BRITISH STANDARD

BS 3600 : 1997

Specification for

Dimensions and masses per unit length of welded and seamless steel pipes and tubes for pressure purposes

ICS 23.040.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ISE/8, Steel pipes, upon which the following bodies were represented:

Adhesive Tape Manufacturers' Association
British Compressed Air Society
British Iron and Steel Producers' Association
British Malleable Tube Fittings Association
British Stainless Steel Association
British Valve and Actuator Manufacturers' Association
British Welded Steel Tube Association
Food and Drink Federation
Institution of Civil Engineers
Institution of Gas Engineers
Large Diameter Steel Tube Association
Mechanical Handling Engineering Association
National Association of Plumbing, Heating and Mechanical Services Contractors
Seamless Steel Tube Association
Steel Construction Institute
Steel Tube Fittings Manufacturers' Technical Association
TI (Group Services) Ltd.
Water Companies' Association
Water Services Association of England and Wales
Co-opted Members

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The following BSI references relate to the work on this standard:
Committee reference ISE/8
Draft for comment

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Contents

Foreword

This British Standard has been prepared by Technical Committee ISE/8, and is based on international agreements included in the ISO publications that are detailed in annex A. The sizes in this standard have been selected as appropriate to British practice.

BS 3600 : 1996 supersedes BS 3600 : 1976 which has been withdrawn. This edition introduces technical changes but it does not reflect a full review or revision of the standard, which will be undertaken in due course.

Where ISO Standards have superseded the original ISO Recommendations, they have discarded the concept of corresponding inch and metric values and are now published only in metric units.

The tabular information, covering the dimensions and masses per unit length of welded and seamless steel pipes and tubes for pressure purposes, presents within a single cover the dimensions and masses applicable to the present editions of BS 3601 to BS 3604.

For the purpose of this standard, no difference is intended in meaning between 'pipe' and 'tube' although idiomatic use prefers sometimes the one and sometimes the other.

1 Scope

This British Standard specifies the dimensions and masses per unit length applicable to welded and seamless carbon and low alloy tubes conforming to the requirements of BS 3601, BS 3602 : Parts 1 and 2 and BS 3604. The dimensional limitations for particular manufacturing processes are given in the appropriate standard in the BS 3601 to BS 3604 series.

NOTE 1. The dimensions of buttwelded tubes and of service tubes with screwed and socketed form of joint, or with plain ends and suitable for screwing, are covered in BS 1387. The dimensions of tubes for boilers and similar plant are covered in BS 3059 : Parts 1 and 2.

NOTE 2. This Standard does not apply to pipes for oil and natural gas pipelines, which are normally specified to the dimensions shown in American Petroleum Institute (API) standards, or to pipes for the petroleum industry for which reference should be made to BS 1600.

NOTE 3. The dimensions, tolerances and conventional masses per unit length of stainless steel tubes are covered in BS EN ISO 1127: 1996.

2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Nominal sizes

Tubes as detailed in table 1 may be specified by nominal size or by outside diameter, but, except in special cases (see clause **5**), the outside diameter shall always be quoted when ordering.

NOTE 1. The nominal size is a numerical designation of size which is common to all components in a piping system other than components designated by outside diameter. It is a convenient round number for reference purposes and is normally only loosely related to manufacturing dimensions.

NOTE 2. The outside diameters, thicknesses and masses per unit length have been selected from ISO publications and details are given in tables 1 and 2.

NOTE 3. In special cases (see clause **3**), hot finished, cold finished, and hot finished and machined seamless tubes may be ordered to inside diameter and thickness by agreement between the purchaser and the manufacturer (see the appropriate tube standard).

4 Tolerances

The tolerances on diameters, thicknesses and lengths depend on the method of manufacture of the tubes and shall be as specified in the appropriate tube standard.

Table 1. Dimensions and masses per unit length of welded and seamless carbon and low alloy steel tubes

Nominal size	Outside diameter	Thickness mm													
		1.2	1.4	1.6	1.8	2.0	2.3	2.6	2.9	3.2	3.6	4.0	4.5	5.0	5.4
		Mass per unit length													
	mm	kg/m													
6	10.2	0.266	0.304	0.339	0.373	0.404	0.448	0.487	–	–	–	–	–	–	–
8	13.5	0.364	0.418	0.470	0.519	0.567	0.635	0.699	0.758	0.813	0.879	–	–	–	–
10	17.2	0.474	0.546	0.616	0.684	0.750	0.845	0.936	1.02	1.10	1.21	1.30	1.41	–	–
15	21.3	0.595	0.687	0.777	0.866	0.952	1.08	1.20	1.32	1.43	1.57	1.71	1.86	2.01	2.12
20	26.9	0.761	0.880	0.998	1.11	1.23	1.40	1.56	1.72	1.87	2.07	2.26	2.49	2.70	2.86
25	33.7	0.962	1.12	1.27	1.42	1.56	1.78	1.99	2.20	2.41	2.67	2.93	3.24	3.54	3.77
32	42.4	1.22	1.42	1.61	1.80	1.99	2.27	2.55	2.82	3.09	3.44	3.79	4.21	4.61	4.93
40	48.3	1.39	1.62	1.84	2.06	2.28	2.61	2.93	3.25	3.56	3.97	4.37	4.86	5.34	5.71
50	60.3	–	2.03	2.32	2.60	2.88	3.29	3.70	4.11	4.51	5.03	5.55	6.19	6.82	7.31
65	76.1	–	–	–	3.30	3.65	4.19	4.71	5.24	5.75	6.44	7.11	7.95	8.77	9.42
80	88.9	–	–	–	3.87	4.29	4.91	5.53	6.15	6.76	7.57	8.38	9.37	10.3	11.1
90	101.6[1)]	–	–	–	–	–	5.63	6.35	7.06	7.77	8.70	9.63	10.8	11.9	12.8
100	114.3	–	–	–	–	–	6.35	7.16	7.97	8.77	9.83	10.9	12.2	13.5	14.5
125	139.7	–	–	–	–	–	–	–	–	10.8	12.1	13.4	15.0	16.6	17.9
150	168.3	–	–	–	–	–	–	–	–	13.0	14.6	16.2	18.2	20.1	21.7
175[1)]	193.7[1)]	–	–	–	–	–	–	–	–	15.0	16.9	18.7	21.0	23.3	25.1
200	219.1	–	–	–	–	–	–	–	–	17.0	19.1	21.2	23.8	26.4	28.5
222.5[1)]	244.5[1)]	–	–	–	–	–	–	–	–	19.0	21.4	23.7	26.6	29.5	31.8
250	273	–	–	–	–	–	–	–	–	21.3	23.9	26.5	29.8	33.0	35.6
300	323.9	–	–	–	–	–	–	–	–	25.3	28.4	31.6	35.4	39.3	42.4
350	355.6	–	–	–	–	–	–	–	–	27.8	31.3	34.7	39.0	43.2	46.6
400	406.4	–	–	–	–	–	–	–	–	31.8	35.8	39.7	44.6	49.5	53.4
450	457	–	–	–	–	–	–	–	–	35.8	40.3	44.7	50.2	55.7	60.1
500	508	–	–	–	–	–	–	–	–	39.8	44.8	49.7	55.9	62.0	66.9
550	559	–	–	–	–	–	–	–	–	43.9	49.3	54.7	61.5	68.3	73.7
600	610	–	–	–	–	–	–	–	–	–	–	59.8	67.2	74.6	80.5
650	660	–	–	–	–	–	–	–	–	–	–	–	72.7	80.8	87.2
700	711	–	–	–	–	–	–	–	–	–	–	–	78.4	87.1	94.0
750	762	–	–	–	–	–	–	–	–	–	–	–	–	93.3	101
800	813	–	–	–	–	–	–	–	–	–	–	–	–	–	108
850	864	–	–	–	–	–	–	–	–	–	–	–	–	–	114
900	914	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1000	1016	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1200	1219	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1400	1422	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1600	1626	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1800	1829	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2000	2032	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2200	2235	–	–	–	–	–	–	–	–	–	–	–	–	–	–

[1)] The use of these sizes should be avoided whenever possible.

NOTE 1. Seamless tubes with outside diameters of 114.3 mm up to and including 457 mm can also be obtained in thicknesses up to 25 % of the outside diameter.

NOTE 2. Welded tubes with outside diameters greater than 1016 mm can also be obtained in thicknesses of 28.0 mm, 30.0 mm or 32.0 mm.

NOTE 3. Tubes for special applications with dimensions other than those listed in this table may be supplied by agreement between the purchaser and the manufacturer.

Table 1. Dimensions and masses per unit length of welded and seamless carbon and low alloy steel tubes (continued)

Thickness mm															
5.6	**6.3**	**7.1**	**8.0**	**8.8**	**10.0**	**11.0**	**12.5**	**14.2**	**16.0**	**17.5**	**20.0**	**22.2**	**25.0**	**Outside diameter**	**Nominal size**
Mass per unit length kg/m														**mm**	
–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.2	6
–	–	–	–	–	–	–	–	–	–	–	–	–	–	13.5	8
–	–	–	–	–	–	–	–	–	–	–	–	–	–	17.2	10
–	–	–	–	–	–	–	–	–	–	–	–	–	–	21.3	15
2.94	3.20	–	–	–	–	–	–	–	–	–	–	–	–	26.9	20
3.88	4.26	4.66	5.07	5.40	–	–	–	–	–	–	–	–	–	33.7	25
5.08	5.61	6.18	6.79	7.29	–	–	–	–	–	–	–	–	–	42.4	32
5.90	6.53	7.21	7.95	8.57	9.45	10.1	–	–	–	–	–	–	–	48.3	40
7.55	8.39	9.32	10.3	11.2	12.4	13.4	14.7	16.1	–	–	–	–	–	60.3	50
9.74	10.8	12.1	13.4	14.6	16.3	17.7	19.6	21.7	23.7	25.3	27.7	–	–	76.1	65
11.5	12.8	14.3	16.0	17.4	19.5	21.1	23.6	26.2	28.8	30.8	34.0	36.5	–	88.9	80
13.3	14.8	16.5	18.5	20.1	22.6	24.6	27.5	30.6	33.8	36.3	40.2	43.5	47.2	101.6[1)]	90[1)]
15.0	16.8	18.8	21.0	22.9	25.7	28.0	31.4	35.1	38.8	41.8	46.5	50.4	55.1	114.3	100
18.5	20.7	23.2	26.0	28.4	32.0	34.9	39.2	43.9	48.8	52.7	59.0	64.3	70.7	139.7	125
22.5	25.2	28.2	31.6	34.6	39.0	42.7	48.0	54.0	60.1	65.1	73.1	80.0	88.3	168.3	150
26.0	29.1	32.7	36.6	40.1	45.3	49.6	55.9	62.9	70.1	76.0	85.7	93.9	104	193.7[1)]	175[1)]
29.5	33.1	37.1	41.6	45.6	51.6	56.6	63.7	71.8	80.1	87.0	98.2	108	120	219.1	200
33.0	37.0	41.6	46.7	51.2	57.8	63.3	71.5	80.6	90.2	98.0	111	122	135	244.5[1)]	225[1)]
36.9	41.4	46.6	52.3	57.3	64.9	71.1	80.3	90.6	101	110	125	137	153	273	250
44.0	49.3	55.5	62.3	68.4	77.4	84.9	96.0	108	121	132	150	165	184	323.9	300
48.3	54.3	61.0	68.6	75.3	85.2	93.5	106	120	134	146	166	183	204	355.6	350
55.4	62.2	69.9	78.6	86.3	97.8	107	121	137	154	168	191	210	235	406.4	400
62.3	70.0	78.8	88.6	97.3	110	121	137	155	174	190	216	238	266	457	450
69.4	77.9	87.7	98.6	108	123	135	153	173	194	212	241	266	298	508	500
76.4	85.9	96.6	109	119	135	149	168	191	214	234	266	294	329	559	550
83.5	93.8	106	119	130	148	162	184	209	234	256	291	322	361	610	600
90.4	102	114	129	141	160	176	200	226	254	277	316	349	392	660	650
97.4	109	123	139	152	173	190	215	244	274	299	341	377	423	711	700
104	117	132	149	163	185	204	231	262	294	321	366	405	454	762	750
112	125	141	159	175	198	218	247	280	314	343	391	433	486	813	800
119	133	150	169	186	211	231	262	298	335	365	416	461	517	864	850
–	141	159	179	196	223	245	278	315	354	387	441	488	548	914	900
–	157	177	199	219	248	273	309	351	395	431	491	544	611	1016	1000
–	188	212	239	263	298	328	372	422	475	519	591	655	736	1219	1200
–	220	248	279	307	348	383	435	493	555	606	692	766	801	1422	1400
–	252	283	319	351	399	438	497	564	635	694	792	878	987	1626	1600
–	–	319	359	396	449	493	560	636	715	782	892	989	1112	1829	1800
–	–	–	399	439	499	548	623	707	795	869	992	1100	1237	2032	2000
–	–	–	–	483	549	604	685	778	876	957	1093	1211	1363	2235	2200

[1)] The use of these sizes should be avoided whenever possible.

NOTE 1. Seamless tubes with outside diameters of 114.3 mm up to and including 457 mm can also be obtained in thicknesses up to 25 % of the outside diameter.

NOTE 2. Welded tubes with outside diameters greater than 1016 mm can also be obtained in thicknesses of 28.0 mm, 30.0 mm or 32.0 mm.

NOTE 3. Tubes for special applications with dimensions other than those listed in this table may be supplied by agreement between the purchaser and the manufacturer.

Table 2. Dimensions and masses per unit length of welded and seamless carbon steel tubes for use with compression couplings

Outside diameter	Thickness mm															
	0.5	**0.6**	**0.8**	**1.0**	**1.2**	**1.6**	**1.8**	**2.0**	**2.3**	**2.6**	**2.9**	**3.2**	**3.6**	**4.0**	**4.5**	**5.0**[1]
mm	**Mass per unit length** kg/m															
6	0.068	0.080	0.103	0.123	0.142	–	–	–	–	–	–	–	–	–	–	–
8	0.092	0.109	0.142	0.173	0.201	0.253	–	–	–	–	–	–	–	–	–	–
10	–	0.139	0.182	0.222	0.260	0.331	0.364	0.395	0.437	–	–	–	–	–	–	–
12	–	0.169	0.221	0.271	0.320	0.410	0.453	0.493	0.550	0.603	0.651	0.694	0.746	–	–	–
15	–	0.213	0.280	0.345	0.408	0.529	0.586	0.641	0.720	0.795	0.865	0.931	1.01	1.09	1.17	–
16	–	–	0.300	0.370	0.438	0.568	0.630	0.691	0.777	0.859	0.937	1.01	1.10	1.18	1.28	–
18	–	–	0.339	0.419	0.497	0.647	0.719	0.789	0.891	0.987	1.08	1.17	1.28	1.38	1.50	1.60
20	–	–	0.379	0.469	0.556	0.726	0.808	0.888	1.00	1.12	1.22	1.33	1.46	1.58	1.72	1.85
22	–	–	0.418	0.518	0.616	0.805	0.897	0.986	1.12	1.24	1.37	1.48	1.63	1.78	1.94	2.10
25	–	–	0.477	0.592	0.704	0.923	1.03	1.13	1.29	1.44	1.58	1.72	1.90	2.07	2.28	2.47
28	–	–	0.537	0.666	0.793	1.04	1.16	1.28	1.46	1.63	1.80	1.96	2.17	2.37	2.61	2.84
30	–	–	0.576	0.715	0.852	1.12	1.25	1.38	1.57	1.76	1.94	2.11	2.34	2.56	2.83	3.08
35	–	–	–	0.838	1.00	1.32	1.47	1.63	1.85	2.08	2.30	2.51	2.79	3.06	3.38	3.70
38	–	–	–	0.912	1.09	1.44	1.61	1.78	2.02	2.27	2.51	2.75	3.05	3.35	3.72	4.07
42	–	–	–	1.01	1.21	1.59	1.78	1.97	2.25	2.53	2.80	3.06	3.41	3.75	4.16	4.56
50	–	–	–	1.21	1.44	1.91	2.14	2.37	2.71	3.04	3.37	3.69	4.12	4.54	5.05	5.55

[1] If thickness greater than 5.0 mm are required, the thicknesses listed in table 1 should be adopted.

Annex

Annex A (informative)
Derivation of the information in tables 1 and 2

NOTE. The data in tables 1 and 2 have been derived from the sources given in **A.1** to **A.3**.

A.1 Outside diameters

A.1.1 The outside diameters for welded and seamless carbon and low alloy steel tubes given in table 1 have been selected from the complete list of outside diameters given in ISO 4200, and, with the exception of diameters 101.6 mm, 193.7 mm, 244.5 mm, 559 mm, 660 mm, 762 mm and 864 mm, are the series 1 diameters agreed by ISO/TC 5, and listed in ISO 4200.

A.1.2 The outside diameters of welded and seamless steel tubes for use with compression couplings given in table 2, which are also included in BS 4368 : Part 1 or in Part 3, are in accordance with ISO 1179.

A.2 Thicknesses

The thicknesses in tables 1 and 2 have been selected from ISO 4200.

A.3 Masses per unit length

A.3.1 The conventional masses per unit length given in table 1 for carbon and low alloy steel tubes have been selected from ISO 4200. They were calculated using the following formula:

$$m = (D - t)\, t \times 0.024\,661\,5^{1)}$$

where

m is the mass per unit length (kg/m)
D is the specified outside diameter (mm)
t is the specified thickness (mm)

A.3.2 The masses per unit length for the steel tubes for use with compression couplings given in table 2 have been calculated as in **A.3.1.**

[1)] This coefficient is based on a density for carbon and low alloy steel tubes of 7.85 kg/dm^3.

List of references (see clause 2)

Informative references

BSI Standards publications

BRITISH STANDARDS INSTITUTION, London

BS 1387 : 1985	*Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads*
BS 1600 : 1991	*Specification for dimensions of steel pipe for the petroleum industry*
BS 3059 :	*Steel boiler and superheater tubes*
BS 3059 : Part 1 : 1987	*Specification for low tensile carbon steel tubes without specified elevated temperature properties*
BS 3059 : Part 2 : 1990	*Specification for carbon, alloy and austenitic stainless steel tubes with specified elevated temperature properties*
BS 3601 : 1987	*Specification for carbon steel pipes and tubes with specified room temperature properties for pressure purposes*
BS 3602 :	*Specification for steel pipes and tubes for pressure purposes: carbon and carbon manganese steel with specified elevated temperature properties*
BS 3602 : Part 1 : 1987	*Specification for seamless and electric resistance welded including induction welded tubes*
BS 3602 : Part 2 : 1991	*Specification for longitudinally arc welded tubes*
BS 3603 : 1991	*Specification for carbon and alloy steel pipes and tubes with specified low temperature properties for pressure purposes*
BS 3604 :	*Steel pipes and tubes for pressure purposes: ferritic alloy steel with specified elevated temperature properties*
BS 3604 : Part 1 : 1990	*Specification for seamless and electric resistance welded tubes*
BS 3604 : Part 2 : 1991	*Specification for longitudinally arc welded tubes*
BS EN ISO 1127 :	*Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length*

BSI Standards publications

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO), Geneva. (All publications are available from BSI Sales.)

ISO 1179 : 1981	*Pipe connections, threaded to ISO 228/1, for plain end steel and other metal tubes in industrial applications*
ISO 4200 : 1991	*Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

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