SLOVENSKI STANDARD
oSIST prEN 17878-1:2022

01-september-2022

Cevi za daljinsko ogrevanje - Tovarniško izdelani gibki cevni sistemi z nižjim temperaturnim profilom - 1. del: Klasifikacija, splošne zahteve in preskusne metode

District heating pipes - Factory made flexible pipe systems with a lower temperature profile - Part 1: Classification, general requirements and test methods

Fernwärmerohre - Flexible Rohrsysteme mit einem niedrigeren Temperaturprofil - Teil 1: Klassifikation, allgemeine Anforderungen und Prüfungen

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

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Ta slovenski standard je istoveten z: **prEN 17878-1**

ICS:

23.040.07	Cevovodi za daljinsko ogrevanje in njihovi deli	Pipeline and its parts for district heat
23.040.20	Cevi iz polimernih materialov	Plastics pipes

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 17878-1

July 2022

ICS 23.040.07

English Version

District heating pipes - Factory made flexible pipe systems with a lower temperature profile - Part 1: Classification, general 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.

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Ref. No. prEN 17878-1:2022 E

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European foreword

This document (prEN 17878-1:2022) 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 document is currently submitted to the CEN enquiry.

This document is read in conjunction with prEN 17878-2:2022 and prEN 17878-3:2022.

This document is part of the standard series EN 17878, *District heating pipes — Factory made flexible pipe systems with a lower temperature profile*:

— 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*.

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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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1 Scope

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

This document is applicable to a maximum operating temperature of 80 °C and a maximum operating design pressure up to 1,0 MPa.

The pipe systems are designed for a service life of at least 50 years. For pipe systems with plastic service pipes. The respective temperature profiles are specified in prEN 17878-2:2022 and prEN 17878-3:2022.

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*

prEN 17878-2:2022, *District heating pipes - Flexible pipe systems with a lower temperature profile - Part 2: Bonded system with plastic service pipes; requirements and test methods*

prEN 17878-3:2022, *District heating pipes - Flexible pipe systems with a lower temperature profile - Part 3: Non bonded system with plastic service pipes; requirements and test methods*

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)*

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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, 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 http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

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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^2
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

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Symbol	Description	Unit
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_{weight}	force resulting from weight	N
g	acceleration due to gravity	m/s^2
L	length of the test specimen	m
M	mass of the service pipe including the water inside	kg
O	ovality	%
P_{test}	area related test load	MPa
P_{weight}	area related load on the cross section of the test specimen of the thermal insulation material	MPa
$\dot{Q}$	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_{STB}	thickness of test specimen after load testing and temperature testing	mm
t	thickness of the casing	mm
λ_{50}	thermal conductivity of the thermal insulation at 50 °C	W/(m·K)
λ_C	thermal conductivity of the casing	W/(m·K)

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Symbol	Description	Unit
λ_{design}	calculation value of the thermal conductivity of the thermal insulation material	W/(m·K)
λ_I	thermal conductivity of the thermal insulation	W/(m·K)
λ_{soil}	thermal conductivity of the soil	W/(m·K)
λ_S	thermal conductivity of the service pipe	W/(m·K)
ϑ_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
ϑ_2	temperature at the outer diameter of the service pipe	K
ϑ_3	temperature at the inner diameter of the casing	K
ϑ_4	temperature at the outer diameter of the casing	K
ϑ_f	flow temperature	K
$\vartheta_{i,mean}$	mean temperature of the thermal insulation	K
ϑ_r	return temperature	K
Σ	compression of the thermal insulation	%

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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
ϑ_{av}	average temperature

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