
Cevni sistemi iz polimernih materialov za odvodnjavanje in kanalizacijo, ki delujejo po težnostnem principu in so položeni v zemljo - Cevni sistemi s strukturirano steno iz nemehčane polivinilklorida (PVC-U), polipropilena (PP) in polietilena (PE) - 2. del: Specifikacije za cevi in fitinge z gladko notranjo in zunanjo površino in sistem, tip A

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

Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Rohrleitungssysteme mit profilierter Wandung aus weichmacherfreiem Polyvinylchlorid (PVC-U), Polypropylen (PP) und Polyethylen (PE) - Teil 2: Anforderungen an Rohre und Formstücke mit glatter Innen- und Außenfläche und an das Rohrleitungssystem, Typ A

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement sans pression enterrés - Systèmes de canalisations à parois structurées en poly(chlorure de vinyle) non plastifié (PVC-U), polypropylène (PP) et polyéthylène (PE) - Partie 2 : Spécifications pour les tubes et raccords avec une surface interne et externe lisses et le système, de Type A

Ta slovenski standard je istoveten z: prEN 13476-2

ICS:

23.040.01	Deli cevovodov in cevovodi na splošno	Pipeline components and pipelines in general
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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 155.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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European foreword

This document (prEN 13476-2:2024) 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 13476-2:2018+A1:2020.

This document includes significant technical changes to the material clauses/annexes with respect to EN 13476-2:2018+A1:2020.

This document is a part of a System Standard for plastics piping systems of particular materials for a specified application. 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.

prEN 13476:2024 consists of the following parts under the general title “Plastics piping systems for non-pressure underground drains and sewers — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE)”:

- *Part 1: General requirements and performance characteristics;*
- *Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A (this standard);*
- *Part 3: Specifications for pipes and fittings with a smooth internal surface and profiled external surface and the system, Type B;*
- *Part 4: Assessment of conformity (CEN/TS). (prCEN/TS 13476-4:2023).*

For guidance for installation, see CEN/TS 1046.

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This standard provides optional choices for impact resistance (see Annex G, Annex H and Annex J) and ring flexibility, see Annex I.

As appropriate, the individual countries may select between those options in their national forewords.

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1 Scope

This document, together with prEN 13476-1, specifies the definitions and 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 intended for use in non-pressure underground drains and sewers for foul wastewater.

NOTE 1 Products complying with this document can also be used in non-pressure underground drains and sewers for surface water.

This document is applicable to pipes and fittings with smooth internal and external surfaces, designated as Type A.

This document also specifies test methods and test parameters.

This document is applicable to:

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

This document 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 document covers a range of pipe and fitting sizes, materials, pipe constructions, stiffness classes, application areas, tolerance classes and gives recommendations concerning colours.

NOTE 2 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.

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 476, *General requirements for components used in drains and sewers*

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 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 1852-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP) — Part 1: Specifications for pipes, fittings and the system*

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EN 12666-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Polyethylene (PE) — Part 1: Specifications for pipes, fittings and the system*

prEN 13476-1:2024, *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*

prEN 13476-3:2024, *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 14680, *Adhesives for non-pressure thermoplastics piping systems — Specifications*

EN 14758-1, *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*

EN 15346:2014, *Plastics — Recycled plastics — Characterization of poly(vinyl chloride) (PVC) recyclates*

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

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 1183-1, *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, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters (ISO 2505)*

EN ISO 2507-1, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 1: General test method (ISO 2507-1)*

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 6259-1, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method (ISO 6259-1)*

EN ISO 9852, *Unplasticized poly(vinyl chloride) (PVC-U) pipes — Dichloromethane resistance at specified temperature (DCMT) — Test method (ISO 9852)*

EN ISO 9967, *Thermoplastics pipes — Determination of creep ratio (ISO 9967)*

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 13260, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Test method for resistance to combined temperature cycling and external loading (ISO 13260)*

EN ISO 13262, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics spirally-formed structured-wall pipes — Determination of the tensile strength of a seam (ISO 13262)*

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)*

ISO 6259-2, *Thermoplastics pipes — Determination of tensile properties — Part 2: Pipes made of unplasticized poly(vinyl chloride) (PVC-U), oriented unplasticized poly(vinyl chloride) (PVC-O), chlorinated poly(vinyl chloride) (PVC-C) and high-impact poly(vinyl chloride) (PVC-HI)*

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

ISO 18373-1, *Rigid PVC pipes — Differential scanning calorimetry (DSC) method — Part 1: Measurement of the processing temperature*

3 Terms and definitions


For the purposes of this document, the terms and definitions given in prEN 13476-1:2024 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

prEN 13476-2:2024 (E)**4 Symbols and abbreviations****4.1 Symbols**

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

A	length of engagement, or maximum pull-out whilst maintaining tightness
C	length of the sealing zone
d_e	outside diameter
d_{em}	mean outside diameter
d_{im}	mean inside diameter
d_n	nominal diameter
$d_{sm,min}$	minimum mean inside diameter of socket
e	wall thickness (at any point)
e_c	construction height
e_{min}	minimum wall thickness of pipe or spigot
e_2	wall thickness at any point of the cylindrical part of a socket
e_3	wall thickness at any point of a sealing ring groove of a socket
e_4	wall thickness of the inside layer (waterway wall thickness)
e_5	wall thickness of the inside layer under a hollow section
l	effective length of a pipe
$L_{1,min}$	minimum length of a spigot
$IMP\ 23C$	impact resistance determined at +23 °C
	impact resistance determined at -10 °C

4.2 Abbreviations

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

$CaCO_3$	calcium carbonate
CT	close tolerance
DN	nominal size
DN/ID	nominal size related to inside diameter
DN/OD	nominal size related to outside diameter
H50	value for impact resistance of a pipe
$MgCO_3$	magnesium carbonate
$Mg_3Si_4O_{10}(OH)_2$	magnesium silicate, talcum
MFR	melt mass-flow rate

OIT	oxidation induction time
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
TIR	true impact rate
TPE	thermoplastic elastomer
VST	vicat softening temperature

5 Material

5.1 General

The material shall be one of the following: unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) or polyethylene (PE).

5.2 Unplasticized poly(vinyl chloride) (PVC-U)

5.2.1 General

The formulation for production of pipes and fittings shall be PVC material to which additives are added to enable conformity with the requirements of this document. (See also Annex A.)

PVC material may be virgin material, reworked material or recyclates (pre- or post-consumer).

Recyclates are permitted if they comply with Annex B.

The formulation (including virgin material, reworked material, recyclates or a mixture, if applicable) shall comply with the requirements given in 5.2.2.

NOTE 1 Layers can have different formulations.

Test results with the maximum specified amount of recyclates with the same agreed specification shall be taken as proving conformity of products containing a lower amount of recyclates.

NOTE 2 Attention is drawn to changing of European and/or national regulations regarding e.g. heavy metals.

5.2.2 Formulation characteristics of pipe and fitting

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

Table 1 — Characteristics of PVC-U formulation for pipes and injection-moulded fittings

Characteristic	Requirements	Test parameters		Test method
Resistance to internal pressure a b c	No failure during the test period	End caps	Type A or type B	EN ISO 1167-1 and EN ISO 1167-2
		Orientation	Free	
		Number of test pieces	3	
		Test temperature	60 °C	
		Circumferential stress for pipe compound / formulation	10 MPa	
		Circumferential stress for fitting compound / formulation	6,3 MPa	
		Conditioning period	Shall conform to EN ISO 1167-1	
		Type of test	Water-in-water	
		Test period	1 000 h	
<p>^a This requirement does not apply to the specified intermediate layer of a Type A1 pipe.</p> <p>^b For the extrusion formulation for the internal and external layers of a multilayer pipe A1 as well as for the formulation of A2 pipes, this test shall be carried out in the form of an injection-moulded or extruded sample of a solid wall pipe made from the relevant formulation.</p> <p>^c For injection-moulding formulation, this test shall be carried out in the form of an injection-moulded or extruded sample in solid wall pipe form made from the relevant formulation.</p>				

5.3 Polypropylene (PP)

5.3.1 General

The compound for production of pipes and fittings shall be PP-base material to which additives can be added to enable conformity with the requirements of this document. (See also Annex C.)

PP material may be virgin material, reworked material or recyclates (pre- or post-consumer).

Recyclates are permitted if they comply with Annex D.

The compound (including virgin material, reworked material, recyclates or a mixture, if applicable) shall comply with the requirements given in 5.3.2 and 5.3.3.

NOTE 1 Layers can have different compounds.

Test results with the maximum specified amount of recyclates shall be taken as proving conformity of products containing a lower amount of recyclates with the same agreed specification.

NOTE 2 Attention is drawn to changing of European and/or national regulations.