BRITISH STANDARD

BS 1873:1975

Incorporating Amendment No. 1

CONFIRMED
NOVEMBER 1983

Specification for

Steel globe and globe stop and check valves (flanged and butt-welding ends) for the petroleum, petrochemical and allied industries

UDC 621.646.2:669.14:[622.323 + 662.753 + 665.6]

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Co-operating organizations

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

British Gas Corporation
British Mechanical Engineering Confederation
British Rubber Manufacturers' Association Ltd.
British Steel Industry*
Council of British Manufacturers of Petroleum Equipment*
Department of Trade and Industry
Oil Companies Materials Association*

The 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:

Association of Hydraulic Equipment Manufacturers
British Chemical Engineering Contractors' Association
British Industrial Measuring and Control Apparatus Manufacturers' Association
British Plastics Federation
British Ship Research Association
British Valve Manufacturers' Association
Engineering Equipment Users' Association
Steel Castings Association

This British Standard, having been approved by the Petroleum Equipment Industry Standards Committee, was published under the authority of the Executive Board on 30 April 1975

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Foreword

This British Standard is one of a series for valves prepared under the authority of the Petroleum Equipment Industry Standards Committee. It was first published in 1952. It is a metricated revision except that class designations and body to bonnet bolting sizes have not been converted into metric units. Imperial units are also given for some dimensions in order to comply with established international petroleum practice. The previous sections dealing with face-to-face and end-to-end dimensions, inspection and test have now been omitted as these subjects have their own separate standards:

BS 2080, *"Face-to-face, centre-to-face, end-to-end and centre-to-end dimensions of flanged and butt-welding end steel valves for the petroleum, petrochemical and allied industries".*

BS 6755, *Testing of valves — Part 1: Specification for production pressure testing requirements.*

NOTE 1 Requirements for final inspection and supplementary inspection or all stages of manufacture, previously specified in BS 5146-1:1974 (now withdrawn) should be stated by the purchaser in his enquiry or order."

Compared with the first edition, angle pattern valves are now incorporated and the size range has been extended and is now aligned with that of ANSI B 16.10.

The end flanges for valves are required to be in accordance with BS 1560 "*Steel pipe flanges and flanged fittings (nominal sizes $\frac{1}{2}$ in to 24 in) for the petroleum industry"*: Part 2 *"Metric dimensions"* (corresponding to ANSI B 16.5) and butt-welding ends are generally in accordance with ANSI B 16.25.

It is intended that the valves complying with the requirements of this standard should be interchangeable as units with those in accordance with ANSI B 16.10 dimensions. There is no equivalent American Standard.

NOTE 2 User requirements for valves generally in accordance with this standard but suitable for use in piping systems with BS 4504 "*Flanges and bolting for pipes, valves and fittings. Metric series*" flanges are dealt with in Appendix B.

Acknowledgement is made to the American Petroleum Institute and to the American National Standards Institute for data used.

The titles of the American standards referred to in this standard and the foreword are as follows:

ANSI

B 16.5	Steel pipe flanges and flanged fittings (including supplements)
B 16.10	Face-to-face and end-to-end dimensions of ferrous valves
B 16.25	Buttwelding ends

API

Std 5b	Specification for threading, gaging, and thread inspection of casing, tubing and line pipe threads

ASTM

A 182	Forged or rolled alloy-steel pipe flanges, forged fittings and valves and parts for high temperature service
A 276	Stainless and heat resisting steel bars and shapes
A 351	Ferritic and austenitic steel castings for high temperature service
B 124	Copper and copper alloy forging rod, bar and shapes
B 138	Manganese bronze rod, bar and shapes
B 148	Aluminium bronze sand castings
B 150	Aluminium bronze rod, bar and shapes
B 584	Copper alloy sand castings for general applications

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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 to iv, pages 1 to 24, 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.

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Section 1. General

1 Scope

This British Standard specifies requirements for cast or forged carbon and alloy steel outside screw and yoke globe and globe stop and check valves, straight pattern, angle pattern and (oblique) Y pattern, with flanged or butt-welding ends in nominal sizes within the range of 15 mm to 400 mm (½ in to 16 in) and Classes 150 to 2500. This standard can also be used as a general guide where valves of material composition outside the scope of section three of this standard are required as, for example, for use in highly corrosive services or environments or for low temperatures (see clause **37**).

The standard can be adapted to apply to valves with needle type seats in 15 mm (½ in) an 20 mm (¾ in) nominal sizes which will meet all requirements of this standard, except that the valve seat bore is reduced and the needle point may be either integral with or loose on the stem.

2 References

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

3 Nomenclature

For the purposes of this British Standard the nomenclature for valve parts shall be as shown in Figure 1 to Figure 4 which are also illustrative of some acceptable designs.

4 Pressure classification

This standard applies to valves of the following pressure class designations:

Class 150, Class 300, Class 400, Class 600, Class 900, Class 1500 and Class 2500.

The numerals in these class designations represent the primary service pressure ratings of the valves in pounds-force per square inch.

5 Pressure/temperature ratings

The pressure/temperature ratings applicable to valves specified in this standard shall be in accordance with Tables PE-1 to PE-12 of Appendix A of BS 1560-2:1970 for the particular shell material specified. There is, however, a temperature restriction on soft seals and on certain trim materials (see **18.3** and **30.5**).

Where valves in accordance with this standard are to be used at service temperatures below – 30 °C, reference should be made to BS 3351. Service temperature refers to the temperature of the fluid in the line at the valve.

6 Nominal sizes

This standard covers valves of the following nominal sizes:

mm	(in)	mm	(in)	mm	(in)
15	(½)	50	(2)	200	(8)
20	(¾)	65[a]	(2½)[a]	250	(10)
25	(1)	80	(3)	300	(12)
32[a]	(1¼)	100	(4)	350	(14)
40	(1½)	150	(6)	400	(16)

For each valve class the applicable sizes are shown in Appendix A.

[a] These sizes have been retained only for the purpose of replacing existing valves. Their use for new construction in piping systems using BS 1560-2 end flanges should be avoided.

7 Information to be supplied by the purchaser

Certain clauses of this standard permit alternatives and the purchaser may require features which depart from the requirements of this standard. The purchaser should state in the enquiry and order the following (the items marked with an asterisk are mandatory).

a) *Valve type, viz. globe or globe stop and check, and whether straight, angle or oblique Y pattern (see clause **1**).

b) *Class and nominal size (see clauses **4** and **6** and **B.7**).

c) *If soft seals are required (see clause **5** and **18.1**).

d) *Whether flanged or butt-welding ends are required.

1) If flanged ends are required, whether welded-on flanges are acceptable (see **8.5**); the type of facing (see **8.6**).

2) If butt-welding ends are required, the pipe schedule number or wall thickness and outside diameter [see **8.8** b)].

e) If shell tappings are required and, if so, the location and the type of thread if other than API Std 5B (see **8.9**).

f) If a particular form of disk or seat is required (see **10.1**).

g) If the yoke is to be fitted with a flange for actuator or gearbox mounting (see clause **11**).

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h) Details of type of operation required if other than direct handwheel operated (see clauses **12** and **16**).

i) If a lantern ring is to be provided for Class 300 to Class 2500 valves (see **14.4**).

j) Where a bypass is required, give the full specification of the bypass valve, piping and connections (see clause **17**).

k) *The shell material (see clause **19**).

l) If a special bonnet gasket is required (see clause **21**).

m) *The nominal trim material symbol (see **30.2**).

n) If any special stem packing is required, or specify packing design temperature if above 400 °C (see clause **32**).

o) Material(s) for bonnet, gland, and yoke bolting if required for operation at process design temperatures below – 30 °C or above 480 °C, or for other special operating conditions (see clause **33**).

p) Material requirements for valves in highly corrosive services or environment, or for low temperature service (see clause **37**).

q) If a lower seat test leakage rate is required for metal seated globe stop valves when used as check valves (see clause **45**);

r) Requirements for tropical or special packaging (see clause **48**).

Section 2. Design

8 Body

8.1 For the body the design criteria specified in **8.2** to **8.10** shall be observed.

8.2 The body shall be designed to minimize pressure loss as well as corrosive and erosive effects. The body end ports shall be circular. The area of the flow passage shall everywhere be as near equal to the area of the body end ports as practicable.

8.3 The body wall thickness shall comply with the requirements for shell thickness in Appendix A. Drilling of, or pinning to, the wall is not permissible, e.g. for nameplate fixing where this would reduce the effective thickness below the minimum permitted value.

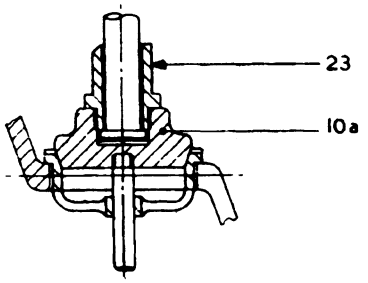
8.4 Face-to-face and centre-to-face dimensions for raised face flanged end valves and end-to-end and centre-to-end dimensions for butt-welding end and ring joint flanged end valves shall conform to the dimensions specified in BS 2080. Stop and check valves shall have the same dimensions as globe valves of similar pattern.

8.5 End flanges shall be cast or forged integral with the body except that flanges may be attached by welding if so specified in the order. The welds of end flanges attached by butt-welding shall comply with the requirements of BS 3351 and shall have any necessary heat treatment as required by BS 3351 to ensure that they are suitable for service temperatures down to – 30 °C. Flange attachment by other welding processes shall be the subject of agreement between the manufacturer and the purchaser.

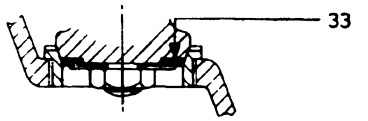
8.6 End flanges shall comply with the requirements of BS 1560-2. End flange facings shall be one of the types shown in Figures 1 and 2 of BS 2080. The purchaser shall specify the type of facing required.

Valves generally in accordance with this standard but suitable for use in piping systems with BS 4504 flanges shall comply with the requirements of Appendix B.

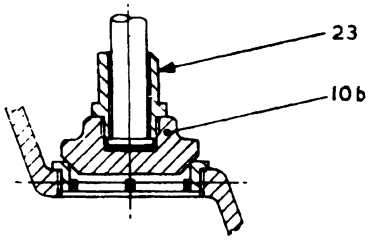
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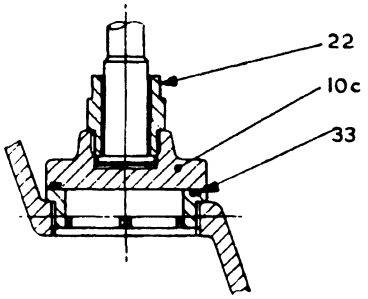
Plug type disk—guided



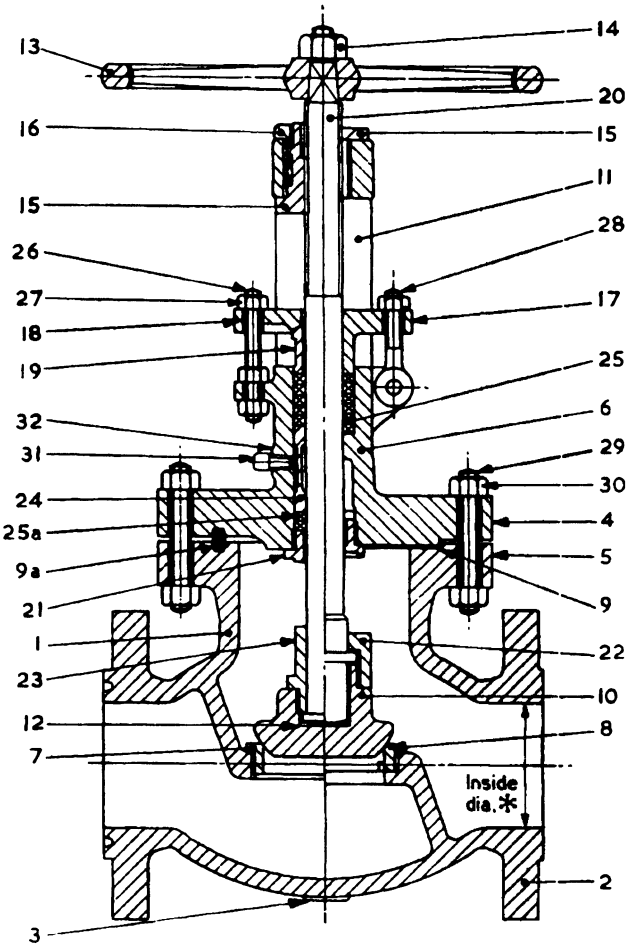
Soft seal in plug type disk



Narrow seat type disk



Flat seat type disk showing soft seal ring in disk or in seat ring



Typical half-sections showing alternative designs, including ball type disk

NOTE Flat seat type disk can be metal-to-metal without soft seal.

Figure 1 — Typical straight pattern globe valve

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Reference	Name of part	Material reference clause
1	Body	**19**
2	End flange	—
3	Body boss	—
4	Bonnet flange	—
5	Body bonnet flange	—
6	Bonnet	**19**
7	Seat ring, shoulder seated	**20** and **30**
8	Seat ring, bottom seated	**20** and **30**
9	Bonnet gasket	**21**
9a	Bonnet ring joint	**21**
10	Disk, ball type	**22**
10a	Disk, plug type	**22** and **30**
10b	Disk, narrow seat type	**22** and **30**
10c	Disk, flat seat type	**22** and **30**
11	Yoke	**23**
12	Disk thrust plate	**24**
13	Handwheel	**25**
14	Handwheel nut	**26**
15	Yoke bush	**27**
16	Yoke bush retaining nut	**28**
17	Gland, one piece type	**29**
18	Gland flange	**29**
19	Gland follower	**29**
20	Stem	**30**
21	Back seat bushing	**30**
22	Disk nut	**30**
23	Disk nut, back seat type	**30**
24	Lantern ring	**31**
25	Stem packing	**32**
25a	Wiper rings	**32**
26	Gland stud bolt	**33**
27	Nut for gland stud bolt	**33**
28	Gland eye bolt	**33**
29	Bonnet stud bolt	**33**
30	Nut for bonnet stud bolt	**33**
31	Plug	**34**
32	Plug boss	—
33	Soft seal ring	**36**

NOTE These sketches are composite for the purpose of showing some typical variations in individual details and parts names. A product utilizing any combination 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.

Figure 1 — Typical straight pattern globe valve (references)

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