



SLOVENSKI STANDARD

SIST EN 12201-3:2011

01-december-2011

Nadomešča:

SIST EN 12201-3:2003

SIST EN 13244-3:2003

Cevni sistemi iz polimernih materialov za oskrbo z vodo in za odvodnjavanje in kanalizacijo pod tlakom - Polietilen (PE) - 3. del: Fitingi

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

iTeh STANDARD PREVIEW

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für Entwässerungs- und Abwasserdruckleitungen - Polyethylen (PE) - Teil 3: Formstücke

[SIST EN 12201-3:2011](http://standards.iTeh.si/catalog/standards/sist/9458d38c-099e-45ab-9f11-f56c04d3ac96/sist-en-12201-3-2011)

Systèmes de canalisations en plastique pour l'alimentation en eau et pour les branchements et les collecteurs d'assainissement avec pression - Polyéthylène (PE) - Partie 3 : Raccords

Ta slovenski standard je istoveten z: EN 12201-3:2011

ICS:

23.040.45	Fitingi iz polimernih materialov	Plastics fittings
91.140.60	Sistemi za oskrbo z vodo	Water supply systems
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

SIST EN 12201-3:2011

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12201-3:2011

<https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-f56c04f4ac96/sist-en-12201-3-2011>

EUROPEAN STANDARD

EN 12201-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2011

ICS 23.040.45

Supersedes EN 12201-3:2003, EN 13244-3:2002

English Version

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

Systèmes de canalisations en plastique pour l'alimentation en eau et pour les branchements et les collecteurs d'assainissement avec pression - Polyéthylène (PE) - Partie 3 : Raccords

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für Entwässerungs- und Abwasserdruckleitungen - Polyethylen (PE) - Teil 3: Formstücke

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

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

<https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-f56c04f4ac96/sist-en-12201-3-2011>



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
Foreword.....	4
Introduction	5
1 Scope.....	6
2 Normative references	7
3 Terms and definitions, symbols and abbreviations	8
4 Material.....	9
4.1 PE compound.....	9
4.2 Material for non-polyethylene parts	9
4.2.1 General.....	9
4.2.2 Metal parts	10
4.2.3 Elastomers.....	10
4.2.4 Other materials.....	10
5 General characteristics	10
5.1 Appearance.....	10
5.2 Design	10
5.3 Colour.....	10
5.4 Electrical characteristics for electrofusion fittings	10
5.5 Appearance of factory made joints	11
5.6 Effect on water quality.....	11
6 Geometrical characteristics	11
6.1 Measurement of dimensions	11
6.2 Dimensions of electrofusion socket fittings	11
6.2.1 Diameters and lengths of electrofusion sockets.....	11
6.2.2 Wall thicknesses	13
6.2.3 Out-of-roundness of the bore of a fitting (at any point).....	14
6.3 Dimensions of spigot end fittings.....	14
6.4 Dimensions of socket fusion fittings	16
6.5 Dimensions of electrofusion saddle fittings	16
6.6 Dimensions of mechanical fittings.....	17
6.7 Dimensions of loose backing flanges and flange adapters	17
6.8 Dimensions of fabricated fittings	17
7 Mechanical characteristics	17
7.1 General.....	17
7.2 Conditioning.....	18
7.3 Requirements	18
7.4 Retest in case of failure at 80 °C	20
7.5 Pressure drop.....	20
7.6 Performance requirements	20
8 Physical characteristics	21
8.1 Conditioning.....	21
8.2 Requirements	21

9	Chemical resistance of fittings in contact with chemicals	21
10	Performance requirements	21
11	Marking	22
11.1	General	22
11.2	Minimum required marking of fittings	22
11.3	Additional marking	23
11.4	Fusion system recognition	23
12	Delivery Conditions	23
	Annex A (normative) Socket fusion fittings	24
	Annex B (normative) Fabricated fittings	26
B.1	General	26
B.2	Dimensions	27
B.3	Segmented bends	28
B.4	Swept bends	30
B.5	Segmented tees	31
	Annex C (informative) Examples of typical terminal connection for electrofusion fittings	33
	Annex D (normative) Short-term pressure test method	36
D.1	Principle	36
D.2	Apparatus	36
D.3	Test piece	36
D.4	Procedure	36
D.5	Test report	37
	Annex E (normative) Tensile test for fitting/pipe assemblies	38
E.1	Principle	38
E.2	Apparatus	38
E.3	Test piece	38
E.4	Procedure	38
E.5	Test report	38
	Bibliography	40

iTeh STANDARD PREVIEW

(standards.iteh.ai)

SIST EN 12201-3:2011

<https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11->[156c04f4ac96/sist-en-12201-3-2011](https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-156c04f4ac96/sist-en-12201-3-2011)

EN 12201-3:2011 (E)**Foreword**

This document (EN 12201-3:2011) 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 12201-3:2003, EN 13244-3:2002.

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;
- 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 (this standard);
- 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.

In this revision the test methods have been updated as appropriate and in accordance with other parts of this standard.

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 3, specifies the requirements for a piping system and its components when made from polyethylene (PE), 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 EN 12201 (all parts):

- a) this European 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 material and components, other than fittings, are specified in EN 12201-1, EN 12201-2 and prEN 12201-4:2011.

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

This Part of EN 12201 covers the characteristics of fittings.

EN 12201-3:2011 (E)**1 Scope**

This part of EN 12201 specifies the characteristics of fittings made from polyethylene (PE 100 and PE 80) 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 5.6 of this part of EN 12201. 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 1, 2, 4 and 5 of EN 12201, it is applicable to PE fittings, 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

NOTE 2 For applications operating at constant temperature greater than 20 °C and up to 40 °C, see Annex A of EN 12201-1:2011.

SIST EN 12201-3:2011

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

<https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-b0c044ac96/sist-en-12201-3-2011>

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.

These fittings can be of the following types:

- a) fusion fittings;
 - 1) electrofusion fittings;
 - 2) spigot end fittings (for butt fusion using heated tools and electrofusion socket fusion);
 - 3) socket fusion fittings (see Annex A);
- b) mechanical fittings;
 - 1) compression fittings;
 - 2) flanged fittings;
- c) fabricated fittings (see Annex B).

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

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 681-1, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 1716, *Plastics piping systems — Polyethylene (PE) tapping tees — Test method for impact resistance of an assembled tapping tee*

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

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

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

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 1167-3, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 3: Preparation of components (ISO 1167-3:2007)*

EN ISO 1167-4, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 4: Preparation of assemblies (ISO 1167-4:2007)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126:2005)*

ISO 4059:1978, *Polyethylene (PE) pipes — Pressure drop in mechanical pipe-jointing systems — Method of test and requirements*

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 9624, *Thermoplastics pipes for fluids under pressure — Mating dimensions of flange adapters and loose backing flanges*

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

ISO 12176-1, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 1: Butt fusion*

ISO 13950, *Plastics pipes and fittings — Automatic recognition systems for electrofusion joints*

EN 12201-3:2011 (E)

ISO 13951, *Plastics piping systems — Test method for the resistance of polyolefin pipe/pipe or pipe/fitting assemblies to tensile loading*

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 13955, *Plastics pipes and fittings — Crushing decohesion test for polyethylene (PE) electrofusion assemblies*

ISO 13956, *Plastics pipes and fittings — Decohesion test of polyethylene (PE) saddle fusion joints — Evaluation of ductility of fusion joint interface by tear test*

ISO 14236, *Plastics pipes and fittings — Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems*

3 Terms and definitions, symbols and abbreviations

For the purposes of this document, the terms and definitions, symbols and abbreviations given in EN 12201-1 and the following apply.

3.1 electrofusion socket fitting polyethylene (PE) fitting which contains one or more integral heating elements that are capable of transforming electrical energy into heat to produce a fusion joint with a spigot end or pipe

3.2 electrofusion saddle fitting polyethylene (PE) fitting which contains one or more integral heating elements that are capable of transforming electrical energy into heat to produce a fusion joint with the pipe

3.2.1 tapping tee electrofusion saddle fitting (top-loading or wraparound) which contains an integral cutter used for cutting through the wall of the main pipe, which remains in the body of the tapping tee after installation

3.2.2 branch saddle electrofusion saddle fitting (top loading or wrap round) which requires an ancillary cutting tool for drilling the hole in the adjoining main pipe

3.3 spigot end fitting polyethylene (PE) fitting where the outside diameter of the spigot end is equal to the nominal outside diameter, d_n , of the corresponding pipe

3.4 mechanical fitting fitting, that generally includes a compression part to provide pressure integrity, leaktightness and resistance to end loads, for assembling polyethylene (PE) pipe to another PE pipe or any other element of the piping system

NOTE 1 A pipe-supporting sleeve providing a permanent support for a polyethylene (PE) pipe to prevent creep in the pipe wall under radial compressive forces, may be applicable. The metallic parts of the fitting can be assembled to metallic pipes by screw-threads, compression joints, welded or flanged connections, including PE flanges. In some cases, the supporting sleeve at the same time constitutes a grip ring.

NOTE 2 The fitting can allow either a dismantable or permanently assembled joint.

NOTE 3 The mechanical fitting can be supplied for field assembly or pre-assembled by the manufacturer.

3.5

fabricated fitting

fitting produced from pipe conforming to EN 12201-2 and/or from injection-moulded fittings in accordance with this part of EN 12201

3.6

voltage regulation

control of energy supplied, during the fusion process of an electrofusion fitting, by means of the voltage parameter

3.7

intensity regulation

control of energy supplied, during the fusion process of an electrofusion fitting, by means of the current parameter

4 Material

4.1 PE compound

The PE compound from which the fittings are made shall conform to EN 12201-1.

The stress bearing parts shall only be made from virgin material conforming to EN 12201-1.

4.2 Material for non-polyethylene parts

4.2.1 General

<https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-f56c04f4ac96/sist-en-12201-3-2011>

All components shall conform to the relevant European Standard(s). Alternative standards may be utilised in cases where suitable European Standards do not exist provided that the fitness for purpose can be demonstrated.

The materials and constituent elements used in making the fitting (including elastomers, greases, and any metal parts) shall be as resistant to the external and internal environments as the other elements of the piping system and shall have a life expectancy under the following conditions at least equal to that of the PE pipe conforming to EN 12201-2 with which they are intended to be used:

- a) during storage;
- b) under the effect of the fluids being conveyed;
- c) taking account of the service environment and operating conditions.

The requirements for the level of material performance for non-polyethylene parts shall be at least as stringent as that of the PE compound for the piping system.

Other materials used in fittings in contact with the PE pipe shall not adversely affect the pipe performance or initiate stress cracking.

NOTE Subclause 4.2 does not apply to non-stress bearing fitting parts.

EN 12201-3:2011 (E)**4.2.2 Metal parts**

All metal parts susceptible to corrosion shall be adequately protected, provided this is necessary for durability and function of the system.

When dissimilar metallic parts are used, which can be in contact with moisture, steps shall be taken to avoid the possibility of galvanic corrosion.

4.2.3 Elastomers

Elastomeric materials used for the manufacture of seals shall conform to EN 681-1.

4.2.4 Other materials

Greases or lubricants shall not exude on to the fusion areas, and shall not affect the long-term performance of the fitting nor have any adverse effect on the quality of the water.

5 General characteristics**5.1 Appearance**

When viewed without magnification, the internal and external surfaces of the fitting shall be smooth, clean and free from scoring, cavities and other surface defects to an extent that would prevent conformity of the fitting to this standard.

No component of the fitting shall show any signs of damage, scratches, pitting, bubbles, blisters, inclusions or cracks to an extent that would prevent conformity of the fittings to the requirements of this standard.

[SIST EN 12201-3:2011](https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-f56c04f4ac96/sist-en-12201-3-2011)

5.2 Design

<https://standards.iteh.ai/catalog/standards/sist/9458d28c-099e-45ab-9f11-f56c04f4ac96/sist-en-12201-3-2011>

The design of the fitting shall be such that, when assembling the fitting onto the pipe or other components, the electrical coils and/or seals are not displaced.

5.3 Colour

The fitting shall be black or blue. For fabricated fittings the colour characteristics of pipes according to EN 12201-2 applies.

NOTE For above ground installations, all blue components should be protected from direct UV light.

5.4 Electrical characteristics for electrofusion fittings

The electrical protection that shall be provided by the system depends on the voltage and the current intensity used and on the characteristics of the electrical power source.

For voltages greater than 25 V, direct human contact with the energised parts shall not be possible when the fitting is in the fusion cycle during assembly in accordance with the instructions of the manufacturer of the fittings and the assembly equipment, as applicable.

NOTE 1 This type of fitting is a part of an electrical system as defined in EN 60335-1 [3], IEC 60364-1 [5] and IEC 60449 [6]. A protection against direct contacts with active parts (live conductors) is required for conformity to EN 60529 [4]. This protection is a function of the work site conditions.

NOTE 2 See Annex C for examples of typical electrofusion terminal connectors.

The tolerance on the electrical resistance of the fitting at 23 °C shall be stated by the manufacturer. The resistance shall be in between nominal resistance (−10%) and nominal resistance (+10%) + 0,1 Ω.

NOTE 3 0,1 Ω is the assumed value of the contact resistance.

The surface finish of the terminal pins shall allow a minimum contact resistance in order to satisfy the resistance tolerance requirements.

5.5 Appearance of factory made joints

The internal and external surfaces of the pipe and fitting after fusion jointing, examined visually without magnification, shall be free from melt exudation outside the confines of the fitting, apart from that which may be declared acceptable by the fitting manufacturer or used as a fusion marker.

Any melt exudation shall not cause wire movement in electrofusion fittings such that it leads to short-circuiting, when jointed in accordance with the manufacturer's instructions. There shall be no excessive creasing of the internal surfaces of the adjoining pipes.

5.6 Effect on water quality

For fittings intended for the conveyance of water for human consumption attention is drawn to the requirements of national regulations (see Introduction).

6 Geometrical characteristics

6.1 Measurement of dimensions

The dimensions of the fittings shall be measured in accordance with EN ISO 3126. In the case of dispute the measurement of dimensions shall not be made less than 24 h after manufacture after being conditioned for at least 4 h at (23 ± 2) °C.

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

6.2 Dimensions of electrofusion socket fittings

6.2.1 Diameters and lengths of electrofusion sockets

When measured in accordance with 6.1, the diameters and lengths of electrofusion sockets (see Figure 1) shall conform to Table 1.