

BEST COPY AVAILABLE
SPECIFICATION FOR
BALLVALVES
(EXCLUDING FLOATS)

Part 2. Diaphragm type
(Brass body)

BS 1212 : Part 2 : 1970

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BRITISH STANDARDS INSTITUTION

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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

This standard makes reference to the following British Standards:

- BS 369. 5 per cent phosphor bronze (copper-tin-phosphorus) rods and sections (other than forging stock).
- BS 417. Galvanized mild steel cisterns and covers, tanks and cylinders.
- BS 427. Methods for Vickers hardness test. Part 1. Testing of metals.
- BS 1010. Draw-off taps and stopvalves for water services (screwdown pattern).
- BS 1125. WC flushing cisterns (including dual flush cisterns, and flush pipes).
- BS 1154. Vulcanized natural rubber compounds.
- BS 1212. Ballvalves (Portsmouth type) excluding floats.
- BS 1212. Ballvalves (excluding floats).
Part 1. Piston type (in course of preparation).
- BS 1400. Schedule of copper alloy ingots and copper and copper alloy castings.
- BS 1574. Split cotter pins.
- BS 1968. Floats for ballvalves (copper).
- BS 2456. Floats for ballvalves (plastics) for cold water.
- BS 2872. Schedule of copper and copper alloys. Forging stock and forgings.
- BS 2874. Schedule of copper and copper alloys. Rods and sections (other than forging stock).

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:
Committee reference SAB/2, SAB/2/10.
Draft for comment 66/24745.

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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:

- Association of Public Health Inspectors
- British Bath Manufacturers' Association
- *British Ironfounders' Association
- *British Plastics Federation
- *British Waterworks Association
- Council of British Ceramic Sanitaryware Manufacturers
- Flushing Cistern Makers' Association
- *Greater London Council
- *Institute of Plumbing
- *Institution of Municipal Engineers
- Institution of Public Health Engineers
- Metal Sink Manufacturers' Association
- *Ministry of Housing and Local Government
- *Ministry of Public Building and Works
- *Ministry of Public Building and Works—Building Research Station
- *National Brassfoundry Association
- National Federation of Building Trades Employers
- *Royal Institute of British Architects
- Royal Institute of Public Health and Hygiene
- The Royal Institution of Chartered Surveyors
- *Royal Society for the Promotion of Health
- Scottish Federation of Plumbers' and Domestic Engineers' (Employers') Association
- *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 Manufacturers of Domestic Electrical Appliances
- British Non-ferrous Metals Research Association
- British Valve Manufacturers' Association
- Copper Ball Manufacturers' Association
- Copper Development Association
- Copper Tube Fittings Manufacturers' Association
- Electricity Council, the Central Electricity Generating Board, and the Area Boards in England and Wales
- Gas Council
- Heating & Ventilating Contractors' Association
- Institute of British Foundrymen
- Institution of Gas Engineers
- Institution of Heating and Ventilating Engineers
- Institution of Production Engineers
- Institution of Water Engineers
- London Chamber of Commerce
- Metropolitan Water Board
- Ministry of Technology
- National Federation of Builders' and Plumbers' Merchants
- Society of British Gas Industries
- An individual manufacturer

BRITISH STANDARD SPECIFICATION FOR
BALLVALVES (EXCLUDING FLOATS)

Part 2. Diaphragm type (brass body)

FOREWORD

This British Standard has been prepared under the authority of the Sanitary Appliances Industry Standards Committee. Features incorporated include:

- (1) a separate inlet shank coupled to the valve body;
- (2) renewable seats;
- (3) the use of inlet shanks, body coupling nuts and seats identical with those specified for 'piston type' ballvalves in BS 1212, Part 1 ;
- (4) the positioning of the water outlet from the body above instead of below the body, so enabling the attachment of a discharge * having effective provision against back siphonage; *arrangements
- (5) test requirements for adequacy of flow and positive prevention of back siphonage.

The basis upon which this British Standard has been drawn up is the 'Garston' diaphragm ballvalve developed by the Building Research Station. The committee responsible for this standard wishes to acknowledge the early work done by the Station in designing and producing that valve.

This British Standard is limited to valves having brass or gunmetal bodies. It is intended to prepare a further specification for diaphragm ballvalves of 'all plastics' construction.

In accordance with BSI's programme of metrication, this standard has been prepared in metric units except that:

- (1) Pipe thread designations are based on ISO Recommendation R 228, 'Pipe threads where pressure-tight joints are not made on the threads ($\frac{1}{8}$ in to 6 in)';
- (2) Seat sizes, which are identical with those in BS 1212 : 1953, and certain other screw threads will remain in imperial sizes until that standard is metricated.

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- (3) Diameters of spherical copper floats, given for guidance in Table 1, will remain in imperial sizes until BS 1968 for copper floats is metricated. (Nevertheless, for plastics floats, the proposed new metric designations in BS 2456* have been used in this standard.)

NOTE. The metric values are given in SI units: for further information, reference should be made to BS 3763, 'International system (SI) units' and PD 5686, 'The use of SI units'.

Ballvalves that comply with this Part of this British Standard will provide the user with assurance that backsiphonage into the feed pipe should not occur providing the water level is no higher than the horizontal centre line of the valve. A greater level of security against backsiphonage will be achieved where normal shut-off level is arranged to be 35 mm or more below the centre line of the ballvalve.

Users of this Part of this standard should note that since the initial publication of this standard it has been decided that the term 'float operated valve' is more appropriate than the term 'ballvalve'. Future British Standards dealing with this subject will refer to 'float operated valves'. When this Part of this standard and other relevant current standards are revised, the term 'float operated valve' will be used in place of the term 'ballvalve'.



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SPECIFICATION

1. GENERAL

1.1 SCOPE

This British Standard specifies materials, workmanship, design, construction, dimensions and tolerances of diaphragm ballvalves in two nominal sizes†, $\frac{3}{8}$ in and $\frac{1}{2}$ in, having four seat sizes†, of $\frac{1}{8}$ in, $\frac{3}{16}$ in, $\frac{1}{4}$ in and $\frac{3}{8}$ in bore. The nominal size is that corresponding with the ISO‡ pipe size of the thread on the inlet shank.

1.2 DEFINITION

1.3 DESIGNATION OF DIAPHRAGM BALLVALVES FOR ORDERING PURPOSES

Diaphragm ballvalves shall be designated, first, by the nominal size, secondly, by the words 'diaphragm ballvalve'; thirdly, by the seat size and finally by the number of this British Standard, 'BS 1212'; for example:

' $\frac{1}{2}$ in diaphragm ballvalve, $\frac{3}{16}$ in seat, BS 1212'.

1.4 MARKING

1.4.1 Markings. Every ballvalve supplied as being in accordance with the requirements of this specification shall be legibly marked as specified in 1.4.1.1 and 1.4.1.2 in such a way as not to deform any working part.

1.4.1.1 On the body:

- (1) The number of this British Standard, i.e. BS 1212 Pt 2.
- (2) The manufacturer's identity.

For this purpose, marking prescribed under (1) and (2) above may be rolled on the body; or there shall be provided a flat surface 8 mm X 16 mm. In either instance, another surface of the same size shall be provided to enable the stamp of a testing station to be applied.

* In course of preparation.

† For explanation of the retention of these imperial sizes, see the Foreword.

‡ International Organization for Standardization.

* ① **'Diaphragm ballvalve.** A float operated valve in which the flow of water is controlled by the flexing of a diaphragm and that incorporates or is fitted with a discharge component to conduct the water into the cistern in which the ballvalve is to be used. In operation, flow from the valve reduces as the water level rises towards shut-off level. The change in water level over which the flow progressively reduces from maximum to zero is not less than four times the nominal size of the valve.



- 1.4.1.2 On every seat (including spares):
The manufacturer's identity.

NOTE 1. The mark BS 1212 Pt 2. on or in relation to the product is a claim by the manufacturer that it complies with the requirements of this standard.

NOTE 2. Attention is drawn to certification facilities offered jointly by the British Standards Institution and the British Waterworks Association; see the back cover to this standard.

2. MATERIALS

2.1 MATERIALS: GENERAL

The materials to be used in the construction of the ballvalve shall be as specified in 2.2, 2.3, 2.4 and 2.5.

They shall not contain any substance capable of promoting microbiological growth or of affecting in any way the physical, chemical or bacteriological quality of the water with which they will be in contact in service.



2.2 METALS ^{or stainless steel}

The metal parts shall be of brass, gunmetal and the chemical compositions shall be at least as suitable as those laid down in the following British Standard specifications:



(1) Brass for sand casting and shell casting for bodies and components excluding seats: BS 1400*, SCB 1 or SCB 3.

NOTE. The copper content may be reduced to 62 %.

(2) Brass for gravity die casting for bodies and components excluding seats: BS 1400*, DCB 3.

(3) Brass for pressure die casting for bodies and components excluding seats: BS 1400*, PCB 1.

(4) Gunmetal for bodies and components excluding seats: BS 1400*, LG 1 or LG 2.

(5) Brass for hot pressing excluding seats: BS 2872†, CZ 122.

(6) Brass rod for machining excluding seats: BS 2874‡, CZ 121.

(7) Rolled bronze for seats: BS 369§.

(8) Gunmetal for seats: BS 1400*, G 1.

(9) Stainless steel for back plate plungers: BS 970 : Part 4 || : 302S17 or 304S16 or other grade not less suitable.

* BS 1400, 'Schedule of copper alloy ingots and copper and copper alloy castings'.

† BS 2872, 'Schedule of copper and copper alloys. Forging stock and forgings'.

‡ BS 2874, 'Schedule of copper and copper alloys. Rods and sections (other than forging stock)'.

§ BS 369, '5 per cent phosphor bronze (copper-tin-phosphorus) rods and sections (other than forging stocks)'.

|| BS 970, 'Wrought steels in the form of blooms, billets, bars and forgings'. Part 4 'Stainless, heat resisting and valve steels'.



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2.3 RUBBER

Rubber shall be vulcanized rubber complying with the requirements of BS 1154*, Group Z14 (Hardness BS degrees 62 to 70).

2.4 PLASTICS**2.4.1**

Plastics for seats shall be nylon of a hardness not less than HV5 = 12 when measured in accordance with BS 427 : Part 1†. Plastics when used for back plate plungers shall be of acetal copolymer with melt flow index in the range 8–10 when measured in accordance with Method 105C of BS 2782‡.



2.4.2 Plastics for components other than seats and back plate plungers shall be of suitable plastics materials as specified in BS 1212 : Part 3§.

2.5 AGATE AND CEMENT

Agate may be used as specified in 4.6.1. When used, it shall be affixed to the metal by a cement which shall be a fusion mixture inert to the working conditions.

3. WORKMANSHIP**3.1 CASTINGS**

All sand castings and die castings shall be sound, free from laps, blowholes and pitting. Both the outside and inside surfaces shall be clean, smooth, free from sand and neatly dressed. No castings shall be burned, plugged, stopped or patched.

3.2 HOT PRESSINGS

All hot pressings shall be sound, without laminations, and shall be smooth and well finished.

3.3 MACHINING

All machining shall be carried out so that parts are true to shape within the limits of size specified in this standard and are correct in alignment when assembled. All machined surfaces shall be smoothly finished.

3.4 SCREW THREADS

Except where otherwise stated in this standard, screw threads shall comply with the free fit or normal class requirements of their appropriate specification.

3.5 TOLERANCE

A working tolerance of plus or minus 0.3 mm shall be allowed for dimensions on which no tolerance has been stated.

§ BS 1212, 'Ballvalves (excluding floats)', Part 3, 'Diaphragm type (plastics body)' (in course of preparation).

* BS 1154, 'Vulcanized natural rubber compounds'.

† BS 427, 'Methods for Vickers hardness test', Part 1, 'Testing of metals'.

‡ BS 2782, 'Methods of testing plastics'



4. DESIGN, CONSTRUCTION AND DIMENSIONS

4.1 DESIGN: GENERAL

Diaphragm ballvalves shall conform to Fig. 1 and 4.2 to 4.10.

4.2 INLET CONNECTIONS

The metal inlet shank shall comply with the requirements of Clause 13, 'Inlet connections' of BS 1212 : Part 1 and Tables 3 and 13 of that standard.

4.3 BACKNUTS

4.3.1 General. The inlet shank of every ballvalve shall be provided with two backnuts, the 'outer' one being one or other of the type specified in 4.3.2 and the 'inner' one being of the type specified in 4.3.3.

4.3.2 'Outer' backnuts. The 'outer' backnut shall be *either*:

(1) (For use with cisterns other than a BS 1125† WC flushing cistern)

A backnut conforming to Type *a* of Table 7 in BS 1212: Part 1

or (2) (For use with a BS 1125† WC flushing cistern)

A backnut conforming to Type *b* of Table 7 of BS 1212: Part 1.

4.3.3 'Inner' ('fixed') backnut. The 'inner' ('fixed') backnut shall conform to Type *c* of Table 7 of BS 1212: Part 1.

4.4 BODY COUPLING NUTS

Body coupling nuts shall be of metal and shall comply with the requirements specified in Table 6 of BS 1212: Part 1.

4.5 BODIES, BACKPLATES, BACKPLATE NUTS AND BACKPLATE PLUNGERS

Bodies, backplates, and backplate nuts/ (shall be made of
brass or gunmetal and shall conform to Figs. 2, 3, and 4 respectively. The
thickness of bodies shall be not less than 1.6 mm.

Backplate plungers shall conform to Fig. 7, and may be made of brass, gunmetal, stainless steel or acetal copolymer. Brass backplate plungers may be electroplated with nickel or tin if the manufacturer so desires.

4.6 SEATS

4.6.1 Seats for ballvalves shall be manufactured from gunmetal, bronze or nylon as specified in 2.2 (6), 2.2 (7) and 2.4.1 respectively. Metal seats may be tipped with agate. Agate tips, if used, shall be in true alignment with the bore.

4.6.2 Seats shall comply with the dimensional requirements specified for the $\frac{1}{8}$ in, $\frac{3}{16}$ in, $\frac{1}{4}$ in and $\frac{3}{8}$ in bore size† seats in Table 4 of BS 1212: Part 1.

† BS 1125, 'WC flushing cisterns (including dual flush cisterns and flush pipes'.

† For explanation of the retention of these imperial sizes, see the Foreword.