SLOVENSKI STANDARD
SIST EN 1555-1:2021

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Nadomešča:
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Cevni sistemi iz polimernih materialov za oskrbo s plinastimi gorivi - Polietilen (PE) - 1. del: Splošno

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

Kunststoff-Rohrleitungssysteme für die Gasversorgung - Polyethylen (PE) - Teil 1: Allgemeines

Systèmes de canalisations en plastique pour la distribution de combustibles gazeux - Polyéthylène (PE) - Partie 1 : Généralités

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English Version

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

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 1555-1:2021) has been prepared by Technical Committee CEN/TC 155 "Plastics piping 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of an identical text or by endorsement, at the latest by January 2022, and conflicting national standards shall be withdrawn at the latest by January 2022.

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 1555-1:2010.

In comparison with the previous version, the following technical modifications have been introduced:

— PE 100-RC type materials with enhanced resistance to slow crack growth have been added.

— Annex A now discusses the performance of this type of material and gives additional information for non-conventional installation techniques.

— The size range has been increased to 800 mm diameter.

— Test methods have been updated.

— New test methods have been added for PE 100-RC materials.

This document has been prepared in liaison with Technical Committee CEN/TC 234 "Gas infrastructure".

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 1555 consists of the following parts:

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

— 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;

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

NOTE EN 12007-2 [1] 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).

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, Turkey and the United Kingdom.

Introduction

This document specifies the requirements for 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 components of the piping system are specified in EN 1555-2:2021, EN 1555-3:2021 and EN 1555-4:2021.

Characteristics for fitness for purpose are covered in EN 1555-5:2021 [3]. CEN/TS 1555-7 [2] gives guidance for assessment of conformity. Recommended practices for installation are given in EN 12007-2 [1], prepared by CEN/TC 234.

This part of EN 1555 covers the general aspects of the plastics piping system.

1 Scope

This document specifies the general aspects of polyethylene (PE) piping systems in the field of the supply of gaseous fuels.

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

In conjunction with Parts 2 to 5 of EN 1555, this document is applicable to PE pipes, fittings, and 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] at a reference temperature of 20 °C for design purposes;

b) an operating temperature between -20 °C and 40 °C.

NOTE 1 For operating temperatures between 20 °C and 40 °C, derating coefficients are defined, see EN 1555-5 [3].

EN 1555 (all parts) covers a range of maximum operating pressures and gives requirements concerning colours.

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 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 1555-2:2021, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 2: Pipes*

EN 1555-3:2021, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 3: Fittings*

EN 1555-4:2021, *Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) - Part 4: Valves*

EN 12099, *Plastics piping systems - Polyethylene piping materials and components - Determination of volatile content*

EN ISO 472, *Plastics - Vocabulary (ISO 472)*

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

EN ISO 1133-1, *Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method (ISO 1133-1)*

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 1183-1, *Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1)*

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

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

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

EN ISO 6259-3, *Thermoplastics pipes - Determination of tensile properties - Part 3: Polyolefin pipes (ISO 6259-3)*

EN ISO 9080, *Plastics piping and ducting systems - Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO 9080)*

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

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

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)*

EN ISO 15512, *Plastics - Determination of water content (ISO 15512)*

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

ISO 3, *Preferred numbers - Series of preferred numbers*

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

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 13479:—[2], *Polyolefin pipes for the conveyance of fluids - Determination of resistance to crack propagation - Test method for slow crack growth on notched pipes*

ISO 16770, *Plastics - Determination of environmental stress cracking (ESC) of polyethylene - Full-notch creep test (FNCT)*

[2] Under preparation. Stage at the time of publication: ISO/DIS 13479:2021.

ISO 18488, *Polyethylene (PE) materials for piping systems - Determination of Strain Hardening Modulus in relation to slow crack growth - Test method*

ISO 18489, *Polyethylene (PE) materials for piping systems - Determination of resistance to slow crack growth under cyclic loading - Cracked Round Bar test method*

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

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

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

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1 Geometrical definitions

3.1.1
nominal size
DN/OD
numerical designation of the size of a component related to the outside diameter

Note 1 to entry: It is a convenient round number approximately equal to the manufacturing dimension in millimetres (mm). It is not applicable to components designated by thread size.

3.1.2
nominal outside diameter
d_n
specified outside diameter assigned to a nominal size DN/OD

Note 1 to entry: Nominal outside diameter is expressed in millimetres.

3.1.3
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, rounded to the next greater 0,1 mm

3.1.4
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

3.1.5
minimum mean outside diameter
$d_{em,min}$
minimum value for the mean outside diameter as specified for a given nominal size

3.1.6
maximum mean outside diameter
$d_{em,max}$
maximum value for the mean outside diameter as specified for a given nominal size

3.1.7
out-of-roundness
ovality
difference between the maximum and the minimum outside diameter in the same cross-section of a pipe or spigot

3.1.8
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 (mm)

Note 1 to entry: For thermoplastics components conforming to the different parts of EN 1555, the value of the nominal wall thickness, e_n, is identical to the specified minimum wall thickness at any point, e_{min}.

3.1.9
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 1 to entry: The symbol for the wall thickness of the fittings and valves body at any point is E.

3.1.10
minimum wall thickness at any point
e_{min}
minimum value for the wall thickness at any point around the circumference of a component, as specified

3.1.11
maximum wall thickness at any point
e_{max}
maximum value for the wall thickness at any point around the circumference of a component, as specified

3.1.12
mean wall thickness
e_m
arithmetical 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

3.1.13
tolerance
permitted variation of the specified value of a quantity, expressed as the difference between the permitted maximum and the permitted minimum value