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Plastics rainwater piping systems for above ground external use - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes, fittings and the system

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Kunststoff-Rohrleitungssysteme für außenliegende Regenfalleitungen - Weichmacherfreies Polyvinylchlorid (PVC-U) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

Systemes de canalisations de descentes d'eaux pluviales en plastique a usage externe en aérien - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 1: Spécifications pour tubes, raccords et le systeme

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This European Standard was approved by CEN on 14 June 2000.

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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 Central Secretariat has the same status as the official versions.

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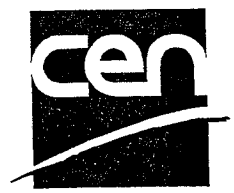

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

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.

It has been prepared in liaison with CEN/TC 128 " Roofing and cladding products for discontinuous laying" taking into account EN 607 and EN 1462 and CEN/TC 165 "Waste water engineering" taking into account EN 12056-3.

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 12200 consists of the following Parts, under the general title *"Plastics rainwater piping systems for above ground external use — Unplasticized poly(vinyl chloride) (PVC-U)":*

- Part 1: Requirements for pipes fittings and the system (the present standard)
- Part 2: Guide for the assessment of conformity
- Part 3: Guidance for installation (ENV).

This Part of EN 12200 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 have been used for the same application. These standards 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)*

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)*

For pipes and fittings which have conformed to the relevant national standard before the date of availability [2000-09-20], as shown by the manufacturer or by a certification body, the national standard may continue to be applied until 2002-09-31.

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 2001-03-31. Conflicting national standards shall be withdrawn at the latest by 2002-09-31.

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.

1 Scope

This standard specifies the requirements for pipes, fittings and the system of unplasticized poly(vinyl chloride) (PVC-U) intended for use as above-ground external rainwater downpipes.

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

These products are usually used in conjunction with gutters conforming to EN 607. They are not intended for use with products conforming to EN 612.

It is applicable to PVC-U rainwater systems of circular, square, rectangular or any other shape with sealed (rubber ring or solvent cement) or unsealed joints.

This standard covers a range of pipes and fittings sizes.

It also specifies requirements for brackets.

NOTE It is the responsibility of the purchaser or specifier to make the appropriate selections from the size range to take into account their particular requirements and any relevant national regulations and installation practices or codes.

2 Normative references

This European 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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 513:1999, *Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors - Determination of the resistance to artificial weathering*

EN 638, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of short-term tensile properties*

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

EN 681-2, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic 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 763:1994, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Test method for visually assessing effects of heating*

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 1462, *Specification for eaves gutter brackets*

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*

EN 12095, *Plastics piping systems — Test method for bracket strength.*

EN 20105-AO2, *Grey scale for assessing change in colour*

EN ISO 527-3:1995, *Plastics — Determination of tensile properties — Part 3 Test conditions for film and sheets.*

prEN ISO 3126:1999, *Plastics piping systems - Plastics components - Measurement and determination of dimensions (revision of prEN 496:1991 and ISO 3126:1974) (ISO/DIS 3126:1999)*

EN ISO 8256:1996, *Plastics — Determination of tensile impact strength (ISO 8256:1990, including Technical Corrigendum 1:1991)*

ISO 472:1988, *Plastics vocabulary*

ISO 1043-1:1997, *Plastics — Symbols — Part 1: Basic polymers and their special characteristics*

ISO 1183:1987, *Plastics — Methods for determining the density and relative density of non-cellular plastics*

ISO 4892-2:1994, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon arc sources*

ISO 4892-3:1994, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

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 definitions given below, the definitions given in ISO 472:1988 and ISO 1043-1:1997 apply.

3.1.1
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 (mm)

3.1.2
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
nominal 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
mean inside diameter of a pipe (d_{im})
arithmetical mean of a number of measurements of the inside diameter of a pipe in the same cross-section

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
wall thickness (e)
value of the measurement of the wall thickness at any point around the circumference of a component rounded to the next greater 0,1 mm

3.1.9
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

3.2 Definitions for brackets

3.2.1
anchor bracket
bracket designed to be fixed to a wall or other support and attached to a socket of a pipe or fitting to prevent the socket from moving under the effect of thermal expansion

NOTE Some anchor brackets can be adapted to act as a guide bracket. (See 3.2.2.)

3.2.2
guide bracket
bracket designed to be fixed to a wall or other support and to fit a pipe sufficiently loosely to allow longitudinal thermal movement whilst preventing the pipe from bowing between anchor brackets

NOTE By fixing an guide bracket tightly below a fitting on vertical pipework, it can be made to act as an anchor bracket. (See 3.2.1.)

3.3 Symbols

A	:	length of engagement
C	:	depth of sealing zone
d_e	:	outside diameter
d_{em}	:	mean outside diameter
d_{im}	:	mean inside diameter of pipe or spigot
d_n	:	nominal outside diameter
d_s	:	inside diameter of a socket
d_{sm}	:	mean inside diameter of a socket
e	:	wall thickness (at any point)
e_m	:	mean wall thickness
e_2	:	wall thickness of a socket
e_3	:	wall thickness at the groove
L_1	:	length of spigot
L_2	:	length of socket
l	:	effective length of a pipe
Z_d	:	design length (Z_d length) of a fitting

α : nominal angle of a fitting

3.4 Abbreviations

DN : nominal size

DN/OD : nominal size, outside diameter related

PVC-U : unplasticized poly(vinyl chloride)

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 standard.

4.2 Utilization of non-virgin material

Utilization of non-virgin material shall conform to Annex A (normative).

4.3 Sealing ring retaining means

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

4.4 Brackets not of PVC-U

All such components shall fulfil the material and corrosion resistance requirements of EN 1462.

5 General characteristics - appearance

When viewed without magnification, the internal and external surfaces of pipes and fittings shall be smooth, clean and free from grooving, blistering, impurities, pores or other surface irregularity likely to prevent conformity of pipes and fittings to this standard. Each end of a pipe or a fitting shall be cleanly cut, if applicable, and shall be square to its axis.

6 Geometrical characteristics

6.1 General

Dimensions shall be measured in accordance with prEN ISO 3126:1999.

In case of dispute the reference temperature is (23 ± 2) °C.

NOTE Figures 1 to 11 are schematic sketches only, to indicate the relevant dimensions. They do not necessarily represent manufactured components.

6.2 Dimensions of pipes

6.2.1 Diameters of circular pipes

The mean diameters, of circular pipes shall conform to Table 1.

Table 1 — Preferred pipe diameters

Dimensions in millimetres

Nominal size DN/OD 1)	Nominal outside diameter	Mean outside diameter		Mean inside diameter	Internal cross-sectional area 2) (mm²)
	d_n	$d_{em,min}$	$d_{em,max}$	$d_{im,min}$	
50	50	50,0	50,3	46,3	1684
53 3)	53	53,0	53,3	49,3	1909
63	63	63,0	63,3	59,3	2762
68 3)	68	68,3	68,7	64,6	3278
75	75	75,0	75,4	71,3	3993
80	80	80,0	80,4	76,0	4546
82	82	82,0	82,4	78,0	4788
90	90	90,0	90,4	85,6	5760
100	100	100,0	100,4	95,4	7151
105 3)	105	105,5	105,9	100,7	7964
110	110	110,0	110,4	104,7	8619
125	125	125,0	125,4	119,1	11141
140	140	140,0	140,5	133,6	14031
160	160	160,0	160,5	152,5	18280

1) Nominal sizes 50 < DN/OD < 160 mm other than those in the table are permitted. They should be selected from the Renard R40 series or traditional nominal sizes. In such cases the pipe outside diameter tolerance, mean inside diameter and internal cross-sectional area shall be interpolated from the nearest adjacent values above and below in the table.
2) For the determination of the wall thickness of non-circular pipes and their sockets, see 6.2.4.2.
3) These sizes are based on the inside diameter series in EN 476:1997, they are not interchangeable with other pipes conforming to the standards listed in the foreword.

6.2.2 Outside dimensions and tolerances of non-circular pipes

The pipe cross-section may be square, rectangular or any other shape. The external sizes shall be given by the manufacturer. The tolerances on the external sizes shall conform to Table 1 using the largest dimension as the nominal size and rounding down to the nearest outside diameter as given in the table. See Figure 1.

EXAMPLE For a rectangular pipe of 80 × 65 the applicable tolerances would be as DN 80.

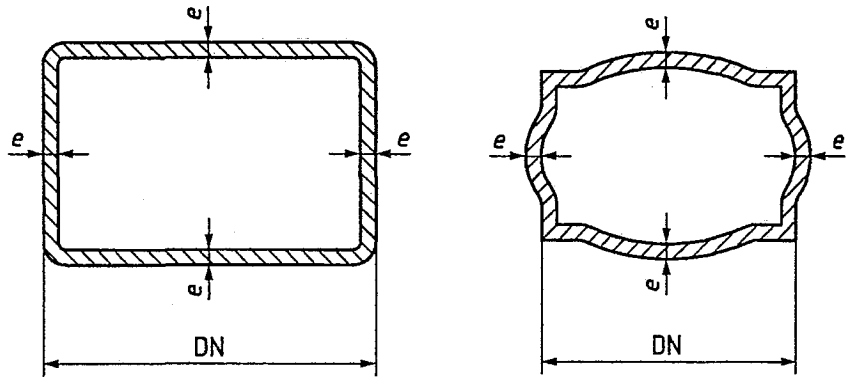

Figure 1 — Dimensions of non-circular pipes

6.2.3 Effective length of pipes

The effective length (useful length) of a pipe, *l*, shall be not less than that specified by the manufacturer when measured as shown in Figure 2.

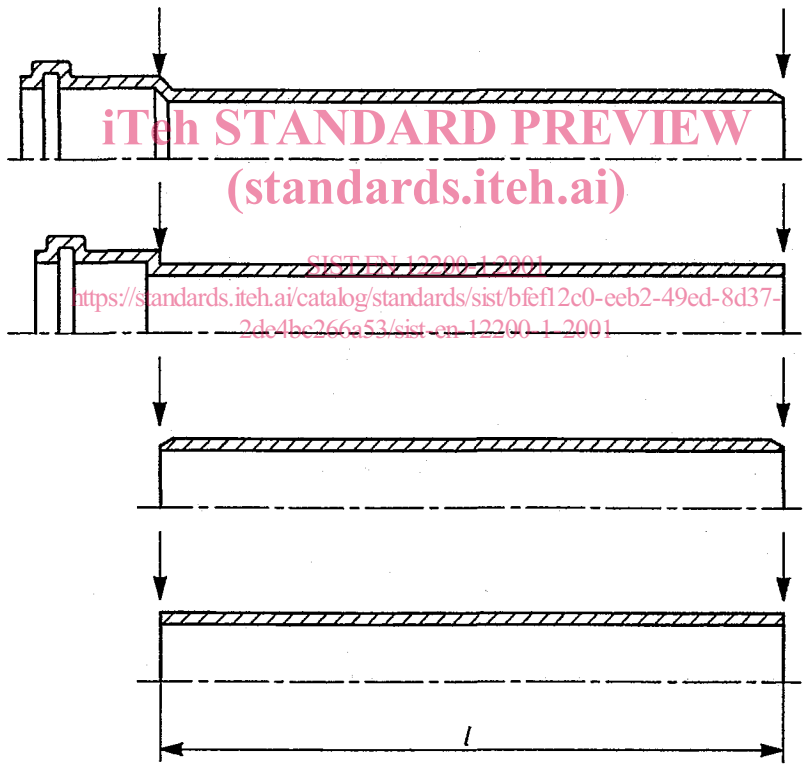

Figure 2 — Effective length of pipe

6.2.4 Wall thicknesses of pipes and sockets

6.2.4.1 Wall thickness of circular pipes and their sockets

The wall thickness of circular pipes and their sockets shall conform to Table 2 when measured at the location points as shown in Figure 3.