SLOVENSKI STANDARD
oSIST prEN 12201-2:2021

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Cevni sistemi iz polimernih materialov za oskrbo z vodo in za odvodnjavanje in kanalizacijo pod tlakom - Polietilen (PE) - 2. del: Cevi

Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 2: Pipes

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für Entwässerungs- und Abwasserdruckleitungen - Polyethylen (PE) - Teil 2: Rohre

Systèmes de canalisations en plastique pour l'alimentation en eau et pour les branchements et les collecteurs d'assainissement avec pression - Polyéthylène (PE) - Partie 2 : Tubes

Ta slovenski standard je istoveten z: **prEN 12201-2**

ICS:

23.040.05	Cevovodi za zunanje sisteme za odpadno vodo in njihovi deli	Pipeline and its parts for external sewage systems
91.140.60	Sistemi za oskrbo z vodo	Water supply systems
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

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English Version

Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 2: Pipes

Systèmes de canalisations en plastique pour l'alimentation en eau et pour les branchements et les collecteurs d'assainissement avec pression - Polyéthylène (PE) - Partie 2 : Tubes

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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.

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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.

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

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European foreword

This document (prEN 12201-2:2021) 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 will supersede EN 12201-2:2011+A1:2013.

In comparison with the previous edition, the following technical modifications have been made:

— The revision of this System Standard has been carried to add the PE 100-RC type materials with enhanced resistance to slow crack growth. EN 12201-1:2021, Annex A discusses the performance of this type of material and gives additional information for non-conventional installation techniques. Test methods have been updated and new test methods have been added for PE 100-RC materials. The pipe diameter range has been increased to 3000 mm.

System Standards are based on the results of the work being 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 12201 consists of the following parts:

— EN 12201-1, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 1: General*;

— EN 12201-2, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 2: Pipes* (this document);

— EN 12201-3, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 3: Fittings*;

— EN 12201-4, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 4: Valves for water supply systems*;

— EN 12201-5, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 5: Fitness for purpose of the system*;

In addition the following document provides guidance on the assessment of conformity:

— CEN/TS 12201-7, *Plastics piping systems for water supply — Polyethylene (PE) — Part 7: Assessment of conformity*.

Introduction

The System Standard, of which this is Part 2, specifies the requirements for a piping system and its components when made from polyethylene (PE). The piping system is intended to be used for water supply intended for human consumption, including the conveyance of raw water prior to treatment, drainage and sewerage under pressure, vacuum sewer systems, and water for other purposes.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by the EN 12201 series:

a) this document provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;

b) products intended for use in water supply systems should comply, when existing, with national regulations and testing arrangements that ensure fitness for contact with drinking water.

Requirements and test methods for material and components, other than pipes, are specified in prEN 12201-1:2021, prEN 12201-3:2021 and prEN 12201-4:2021.

Characteristics for fitness of purpose are covered in prEN 12201-5:2021 and CEN/TS 12201-7 [3] gives guidance for the assessment of conformity.

This Part of EN 12201 covers the characteristics of pipes.

1 Scope

This document specifies the characteristics of pipes made from polyethylene (PE) for buried and above ground applications, intended for the conveyance of water for human consumption, raw water prior to treatment, drainage and sewerage under pressure, vacuum sewer systems, and water for other purposes.

NOTE 1 For PE components intended for the conveyance of water for human consumption and raw water prior to treatment attention is drawn to 6.3 of this document. Components manufactured for water for general purposes, drainage and sewerage are possibly not suitable for water supply for human consumption.

For use in contaminated soils special consideration is taken for pipes intended for the transport of water intended for human consumption or raw water prior to treatment.

NOTE 2 Pipes constructions including barrier layers are not covered by this document. ISO 21004 provides an alternative solution for use in contaminated soils [9].

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

In conjunction with Part 1 and Parts 3 to 5 of EN 12201, it is applicable to PE pipes, their joints and to joints with components of PE and other materials intended to be used under the following conditions:

a) allowable operating pressure, PFA, up to 25 bar [1)];

b) an operating temperature of 20 °C as a reference temperature;

c) buried in the ground;

d) sea outfalls;

e) laid in water;

f) above ground, including pipes suspended below bridges.

NOTE 3 For applications operating at constant temperatures greater than 20 °C and up to 40 °C, see prEN 12201-1:2021, Annex A

EN 12201 series covers a range of allowable operating pressures and gives requirements concerning colours.

This document specifies three types of pipe:

— PE pipes (outside diameter d_n) including any identification stripes;

— PE pipes with co-extruded layers on either or both the outside and/or inside of the pipe (total outside diameter d_n) as specified in Annex B, where all layers have the same MRS rating. A coextruded pipe made of a combination of PE 100 and PE 100-RC layers are regarded as PE 100 and marked accordingly.

— PE pipes (outside diameter d_n) with a peelable, contiguous thermoplastics additional layer on the outside of the pipe ('coated pipe') as specified in Annex C.

NOTE 4 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 guidance or regulations and installation practices or codes.

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

NOTE 5 Assessment of the resistance to slow crack growth of the PE pipe compound used for the manufacture of products to this document is required in accordance with prEN 12201-1:2021, Table 2.

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.

prEN 12201-1:2021, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 1: General*

prEN 12201-5, *Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) - Part 5: Fitness for purpose of the system*

CEN/TR 15438, *Plastics piping systems - Guidance for coding of products and their intended uses*

EN ISO 1133-1, *Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method (ISO 1133-1)*

EN ISO 1167-1:2006, *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 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 6259-1, *Thermoplastics pipes - Determination of tensile properties - Part 1: General test method (ISO 6259-1)*

EN ISO 6259-3, *Thermoplastics pipes - Determination of tensile properties - Part 3: Polyolefin pipes (ISO 6259-3)*

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

EN ISO 11357-6, *Plastics - Differential scanning calorimetry (DSC) - Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO 11357-6)*

EN ISO 13968, *Plastics piping and ducting systems - Thermoplastics pipes - Determination of ring flexibility (ISO 13968)*

ISO 4433-1:1997, *Thermoplastics pipes — Resistance to liquid chemicals — Classification — Part 1: Immersion test method*

ISO 4433-2:1997, *Thermoplastics pipes — Resistance to liquid chemicals — Classification — Part 2: Polyolefin pipes*

ISO/DIS 13479:—[2)], Polyolefin pipes for the conveyance of fluids — Determination of resistance to crack propagation — Test method for slow crack growth on notched pipes

[2)] Under preparation.

ISO 18488, *Polyethylene (PE) materials for piping systems — Determination of Strain Hardening Modulus in relation to slow crack growth — Test method*

ISO 18489, *Polyethylene (PE) materials for piping systems — Determination of resistance to slow crack growth under cyclic loading — Cracked Round Bar test method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 12201-1 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 https://www.iso.org/obp

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations given in prEN 12201-1 apply.

5 Material

5.1 Compound for pipes

The PE compound from which the pipes are made shall conform to prEN 12201-1.

The pipes shall be made from virgin material or reworked material from the same PE compound from the manufacturer's own plant, or a mixture of both. Reworked material from the base pipe of peelable layer pipe (coated pipe) and reworked material from pipes with identification stripes may be used.

For co-extruded layers and use of reworked material from coextruded pipes, see Annex B.

Reworked material from peelable layer pipes with this layer attached shall not be used.

5.2 Compound for identification stripes

The stripe compound (see 6.2) shall be manufactured from a PE base polymer according to prEN 12201-1, which is used for a pipe compound for which fusion compatibility has been proven.

The compound used for identification stripes shall comply with the fusion compatibility requirements in prEN 12201-1, and with the resistance to weathering as described in prEN 12201-1:2021, Table 2. The resistance to weathering of the identification stripe compound shall be declared by the manufacturer of the compound, confirming whether either a cumulative radiant exposure of ≥ 3,5 GJ/ m² or ≥ 7 GJ/m² related to the outdoor storage ability limit is applicable.

NOTE Fusion compatibility is not applicable for PE 40 materials.

The OIT of the stripe compound shall be ≥ 20 min at 200 °C, measured by the compound supplier in accordance with EN ISO 11357-6.

5.3 External reworked and recyclable material

Reworked material obtained from external sources and recyclable material shall not be used.

6 General characteristics

6.1 Appearance

When viewed without magnification the internal and external surfaces of pipes shall be smooth and clean and shall have no scoring, cavities, and other surface defects to an extent that would prevent conformity to this document.

The ends of the pipe shall be cut cleanly and square to the axis of the pipe.

6.2 Colour

Pipes intended for the conveyance of water for human consumption shall be black or blue. In addition, black pipes may be identified by blue stripes, according to national preference.

Blue pipes or black pipes with blue stripes are intended for the conveyance of water for human consumption only.

Pipes intended for other purposes, drainage and sewerage shall be black or black with brown stripes or according to national preference.

The outer coextruded layer of coextruded pipes (see Annex B) or the outer peelable layer of peelable layer pipes (see Annex C) for pipe intended for the conveyance of water for human consumption shall be either black or blue. In addition identification stripes may be used according to national preference for the application.

The outer coextruded layer of coextruded pipes (see Annex B) or the outer peelable layer of peelable layer pipes (see Annex C) for pipe intended for other purposes shall be either black or black with brown stripes or brown or according to national preference. In addition identification stripes of a different colour may be used according to national preference for the application.

NOTE National preference for colour can be stated in the National Foreword.

For above ground installations, all components other than black shall be protected from direct UV light.

6.3 Effect on water quality

For compounds intended to be used for components in contact with water for human consumption, attention is drawn to the requirements of national regulations.

7 Geometrical characteristics

7.1 Measurement of dimensions

The dimensions of the pipe shall be measured in accordance with EN ISO 3126 and rounded to the next 0,1 mm. In the case of dispute, the measurements of dimensions shall not be made less than 24 h after manufacture after being conditioned for at least 4 h at (23 ± 2) °C.

Indirect measurement during the stage of production is allowed at shorter time periods providing evidence is shown of correlation.

NOTE The national preference for pipe size and PN rating can be given in the National Foreword.

7.2 Mean outside diameter, out-of-roundness (ovality) and tolerances

The mean outside diameters, d_{em}, and the out-of-roundness (ovality) shall be in accordance with Table 1.

For straight pipes, the maximum out-of-roundness shall conform to Table 1. For coiled pipes, the maximum out-of roundness shall be specified by agreement between the manufacturer and the end-user.

Pipe extruded from PE 40 materials shall be limited to diameters up to and including 63 mm.

In some countries pipe in PE 40 materials may be used in diameters up to and including 90 mm. If this is the case this should be stated in the National Foreword.