
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, fittinge in sistem

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 Abwasserkanäle und -leitungen - Polypropylen (PP) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem
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Systemes de canalisations en plastique pour les branchements et les collecteurs enterrés d'assainissement sans pression - Polypropylene (PP) - Partie 1: Spécifications pour les tubes, les raccords et le système

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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
branchements et les collecteurs enterrés
d'assainissement sans pression - Polypropylène
(PP) - Partie 1: Spécifications pour les tubes,
les raccords et le système

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(PP) - Teil 1: Anforderungen an Rohre,
Formstücke und das Rohrleitungssystem

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems" in liaison with CEN/TC 165 "Waste water engineering", the secretariat of which is held by NNI.

This standard is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

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.

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*
- Part 3: *Guidance for installation*

This Part of EN 1852 includes the following annexes:

- Annex A (informative): General characteristics of PP pipes and fittings
- Annex B (informative): Bibliography

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 February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

For pipes and fittings which have conformed to the relevant national standard before January 1997, as shown by the manufacturer or by a certification body, the national standard may continue to be applied until January 1999.

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According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1) This standard does not cover ancillary components. For ancillary components a separate standard is foreseen.

1 Scope

This Part of EN 1852 specifies the requirements for pipes, fittings and the system of polypropylene (PP) piping systems 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.

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 standard.

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

NOTE 1: 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 and Part 3 of EN 1852 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.

This standard is applicable to PP pipes with or without an integral socket.

NOTE 2: The fittings can be manufactured by injection-moulding or be fabricated from pipes and/or mouldings.

NOTE 3: Requirements and limiting values for application area code "D" are given in table 3, table 6 and table 12.

NOTE 4: Pipes, fittings and other components conforming to any of the plastics product standards listed in annex B may be used with 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 12.

2 Normative references

This Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 496	<i>Plastics piping and ducting systems – Plastics pipes and fittings – Measurement of dimensions and visual inspection of surfaces</i>
EN 681-1	<i>Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized rubber</i>
prEN 681-2	<i>Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications – Part 2: Thermoplastic elastomers</i>

EN 728	<i>Plastics piping and ducting systems – Polyolefin pipes and fittings – Determination of oxidation induction time</i>
EN 743	<i>Plastics piping and ducting systems – Thermoplastics pipes – Determination of the longitudinal reversion</i>
EN 744	<i>Plastics piping and ducting systems – Thermoplastics pipes – Test method for resistance to external blows by the round-the-clock method</i>
EN 763	<i>Plastics piping and ducting systems – Injection-moulded thermoplastics fittings – Test method for visually assessing effects of heating</i>
EN 921	<i>Plastics piping systems – Thermoplastics pipes – Determination of resistance to internal pressure at constant temperature</i>
EN 1055	<i>Plastics piping systems – Thermoplastics piping systems for soil and waste discharge inside buildings – Test method for resistance to elevated temperature cycling</i>
EN 1277	<i>Plastics piping systems – Thermoplastics piping systems for buried non-pressure applications – Test methods for leaktightness of elastomeric sealing ring type joints</i>
prEN 1401-1	<i>Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticized poly(vinyl chloride)(PVC-U) – Part 1: Specifications for pipes, fittings and the system</i>
EN 1411	<i>Plastics piping and ducting systems – Thermoplastics pipes – Determination of resistance to external blows by the staircase method</i>
prEN 1852-2	<i>Plastics piping systems for non-pressure underground drainage and sewerage – Polypropylene (PP) – Part 2: Guidance for the assessment of conformity</i>
prEN 1989	<i>Thermoplastics piping and ducting systems – Joints for buried non-pressure applications – Test method for long-term sealing performance of joints with thermoplastic elastomer (TPE) seals by estimating the sealing pressure</i>
EN 12061	<i>Plastics piping systems – Thermoplastics fittings – Test method for impact strength</i>
prEN 12256	<i>Plastics piping systems – Thermoplastics fittings – Test method for mechanical strength or flexibility of fabricated fittings</i>
EN ISO 9969	<i>Thermoplastics pipes – Determination of ring stiffness</i>
ISO 472:1988	<i>Plastics – Vocabulary</i>
ISO 1043-1:1997	<i>Plastics – Symbols – Part 1: Basic polymers and their special characteristics</i>
ISO 1133:1992	<i>Plastics – Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics</i>
ISO 4440-1:1994	<i>Thermoplastics pipes and fittings – Determination of melt mass-flow rate – Part 1: Test method</i>
ISO 4440-2:1994	<i>Thermoplastics pipes and fittings – Determination of melt mass-flow rate – Part 2: Test conditions</i>

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of this standard, the following definitions and those given in ISO 472:1988 and ISO 1043-1:1997 apply.

3.1.1 application area code: A 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: In code D application areas, the existence of hot water discharge in addition to the external forces from the surroundings is usual.

3.1.2 Geometrical definitions

3.1.2.1 nominal size (DN): A numerical designation of the size of a component, which is a convenient round number approximately equal to the manufacturing dimension, in millimetres.

3.1.2.2 nominal size (DN/OD): Nominal size, related to the outside diameter.

3.1.2.3 nominal outside diameter (d_n): The specified outside diameter, in millimetres, assigned to a nominal size (DN/OD).

3.1.2.4 outside diameter (d_e): The 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.

3.1.2.5 mean outside diameter (d_{em}): The 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.

3.1.2.6 mean inside diameter of a socket (d_{sm}): The arithmetical mean of a number of measurements of the inside diameter of a socket in the same cross section.

3.1.2.7 wall thickness (e): The value of the measurement of the wall thickness at any point around the circumference of a component.

3.1.2.8 mean wall thickness (e_m): The 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.

3.1.2.9 pipes series S: A number for pipe designation (see ISO 4065:1996).

3.1.2.10 standard dimension ratio (SDR): A 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} .

3.1.2.11 nominal ring stiffness (SN): A 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 (kN/m^2), indicating the minimum ring stiffness of a pipe or fitting.

3.1.2.12 design length (Z): The 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).

3.1.3 Material definitions

3.1.3.1 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 reprocessable or recyclable material has been added.

3.1.3.2 own reprocessable 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.

3.1.3.3 external reprocessable material: Material comprising either one of the following forms:

- a) material from rejected unused pipes or fittings or trimmings therefrom, 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.

3.1.3.4 recyclable 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.

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3.2 Symbols

A	: length of engagement
C	: depth of sealing zone
DN	: nominal size
DN/OD	: nominal size, outside diameter related
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

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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
α	: nominal angle of a fitting

3.3 Abbreviations

CT	: close tolerance
MFR	: melt mass-flow rate
OIT	: oxidation induction time
PP	: polypropylene
SDR	: standard dimension ratio
SN	: nominal ring stiffness
TIR	: true impact rate

4 Material

4.1 PP compound

The compound for pipes and fittings shall be PP base material to which are added those additives that are needed to facilitate the manufacture of components conforming to the requirements of this standard.

4.2 Reprocessable and recyclable material

In addition to virgin material the use of the manufacturer's own reprocessible material obtained during the production and testing of products conforming to this standard is permitted. External reprocessible or recyclable material shall not be used.

4.3 Melt mass-flow rate

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

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

The MFR of the base material shall be tested in accordance with ISO 1133:1992, condition 12 (temperature: 230 °C; 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.

4.4 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	types a or b	EN 921
		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	≥ 1000 h	

4.5 Thermal stability (OIT)

When tested in accordance with EN 728 using a test temperature of 200 °C, the oxidation induction time of the material used for pipe or fittings shall not be less than 8 min.

4.6 Sealing ring retaining means

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

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5 General characteristics

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5.1 Appearance

When viewed without magnification, the following requirements apply.

The internal and external surfaces of pipes and fittings shall be smooth, clean and free from grooving, blistering, impurities and pores and any other surface irregularity likely to prevent their conformity to this standard.

Pipe ends shall be cleanly cut and the ends of pipes and fittings shall be square to their axis.

5.2 Colour

The pipes and fittings shall be coloured through the wall.

The colour should preferably be black, orange-brown (approximately RAL 8023)¹⁾ or dusty grey (approximately RAL 7037)¹⁾. Other colours may be used.

6 Geometrical characteristics

6.1 General

Dimensions shall be measured in accordance with prEN 496.

NOTE: The figures are schematic sketches only, to indicate the relevant dimensions. They do not necessarily represent the manufactured components.

6.2 Dimensions of pipes

6.2.1 Outside diameters

The mean outside diameter, d_{em} , shall conform to table 2.

Table 2: Mean outside diameters

Dimensions in millimetres			
Nominal size DN/OD	Nominal outside diameter d_n	Mean outside diameter ¹⁾	
		$d_{em,min}$	$d_{em,max}$
110	110	110,0	110,4
125	125	125,0	125,4
160	160	160,0	160,5
200	200	200,0	200,6
250	250	250,0	250,8
315	315	315,0	316,0
355	355	355,0	358,2
400	400	400,0	403,6
450	450	450,0	454,1
500	500	500,0	504,5
630	630	630,0	635,7
800	800	800,0	807,2
1000	1000	1000,0	1009,0
1200	1200	1200,0	1210,0
1400	1400	1400,0	1410,0
1600	1600	1600,0	1610,0

1) The tolerances for mean outside diameters up to and including 315 mm conform to ISO 11922-1:1997, grade C.
The tolerances for mean outside diameters greater than 315 mm conform to ISO 11922-1:1997, grade A.

1) See colour register RAL 840-HR.