
Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 1: General (ISO 15875-1:2003)

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English version

Plastics piping systems for hot and cold water installations -
Crosslinked polyethylene (PE-X) - Part 1: General (ISO 15875-
1:2003)

Systèmes de canalisations en plastique pour les
installations d'eau chaude et froide - Polyéthylène réticulé
(PE-X) - Partie 1: Généralités (ISO 15875-1:2003)

Kunststoff-Rohrleitungssysteme für die Warm- und
Kaltwasserinstallation - Vernetztes Polyethylen (PE-X) -
Teil 1: Allgemeines (ISO 15875-1:2003)

This European Standard was approved by CEN on 14 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 15875-1:2003) 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".

NOTE This standard was submitted for CEN enquiry as prEN 12318-1:1996.

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of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by December 2005.

This standard is 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 15875:2003 consists of the following Parts¹⁾, under the general title *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X)*

- 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 15875-7).

This Part of EN ISO 15875 includes a Bibliography.

At the date of publication of this standard, System Standards for piping systems of other plastics materials used for the same application are the following:

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

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

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

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

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.

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 12108:2001 [1].

Introduction

The System Standard, of which this is Part 1, specifies the requirements for a piping system when made from crosslinked polyethylene (PE-X). 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 15875:

- 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.

Requirements and test methods for components of the piping system are specified in Part 2 and Part 3 of EN ISO 15875:2003. Characteristics for fitness of purpose (mainly for joints) are covered in Part 5. Part 7 (GEN ISO/TS 15875-7) gives guidance for the assessment of conformity.

This Part of EN ISO 15875 specifies the general aspects of the plastics piping system.

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1 Scope

This Part of EN ISO 15875 specifies the general aspects of crosslinked polyethylene (PE-X) 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), and for heating systems, under design pressures and temperatures according to the class of application (see Table 1).

This standard covers a range of service conditions (application classes) and design pressure 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 in 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 15875 (see Foreword) it is applicable to PE-X pipes, 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 15875-2:2003, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 2: Pipes (ISO 15875-2:2003)*

EN ISO 15875-3:2003, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 3: Fittings (ISO 15875-3:2003)*

ISO 472:1999, *Plastics — Vocabulary*

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

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.

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 the outside diameter

3.1.1.2

nominal outside diameter (d_n)

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

3.1.1.3

outside diameter (at any point) (d_e)

measured outside diameter through its 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 for the mean outside diameter as specified for a given nominal size

3.1.1.6

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

maximum value for 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)

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 15875 the pipe series S is used as a means for selecting pipe sizes for practical purposes (see EN ISO 15875-2:2003).

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:

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

where:

- d_n is the nominal outside diameter, in millimetres;
- e_n is the nominal wall thickness, expressed in millimetres

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

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, 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:

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

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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

3.1.2.4**maximum design temperature (T_{max})**

highest design temperature, T_D , occurring for short periods only

3.1.2.5**malfunction temperature (T_{mal})**

highest temperature that can be reached when the control limits are exceeded

3.1.2.6**cold water temperature (T_{cold})**

temperature of conveyed cold water of up to approximately 25 °C

NOTE For design purposes 20 °C is used.

3.1.2.7**treated water for heating installations**

water, intended for heating installations, which contains additives which have no detrimental effect on the system