
Plastics piping systems for hot and cold water installations - Chlorinated poly (vinyl chloride) (PVC-C) - Part 1: General (ISO 15877-1:2003)

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Kunststoff-Rohrleitungssysteme für die Warm- und Kaltwasserinstallation - Chloriertes Polyvinylchlorid (PVC-C) - Teil 1: Allgemeines (ISO 15877-1:2003)

Systemes de canalisations en plastique pour les installations d'eau chaude et froide - Poly(chlorure de vinyle) chloré (PVC-C) - Partie 1: Généralités (ISO 15877-1:2003)

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This European Standard was approved by CEN on 17 March 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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EN ISO 15877-1:2003 (E)

Contents

Contents	2
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions, symbols and abbreviated terms	5
3.1 Terms and definitions	5
3.2 Symbols.....	8
3.3 Abbreviated terms	9
4 Classification of service conditions	9
5 Material	10
5.1 General.....	10
5.2 Density	10
5.3 Chlorine content	10
5.4 Hydrostatic stress properties.....	10
5.5 Verification of the malfunction temperature	11
5.6 Influence on water intended for human consumption	11
5.7 Reprocessable and recycable material.....	11
Annex A (normative)	12
A.1 Scope	12
A.2 Principle.....	12
A.3 Apparatus	12
A.4 Test pieces	12
A.5 Procedure.....	13
A.6 Test report.....	13
Bibliography	14

Foreword

This document (EN ISO 15877-1:2003) has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NEN, in collaboration with Technical Committee ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by December 2005.

NOTE This standard was submitted for CEN enquiry as prEN 12731-1:1995

This standard is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

System Standards are based on the results of the work undertaken in ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids", which is a Technical Committee of the International Organization for Standardization (ISO).

They are supported by separate standards on test methods to which references are made throughout the System Standard.

The System Standards are consistent with general standards on functional requirements and recommended practices for installation.

EN ISO 15877:2003 consists of the following Parts ¹⁾, under the general title *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C)*

- Part 1: *General* (the present standard)
- Part 2: *Pipes*
- Part 3: *Fittings*
- Part 5: *Fitness for purpose of the system*
- Part 7: *Guidance for the assessment of conformity* (CEN ISO/TS 15877-7).

This Part 1 of EN ISO 15877 includes the following:

- Annex A (normative): Test method for the verification of the malfunction temperature, T_{mal} , of PVC-C material;
- Bibliography.

At the date of publication of this standard, System Standards for piping systems of other plastics materials used for hot and cold water installations are the following:

EN ISO 15874, *Plastics piping systems for hot and cold water installations — Polypropylene (PP)* (ISO 15874:2003)

EN ISO 15875, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X)* (ISO 15875:2003)

EN ISO 15876, *Plastics piping systems for hot and cold water installations — Polybutylene (PB)* (ISO 15876:2003)

For pipes and fittings which have conformed to the relevant national standard before 1st November, 2003, as shown by the manufacturer or by a certification body, the national standard may continue to apply until 30th November 2005.

1) This System Standard does not incorporate a Part 4: *Ancillary equipment* or a Part 6: *Guidance for installation*. For ancillary equipment separate standards can apply. Guidance on installation of plastics piping systems made from different materials intended to be used for hot and cold water installations is given by ENV 12108 [1].

EN ISO 15877-1:2003 (E)

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The System Standard, of which this is Part 1, specifies the requirements for a piping system when made from chlorinated poly(vinyl chloride) (PVC-C). The piping system is intended to be used for hot and cold water installations.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by EN ISO 15877:

- This standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;
- It should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

When using solvent cement, relevant national safety rules or regulations concerning their use (e.g. protection of workers) are to be observed.

Requirements and test methods for components of the piping system are specified in Part 2 and Part 3 of EN ISO 15877:2003. Characteristics for fitness for purpose (mainly for joints) are covered in Part 5. Part 7 (CEN ISO/TS 15877-7) gives guidance for the assessment of conformity.

This Part of EN ISO 15877 specifies the general aspects of the plastics piping system.

1 Scope

This Part of EN ISO 15877 specifies the general requirements of chlorinated poly(vinyl chloride) (PVC-C) piping systems intended to be used for hot and cold water installations within buildings for the conveyance of water, whether or not intended for human consumption (domestic systems), under design pressures and temperatures appropriate to the class of application (see Table 1).

This standard covers a range of service conditions (classes of application), design pressures and pipe dimension classes. For values of T_D , T_{max} and T_{mal} in excess of those in Table 1, this standard does not apply.

NOTE 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.

It also specifies the test parameters for the test methods referred to in this standard.

In conjunction with the other Parts of EN ISO 15877 (see Foreword) it is applicable to PVC-C pipes and fittings, their joints and to joints with components of other plastics and non-plastics materials intended to be used for hot and cold water installations.

2 Normative references

This 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 this Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 15877-2:2003, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 2: Pipes (ISO 15877-2:2003)*

EN ISO 15877-3:2003, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 3: Fittings (ISO 15877-3:2003)*

EN ISO 1158, *Plastics — Vinyl chloride homopolymers and copolymers — Determination of chlorine content (ISO 1158:1998)*

EN ISO 9080, *Plastics piping and ducting systems - Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO 9080:2003)*

ISO 472:1999, *Plastics — Vocabulary*

ISO 1043-1:2001, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

ISO 3514, *Chlorinated polyvinyl chloride (CPVC) pipes and fittings — Specification and determination of density*

3 Terms and definitions, symbols and abbreviated terms

For the purposes of this standard, the following terms and definitions, symbols and abbreviated terms apply.

3.1 Terms and definitions

In addition to the terms and definitions given below, the terms and definitions given in ISO 472:1999 and ISO 1043-1:2001 apply.

EN ISO 15877-1:2003 (E)

3.1.1 Geometrical terms and definitions**3.1.1.1 Nominal size****3.1.1.1.1****nominal size DN**

numerical designation of the size of a component, which is a convenient round number, approximately equal to the manufacturing dimensions in millimetres (mm)

3.1.1.1.2**nominal size DN/OD**

nominal size, related to outside diameter

3.1.1.2**nominal outside diameter (d_n)**

specified diameter, in millimetres, assigned to a nominal size DN/OD

NOTE According to EN ISO 15877, the nominal outside diameter, d_n , of a pipe or spigot end of a fitting is equal to its minimum mean outside diameter, $d_{em,min}$.

3.1.1.3**outside diameter (at any point) (d_e)**

measured outside diameter through the cross-section at any point of a pipe or spigot end of a fitting, rounded up to the nearest 0,1 mm

3.1.1.4**mean outside diameter (d_{em})**

measured length of the outer circumference of a pipe or spigot end of a fitting in any cross section divided by π ($\approx 3,142$) rounded up to the nearest 0,1 mm

3.1.1.5**minimum mean outside diameter ($d_{em,min}$)**

minimum value of the mean outside diameter as specified for a given nominal size

3.1.1.6**maximum mean outside diameter ($d_{em,max}$)**

maximum value of the mean outside diameter as specified for a given nominal size

3.1.1.7**mean inside diameter of socket (d_{sm})**

arithmetical mean of two measured inside diameters perpendicular to each other at the midpoint of the socket length

3.1.1.8**out-of-roundness (ovality)**

difference between the measured maximum outside diameter and the measured minimum outside diameter in the same cross-sectional plane of a pipe or spigot end of a fitting, or the difference between the measured maximum inside diameter and the measured minimum inside diameter in the same cross-sectional plane of a socket

3.1.1.9**nominal wall thickness (e_n)**

numerical designation of the wall thickness of a component, approximately equal to the manufacturing dimension in millimetres (mm)

NOTE According to EN ISO 15877, the nominal wall thickness, e_n , of a pipe or spigot end of a fitting is equal to the specified minimum wall thickness, e_{min} .

3.1.1.10**wall thickness (at any point) (e)**

measured wall thickness at any point around the circumference of a component, rounded up to the nearest 0,1 mm

3.1.1.11**minimum wall thickness (at any point) (e_{\min})**

minimum wall thickness at any point around the circumference of a component, as specified

3.1.1.12**maximum wall thickness at any point (e_{\max})**

maximum wall thickness at any point around the circumference of a component, as specified

3.1.1.13**tolerance**

permitted variation of the specified value of a quantity, expressed as the difference between the permitted maximum and the permitted minimum value

3.1.1.14**pipe series (S)**

dimensionless number for pipe designation conforming to ISO 4065 [2]

NOTE According to EN ISO 15877 the pipe series S is used as a means for selecting pipe sizes for practical purposes (see EN ISO 15877-2:2003).

3.1.1.15**calculated pipe value (S_{calc})**

value for a specific pipe calculated according to the following equation, rounded up to the nearest 0,1 mm:

$$S_{\text{calc}} = \frac{d_n - e_n}{2e_n}$$

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where:

d_n is the nominal outside diameter, in millimetres;

e_n is the nominal wall thickness, expressed in millimetres

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3.1.2 Terms and definitions related to service conditions**3.1.2.1****design pressure (p_D)**

highest pressure related to the circumstances for which the system has been designed and is intended to be used

NOTE The design pressure (p_D) is equal to the maximum design pressure (MDP), as specified in EN 806-1 [3].

3.1.2.2**hydrostatic stress (σ)**

stress, expressed in megapascals, induced in the wall of a pipe when a pressure is applied using water as a medium. It is calculated using the following approximate equation:

$$\sigma = p \times \frac{(d_{em} - e_{\min})}{2e_{\min}}$$

where:

p is the applied pressure, in megapascals;

d_{em} is the mean outside diameter of the pipe, in millimetres;

e_{\min} is the minimum wall thickness, in millimetres.

3.1.2.3**design temperature (T_D)**

a temperature or a combination of temperatures of the conveyed water dependent on the service conditions for which the system has been designed