
Cevni sistemi iz polimernih materialov, ki delujejo po težnostnem principu in so položeni v zemljo, za transport in shranjevanje vode, ki ni namenjena pitju - Zaboji za sisteme infiltriranja, reduciranja in hrambe - 1. del: Specifikacije za zaboje za meteorne vode, iz PP in PVC-U

Plastics piping systems for non-pressure underground conveyance and storage of non-potable water - Boxes used for infiltration, attenuation and storage systems - Part 1: Specifications for storm water boxes made of PP and PVC-U

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Kunststoff-Rohrleitungssysteme für die drucklose unterirdische Entwässerung für Nicht-Trinkwasser - Versickerungsblöcke zur Verwendung in Infiltrations-, Zwischenspeicher- und Speichersystemen - Teil 1: Festlegungen für Regenwasserabfluss-Versickerungsblöcke aus PP und PVC-U

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Systèmes de canalisations en plastique pour le transport et le stockage souterrains sans pression de l'eau non potable - Structures alvéolaires ultra-légères pour les systèmes d'infiltration, de rétention et de stockage - Partie 1 : Spécifications relatives aux structures alvéolaires ultra-légères pour eaux pluviales fabriquées à partir de PP et de PVC-U

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transporta vode in njihovi deli external water conveyance
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This European Standard was approved by CEN on 19 October 2018.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 17152-1:2019) 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 2020, and conflicting national standards shall be withdrawn at the latest by February 2021.

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

This standard is supported by separate standards on test methods to which normative references are made.

EN 17152 consists of the following parts under the general title *Plastics piping systems for non-pressure underground conveyance and storage of non-potable water - Boxes used for infiltration, attenuation and storage systems*:

- *Part 1: Specifications for storm water boxes made of PP and PVC-U* [this document];
- *Part 2: Specifications for systems of storm water boxes made of PP and PVC-U* [under development];
- *Part 3: Assessment of conformity (CEN/TS)* [under development].

Recommended practices for installation are described in CEN/TR 17179 [1].

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

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 17152-1:2019 (E)**Introduction**

The products covered by this standard are part of storm water management system.

This standard is intended to reflect the current state of knowledge of determining and predicting the long-term lifetime of product groups mentioned in the scope while maintaining reasonable testing times for producers and developers of these systems.

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1 Scope

This document gives the definitions and specifies the minimum requirements for injection moulded, extruded and thermoformed thermoplastics cuboid shaped boxes, including integral components, used in underground systems for infiltration, attenuation and storage of non-potable water (e.g. storm water) and manufactured from polypropylene (PP) or unplasticized polyvinylchloride (PVC-U).

NOTE 1 Specifications and design rules for systems will be described in part 2 of EN 17152.

Product properties are determined by a combination of material specifications, design and manufacturing process.

These boxes are intended for buried underground use, e.g. in landscape, pedestrian or vehicular traffic areas.

A box can either be factory assembled or site assembled from different components.

These boxes are intended to be used as elements in a modular system where the manufacturer has clearly stated in the documentation how the components are assembled to create a complete infiltration, attenuation or storage system.

NOTE 2 Non load bearing component(s) can be manufactured by various methods e.g. extrusion, injection moulding, rotational moulding, thermoforming and low-pressure injection moulding

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 17150:2018, *Plastics piping systems for non-pressure underground conveyance and storage of non-potable water - Test method for determination of short-term compression strength of boxes*

EN 17151:2018, *Plastics piping systems for non-pressure underground conveyance and storage of non-potable water - Test method for determination of long-term compression strength of boxes*

EN ISO 179-1, *Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test (ISO 179-1)*

EN ISO 306, *Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST) (ISO 306)*

EN ISO 472:2013, *Plastics - Vocabulary (ISO 472)*

EN ISO 527-1, *Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1)*

EN ISO 527-2, *Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 527-3, *Plastics - Determination of tensile properties - Part 3: Test conditions for films and sheets (ISO 527-3)*

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 899-1, *Plastics - Determination of creep behaviour - Part 1: Tensile creep (ISO 899-1)*

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EN ISO 899-2, *Plastics - Determination of creep behaviour - Part 2: Flexural creep by three-point loading (ISO 899-2)*

EN ISO 1043-1:2011, *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 1183-1, *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 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 3451-5, *Plastics - Determination of ash - Part 5: Poly(vinyl chloride) (ISO 3451-5)*

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 11358-1, *Plastics - Thermogravimetry (TG) of polymers - Part 1: General principles (ISO 11358-1)*

EN ISO 13229, *Thermoplastics piping systems for non-pressure applications - Unplasticized poly(vinyl chloride) (PVC-U) pipes and fittings - Determination of the viscosity number and K-value (ISO 13229)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472:2013, EN ISO 1043-1:2011 and the following apply.

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

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

3.1

box

thermoplastic cuboid shaped element, with or without sidewalls, used to create a modular system

3.2

integral component

load bearing component contributing to the overall strength of the box

3.3

modular system

system made of repeating boxes

3.4**attenuation system**

modular system designed to reduce the peak flow from a given site by providing a temporary underground storm water storage facility

3.5**infiltration system**

modular system designed to provide a temporary underground storage facility from which storm water soaks into the surrounding ground

3.6**storage system**

modular system designed to provide an underground storage facility for storm water

3.7**porosity**

total available volume for water storage divided by the total envelope cuboid volume for a box

3.8**long-term compression strength**

maximum applied stress for which the box will survive without creep rupture for 50 years determined as the lower 95 % confidence limit (LCL) for the stress leading to a failure at the extrapolated lifetime, in kN/m²

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3.9**material**

material specified for a particular component in a box

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Note 1 to entry: Boxes consisting of components of different materials are possible.

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3.10**virgin material**

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

3.11**mineral modified material**

material to which minerals have been added during specific processing operation(s) which during such processing is distributed in the material

3.12**own reprocessed material**

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

3.13**non-virgin material**

material from used or unused infiltration, attenuation and storage boxes which have been cleaned and crushed or ground, or material from used or unused PP or PVC-U products other than infiltration, attenuation and storage boxes, regardless of where they are manufactured

EN 17152-1:2019 (E)**3.14****agreed specification**

specification of the relevant material characteristics agreed between the supplier of the material and the box manufacturer

3.15**test duration period**

specifies a series of creep rupture tests failing in a specific period of time

4 Symbols and abbreviations

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

OIT	oxidation induction time
PP	polypropylene
PP-MD	polypropylene mineral modified
PVC-U	unplasticized polyvinylchloride (PVC-U)
IR	Infrared
VR	Void ratio
TDP	test duration period
e	maximum thickness of the component tested in mm

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5 Material

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5.1 General

The material shall be one of the following: PP or PVC-U, to which may be added: mineral modifier(s) of known specification, additives needed to facilitate the manufacture or improve the properties of components conforming to this document.

The material shall have an agreed specification between supplier and manufacturer or the interested parties.

5.2 Polypropylene (PP) material**5.2.1 General**

The material shall be one of the following: PP, PP virgin, PP modified, or PP non-virgin material.

5.2.2 Polypropylene (PP) virgin material

The material for boxes and integral components shall be a compound of PP virgin material and those additives that are needed to facilitate the manufacture of box or integral components conforming to the requirements of this document.

When own reprocessed material is added to a level of less than 10 %, the material for boxes can still be considered as virgin.

5.2.3 Polypropylene (PP) modified material

The material for boxes and integral components shall be a compound of PP virgin material modified with minerals and those additives that are needed to facilitate the manufacture or improve the properties of box or integral components conforming to the requirements of this document.

If calcium carbonate is used, only coated calcium carbonate shall be used.

The content of minerals in the final compound shall be less than 50 % by mass.

When own reprocessed material is added to a level of less than 10 %, the material for boxes can still be considered as modified.

5.2.4 Polypropylene (PP) non-virgin material

The material for boxes and integral components shall be a compound of non-virgin PP material, and those additives that are needed to facilitate the manufacture or improve the properties of box or integral components conforming to the requirements of this document.

Non-virgin materials shall be permitted to be used up to 100 % or added to virgin or own reprocessed material or a mixture of those two materials.

The content of minerals in the final compound shall be less than 50 % by mass.

5.3 Unplasticized polyvinylchloride (PVC-U) material

5.3.1 General

The material shall be one of the following: PVC-U virgin or PVC-U non-virgin material.

5.3.2 Unplasticized polyvinylchloride (PVC-U) virgin material

The material for boxes or integral components shall be a recipe of PVC-U virgin material and those additives that are needed to facilitate the manufacture of box or integral components conforming to the requirements of this document.

When own reprocessed material is added to a level of less than 10 %, the material can still be considered as virgin.

5.3.3 Unplasticized polyvinylchloride (PVC-U) non-virgin material

The material for boxes or integral components shall be a recipe of PVC-U non-virgin material and those additives that are needed to facilitate the manufacture or improve the properties of box and integral components conforming to the requirements of this document.

Recycled materials from PVC-U products that are available in relevant quantities and intervals of time shall be permitted to be used up to 100 % by mass or added to virgin or own reprocessed material or a mixture of those two materials.

5.4 Box and integral components material characteristics

A product in this document is formed by a combination of a material specification, a design and a manufacturing process. Table 1 specifies the minimum required tests to fingerprint the material and to specify the material requirements.

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