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

**Part 1:
General**

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

Partie 1: Généralités



Reference number
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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).

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).

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.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 3, *Polyethylene reinforced with short glass fibres (PE-sGF) piping systems 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.

Introduction

Polyethylene reinforced with short glass fibres (PE-sGF) piping systems are pipe systems which consist of pipes 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 that traditionally used during PE pipes extrusion. For this reason, this document makes reference to standard inside diameter ratio (SIDR) sized pipe. To prevent the confusion, the standard dimension ratio (SDR) size pipe, commonly used for PE products, is not used in this document.

The PE-sGF system is intended to be used for general purpose liquid fluids supply (e.g. chemical plants, industrial sewerage engineering, power plants, agricultural production plants, water treatment).

For the material subject of this document, the mechanical performances are obtained on the basis of International Standards dedicated to thermoplastics. The geometrical characteristics are defined exclusively for this material in line with ISO 3 and ISO 4065.

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

Part 1: General

1 Scope

This document specifies the general aspects of short glass fibre reinforced polyethylene (PE-sGF) piping systems, manufactured by the spiral cross winding method, which are used below ground for the conveyance of liquid fluids for the following industrial and agricultural uses:

- 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).

In conjunction with the other parts of the ISO 22101 series, this document applies to PE-sGF pipes, fittings and their joints with each other, with other PE-sGF components, and to components from other materials intended for use under the following conditions:

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

NOTE For other operating temperatures, guidance is given in [Annex A](#).

Other application areas differing from those listed in the scope can be permitted if the requirements of this document and/or relevant national requirements are taken into account. Drinking water applications are outside the scope of this document.

This document covers only PE-sGF using glass fibre with lengths comprised in the range between 3 mm and 5 mm.

Components conforming to any of the documents listed in the Bibliography or to national standards, as applicable, can be used with components conforming to this document, provided that they conform to the requirements for joint dimensions and to the relevant requirements 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 179-1, *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test*

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

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

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, *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 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method*

ISO 1887, *Textile glass — Determination of combustible-matter content*

ISO 1888, *Textile glass — Staple fibres or filaments — Determination of average diameter*

ISO 2078, *Textile glass — Yarns — Designation*

ISO 3344, *Reinforcement products — Determination of moisture content*

ISO 4427-1, *Plastics piping systems for water supply and for drainage and sewerage under pressure — Polyethylene (PE) — Part 1: General*

ISO 6259-1, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method*

ISO 6259-3, *Thermoplastics pipes — Determination of tensile properties — Part 3: Polyolefin pipes*

ISO 7510, *Plastics piping systems — Glass-reinforced plastics (GRP) components — Determination of the amounts of constituents*

ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation*

ISO 9969, *Thermoplastics pipes — Determination of ring stiffness*

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

ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification, designation and design coefficient*

ISO 13479, *Polyolefin pipes for the conveyance of fluids — Determination of resistance to crack propagation — Test method for slow crack growth on notched pipes*

ISO 13967, *Thermoplastics fittings — Determination of ring stiffness*

ISO 15512, *Plastics — Determination of water content*

ISO 15853, *Thermoplastics materials — Preparation of tubular test pieces for the determination of the hydrostatic strength of materials used for injection moulding*

ISO 16770, *Plastics — Determination of environmental stress cracking (ESC) of polyethylene — Full-notch creep test (FNCT)*

ISO 22314, *Plastics — Glass-fibre-reinforced products — Determination of fibre length*