British Standard

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BS 5150:1990

Specification for

Cast iron gate valves

UDC 621.646.5:669.13

Committees responsible for this British Standard

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

Amalgamated Union of Engineering Workers
Association Offices Technical Committee
Association of Bronze and Brass Founders
Association of Building Component Manufacturers Ltd.
British Chemical Engineering Contractors' Association
British Compressed Gases' Association
British Foundry Association
British Gas plc
British Maritime Technology
British Plumbing Fittings Manufacturers' Association
British Valve and Actuator Manufacturers' Association
Chartered Institution of Building Services Engineers
Copper Development Association
Department of the Environment (Property Services Agency)
Electricity Supply Industry in England and Wales
Energy Industries Council
Engineering Equipment and Materials Users' Association
GAMBICA (BEAMA Ltd.)
Health and Safety Executive
Institute of British Foundrymen
Institution of Chemical Engineers
Institution of Gas Engineers
Institution of Mechanical Engineers
Institution of Water and Environmental Management (IWEM)
Society of British Gas Industries
Water Companies' Association
Water Services Association of England and Wales
West Midlands CBI

The following bodies were also represented in the drafting of the standard, through sub-committees and panels:

British Effluent and Water Association
British Non-ferròus Metals Federation

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Contents

Foreword

This British Standard has been prepared under the direction of the Piping Systems Components Standards Policy Committee and constitutes the first revision of BS 5150:1974 which is withdrawn.

This British Standard takes into account ISO 5996 published by the International Organization for Standardization (ISO). It incorporates many of the requirements of ISO 5996 for flanged valves although not necessarily in the same format; the essential differences between this British Standard and ISO 5996 are as follows.

a) The scope has been extended to cover valves of nominal sizes DN 10 to DN 1 000.

b) Valves having threaded ends of sizes in the range $^1/_2$ to 6 have been included.

c) Valves of nominal sizes DN 550, DN 650 and DN 750 have been omitted.

d) Valves having nominal pressure designations PN 1, PN 1.6, PN 2.5, PN 4, PN 20, PN 40 and PN 50 have been omitted.

e) Valves having Class 125 and Class 150 flanges have been included.

f) Clamp pattern valves having the body-to-bonnet connection via a U bolt have been included.

g) Greater details have been specified for trim materials.

h) Operation has been given in greater detail.

i) Marking requirements have been included in greater detail.

j) Inspection requirements have been omitted.

k) Information to be supplied by the purchaser has been included in a non-mandatory appendix (see appendix A).

l) Reference to BS 6920-1 is made concerning requirements for valves when used to convey potable water.

The essential differences between this British Standard and BS 5150:1974 are as follows.

1) Valves having nominal pressure designations of PN 1.6, PN 2.5 and PN 4 have been omitted.

2) Short series valves for nominal pressures PN 10 are included for the first time.

3) Valves with bodies made from spheroidal graphite and malleable cast iron are included for the first time.

4) Clamp pattern valves having the body-to-bonnet connection via a U bolt are included for the first time.

5) A greater choice of trim materials is given.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

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 16, 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 flanged, threaded end and clamp pattern cast iron gate valves for general purposes. The range of valve sizes covered is DN 10 to DN 1 000 for flanged valves and $^1/_2$ to 6 for threaded end valves for nominal pressures in the range PN 6 to PN 25 and for valves having Class 125 and Class 150 flanges.

NOTE 1 For cast iron gate valves for waterworks purposes reference should be made to BS 5163.
NOTE 2 The information to be supplied by the purchaser at the time of the enquiry and/or order is detailed in appendix A.
NOTE 3 The titles of 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
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 the appropriate reference number, e.g. DN 150.
NOTE 2 This definition is identical to that given in ISO 6708:1980.

2.2
nominal pressure (PN)

a numerical designation which is a convenient round 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 allowable working pressure depends on materials, design and working temperature and should be selected from the tables of pressure/temperature ratings in the appropriate standard.
NOTE 2 It is designated by the letters PN followed by the appropriate reference number, e.g. PN 16.
NOTE 3 This definition is identical to that given in ISO 7268:1973.

2.3
face-to-face dimension

the distance, expressed in millimetres, between two planes perpendicular to the valve axis located at the extremities of the body end ports

3 Types of valves

Valves shall be one of the following types, with either rising or non-rising stems:

a) solid or split wedge;

b) double disk.

NOTE The manufacturer should state in his enquiry and/or order whether the valve is to have rising or non-rising stems. (See appendix A.)

4 Nominal sizes

4.1 Flanged end PN designated valves

4.1.1 *Flanged end PN designated non-clamp pattern valves.* Flanged end valves other than those in **4.1.2** shall be one of the following nominal sizes.

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, DN 300, DN 350, DN 400, DN 450, DN 500,DN 600, DN 700, DN 800, DN 900, DN 1 000.

4.1.2 *Flanged end, clamp pattern valves*

4.1.2.1 *PN designated valves.* Flanged end, clamp pattern valves which are PN designated shall be one of the following nominal sizes.

DN 25, DN 40, DN 50, DN 65, DN 80, DN 100.

4.1.2.2 *Class 125 valves.* Flanged end, clamp pattern Class 125 valves shall be one of the following nominal sizes.

1, $1^1/_2$, 2, $2^1/_2$, 3, 4.

4.2 Threaded end valves

4.2.1 *Threaded end non-clamp pattern valves.* Threaded end valves other than those in **1.0.0.1** shall be one of the following nominal sizes.

$^1/_2$, $^3/_4$, 1, $1^1/_4$, $1^1/_2$, 2, $2^1/_2$, 3, 4, 5, 6.

1.0.0.1 *Threaded end, clamp pattern valves.* Threaded end, clamp pattern valves shall be one of the following nominal sizes.

$^1/_2$, $^3/_4$, 1, $1^1/_4$, $1^1/_2$, 2, $2^1/_2$, 3, 4.

4.3 Valves for use in Class rated flanged piping systems with Class 125 and Class 150 flanges

Valves for use in Class rated flanged piping systems with Class 125 and Class 150 flanges shall be one of the following nominal sizes.

1, $1^1/_4$[1)], $1^1/_2$, 2, $2^1/_2$[1)], 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20 and 24.

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

5 Nominal pressures

5.1 Non-clamp pattern valves

5.1.1 *General.* Non-clamp pattern valves shall be selected from the following nominal pressure designations.
designations.

PN 6, PN 10, PN 16 and PN 25; or

Class 125 and Class 150.

5.1.2 *Valves for use in Class rated flanged piping systems.* Valves for use in Class rated flanged piping systems shall be designated:

a) Class 125 for grey cast iron and malleable cast iron;

b) Class 150 for spheroidal graphite (ductile) cast iron.

5.2 Clamp pattern valves

Clamp pattern valves shall be selected from the following nominal pressure designations.

PN 10 and PN 16 or Class 125.

6 Pressure/temperature ratings

The pressure/temperature ratings for PN designated valves shall be as given in Table 1. The pressure/temperature ratings for valves having Class 125 and Class 150 flanges shall be as given in Table 2.

Table 1 — Pressure/temperature ratings for PN designated values

Material[a]	Nominal pressure	Temperature				
		°C – 10 to 120	°C 150	°C 180	°C 200	°C 220
		Maximum permissible working pressure				
	PN	bar[b]	bar	bar	bar	bar
Grey cast iron[c]	6	6.0	5.4	—	—	—
	10	10.0	9.0	8.4	—	—
	16	16.0	14.4	13.4	12.8	—
	25	25.0	22.5	21.0	20.0	19.0
Spheroidal graphite cast iron grades 400/18, 420/12 and 414/18	6[d]	6.0	5.8	—	—	—
	10	10.0	9.7	9.4	—	—
	16	16.0	15.5	15.0	14.7	—
	25	25.0	24.3	23.5	23.0	22.5
Spheroidal graphite cast iron grades 500/7 and 600/3	6[d]	6.0	5.8	—	—	—
	10	10.0	9.5	9.2	—	—
	16	16.0	15.2	14.7	14.4	—
	25	25.0	23.8	23.0	22.5	21.5
Malleable cast iron[c]	6[e]	6.0	5.8	—	—	—
	10[e]	10.0	9.7	9.4	—	—
	16[e]	16.0	15.5	15.0	14.7	—
	25	25.0	24.3	23.5	23.0	22.5

NOTE 1 Intermediate values may be obtained by linear interpolation.

NOTE 2 Restrictions on temperature may be placed by the manufacturer by reason of valve type, trim materials or other factors (see **20.3** for marking requirements).

[a] See Table 10 for material identification.

[b] 1 bar = 10^5 N/m^2 = 100 kPa.

[c] Materials ASTM A126, grade B and grade B30-06 of BS 6681 are limited to PN 16 maximum.

[d] PN 6 spheroidal graphite cast iron flanged valves have flange dimensions in accordance with grey cast iron flanges specified in BS 4504-3.2.

[e] For nominal sizes DN 10 to DN 100 inclusive the pressure/temperature ratings given for grey cast iron apply.

Table 2 — Pressure/temperature ratings for valves with Class 125 and Class 150 flanges

Material[a]	Size	Temperature[b]					
		°C – 10 to 65	°C 120	°C 150	°C 180	°C 200	°C 220
		Maximum permissible working pressure					
	in	bar	bar	bar	bar	bar	bar
Grey cast iron, grades 220 and B	≤ 12	13.8	12.1	11.4	10.3	9.8	9.0
	> 12 ≤ 24	10.3	8.6	7.6	6.9	—	—
Spheroidal graphite cast iron, grades 400/18, 420/12, 414/18 and 450/10	All	17.5	15.5	14.5	14.3	13.6	12.8
Spheroidal graphite cast iron, grades 500/ 7 and 600/3[d]	All	17.5[c]	15.5	14.5	14.3	13.6	12.8
Malleable cast iron, all grades	All	13.8	12.1	11.4	10.3	9.8	8.6

NOTE 1 Intermediate values may be obtained by linear interpolation.

NOTE 2 Restrictions on temperature may be placed by the manufacturer by reason of valve type, trim materials or other factors (see **20.3** for marking requirements).

[a] See Table 10 for material identification. Materials are limited to those specified in BS 1560-3.2.

[b] Pressure/temperature ratings given are those for Class 150 given in BS 1560-3.2.

[c] Applies to range –10 °C to 40 °C.

[d] Grade 600/3 is limited to applications up to 120 °C.

7 Dimensions and tolerances

7.1 Face-to-face dimensions and tolerances for flanged end valves

The face-to-face dimensions and tolerances for flanged end non-clamp pattern valves shall be as given in Table 3. The face-to-face dimensions of flanged end, clamp pattern valves shall be as given in Table 4. Both sets of dimensions shall apply to unlined valves and include the raised faces of the flanges.

7.2 Body flange dimensions

The body flange dimensions shall comply with BS 4504-3.2 with the exception of valves having Class 125 and Class 150 flanges. The dimensions of Class 125 and Class 150 flanges shall be as given in BS 1560-3.2. The tolerance on Class 125 and Class 150 flange thicknesses shall be:

a) up to and including 32 mm: $^{+3.0}_{-0.0}$ mm;

b) over 32 mm thick: $^{+4.5}_{-0.0}$ mm.

Valves of nominal pressure PN 6 having spheroidal graphite cast iron bodies shall have body flange dimensions in accordance with grey cast iron flanges specified in BS 4504-3.2.

7.3 Threaded body ends

Threaded body ends shall have one of the following:

a) female taper or parallel threads complying with BS 21;

b) female taper threads complying with ANSI/ASME B1.20.1.

c) threads complying with BS 2779.

NOTE The manufacturer will supply threaded body ends complying with BS 21, female taper unless the purchaser specifically requests a parallel thread complying with BS 21, a female thread complying with ANSI/ASME B1.20.1 or threads complying with BS 2779 (see appendix A).

End sealing faces for parallel threads complying with BS 2779 shall have a smooth finish at 90° to the thread axis and shall have minimum outside diameters in accordance with Table 5. Body ends shall incorporate a method of holding the valve securely during installation, e.g. a hexagon shape or provision for a C-spanner.

Table 3 — Face-to-face dimensions and tolerances of flanged end non-clamp pattern valves

Nominal size	Face-to-face dimension					Tolerances
	PN 6	PN 10[a]		PN 16	PN 25	
	Basic series[b] 14	Basic series[b] 14	Basic series[b] 3	Basic series[b] 3	Basic series[b] 19	
DN	mm	mm	mm	mm	mm	mm
10	—	—	102	102	—	
15	—	—	108	108	140	
20	—	—	117	117	152	
25	—	—	127	127	165	
32	—	—	140	140	178	
40	140	140	165	165	190	
50	150	150	178	178	216	± 2
65	170	170	190	190	241	
80	180	180	203	203	283	
100	190	190	229	229	305	
125	200	200	254	254	381	
150	210	210	267	267	403	± 3
200	230	—	292	292	419	
250	250	—	330	330	457	
300	270	—	356	356	502	
350	290	—	381	381	572	
400	310	—	406	406	610	
450	330	—	432	432	660	
500	350	—	457	457	711	
600	—	—	508	508	787	
700	—	—	610	610	—	± 4
800	—	—	660	660	—	
900	—	—	711	711	—	
1 000	—	—	811	811	—	± 5

[a] The purchaser should state on his enquiry or order the basic series of PN 10 valves (see appendix A).

[b] Basic series of dimensions are in accordance with BS 2080.

Table 4 — Face-to-face dimensions of flanged end clamp pattern valves

Nominal size		Face-to-face dimension PN 10, PN 16, Class 125
DN	in	mm
25	1	81
40	$1^1/_2$	95
50	2	108
65	$2^1/_2$	125
80	3	129
100	4	172

NOTE The tolerances for these face-to-face dimensions are as given in Table 3.

7.4 Maximum height dimensions

The maximum overall heights of valves having sizes DN 40 to DN 1 000 and $1^1/_2$ to 24 shall comply with the dimensions given in Table 6 and shown in Figure 1.

NOTE The dimensions h_2 and h_3 given in Table 6 and shown in Figure 1 are for installation purposes and represent the maximum heights of valves complying with this standard.

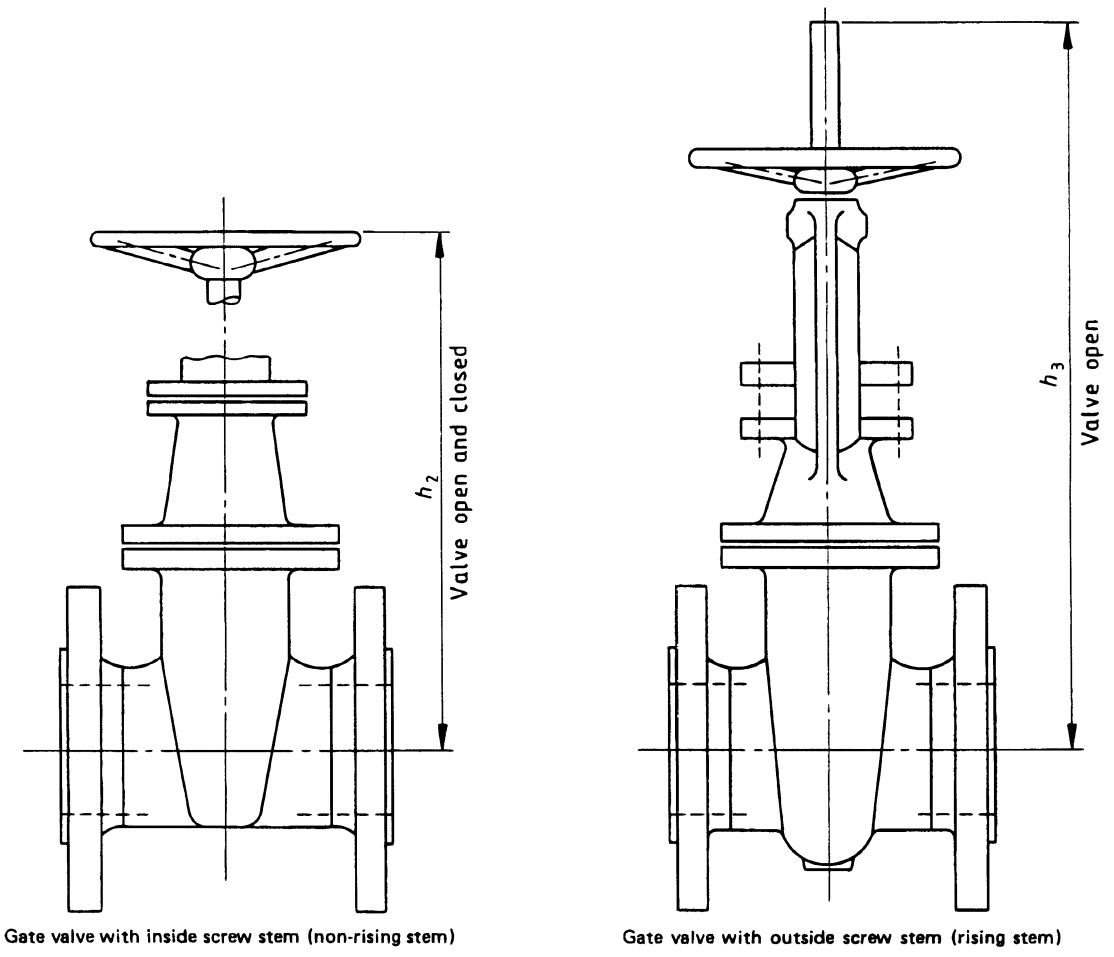
Table 5 — Minimum outside diameters of sealing faces for parallel threaded valves complying with BS 2779

Nominal size	Minimum outside diameter of sealing face
in	mm
$^1/_2$	26
$^3/_4$	32
1	39
$1^1/_4$	49
$1^1/_2$	55
2	68
$2^1/_2$	85
3	98
4	126
5	151
6	178

Table 6 — Maximum heights of valves

Nominal size		h_2	h_3
DN	in	mm	mm
40	$1^1/_2$	350	480
50	2	400	510
65	$2^1/_2$	425	560
80	3	475	610
100	4	575	720
125	5	650	875
150	6	700	950
200	8	850	1 200
250	10	1 025	1 440
300	12	1 125	1 675
350	14	1 150	1 900
400	16	1 275	2 070
450	18	1 350	2 250
500	20	1 500	2 430
600	24	1 700	2 850
700	—	1 800	3 250
800	—	2 000	3 750
900	—	2 400	4 150
1 000	—	2 500	4 450

NOTE Values for the maximum height of valves cover only the range of DN 40 to DN 1 000. Dimensions for h_2 and h_3 were taken from ISO 5996 which only covers the range DN 40 to DN 1 000.



NOTE. The illustrations are intended to show only the location of dimensions h_2 and h_3.

Figure 1 — Sketches showing maximum heights of valves

Section 2. Design

8 General

8.1 Non-clamp pattern valves

NOTE Valves may require a by-pass, if so required, the purchaser should state this requirement on his enquiry and/or order (see appendix A).

Non-clamp pattern valves shall have the following features (see appendix A):

a) inside screw stem (non-rising) or outside screw stem (rising);

b) solid wedge, split wedge or double disk obturator;

c) metallic or resilient obturator seatings;

d) metallic or resilient body seatings;

e) copper alloy faced, resilient seated or all iron trim;

f) flanged or threaded ends.

8.2 Clamp pattern valves

8.2.1 *General*. Clamp pattern valves shall have particular design features as described in **8.2.2** to **8.2.5**.

8.2.2 *Body-to-bonnet connection*. The body-to-bonnet connection shall be in the form of a "U" bolt which clamps around the base of the body and through two bolt holes in the bonnet.

8.2.3 *Stem sealing*. A screwed gland and gland nut shall effect the stem seal on all sizes.

8.2.4 *Seat bore*. The seat bore shall be not less than 90 % of the bore diameter given in Table 8.

8.2.5 *Screw stem*. The screw stem shall be an inside screw stem (rising).

9 Body or bonnet tappings

Where body or bonnet tappings are provided, they shall be one of the thread nominal sizes shown in Table 7.

NOTE The purchaser should specify on his enquiry and/or order the type of thread required for the body tapping. See appendix A.

Table 7 — Minimum thread nominal size for body or bonnet tappings

Nominal size	Minimum threaded nominal size
for valves up to and including DN 100	$^1/_2$
for valves DN 125 to DN 300	$^3/_4$
for valves DN 350 to DN 1 000	1

10 Stem sealing

The design of stem seal shall be one of the following:

a) stuffing box and gland;

NOTE 1 For valves larger than DN 40 or $1^1/_2$ it is essential that the gland is bolted.

NOTE 2 For all sizes of clamp pattern valves in particular, a screwed gland and gland nut is permitted. The screw gland and gland nut is a particular version of the stuffing box and gland and is the only method of stem sealing for clamp pattern valves used at present in the UK.

b) injector packing form;

c) toroidal sealing rings (O-rings).

When present the seal material shall be suitable for continuous use over the full range of service temperatures for which the valve has been designed.

NOTE The purchaser should state on the enquiry and/or order the maximum service temperature of the valve (see appendix A).

11 Body end ports and seat bores

11.1 The body end ports shall be circular.

NOTE Table 8 gives approximate values, for guidance only, for the bore dimensions at the body and ports of flanged valves.

11.2 Seat bores shall be circular and shall be not less than the dimensions given in Table 8 but any lugs required to facilitate the fitting of seat rings are permitted to intrude into the bore.

NOTE For clamp pattern valves see **8.2.4**.

12 Back seat

If valves with rising stems have a back seating surface in the bonnet, the back seating surface shall contact a corresponding seat on the stem when the valve is fully open. When a separate back seat bushing is provided it shall comply with the appropriate trim requirements given in Table 10.

NOTE The purchaser should state in his enquiry and/or order whether valves with rising stem are to have a back seating surface in the bonnet. (See appendix A.)

CAUTION. It is important to recognize the danger associated with the removal of the stem packing gland with pressure in the pipework system and the use of the backseat should not necessarily be regarded as a device permitting repacking of the stem packing gland whilst the valve is under pressure. In the case of some valves manufactured in accordance with this standard it is acknowledged that stem gland repacking is sometimes carried out without depressurizing the valve providing that the valve is in the fully open position. However, inside screw stem valves may not have a back seat bush and therefore should not be re-packed whilst the valve is under pressure.

Table 8 — Dimensions of body end ports and seat bores

1	2	3	4	5
Nominal size	Bore dimensions for PN ratings of:			
	PN 6	PN 10	PN 16	PN 25
DN	mm	mm	mm	mm
10	—	10	10	—
15	—	15	15	15
20	—	20	20	20
25	—	25	25	25
32	—	32	32	32
40	40	40	40	40
50	50	50	50	50
65	65	65	65	65
80	80	80	80	80
100	100	100	100	100
125	125	125	125	125
150	150	150	150	150
200	200	200	200	200
250	250	250	250	250
300	300	300	300	300
350	350	350	335	335
400	400	400	385	385
450	450	450	440	430
500	500	500	490	485
600	—	600	590	585
700	—	700	690	—
800	—	800	792	—
900	—	900	891	—
1 000	—	1 000	989	—

13 Valves for potable water

When used under the conditions for which they are designated, non-metallic products in contact with or likely to come into contact with potable water shall comply with BS 6920-1.

NOTE 1 Non-metallic products for installation and use in the United Kingdom which are verified and listed under the UK Water Fittings Byelaws Scheme are deemed to satisfy the requirements of this clause. Details of the Scheme are obtainable from the Water Research Centre Byelaws Advisory Service, 660 Ajax Avenue, Slough SL1 4BG.

Non-metallic products approved by the Department of the Environment Committee on Chemicals and Materials of Construction for use in Public Water Supply and Swimming Pools are considered free from adverse health effects for the purposes of compliance with this clause.

NOTE 2 A list of approved chemicals and materials and details of the approvals scheme is available from the Secretary of the Committee at the Department of the Environment, Water Division, Romney House, 43 Marsham Street, London SW1P 3PY.

NOTE 3 The purchaser should state in his enquiry and/or order whether when used under the conditions for which they are designated, non-metallic products come or are likely to come into contact with potable water. (See appendix A.)

14 Operation

14.1 Operation capability

Valves shall be capable of being operated by one of the appropriate devices, as specified in **14.2** when a differential pressure equal to the maximum pressure to which the valve can be subjected within its nominal rating exists across the wedge or disk.

14.2 Operating device

Valves shall be operated by one of the following:

a) a handwheel (either directly or via a gearbox);

b) a key which will close the valve;

NOTE The key is usually turned in a clockwise direction when facing the key. If required, the purchaser may state in his enquiry or order that the key may be turned anti-clockwise when facing the key (see appendix A).

c) an actuator complying with the dimensions of actuator attachment specified in BS 5840-1.

NOTE The purchaser should state in his enquiry and/or order which operating device is required. If actuator operation is required, the details of the enquiry actuator differential pressure across the valve, should be stated in the enquiry and/or order. (See appendix A.)

14.3 Handwheel

When provided with a handwheel, manually-operated valves shall be closed by turning the handwheel in a clockwise direction when facing the handwheel.

Handwheels or the plate secured below the handwheel nut shall be marked “close” or “shut” with an arrow to indicate the direction of closure.

NOTE In addition, handwheels or the plate secured below the handwheel nut may be marked “open” with an arrow to indicate the anti-clockwise direction of opening.

15 Indicators

If an indicator is provided, the marking shall show both open and shut positions.

NOTE The purchaser should state in his enquiry and/or order whether an indicator is to be provided. (See appendix A.)

Section 3. Materials

16 Body, bonnet, yoke and stuffing box materials

Body, bonnet, yoke and stuffing box components shall be manufactured from the materials given in Table 9.

NOTE The purchaser should state on his enquiry and/or order the body and bonnet material required. (See appendix A.)

Table 9 — Body, bonnet, yoke and stuffing box materials

Material	Standard reference	Grade
Grey (flake graphite) cast iron	BS 1452	220 260
	ASTM A126	B[a]
Spheroidal graphite cast iron	BS 2789	400/18 420/12 500/7 600/3
	ASTM A395	414-18
Malleable cast iron[b]	BS 6681	B 30-06[a] B 32-10 B 35-12

[a] Limited to PN 16 maximum.

[b] For clamp pattern valves only.

17 Trim, stem nut/yoke sleeve materials

Materials for the valve trim components and for the yoke sleeve shall be manufactured from one of the three categories given in Table 10.

NOTE The purchaser should state in his enquiry and/or order the materials for the valve trim components and for the yoke sleeve required. (See appendix A.)

Table 10 — Materials for trim components and yoke sleeve

Component	Category CF, copper alloy faced	Category RES, resilient seated	Category FE, all iron
Obturator with integral faces	Copper alloy complying with BS 1400 grades LG2, LG4, AB1	Grey cast iron complying with BS 1452 grade 220 minimum	Grey cast iron complying with BS 1452 grade 220 minimum
		Grey cast iron complying with ASTM A126 Class B	Grey cast iron complying with ASTM A126 Class B
		SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 500/7, 600/3	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 500/7, 600/3
		Malleable cast iron complying with BS 6681 grade B30-06	Malleable cast iron complying with BS 6681 grade B30-06
		Copper alloy complying with BS 1400 grades LG2, LG4, AB1	
Obturator with separate facings	Grey cast iron complying with BS 1452 grade 220 minimum	Grey cast iron complying with BS 1452 grade 220 minimum	Gray cast iron complying with BS 1452 grade 220 minimum
	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3
	Malleable cast iron complying with BS 6681 grade B30-06	Malleable cast iron complying with BS 6681 grade B30-06	Malleable cast iron complying with BS 6681 grade B30-06
Body seat and obturator facing	Copper alloy complying with BS 1400 grades LG2, LG4, AB1	Resilient material[a]	Grey cast iron complying with BS 1452 grade 220 minimum
	Copper alloy complying with BS 2874 grade CZ114		SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3
			Stainless steel complying with BS 970-1 grades 347S31, 302S31, 303S42, 431S29
			Stainless steel complying with BS 1504 grade 347C17
			Stainless steel complying with BS 3100 grade 347C17F
Stem	Copper alloy complying with BS 2872 and BS 2874, grades CZ112, CZ114, CZ116, CZ121, CZ122, CZ124, CA104, CA106, CA107	Copper alloy complying with BS 2782 and BS 2874, grades CZ114, CZ116, CZ121, CZ122, CZ124, CA104, CA106, CA107	Stainless steel complying with BS 970-1, grades 410S21, 431S29
	Copper alloy complying with ASTM B584 Alloy 864	Copper alloy complying with ASTM B584 Alloy 864	Steel complying with BS 970-1 grades 220M07, 230M07
	Copper alloy complying with BS 1400 grade LG2[b]	Copper alloy complying with BS 1400 grade LG2[b]	Steel complying with ASTM A182-F6A
	Copper alloy complying with ASTM B16-C3600	Steel complying with BS 970-1 grades 220M07, 230M07	Steel complying with ASTM A276-410
	Copper alloy complying with JIS-H3250, grade 6782		
	Stainless steel complying with BS 970-1 grades 410S21, 431S29	Stainless steel complying with BS 970-1, grades 410S21, 431S29	
Backseat bushing, obturator stem nut and yoke sleeve	Copper alloy complying with BS 2872 and BS 2874 grades CZ114, CZ116, CZ121, CZ122, CA104, CA106, CA107	Copper alloy complying with BS 2872 and BS 2874 grades CZ114, CZ116, CZ121, CZ122, CA104, CA106, CA107	Cu-Ni alloy[c]
	Copper alloy complying with ASTM B584 Alloy 864	Copper alloy complying with ASTM B584 Alloy 864	Copper alloy[c] complying with BS 2872 and BS 2874 grades CZ114, CZ116, CZ121, CZ122, CA104, CA106, CA107
	Copper alloy complying with BS 1400 grades LG2, LG4, AB1, AB2	Copper alloy complying with BS 1400 grades LG2, LG4, AB1, AB2	Copper alloy[c] complying with ASTM B584 Alloy 864
	Stainless steel complying with BS 970-1 grades 431S29, 303S31, 303S42, 316S33	Stainless steel complying with BS 970-1 grades 431S29, 303S31, 303S42, 316S33	Copper alloy[c] complying with BS 1400 grades LG2, LG4, AB1, AB2
	Stainless steel complying with BS 1504 grade 304C17	Stainless steel complying with BS 1504 grade 304C17	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3
	Stainless steel complying with BS 3100 grade 347C17F	Stainless steel complying with BS 3100 grade 347C17F	
	Grey cast iron (inside screw only) complying with BS 1452, grade 220 minimum	Grey cast iron (inside screw only) complying with BS 1452, grade 220 minimum	Grey cast iron complying with BS 1452 grade 220 minimum
	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3	SG cast iron complying with BS 2789 grades 350/22, 400/18, 420/12, 450/10, 500/7, 600/3	Steel complying with BS 970-1, grade 220M07
	Malleable cast iron complying with BS 6681, grade B30-06	Malleable cast iron complying with BS 6681, grade B30-06	Malleable cast iron complying with BS 6681, grade B30-06 (stem nut only)
	Austenitic cast iron complying with BS 3468 grades F3, S2 and S3	Austenitic cast iron complying with BS 3468 grades F3, S2 and S3	

NOTE Resilient facing can be either on the body seat or on the obturator; the material of the mating seat will then be selected respectively from the obturator (with integral or separate facing) or the body seat for category CF or FE trims.

[a] When used in contact with water for human consumption the resilient material is required to comply with BS 6920-1 (see clause **13**).

[b] Preferably produced by the continuous casting process.

[c] For yoke sleeve application only.

Section 4. Testing

18 Production pressure testing

All valves shall be hydrostatically pressure tested by the manufacturer before despatch in accordance with BS 6755-1. Clamp pattern valves of nominal size 2 or DN 50 and smaller shall be either hydrostatically or pneumatically tested. Valves of nominal size $2^{1}/_{2}$ or DN 65 and larger shall be hydrostatically tested.

The rate of leakage shall not exceed rate A as specified in BS 6755-1.

19 Test certificate

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

NOTE A test certificate is not normally provided. The purchaser should state in his enquiry and/or order whether a test certificate is required. (See appendix A.)

Section 5. Marking

20 Marking

20.1 General

Valves shall be marked in accordance with **20.2**, **20.3** and clause **21**, as appropriate.

20.2 Body markings

Body markings shall include:

a) nominal size (DN) for flanged valves, nominal size in inches for valves with Class 125 and Class 150 flanges or nominal threaded end size as appropriate (see clause **4**);

b) nominal pressure designation (PN), Class 125 or Class 150, as appropriate[2] (see clause **5**);

c) body material identification (see Table 11);

d) manufacturer's name or trade mark.

NOTE 1 Additional markings may be used at the option of the manufacturer provided that they do not conflict with any of the markings specified in **20.2**.

Body markings, with the exception of the nominal pressure designation on valves of nominal size DN 40 and smaller, shall be either 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 **20.3**. Valves with flanged ends of nominal size DN 40 and smaller shall be deemed to comply with this clause if the nominal pressure designation is clearly marked on the rim of the flange.

20.3 Body or identification plate markings

Body or identification plate markings shall include:

a) the number of this British Standard, i.e. BS 5150[3];

b) any pressure or temperature limitations imposed by the manufacturer due to limitations on materials or design including the maximum permissible working pressure;

c) trim materials identification (see clause **21**) for all trim categories, including aluminium bronze but excluding other types of copper alloy faced trims. Trim marking shall indicate trim in the following order:

1) stem;

2) disk;

3) seat.

NOTE Symbols indicating trim material may either be preceded by the words stem, disk or seat or used in the order given. (See also clause **21**.)

Table 11 — Identification symbols

Material	Identification symbol
Grey (flake graphite) cast iron	CI
Spheroidal graphite cast iron	SG
Malleable cast iron	MI
Gunmetal	GM
Brass	BR
Aluminium bronze	AB
Carbon steel	CS or STEEL
13 % Cr steel	CR 13
Stainless steels	SS
Resilient seats	RES
Integral faces	INT

21 Identification symbols

Symbols used to identify types of valves and body and trim materials for the purpose of marking shall be as given in Table 11.

NOTE Recommendations for the designation of valves for purchasing purposes are given in appendix B.

[2] Where, due to the small size of the valves, it is impracticable to incorporate the word "Class" this may be omitted.

[3] Marking BS 5150 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Section 6. Preparation for storage and transportation

22 General

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

23 Obturator position and body ends

Valve obturators, except for resilient seated valves, shall be in the closed position when despatched. Resilient seated valves shall be in the open position and unless they are in the fully open position the body end ports shall be covered with a material extending over the entire flange gasket face to exclude ultra-violet light.

Appendix A Information to be supplied by the purchaser

The following information should be included by the purchaser with his enquiry and order. It is the responsibility of the purchaser to ensure compliance with any appropriate application standard or code of practice (e.g. BS 6700).

a) The number of this British Standard,
i.e. BS 5150.

b) Valve type (see clause **3**).

c) Nominal size (see clause **4**) and type of threaded end, if applicable (see **7.3**).

d) Nominal pressure (see clause **5**).

e) Appropriate basic series of PN 10 valves (see Table 3).

f) Whether threaded end valves require a BS 21 parallel thread or a ANSI/ASME B1.20.1 taper thread or BS 2779 thread (see **7.3**).

g) Resilient or metal seated valve (see **8.1**).

h) Whether the valve is to be used for potable water service (see clause **13**).

i) Whether a body or bonnet tapping is required and, if so, the type of thread for the tapping (see clause **9**).

j) Form of stem sealing required and maximum service temperature (see clause **10**).

k) Whether a back seat is required with rising stem valves (see clause **12**).

l) Whether a by-pass is required (see **8.1**).

m) Operating device required (see **14.2**).

n) If anti-clockwise direction required when facing key (see note to item b) of **14.2**).

o) If actuator operation is required, details of the actuator and its power supply and the design maximum operating differential pressure across the valve (see note to **14.2**).

p) Whether an indicator is required (see clause **15**).

q) Body and bonnet material (see clause **16** and Table 9).

r) Trim materials (see clause **17** and Table 10).

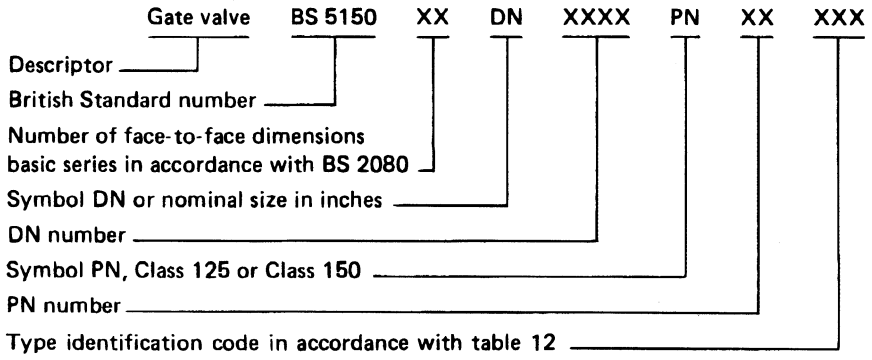
s) Whether a test certificate required (see clause **19**).

t) Requirements for any special marking (see clause **20**).

u) Special requirements for despatch (see clause **22** and **23**).

Appendix B Designation for purposes

A gate valve manufactured in accordance with this British Standard may be designated for purchasing purposes as follows.



Example:

Gate valve, handwheel operated, face-to-face dimension series 3, DN 500, PN 10, inside screw (symbol N)[4], all iron trim (symbol FE)[4], spheroidal graphite cast iron, (symbol SG), obturator type (see clause **3**).

Gate valve BS 5150 15 DN 500 PN 10 N FE SG ...

Table 12 — Identification codes

Item	Description	Code
Screwed stem	Outside	R
	Inside	N
Trim category	Copper alloy faced	CF
	Resilient seated	RES
	All iron	FE

[4] See Table 12 for identification codes.

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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 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 and stainless steels.*
BS 1400, *Specification for copper alloy ingots and copper alloy and high conductivity copper castings.*
BS 1452, *Specification for grey iron 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 1560-3.2, *Specification for cast iron flanges.*
BS 2080, *Specification for face-to-face, centre-to-centre, end-to-end and centre-to-end dimensions of flanged and butt-welding end steel valves for the petroleum, petrochemical and allied industries.*
BS 2779, *Specification for pipe threads for tubes and fittings where pressure-tight joints are not made on the threads (metric dimensions).*
BS 2789, *Specification for spheroidal graphite or nodular graphite cast iron.*
BS 2872, *Specification for copper and copper alloys. Forging stock and forgings.*
BS 2874, *Specification for copper and copper alloy rods and sections (other than forging stock).*
BS 3100, *Specification for steel castings for general engineering purposes.*
BS 3468, *Specification for austenitic cast iron.*
BS 4504, *Circular flanges for pipes, valves and fittings (PN designated).*
BS 4504,-3, *Steel, cast iron and copper alloy.*
BS 4504-3.2, *Specification for cast iron flanges.*
BS 5163, *Specification for predominantly key-operated cast iron gate valves for waterworks purposes.*
BS 5750, *Quality systems*[5)].
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 6700, *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.*
BS 6755, *Testing of valves.*
BS 6755-1, *Specification for production pressure testing requirements.*
BS 6920, *Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.*
BS 6920-1, *Specification.*
ISO 5996, *Cast iron gate valves*[5)].
ISO 6708, *Pipe components — Definition of nominal size.*
ISO 7268, *Pipe components — Definition of nominal pressure.*
ANSI/ASME B1.20.1, *Pipe threads, general purpose (inch).*
ASTM A126, *Specification for grey cast iron castings for valves, flanges and pipe fittings.*
ASTM A182, *Specification for forged or rolled alloy-steel pipe flanges, forged fittings and valves and parts for high-temperature service.*
ASTM A276, *Stainless and heat-resisting steel bars and shapes.*
ASTM A395, *Specification for ferritic ductile iron pressure-retaining castings for use at elevated temperatures.*
ASTM B16, *Specification for free-cutting brass rod, bar and shapes for use in screw machines.*
ASTM B584, *Copper alloy sand castings for general applications.*
JIS-H3250, *Copper and copper rods and bars.*

[5)] Referred to in the foreword only.

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