



**SLOVENSKI STANDARD**  
**oSIST prEN 1329-1:2024**

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**Cevni sistemi iz polimernih materialov za nizko- in visokotemperaturne odvodne sisteme v zgradbah - Nemehčan polivinilklorid (PVC-U) - 1. del: Zahteve za cevi, fitinge in sistem**

Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes, fittings and the system

Kunststoff-Rohrleitungssysteme zum Ableiten von Abwasser (niedriger und hoher Temperatur) innerhalb der Gebäudestruktur - Weichmacherfreies Polyvinylchlorid (PVC-U) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

Systèmes de canalisations en plastique pour l'évacuation des eaux-vannes et des eaux usées (à basse et à haute température) à l'intérieur de la structure des bâtiments - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 1 : Spécifications pour tubes, raccords et le système

**Ta slovenski standard je istoveten z: prEN 1329-1**

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23.040.20	Cevi iz polimernih materialov	Plastics pipes
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Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure -  
Unplasticized poly(vinyl chloride) (PVC-U) - Part 1:  
Specifications for pipes, fittings and the system

Systèmes de canalisations en plastique pour l'évacuation des eaux-vannes et des eaux usées (à basse et à haute température) à l'intérieur de la structure des bâtiments - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 1 : Spécifications pour tubes, raccords et le système

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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.

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## prEN 1329-1:2024 (E)

### European foreword

This document (prEN 1329-1:2024) 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 1329-1:2020.

prEN 1329-1:2024 includes the following significant technical changes with respect to EN 1329-1:2020:

- increase of the use of recyclates up to 100 %;
- in 5.1, clarification that the conformity with all the requirements shall be demonstrated with one formulation with the 100 % virgin material and a second formulation with the maximum content of recycle;
- in Annex A, addition of detailed information about the use of PVC-U recyclates.

EN 1329 consists of the following parts, under the general title *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Unplasticized poly(vinyl chloride) (PVC-U)* :

- *Part 1: Specifications for pipes, fittings and the system;*
- *Part 2: Assessment of conformity (technical specification).*

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## 1 Scope

This document specifies the requirements for solid wall pipes with smooth internal and external surfaces, extruded from the same formulation throughout the wall, fittings and the system of unplasticized poly(vinyl chloride) (PVC-U) piping systems intended for soil and waste discharge applications (low and high temperature):

- inside buildings (application area code “B”), above ground inside the building, or outside buildings fixed onto the wall;
- for both inside buildings (application area code “B”) and buried in ground within the building structure (application area code “D”), which is reflected in the marking by “BD”. This intended use is only applicable for components with nominal outside diameters equal to or greater than 75 mm.

NOTE 1 Multilayer pipes with different formulations throughout the wall and foamed core pipes are covered by EN 1453-1 [1].

NOTE 2 EN 476 [2] specifies the general requirements for components used in discharge pipes, drains and sewers for gravity systems. Pipes and fittings conforming to EN 1329-1 fully meet the EN 476 requirements.

PVC-U pipes, fittings and the system complying with this document are suitable for the following purposes:

- ventilating part of the pipework in association with discharge applications;
- rainwater pipework within the building structure.

This document covers a range of nominal sizes, a range of pipes and fittings series and gives recommendations concerning colours.

Pipes, fittings and other components conforming to any of the plastics product standards listed in Annex B can be used with pipes and fittings conforming to this document, provided they conform to the requirements for joint dimensions given in Clause 7 and to the requirements of Table 27.

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## 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 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 — Material requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

EN 14680, *Adhesives for non-pressure thermoplastics piping systems — Specifications*

EN ISO 472, *Plastics — Vocabulary (ISO 472)*

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

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

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EN ISO 1158, *Plastics — Vinyl chloride homopolymers and copolymers — Determination of chlorine content (ISO 1158)*

EN ISO 1167-1:2006, *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)*

EN ISO 1167-2:2006, *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 1167-2:2006)*

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 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 3451-5, *Plastics — Determination of ash — Part 5: Poly(vinyl chloride) (ISO 3451-5)*

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 11173, *Thermoplastics pipes — Determination of resistance to external blows — Staircase method (ISO 11173)*

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

EN ISO 13255, *Thermoplastics piping systems for soil and waste discharge inside buildings — Test method for airtightness of joints (ISO 13255)*

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

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

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 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 EN ISO 472 and EN ISO 1043-1 and the following 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/>

#### 3.1

##### **application area code**

code used in the marking of pipes and fittings to indicate the application area(s) for which they are intended, as follows:

- B: application area code for components intended for use above ground inside the building, or for components outside buildings fixed onto the wall;
- D: application code for the area under and within 1 m from the building where the pipes and fittings are buried in ground and are connected to the underground drains and sewers system

Note 1 to entry: In D application areas the existence of external forces from the surroundings in addition to the hot water discharge is usual.

#### 3.2

##### **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

Note 1 to entry: It is expressed in millimetres, mm.

#### 3.3

##### **nominal size, outside diameter related**

##### **DN/OD**

nominal size, related to the outside diameter

#### 3.4

##### **nominal outside diameter**

##### $d_n$

specified outside diameter, assigned to a nominal size DN/OD

Note 1 to entry: It is expressed in millimetres, mm.

#### 3.5

##### **outside diameter**

##### $d_e$

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

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

**3.7****inside diameter** $d_s$ 

value of the measurement of the inside diameter through its cross section at any point of a socket, rounded to the next greater 0,1 mm

**3.8****mean inside diameter of socket** $d_{sm}$ 

arithmetical mean of a number of measurements of the inside diameter of a socket in the same cross section

**3.9****out-of-roundness**

difference between the measured maximum and the measured minimum outside diameter in the same cross section of a component

**3.10****wall thickness** $e$ 

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

**3.11****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

**3.12****standard dimension ratio****SDR**

numerical designation of a pipe series, which is a convenient round number, approximately equal to the ratio of the nominal outside diameter of a pipe to its nominal wall thickness

[SOURCE: ISO 4065:2018, 3.5, modified — No symbol is introduced in the definition and Note 1 to entry is not included here]

**3.13****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

**3.14****assembled fittings**

fittings which are made from several injection moulded parts to be assembled together by screwing or clipping

Note 1 to entry: Such fittings can incorporate rubber membranes or joints.

**3.15****fabricated fittings**

fittings produced from pipe and/or from injection-moulded fittings by thermoforming, adhesive joint or welding

Note 1 to entry: Fabricated fittings need an additional fabrication step.

**3.16****solid wall pipe**

pipe with smooth internal and external surface with the same formulation throughout the wall

Note 1 to entry: Pipes having more than one layer are considered as solid wall pipes, provided they are all made from the same formulation.

**3.17****virgin material**

plastics material in the form of pellets, granules, powder, floc, etc. that has not been subjected to use or processing other than that required for its initial manufacture

Note 1 to entry: Does not contain any reworked plastics material and/or plastics recycle.

Note 2 to entry: Sometimes also referred to as “primary material” or “primary plastics feedstock”.

Note 3 to entry: It is understood that the addition of additives such as stabilizers and pigments is still resulting into a virgin (plastics) material.

[SOURCE: EN 14541-1:2022, 3.1]

**3.18****reworked material**

plastics material from rejected unused products or trimmings capable of being reclaimed within the same process that generated it

Note 1 to entry: Reworked material does not change the status of the feedstock.

Note 2 to entry: This definition does not cover the conditions for the use of reworked material, which can be found in the applicable product standard.

Note 3 to entry: Previously referred to as “own reprocessed material”.

[SOURCE: EN 14541-1:2022, 3.2]

**3.19****pre-consumer material**

plastics material diverted from the waste stream during a manufacturing process, excluding reworked (plastics) material

Note 1 to entry: Previously referred to as “post-industrial material”.

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Note 2 to entry: Different categories of pre-consumer material may be considered in the applicable product standard.

[SOURCE: EN 14541-1:2022, 3.3]

**3.20****post-consumer material**

plastics material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose

Note 1 to entry: This includes returns of material from the distribution chain.

Note 2 to entry: Different categories of post-consumer material may be considered in the applicable product standard.

[SOURCE: EN 14541-1:2022, 3.4]

**3.21****recyclate**

plastics material resulting from the recycling of pre-consumer and post-consumer plastics products

Note 1 to entry: Also referred to as “secondary raw material” or “recycled plastics” or “regenerate”.

Note 2 to entry: Recycling can be chemical, physical or mechanical.

[SOURCE: EN 14541-1:2022, 3.5]

**3.22****agreed specification**

specification of the relevant material characteristics agreed between the supplier of the recyclate and the pipes and/or fittings manufacturer

Note 1 to entry: The agreed specification is often considered in the context of certification by a third party organization.

[SOURCE: EN 14541-1:2022, 3.15]

**4 Symbols and abbreviations****4.1 Symbols**

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

$A$	length of engagement
$\alpha$	nominal angle of fitting
$C$	depth of sealing zone
$d_e$	outside diameter
$d_{em}$	mean outside diameter
$d_s$	inside diameter of socket
$e$	wall thickness
$e_{min}$	minimum wall thickness

$e_2$	wall thickness of socket
$e_3$	wall thickness at the groove
$L_1$	length of spigot
$L_2$	length of adhesive joint socket
$l$	effective length of pipe
$R$	radius of swept fittings
$X$	stop width
$Z$	design length of fitting

## 4.2 Abbreviations

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

DN	nominal size
DSC	differential scanning calorimetry
L	long (type)
M	medium (type)
DN/OD	nominal size, outside diameter related
PVC-U	unplasticised poly(vinyl chloride)
S	short (type)
SDR	standard dimension ratio
SN	ring stiffness class
TIR	true impact rate
VST	vicat softening temperature
RAL	colour reference system

## 5 Material

### 5.1 General

The formulation for production of pipes and fittings shall be PVC-U material to which additives are added to enable conformity with the requirements of this document.

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

The dosage level of each ingredient of the formulation shall be specified in the quality documentation by the manufacturer as part of the material specification.

The maximum amount of recyclate part of the formulation is calculated based on the amount of separate recyclate added to the formulation plus the amount of recyclate present in reworked material which is added to the formulation.

Conformity with all the requirements of this document shall be demonstrated.

If recyclates are used, the maximum amount of recyclate in the formulation shall be specified by the manufacturer and the conformity with all the requirements of this document shall be demonstrated by:

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- a) one formulation with 100 % virgin material and
- b) a second formulation consisting the same virgin material as a) and the maximum content of recyclate.

NOTE CEN/TS 1329-2 gives specific recommendation with regard to test frequency when recyclate is used.

Recyclates are permitted if they comply with Annex A.

The formulation (including virgin material, reworked material, recyclates or a mixture, if applicable) shall comply with the requirements given in 5.2.

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

**5.2 Formulation characteristics of pipe and fitting**

The formulation shall comply with the requirements given in Table 1 and, if applicable in 5.3 for pipes and 5.4 for fittings.

**Table 1 — Requirements applicable for the formulation**

Characteristics	Requirements	Test method
PVC-U content for pipes	≥ 80 % by mass	Calculation or EN ISO 1158 <sup>a</sup> or
PVC-U content for injection-moulded fittings	≥ 85 % by mass	EN ISO 3451-5, Method A <sup>b</sup>
<sup>a</sup> The PVC-U content is equal to $(m_{Cl}/56,8) \times 100$ , where $m_{Cl}$ is the chlorine content expressed as a percentage by mass in accordance with EN ISO 1158. <sup>b</sup> The measurement of filler content by ash rest is an alternative to the measurement of PVC-U content and is recommended when recyclates are used.		

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**5.3 Material for BD application****5.3.1 Use of mineral modifier**

For pipes with no recyclate content ≥ 110 mm and intended for BD application, a further reduction of the PVC-U content to ≥ 75 % by mass is permitted provided the PVC-U is substituted by coated or uncoated CaCO<sub>3</sub> conforming to the following:

- a) the composition of the CaCO<sub>3</sub>, before coating if any, shall conform to the following:
- 1) content of CaCO<sub>3</sub> ≥ 96 % by mass;
  - 2) content of MgCO<sub>3</sub> ≤ 4 % by mass;
  - 3) content of CaCO<sub>3</sub> and MgCO<sub>3</sub> in total ≥ 98 % by mass;
- b) the physical properties of the material shall conform to the following:
- 4) mean particle size D50 ≤ 2,5 μm;
  - 5) top cut D98 ≤ 20 μm.