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Polyethylene reinforced with short glass fibres (PE-sGF) piping systems for industrial applications —

Part 5: Fitness for purpose of the system

Systèmes de canalisations en polyéthylène renforcé de fibres de verre courtes (PE-sGF) pour les applications industrielles —

Partie 5: Aptitude à l'emploi du système

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Foreword

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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).

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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 3, *Plastics pipes and fittings for industrial applications*.

A list of all parts in the ISO 22101 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.

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Introduction

Polyethylene reinforced with short glass fibres (PE-sGF) piping systems are pipe systems which consist of fittings produced by adding short glass fibres into high density polyethylene resins. Their physical and mechanical properties are influenced by short glass fibre orientation.

The technology of production of PE-sGF pipes is completely different from the traditional technology used during PE pipes extrusion. For this reason, this document makes reference to standard inside dimension ratio (SIDR). To prevent confusion, the parameter "standard dimension ratio" (SDR), commonly used for PE products, is not used in this document.

For the material subject of this document, the mechanical performances are obtained on the basis of standards dedicated to thermoplastics. The geometrical characteristics are defined for this material in line with ISO 4065.

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Polyethylene reinforced with short glass fibres (PE-sGF) piping systems for industrial applications —

Part 5:
Fitness for purpose of the system

1 Scope

This document specifies the requirements of the fitness for purpose of pipes or fittings assemblies or both made from short glass fibre reinforced polyethylene (PE-sGF) piping systems manufactured by the spiral cross winding method used below ground for the conveyance of fluids in the following industrial and agricultural contexts:

— chemical plants;

— industrial sewerage engineering;

— power engineering (cooling and general-purpose water supply);

— agricultural production plants;

— water treatment;

— small hydraulic power plants (general-purpose water supply).

This document also specifies the test parameters for the test methods it references.

In conjunction with other parts of the ISO 22101 series, this document is applicable to PE-sGF pipes, fittings, their joints and joints with components of PE-sGF or other materials, intended to be used under the following conditions:

a) a maximum allowable operating pressure (PFA) up to and including 25 bar;[1)]

b) operating temperature of 20 °C as the reference temperature.

NOTE For other operating temperatures, guidance is given in ISO/PAS 22101-1:2022, Annex A.

This document is applicable to pipes with an inside diameter of 200 mm to 1 000 mm with integrated socket and spigot fusion joint.

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 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*

1) 1 bar = 0,1 MPa = 105 Pa; 1 MPa = 1 N/mm^2.

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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 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 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/PAS 22101-2, *Polyethylene reinforced with short glass fibres (PE-sGF) piping systems for industrial applications — Part 2: Pipes*

ISO/PAS 22101-3, *Polyethylene reinforced with short glass fibres (PE-sGF) piping systems for industrial applications — Part 3: Fittings*

3 Terms and definitions

No terms and definitions are listed in this document.

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/

4 Fitness for purpose of pipes and/or fittings assemblies

4.1 Method of preparation of assemblies for testing

4.1.1 General

The joint shall be made by using pipes conforming to ISO/PAS 22101-2 or fittings conforming to ISO/PAS 22101-3 or both.

Test pieces for pressure testing 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.

Test assemblies shall be prepared, taking into consideration applicable national safety regulations.

If failures that call for a redesign of the fittings are detected during testing according to this document, retesting according to ISO/PAS 22101-3 automatically becomes necessary.

4.1.2 Electrofusion joints

PE-sGF pipes and fittings intended to be used for jointing by electrofusion shall be prepared and assembled in accordance with ISO 11413. The conditions for the preparation of joints are given in 4.2.3.1 for the

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