



CD/K/015-4:2009  
ICS 23.060.01; 91.140.60

## **EAST AFRICAN STANDARD**

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**Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 4: Air valves**

**EAST AFRICAN COMMUNITY**

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## 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:

BS EN 1074-4:2000, *Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 4: Air valves*

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

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## Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 4: Air valves

### 1 Scope

This East African Standard specifies the minimum fitness for purpose requirements for valves to be used in, or connected to, water supply pipe systems above or below ground (see CD/K/004-2009), carrying water intended for human consumption.

This standard specifies the design requirements, the performance requirements, and the conformity assessment method for valves, whatever their type and materials.

This standard applies in priority to any other product or test standard: the requirements from other standards apply only when this standard refers to them.

This standard deals with the requirements applicable to air valves with DN up to DN 300 and PFA 6 to PFA 25.

### 2 Normative references

This East African Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to the East African Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 7268, *Pipe components — Definition of nominal pressure*

CD/K/004:2009, *Water supply — Requirements for systems and components outside buildings*

ISO 6708, *Pipework components — Definition and selection of DN (nominal size)*

CD/K/015-1:2009, *Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 1: General requirements*

CD/K/015-2:2009, *Valves for water supply — Fitness for purpose requirements and appropriate verifications tests — Part 2: Isolating valves*

ISO 5208:2008, *Industrial valves — Pressure testing of metallic valves*

### 3 Terms and definitions

For the purposes of this standard, the terms and definitions given in CD/K/015-1:2009 apply together with the following:

#### 3.1

##### **float type purgers and air valves**

self-operating float type valves for the evacuation of air from, or for the ingress of air into water pipelines. Such valves may be single float or double float and may fulfil one or more of the following functions: air release, air intake, air venting

#### 3.2

##### **air release function**

to discharge a large air flow from a water pipeline

#### 3.3

##### **air intake function**

to admit a large air flow into a water pipeline

**3.4**

**air venting function**

to purge entrapped air from a water pipeline in service under pressure

**4 Design requirements**

Self-operating float type purgers and air valves shall be designed in compliance with the requirements given in clause 4 of CD/K/015-1:2009. In addition, these valves may be fitted with an integrated isolating device which shall be in accordance with CD/K/015-2:2009.

**5 Performance requirements**

**5.1 Mechanical strength**

**5.1.1 Resistance to internal pressure of the shell and all pressure containing components**

Requirement and test shall be in accordance with 5.1.1 of CD/K/015-1:2009. For double float valves, the obturators may be tested simultaneously or separately.

**5.1.2 Resistance of the obturator to differential pressure**

Tested within 5.1.1.

**5.1.3 Resistance of valves to bending**

Not applicable.

**5.1.4 Resistance of valves to operating loads**

Not applicable, except for any integrated isolating device which shall be in accordance with 5.1.4 of CD/K/015-2:2009.

**5.2 Leaktightness**

**5.2.1 Leaktightness of the shell and all pressure containing components**

**5.2.1.1 Leaktightness to internal pressure**

The requirement of leaktightness to internal pressure is fulfilled by conformance to 5.1.1.

**5.2.1.2 Leaktightness to external pressure**

Not applicable, except for any integrated isolating device which shall be in accordance with 5.2.1.2 of CD/K/015-2:2009.

**5.2.2 Seat tightness**

**5.2.2.1 Seat tightness at high pressure**

Requirement and test shall be in accordance with 5.2.2.1 of CD/K/015-1:2009, the test fluid shall be water. The leakage rate shall be the rate A. For a type test, the test duration shall be not less than 10 min. For double float valves, the obturators may be tested simultaneously or separately.

**5.2.2.2 Seat tightness at low pressure**

Requirement and test shall be in accordance with 5.2.2.2 of CD/K/015-1:2009, with test fluid, leakage rate and test duration as given in 5.2.2.1. For double float valves, the obturators may be tested simultaneously or separately.

### 5.2.3 Maximum operating torque (MOT) for operation and tightness

Not applicable, except for any integrated isolating device which shall be in accordance with 5.2.3 of CD/K/015-2:2009.

## 5.3 Airflow characteristics

Requirement shall be in accordance with 5.3 of CD/K/015-1:2009.

The characteristics given by the manufacturer shall be the air flow as a function of pressure. When it is measured according to the conditions defined in the relevant hereafter subclauses, the flow shall be not less than 90 % of the value indicated by the manufacturer, at two points of the curve, these two points being indicative of the range and functions of the valve.

### 5.3.1 Air release function

The type test shall be in accordance with Annex A. Testing is not required for air valves larger than DN 100.

### 5.3.2 Air intake function

The type test shall be in accordance with Annex B. Testing is not required for air valves larger than DN 100.

### 5.3.3 Air venting function

The air venting function shall be verified by measuring the section of the small orifice of the valve, calculating the flow through it under sonic conditions and comparing the result with the value given in the manufacturer's catalogues.

The difference shall be no greater than  $\pm 10\%$ .

## 5.4 Resistance to disinfection products

Requirement and test shall be in accordance with 5.4 of CD/K/015-1:2009.

## 5.5 Endurance

### 5.5.1 Endurance of valves with air intake and/or air release functions

The endurance of a valve with air intake and/or air release functions shall be evaluated by subjecting the valve to 250 consecutive cycles of filling and draining in accordance with Annex C, the pressure varying from atmospheric to PFA; the valve shall open and close fully during the test and shall pass the leaktightness tests in accordance with 5.2.1 and 5.2.2 after the 250 cycles.

### 5.5.2 Endurance of valves with an air venting function

The endurance of a valve with air venting function shall be evaluated by subjecting the valve to 2 500 consecutive cycles of air venting. This may be achieved by continuous injection of air into the system allowing the valve to cycle automatically, or by cyclic injection of air. The valve shall open and close fully at each cycle of the test and shall pass the leaktightness tests in accordance with 5.2.1 and 5.2.2 after the 2 500 cycles.

### 5.5.3 Long term unseating test

This is an accelerated test to ensure that the obturator will release after being under pressure for a long time.

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The test shall be carried out on a valve in its delivery condition, mounted vertically, at a temperature of  $(50_{-5}^0)$  °C, kept under hydraulic pressure of at least PFA during five days.

Then release the pressure and check that the valve opens normally.

The valve shall pass the leaktightness tests in accordance with 5.2.1 and 5.2.2.

Valves with several functions shall be tested without isolating the parts ensuring the different functions.

### 6 Conformity assessment

#### 6.1 General

Requirement shall be in accordance with 6.1 of CD/K/015-1:2009.

#### 6.2 Type tests

Requirement shall be in accordance with 6.2 of CD/K/015-1:2009; the type tests to be performed shall be those given in Table 1.

#### 6.3 Control of production process and quality system

Requirement shall be in accordance with 6.3 of CD/K/015-1:2009; the production tests given in Table 1 are informative.

### 7 Marking

Requirement shall be in accordance with clause 7 of CD/K/015-1:2009.

### 8 Packaging

Requirement shall be in accordance with clause 8 of CD/K/015-1:2009.

Table 1 — Requirements and tests

Subclause	Requirement <sup>a</sup>	Type tests	Production tests (informative)
4.1 <sup>a</sup>	Materials	See drawing and parts lists	—
4.2 <sup>a</sup>	DN	See drawings	—
4.3 <sup>a</sup>	Pressures	See technical documentation	—
4.4 <sup>a</sup>	Temperatures	See materials	—
4.5 <sup>a</sup>	Design of the shell and obturator	See test or calculation report	—
4.6 <sup>a</sup>	End types and interchangeability	See drawings and marking	—
4.7 <sup>a</sup>	Operating direction	See drawings	—
4.8 <sup>a</sup>	Maximum water velocity	See clause 4	—
4.9 <sup>a</sup>	All materials, including lubricants, in contact with water intended for human consumption	See test reports in accordance with national regulations	—
4.10 <sup>a</sup>	Internal corrosion and ageing resistance	See drawings, parts lists and technical documentation	Visual inspection of coatings
4.11 <sup>a</sup>	External corrosion and ageing resistance	See drawings, parts lists and technical documentation	Visual inspection of coatings
5.1.1 <sup>a</sup>	Resistance to internal pressure of the shell and of all pressure containing components	See 5.1.1	See 5.1.1
5.1.23	Resistance of the obturator to differential pressure	See 5.1.2	—
5.1.4 <sup>a</sup>	Resistance of valves to operating loads	See 5.1.4	—
5.2.1.1 <sup>a</sup>	Leaktightness of the shell and all pressure containing components to internal pressure	See 5.2.1.1	See 5.2.1.1
5.2.1.23	Leaktightness of the shell and all pressure containing components to external pressure	See 5.2.1.2	—
5.2.2.1 <sup>a</sup>	Seat tightness at high pressure	See 5.2.2.1	See 5.2.2.1
5.2.2.2 <sup>a</sup>	Seat tightness at low pressure	See 5.2.2.2	—
5.2.3 <sup>a</sup>	Maximum operating torque (MOT)	See 5.2.3	See 5.2.3
5.3.1	Airflow characteristics for air release function	See 5.3.1	—
5.3.2	Airflow characteristics for air intake function	See 5.3.2	—
5.3.3	Airflow characteristics for air venting function	See 5.3.3	—
5.4 a	Resistance to disinfection products	See 5.4	—
5.5.1	Endurance for air intake and/or air release function	See 5.5.1	—
5.5.2	Endurance for air venting function	See 5.5.2	—
5.5.3	Long term unseating test	See 5.5.3	—

<sup>a</sup> The sub-clauses and requirements shown above are those given in CD/K/015-1:2009.

**Annex A**  
(normative)

**Test method for the airflow characteristics of valves with an air release function (see 5.3 and 5.3.1)**

**A.1 General**

Test medium shall be air; air pressure testing shall be in accordance with all related safety regulations; additional safety measures shall be taken when necessary.

The test shall be carried out on a valve in its delivery conditions, mounted vertically. The test shall begin with the valve and the air at ambient temperature.

At the point where the air flow is measured, the air temperature shall remain between 5 °C and 45 °C throughout the test.

Valves with several functions (air release, air intake and air venting) shall be tested without isolating the parts ensuring the different functions.

**A.2 Test installation**

Figure A.1 is given as an example.

**A.3 Test procedure**

Open the isolating valve to reach the flow of the first point of measurement.

The value of the flow shall be within the range of  $\pm 4$  % for all the test duration.

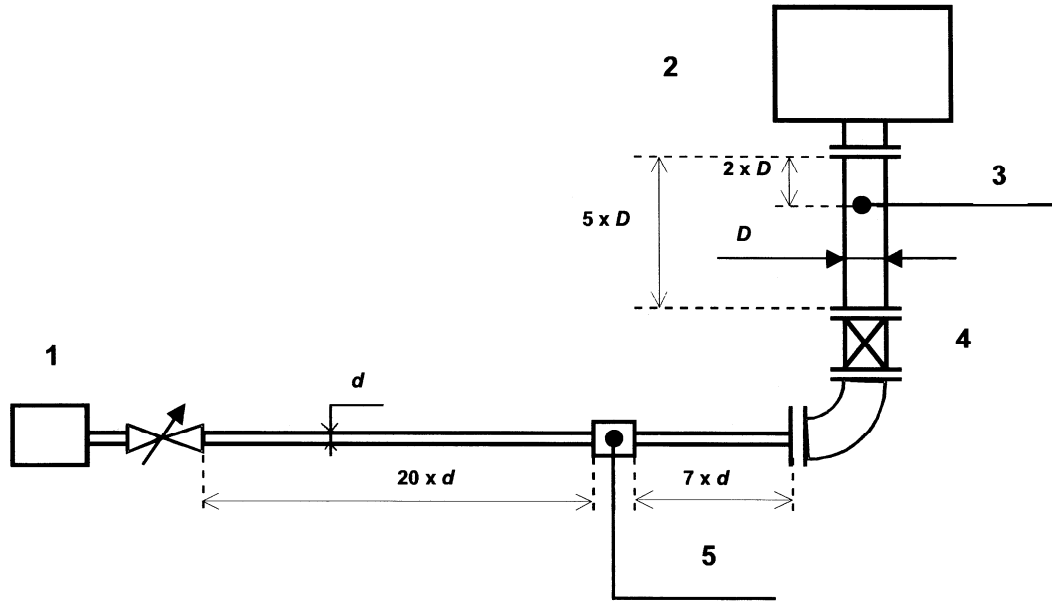
The value of the pressure shall be within the range of  $\pm 5$  % for all the test duration.

The value of the temperature shall be within the range of  $\pm 2$  °C for all the test duration.

Calculate the average flow and express it in m<sup>3</sup>/h (at standard temperature and pressure).

Record the test conditions and test results (average pressure, average temperature, average flow).

Repeat the procedure by opening the isolating valve to reach the flow of the second point of measurement.



- Key
- 1 Pressure source
  - 2 Air valve
  - 3 Pressure and temperature measurement devices
  - 4 Flow stabilizer
  - 5 Flowmeter

Figure A.1 — Test installation

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## Annex B (normative)

### Test method for the airflow characteristics of valves with an air intake function (see 5.3 and 5.3.2)

#### B.1 General

See A.1.

#### B.2 Test installation

The test installation shall be capable of creating an air flow in the air intake direction, either by negative pressure below the valve or by positive pressure around or into the valve. Drawings in Figure B.1 are given as examples.

The test installation shall be equipped with devices allowing the measurement of air flow, pressure and temperature.

#### B.3 Test procedure

Open the isolating valve to reach the flow of the first point of measurement.

The value of the flow shall be within the range of  $\pm 4\%$  for all the test duration.

The value of the pressure shall be within the range of  $\pm 5\%$  for all the test duration.

The value of the temperature shall be within the range of  $\pm 2\text{ }^{\circ}\text{C}$  for all the test duration.

Calculate the average flow and express it in  $\text{m}^3/\text{h}$  (at standard temperature and pressure), converting it to normal outside atmospheric conditions.

Record the test conditions and test results (average pressure, average temperature, average flow). Repeat the procedure by opening the isolating valve to reach the flow of the second point of measurement.

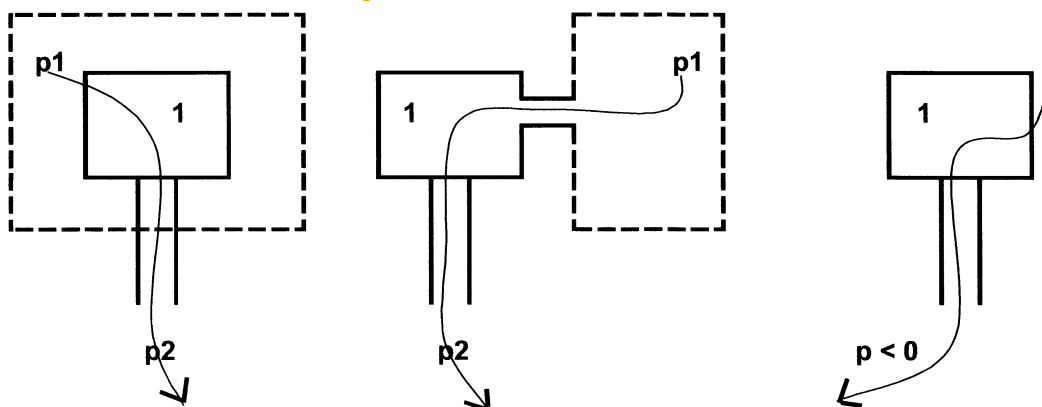


Figure B.1 — Test installation examples

**Annex C**  
(normative)

**Test method for the endurance of valves with air intake and/or air release functions (see 5.3 and 5.3.3)**

**C.1 General**

Test medium shall be water: however, some air may get trapped and compressed; air pressure testing shall therefore be in accordance with the related safety regulations.

The test shall be carried out on a valve in its delivery condition at ambient temperature, mounted vertically.

Valves with several functions (air release, air intake and air venting) shall be tested without isolating the parts ensuring the different functions.

**C.2 Test procedure**

Fill the test installation with water up to the lowest point of the valve to be tested.

Begin the first test cycle by filling the valve with water, purging the air, in a time not exceeding 10s.

Increase the water pressure inside the valve up to PFA  $\pm 10\%$  and maintain it for at least 2 min.

Release the pressure to allow the full displacement of the obturator, the air coming into the valve through the orifice in case of a valve with air intake function.

Repeat the same procedure for 250 cycles.

Proceed to the leaktightness tests in accordance with 5.2.1 and 5.2.2.

Record the test conditions and test results.

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