



SLOVENSKI STANDARD
SIST EN 12201-3:2003
01-oktober-2003

**Cevni sistemi iz polimernih materialov za oskrbo z vodo - Polietilen (PE) - 3. del:
Fitingi**

Plastics piping systems for water supply - Polyethylene (PE) - Part 3: Fittings

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

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Systemes de canalisations en plastique pour l'alimentation en eau - Polyéthylène (PE) -
Partie 3 : Raccords

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EUROPEAN STANDARD
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Plastics piping systems for water supply - Polyethylene (PE) - Part 3: Fittings

Systèmes de canalisations en plastique pour l'alimentation
en eau - Polyéthylène (PE) - Partie 3: Aptitude à l'emploi

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

This European Standard was approved by CEN on 4 December 2002.

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 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 Management Centre has the same status as the official versions.

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

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EN 12201-3:2003 (E)**Foreword**

This document EN 12201-3:2003 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of an identical text or by endorsement, at the latest by September 2003, and conflicting national standards shall be withdrawn at the latest by March 2005.

This standard is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

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 standards on general functional requirements and standards on installation practices.

This European Standard consists of the following Parts, under the general title *Plastics piping systems for water supply — Polyethylene (PE)*:

- Part 1: General.
- Part 2: Pipes.
- Part 3: Fittings (this standard).
- Part 4: Valves.
- Part 5: Fitness for purpose of the system.
- Part 7: Guidance for the assessment of conformity. ¹⁾

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NOTE It was decided not to publish a Part 6: Recommended practice for installation. Instead, existing national practices would be applicable.

This Part of this European Standard includes the following:

- Annex A (normative): Socket fusion fittings;
- Annex B (informative): Examples of typical terminal connection for electrofusion fittings;
- Bibliography.

System Standards for piping systems of other plastics materials used for the conveyance of water include the following:

EN 1452, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U)*

prEN 1796, *Plastics piping systems for water supply with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on polyester resins (UP)*

For components which have conformed to the relevant national standard before [DAV], as shown by the manufacturer or by a certification body, the national standard may continue to be applied until the [DAV + 24 months].

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom.

¹⁾ to be published as a CEN/TS.

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.

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

- a) this standard 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) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

Requirements and test methods for material and components, other than fittings, are specified in EN 12201-1, EN 12201-2 and EN 12201-4. Characteristics for fitness of purpose are covered in EN 12201-5 and prCEN/TS 12201-7 gives guidance for the assessment of conformity.

This Part of this European Standard covers the characteristics of fittings.

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EN 12201-3:2003 (E)**1 Scope**

This Part of this European Standard specifies the characteristics of fittings made from polyethylene (PE) intended for the conveyance of water for human consumption, including raw water prior to treatment.

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

In conjunction with other Parts of this European Standard (see Foreword) 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) a maximum operating pressure, MOP, up to 25 bar ²⁾;
- b) an operating temperature of 20 °C as a reference temperature.

NOTE 1 For applications operating at constant temperature greater than 20 °C and up to 40 °C, see annex A of EN 12201-1:2003.

This European Standard covers a range of maximum operating pressures and gives requirements concerning colours and additives.

NOTE 2 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:

—fusion fittings;

— butt fusion fittings;

— socket fusion fittings (see annex A);

— electrofusion fittings;

—mechanical fittings;

— compression fittings;

— flanged fittings.

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2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

EN 681-2, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastics elastomers.*

EN 728, *Plastics piping and ducting systems — Polyolefin pipes and fittings — Determination of the oxidation induction time.*

EN 921:1994, *Plastics piping systems — Thermoplastics pipes — Determination of resistance to internal pressure at constant temperature (including corrigendum of 1995).*

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

EN 12201-1:2003, *Plastics piping systems for water supply — Polyethylene (PE) — Part 1: General.*

2) 1 bar = 10⁵ N/m²

- EN 12201-2:2003, *Plastics piping systems for water supply — Polyethylene (PE) — Part 2: Pipes.*
- EN 12201-5, *Plastics piping systems for water supply — Polyethylene (PE) — Part 5: Fitness for purpose of the system.*
- EN ISO 1133:1999, *Plastics — Determination of the melt-mass flow rate (MFR) and the melt-volume flow rate (MVR) of thermoplastics (ISO 1133:1997).*
- prEN ISO 3126:1999, *Plastics piping systems — Plastics piping components — Measurement and determination of dimensions (ISO/DIS 3126:1999).*
- 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 13953:2001, *Polyethylene (PE) pipes and fittings — Determination of the tensile strength and failure mode of test pieces from a butt-fused joint.*
- ISO 13954:1997, *Plastics pipes and fittings — Peel decohesion test for polyethylene (PE) electrofusion assemblies of nominal outside diameter greater than or equal to 90 mm.*
- ISO 13955:1997, *Plastics pipes and fittings — Crushing decohesion test for polyethylene (PE) electrofusion assemblies.*
- ISO/DIS 13956:1996, *Plastics pipes and fittings — Determination of cohesive strength — Tear test for polyethylene (PE) assemblies.*

3 Terms and definitions, symbols and abbreviations

For the purposes of this European Standard, the terms and definitions, symbols and abbreviations given in EN 12201-1:2003 and the following apply.

3.1

electrofusion socket fitting

polyethylene (PE) fitting which contains one or more integrated heating elements, that are capable of transforming electrical energy into heat to realise a fusion joint with a spigot end or a pipe

3.2

electrofusion saddle fitting

polyethylene (PE) fitting which contains one or more integrated heating elements, that are capable of transforming electrical energy into heat to realise a fusion on to a pipe

3.2.1

tapping tee

electrofusion saddle fitting (top loading or wrap round) which contains an integral cutter, to cut through the wall of the main pipe. The cutter remains in the body of the saddle 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

EN 12201-3:2003 (E)**3.3****spigot end fitting**

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

3.4**mechanical fitting**

fitting for assembling polyethylene (PE) pipe to another PE pipe or any other element of the piping system

The mechanical fitting can be supplied for field assembly or pre-assembled by the manufacturer. The fitting generally includes a compression part to provide pressure integrity, leaktightness and resistance to end loads. A support sleeve inserted into the pipe bore provides a permanent support for the PE pipe to prevent creep in the pipe wall under radial compressive forces.

NOTE 1 The metallic parts of the fitting can be assembled to metallic pipes by screw threads, compression joints, welded or flanged connections, including PE flanges. The fitting can allow either a dismantable or permanently assembled joint.

NOTE 2 In some cases the supporting ring can also act as a grip ring.

3.5**voltage regulation**

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

3.6**intensity regulation**

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

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4 Material**4.1 PE compound**

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The PE compound from which the fittings are made shall conform to EN 12201-1:2003.

4.2 Material for non-polyethylene parts**4.2.1 General**

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 12201-2:2003 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.

Fittings material in contact with the PE pipe shall not adversely affect the pipe performance or initiate stress cracking.

4.2.2 Metal parts

All parts susceptible to corrosion shall be adequately protected.

When dissimilar metallic materials are used which may be in contact with moisture, steps shall be taken to avoid galvanic corrosion.

4.2.3 Elastomers

Elastomeric materials used for the manufacture of seals shall conform to EN 681-1 or EN 681-2, as applicable.

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.

5.2 Design

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 blue or black.

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 electricity power.

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[1], IEC 60364-1[2] and IEC 60449[3]. 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 B for examples of typical electrofusion terminal connectors.

The surface finish of the terminal pins shall allow a minimum contact resistance in order to satisfy the resistance tolerance requirements (nominal value $\pm 10\%$).

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

Attention is drawn to the requirements of national regulations (see introduction).