INTERNATIONAL STANDARD

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Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) —

Part 1: Material specification and performance criteria for pipes, fittings and systems

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement sans pression enterrés — Systèmes de canalisations à parois structurées en poly(chlorure de vinyle) non plastifié (PVC-U), polypropylène (PP) et polyéthylène (PE) —

Partie 1: Spécification des matières et critères de performance des tubes, raccords et système

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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 1, *Plastics pipes and fittings for soil, waste and drainage (including land drainage)*.

This second edition cancels and replaces the first edition (ISO 21138-1:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

— the normative references have been updated;

— references to EN test methods have been updated to ISO test methods, when applicable;

— editorial improvements have been made for clarification.

A list of all parts in the ISO 21138 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

The ISO 21138 series of standards covers plastics piping systems for non-pressure underground drainage and sewerage, in particular thermoplastics structured-wall piping systems.

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Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) —

Part 1: Material specification and performance criteria for pipes, fittings and systems

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1 Scope

This document, together with ISO 21138-2 and ISO 21138-3, specifies the definitions and requirements for pipes, fittings and systems based on unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) structured-wall piping systems intended to be used in non-pressure underground drainage and sewerage applications.

NOTE 1 Pipes, fittings and the system complying with this document can also be used for highway drainage and surface water.

This document covers a range of pipe and fitting sizes, materials, pipe constructions, nominal ring stiffnesses, and gives recommendations concerning colours.

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 installation practices or codes.

In conjunction with ISO 21138-2 and ISO 21138-3, this document is applicable to structured-wall pipes and fittings, to their joints and to joints with components of other plastics and non-plastics materials.

It is applicable to structured-wall pipes and fittings with or without an integral socket with elastomeric ring seal joints as well as welded and fused joints.

NOTE 3 Pipes, fittings and other components conforming to any plastics product standards referred to in the Bibliography can be used with pipes and fittings conforming to this document when they conform to the requirements for joint dimensions given in ISO 21138-2 and ISO 21138-3 and to the performance requirements given in Clause 9.

NOTE 4 For dimensions larger than DN/OD 1200 or DN/ID 1200, this document can serve as a general guideline regarding appearance, colour, physical and mechanical characteristics as well as performance requirements.

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 472, *Plastics — Vocabulary*

ISO 580, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating*

ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

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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 2505, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters*

ISO 2507-1, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 1: General test method*

ISO 2507-2, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 2: Test conditions for unplasticized poly(vinyl chloride) (PVC-U) or chlorinated poly(vinyl chloride) (PVC-C) pipes and fittings and for high impact resistance poly (vinyl chloride) (PVC-HI) pipes*

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

ISO 3127, *Thermoplastics pipes — Determination of resistance to external blows — Round-the-clock method*

ISO 9852, *Unplasticized poly(vinyl chloride) (PVC-U) pipes — Dichloromethane resistance at specified temperature (DCMT) — Test method*

ISO 9967, *Thermoplastics pipes — Determination of creep ratio*

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

ISO 11173, *Thermoplastics pipes — Determination of resistance to external blows — Staircase method*

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

ISO 11922-1, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO 12091, *Structured-wall thermoplastics pipes — Oven test*

ISO 13254, *Thermoplastics piping systems for non-pressure applications — Test method for watertightness*

ISO 13259, *Thermoplastics piping systems for underground non-pressure applications — Test method for leaktightness of elastomeric sealing ring type joints*

ISO 13262, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics spirally-formed structured-wall pipes — Determination of the tensile strength of a seam*

ISO 13263, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for impact strength*

ISO 13264, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings*

ISO 13265, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Joints for buried non-pressure applications — Test method for the long-term sealing performance of joints with elastomeric seals by estimating the sealing pressure*

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

ISO 13968, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of ring flexibility*

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ISO 21138-2, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 2: Pipes and fittings with smooth external surface, Type A*

ISO 21138-3, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 3: Pipes and fittings with non-smooth external surface, Type B*

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

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

EN 681-4, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 4: Cast polyurethane sealing elements*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472, ISO 1043-1, ISO 11922-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1 General terms

3.1.1.1
structured-wall pipes and fittings
products that have an optimized design with regard to material usage to achieve the physical, mechanical and performance requirements of this document

Note 1 to entry: For a description of the particular designs covered by this document, see ISO 21138-2 for Type A and ISO 21138-3 for Type B. Type A pipes have an internal and external plain surface. Type B pipes have an internal plain surface and a hollow spiral or annular ribbed external surface.

3.1.1.2
fabricated fitting
fitting manufactured by heat forming and/or joining more than one piece of pipe and/or moulded component

Note 1 to entry: Sealing rings retaining components are not considered as a piece.

3.1.2 Geometrical terms

3.1.2.1
nominal size
DN
numerical designation of the size of a component, other than a component designated by thread size, which is approximately equal to the manufacturing dimension in millimetres

Note 1 to entry: The nominal size is either related to the outside diameter, or to the inside diameter

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