Plastics piping systems for water supply, and for drains and sewers under pressure - Polyethylene (PE) - Part 5: Fitness for purpose of the system

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NATIONAL FOREWORD

See Eesti standard EVS-EN 12201-5:2024 sisaldab Euroopa standardi EN 12201-5:2024 ingliskeelset teksti.	This Estonian standard EVS-EN 12201-5:2024 consists of the English text of the European standard EN 12201-5:2024.
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 and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 31.01.2024.	Date of Availability of the European standard is 31.01.2024.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

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

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English Version

Plastics piping systems for water supply, and for drains and sewers under pressure - Polyethylene (PE) - Part 5: Fitness for purpose of the system

Systèmes de canalisations en plastique pour l'alimentation en eau et pour les branchements et les collecteurs d'assainissement avec pression - Polyéthylène (PE) - Partie 5 : Aptitude à l'emploi du système

Kunststoff-Rohrleitungssysteme für die Wasserversorgung und für Entwässerungs- und Abwasserdruckleitungen - Polyethylen (PE) - Teil 5: Gebrauchstauglichkeit des Systems

This European Standard was approved by CEN on 10 December 2023.

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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.

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

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European foreword

This document (EN 12201-5:2024) 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 July 2024, and conflicting national standards shall be withdrawn at the latest by July 2024.

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.

This document supersedes EN 12201-5:2011.

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 drains and sewers under pressure — Polyethylene (PE) — Part 1: General*;

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

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

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

— EN 12201-5, *Plastics piping systems for water supply, and for drains and sewers under pressure — Polyethylene (PE) — Part 5: Fitness for purpose of the system* (this document).

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

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

The revision of this System Standard has been carried out principally to add the PE 100-RC type materials with enhanced resistance to slow crack growth. EN 12201-1:2024, Annex C discusses the performance of this type of material and gives additional information for non-conventional installation techniques. In addition, test methods have been updated.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document specifies the requirements for a piping system and its components 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, drains and sewers 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:

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

NOTE Attention is drawn to the presence of national regulations and testing arrangements in relation to products intended for use in water supply to ensure fitness for contact with drinking water.

Requirements and test methods for components of the piping system are specified in EN 12201-1, EN 12201-2, EN 12201-3 and EN 12201-4. CEN/TS 12201-7 [1] gives guidance for assessment of conformity.

This part of EN 12201 covers the characteristics of the fitness for purpose of the system.

1 Scope

This document specifies the requirements of fitness for purpose of assembled polyethylene (PE) piping systems intended for the conveyance of water intended for human consumption, raw water prior to treatment, drains and sewers under pressure, vacuum sewer systems, and water for other purposes, with the exception of industrial application.

It specifies the requirements for electrofusion, socket fusion, butt fusion and mechanical joints.

It specifies the method of preparation of test piece joints, and the tests to be carried out on these joints for assessing the fitness for purpose of the system under normal and extreme conditions.

NOTE 1 For PE components intended for the conveyance of water for human consumption and raw water prior to treatment attention is drawn to the introduction of this document. Components manufactured for water for other purposes, drains and sewers, and vacuum systems, are possibly not suitable for water supply for human consumption.

NOTE 2 Industrial application is covered by EN ISO 15494 [2].

The intended use includes sea outfalls, laid in water and pipes suspended below bridges.

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

This document is intended to only be used by the product manufacturer to assess the performance of components in accordance with EN 12201-2, EN 12201-3, or EN 12201-4 when joined together under normal and extreme conditions in accordance with this document. It is not intended for on-site testing of pipe systems.

In conjunction with EN 12201-1, EN 12201-2, EN 12201-3 and EN 12201-4 this document is applicable to PE pipes, fittings and valves, their joints and 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 for design purposes.

NOTE 3 For applications operating at constant temperatures greater than 20 °C up to and including 50 °C, see EN 12201-1:2024, Annex A.

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

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

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

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

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

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

EN ISO 3501, *Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for resistance to pull-out under constant longitudinal force (ISO 3501)*

EN ISO 3503, *Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under internal pressure of assemblies subjected to bending (ISO 3503)*

EN ISO 3458, *Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under internal pressure (ISO 3458)*

EN ISO 3459:2022, *Plastic piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under negative pressure (ISO 3459:2022)*

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 1167-1:2006)*

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)*

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)*

ISO 11413:2019, *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 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 17885, *Plastics piping systems — Mechanical fittings for pressure piping systems — Specifications*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Symbols and abbreviations

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

5 Fitness for purpose of the system

5.1 Method of preparation of assemblies for testing

5.1.1 General

The joints shall be made by using pipes conforming to EN 12201-2, fittings conforming to EN 12201-3 or valves conforming to EN 12201-4.

Test pieces for pressure testing shall be closed with pressure-tight, end-load-bearing end caps, plugs or flanges which shall be provided with connections for the entry of water and release of air.

Butt fusion and electrofusion joints are applicable for components in PE 100, PE 100-RC, and PE 80 materials. Pipes in PE 40 materials are joined using mechanical fittings only.

The peelable layer of peelable layer pipe shall be removed in the area of the joint prior to jointing.

5.1.2 Butt fusion joints

PE pipes, spigot end fittings and valves intended to be used for jointing by butt fusion shall be prepared and assembled in accordance with ISO 11414. The conditions for the preparation of the joints are given in 5.2.2.1 for the assessment of fitness for purpose of the system under normal conditions and in 5.2.2.2 for the assessment of fitness for purpose of the system under extreme conditions.

5.1.3 Electrofusion joints

PE pipes, fittings and valves intended to be used for jointing by electrofusion shall be prepared and assembled in accordance with ISO 11413. The conditions for the preparation of the joints are given in 5.2.3.1 for the assessment of fitness for purpose of the system under normal conditions and in 5.2.3.2 for the assessment of fitness for purpose of the system under extreme conditions.

For joints with electrofusion saddle fittings, the electrofusion saddle fitting shall be fused to the pipe, while it is pressurized to the allowable operating pressure (PFA). The pipe shall be tapped immediately after the manufacturer prescribed cooling time has elapsed.

NOTE Joints with electrofusion saddle fitting are expected to take national safety regulations into consideration when being prepared.

For electrofusion couplers, test joints on selected diameters out of the product range shall be prepared with a gap of $0{,}05 d_n$ between the pipe end and the maximum theoretical depth of penetration of the fitting, where for diameters greater than 225 mm, the adjoining pipes shall be arranged to provide the maximum angular deflection possible for the fitting, limited to 1,5°.