



CD/K/015-3:2009
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EAST AFRICAN STANDARD

Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 3: Check valves

EAST AFRICAN COMMUNITY

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 1074-3:2000, *Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 3: Check valves*

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

Draft for comments only — Not to be cited as East African Standard

Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 3: Check valves

1 Scope

This East African Standard defines the minimum fitness for purpose requirements for check 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 check 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 check valves up to DN 2 000 and PFA 6 bar to PFA 25 bar. It does not apply to anti-pollution check valves which are covered by other standards.

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*

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

3 Definitions

For the purpose of this standard, the definitions of CD/K/015-1:2009 apply together with the following definitions:

3.1

check valve

Valve which automatically opens by fluid flow in a defined direction and which automatically closes to prevent fluid flow in the reverse direction

4 Design requirements

Check valves shall be designed in accordance with the requirements given in clause 4 of CD/K/015-1:2009.

Check valves can be equipped with a device to assist closure or balance the weight of the obturator; however, such valves are not considered to have a mechanically operated obturator.

The manufacturer shall indicate in the relevant technical documentation the orientations in which the check valves fulfil the requirements of this standard.

5 Performance requirements

5.1 Mechanical strength

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

Requirement and test shall be in accordance with 5.1.1 of CD/K/015-1:2009.

5.1.2 Resistance of the obturator to differential pressure

Requirement and test shall be in accordance with 5.1.2 of CD/K/015-1:2009.

The test shall be performed with the pressure applied to the downstream side of the obturator.

After the test, the obturator shall not be jammed nor wedged. After completing the test, the operating torque shall not exceed the initial operating torque by more than 10 %.

5.1.3 Resistance of valves to bending

Bending resistance is an optional requirement for check valves; if bending resistance is claimed by the manufacturer, the requirement and test shall be in accordance with 5.1.3 of CD/K/015-1:2009, for sizes DN 50 up to and including DN 500.

The test shall be performed with the pressure applied to the downstream side of the obturator. The bending moments M to be applied during the test shall be as given in table 1 as a function of DN, or shall be given by the manufacturer's technical documentation.

Table 1 — Bending moments

| DN | M Nm |
|-----------|-----------------|
| 50 | 1 050 |
| 65 | 1 400 |
| 80 | 1 500 |
| 100 | 2200 |
| 125 | 3200 |
| 150 | 4800 |
| 200 | 7200 |
| 250 | 11 000 |
| 300 | 15000 |
| 350 | 19000 |
| 400 | 24000 |
| 450 | 28000 |
| 500 | 33000 |

5.2 Leak-tightness

5.2.1 Leak-tightness of the shell and all pressure containing components

5.2.1.1 Leak-tightness to internal pressure

Requirement and test shall be in accordance with 5.2.1.1 of CD/K/015-1:2009.

5.2.1.2 Leak-tightness to external pressure

Requirement and test shall be in accordance with 5.2.1.2 of CD/K/015-1:2009.

5.2.2 Seat tightness

5.2.2.1 Seat tightness at high differential pressure

Requirement and test shall be in accordance with 5.2.2.1 of CD/K/015-1:2009. For a type test, the test duration shall be not less than 10 min.

The test shall be performed with the pressure applied to the downstream side of the obturator.

5.2.2.2 Seat tightness at low differential pressure

Requirement and test shall be in accordance with 5.2.2.2 of CD/K/015-1:2009, with the test duration given in 5.2.2.1.

The test shall be performed with the pressure applied to the downstream side of the obturator.

5.3 Hydraulic characteristics

Requirement shall be in accordance with 5.3 of CD/K/015-1:2009; the characteristic given by the manufacturer shall be the head loss as a function of flow.

When measured with a test installation in accordance with ISO 5208, the head loss shall be not more than 1.1 times the value indicated by the manufacturer. Testing is not required for check valves greater than DN 300.

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

Check valves shall keep their functional capacity after a significant number of operations (opening/closing cycles).

When, in order to verify this requirement, a check valve has been subjected to a test in accordance with annex A, comprising 2 500 opening/closing cycles, it shall still pass the leak-tightness tests in accordance with 5.2.1 and 5.2.2 and no breakage of any part shall be detected by visual inspection after dismantling the valve. Testing is not required for check valves greater than DN 300.

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 2. They shall take place with the valve in the horizontal position, or in the position indicated by the manufacturer depending on the possibilities of use of the check valve.

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 control tests in Table 2 are informative.

7 Marking

Requirement shall be in accordance with clause 7 of CD/K/015-1:2009. In addition, the direction of flow shall be marked.

8 Packaging

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

Table 2 — Requirements and tests

| Sub-clause ^a | Requirement ^a | Type tests | Production tests (informative) |
|-------------------------|---|--|--------------------------------|
| 4.1 | Materials | see drawings and part lists | — |
| 4.2 | DN | see drawings | — |
| 4.3 | Pressures | see technical documentation | — |
| 4.4 | Temperatures | see Materials | — |
| 4.5 | Design of the shell and obturator | see test report or calculation report | — |
| 4.6 | End types and interchangeability | see drawings and marking | — |
| 4.7 | Operating direction | see drawings | — |
| 4.8 | Maximum water velocity | see clause 4 | — |
| 4.9 | All materials, including lubricants, in contact with water intended for human consumption | see test reports in accordance with national regulations | — |
| 4.10 | Internal corrosion and ageing resistance | see drawings, part lists and technical documentation | visual inspection of coatings |
| 4.11 | External corrosion and ageing resistance | see drawings, part lists and technical documentation | visual inspection of coatings |
| 5.1.1 | Resistance to internal pressure of the shell and of all pressure containing components | see 5.1.1 | see 5.1.1 |
| 5.1.2 | Resistance of the obturator to differential pressure | see 5.1.2 | — |
| 5.1.3 | Resistance of valves to bending | see 5.1.3 | — |
| 5.2.1.1 | Leak-tightness to internal pressure | see 5.2.1.1 | see 5.2.1.1 |
| 5.2.1.2 | Leak-tightness to external pressure | see 5.2.1.2 | — |
| 5.2.2.1 | Seat tightness at high differential pressure | see 5.2.2.1 | see 5.2.2.1 |
| 5.2.2.2 | Seat tightness at low differential pressure | see 5.2.2.2 | — |
| 5.3 | Hydraulic or airflow characteristics | see 5.3 | — |
| 5.4 | Resistance to disinfection products | see 5.4 | — |
| 5.5 | Endurance | see 5.5 | — |

^a The sub-clauses and requirements shown above, are those given in CD/K/015-1:2009

**Annex A
(normative)****Test method for the endurance of check valves (see 5.5)****A.1 General**

The test shall be performed with water at ambient temperature, on a check valve in its delivery state. The test assembly shall be able to establish in sequence a water flow situation through the valve with a minimum velocity of 1 m/s and a no flow situation with a downstream pressure equal to PMA.

A.2 Test procedure

Place the check valve in the test assembly in the horizontal position, or in the position indicated by the manufacturer depending on the possibilities of use of the valve.

Establish a water flow through the valve and maintain the flow for a time sufficient to reach a minimum velocity of 1 m/s.

Stop the flow, decrease the upstream pressure and raise the downstream pressure (thus closing the obturator) until the differential pressure on the obturator reaches $PMA \pm 10\%$. Maintain closed at this pressure for a minimum of 30 s.

Release the downstream pressure and begin a new cycle by re-establishing a water flow. Repeat the procedure for 2 500 cycles.

Remove the valve from the test assembly and perform the leak-tightness tests in accordance with 5.2.1 and 5.2.2.

After termination of all tests, dismantle the valve and check by visual inspection the absence of breakage of any part.

Terminate the test, record the test conditions and test results, noting the calibration status of all measuring devices.

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