BRITISH STANDARD

BS 5041-2: 1987

Incorporating Amendment No. 1

Fire hydrant systems equipment —

Part 2: Specification for landing valves for dry risers

UDC 614.843.1 + 621.643.51

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Fire Standards Committee (FSM/-) to Technical Committee FSM/6, upon which the following bodies were represented:

Association of County Councils
Association of Metropolitan Authorities
British Coal
British Fire Services' Association
British Plastics Federation
British Valve Manufacturers' Association Ltd.
Chief and Assistant Chief Fire Officers' Association
Convention of Scottish Local Authorities
Copper Development Association
Department of the Environment (Property Services Agency)
Department of Transport (Marine Directorate)
Fire Extinguishing Trades Association
Fire Offices Committee
Fire Protection Association
Greater London Council
Home Office
Institution of Fire Engineers
Ministry of Defence
Royal Institute of British Architects

The following body was also represented in the drafting of the standard, through subcommittees and panels:

British Fire Protection Systems Association Ltd.

This British Standard, having been prepared under the direction of the Fire Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 March 1987

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Contents

Foreword

This revision of BS 5041-2 has been prepared under the direction of the Fire Standards Committee and supersedes BS 5041-2:1976, which is withdrawn. It specifies requirements for copper alloy gate valves for use on dry risers, tests and marking.

The subjects of the other Parts in the BS 5041 series of general specifications for fire hydrant systems equipment are as follows.

— *Part 1: Landing valves for wet risers;*

— *Part 3: Inlet breechings for dry riser inlets;*

— *Part 4: Boxes for landing valves for dry risers;*

— *Part 5: Boxes for foam inlets and dry riser inlets.*

These Parts give detailed requirements for most of the other special items required for wet and dry risers described in BS 5306-1.

A full bore valve, as specified in this Part, is needed in dry risers to ensure minimum resistance to water flow, and stem diameters have been specified to ensure reliability.

In this standard metric values are given in SI units; for further information reference should be made to BS 3763. Some nominal bores and thread sizes are given in inches to accord with the standards referred to.

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 6, 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.

Section 1. General

1 Scope

This Part of BS 5041 specifies requirements for copper alloy gate valves generally complying with BS 5154, suitable for installation as landing valves on dry risers. The valves have screwed or flanged inlets and also delivery hose connections complying with BS 336. The standard covers valves of nominal pressure (PN) designation 15 bar and nominal inlet size DN 65 for flanged ends and 2½ for screwed ends.

NOTE 1 Unless otherwise stated all pressures are gauge pressures expressed in bar: 1 bar = 10^5 N/m^2 = 100 kPa.
NOTE 2 Information which the purchaser is recommended to supply to the manufacturer is given in Appendix B and does not form part of the specification.
NOTE 3 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 5401, the following definitions apply.

2.1
dry riser (dry rising main)

a vertical pipe installed in a building for fire fighting purposes, fitted with inlet connections at fire service access level and outlet connections at specified points, which is normally dry but capable of being charged with water by pumping from fire service appliances

2.2
landing valve

an assembly comprising a valve and outlet connection from a wet or dry riser

3 Pressure rating

Valves shall be suitable for use at nominal inlet pressures up to 15 bar.

4 Nominal inlet sizes

4.1 Flanged end valves

The nominal inlet size (DN) shall be 65.

4.2 Screwed end valves

The nominal inlet size (DN) shall be 2½.

5 Temperature rating

Valves shall be suitable for continuous use at the nominal pressure rating (see clause **3**) throughout the temperature range from 0 °C to 38 °C.

6 Marking

Each valve shall be marked with the following:

a) the nominal size;

b) the manufacturer's name or trademark;

c) the number of this standard, i.e. BS 5041-2[1)].

[1)] Marking BS 5041-2 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification should be addressed to the appropriate certification body.

Section 2. Design

7 Materials

Each component or part of the valve shall be made from one of the materials given in Table 1.

8 Valve bodies

8.1 Flow-way dimensions

The body inlet port and the seat bore shall be circular and have a diameter of not less than 63.5 mm.

8.2 Body wall thickness

The body wall thickness at any point shall be not less than 2.8 mm and the distance from the back face or flange face to the extremity of the chain retaining lug on the blank cap shall be not more than 300 mm, with the blank cap fitted to the outlet.

8.3 Body seat

The body seat shall be either integral with the body or inserted in the form of a securely fitted but renewable ring.

8.4 Seating face

The seating face shall be not less than 3 mm wide.

9 Valve inlets

9.1 General

Valve inlets shall be either flanged (see **9.2**) or screwed (see **9.3**).

9.2 Flanged ends

9.2.1 The inlet flange shall be in accordance with Table 16/21 of BS 4504-2:1974, with the possible exception of drilling (see **9.2.2**). The casting surrounding the bolt holes on the flange shall be cast smooth and level or machined or spot faced to ensure satisfactory bolting.

Holes shall be equally spaced on the pitch circle diameter and shall be drilled "off centres".

If a flange is fitted with an "O" ring seal then the seal shall comply with BS 1806 or BS 4518.

Table 1 — Choice of materials for components and parts

Component	Material	British Standard number	Grade of designation
Body	Copper alloy	1400	LG2 or LG4
Bonnet	Copper alloy	1400 2872	LG2 or LG4 CZ114 or CZ122
Stem	Copper alloy	2874	CZ112,CZ113,CZ114 or CZ121
Wedge	Copper alloy	1400 2872	LG2 or LG4 CZ114 or CZ122
Outlet	Copper alloy	1400	LG2 or LG4
Handwheel	Copper alloy Malleable cast iron Grey cast iron Spheroidal graphite cast iron Aluminium alloy[a]	1400 2872 6681 1452 2789 1490	LG2 or LG4 CZ114 or CZ122 — 150 or 180 — LM6 or LM25
Blank cap	Copper alloy Aluminium alloy[a]	1400 2872 1490	LG2 CZ114 or CZ122 LM5 condition M LM6 condition M LM16 condition TF LM25 condition TB or TF
Bolting	Carbon steel[b], tensile strength not less than 390 N/mm^2	1506	162

[a] The surface shall have an anodized finish of thickness not less than grade AA15 of BS 1615:1987, and the anodic oxidation coating shall be sealed (see clause **7** of that standard).
[b] Free cutting steels shall not be used.

9.2.2 If the purchaser does not specify drilling requirements for the flanges, they shall be drilled in accordance with Table 16/21 of BS 4504-2:1974.

9.3 Screwed ends

9.3.1 Body ends shall be hexagonal or of shape suitable for a hook or "C" spanner to facilitate tightening.

9.3.2 Screwed ends shall have male or female threads of nominal size 2½ complying with BS 21.

9.3.3 The thickness of male ends shall be not less than 3 mm from the root diameter of the thread to the bore of the inlets.

10 Valve outlets

Outlet end connections shall be either integral or screwed on, and shall be of female instantaneous pattern complying with BS 336.

11 Bonnets

11.1 General

The bonnet to body connection shall be screwed or union or bolted. The surfaces forming the body and bonnet joint shall be machined. The joint may be metal to metal, or made with a gasket, or "O" ring of non-shrinking material and complying with BS 1806 or BS 4518.

11.2 Bonnet wall thickness

The bonnet wall thickness at any point shall be not less than 2.8 mm.

12 Wedge gates

12.1 General

Wedges shall be solid and shall be guided to ensure proper operation of the valve. Guides shall be smooth and true.

NOTE Split wedges are more susceptible to damage by frost or the presence of foreign matter.

12.2 Gate faces

Seating of gate faces shall be finished smooth without sharp edges and shall be not less than 4.8 mm wide.

12.3 Wedge clearance

Wedges shall be clear of the seat bore when fully raised.

NOTE When the valve is closed, the wedge should rise high in the body seats to allow for wear, and the seating surface of the wedge shall not touch the body surface until near the point of closure.

13 Stems

13.1 General

Valves shall be of the non-rising stem type, having the actuating thread within the wedge. They shall be formed in one piece, and shall be of sufficient length to ensure a minimum clearance of 40 mm between the handwheel and any part of the valve vertically below the periphery of the handwheel and between the handwheel and the plunger release lug on the outlet.

13.2 Stem sizes

The diameter of the stem shall be not less than 16 mm where the stem is made from CZ 114, or 19 mm where the stem is made from any other copper alloy (see Table 1).

The size of any square or drive on the stem shall be not less than 12 mm across flats. Where the handwheel is attached to the stem using a pin, the minimum cross-sectional dimension at that point shall be not less than 14.5 mm.

13.3 Threads on stems

The actuating thread shall be either Acme form or "V" form. The major diameter of the thread shall be not less than 16 min.

13.4 Retention of stem

Means shall be provided to prevent the stem becoming detached from the wedge.

14 Stem sealing

Valves shall be provided with one of the following means of sealing the stem:

a) an "O" ring complying with BS 1806 or BS 4518; or

b) a rubber gland seal; or

c) a stuffing box gland.

NOTE *Repacking under pressure.* Valves for wet risers (see BS 5041-1 are required to have provision for the replacement of seals and the repacking of glands when under pressure. It is not considered necessary that valves for dry risers have provision to enable them to be repacked under pressure.

15 Glands

Glands shall be either screwed or bolted. Screwed glands shall consist of a gland and gland nut when used as a stuffing box. Bolted glands shall be either a solid type or a two-piece self-aligning type.

16 Handwheels and operation

The valve shall be closed by turning the handwheel in a clockwise direction when facing the handwheel. The number of complete turns of the handwheel to fully open a completely closed valve shall be not less than four nor more than 10.

Handwheels shall be marked with the SHUT direction.

Handwheels shall have a diameter of not less than 100 mm.

17 Bolting

Bolting shall be in accordance with the standards given in Table 2.

Table 2 — Bolting for valves

Metric	Inch
BS 3692 BS 4190 BS 4439 BS 4882	BS 1769 BS 2693-1 BS 4882

18 Pressure retention

18.1 Body test

A valve shall show no sign of leakage or distortion when tested in accordance with **A.1** (see also **21.1**).

18.2 Seat test

A valve shall show no sign of leakage or distortion when tested in accordance with **A.2** (see also **21.2**).

19 Strap

The valve shall be provided with a means for attaching a strap, so that the handwheel can be secured to counter unauthorized use.

NOTE If specified by the purchaser the following should also be provided (see BS 5306-1):

a) a strap made of leather or reinforced plastics material not less than 12 mm wide or less than 2 mm thick, and with ends suitable for linking by a padlock;

b) a small non-ferrous padlock to secure the two ends of the strap.

The provision of a strap is not usually considered necessary where the valve is to be enclosed in a box.

20 Blank cap and chain

A blank cap complying with BS 336 shall be provided. The cap shall be provided with a pressure relief hole having a flow area of not less than 2 mm^2.

The blank cap shall be attached to the body by a suitable lug, “S” hook and chain.

Section 3. Production testing requirements and test certificate

21 Hydrostatic test requirements

21.1 Body test

Each valve shall be tested in accordance with **A.1** and shall comply with **18.1**.

21.2 Seat test

Each valve shall be tested in accordance with **A.2** and shall comply with **18.2**.

22 Test certificate

If the purchaser has requested a test certificate, the manufacturer shall supply one to certify that the valves in question have been tested and have satisfactorily complied with clause **21**. It shall also state the medium used in each test.

Appendix A Hydrostatic test methods (see clauses **18** and **21**)

WARNING NOTE. Where hydrostatic testing is involved, safety precautions in accordance with the relevant parts of the Health and Safety Executive Guidance Note "General Series/4" should be taken.

A.1 Body test

Blank off the outlet of the valve and with the valve in the open or partly open position connect the inlet to a hydrostatic pressure test rig. Vent any trapped air. Subject the valve body to a hydrostatic test pressure of 22.5 bar for 2 min. Apply the test pressure without significant hydraulic shock. Use no external restraint on the valve body and, when testing valves with the delivery connector fitted, use only the release mechanism of the connector to retain the blank.

NOTE In the case of valves with screwed-on delivery connectors, the test may be carried out before the connector is fitted.

A.2 Seat test

Connect the inlet to a hydrostatic pressure test rig. Vent any trapped air. With the outlet open to the atmosphere and the wedge in the closed position, subject the valve to a hydrostatic test pressure of 16.5 bar for 2 min. Apply the test pressure without significant hydraulic shock.

Appendix B Recommendations for the information to be supplied by the purchaser to the manufacturer

It is recommended that the purchaser provide the following information with his or her order:

a) whether a screwed or flanged valve inlet is required (see clause **9**) and/or the nominal size (see clause **4**);

b) if flanged inlet then whether the flange should be supplied undrilled (see **9.2.2**);

c) whether a strap and padlock is required (see clause **19**).

Publications referred to

BS 21, *Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions).*

BS 336, *Specification for fire hose couplings and ancillary equipment.*

BS 1400, *Specification for copper alloy ingots and copper alloy and high conductivity copper alloy castings.*

BS 1452, *Specification for grey iron castings.*

BS 1490, *Aluminium and aluminium alloy ingots and castings.*

BS 1506, *Specification for carbon, low alloy and stainless steel bars and billets for belting material to be used in pressure retaining applications.*

BS 1615, *Method for specifying anodic oxidation coatings on aluminium and its alloys.*

BS 1769, *Unified black hexagon bolts, screws and nuts (UNC and UNF threads). Heavy series.*

BS 1806, *Dimensions of toroidal sealing rings ("O" seals and their housings).*

BS 2693, *Screwed studs.*

BS 2693-1, *General purpose studs (obsolescent).*

BS 2789, *Iron castings with spheroidal or nodular graphite.*

BS 2872, *Copper and copper alloys. Forging stock and forgings.*

BS 2874, *Specification for copper and copper alloy rods and sections (other than forging stock).*

BS 3692, *ISO metric precision hexagon bolts, screws and nuts. Metric units.*

BS 3763, *The International System of Units (SI)*[2)].

BS 4190, *ISO metric black hexagon bolts, screws and nuts.*

BS 4439, *Screwed studs for general purposes. Metric series.*

BS 4504, *Flanges and bolting for pipes, valves and fittings. Metric series.*

BS 4504-2, *Copper alloy and composite flanges.*

BS 4518, *Specification for metric dimensions of toroidal sealing rings ("O" rings) and their housings.*

BS 4882, *Bolting for flanges and pressure containing purposes.*

BS 5041, *Fire hydrant systems equipment*[2)].

BS 5041-1, *Specification for landing valves for dry risers.*

BS 5041-3, *Inlet breechings for dry riser inlets.*

BS 5041-4, *Boxes for landing valves for dry risers.*

BS 5041-5, *Boxes for foam inlets and dry riser inlets.*

BS 5154, *Specification for copper alloy globe, globe stop and check, check and gate valves.*

BS 5306, *Code of practice for fire extinguishing installations and equipment on premises.*

BS 5306-1, *Hydrant systems, hose reels and foam inlets.*

BS 6681, *Specification for malleable cast iron.*

Health and Safety Executive Guidance Note "General Series/4"[3)].

[2)] Referred to in the foreword only.

[3)] Available from HMSO, 49 High Holborn, London WC1 for personal callers, or by post from HSMO, PO Box 276, London SW8 5DT.

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BSI
389 Chiswick High Road
London
W4 4AL