
**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**

*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 2: Tubes et raccords avec une surface externe lisse, type A



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	1
3 Terms, definitions, symbols and abbreviated terms.....	3
3.1 Terms and definitions.....	3
3.2 Symbols.....	4
3.3 Abbreviated terms.....	4
4 Material	5
4.1 General.....	5
4.2 Unplasticized poly(vinyl chloride) (PVC-U).....	5
4.3 Polypropylene (PP).....	6
4.4 Polyethylene (PE).....	8
5 Designation of wall construction and examples of typical jointing methods	10
5.1 Wall constructions designated as Type A.....	10
5.2 Designation and design of joints.....	12
6 General characteristics for pipes and fittings — Colour	12
7 Geometrical characteristics.....	12
7.1 General.....	12
7.2 Dimensions.....	12
7.3 Types of fitting	17
8 Physical characteristics	17
8.1 Unplasticized poly(vinyl chloride) (PVC-U).....	17
8.2 Polypropylene (PP).....	19
8.3 Polyethylene (PE).....	19
9 Mechanical characteristics	20
9.1 Mechanical characteristics of pipes	20
9.2 Mechanical characteristics of fittings.....	23
10 Performance requirements	23
11 Marking	25
11.1 General.....	25
11.2 Minimum required marking.....	25
Annex A (normative) Virgin PVC-U material.....	27
Annex B (normative) Utilization of non-virgin PVC-U material.....	28
Annex C (normative) Virgin PP material	31
Annex D (normative) Utilisation of non-virgin PP material.....	32
Annex E (normative) Virgin PE material	35
Annex F (normative) Utilization of non-virgin PE material	36
Annex G (informative) Survey of possible use of reprocessible and recyclable material.....	40
Bibliography	41

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 21138-2 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)*.

ISO 21138 consists of the following parts, under the general title *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 specifications and performance criteria for pipes, fittings and system*
- *Part 2: Pipes and fittings with smooth external surface, Type A*
- *Part 3: Pipes and fittings with non-smooth external surface, Type B*

Introduction

ISO 21138 is the system standard covering the plastics piping systems for non-pressure underground drainage and sewerage, in particular thermoplastics structured-wall piping systems.

This document is a preview generated by EVS

This document is a preview generated by EVS

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

1 Scope

This part of ISO 21138, together with ISO 21138-1, specifies the definitions and requirements for pipes with a smooth external surface (Type A), fittings and systems based on unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) structured-wall piping in the field of non-pressure systems for underground drainage and sewerage.

NOTE 1 These pipes, fittings and the system can be used for highway drainage and surface water.

This part of ISO 21138 specifically refers to PVC, PP and PE materials.

NOTE 2 Other thermoplastic materials can be added via an addendum.

This part of ISO 21138 specifies test methods and test parameters.

This part of ISO 21138 covers a range of pipe and fitting sizes, materials, pipe constructions and nominal ring stiffnesses, and gives recommendations concerning colours.

NOTE 3 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.

In conjunction with ISO 21138-1, it is applicable to PVC-U, PP and PE structured-wall pipes and fittings, to their joints and to joints with components of other plastics and non-plastics materials intended to be used for buried piping systems for the transport of drainage and sewage.

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

NOTE 4 For dimensions larger than DN/OD 1200, or DN/ID 1200, this part of ISO 21138 can serve as a general guide regarding appearance, colour, physical and mechanical characteristics as well as performance requirements.

Test methods are not included in this document.

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 178, *Plastics — Determination of flexural properties*

ISO 306:1994, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)*

ISO 527-2:1993, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

ISO 580:2005, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating*

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

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 methods 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 3127:1994, *Thermoplastics pipes — Determination of resistance to external blows — Round-the-clock method*

ISO 3451-1:1997, *Plastics — Determination of ash — Part 1: General methods*

ISO 4435:2003, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U)*

ISO 8772:2006, *Plastics piping systems for non-pressure underground drainage and sewerage — Polyethylene (PE)*

ISO 8773:2006, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP)*

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 11173:1994, *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 21138-1, *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 specifications and performance criteria for pipes, fittings and the system*

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 a non-smooth external surface, Type B*

ISO 22088-3, *Plastics — Determination of resistance to environmental stress cracking (ESC) — Part 3: Bent strip method*

EN 922, *Plastics piping and ducting systems — Pipes and fittings of unplasticized poly(vinyl chloride) (PVC-U) — Specimen preparation for determination of the viscosity number and calculation of the K-value*

EN 1053, *Plastics piping systems — Thermoplastics piping systems for non-pressure applications — Test method for watertightness*

EN 1277:2003, *Plastics piping systems — Thermoplastics piping systems for buried non-pressure applications — Test methods for leaktightness of elastomeric sealing ring type joints*

EN 1437:2002, *Plastics piping systems — Piping systems for underground drainage and sewerage — Test method for resistance to combined temperature cycling and external loading*

EN 1446, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of ring flexibility*

EN 1905, *Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) pipes, fittings and material — Method for assessment of the PVC content based on total chlorine content*

EN 1979, *Plastics piping and ducting systems — Thermoplastics spirally-formed structured-wall pipes — Determination of the tensile strength of a seam*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 12099, *Plastics piping systems — Polyethylene piping materials and components — Determination of volatile content*

EN 14741, *Thermoplastics piping and ducting systems — Joints for buried non-pressure applications — Test method for the long-term sealing performance of joints with elastomeric seals by estimating the sealing pressure*

EN 15344:—¹⁾, *Plastics — Recycled plastics — Characterisation of polyethylene (PE) recyclates*

EN 15345:—¹⁾, *Plastics — Recycled plastics — Characterisation of polypropylene (PP) recyclates*

EN 15346:—¹⁾, *Plastics — Recycled plastics — Characterisation of poly(vinyl chloride) (PVC) recyclates*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the following terms, definitions, symbols and abbreviated terms apply.

3.1 Terms and definitions

The terms and definitions given in ISO 21138-1 apply.

1) To be published.