SLOVENSKI STANDARD
SIST EN 17176-2:2019

01-julij-2019

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: **EN 17176-2:2019**

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

SIST EN 17176-2:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 17176-2

April 2019

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 European Standard was approved by CEN on 14 January 2019.

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 CEN-CENELEC Management Centre 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 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.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 17176-2:2019 E

Contents

Page

European foreword

This document (EN 17176-2:2019) 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 2019 and conflicting national standards shall be withdrawn at the latest by September 2019.

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.

EN 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)*:

— *Part 1: General*;

— *Part 2: Pipes* (this document);

— *Part 3: Fittings* (Technical Specification);

— *Part 5: Fitness for purpose of the system*;

— *Part 7: Guidance for assessment of conformity* (in preparation).

For valves, see EN ISO 1452-4 [3].

Guidance for installation is given in ISO/TR 4191 [4].

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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.

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 from 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 EN 17176, the following is relevant:

a) This part of EN 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 EN 17176-1 and CEN/TS 17176-3. For other components (not manufactured from PVC-O) reference is made to the following standards: EN ISO 1452-3 (PVC-U) [2] and EN 12842 (Cast Iron) [1]. Characteristics for fitness for purpose (mainly for joints) are established in EN 17176-5.

This part of EN 17176 specifies the characteristics of PVC-O pipes.

1 Scope

This part of EN 17176 specifies the characteristics of solid-wall pipes made of oriented unplasticized poly(vinyl chloride) (PVC-O) for piping systems intended for water supply and for buried drainage, sewerage, treated waste water and irrigation under pressure or above-ground where protected from direct sunlight. It also specifies the test parameters for the test methods referred to in this document.

In conjunction with EN 17176-1 and EN 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 with a maximum allowable operating pressure (PFA) up to and including 25 bar[1)]. The piping system according to this document is intended for the conveyance of cold water up to and including 45 °C and especially in those applications where special performance requirements are needed, such as impact loads and pressure fluctuations.

For temperatures between 25 °C and 45 °C, Figure C.1 of this document applies.

This part of EN 17176 specifies a range of pipe sizes and pressure classes and gives a requirement and recommendations concerning colours.

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*

EN 17176-1:2019, *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*

EN 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*

1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

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 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 3, *Preferred numbers — Series of preferred numbers*

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

ISO 2531, *Ductile iron pipes, fittings, accessories and their joints for water applications*

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)*

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

ISO 11922-1:2018, *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 and definitions

For the purposes of this document, the terms and definitions given in EN 17176-1 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

4 Symbols

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

l_s is the length of socket (mm)

m is the depth of engagement (mm)

S_o is the calculated preferred value of the nominal S series number of the pipe from 6.4.2

β minimum angle chamfer

5 Material

5.1 General

The material from which the pipes are made shall conform to EN 17176-1 and to the requirements given in 5.2 and 5.4.

5.2 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:

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

5.3 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 MRS value shall be classified in accordance with EN 17176-1.

The MRS class shall be declared by the manufacturer.

5.4 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 be declared by the manufacturer and 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 the declared values.

Table1 — Minimum declared orientation factor

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

6 General characteristics

6.1 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 EN 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.

6.2 Colour

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

The preferred colour of pipes shall be as follows:

a) for water supply cream, blue, white or white with blue striping;

b) for irrigation under pressure blue or white;

c) for pressurized drainage and sewerage grey, brown or white with brown stripes;

d) for treated waste water purple.

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.

6.3 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.

6.4 Classification of pipes

6.4.1 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:

$$PN \cong \frac{10\sigma_s}{S} \quad (1)$$

$$S = \frac{SDR - 1}{2} \quad (2)$$

$$SDR = \frac{d_n}{e_n} \quad (3)$$

$$\sigma_s = \frac{MRS}{C} \quad (4)$$

6.4.2 Calculation of wall thickness

The relationship between the nominal wall thickness e_n and the nominal outside diameter d_n is specified in ISO 4065. The values for nominal pipe wall thickness e_n for nominal pressure ratings PN, can be calculated by substituting the values for MRS, C, and d_n in the formula:

$$e_n = \frac{d_n}{2S_o + 1} \quad (5)$$

Values shall be rounded to one decimal place according to the rules of ISO 4065.

Nominal S numbers and their calculated values are given in ISO 4065 for the R10 series of preferred numbers. For the R20 series required for this European Standard, refer to ISO 3.

The nominal outside diameter and nominal wall thickness for the relevant nominal pressure and material classes are specified in Table 3.

7 Geometrical characteristics

7.1 Measurement of dimensions

Dimensions shall be measured in accordance with EN ISO 3126.

7.2 Length of pipes

It is recommended to supply pipes in one or more of the following lengths: 3 m, 5 m, 6 m, 10 m or 12 m, where these lengths do not include the depth of any integral socket(s). Other lengths are subject to agreement between the manufacturer and the purchaser.

The tolerance on length, including sockets, is specified in Table 2.