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Specification for

**Steel wedge gate, globe
and check valves 50 mm
and smaller for the
petroleum,
petrochemical and
allied industries**

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Foreword

This British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee and constitutes a revision of BS 2995:1966 and BS 3808:1964. This new metric standard covers classes 800 and 1500 screwed and socket-weld end wedge gate, globe and check valves previously covered by BS 2995 and BS 3808, also classes 150, 300, 600 and 1500 flanged and butt-weld end wedge gate, globe and check valves previously covered by BS 3808, BS 1414, BS 1868 and BS 1873. Apart from metrication, The valves are basically the same, but the list of shell and trim materials has been extended and bellows seal valves have been included.

BS 2995 and BS 3808 are withdrawn on publication of this standard. Amendments to BS 1414, BS 1868 and BS 1873 will delete references to size 40 mm and smaller. BS 2080 will be amended.

The plug valves previously covered in BS 2995 will be included in the new metric version of BS 1570.

The previous sections in BS 2995 and BS 3808 dealing with tests and inspection have not been included in this standard, as these are now the subject of a separate standard, BS 6755-1.

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final inspection and supplementary inspection at all stages of manufacture previously specified in BS 5146-1:1974 (now withdrawn) should be stated by the purchaser in his enquiry or order.

Similarly, sections in BS 2995 and BS 3808 dealing with dimensional sizes and tolerances of screwed and socket-weld end details have been omitted and cross references made to the appropriate sections of the new metric version of BS 3799, which in turn has been modified for bore dimensions of sockets to allow use of pipe in accordance with BS 3600 and BS 1600.

It is the intention that valves complying with the requirements of this standard shall be interchangeable as units with those of similar type produced by American manufacturers. In the preparation of this standard, consideration has therefore been given to the latest edition of API Standard 602.

Valves specified in this standard are primarily intended for installation as follows:

- a) *screwed ends*, with pipes or fittings threaded in accordance with API Standard 5B or ANSI B2.1;
- b) *socket-weld ends*, with plain end pipe in accordance with API Standard 5L, BS 1600 or BS 3600;
- c) *butt-weld ends*, with plain end pipe in accordance with API Standard 5L, BS 1600 or BS 3600;
- d) *flanged ends*, with flanges in accordance with BS 1560-2.

Where valves are for use in piping systems using flanges in accordance with BS 4504-1 or screw-threads in accordance with BS 21 attention is drawn to Appendix A and Appendix B respectively.

This standard can also be used as a general guide where valves of material composition outside the scope of section 3 of this standard are required as, for example, for use in highly corrosive services and environments, or for low temperatures.

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

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 22, 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 forged, cast or bar stock steel wedge gate, globe stop and check valves with flanged, screwed, socket-weld or butt-weld ends, in nominal sizes 50 mm (2 in) and smaller in classes 150, 300, 600, 800 and 1500 of the following types.

- a) *Wedge gate valves*, with outside screw and yoke, rising stem, bolted or welded bonnet and bolted gland:
 - 1) reduced bore, compact (class 800 only); and 800 only;
 - 2) standard bore.
- b) *Wedge gate valves*, with inside screw, rising stem and handwheel, bolted or welded bonnet and gland nut, for use at temperatures up to 425 °C only, and with screwed and socket-weld ends:
 - 1) reduced bore, compact (class 800 only);
 - 2) standard bore (class 1500 only).
- c) *Globe valves, including screw down check valves (straight angle or oblique pattern)*, outside screw and yoke, rising stem and handwheel, bolted or welded bonnet and bolted gland, plug or needle type disk:
 - 1) reduced bore;
 - 2) standard bore.
- d) *Globe valves, including screw down check valves (straight angle or oblique pattern)*, inside screw, rising stem and handwheel, bolted or welded bonnet, gland nut and plug or needle type disk, for use at temperatures up to 425 °C only:
 - 1) reduced bore;
 - 2) standard bore.

NOTE Screwed and socket-weld ends classes 800 and 1500 only.

e) *Bellows-sealed valves*:

- 1) wedge gate, with outside screw and yoke, rising stem, bolted or welded bonnet, screwed or bolted gland, and reduced bore (compact);
 - 2) globe (straight angle or oblique pattern), with outside screw and yoke, rising stem, bolted or welded bonnet, screwed or bolted gland, plug or needle type disk, and reduced or standard bore.
- f) *Check valves*, with bolted, welded or union cover:
- 1) piston type (for angle or horizontal flow);
 - 2) ball type (for angle or horizontal flow);
 - 3) ball type (for vertical flow).

NOTE The terms “vertical”, “horizontal” and “angle” relate to the axis of the body ends.

2 References

The titles of the publications referred to in this standard are listed on pages 22 and 23.

3 Definition

For the purposes of this British Standard the following definition applies.

nominal size (DN)

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

NOTE It is designated by the letters DN followed by a number.

4 Pressure classification

This standard applies to valves of the following class ratings:

150; 300; 600; 800; 1500.

NOTE The number in these class ratings represents the primary service pressure rating of the valve in lbf/in².

5 Pressure/temperature ratings

5.1 General. The pressure/temperature ratings applicable to valves covered by this standard shall be in accordance with Tables PE-1 to PE-12 of BS 1560-2:1970 for the particular shell material except that class 800 valves shall be in accordance with Table 1.

NOTE 1 There is, however, a temperature restriction on certain trim materials (see 33.4 and Table 11).

NOTE 2 Inside screw valves are subject to a service temperature restriction (see 5.2).

NOTE 3 Valves with a bellows seal may be subject to reduced pressure/temperature ratings compared with standard valves (see 5.3).

NOTE 4 Where valves complying with the requirements of 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.

NOTE 5 For pressure/temperature ratings for valves supplied for use in piping systems with flanges in accordance with BS 4504-1 see A.2.

5.2 Inside screw valves. The following types of valve shall not be used at service temperatures exceeding 425 °C:

- a) inside screw wedge gate valves;
- b) inside screw globe and screw down check valves.

5.3 Bellows seal valves. The

pressure/temperature ratings for bellows seal valves shall be in accordance with Table 2, and are a minimum requirement for valves complying with the requirements of this standard and having a body rating in excess of the values specified in Table 2; for valves with a lower body rating, the values specified in Table 2 shall still apply.

Table 1 — Pressure/temperature ratings for class 800 screwed and socket-weld end valves

Service temperature	Maximum non-shock service pressure rating		
	Carbon steel	1 ¼ % chromium-½ % molybdenum steel	5 % chromium ½ % molybdenum steel
°C	bar ^a	bar ^a	bar ^a
– 30 to 38	138	138	138
50	137	137	137
75	135	135	135
100	133	133	133
125	132	132	132
150	130	130	130
175	129	129	129
200	128	128	128
225	125	125	125
250	122	122	122
275	116	116	116
300	110	110	110
325	103	103	103
350	97	97	97
375	89	91	91
400	81	86	86
425	71	80	80
450	59	74	74
454	55 ^b	73	73
475	47	68	68
500	34	63	63
525	22	55 ^b	55 ^b
540	15	50	50

NOTE 1 The above pressure/temperature ratings are the minimum requirement and valves having ratings in excess of these may be obtained from individual manufacturers.

NOTE 2 The use of valves at temperatures where the creep strength might be the limiting criterion is subject to the establishment of a design life.

^a 1 bar = 10⁵ N/mm² = 100 kPa.

^b Primary service pressure.

6 Nominal sizes

Valves of the following nominal sizes are specified in this standard:

DN 8	(¼ in)
DN 10	(⅜ in)
DN 15	(½ in)
DN 20	(¾ in)
DN 25	(1 in)
DN 32 ^a	(1 ¼ in)
DN 40	(1 ½ in)
DN 50	(2 in)

^a Non-preferred size.

7 End types

Table 3 specifies the types of ends available for each class and size of valve covered by this standard.

Table 2 — Pressure/temperature ratings for bellows seal valves

Service temperature	Maximum non-shock service pressure rating (see note 1 and 5.3)	Test pressure	
		Body	Seat
°C	bar	bar	bar
– 30 to 38	99	150	103
50	98		
75	97		
100	96		
125	95		
150	94		
175	93		
200	91		
225	90		
250	87		
275	83		
300	79		
325	75		
350	71		
375	67		
400	63		
425	59		
450	55		
454	55 ^a		
475	47		
500	34		
525	22		
540	15		

NOTE 1 The above pressure/temperature ratings apply to the bellows sealing element and are a minimum requirement for valves complying with this standard; bellows ratings higher than the values listed above may be obtainable from individual manufacturers who should be consulted as to the maximum pressure/temperature ratings applicable to their particular product.

NOTE 2 The use of valves at temperatures where the creep strength might be the limiting criteria is subject to the establishment of a design life.

^a Primary service pressure.

Table 3 — End type availability according to class and size of valve

Nominal size DN	Class				
	150	300	600	800	100
8	—	—	—	B —	— — —
10	—	—	—	B —	— — —
15	A	A	A	B, C	A, B, C
20	A	A	A	B, C	A, B, C
25	A	A	A	B, C	A, B, C
32	A	A	A	B, C	A, B, C
40	A	A	A	B, C	A, B, C
50	A	A	A	B, C	A, B, C

NOTE

A denotes flanged ends and butt-weld ends;
 B denotes screwed ends;
 C denotes socket-weld ends.

8 Information to be supplied by the purchaser

Certain clauses of this standard permit alternatives and the purchaser may require features which depart from this standard. The purchaser shall state in his enquiry and purchase order, the following.

- Type, class rating and nominal size, standard or reduced bore (see clauses 1, 4, 6 and 9.3).
- Whether screwed, socket-weld, flanged or butt-weld ends are required (see clause 7).
 - If flanged ends are required, whether welded-on flanges are acceptable, and type of facing (see 9.5).
 - If butt-weld ends are required, state the pipe schedule number or wall thickness, and outside diameter (see clause 9.7).
 - If screwed ends are required, state form of thread required (see 9.4).
- Whether a bolted or welded bonnet/cover is required (see 9.8), or a union nut for check valves (see 22.1).
- Whether a particular form of disk is required (see clause 15).
- Stuffing box requirements for bellows seal valves (see clause 17).
- The body and bonnet/cover material (see clause 23).
- The body and bonnet/cover gasket type (see clause 25).
- The bellows material (see clause 32).
- The nominal trim material (see clause 33).
- State if any special packing is required, and specify packing design temperature, if above 400 °C, or if the design pressure is above 50 bar (see clause 34).

k) Material for bonnet/cover bolting, if required for operation at process design temperatures below – 30 °C or above 400 °C, or for other special operating conditions (see clause 35).

l) Special material requirements for valves in highly corrosive environment or for low temperature service (see clause 37).

m) Whether any additional markings are required (see clause 41).

n) Whether a lower seat test leakage rate is required for check valves (see clause 43).

o) Requirements for special packaging (see 44.6).

Section 2. Design

9 Shell

9.1 General. The shell shall be designed to resist the maximum pressure ratings, to minimize pressure loss and to minimize corrosive and erosive effects.

9.2 Body and bonnet wall thickness. With the exception of pipe ends, the minimum wall thickness of body and bonnet, measured at any point, shall be not less than that specified in Table 4.

Table 4 — Minimum body and bonnet wall thickness (excluding pipe ends)

Nominal size DN	Minimum body and bonnet wall thickness		
	Classes 150, 300, 600 and 800		Class 1500 Standard bore
	Standard bore	Reduced bore	
	mm	mm	mm
8	3.3	3.0	—
10	4.1	3.3	—
15	4.8	4.1	5.2
20	5.6	4.8	6.1
25	5.8	5.6	6.7
32	6.1	5.8	7.5
40	7.1	6.1	7.8
50	7.5	7.1	8.6

9.3 Port diameter and seat bore. The body end ports shall be circular. The port diameter and seat bore shall comply with the values specified in Table 5.

9.4 Body ends for screwed-end and socket-weld end valves

9.4.1 General. The outside diameter or dimension across flats of body ends for all types of screwed-end and socket-weld end valves shall be not less than the minimum values specified in Table 6 for classes 800 and 1500.

9.4.2 Socket-weld ends. Socket-weld end valves shall have circular ends and end faces machined square to the axis. Socket details shall comply with the requirements of BS 3799.