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

Part 5: Fitness for purpose

Systèmes de canalisations en matières plastiques pour la distribution de combustibles gazeux — Polyéthylène (PE) —

Partie 5: Aptitude à l'emploi

[Revision of third edition (ISO 4437:2007)]

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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.

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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 4437-5 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 fourth edition, together with the other parts of ISO 4437, cancels and replaces ISO 4437:2007 and ISO 8085-1/2/3:2001, of which it constitutes a technical revision.

ISO 4437 consists of the following parts, under the general title *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE)*:

— *Part 1: General*

— *Part 2: Pipes*

— *Part 3: Fittings*

— *Part 4: Valves*

— *Part 5: Fitness for purpose of the system*

Introduction

ISO/TS 10839 [1[gives recommended practices for installation.

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

1 Scope

This International Standard specifies requirements of fitness for purpose of the polyethylene (PE) piping system intended to be used for the supply of gaseous fuels.

It specifies the definitions of electrofusion, socket fusion?, 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 standard.

In conjunction with Parts 1 to 4 of ISO 4437, it is applicable to PE pipes, fittings, valves, their joints and joints with components of other materials intended to be used under the following conditions:

The maximum operating pressure MOP is based on the design stress, determined from the compound MRS divided by the C factor, and taking into account RCP requirements;

A temperature of 20 °C as reference temperature.for the design basis.

NOTE 1 For other operating temperatures, derating coefficients should be used, see Annex A.

ISO 4437 (all parts) covers a range of maximum operating pressures and gives requirements concerning additives.

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.

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 1167-2, *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 1167-4, Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 4: Preparation of assemblies

ISO/DIS 4437-1:2012, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 1: General*

ISO/DIS 4437-2:2012, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 2: Pipes*

ISO/DIS 4437-3:2012, *Plastics piping systems for the supply of gaseous fuels — Polyethylene (PE) — Part 3: Fittings*

ISO 10838-1 1), *Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels — Part 1: Metal fittings for pipes of nominal outside diameter less than or equal to 63 mm*

ISO 10838-2 1), *Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels — Part 2: Metal fittings for pipes of nominal outside diameter greater than 63 mm*

ISO 10838-3 1), *Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels — Part 3: Thermoplastics fittings for pipes of nominal outside diameter less than or equal to 63 mm*

ISO 11413:2008, *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 13477, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Small-scale steady-state test (S4 test)*

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

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 — Tear test for polyethylene (PE) saddle assemblies*

3 Terms and definitions

For the purposes of this document, the terms and definitions, symbols and abbreviations given in ISO/DIS 4437-1:2012 and the following definition apply.

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

1) These standards are under revision and may be replaced by ISO 17885.

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 ISO/DIS 4437-2:2012, and fittings conforming to ISO/DIS 4437-3:2012.

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 11414:2009. 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 11413:2008. 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 should be prepared taking into consideration national safety regulations.

For straight equal electrofusion socket fittings (couplers) test joints on selected diameters out of the product range shall be prepared with a gap of 0,05d_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 10838-1, ISO 10838-2 or ISO 10838-3, as applicable.

NOTE 1 The ISO 10838 series of standards may be replaced by ISO 17885 in the future.

NOTE 2 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.