SLOVENSKI STANDARD
oSIST prEN 1555-5:2019

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Cevni sistemi iz polimernih materialov za oskrbo s plinastimi gorivi - Polietilen (PE) - 5. del: Ustreznost sistema namenu

Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 5: Fitness for purpose of the system

Kunststoff-Rohrleitungssysteme für die Gasversorgung - Polyethylen (PE) - Teil 5: Gebrauchstauglichkeit des Systems

Systèmes de canalisations en plastique pour la distribution de combustibles gazeux - Polyéthylène (PE) - Partie 5 : Aptitude à l'emploi du système

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83.140.30	Polimerne cevi in fitingi za snovi, ki niso tekočine	Plastics pipes and fittings for non fluid use
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Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 5: Fitness for purpose of the system

Systèmes de canalisations en plastique pour la distribution de combustibles gazeux - Polyéthylène (PE) - Partie 5: Aptitude à l'emploi du système

Kunststoff-Rohrleitungssysteme für die Gasversorgung - Polyethylen (PE) - Teil 5: Gebrachstauglichkeit des Systems

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 1555-5:2019) 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 is currently submitted to the CEN Enquiry.

This document will supersede EN 1555-5:2010.

EN 1555 consists of the following parts:

— EN 1555-1, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*;

— EN 1555-2, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*;

— EN 1555-3, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*;

— EN 1555-4, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 4: Valves*;

— EN 1555-5, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 5: Fitness for purpose of the system* (this standard);

— CEN/TS 1555-7, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 7: Guidance for assessment of conformity.*

System Standards 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.

NOTE EN 12007-2:2012 [2], prepared by CEN/TC 234 “Gas infrastructure”, deals with the recommended practice for installation of plastics pipes system in accordance with EN 1555 (all parts).

Introduction

This document specifies the requirements of a piping system and its components made from polyethylene (PE) and which is intended to be used for the supply of gaseous fuels.

Requirements and test methods for material and components are specified in prEN 1555-1:2019, prEN 1555-2:2019, prEN 1555-3:2019 and prEN 1555-4:2019.

CEN /TS 1555-7 [1] gives guidance for assessment of conformity. Recommended practice for installation is given in EN 12007-2:2012 [2] prepared by CEN /TC 234.

This part of EN 1555 covers the characteristics of fitness for purpose of the system.

1 Scope

This document specifies requirements of fitness for purpose of the polyethylene (PE) piping system in the field of the supply of gaseous fuels.

It specifies the definitions of electrofusion, 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.

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

NOTE 1 This document is intended only to be used by the product manufacturer to assess the performance of components according to EN 1555-2, EN 1555-3, and/or EN 1555-4 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 Parts 1 to 4 of EN 1555, 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) a maximum operating pressure, MOP, up to and including 10 bar [1];

b) an operating temperature of 20 °C as reference temperature.

NOTE 2 For other operating temperatures, derating coefficients can be used, see Annex A.

EN 1555 (all parts) covers a range of maximum 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 regulations and installation practices or codes.

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 1555-1, Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General

EN 1555-2, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

prEN 1555-3:2019, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

prEN 1555-4:2019, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 4: Valves*

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)*

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)*

1 1 bar = 0,1 MPa.

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)*

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)*

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

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 — Determination of cohesive strength — 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, symbols and abbreviations given in prEN 1555-1:2019 and the following definition 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 http://www.iso.org/obp

3.1
mechanical joint
joint made by assembling a PE pipe with a fitting that generally includes a compression part to provide for pressure integrity, leaktightness and resistance to end loads

Note 1 to entry A support sleeve inserted into the pipe bore should be used to provide a permanent support for the PE pipe to prevent creep in the pipe wall under radial compressive forces. The metallic part of this fitting can be assembled to a metallic pipe by screw threads, compression joints, welded or brazed flanges or by other means

4 Fitness for purpose

4.1 Method of preparation of assemblies for testing

4.1.1 General

The joints shall be made by using pipes conforming to prEN 1555-2:2019, fittings conforming to prEN 1555-3:2019 or valves conforming to prEN 1555-4:2019.

Test pieces for pressure test 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.

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

4.1.2 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 4.2.2.1 for the assessment of fitness for purpose under normal conditions and in 4.2.2.2 for the assessment of fitness for purpose under extreme conditions.

4.1.3 Electrofusion jointing

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 4.2.3.1 for the assessment of fitness for purpose under normal conditions and in 4.2.3.2 for the assessment of fitness for purpose under extreme conditions.

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

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

For straight equal electrofusion socket fittings (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°.

4.1.4 Mechanical joints

For mechanical joints the assembly of the PE pipe and the fitting shall be prepared in accordance with ISO 17885, as applicable.

4.2 Requirements for fitness for purpose

4.2.1 General

When tested in accordance with the test methods as specified in Table 5 using the indicated parameters, fittings shall have mechanical characteristics conforming to the requirements given in Table 5, as applicable to the following types of joint assemblies with pipe:

— (A) electrofusion socket fittings;

— (B) electrofusion saddle fitting;

— (C) spigot end fitting;

— (D) pipes.

4.2.2 Fitness for purpose of butt fusion joints

4.2.2.1 Under normal conditions (ambient temperature 23 °C)

For the assessment of fitness for purpose under normal conditions, butt fusion joints shall have the characteristic of tensile strength conforming to the requirement given in Table 5, using the parameters as specified in ISO 11414:2009, Annex B, Condition 1 at an ambient temperature of (23 ± 2) °C and the scheme listed in Table 1.

Table 1 — Scheme for butt-fused joints

Pipe/spigot end fitting/valve with spigot ends	Pipe	
	PE 80	PE 100 or PE 100-RC
PE 80	X	X [a]
PE 100 or PE 100-RC	X [a]	X
[a] Only when requested by the purchaser.		

NOTE The table can be interpreted as follows: as an example, for a pipe or a spigot end fitting or a valve with spigot end made from a PE 80 compound, a joint can be tested with a pipe made from PE 80 compound. When requested by the purchaser, for mixed compound joints, test pieces can be used incorporating PE 80, and PE 100 or PE 100-RC compounds.

The pipe manufacturer shall declare, according to 4.2.2.1, which pipes from his own product range manufactured from different compounds conforming to prEN 1555-2:2019 are compatible to each other for butt fusion.

The fitting or valve manufacturer shall declare, according to 4.2.2.1, the SDR range and MRS values of pipes conforming to prEN 1555-2:2019 to which his fittings conforming to prEN 1555-3:2019 and/or his valves conforming to prEN 1555-4:2019 can be fused by using the same procedures (e.g. times, temperatures, fusion pressures) to conform to this document. If there is a need for deviation in fusion procedures the fitting or valve manufacturer shall state this clearly.

4.2.2.2 Under extreme conditions

For butt fusion joints, the characteristics to be examined for fitness for purpose under extreme conditions shall conform to Table 2.

Table 2 — Characteristics for fitness for purpose of the system

Butt fusion joint (C) (D)	Associated characteristics
Both components of the joint: same MRS and same SDR Joint: minimum and maximum condition [a]	Hydrostatic strength [b] (80 °C, 165 h)
Both components of the joint: same MRS and same SDR Joint: minimum and maximum condition [a]	Tensile strength for butt fusion joint
[a] As specified in ISO 11414:2009, Clause 7, item a), concerning misalignment and the limit values of fusion parameters conforming to in ISO 11414:2009, Annex B, Condition 2 and 3 [b] Not applicable for joints between pipes	