
Cevni sistemi iz polimernih materialov za odvodnjavanje in kanalizacijo, ki delujejo po težnostnem principu - Polipropilen z mineralnimi modifikatorji (PP-MD) - 1. del: Specifikacije za cevi, fiteinge in cevni sistem

Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene with mineral modifiers (PP-MD) - Part 1: Specifications for pipes, fittings and the system

Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Polypropylen mit mineralischen Additiven (PP-MD) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Polypropylène avec modificateurs minéraux (PP-MD) - Partie 1 : Spécifications pour les tubes, les raccords et le système

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prEN 14758-1:2021 (E)**European foreword**

This document (prEN 14758-1:2021) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14758-1:2012.

EN 14758, Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene with mineral modifiers (PP-MD) consists of the following parts:

- Part 1: Specifications for pipes, fittings and the system;
- Part 2: Assessment of conformity (Technical Specification).

The main changes in comparison with the previous edition are:

- the Scope has been changed by introducing skin layer;
- updating of the Normative references;
- updating of the Terms and definition with the material definitions in prEN 14541-1 and a new definition of the skin;
- the Material clause has been modified by specifying the PP compound used in the skin and defining a minimum content of mineral modifier;
- the maximum thickness of each skin has been introduced;
- the Ring stiffness class SN16 for pipes and fittings has been introduced;
- two alternatives for inside diameter of sockets has been introduced – normal and close tolerance (CT);
- the water tightness test of fabricated fittings has been introduced has been introduced;
- Annex A Utilization of non-virgin PE materials has been modified to be in line with prCEN/TS 14541-2;
- a new informative Annex D for testing of PP recyclates with the CRB-method has been added.

System Standards are based on the results of the work undertaken in ISO/TC 138 “Plastics pipes, fittings and valves for the transport of fluids”, which is a Technical Committee of the International Organization for Standardization (ISO).

They are supported by separate standards on test methods to which references are made throughout the System Standard.

The System Standards are consistent with general standards on functional requirements and on recommended practice for installation.

1 Scope

This document specifies the requirements for solid-wall pipes and fittings with or without internal and/or external skin, and the system of piping systems made from mineral modified polypropylene materials (PP-MD) in the field of non-pressure underground drainage and sewerage outside the building structure (application area code "U"), and non-pressure underground drainage and sewerage for both buried in ground within the building structure (application area code "D") and outside the building structure.

NOTE 1 The skins are made of PP compound without mineral modifier.

This is reflected in the marking of products by "U" and "UD".

It also specifies the test parameters for the test methods referred to in this document.

This document covers a range of nominal sizes, a range of pipe series/stiffness classes and gives recommendations concerning colours.

NOTE 2 It is the responsibility of the purchaser or specifier to make the appropriate selection from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

In conjunction with Part 2 of EN 14758 (see Foreword) it is applicable to PP-MD pipes and fittings, their elastomeric sealing ring joints and to joints with components of other plastics and non-plastics materials intended to be used for buried piping systems for non-pressure underground drainage and sewerage.

This document is applicable to PP-MD pipes with or without an integral socket.

NOTE 3 The fittings can be manufactured by injection-moulding or be fabricated from pipes and/or mouldings.

NOTE 4 Requirements and limiting values for application area code "D" are given in Table 4, Table 7 and Table 13.

NOTE 5 Pipes, fittings and other components conforming to any of the plastics product standards listed in Annex B can be used with pipes and fittings conforming to this document, when they conform to the requirements for joint dimensions given in Clause 6 and to the requirements of Table 13.

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 681-1, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber of part*

EN 681-2, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

EN 12099, *Plastics piping systems — Polyethylene piping materials and components — Determination of volatile content*

EN ISO 472, *Plastics — Vocabulary (ISO 472)*

EN ISO 580:2005, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating (ISO 580:2005)*

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EN ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

EN ISO 1133-1, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133-1)*

EN ISO 1167 (all parts), *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure*

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1)*

EN ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method (ISO 1183-2)*

EN ISO 2505:2005, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters (ISO 2505:2005)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126)*

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

EN ISO 3451-1, *Plastics — Determination of ash — Part 1: General methods (ISO 3451-1)*

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

EN ISO 11173, *Thermoplastics pipes — Determination of resistance to external blows — Staircase method (ISO 11173)*

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 13254, *Thermoplastics piping systems for non-pressure applications — Test method for watertightness (ISO 13254)*

EN ISO 13257:2018, *Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling (ISO 13257:2018)*

EN ISO 13259:2020, *Thermoplastics piping systems for underground non-pressure applications — Test method for leaktightness of elastomeric sealing ring type joints (ISO 13259:2020)*

EN ISO 13263, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for impact strength (ISO 13263)*

EN ISO 13264, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings (ISO 13264)*

EN ISO 13967, *Thermoplastics fittings — Determination of ring stiffness (ISO 13967)*

EN ISO 13968, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of ring flexibility (ISO 13968)*

CEN/TS 17627, *Plastics — Recycled plastics — Determination of solid contaminants content*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472, EN ISO 1043-1 and the following 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>

3.1

application area code

code used in the marking of pipes and fittings to indicate the application area for which they are intended, as follows:

- U: code for the area more than 1 m from the building to which the buried piping system is connected;
- D: code for the area under and within 1 m from the building where the pipes and the fittings are buried in ground and are connected to the soil and waste discharge system of the building.

Note 1 to entry: In code D application areas, the existence of hot water discharge in addition to the external forces from the surroundings is usual.

Note 2 to entry: Components intended for use for both code U and code D application areas are marked UD.

Note 3 to entry: Other application area codes B and BD not covered by this standard are defined elsewhere, e.g. in EN 1451-1 [1].

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3.2

nominal size DN

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[2022](https://standards.iteh.ai/catalog/standards/sist/4891bb6d-b608-40ad-94f1-896e5a231e64/osist-pren-14758-1-2022)

numerical designation of the size of a component, which is a convenient round number approximately equal to the manufacturing dimension, in millimetres

3.3

nominal size DN/OD

nominal size, related to the outside diameter

3.4

nominal outside diameter

d_n

specified outside diameter, in millimetres, assigned to a nominal size (DN/OD)

3.5

outside diameter

d_e

value of the measurement of the outside diameter through its cross section at any point of a pipe or spigot end of a fitting, rounded up to the next greater 0,1 mm

prEN 14758-1:2021 (E)**3.6****mean outside diameter** d_{em}

value of the measurement of the outer circumference of a pipe or spigot end of a fitting in any cross section, divided by π ($\approx 3,142$), rounded to the next greater 0,1 mm

3.7**mean inside diameter of a socket** d_{sm}

arithmetical mean of a number of measurements of the inside diameter of a socket in the same cross section

3.8**wall thickness** e

value of the measurement of the wall thickness at any point around the circumference of a component

3.9**mean wall thickness** e_m

arithmetical mean of a number of measurements of the wall thickness, regularly spaced around the circumference and in the same cross section of a component, including the measured minimum and the measured maximum values of the wall thickness in that cross section

3.10**pipes series****S**

number for pipe designation

[SOURCE: ISO 4065:2018, 3.6]

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3.11**standard dimension ratio****SDR**

numerical designation of a pipe series, which is a convenient round number approximately equal to the ratio of the nominal outside diameter, d_n , and the minimum wall thickness, e_{min}

3.12**nominal ring stiffness****SN**

numerical designation of the ring stiffness of a pipe or fitting, which is a convenient round number, relative to the determined stiffness in kilo Newtons per square metre (kN/m^2), indicating the minimum ring stiffness of a pipe or fitting

3.13**design length** Z

length of a fitting (e.g. the main pipe of a branch) excluding any spigot or socket length. In case of a change in direction (e.g. in case of a bend or the service pipe of a branch), it is the length from one end to the intersection of the straight axis of this end with the straight axis of the other end of the fitting, excluding any spigot or socket length (see the dimensions Z_1 and Z_2 in e.g. Figures 7 and 11)

3.14**virgin material**

plastics material in the form of pellets, granules, powder, floc, etc. that has not been subjected to use or processing other than required for its initial manufacture

Note 1 to entry: Does not contain any reworked plastics material and/or plastics recycle.

Note 2 to entry: Sometimes also referred to as “primary material” or “primary plastics feedstock”.

Note 3 to entry: It is understood that the addition of additives such as stabilizers and pigments is still resulting into a virgin (plastics) material.

[SOURCE: ISO 472:2013, 2.1231, modified - Notes 1 to entry, Note 2 to entry and Note 3 to entry added]

3.15**mineral modified material****PP-MD**

material to which has been added minerals during specific processing operation(s) which during such processing is well distributed in the material

3.16**mean particle size****D50**

diameter which 50 % by mass of the particles of a mineral modifier is smaller than

3.17**particle top cut****D98**

diameter which 98 % by mass of the particles of a mineral modifier is smaller than

3.18**reworked material**

plastics material from rejected unused products or trimmings capable of being reclaimed within the same process that generated it

Note 1 to entry: Reworked material does not change the status of the feedstock.

Note 2 to entry: This definition does not cover the conditions for the use of reworked material, which can be found in the applicable product standard.

Note 3 to entry: Previously referred to as “own reprocessed material”.

3.19**pre-consumer material**

plastics material diverted from the waste stream during a manufacturing process, excluding reworked (plastics) material

Note 1 to entry: Previously referred to as “post-industrial material”.

Note 2 to entry: Different categories of pre-consumer material may be considered in the applicable product standard.

[SOURCE ISO 14021:2016, 7.8.1.1, modified – ‘plastics’ added, text deleted after ‘rework’ and 2 notes to entry introduced]

prEN 14758-1:2021 (E)**3.20****post-consumer material**

plastics material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose

Note 1 to entry: This includes returns of material from the distribution chain.

Note 2 to entry: Different categories of post-consumer material may be considered in the applicable product standard.

[SOURCE ISO 14021:2016, 7.8.1.1, modified – ‘plastics’ added, last sentence changed into Note 1 to entry and Note 2 to entry introduced]

3.21**recyclate**

plastics material resulting from the recycling of pre-consumer and post-consumer plastics products

Note 1 to entry: Also referred to as “secondary raw material” or “recycled plastics” or “regenerate”.

Note 2 to entry: Recycling can be chemical, physical or mechanical.

[SOURCE: ISO 472:2013, 2.1705, modified — Note 1 to entry and Note 2 to entry deleted, new Note 1 to entry and Note 2 to entry introduced and "plastic waste" changed into "pre-consumer and post-consumer plastics products"]

3.22**agreed specification**

specification of the relevant material characteristics agreed between the supplier of the recyclate and the pipe and/or fitting manufacturer

Note 1 to entry: The agreed specification is often considered in the context of certification by a third party organization.

[SOURCE: FprEN 14541:2021, 3.15]

3.23**solid wall pipe**

pipe with smooth internal and external surface with same compound/formulation throughout the wall

3.24**skin**

coating applied to the inner and/or outer side of a solid wall pipe

Note 1 to entry: A coating can be applied for example for the purpose of colour coding, video inspection and/or UV-protection.

4 Symbols and abbreviations**4.1 Symbols**

For the purposes of this document, the following symbols apply.

- A* length of engagement
- C* depth of sealing zone

d_s	inside diameter of a socket
e_2	wall thickness of a socket
e_3	wall thickness in the groove area
l	effective length of a pipe
L_1	length of spigot
M	length of spigot of a plug
R	radius of swept fittings
Z_1	design length of a fitting
Z_2	design length of a fitting
Z_3	design length of a fitting
α	nominal angle of a fitting

4.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

MFR	melt mass-flow rate
CaCO_3	calcium carbonate
MgCO_3	magnesium carbonate
$\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$	magnesium silicate
PP	polypropylene
PP-MD	mineral modified polypropylene
SDR	standard dimension ratio
SN	nominal ring stiffness
TIR	true impact rate

5 Material

5.1 PP-MD final compound

The final compound for production of pipes and fittings shall be a PP base material, with added mineral modifier(s) of known specification, additives needed to facilitate the manufacture of components, and with added non-virgin material (if applicable) conforming to the requirements of this document.

5.2 PP final compound for the skin

The final compound for production of skins shall be a PP base material, with added additives needed to facilitate the manufacture of components, and with added non-virgin material (if applicable) conforming to the requirements of this document.

5.3 Utilization of non-virgin material

For the utilization of non-virgin PP materials, conditions and requirements are given in Annex A.