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**Plastics piping systems for the supply of gaseous fuels —
Polyethylene (PE) — ~~—~~ —**

**Part ~~3~~:
Fittings**

*~~Systèmes de canalisations en plastique pour la distribution de combustibles gazeux — Polyéthylène
(PE) —~~*

~~Partie 3: Raccords~~

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: + 41 22 749 01 11

~~Email:~~ copyright@iso.org

~~E-mail:~~ copyright@iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 4, *Plastics pipes and fittings for the supply of gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 4437-3:2014), which has been technically revised.

The main changes are as follows:

- PE 100-RC type materials with enhanced resistance to slow crack growth (SCG) have been added;
- the nominal diameter range of the electrofusion socket fittings and spigot end fittings has been increased to 800 mm;
- the PE 80 20 °C/100 h control point has been changed to 10 MPa with a note to advise that 9 MPa is applicable if the ISO 9080 data set for a material indicates that a lower value is applicable;
- test methods have been updated and new methods have been added for PE 100-RC materials.

A list of all parts in the ISO 4437 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The ISO 4437 series specifies the requirements for a piping system and its components made from polyethylene (PE) compounds, which is intended to be used for the supply of gaseous fuels.

This document covers the characteristics of fittings.

Requirements and test methods for materials and components, other than fittings, are specified in ISO 4437-1¹, ISO 4437-2² and ISO 4437-4.

Characteristics for fitness for purpose of the system are covered in ISO 4437-5³.

Recommended practice for design, handling and installation is given in ISO/TS 10839.

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¹ [Under preparation. Stage at the time of publication: ISO/PRF 4437-1:2023.](#)

² [Under preparation. Stage at the time of publication: ISO/PRF 4437-2:2023.](#)

³ [Under preparation. Stage at the time of publication: ISO/PRF 4437-5:2023.](#)

Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE)

Part Fittings

1 Scope

This document specifies the characteristics of fusion fittings made from polyethylene (PE) as well as of mechanical fittings for 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 ISO 4437-1, ISO 4437-2, ISO 4437-4 and ISO 4437-5, 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) a) a maximum operating pressure (MOP), up to and including 10 bar⁴, at a reference temperature of 20 °C for design purposes;
- b) b) an operating temperature between 20 °C and 40 °C.

For operating temperatures between 20 °C and 40 °C, derating coefficients are defined in ISO 4437-5.

The ISO 4437 series covers a range of maximum operating pressures and gives requirements concerning colours.

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.

This document is applicable for fittings of the following types:

- electrofusion socket fittings;
- electrofusion saddle fittings;
- spigot end fittings (for butt fusion using heated tools and electrofusion socket fusion);
- socket fusion fittings;
- mechanical fittings.

NOTE 1 The fittings can be, for example, in the form of couplers, saddles, equal and reduced tees, reducers, elbows, bends or end caps.

NOTE 2 Fabricated fittings are normally not used for gas applications except for larger dimensions or in the absence of other solutions. Guidance can be found in ISO 4427-3:2019, Annex B.

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

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.

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation*

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

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 4437-1-~~5~~⁵, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*

ISO 4437-2-~~5~~⁶, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

ISO 4437-5-~~7~~⁷, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

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

ISO 12176-5, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 5: Two-dimensional data coding of components and data exchange format for PE piping systems*

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

ISO 13951, *Plastics piping systems — Test method for the resistance of plastic 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*

⁵ Under preparation. [Stage at the time of publication: ISO/PRF 4437-1:2023.](#)

⁶ Under preparation. [Stage at the time of publication: ISO/PRF 4437-2:2023.](#)

⁷ Under preparation. [Stage at the time of publication: ISO/PRF 4437-5:2023.](#)

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 13957, *Plastics pipes and fittings — Polyethylene (PE) tapping tees — Test method for impact resistance*

ISO 16010, *Elastomeric seals — Material requirements for seals used in pipes and fittings carrying gaseous fuels and hydrocarbon fluids*

ISO 17778, *Plastics piping systems — Fittings, valves and ancillaries — Determination of gaseous flow rate/pressure drop relationships*

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/>

3.1 Terms related to geometry

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* (3.1.1)(3.1.1)

Note_1_to_entry:—Nominal outside diameter is expressed in millimetres.

3.1.3

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

3.1.4

minimum mean outside diameter

$d_{em,min}$

minimum value for the *mean outside diameter* ~~(3.1.3)~~(3.1.3) as specified for a given *nominal size* ~~(3.1.1)~~(3.1.1)

3.1.5

maximum mean outside diameter

$d_{em,max}$

maximum value for the *mean outside diameter* ~~(3.1.3)~~(3.1.3) as specified for a given *nominal size* ~~(3.1.1)~~(3.1.1)

3.1.6

out-of-roundness

ovality

difference between the maximum and the minimum outside diameters in the same cross-section of a pipe or spigot

3.1.7

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 ISO 4437 series, 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)~~ (3.1.9).

3.1.8

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 a fitting or valve at any point is E .

3.1.9

minimum wall thickness at any point

e_{min}

minimum value for the *wall thickness at any point* ~~(3.1.8)~~(3.1.8) around the circumference of a component, ~~as specified~~

3.1.10

tolerance

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

3.1.11

standard dimension ratio

SDR

numerical designation of a *pipe series* ~~(3.1.12)~~(3.1.12), which is a convenient round number, approximately equal to the dimension ratio of the *nominal outside diameter*, ~~d_n (3.1.2)~~ (3.1.2) and the *nominal wall thickness*, ~~e_n (3.1.7)~~ (3.1.7)