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EAST AFRICAN STANDARD

Float valves — Specification

EAST AFRICAN COMMUNITY

First Edition 2010

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Introduction

In the preparation of this East African Standard, the following source was consulted extensively:

SANS 752:2009, *Float valves — Specification*

Assistance derived from this source and others inadvertently not mentioned is hereby acknowledged.

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SANS 752:2009

Edition 2.6

SOUTH AFRICAN NATIONAL STANDARD

Float valves

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SANS 752:2009
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Table of changes

Change No.	Date	Scope
Amdt 1	1996	Amended to alter the conditioning temperature for the assembled float valve prior to testing.
Amdt 2	2000	Amended to allow for two designs of float valves and to add a requirement for the inlet valve to accommodate copper pipe.
Amdt 3	2002	Amended to add polyvinyl chloride as optional requirement for plastics material and to update applicable standards.
Amdt 4	2004	Amended to delete reference to a requirement and test method for noise level in the scope, to update the applicable standards and to change the test method for anti-siphonage.
Amdt 5	2007	Amended to change a requirement for the inlet connection of a float valve.
Amdt 6	2009	Amended to add a definition for "acceptable" and to renumber the definitions accordingly, to change the requirements for metallic materials, and to delete a referenced standard.

Foreword

This South African standard was approved by National Committee SABS SC 138G, *Water and sanitation – Equipment and systems – Plumbing components*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in December 2009.

This document supersedes SANS 752:2007 (edition 2.5).

A vertical line in the margin shows where the text has been technically modified by amendment No. 6.

Contents

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Float valves

1 Scope

This specification covers the requirements for two classes, two designs and three types of float valve of nominal size not exceeding 50 mm that are intended for use with water at a temperature not exceeding 50 °C. It does not cover the requirements for floats.

NOTE

a) The standards referred to in the specification are listed in appendix A.

b) Requirements that must be specified by the purchaser are listed in appendix B.

c) Information regarding the verification of the quality of float valves produced to this specification, that could be used to assess compliance with the specification of a lot of float valves, is given in appendix C.

2 Definitions

For the purposes of this standard, the following definitions apply:

2.1
acceptable
acceptable to the authority administering this standard, or to the parties concluding the purchase contract, as relevant **Amdt 6**

2.2 **Amdt 6**
equilibrium type
float valve whose closing action is unaffected by the pressure of the water in the inlet shank

2.3 **Amdt 6**
nominal size
<float valve> nominal bore, in millimetres, of the inlet shank of the float valve

2.4 **Amdt 6**
pressure-assisted type
float valve whose closing action is assisted by means of the pressure of the water in the inlet shank

2.5 **Amdt 6**
pressure-opposed type
float valve whose closing action is resisted by the pressure of the water in the inlet shank

3 Requirements

3.1 Class and type

3.1.1 Class

A float valve shall be of one of the following classes:

a) **Class HP**: Float valves intended for operation at static water pressures not exceeding 2 000 kPa.

b) **Class LP**: Float valves intended for operation at static water pressures not exceeding 600 kPa.

3.1.2 Type

A float valve shall be of a pressure-opposed, a pressure-assisted or an equilibrium type.

3.1.3 Design

A float valve shall be designed for side entry or for bottom entry.

3.2 Materials

3.2.1 Metallic materials for components in direct contact with water

The metallic material of any component in direct contact with water shall be either

a) a copper alloy that, when tested for dezincification resistance in accordance with 5.11, shows a depth of penetration not exceeding 250 µm; or

b) a stainless steel of an acceptable grade. **Amdt 4; amdt 6**

3.2.2 Plastics materials

All plastics components which are in direct contact with water shall be of polyacetal or polyvinyl chloride (PVC). When tested in accordance with 5.10, plastics components shall show no sign of blistering or weldline splitting. Any surface defects around the injection point shall not penetrate to a depth greater than 50 % of the thickness of the material at that point.

3.3 Dimensions

3.3.1 Nominal size

The nominal size of a float valve shall be 15 mm, 20 mm, 25 mm, 32 mm, 40 mm or 50 mm.

3.3.2 Overall length

The overall length of a 15 mm float valve intended for use with a WC cistern shall not exceed 330 mm measured from the outer face of the fixing flange on the inlet shank to the end of the lever of the assembled float valve in its closed position and without a float.

3.3.3 Floats for float valves

A float valve that is supplied without a float shall be designed to be able to operate with a float that complies with SANS 1006. Other float valves shall be supplied complete, fitted with their own design of float. A 15 mm pressure-opposed float valve shall be designed to operate with a 110 mm float. In the case of other sizes of pressure-opposed float valves, the size (nominal diameter) of the float shall be marked on the lever of the float valve (see 4.1(c)). **Amdt 4**

3.4 Construction

3.4.1 Screw threads

The pipe-connecting screw thread on the inlet shank of the body shall be internal or external right-hand thread that complies with the relevant requirements of SANS 1109-1 for the nominal size of the valve. **Amdt 4**

3.4.2 Provision for anti-siphonage

A float valve shall incorporate means of preventing back siphonage through the float valve. Any air hole incorporated shall discharge downwards. When a float valve is tested in accordance with 5.9, the level of the water in the cistern shall not drop.

3.4.3 Attachment of silencing device

When a float valve is provided with a silencing device which comprises a separate component that is attached to the float valve, the valve body and the silencing device shall be so connected that the device does not become dislodged when tested in accordance with 5.12.

3.4.4 Seats

The seat shall be integral with the body, or otherwise, replaceable.

3.4.5 Levers

A lever shall

a) when tested in accordance with 5.3, not develop a permanent set;

b) for a 15 mm or a 20 mm float valve, except when supplied with a float that is attached by means other than an internal thread, be threaded (at the end that will accept the float) with an external thread of useful length at least 10 mm and of size M8;

c) be adjustable (to enable the level of the water in a cistern to be altered) by means of a float adjuster or, in the case of a metal lever on a float valve of nominal size 15 mm, by manual bending, provided that a lever designed for manual bending does not crack or fracture when it is subjected to five cycles of bending by hand (without the aid of tools or other devices), each cycle consisting of bending the lever through an angle of approximately 45° and then back to its original shape.

3.4.6 Inlet shank

The inlet shank shall be furnished with either an integral flange and a back nut or two back nuts to aid in the mounting of the float valve.

3.4.7 Inlet connection

Float valves of nominal size 15 mm shall be threaded in accordance with SANS 1306-1. **Amdt 5**

3.4.8 Stabilizing device

A bottom-entry float valve shall incorporate an adjustable and rigid mechanism positioned in such a manner that, when correctly adjusted, it shall prevent any reverse movement of the body of the float valve during the closing action of the float and arm.

3.5 Performance

3.5.1 Rate of flow

When a float valve is tested in accordance with 5.4, it shall deliver water at the rate given in column 3 of table 1, applicable to the appropriate class and nominal size of float valve given in column 1, using for the test the lower water pressure given in column 2, provided also that when tested using the higher water pressure for each class of float valve as given in column 2, the water flow rate for a 15 mm valve does not exceed 28 L/min.

Table 1 — Rate of flow

1	2	3
Class LP float valves		
Nominal size mm	**Water pressure** ± 1 %, kPa	**Rate of flow** L/min, min.
15	100 to 600	5
20	100 to 600	20
25	100 to 600	35
32	100 to 600	200
40	100 to 600	250
50	100 to 600	300
Class HP float valves		
15	200 to 1 500	5
20	200 to 1 500	20
25	200 to 1 500	35
32	200 to 1 500	80
40	200 to 1 500	90
50	200 to 1 500	100

3.5.2 Body strength

When a float valve is tested in accordance with 5.5, it shall not break or suffer any permanent deformation that will affect its operation.

3.5.3 Durability

When a float valve is tested in accordance with 5.8, it shall

a) operate smoothly and the plunger shall move freely and not bind during operation;

b) not allow water to emerge from any part of the valve except through the normal outlet, the air (anti-siphon) hole, when applicable, and the hinge pin area of the lever;

c) not show any sign of damage or deformation;

d) not leak at the seat while the valve is under pressure.

3.5.4 Resistance to torque

When a float valve is tested in accordance with 5.7, the inlet shank shall not crack or break, the threads on the shank or on the back nut (or both) shall not strip, and the back nut shall not be forced over the mating thread on the inlet shank.

3.5.5 Resistance to impact

When the body of a float valve (with any loose covers removed) is tested in accordance with 5.6, it shall not crack or break.

4 Marking

4.1 Each float valve shall bear the following information in legible and indelible marking on the body of the valve:

a) the manufacturer's name, trade name or trademark;

b) the letters "LP" in the case of a float valve of class LP and "HP" in the case of a float valve of class HP; and

c) except in the case of a 15 mm float valve, the nominal diameter of the float with which the valve is intended to operate (marked on the lever of the valve) (see 3.3.3).

5 Inspection and methods of test

5.1 Inspection and sequence of tests

5.1.1 Inspection

Visually examine each float valve for compliance with all the requirements of the specification for which tests to assess compliance are not given in 5.3-5.12 (inclusive).

5.1.2 Sequence of tests

Carry out the tests in 5.3-5.8 (inclusive) in the order in which they are given.

5.2 Conditioning

Before conducting the tests, condition the completely assembled float valve by placing it for approximately 72 h in an air oven maintained at a temperature of 60 ± 2 °C. Then remove the valve from the oven and allow it to cool to approximate ambient temperature.

5.3 Test on levers

Remove the lever from the float valve, so rigidly clamp the lever at the end that attaches to the valve that the lever is held horizontal and in an inverted position. Then gradually apply to the free end a vertical load equal to 1,5 times the lifting effort (full buoyancy) of the float with which it is intended to operate. Maintain the test load for 3 min and then remove the load. Examine the lever for compliance with 3.4.5(a).

5.4 Rate of flow test

5.4.1 Equipment

a) **Mains water supply**: A supply of water which is at a temperature of 20 ± 5 °C and is controlled by a flow control valve and which is at a pressure of 2 000 ± 20 kPa. The water shall be delivered through a pipe system terminating in a flow conditioning chamber.

b) **A flow meter**, calibrated and accurate to within 2 % of the flow rate to be measured.

c) **Flow conditioning chamber**: A steel pipe of length at least 500 mm and having an inside diameter of approximately 70 mm and having both ends reduced to a size appropriate to the valve under test. The centre of the pipe shall be furnished with a pressure gauge and an air bleed cock.

5.4.2 Procedure

So connect the flow meter and the float valve to the water supply that the flow meter will measure the rate of flow of water delivered by the float valve. Ensure that the lever of the float valve is in its fully open position. Turn on the water supply.

So adjust the water supply that the pressure indicated at the flow conditioning chamber is the appropriate pressure for the valve under test (see 3.5.1). Determine the flow rate in litres per minute. In the case of a 15 mm float valve, repeat the test using the higher water pressure. Check for compliance with 3.5.1.

5.5 Body strength test

Connect the inlet shank of the float valve to a water supply at a pressure of 3 000 ± 100 kPa, the water flow being controlled by a control valve.

Using any convenient means, keep the float valve closed at the seat and open the control valve. After 30 s close the control valve and examine the float valve for compliance with 3.5.2.

5.6 Impact test

5.6.1 Equipment

a) **Tank**: A rigidly secured open tank or cistern in which the float valve under test can be fitted as in normal use.

b) **Sphere**: A solid steel ball of mass 500 ± 10 g.

5.6.2 Procedure

Install the float valve (without a float and lever) in the tank, clamp it, and hand-tighten the back nut as far as it will go. So drop the steel ball three times, from a height of 1,0 m, that it strikes the body of the float valve (not the inlet shank) at a distance of 12 mm from the body flange or from the end of the thread on the inlet shank, as relevant. Examine the float valve for compliance with 3.5.5.

5.7 Torque test

5.7.1 Equipment

a) **Tank**: As in 5.6.1(a).

b) **Clamp**: A rigidly mounted clamp (or similar device) by means of which any movement of the body of a float valve secured in the tank or cistern can be prevented.

c) **Torque spanner**: A torque measuring device that terminates in a flat spanner head of dimensions that will allow a close fit on the back nut.

5.7.2 Procedure

Secure the float valve (without a float and lever) as in 5.6.2, with the back nut hand-tightened as far as it will go. Apply the torque spanner to the nut and adjust the spanner to snugly fit the nut. Apply a tightening torque of 10 ± 1 N·m to the back nut. Examine the float valve for compliance with 3.5.4.

5.8 Durability test

5.8.1 Equipment

a) **Tank**: A tank (or cistern) of adequate size, to which the float valve under test can be fitted as in normal use, and that is directly connected to a suitable water supply pump which is arranged to supply water directly to the tank.

b) **Test float (for valves supplied without floats)**: A spherical float that complies with the requirements of SANS 1006 and which is of the appropriate nominal diameter for the valve under test (see 3.3.3 and 4.1(c)). **Amdt 4**

c) **Mains water supply**: As in 5.4.1(a).

5.8.2 Procedure

a) In the case of a float valve supplied without a float, fit the valve under test with a test float and install the valve in the tank.

b) Connect the inlet shank of the float valve to the water supply and, with the float valve closed, adjust the water pressure to 500 kPa.

c) By means of the pump, so lower and raise the level of the water in the tank that the float valve performs an opening and closing cycle, as in normal practice, with the mains water passing through it. Each cycle consists of the movement from the closed position (with the float completely submerged) to the fully open position and back to the closed position. Repeat for 30 000 cycles and then, while the operating cycles continue, check for compliance with 3.5.3(a), (b) and (c).

d) Disconnect the pump water supply to the tank and allow the tank to fill through the float valve until the valve closes. So adjust the level of the water in the tank that the float is immersed to three quarters of its diameter and adjust the water pressure at the inlet to 2 000 ± 20 kPa in the case of a class HP float valve or 600 ± 10 kPa in the case of a class LP float valve. Maintain this pressure for at least 5 min and then, with the valve still under pressure, examine the float valve for compliance with 3.5.3(c) and (d).

5.9 Anti-siphonage test

5.9.1 Equipment

a) A suitable support to mount the cistern in accordance with the manufacturer's fixing instructions.

b) A suitable gauge and equipment for measuring and maintaining a vacuum of –55 kPa.

c) Suitable sight glass in the vacuum line system. **Amdt 4**

5.9.2 Procedure

a) Mount the fully assembled cistern on a suitable support in accordance with the manufacturer's fixing instructions.

b) Remove non-return devices if applicable.

c) Plug off the overflow and, with the outlet valve closed, fill the cistern with water to the overflow level.

d) Connect the inlet of the valve to the vacuum tank.

e) Locate the site glass between the valve and the vacuum tank so that any water that is back-siphoned can be observed.

f) With the inlet valve fully open, gradually apply a vacuum of –50 kPa to –55 kPa and sustain for $30\ ^{+10}_{-0,5}$ s.

g) Maintain the water inlet valve in the fully open position and re-apply the vacuum three times, rapidly alternating between 0 kPa and (–50 to –55) kPa.

h) Check for compliance with 3.4.2. **Amdt 4**

5.10 Test for quality of plastics component parts

5.10.1 Equipment

An air circulating oven maintained at a temperature of 150 ± 2 °C.

5.10.2 Procedure

Disassemble the float valve and place all its plastics components in the oven. Leave for 60 ± 1 min and then inspect for compliance with 3.2.2.

5.11 Test for dezincification resistance

a) **For cast components**: Take one test specimen from both the thickest and the thinnest section of the component.

b) **For other components**: Take only one test specimen from the component.

Use the method given in SANS 6509 to determine the maximum depth of penetration for each specimen and check for compliance with the requirements of 3.2.1(a).

5.12 Test for attachment of silencing device

5.12.1 Equipment

A (5 000 ± 10) g mass piece.

5.12.2 Procedure

Mount the float valve as in normal practice. Suspend the mass piece from the silencing device for a period of at least 5 min and then inspect for compliance with the requirements of 3.4.3.

Appendix A

Applicable standards

Reference is made to the latest issues of the following standards:

SANS 1006, *Plastic floats for ball valves.*

~~SANS 1067-1, *Copper based fitting tubes – Part 5: Compression fittings.*~~ **Amdt 5**

SANS 1109-1/ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation.*

SANS 1306-1/ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation.*

SANS 6509/ISO 6509, *Corrosion of metals and alloys – Determination of dezincification resistance of brass.*

SANS 9001/ISO 9001, *Quality management systems – Requirements.*

~~SANS 10202 (SABS 0202), *Colour marking for the identification of wrought steels commonly used in South Africa.*~~ **Amdt 6**

Appendix B

Notes to purchasers

The following requirements shall be specified in tender invitations and in each order or contract:

a) the class and type (see 3.1);

b) the design (see 3.1.3);

c) the nominal size (see 3.3.1);

d) the type of thread on the inlet shank and body (see 3.4.1); and

e) whether the seat is to be replaceable or an integral part of the body (see 3.4.4).

Appendix C

Quality evaluation of float valves produced to the requirements laid down in the specification

C.1 Quality verification of float valves

When a purchaser requires ongoing verification of the quality of float valves, it is suggested that, instead of concentrating solely on evaluation of the final product, he also direct his attention to the manufacturer's quality system. In this connection it should be noted that SANS 9001 covers the provision of an integrated quality system.

SABS – Standards Division

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Amendments and Revisions

South African National Standards are updated by amendment or revision. Users of South African National Standards should ensure that they possess the latest amendments or editions.

The SABS continuously strives to improve the quality of its products and services and would therefore be grateful if anyone finding an inaccuracy or ambiguity while using this standard would inform the secretary of the technical committee responsible, the identity of which can be found in the foreword.
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