

**SLOVENSKI STANDARD**  
**SIST EN 15632-1:2022****01-julij-2022****Nadomešča:****SIST EN 15632-1:2009+A1:2015**

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**Cevi za daljinsko ogrevanje - Tovarniško izdelani gibki cevni sistemi - 1. del:  
Klasifikacija, splošne zahteve in preskusne metode**District heating pipes - Pre-insulated flexible pipe systems - Part 1: Classification,  
general requirements and test methodsFernwärmerohre - Werkmäßig gedämmte flexible Rohrsysteme - Teil 1: Klassifikation,  
allgemeine Anforderungen und PrüfungenTuyaux de chauffage urbain - Systèmes de tuyaux flexibles manufacturés - Partie 1 :  
Classification, exigences générales et méthodes d'essai[SIST EN 15632-1:2022](https://standards.iteh.ai/catalog/standards/sist/29e4dcf7-b949-4361-a344-bac0b5364d76/sist-en-15632-1-2022)**Ta slovenski standard je istoveten z: EN 15632-1:2022****ICS:**

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NORME EUROPÉENNE

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English Version

## District heating pipes - Factory made flexible pipe systems - Part 1: Classification, general requirements and test methods

Tuyaux de chauffage urbain - Systèmes de tuyaux  
flexibles manufacturés - Partie 1 : Classification,  
exigences générales et méthodes d'essai

Fernwärmerohre - Werkmäßig gedämmte flexible  
Rohrsysteme - Teil 1: Klassifikation, allgemeine  
Anforderungen und Prüfungen

This European Standard was approved by CEN on 27 March 2022.

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-CENELEC Management Centre or to any CEN member.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	5
<b>1</b> <b>Scope</b> .....	<b>6</b>
<b>2</b> <b>Normative references</b> .....	<b>6</b>
<b>3</b> <b>Terms and definitions and symbols</b> .....	<b>7</b>
<b>3.1</b> <b>Terms and definitions</b> .....	<b>7</b>
<b>3.2</b> <b>Symbols, indices and abbreviations</b> .....	<b>7</b>
<b>4</b> <b>Classification</b> .....	<b>11</b>
<b>5</b> <b>Design requirements</b> .....	<b>11</b>
<b>5.1</b> <b>Thermal insulation properties</b> .....	<b>11</b>
<b>5.2</b> <b>Bending test</b> .....	<b>12</b>
<b>5.2.1</b> <b>Flexibility</b> .....	<b>12</b>
<b>5.2.2</b> <b>Ovality</b> .....	<b>12</b>
<b>5.2.3</b> <b>Cracks</b> .....	<b>12</b>
<b>5.3</b> <b>Resistance to external load</b> .....	<b>12</b>
<b>5.3.1</b> <b>Ring stiffness</b> .....	<b>12</b>
<b>5.3.2</b> <b>Impact resistance</b> .....	<b>12</b>
<b>5.4</b> <b>Thermal insulation</b> .....	<b>12</b>
<b>5.4.1</b> <b>Compressive creep</b> .....	<b>12</b>
<b>5.4.2</b> <b>Water absorption at elevated temperatures</b> .....	<b>12</b>
<b>5.4.3</b> <b>Density of thermal insulation</b> .....	<b>13</b>
<b>5.5</b> <b>Casing</b> .....	<b>13</b>
<b>5.5.1</b> <b>UV stability</b> .....	<b>13</b>
<b>5.5.2</b> <b>Thermal stability of the material</b> .....	<b>13</b>
<b>5.5.3</b> <b>Stress crack resistance of the material</b> .....	<b>13</b>
<b>5.5.4</b> <b>Use of rework material</b> .....	<b>13</b>
<b>5.6</b> <b>Surveillance systems</b> .....	<b>14</b>
<b>6</b> <b>Test methods</b> .....	<b>14</b>
<b>6.1</b> <b>General</b> .....	<b>14</b>
<b>6.2</b> <b>Bending test</b> .....	<b>14</b>
<b>6.2.1</b> <b>Flexibility</b> .....	<b>14</b>
<b>6.2.2</b> <b>Ovality test</b> .....	<b>16</b>
<b>6.2.3</b> <b>Cracks in the thermal insulation</b> .....	<b>16</b>
<b>6.3</b> <b>Compressive creep</b> .....	<b>17</b>
<b>6.3.1</b> <b>General</b> .....	<b>17</b>
<b>6.3.2</b> <b>Principles of testing</b> .....	<b>17</b>
<b>6.3.3</b> <b>Test apparatus</b> .....	<b>17</b>
<b>6.3.4</b> <b>Test specimen</b> .....	<b>19</b>
<b>6.3.5</b> <b>Test procedure</b> .....	<b>19</b>
<b>6.3.6</b> <b>Test force and expression of results</b> .....	<b>20</b>
<b>7</b> <b>Marking</b> .....	<b>21</b>
<b>7.1</b> <b>General marking aspects</b> .....	<b>21</b>
<b>7.2</b> <b>Minimum marking information</b> .....	<b>21</b>
<b>8</b> <b>Manufacturer's information</b> .....	<b>22</b>

<b>Annex A (normative) Thermal conductivity of factory made pipes – Test procedure .....</b>	<b>23</b>
<b>A.1 General .....</b>	<b>23</b>
<b>A.2 Requirements.....</b>	<b>23</b>
<b>A.2.1 Test specimen .....</b>	<b>23</b>
<b>A.2.2 Operating temperature .....</b>	<b>23</b>
<b>A.2.3 Types of apparatus.....</b>	<b>23</b>
<b>A.3 Apparatus .....</b>	<b>23</b>
<b>A.3.1 Guarded end apparatus.....</b>	<b>23</b>
<b>A.3.2 Calibrated end apparatus .....</b>	<b>23</b>
<b>A.3.3 Dimensions .....</b>	<b>24</b>
<b>A.3.4 Heater pipe surface temperature .....</b>	<b>24</b>
<b>A.4 Test specimen .....</b>	<b>24</b>
<b>A.4.1 Conditioning.....</b>	<b>24</b>
<b>A.4.2 Surface temperature measurement.....</b>	<b>24</b>
<b>A.4.3 Location of temperature sensors.....</b>	<b>24</b>
<b>A.5 Procedure .....</b>	<b>24</b>
<b>A.5.1 Test length.....</b>	<b>24</b>
<b>A.5.2 Diameter and dimension measurement.....</b>	<b>24</b>
<b>A.5.3 Thickness of casing .....</b>	<b>26</b>
<b>A.5.4 Ambient requirements .....</b>	<b>26</b>
<b>A.5.5 Test pipe temperature.....</b>	<b>26</b>
<b>A.5.6 Power supply.....</b>	<b>26</b>
<b>A.5.7 Axial heat loss .....</b>	<b>27</b>
<b>A.5.8 Test period and stability .....</b>	<b>27</b>
<b>A.6 Calculations - Thermal conductivity.....</b>	<b>27</b>
<b>Annex B (informative) Determination of design values for the radial thermal resistance .....</b>	<b>29</b>
<b>Annex C (informative) Guideline for testing.....</b>	<b>30</b>
<b>Bibliography .....</b>	<b>32</b>

**EN 15632-1:2022 (E)****European foreword**

This document (EN 15632-1:2022) 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 15632-1:2009+A1:2014.

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 15632-1:2009+A1:2014, the following changes have been made:

- a) improved description of the bending test in 5.2 and 6.2;
- b) improved description of the thermal insulation in 5.4;
- c) improved description of the compressive creep test in 6.3;
- d) improved calculation of the thermal conductivity in Annex A, A.6;
- e) improved calculation of the radial thermal resistance in Annex B;
- f) completely revised “guideline for testing” in the informative Annex C.

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.

## 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 this document.

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**EN 15632-1:2022 (E)****1 Scope**

This document specifies classification, general requirements and test methods for flexible, factory made, buried district heating pipe systems.

This document is intended to be used in conjunction with part 2, 3 or 4, as applicable.

Depending on the pipe assembly (see Table 4), this document is applicable to a maximum operating temperature of 95 °C (part 2 and 3) and a maximum operating temperature of 120 °C (for part 4) and design pressures of 0,6 MPa to 2,5 MPa.

The pipe systems are designed for a service life of at least 30 years. For pipe systems with plastic service pipes, the respective temperature profiles are specified in EN 15632-2 and EN 15632-3.

NOTE For the transport of other liquids, for example potable water, additional requirements can 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 253, *District heating pipes - Bonded single pipe systems for directly buried hot water networks - Factory made pipe assembly of steel service pipe, polyurethane thermal insulation and a casing of polyethylene*

EN 1605, *Thermal insulating products for building applications - Determination of deformation under specified compressive load and temperature conditions*

EN 1606, *Thermal insulating products for building applications - Determination of compressive creep*

EN 12085, *Thermal insulating products for building applications - Determination of linear dimensions of test specimens*

EN 13941-1, *District heating pipes - Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks - Part 1: Design*

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

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

EN 60811-406:2012, *Electric and optical fibre cables - Test methods for non-metallic materials - Part 406: Miscellaneous tests - Resistance to stress cracking of polyethylene and polypropylene compounds*

EN ISO 845, *Cellular plastics and rubbers - Determination of apparent density (ISO 845)*

EN ISO 3127, *Thermoplastics pipes - Determination of resistance to external blows - Round-the-clock method (ISO 3127)*

EN ISO 9967, *Thermoplastics pipes - Determination of creep ratio (ISO 9967)*

EN ISO 9969, *Thermoplastics pipes - Determination of ring stiffness (ISO 9969)*



EN ISO 11357-6, *Plastics - Differential scanning calorimetry (DSC) - Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO 11357-6)*

EN ISO 16871, *Plastics piping and ducting systems - Plastics pipes and fittings - Method for exposure to direct (natural) weathering (ISO 16871)*

ISO 6964, *Polyolefin pipes and fittings — Determination of carbon black content by calcination and pyrolysis — Test method*

ISO 16770, *Plastics — Determination of environmental stress cracking (ESC) of polyethylene — Full-notch creep test (FNCT)*

### 3 Terms and definitions and symbols

#### 3.1 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>

#### 3.2 Symbols, indices and abbreviations

For the purposes of this document, the following symbols in Table 1, indices in Table 2 and abbreviations in Table 3 apply.

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Table 1 — Symbols

Symbol	Description	Unit
$A$	projected area of the service pipe (length * width)	mm <sup>2</sup>
$d_1$	inner diameter of the service pipe	mm
$D$	actual diameter of casing, measured with measuring tape	mm
$De$	deviation of service pipe	%
$D_{\min}$	minimum casing diameter, measured with calliper	mm
$D_{\max}$	maximal casing diameter, measured with calliper	mm
$d_{1,p}$	inner diameter of the service pipe at the peak of a corrugation	mm
$d_{1,t}$	inner diameter of the service pipe at the trough of a corrugation	mm
$d_2$	outer diameter of the service pipe	mm
$d_{2,p}$	outer diameter of the service pipe at the peak of a corrugation	mm
$d_{2,t}$	outer diameter of the service pipe at the trough of a corrugation	mm
$d_3$	inner diameter of the casing	mm
$d_{3,p}$	inner diameter of the casing at the peak of a corrugation	mm
$d_{3,t}$	inner diameter of the casing at the trough of a corrugation	mm
$d_4$	outer diameter of the casing	mm
$d_{4,p}$	outer diameter of the casing at the peak of a corrugation	mm
$d_{4,t}$	outer diameter of the casing at the trough of a corrugation	mm
$F$	force	N
$f_a$	ageing factor	/
$f_m$	moisture factor	/
$F_{\text{weight}}$	force resulting from weight in N	N
$g$	acceleration due to gravity	m/s <sup>2</sup>
$L$	length of the test specimen	m
$M$	mass of the service pipe including the water inside	kg
$O$	ovality	%
$P_{\text{test}}$	area related test load	MPa

Symbol	Description	Unit
$P_{\text{weight}}$	area related load on the cross section of the test specimen of the thermal insulation material	MPa
$q$	heat flow rate	W/m
$r$	bending radius in the axis of the pipe	mm
$R$	radial thermal resistance	m·K/W
$R_r$	radial thermal resistance of the return pipe	m·K/W
$s$	thickness	mm
$s_{\text{STB}}$	thickness of test specimen after load testing and temperature testing	mm
$t$	thickness of the casing	mm
$\lambda_{50}$	thermal conductivity of the thermal insulation at 50 °C	W/(m·K)
$\lambda_c$	thermal conductivity of the casing	W/(m·K)
$\lambda_{\text{design}}$	calculation value of the thermal conductivity of the thermal insulation material	W/(m·K)
$\lambda_1$	thermal conductivity of the thermal insulation	W/(m·K)
$\lambda_s$	thermal conductivity of the soil	W/(m·K)
$\lambda_{\text{SP}}$	thermal conductivity of the service pipe	W/(m·K)
$\vartheta_1$	temperature at the inner diameter of the service pipe	K
$\vartheta_{1,f}$	temperature at the inner diameter of the service flow pipe	K
$\vartheta_{1,r}$	temperature at the inner diameter of the service return pipe	K
$\vartheta_2$	temperature at the outer diameter of the service pipe	K
$\vartheta_3$	temperature at the inner diameter of the casing	K
$\vartheta_4$	temperature at the outer diameter of the casing	K
$\vartheta_f$	flow temperature	K
$\vartheta_{i,\text{mean}}$	mean temperature of the thermal insulation	K
$\vartheta_r$	return temperature	K
$\Sigma$	Compression of the thermal insulation	%

Table 2 — Indices

Symbol	Definition
1	position at the inner diameter of the service pipe
2	position at the outer diameter of the service pipe
3	position at the inner diameter of the casing
4	position at the outer diameter of the casing
50	at 50 °C
a	ageing
amb	ambient
ax	axial
C	casing or casing pipe
cor	corrective
design	design
f	flow
I	thermal insulation
mean	mean
min	minutes
p	peak of a corrugation
r	return
S	service pipe
soil	soil
steel	steel
t	trough of a corrugation
test	test
weight	weight
x	placeholder for 1,2,3 or 4
$\vartheta_{av}$	average temperature