

# Gas Industry Standard

GIS/V7-1:2022

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Specification for

## Distribution valves

**Part 1: Metal-bodied line valves for use at pressures up to 16 bar and construction valves for use at pressures up to 7 bar**

**Addendum to BS EN 13774:2013**

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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

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## Brief history

<p>First published as BGC/PS/V7: Part 1  Revision published as V7: Part 1  Editorial update to reflect demerger November 2000  Editorial update to reflect merger October 2002  Revised and re-issued as T/SP/V/7 Part 1 to reflect GRM  Edited by BSI in accordance with BS 0-3:1997  Updated minor modifications  Revised as an addendum to BS EN 13774  Clarification of test requirements in sections 4.3, 4.9, 4.11 and 4.12</p>	<p>August 1998  September 1995  June 2001  November 2002  October 2004    August 2006  April 2007  October 2021  November 2022</p>
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## 1. Scope

This Gas Industry Standard specifies requirements for metal-bodied valves, for gas distribution purposes. The valves shall be suitable for use at temperatures within the range  $-20\text{ }^{\circ}\text{C}$  to  $60\text{ }^{\circ}\text{C}$ . The valves are for use as line valves up to 16 bar MOP (maximum operating pressure) or construction valves up to 7 bar MOP and the MOP of the valve shall be specified in the purchase order.

*This addendum shall be read alongside BS EN 13774, Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements. This addendum amends some of the requirements specified in BS EN 13774 and supplements with some additional requirements. In order to comply with this addendum the requirements of BS EN 13774 and this addendum shall be met.*

## 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 21, *Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions).*

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

BS EN 19, *Industrial valves — Marking of metallic valves.*

BS EN 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment.*

BS EN 682, *Elastomeric seals — Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids.*

BS EN 1092-1, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Steel flanges.*

BS EN 1092-2, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated— Cast iron flanges.*

BS EN 1560, *Founding. Designation system for cast iron. Material symbols and material numbers.*

BS EN 1563, *Founding. Spheroidal graphite cast irons.*

BS EN 1775, *Gas supply — Gas pipework for buildings — Maximum operating pressure less than or equal to 5 bar — Functional recommendations.*

BS EN 10226-1, *Pipe threads where pressure tight joints are made on the threads — Taper external threads and parallel internal threads — Part 1: Dimensions, tolerances and designation.*

BS EN 10290: 2002, *Steel tubes and fittings for onshore and offshore pipelines. External liquid applied polyurethane and polyurethane-modified coatings*

BS EN 12266-1:2012, *Industrial valves — Testing of valves — Pressure tests, test procedures and acceptance criteria — Part 1: Mandatory requirements.*

BS EN 13774:2013, *Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements.*

BS ISO 1817, *Rubber, vulcanized or thermoplastic. Determination of the effects of liquids.*

## **2.2 Gas Industry Standards**

GIS/C5, *Specification for distribution pipe fittings cast in grey cast iron for use up to 7 bar maximum operating pressure.*

GIS/CW6-2, *Specification for the external protection of steel line pipe and fittings. Part 2 – Factory applied coatings.*

GIS/PL2-1, *Specification for polyethylene pipes and fittings for natural gas and suitable manufactured gas — Part 1: Pipes for use at pressures up to 5.5 bar.*

GIS/PL2-8, *Specification for polyethylene pipes and fittings for natural gas and suitable manufactured gas — Part 8: Pipes for use at pressures up to 7 bar.*

GIS/PL3, *Specification for self-anchoring mechanical fittings for natural gas and suitable manufactured gas*

GIS/V6, *Specification for steel valves for use with natural gas at normal operating pressures above 7 bar and sizes above DN15.*

GIS/P16, *Specification for the dimensions and applications of standard weld end preparations for steel pipe, fittings and valves.*

## **3. Terms and Definitions**

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

### **3.1 Mean temperature**

20°C ± 5°C

### **3.2 MOP**

Maximum operating pressure. The pressure in the pipework under normal conditions.



#### **4. Addendum to BS EN 13774**

4.1 For metal bodied gas carrying isolation valves used for gas distribution up to 16 bar BS EN 13774 shall be followed with the following exceptions.

##### **BS EN 13774 Clause 1 Scope**

4.2 Valves shall be designed to meet the specified performance requirements with ambient and gas temperatures in the range  $-20\text{ }^{\circ}\text{C}$  to  $+60\text{ }^{\circ}\text{C}$ . Unless low temperature compliant materials are used, cast iron and ductile iron valves can only be rated down to  $-10\text{ }^{\circ}\text{C}$  for pressure containing parts to comply with the Pressure Equipment Directive but they should be able to perform to this specification at  $-20\text{ }^{\circ}\text{C}$ . Valves manufactured of ductile iron for low temperature, marked 'LT' appropriately, can be rated down to  $-20\text{ }^{\circ}\text{C}$  for the Pressure Equipment Directive and should perform to this specification at  $-20\text{ }^{\circ}\text{C}$ .

##### **BS EN 13774 Clause 5.1 Type Testing (including Production Testing)**

4.3.1 Type tests and production tests specified applies to both line valves and construction valves. Any changes to test variables and parameters appropriate to the testing of construction valves are detailed within this addendum.

4.3.2 All type tests detailed in BS EN 13774 and Section 5.5 of this Addendum shall be carried out for type approval testing to GIS/V7-1. Type testing shall be carried out in the following order:

- a) Shell strength (5.9 in BS EN 13774)
- b) External leak tightness (5.10 in BS EN 13774)
- c) Internal leak tightness (5.11 in BS EN 13774)
- d) Operability and endurance (5.5.1 & 5.5.2 in BS EN 13774)
- e) Bending test (5.5.1 in this Addendum)
- f) Resistance to liquids (5.5.2 in this Addendum)
- g) Resistance to wear test (5.12 in BS EN 13774)
- h) Strength of stops (5.6 in BS EN 13774)
- i) Mechanical resistance against excessive actuating forces (5.7 in BS EN 13774)
- j) Resistance of the obturator to static differential pressure (5.8 in BS EN 13774)
- k) Resistance to bending moment via spindle head (5.5.3 in this Addendum)
- l) Double block and bleed test (5.5.4 in this Addendum)
- m) Reference flow rate (5.13 in BS EN 13774)
- n) Resistance to thermal loading (5.5.5 in this Addendum)

4.3.3 Please note the wear test and the double block and bleed test do not apply to construction valves. To meet the requirements of this addendum the wear test is only mandatory for line valves.

##### **Production Testing**

4.3.4 Production tests as specified in BS EN 13774 shall be carried out with the addition of Section 5.5.4 of this Addendum and Section 5.5.1 and Section 5.8 in BS EN 13774. Production tests shall be carried out in the following order:

- a) Shell strength (5.9 in BS EN 13774)
- b) Obturator strength test (5.8 in BS EN 13774)
- c) Internal leak tightness (5.11 in BS EN 13774)
- d) Operability test (5.5.1 in BS EN 13774). Note this test is only required annually.

- e) Endurance test (5.5.2 in BS EN 13774). Note this test is only required annually.
- f) Double block and bleed (5.5.4 in this Addendum). Note this test is routinely required at ambient temperature with additional tests at  $-20\text{ }^{\circ}\text{C}$  and  $+60\text{ }^{\circ}\text{C}$  only required annually.
- g) External leak tightness (5.10 in BS EN 13774)

4.3.5 Please note the double block and bleed test does not apply to construction valves.

#### **BS EN 13774 Clause 5.1.2 Test Documents**

4.4 Certified records relating to the materials used and inspection and testing of all valves shall be kept by the contractor. Such records shall be available for inspection for 5 years from manufacture.

#### **BS EN 13774 Clause 5.2.1.1 Shell General**

4.5.1 All materials used for the components of the valves shall be suitable for use with natural gas conforming to the requirements of the Gas Safety (Management) Regulations 1996 or equivalent manufactured gas and shall not be adversely affected by any of its constituents or additives.

4.5.2 Grey cast iron conforming to GIS/C5 in Grade 250 or spheroidal graphite cast iron conforming to BS EN 1563 in Grade 450-10 may be used for up to 7 bar MOP for sizes up to and including 400mm diameter and up to 2 bar MOP for sizes above 400mm and up to 800mm diameter. Other valve sizes may be permitted as long as performance can be adequately demonstrated.

4.5.3 ASTM, ISO or EN materials of equivalent grades may be proposed for consideration by the gas transporter as variants.

4.5.4 Where a valve is intended to be installed inside an occupied building then the materials selected shall be resistant to high temperatures and the valve shall comply with the test requirements detailed in Section 5.5.5 of this Addendum.

Note: Above 2 bar operating pressure in the UK and 4 bar operating pressure in Ireland, steel valves shall be installed.

#### **BS EN 13774 Clause 5.2.5 Seals**

4.6 All elastomeric materials shall conform to EN 682 or EN 549 and be suitable for operating temperatures from  $-5\text{ }^{\circ}\text{C}$  to  $+50\text{ }^{\circ}\text{C}$  and be type approve tested to  $-20\text{ }^{\circ}\text{C}$ .

#### **BS EN 13774 Clause 5.3.1 Design General**

4.7.1 Foreign material or corrosion products, external to the valve body, which could impair the operation of the valve, shall be effectively excluded by the design of the valve.

4.7.2 Where pressure retaining parts or assemblies are held together by means of screwed components, the valve shall be designed to prevent accidental disassembly under pressure. If replacement of internal parts is possible, the parts shall be designed so as to prevent mis-assembly.

4.7.3 Valves that rely on support from mating flanges to contain internal components shall not be used.

#### **BS EN 13774 Clause 5.3.3 Stems or shafts**

4.8.1 Line and rotary construction valve operation shall be in a clockwise direction to close.

4.8.2 Operational requirements for line valves; for line valves, the stem termination shall be a 28 mm (1-1/8in) square section and between 28 mm to 35 mm long. This may be achieved using an adaptor which shall be secured to the stem by mechanical means.

#### **BS EN 13774 Clause 5.5.1 Operability**

4.9.1 The breaking torque (the torque to initiate movement of the obturator) and the running torque

shall be kept to a minimum and shall not exceed 150 Nm over the operating temperature range. This shall apply in both the opening and closing direction.

The closing torque shall be kept to a minimum and shall not exceed 400 Nm over the operating temperature range. Where this exceeds 150 Nm the manufacturer must provide an appropriate risk assessment in the operating instructions.

This torque requirement may be achieved by the provision of suitable gearing. This may be achieved by the use of a gearbox which may be integral or externally fixed and shall be non-pressurized. Where the breakdown of any seal could lead to leakage into the gearbox, the design shall incorporate a relief so as to prevent the build-up of pressure. The design of the relief shall not permit the ingress of foreign material, e.g. dirt or moisture.

4.9.2 The breaking torque shall not be less than 6 Nm.

4.9.3 A torque of 150 Nm or 1.5 times the breaking torque or 2 times the operating torque, whichever is the greater, applied via the stem at the fully open and closed position shall not result in damage likely to affect the operation of the valve.

4.9.4. The operability test as detailed in A.2.2 in BS EN 13774 shall additionally be undertaken as a production test in order to meet the requirements of this specification.

Note: Breaking torque is that required to initiate movement of the obturator.

#### **BS EN 13774 Clause 5.5.2 Endurance**

4.10 For construction valves, limit this to a five cycle operation.

#### **BS EN 13774 Clause 5.8 Obturator Strength**

4.11.1 The Obturator Strength test as defined in BS EN 13774 Clause 5.8 shall be undertaken as a type test and a production test.

4.11.2 Subject the obturator of the valve to a minimum internal hydrostatic pressure of 1.5 times the MOP value at mean temperature applied to each end in turn for a duration of at least 10 minutes for the type test.

Note: The differential pressure limit of 1.5 times the MOP not exceeding the MOP + 5 bar specified in BS EN 13774 shall be disregarded when performing tests to this addendum.

4.11.3 The production test duration shall be in accordance with BS EN 12266 .

#### **BS EN 13774 Clause 5.9 Shell strength**

4.12.1 The shell of the valve shall withstand a minimum internal hydraulic pressure of 2.25 times the MOP value. Pneumatic testing to an equivalent standard would be an acceptable alternative.

4.12.2 Unless otherwise specified, leakage from the operating mechanism sealing is permitted at the shell test pressure, provided that there is no visually detectable leakage when the test pressure is 1,5 times the MOP at room temperature.

#### **BS EN 13774 5.10 External leak tightness**

4.13.1 The type test shall be carried out in accordance with A.3 of EN 12266-1:2012, with air or inert gas, at the pressures 6 mbar and  $1,1 \times p_{max}$ , at the temperatures  $t_a$ ,  $t_{max}$  and  $t_{min}$ .

4.13.2 The production test shall be carried out in accordance with A.3 of EN 12266-1:2012, with air or inert gas, at the pressures 6 mbar and  $1,1 \times p_{max}$ , at the temperatures  $t_a$ .

4.13.3 The type test period for valves DN 500 and above shall be 15 minutes.

#### **BS EN 13774 Clause 5.11 Internal leak tightness**

4.14.1 The production test shall be carried out in accordance with A.4 of EN 12266-1:2012, with air or inert gas, at the pressures 6 mbar and  $1,1 \times p_{max}$ , at the temperatures  $t_a$ .

4.14.2 The type test period for valves DN 500 and above shall be 15 minutes.

**BS EN 13774 Clause A.6 Test method 5: internal leak tightness test for double isolation and bleed (DIB) valves**

4.15 Construction valves and single block double face line valves less than or equal to 6 “ (150 mm) nominal diameter for operation up to 75 mbar operating pressure are not required to meet this test requirement

**BS EN 13774 Clause 5.12 Resistance to wear**

4.16.1 To meet the type testing requirements of this addendum the wear test is mandatory. Only the smallest diameter valve in the range is required to be tested, assuming the valve design does not vary for the range.

4.16.2 Following the wear test the internal leak tightness should be assessed, the pass criteria is zero visible leakage.

**BS EN 13774 Clause 6 Marking**

4.17.1 Marking shall be carried out in accordance with the requirements given in BS EN 19.

4.17.2 Products conforming to GIS/V/7-1 shall be permanently marked with the following information:

- a) the number and date of this standard, i.e. GIS/V7-1:2021;
- b) the name or trademark of the manufacturer or their appointed agent;
- c) the manufacturer's contact details;
- d) a unique serial number;
- e) where authorized, the product conformity mark of a third party certification body, e.g. BSI Kitemark.

Note: Attention is drawn to the advantages of using third party certification of conformance to a standard.

4.17.3 For all valves, the valve body shall be marked with the following items:

- a) DN;
- b) PN;
- c) material designation for pressure containing parts (with EN or ISO reference).

4.17.4 In addition, the following information shall be marked on a securely attached tag or nameplate:

- a) weight;
- b) tightness class A or B;
- c) rating (MOP);
- d) number of turns from fully open to fully closed

## 5. Supplementary Data (in addition to BS EN 13774)

For metal bodied gas carrying isolation valves used for gas distribution up to 16 bar BS EN 13774 shall be followed with the following additions.

### 5.1 Clarify difference between Line valves and Construction valves

#### 5.1.1 Line valves

5.1.1.1 Line valves shall be of wedge, parallel slide or conduit design, multi-turn in operation and utilize a gate-like disk and two seats for closure. Line valves shall be capable of operation and sealing against gas flowing from either direction.

5.1.1.2 Valves up to PN10 pressure rating shall have a minimum clear bore equal to the nominal diameter of the valve. Valves of pressure rating greater than PN10 shall have a minimum clear bore in accordance with GIS/V6.

5.1.1.3 Line valves less than or equal to 6" (150 mm) nominal diameter for operation up to 75 mbar operating pressure only can be of single block double face design.

5.1.1.4 Line valves with adjustable glands/stem seals shall not be used.

5.1.1.5 Line valves shall not be of the rising spindle type.

5.1.1.6 All line valves apart from those specified in the above clause (less than 150 mm operating up to 75 mbar) shall incorporate a double block and bleed facility. Vents shall be internally threaded in accordance with BS 21 and BS EN 10226-1, Rp  $\frac{1}{2}$  or Rc  $\frac{1}{2}$  for valve sizes up to and including 100 mm and Rp  $\frac{3}{4}$  or Rc  $\frac{3}{4}$  for sizes above 100 mm, as a minimum. The vent plug shall be provided with a safety feature to ensure that gas releases before the plug comes to the end of thread when being removed by operative to avoid possible blow-out due to pressure contained and injury. This can be achieved by means such as indentations or slots in the plug threaded body to enable effective gas release. All vents shall be plugged in a gas-tight manner when delivered.

5.1.1.7 The positioning of a vent on the valve body shall be such that it is easily accessible for the connection of a vent pipe. The plug material shall satisfy the requirements of 5.2.1.1 of BS EN 13774.

5.1.1.8 The weld ends of weld end valves shall be of sufficient length to allow welding without damage of the valve internals.

5.1.1.9 The valve weld end shall be manufactured from a material which is suitable for welding into the pipeline system. The pipeline material shall be specified in the purchase order. All weld end preparations shall be machine-cut in accordance with GIS/P16.

5.1.1.10 For valves fitted with pipe pups, the pups shall be of a material suitable for the pressure rating of the valve with weld end preparation machine-cut in accordance with GIS/P16.

5.1.1.11 Where the valve body weld ends are thicker than the pups to which they are to be welded, they shall be reduced to the same thickness at their ends. The reduction shall be by a 1 in 4 taper on the outer, inner or both walls as appropriate.

5.1.1.12 Flanged line valves shall conform to BS EN 1092-1 for steel flanges and BS EN 1092-2 for cast iron flanges, Class PN16 for MOP of  $\leq 7$  bar and BS EN 1092-1 for steel flanges and BS EN 1092-2 for cast iron flanges, Class PN25 for MOP above 7 bar. Sufficient clearance between the back of the flange and the body to allow standard bolts to be used shall be incorporated into the design.

5.1.1.13 Line valves with polyethylene pups shall be suitable for welding to polyethylene pipe manufactured to GIS/PL2-1 and GIS/PL2-8 or equivalent, if agreed with the customer.

## 5.1.2 Construction valves

5.1.2.1 Construction valves are used for under pressure drilling or flow-stopping applications and are operated either by a push/pull action, multi-turn or by an operating lever.

5.1.2.2 Construction valves that incorporate only one seat on the sliding member shall be marked "live side" on the live side of the valve.

5.1.2.3 Where an obturator is provided that operates in a circular motion, the fully open or fully closed position of the slide shall be clearly indicated by the activator.

5.1.2.4 Multi-turn and operating lever construction valves shall be capable of open/ close operation under all conditions. Levers shall be attached for operating lever valves and handles shall be made available for multi-turn valves. Locking arrangements and position indicators shall be made available where requested by the purchaser for above-ground valves in addition to the direction of open/ close marked on valves or handles.

5.1.2.5 Push/pull action construction valves shall be capable of open/close operation and locking in the open position under all conditions. The locking arrangement shall be provided to prevent unintentional closing of the valve.

5.1.2.6 Construction valves shall be suitable for flange connections conforming to BS EN 1092-1 for steel flanges and BS EN 1092-2 for cast iron flanges, Class PN16 and the maximum distance between flanges shall be in accordance with Table 1.

5.1.2.7 Construction valves shall have a minimum clear bore in accordance with Table 1.

**Table 1 – Minimum clear bore distances**

<b>Nominal bore</b>	<b>Clear bore</b>	<b>Maximum (face to face) distance between flanges</b>
<b>mm</b>	<b>mm</b>	<b>mm</b>
50	50	150
80	85	180
100	105	190
150	155	210
200	205	230
250	255	250
300	310	270
400	400	310
500	500	350
600	600	390

5.1.2.8 Push/pull action construction valves rated above 2 bar shall have a pressure equalizing facility to equalize the pressure across the obturator incorporated into the design.

5.1.2.9 Operational requirements of construction valves; where a construction valve is operated in a straight pull / push motion, the breaking force (the force to initiate movement of the obturator) and the running force shall be kept to a minimum but within the range 50 N to 350 N.

## **5.2 Clarify corrosion prevention requirements for various uses**

5.2.1 Customers shall agree the preferred corrosion protection, if they require any, when purchasing valves.

5.2.2 Any corrosion protection, if applied, for below ground or above ground use shall be suitable for the intended environment with a minimum 50 year design life. Coating requirements are dependent upon valve materials and the internal and external environment for which they are intended. If necessary, the customer can be consulted for relevant information or documentation.

5.2.3 Unprotected valves may be purchased, if specified by the customer. Unprotected valves installed on the network shall be protected with a suitable field applied coating system with a minimum design life of 50 years for the intended environment.

5.2.4 For buried service, consideration shall be given to the corrosion protection's resistance to cathodic disbondment. This shall be demonstrated to the gas network, if requested.

5.2.5 Unless otherwise stipulated, surface preparation and coating application shall be carried out in accordance with the manufacturers' specification. Inspection and testing plans (ITP) and coating inspection reports shall be made available to the customer upon request.

5.2.6 In the absence of customer specific requirements, corrosion protection shall be in accordance with recognised standards for surface preparation, selection and application for above or below ground environment such as GIS/CW6-2 and BS EN 10290.

- Typical good practice for below ground use may be a 250µm minimum thickness fusion bonded epoxy
- Typical best practice for below ground use may be a 1500µm minimum thickness Polyurethane coating.
- Typical good practice for above ground use may be a 300µm minimum thickness two part epoxy paint.

5.2.7 Before type tests, valves shall not be externally coated to ensure the coating does not affect the sealing capability of the valve against external leakage.

5.2.8 Valves with internal liners or coatings forming a design feature of the valve may be tested with it in situ. Attention shall be given to ensure the internal lining is not damaged by the test procedure.

## **5.3 PE ends**

5.3.1 A combination of end connections may be incorporated into a single valve design. As such, a combination valve shall incorporate a flanged connection and a polyethylene pup connection manufactured in accordance with the above material guidance.

5.3.2 Mechanical joints between the valve and PE pipe should meet the requirements of GIS/PL3.

## **5.4 Packaging**

5.4.1 Valves shall be clean and dry and all the relevant production test requirements for both individual valves and random samples shall have been achieved for that batch before packaging.

5.4.2 All valve openings shall be protected using an appropriate method immediately after the production tests have been completed. Such protection shall keep out both dirt and moisture.

5.4.3 Packaging shall be such that each valve is protected against damage or corrosion.

## 5.5 Additional performance testing requirements

### 5.5.1 Bending test

#### 5.5.1.1 Principle

5.5.1.1.1 To establish that the valve will resist the stresses transmitted by the installation components to which it is rigidly secured without unacceptable change in the performance of the valve at mean temperature, 60 °C and –20 °C.

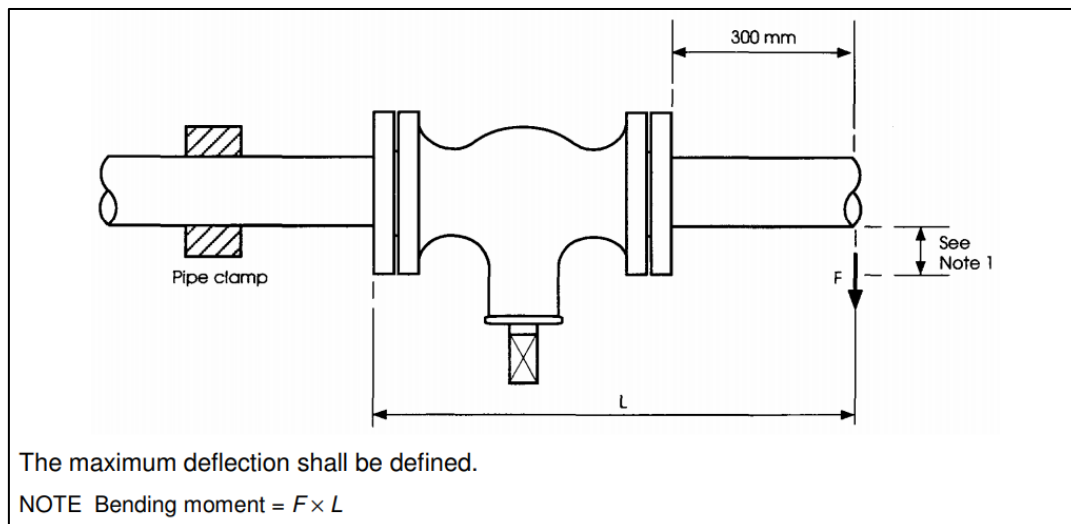
#### 5.5.1.2 Apparatus

5.5.1.2.1 Cantilever bending test apparatus, capable of applying the bending moment to an accuracy of  $\pm 2\%$ .

#### 5.5.1.3 Test procedure

5.5.1.3.1 Set up the valve for a cantilever bending test in accordance with Figure 1.

Note: Qualification of the range shall be achieved by testing the smallest valve, the largest valve limited by DN 500 and one chosen in the middle of the range. For valves greater than DN 500, the DN 500 qualifies the range up to DN 1000. This applies only where the materials, design and construction does not change within the range.



**Figure 1 – Bending strength test**

5.5.1.3.2 Subject the valve to the required test temperature and then a bending moment applied as specified in Table 2 for a period of 10 min.

5.5.1.3.3 Check the operability of the valve in accordance with Appendix A.2.2 in BS EN 13774 excluding the 200 cycle operation test, then subject the Double block and bleed valves to the internal leakage tests given in A.6 of BS EN 13774 and single seat gate valves and construction valves tested to Section 5.11 of BS EN 13774.

5.5.1.3.4 Do not commence the test period until the pressure and temperature have stabilized to the required test conditions.

5.5.1.3.5 Ensure the test temperature holds to within  $\pm 1$  °C for the test duration.



**Table 2 – Table of bending moments**

Nominal size mm	Bending moment Nm
25	500
50	1 000
80	1 500
100	2 200
125	3 200
150	4 800
200	7 200
250	11 000
300	15 000
350	19 000
400	24 000
450	32 000
500	40 000
550*	50 000
600*	60 000
650*	72 000
700*	84 000
750*	99 000
800*	115 000

Note: \* denotes bending moments applicable to valves greater than DN 500 where the design and/or construction of the valve range changes.

#### 5.5.1.4 Results

5.5.1.4.1 The valve leak rate in the closed position shall not exceed the leakage rate “Rate B” in Table A.5 of BS EN 12266-1:2012 and operation shall be in accordance with Section 4.9.1 of this Addendum, as applicable, when subjected to the bending test specified.

### 5.5.2 Resistance to liquid agents test

#### 5.5.2.1 Principle

The purpose of this test is to subject the elastomeric components in a valve to the fluids present in natural gas distribution networks to ensure the elastomers are fit for purpose.

#### 5.5.2.2 Apparatus

5.5.2.2.1 Valve, with a bleed hole in the lower part of the valve.

5.5.2.2.2 Test fluid, either:

- a) methanol; or
- b) a condensate mixture of 2/3 petrol plus 1/3 toluene; or
- c) BS ISO 1817, liquid B.

5.5.2.2.3 Hydrostatic pressure test equipment.

5.5.2.2.4 Temperature measuring equipment.

#### 5.5.2.3 Procedure

5.5.2.3.1 With the obturator in the mid-position, fill the valve with test fluid and pressurize to the MOP.

5.5.2.3.2 Hold this pressure for 1 week.

5.5.2.3.3 Depressurize the valve, drain it of test fluid and immediately test the valve in accordance with the requirements of Section 5.10, 5.11 and Appendix A.2.2 in BS EN 13774 and also Section 5.5.1 in this Addendum.

5.5.2.3.4 Repeat these tests after drying for 1 week in atmospheric conditions at mean temperature.

#### 5.5.2.4 Results

5.5.2.4.1 The valve shall be tested as above and meet the requirements of Section 5.10, 5.11 and Appendix A.2.2 in BS EN 13774 and also Section 5.5.1 in this Addendum with no leakage or any adverse valve working operation or visible damage.

### 5.5.3 Resistance to bending moment applied via spindle head

#### 5.5.3.1 Principle

5.5.3.1.1 The purpose of this test is to ensure that the valve performance does not deteriorate when subjected to a bending moment via the spindle head at mean temperature.

#### 5.5.3.2 Apparatus

5.5.3.2.1 Rig, with valve held securely by pipe clamps in horizontal and vertical position to apply test via spindle head as shown in Figure 2.

#### 5.5.3.3 Procedure

5.5.3.3.1 Test the valve pneumatically in the half open position for 5 min at the test pressures for the tightness class given in Section 5.10 in BS EN 13774. During this time also subject the spindle head to a bending moment of 200 Nm at mean temperature.

Note: This is illustrated in Figure 2.

5.5.3.3.2 Test the valve for external leakage in accordance with Section 5.10 in BS EN 13774 as follows.

a) With the closure member in the half-open position, pressurize the valve to the test pressure over and above the hydrostatic head produced by any water surrounding the valve for the purpose of detecting external leakage.

b) While this pressure is being applied, subject the square head to a bending moment of 200 Nm for a minimum period of 5 min. During this time, also check the external leakage in accordance with Section 5.10 in BS EN 13774. Apply the bending moment both in line and then perpendicular to the bore with the valve in the half open position. With the bending moment removed, check external leakage for a further period of 2 min.

Note: This is illustrated in Figure 2.

c) With the valve in the fully-closed position, subject it to the internal leakage test described in Section 5.11 in BS EN 13774 at the test pressure over and above the hydrostatic head produced by any water surrounding the valve.

#### 5.5.3.4 Results

5.5.3.4.1 Compare the results of the test with the requirements of Section 5.10 and 5.11 in BS EN 13774.

5.5.3.4.2 The mechanical failure of any component of the valve at any stage constitutes a failure.

5.5.3.4.3 There shall be no external leakage from the valve or internal leakage past the seats when subjected to a bending moment applied, both in line and perpendicular to the bore with the valve in the half open position when tested in accordance with this test procedure.

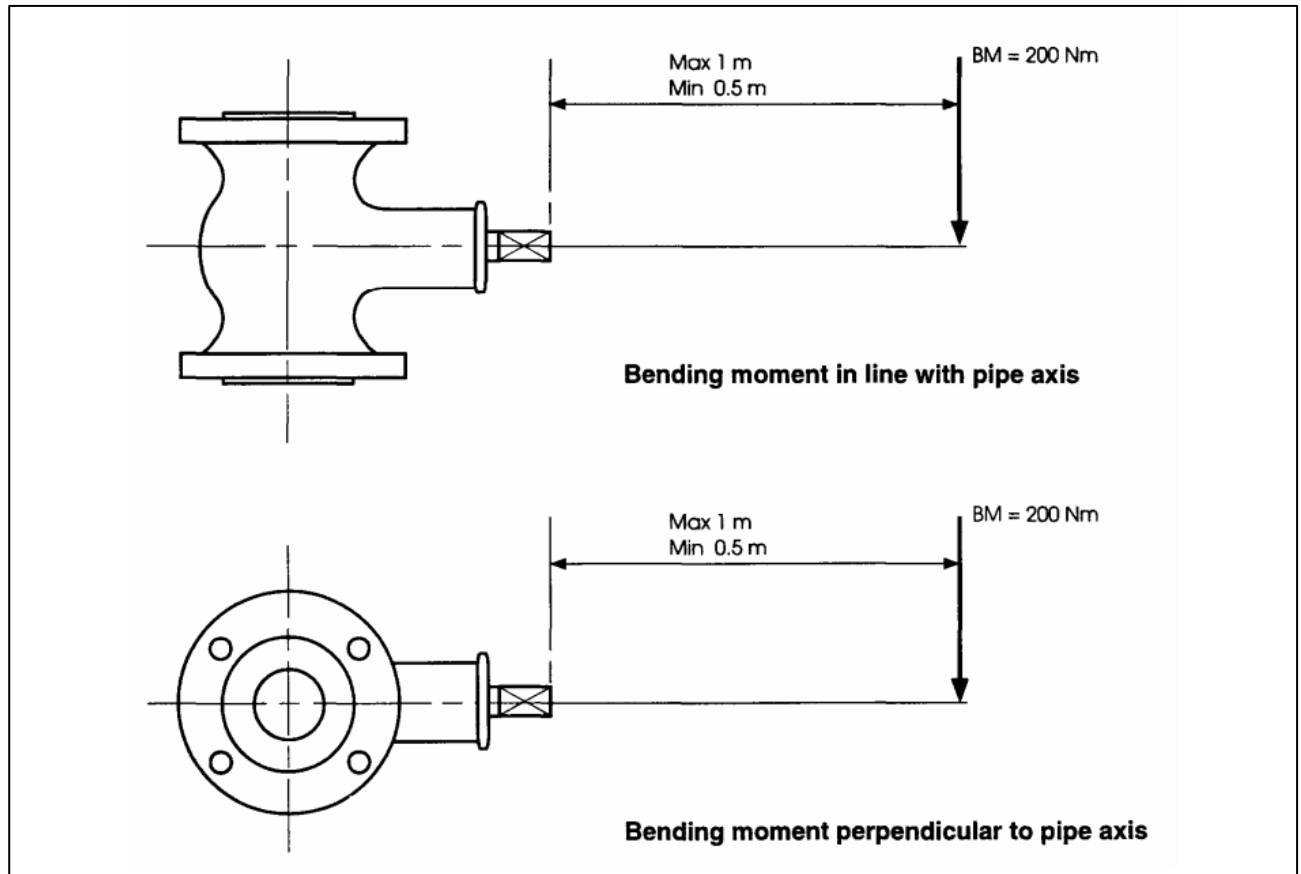


Figure 2 – Bending strength test applied via the spindle head

## **5.5.4 Test for double block and bleed**

### **5.5.4.1 Principle**

5.5.4.1.1 The purpose of this test is to check the sealing of seats in both directions for valves with double block and bleed facility.

### **5.5.4.2 Apparatus**

5.5.4.2.1 Pneumatic testing equipment.

5.5.4.2.2 Inert gas apparatus.

### **5.5.4.3 Procedure**

5.5.4.3.1 Carry out the test in accordance with BS EN 12266-1:2012. This test is not required on construction valves.

5.5.4.3.2 Apply this test using air or inert gas to each test pressure specified for the tightness class given in Section 5.11 of BS EN 13774, with the obturator in the closed positions at mean temperature, +60 °C and –20 °C.

5.5.4.3.3 When tested at temperatures above 7 °C, test the valve in general accordance with BS EN 12266-1.

5.5.4.3.4 Operate the valve through two complete opening/closing cycles prior to each test and then place the obturator in the closed position using forces/torques not in excess of the requirements of Section 4.9 of this Addendum.

5.5.4.3.5 Apply the required test pressure specified in Section 5.11 of BS EN 13774 to one end of the valve (Branch A) for the duration specified and check for leakage into the cavity. Repeat this process for the other end of the valve (Branch B).

5.5.4.3.6 Do not commence the test period until the pressure and temperature have stabilized to the required test conditions.

5.5.4.3.7 Ensure the test temperature holds to within  $\pm 2$  °C over the test duration.

5.5.4.3.8 Monitor leakage using a “bubble” tube in water placed not more than 3 mm below the surface.

5.5.4.3.9 Alternatively, for testing at temperatures above 7 °C, fill one end connection of the valve with water to a maximum depth of 25 mm and check for leakage.

5.5.4.3.10 Turn the valve through 180 ° and repeat the procedure.

5.5.4.3.11 For valves tested at –20 °C, pressurize the valve with clean/dry nitrogen.

### **5.5.4.4 Results**

5.5.4.4.1 There shall be no leakage past the seats into the cavity when the valve is closed and both valve branches have been pneumatically pressurized to the pressures required for the tightness class range and duration given in Section 5.11 of BS EN 13774.

5.5.4.4.2 Examination shall be performed on each valve to assess the condition after testing and compared with the original condition given in the descriptive study. A written report shall be prepared. For type testing dismantling, or in the case of welded body valves, destructive testing followed by visual and dimensional tests to verify the condition of the valve shall be carried out.

## **5.5.5 Resistance to thermal loading**

### **5.5.5.1 Principle**

5.5.4.1.1 This test is required for valves which will be installed inside an occupied building. The purpose of this test is to check that the valve will be resistant to high temperatures, such as fires, and will retain its leak-tightness under these conditions.

### **5.5.5.2 Procedure**

5.5.4.2.1 Carry out the test in accordance with BS EN 1775, Annexe A, Procedure A.

### **5.5.5.3 Results**

5.5.4.3.1 This test is deemed to have passed if the leakage rate of the valve does not exceed 150 dm<sup>3</sup>/h during and after the 30 min increase in temperature when tested in accordance with Procedure A.