



SLOVENSKI STANDARD
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Cevi za daljinsko hlajenje - Tovarniško izdelani sistemi gibkih cevi - 2. del: Spojeni sistem s plastičnimi delovnimi cevmi - Zahteve in preskusne metode

District cooling pipes - Factory made flexible pipe systems - Part 2: Bonded system with plastic service pipes - Requirements and test methods

Fernkühlungsrohre - Werkmäßig gedämmte flexible Rohrsysteme - Teil 2: Verbundrohrsysteme mit Mediumrohren aus Kunststoff - Anforderungen und Prüfungen

Réseaux d'eau glacée - Systèmes de tuyaux flexibles manufacturés - Partie 2 : Système bloqué avec tube de service en plastique - Prescriptions et méthodes d'essai

Ta slovenski standard je istoveten z: prEN 17414-2

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23.040.99	Drugi sestavni deli za cevovode	Other pipeline components
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**District cooling pipes - Factory made flexible pipe systems
- Part 2: Bonded system with plastic service pipes -
Requirements and test methods**

Réseaux d'eau glacée - Systèmes de tuyaux flexibles
manufacturés - Partie 2 : Système bloqué avec tube de
service en plastique - Prescriptions et méthodes d'essai

Fernkühlungsrohre - Werkmäßig gedämmte flexible
Rohrsysteme - Teil 2: Verbundrohrsysteme mit
Mediumrohren aus Kunststoff - Anforderungen und
Prüfungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 107.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 17414-2:2019) has been prepared by Technical Committee CEN/TC 107 “Prefabricated district heating and cooling pipe systems”, the secretariat of which is held by DS.

This document is currently submitted to the CEN Enquiry.

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Introduction

Factory made flexible pipe systems for directly buried district cooling networks are of common technical usage. In order to assure quality including product-related service life, to assure safety in use, economical energy usage and to facilitate comparability in the market, CEN/TC 107 decided to set up standards for these products.

This document is one of a series of standards which form several parts of prEN 17414, *District cooling pipes – Factory made flexible pipe systems*:

- *Part 1: Classification, general requirements and test methods*;
- *Part 2: Bonded system with plastic service pipes; requirements and test methods* (this document);
- *Part 3: Non bonded system with plastic service pipes; requirements and test methods*.

The other standards from CEN/TC 107 covering this subject are:

- prEN 17415-1, *District cooling pipes – Bonded single pipe systems for directly buried cold water networks – Part 1: Factory made pipe assembly of steel or plastic service pipe, polyurethane thermal insulation and a casing of polyethylene*¹⁾;
- prEN YYYYY-2, *District cooling pipes – Bonded single pipe systems for directly buried cold water networks Part 2: Factory made fitting assemblies of steel or plastic service pipe, polyurethane thermal insulation and a casing of polyethylene*¹⁾;
- prEN YYYYY-3, *District cooling pipes – Bonded single pipe systems for directly buried cold water networks Part 3: Factory made steel valve assembly for steel or plastic service pipe, polyurethane thermal insulation and a casing of polyethylene*¹⁾;
- prEN YYYYY-4, *District cooling pipes – Bonded single pipe systems for directly buried cold water networks Part 4: Joint casing assemblies of polyurethane thermal insulation and a casing of polyethylene for steel or plastic service pipes*¹⁾;
- prEN ZZZZZ-1, *District cooling pipes – Design and installation of thermal insulated bonded single and twin pipe systems for directly buried cold water networks – Part 1: Design*²⁾;
- prEN ZZZZZ-2, *District cooling pipes – Design and installation of thermal insulated bonded single and twin pipe systems for directly buried cold water networks – Part 2: Installation*²⁾;
- prEN UUUUU, *District cooling pipes – Factory made bonded pipe systems for directly buried cold water networks – Surveillance systems*²⁾.

1) Under development.

2) Under development.

1 Scope

This document specifies requirements and test methods for factory made thermally insulated bonded flexible pipe-in-pipe assemblies for directly buried district cooling distribution systems, comprising a service pipe from DN 15 to DN 200 and a casing of polyethylene. The pipe assembly may also include the following additional elements: measuring wires, spacers and diffusion barriers.

This document is intended to be used in conjunction with prEN 17414-1.

This document applies only to insulated pipe assemblies, for continuous operation with water at various temperatures (1 to 30) °C and a maximum operation pressure of 25 bar dependent on material specified.

The design is based on an expected service life with continuous operation of a minimum 50 years.

This document does not cover surveillance systems.

NOTE For the transport of other liquids, for example potable water, additional requirements may be applicable.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12201-1, *Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 1: General*

EN 12201-2, *Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 2: Pipes*

EN 12201-3, *Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 3: Fittings*

EN 12201-5, *Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 5: Fitness for purpose of the system*

prEN 17414-1, *District cooling pipes - Factory made flexible pipe systems - Part 1: Classification, general requirements and test method*

EN ISO 15874-1, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 1: General (ISO 15874-1)*

EN ISO 15874-2, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 2: Pipes (ISO 15874-2)*

EN ISO 15874-3, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 3: Fittings (ISO 15874-3)*

EN ISO 15874-5, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 5: Fitness for purpose of the system (ISO 15874-5)*

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

EN ISO 15875-2, *Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 2: Pipes (ISO 15875-2)*

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

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

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

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

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

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

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

ISO 21004, *Plastics piping systems - Multilayer pipes and their joints, based on thermoplastics, for water supply*

3 Terms and definitions

For the purposes of this document the terms and definitions given in prEN 17414-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Classification

4.1 Operating temperatures and service life

Pipe systems according to this document are designed for a service life of 50 years when operated with temperature profiles within (1 to 30) °C and profiles of 1 °C at 50 years and of 30 °C at 50 years.

The maximum continuous operating temperature shall not exceed 30 °C.

4.2 Operating pressures

Pipe systems according to this document are designed for continuous operating pressures of up to 25 bar.

Tables 1 and 2 defines the SDR ratios of the service pipe required to withstand the operating pressures at a nominal temperature of 30 °C (see Annex A, Example 3).

NOTE 1 A higher SDR may be applicable for a lower temperature profile (see Annex A, Example 1).

Table 1 — SDR ratios required for operating pressures 6 to 10 bar

Service pipe material	Operating Pressure	
	6 bar	10 bar
PB-H, PB-R, PP-RCT	SDR 26	SDR 17
PE-X, PP-R	SDR 13,6	SDR 11
PE 100	SDR 21	SDR 13,6
PE 80	SDR 13,6	SDR 11
Multilayer pipes	Wall thicknesses shall be calculated according to the methods defined in ISO 21004	

NOTE 2 For PB-H, PB-R, PP-RCT, PE-X and PP-R the maximum operating pressure is 10 bar according to the reference standards as given in 5.2.1.

Table 2 — SDR ratios required for operating pressures 16 to 25 bar

Service pipe material	Operating Pressure		
	16 bar	20 bar	25 bar
PE 100	SDR 9	SDR 7,4	SDR 6
PE 80	SDR 7,4	SDR 6	—

5 Requirements

5.1 General requirements

In addition to the general requirements defined in prEN 17414-1 the following product specific requirements apply.

5.2 Service pipes and fittings

5.2.1 Complying piping systems

Service pipes and fittings shall comply with:

- EN 12201-1, EN 12201-2, EN 12201-3, EN 12201-5, for pipes made of polyethylene (PE),
- EN ISO 15874-1, EN ISO 15874-2, EN ISO 15874-3, EN ISO 15874-5, for pipes made of polypropylene (PP),
- EN ISO 15875-1, EN ISO 15875-2, EN ISO 15875-3, EN ISO 15875-5, for pipes made of cross-linked polyethylene (PE-X),

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All requirements of the pipe and fitting according to EN ISO 15875-2 and EN ISO 15875-3 especially the degree of cross-linking shall be met before leaving the production site.

- EN ISO 15876-1, EN ISO 15876-2, EN ISO 15876-3, EN ISO 15876-5, for pipes made of polybutene (PB);
- ISO 21004, for multi-layer pipes.

5.2.2 Oxygen tightness

The oxygen diffusion of service pipes shall not exceed 0,32 mg/m²d at 40 °C when tested in accordance with ISO 17455.

5.3 Axial shear strength

The axial shear strength between the service pipe and the insulation shall be at least 0,09 MPa for plastics pipes and 0,12 MPa for multi-layer pipes. The axial shear strength shall be tested in accordance with 6.2. The test result shall be determined as an average of five measurements.

5.4 Linear water tightness

When tested in accordance with 6.3, the amount of water leaking through any of the pipe ends shall not exceed 100 g after 168 h.

5.5 Water vapour permeation

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

NOTE PB, PE, PE-X, PP-R and PP-RCT pipes are slightly open for diffusion of water from the media to the insulation. The rate of diffusion increases with the temperature. The casing is likewise open for diffusion from the insulation to the soil. The rate of this diffusion depends on 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.

6 Test procedures**6.1 General**

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

- no sooner than 72 h after production;
- at room temperature;
- on specimens taken from coiled pipes.

Guidelines for testing frequencies and responsibilities are given in prEN 17414-1:2019, Annex D.

6.2 Axial shear strength

The axial shear strength between the service pipe and the insulation shall be tested as shown in Figure 1, where (1) is the test specimen, (2) is a cylindrical piston pressing onto the service pipe and a support (3) with a cylindrical opening.

The test specimen (1) shall have a length which equals the outer diameter of the casing \pm 5 %, the ends shall be cut at a right angle.