
Cevi za daljinsko ogrevanje - Izolirani gibki cevni sistemi - 3. del: Nevezani cevni sistemi iz polimernih materialov - Zahteve in preskusne metode

District heating pipes - Pre-insulated flexible pipe systems - Part 3: Non bonded system with plastic service pipes; requirements and test methods

Fernwarmerohre - Werkmaig gedamnte flexible Rohrsysteme - Teil 3: Nicht-Verbund-Rohrsysteme mit Mediumrohren aus Kunststoff - Anforderungen und Prufungen

Tuyaux de chauffage urbain - Systemes de tuyaux flexibles preisoles - Partie 3: Systeme non bloque avec tube de service en plastique; prescriptions et methodes d'essai

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District heating pipes - Pre-insulated flexible pipe systems - Part 3: Non bonded system with plastic service pipes; requirements and test methods

Tuyaux de chauffage urbain - Systèmes de tuyaux flexibles préisolés - Partie 3: Système non bloqué avec tube de service en plastique; prescriptions et méthodes d'essai

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This European Standard was approved by CEN on 10 December 2009.

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 CEN 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 CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 15632-3:2010) has been prepared by Technical Committee CEN/TC 107 “Prefabricated district heating pipe systems”, the secretariat of which is held by DS.

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of an identical text or by endorsement, at the latest by August 2010, and conflicting national standards shall be withdrawn at the latest by August 2010.

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

This document is one of a series of standards which form several parts of EN 15632, *District heating pipes — Pre-insulated flexible pipe systems*:

Part 1: *Classification, general requirements and test methods*;

Part 2: *Bonded system with plastic service pipes; requirements and test methods*;

Part 3: *Non bonded system with plastic service pipes; requirements and test methods*;

Part 4: *Bonded system with metal service pipes; requirements and test methods*.

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

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Introduction

Pre-insulated flexible non bonded pipe systems with plastic service pipes are widely used in district and local heating networks.

This part of the series of standards for the various types of flexible pipe systems is intended to be used in connection with EN 15632-1 where the basic design criteria for flexible district heating pipes are specified.

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1 Scope

This European Standard provides requirements and test methods for flexible, pre-insulated, direct buried district heating pipes with plastic service pipes and no bonding between the layers of the pipes.

This European Standard is valid for maximum operating temperatures of 95 °C and maximum operating pressures up to 10 bar for a design lifetime of at least 30 years.

This European Standard does not cover surveillance systems.

NOTE For higher temperatures or for the transport of other fluids, for example potable water, additional requirements and testing is needed. Such requirements are not specified in this European Standard.

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.

EN 489, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Joint assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene*

EN 15632-1:2009, *District heating pipes — Pre-insulated flexible pipe systems — Part 1: Classification, general requirements and test methods*

EN 15632-2:2009, *District heating pipes — Pre-insulated flexible pipe systems — Part 2: Bonded system with plastic service pipes, requirements and test methods*

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)*

EN ISO 13760, *Plastics pipes for the conveyance of fluids under pressure — Miner's rule — Calculation method for cumulative damage (ISO 13760:1998)*

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

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

EN ISO 15875-5:2003, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 5: Fitness for purpose of the system (ISO 15875-5:2003)*

EN ISO 15876-1, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 1: General (ISO 15876-1:2003)*

EN ISO 15876-2, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 2: Pipes (ISO 15876-2:2003)*

EN ISO 15876-3, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 3: Fittings (ISO 15876-3:2003)*

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EN ISO 15876-5, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 5: Fitness for purpose of the system (ISO 15876-5)*

EN ISO 21003-2, *Multilayer piping systems for hot and cold water installations inside buildings – Part 2: Pipes (ISO 21003-2:2008)*

ISO 10147, *Pipes and fittings made of crosslinked polyethylene (PE-X) — Estimation of the degree of crosslinking by determination of the gel content*

ISO 17455, *Plastics piping systems — Multilayer pipes — Determination of the oxygen permeability of the barrier pipe*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15632-1:2009 apply.

4 Classification**4.1 Operating temperatures and service life**

Pipe systems according to this European Standard are designed for a service life of at least 30 years when operated at the following temperature profile:

29 years at 80 °C + 1 year at 90 °C + 100 h at 95 °C.

Other temperature/time profiles can be applied in accordance with EN ISO 13760 (Miner's Rule). Further information is given in EN 15632-2:2009, Annex A.

The maximum operating temperature shall not exceed 95 °C.

4.2 Operating pressures

Pipe systems according to this European Standard are designed for continuous operating pressures of 6, 8 or 10 bar. Table 1 defines maximum SDR ratios of the service pipe required to withstand the operating pressures.

Table 1 —SDR ratios required for different operating pressures

| Service pipe | Operating Pressure | | |
|------------------|---|--------|---------|
| | 6 bar | 8 bar | 10 bar |
| PE-X | SDR 11 | SDR 9 | SDR 7.4 |
| PB | SDR 13,6 | SDR 11 | SDR 9 |
| Multilayer pipes | Wall thicknesses shall be calculated according to the methods defined in EN ISO 21003-2 | | |

The SDR ratios in Table 1 are based on the regression curves of EN ISO 15875 and EN ISO 15876. Higher SDR ratios may be applied, if they are based on regression curves developed in accordance with EN ISO 9080.

4.3 General requirements

In addition to the general requirements defined in EN 15632-1 the following product specific requirements shall apply.

4.4 Service pipes and fittings

4.4.1 Quality

Plastics service pipes and fittings shall comply with:

- 1) EN ISO 15875-1, EN ISO 15875-2, EN ISO 15875-3 and EN ISO 15875-5 for pipes made of cross linked polyethylene (PE-X, for PE-Xb see also Annex B),
- 2) EN ISO 15876-1, EN ISO 15876-2, EN ISO 15876-3 and EN ISO 15876-5 for pipes made of polybutylene (PB),
- 3) for multi-layer pipes EN ISO 21003-2.

Deviating from these standards, temperature cycle tests on pipe systems and fittings shall be carried out with test cycle numbers specified in 5.2.

4.4.2 Oxygen tightness

The oxygen diffusion of service pipes shall not exceed 3.6 mg/m²d at 80°C when tested in accordance with ISO 17455.

NOTE The value of 3,6 mg/m²d is state of the art at general heating applications. A maximum diffusion rate of 0,8 mg/m²d is recommended for district heating purposes.

4.5 Sealing in linear direction (standards.iteh.ai)

The manufacturer of the system shall offer components to stop leakage in the linear direction at the end of each pipe section. These components shall be water tight when tested according to water tightness test of EN 489 (without the box load test).

4.6 Water vapour permeation

The pipe supplier shall give information about the risk of the water accumulation in the insulation dependent on the service conditions.

NOTE PE-X and PB pipes are slightly open for diffusion of water from the media to the insulation. The rate of diffusion is increasing with the temperature. The casing is likewise open for diffusion from the insulation to the soil. The rate of this diffusion is depending upon the casing temperature and the water vapour partial pressure difference over the casing wall. For pipes installed under the ground water table there will always be a certain build up of water directly under the casing. Experience shows that this build up is limited and not detrimental to the function although a certain loss of insulation capacity may be expected.

5 Test procedures

5.1 General

Unless stated otherwise, all tests are to be carried out:

- 1) no sooner than 72 hours after production;
- 2) at room temperature;
- 3) on samples taken from coiled pipes.