
Cevi za daljinsko ogrevanje - Izolirani gibki cevni sistemi - 4. del: Vezane kovinske cevi; zahteve in preskusne metode

District heating pipes - Pre-insulated flexible pipe systems - Part 4: Bonded system with metal service pipes; requirements and test methods

Fernwarmerohre - Werkmaig gedamnte flexible Rohrsysteme - Teil 4:
Verbundmediumrohre aus Metall; Anforderungen und Prufungen

Tuyaux de chauffage urbain - Systemes de tuyaux flexibles preisoles - Partie 4: Systeme bloque en tube de service en metal; prescriptions et methodes d'essai

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District heating pipes - Pre-insulated flexible pipe systems - Part 4: Bonded system with metal service pipes; requirements and test methods

Tuyaux de chauffage urbain - Systèmes de tuyaux flexibles préisolés - Partie 4: Système bloqué avec tube de service en métal - Prescriptions et méthodes d'essai

Fernwärmerohre - Werkmäßig gedämmte flexible Rohrsysteme - Teil 4: Verbundmediumrohre aus Metall - Anforderungen und Prüfungen

This European Standard was approved by CEN on 5 December 2008.

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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 15632-4:2009) 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of an identical text or by endorsement, at the latest by July 2009, and conflicting national standards shall be withdrawn at the latest by July 2009.

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, 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 bonded pipe systems with metallic service pipes are 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, directly buried district heating pipe assemblies with metallic service pipes and bonding between the layers of the pipes and thermal insulation materials of polyurethane or polyisocyanurate foam, the casing pipes being made of polyethylene.

This European Standard is valid for maximum operating temperatures up to 140 °C and pressures up to 25 bar for a design lifetime of at least 30 years.

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 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 10246-1, *Non destructive testing of steel tubes — Part 1: Automatic electromagnetic testing of seamless and welded (except submerged arc welded) ferromagnetic steel tubes for verification of hydraulic leak-tightness*

EN 10305-1, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*

EN 10305-2, *Steel tubes for precision applications — Technical delivery conditions — Part 2: Welded cold drawn tubes*

EN 12449, *Copper and copper alloys — Seamless, round tubes for general purposes*

EN 13941, *Design and installation of preinsulated bonded pipe systems for district heating*

EN 14419, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Surveillance systems*

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

3 Terms and definitions

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

EN 15632-4:2009 (E)

4 Operating conditions

Pipe systems according to this European Standard shall have a lifetime of at least 30 years at a continuous operating temperature of 120 °C and a maximum operating temperature of 140°C.

Table 1 — Operating pressures

Service pipe	Operating Pressure	
	16 bar	25 bar
Copper	X	-
Mild steel	X	X
Corrugated stainless steel	X	X

5 Requirements

5.1 General requirements

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

5.2 Service pipes and fittings

The service pipes shall fulfil the requirements of diameter and wall thickness in Table 2.

Table 2 — Nominal diameters and minimum wall thickness

Nominal diameter	Outside diameter d_2 , minimum inside diameter d_1 , and minimum wall thickness s					
	Copper		Mild steel		Corrugated stainless steel	
	d_2 mm	s mm	d_2 mm	s mm	d_1 mm	s mm
DN						
12	15	1,0	-	-	14	0,2
16	18	1,0	20	2,0	18	0,2
20	22	1,0	25	2,0	22	0,2
25	28	1,2	28	2,0	30	0,3
32	35	1,5	-	-	39	0,4
40	42	1,5	-	-	48	0,5
50	54	1,5	-	-	60	0,5
65	-	-	-	-	75	0,6
80	-	-	-	-	98	0,8
100	-	-	-	-	127	0,9
125	-	-	-	-	147	1,0
150	-	-	-	-	197	1,2

EN 10088-2 shall be applied for pipes made of corrugated stainless steel. Material: 1.4301 or 1.4404

For copper pipes EN 12449 shall be applied. The material shall be Cu-DHP-CW024A-H40, and for the tolerances EN 1057 shall be applied.

For seamless steel pipes EN 10305-1 shall be applied. The material shall be E215+N.

For welded steel pipes EN 10305-2 shall be applied. The material shall be E215+N. Welded pipes shall be tightness tested according to EN 10246-1.

Deviating from these standards, service pipes and fittings shall be designed and tested for the operating cycles specified in 6.3.

5.3 Axial shear stress

The axial shear strength between the service pipe and the insulation shall be at least 0,12 MPa when tested according to 6.2 at ambient temperature.

The axial shear strength between the service pipe and the insulation shall be at least 0,08 MPa when tested according to 6.2 at maximum operating temperature.

This requirement is only applicable for smooth wall service pipes and not relevant for corrugated stainless steel pipes.

5.4 Linear water tightness

When tested in accordance with 6.4, the amount of water leaking through any of the pipe ends shall not exceed 100 g after 168 hours.

5.5 Fittings

When tested in accordance with 6.3 there shall be no leakage.

5.6 Surveillance systems

If measuring systems are installed, all relevant requirements of EN 14419 shall be fulfilled before and after the flexibility test according to EN 15632-1:2009, 6.1, and the linear water tightness test according to 6.4 of this document shall be performed with the measuring elements installed.

6 Test procedures

6.1 General

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

- no sooner than 72 hours after production,
- at room temperature,
- on samples taken from coiled pipes.

6.2 Axial shear stress

6.2.1 General

The shear stress of a soft steel or copper smooth walled pipe assembly shall be determined on at least 3 test specimens at each temperature.

There shall be no visual air gap between service pipe and insulation on a corrugated stainless pipe assembly (For corrugated stainless steel pipe assembly an axial shear test cannot be carried out).