SLOVENSKI STANDARD
SIST EN 12201-1:2011

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Nadomešča:
SIST EN 12201-1:2003
SIST EN 13244-1:2003

Cevni sistemi iz polimernih materialov za oskrbo z vodo in za odvodnjavanje in kanalizacijo pod tlakom - Polietilen (PE) - 1. del: Splošno

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

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für Entwässerungs- und Abwasserdruckleitungen - Polyethylen (PE) - Teil 1: Allgemeines

Ta slovenski standard je istoveten z: **EN 12201-1:2011**

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23.040.20	Cevi iz polimernih materialov	Plastics pipes
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 1: General

Systèmes de canalisations en plastique pour l'alimentation en eau et pour les branchements et les collecteurs d'assainissement avec pression - Polyéthylène (PE) - Partie 1: Généralités

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für Entwässerungs- und Abwasserdruckleitungen - Polyethylen (PE) - Teil 1: Allgemeines

This European Standard was approved by CEN on 8 July 2011.

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Foreword

This document (EN 12201-1:2011) 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of an identical text or by endorsement, at the latest by March 2012, and conflicting national standards shall be withdrawn at the latest by March 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12201-1:2003, EN 13244-1:2002.

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 (this standard)*;

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

— 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*;

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

This revision is a merger of both EN 12201-1:2003 and EN 13244-1:2003. The test methods referenced have been changed or updated as appropriate. The requirements for resistance to slow crack growth in accordance with EN ISO 13479 have been increased, and the rating of dispersion for pigment and carbon black dispersion in accordance with ISO 18553 has been added.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The System Standard, of which this is Part 1, 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 products covered by EN 12201 (all parts):

a) this standard provides no information as to whether the products 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 must comply, when existing, with national regulations and testing arrangements that ensure fitness for contact with drinking water.

NOTE On April 2006, EC Commission set up a revised mandate (M/136) asking CEN to propose harmonised product standards and support standards for test methods which could be used for assessing the fitness for contact with drinking water. In parallel, EC Commission has launched processes for a regulation of construction products (CPR) to be substituted to CP directive (89/106/EEC) and for the revision of drinking water directive (98/83/EC). If relevant, when the outputs of these processes will be known, European Product Standards will be amended by the addition of an Annex Z under Mandate M136 which will contain formal references to the applicable requirements. Until such amendments, the current national regulations remain applicable.

Requirements and test methods for components of the piping system are specified in EN 12201-2:2011, EN 12201-3:2011 and prEN 12201-4:2011.

Characteristics for fitness for purpose are covered in EN 12201-5:2011.[1] CEN/TS 12201-7 [2] gives guidance on the assessment of conformity.

This Part of EN 12201 covers the general aspects of the plastics piping system.

1 Scope

This part of EN 12201 specifies the general aspects of polyethylene (PE) pressure piping systems (mains and service pipes) for buried or 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 intended for human consumption and raw water prior to treatment attention is drawn to Clause 5 of this European Standard. Components manufactured for water for other purposes, drainage and sewerage may not be suitable for water supply for human consumption.

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

In conjunction with Parts 2 to 5 of EN 12201, it is applicable to PE pipes, fittings, valves, their joints and to joints with components of 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 2 For applications operating at constant temperatures greater than 20 °C and up to 40 °C, see Annex A.

EN 12201 (all parts) covers a range of allowable operating pressures and gives requirements concerning colours and additives.

NOTE 3 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.

2 Normative references

The following referenced documents are indispensable for the application 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 12099, *Plastics piping systems — Polyethylene piping materials and components — Determination of volatile content*

EN 12201-2:2011, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 2: Pipes*

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

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

prEN 12201-4:2011, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 4: Valves for water supply systems*

EN ISO 472:2001, *Plastics —Vocabulary (ISO 472:1999)*

EN ISO 1043-1:2001, *Plastics – Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1:2001)*

EN ISO 1133, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:2005)*

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 1167-1:2006)*

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 1167-2:2006)*

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 1183-1:2004)*

EN ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method (ISO 1183-2:2004)*

EN ISO 6259-1, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method (ISO 6259-1:1997)*

prEN ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO/DIS 9080:2010)*

EN ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification, designation and design coefficient (ISO 12162:2009)*

EN ISO 13477, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Small-scale steady-state test (S4 test) (ISO 13477:2008)*

EN ISO 13478, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Full-scale test (FST) (ISO 13478:2007)*

EN ISO 13479, *Polyolefin pipes for the conveyance of fluids — Determination of resistance to crack propagation — Test method for slow crack growth on notched pipes (ISO 13479:2009)*

EN ISO 15512, *Plastics — Determination of water content (ISO 15512:1999)*

EN ISO 16871, *Plastics piping and ducting systems — Plastics pipes and fittings — Method for exposure to direct (natural) weathering (ISO 16871:2003)*

ISO 6259-3, *Thermoplastics pipes — Determination of tensile properties — Part 3: Polyolefin pipes*

ISO 6964, *Polyolefin pipes and fittings — Determination of carbon black content by calcination and pyrolysis — Test method and basic specification*

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

ISO 11413:2008, *Plastics pipes and fittings — Preparation of test piece assemblies between a polyethylene (PE) pipe and an electrofusion fitting*

ISO 11414:2009, *Plastics pipes and fittings — Preparation of polyethylene (PE) pipe/pipe or pipe/fitting test piece assemblies by butt fusion*

ISO 13953, *Polyethylene (PE) pipes and fittings — Determination of the tensile strength and failure mode of test pieces from a butt-fused joint*

ISO 13954, *Plastics pipes and fittings — Peel decohesion test for polyethylene (PE) electrofusion assemblies of nominal outside diameter greater than or equal to 90 mm*

ISO 18553, *Method for the assessment of the degree of pigment or carbon black dispersion in polyolefin pipes, fittings and compounds*

3 Terms and definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472:2001 and EN ISO 1043-1:2001 and the following apply.

3.1.1 Geometrical characteristics

3.1.1.1
nominal size
DN/OD
numerical designation of the size of a component, other than a component designated by a thread size, which is a convenient round number, approximately equal to the manufacturing dimension in millimetres (mm) and related to the outside diameter

3.1.1.2
nominal outside diameter
d_n
specified outside diameter, in millimetres, assigned to a nominal size DN/OD

3.1.1.3
outside diameter at any point
d_e
value of the measurement of the outside diameter through its cross-section at any point of the pipe or spigot end, rounded to the next greater 0,1 mm

3.1.1.4
mean outside diameter
d_{em}
value of the measurement of the outer circumference of the pipe or spigot end of a fitting in any cross section divided by π (= 3,142), rounded to the next greater 0,1 mm

3.1.1.5
minimum mean outside diameter
$d_{em,min}$
minimum value of the outside diameter as specified for a given nominal size

3.1.1.6
maximum mean outside diameter
$d_{em,max}$
maximum value of the outside diameter as specified for a given nominal size

3.1.1.7
out-of-roundness
ovality
difference between the maximum outside diameter and the minimum outside diameter in the same cross-section of the pipe or spigot

3.1.1.8
nominal wall thickness
e_n
numerical designation of the wall thickness of a component, which is a convenient round number, approximately equal to the manufacturing dimension in millimetres

NOTE For thermoplastics components conforming to the different parts of EN 12201, the value of the nominal wall thickness, e_n, is identical to the specified minimum wall thickness at any point, e_{min}.

3.1.1.9
wall thickness at any point
e
wall thickness at any point around the circumference of a component rounded to the next greater 0,1 mm

NOTE The symbol for the wall thickness of the fittings and valves body at any point is *E*.

3.1.1.10
minimum wall thickness at any point
e_{min}
minimum value of the wall thickness at any point around the circumference of a component as specified

3.1.1.11
maximum wall thickness at any point
e_{max}
maximum value of the wall thickness at any point around the circumference of a component as specified

3.1.1.12
mean wall thickness
e_m
arithmetic 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

3.1.1.13
tolerance
permitted variation of the specified value of a quantity expressed as the difference between the permissible maximum and permitted minimum values

3.1.1.14
wall thickness tolerance
t_y
permitted difference between the wall thickness at any point, e, and the nominal wall thickness, e_n

NOTE $e_n \leq e \leq e_n + t_y$

3.1.1.15
pipe series
S
dimensionless number for pipe designation.

NOTE The relationship between the pipe series S and the standard dimension ratio SDR is given by the following equation as specified in ISO 4065:1996 [6].

$$S = \frac{SDR - 1}{2}$$

3.1.1.16
standard dimension ratio
SDR
numerical designation of a pipe series, which is a convenient round number, approximately equal to the dimension ratio of the nominal outside diameter, d_n, and the nominal wall thickness, e_n

3.1.2 Material definitions

3.1.2.1
virgin material
material in a form such as granules that has not been subjected to use or processing other than that required for its manufacture and to which no reprocessable or recyclable materials have been added

3.1.2.2
own reprocessable material
material prepared from clean rejected unused pipes, fittings or valves, including trimmings from the production of pipes, fittings or valves, that will be reprocessed in a manufacturer's plant after having been previously processed by the same manufacturer in the production of components by, for example, injection-moulding or extrusion

3.1.2.3
compound
homogenous extruded mixture of base polymer (PE) and additives, i.e. anti-oxidants, pigments, carbon black, UV-stabilisers and others, at a dosage level necessary for the processing and use of components conforming to the requirements of this standard

3.1.3 Definitions related to material characteristics

3.1.3.1
lower confidence limit of the predicted hydrostatic strength
σ_{LPL}
quantity, with the dimensions of stress, which represents the 97,5 % lower confidence limit of the predicted hydrostatic strength at a temperature θ and time t

NOTE It is expressed in megapascals.

3.1.3.2
minimum required strength
MRS
value of σ_{LPL} at 20 °C and 50 years, rounded down to the next lower value of the R10 series when σ_{LPL} is below 10 MPa, or to the next lower value of the R20 series when σ_{LPL} is 10 MPa or greater

NOTE R10 and R20 series are the Reynard number series conforming to ISO 3:1973 [3] and ISO 497:1973 [4].

3.1.3.3
design coefficient
C
coefficient with a value greater than 1, which takes into consideration service conditions as well as properties of the components of a piping system other than those represented in the lower confidence limit