# **Specification for**

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

ICS 23.040.10



NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

# 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

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on 15 January 1997

© BSI 1997

#### Amendments issued since publication

Amd. No.	Date	Text affected

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

ISBN 0 580 26429 7

BS 3600: 1997

# **Contents**

		Page
For	reword	ü
Sp	ecification	
1	Scope	1
2	Informative references	1
3	Nominal sizes	1
4	Tolerances	1
Tal	bles	
1	Dimensions and masses per unit length of welded and seamless carbon and low alloy steel tubes	2
2	Dimensions and masses per unit length of welded and seamless carbon steel tubes for use with compression couplings	4
An	nex	
<b>A</b> (	(informative) Derivation of the information in tables 1 and 2	5
Lis	t of references Inside bac	k cover

## **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BS 3600: 1996 supersedes BS 3600: 1976 which has been withdrawn.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.

ii

### 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.

© BSI 1997

Nominal size	Outside diameter	diameter 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
1	mm	Mass	per unit	length	<u> </u>	<del>1</del>			<del></del>		<del>'</del>				
		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	2.1
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	2.8
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	3.7
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	4.9
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	5.7
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	7.3
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	101.61)	-	-	_	_	_	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	_		_		<del>                                     </del>	_	-	-	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 <sup>1)</sup>	193.71)	_	_	_		<del> </del>	_	-	_	15.0	16.9	18.7	21.0	23.3	25.1
200	219.1	_	_	_		<del> </del>		-	_	17.0	19.1	21.2	23.8	26.4	28.5
222.51)	244.51)	_	-	_	_	_	_	<u> </u>	_	19.0	21.4	23.7	26.6	29.5	31.8
250	273	-	_	_		<del>  -</del>	_		_	21.3	23.9	26.5	29.8	33.0	35.6
300	323.9	-	_	_	-	-	_	<del>                                     </del>	-	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	-	_	_	_	<del>                                     </del>	_	_		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	_	_	_	-	<del> </del>	_	_	_	-	_		-	93.3	101
800	813	-	-		_	_	_	_	_	-	_		_	-	108
850	864	_		_	_		_	_	_		_			-	114
900	914	_	_	_				_		<del>                                     </del>		_	_	-	
1000	1016	_	_		_	<del>-</del>	_	_	_	<del>-</del>	_	_			
1200	1219		<del>-</del>		_	<del>                                     </del>	<del>-</del>	<del>-</del>	_	<del>  -</del>	_		_	-	
1400	1422	_		_	_	<u> </u>	<del>-</del>	<del>-</del>		_	_			<u> </u>	
	1626	_						<del>  -</del>					_	_	
	1020	_	_					<u> </u>			-	<u> </u>		<u> </u>	
1600	1920			ł			l	1			l .				
1800	1829 2032	-	-	-	-	-	-	-		-		-		-	

<sup>1)</sup> 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.

<b>Thickn</b> omm	e <b>s</b> s														
5.6 Mass p	6.3 er unit le	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	Nomina size
kg/m	LI MINE II	m8 tm												mm	
_			_	_	_	_				}					
				_	_			-	-	-	-	-	-	10.2	6
						-				_	-	-	-	13.5	8
			-	-		-	-		-		-	-	-	17.2	10
2.94	3.20		-			<u>-</u>		-		-	-		-	21.3	15
		-			-		-	-	-	-	-			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 <sup>1)</sup>	90 <sup>1)</sup>
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 <sup>1)</sup>	1751)
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 <sup>1)</sup>	225 <sup>1)</sup>
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
	t		_	483	549	604	685	778	876	957	1093	1211	1363	2235	2200

<sup>1)</sup> 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.

BS 3600: 1997

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	<b>5.0</b> <sup>1)</sup>
	Mass I	er unit	length					-	-							
mm	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	_	T -	-	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

### 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  ${\bf A.1}$  to  ${\bf A.3}$ .

#### 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**.

© BSI 1997

<sup>1)</sup> This coefficient is based on a density for carbon and low alloy steel tubes of 7.85 kg/dm<sup>3</sup>.

BS 3600: 1997

# 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 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**

BS 3604:

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

© BSI 1997

## **BSI** — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

#### Contract requirements

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the responsible technical committee, the identity of which can be found on the inside front cover. Tel: 0181 996 9000; Fax: 0181 996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

#### **Buying standards**

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services, Sales Department at Chiswick: Tel: 0181 996 7000; Fax: 0181 996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

#### Information on standards

BSI provides a wide range of information on national, European and international standards through its Library, the Standardline Database, the BSI Information Technology Service (BITS) and its Technical Help to Exporters Service. Contact the Information Department at Chiswick: Tel: 0181 996 7111; Fax: 0181 996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Customer Services, Membership at Chiswick: Tel: 0181 996 7002; Fax: 0181 996 7001.

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means - electronic, photocopying, recording or otherwise - without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager, BSI, 389 Chiswick High Road, London W4 4AL

BSI 389 Chiswick High Road London W4 4AL

ISBN 0580264297

ISE/8