
Cevni sistemi iz polimernih materialov za oskrbo z vodo in za podzemne in nadzemne sisteme odvodnjavanja, kanalizacije ter namakanja pod tlakom - Orientiran nemehčan polivinilklorid (PVC-O) - 2. del: Cevi

Plastics piping systems for water supply and for buried and above ground drainage, sewerage and irrigation under pressure - Oriented unplasticized poly(vinyl chloride) (PVC-O) - Part 2: Pipes

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für erdverlegte und nicht erdverlegte Entwässerungs-, Abwasser- und Bewässerungsdruckleitungen - Orientiertes weichmacherfreies Polyvinylchlorid (PVC-O) - Teil 2: Rohre

Systèmes de canalisations en plastique pour l'alimentation en eau, les branchements et collecteurs d'assainissement et les systèmes d'irrigation sous pression, enterrés ou aériens - Poly(chlorure de vinyle) non plastifié orienté (PVC-O) - Partie 2 : Tubes

Ta slovenski standard je istoveten z: prEN 17176-2

ICS:

| | | |
|-----------|---------------------------------|-------------------------|
| 23.040.20 | Cevi iz polimernih materialov | Plastics pipes |
| 91.140.80 | Drenažni sistemi | Drainage systems |
| 93.030 | Zunanji sistemi za odpadno vodo | External sewage systems |

oSIST prEN 17176-2:2018

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 17176-2

November 2017

ICS 23.040.20

English Version

**Plastics piping systems for water supply and for buried
and above ground drainage, sewerage and irrigation under
pressure - Oriented unplasticized poly(vinyl chloride)
(PVC-O) - Part 2: Pipes**

Systèmes de canalisations en plastique pour
l'alimentation en eau, les branchements et collecteurs
d'assainissement et les systèmes d'irrigation sous
pression, enterrés ou aériens - Poly(chlorure de vinyle)
non plastifié orienté (PVC-O) - Partie 2 : Tubes

Kunststoff-Rohrleitungssysteme für die
Wasserversorgung und für erdverlegte und nicht
erdverlegte Entwässerungs-, Abwasser- und
Bewässerungsdruckleitungen - Orientiertes
weichmacherfreies Polyvinylchlorid (PVC-O) - Teil 2:
Rohre

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 155.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

| | |
|--|----|
| European foreword..... | 4 |
| Introduction | 5 |
| 1 Scope..... | 6 |
| 2 Normative references..... | 6 |
| 3 Terms, definitions, symbols and abbreviated terms..... | 8 |
| 4 Material..... | 8 |
| 4.1 Pipe material | 8 |
| 4.2 Density | 8 |
| 4.3 Determination of the MRS class | 8 |
| 4.4 Orientation factor | 9 |
| 5 General characteristics | 9 |
| 5.1 Appearance..... | 9 |
| 5.2 Colour | 9 |
| 5.3 Opacity | 9 |
| 5.4 Classification of pipes | 9 |
| 5.4.1 Classification..... | 9 |
| 5.4.2 Calculation of wall thickness..... | 10 |
| 6 Geometrical characteristics | 10 |
| 6.1 Measurement of dimensions..... | 10 |
| 6.2 Length of pipes | 10 |
| 6.3 Nominal outside diameters and wall thicknesses..... | 11 |
| 6.4 Pipes with integral sockets with elastomeric sealing ring type..... | 12 |
| 6.5 Pipe ends with integral sockets with solvent cement joints | 14 |
| 6.6 Plain ends..... | 14 |
| 7 Selection of pipes..... | 14 |
| 7.1 Selection of nominal pressure and pipe series S for water up to and including 25 °C..... | 14 |
| 7.2 Determination of the allowable operating pressure for water up to 45 °C..... | 15 |
| 8 Mechanical characteristics | 15 |
| 8.1 Resistance to hydrostatic pressure | 15 |
| 8.1.1 General..... | 15 |
| 8.1.2 Pipes..... | 16 |
| 8.1.3 Pipes with integral sockets..... | 16 |
| 8.2 Impact strength..... | 16 |
| 8.3 Ring stiffness..... | 17 |
| 9 Physical characteristics | 17 |
| 10 Sealing rings..... | 18 |
| 11 Adhesives | 18 |
| 12 Marking..... | 19 |
| 12.1 General..... | 19 |
| 12.2 Minimum required marking | 19 |
| 12.3 Additional marking | 19 |

| | |
|--|-----------|
| Annex A (normative) Establishment of the pipe material classification..... | 20 |
| A.1 General | 20 |
| A.2 Determination of pipe material classification | 20 |
| A.2.1 Procedure | 20 |
| A.2.2 Classified feedstock material | 20 |
| A.2.3 Feedstock material not a classified material..... | 20 |
| Annex B (informative) Minimum depth of engagement of sockets | 21 |
| B.1 General | 21 |
| B.2 Calculation of depth of engagement..... | 21 |
| Annex C (normative) Temperature derating factor | 24 |
| Annex D (informative) Calculation of initial ring stiffness and negative pressure capability of pipes | 25 |
| D.1 Calculation of initial ring stiffness..... | 25 |
| D.2 Negative pressure capability of pipes | 25 |
| Annex E (normative) Determination of axial and circumferential orientation factor | 27 |
| E.1 Principle..... | 27 |
| E.2 Method..... | 27 |
| E.3 Test parameters | 27 |
| E.4 Test procedure | 27 |
| Bibliography | 29 |

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

SIST EN 17176-2:2019

<https://standards.iteh.ai/catalog/standards/sist/c415c767-4755-4ecd-a829-84aa05ff190c/sist-en-17176-2-2019>

prEN 17176-2:2017 (E)**European foreword**

This document (prEN 17176-2:2017) 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.

prEN 17176 consists of the following parts, under the general title *Plastics piping systems for water supply and for buried and above ground drainage, sewerage and irrigation under pressure — Oriented unplasticized poly(vinyl chloride) (PVC-O)*:

- a) *Part 1: General*;
- b) *Part 2: Pipes* (this document);
- c) *Part 3: Fittings*;
- d) *Part 5: Fitness for purpose of the system*;
- e) *Part 7: Guidance for assessment of conformity*¹⁾.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

SIST EN 17176-2:2019

<https://standards.iteh.ai/catalog/standards/sist/c415c767-4755-4ecd-a829-84aa05ff190c/sist-en-17176-2-2019>

1) Currently in preparation.

Introduction

The System Standard, of which this is Part 2, specifies the requirements for a piping system made from oriented unplasticized poly(vinyl chloride) (PVC-O) pipes and its components. The piping system is intended to be used for water supply, pressurized drainage, sewerage, treated waste water and irrigation systems to be used underground or above ground where protected to direct sunlight.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the products covered by this part of prEN 17176, the following are relevant.

- a) This part of prEN 17176 provides no information as to whether or not the products can be used without restriction.
- b) Existing national regulations concerning the use and/or the characteristics of these products remain in force.

Requirements and test methods for PVC-O components are specified in prEN 17176-1 and prEN 17176-3. Reference is made to the following standards: EN ISO 1452-3, EN 12842 for other components manufactured not from PVC-O. Characteristics for fitness for purpose (mainly for joints) are established in prEN 17176-5.

This part of prEN 17176 specifies the characteristics of pipes.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

SIST EN 17176-2:2019

<https://standards.iteh.ai/catalog/standards/sist/c415c767-4755-4ecd-a829-84aa05ff190c/sist-en-17176-2-2019>

1 Scope

This part of prEN 17176 specifies the characteristics of solid-wall pipes made from oriented unplasticized poly(vinyl chloride) (PVC-O) for piping systems intended for water supply and for buried and above-ground drainage, sewerage, treated waste water and irrigation under pressure.

It also specifies the test parameters for the test methods referred to this part of prEN 17176.

In conjunction with prEN 17176-1 and prEN 17176-5, it is applicable to oriented PVC-O pipes with or without integral socket intended to be used for the following:

- a) water mains and services lines;
- b) conveyance of water for both outside and inside buildings;
- c) drainage, sewerage and treated waste water under pressure.
- d) irrigation under pressure

It is applicable to piping systems intended for the supply of water under pressure up to and including 25 °C (cold water) intended for human consumption and for general purposes as well as for waste water and water for irrigation under pressure.

This part of prEN 17176 specifies pipes for the conveyance of water, waste water and water for irrigation up to and including 45 °C. For temperatures between 25 °C and 45 °C, EN ISO 1452-2:2009, Figure C.1 applies.

This part of prEN 17176 specifies a range of pipe sizes and pressure classes and gives requirements concerning colours.

The piping system according to this European Standard is intended for the conveyance of cold water up to pressures of 25 bars²⁾ and especially in those applications where special performance requirements are needed, such as impact loads and pressure fluctuations, up to pressure of 25 bars.

NOTE 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.

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

prEN 17176-1:2017, *Plastics piping systems for water supply and for buried and above ground drainage, sewerage and irrigation under pressure — Oriented unplasticized poly(vinyl chloride) (PVC-O) — Part 1: General*

2) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm².

prEN 17176-5, *Plastic piping systems for water supply and for buried and above ground drainage, sewerage and irrigation under pressure — Oriented unplasticized poly(vinyl chloride) (PVC-O) — Part 5: Fitness for purpose of the system*

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 pycnometer method and titration method*

EN ISO 1452-2:2009, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Pipes (ISO 1452-2:2009)*

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

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

EN ISO 7686, *Plastics pipes and fittings — Determination of opacity (ISO 7686)*

EN ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO 9080)*

EN ISO 9311-1, *Adhesives for thermoplastic piping systems — Part 1: Determination of film properties (ISO 9311-1)*

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

EN ISO 9969, *Thermoplastics pipes — Determination of ring stiffness (ISO 9969)*

EN ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification, designation and design coefficient (ISO 12162)*

ISO 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

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

ISO 4065, *Thermoplastics pipes — Universal wall thickness table*

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)*

prEN 17176-2:2017 (E)

ISO 7387-1, *Adhesives with solvents for assembly of PVC-U pipe elements — Characterization — Part 1: Basic test methods*

ISO 11922-1:1997, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO 18373-1, *Rigid PVC pipes — Differential scanning calorimetry (DSC) method — Part 1: Measurement of the processing temperature*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms, definitions, symbols and abbreviated terms given in prEN 17176-1 and the following symbols and abbreviated terms 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 <http://www.iso.org/obp>

L is the length of socket;

m is the depth of engagement;

e_n is expressed in millimetres (mm);

PN is expressed in mega pascals (MPa);

MRS is expressed in mega pascals (MPa);

C is non dimensional;

S_0 is the calculated preferred value of the nominal S series number of the pipe from 5.4.1.

4 Material**4.1 Pipe material**

The material from which the pipes are made shall conform to prEN 17176-1 and to the requirements given in 4.2 and 4.3.

4.2 Density

The density, ρ , at 23 °C of the pipe, when measured in accordance with EN ISO 1183-1, shall be within the following limits:

$$1\,350\text{ kg/m}^3 < \rho < 1\,460\text{ kg/m}^3$$

4.3 Determination of the MRS class

Oriented pipes made from a defined PVC compound/formulation and with a well-defined orientation level in circumferential and axial direction, shall be evaluated according to the procedures of Annex A. The minimum required strength (MRS) values shall be classified in accordance with prEN 17176-1.

The MRS class shall be declared by the manufacturer.

4.4 Orientation factor

The level of orientation, is an indirect parameter for the material classification of the pipes and is depending of the production process.

The orientation factor, circumferential and axial shall comply with the minimum values as defined in Table 1. The orientation factors shall be measured according to Annex E and specified by the manufacturer to be within – 5 % and + 15 % deviation from MRS type-tested pipes.

Table1 — Orientation factor

| Minimum required strength (MRS) | 315 | 355 | 400 | 450 | 500 |
|---------------------------------|-----|-----|-----|-----|-----|
| Minimum Orientation axial | 1,0 | | | | |
| Minimum Orientation radial | 1,5 | 1,6 | 1,7 | 1,8 | 1,9 |

5 General characteristics

5.1 Appearance

When viewed without magnification the internal and external surfaces of pipes shall be smooth, clean and free from scoring, cavities and other surface defects to an extent that would prevent conformity to this part of prEN 17176. The material shall not contain any impurities visible without magnification. The ends of the pipe shall be cut cleanly and square to the axis of the pipe.

5.2 Colour

The colour of the pipes shall be uniform throughout the wall.

The colour of the pipes shall be preferable the following:

- a) cream, blue, white, white with blue striping for water supply;
- b) blue, white for irrigation under pressure;
- c) grey or brown for pressurized drainage and sewerage;
- d) purple for treated waste water

NOTE Attention is drawn to the fact that the colouring of pipes for the supply of water for human consumption can be part of national regulation.

5.3 Opacity

If a pipe is required to be opaque for use in above ground applications the wall of the pipe shall transmit not more than 0,2 % of visible light falling on it when tested in accordance with EN ISO 7686.

5.4 Classification of pipes

5.4.1 Classification

Pipes shall be classified to their nominal pressure PN.

The nominal pressure PN, the pipe series S and the design stress, σ_s , are connected by the following relationship.