BRITISH STANDARD

BS 1968:1953
Incorporating Amendment Nos. 1 and 2

CONFIRMED
DECEMBER 2007

Specification for

Floats for ballvalves (copper)

Co-operating organizations

The Sanitary Appliances Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

Admiralty
British Bath Manufacturers' Association
British Ironfounders' Association*
British Plastics Federation
British Sanitary Earthenware Manufacturers' Association
British Sanitary Fireclay Association
British Waterworks Association*
D.S.I.R. — Building Research Station*
Flushing Cistern Makers' Association*
Institute of Plumbers*
Institution of Municipal Engineers*
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Scottish Federation of Plumbers and Domestic Engineers (Employers) Associations
Water Companies Association*

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:—

Associated Master Plumbers and Domestic Engineers
Association of Heating, Ventilating and Domestic Engineering Employers
British Electrical Development Association
British Electrical and Allied Manufacturers' Association
British Non-Ferrous Metals Research Association
Building Industries National Council
B.W.A. Licensees Association
Copper Ball Manufacturers' Association
Copper Tube Fittings Manufacturers' Association
Crown Agents for the Colonies
Distributors of Builders' Supplies Joint Council
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Institution of Gas Engineers
Institution of Heating and Ventilating Engineers
Institution of Water Engineers
London Chamber of Commerce
Metropolitan Water Board
Society of British Gas Industries
Urban District Council's Association

This British Standard, having been approved by the Sanitary Appliances Industry Standards Committee and endorsed by the Chairman of the Building Divisional Council, was published under the authority of the General Council on 8 May 1953

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3220	November 1958	
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Contents

Foreword

This standard makes reference to the following British Standards:—

BS 84, *Screw threads of Whitworth form.*

BS 218, *Brass bars and sections (suitable for forging) and drop forgings.*

BS 219, *Soft solders.*

BS 427, *Tables of diamond pyramid hardness numbers.*

BS 899, *Cold rolled copper sheets and strip (half-hard and annealed) for general purposes.*

BS 1212, *Ballvalves ("Portsmouth" type) excluding floats.*

BS 1400, *Copper alloy ingots and castings.*

BS 1845, *Filler alloys for brazing (silver solders and brazing solders).*

This British Standard specifies requirements for copper floats for use with ballvalves and has been issued to facilitate the manufacture — as separate items, to be purchasable as such — of floats suitable for ballvalves complying with the requirements of BS 1212, "*Ballvalves ("Portsmouth" type)*" and other types of ballvalve requiring floats of this description. Reference should be made to BS 1212 for permissible alternative types of float for use with ballvalves complying with that specification.

For information regarding the correct size of float to use for a particular size of ballvalve, or range of pressure, where the leverage exerted is not less than that specified in BS 1212, reference should be made to Table 2 of this standard and also to BS 1212.

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.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for a range of spherical copper floats of $4^1/_2$, 5, 6, 7, 8, 9, 10, 11 and 12 inches nominal diameter suitable for attachment to the ballvalves specified in BS 1212 and to ballvalves the leverage of which for the same bore of seat is not less than that specified in BS 1212, in the following classes:—

Class A. Floats of all sizes with soldered joints.

Class B. Floats of all sizes with solderless joints.

Class C. Floats of all sizes with brazed, welded or silver-soldered joints.

Performance requirements relating to floats of a shape other than spherical are also included.

2 Definitions

For the purposes of this British Standard the following definitions shall apply:—

2.1
volume

the volume of water in cubic inches, taken to the nearest cubic inch, displaced when the shell (float with no boss) is completely immersed

2.2
free-floating, volume

the volume of water in cubic inches, taken to the nearest cubic inch, displaced when the shell (float with no boss) is resting on water

2.3
useful volume

half the volume (see definition **2.1** above) less the free-floating volume (see definition **2.2** above) taken to the nearest cubic inch

2.4
lifting effort

the useful volume (see definition **2.3** above) converted into weight in pounds at the rate of 0.036 lb. per cubic inch (Shown calculated in Table 1 for the minimum weight of shell.)

2.5
maximum immersed operating depth

the point at which the volume (see definition **2.1** above) is equally above and below the surface of the water

2.6
diameter of spherical floats

the average outside diameter of the shell measured at two axes at right angles to each other and clear of the jointing seam

3 General

The shells of copper floats shall comply with the requirements of Clauses **4**, **5**, **6**, **8**, **9** and **10**, and shall be of the dimensions and weights given in Table 1. They shall be fitted with bosses complying with the requirements of Clause **7** and Table 2, Table 3a, Table 3b and Table 4. The complete float shall comply with the weight requirements of Table 5 and shall not be artificially loaded for this purpose.

After manufacture, the copper used for floats shall be left in a planished, condition and shall have a minimum Vickers hardness (HV) of 70 at any one point when tested with a 5 kgf load applied in accordance with the requirements of BS 427-1[1)] Table 3.

4 Materials

The chemical, composition of the materials of which the float is made shall be not less suitable than that laid down in the following British Standards:—

a) *Copper for the shell:* BS 899, "*Cold rolled copper sheets and strip for general purposes*".

b) *Alloy for cast bosses:* BS 1400, "*Copper alloy ingots and castings*". Complying with either Specification BS 1400-B1-C for brass castings or for Specification BS 1400-LG2-C for leaded gunmetal castings.

c) *Alloy for hot pressed bosses:* BS 218, "*Brass bars and sections (suitable for forging) and drop forgings*".

d) *Solder:* BS 219, "*Soft solders*", complying with Type F, Table 2, "Non-antimonial solders" *or* BS 1845, "*Filler alloys for brazing*", complying with the requirements for silver bearing brazing alloy, Types 4 or 5 or with the requirements for brazing brasses, Grades 8, 9 or 10.

5 Jointing of copper floats

The jointing of the shells shall be in accordance with one of the methods given below, provided that when floats are required for use in water at a temperature exceeding 37.8 °C. (100 °F.) they shall be jointed as specified for Class C. The purchaser shall specify the method of jointing required. The methods of jointing are as follows:—

Class A floats. An efficient, burnished, lapped and soldered seam.

[1)] BS 427, "*Method for Vickers hardness test*", Part 1, "*Testing of metals*".

Class B floats. An efficient, solderless, compressed seam with a jointing ring of rubber or other equally suitable material, either extending right through the joint or otherwise arranged to prevent the joint ring from extruding into the shell and thus unsealing the joint.

Class C floats. A brazed, bronze welded or silver-soldered joint.

6 Floats other than spherical

Floats of a shape other than spherical shall have a "lifting effort" at least equal to that of a spherical float intended for the same duty, as given in Table 1, and shall be not less robust.

7 Bosses and fitments

Bosses shall be either:—

a) Brass (pressed or forged).

b) Cast brass (die cast or sand cast).

c) Cast gunmetal.

Fitments (rivets and washers or like methods of attachment) for Class B floats shall be either:—

a) Copper — for rivets or washers.

b) Brass — for washers only.

Every boss shall comply with one of the classifications set out in Table 2 and shall be in accordance with the appropriate dimensions given in Table 3a or Table 3b. The bottom of the tapped hole shall not extend through the flange.

Spherical floats of all diameters shall be fitted with the appropriate size of tapped boss set out in Table 2, except that when so ordered the size of the tapping may be varied to suit special conditions.

The boss shall be fitted to the shell in the following manner:—

Class A floats. The boss shall be located centrally astride the seam and shall be properly soldered to the shell. The soldering shall extend across the full width (see Dimension "H", Table 3a) of the edge of the flange. A slot shall be cut in the flange of the boss to accommodate the seam of the shell.

Class B floats. The boss shall be in accordance with Table 2 and Table 3b. The flange shall be non-recessed; it shall be shaped to suit the curved face of the shell, to which it shall be securely fixed, on an axis at right angles to the plane of the seam, by riveting or other equally efficient method.

Class C floats. The alloy of which the boss is made shall be suitable for brazing. The boss shall be located centrally astride the seam and properly brazed to the shell. The brazing shall extend across the full width (see Dimension "H", Table 3a) of the edge of the flange. A slot shall be cut in the flange of the boss to accommodate the seam of the shell.

8 Tolerances

a) The volume of the shell shall be as given in Table 1, for each size, with a tolerance of ± 5 per cent.

b) The minimum weights of copper shells of Classes A, B and C shall be as set out in Table 1.

c) The weight and dimensions (excluding Dimension A) of bosses shall be as set out in Table 3a, Table 3b and Table 4 with a tolerance of ± 5 per cent. Dimension A shall be in accordance with the requirements of BS 84, "*Screw threads of Whitworth form*".

d) The minimum assembled weight of completed spherical floats, including solder or other jointing material, shall be as set out in Table 5, subject to the tolerances permitted under a), b) and c) above.

9 Tests

Every finished float shall be tested by immersion for not less than two minutes, in water having a temperature of not less than 17 °C. (30 °F.) above the temperature of the surrounding air.

There shall be no leakage of air from the float when so immersed.

10 Marking[2)]

Every float supplied as being in accordance with this British Standard shall be legibly and permanently marked with the information indicated below, in such a manner as not to damage or distort the float:

a) Manufacturer's name or trade mark.

b) The number of this British Standard, i.e. BS 1968.

[2)] A joint arrangement has been made between the British Waterworks Association and the BSI under which ballvalve floats made to this specification may be certified as complying with its provisions. Details of the conditions under which licences are issued for the use of the appropriate certification marks may be obtained from the Association, at 34 Park Street London, W.1. and from the British Standards Institution, at 2 Park Street, London, W.1.

Appendix Information to be supplied by the purchaser

The purchaser shall supply the following information when making an enquiry, or placing an order:—

a) Size and class of floats required.

b) The material for jointing, if Class C floats are required.

c) The appropriate tapping of boss required (see Table 2 and Clause **7**).

Table 1 — Spherical copper floats

Nominal outside diameter of float	Volume of sphere	Class A				Class B				Class C			
		Weight of shell (min.)	Free floating volume	Useful volume	Lifting effort	Weight of shell (min.)	Free-floating volume	Useful volume	Lifting effort	Weight of shell (min.)	Free floating volume	Useful volume	Lifting effort
in.	cu. in.	lb.	cu. in.	cu. in.	lb.	lb.	cu. in.	cu. in.	lb.	lb.	cu. in.	cu. in.	lb.
$4^1/_2$	48	0.25	7	17	0.61	0.25	7	17	0.61	0.39	11	13	0.46
5	65	0.328	9	23	0.84	0.328	9	23	0.84	0.515	14	18	0.65
6	113	0.476	13	43	1.56	0.476	13	43	1.56	0.843	23	33	1.19
7	180	1.074	30	60	2.16	1.074	30	60	2.16	1.187	53	57	2.05
8	268	1.425	40	94	3.38	1.425	40	94	3.38	1.875	52	82	2.95
9	382	1.782	50	141	5.07	1.782	50	141	5.07	2.06	57	134	4.82
10	524	2.197	61	201	7.23	2.197	61	201	7.23	3.62	100	162	5.83
11	697	2.755	77	271	9.75	2.755	77	271	9.75	4.21	117	231	8.31
12	905	3.207	89	363	13.06	3.207	89	363	13.06	4.85	135	317	11.41

NOTE The lifting effort figures are calculated for the minimum weight of shell in each class.

Table 2 — Classification of bosses for use with classes A, B and C floats

Classification No. of boss	Dia. of flange	BS Whit. tapping	Appropriate float diameter (if spherical)	Sizes of BS 1212[a] ballvalve bodies with which floats are to be used
	in.	in.	in.	in.
1	1 min.	$^5/_{16}$	$4^1/_2$ and 5	$^3/_8$, $^1/_2$ and $^3/_4$
2	$1^7/_{16}$	$^5/_{16}$	6	
3	$1^3/_4$	$^5/_{16}$	7	
3A	$1^3/_4$	$^7/_{16}$	6 and 7	1
4	$2^1/_4$	$^7/_{16}$	8 and 9	
4A	$2^1/_4$	$^9/_{16}$	8 and 9	$1^1/_4$ and $1^1/_2$
5	$2^3/_4$	$^9/_{16}$	10 and 11	
5A	$2^3/_4$	$^5/_8$	10, 11 and 12	2
6	With 2 straps	$^5/_8$	12 (alternative to 5A)	

[a] BS 1212, "*Ballvalves ("Portsmouth" type) excluding floats*".

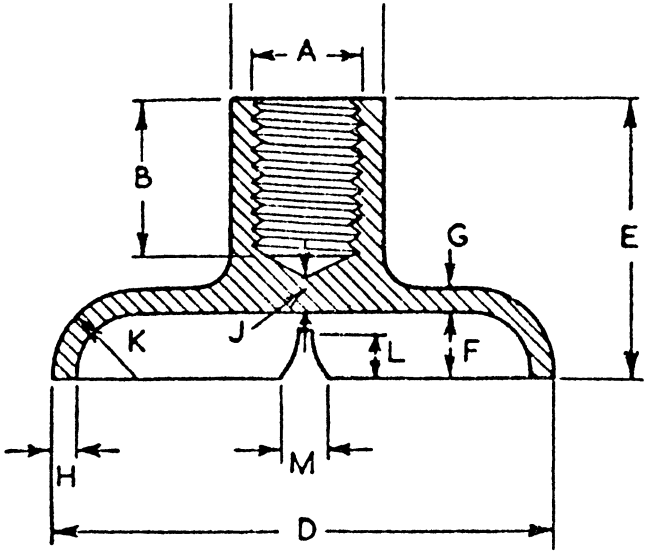


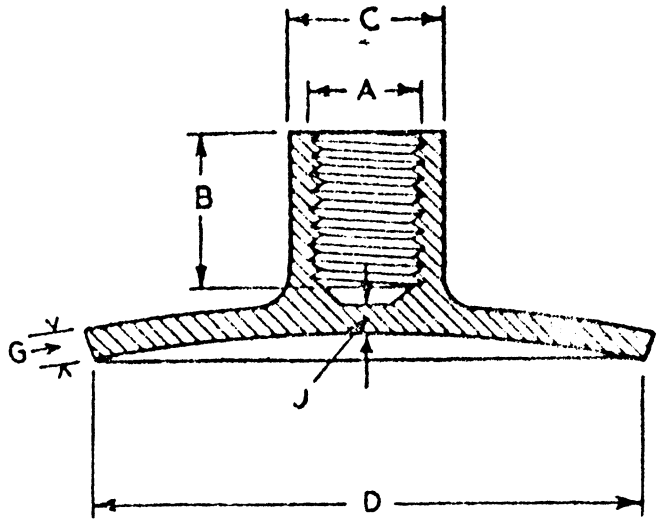
Table 3a — Bosses for classes A and C floats with soldered and brazed joints

Dimension	Description	Classification number of boss								
		1	2	3	3A	4	4A	5	5A	6
		in.	in.	in.	in.	in.	in.	in.	in.	in.
A	BS Whitworth tapping of boss	5/16	5/16	5/16	7/16	7/16	9/16	9/16	5/8	5/8
[c]B	Axial length of thread	5/16	5/16	1/2	1/2	9/16	5/8	3/4	3/4	3/4
[c]C	Diameter of barrel or, if tappered, diameter of small end	0.500	0.656	0.687	0.687	0.812	0.812	0.875	0.875	0.938
D	Diameter of flange	1 min.	1 7/16	1 3/4	1 3/4	2 1/4	2 1/4	2 3/4	2 3/4	—
[c]E	Face of flange to end of boss	0.688	0.750	1.000	1.000	1.250	1.250	1.500	1.500	1.500
[a]F	Height of dome (inside)	0.187	0.187	0.250	0.250	0.328	0.328	0.375	0.375	0.375
[a]G	Thickness of metal (dome)	0.062	0.062	0.078	0.078	0.109	0.109	0.125	0.125	0.250
H	Width of face	0.062	0.078	0.078	0.078	0.109	0.109	0.140	0.140	—
J	Thickness of metal at bottom of tapped hole	0.062	0.062	0.062	0.062	0.109	0.109	0.109	0.109	0.109
[b]K	Radius of dome	0.250	0.250	0.328	0.328	0.437	0.437	0.515	0.515	—
L	Depth of slot for seam	To accommodate the seam of the joint on float								
M	Width of slot for seam									

[a] Dimensions "*F*" and "*G*". When so desired the manufacturer may regard these as one dimension for a solid instead of hollow flange.

[b] Dimension "*K*" This dimension may be disregarded for solid flanges.

[c] Dimensions "*B*" "*C*" and "*E*" These dimensions shall be regarded as minima.



This sketch indicates dimensions only and is not intended to show design.

Table 3b — Bosses for class B floats with solderless joints

Dimension	Description		Classification number of boss						
		1	2	3	3A	4	4A	5	5A
		in.	in.	in.	in.	in.	in.	in.	in.
A	BS Whitworth tapping of boss	$^5/_{16}$	$^5/_{16}$	$^5/_{16}$	$^7/_{16}$	$^7/_{16}$	$^9/_{16}$	$^9/_{16}$	$^5/_8$
[a]B	Axial length of thread	$^5/_{16}$	$^5/_{16}$	$^1/_2$	$^1/_2$	$^9/_{16}$	$^5/_8$	$^3/_4$	$^3/_4$
[a]C	Diameter of barrel or, if tapered, diameter of small end	0.500	0.656	0.687	0.687	0.812	0.812	0.875	0.875
[a]D	Diameter of flange or fitment	$1^1/_4$	$1^7/_{16}$	$1^3/_4$	$1^3/_4$	$2^1/_4$	$2^1/_4$	$2^3/_4$	$2^3/_4$
[a]G	Thickness of flange	0.062	0.062	0.078	0.078	0.109	0.109	0.125	0.125
[a]J	Thickness of metal at bottom of tapped hole	0.062	0.062	0.062	0.062	0.109	0.109	0.109	0.109

[a] *Dimension "B", "C", "D", "G" and "J"*. These dimension shall be regarded as manima.

Table 4 — Weight of boss for classes A and C floats and of boss and fitments for class B floats

Classification number of boss	Weight of boss	
	lb.	oz.
1	0.062	1
2	0.086	$1^{3}/_{8}$
3	0.140	$2^{1}/_{4}$
3A	0.140	$2^{1}/_{4}$
4	0.250	4
4A	0.250	4
5	0.406	$6^{1}/_{2}$
5A	0.406	$6^{1}/_{2}$
6	0.718	$11^{1}/_{2}$

Table 5 — Assembled weight of spherical copper floats including solder or other jointing material

(to nearest $^{1}/_{4}$ oz.)

Diameter of float	Classification number of boss	Weight of floats					
		Class A		Class B		Class C	
in.		lb.	oz	lb.	oz.	lb.	oz.
$4^{1}/_{2}$	1		5		5		$7^{1}/_{4}$
5	1		$6^{1}/_{4}$		$6^{1}/_{4}$		$9^{1}/_{4}$
6	2		9		9		$14^{3}/_{4}$
6	3 or 3A		$9^{3}/_{4}$		$9^{3}/_{4}$		$15^{3}/_{4}$
7	3 or 3A	1	$3^{1}/_{2}$	1	$3^{1}/_{2}$	1	$5^{1}/_{4}$
8	4 or 4A	1	11	1	11	2	2
9	4 or 4A	2	$0^{1}/_{2}$	2	$0^{1}/_{2}$	2	5
10	5 or 5A	2	$9^{3}/_{4}$	2	$9^{3}/_{4}$	4	$0^{1}/_{2}$
11	5 or 5A	3	$2^{1}/_{2}$	3	$2^{1}/_{2}$	4	10
12	5A	3	10	3	10	5	4
12	6	3	15		—	5	9

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