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**Cevni sistemi iz polimernih materialov za odpadno vodo in kanalizacijo, ki delujejo po težnostnem principu in so položeni v zemljo - Polipropilen (PP) - 1. del: Specifikacije za cevi, fitege in sistem (vključno z dopolnilom A1)**

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

Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Polypropylen (PP) - 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 (PP) - Partie 1: Spécifications pour tubes, raccords et le système

**Ta slovenski standard je istoveten z: EN 1852-1:2018+A1:2022**

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

Systèmes de canalisations en plastique pour les  
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drucklose Abwasserkanäle und -leitungen -  
Polypropylen (PP) - Teil 1: Anforderungen an Rohre,  
Formstücke und das Rohrleitungssystem

This European Standard was approved by CEN on 20 November 2017 and includes Amendment 1 approved by CEN on 28 June 2022.

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## EN 1852-1:2018+A1:2022 (E)

## European foreword

This document (EN 1852-1:2018+A1:2022) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

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

This document includes Amendment 1 approved by CEN on 28 June 2022.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

**A1** This document supersedes EN 1852-1:2018. **A1**

The 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).

The System Standards 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.

EN 1852 consists of the following parts, under the general title *Plastics piping systems for non-pressure underground drainage and sewerage – Polypropylene (PP)*:

- *Part 1: Specifications for pipes, fittings and the system* (the present standard)
- *Part 2: Guidance for the assessment of conformity* (CEN Technical Specification)

This part of EN 1852 includes Annex A (normative) “Utilization of non-virgin PP materials”, Annex B (informative), “General characteristics of PP pipes and fittings” and Annex C (informative), “Product standards of components that can be connected to components conforming to this standard”.

Plastics piping systems made of PP with mineral modifiers (PP-MD) are covered by EN 14758-1 [1].

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, Türkiye and the United Kingdom.

## 1 Scope

This part of EN 1852 specifies the requirements for solid wall pipes with smooth internal and external surfaces extruded from the same compound/formulation throughout the wall, fittings and the system of polypropylene (PP) piping systems intended for use for:

- 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.

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

This standard covers PP materials without mineral modifiers.

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

NOTE 1 Solid wall multilayer pipes with different formulation throughout the wall and foamed core pipes are covered by EN 13476-2 [1] (see also CEN ISO/TR 27165 [2]).

This standard covers a range of nominal sizes, and pipe series 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 CEN/TS 1852-2, it is applicable to PP pipes and fittings, their 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.

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

NOTE 3 Pipes, fittings and other components conforming to any of the plastics product standards listed in Annex C can be connected to pipes and fittings conforming to this standard, when they conform to the requirements for joint dimensions given in Clause 6 and to the requirements of Table 14.

## 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*

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

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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 melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method (ISO 1133-1)*

EN ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method (ISO 1167-1)*

EN ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces (ISO 1167-2)*

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

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

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

EN ISO 9969:2016, *Thermoplastics pipes — Determination of ring stiffness (ISO 9969:2016)*

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

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

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

EN ISO 13257:2017, *Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling (ISO 13257:2010)*

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

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)*

ISO 4065:1996, *Thermoplastics pipes — Universal wall thickness table*



### 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.

#### 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: application area code for the area more than 1 m from the building to which the buried piping system is connected;

D: application area 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.

#### 3.2

##### **nominal size**

##### **DN/OD**

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

#### 3.3

##### **nominal outside diameter**

##### **$d_n$**

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

#### 3.4

##### **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

#### 3.5

##### **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  $\pi$  ( $\approx 3,142$ ), rounded to the next greater 0,1 mm

#### 3.6

##### **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

#### 3.7

##### **wall thickness**

##### **$e$**

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

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## 3.8

**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

## 3.9

**pipes series****S**

number for pipe designation (see ISO 4065:1996, 3.6)

## 3.10

**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,  $e_{min}$

## 3.11

**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 kilonewtons per square metre ( $\text{kN/m}^2$ ), indicating the minimum ring stiffness of a pipe or fitting

## 3.12

**solid wall pipe**

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

## 3.13

**virgin material**

material in a form such as granules or powder that has not been subjected to use or processing other than that required for its manufacture and to which no reprocessed or recycled material has been added

## 3.14

**own reprocessed material**

material prepared from rejected unused pipes or fittings, including trimmings from the production of pipes or fittings, that will be reprocessed in a manufacturer's plant after having been previously processed by the same manufacturer by a process such as moulding or extrusion, and for which the complete formulation is known

## 3.15

**external reprocessed material**

material comprising either one of the following forms:

- a) material from rejected unused pipes or fittings or trimmings there from, that will be reprocessed and that were originally processed by another manufacturer;
- b) material from the production of unused PP products other than pipes and fittings, regardless of where they are manufactured

**3.16****recycled material**

material comprising either one of the following forms:

- a) material from used pipes or fittings which have been cleaned and crushed or ground;
- b) material from used PP products other than pipes or fittings which have been cleaned and crushed or ground

**3.17****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

**4 Symbols and abbreviations****4.1 Symbols**

$A$  length of engagement

$C$  depth of sealing zone

$d_e$  outside diameter

$d_{em}$  mean outside diameter

$d_n$  nominal outside diameter

$d_{sm}$  mean inside diameter of a socket

$e$  wall thickness

$e_m$  mean wall thickness

$e_2$  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

$Z$  design length of (a part of) a fitting

$\alpha$  nominal angle of a fitting

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## 4.2 Abbreviations

CT	close tolerance
DN	nominal size
DN/OD	nominal size, outside diameter related
MFR	melt mass-flow rate
OIT	oxidation induction time
PP	polypropylene
S	pipes series
SDR	standard dimension ratio
SN	nominal ring stiffness
TIR	true impact rate

## 5 Material

### 5.1 PP final compound

The final compound for pipes and fittings shall be PP base material without added mineral modifiers, to which is added those additives that are needed to facilitate the manufacture of components, and with added non-virgin material (if applicable) conforming to the requirements of this standard.

NOTE PP-based materials with added mineral modifiers (PP-MD) are covered in EN 14758-1 [3].

Due to the use of additives and non-virgin material, which both can contain minerals, the maximum content of minerals in the final compound shall be  $\leq 3,0$  % by mass.

The content of the minerals (Ash residue) shall be tested in accordance with EN ISO 3451-1.

### 5.2 Utilization of non-virgin material

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

### 5.3 Melt mass-flow rate

Pipes and fittings shall be made from materials with an MFR as follows:

$MFR(230/2,16) \leq 1,5$  g/10 min.

The MFR of the base material shall be tested in accordance with EN ISO 1133-1, using the test parameters: temperature 230 °C and loading mass 2,16 kg.

Materials for pipes and fittings for butt fusion joints shall be designated by the following classes with regard to the MFR:

Class A:  $MFR \leq 0,3$  g/10 min;

Class B:  $0,3$  g/10 min <  $MFR \leq 0,6$  g/10 min;

Class C:  $0,6$  g/10 min <  $MFR \leq 0,9$  g/10 min;

Class D:  $0,9$  g/10 min <  $MFR \leq 1,5$  g/10 min.

Only pipes and fittings made from materials of the same or an adjacent MFR class may be fused together.

#### 5.4 Resistance to internal pressure

When tested in accordance with the test method as specified in Table 1, using the indicated parameters, the material shall have characteristics conforming to the requirements given in Table 1.

The material shall be tested in the form of a pipe.

**Table 1 — Material characteristics (long-term behaviour)**

Characteristic	Requirements	Test parameters		Test method
Resistance to internal pressure	No failure during the test period	End caps	Type A or type B	EN ISO 1167-1 EN ISO 1167-2
		Test temperature	80 °C	
		Orientation	free	
		Number of test pieces	3	
		Circumferential (hoop) stress	4,2 MPa	
		Conditioning period	1 h	
		Type of test	Water-in-water	
		Test period	140 h	
		End caps	Types A or B	
		Test temperature	95 °C	
		Orientation	free	
		Number of test pieces	3	
		Circumferential (hoop) stress	2,5 MPa	
		Conditioning period	1 h	
		Type of test	Water-in-water	
		Test period	1 000 h	

#### 5.5 Thermal stability (OIT)

The test shall be carried out in accordance with EN ISO 11357-6 using a test temperature of 200 °C. The oxidation induction time of the material shall not be less than 8 min.

#### 5.6 Sealing ring retaining means

Sealing rings may be retained using means made from polymers other than PP.