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**Cevi za daljinsko ogrevanje - Tovarniško izdelani gibki cevni sistemi z nižjim temperaturnim profilom - 3. del: Nevezani cevni sistemi iz polimernih materialov - Zahteve in preskusne metode**

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

Fernwärmerohre - Werkmäßig gedämmte flexible Rohrsysteme mit einem niedrigeren Temperaturprofil - Teil 3: Nicht-Verbund-Rohrsysteme mit Mediumrohren aus Kunststoff; Anforderungen und Prüfungen

Tuyaux de chauffage urbain - Système de tuyaux flexibles préisolés - Partie 3: Système non bloqué avec tubes de service en plastique, exigences et méthodes d'essai

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

Tuyaux de chauffage urbain - Système de tuyaux flexibles préisolés - Partie 3: Système non bloqué avec tubes de service en plastique, exigences et méthodes d'essai

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

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## European foreword

This document (prEN 17878-3:2022) 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 will be a new standard under the group of standards within Factory made flexible pipe

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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**prEN 17878-3:2022 (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 pipes systems with plastic service pipes and no bonding between the layers of the pipe assemblies.

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 maximum operating temperature of 80 °C and maximum operating design pressure up to 1,0 MPa for a design service life of at least 50 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 485-2, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 2: Mechanical properties*

EN 489-1, *District heating pipes - Bonded single and twin pipe systems for buried hot water networks - Part 1: Joint casing assemblies and thermal insulation for hot water networks in accordance with EN 13941-1*

EN 573-3, *Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products*

EN 10025-2, *Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10025-3, *Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*

EN 10025-4, *Hot rolled products of structural steels - Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*

EN 10216-1, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties*

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 10216-3, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes*

EN 10217-1, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room 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*

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EN 10217-3, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low temperature properties*

prEN 17878-1:2022, *District heating pipes — Factory made flexible pipe systems with a lower temperature profile — Part 1: Classification, general requirements and test methods*

EN ISO 15875 (all parts), *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) (ISO 15875)*

EN ISO 15876 (all parts), *Plastics piping systems for hot and cold water installations — Polybutylene (PB) (ISO 15876)*

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

EN ISO 21003 (all parts), *Multilayer piping systems for hot and cold water installations inside buildings (ISO 21003-1)*

EN ISO 22391 (all parts), *Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) (ISO 22391)*

ISO 17455, *Plastics piping systems — Multilayer pipes — Determination of the oxygen permeability of the barrier pipe*

### 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/92fbf65b-001d-439c-9f92-366dc6d16ada/osist-pren-17878-3-2022>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

## 4 Classification

### 4.1 Operating temperatures and service life

Pipe systems according to this document are designed for a service life of at least 30 years when operated with the following temperature profile DH 2 according to Table 1:

**Table 1 — Temperature profile DH 2**

	Temperature °C	Duration
Operating Temperature ( $T_{op}$ )	70	29 Years
Maximum operating temperature ( $T_{max}$ )	80	1 year
Malfunction temperature ( $T_{mal}$ )	95	100 h



NOTE Temperature profile DH 2 is equal to Application profile 2 according to ISO 10508.

Other temperature/time profiles may be applied in accordance with EN ISO 13760 (Miner's Rule). Further information is given in Annex A.

The maximum operating temperature shall not exceed 80 °C.

#### 4.2 Design pressures

Pipe systems according to this document are designed for continuous operating pressures of 0,6 MPa, 0,8 MPa or 1,0 MPa.

Table 2 specifies maximum SDR ratios of the service pipe required to withstand the operating pressures.

**Table 2 — SDR ratios required for different design pressures**

	Design Pressure		
	0,6 MPa	0,8 MPa	1,0 MPa
Service pipe	0,6 MPa	0,8 MPa	1,0 MPa
PE-RT Type II	SDR 11	SDR 9	SDR 7,4
PE-X	SDR 11	SDR 9	SDR 7,4
PB-H	SDR 13,6 <sup>a</sup>	SDR 13,6	SDR 11
Multilayer M pipes	The construction shall meet the design pressure 0,6 MPa, 0,8 MPa or 1,0 MPa, as applicable, when tested according to EN ISO 21003-2		
<sup>a</sup> calculated value is SDR 17, but practical use requires SDR 13,6.			

NOTE 1 The SDR ratios in Table 2 are based on the reference lines given in EN ISO 22391-1, EN ISO 15875-1 and EN ISO 15876-1, respectively.

The following minimum safety factors for design stress shall be applied (Table 3):

**Table 3 — Safety factors for design stress**

Temperature	Safety factor	Temperature range °C
Operating Temperature ( $T_{op}$ )	1,5	≤ 70
Maximum operating temperature ( $T_{max}$ )	1,3	> 70 to ≤ 80
Malfunction temperature ( $T_{mal}$ )	1,0	> 80 to ≤ 95
The given temperature range defines the safety factors, which shall be applied for other temperature / time profiles than Table 1 calculated in accordance with Annex A.		

NOTE 2 These safety factors are identical with the overall service (design) coefficients given in EN ISO 22391-2, EN ISO 15875-2, EN ISO 15876-2 and EN ISO 21003-2, respectively.

NOTE 3 The column "Temperature range" of Table 3 shows the temperature ranges in which the relevant safety factors are applied. This is of particular importance for the temperature profiles of Annex A, or for further customized temperature profiles.

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### 5 Requirements

#### 5.1 General requirements

In addition to the general requirements specified in prEN 17878-1:2022 the following product specific requirements shall apply.

#### 5.2 Service pipes, fittings and their connections

##### 5.2.1 Quality of service pipes, fittings and their connections

Service pipes, fittings and their connections shall comply with one of the following standard series, as applicable: EN ISO 22391 series or EN ISO 15875 series or EN ISO 15876 series or EN ISO 21003 series. The respective details to comply with are as follows:

- EN ISO 22391-1, EN ISO 22391-2, EN ISO 22391-3, EN ISO 22391-5, for service pipes made of Polyethylene raised temperature (PE-RT Type II).

The EN ISO 22391 standards series consisting of part 1, 2, 3 and 5 is a piping system standard. EN ISO 22391-1 is of general importance. Pipes conforming to EN ISO 22391-2 are intended to be joined with fittings conforming to EN ISO 22391-3, whereby the connection conforms to the requirements of EN ISO 15875-5. prEN 17878 shall only be used in conjunction with all these parts of EN ISO 22391.

NOTE 1 The test results obtained from a specific piping system test according EN ISO 22391-5 cannot be transferred to other combinations of pipes and fittings.

All requirements of the pipe and fitting according to EN ISO 22391-2 and EN ISO 22391-3 shall be met before leaving the production site.

- Deviating from EN ISO 22391-2, the following shall apply:
  - the service pipe shall be a PE-RT Type II pipe;
- Deviating from EN ISO 22391-2, the thermal stability test on service pipes shall be carried out as follows:
  - Pipes shall not fail when tested at 110 °C at a hoop stress of 2,3 N/mm<sup>2</sup> for 15 000 h;
  - Alternatively, pipes shall not fail when tested at 115 °C at a hoop stress of 2,0 N/mm<sup>2</sup> for 8 760 h;
  - In case of dispute, the result of the thermal stability test at 110 °C applies.
- EN ISO 15875-1, EN ISO 15875-2, EN ISO 15875-3, EN ISO 15875-5, for service pipes made of crosslinked polyethylene (PE-X).

The EN ISO 15875 standards series consisting of part 1, 2, 3 and 5 is a piping system standard. EN ISO 15875-1 is of general importance. Pipes conforming to EN ISO 15875-2 are intended to be joined with fittings conforming to EN ISO 15875-3, whereby the connection conforms to the requirements of EN ISO 15875-5. prEN 17878 shall only be used in conjunction with all these parts of EN ISO 15875.

NOTE 1 The test results obtained from a specific piping system test according EN ISO 15875-5 cannot be transferred to other combinations of pipes and fittings.