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**Polyethylene pipes and fittings for  
the supply of gaseous fuels — Code  
of practice for design, handling and  
installation**

*Tubes et raccords en polyéthylène pour le transport de combustibles  
gazeux — Code de pratique pour la conception, la manutention et  
l'installation*



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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 documents 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://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/TS 10839:2000), which has been technically revised.

The main changes are as follows:

- the whole document has been redrafted in order to improve its readability;
- clauses referring to the jointing processes have been transformed into normative annexes (see [Annex A](#), [Annex B](#) and [Annex C](#));
- the Scope has been updated to include hydrogen;
- [Clause 2](#) and [Clause 3](#) have been updated;
- various additional updates and corrections have been made throughout the document to reflect the current state of the art;
- information on socket fusion jointing procedures has been deleted as this is the subject of other published documents (see [Annex D](#)).

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](http://www.iso.org/members.html).

# Polyethylene pipes and fittings for the supply of gaseous fuels — Code of practice for design, handling and installation

## 1 Scope

This document presents a code of practice dealing with polyethylene (PE) pipes and fittings for buried pipeline systems outside buildings, conforming to the ISO 4437 series, and designed to transport gaseous fuels [as defined in ISO 4437-1, e.g. methane, liquified petroleum gas (LPG), manufactured gas and hydrogen] within the temperature range  $-20\text{ }^{\circ}\text{C}$  to  $+40\text{ }^{\circ}\text{C}$ . This document also gives appropriate temperature-related requirements.

The code of practice covers mains and service lines whose components are prepared for fusion or mechanical jointing. It also gives instructions for the design, storage, handling, transportation, laying conditions and fusion quality control of PE pipes and fittings as well as subsequent joint testing, backfilling, pipe system testing and commissioning.

NOTE For the renovation code of practice, reference is made to the ISO 11299 series and to ISO 11295 for classification and to the ISO 21225 series for further information for trenchless replacement.

The minimal requirements for the jointing methods are given in:

- [Annex A](#) (butt fusion);
- [Annex B](#) (electrofusion); and
- [Annex C](#) (mechanical jointing).

In some countries the use of heated-tools socket and saddle fusion is permitted; information on heated-tools fusion jointing techniques is given in [Annex D](#).

In the case of ground movement or shaking (e.g. earthquakes, etc.) it can be necessary to implement precautions mentioned in this document following guidelines provided by authorities (e.g. Eurocode 8,<sup>[7]</sup> EN 12007-1:2012, Annex A,<sup>[8]</sup> etc.),

Workers' health and safety issues are outside the scope of this document.

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

ISO 4437-2:2014, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

ISO 4437-3, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

ISO 4437-4, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 4: Valves*

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

ISO 12176-1, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 1: Butt fusion*

ISO 12176-2, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 2: Electrofusion*

ISO 12176-3, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 3: Operator's badge*

ISO 12176-4, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 4: Traceability coding*

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 17885:2021, *Plastics piping systems — Mechanical fittings for pressure piping systems — Specifications*

EN 12327, *Gas infrastructure — Pressure testing, commissioning and decommissioning procedures — Functional requirements*

### 3 Terms, definitions and abbreviated terms

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 and definitions

##### 3.1.1

##### **butt fusion machine pressure**

pressure indicated on the gauge or on a pressure display on a butt fusion machine, giving an indication of the interface force applied to the pipe and/or fitting ends

##### 3.1.2

##### **clearance**

shortest distance between the outer limits of two objects

##### 3.1.3

##### **drag resistance**

frictional resistance due to the weight of the length of pipe fixed in the moveable clamp at the point at which movement of the moveable clamp is initiated (peak drag), or the friction occurring during movement (dynamic drag)

##### 3.1.4

##### **electrofusion control unit**

equipment implementing the output fusion parameters of voltage or current and time or energy to execute the fusion cycle as specified by the electrofusion fitting manufacturer

##### 3.1.5

##### **frictional losses in the butt fusion machine**

force necessary to overcome friction in the whole mechanism of a butt fusion machine