

Loss Prevention Standard

LPS 1185: Issue 3.2

Requirements and testing methods for remote monitored gear operated butterfly stop valves

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REVISION OF LOSS PREVENTION STANDARDS

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at www.redbooklive.com

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 11)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.

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FOREWORD

This standard identifies The Loss Prevention Certification Board Ltd (LPCB) evaluation and testing practices for the certification and listing of suitable products. Certification is based on the following criteria:

- a) Satisfactory product performance and construction, in accordance with the requirements of the LPCB and the manufacturer's specifications.
- b) Verification of the establishment and maintenance of the manufacturer's quality management systems in accordance with ISO 9001: Quality management systems - Requirements.
- c) Satisfactory product service experience.

Products which conform to the published requirements of the LPCB, but the construction of which is considered improper, may be refused certification and listing.

NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to "the Technical Director" at enquiries@breglobal.co.uk.

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1. SCOPE

This standard specifies the design and performance requirements for remote monitored, gear operated, butterfly valves used in wet automatic sprinkler systems complying with the installation rules of the LPC.

2. DEFINITIONS

2.1 Nominal size (DN)

A numerical designation of size which is common to all components in a piping system other than components designated by outside diameters or by thread size. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions.

Note: Nominal size is designated by the letters DN followed by the appropriate reference number.

2.2 Nominal pressure (PN)

A numerical designation which is a convenient round number for reference purposes. All equipment of the same nominal size (DN) designated by the same PN number shall have compatible mating dimensions.

Note: Nominal pressure is designated by the letters PN followed by the appropriate reference number.

2.3 Maximum working pressure

The maximum pressure at which the valve is designed to operate. This may be different from the nominal pressure as it is dependent upon materials, detail design and working temperatures rather than compatible dimensions.

2.4 Tight shut-off valve

A valve having no visible leakage passed the disc in the closed position under test conditions.

2.5 Double flanged

A valve having flanged ends for connection to pipe flanges by individual bolting.

2.6 Wafer

A valve primarily intended for clamping between pipe flanges using through bolting.

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2.7 Face-to-face dimension

The distance between the two planes perpendicular to the body axis located at the extremities of the body end ports. Where a liner extends over the end faces and acts as a gasket, the face-to-face dimension is inclusive of the double thickness of the liner (e.g. the thickness over each face) when in the installed (i.e. compressed) condition.

3. DESIGN REQUIREMENTS

3.1 Nominal size

Butterfly valves shall have a nominal size (DN) of 40, 50, 65, 80, 100, 125, 150, 200, 250 or 300.

3.2 Connections

The inlet and outlet connections of a valve shall be double flanged, wafer type (single flange, flangeless or U-section) or suitable for use with grooved pipe couplings. The valve end connections shall be compatible with either B.S.4504:Section 3.1/3.2:1989 flanges or LPC approved grooved pipe couplings.

3.3 Classification

The valve shall be of the tight shut-off type with a maximum working pressure of not less than 12 bar. The valve shall be gear-operated and incorporate a handwheel which closes the valve when operated in a clockwise direction.

3.4 Dimensions

Face-to-face dimensions of flanged or wafer type valves shall be in accordance with Tables 6 and 7 of B.S.5155:1984.

3.5 Indicators

Valves shall be provided with a mechanical indicator to show the position of the disc and an electrical means of remotely monitoring closure of the valve.

The mechanical indicator shall be designed such that it cannot improperly indicate the disc position.

3.6 Limit stops

Limit stops shall be provided for both the fully open and fully closed positions of valve.

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3.7 Materials

The valve shall be manufactured from materials specified in Table 8 of B.S.5155:1984, providing combinations of specified materials are acceptable to the Water Research Council.

Non-metallic materials (other than seals or liners) or metals with a melting point of less than 800°C shall not be used in the pressure retaining envelope.

3.8 Marking

Each valve shall be permanently marked with the following:

- a) The manufacturer's name or trademark
- b) Type designation
- c) Nominal size (DN)
- d) Nominal pressure (PN)
- e) Maximum working pressure
- f) Indication of flow direction (if applicable)
- g) Direction of closure of handwheel
- h) Identification of design options.

4. **PERFORMANCE AND TEST METHODS**

4.1 Examination

Requirement

The principal dimensions and component configuration of a butterfly valve shall conform with the manufacturer's drawings and engineering specification.

Test

Inspect valve assembly and measure principal dimensions, compare component configuration and dimensions with manufacturer's drawings/specification.

4.2 Operation

Requirements

- a) A valve shall be capable of manual operation without any additional mechanical assistance at zero and maximum working differential pressure.
- b) The valve disc shall not close by more than 20° without being sensed by the electrical remote monitoring device.

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Test

With the valve closed and under no pressure, no flow conditions ensure that operation can be effected without the need of any additional mechanical assistance. Repeat with maximum working pressure (+1 bar/-0 bar) applied to one side of the disc.

Fully open valve, then slowly close until remote monitoring device is initiated. Measure angle that the disc has travelled through.

4.3 Body pressure strength

Requirement

The valve body shall sustain without rupture or sudden release of pressure, an internal hydrostatic pressure of four times the maximum working pressure subject to a minimum of 48 bar and a maximum of 80 bar.

Test

The valve inlet and outlet shall be suitably blanked and a connection made to a hydrostatic pressure pump. Provision shall be made to vent entrained air.

With the valve disc open, pressurize the valve to 4 times the maximum working pressure, +2 bar/-0 bar, (minimum 48 bar, maximum 80 bar) and hold for 5 minutes +10s/-0s.

4.4 Disc pressure strength

Requirement

The valve disc shall sustain without rupture or deformation a hydrostatic pressure of 1.5 times the maximum working pressure applied to one side of the disc. There shall also be no leakage through the disc during the period of pressurization.

Test

The valve inlet shall be suitably blanked and connected to a hydrostatic pressure pump. With the disc closed and all air vented, pressurize the upstream side of the valve to 1.5 times the maximum working pressure (+1 bar/-0 bar) and hold for 5 minutes +10s/-0s.

4.5 Valve seat leakage

Requirement

There shall be no visually detectable leakage passed the valve seat when one side of the disc is subjected to a hydrostatic pressure of 1.1 times the maximum working pressure.

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Test

The valve inlet shall be suitably blanked and connected to a hydrostatic pressure pump. With the disc closed and all air vented, pressurize the upstream side of the valve to 1.1 times the maximum working pressure (+1 bar/-0 bar) and hold for 1 minute +10s/-0s and inspect for leakage.

4.6 Resistance to temperature

Requirement

A valve shall be capable of operating within a temperature range of -10°C to +70°C or within the manufacturer's specified temperature range whichever is the greater.

Test

Prior to temperature conditioning conduct an operation test on a valve in accordance with Clause 4.2 at zero differential pressure.

Condition the valve for 24 hours +1h/-0h, with disc in closed position, at a temperature of -10°C ∇ 3°C or at the manufacturer's rated temperature if lower. Ensure that unaided operation of the valve can be effected at depressed temperature. Fully open valve and ensure that the disc does not close by more than 20° without being sensed by the electrical remote monitoring device. Condition the valve for 24 hours +1h/-0h, with disc in closed position, at a temperature of +70°C ∇ 2°C or at the manufacturer's rated temperature if higher. Check operation at elevated temperature as above.

4.7 Ageing

Requirement

Any non-metallic element of a valve shall not deteriorate when aged for 90 days at a temperature of 95°C or at the manufacturer's maximum rated temperature, if lower, subject to a minimum of 70°C.

Test

Prior to ageing conduct an operation test on a valve in accordance with Clause 4.2 at zero differential pressure.

The valve inlet and outlet shall then be suitably blanked and a connection made to a hydrostatic pressure pump.

Provision shall be made to vent entrained air. Tighten flange fixing bolts/nuts to a nominal torque of 50Nm and grooved coupling fixings to the manufacturer's recommendations, as applicable.

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With the valve disc open, pressurize the valve to 2 times the maximum working pressure (+1 bar/-0 bar) and check for leakage. Tighten flange fixing bolts/nuts or grooved coupling fixings to stem any leak. With assembly filled with 60% water and pressure pump/vent connections plugged, condition valve for 90 days + 5 days/-0 days at a temperature of 95°C ∇ 2°C or the manufacturer's maximum rated temperature, if lower, subject to a minimum of 70°C.

Following ageing allow valve to cool at ambient temperature, pressurize to 2 times the maximum working pressure (+1 bar/-0 bar) and observe for leakage.

Conduct an operation test in accordance with Clause 4.2 at zero differential pressure, followed by a valve seat leakage test in accordance with Clause 4.5. If the valve liner/seat is bonded to the valve body subject the valve to a partial vacuum of 0.8 bar+0 bar/-0.1 bar for 2 minutes ∇ 15s and inspect liner/seat for detachment.

4.8 Resistance to vibration

Requirement

A valve shall remain intact and exhibit no deterioration of operation.

Test

Prior to vibration conditioning conduct an operation test on a valve in accordance with Clause 4.2 at zero differential pressure.

Using a suitable fixture mount valve to vibration exciter in vertical plane. subject valve to sinusoidal vibration with a single sweep of 5Hz to 60Hz frequency range at a rate of 1.8 ∇ 0.2 octaves/h.

The maximum acceleration of the valve at its point of installation shall be 0.7 /f ∇ 10% m/s, where f is the instantaneous frequency in Hz. Repeat vibration conditioning sweep in two horizontal directions mutually perpendicular to one another.

Following conditioning inspect for damage and conduct an operation test in accordance with Clause 4.2 at zero differential pressure.

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5. PUBLICATIONS REFERRED TO

ISO 9001:	Quality management systems – Requirements
BS 4504:Section 3.1:1989	Circular flanges for pipes, valves and fittings (PN designated). Part 3. Steel, cast iron and copper alloy flanges. Section 3.1. Specification for steel flanges.
BS 4504:Section 3.2:1989	Circular flanges for pipes, valves and fittings (PN designated). Part 3. Steel, cast iron and copper alloy flanges. Section 3.2. Specification for cast iron flanges.
BS 5155:1984	Specification for butterfly valves.

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Amendments Issued Since Publication

DOCUMENT NO.	AMENDMENT DETAILS	SIGNATURE	DATE
LPS 1185-3.0	Copyright changes	CJA	12/08/02
LPS 1185-3.1	Further copyright changes	CJA	19/09/05
LPS 1185-3.2	<ol style="list-style-type: none"> 1. New front cover 2. Title added to header 3. References to BS5750 deleted (this standard has been withdrawn and now replaced by ISO 9001) 4. Contents page moved to Page 1 5. Revision of Loss Prevention Standards added on Page 2 6. Notes added on Page 3 7. Repagination 8. Update to copyright information 9. References to ISO 9002 deleted - this standard has been withdrawn and is replaced by ISO 9001 	DC	Jan. 2014