
**Plastics piping systems — Polyethylene
(PE) pipes and fittings for water supply —**

**Part 3:
Fittings**

*Systèmes de canalisations en plastique — Tubes et raccords en
polyéthylène (PE) destinés à l'alimentation en eau*

Partie 3: Raccords



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	2
3 Terms, definitions, symbols and abbreviated terms.....	3
4 Material	4
4.1 PE compound.....	4
4.2 Material for non-polyethylene parts.....	4
5 General characteristics	5
5.1 Appearance	5
5.2 Design	5
5.3 Colour	5
5.4 Electrical characteristics for electrofusion fittings.....	5
5.5 Appearance of factory-made joints.....	5
5.6 Effect on water quality.....	5
6 Geometrical characteristics.....	6
6.1 Measurement of dimensions	6
6.2 Dimensions of electrofusion sockets.....	6
6.3 Dimensions of spigot fittings	8
6.4 Dimensions of socket fusion fittings.....	8
6.5 Dimensions of fabricated fittings.....	8
6.6 Dimensions of electrofusion saddle fittings.....	10
6.7 Dimensions of mechanical fittings	11
6.8 Dimensions of loose backing flanges and flange adapters	11
7 Mechanical characteristics	11
7.1 General.....	11
7.2 Conditioning.....	11
7.3 Requirements	12
7.4 Retest in case of failure at 80 °C	13
7.5 Performance requirements	14
8 Physical characteristics	14
8.1 Conditioning.....	14
8.2 Requirements	14
9 Chemical resistance of fittings in contact with chemicals.....	15
10 Performance requirements	15
11 Marking	15
11.1 General.....	15
11.2 Minimum required marking.....	15
11.3 Fusion system recognition	16
12 Packaging	16
Annex A (normative) Socket fusion fittings	17
Annex B (normative) Fabricated fittings.....	19
Annex C (informative) Examples of typical terminal connections for electrofusion fittings	26
Annex D (normative) Short-term pressure test method.....	28
Annex E (normative) Tensile test for fitting/pipe assemblies.....	30
Bibliography	31

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 4427-3 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 2, *Plastics pipes and fittings for water supplies*.

ISO 4427 consists of the following parts, under the general title *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply*:

- Part 1: General
- Part 2: Pipes
- Part 3: Fittings
- Part 5: Fitness for purpose of the system

Introduction

ISO 4427, the system standard, specifies the requirements for a piping system and its components when 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 and that of water for general purposes.

In respect of potential adverse effects on the quality of water intended for human consumption caused by the products covered by ISO 4427:

- a) ISO 4427 provides no information as to whether the products may be used without restriction;
- b) existing national regulations concerning the use and/or the characteristics of these products are in force.

NOTE Guidance for assessment of conformity can be found in Bibliographical references [8] and [9].

This document is a preview generated by EVS

Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply —

Part 3: Fittings

1 Scope

This part of ISO 4427 specifies the general aspects of fittings made from polyethylene (PE) for piping systems intended for the conveyance of water for human consumption, including raw water prior to treatment and water for general purposes.

It also specifies the test parameters for the test methods to which it refers.

In conjunction with the other parts of ISO 4427, it is applicable to PE fittings, their joints, to joints with components of PE and to joints with mechanical fittings of other materials, intended to be used under the following conditions:

- a) a maximum operating pressure (MOP) up to and including 25 bar¹⁾;
- b) an operating temperature of 20 °C as the reference temperature.

NOTE 1 For applications operating at constant temperatures greater than 20 °C and up to 40 °C, see ISO 4427-1:2007, Annex A.

NOTE 2 ISO 4427 covers a range of maximum operating pressures and gives requirements concerning colours and additives. 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.

It is applicable to fittings of the following types:

- fusion fittings — electrofusion fittings, butt fusion fittings and socket fusion fittings (see Annex A);
- fabricated fittings (see Annex B);
- mechanical fittings;
- flanged fittings.

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

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.

ISO 1133:2005, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics* ²⁾

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 1167-3, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 3: Preparation of components*

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

ISO 4427-1:2007, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 1: General*

ISO 4427-2:2007, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 2: Pipes*

ISO 4427-5, *Plastics piping systems — Polyethylene (PE) pipes and fittings for water supply — Part 5: Fitness for purpose of the system*

ISO 4433-1, *Thermoplastics pipes — Resistance to liquid chemicals — Classification — Part 1: Immersion test method*

ISO 4433-2, *Thermoplastics pipes — Resistance to liquid chemicals — Classification — Part 2: Polyolefin pipes*

ISO 9624, *Thermoplastics pipes for fluids under pressure — Mating dimensions of flange adapters and loose backing flanges*

ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)* ³⁾

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

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

ISO 13955, *Plastics pipes and fittings — Crushing decohesion test for polyethylene (PE) electrofusion assemblies*

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

2) Under revision.

3) To be published. (Revision of ISO 11357-6:2002)

ISO 14236, *Plastics pipes and fittings — Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems*

EN 681-1:1996, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 681-2:2000, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms, definitions, symbols and abbreviated terms given in ISO 4427-1 and the following terms and definitions apply.

3.1

electrofusion socket fitting

polyethylene (PE) fitting which contains one or more integral heating elements that are capable of transforming electrical energy into heat to realize a fusion joint with a spigot end or pipe

3.2

electrofusion saddle fitting

polyethylene (PE) fitting which contains one or more integral heating elements that are capable of transforming electrical energy into heat to produce a fusion onto a pipe

3.2.1

tapping tee

electrofusion saddle fitting (top-loading or wraparound) which contains an integral cutter used for cutting through the wall of the main pipe, which remains in the body of the tapping tee after installation

3.2.2

branch saddle

electrofusion saddle fitting (top-loading or wraparound) which requires an ancillary cutting tool for drilling the hole in the adjoining main pipe

3.3

spigot end fitting

polyethylene (PE) fitting where the outside diameter of the spigot length is equal to the nominal outside diameter, d_n , of the corresponding pipe

3.4

socket fusion fitting

polyethylene (PE) fitting where the socket mouth is designed to be fusion-jointed with a spigot end or a pipe using heated tools

3.5

fabricated fitting

fitting produced from pipe conforming to ISO 4427-2 and/or from injection-moulded fittings in accordance with this part of ISO 4427

3.6

mechanical fitting

fitting used for assembling a polyethylene (PE) pipe to another PE pipe or any other element of the piping system

NOTE 1 The mechanical fitting can be supplied for field assembly or pre-assembled by the manufacturer and generally includes a compression part to provide pressure integrity, leaktightness and resistance to end loads. A support sleeve inserted into the pipe bore provides a permanent support for the PE pipe to prevent creep in the pipe wall under radial compressive forces.