SLOVENSKI STANDARD
SIST EN 12666-1:2006+A1:2011

01-december-2011

Cevni sistemi iz polimernih materialov za odpadno vodo in kanalizacijo, ki delujejo po težnostnem principu in so položeni v zemljo - Polietilen (PE) - 1. del: Specifikacije za cevi, fitinge in sistem

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

Kunststoff-Rohrleitungssysteme für erdverlegte Abwasserkanäle und -leitungen - Polyethylen (PE) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

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Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement sans pression enterrés - Polyéthylène (PE) - Partie 1: Spécifications pour les tubes, les raccords et le système

Ta slovenski standard je istoveten z: EN 12666-1:2005+A1:2011

ICS:

23.040.01	Deli cevovodov in cevovodi na splošno	Pipeline components and pipelines in general
91.140.80	Drenažni sistemi	Drainage systems
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

SIST EN 12666-1:2006+A1:2011 en,fr,de

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 12666-1:2005+A1

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English Version

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

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement sans pression enterrés - Polyéthylène (PE) - Partie 1: Spécifications pour les tubes, les raccords et le système

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This European Standard was approved by CEN on 24 November 2005 and includes Amendment 1 approved by CEN on 15 July 2011.

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Foreword

This document (EN 12666-1:2005+A1:2011) 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 February 2012, and conflicting national standards shall be withdrawn at the latest by February 2012.

This document includes Amendment 1, approved by CEN on 2011-07-15.

This document supersedes EN 12666-1:2005.

〉A1〈 The main changes in the revised document are:

— relevant test methods are changed from EN to ISO versions;

— two new dimensions, 560 mm and 710 mm are introduced;

— a new ring stiffness class SN 16 is introduced;

— updating of the references in Clause 2;

— introduction of S-series in 3.3;

— introduction of S-series, a new footnote a) and a new NOTE in Table 3;

— introduction of a new watertightness test for fabricated fittings;

— deletion of Long Term Performance of TPE seals – Table 12 and 10.3;

— corrections of misprints in Tables 13 and 14 Marking of pipes and fittings;

— introduction of a new informative Annex B Product standards of components that can be connected to components conforming to this European Standard;

— updating and modification of the Bibliography. 〈A1〉

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

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

This European 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 12666 consists of the following parts, under the general title *Plastics piping systems for non-pressure underground drainage and sewerage - Polyethylene (PE)*

— *Part 1: Specifications for pipes, fittings and the system (this European Standard)*

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— [A1] *Part 2: Guidance for the assessment of conformity (CEN Technical Specification)* [A1]

— [A1] *deleted text* [A1]

[A1] *deleted text* [A1]

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This Part of EN 12666 specifies the requirements for pipes, fittings and the system of polyethylene (PE) piping systems intended to be used 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 the 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 European Standard.

This European 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 CEN/TS 12666-2 [1] it is applicable to PE 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 drainage and sewerage.

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This European Standard is applicable to PE pipes with or without an integral socket.

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

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This European Standard is applicable to PE pipes and fittings for the following types of joints:

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— elastomeric ring seal joints;

— butt fused joints;

— electrofusion joints;

— mechanical joints.

NOTE 2 Requirements and limiting values for application area code "D" are given in Tables 3, 6 and Table 12.

NOTE 3 Pipes, fittings and other components conforming to any of the plastics product standards listed in the bibliography may be used with pipes and fittings conforming to this European Standard, provided they conform to the requirements for joint dimensions given in Clause 6 and to the requirements of Table 8 and Table 12.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. 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*

〖A1〗 *deleted text* 〖A1〗

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EN 1401-1, *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*

EN 1519-1:1999, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Polyethylene (PE) — Part 1: Specifications for pipes, fittings and the system*

〈A1〉 *deleted text* 〈A1〉

〈A1〉 CEN/TS 14541:2007, *Plastics pipes and fittings for non-pressure applications — Utilisation of non-virgin PVC-U, PP and PE materials* 〈A1〉

EN ISO 472:2001, *Plastics — Vocabulary (ISO 472:1999)*

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

EN ISO 1043-1:2005, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1:2005)*

EN ISO 1133:2005, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:2005)*

〈A1〉 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 1167-1:2006)* 〈A1〉

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

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EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126:2005)*

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EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pyknometer method and titration method (ISO 1183-1:2004)*

〈A1〉 EN ISO 9969:2007 〈A1〉, *Thermoplastics pipes — Determination of ring stiffness (〈A1〉 ISO 9969:2007 〈A1〉)*

〈A1〉 ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation temperature (dynamic OIT)*

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

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

ISO 13259, *Thermoplastics piping systems for non-pressure applications — Test method for leaktightness for elastomeric sealing ring type joints*

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

ISO 13264, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings* 〈A1〉

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3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 472:2001, EN ISO 1043-1:2001 and the following apply.

3.1.1
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 one meter from the building to which the buried piping system is connected;

— D: code for the area under and within one metre from the building where the pipes and the fittings are buried in the 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 surroundings is usual.

3.1.2 Geometrical definitions

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

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3.1.2.2
nominal size DN/OD
nominal size, related to the outside diameter

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3.1.2.3
nominal outside diameter
d_n
specified outside diameter, in millimetres, assigned to a nominal size DN/OD

3.1.2.4
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

3.1.2.5
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 π ($\approx$ 3,142), rounded up to the next greater 0,1 mm

3.1.2.6
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

3.1.2.7
wall thickness
e
value of the measurement of the wall thickness at any point around the circumference of a component

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3.1.2.8
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

3.1.2.9
pipe series S
number for pipe designation (conforming to ISO 4065:1996 [2])

3.1.2.10
standard dimension ratio (SDR)
numerical designation of a pipe series, which is a convenient round number approximately equal to the dimension ratio of the nominal outside diameter, d_n and the nominal wall thickness, e_n

3.1.3 Mechanical definitions

3.1.3.1
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 (kN/m^2), indicating the minimum ring stiffness of a pipe or fitting

3.1.4 Material definitions

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3.1.4.1
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

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3.1.4.2
own reprocessable material
material prepared from rejected unused pipes and fittings, including trimmings from the production of pipes and 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

3.1.4.3
external reprocessable 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 PE products other than pipes and fittings regardless of where they were manufactured

3.1.4.4
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 PE 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

d_e : outside diameter

d_{em} : mean outside diameter

d_n : nominal outside diameter

d_{sm} : mean inside diameter of a socket

e_m : mean wall thickness

e_n : nominal wall thickness

e_2 : wall thickness of a socket

e_3 : wall thickness in the groove area

l : effective length of pipe

L_1 : length of spigot

M : length of spigot of a plug

R : radius of swept fittings

Z_d : design length (Z_d-length)

α_n : nominal angle of a fitting

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3.3 Abbreviations

CT : close tolerance

DN : nominal size

DN/OD : nominal size, outside diameter related

MFR : melt mass-flow rate

OIT : oxidation induction time

PE : polyethylene

〚A1〛 S : pipe series 〚A1〛

SDR : standard dimension ratio

SN : nominal ring stiffness

4 Material

4.1 Base material

The base material shall be polyethylene (PE) to which are added those additives that are needed to facilitate the manufacture of pipes and fittings conforming to this European Standard.

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The reference density of the base material (resin) shall be at least 930 kg/m^3 when determined according to EN ISO 1183-1.

4.2 Reprocessable and recyclable material

In addition to virgin material the use of the manufacturer's own reprocessable material obtained during the production and testing of products conforming to this European Standard is permitted.

External reprocessable material and recyclable material of pipes and fittings is permitted [A1] according to the rules in CEN/TS 14541 [A1] provided it originates from products in accordance with this European Standard or EN 1519, EN 12201 [3], EN 13244 [4] and EN 1555 [5] or national standards replaced by these European Standards.

4.3 Melt mass-flow rate

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

0,2 g/10 min ≤ MFR (190/5) ≤ 1,4 g/10 min

[A1] The MFR of the base material shall be tested in accordance with EN ISO 1133, using the test parameters: temperature 190 °C and loading mass 5 kg. [A1]

4.4 Resistance to internal pressure (long-term behaviour)

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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.

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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 Test temperature Orientation Number of test pieces Circumferential (hoop) stress Conditioning period Type of test Test period	Type a) or b) 80 °C Free 3 4,0 MPa 1 h Water-in-water 165 h	[A1] EN ISO 1167-1 [A1]
Resistance to internal pressure	No failure during the test period	End caps Test temperature Orientation Number of test pieces Circumferential (hoop) stress Conditioning period Type of test Test period	Type a) or b) 80 °C Free 3 2,8 MPa 1 h Water-in-water 1 000 h	[A1] EN ISO 1167-1 [A1]

4.5 Thermal stability (OIT)

When tested in accordance with [A1] ISO 11357-6 [A1] using a test temperature of 200 °C, the oxidation induction time of the material used for pipes or fittings shall not be less than 20 min.