

# Gas Industry Standard

GIS/V8:2019

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Specification for

## VALVES (25 mm NOMINAL SIZE AND BELOW) FOR INSTRUMENTATION AND CONTROL PURPOSES

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## Foreword

Gas Industry Standards (GIS) are revised, when necessary, by the issue of new editions. Users should ensure that they are in possession of the latest edition. Contractors and other users external to Gas Transporters should direct their requests for copies of a GIS to the department or group responsible for the initial issue of their contract documentation.

Comments and queries regarding the technical content of this document should be directed in the first instance to the contract department of the Gas Transporter responsible for the initial issue of their contract documentation.

This standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Compliance with this engineering document does not confer immunity from prosecution for breach of statutory or other legal obligations.

## Mandatory and non-mandatory requirements

For the purposes of a GIS the following auxiliary verbs have the meanings indicated:

**can** indicates a physical possibility;

**may** indicates an option that is not mandatory;

**shall** indicates a GIS requirement;

**should** indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment needs to be completed to show that the alternative method delivers the same, or better, level of protection.

## Disclaimer

This engineering document is provided for use by Gas Transporters and such of their contractors as are obliged by the terms of their contracts to comply with this engineering document. Where this engineering document is used by any other party, it is the responsibility of that party to ensure that the engineering document is correctly applied.

## Brief history

First published as BGC/PS/V8	August 1982
Amendment No1 published	June 1987
Editorial update to reflect demerger November 2000	June 2001
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Revised and re-issued to reflect GRM	July 2004
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## 1. Scope

This Gas Industry Standard specifies requirements for valves of ball, plug and needle types of nominal sizes 25 mm and below with screwed or compression type ends for use with the fluid specified on the data sheet (see Annex A, lines 19 to 23 inclusive). Valves for distribution purposes at pressures below 7 bar are excluded.

Valves to this standard for use with natural gas shall be suitable for operation at pressures up to 100 bar, or higher pressures when specified on the data sheet (see Annex A, line 4). Temperatures shall be normally within the range -20°C to 100 °C unless otherwise specified on the data sheet (see Annex A, line 5).

The requirements of this standard apply to valves of types not covered by recognized National or International standards. Reference should be made to GIS/V6 for requirements for small valves to British Standards which can also be used for applications covered by this standard.

Automatic control and slam shut valves, pressure regulators and pressure relief valves or valves for cryogenic and low temperature applications are excluded from the scope of this standard.

## 2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

### 2.1 British and European standards

BS 4368- Part 1, *Metallic tube connectors for fluid power and general use. Split collet compression fittings*

BS EN ISO 8434-1, *Metallic tube connections for fluid power and general use. 24° cone connectors*

BS ISO 8434-2, *Metallic tube connections for fluid power and general use. 37° flared connectors*

BS EN ISO 9001, *Quality management systems. Requirements*

BS EN ISO 10497, *Testing of valves. Fire type-testing requirements*

BS EN 10226-2, *Pipe threads where pressure tight joints are made on the threads. Taper external threads and taper internal threads. Dimensions, tolerances and designation*

BS EN 12266-1, *Industrial valves. Testing of metallic valves. Pressure tests, test procedures and acceptance criteria. Mandatory requirements*

BS EN 12266-2, *Industrial valves. Testing of metallic valves. Tests, test procedures and acceptance criteria. Supplementary requirements*

### 2.2 Gas Industry Standards

GIS/V6:2019, *Steel Valves for use with Natural Gas at Normal Operating Pressures above 7 bar and Sizes above DN15 (Supplementary to EN13942:2009)*

### 2.3 Gas Transporter Specifications

\*/SP/E/55, *Specification for Bolting, Jointing, Threading & Fasteners*

#### NOTE

Where no date is shown, the latest edition of each standard and specification shall apply.

- Gas Transporters will each have their own specifications normally in the referenced format \*/SP/XX/No, where \* is replaced by the Gas Transporters reference e.g. T for National Grid, or SGN, WWU etc. followed by the specification initials and number reference.

### **3. Terms and Definitions**

For the purposes of this document, the following definitions apply.

#### **3.1 Contractor**

The person, firm or company with whom a Gas Transporter enters into a contract to which this standard applies, including the Contractor's personal representatives, successors and permitted assigns.

#### **3.2 Manufacturer**

The firm or company which actually produces the valves to which this standard applies; the Manufacturer might therefore be either the Contractor or the firm or company which supplies the valves to the Contractor.

### **4. Conformance**

#### **4.1 Units of measurement**

In this standard, for data expressed in both SI and USC units, a dot (on the line) is used as the decimal separator, and no comma or space is used as the thousands separator, in order to be consistent with other Gas Transporter specifications.

### **5. General requirements**

**5.1** This standard shall be read in conjunction with the completed data sheet (see Annex A) together with any information given in the purchase order.

**5.2** Gas Transporters require to approve the design, materials and manufacturing procedure of the valve. Once a valve has received Gas Transporter approval, any changes in design, materials or manufacture shall be notified to the approving Gas Transporter whose approval in writing of all changes shall be obtained before the modified valve is tendered or supplied.

**5.3** Quarter turn valves shall have a marking on the stem to indicate the position of the port. Where a metering valve is specified in the data sheet (see Annex A, line 3) it shall be fitted with an indicator to show the degree of opening.

**5.4** Compression coupling ends should be as specified on the data sheet (see Annex A, line 9). Single ferrule type compression couplings shall conform to BS 4368: Part 1 or BSEN ISO 8434 part 1 or BS ISO 8434 Part 2.

Valves which have integral ends suitable for compression couplings of the double ferrule type shall be supplied only by the manufacturer of the couplings or his licensee. This rule may be waived only by agreement with the Gas Transporter.

**5.5** All screwed ends shall be to BS EN 10226-2 taper (unless otherwise specified for particular applications in accordance with\*/SP/E/55).

**5.6** Valves shall not be fitted with adaptors to provide specified size requirements.

**5.7** Where pressure retaining parts or assemblies are held together by means of screwed components, the valve shall be designed to prevent accidental dis-assembly under pressure.

Union type bonnets or screwed-in gland assemblies shall be securely locked by an approved method.

**5.8** As specified on the data sheet (see Annex A, line 14) the design of needle valves shall be

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either:

- a) two-piece non-rotating tip, i.e. of the type where there is no relative rotation between the tip and the seat after contact,  
or
- b) rotating tip, i.e. of the type where there is relative rotation between the tip and the seat after contact.

**5.9** Needle valves shall be provided with a back stop to prevent the needle being unscrewed from the body.

**5.10** All valves shall be capable of sealing against pressure in both directions and passing fluid in both directions, irrespective of the preferred direction of flow.

**5.11** The valve shall be suitable for the type of mounting specified in the data sheet (see Annex A, line 11).

**5.12** The valve body shall be permanently marked with the following information:

- a) Direction of flow (where there is a preferred direction).
- b) Manufacturer's rated working pressure (bar).
- c) Size and type of end connection.

In addition the valve shall be marked with a code providing traceability.

**5.13** The stem and threads of rising stem valves shall be shrouded against exposure to atmospheric conditions.

**5.14** The valves shall be suitable for installation in an exposed external situation at coastal or inland sites throughout the United Kingdom in all prevailing weather conditions.

## **6. Materials**

**6.1** Valves shall be manufactured from stainless steel unless otherwise specified in the data sheet (see Annex A, line 7).

**6.2** Threaded stem valves shall be designed to prevent binding or galling.

**6.3** The ball of ball valves shall be of corrosion resistant material or, alternatively, may be given a corrosion resistant plating or coating by a procedure which shall be approved by the Gas Transporter.

The thickness of plating on the finished part shall normally be not less than 0.02 mm, but thinner coatings may be acceptable if the Gas Transporter agrees that they have satisfactory corrosion resistance and mechanical properties.

The hardness of the plating shall be a minimum of 800 HV.

**6.4** Where valves are specified as fire safe (see Annex A, line 17) they shall be subject to a test generally in accordance with BS EN 12266 Parts 1 and 2 and to BS EN ISO 10497 and as agreed with the Gas Transporter.

**6.5** All materials shall be resistant to the action of hydrocarbons, glycol, methanol, and natural gas (see Annex B). Requirements for resistance to other materials or operating conditions shall be specified in the data sheet (see Annex A).

**6.6** Where stainless steel valves are supplied with compression coupling type ends either via stud couplings being screwed in at time of manufacture or by integral casting/turning techniques, all parts of the end fitting (body, nut and ferrule) shall be manufactured from austenitic stainless steel Type 316.

Valves supplied in materials other than stainless steel shall have the compression couplings of compatible material as stated in the data sheet (see Annex A, line 9 b).

## **7. Testing**

**7.1** The Contractor's testing procedure shall be subject to the approval of the Gas Transporter and shall be capable of meeting the requirements specified in 7.2 and 7.3.

**7.2** All valves shall be subjected to production tests as follows:

- a) Hydrostatic pressure test of body and gland with valve in half open position to 150 bar or 1.5 times the Contractor's rated working pressure, whichever is the greater, for a minimum period of 15 s.
- b) Pneumatic or hydrostatic seat leakage test at 100 bar or the Contractor's rated working pressure, whichever is the greater, applied in turn to each side of the closed valve for a minimum period of 15 s, during which time there shall be no visible leakage.

**7.3** A minimum of 5% sample of all valves shall be subjected to operational pneumatic tests. The full rated pneumatic pressure shall be applied to one side of the closed valve. The valve shall then be opened and closed at least once with no gland adjustment, following the tests specified in 7.2. This test shall be repeated with the pressure applied in the reverse direction. Following each of these operations a pneumatic seat leakage test, in accordance with 7.2 b), shall be carried out. No leakage shall occur between body, seat or gland.

## **8. Quality Assurance**

**8.1** The Contractor or Manufacturer shall set up and maintain such quality assurance and inspection systems as are necessary to ensure that the goods or services supplied comply in all respects with the requirements of this engineering standard.

**8.2** Gas Transporters will assess such systems against the recommendations of the applicable parts of BS EN ISO 9001 and shall have the right to undertake such surveys as are necessary to ensure that the quality assurance and inspection systems are satisfactory.

**8.3** Gas Transporters shall have the right to undertake inspection and testing of the goods or services during any stage of manufacture at which the quality of the finished goods may be affected and to undertake inspection or testing of raw materials or purchased components.

**Annex - A Standard Data Sheet – Valves to GIS/V8:2019**

**SECTION 1 – TO BE READ IN CONJUNCTION WITH GIS/V8 AND TO BE COMPLETED BY A GAS TRANSPORTER**

1 Lot numbers ..... Valve identification numbers .....

2 Valve type: Needle  Ball  Plug  Rising Plug

3 Valve duty: Isolating  Metering

4 Operating pressure Maximum ..... bar

5 Operating temperature: Maximum ..... °C Minimum ..... °C

6 Valve nominal size (connections) ..... mm

7 Valve body materials: Stainless steel  Other .....

8 Valve connections: Taper female to BS EN 10226-2  Compression couplings  Other .....

9 Compression coupling details:

a) BS 4368: Part 1  BS EN ISO 8434 Part 1  BS EN ISO 8434 Part 2  Double ferrule

b) Coupling materials: Stainless Steel  Other .....

c) Mating pipe: Actual OD .....mm

10 Valve body configuration: Straight  Angle  Oblique

11 Type of mounting: None  Body  Body bracket  Panel

12 Handle details:

T-bar  Disc  Lever  Special  Lockable  Non-lockable

Lockable  Type, padlock  Other .....

Non-lockable

13 Valve closure:

Soft seat, tip hard  Either a) or b)

Seat hard, tip soft  Seat hard, tip hard

Seat material ..... Tip material .....

14 Needle Valve spindle: Two piece non-rotating tip  Rotating tip

15 Plug valve type: Lubricated  Lined

16 Flow: Uni-directional  Bi-directional

17 Fire-safe design: Required  Not required

18 Other reference documents: .....

19 Operating fluid:

Natural gas  H<sub>2</sub>  Air  N<sub>2</sub>  N<sub>2</sub> (Liq)  CO<sub>2</sub>

Lube oil  O<sub>2</sub> (Oxygen service preparation required  Other .....

20 .....

21 .....

22 .....

23 .....

First issue	Date	By	Rev	Date	By	Rev	Date	By	Rev	Date	By

Order/enquiry	Title	Plant/project
Data sheet number	Sheet of	

**SECTION 2 – TO BE COMPLETED BY THE CONTRACTOR**

24 Manufacturer's mark: .....

25 Valve type and figure No: .....

26 Body/stem material: Specify .....

27 Gland material: Specify .....

28 Seat material: Hard ..... Soft .....

29 Tip material: Hard ..... Soft .....

30 Manufacturer's standard finish: Specify .....

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**Annex - B Typical Composition of Natural Gas**

	<b>Typical composition Volume %</b>	<b>Range of composition Volume %</b>
Nitrogen	2.60	1.20 to 3.10
Helium	0.05	0.03 to 0.07
Carbon dioxide	0.40	0.04 to 0.50
Methane	92.37	91.00 to 95.00
Ethane	3.25	3.00 to 3.65
Propane	0.87	0.55 to 1.05
Butanes	0.24	0.19 to 0.40
Pentane and heavier hydrocarbons	0.22	0.12 to 0.32
	<b><u>100.00</u></b>	

The main aromatic components of the heavy hydrocarbons are:

Benzene	0.04	0.03 to 0.04
Toluene	0.01	0.00 to 0.01

The natural gas may also contain the following

Hydrogen sulphide	0.0 ppm	00 to 3 ppm
Di-ethyl sulphide	3.0 ppm	3 to 5 ppm
Ethyl mercaptan	0.3 ppm	0.3 to 0.4 ppm
Tertiary butyl mercaptan	0.9 ppm	0.8 to 0.9 ppm
Water	50.0 ppm	40 to 200 ppm
Methanol	100.0 ppm	0 to 200 ppm

NOTE - All pipeline components shall be subjected, at infrequent intervals, to swabbing with liquid methanol.