SLOVENSKI STANDARD
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Cevi za daljinsko ogrevanje - Tovarniško izdelani gibki cevni sistemi - 4. del: Vezane kovinske cevi - Zahteve in preskusne metode

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

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

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

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English Version

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

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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
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 15632-4:2020) has been prepared by Technical Committee CEN/TC 107 “Prefabricated district heating and district cooling pipe system”, the secretariat of which is held by DS.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15632-4:2009.

This document is one of a series of standards which form several parts of EN 15632, *District heating 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;*

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*

In comparison to EN 15632-4:2009 the following changes have been made:

a) change the temperature in the scope;

b) changes in the mild steel qualities incl. the referring standards;

c) completely revised “guideline for testing” in the informative Annex A.

Introduction

Factory made 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 shall be used in connection with EN 15632-1 which specifies the basic design criteria for flexible district heating pipes.

1 Scope

This document provides requirements and test methods for flexible, factory made, buried district heating pipe systems with metallic service pipes and bonding between the layers of the pipe assemblies and thermal insulation materials of polyurethane or polyisocyanurate foam, the casing being made of polyethylene.

It shall be used in conjunction with part 1.

This document is valid for maximum media temperatures up to 120 °C and, occasionally peak temperatures up to 140 °C for maximum 300 h/a, and a design pressure up to 2,5 MPa for a design lifetime of at least 30 years.

This document covers surveillance systems.

In conjunction with the other parts of EN 15632, this document is applicable to pipes, fittings, their joints and to joints with components made of non-plastics materials intended to be used for district heating installations.

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 document.

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 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 10216-2, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-2, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties*

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 10305-3, *Steel tubes for precision applications — Technical delivery conditions — Part 3: Welded cold sized tubes*

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

EN 14419, *District heating pipes — Bonded single and twin pipe systems for buried hot water networks — Surveillance systems*

EN 15632-1, *District heating pipes — Factory made 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 17248 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 https://www.iso.org/obp

4 Operating conditions

Pipe systems according to this document 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 for maximum 300 h/a (see Table 1).

Table 1 — Design pressures

Service pipe	Design Pressure	
	1,6 MPa	2,5 MPa
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, fittings and their connections

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	
DN	d_2 mm	s mm	d_2 mm	s mm	d_1 mm	s mm
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

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 mild steel pipes EN 10305-1 or EN 10216-2 shall be used. The material used shall be at least E215+N or P195GH+N. For welded mild steel pipes EN 10305-2 or EN 10305-3 or EN 10217-2 shall be used. The material used shall be at least E195+N or P195GH. Welded pipes shall be subjected to a leak test according to EN ISO 10893-1. For higher steel grades than those previous given, the yield strength is defined in their related standards. If such higher steel grades are used for service pipes, it shall be verified that all components used in the involved part of the system are compatible to the higher yield strength of the pipes.

For steel pipes welded together with a circular weld to create longer coils, the circular welding must follow a defined process. The welding process shall be specified and approved in accordance with EN ISO 15607.

The coil is leak-tightness tested with air. The test pressure inside the pipe shall be at least 0,02 MPa over the external pressure or 0,02 MPa under the external pressure. No air bubbles shall be visible at the surface of the weld when immersed in water or when wetted with soap water or any other test liquid.

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

For evaluated temperature profiles is Table 12 from the standard EN 10088-2 valid. The manufacturer of the corrugated pipe shall apply a welding quality management system according to EN ISO 3834-2.

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

All service pipes under the scope of this standard shall as a minimum be delivered to the manufacturer of pipe elements with an inspection certificate 3.1 according to EN 10204. The manufacturer shall keep documentation of the inspection certificates.

5.3 Axial shear stress of the pipe assemblies

The axial shear strength between the service pipe and the thermal 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 thermal insulation shall be at least 0,08 MPa when tested according to 6.2 at continuous 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 of pipe assemblies

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, 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 described in this part of EN 15632 are to be carried out:

— at least 72 hours after production;

— at room temperature;

— one samples taken from coiled pipes.

— Guidelines for testing frequencies and responsibilities are given in EN 15632-1 and in Annex A.

6.2 Axial shear strength of pipe assemblies

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 thermal insulation on a corrugated stainless pipe assembly (For corrugated stainless steel pipe assembly an axial shear test cannot be carried out).