



CD/K/027-4:2009
ICS 23.040.20; 23.040.45; 91.140.60; 93.025

EAST AFRICAN STANDARD

Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 4: 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.

© 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

Web: www.each.int

Introduction

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

ISO 1452-4:2009, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 4: 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

**Plastics piping systems for water supply
and for buried and above-ground
drainage and sewerage under pressure —
Unplasticized poly(vinyl chloride)
(PVC-U) —**

**Part 4:
Valves**

*Systèmes de canalisations en plastique pour l'alimentation en eau, pour
branchements et collecteurs d'assainissement enterrés et aériens avec
pression — Poly(chlorure de vinyle) non plastifié (PVC-U) —*

Partie 4: Robinets



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2009

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction.....	v
1 Scope	1
2 Normative references	2
3 Terms, definitions, symbols and abbreviated terms	3
4 Material	3
4.1 Valve bodies.....	3
4.2 Density.....	3
4.3 MRS-value	3
4.4 Additional components.....	3
5 General characteristics.....	3
5.1 Appearance	3
5.2 Colour	3
5.3 Opacity.....	3
6 Geometrical characteristics	4
6.1 Measurement of dimensions	4
6.2 Nominal diameters	4
6.3 Valves dimensions	4
7 Classification and operating conditions	4
7.1 Classification	4
7.2 Determination of the allowable operating pressure for water up to 45 °C	4
8 Mechanical characteristics.....	5
8.1 Resistance of valve bodies to internal pressure.....	5
8.2 Crushing test	5
8.3 Durability	5
8.4 Functional properties.....	5
9 Physical characteristics.....	5
10 Chemical characteristics	6
11 Sealing rings	6
12 Adhesives.....	6
13 Performance requirements.....	7
14 Marking	7
14.1 General.....	7
14.2 Minimum required marking	7
14.3 Additional marking	8
Annex A (normative) Imperial(inch)-sized valves.....	9
Bibliography.....	11

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1452-4 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 155, *Plastics piping systems and ducting systems*, in collaboration with ISO Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 2, *Plastics pipes and fittings for water supplies*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition cancels and replaces ISO 4422-4:1997, which has been technically revised.

ISO 1452 consists of the following parts, under the general title *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U)*:

- Part 1: General
- Part 2: Pipes
- Part 3: Fittings
- Part 4: Valves
- Part 5: Fitness for purpose of the system

Guidance for the assessment of conformity is to form the subject of a part 7.

Introduction

The System Standard, of which this is Part 4, specifies the requirements for a piping system and its components made from unplasticized poly(vinyl chloride) (PVC-U). The piping system is intended to be used for water supply and for buried and above-ground drainage and sewerage under pressure.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the products covered by this part of ISO 1452, the following are relevant.

- a) This part of ISO 1452 provides no information as to whether or not the products can be used without restriction.
- b) Existing national regulations concerning the use and/or the characteristics of these products remain in force.

Requirements and test methods material and components, other than valves, are specified in ISO 1452-1, ISO 1452-2 and ISO 1452-3. Characteristics for fitness for purpose (mainly for joints) are covered in ISO 1452-5.

This part of ISO 1452 covers the characteristics of valves.

Guidance for installation is given in ISO/TR 4191^[1].

Guidance for assessment of conformity is provided in ENV 1452-7^[2].

For the convenience of users of this part of ISO 1452, marking on valves according to withdrawn International Standards (e.g. ISO 4422-4:1997) may be considered valid for a period, e.g. up to three years from the date of publication of this part of ISO 1452.

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

Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) —

Part 4: Valves

1 Scope

This part of ISO 1452 specifies the characteristics of valves made from unplasticized poly(vinyl chloride) (PVC-U) for piping systems intended for water supply and for buried and above-ground drainage and sewerage under pressure.

It also specifies the test parameters for the test methods referred to in this part of ISO 1452.

In conjunction with ISO 1452-1, ISO 1452-2, ISO 1452-3 and ISO 1452-5 it is applicable to PVC-U valves with components of PVC-U, other plastics and non-plastics materials intended to be used for the following:

- a) water mains and services buried in ground;
- b) conveyance of water above ground for both outside and inside buildings;
- c) buried and above-ground drainage and sewerage under pressure.

It is applicable to valves in piping systems intended for the supply of water under pressure up to and including 25 °C (cold water) intended for human consumption and for general purposes as well as for waste water under pressure.

This part of ISO 1452 is also applicable to valves for the conveyance of water and waste water up to and including 45 °C. For temperatures between 25 °C and 45 °C, Figure A.1 of ISO 1452-2:2009 applies.

NOTE 1 The producer and the end-user can come to agreement on the possibilities of use for temperatures above 45 °C on a case-by-case basis.

This part of ISO 1452 is applicable to valves of the following types:

- valves for solvent cementing;
- valves for elastomeric ring seal joints;
- valves for flanged joints.

NOTE 2 It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 580, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating*

ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

ISO 1167-3, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 3: Preparation of components*

ISO 1183-1:2004, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 1452-1:2009, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 1: General*

ISO 1452-2:2009, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Pipes*

ISO 1452-3:2009, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Fittings*

ISO 1452-5, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 5: Fitness for purpose of the system*

ISO 2507-1:1995, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 1: General test method*

ISO 2507-2:1995, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 2: Test conditions for unplasticized poly(vinyl chloride) (PVC-U) or chlorinated poly(vinyl chloride) (PVC-C) pipes and fittings and for high impact resistance poly(vinyl chloride) (PVC-HI) pipes*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 7686, *Plastics pipes and fittings — Determination of opacity*

ISO 16135, *Industrial valves — Ball valves of thermoplastics materials*

ISO 16136, *Industrial valves — Butterfly valves of thermoplastics materials*

ISO 16137, *Industrial valves — Check valves of thermoplastics materials*

ISO 16138, *Industrial valves — Diaphragm valves of thermoplastics materials*

ISO 16139, *Industrial valves — Gate valves of thermoplastics materials*

ISO 21787, *Industrial valves — Globe valves of thermoplastics materials*

EN 802, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings for pressure piping systems — Test method for maximum deformation by crushing*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms, definitions, symbols and abbreviated terms given in ISO 1452-1 apply.

4 Material

4.1 Valve bodies

The valve body material used shall conform to ISO 1452-1 and to the requirements given in 4.2 and 4.3.

4.2 Density

The density, ρ , at 23 °C of the valve body, when measured in accordance with ISO 1183-1, shall be between the following limits:

$$1\,350 \text{ kg/m}^3 \leq \rho \leq 1\,460 \text{ kg/m}^3$$

4.3 MRS-value

The fitting material shall have a minimum required strength, MRS, as defined in ISO 1452-1:2009, 4.4.1.

The manufacturer of the compound or formulation shall confirm the MRS by testing as described in ISO 1452-1:2009, 4.4.1, 4.4.2 or 4.4.3, respectively.

The MRS value of the valve body material shall be declared by the fitting manufacturer in its technical file.

4.4 Additional components

Additional components made from other plastics and non-plastics materials, as necessary for the construction of the PVC-U valves, shall fulfil their specific functions without preventing conformity to ISO 1452-5.

5 General characteristics

5.1 Appearance

When viewed without magnification, the internal and external surfaces of valves shall be smooth, clean and free from scoring, cavities and other surface defects to an extent that would prevent conformity to this part of ISO 1452.

Each end shall be square to its axis.

5.2 Colour

The colour of injection-moulded valve bodies shall be grey throughout the wall.

5.3 Opacity

The wall of the valve shall be opaque and shall not transmit more than 0,2 % of visible light when measured in accordance with ISO 7686.

6 Geometrical characteristics

6.1 Measurement of dimensions

Dimensions shall be measured in accordance with ISO 3126.

6.2 Nominal diameters

The nominal diameter(s), d_n , of a valve shall correspond to, and be designated by, the nominal outside diameter(s) of the pipe(s) for which they are designed.

6.3 Valves dimensions

6.3.1 Joint dimensions

6.3.1.1 Dimensions of sockets and spigots for solvent cement type valves

The socket dimensions of the valve shall be the same as for sockets on pipes or fittings and shall conform to ISO 1452-2.

The spigot length(s) shall be at least equal to the corresponding socket length(s).

6.3.1.2 Dimensions of sockets and spigots for ring seal type valves

The socket dimensions of the valve shall be the same as for pipes or fittings and conform to ISO 1452-2.

The spigot diameters shall conform to ISO 1452-2 and the spigot length(s) shall be the same as for fittings conforming to ISO 1452-3.

6.3.1.3 Mating dimensions for flange type valves

The mating dimensions of the flanges used on valves shall conform to ISO 1452-3.

6.3.2 Laying lengths and face-to-face lengths

Laying lengths (Z-lengths), or for flanged valves the face-to-face length, shall conform in general to ISO 16135, ISO 16136, ISO 16137, ISO 16138, ISO 16139 or ISO 21787, as applicable.

7 Classification and operating conditions

7.1 Classification

Valves shall be classified according to their nominal pressure, PN, and the series S of the connecting pipe for which they are designed. The nominal pressure, PN, of the valves shall be related to their material design stress, σ_s , using as a basis, the relationship used for pipes, i.e.

$$PN = \frac{10\sigma_s}{S} \quad (1)$$

7.2 Determination of the allowable operating pressure for water up to 45 °C

The allowable operating pressure, PFA, of valves for temperatures up to and including 25 °C shall be equal to the nominal pressure.

To determine the allowable operating pressure of valves for temperatures between 25 °C and 45 °C, a supplementary derating factor, f_T , shall be applied to the nominal pressure as given in Equation (2):

$$PFA = f_T \times PN \quad (2)$$

This factor is given in the relevant clause of ISO 16135, ISO 16136, ISO 16137, ISO 16138, ISO 16139 and ISO 21787, as applicable.

8 Mechanical characteristics

8.1 Resistance of valve bodies to internal pressure

Valve bodies, where hydrostatic pressure can be applied, shall be tested in accordance with the procedure and the test parameters given in the relevant clause of ISO 16135, ISO 16136, ISO 16137, ISO 16138, ISO 16139 and ISO 21787, as applicable, using test equipment conforming to ISO 1167-1 and ISO 1167-3.

8.2 Crushing test

Injection-moulded parts of valves, on which hydrostatic pressure cannot be applied, shall be tested in accordance with EN 802. The tested valve parts shall not shatter when they undergo a deformation of 20 %.

The period between manufacture and testing, t_1 , and the conditioning period, t_2 , shall be not less than 30 min. The closure speed of the press plates shall be (50 ± 5) mm/min.

8.3 Durability

The valve shall conform to the relevant clause of ISO 16135, ISO 16136, ISO 16137, ISO 16138, ISO 16139 and ISO 21787, as applicable.

NOTE The test method given in ISO 8659^[9] specifies a fatigue strength test to confirm the ability of valves to withstand prolonged use in plastics piping systems for water supply, with repeated opening and closure.

8.4 Functional properties

8.4.1 Operating torque

The valve shall conform to the relevant clauses of ISO 16135, ISO 16136, ISO 16137, ISO 16138, ISO 16139 and ISO 21787, as applicable.

8.4.2 Seat and packing test

The valve shall conform to the relevant clause of ISO 16135, ISO 16136, ISO 16137, ISO 16138, ISO 16139 and ISO 21787, as applicable.

9 Physical characteristics

When tested in accordance with the test methods as specified in Table 1 using the indicated parameters, the injection-moulded PVC-U components, such as valve bodies, shall have physical characteristics conforming to the requirements given in Table 1.

13 Performance requirements

When valves conforming to this part of ISO 1452 are jointed to each other or to components conforming to other parts of ISO 1452, the valve assemblies and their joints shall conform to ISO 1452-5.

14 Marking

14.1 General

Unless otherwise specified in Table 2, the marking elements shall be either

- printed or formed directly on the product, or
- put on a plate/label attached to the body of the assembled product

in such a way that after storage, weathering, handling and installation, legibility is maintained during the use of the products.

NOTE The manufacturer is not responsible for marking being illegible due to actions caused by installation and use such as painting, scratching, covering of the components or the use of detergents, etc. on the product.

Marking shall not initiate cracks or other types of defects which would impair conformity to the requirements of this part of ISO 1452.

If printing is used, the colour of the printed information shall differ from the basic colour of the product.

The size of the marking shall be such that the marking is legible without magnification.

14.2 Minimum required marking

The minimum required marking shall conform to Table 2.

Table 2 — Minimum required marking on valves

Aspects	Mark or symbol
– Number of the International Standard ^a	ISO 1452
– Manufacturer's name and/or trade mark	xyz
– Nominal diameter d_n	e.g. 63
– Material	e.g. PVC-U
– Nominal pressure PN ^{bc}	e.g. PN 16
– Nominal diameter of flange DN ^d	e.g. DN 80
– Manufacturer's information ^{be}	e.g. 93.66
– Intended use ^{af}	e.g. W/P
^a This information may either be marked directly on the product or on a plate/label attached to the product or on the packaging. ^b For nominal diameters $d_n \leq 32$ mm table footnote «a» applies. ^c The marking of the pipe series S may be included, e.g. PN 16/S 8. ^d For flanged valves only. ^e To provide traceability, the following details shall be given: — the production period, the year, in figures or in code; — a name or code for the production site, if the manufacturer is producing in different sites, nationally and/or internationally. ^f Information on abbreviations can be found in CEN/TR 15438 ^[4] and/or in national rules.	

NOTE For valves having the former standard reference (i.e. ISO 4422-4:1996) directly engraved in the mould, see Introduction.

14.3 Additional marking

Valves conforming to this part of ISO 1452, which conform also to other standard(s), may be additionally marked with the minimum required marking in accordance with this/these other standard(s) in which case table footnote «a» of Table 2 applies.

Valves conforming to this part of ISO 1452, which are third party certified may be marked accordingly. For practical reasons, this should be done on a label or on the packaging.

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

Annex A (normative)

Imperial(inch)-sized valves

A.1 General

All clauses of this part of ISO 1452 shall apply, together with the following clauses. The specifications given in this annex are for the requirements which differ from those given in Clauses 1 to 14.

A.2 Nominal sizes and pressure classes

A.2.1 Nominal sizes

In place of 6.2, the following shall apply. The nominal size(s) of a valve shall correspond to and be designated by the nominal size(s) of the pipe(s) for which they are designed.

A.2.2 Pressure classes

Valves shall be classified according to the following nominal pressures, as applicable:

PN 9, PN 12 and PN 15.

A.3 Geometrical characteristics

For the purposes of 6.3, the following shall apply.

A.3.1 Dimensions of sockets and spigots for solvent cement type valves

The socket dimensions of the valve shall be the same as for pipes and fittings conforming to ISO 1452-2:2009, Annex B.

A.3.2 Dimensions of sockets and spigots for sealing ring type valves

The socket dimensions of the valve shall be the same as for pipes and fittings conforming to ISO 1452-2:2009, Annex B.

A.3.3 Mating dimensions for flange type valves

The mating dimensions of flanges used on valves shall conform to ISO 1452-3:2009, Annex A.

A.3.4 Laying lengths

For imperial-sized valves, 6.3.2 does not apply.

A.4 Mechanical characteristics

For the purposes of 8.1, Table A.1 shall apply.

Table A.1 — Resistance of valve bodies to internal pressure

Characteristic	Requirement	Type of test piece	Test parameters				Test method
			Temp. °C	Pressure bars	Test period h	Type of test	
Internal pressure	No failure during the test period	Injection-moulded valve bodies	20	3,36 × PN	1	Water-in-water	ISO 1167-1 and ISO 1167-3
				2,56 × PN	1 000		

Bibliography

- [1] ISO/TR 4191, *Unplasticized polyvinyl chloride (PVC-U) pipes for water supply — Recommended practices for laying*
- [2] ENV 1452-7, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 7: Guidance for the assessment of conformity*
- [3] ISO 8659, *Thermoplastics valves — Fatigue strength — Test method*
- [4] CEN/TR 15438, *Plastics piping systems — Guidance for coding of products and their intended uses*

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

ICS 23.040.20; 23.040.45; 91.140.60; 93.025

Price based on 11 pages

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