



# SLOVENSKI STANDARD

## SIST EN 15632-4:2022

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Nadomešča:  
SIST EN 15632-4:2009

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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 manufacturés - Partie 4 :  
Système bloqué avec tubes de service en métal ; exigences et méthodes d'essai

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23.040.07	Cevovodi za daljinsko ogrevanje in njihovi deli	Pipeline and its parts for district heat
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EUROPEAN STANDARD

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NORME EUROPÉENNE

EUROPÄISCHE NORM

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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

Tuyaux de chauffage urbain - Systèmes de tuyaux  
flexibles manufacturés - Partie 4 : Système bloqué avec  
tubes de service en métal ; exigences 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 27 March 2022.

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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-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (EN 15632-4:2022) has been prepared by Technical Committee CEN/TC 107 “Prefabricated district heating and district cooling 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 November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

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

This document supersedes 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 with EN 15632-4:2009, the following changes have been made:

- a) change in the temperature in the scope;
- b) changes in the steel qualities, including the referenced standards;
- c) completely revised “guideline for testing” in the informative Annex A.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**EN 15632-4:2022 (E)****Introduction**

District heating technology has developed rapidly since its origin and especially in recent times. Today, there are different generations of district heating networks. The technologies of these generations are driven by the different heat sources and operating temperatures used.

CEN/TC 107 provides a set of European standard series for rigid and flexible piping systems in district heating to suit all generations and requirements of district heating networks in the market.

The standard documents ensure quality for pre-fabricated piping systems in district heating.

This standard series covers flexible, pre-fabricated piping systems for operation conditions as described in the scope of part 1.

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## 1 Scope

This document specifies 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 is only applicable in conjunction with part 1.

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.

This document is applicable to a continuous operating temperature up to 120 °C and a maximum operating temperature of 140 °C for maximum 300 h/a, and a design pressure up to 2,5 MPa for a design service life of at least 30 years.

This document does not apply to 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 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 10204, *Metallic products - Types of inspection documents*

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 - Pre-insulated flexible pipe systems - Part 1: Classification, general requirements and test methods*

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EN 17248, *District heating and district cooling pipe systems - Terms and definitions*

EN ISO 3834-2, *Quality requirements for fusion welding of metallic materials - Part 2: Comprehensive quality requirements (ISO 3834-2)*

EN ISO 10893-1, *Non-destructive testing of steel tubes - Part 1: Automated electromagnetic testing of seamless and welded (except submerged arc-welded) steel tubes for the verification of hydraulic leaktightness (ISO 10893-1)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials - General rules (ISO 15607)*

**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 <https://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).

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Table 1 — Design pressures

Service pipe	Design Pressure	
	1,6 MPa	2,5 MPa
Copper	X	-
Steel	X	X
Corrugated stainless steel	X	X

**5 Requirements****5.1 General requirements**

In addition to the general requirements specified 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		Steel		Corrugated stainless steel <sup>a</sup>	
	$d_2$ mm	$s$ mm	$d_2$ mm	$s$ mm	$d_1$ mm	$s$ mm
12 <sup>b</sup>	15	1,0	-	-	14	0,2
16 <sup>b</sup>	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

<sup>a</sup> A product standard for corrugated stainless steel pipes does not exist.

<sup>b</sup> DN 12 and DN 16 are not specified in EN ISO 6708, which lists preferred DN values.

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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 or EN 10216-2 shall be used, as applicable. The material used shall be at least E215+N or P195GH+N. For welded steel pipes EN 10305-2 or EN 10305-3 or EN 10217-2 shall be used, as applicable. 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 specified 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 pipe length, the circular welding shall follow a specified 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 the standard EN 10088-2 is 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.

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All service pipes and raw materials under the scope of this document 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 strength 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 steel and copper service pipes according to EN 12449, EN 10305-1, EN 10305-2 and EN 10305-3, EN 10216-2 and EN 10217-2 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 clause 6.4 of this document shall be performed with the measuring elements installed.

**6 Test procedures****6.1 General**

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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;
- on 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 strength 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).