BRITISH STANDARD

BS 5157:1989

Specification for

Steel gate (parallel slide) valves

UDC 621.646.5:669.14:001.4:620.1

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 Building Component Manufacturers Ltd.
British Chemical Engineering Contractors Association
British Compressed Gases Association
British Foundry Association
British Gas plc
British Maritime Technology
British Shipbuilders
British Valve and Actuator Manufacturers Association Ltd.
Chartered Institution of Building Services Engineers
Copper Development Association
Copper Tube Fittings Manufacturers' 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
Steel Casting Research and Trade Association
Water Authorities' Association
Water Companies' Association

The following body was also represented in the drafting of the standard, through sub-committees:

Combustion Engineering Association

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Contents

Foreword

This British Standard has been prepared under the direction of the Piping Systems Components Standards Committee and constitutes the revision of BS 5157:1974 which is withdrawn.

At the time of publication of this British Standard, no corresponding international standard exists.

In carrying out this revision, the types and ranges of valves covered have been changed. The essential differences between this British Standard and BS 5157:1974 are:

a) valves having butt-weld ends are included for the first time;

b) valves having nominal pressure (PN) designations are limited to PN 16, PN 25 and PN 40 in accordance with BS 4504-3.1 and international philosophy on pressure designation;

c) valves of Class 400 designation have been omitted;

d) tolerances on face-to-face and end-to-end dimensions have been changed to obtain a practical compromise between European and American practices and this will become the practice for future British Standards for valves;

e) the materials given for the body, bonnet and stuffing box have been updated and are now a requirement;

f) production pressure testing requirements are now specified in detail by reference to BS 6755-1 and the test durations are generally longer.

Assessed capability. Users of this British Standard are advised to consider the desirability of assessment and registration of a supplier's quality systems against the appropriate Part of BS 5750 by a third party certification body.

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 18, 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

1.1 Scope

This British Standard specifies requirements for flanged end and butt-weld end carbon, carbon molybdenum and chromium molybdenum steel gate valves of the parallel slide type having hard metal, nickel alloy or stainless steel facings.

It covers valves of pressure designations PN 16, PN 25 and PN 40 with ends flanged in accordance with the appropriate tables of BS 4504-3.1 and Class 150, Class 300 and Class 600 designated valves with butt-weld ends and with ends flanged in accordance with the appropriate tables of BS 1560-3.1 for nominal sizes DN 40 to DN 600 and NPS 1½ to 24 inclusive.

NOTE 1 The information to be supplied by the purchaser at the time of enquiry/order is given in Appendix A.
NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Definitions

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

1.2.1
nominal size (DN) (for PN designated valves)

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 number.
NOTE 2 This definition is identical with that given in ISO 6708.

1.2.2
nominal pipe size (NPS) (for Class designated valves)

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

NOTE 1 Nominal pipe size is designated by the letters NPS followed by a number.
NOTE 2 NPS is used only in association with the Class system.

1.2.3
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 on materials, design and working temperatures and should be selected from the tables of pressure/temperature ratings given in the appropriate standard.
NOTE 2 Nominal pressure is designated by the letters PN followed by the appropriate reference number.
NOTE 3 This definition is identical with that given in ISO 7268.

1.2.4
class

a numerical designation for reference purposes

NOTE 1 The maximum allowable working pressure depends on materials, design and design temperature and should be selected from the tables of pressure/temperature ratings given in the appropriate standards.
NOTE 2 Class is designated by the word Class followed by the appropriate reference number.

1.2.5
special Class

a term applied to Class designated butt-weld end valves which have specified quality requirements for body/bonnet castings (see **4.1.1**), or in the case of forged valve bodies are limited in size to NPS 5(DN 125)

1.2.6

face-to-face dimension (for flanged valves, excluding ring joint flanged valves)
the distance, expressed in millimetres, between the connecting end facings upon which the gaskets are actually compressed

1.2.7

end-to-end dimension (for valves with butt-weld ends or ring joint flanges). the distance, expressed in millimetres, between the extremities of the connecting ends

1.3 Valve patterns

Valves shall be full bore pattern or venturi pattern.

NOTE If a particular pattern is required the purchaser should state the requirement on the enquiry and/or order (see Appendix A).

1.4 Size ranges

Valves shall be one of the following sizes selected from the appropriate size range.

PN designated range 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

Class designated range 1½ NPS, 2 NPS, 2½ NPS, 3 NPS, 4NPS, 5 NPS, 6 NPS, 8 NPS, 10 NPS, 12 NPS, 14 NPS, 16 NPS, 18 NPS, 20 NPS, 24 NPS

1.5 Nominal pressure (PN) and Class designation

Valves flanged in accordance with BS 4504-3.1 shall be designated by nominal pressure (PN) as follows: PN 16, PN 25 and PN 40.

Valves flanged in accordance with BS 1560-3.1 or with butt-weld ends shall be designated by Class as follows: Class 150, Class 300 and Class 600.

1.6 Pressure/temperature ratings

1.6.1 The pressure/temperature ratings applicable to valves designated by PN shall be as specified in BS 4504-3.1 for the particular body/bonnet material.

1.6.2 The pressure/temperature ratings applicable to flanged and butt-weld valves designated by Class (except for Special Class valves) shall be as specified in BS 1560-3.1 for the particular body/bonnet material.

1.6.3 The pressure/temperature ratings applicable to Special Class butt-weld end valves shall be as given in Table 1 to Table 4, as appropriate, for the particular body/bonnet material.

NOTE Restrictions on temperature may be placed by the manufacturer on valves complying with this standard due to valve type, trim materials or other factors, in which case valves are marked with the limiting temperature [see **6.3** d)].

Table 1 — Pressure/temperature ratings for Special Class butt-weld end valves: material carbon steel

Temperature	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
°C	bar[a]	bar[a]	bar[a]
– 29 to 38	20.0	51.7	103.4
50	20.0	51.7	103.4
100	20.0	51.7	103.4
150	20.0	51.7	103.4
200	20.0	51.7	103.4
250	20.0	51.7	103.4
300	19.1	49.9	99.7
350	18.4	48.1	96.3
375	18.1	47.2	94.5
400	16.5	43.1	86.3
425	13.8	35.9	71.9
450	9.6	25.0	50.1
475	6.5	16.9	33.9
500	4.2	11.0	22.0

NOTE 1 For temperature limitations on specific materials see Table 9.
NOTE 2 Intermediate values may be obtained by linear interpolation.
[a] 1 bar = 10^5 N/m^2 = 10^5 Pa.

Table 2 — Pressure/temperature ratings for Special Class butt-weld end valves: material carbon molybdenum steel

Temperature	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
°C	bar	bar	bar
– 29 to 38	18.4	47.9	95.8
50	18.4	47.9	95.8
100	18.4	47.9	95.8
150	18.4	47.9	95.8
200	18.4	47.9	95.8
250	18.4	47.9	95.8
300	18.4	47.9	95.8
350	18.4	47.9	95.8
375	18.4	47.9	95.8
400	18.4	47.9	95.8
425	18.4	47.9	95.8
450	18.0	46.9	93.8
475	16.1	42.1	84.2
500	11.5	30.1	60.2

NOTE 1 For temperature limitations on specific materials see Table 9.
NOTE 2 Intermediate values may be obtained by linear interpolation.

Table 3 — Pressure/temperature ratings for Special Class butt-weld end valves: material 1 % chromium ½ % molybdenum steel and 1¼ % chromium ½ % molybdenum steel

Temperature	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
°C	bar	bar	bar
– 29 to 38	20.0	51.7	103.4
50	20.0	51.7	103.4
100	20.0	51.7	103.4
150	20.0	51.7	103.4
200	20.0	51.7	103.4
250	20.0	51.7	103.4
300	20.0	51.7	103.4
350	18.8	49.2	98.3
375	18.1	47.3	94.7
400	17.5	45.7	91.5
425	16.8	43.9	87.7
450	16.2	42.3	84.5
475	15.2	39.6	79.1
500	13.3	34.7	69.5
525	9.7	25.3	50.7
550	6.1	16.0	31.9
575	4.1	10.6	21.2
600	2.8	7.4	14.7

NOTE 1 Consideration should be given to the possibility of excessive oxidation (scaling) at temperatures above 566 °C.
NOTE 2 For temperature limitations on specific materials see Table 9.
NOTE 3 Intermediate values may be obtained by linear interpolation.

Table 4 — Pressure/temperature ratings for Special Class butt-weld end valves: material 2¼ % chromium 1 % molybdenum steel

Temperature	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
°C	bar	bar	bar
– 29 to 38	20.0	51.7	103.4
50	20.0	51.7	103.4
100	20.0	51.7	103.4
150	20.0	51.7	103.4
200	20.0	51.7	103.4
250	19.5	51.0	102.0
300	19.5	50.8	101.7
350	19.5	50.8	101.5
375	19.4	50.5	101.0
400	19.3	50.2	100.4
425	19.0	49.7	99.4
450	18.1	47.2	94.3
475	16.4	42.8	85.5
500	13.7	35.7	71.4
525	10.5	27.4	54.8
550	7.8	20.5	40.9
575	5.6	14.6	29.3
600	3.7	9.5	19.1

NOTE 1 Consideration should be given to the possibility of excessive oxidation (scaling) at temperatures above 566 °C.
NOTE 2 For temperature limitations on specific materials see Table 9.
NOTE 3 Intermediate values may be obtained by linear interpolation.

Section 2. Body ends

2.1 Flanged body ends

2.1.1 Flange dimensions and facing types shall comply with BS 4504-3.1 for PN designated valves or BS 1560-3.1 for Class designated valves.

NOTE The purchaser should state in the enquiry or order whether PN or Class designated valves are required and the type of flange facing required.

2.1.2 Flanges shall be at right angles to the axis of the bore and concentric with the body end port.

NOTE The purchaser should state in the enquiry or order whether flanges without bolt holes are required. The bolt holes will be "off-centres" unless otherwise specified in the enquiry or order.

2.1.3 The face-to-face dimensions shall be as given in Table 5 except that for flanges complying with BS 1560-3.1 with ring-joint faces the end-to-end dimensions shall be as given in Table 6.

NOTE 1 For flanges with other types of facings consult the manufacturer for dimensions.

NOTE 2 The purchaser should specify in the enquiry or order the basic series of dimensions required.

2.1.4 The body end ports shall be circular.

NOTE Approximate values for the bore diameters at the body end ports are given in Appendix C for guidance only.

2.2 Butt-weld body ends

2.2.1 Butt-weld ends shall be at right angles to the axis of the valve body end port.

2.2.2 End-to-end dimensions for butt-weld end valves shall be as given in Table 7.

NOTE The details for the weld preparation for butt-weld end valves are not a requirement of this standard but attention is drawn to Appendix B which gives details of weld-end preparations. It is encumbent upon the purchaser to specify a particular weld-end preparation, if required (see Appendix A).

Table 5 — Face-to-face dimensions and tolerances for flanged end valves with raised faces

Nominal size		Face-to-face dimensions for designations					Tolerance
PN designated	Class designated	PN 16 and Class 150	PN 25, PN 40 and Class 300		Class 600		
		Basic series 3[a]	Basic series 19[a]	Basic series 4[a]	Basic series 56[a]	Basic series 5[a]	
DN	NPS	mm	mm	mm	mm	mm	mm
40	1½	165	190	190	152	241	
50	2	178	216	216	178	292	
65	2½	190	241	241	216	330	
80	3	203	283	283	254	356	
100	4	229	305	305	305	432	± 2.0
125	5	254	381	381	381	508	
150	6	267	403	403	457	559	
200	8	292	419	419	584	660	
250	10	330	457	457	711	787	
300	12	356	502	502	813	838	
350	14	381	572	762	889	889	
400	16	406	610	838	991	991	
450	18	432	660	914	1 092	1 092	± 3.5
500	20	457	711	991	1 194	1 194	
600	24	508	787	1 143	1 397	1 397	

[a] Basic series of face-to-face dimensions are given in BS 2080.

Table 6 — End-to-end dimensions and tolerances for valves with body ends flanged to BS 1560-3.1 having ring-joint faces

Nominal pipe size	End-to-end dimensions for ring-joint faced flanged valves for Class designation					Tolerance
Class designated	Class 150	Class 300	Class 300	Class 600	Class 600	
		Basic series 19R[a]	Basic series 4R[a]	Basic series 56R[a]	Basic series 5R[a]	
NPS	mm	mm	mm	mm	mm	mm
1½	178	203	203	152	241	
2	190	232	232	181	295	
2½	203	257	257	219	333	
3	216	298	298	257	359	± 2.0
4	241	321	321	308	435	
5	267	397	397	384	511	
6	279	419	419	460	562	
8	305	435	435	587	664	
10	343	473	473	714	791	
12	368	518	518	816	841	
14	394	587	778	892	892	
16	419	625	854	994	994	± 3.5
18	444	676	930	1 095	1 095	
20	470	730	1 010	1 200	1 200	
24	521	810	1 165	1 407	1 407	

[a] Basic series of end-to-end dimensions are given in BS 2080.

Table 7 — End-to-end dimensions and tolerances for butt-weld end valves

Nominal pipe size	End-to-end dimensions for Class designations					Tolerance
Class designated	Class 150	Class 300	Class 300	Class 600	Class 600	
	Basic series 51[a]	Basic series 51[a]	Basic series 4[a]	Basic series 56[a]	Basic series 5[a]	
NPS	mm	mm	mm	mm	mm	mm
1½	165	190[b]	190	152	241	
2	216	216	216	178	292	
2½	241	241	241	216	330	
3	283	283	283	254	356	
4	305	305	305	305	432	± 2.0
5	381	381	381	381	508	
6	403	403	403	457	559	
8	419	419	419	584	660	
10	457	457	457	711	787	
12	502	502	502	813	838	
14	572	572	762	889	889	
16	610	610	838	991	991	± 3.5
18	660	660	914	1 092	1 092	
20	711	711	991	1 194	1 194	
24	813	787[b]	1 143	1 397	1 397	

[a] Basic series are given in BS 2080.
[b] Dimension differs from basic series.

Section 3. Design

NOTE 1 The purchaser should state on the enquiry and/or order if a back seat is specifically required (see Appendix A).
NOTE 2 The back seat should not be regarded as a device permitting repacking of the stem packing gland whilst the valve is under pressure as this is recognized as a dangerous practice.

3.1 Bodies

NOTE Typical steel gate (parallel slide) valve constructions are given in Appendix D.

3.1.1 Seat bores

For full bore pattern valves the seat bore diameter shall be not less than 90 % of the body end port diameter.

In the case of venturi pattern valves the seat bore diameter shall be not less than 60 % of the body end port diameter.

It is permissible for any lugs required to facilitate the fitting of seat rings to intrude into the bore.

3.1.2 Drain tappings

It is permissible to provide a drain tapping threaded to comply with BS 21 or ANSI B1.20.1 which shall be of the appropriate size as given in Table 8.

NOTE The purchaser should state on the enquiry and/or order if a drain tapping, and a plug are required and, if so, the thread form required (see Appendix A).

Table 8 — Drain tapping sizes

Nominal size		Drain tapping size
DN	NPS	
40 to 100	1½ to 4	½
125 to 300	5 to 12	¾
350 to 600	14 to 24	1

3.2 By-pass

Any by-pass supplied shall be external to the main valve and be of the following size:

Valve size	By-pass size
DN 200 to DN 300 or NPS8 to NPS12	DN 20, NPS¾
DN 350 or NPS14 and larger	DN 32, NPS1¼

NOTE If a by-pass is required this should be specified by the purchaser in the enquiry or order (see Appendix A).

3.3 Body to bonnet connection

The body to bonnet connection shall be either:

a) bolted; or

b) pressure seal type.

3.4 Stems

The actuating thread on stems shall be outside the pressure containing components and shall be of trapezoidal or square form.

3.5 Operation

3.5.1 Valves shall be operated by one of the following, as appropriate: handwheel, chainwheel, gearbox or actuator.

NOTE 1 The type of operation required should be stated by the purchaser in the enquiry or order (see Appendix A).
NOTE 2 If chainwheel operation is required, the type of chainwheel and chain should be specified in the enquiry and/or order (see Appendix A).
NOTE 3 If gear operation is required, the type of gearing and its arrangement together with the maximum operating differential pressure across the valve should be specified in the enquiry and/or order (see Appendix A).
NOTE 4 If actuator operation is required, the details of the actuator and its power supply together with the maximum operating differential pressure across the valve should be specified in the enquiry and/or order (see Appendix A). Dimensions of actuator attachment should comply with BS 5840-1, when appropriate.
NOTE 5 For manually operated valves, clockwise closing will always be supplied unless the purchaser specifically requests anti-clockwise closing (see Appendix A).

3.5.2 Handwheels shall be marked **CLOSE** or **SHUT** with an arrow to indicate the direction of closure.

NOTE In addition, handwheels may be marked OPEN with an arrow to indicate the direction of opening. Alternatively, these markings may be shown on a plate secured below the handwheel nut.

3.5.3 Handwheels shall be securely fitted yet allow for removal and replacement when necessary.

The design of the handwheel, when fitted, or the method of handwheel to stem attachment, shall be such as to permit the fitting of a 1.5 mm thick service nameplate.

3.5.4 If an indicator is provided the marking shall show both **OPEN** and **SHUT** positions.

NOTE The purchaser should state a requirement for an indicator on the order and/or enquiry (see Appendix A).

3.6 Bolting

Bolting threads shall be in accordance with ISO metric or unified inch standards. The dimensions and finish of bolting shall comply with the following British Standards as appropriate.

metric	inch
BS 3692	BS 1768 (below ½ in)
BS 4190	BS 1769
BS 4439	BS 2693-1
BS 4882	BS 4882

3.7 Seats

Body seat rings shall be so fitted as to avoid their becoming loose in service. Threaded seat rings shall be designed to facilitate removal.

3.8 Disks

Disks shall be guided to ensure alignment relative to the body seats and the stem. The guides are permitted to be external to the body.

3.9 Stem glands

Valves shall be provided with means for sealing the stem. Glands, when fitted, of DN 40 and NPS 1½ valves shall be screwed or bolted; all other sizes of valves shall be bolted.

3.10 Yokes

Yokes shall be one of the following types:

a) integral with the bonnet;

b) separate from the bonnet;

c) in the form of a bridge mounted on pillars.

3.11 End connections

Ends, flanged or butt-weld, shall be integral or welded-on. Where ends are welded-on the welding shall comply with BS 2633 or BS 4677 as appropriate.

Section 4. Materials

4.1 Pressure containing shell

4.1.1 The body, bonnet and stuffing box materials shall be selected from Table 9.

4.1.2 Where butt-weld end valves are designated Special Class the materials for the body, bonnet and stuffing box shall be selected from Table 9 and castings shall comply with the following quality levels given in BS 5998.

a) Quality level IV for all sizes of Class 150 and Class 300 valves [see also item d)].

b) Quality level IV for sizes up to and including NPS 5 (DN 125) for Class 600 valves [see also item d)].

c) Quality level III for sizes NPS 6 (DN 150) and greater for Class 600 valves.

d) Quality level III for the butt-weld ends.

4.2 Disks and body seats

The material used for disks and body seat rings shall be suitable for the pressure/temperature ratings appropriate for the material of the pressure containing shell, unless the valve is derated (see note to **1.6.3**).

4.3 Facings for disk, body seat and body

The material used for disk facings, body seat facings and body facings shall be nickel alloy, stainless steel or hard facing alloy and shall be suitable for the pressure/temperature ratings appropriate for the material of the pressure containing shell unless the valve is derated (see note to **1.6.3**).

4.4 Stems

The material used for stems shall be stainless steel and suitable for the pressure/temperature ratings appropriate for the material of the pressure containing shell unless the valve is derated (see note to **1.6.3**).

4.5 Stem glands, body seals and gaskets

Materials for stem glands, body seals and gaskets shall be suitable for use at the maximum temperature rating applying to the valve. The minimum corrosion resistance of any metallic part of the gasket shall be equal to the corrosion resistance of the shell.

4.6 Bolting

The material of bolting for pressure-containing purposes shall comply with BS 4882. Carbon steel bolting shall only be used for valves of Class 150 and PN 16 and at a maximum service temperature not exceeding 230 °C. Free cutting steel for bolting shall not be used.

4.7 Handwheel

When fitted, the handwheel shall be of steel, grey cast iron, malleable cast iron or nodular (spheroidal) graphite cast iron.

Table 9 — Materials for body, bonnet and stuffing box[a]

Material	Forgings			Castings		
	British Standard[b]	Comparable ASTM standard[c]	Symbol	British Standard[b]	Comparable ASTM standard[c]	Symbol
Carbon steel	BS 1503-164-490 BS 1503-221-430	A 105	A 105 221	BS 1504-161 grade 480	A 216 grade WCB	WCB
Carbon molybdenum steel	BS 1503-245-420	A 182 grade F1	F1	BS 1504-245	A 217 grade WC1	WC1
1 % chromium ½ % molybdenum steel	BS 1503-620-440	A 182 grade F12	F12			
1¼ chromium ½ % molybdenum steel	BS 1503-621-460	A 182 grade F11	F11	BS 1504-621	A 217 grade WC6	WC6
2¼ % chromium 1 % molybdenum steel	BS 1503-622-490	A 182 grade F22	F22	BS 1504-622	A 217 grade WC9	WC9

[a] Appropriate carbon, carbon manganese and alloy steel plate, bar, section and tubular product materials as given in BS 5500 are permitted for the manufacture of components, in which case the requirements of BS 5500 shall apply to these materials.

[b] For British Standard materials the maximum allowable temperatures shall be in accordance with BS 5500.

[c] For ASTM materials the maximum allowable temperatures shall be in accordance with the appropriate ASTM standards and/or ANSI standards.

Section 5. Testing

5.1 Production pressure testing

All assembled valves shall be pressure tested by the manufacturer, before despatch, in accordance with BS 6755-1.

The shell test shall be a hydrostatic test.

The seat test and, if the valve incorporates a back seat, the back seat test shall be either hydrostatic or pneumatic.

NOTE 1 Hydrostatic seat and back seat tests are recommended in preference to pneumatic tests. If a purchaser specifically requires a pneumatic test then it should be stated on the enquiry and/or order for the valves (see Appendix A).

The test durations shall be as given in Table 10. The maximum leakage rate shall be rate A, rate B or rate C as given in BS 6755-1.

NOTE 2 The maximum leakage rate required should be specified by the purchaser in the enquiry or order. If a maximum leakage rate is not specified then valves with leakage rate C will be supplied (see Appendix A).

NOTE 3 The purchaser may specify longer test durations (see Appendix A).

5.2 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 medium used in the test.

NOTE If a test certificate is required this should be specified by the purchaser in the enquiry or order (see Appendix A).

5.3 Manufacturer's certificate

When required by the purchaser the manufacturer shall supply a certificate stating that the valves and valve parts comply in all respects with the requirements of this standard.

NOTE If a manufacturer's certificate is required this should be specified by the purchaser in the enquiry or order (see Appendix A).

Table 10 — Test durations

Nominal size	Minimum test duration for shell, seat and back seat tests
	min
Up to and including DN 150 Up to and including NPS 6	2
Over DN 150 and up to and including DN 250 Over NPS 6 and up to and including NPS 10	3
Over DN 250 and up to and including DN 450 Over NPS 10 and up to and including NPS 18	4
Over DN 450 Over NPS 18	5

Section 6. Marking

6.1 General

Each valve shall be clearly marked with the body and identification plate markings specified in **6.2** and **6.3**.

6.2 Body markings

Body markings shall be integral with the body or on a plate securely fixed to the body. The plate shall be separate and distinct from the identification plate referred to in **6.3**. Body markings shall include the following.

a) Nominal size, expressed as DN or given in inches (NPS) as appropriate for PN designated or Class designated valves respectively.

b) Pressure designation PN, Class or Special Class (SPL) as appropriate, e.g. PN 16, 300 or 300 SPL respectively.

c) Body material symbol (see Table 9).

d) Manufacturer's name or trade mark.

6.3 Identification plate markings

Identification plates shall be marked with the following.

a) The number of this British Standard, i.e. BS 5157[1)].

b) The manufacturer's figure or number identifying the valve in all respects. The same figure or number shall, therefore, only be used for valves that are identical in design, detail, dimensions and material, and that have interchangeable parts.

NOTE 1 This identification may be used to determine the precise pressure/temperature rating of the valve from the manufacturer's technical data.

c) Trim materials identification (see **6.4**). Trim marking shall indicate trim in the following order: stem; disk facing; seat facing.

NOTE 2 Symbols indicating trim material may either be preceded by the words stem, disk, or seat, or used in the order indicated.

d) Any limiting temperature (in degrees Celsius) (see note to **1.6**).

NOTE 3 Additional markings may be used at the option of the manufacturer providing they do not conflict with any of the specified markings.

6.4 Material symbols

6.4.1 The symbols for body, bonnet and stuffing box materials as given in Table 9 shall be used to identify the body material [see **6.2** c)].

6.4.2 When appropriate the symbols given in Table 11 shall be used for trim material identifications [see **6.3** c)].

Table 11 — Trim material identification symbols

Material	Symbol
Stainless steel	SS
Nickel alloy	NA
13 % chromium	CR 13
Hard facing	HF

6.5 Omission of markings

On valves DN 40, NPS 1½ it is permissible to omit the body markings in the following order provided they are shown on the identification plate:

a) nominal size;

b) manufacturer's name or trademark.

[1)] Marking BS 5157 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 7. Preparation for storage and transportation

7.1 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 painting of valves is required this should be specified by the purchaser (see Appendix A).

7.2 Body Ends

Unless otherwise specified all valves shall have body ends sealed to exclude foreign matter during transit and storage (see Appendix A).

7.3 Disk position

If body ends are not sealed (see **7.2**) valve disks shall be in the closed position when despatched unless otherwise specified by the purchaser (see Appendix A).

Appendix A Information to be supplied by purchaser

A.1 Essential information

The following information should be supplied by the purchaser in an enquiry or order.

a) The number of this British Standard,
i.e. BS 5157.

b) Nominal size of the valve (see **1.4**).

c) Designation of the valve, i.e. PN, Class or Special Class.

d) The basic series of dimensions required
(see **2.1.3** and Table 6).

e) Type of valve pattern required, i.e. full bore or venturi (see **1.3**).

f) Trim materials required (see **4.2** and **4.3**).

g) Type of body ends required, i.e. flanged or butt welded.

h) If flanged body ends are required, the type of flange facing required (see **2.1.1**), whether flanges without bolt holes are required and if bolt holes not "off-centres" are required (see **2.1.2**).

i) If butt welded ends are required, the pipe schedule number or the wall thickness and outside diameter of the pipe to which the valve is to be welded and details of any special weld preparation required (see note to **2.2.2**).

j) Type of operation required (see **3.5.1**).

k) Whether anti-clockwise closing is required
(see note 5 to **3.5.1**).

l) If chainwheel operation is required, details of the chainwheel and chain (see note 2 to **3.5.1**).

m) If gear operation is required, details of the gearing and its arrangement on the valve and the design maximum operating differential pressure across the valve (see note 3 to **3.5.1**).

n) 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 4 to **3.5.1**).

o) The particular form of attachment of the end flanges required (see **3.10** and Appendix B).

p) Body materials required (see **4.1.1**)

q) Production pressure test maximum leakage rate (see **5.1**).

r) Whether body ends should not be sealed for despatch (see **7.2**).

s) Position of disk if body ends are not sealed (see **7.3**).

A.2 Information about options

The following information about options should be supplied by the purchaser in the enquiry or order.

NOTE Items a) to i) will not be supplied or carried out unless specified in the enquiry or order.

a) Whether a back seat is required (see note to section 3).

b) Whether an indicator is required (see **3.5.4**).

c) Whether a drain tapping is required and if so its thread form and whether a plug is required (see **3.1.2**).

d) Whether a by-pass is required (see **3.2**).

e) Whether a pneumatic seat (and back seat) production pressure test is required (see **5.1**).

f) Whether a longer production pressure testing time is required (see **5.1**).

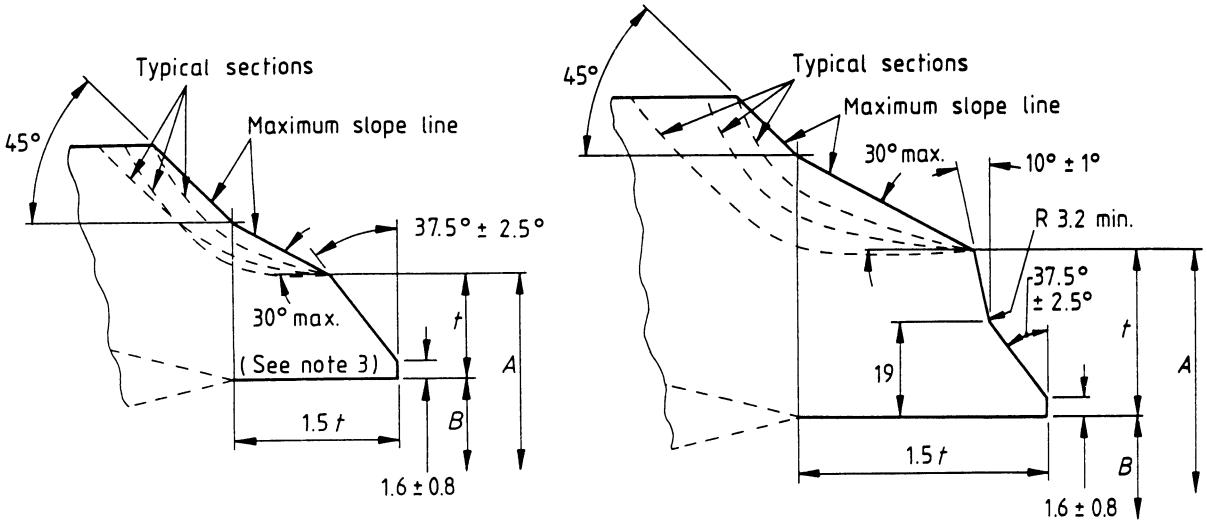
g) Whether a test certificate is required (see **5.2**).

h) Whether a manufacturer's certificate is required (see **5.3**).

i) Whether valves are to be painted
(see note to **7.1**).

Appendix B Weld-end preparations

Typical weld-end preparations are shown in Figure 1. Values for the nominal inside and outside diameters of the weld-end are given in Table 12.



All dimensions are in millimetres.

a) Weld-end for connection to pipe of wall thickness t of 22 mm or less

NOTE 1 A is the nominal outside diameter of welding end (see Table 12); B is the nominal inside diameter of pipe (for tolerance on B, see Table 12); t is the nominal wall thickness of pipe.

NOTE 2 Dotted lines denote maximum envelope for transitions from welding groove.

NOTE 3 The inside and outside surfaces of valve welding ends should be machine finished overall. Contour within the envelope is at the manufacturer's option unless otherwise specifically ordered.

b) Weld-end for connection to pipe of wall thickness t greater than 22 mm

NOTE 4 Intersections should be slightly rounded.

NOTE 5 Valves having nominal wall thickness of 3 mm or less at the weld preparation may have ends cut square or slightly chamfered ends.

NOTE 6 For nominal outside diameters and wall thicknesses of steel pipe, see ANSI B36.10 or BS 1600-2.

NOTE 7 Regardless of tolerances specified for dimensions A and B, the thickness of the weld-end should never be less than 87.5 % of the nominal thickness of the pipe.

Figure 1 — Weld-end preparation

Table 12 — Weld-end preparation

Valve nominal size		A	Tolerance on A	Tolerance on B
DN	NPS	mm		
40	1½	50	+2.5	± 1
50	2	62	− 1	
65	2½	75[a]		
80	3	91		
100	4	117		
150	6	172		
200	8	223		
250	10	278	+4	
300	12	329	− 1	± 2
350	14	362		
400	16	413		
450	18	464		
500	20	516		
600	24	619		

[a] A is 78 mm when used with pipe complying with BS 3600.

Appendix C Approximate diameters of body end ports

Approximate diameters of body end ports are given in Table 13.

Table 13 — Approximate diameters of body end ports

Nominal size		Approximate diameters of body end ports		
PN designated	Class designated	PN 16 and Class 150	PN 25, PN 40 and Class 300	Class 600
DN	NPS	mm	mm	mm
40	1½	40	40	40
50	2	50	50	50
65	2½	65	65	65
80	3	80	80	80
100	4	100	100	100
125	5	125	125	125
150	6	150	150	150
200	8	200	200	200
250	10	250	250	250
300	12	300	300	300
350	14	335	335	325
400	16	385	385	375
450	18	440	430	420
500	20	490	485	465
600	24	590	585	560

Appendix D Typical steel gate (parallel slide) valves

Typical constructions of steel gate (parallel slide) valves are shown in Figure 2, Figure 3 and Figure 4 which show some typical variations in individual details. A product utilizing any combination of the details shown in each particular figure (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.

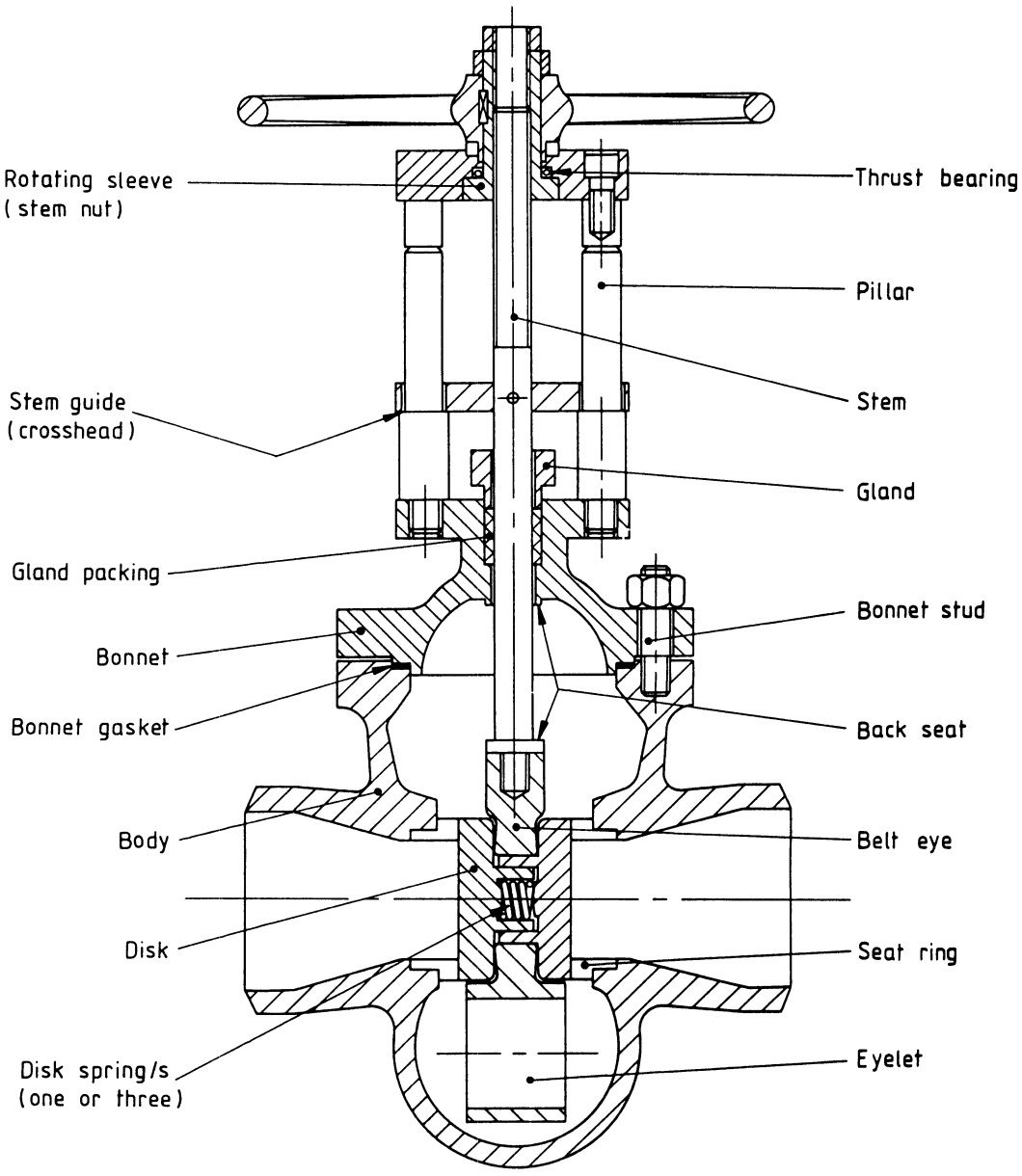


Figure 2 — Venturi pattern with eyelet

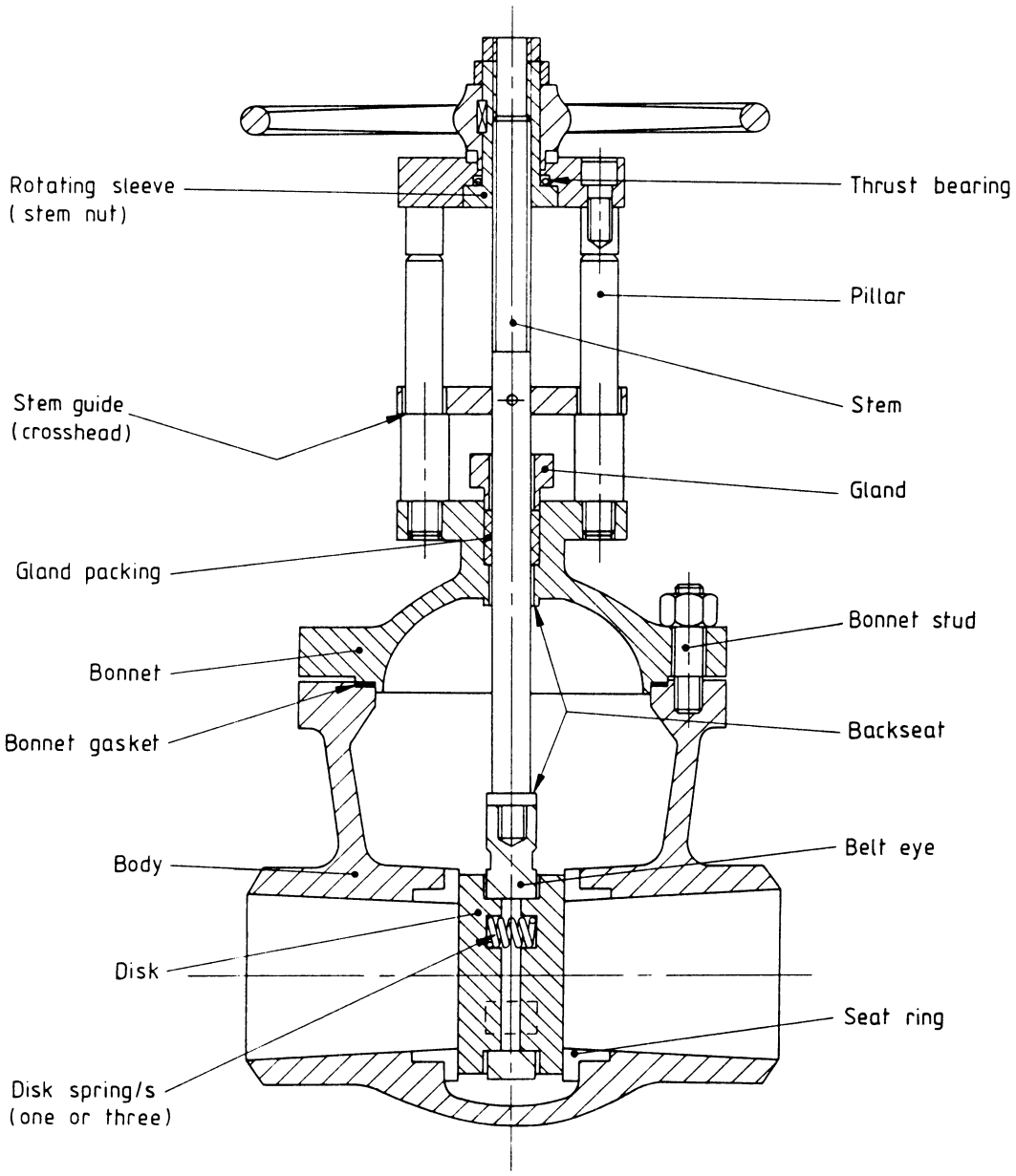


Figure 3 — Full bore pattern without eyelet

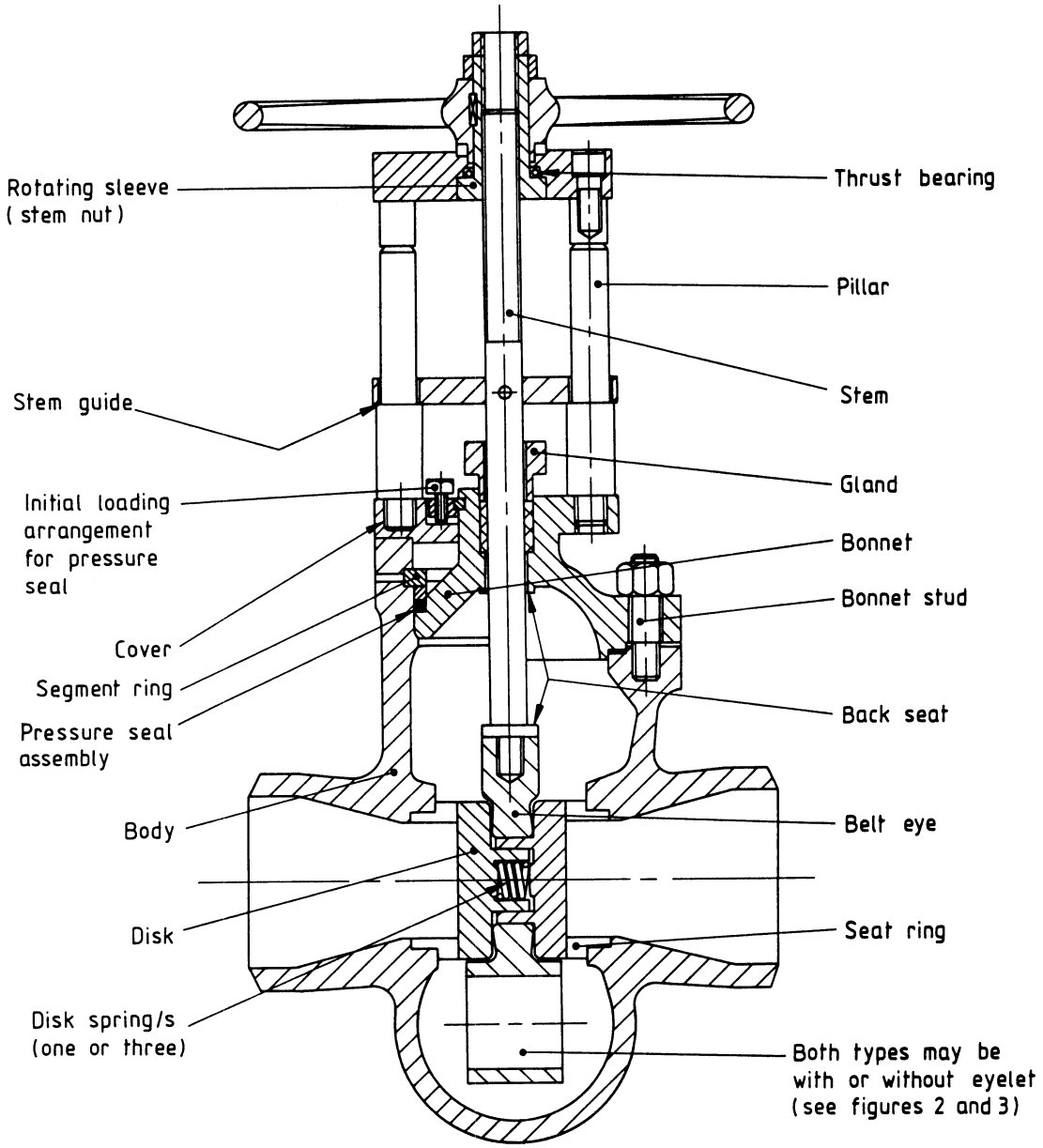


Figure 4 — Pressure seal and bolted bonnet assemblies

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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 1503, *Specification for steel forgings (including semi-finished forged products) for pressure purposes.*

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 1600, *Specification for dimensions for steel pipe for the petroleum industry.*

BS 1600-2, *Metric units.*

BS 1768, *Specification for unified precision hexagon bolts, screws and nuts (UNC and UNF threads). Normal series.*

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

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

BS 2633, *Specification for class 1 arc welding of ferritic steel pipework for carrying fluids.*

BS 2693, *Specification for screwed studs.*

BS 2693-1, *General purpose studs.*

BS 3600, *Specification for dimensions and masses per unit length of welded and seamless steel pipes and tubes for pressure purposes.*

BS 3692, *Specification for ISO metric precision hexagon bolts, screws and nuts.*

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

BS 4439, *Specification for screwed studs for general purposes. Metric series.*

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

BS 4882, *Specification for bolting for flanges and pressure containing purposes.*

BS 5500, *Specification for unfired fusion welded pressure vessels.*

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

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

BS 5998, *Specification for quality levels for steel valve castings.*

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.*

ANSIB36.10, *Welded and seamless wrought steel pipe.*

ANSIB1.20.1, *Pipe threads, general purpose (inch).*

ASTM A105, *Specification for forgings, carbon steel, for piping components.*

ASTM A182, *Specification for forged or rolled alloy-steel pipe flanges, forged fittings, and valves and parts for high-temperature service.*

ASTM A216, *Specification for carbon-steel castings suitable for fusion welding for high-temperature service.*

ASTM A217, *Specification for martensitic stainless steel and alloy steel castings for pressure-containing parts suitable for high-temperature service.*

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