

Specification for

Steel gate (parallel slide) valves

UDC 621.646.5:669.14:001.4:620.1

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

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

This British Standard, having been prepared under the direction of the Piping Systems Components Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 July 1989

© BSI 04-1999

First published December 1974
First revision July 1989

The following BSI references relate to the work on this standard:
Committee reference PSE/7
Draft for comment 87/72143 DC

ISBN 0 580 17297 X

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
Section 1. General	
1.1 Scope	1
1.2 Definitions	1
1.3 Valve patterns	1
1.4 Size ranges	1
1.5 Nominal pressure (PN) and Class designation	1
1.6 Pressure/temperature ratings	2
Section 2. Body ends	
2.1 Flanged body ends	4
2.2 Butt-weld body ends	4
Section 3. Design	
3.1 Bodies	6
3.2 By-pass	6
3.3 Body to bonnet connection	6
3.4 Stems	6
3.5 Operation	6
3.6 Bolting	6
3.7 Seats	6
3.8 Disks	7
3.9 Stem glands	7
3.10 Yokes	7
3.11 End connections	7
Section 4. Materials	
4.1 Pressure containing shell	8
4.2 Disks and body seats	8
4.3 Facings for disk, body seat and body	8
4.4 Stems	8
4.5 Stem glands, body seals and gaskets	8
4.6 Bolting	8
4.7 Handwheel	8
Section 5. Testing	
5.1 Production pressure testing	9
5.2 Test certificate	9
5.3 Manufacturer's certificate	9
Section 6. Marking	
6.1 General	10
6.2 Body markings	10
6.3 Identification plate markings	10
6.4 Material symbols	10
6.5 Omission of markings	10
Section 7. Preparation for storage and transportation	
7.1 General	11
7.2 Body ends	11
7.3 Disk position	11

	Page
Appendix A Information to be supplied by purchaser	12
Appendix B Weld-end preparations	13
Appendix C Approximate diameters of body end ports	14
Appendix D Typical steel gate (parallel slide) valves	15
Figure 1 — Weld-end preparation	13
Figure 2 — Venturi pattern with eyelet	15
Figure 3 — Full bore pattern without eyelet	16
Figure 4 — Pressure seal and bolted bonnet assemblies	17
Table 1 — Pressure/temperature ratings for Special Class butt-weld end valves: material carbon steel	2
Table 2 — Pressure/temperature ratings for Special Class butt-weld end valves: material carbon molybdenum steel	2
Table 3 — Pressure/temperature ratings for Special Class butt-weld end valves: material 1 % chromium ½ % molybdenum steel and 1¼ % chromium ½ % molybdenum steel	2
Table 4 — Pressure/temperature ratings for Special Class butt-weld end valves: material 2¼ % chromium 1 % molybdenum steel	3
Table 5 — Face-to-face dimensions and tolerances for flanged end valves with raised faces	4
Table 6 — End-to-end dimensions and tolerances for valves with body ends flanged to BS 1560-3.1 having ring-joint faces	5
Table 7 — End-to-end dimensions and tolerances for butt-weld end valves	5
Table 8 — Drain tapping sizes	6
Table 9 — Materials for body, bonnet and stuffing box	8
Table 10 — Test durations	9
Table 11 — Trim material identification symbols	10
Table 12 — Weld-end preparation	13
Table 13 — Approximate diameters of body end ports	14
Publications referred to	Inside back cover

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.

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 °C	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
– 29 to 38	bar ^a	bar ^a	bar ^a
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 = 10⁵ N/m² = 10⁵ Pa.

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

Temperature °C	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
– 29 to 38	bar	bar	bar
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 °C	Maximum permissible working pressure		
	Class 150	Class 300	Class 600
– 29 to 38	bar	bar	bar
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.