



# SLOVENSKI STANDARD SIST EN 13476-1:2007

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Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: General requirements and performance characteristics

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Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Rohrleitungssysteme mit profilierte Wandung aus weichmacherfreiem Polyvinylchlorid (PVC-U), Polypropylen (PP) und Polyethylen (PE) - Teil 1: Allgemeine Anforderungen und Leistungsmerkmale

Systemes de canalisations en plastique pour les branchements et les collecteurs d'assainissements sans pression enterrés - Systemes de canalisation a parois structurées en poly(chlorure de vinyle) non plastifié (PVC-U), polypropylene (PP) et polyéthylene (PE) - Partie 1: Exigences générales et caractéristiques de performance

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Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: General requirements and performance characteristics

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## Foreword

This document (EN 13476-1:2007) 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of an identical text or by endorsement, at the latest by November 2007, and conflicting national standards shall be withdrawn at the latest by November 2007.

This standard is a part of a System Standard for plastics piping systems of particular materials for specified applications. There are a number of such System Standards.

System Standards are based on the results of the work being 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 13476 consists of the following Parts under the general title Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE):

- *Part 1: General requirements and performance characteristics (this standard);*
- *Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A;*
- *Part 3: Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B;*
- *Part 4: Assessment of conformity (CEN/TS);*
- *Part 5: Guidance for installation (CEN/TS).<sup>1</sup>*

For pipes and fittings which have conformed to the relevant national standard before May 2007, as shown by the manufacturer or by a certification body, the national standard may continue to be applied until May 2009.

National standards specifically for pipes and fittings for the transport of surface water are not considered to be conflicting with this standard and may thus be allowed to coexist.

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, 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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<sup>1</sup> The feasibility of this project is under study.

## Introduction

Due to the variety in materials, pipe constructions, application areas and classes, several combinations are possible.

The purchaser or specifier may select between these possibilities by designating the pipe and fitting he or she prefers to use for each case, as described in Annex C, Designation of pipes and corresponding fittings, taking into account any particular requirements and relevant national regulations and installation practices or codes.

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## 1 Scope

This European Standard, together with EN 13476-2 and EN 13476-3, specifies the definitions and general requirements for pipes, fittings and the system based on unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) structured-wall piping systems that are to be used for non-pressure underground drainage and sewerage systems.

This standard is applicable to:

- a) structured-wall pipes and fittings, which are to be used buried in the ground outside a building structure only; reflected by the marking of products by "U";
- b) structured-wall pipes and fittings, which are to be used buried in ground both outside (application area code "U") and within a building structure (application area code "D"); reflected in the marking of products by "UD".

In conjunction with EN 13476-2 and EN 13476-3 it is applicable to structured-wall pipes and fittings with or without an integral socket with elastomeric ring seal joints, as well as welded and fused joints.

This part specifies general aspects and gives guidance concerning a national selection of requirement levels and classes where part 2 and part 3 of this standard provide options.

EN 13476-2 and EN 13476-3 specify material characteristics, dimensions and tolerances, test methods, test parameters and requirements for pipes with smooth internal and external surfaces, Type A, and pipes with smooth internal and profiled external surfaces, Type B.

This standard, together with EN 13476-2 and EN 13476-3, covers a range of pipe and fitting sizes, materials, pipe constructions, stiffness classes and tolerance classes and offers recommendations concerning colours.

NOTE 1 It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

NOTE 2 Pipes, fittings and other components conforming to any plastic product standards referred to in clause 2 can be used with pipes and fittings conforming to this standard, when they conform to the requirements for joint dimensions given in part 2 and part 3 of this standard and to the performance requirements given in Clause 9.

NOTE 3 For dimensions larger than DN 1200 OD/ID this document may serve as general guideline regarding appearance, colour, physical and mechanical characteristics as well as performance requirements.

## 2 Normative references

The following referenced documents are indispensable for the application 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 681-4, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 4: Cast polyurethane sealing elements*

EN 13476-2:2007, *Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A*



EN 13476-3:2007, *Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 3: Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B*

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

EN ISO 1043-1:2001, *Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics (ISO 1043-1:2001)*

EN ISO 9969, *Thermoplastics pipes — Determination of ring stiffness (ISO 9969:1994)*

ISO 11922-1:1997, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO 13967, *Thermoplastics fittings — Determination of ring stiffness*

### 3 Terms and definitions, symbols and abbreviations

For the purposes of this standard, the terms and definitions given in EN ISO 472:2001, EN ISO 1043-1:2001, ISO 11922-1:1997 and the following apply.

#### 3.1 Definitions

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##### 3.1.1 General definitions

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##### 3.1.1.1

##### application area code

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code used to mark pipes and fittings to indicate the permitted application area(s) 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 fittings are buried underground and are connected to the soil and waste discharge system of the building

NOTE In the “D” application area, the existence of hot water discharge in addition to external forces from the surroundings is usual.

##### 3.1.1.2

##### structured-wall pipes and fittings

products which have an optimised design with regard to material usage to achieve the physical, mechanical and performance requirements of this standard

NOTE For a description of the particular designs covered by this standard, see clause 5 in EN 13476-2:2007 and EN 13476-3:2007.

##### 3.1.1.3

##### fabricated fitting

fitting manufactured by heat forming and/or joining more than one piece of pipe and/or moulded component

NOTE Sealed ring retaining components are not considered as a piece.

### 3.1.2 Geometrical definitions

#### 3.1.2.1

##### **nominal size, DN**

numerical designation of the size of a component, other than a component designated by thread size, which is approximately equal to the manufacturing dimension in mm

#### 3.1.2.2

##### **nominal size, DN/OD**

nominal size, related to the outside diameter

#### 3.1.2.3

##### **nominal size, DN/ID**

nominal size, related to the inside diameter

#### 3.1.2.4

##### **nominal diameter**

$d_n$

specified diameter, in mm, assigned to a nominal size (DN/OD or DN/ID)

#### 3.1.2.5

##### **outside diameter**

$d_e$

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

NOTE For Type B constructions, see EN 13476-3.

#### 3.1.2.6

##### **mean outside diameter**

$d_{em}$

value of the measurement of the outer circumference of a pipe or spigot in any cross-section divided by  $\pi$  ( $\pi = 3,142$ ), rounded to the next greatest 0,1 mm

NOTE For Type B constructions, see EN 13476-3.

#### 3.1.2.7

##### **mean inside diameter**

$d_{im}$

average value of a number of equally spaced measurements of inside diameter in the same cross-section of a pipe or fitting

#### 3.1.2.8

##### **wall thickness**

$e$

measured wall thickness at any point of the body of a component

#### 3.1.2.9

##### **construction height**

$e_c$

radial distance between the top of ribs or corrugation or, in case of Type A1 and Type A2 pipes and fittings, the external surface of the wall and the internal surface of the wall

#### 3.1.2.10

##### **ring flexibility**

ability of a pipe to resist diametric deflection without the loss of structural integrity

**3.1.2.11****ring stiffness**

mechanical characteristic of a pipe, which is a measure of the resistance to ring deflection under an external force as determined in accordance with EN ISO 9969

**3.1.2.12****fitting stiffness**

mechanical characteristic of a fitting which is a measure of the resistance to ring deflection under an external force as determined in accordance with ISO 13967

**3.1.2.13****ring stiffness class, SN**

numerical designation of the ring stiffness of the pipe or fitting which is a convenient round number, indicating the minimum required ring stiffness of the pipe or stiffness of the fitting

**3.2 Symbols and abbreviations**

$d_{n,1}$  nominal diameter of the main of a branch/saddle branch

$d_{n,2}$  nominal diameter of the branch of a branch/saddle branch

$L$  axial cover by a saddle branch

$Z_1$  design length of a fitting

$Z_2$  design length of a fitting

$Z_3$  design length of a fitting

$\alpha$  nominal angle of fitting

DN nominal size

DN/ID nominal size related to inside diameter

DN/OD nominal size related to outside diameter

PE polyethylene

PP polypropylene

PP-MD Mineral modified PP

PVC-U unplasticized poly(vinyl chloride)

RF ring flexibility performance

S pipe series S

SDR standard dimension ratio

SN ring stiffness class

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## 4 Material

### 4.1 General

The material shall be one of the materials specified in the relevant annexes of EN 13476-2 or EN 13476-3, as applicable.

NOTE Information about general material characteristics is given in Annex A.

### 4.2 Utilisation of non-virgin material

The specifications for the material and levels of permitted addition are specified in EN 13476-2 or EN 13476-3.

### 4.3 Sealing ring retaining components

It is permitted that sealing rings are retained using components made from polymers other than PVC U, PP or PE.

### 4.4 Sealing rings

The sealing ring material shall conform to EN 681-1, EN 681-2 or EN 681-4, as applicable.

The sealing ring shall have no detrimental effects on the component properties.

### 4.5 Fused or welded joints

When fused or welded joints are used, the component manufacturer's instructions for jointing shall be followed.

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## 5 Designation of wall construction

Pipes and fittings with smooth internal and external surfaces are designated as Type A.

Pipes and fittings with smooth internal and profiled external surfaces are designated as Type B.

Definitions of wall constructions including schematic sketches and examples of typical jointing methods are given in EN 13476-2 for Type A pipes and in EN 13476-3 for Type B pipes.

## 6 Appearance and colour

### 6.1 Appearance

When viewed without magnification the following requirements apply:

- a) visible surfaces of pipes and fittings shall be smooth, clean and free from grooving, blistering, visible impurities or pores and any other surface irregularity likely to prevent conformity to this standard;
- b) pipe and fittings ends shall be cleanly cut square to the axis of the pipe, and within any cutting zone recommended by the manufacturer, or according to the profile geometry as specified by the manufacturer;
- c) edges on spirally formed pipes and fittings which become sharp when cut, shall be rounded off.