



CD/K/015-6:2009  
ICS 23.060.99

## **EAST AFRICAN STANDARD**

---

**Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 6: Hydrants**

**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.

© East African Community 2010 — All rights reserved\*

East African Community

P O Box 1096

**Arusha**

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: [eac@eachq.org](mailto:eac@eachq.org)

Web: [www.each.int](http://www.each.int)

## Contents

1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	2
4	Design requirements .....	2
5	Performance requirements .....	2
5.1	Mechanical strength .....	2
5.2	Leak-tightness .....	3
5.3	Hydraulic characteristic.....	4
5.4	Resistance to disinfection products .....	4
5.5	Endurance .....	5
5.6	Performance of the draining system .....	5
6	Conformity assessment .....	5
6.1	General.....	5
6.2	Type tests.....	5
6.3	Control of production process and quality system.....	5
7	Marking.....	6
8	Packaging.....	6
	Annex A (normative) Test method for the resistance of hydrants to bending.....	7
	Annex B (normative) Test method for the resistance of pillar hydrants to a force applied above ground level.....	8
	Annex C (normative) Test method for the operation of hydrants .....	10
	Annex D (normative) Test method for the endurance of hydrants .....	11
	Annex E (normative) Test method for the performance of draining system .....	12
	Bibliography .....	13

## Introduction

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

BS EN 1074-6:2006, *Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 6: Hydrants*

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 6: Hydrants

### 1 Scope

This East African Standard defines the minimum fitness for purpose requirements for hydrants 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 hydrants, whatever their type, materials and functions. Where hydrants can be used for fire fighting, irrigation or other function, additional requirements can be given in other standards.

This standard applies in priority to any other product or test standard. The requirements from other standards apply only when this East African Standard refers to them.

This part of this East African Standard deals with the requirements applicable to both underground and pillar hydrants, in sizes DN 65 to DN 150, and PFA up to 16 bar.

This part of this East African Standard does not give requirements for the outlets or their interface with the hydrants, since they are subject to national 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.

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 verification tests — Part 2: Isolating valves*

CD/K/015-3:2009, *Valves for water supply — Fitness for purpose requirements and appropriate verification tests — Part 3: Check valves*

ISO 7005-2, *Metallic flanges — Part 2: Cast iron flanges*

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

ISO 5209:1977, *General purpose industrial valves — Marking*

ISO 5752:1982, *Metal valves for use in flanged pipe systems — Face-to-face and centre-to-face dimensions*

ISO 10497:2010, *Testing of valves — Fire type-testing requirements*

ISO 15848-1:2006, *Industrial valves — Measurement, test and qualification procedures for fugitive emissions — Part 1: Classification system and qualification procedures for type testing of valves*

ISO 15848-2:2006, *Industrial valves — Measurement, test and qualification procedures for fugitive emissions — Part 2: Production acceptance test of valves*

### 3 Terms and definitions

For the purposes of this East African Standard, the terms and definitions given in CD/K/015-1:2009 and the following apply.

#### 3.1

##### **hydrant**

connection to a water supply system including an isolating valve

#### 3.2

##### **pillar hydrant**

hydrant with a connection point located above ground level, for use by water utilities or to supply water to fire fighting equipment

#### 3.3

##### **breakable pillar hydrant**

pillar hydrant equipped with a specific device allowing its above ground part to separate from its below ground part, when submitted to an impact

#### 3.4

##### **underground hydrant**

hydrant with a connection point located under ground level, for use by water utilities or to supply water to fire fighting equipment

#### 3.5

##### **theoretical ground level**

limit between the above ground part and the underground part of the pillar hydrant as installed

NOTE This point is used for pillar positioning on site, once the height of components of the above ground part, the depth of water supply pipeline axis and of the unfreezing device are defined.

### 4 Design requirements

Hydrants shall be designed in accordance with the design requirements given in clause 4 of CD/K/015-1:2009, with the following additional or different requirements.

The requirements of ISO 5752 (interchangeability) shall not apply to hydrants. When fitted with an inlet flange, it shall be in accordance with ISO 7005-2. The outlets shall be in accordance with the national requirements.

For hydrants manually operated, the closing direction shall be clockwise.

If fitted, the breaking system shall be above the ground level and shall be replaceable in-situ.

The manufacturer shall indicate in his technical documentation whether the hydrant is equipped with an automatic draining device. If fitted, such a device shall comply with the National Health and Safety Regulations.

The manufacturer's technical documentation shall indicate whether the hydrant is equipped with a non-return device.

### 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, except that leakage of an automatic draining device at a pressure less than 1 bar shall not be a reason for failure.

To conduct this test the outlets of the hydrant and a drilled drain plug if fitted shall be blanked off with any suitable device.

### 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 and the test shall be performed in the direction of flow.

### 5.1.3 Resistance of hydrants to bending and to any force applied above the ground level

#### 5.1.3.1 Resistance of the hydrant to bending

Requirements shall be in accordance with the first paragraph of 5.1.3 of CD/K/015-1:2009. The test shall be performed in accordance with annex A on any hydrant in its delivery condition.

This test is not required for hydrants designed for installation in a chamber, as given in the manufacturer's documentation.

The bending moments  $M$  to be applied during the test shall be in accordance with the values given in Table 1 of CD/K/015-2:2009.

#### 5.1.3.2 Resistance of the pillar hydrant to a force applied above ground level

The test shall be performed in accordance with annex B.

If not equipped with a breaking system, the pillar hydrant shall withstand the force,  $F$ , given in the corresponding part of Table 1, remaining leak-tight during the test.

If the hydrant is designed to break at ground level, the force to break the hydrant shall be as given in the corresponding part of Table 1. The pillar hydrant shall remain leak-tight after breaking, and all the parts below the breaking system shall be undamaged.

Table 1 — Force applied above ground level

DN	Minimum force to apply for pillar hydrants not equipped with a breaking system $F$ Newton	Range of the force to apply to break a pillar hydrant equipped with a breaking system $F$ Newton
65, 80 and 100	25000	between 1 0 000 and 30 000
150	30000	

### 5.1.4 Resistance of hydrants to operating loads

Requirement shall be in accordance with 5.1.4 of CD/K/015-1:2009. The test shall be performed in accordance with annex A of CD/K/015-1:2009, and with the values given in Table 2.

Table 2 — Torque requirements

DN	MOT, Nm	MST, Nm
65	85	170
80	105	210
100	130	260
150	195	380

## 5.2 Leak-tightness

### 5.2.1 Leak-tightness of the shell and of 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, except that leakage of an automatic draining device at a pressure less than 1 bar shall not be a reason for failure.

To conduct this test the outlets of the hydrant and a drilled drain plug if fitted shall be blanked off with any suitable device.

**5.2.1.2 Leak-tightness to external pressure**

With the obturator in the closed position, hydrants shall prevent the ingress of air, water or any foreign matter into the water pipeline.

Requirement and test shall be in accordance with 5.2.1.2 of CD/K/015-1:2009, the test being operated between the inlet connection and the closed obturator.

**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.

After closing the hydrant by application of MOT (see 5.2.3), the leakage rate shall be rate A as defined in ISO 15848-1. For a type test, the test duration shall be not less than 10 min.

The test shall be performed in the direction of flow towards the outlet.

**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 torque and the test duration given in 5.2.2.1. The leakage rate shall be rate A as defined in ISO 15848-1.

The test shall be performed in the direction of flow towards the outlet.

**5.2.2.3 Seat-tightness of the non-return device**

When fitted, the non-return device shall be leak-tight (rate A as defined in ISO 15848-1). The tests shall be in accordance with 5.2.2.1 and 5.2.2.2 of CD/K/015-3:2009.

**5.2.3 Maximum operating torque (MOT) for operation and seat-tightness**

Requirement shall be in accordance with 5.2.3 of CD/K/015-1:2009. When, in order to verify this requirement, a hydrant valve in its delivery state is subjected to a test according to annex C, the measured torque shall not exceed the maximum operating torque MOT as given in Table 2.

**5.2.4 Leak-tightness of gearboxes to external pressure**

If applicable, requirement and tests shall be in accordance with 5.2.4 of CD/K/015-1:2009.

**5.3 Hydraulic characteristic**

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, for each outlet independently, the other ones being closed.

When measured with a test installation in accordance with ISO 5208 on a hydrant in its delivery state, the head loss shall be not more than 1.1 times the values given by the manufacturer.

Hydrants intended for fire fighting service shall comply with additional requirements of national or East African Standards.

**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 the hydrant

The endurance of hydrants shall be evaluated as follows:

- a hydrant in its delivery state shall be subjected to an endurance test in accordance with annex D at a differential pressure across the obturator equal to PFA.
- it shall then be tested in accordance with 5.2.1, 5.2.2 and 5.2.3.

The number of opening/closing cycles to be applied during the endurance test shall be of 1 000 cycles.

### 5.5.2 Endurance of the non-return device

The endurance test of the non-return device shall be in accordance with 5.5 of CD/K/015-3:2009.

The test shall be performed with the obturator of the hydrant in the fully opened position.

The number of opening/closing cycles to be applied during the endurance test shall be of 1 000 cycles.

## 5.6 Performance of the draining system

When fitted, the draining device shall allow the hydrant to be automatically emptied without water retention, both for frost and for health and safety reasons.

When tested in accordance with annex E, the time for draining shall not exceed 10 min/m of cover depth and the amount of water remaining above the seat of the hydrant shall not exceed the values given in Table 3.

**Table 3 — Maximum remaining amount of water after draining**

DN	Maximum amount of water ml
65	100
80	100
100	150
150	200

## 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 4.

### 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 4 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 4 — Requirements and tests**

Sub-clause	Requirement a	Type tests	Production tests (informative)
4.1 <sup>a</sup>	Materials	see drawings and part 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	—
4.7 <sup>a</sup>	Operating direction	see drawings	—
4.8 <sup>a</sup>	Maximum water velocity	see 4.8	—
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, part lists and technical documentation	visual inspection of coatings
4.11 <sup>a</sup>	External corrosion and ageing resistance	see drawings, part 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
5.1.2 <sup>a</sup>	Resistance of the obturator to differential pressure	see 5.1.2	—
5.1.3.1	Resistance of hydrant to bending	see 5.1.3.1	—
5.1.3.2	Resistance of pillar hydrant to a force applied above ground level	see 5.1.3.2	—
5.1.4 <sup>a</sup>	Resistance of hydrant valves to operating loads	see 5.1.4	—
5.2.1.1 <sup>a</sup>	Leak-tightness to internal pressure	see 5.2.1.1	see 5.2.1.1
5.2.1.2	Leak-tightness to external pressure of hydrant	see 5.2.1.2	—
5.2.2.1 <sup>a</sup>	Seat tightness at high differential pressure	see 5.2.2.1 and 5.2.3	see 5.2.2.1
5.2.2.2 <sup>a</sup>	Seat tightness at low differential pressure	see 5.2.2.2	—
5.2.2.3	Seat-tightness of non-return device	see 5.2.2.3	—
5.2.3 <sup>a</sup>	Maximum operating torque (MOT)	see 5.2.2.1, 5.2.2.2 and 5.1.4	see 5.2.2.1
5.2.4 <sup>a</sup>	Leak-tightness of gearboxes to external pressure	see 5.2.4	—
5.3 <sup>a</sup>	Hydraulic or airflow characteristics	see 5.3	—
5.4 <sup>a</sup>	Resistance to disinfection products	see 5.4	—
5.5.1	Endurance of hydrant	see 5.5.1	—
5.5.2	Endurance of non-return device	see 5.5.2	—
5.6	Performance of draining system	see 5.6	—

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

## Annex A (normative)

### Test method for the resistance of hydrants to bending

#### A.1 General

The test fluid shall be water at a temperature in the range of service temperatures given in 4.4 of CD/K/015-1:2009.

The test shall be carried out on a test assembly as shown on Figure A.1, with a hydrant in its delivery state. The test is not required for hydrants whose total length does not exceed  $L = 500$  mm.

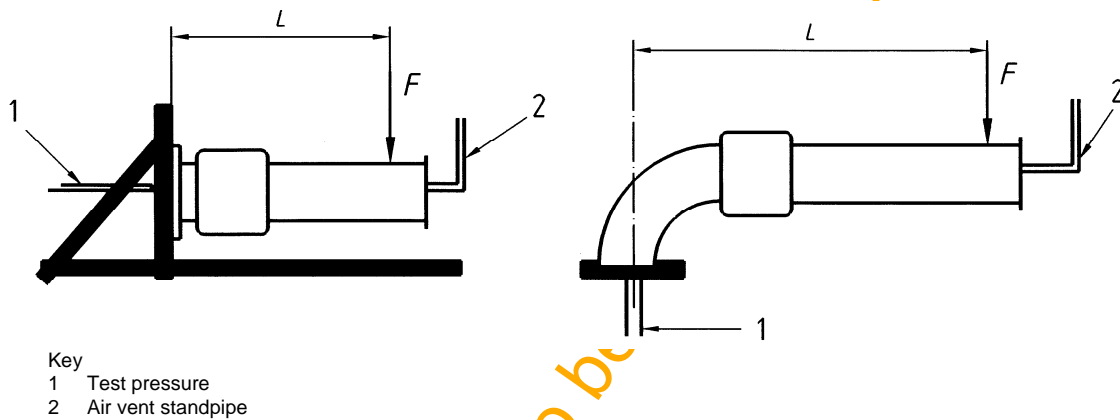


Figure A.1 — Test assembly

#### A.2 Test procedure

Position the hydrant on the supports, both ends being closed off.

Fill the hydrant with water, the obturator being in a partially opened position, and vent the air.

Apply the calculated force  $F$  in order to achieve the bending moment  $M$ .

Close the obturator by application of the torque  $MOT$ .

Raise the upstream pressure until it reaches the required test pressure.

Maintain the test pressure for a test duration of at least 10 min.

Check visually that there is no detectable external leakage for the test duration.

At the end of the test, read on the air vent standpipe the amount of water that has leaked from the upstream part of the hydrant and calculate the leakage rate.

Release the force  $F$  and the pressure and terminate the test. Record the test conditions and test results.

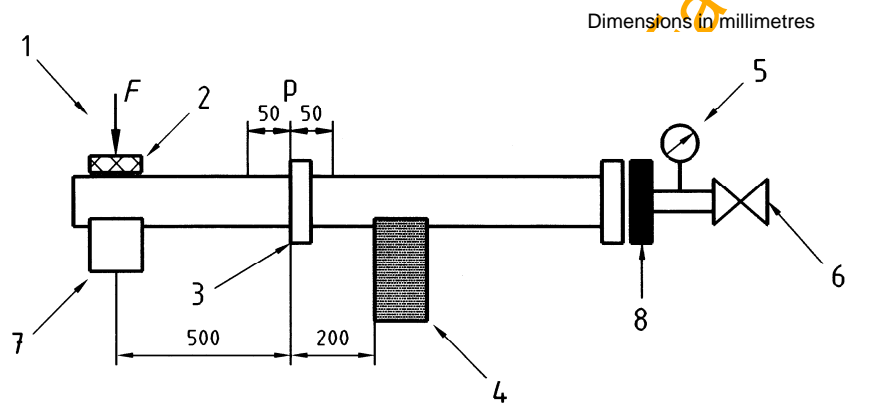
## Annex B (normative)

### Test method for the resistance of pillar hydrants to a force applied above ground level

#### B.1 General

The test fluid shall be water at a temperature in the range of service temperatures given in 4.4 of CD/K/015-1:2009.

The test shall be carried out on a test assembly as shown on Figure B.1, with a hydrant in its delivery state.



#### Key

- |   |                       |
|---|-----------------------|
| 1 Force device  | 5 Manometer           |
| 2 Hard bloc 100 mm x 100 mm covered with plastic or elastomer | 6 Water supply at PFA |
| 3 Breaking system   | 7 Outlet(s)           |
| 4 Support at ground level                                     | 8 Fixing point        |

Figure B.1 — Test assembly

#### B.2 Test procedure for pillar hydrants not equipped with a breaking system

Position the hydrant on the supports, both ends being closed off.

Fill the hydrant with water, the obturator being in a partially open position, and vent the air.

Close the obturator by application of the torque MOT, ensuring that the internal pressure does not exceed PFA.

Raise the upstream pressure until it reaches the required test pressure. Apply progressively the force  $F$  up to the value given in Table 1.

Check visually that there is no detectable external leakage for the test duration.

Release the force  $F$  and the pressure, terminate the test and record the test conditions and test results.

#### B.3 Test procedure for pillar hydrants equipped with a breaking system

Position the hydrant on the supports, both ends being closed off.

Fill the hydrant with water, the obturator being in a partially opened position, and vent the air.

Close the obturator by application of the torque  $MOT$ , ensuring that the internal pressure does not exceed PFA.

Raise the upstream pressure until it reaches the required test pressure.

Apply progressively a force  $F$ .

During the test the pillar hydrant shall remain leak-tight.

The pillar hydrant shall break between the values given in Table 1.

Check the lower section of the pillar hydrant has not been damaged, and that there is no visible external leakage.

Record the test conditions and test results.

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

**Annex C**  
(normative)

**Test method for the operation of hydrants**

**C.1 General**

The test fluid shall be water at a temperature in the range of service temperatures given in 4.4 of CD/K/015-1:2009.

The test shall be carried out on a hydrant in its delivery state.

The test shall begin with the obturator in the fully opened position and the outlet opened.

**C.2 Test procedure**

Fill with water through the inlet.

Close the obturator and apply a torque to MOT.

Raise the pressure until it reaches PFA and maintain it for at least 1 min.

Check the seat tightness.

Open the hydrant, ensuring that the internal pressure does not exceed PFA. The running torque shall not exceed MOT.

Close the hydrant, ensuring that the internal pressure does not exceed PFA. The running torque shall not exceed MOT.

Note the maximum torque required during the test and check that it does not exceed MOT.

**Annex D**  
(normative)

**Test method for the endurance of hydrants**

**D.1 General**

The test fluid shall be water at a temperature in the range of service temperatures given in 4.4 of CD/K/015-1:2009.

The test shall be carried out on a hydrant in its delivery state.

The test assembly should be designed to minimize water consumption and cycle time.

**D.2 Test procedure**

Fix the hydrant on a test assembly in its normal operating position. Fill hydrant with water through the inlet, ensuring all air is vented.

Bring the obturator to the fully closed position, applying a closing torque equal to MOT for hydrants manually operated, or using the maximum level of energy specified by the manufacturer for hydrants with an actuator.

Increase the water pressure until it reaches a minimum of PFA and maintain the pressure for at least 5 s.

Open the obturator fully and establish a flow with a minimum velocity of 1 m/s. Maintain for a minimum of 30 s.

Repeat the cycle closing / pressurizing / opening for the specified number of cycles.

Check the leak-tightness of the shell and of all the pressure containing components in accordance with 5.2.1.

Check the seat tightness in accordance with 5.2.2. Apply a closing torque equal to MOT and check that the leakage rate does not exceed the value given in 5.2.2 increased by one rate. If it is exceeded, increase the applied torque to 1.2 times MOT and check that the leakage rate does not exceed the value given in 5.2.2.

Check that the operating torque does not exceed MOT according to 5.2.3.

On completion of the test, if the hydrant is equipped with a non-return device common with the obturator, it shall be tested in accordance with 5.2.2.3.

Record the test conditions and test results.

**Annex E**  
(normative)

**Test method for the performance of draining system**

**E.1 General**

The test fluid shall be water at a temperature in the range of service temperatures given in 4.4 of CD/K/015-1:2009.

The test shall be carried out on a hydrant in its delivery state.

The test shall begin with the obturator in the fully opened position and the outlet opened.

**E.2 Test procedure**

Connect the hydrant to a water supply and fill the hydrant completely, water pouring out of the outlet. Close the hydrant obturator.

Measure the time elapsed between complete closure of the valve and the last drop pouring from the draining device. This time shall not exceed the value given in 5.6.

Dry completely the inside parts of the hydrant, then close the hydrant obturator.

The obturator remaining closed, pour a recorded quantity of water (e.g. 1 l) into the hydrant through the open outlet.

Measure the quantity of water collected through the draining device.

Calculate the difference between the quantity poured in and the quantity collected.

That difference shall not exceed the values given in Table 3.

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

**Bibliography**

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

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

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

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