**DRAFT SRI LANKA STANDARD SLS ×××× : 20××**

# DRAFT SRI LANKA STANDARAD SPECIFICATION FOR FLOAT OPERATED VALVES PART 7: ROLLING DISC TYPE (INCUDING FLOATER)

**SRI LANKA STANDARDS INSTITUTION**

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**SRI LANKA STANDARDS INSTITUTION**
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**SRI LANKA**

# DRAFT SRI LANKA STANDARAD SPECIFICATION FOR FLOAT OPERATED VALVES PART 7: ROLLING DISC TYPE (INCUDING FLOATER)

## FOREWORD

This standard was approved by the Sectoral committee on Materials, Mechanical Systems and manufacturing engineering and was authorized for adoption and publication as a Sri Lanka standard by the council of the Sri Lanka Standards Institution on …….

This document has been prepared in response to National Water Supply & Drainage Board as a part of their national programme on water conservation which implement under the directive and guidance of Ministry of Water Supply.

The formulation of this standard series have been introduced ten types of Float Operated Valves as follows,

1) SLS ×× : Part 1: 20××: Float operated valves of copper alloy body – piston and plunger type, (excluding floater)
2) SLS ×× : Part 2: 20××: Float operated valves of plastic body – piston and plunger type, (excluding floater)
3) SLS ×× : Part 3: 20××: Float operated valves of copper alloy body – diaphragm type, (excluding floater)
4) SLS ×× : Part 4: 20××: Float operated valves of plastic body – diaphragm type, (excluding floater)
5) SLS ×× : Part 5: 20××: Float operated valves for water closet flushing cisterns - compact type, (excluding floats)
6) SLS ×× : Part 6: 20××: Float operated valves for storage cistern - confined replenishing type (including floats)
7) SLS ×× : Part 7: 20××: Float operated valves for the storage cistern - rolling disc type (including floats)
8) SLS ×× : Part 8: 20××: Float operated valves for water closet flushing cisterns -Inlet Valve for Filling water Closet cisterns with internal over flow.
9) SLS ×× : Part 9: 20××: Float operated valves for cold water services -Copper floats
10) SLS ×× : Part 10: 20××: Float operated valves for cold water services -Plastic floats

Guideline for the determination of compliance of a lot with the requirements of this standard based on statistical sampling and inspection are given in **Annex A**.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final

value observed or calculated expressing the result of a test or an analysis shall be rounded off in accordance with SLS 102.

The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

## 1. SCOPE

This standard specifies the technical requirements for the rolling disc type float operated valves of use for use for filling potable water into a confined storage cistern (storage tank) which is used to store water for subsequent use, not being a flushing cistern.

The Standard specifies requirements of the valves for use in potable water supply systems where the pressure extends up to maximum of 1.4 MPa.

The range of nominal sizes covered in the standard are DN 10, DN 15, DN 20, DN 25, D32 and DN 40.

This standard covers the requirements regarding the dimensional parameters, materials & performance and testing requirements.

## 2. REFERENCES

| | |
|---|---|
| ISO 6708 | Pipework components – Definition and selection of DN (nominal size) |
| ISO 5208 | Industrial valves — Pressure testing of metallic valves |
| ISO 815-1 | Rubber, vulcanized or thermoplastic -Determination of compression set – Part 1: At ambient or elevated temperatures |
| ISO 48-4 | Rubber, vulcanized or thermoplastic. Determination of hardness. Indentation hardness by durometer method (Shore hardness) |
| ISO 868 | Plastics and ebonite. Determination of indentation hardness by means of a durometer (Shore hardness) |
| ISO 2768-1 | General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications |
| ISO 2768-2 | General tolerances – Part 2: Geometrical tolerances for features without individual tolerance indications |
| ISO 228-1 | Pipe threads where pressure-tight joints are not made on the threads. Dimensions, tolerances and designation |
| ISO 1041-1 | Plastic material designation |
| ISO 4185 | Measurement of liquid flow in closed conduits — Weighing method |

| | |
|---|---|
| BS EN 1074-1 | Valves for water supply. Fitness for purpose requirements and appropriate verification tests; Part 1- General requirements |
| BS EN 1074-2 | Valves for water supply. Fitness for purpose requirements and appropriate verification tests;<br>Part 2- Isolating valves |
| BS 6920-1 | Suitability of non-metallic materials and products for use in contact with water intended for human consumption with regard to their effect on the quality of the water. |
| BS 1212-3 | Float operated valves. Specification for Diaphragm type float operated valves -Plastic bodied (Excluding floater) |
| BS 2456 | Specification for floats (Plastics) for float operated valves for cold water service |
| ASTM D 2240-15 | Standard Test Method for Rubber Property - Durometer Hardness |
| ASTM D 395-03 | Standard Test Methods for Rubber Property- Compression Set |
| SLS 297 | Method of testing vulcanized rubber |
| SLS 614 | Potable water |
| ASTM A240 | Specifications for Stainless steel Material |

## 3. TERMS AND DEFINITIONS

For the purposes of this standard the following definitions shall apply.

**3.1 Float Operated valve:** A pressure-opposed float operated valve that automatically controls the level of water in a storage Cistern.

**3.2 Rolling Disc type float operated valve for storage cistern:** A float operated valve in which the flow of water is controlled by a rolling disc inbuild to the valve which moment is directed by a floater link to the rolling disc by an arm.

**3.3 Inlet shank thd size:** The inlet shank thread size is that corresponding with the thread designation of the ISO pipe thread on the inlet shank.

**3.4 Nominal Size of "DN"**

An alphanumeric designation of size for components of a pipework system, which is used for reference purposes. It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimeters, of the bore or outside diameter of the end connections. (ISO 6708:1995)

**NOTE:**

1. *DN size is related to inlet shank thread designation of ISO 228-1. (See table 6).*

2. *The nominal size of the valves are also designated as "NPS" or "A" . When the nominal sizes of valves are given in the designation of "NPS" or "A" the equivalent DN sizes are stated in the Annexure A.*

### 3.5 Nominal Size of "A"

It is an alphanumeric designation of size for reference purposes. The letter "A" proceeded by a dimensionless whole number. The number is indirectly related to the physical size in millimeters of the bore (ID) or outer diameter (OD) of the end connections. (Reference ISO 6708)

### 3.6 Nominal Size of NPS

The letters, NPS stand for Nominal Pipe Size. It is an alphanumeric designation of size for reference purposes. It comprises the letters NPS followed by a dimensionless whole number which is indirectly related to the physical size in inches of the bore (ID) of the end connections. (Reference ISO 5208)

### 3.7 Allowable operating pressure (PFA)

Maximum hydrostatic pressure which a pipe is capable of withstanding continuously in service (excluding surge).

**NOTE** :
*PFA = PN rating for this type of valves only (see EN 1074-1)*

### 3.8 Storage cistern (Storage tank)

A tank for storing water for subsequent use, not being a flushing cistern.

## 4. DESIGNATION

Rolling Disc type float operated valve for storage cisterns shall be designated by the following,

1) Type of Valve – Rolling Disc type FOV
2) The nominal size in DN
3) Pressure rating in MPa

## 5. CLASSIFICATIONS

**5.1** Rolling Disc type float operated valves float operated valves shall be designed for following two pressure classes.

1) Low pressure: Pressure range up to 0.7 MPa
2) High pressure: Pressure range from 0.7 MPa up to 1.4MPa

**5.2** The typical diagram of rolling disc type float operated valve is given in **Figure 1**.

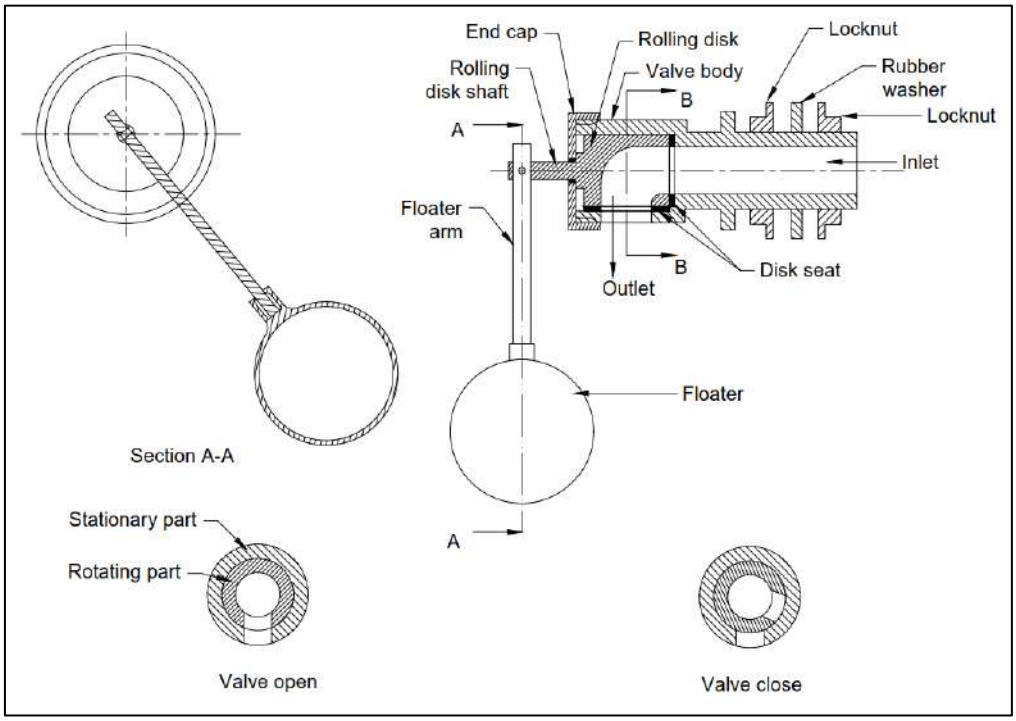



**Figure 1 – Rotary Disc type float operated valve**

# 6. REQUIREMENTS

## 6.1 MATERIALS

### 6.1.1 Chemical composition of the components of the float operated valves

The type of materials used for the construction of the float operated valve shall conform to the **Table 1**.

**Table 1 – Materials**

| Component | Plastic | Copper alloy | Stainless Steel | Rubber | Requirement |
|---|---|---|---|---|---|
| Body | × | √ | √ | × | **Clause 6.1.3 & 6.1.4** |
| Rolling Disc | √ | √ | √ | × | **Clause 6.1.2, 4 & 5** |
| Rolling Disc Connecting shaft | × | √ | √ | × | **Clause 6.1.3 & 4** |
| Arm | × | √ | √ | × | **Clause 6.1.3 & 4** |
| Floater | √ | × | × | × | **Clause 6.1.2,** |
| Other | √ | √ | √ | √ | **Clause 6.1.2, 3, 4 & 5** |

### 6.1.2 Plastic material for major components

The manufacturer shall specify the thermoplastic materials used for manufacture of the above valve part by material composition name or its designation according to the ISO 1043-1. Declared material designation shall comply with ISO 1043-1.

No revoked material shall be used. Other plastic components if required manufacturer's own clean revoke material maximum up to maximum 15% is allowed.

Material hardness and other properties shall be declared by the manufacturer complying to meet performance indicators as per **clause 7.**

### 6.1.3 Copper Alloy materials

Copper or copper alloy use for any part of the valve shall comply the chemical composition specified in **Table 2,** as applicable, when tested according to Spectrometric methods specified in one of the international standards listed in ISO /TR 9769

### 6.1.4 Stainless Steel

Stainless Steel use for any part of the valve shall comply the chemical composition specified in **Table 3.**

**Table 2 – Chemical composition of Copper or Copper alloy**

| Material designation / symbol | SCB3 (CuZn33Pb2) | DCB3 CuZn40Pb | PCB1 CuZn40Pb | G1 | CZ122 | CZ129 | CW509L | CW 510L | CW511L | CuZn42Al-C | CuZn42Al-C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Standard** | BS 1400 | BS 1400 | BS 1400 | BS 1400 | BS 2872 | BS 2872 | | | | | |
| **CU** | 63 - 66 | 58 - 62 | 57 - 60 | | 56.5 - 58.5 | 58.5 - 61.0 | 59 - 61.5 | 57 - 59 | 61.5 - 63.5 | 57 - 69 | 57 - 69 |
| **Sn** | < 1.5 | < 1.0 | < 0.5 | 9.5 - 10.5 | - | - | < 0.2 | < 0.3 | 0.1 | 0.3 | 0.3 |
| **Zn** | Remainder | Remainder | Remainder | 1.75 - 2.75 | | | Remainder | Remainder | | | |
| **Pb** | 1.0 - 2.8 | 0.5 - 2.5 | 0.5 - 2.5 | -1.5 | 1.5 - 2.5 | 0.8 - 1.5 | < 0.05 | < 0.2 | 0.2 | | |
| **P** | < 0.02 | < 1.0 | | - | | | | | | 0.02 | 0.02 |
| **Ni** | < 1.0 | < 0.5 | | < 1.0 | - | - | 0.2 | 0.3 | | 0.02 | 0.02 |
| **Fe** | < 0.5 | 0.2 - 0.8 | < 0.3 | < 0.15 | 0.3 | 0.2 | 0.2 | 0.3 | 0.1 | 0.3 | 0.3 |
| **Al** | < 0.1 | < 0.5 | < 0.5 | | - | - | 0.05 | 0.05 | 0.05 | 0.1 - 0.3 | 0.1 - 0.3 |
| **Mn** | | | | | - | - | | | 0.1 | 0.02 | 0.02 |
| **As** | | | | | - | - | | | 0.02 - 0.15 | | |
| **Si** | | | | | - | - | | | | 0.02 | 0.02 |

**Table 2–continued…**

| Material designation / symbol | CW501L-DW (CuZn10) | CW506L-DW* (CuZn33) | CW507L-DW* (CuZn36) | CW508L-DW* (CuZn37) | (CuZn42Al) | (CuZn35Al1,5Sn) | CW724R (CuZn21Si3P) | CC768S (CuZn21Si3P-C) | CC771S (CuZn38AsSb-C) | C87700 (CuZn10Si4MnP) | CW617N (CuZn40Pb2) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Standard** | | | | | | | EN 12164 | EN 1982 | EN 1982 | EN 1412 | EN 12164 |
| **CU** | 89 - 91 | 66 - 68 | 63.5 - 65.5 | 62 - 64 | 57 - 59 | 64 - 66 | 75 - 77 | 75 - 77 | 62 - 65 | 87.78 | 58 |
| **Sn** | 0.1 | 0.1 | 0.1 | | 0.3 | | < 0.3 | 0.3 | 0.3 | 0.015 | 0.3 |
| **Zn** | | | | | | | Remainder | Remainder | Remainder | 8.793 | Remainder |
| **Pb** | 0.05 | 0.05 | 0.1 | 0.2 | 0.2 | | < 0.1 | 0.1 | 0.2 | 0.02 | 2 |
| **P** | | | | | | | 0.02 - 0.1 | 0.02 - 0.1 | - | 0.073 | - |
| **Ni** | 0.2 | 0.2 | 0.2 | | | | < 0.2 | 0.2 | 0.2 | 0.007 | 0.2-2.3 |
| **Fe** | 0.05 | 0.05 | 0.05 | | 0.3 | | < 0.3 | 0.3 | 0.2 | 0.068 | 0.3 |
| **Al** | | | | 0.05 | 0.1 - 0.3 | 1.4 - 1.6 | < 0.05 | 0.05 | 0.45 - 0.7 | 0.001 | 0.05 |
| **Mn** | | | | | | | < 0.05 | 0.05 | - | 0.067 | - |
| **As** | | | | | | | - | - | 0.02 - 0.04 | < 0.001 | - |
| **Si** | | | | | | | 2.7 - 3.5 | 2.7 - 3.5 | - | 3.15 | - |
| **Sb** | | | | | | | - | - | 0.002 - 0.05 | 0.001 | - |
| **S** | | | | | | | - | - | - | - | other 0.0002 |

**Table 2 –continued…**

| Material designation / symbol | CW612N (CuZn39Pb2) | CC772S (CuZn36Pb.5AsSbAl) | CW725R (CuZn33Pb.AlSiAs) | CC499K (CuSn5Pb2) | CW614N (CuZn39Pb3) | CW603N (CuZn36Pb3) | CC757S (CuZn39Pb2Al-C) | CC770S (CuZn39Pb-C) | CW626N (CuZn33Pb1.5AlAs) | CW625N (CuZn35Pb1.5AlAs) | (CuZn35Al-C) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Standard** | EN 12164 | EN 1982 | EN 12164 | EN 1982 | EN 12164 | EN 12164 | EN 1982 | EN 1982 | EN 12164 | EN 12164 | EN 1982 |
| **Cu** | 59 - 60 | 62 - 65 | 64 - 67 | 84 - 88 | 57 - 62 | 61 | 58.63 | 62 - 64 | 64 - 66 | 62 - 64 | 63 - 64 |
| **Sn** | 0.3 | < 0.3 | < 0.3 | 4-6 | < 0.3 | 0.2 | 0.5 | 0.3 | - | 0.3 | < 0.3 |
| **Zn** | Remainder | Remainder | Remainder | 4-6 | Remainder | Remainder | Remainder | Remainder | Remainder | Remainder | Remainder |
| **Pb** | 1.8 - 2.5 | 0.2 - 1.1 | 0.4 - 0.6 | 0.2 - 0.3 | 2.5 - 3.5 | 3 | 0.2 - 1.4 | 0.2 - 1.6 | 1.2 - 1.5 | 1.2 - 1.6 | < 0.2 |
| **P** | - | - | - | <0.4 | - | - | - | - | - | - | - |
| **Ni** | 0.3 | < 0.2 | < 0.2 | 0.1 - 0.6 | < 0.2 | 0.3 | 0.2 | 0.2 | < 0.2 | 0.3 | - |
| **Fe** | 0.3 | < 0.2 | < 0.3 | < 0.3 | < 0.3 | 0.3 | 0.3 | 0.3 | < 0.1 | 0.3 | < 0.3 |
| **Al** | 0.5 | 0.45 - 0.7 | 0.1 - 0.4 | - | < 0.05 | 0.05 | 0.3 - 0.9 | - | 0.8 - 0.9 | 0.5 - 0.7 | 0.2 - 0.7 |
| **Mn** | - | < 0.1 | < 0.1 | - | - | - | 0.05 | 0.1 | < 0.1 | 0.1 | < 0.1 |
| **As** | - | 0.02 - 0.4 | 0.4 - 0.8 | - | - | - | - | 0.04 - 0.14 | 0.02 - 0.08 | 0.02 - 0.15 | 0.04 - 0.14 |
| **Si** | - | - | 0.1 - 0.3 | - | < 0.03 | - | 0.05 | - | - | - | - |
| **Sb** | - | 0.03 - 0.06 | - | < 0.1 | - | - | - | - | - | - | - |
| **S** | - | - | - | < 0.04 | - | - | - | - | - | - | - |

**NOTE :** *If Zn content is ≥15% then Dezincification test shall be submitted along with consignment..*

**Table 3 - Chemical Composition – Stainless Steel**

| Material /EN Code | EN 1.4401 | EN 1.4404 | 1.4408 | 1.4571 | 1.4581 |
|---|---|---|---|---|---|
| Ferrous | Balance | Balance | Balance | Balance | Balance |
| Carbon - Max | 0.08 | 0.03 | 0.07 | 0.08 | 0.07 |
| Chromium | 16 -18.5 | 16 - 18.5 | 18 - 20 | 16.5 -18.5 | 18 - 20 |
| Nickel | 10 - 14 | 10 - 14 | 9 - 12 | 10.5– 13.5 | 9 - 12 |
| Molybdenum | 2 - 3 | 2 - 3 | 2 - 3 | 2 - 3 | 2 –2.5 |
| Manganese - Max | 2 | 2 | 2 | 2 | 1.5 |
| Nitrogen -Max | 0.11 | 0.11 | - | - | - |
| Prosperous - Max | 0.045 | 0.045 | 0.045 | 0.045 | 0.045 |
| Silicon - Max | 1.0 | 1.0 | 1.5 | 1.0 | 1.5 |
| Sulfur - Max | 0.03 | 0.03 | 0.03 | 0.015 | 0.03 |
| Copper – CU - Max | - | - | 0.5 | - | 0.5 |
| Ti- Max | - | - | - | 0.7 | - |
| Nb - Max | - | - | - | | 1 |

### 6.1.5 Rubber/ Elastomeric – For other parts

Rubber/ Elastomeric used for any other parts shall be complying with the requirements of **Table 4**.

**Table 4 – Properties of materials – Elastomeric /Rubber Parts**

| Test<br>(1) | Requirement<br>(2) | Test method<br>(3) |
|---|---|---|
| Hardness, degree IRHD | $60^{+5}_{-4}$ | SLS |
| Tensile strength, MPa, min.<br>Elongation at break, %, min. | 17<br>400 | SLS 297 : Pt 2,<br>Dumb-bells, 2.0 mm thick |
| Compression set at $70^0$C, %, max. | 30 | ISO 815, method A Type 1 test piece, lubricated |
| Resistance to heat ageing, 168 h at $70^0$C<br>Change in tensile strength, % of original value, max.<br>Change in elongation at break, % of original value, max. | −10<br><br>−15 | SLS 297 : Pt 5, method A or Method B.<br><br>SLS 297 : Pt 2,<br>Dumb-bells, 2.0 mm thick |

### 6.2 EFFECT ON NON-METALLIC MATERIALS ON WATER QUALITY

Material shall not adversely affect the quality of the drinking water and when tested in accordance with test method given in **Table 5** the extracted qualities of lead, tin, cadmium and mercury levels metals shall not exceed the levels specified in **Table 5.**

**Table 5: Limit of toxic substance**

| Toxic substance | Levels of toxic substance (third extraction), mg/l | Test method |
|---|---|---|
| lead | 0.01 | SLS 147 or BS 6920-section 2.6 |
| Dialkyl tin as tin (C4 and above) | 0.02 | SLS 147 or BS 6920-section 2.6 |
| Cadmium | 0.003 | SLS 147 or BS 6920-section 2.6 |
| Mercury | 0.001 | SLS 147 or BS 6920-section 2.6 |

## 6.3 DIMENSIONAL REQUIREMENTS

### 6.3.1General

The dimensions of the assembly and components of Rolling Disc type float operated valves for storage cisterns cover under this standard shall be declared by the manufacturer in the design or drawings it shall comply with a working tolerances given in **Table 6** if no tolerance has been stated.

Certain dimensions & tolerances (see **Table 5**) of Rolling Disc type float operated valves shall conform to requirement specified in **6.3.2** to **6.3..5** of this standard .

**Table 6 – Dimensional tolerance for the manufacturers design**

| **Nominal size of Float operated valve ,DN** | **Tolerance for the manufacturers design in mm specified in the drawing/ design** |
|---|---|
| 10 | ±0.3 |
| 15 | ±0.3 |
| 20 | ±0.3 |
| 25 | ±0.5 |

**NOTE:**

*Any other types float operated valves covered under this standard, tolerances of dimensional requirement according to the design / drawing are also acceptable.*

### 6.3.2 Inlet Shank (Inlet connection)

The inlet shank shall be screwed ISO pipe thread to ISO 228 ‘Class A’ the same thread designation as the float valve, is the same nominal size as the valve.

The inlet shanks side entry and bottom entry shall have dimensions as given in **Figure 2** and **Table 7**.

**Table 7 - The dimensions of the inlet connections**

| Feature | | Thread Size | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 DN | | 15 DN | | 20 DN | | 25 DN | | 32 DN | | 40 DN | |
| (1) | (2) | max (3) | min (4) | max (5) | min (6) | max | min | max | min | max | min | max | min |
| A | Major dia. of ISO pipe Thread | 16.662 | 16.412 | 20.955 | 20.671 | 26.441 | 26.157 | 33.249 | 32.889 | G 1 ¼ B | | G 1 ½ B | |
| B | Thickness of wall, minor dia. to bore | 2.9 | 2 | 2.9 | 2 | NA* | 2.0 | NA* | 2.7 | NA* | 3.2 | NA* | 3.2 |
| C | Bore through spigot | 11.2 | 10.3 | 11.2 | 10.3 | 15.9 | 15.0 | 19.1 | 18.2 | 27.0 | 26.1 | 27.0 | 26.1 |
| D | Outside dia. Of spigot | 22.2 | 22 | 22.2 | 22 | 24.2 | 23.8 | 28.6 | 28.2 | 39.6 | 39.1 | 39.6 | 29.1 |
| E | Axial length of spigot | 5.4 | 5 | 5.4 | 5 | 8.6 | 8.2 | 13.3 | 12.9 | 15.0 | 14.6 | 15.0 | 14.6 |
| F | Diameter of collar | 26.5 | 26.3 | 26.5 | 26.3 | 32.1 | 31.8 | 40.2 | 39.9 | 55.1 | 54.8 | 55.1 | 54.8 |
| G | Length of collar | 2.7 | 2.3 | 2.7 | 2.3 | 2.7 | 2.3 | 3.5 | 3.1 | 4.3 | 3.9 | 4.3 | 3.9 |
| H | Length of tail under collar | NA* | 44.5 | NA* | 44.5 | NA* | 46.0 | NA* | 53.0 | NA* | 66.0 | NA* | 66.0 |
| K | Length of plain tail | NA* | 4.75 | NA* | 4.75 | NA* | 4.7 | NA* | 6.3 | NA* | 7.9 | NA* | 7.9 |
| L | Outside dia. At K | 21 | NA* | 21 | NA* | 26.4 | NA* | 33.2 | NA* | 47.8 | NA* | 47.8 | NA* |

NA* - Not Applicable

*(All dimensions in millimeters)*

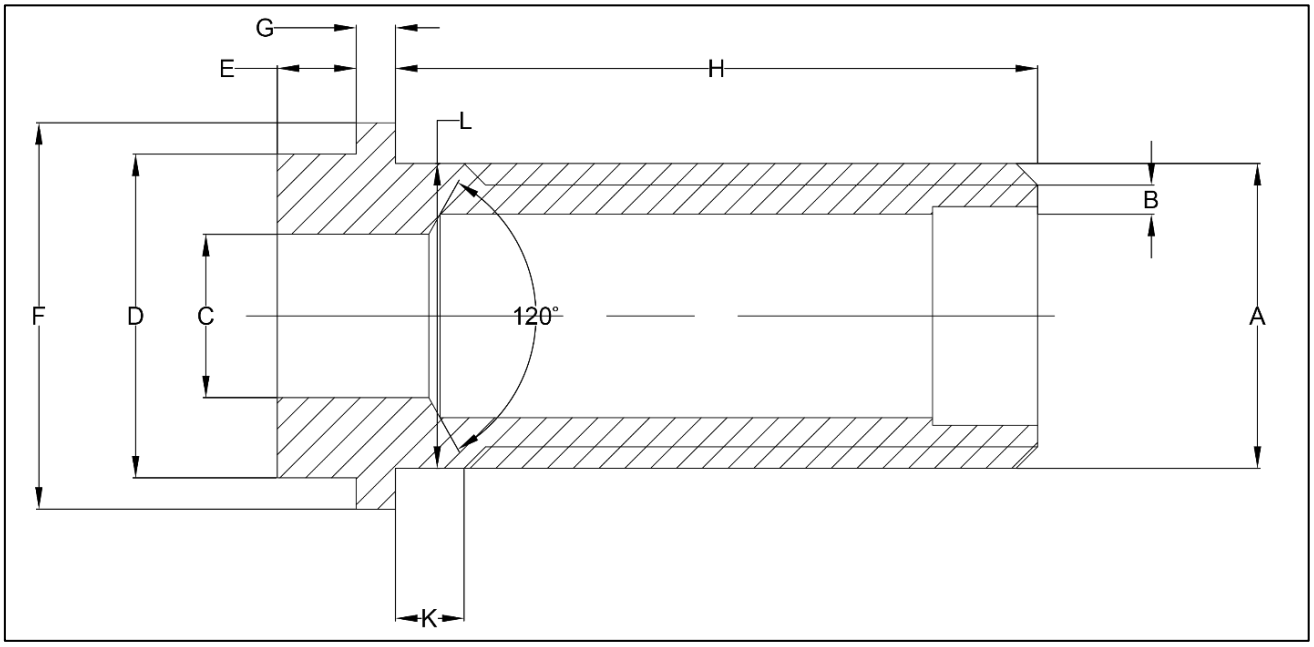



**Figure 2 - Inlet shank**

### 6.3.3 Back nuts

The inlet shank of every float valve shall be provided with two back nuts, outer & inner.

The outer one being as specified below.

a) The outer back nut shall conform to Figure 3 A.

The Inner one being of the type specified below.

b) The Inner back nut shall conform to Figure 3.B

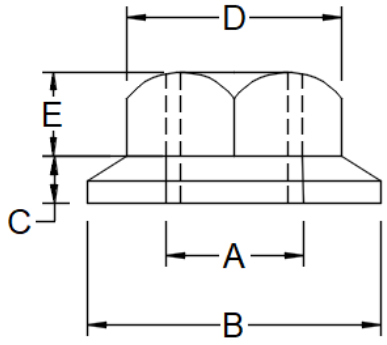



**Figure 3A - Outer back nut**

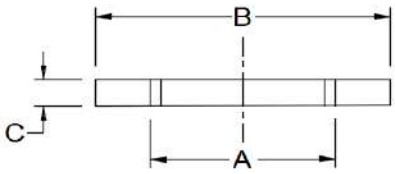
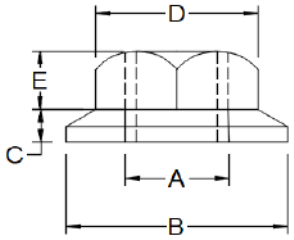
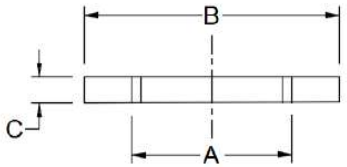



**Figure 3B – Inner back nut**

**Figure 3 – Shape of back nuts.**

**Table 8 – Shape and dimensions of back nuts.**

*(All dimensions in millimeters)*

| **Features** | **Type (a)** | | | | | | **Type (b)** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | | | | | | (3) | | | | | |
| Shape |  | | | | | |  | | | | | |
| A | DN 10 Pipe thread ISO 228/1- G $\frac{3}{8}$ A | DN 15 Pipe thread ISO 228/1- G $\frac{1}{2}$ A | DN 20 Pipe thread ISO 228/1- G ¾ A | DN 25 Pipe thread ISO 228/1- G 1 A | DN 32 Pipe thread ISO 228/1- G 1 ¼ A | DN 40 Pipe thread ISO 228/1- G 1 ½ A | DN 10 Pipe thread ISO 228/1- G $\frac{3}{8}$ A | DN 15 Pipe thread ISO 228/1- G $\frac{1}{2}$ A | DN 20 Pipe thread ISO 228/1- G ¾ A | DN 25 Pipe thread ISO 228/1- G 1 A | DN 32 Pipe thread ISO 228/1- G 1 ¼ A | DN 40 Pipe thread ISO 228/1- G 1 ½ A |
| | min. | min. | min. | min. | min | min | min. | min. | min. | min. | min | min |
| B | 28.5 | 38.0 | 38 | 45 | 60 | 66 | 32.0 | 35.0 | 37 | 47 | 56 | 63 |
| C | 2.5 | 2.5 | 3 | 3.8 | 4.5 | 5.3 | 5.0 | 5.0 | 6.3 | 9.5 | 9.5 | 9.5 |
| D | 20.0 | 25.0 | 31 | 38 | 51 | 56 | - | - | - | - | - | - |
| E | 7 | 7 | 7 | 7.8 | 9.3 | 10.9 | - | - | - | - | - | - |

### 6.3.4 Other parts in connection with inlet closing mechanism if any

If any part design by manufacturer to fulfil the confined replenishing type float operated valve, design or drawing shall be supplied to the relevant authority with material description.

### 6.3.5 Discharge arrangement

Manufacturer shall have freedom to design the discharge arrangement which prevents back sinphonage of water previously discharge by float valve.

## 6.4 WORKMANSHIP AND FINISH

### 6.4.1 Castings

All castings shall be sound, free from laps, blowholes and pitting. Both the outside and inside surfaces shall be clean, smooth, free from sand and neatly dressed. No casting shall be burned, plugged, stopped or patched.

### 6.4.2 Hot Pressings

All hot pressings shall be sound, without laminations and shall be smooth and well finished.

### 6.4.3 Moulding/machining

All matching shall be carried out so that parts are true to shape within the limits of size specified in this standard and are correct in alignment when assembled. All machined surfaces shall be smoothly finished.

### 6.4.4 Screw Threads

Except where otherwise stated in this standard, screw threads shall comply with ISO 228-1.

# 7. PERFORMANCE REQUIREMENTS

## 7.1. Hydraulic pressure test

The valve body shall be withstand a hydraulic pressure of 1.5 x PFA at working conditions without any leakage or sweating when tested in accordance with **Annex D.**

**NOTE** :

PFA = manufacturer designated pressure

## 7.2. Shut off test

The valve shall not be shown any leakage or sweating when tested in accordance with **Annex E.**

In addition to that the valve shall be able to shut-off the flow with keeping minimum atmospheric air gap between bottom edge of valve outlet and the maximum water level raised in the cistern at closing position given in **Table 9**.

**Table 9**

| FOV - DN | 10 | 15 | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|---|
| Air gap – mm | 65 | 65 | 70 | 108 | 130 | 130 |

## 7.3. Dynamic Pressure Test

Every float valve, when assembled at working condition, with the float with which it will be used and operated in specified pressure at fully open position shall show no any permanent deformation or separation of any component or part.

Test Procedure is described in **Annex F.**

## 7.4. Antisiphonage test ( Back flow prevention test)

Every float valve, shall satisfy the anti-siphonage requirements of **6.3.4** and shall be deemed to satisfy them if no water can be seen in the catch pot if tested in accordance with **Annex G**.

## 7.5. Flow test

Every float shall be capable of delivering minimum water quantity which declared by the manufacturer when tested as per the **Annex H.**

## 7.6. Endurance test

All operating parts shall be withstanding to minimum of 50,000 of working cycles tested at working pressure, declared by Manufacturer without deteriorating its performance. After completion of the test, the test for checking "resistance to internal pressure" and shut off test shall be repeated and check the acceptance criteria as 7.1 & 7.2.

All other type and diameter range CFV which covered from this standard shall be fulfilled this testing requirement as the method specified in **Annex J.**

## 8. MARKING

A float operated valve shall be permanently and legibly marked in accordance with **8.1** & **8.2**.

**8.1** Marking on the body

1) The manufacturers name or trade mark;
2) Diameter

**8.2** Marking on the package

Each valve shall be included following information attached in package inside.

1) The manufacturers name or trade mark;
2) Diameter in DN
3) Pressure Class
4) Material type of Body
5) Other details / special precautionary method for water pollution /back flow prevention specified by manufacture if any
6) Batch no with designation

### 9.0 Sampling

Sampling shall be carried out as given in **Annex A.**

# ANNEX A

## A.1 LOT INSPECTION

The sampling scheme given in this annex shall be applied where compliance for a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection.

### A.1.1 Lot

Any quantity of Float operated valve belonging to one batch of manufacturer shall constitute a lot.

## A.2 SCALE OF SAMPLING

**A.2.1** The number of Float operated valve to be selected from a lot for testing for dimensions, Materials, performance requirements and marking shall be in accordance with **Table 10**.

**TABLE 10 – Scale of sampling**

| Number of bars in the lot (1) | Number of Float operated valves to be selected (2) | Sub samples to be selected (3) |
|---|---|---|
| Up to 500 | 5 | 2 |
| 500-1200 | 8 | 3 |
| 1201-3200 | 13 | 4 |
| 3201 and above | 20 | 5 |

**A.2.2** The Float operated valves to be tested shall be selected at random. To ensure randomness, the valves shall be drawn from a lot in accordance with **SLS 428**.

## A.3 NUMBER OF TESTS

**A 3.1** Each valves selected in accordance with column 3 of **Table 10** shall be inspected for and marking requirements specified in **8.**

**A.3.2** Each valves selected in accordance with column 3 of **Table 10** shall be tested for Chemical properties specified in **6.1.**

**A.3.3** Each valves selected in accordance with column 1 of **Table 10** shall be tested for Water quality specified in **6.2**.

**A.3.4** Each valves selected in accordance with column 2 of **Table 10** shall be inspected for Dimensions in **6.3**.

**A.3.5** Each valves selected in accordance with column 2 of **Table 10** shall be tested for workmanship & finish in **6.4**.

**A.3.6** Each valves selected in accordance with column 2 of **Table 10** shall be inspected for Hydraulic pressure test specified in 7.1.

**A.3.7** Each valves selected in accordance with column 2 of **Table 10** shall be tested for Shut off test specified in **7.2**.

**A.3.8** Each valves selected in accordance with column 2 of **Table 10** shall be tested for Dynamic pressure test specified in **7.3**.

**A.3.9** Each valves selected in accordance with column 2 of **Table 10** shall be tested for test specified Antisiphonage test in **7.4**.

**A.3.10** Each valves selected in accordance with column 2 of **Table 10** shall be tested for Flow test specified in **7.5**.

**A.3.11** Each valves selected in accordance with column 2 of **Table 10** shall be tested for Endurance test specified in **7.6**.

## A.4 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this standard, if the following conditions are satisfied.

**A.4.1** Each valves inspected as in **A.3.1** satisfy the marking requirements.

**A.4.2** Each valves inspected as in **A.3.2** satisfy the specified requirements for *chemical composition.

**A.4.3** Each valves inspected as in **A.3.3** satisfy the effect on water quality.

**A.4.4** Each valves inspected as in **A.3.4** satisfy the dimensional requirements.

**A.4.5** Each valves inspected as in **A.3.5** satisfy the workmanship & finish requirements.

**A.4.6** Each valves inspected as in **A.3.6** satisfy the Hydraulic pressure test.

**A.4.7** Each valves inspected as in **A.3.7** satisfy the Shut off test.

**A.4.8** Each valves inspected as in **A.3.8** satisfy the Dynamic pressure test.

**A.4.8** Each valves inspected as in **A.3.9** satisfy the Antisiphonage test.

**A.4.9** Each valves inspected as in **A.3.10** satisfy the Flow test.

**A.4.10** Each valves except inspected as in **A.3.11** satisfy the Endurance test.

## A.5 TEST SEQUENCE

Tests and procedures to determine compliance with the requirement specified in 7.1, 7.2, 7.3, 7.4 , 7.5 & 7.6 shall be carried out on each individual Float operated valve in the following sequence,

1) Hydraulic pressure test
2) Shut off
3) Dynamic pressure
4) Antisiphonage
5) Flow test
6) Endurance

If any parameter which specified under test sequence is not satisfactory, balance test shall not carry out and decision may be taken by the lab.

## ANNEX B
## EQUIVALENT NOMINAL SIZES
## (Informative)

Nominal size of float operated valves is designated as “DN” or “NPS” or “A”. The equivalent DN numbers are given in **Table 11.**

**Table 11 - Equivalent DN numbers for the float operated valves designated in “NPS” or “A”**

| DN | NPS | A |
|---|---|---|
| 10 | ⅜ | 10 |
| 15 | ½ | 15 |
| 20 | ¾ | 20 |
| 25 | 1 | 25 |
| 32 | 1¼ | 32 |
| 40 | 1½ | 40 |

## ANNEX C
## MANUFACTURER’S DECLARATION OF FLOW RATES
## (Informative)

The format for declaration of the flow rates against the Nozzle/seat Bore diameter should be as in **Table 12** or similar format.

**Table 12- Manufacturer’s declaration of flow rates**

| Test pressure zone | Test Pressure | Nozzle/seat Bore diameter in mm |
|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | x | x | x | x | x | x |
| | | Flow rate in l/s | | | | | |
| ≤0.7 MPa | Lower point …. | x | x | x | x | x | x |
| | Middle point …. | x | x | x | x | x | x |
| | At 0.7 MPa | x | x | x | x | x | x |
| 0.7 MPa < & ≤ 1.4MPa | Lower point …. | x | x | x | x | x | ~~x~~ |
| | Middle point …. | x | x | x | x | x | x |
| | At 1.4 MPa | | | | | | |

# ANNEX D
# HYDRAULIC PRESSURE TEST

## D.1 SCOPE

To establish that the design and strength of the assembly is adequate for the application by subjecting the fittings to pressure tests.

## D. 2 TEST APPARATUS

### D.2.1 Pressure system :

A hydraulic system capable of producing a test pressure of (2 $^{+0.4}_{-0}$ MPa) MPa without shock or pulsations. A hydraulic pump or accumulator may be used for this purpose. In case any internal leakage occurs during the test, the pressurizing system shall be capable of maintaining the pressure during these flow conditions.

### D.2.2 Water supply :

A water supply system capable of maintaining the supply at the nominal ambient temperature (27 °C ± 2 °C).

### D.2.3 Pressure gauge :

A digital or analog pressure gauges with an accuracy of ±0.5 % of the true value.

## D.3 PROCEDURE

This test shall be conducted using water at ambient temperature. The procedure shall be as follows,

a) Mount the float operated valve and connect to the pressuring system.
b) Open the valve under test and the flow control valve, if applicable, and allow water to run and discharge freely to atmosphere for 10 $\pm^{+5}_{-0}$ minutes through the float operated valve. Ensure that all air is removed.
c) Immediately shut the valve (close the nozzle of end of test valve by pushing the piston towards the nozzle forcefully by pulling the lever stem upward) and pressurize the valve at its inlet to test pressure of (1.5 x PFA) $^{+0.4}_{-0}$ MPa.
d) Keep the system for minimum of 60$\pm^{+15}_{-0}$ min with the same pressure.
e) Observe the valve body and check whether there is visible leakage or any type of mechanical defect such as cracks, swelling or breaking areas etc.

**NOTE :**

*This test involve high pressure. Suitable protection shall be provided so that the operator is not exposed to a safety hazard if a burst failure occurs.*

# ANNEX E
# SHUT OFF TEST

## E.1 SCOPE

This Appendix sets out the method for testing float valves to ensure that the valve will shut off against a water pressure of designated pressure class.

## E. 2 TEST APPARATUS

### E.2.1 Pressurizing system :

A hydraulic system capable of producing a test pressure of 1.5 $^{-0.4}_{-0}$ MPa without shock or pulsations. A hydraulic pump or accumulator may be used for this purpose. In case any internal leakage occurs during the test, the pressurizing system shall be capable of maintaining the pressure during these flow conditions.

**NOTE** : *PFA = manufacture designated pressure*

### E.2.2 Cistern (Storage tank) :

A cistern or storage tank with suitable mounting for the valve and large enough to enable the float to operate freely. An overflow shall be located at the appropriate air gap distance below the valve outlet.

### E.2.3 Pressure gauge :

A digital or analog pressure gauges with an accuracy of ±0.5 % of the true value.

## E.3 PROCEDURE

The Procedure shall be as follows,

a) Mount the float operated valve in the cistern, and mark the overflow level and the working water level on the cistern wall.
b) Adjust the water inlet valve to shut off below the working water level.
c) Connect the water supply and allow the cistern to fill. The valve shall shut off at or below the working level when the hydrostatic pressure is increased to the test pressure of (1.1 x PFA) MPa
d) Maintain the pressure for not less than 15 minutes to ensure that the water level has stabilized.
e) Mark the water level and maintain a pressure for another 15 minutes (total $30^{-10}_{-0}$ minutes.). Observe and report any increase in the water level or leakage through the valve under test.
f) The measure the air gap between bottom edge of valve outlet and the maximum water level raised in the cistern at closing position. Air gap shall be comply with **Table 9.**

**NOTE :**

*If the valve leaks, air gap test is not necessary to carry out.*

## ANNEX F

## DYNAMIC PRESSURE TEST

### F.1 SCOPE

This test ensures that the valve will perform against the maximum pressure likely to be encountered in public water supplies.

### F.3 APPARATUS

The following apparatus is required:

1. Pressurizing system A hydraulic system capable of producing a minimum pressure of 1.5 +0.4, -0 MPa without shock or pulsation. A hydraulic accumulator or pump may be used for this purpose. In case any internal leakage occurs during the test, the pressurizing system shall be capable of maintaining the pressure during these flow conditions.

2. Cistern A cistern or other vessel with suitable mounting for the valve and large enough to enable the float to operate freely. An overflow shall be located at the appropriate air gap distance below the valve outlet.

3. Pressure *gauge* A digital or analog pressure gauge with an accuracy of $\pm$5% of the true value.

### F.4 PROCEDURE

The procedure shall be as follows:

1. Mount the valve in the cistern and keep fully open position.

2. Gradually increase the supply pressure to designated class pressure.

3. Maintain this pressure for 60 +5, -0 s

## ANNEX G

## ANTI SIPHONAGE TEST ( BACK FLOW PREVENTION )

### G.1 APPARATUS

The following apparatus is required for the test:

**G.1.1** A galvanized mild steel cylinder, with connection on the side to take 50 mm diameter ISO pipework and with other connections for vacuum line, pressure gauge, and if fitted a drain valve

**G.1.2** A transparent sight tube.

**G.1.3** Vacuum gauge -An accurately calibrated vacuum gauge, to measure 0 to 101 kPa vacuum (1.01 bar).

**G.1.4** A 50 mm quick-opening valve.

**G.1.5** A transparent catchpot.

**G.1.6** A galvanized mild steel cistern, of not less than 22.5 1itres capacity, with a stand.

**G.1.7** A full way valve, 50 mm diameter.

**G.1.8** A suitable shut-off valve.

**G.1.9** A means of producing and maintaining a vacuum of not 1ess than 98 kPa. (for example: pump or injector.

**G.1.10** A drain valve.

**G.1.11** Fitting under test.

**G.1.12** Pipework between cylinder and fitting to connect the foregoing items as shown in Figure 5 to be 50 mm nominal bore and not exceeding 2 meters in length.

**G.1.13** A water supply.

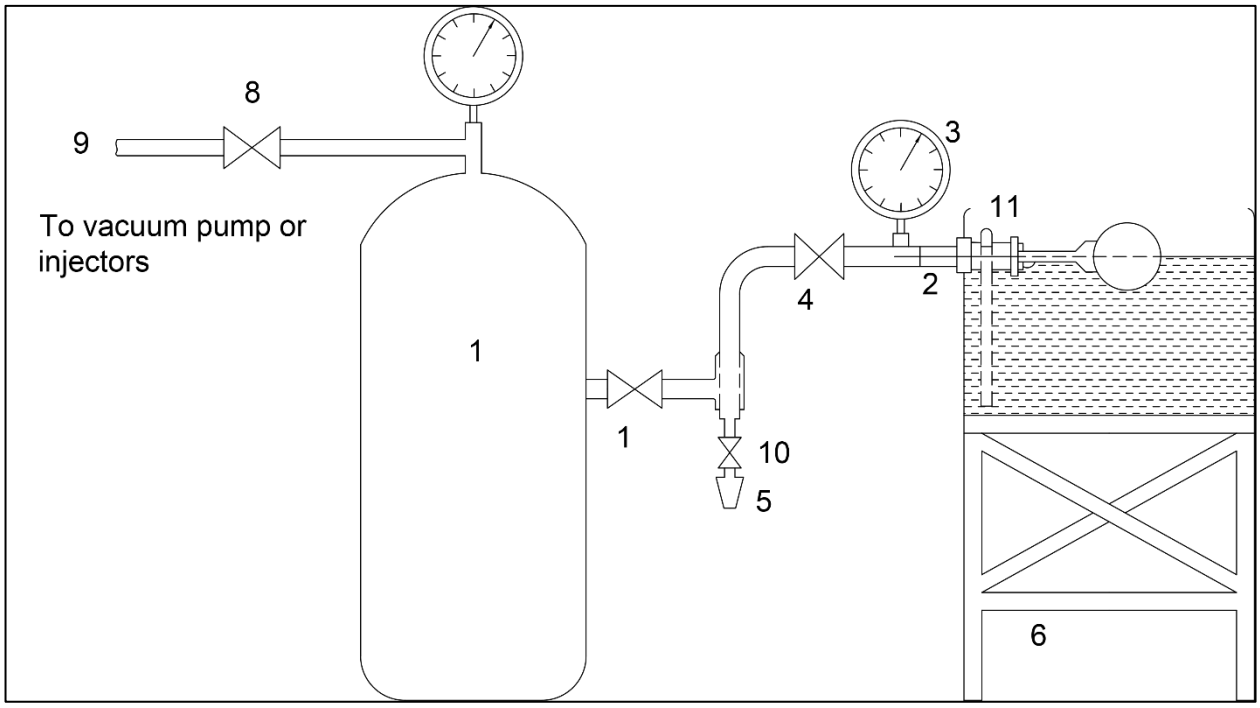



**Figure 4 - Diagrammatic representation of antisiphonage test apparatus**

## G.2 PROCEDURE

For the antisiphonage test the following procedure shall be followed:

**a)** Modify the float valve to be tested, by removing its diaphragm and substituting a rigid steel disc of the same diameter and a rubber packing ring which together make up the same thickness as the rubber diaphragm.

**b)** Install the modified float valve, together with its discharge assembly, in the cistern.

**c)** Connect up the apparatus as shown in **Figure 4** (If desired the vacuum cylinder may be inverted and the connection on the dome used to fit a drain valve).

**d)** Run water into the cistern until the water level in the cistern is not lower than 10 mm below the horizontal center line of the float valve.

**e)** Close valves Nos 4,7 and 10, and open valve Number. 8.

**f)** Activate the means for producing the vacuum until the gauge reading on the cylinder is 95 kPa minimum

**g)** Close valve No. 8 and open valve No. 7,

**h)** Quickly open valve No. 4 and allow it to remain open for 60s.

**i)** close valve No. 4 and open valve No. 10.

**j)** Examine the catchpot and report any water appearing during the test period.

## ANNEX H

## FLOW TEST

### H.1 LOW PRESSURE FLOW TEST

#### H.1.1. APPARATUS

**H.1.1.1**. *A test rig* (**Figure 16**) capable of maintaining 4 ±0.1 m head of water at the seat of the valve under test, comprising a cistern connected, through diameter similar to test valve bore, PVC pipework to the specimen valve via a controlling isolation valve.

#### H.1.2. PROCEDURE

Fit the float operated valve to be tested together with its discharge arrangement. Remove the float. Cause the valve to discharge water from cistern A into container B (see **Figure 5**) for a period of 140**±** 5 s whist maintaining, for the duration of the test the water level in cistern A at a height of 4**±** 0.1 m above the center of the inlet of the valve. Record the amount of water in container B in liters, divide the amount in 140 and calculate flow rate.

### H.2 HIGH PRESSURE FLOW TEST

#### H.2.1. APPARATUS

**H.2.1.1.** *A test rig* (**Figure 6**) capable of marinating a constant pressure of 8±0.1 bar at the inlet of valve under test, connected through diameter similar to test valve bore, pipework to the specimen valve via a controlling Isolation valve.

#### H.2.2. PROCEDURE

Fit the float operated valve (installed with the HP maximum diameter seat) to be tested together with its discharge arrangement. Remove the float. Cause the valve to discharge water into container B for a period of 140**±** 5 s whist maintaining, for the duration of the test the, the constant pressure of 8**±** 0.1 bar at the seat. Record the amount of water in container Bin liters, divide the amount in 140 and calculate flow rate.

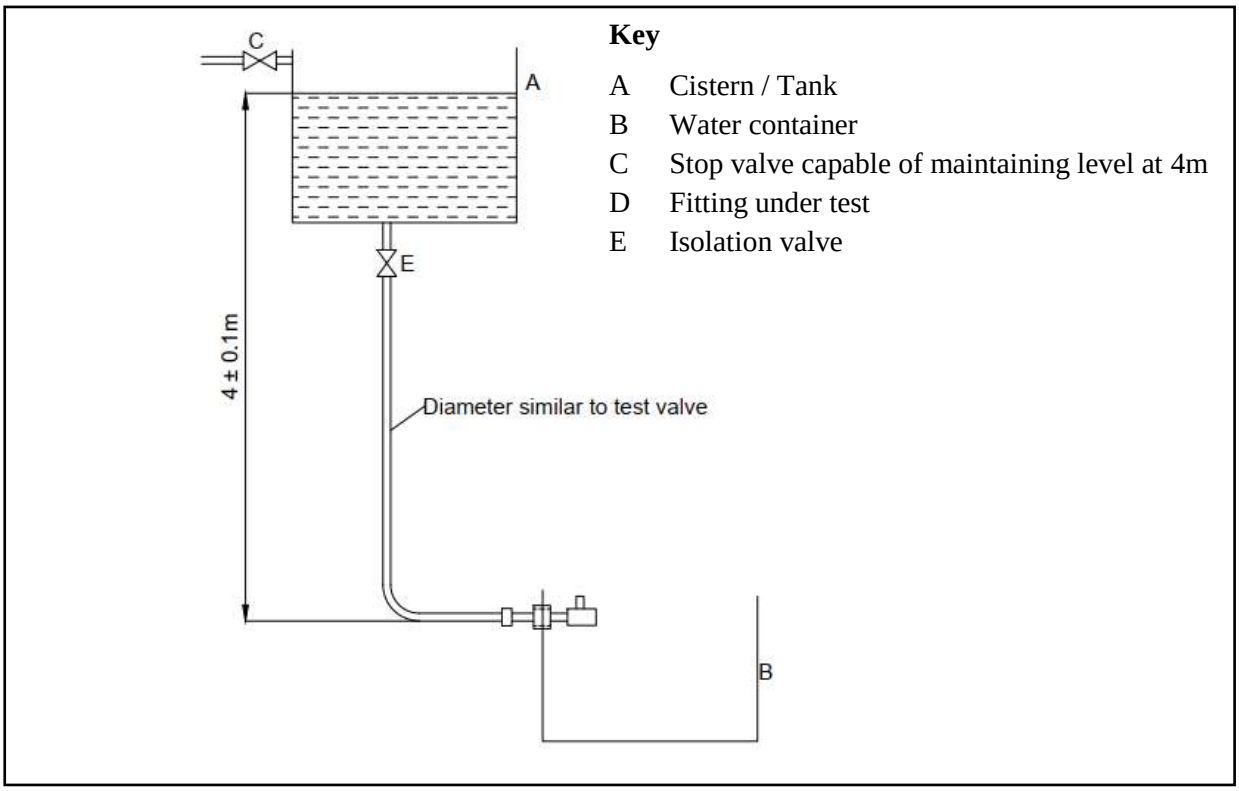



**Figure 5 – Flow rate test apparatus**

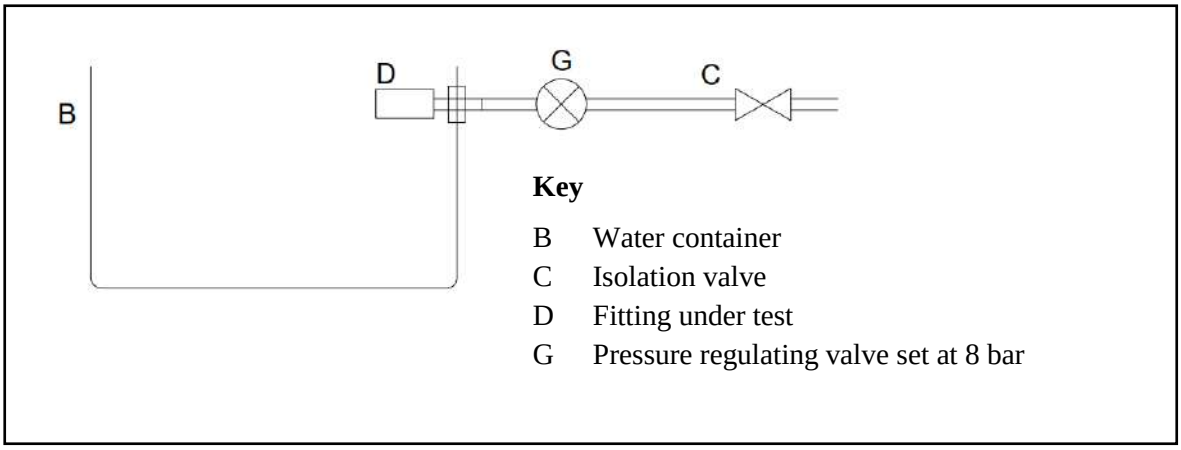



**Figure 6 – Water container B for high Pressure flow rate test**

# ANNEX J

# ENDURANCE TEST

## J.1 SCOPE

The test measures the ability of valve to operate satisfactorily with normal opening and closing operations during the expected life of the valve.

## J. 2 TEST APPARATUS

### J.2.1 Test apparatus

A test apparatus fitted with a counter to register complete cycles and capable of the following performance:

(a) Fully opening and closing the valve over the entire extent of the valve's operating limits by manipulation of the float arm.

(b) Shut off the flow against the prescribed pressure when the valve is in the closed position by applying a force not less than that normally imposed by the float.

### J.2.2 Water supply system

A water supply system capable of maintaining the supply at the nominal ambient temperature (27 °C ± 2 °C) under test. The system shall be capable of maintaining a hydrostatic pressure to the valve at a static pressure of (400 ±20) kPa when the valve is in the closed position**.**

### J.2.3 Pressure gauge

A digital or analogue pressure gauge with an accuracy of ±2% of the true value.

### J.2.4 Timing and control equipment

Timing and control equipment shall achieve a complete cycle as follows:

a) Fully open the valve.

b) Allow valve to remain fully open for a period of (2 +5), ± 0 s.

c) Fully close the valve.

d) Allow valve to remain fully closed for a period of (2 +5), - 0 s.

### J.2.5 Monitors

The apparatus may be provided with continuous monitoring equipment to stop the tests if the parameters and limits are not being met. The apparatus may then be repaired or reset and the test continued.

If a manual system of monitoring the system's performance is used, one of the following actions shall be taken if it is found that the equipment is outside the set limits

(a) The test shall be abandoned and recommenced with a new valve.

(b) The equipment shall be repaired and reset, and the cycles continued. All the cycles, between the time of detection of the fault and the recorded cycle count at the last check when the equipment was operating correctly, shall be added to the required number of cycles.

**J.3 PROCEDURE**

The procedure shall be as follows:

a) Connect the valve assembly to the test rig.

b) Adjust the water supply pressure to (400 +20), —0 kPa with the valve under test in the closed position.

c) Commence the opening and closing cycling of the valve, and set the apparatus so that the valve opens to at least 90% of the fully open position and the opening and closing times are in accordance with **J.2.4.**

d) Reset the cycle counter to zero.

e) Then start to commence the cycling & continuing to a minimum of 50,000 cycles cycling.

f) Regularly check that the prescribed limits are being met throughout the test and also that the valve shuts off the water when closed. The apparatus may be turned off to perform this test. Record the results and the number of cycles at which these checks occur. The washer or diaphragm shall be replaced immediately the valve is found not to shut off the water. A valve washer may only be replaced once during an endurance test. A second failure will fail the valve under test. For other defects the test shall be aborted due to failure.

g) At the completion of minimum of 50,000 cycles, check the equipment for compliance with the parameters and limits of this test.

f) Remove the valve assembly and carry out the shut-off test in **Annex E**.

**NOTE:**

*No repairs or part replacements shall be carried out before the final water shut-off test, except for the washer that may be replaced once during the cycling test. The gland may be adjusted provided that no adjustments have occurred during the cycling test.*