

## 1. SCOPE

This specification sets the minimum acceptable requirements for supply of flow limiting and pressure sustaining valves type for size range of DN100 – DN1000mm.

## 2. APPLICABLE STANDARDS

EN 1074-1	Valves for water supply – Part 1: Fitness for purpose req. and Appropriate verification tests (General Req.)
EN 1074-5	Valves for water supply – Part 5: Fitness for purpose req. and Appropriate verification tests (Control valves.)
EN 12266-1	Testing of valves Part 1: Pressure tests, test procedures and acceptable criteria - Mandatory requirements – (Industrial valves)
ISO5752	Face to face dimensions of valves
ISO 7005	Metallic flanges
ISO5208	Industrial valves, Pressure testing of metallic valves
EN 1092	Flanges and their joints – Part 2: Cast Iron flanges, Circular flanges for pipes, valves, fittings and accessories, PN designated
EN1563/DIN 1693	Spheroidal graphite cast iron

### 1. General description

The flow limiting and pressure sustaining valve prevents excessive flow by sensing the pressure differential across the specially sized orifice plate, and shall maintain a minimum predetermined upstream pressure. When the actual upstream pressure meets the minimum allowable predetermined upstream pressure the valve will either open or modulate in order to maintain the minimum allowable upstream pressure, as long as the flow rate is below a preset maximum.

The orifice plate is factory calibrated based upon minimum and maximum flow rate requirements.

	<b>Technical Specification</b> PRESSURE SUSTAINING & PRESSURE REDUCING VALVES	Date 28/08/2021 Page 2 of 4
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## **2. Flange Drilling**

Flanges shall be designed to comply with ISO 7005 and BSEN 1092-2. Flange drilling shall be PN10 or PN16 according to project requirement.

## **3. Sizing**

Valves shall be adequately sized to control the flow and pressure differential required for the application, with an accuracy of 5% of the set value. Valves shall be sized to ensure that their full capacity will be more than adequate to accept the desired maximum flow at the minimum required differential pressure.

## **4. Body description for diaphragm types**

Valves shall be a hydraulically operated diaphragm actuated globe valve. The valve is operated by introducing or releasing water from the control chamber above the diaphragm.

The inner valve assembly shall be top and bottom guided by means of easily replaceable bearing bushings. The inner valve assembly shall be the only moving part and shall be securely mounted on a stainless steel stem.

Valves shall provide smooth motion with actuation being achieved by the use of an EPDM or NBR diaphragm. They shall be constructed of nylon or wool fabric bonded with synthetic rubber. The diaphragms shall not be used as a seating surface.

The valves shall form a drip tight seal between the stationary stainless steel seat ring and the resilient disc, which has a rectangular cross-section and is retained by clamping. The resilient disc shall be constructed of Buna or EPDM for normal service conditions.

All repairs and maintenance shall be possible without removing the valve from the line. To facilitate easy removal and replacement of the inner valve assembly and to reduce unnecessary wear on the guide, the stem shall be vertical when the valve is mounted in a horizontal line.

## **5. Pilot system**

The pilot valves, controlling operation of the main valve, shall have a range of adjustment, be easily accessible, and arranged to allow for easy removal from the main valve while the main valve is under pressure. The two pilots shall be of stainless steel construction with a spring to adjust the pressure setting.

The diaphragm of the pilots shall be constructed of nylon or wool fabric bonded with synthetic rubber and shall not be used as a seating surface.

A needle valve shall be incorporated in the connection from the pilot system to the main valve to adjust the rate of valve closure. Where required a second needle valve can be added to control the rate of opening of the main valve.

The pilot's seat, stem and inner valve shall be of stainless steel construction and the inner valve shall have EPDM resilient compound for seating.

The orifice plate shall be made of stainless steel construction and will be placed inside bolted pattern ductile iron orifice plate housing.

## **6. Hydrostatic Testing**

Hydrostatic test of automatic control valve shall be performed on the completely assembled valve and are being tested in four tests:

- Shell Pressure Test.
- Seat Pressure Test.
- Diaphragm or Piston Sealing Test.
- Pilot System Test.

Standard testing is according to ISO5208. Shell test is 1.5times the working pressure, seal test is 1.1times of the working pressure.

	<b>Technical Specification</b> PRESSURE SUSTAINING & PRESSURE REDUCING VALVES	Date 28/08/2021 Page 4 of 4
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## 7. Coating

All valves shall be internally and externally Epoxy coated to a minimum DFT of 250microns after careful surface preparation. Internal epoxy coating shall be of non-toxic type.

## 8. Materials of Construction

Valve body, Bonnet and disc shall be constructed of ductile iron castings that conform to ISO1083 Grade500-7 or equivalent.

Internal Stainless Steel components (stem and seating faces) shall conform to BS304S15, ASTM276-1967 Grade304 or 316.

Diaphragm shall be constructed of nylon or wool fabric bonded with synthetic rubber.

## 9. Marking

Marking shall be cast on the body with raised letters or engraved on a separate stainless steel name plate and it may indicates the nominal valve size, manufacturer's name, design pressure rating and the year of manufacture.

## 10. The given data

Pipe line size:

Pressure at valve inlet (upstream pressure of the valve):

Desired set point pressure (downstream pressure of the valve):

Maximum and minimum flow rate through the valve:

The valve manufacturer or supplier should select the suitable valve size according to the above given data to guarantee an optimum operation and avoid the phenomenon of cavitation.

The valve manufacturer should submit a sizing exercise with the technical offer.

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