SLOVENSKI STANDARD
SIST EN 1329-1:2021

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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

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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

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This European Standard was approved by CEN on 2 November 2020.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 1329-1:2020) 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of an identical text or by endorsement, at the latest by June 2021, and conflicting national standards shall be withdrawn at the latest by June 2021.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 document supersedes EN 1329-1:2014+A1:2018.

The main changes compared to the previous version EN 1329-1:2014+A1:2018:

— review of non-virgin material use and alignment with recently revised EN 1401-1;

— addition of subclause 6.4 Reaction to fire;

— updating in accordance with the latest template;

— updating of normative references.

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: Guidance for the assessment of conformity (technical specification).*

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, 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 the United Kingdom.

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”);

— for both inside buildings and buried in ground within the building structure (application area code “BD”).

NOTE 1 The intended use is reflected in the marking of products by “B” or “BD”.

NOTE 2 Application "B" covers uses above ground inside the building, or outside buildings fixed onto the wall.

NOTE 3 Multilayer pipes with different formulations throughout the wall and foamed core pipes are covered by EN 1453-1 [1].

NOTE 4 For use buried in ground within the building structure are intended only those components (marked with “BD”) with nominal outside diameters equal to or greater than 75 mm.

NOTE 5 EN 476 [2] specifies the general requirements for components used in discharge pipes, drains and sewers for gravity systems. Pipes and fittings conforming to this standard fully meet these requirements.

This document is also applicable to PVC-U pipes, fittings and the system intended for the following purposes:

— ventilating part of the pipework in association with discharge applications;

— rainwater pipework within the building structure.

This document also specifies the test parameters for the test methods that are referred to.

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

NOTE 6 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 7 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 26.

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

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

EN 14814, *Adhesives for thermoplastic piping systems for fluids under pressure — 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)*

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 13257:2018, *Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling (ISO 13257:2018)*

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 terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

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 drainage and sewerage 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.

Note 2 to entry: Components intended for use for both code B and code D application areas are marked BD.

Note 3 to entry: Other application area codes U and UD not covered by this standard are defined elsewhere, e.g. in EN 1401-1.

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

3.6
mean outside diameter
d_{em}
value of the measurement of the outer circumference of a pipe or spigot of a fitting in any cross section, divided by π (≈ 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
ovality
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
material in the form such as granules or powder that has not been subjected to use or processing other than that required for its manufacture

Note 1 to entry: Virgin material is a material to which no own and/or external reprocessed or recycled material has been added.

Note 2 to entry: It is understood that the addition of additives such as stabilizers and pigments is still resulting into a virgin material.

3.18
non-virgin material
all material which is not defined as virgin material

Note 1 to entry: It covers own reprocessed material, external reprocessed materials and recycled materials.

3.18.1
own reprocessed material
material prepared from rejected unused pipes, gutters, fittings and ancillaries, including trimmings from the production, 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

3.18.2
external reprocessed material
material prepared from unused thermoplastics products regardless of where those products were manufactured

Note 1 to entry: External reprocessed material is often called post-industrial recyclate.

3.18.3
recycled material
material prepared from used thermoplastic products which have been cleaned and crushed or ground

Note 1 to entry: Recycled material is often called post-consumer recyclate.

3.19
agreed specification
specification of the relevant material characteristics agreed between the supplier of the non-virgin material and the pipes and/or fittings manufacturer

4 Symbols and abbreviations

4.1 Symbols

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

A length of engagement

α nominal angle of fitting

C depth of sealing zone

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.

PVC-U unplasticised poly(vinyl chloride)

TIR true impact rate

5 Material

5.1 General

The formulation shall be a mixture of PVC to which are added additives and if applicable non-virgin material that shall allow the final product to comply with the requirements of this document.

Non-virgin material (either supplied externally or own reprocessed or a mixture of both) may be used in the conditions given in 5.5.

The formulation (including non-virgin materials if applicable) shall comply with the requirements given in Table 1 and, if applicable in 5.2 for pipes and 5.3 for fittings.

Table 1 — Requirements applicable for the formulation

Characteristics	Requirements	Test method
PVC content for pipes	≥ 80 % by mass [a]	Calculation or EN ISO 1158 [b] [c] or EN ISO 3451-5, Method A [c]
PVC content for injection-moulded fittings	≥ 85 % by mass	

[a] A further reduction of the PVC content is permitted according to 5.2.1.

[b] The PVC content is equal to (m_{cl}/56,8) x 100, where m_{cl} is the chlorine content expressed as a percentage by mass in accordance with EN ISO 1158.

[c] The measurement of filler content by ash rest is an alternative to the measurement of PVC content and is recommended when external reprocessed and/or recycled material is used.

5.2 Pipe material for BD application

5.2.1 Use of mineral modifier

For pipes ≥ 110 mm and intended for BD application, a further reduction of the PVC content to ≥ 75 % by mass is permitted provided the PVC is substituted by coated or uncoated $CaCO_3$ conforming to the following:

a) The composition of the $CaCO_3$, before coating if any, shall conform to the following:

   1) content of $CaCO_3$ ≥ 96 % by mass;

   2) content of $MgCO_3$ ≤ 4 % by mass;

   3) content of $CaCO_3$ and $MgCO_3$ in total ≥ 98 % by mass.

b) The physical properties of the material shall conform to the following:

   1) mean particle size D50 ≤ 2,5 µm;

   2) top cut D98 ≤ 20 µm.

5.2.2 Additional requirements

The material of pipes intended to be used in application area BD shall comply with the additional requirement given in Table 2, when tested in accordance with the test method as specified in Table 2, using the indicated parameters.

The pipe formulation shall be tested in the form of a pipe.