

7 Yj b]`g]ghYa]`n'dc`ja Yfb]`a UHf]Ucj `g'gffi _hi f]fUbc`ghYbc`Wj]`nU'b]n_c!]`b
j]gc_chYa dYfUi fbY'cXj cXbY'g]ghYa Y'j`g]Uj VUA !'BYa Y Ub'dc`]j]b]`cf]X'fDJ7!
I Ł!'%'XY. `GdYV]Z_UW]Y'nUW]j]]b`g]ghYa

Plastics piping systems with structured wall-pipes for soil and waste discharge (low and high temperature) inside buildings - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes and the system

STANDARD PREVIEW

Kunststoff-Rohrleitungssysteme mit Rohren mit profilierter Wandung und glatten Rohroberflächen zum Ableiten von Abwasser (niedriger und hoher Temperatur) innerhalb von Gebäuden - Weichmacherfreies Polyvinylchlorid (PVC-U) - Teil 1: Anforderungen an Rohre und das Rohrleitungssystem

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Systemes de canalisations en plastique avec des tubes a paroi structurée pour l'évacuation des eaux-vannes et des eaux usées (a basse et a haute température) a l'intérieur des bâtiments - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 1: Spécifications pour tubes et le systeme

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EUROPEAN STANDARD
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English version

Plastics piping systems with structured-wall pipes for soil and waste discharge (low and high temperature) inside buildings - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes and the system

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This European Standard was approved by CEN on 24 April 1999.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NNI.

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 July 2000, and conflicting national standards shall be withdrawn at the latest by January 2002.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This standard is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

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 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.

EN 1453 consists of the following Parts, under the general title "Plastics piping systems with structured-wall pipes for soil and waste discharge (low and high temperature) inside building — Unplasticized poly(vinyl chloride) (PVC-U)"¹⁾:

- Part 1: *Requirements for pipes and the system (the present standard)*
- Part 2: *Guidance for the assessment of conformity (under preparation)*

This Part of EN 1453 includes the following:

- Annex A (normative): Utilization of non-virgin material
- Bibliography

At the date of publication of this standard, System Standards for piping systems of PVC-U and other plastics materials used for the inside buildings are the following:

EN 1329, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Unplasticized poly(vinyl chloride) (PVC-U)*

EN 1451, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Polypropylene (PP)*

1) EN 1453 does not cover a recommended practice for installation. A recommended practice for installation is covered by the following European prestandard: *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Thermoplastics — Recommended practice for installation (under preparation)*.

EN 1455, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Acrylonitrile-butadiene-styrene (ABS)*

EN 1519, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Polyethylene (PE)*

EN 1565, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Styrene copolymer blends (SAN+PVC)*

EN 1566, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Chlorinated poly(vinyl chloride) (PVC-C)*

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1 Scope

This standard specifies the requirements for pipes and the system of unplasticized poly(vinyl chloride) (PVC-U) piping systems with structured-wall pipes intended to be used for soil and waste discharge (low and high temperature) inside buildings (marked with "B").

It also specifies the test parameters for the test methods referred to in this standard.

It covers pipes with an external and internal smooth layer which are connected with foamed PVC-U or by radial legs in solid PVC-U. The fully foamed PVC-U pipes and spirally-formed PVC-U pipes are not covered by this standard.

This standard covers a range of pipe sizes and gives recommendations concerning colours.

NOTE 1 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.

This standard is applicable to PVC-U pipes, their joints and to joints with components (marked with "B" and "BD") of other plastics intended to be used for the following purposes:

- a) soil and waste discharge pipework for the conveyance of domestic waste waters (low and high temperature);
- b) ventilation pipework associated with a);
- c) rainwater pipework inside building.

This standard is applicable to pipes marked with "B", which are intended to be used above ground inside the building.

NOTE 2 Fittings conforming to EN 1329-1 are normally be used with pipes conforming to this standard. Components conforming to other standards on plastics piping system can be used with pipes conforming to this standard, provided they conform to the requirements for joint dimensions and functional requirements given in this standard.

NOTE 3 For external above ground application additional requirements depending on the climate should be agreed between the manufacturer and the user.

NOTE 4 This standard does not include any requirement for fire. Certain countries may require additional requirements based on national regulations.

2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

For dated references, subsequent amendments to, or revisions of, any of these publications apply to this standard only when incorporated in it by amendment or revision.

For undated references the latest edition of the publication referred to applies.

EN 580, *Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) pipes — Test method for the resistance to dichloromethane at a specified temperature (DCMT)*

EN 681-1, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

prEN 681-2, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastics elastomers*

EN 727, *Plastics piping and ducting systems — Thermoplastics pipes and fittings — Determination of Vicat softening temperature (VST)*

- EN 743:1994, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of the longitudinal reversion*
- EN 744:1995, *Plastics piping and ducting systems — Thermoplastics pipes — Test method for resistance to external blows by the round-the-clock method*
- EN 922, *Plastics piping and ducting systems — Pipes and fittings of unplasticized poly(vinyl chloride) (PVC-U) — Specimen preparation for determination of the viscosity number and calculation of the K-value*
- EN 1053, *Plastics piping systems — Thermoplastics piping systems for non-pressure applications — Test method for watertightness*
- EN 1054, *Plastics piping systems — Thermoplastics piping systems for soil and waste discharge — Test method for airtightness of joints*
- EN 1055:1996, *Plastics piping systems — Thermoplastics piping systems for soil and waste discharge inside buildings — Test method for resistance to elevated temperature cycling*
- 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: Requirements for pipes and the system*
- EN 1411:1996, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of resistance to external blows by the staircase method*
- 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 10204:1991, *Metallic products — Types of inspection documents*
- prEN ISO 3126, *Plastics piping systems — Plastics components — Measurement and determination of dimensions (revision of prEN 496:1991 and ISO 3126:1974) (ISO/DIS 3126:1999)*
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- ISO 472:1988, *Plastics — Vocabulary*
- ISO 1043-1:1997, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*
- ISO 1183:1987, *Plastics — Methods for determining the density and relative density of non-cellular plastics*

3 Definitions, symbols and abbreviations

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

3.1 Definitions

In addition to the following definitions, the definitions given in ISO 472:1988 and ISO 1043-1:1997 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.

NOTE Other application area codes BD, U and D not covered by this standard are defined elsewhere, e.g. in EN 1329-1 and EN 1401-1.

3.1.2**structured-wall pipe**

pipe with a structure based on an internal smooth layer and an external smooth layer in solid PVC-U which are connected by foamed PVC-U material or by radial legs in solid wall PVC-U.

3.1.3 Nominal size**3.1.3.1****nominal size DN**

numerical designation of the size of a component, other than a component designated by thread size, which is a convenient round number approximately equal to the manufacturing dimension, in millimetres (mm).

3.1.3.2**nominal size DN/OD**

nominal size, related to the outside diameter.

3.1.4**nominal outside diameter (d_n)**

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

3.1.5**outside diameter (d_e)**

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

3.1.6**mean outside diameter (d_{em})**

value of the measurement of the outer circumference of a pipe or spigot end of a fitting in any cross-section, divided by π ($\approx 3,142$), rounded up 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**overall wall thickness (e)**

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

3.1.10**mean overall wall thickness (e_m)**

arithmetical mean of a number of measurements of the overall wall thickness, regularly spaced around the circumference and in the same cross-section of a component, including the measured minimum and the measured maximum value of the overall wall thickness in that cross-section.

3.1.11**wall thickness of inside layer (e_4)**

thickness at any point of the inside wall between a hollow or foamed section and the inside surface of the pipe.

3.2 Symbols

A : length of engagement

C : depth of sealing zone

d_e	: outside diameter (at any point)
d_{em}	: mean outside diameter
d_n	: nominal outside diameter
d_s	: inside diameter of the socket
d_{sm}	: mean inside diameter of the socket
e	: overall wall thickness (at any point)
e_m	: mean overall wall thickness
e_2	: wall thickness of a socket
e_3	: wall thickness at the groove
e_4	: wall thickness of the inside layer
L_2	: length of socket
l	: effective length of a pipe

3.3 Abbreviations

DN	: nominal size
DN/OD	: nominal size, outside diameter related
PVC-U	: unplasticized poly(vinyl chloride)
TIR	: true impact rate

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4 Material

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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 pipes conforming to the requirements of this standard.

When calculated on the basis of a known formulation or determined in accordance with EN 1905, the PVC content shall be at least 80 % by mass for pipes.

For the intermediate layer of foamed pipes where calcium carbonate (CaCO_3) is used as a filler, the content of PVC shall be at least 60 % by mass. In such cases the content of PVC plus calcium carbonate shall be at least 85 % by mass and the type of CaCO_3 shall be specified for the type test samples. The same type and quantity of CaCO_3 shall be used in further production.

4.2 Utilization of non-virgin material

Requirements for the utilization of non-virgin material are given in Annex A.

4.3 Sealing ring retaining means

Retaining rings may be made from polymers other than PVC-U, provided the joints conform to the requirements given in Table 12.

5 General characteristics

5.1 Appearance

When viewed without magnification, the internal and external surfaces of pipes shall be smooth, clean and free from grooving, blistering, impurities or other surface irregularity likely to prevent conformity of pipes to this standard.

Each end of a pipe shall be cleanly cut and shall be square to its axis.

5.2 Colour

The recommended colour for the outside layer of pipes is grey.

6 Geometrical characteristics

6.1 General

Dimensions shall be measured in accordance with prEN ISO 3126.

In case of dispute the reference temperature for dimensional measurements shall be $(23 \pm 2) ^\circ\text{C}$.

NOTE The figures are schematic sketches only to indicate the relevant dimensions. They do not necessarily represent manufactured components.

6.2 Dimensions of pipes

6.2.1 Outside diameter

The mean outside diameter, d_{em} , shall conform to Table 1.