SLOVENSKI STANDARD
SIST EN 1329-1:2014+A1:2018

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Nadomešča:
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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 systems

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 systems

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Foreword

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of an identical text or by endorsement, at the latest by September 2018, and conflicting national standards shall be withdrawn at the latest by September 2018.

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

This document includes Amendment 1 approved by CEN on 11 November 2017.

This document supersedes A1 EN 1329-1:2014 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

EN 1329 consists of the following parts:

— EN 1329-1, *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* [the present document];

— CEN/TS 1329-2, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Guidance for the assessment of conformity* [Technical Specification].

The main changes are:

— specification of the scope with restriction to solid wall;

— updating of the normative references;

— alignments of products characteristics for BD applications with UD applications (EN 1401-1) for $d_n \geq 110$ mm;

— introduction of alternative test methods to DCMT for the evaluation of the gelation of PVC;

— explicit integration of designs of fittings.

System Standards are based on the results of the work 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 method 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.

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.

1 Scope

This part of EN 1329 specifies the requirements for solid wall unplasticized poly(vinyl chloride) (PVC-U) pipes, fittings and the system intended for:

— soil and waste discharge applications (low and high temperature) inside buildings (application area code “B”);

— soil and waste discharge applications (low and high temperature) 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 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.

This part of EN 1329 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.

It also specifies the test parameters for the test method referred to in this European Standard.

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

NOTE 3 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.

For external above ground application additional requirements depending on the climate should be agreed between the manufacturer and the user.

NOTE 4 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 European Standard, provided they conform to the requirements for joint dimensions given in Clause 6 and to the requirements of Table 24.

NOTE 5 Joints and adhesives are considered to be part of the system as covered in the scope.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 1401-1:2009, *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 1905, *Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) pipes, fittings and material — Method for assessment of the PVC content based on total chlorine content*

EN 10204:2004, *Metallic products — Types of inspection documents*

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 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 pyknometer method and titration method (ISO 1183-1)*

EN ISO 2505, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters (ISO 2505)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126)*

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

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)*

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

ISO 3127, *Thermoplastics pipes — Determination of resistance to external blows — Round-the-clock method*

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

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

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

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

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

ISO 13257:2010, *Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling*

ISO 13259, *Thermoplastics piping systems for underground non-pressure applications — Test method for leaktightness 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, symbols and abbreviations

3.1 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.

3.1.1
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;

— BD: application area code for components intended for use for both code B and code D application areas

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

3.1.2
nominal size
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 millimetres

3.1.2.2
nominal size
DN/OD
nominal size, related to the outside diameter

3.1.3
nominal outside diameter
d_n
specified outside diameter, in millimetres, assigned to a nominal size DN/OD

3.1.4
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

3.1.5
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

3.1.6
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

3.1.7
mean inside diameter of a socket
d_{sm}
arithmetical mean of a number of measurements of the inside diameter of a socket in the same cross section

3.1.8
out-of-roundness
ovality
difference between the measured maximum and the measured minimum outside diameter in the same cross section of a component

3.1.9
wall thickness
e
value of measurement of the wall thickness at any point around the circumference of a component

3.1.10
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

3.1.11
standard dimension ratio
SDR
nominal ratio of the outside diameter, d_n, to the minimum wall thickness, e_{min}

3.1.12
nominal ring stiffness
SN
numerical designation of the ring stiffness of a pipe or fitting which is a convenient round number relative to the determined stiffness in kilonewtons per square metre, indicating the minimum ring stiffness of a pipe or fitting

3.1.13
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.

3.1.14
fabricated fittings
fittings produced from pipe and/or from injection-moulded fittings by thermoforming, solvent-cementing or welding

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

3.1.15
solid wall pipe and fitting
pipe or fitting with smooth internal and external surface with the same compound / formulation through the wall

3.1.16
material definitions

3.1.16.1
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 and to which no reprocessed or recycled material has been added

Note 1 to entry: It is understood that the addition of additives such as stabilizers and pigments is still resulting into a virgin material.

3.1.16.2
own reprocessed material
material prepared from rejected unused pipes, gutters or fittings and ancillaries, including trimmings from the production of pipes or fittings, that has been 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

3.1.16.3
external reprocessed material
material prepared from unused thermoplastics products regardless of where those products were manufactured

3.1.16.4
recycled material
material from used thermoplastic products which have been cleaned and crushed or ground

3.1.16.5
reformulated material
recycled/reprocessed material that has been reformulated, by additives and processing techniques, to meet an agreed specification

Note 1 to entry: Typically the additives used would be stabilizers, pigments etc.; the reformulation material: homogeneous pellets, granules, powder etc., with the produced batch having consistent physical properties.

3.1.16.6
agreed specification
specification of the relevant material characteristics agreed between the supplier of the non-virgin material and the pipe, fitting and/or ancillary manufacturer

3.2 Symbols

A : length of engagement

C : depth of sealing zone

d_e : outside diameter

d_{em} : mean outside diameter

d_n : nominal outside diameter

d_s : inside diameter of a socket

d_{sm} : mean inside diameter of a socket

e : wall thickness

e_m : mean wall thickness

e_2 : wall thickness of a socket

e_3 : wall thickness in the groove area

L_1 : length of spigot

L_2 : length of socket

l : effective length of a pipe

R : radius of swept fittings

Z : design length of a fitting

α : nominal angle of a fitting

3.3 Abbreviations

DN : nominal size

DN/OD : nominal size, outside diameter related

PVC-U : Unplasticised poly(vinyl chloride)

SDR : Standard dimension ratio

SN : Nominal ring stiffness

TIR : True impact rate

4 Material

4.1 Raw material

The raw material shall be PVC-U to which are added those additives that are needed to facilitate the manufacture of components conforming to the requirements of this European Standard.

The PVC content shall be at least 80 % by mass for pipes and 85 % by mass for injection-moulded fittings and shall be determined by calculation. In case of dispute, the PVC content can also be determined in accordance with EN 1905.

For pipes ≥ 110 mm and intended for BD applications, a further reduction of the PVC-U content to ≥ 75 % by mass for pipes only is permitted provided the PVC-U 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.

4.2 Additional requirement for pipe material for BD application

The material of pipes intended to be used in application area BD shall comply with the additional requirement given in Table 1, when tested in accordance with the methods and the parameters indicated in Table 1.

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

Table 1 — Material characteristics of pipes intended for BD application

Characteristic	Requirements	Test parameters		Test method
Resistance to internal pressure	No failure during the test period	End caps	Type A or B	EN ISO 1167-1 and EN ISO 1167-2
		Test temperature	60 °C	
		Orientation	Free	
		Number of test pieces	3	
		Circumferential (hoop) stress	10,0 MPa	
		Conditioning period	1 h	
		Type of test	Water-in-water	
		Test period	1 000 h	

4.3 Additional requirement for fitting material for BD application

The material of fittings intended to be used in application area BD shall comply with the additional requirement given in Table 2, when tested in accordance with the methods and the parameters indicated in Table 2.

The fitting material shall be tested in the form of an extruded or injection-moulded pipe.

Table 2 — Material characteristics of fittings intended for BD application

Characteristic	Requirements	Test parameters		Test method
Resistance to internal pressure	No failure during the test period	End caps	Type A or B	EN ISO 1167-1 and EN ISO 1167-2
		Dimensions	50 mm ≤ d_n ≤ 110 mm	
		Test temperature	60 °C	
		Orientation	Free	
		Free length for injection-moulded pipe	≥ 140 mm	
		Number of test pieces	3	
		Circumferential (hoop) stress	6,3 MPa	
		Conditioning period	1 h	
		Type of test	Water-in-water	
		Test period	1 000 h	