

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 17176-1:2019 sisaldab Euroopa standardi EN 17176-1:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 17176-1:2019 consists of the English text of the European standard EN 17176-1:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 17.04.2019.	Date of Availability of the European standard is 17.04.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 23.040.20, 23.040.45

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

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 1: General

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 1 : Généralités

Kunststoff-Rohrleitungssysteme für die  
Wasserversorgung und für erdverlegte und nicht  
erdverlegte Entwässerungs-, Abwasser- und  
Bewässerungsdruckleitungen - Orientiertes  
weichmacherfreies Polyvinylchlorid (PVC-O) - Teil 1:  
Allgemeines

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

## Contents

Page

European foreword.....	3
Introduction .....	4
1     Scope.....	5
2     Normative references.....	5
3     Terms and definitions .....	6
4     Symbols and abbreviations .....	11
5     Material.....	12
5.1   General requirements for compounds or formulations .....	12
5.2   Special requirements for compounds or formulations in contact with drinking water ....	12
5.3   Use of non-virgin material.....	13
6     Material classification .....	13
6.1   MRS value classification pipes.....	13
6.2   PN classification fittings .....	13
6.3   Design stress pipes.....	13
Bibliography.....	14

## European foreword

This document (EN 17176-1:2019) 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 October 2019 and conflicting national standards shall be withdrawn at the latest by October 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* (this document);
- *Part 2: Pipes*;
- *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 [6].

Guidance for installation is given in ISO/TR 4191 [7].

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 1, specifies the requirements for a piping system made from oriented unplasticized poly(vinyl chloride) (PVC-O) 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 17176-2 and CEN/TS 17176-3:2018. For other components (not manufactured from PVC-O) reference is made to the following standards: EN ISO 1452-3 (PVC-U) and EN 12842 (Cast Iron). Characteristics for fitness of purpose (mainly for joints) are specified in EN 17176-5.

This part of EN 17176 specifies the general aspects and characteristics of materials.

## 1 Scope

This part of EN 17176 specifies the material characteristics of oriented unplasticized poly(vinyl chloride) (PVC-O) solid wall piping systems intended for water supply and for buried drainage, sewerage and irrigation under pressure or above-ground where protected from direct sunlight.

In conjunction with EN 17176-2, CEN/TS 17176-3 and EN ISO 1452-3, it is applicable to PVC-O pipes, PVC-O fittings, their joints and to joints with components of other plastics and non-plastics materials 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.

Joints constructed of other materials will meet their own standards in addition to the fitness of purpose requirements specified in EN 17176-5.

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<sup>1)</sup>. 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, EN 17176-2:2018, Figure C.1 applies.

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 17176-2:2018, *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*

CEN/TS 17176-3, *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 3: Fittings*

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*

EN ISO 472, *Plastics — Vocabulary (ISO 472)*

EN ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

---

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

EN ISO 1452-2, *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)*

EN ISO 1452-3, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 3: Fittings (ISO 1452-3)*

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

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 6401, *Plastics — Poly(vinyl chloride) — Determination of residual vinyl chloride monomer — Gas-chromatographic method (ISO 6401)*

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

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)*

### 3 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.

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>

#### 3.1 Wall construction definition

##### 3.1.1

##### **solid-wall**

having smooth internal and external surface and the same homogeneous compound/formulation throughout the wall

#### 3.2 Geometrical definitions

##### 3.2.1

##### **mean inside diameter of socket**

$d_{im}$

arithmetical mean of inside diameters at the midpoint of the socket length according EN ISO 3126

##### 3.2.2

##### **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  $\pi$  ( $\approx 3,142$ ), rounded up to the nearest 0,1 mm