BRITISH STANDARD

BS 5156:1985

Incorporating Amendment No. 1

Specification for

Diaphragm valves

UDC 621.646.22:621.646.38

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Piping Systems Components Standards Committee (PSE/-) to Technical Committee PSE/7 upon which the following bodies were represented:

Amalgamated Union of Engineering Workers
Associated Offices Technical Committee
Association of Bronze and Brass Founders
Association of Hydraulic Equipment Manufacturers
British Chemical Engineering Contractors' Association
British Compressed Gases Association
British Foundry Association
British Gas Corporation
British Maritime Technology
British Shipbuilders
British Valve Manufacturers' Association Ltd.
Copper Development Association
Copper Tube Fittings Manufacturers' Association
Electricity Supply Industry in England and Wales
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Institution of Mechanical Engineers
Institution of Water Engineers and Scientists
Society of British Gas Industries
Steel Casting Research and Trade Association
Water Authorities Association
Water Companies Association

This British Standard, having been prepared under the direction of the Piping Systems Components Standards Committee, was published under the authority of the Board of BSI and comes into effect on 29 November 1985

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Amendments issued since publication

Amd. No.	Date of issue	Comments
6513	June 1990	Indicated by a sideline in the margin

Contents

Foreword

This revision of BS 5156 has been prepared under the direction of the Piping Systems Components Standards Committee. It is one of a series of standards for valves that are designed to meet the majority of national requirements and to assist both manufacturers and users. This revision reflects current manufacturing practice and supersedes the 1974 edition, which is withdrawn.

The satisfactory performance of any valve depends on design, manufacture, correct installation and maintenance; this standard specifies requirements for design and manufacture but not installation or maintenance.

The design of a diaphragm valve encourages the interchange of its three basic units, namely the body, the diaphragm and the actuating mechanism. Since each one of these can impose a limitation on the pressure/temperature rating of the complete valve there can be many permutations of these complete assembled valves; therefore, it is not practicable to include specific pressure/temperature ratings for valves in this standard.

This standard allows options to the standard product, the preferred option being indicated by a note to the appropriate clause. Particular requirements should be indicated by the purchaser, as stated in Appendix A, otherwise the manufacturer will supply the product with the following preferred options:

a) flange ends drilled (see **7.1.1**);

b) screwed body ends with the R_p form in accordance with BS 21 (see **7.2**);

c) component materials other than for the body, body lining and diaphragm selected by the manufacturer from Table 3 (see clause **10**).

Throughout this standard, all pressure ratings specified are gauge pressures.

Acknowledgement is made to Saunders Valve Co. Ltd. for permission to use the figures of the particular valves illustrated in Figure 3 and Figure 4.

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 12, 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 British Standard specifies requirements for size, rating, design, materials, marking and preparation for transport and storage for flanged and screwed diaphragm valves with nominal pressure up to PN 16. It also specifies requirements for pressure testing.

For flanged valves the nominal size (DN) range is from DN 10 to DN 300 and for valves with internal screwed threads from sizes ¼ to 3,

This standard does not cover the installation of diaphragm valves. Strict compliance with the instructions of the manufacturer is necessary.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard, the following definitions apply.

2.1
face-to-face dimensions

the distance between the two planes perpendicular to the body axis located at the extremities of the body end ports. Where a lining extends over the end faces, the face-to-face dimension is exclusive of the lining thickness

2.2
end-to-end dimension

the distance, expressed in millimetres, between the extremities of the body end ports

2.3
sealed bonnet valve

a valve having a seal between the spindle and the bonnet neck to contain line pressure or vacuum without leakage in the event of diaphragm failure

2.4
lined body

a body where the wetted surface and any other sealing areas necessary for the correct functioning of the valve have a lining of a corrosion- or abrasive-resistant material

2.5
nominal size (DN)

a numerical designation of size which is common to all components in a piping system other than components designated by outside diameters or by thread size. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions

NOTE 1 Nominal size is designated by the letters "DN" followed by a number, e.g. DN 100.
NOTE 2 This definition is identical with that in ISO 6708, published by the International Organization for Standardization (ISO).

2.6
nominal pressure (PN)

a numerical designation which is a convenient rounded number for reference purposes

all equipment of the same nominal size (DN) designated by the same PN number shall have compatible mating dimensions

NOTE 1 The maximum permissible working pressure depends upon materials, design and working temperatures and should be selected from the tables of pressure/temperature ratings given in the appropriate standards.
NOTE 2 It is designated by the letters "PN" followed by the appropriate reference number, e.g. PN 10.
NOTE 3 This definition is identical with that in ISO 7268.

2.7
tight shut-off valve

a valve having no visible leakage past the diaphragm in the closed position under test conditions

3 Types

Valves shall have one of the following body configurations:

a) weir pattern;

b) straight through pattern.

NOTE 1 Typical examples are shown in Figure 1 and Figure 2.
NOTE 2 The type of valve required should be specified by the purchaser in accordance with item a) of Appendix A.

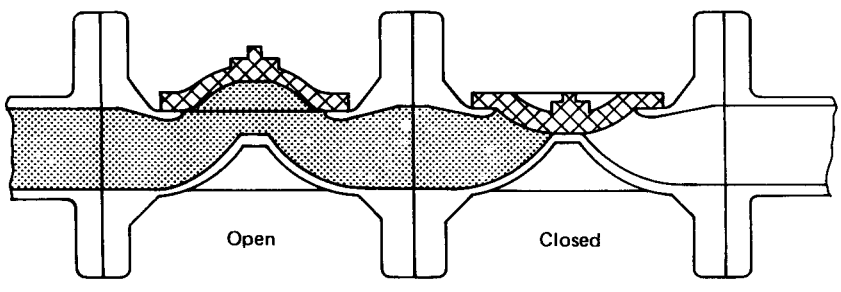


Figure 1 — Typical weir pattern diaphragm valve

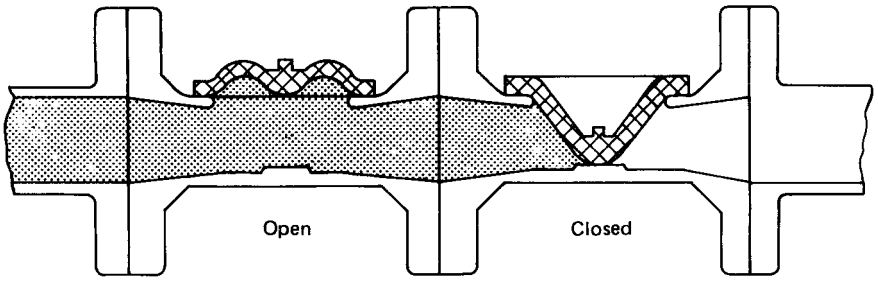


Figure 2 — Typical straight through pattern diaphragm valve

4 Nominal size range

4.1 Flanged body ends

Valves with flanged body ends shall have one of the following nominal sizes (DN):

DN 10, DN 15, DN 20, DN 25, DN 32, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250 and DN 300.

4.2 Screwed body ends

Valves with screwed body ends shall have one of the following sizes:

¼, ⅜, ½, ¾, 1, 1¼, 1½, 2, 2½ and 3

NOTE to clause **4** The valve size required should be specified by the purchaser in accordance with item b) of Appendix A.

4.3 Butt weld body ends

Valves with butt weld body ends shall have one of the following nominal sizes (DN):

DN 15, DN 20, DN 25, DN 32, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250 and DN 300.

5 Nominal pressure designations

Valves shall be designated by one of the following nominal pressures:

PN 6, PN 10, PN 16

NOTE The valve pressure designation required should be specified by the purchaser in accordance with item c) of Appendix A.

6 Pressure/temperature ratings

All valves shall be suitable for use in a temperature range of – 5 °C to + 50 °C at the maximum permissible working pressure of the valve assembly (see also foreword and **9.1**).

However, the body and bonnet shall be designed for a pressure containing capability in accordance with the pressure/temperature ratings for the respective materials as specified for flanges in BS 4504-3.1, BS 4504-3.2 and BS 4504-3.3.

NOTE 1 In the case of lined bodies, the pressure/temperature rating may be restricted to the manufacturer's recommendations.

When the valve has a flange which has a different PN rating from that of the body, then the lower of the two shall be taken as the body pressure rating.

NOTE 2 The service conditions under which a valve is to be used should be specified by the purchaser in accordance with item d) of Appendix A.

NOTE 3 If the user replaces any of the three components of the valve as defined in the foreword, the identification plate markings may no longer be applicable.

7 Dimensions and tolerances of body ends

7.1 Flanged body ends

7.1.1 *Dimensions.* Flange dimensions shall comply, as appropriate, with the requirements of one of the following standards, except that it is permissible for flanges to be undrilled (see note 2):

a) BS 4504-3.1 for steel;

b) BS 4504-3.2 for cast iron;

c) BS 4504-3.3 for copper alloy;

d) BS 1560-3.1 for steel;

e) BS 1560-3.2 for cast iron;

f) BS 1560-3.3 for copper alloy;

g) BS 10.

NOTE 1 BS 10 is obsolescent. Valves with flanges complying with BS 10 should not be used in new pipework systems.

NOTE 2 Flanges will be supplied drilled unless undrilled flanges are specified by the purchaser [see item e) of Appendix A].

NOTE 3 Flanges of a pressure rating or Class different to the body PN rating may be supplied if specified by the purchaser [see item f) of Appendix A].

7.1.2 *Face-to-face dimensions.* The face-to-face dimensions shall be in accordance with Table 1.

7.1.3 *Tolerances on face-to-face dimensions.* Tolerances on face-to-face dimensions shall be in accordance with Table 1.

Table 1 — Face-to-face dimensions for flanged body end valves and end-to-end dimensions for butt weld end valves

Nominal size	Face-to-face/end-to-end dimension	Tolerance
DN	mm	mm
10	108[a]	± 1
15	108	
20	117	
25	127	
32	146	
40	159	
50	190	
65	216	± 2
80	254	
100	305	
125	356	
150	406	± 3
200	521	
250	635	± 4
300	749	

NOTE 1 Dimensions are in accordance with BS 2080, basic series 7.
NOTE 2 Refer to **2.1** for a definition of face-to-face dimensions of lined valves.
[a] Not applicable to butt weld end valves.

7.2 Threads for screwed body ends

Screwed body ends shall have either female parallel threads with the R_p form in accordance with the requirements of BS 21 or any other suitable thread.

NOTE Screwed body ends will be supplied with BS 21 threads, unless other threads are specified by the purchaser [see item g) of Appendix A].

7.3 Butt weld ends

End-to-end dimensions and tolerances for butt weld end valves shall be in accordance with Table 1.

NOTE The details for the weld preparation for butt weld end valves are not a requirement of the British Standard, but attention is drawn to the need to match the dimensions of the butt weld end to those of the equivalent pipe, e.g. see Appendix E of BS 1560-3.1:1989 or Appendix C of BS 4504-3.1:1989. It is encumbent upon the purchaser to specify a particular weld–end preparation, if required (see also Appendix A).

Section 2. Design and operation

8 Design

NOTE For guidance, typical diaphragm valve constructions are given in Appendix B.

8.1 General

All valves shall be suitable for tight shut-off service applications.

All valves shall have the spindle isolated from the service fluid.

NOTE Where valves are to be used under vacuum conditions, this should be specified by the purchaser [see item h) of Appendix A].

8.2 Bodies

End flanges of flanged steel valves shall be cast or forged integral with the body or butt-welded to the body. Flanges attached by butt-welding shall be welded in accordance with BS 2633 or BS 4677.

NOTE Flange attachment by other welding procedures is outside the scope of this standard.

8.3 Bonnets

Valves designated as sealed bonnet shall have a seal between the spindle and the bonnet neck to contain the line pressure or vacuum without leakage.

NOTE If sealed bonnet valves are required, this should be specified by the purchaser [see item i) of Appendix A].

8.4 Diaphragms

The diaphragm shall be capable of being replaced.

8.5 Bolting

Bolting threads shall be in accordance with BS 3643 (ISO metric coarse) or BS 1580-1 & BS 1580-2 (Unified inch).

9 Operation

9.1 Operational capability

It is permissible for valves to have an operational capability less than the nominal pressure rating. The valve bonnet shall be marked with this limiting pressure using an identification plate [see item c) of clause **15**].

All valves shall be capable of being operated by one of the appropriate devices, as specified in **9.2** and **9.3**.

9.2 Manual operation

Handwheels, where fitted, shall be marked with the direction of closure. Handwheels shall be securely fitted yet allow for removal and replacement when necessary.

NOTE Clockwise closing will always be supplied unless the purchaser specifically requests an anticlockwise closing and it is therefore essential that the purchaser specifies such operation in accordance with item j) of Appendix A.

9.3 Actuator operation

Where actuator operation is required and the actuator is not an integral part of the valve, the valve to actuator flange or yoke dimensions shall comply with the requirements of BS 5840-1.

NOTE The details of the actuator and its power supply together with the design maximum pressure differential across the valve should be specified by the purchaser [see item k) of Appendix A].

9.4 Indicators

Valves shall be provided with an indicator to show the open and shut positions.

Section 3. Materials

10 Materials

Materials for the body, body lining and diaphragm shall be selected from those listed in Table 2.

NOTE 1 Body, body lining and diaphragm materials should be specified by the purchaser in accordance with item I) of Appendix A.

Materials for other components shall be selected from Table 2.

NOTE 2 Where a choice of materials for other components is given in Table 2, the purchaser should specify the material to be used in accordance with item m) of Appendix A. if the purchaser does not specify a material, the manufacturer will select one from Table 2.

If carbon steel, stainless steel or copper alloy bolting is used it shall have a minimum tensile strength of 390 N/mm^2. If different bolting is fitted because of design or performance requirements, it shall be readily identifiable. Free cutting steel shall not be used.

Table 2 — Materials

1	2	3	4
Component	**Material**	**BS reference**	**Grade or designation**
Body	Grey cast iron	1452	180 if section thickness ≤ 15 mm[a] 220
	Malleable cast iron	6681	B32-10, B30-06, W40-05
	Gunmetal	1400	LG2, LG4, G1 430 A
	Carbon steel	1504-161	
	Stainless steel	3100	347C17F, 318C17F, 316C71F, 316C16,
		970-1	316C12, 316S11
	Aluminium	1490	LM6, LM25
	Spheroidal graphite cast iron	2789	420/12, 350/22, 400/18, 500/7
Body linings	Glass	—	—
	Ethylene chlorotrifluoroethylene (ECTFE) Polypropylene (PP) Ethylene tetrafluoroethylene (ETFE) Polyvinylidene fluoride (PVDF) Perfluoroalkoxy (PFA)	— —	— —
	Natural rubber ebonite Neoprene rubber Butyl rubber Soft natural rubber	—	—
Diaphragm (basic polymer)	Natural rubber Butyl rubber Neoprene rubber Nitrile rubber Fluorinated hydrocarbon Ethylene propylene Polytetrafluoroethylene (PTFE)	—	—
Bonnet	Grey cast iron	1452	180
	Malleable cast iron	6681	B32-10, B30-06, W40-05
	Gunmetal	1400	LG2, LG4, G1
	Carbon steel	1504-161	430A
	Stainless steel	3100	347C17F, 318C17F, 316C71F, 316C16
	Aluminium	1490	LM6, LM25
	Spheroidal graphite cast iron	2789	420/12, 350/22, 400/18, 500/7
	Plastics	—	—

[a] Grey cast iron in accordance with grade 180 of BS 1452 is permitted for this application as an alternative to grade 220 only where the section thickness at any point does not exceed 15 mm.

Table 2 — Materials

1	2	3	4
Component	**Material**	**BS reference**	**Grade or designation**
Handwheel	Grey cast iron	1452	150
	Malleable cast iron	6681	B32-10, B30-06, W40-05
	Gunmetal	1400	LG2, LG4, G1
	Carbon steel	1504-161	430A
	Stainless steel	3100	347C17F, 318C17F, 316C71F, 316C16
	Aluminium	1490	LM6, LM25
	Plastics	—	—
Compressor	Grey cast iron	1452	150
	Malleable cast iron	6681	B32-10, B30-06, W40-05
	Gunmetal	1400	LG2, LG4, G1
	Carbon steel	1504-161	430A
	Stainless steel	3100	347C17F, 318C17F, 316C71F, 316C16
	Aluminium	1490	LM6, LM25
	Zinc alloy	1004	A
	Plastics	—	—
Spindle, bush, spindle nut	Copper alloy	1400	LG2[a]
		2872	CZ 112
		2874	CZ 114, CZ 121, PB3, PB102
	Carbon, non-alloy free cutting steel	970-1	220M07, 230M07
	Stainless steel	970-1	303S31, 325S31, 431S29

[a] Preferably produced by the continuous casting process when used for spindles.

Section 4. Testing

11 Pressure test requirements

11.1 General pressure tests

All valves shall be hydrostatically or pneumatically pressure tested in accordance with BS 6755-1.

NOTE 1 Where valves are assembled by an authorised distributor pressure testing requirements will apply.

The pressure test durations shall be as given in Table 3.

NOTE 2 Depending on the nominal pressure designation and nominal size of the valve, there may be a choice between pneumatic and hydrostatic testing; if hydrostatic testing is required, this should be specified by the purchaser in accordance with item n) of Appendix A.

The leakage rate shall be rate A specified in BS 6755-1 (i.e. no visually detectable leakage).

11.2 Sealed bonnet test

All sealed bonnets shall be tested.

For the sealed bonnet test a slave diaphragm, which is a diaphragm with its centre removed, shall be fitted into the test valve. The valve shall be tested by the shell test described in BS 6755-1, both the sealed bonnet and body being tested for the minimum duration given in Table 3. The leakage rate shall be rate A specified in BS 6755-1 (i.e. no visually detectable leakage).

The slave diaphragm shall then be removed and replaced with the diaphragm required for the complete valve assembly. This complete valve shall then be tested in accordance with BS 6755-1 as described in **11.1** and shall comply with the requirements of **11.1**.

12 Test certificates

If a test certificate is issued, it shall contain a statement by the manufacturer or authorized distributor confirming that the valves have been tested in accordance with this standard and stating the actual pressures and medium used in the test.

NOTE If a test certificate is required this should be specified by the purchaser in accordance with item o) of Appendix A.

Table 3 — Test durations

Nominal size of valve		Minimum test duration	
Flanged end valves	**Screwed end valves**	**Shell and sealed bonnet test**	**Seat test**
DN		s	s
10, 15, 20	¼, ⅜, ½, ¾	6	6
25, 32, 40, 50	1, 1¼, 1½, 2	15	15
65, 80, 100, 125, 150, 200	2½, 3	60	15
250, 300	—	180	30

Section 5. Marking

13 General

Each valve shall be clearly marked in accordance with the requirements of BS 5418.

NOTE Additional markings may be used at the option of the manufacturer provided that they do not conflict with any markings specified in clauses **14** to **18**.

14 Body markings

Body markings shall be integral with the body or on a plate securely fixed to the body. If on a plate, this shall be separate and distinct from the identification plate referred to in clause **15**.

Body markings shall be as follows:

a) nominal size (DN) or nominal size of screwed body ends (see clause **4**);

b) nominal pressure rating (PN) (see clause **5**);

c) body material designation, e.g. "CI" (see clause **18**);

d) manufacturer's name or trade mark;

e) for valves designed for a preferred direction of flow, arrow to indicate direction of flow (uni-directional flow valves only).

15 Identification plate markings

Identification plate markings shall include the following:

a) the number and date of this British Standard, i.e. BS 5156:1985[1)];

b) the reference for the body end threads where these do not comply with the requirements of BS 21 (see **7.2**);

c) the maximum permissible working pressure (in bar), (see **9.1**).

16 Diaphragm markings

The diaphragm shall be marked with the following:

a) manufacturer's grade reference; this shall be marked so that it is visible on the assembled valve;

b) nominal size (DN) or nominal size of screwed body ends (see clause **4**);

c) manufacturer's name or trade mark.

17 Marking indicating body lining

A valve body which is lined shall be marked with the manufacturer's grade reference. The marking shall be such that it is visible on the assembled valve.

18 Material symbols

Where appropriate the following symbols shall be used for body material designation [see item c) of clause **14**].

grey cast iron	CI
malleable cast iron	MI
spheroidal graphite cast iron	SG
gunmetal	GM
aluminium	AL
carbon steel	CS or steel
stainless steel	SS

[1)] Marking BS 5156:1985 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 to support such claims should be addressed to the Director, Quality Assurance Division, BSI, PO Box 375, Milton Keynes, MK14 6LO, for certification marks administered by BSI or to the appropriate authority for other certification marks.

Section 6. Preparation for storage and transportation

19 General

After testing, each valve shall be drained of test liquid, cleared of any extraneous matter and suitably protected in preparation for storage and transportation.

NOTE Painting is not a requirement of this standard but if valves are required painted this should be specified by the purchaser in accordance with item p) of Appendix A.

20 Diaphragm position

Valves shall be stored and transported with the diaphragm in the non-stressed condition.

21 Body ends

All lined valves shall have body ends sealed to exclude foreign matter and their jointing surfaces shall be protected during transport and storage.

NOTE If unlined valves are required with their body ends sealed or if the jointing surfaces of these valves require protection, this should be stated by the purchaser in accordance with items q) and r) of Appendix A.

Appendix A Information to be supplied by the purchaser

The following information should be supplied by the purchaser in his enquiry or order:

a) number of this British Standard and type of valve, i.e. weir or straight through pattern (see clause **3**);

b) nominal size (see clause **4**);

c) nominal pressure (PN) (see clause **5**);

d) service conditions, e.g. nature of fluid conveyed, maximum and minimum working pressures and temperatures (see clause **6**);

e) if flanged body ends are required, the type of flanges to be supplied and whether flanges are to be supplied undrilled (see **7.1.1**);

f) whether flanges of a pressure rating or Class different to the body PN rating are to be supplied (see **7.1.1**);

g) whether screwed body ends are to be supplied with other than the R_p form specified in BS 21 (see **7.2**);

h) whether valves are to be used under vacuum conditions (see **8.1**);

i) whether a sealed bonnet valve is to be supplied (see **8.3**);

j) whether anticlockwise closure is required (see **9.2**);

k) if actuator operation is required, type of actuator, maximum differential pressure across the valve and power source (see **9.3**);

l) materials required for body, body lining and diaphragm (see clause **10** and Table 3);

m) if specific materials are required for components (other than body, body lining and diaphragm) (see clause **10** and Table 3);

n) whether hydrostatic pressure tests are required (see **11.1**) and whether water, without any additives, is required for hydrostatic pressure tests;

o) if a test certificate is required (see clause **12**);

p) if valves are to be painted (see clause **19**);

q) if unlined valves are to have their jointing surfaces protected (see clause **21**);

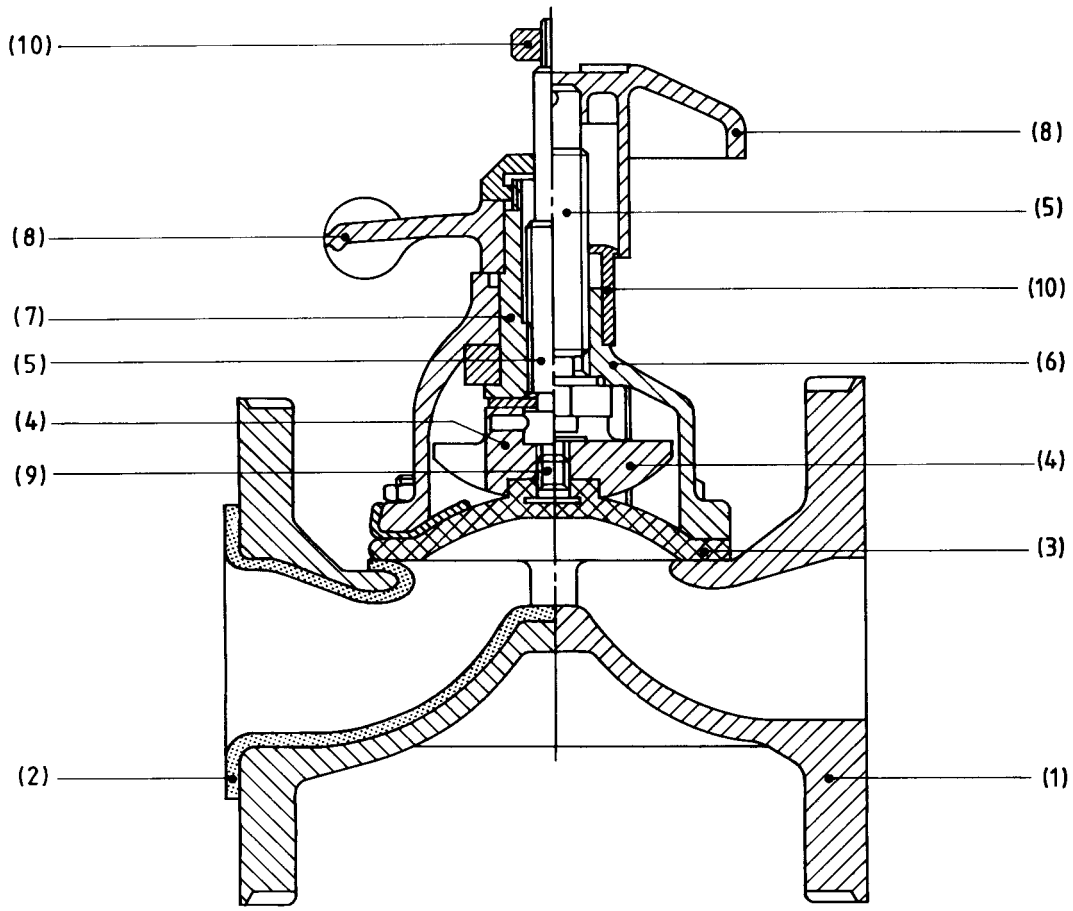
r) if unlined valves are to have their body ends sealed (see clause **21**).

s) weld-end details, if appropriate (see **7.3**).

Appendix B Typical diaphragm valve constructions

Figure 3 and Figure 4 show typical constructions for a weir pattern valve and a straight through pattern valve.

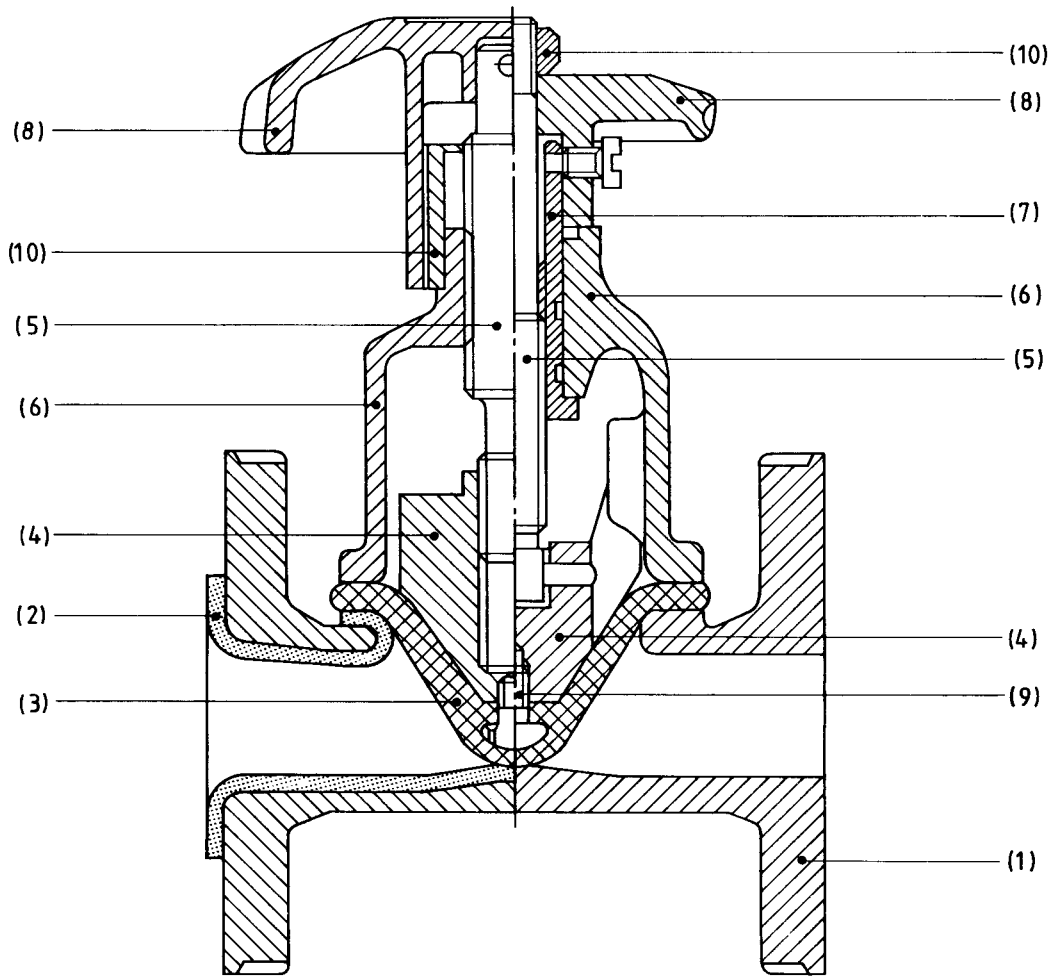
NOTE Figure 3 and **4** show composite sketches for the purpose of showing some typical variations in individual details. A product utilizing any combinations of these details (except when such combination may be specifically prohibited in the text) or similar construction will be acceptable provided it complies with this standard in all other respects.



Key

1	body	6	bonnet
2	body lining	7	bush
3	diaphragm	8	handwheel
4	compressor	9	diaphragm stud
5	spindle	10	indicator

Figure 3 — Typical weir pattern valve



Key

1	body	6	bonnet
2	body lining	7	bush
3	diaphragm	8	handwheel
4	compressor	9	diaphragm stud
5	spindle	10	indicator

Figure 4 — Typical straight through pattern valve

Publications referred to

BS 10, *Flanges and bolting for pipes, valves and fittings.*

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

BS 970, *Specification for wrought steels for mechanical and allied engineering purposes.*

BS 970-1, *General inspection and testing procedures and specific requirements for carbon, carbon manganese, alloy and stainless steels.*

BS 1004, *Zinc alloys for die casting and zinc alloy die castings.*

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

BS 1452, *Specification for grey iron castings.*

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

BS 1504, *Specification for steel castings for pressure purposes.*

BS 1560, *Circular flanges for pipes, valves and fittings (Class designated).*

BS 1560-3, *Steel, cast iron and copper alloy flanges.*

BS 1560-3.1, *Specification for steel flanges.*

BS 1560-3.2, *Specification for cast iron flanges.*

BS 1560-3.3, *Specification for copper alloy and composite flanges.*

BS 1580, *Unified screw threads.*

BS 1580-1 & BS 1580-2, *Diameters ¼ in and larger.*

BS 2080, *Specification for face-to-face, centre-to-face, end-to-end and centre-to-end dimensions of valves.*

BS 2633, *Class 1 arc welding of ferritic steel pipe work for carrying fluids.*

BS 2789, *Specification for spheroidal graphite or nodular graphite cast iron.*

BS 2870, *Specification for rolled copper and copper alloys: sheet, strip and foil.*

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

BS 2874, *Copper and copper alloys. Rods and sections (other than forging stock).*

BS 3100, *Specification for steel castings for general engineering purposes.*

BS 3643, *ISO metric screw threads.*

BS 4504, *Circular flanges for pipes, valves and fittings (PN designated).*

BS 4504-3, *Steel, cast iron and copper alloy flanges.*

BS 4504-3.1, *Specification for steel flanges.*

BS 4504-3.2, *Specification for cast iron flanges.*

BS 4504-3.3, *Specification for copper alloy and composite flanges.*

BS 4677, *Specification for arc welding of austenitic stainless steel pipework for carrying fluids.*

BS 5418, *Specification for marking of general purpose industrial valves.*

BS 5840, *Valve mating details for actuator operation.*

BS 5840-1, *Specification for flange dimensions and characteristics.*

BS 6681, *Specification for malleable cast iron.*

BS 6755, *Testing of valves.*

BS 6755-1, *Specification for production pressure testing requirements.*

ISO 6708, *Pipe components — Definition of nominal size.*

ISO 7268, *Pipe components — Definition of nominal pressure.*

ANSI B16.5, *Pipe flanges and flanged fittings.*

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