 4. For design purposes, the calculation of wall thickness should be made in accordance with the relevant provisions in ANSI/ASME B31.3 'Chemical plant and petroleum refinery piping' and the relevant EEMUA supplements¹⁾.

NOTE 5. Tolerances are specified in the relevant pipe standards.

3 Nominal masses

The nominal masses of carbon and stainless steel pipe, in kilogrammes per linear metre, shall be as given in table 2. These are derived from the following formula:

$$\text{nominal mass} = 0.02466 (D - t)t$$

where

D = outside diameter (in mm) to the nearest 0.1 mm for outside diameter ≤ 406.4 mm, or to the nearest 1.0 mm for outside diameter > 406.4 mm;

t = specified wall thickness to the nearest 0.01 mm.

NOTE 1. Different types of steel have different densities and their masses will therefore vary slightly from those listed in table 2 (see note 1 to table 2).

NOTE 2. Tolerances are specified in the relevant pipe standards.

4 Screw threads

The screw threads of threaded pipe and couplings shall conform in all respects to the requirements of ANSI/ASME B1.20.1 or American Petroleum Institute (API) standard API Std 5B.

¹⁾ EEMUA supplements are available from Engineering Equipment and Materials User's Association (EEMUA), 14 Belgrave Square, London SW1X 8PS.

Table 1. Dimensions of seamless and welded steel pipes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Nominal pipe size	Outside diameter	Nominal wall thickness																
		Schedule 5S ¹⁾	Schedule 10S ¹⁾	Schedule 20	Schedule 30	Schedule 40S ¹⁾	Standard wall ²⁾	Schedule 40	Schedule 60	Schedule 80S ¹⁾	Extra strong ²⁾	Schedule 80	Schedule 100	Schedule 120	Schedule 140	Schedule 160	Double extra strong ²⁾	
in	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
¼	10.3	—	1.24	—	—	—	1.73	1.73	1.73	—	2.41	2.41	2.41	—	—	—	—	—
¼	13.7	—	1.65	—	—	—	2.24	2.24	2.24	—	3.02	3.02	3.02	—	—	—	—	—
¼	17.1	—	1.65	—	—	—	2.31	2.31	2.31	—	3.20	3.20	3.20	—	—	—	—	—
½	21.3	1.65	2.11	—	—	—	2.77	2.77	2.77	—	3.73	3.73	3.73	—	—	—	4.78	7.47 ⁺
¾	26.7	1.65	2.11	—	—	—	2.87	2.87	2.87	—	3.91	3.91	3.91	—	—	—	5.56	7.82 ⁺
1	33.4	1.65	2.77	—	—	—	3.38	3.38	3.38	—	4.55	4.55	4.55	—	—	—	6.35	9.09 ⁺
1½ ³⁾	42.2	1.65	2.77	—	—	—	3.56	3.56	3.56	—	4.85	4.85	4.85	—	—	—	6.35	9.70 ⁺
1½	48.3	1.65	2.77	—	—	—	3.68	3.68	3.68	—	5.08	5.08	5.08	—	—	—	7.14	10.15 ⁺
2	60.3	1.65	2.77	—	—	—	3.91	3.91	3.91	—	5.54	5.54	5.54	—	—	—	8.74	11.07 ⁺
2½ ³⁾	73.0	2.11	3.05	—	—	—	5.16	5.16	5.16	—	7.01	7.01	7.01	—	—	—	9.53	14.02 ⁺
3	88.9	2.11	3.05	—	—	—	5.49	5.49	5.49	—	7.62	7.62	7.62	—	—	—	11.13	15.24 ⁺
3½ ³⁾	101.6	2.11	3.05	—	—	—	5.74	5.74	5.74	—	8.08	8.08	8.08	—	—	—	—	—
4	114.3	2.11	3.05	—	—	—	6.02	6.02	6.02	—	8.56	8.56	8.56	—	11.13	—	13.49	17.12 ⁺
5 ³⁾	141.3	2.77	3.40	—	—	—	6.55	6.55	6.55	—	9.53	9.53	9.53	—	12.70	—	15.88	19.05 ⁺
6	168.3	2.77	3.40	—	—	—	7.11	7.11	7.11	—	10.97	10.97	10.97	—	14.27	—	18.26	21.95 ⁺
8	219.1	2.77	3.76	—	—	6.35	8.18	8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.23 ⁺
10	273.0	3.40	4.19	—	—	6.35	9.27	9.27	9.27	12.70	12.70	12.70	12.70	15.09	18.26	21.44	28.58	25.40
12	323.8	3.96	4.57	—	—	6.35	9.53	9.53	9.53	14.27	12.70	12.70	12.70	17.48	21.44	25.40	33.32	25.40
14	355.6	3.96	4.78	6.35	7.92	9.53	—	9.53	11.13	15.09	—	12.70 ⁺	19.05	23.83	27.79	31.75	35.71	—
16	406.4	4.19	4.78	6.35	7.92	9.53	—	9.53	12.70	16.66	—	12.70	21.44	26.19	30.96	36.53	40.49	—
18	457	4.19	4.78	6.35	7.92	11.13	—	9.53 ⁺	14.27	19.05	—	12.70 ⁺	23.83	29.36	34.93	39.67	45.24	—
20	508	4.78	5.54	6.35	9.53	12.70	—	9.53	15.09	20.62	—	12.70	26.19	32.54	38.10	44.45	50.01	—
22	559	4.78	5.54	6.35	9.53	12.70	—	9.53	—	22.23	—	12.70	28.58	34.93	41.28	47.63	53.98	—
24	610	5.54	6.35	6.35	9.53	14.27	—	9.53	17.48	24.61	—	12.70 ⁺	30.96	38.89	46.02	52.37	59.54	—
26	660	—	—	7.92	12.70	—	—	9.53 ⁺	—	—	—	12.70	—	—	—	—	—	—
28	711	—	—	7.92	12.70	15.88	—	9.53 ⁺	—	—	—	12.70	—	—	—	—	—	—
30	762	6.35	7.92	7.92	12.70	15.88	—	9.53 ⁺	—	—	—	12.70	—	—	—	—	—	—
32	813	—	—	7.92	12.70	15.88	—	9.53 ⁺	17.48	—	—	12.70	—	—	—	—	—	—
34	864	—	—	7.92	12.70	15.88	—	9.53 ⁺	17.48	—	—	12.70	—	—	—	—	—	—
36	914	—	—	7.92	12.70	15.88	—	9.53 ⁺	19.05	—	—	12.70	—	—	—	—	—	—

1) Schedule 5S, 10S, 40S and 80S apply to austenitic chromium-nickel steel pipe only.
 2) Except when marked "standard", "extra strong" and "double extra strong" wall thicknesses have pipe of corresponding wall thickness listed under one of the schedule numbers.
 3) The use of these sizes should be avoided whenever possible.
 NOTE 1: For nominal pipe sizes greater than 36 inches, see ANSI/ASME B36.10M.
 NOTE 2: Dimensions in this table are based on ANSI/ASME B36.10M and ANSI/ASME B36.19M.
 NOTE 3: For tolerance on outside diameter and wall thickness see the appropriate pipe standards.

Table 2. Nominal masses of seamless and welded carbon and stainless steel plain end pipe

Nominal pipe size	Outside diameter	Nominal wall thickness										19					
		3	4	5	6	7	8	9	10	11	12		13	14	15	16	17
in	mm	Schedule 5S ¹⁾	Schedule 10S ¹⁾	Schedule 10	Schedule 20	Schedule 30	Schedule 40S ¹⁾	Schedule 40	Schedule 60	Schedule 80S ¹⁾	Extra strong ²⁾	Schedule 80	Schedule 100	Schedule 120	Schedule 140	Schedule 160	Double extra strong ²⁾
		kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m	kg/m
1/4	10.3	-	0.28	-	-	-	0.37	0.37	-	0.47	0.47	0.47	-	-	-	-	-
1/2	13.7	-	0.49	-	-	-	0.63	0.63	-	0.80	0.80	0.80	-	-	-	-	-
3/4	17.1	-	0.63	-	-	-	0.84	0.84	-	1.10	1.10	1.10	-	-	-	-	-
1	21.3	0.80	1.00	-	-	-	1.27	1.27	-	1.62	1.62	1.62	-	-	-	1.95	2.55+
1 1/4 ³⁾	26.7	1.03	1.28	-	-	-	1.69	1.69	-	2.20	2.20	2.20	-	-	-	2.90	3.64+
1 1/2	33.4	1.30	2.09	-	-	-	2.50	2.50	-	3.24	3.24	3.24	-	-	-	4.24	5.45+
2	42.2	1.65	2.70	-	-	-	3.39	3.39	-	4.47	4.47	4.47	-	-	-	5.61	7.77+
2 1/2 ³⁾	48.3	1.91	3.11	-	-	-	4.05	4.05	-	5.41	5.41	5.41	-	-	-	7.25	9.56+
3	60.3	2.40	3.93	-	-	-	5.44	5.44	-	7.48	7.48	7.48	-	-	-	11.11	13.44+
3 1/2	73.0	3.69	5.26	-	-	-	8.63	8.63	-	11.41	11.41	11.41	-	-	-	14.92	20.39+
4 ³⁾	88.9	4.51	6.45	-	-	-	11.29	11.29	-	15.27	15.27	15.27	-	-	-	21.35	27.08+
4 1/2	101.6	5.18	7.40	-	-	-	13.57	13.57	-	18.63	18.63	18.63	-	-	-	-	-
5 ³⁾	114.3	5.84	8.36	-	-	-	16.07	16.07	-	22.32	22.32	22.32	-	-	-	-	-
6	141.3	9.47	11.57	-	-	-	21.77	21.77	-	30.97	30.97	30.97	-	-	-	-	-
8	168.3	11.92	13.84	-	-	-	28.26	28.26	-	42.56	42.56	42.56	-	-	-	-	-
10	219.1	14.79	19.96	-	-	-	42.55	42.55	-	64.64	64.64	64.64	-	-	-	-	-
12	273.0	22.63	27.78	-	-	-	60.31	60.31	-	96.01	96.01	96.01	-	-	-	-	-
14	323.8	31.25	36.00	-	-	-	73.88	73.88	-	132.08	132.08	132.08	-	-	-	-	-
16	355.6	34.36	41.30	54.69	67.90	81.33	93.27	123.30	160.12	158.10	158.10	158.10	194.96	224.65	253.56	281.70	305.35
18	406.4	41.56	47.29	62.64	77.83	93.27	105.16	155.80	205.74	203.53	203.53	203.53	300.62	363.56	408.26	450.37	504.81
20	457	46.81	53.26	70.57	87.71	117.15	117.15	183.42	247.83	247.83	247.83	311.17	381.53	441.49	508.11	564.81	627.26
22	508	50.25	68.61	78.55	117.15	155.12	155.12	255.41	355.26	355.26	355.26	442.08	547.71	640.03	720.15	808.22	896.36
24	559	65.24	75.53	86.54	129.13	171.09	171.09	294.25	420.22	420.22	420.22	527.02	600.63	683.19	765.75	848.31	930.87
26	610	82.47	94.45	127.36	202.72	271.21	271.21	452.87+	635.42	635.42	635.42	782.92	930.42	1077.92	1225.42	1372.92	1520.42
28	660	-	-	137.32	218.69	271.21	271.21	452.87+	635.42	635.42	635.42	782.92	930.42	1077.92	1225.42	1372.92	1520.42
30	762	118.31	147.36	147.28	234.67	292.18	292.18	476.84+	660.31	660.31	660.31	807.81	955.31	1102.81	1250.31	1397.81	1545.31
32	813	-	-	157.24	250.64	312.15	312.15	504.90	691.40	691.40	691.40	838.90	986.40	1133.90	1281.40	1428.90	1576.40
34	864	-	-	167.20	266.61	332.12	332.12	520.31	706.81	706.81	706.81	854.31	1001.81	1149.31	1296.81	1444.31	1591.81
36	914	-	-	176.96	282.27	351.70	351.70	554.42	740.92	740.92	740.92	888.42	1035.92	1183.42	1330.92	1478.42	1625.92

¹⁾ Schedule 5S, 10S, 40S and 80S apply to stainless steel pipe only. The different grades of stainless steels permit considerable variations in mass. The ferritic stainless steels may be about 5 % less and the austenitic stainless steels about 2 % greater than the values shown in this table, which are based on masses for carbon steels.

²⁾ Except where marked + masses of 'standard', 'extra strong' and 'double extra strong' pipe have pipe of a corresponding mass listed under one of the schedule numbers.

³⁾ The use of these sizes should be avoided wherever possible.

NOTE 1. For masses of threaded pipe with couplings see API Std 5L.

NOTE 2. For nominal pipe sizes greater than 36 inches, see ANSI/ASME B36.10M.

NOTE 3. For tolerance on masses see the appropriate pipe standards.

Publication(s) referred to

ANSI/ASME B1.20.1 : 1983 Pipe threads general purpose (inch)¹⁾

ANSI/ASME B31.3 : 1990 Chemical plant and petroleum refinery piping¹⁾

ANSI/ASME B36.10M : 1985 Welded and seamless wrought steel pipe¹⁾

ANSI/ASME B36.19M : 1985 Stainless steel pipe¹⁾

API Std 5B: 1988 Threading, gauging and thread inspection of casing, tubing and line pipe threads¹⁾

API Std 5L: 1991 Line pipe¹⁾

¹⁾ Available from BSI Sales Department, Linford Wood, Milton Keynes, MK14 6LE.

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