
**Plastics piping systems — Multilayer pipe
systems for indoor gas installations with
a maximum operating pressure up to and
including 5 bar (500 kPa) —**

**Part 1:
Specifications for systems**

*Systèmes de canalisations en matières plastiques — Tubes
multicouches et leurs assemblages pour une pression maximale de
service inférieure ou égale à 5 bar (500 kPa) destinés à l'alimentation
en gaz à l'intérieur des bâtiments —*

Partie 1: Spécifications pour les systèmes



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

© ISO 2006

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.....	v
Introduction	vi
1 Scope	1
2 Normative references	2
3 Terms, definitions and symbols	3
3.1 Structural definitions	3
3.2 Geometrical definitions	3
3.3 Definitions related to pressure	4
3.4 Materials definitions	4
3.5 Definitions related to material characteristics	5
3.6 Terms related to service conditions	5
4 Requirements for the system	6
4.1 Pressure drop	6
4.2 Bending	6
4.3 Corrosive conditions	6
5 Pipes	6
5.1 Material	6
5.2 General characteristics	7
5.3 Dimensions of pipes	7
5.4 Mechanical properties	8
5.5 Physical properties	9
6 Fittings	10
6.1 General	10
6.2 Materials	11
6.3 Dimensions	11
6.4 Transition fittings	11
6.5 Rubber rings	11
7 Fitness for purpose	11
7.1 Diameter classes	11
7.2 Relation between maximum operating pressure and qualification test pressure	11
7.3 Requirements	12
8 Marking and documentation	13
8.1 Legibility	13
8.2 Damage	13
8.3 Minimum marking requirements	13
Annex A (normative) List of the reference product standards	15
Annex B (normative) Test for delamination and strength of the joint line	16
Annex C (normative) Resistance to gas constituents	18
Annex D (normative) Thermal durability of the outer layer of M-pipes	19
Annex E (normative) Adhesion test	21
Annex F (normative) Odour permeability	22
Annex G (normative) Resistance to tensile load on joints	23
Annex H (normative) Crush test on joints	25

Annex I (normative) Impact resistance test on joints 27

Annex J (normative) Thermal cycling test on joints 29

Annex K (normative) Repeated bending test..... 31

Bibliography 33

This document is a preview generated by EVS

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 17484-1 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*.

ISO 17484 consists of the following parts, under the general title *Plastics piping systems — Multilayer pipe systems for indoor gas installations with a maximum operating pressure up to and including 5 bar (500 kPa)*:

— *Part 1: Specifications for systems*

A Part 2 dealing with the code of practice is planned.

Introduction

This part of ISO 17484 was developed in response to worldwide demand for minimum specification for multi-layered pipes for indoor gas applications.

Multi-layered pipes are delivered generally as a complete system. Pipes, fittings, tools, etc., are not compatible with components of another brand, generally. An advantage is that all components are perfectly geared to one another, but for repairing, the lack of compatibility might be problematic in the future.

Fire safety of systems

Depending on the construction of the house, pipework layout and other local circumstances, it is possible that additional safety devices are required to fulfill the demands of fire safety. Safety aspects of the system will be described in the planned Part 2.

Code of practice

The planned second part of ISO 17484 will be the code of practice for installation.

Recommendations on design, construction and protection in case of fire of the gas indoor installation are given in EN 1775).

References to ISO/TC 138/SC5 work

Test methods referred to in this part of ISO 17484 have been developed by SC 5 as far as possible. However, not all test methods needed are in the working programme of SC 5. These test methods are placed in Annexes B to K of this part of ISO 17484. It is planned that these tests will be developed as International Standards in the future.

For multilayer pipe construction, consisting of a layer of a reference standard material, an adhesive and a non-stress-designed layer, procedure I and the relevant product standards are followed for all aspects, excluding the aspects of delamination and, if applicable, oxygen permeation.

For example, layers can have the following purposes:

- ability to withstand the pressure;
- ability to realize interlayer adhesion;
- ability to block or greatly diminish incoming UV and/or sunlight;
- ability to mechanically protect the outside layer;
- ability to control the longitudinal expansion;
- ability to give the multilayer pipe a colour (inside layer or outside layer).

Some characteristics can be combined in one layer.

Plastics piping systems — Multilayer pipe systems for indoor gas installations with a maximum operating pressure up to and including 5 bar (500 kPa) —

Part 1: Specifications for systems

1 Scope

This part of ISO 17484 specifies the general requirements and the performance requirements for multilayer pipe systems based on pipes, fittings and their joints intended to be used for gas supply within buildings.

PE-X and PE pipes composed of one stress-designed layer, adhesive and a barrier layer are also covered by this part of ISO 17484.

This part of ISO 17484 gives guidance for the design of piping systems consisting of multilayer pipes based on thermoplastics, for which at least 60 % of the wall thickness is polymeric material. Polymeric materials intended for stress-designed layers and all inner layers are required to be polyethylene (PE) and/or crosslinked polyethylene (PE-X) in accordance with Annex A of this part of ISO 17484. The outer layer of a metal multilayer is required to be PE or PE-X. PE-RT is considered as PE but with specific properties concerning hoop-stress performance (see 5.4.2.).

This part of ISO 17484 applies to systems that operate at temperatures of – 20 °C up to 60 °C.

For the purpose of this part of ISO 17484, crosslinked polyethylene (PE-X) and adhesive layers are considered as thermoplastic materials.

For sizes greater than 63 mm the requirements of ISO 18225 have to be fulfilled in addition.

This part of ISO 17484 is applicable for piping systems used in buildings to supply gas with a maximum operating pressure up to and including 500 kPa (5 bar)¹⁾.

This standard applies to the following fuels:

- Category D gaseous fuel: natural gas; see ISO 13623;
- Category E gaseous fuel: LPG vapour, and natural gas or LPG vapour; see ISO 13623.

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

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 3:1973, *Preferred numbers — Series of preferred numbers*

ISO 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

ISO 497:1973, *Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers*

ISO 1167 (all parts), *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure*

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

ISO 3503, *Assembled joints between fittings and polyethylene (PE) pressure pipes — Test of leakproofness under internal pressure when subjected to bending*

ISO 8085-3:2001, *Polyethylene fittings for use with polyethylene pipes for the supply of gaseous fuels — Metric series — Specifications — Part 3: Electrofusion fittings*

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

ISO 10838 (all parts), *Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels*

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

ISO 12162:1995, *Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient*

ISO 13480, *Polyethylene pipes — Resistance to slow crack growth — Cone test method*

ISO 13623:2000, *Petroleum and natural gas industries — Pipeline transportation systems*

ISO 14531-1, *Plastics pipes and fittings — Crosslinked polyethylene (PE-X) pipe systems for the conveyance of gaseous fuels — Metric series — Specifications — Part 1: Pipes*

ISO 17454:2006, *Plastics piping systems — Multilayer pipes — Test method for the adhesion of the different layers using a pulling rig*

ISO 17456:—, *Plastics piping systems — Multilayer pipes — Determination of long-term strength*

ISO 18225, *Plastic piping systems — Multilayer piping systems for outdoor gas installations — Specifications for systems*

EN 713, *Plastics piping systems — Mechanical joints between fittings and polyolefin pressure pipes — Test method for leaktightness under internal pressure of assemblies subjected to bending*

EN 1555-3, *Plastics piping systems for the supply of gaseous fuels — Polyethylene(PE) — Part 3: Fittings*