

# **Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure —**

## **Part 2: Preparation of pipe test pieces**

The European Standard EN ISO 1167-2:2006 has the status of a  
British Standard

ICS 23.040.45; 23.040.20

**NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW**

## National foreword

This British Standard is the official English language version of EN ISO 1167-2:2006. It is identical with ISO 1167-2:2006. This Standard, together with BS EN 1167-1 supersedes BS EN 921:1995 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee PRI/88, Plastic piping systems, to Subcommittee PRI/88/4, Test methods, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

### Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to iv, pages 1 to 4, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

### Amendments issued since publication

Amd. No.	Date	Comments

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2006

© BSI 2006

ISBN 0 580 49070 X

EUROPEAN STANDARD

EN ISO 1167-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2006

ICS 23.040.45; 23.040.20

Supersedes EN 921:1994

English Version

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 1167-2:2006)

Tubes, raccords et assemblages en matières thermoplastiques pour le transport des fluides - Détermination de la résistance à la pression interne - Partie 2: Préparation des éprouvettes tubulaires (ISO 1167-2:2006)

Rohre, Formstücke und Zubehör aus thermoplastischen Kunststoffen für den Transport von Flüssigkeiten - Bestimmung der Widerstandsfähigkeit gegen inneren Überdruck - Teil 2: Vorbereitung der Rohr-Probekörper (ISO 1167-2:2006)

This European Standard was approved by CEN on 23 January 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels



MAHCO

INTERNATIONAL  
STANDARD

ISO  
1167-2

First edition  
2006-02-01

---

---

**Thermoplastics pipes, fittings and  
assemblies for the conveyance of  
fluids — Determination of the resistance  
to internal pressure —**

Part 2:  
**Preparation of pipe test pieces**

*Tubes, raccords et assemblages en matières thermoplastiques pour le  
transport des fluides — Détermination de la résistance à la pression  
interne —*

*Partie 2: Préparation des éprouvettes tubulaires*

MAHCO



Reference number  
ISO 1167-2:2006(E)



## Contents

Page

Foreword.....	iv
1 Scope .....	1
2 Normative references .....	1
3 Principle .....	1
4 Apparatus .....	2
5 Test pieces .....	2
5.1 Extruded test pieces.....	2
5.2 Injection-moulded tubular test pieces .....	2
5.3 Measurement of dimensions .....	2
6 Test report .....	2
Bibliography .....	4

MAHCO



## 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 1167-2 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*.

This first edition of ISO 1167-2, together with ISO 1167-1, cancels and replaces ISO 1167:1996 and, together with ISO 1167-3, cancels and replaces ISO 12092:2000, of which it constitutes a technical revision.

ISO 1167 consists of the following parts, under the general title *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure*:

- *Part 1: General method*
- *Part 2: Preparation of pipe test pieces*
- *Part 3: Preparation of components*
- *Part 4: Preparation of assemblies*

MAHCO



# 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 Scope

This part of ISO 1167 specifies the dimensions and method for preparation of extruded, or injection-moulded tubular, test pieces used to determine the resistance of thermoplastics pipes to internal hydrostatic pressure according to ISO 1167-1.

### 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 1167-1:2006, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

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

### 3 Principle

Pipe test pieces may be obtained by extrusion or injection-moulding. The extruded test pieces are used for material and pipe testing, whereas the injection-moulded tubular test pieces are used for testing injection moulding materials only.

The injection-moulded tubular test pieces make it possible to determine the time-related behaviour of the injection moulding material for fittings under hydrostatic pressure and under the same conditions as specified for extruded pipes. It is possible to extrapolate the results in accordance with a method such as that specified in ISO 9080 in order to determine the MRS (minimum required strength) and to classify the material using ISO 12162. The tubular test pieces also make it possible to verify individual points on previously established stress/time regression curves as a minimum material test requirement.

**NOTE** If the compound used for the injection-moulding of components can also be extruded, then its time-related behaviour can be investigated using either injection-moulded or extruded tubular test pieces.

After conditioning, test pieces consisting of a portion of pipe sufficient to provide the required free length as a function of the diameter of the pipe are subjected to a specified internal hydrostatic pressure or stress for a specified period of time or until the test piece(s) fail(s), in accordance with ISO 1167-1.

The number of test pieces, conditioning and details of the test report are given in ISO 1167-1.

## 4 Apparatus

- 4.1 **End caps**, as specified in the standard making reference to ISO 1167-1.
- 4.2 **Means of measuring the wall thickness**, conforming to ISO 3126.
- 4.3 **Means of measuring the mean outside diameter of the pipe**, conforming to ISO 3126, e.g. Pi-tape.

## 5 Test pieces

### 5.1 Extruded test pieces

#### 5.1.1 Free length

The free length,  $l_0$ , of the pipe between the end caps shall be at least three times the nominal outside diameter  $d_n$ , with a minimum of 250 mm.

If, for pipes with  $d_n$  greater than 315 mm, the specified minimum free length cannot be achieved, a shorter free length may be chosen with a minimum of two times  $d_n$ , unless otherwise specified in the referring standard or specification.

#### 5.1.2 Total length

For type B end caps (see ISO 1167-1:2006, 5.1), the total length of the test piece shall be such that movement of the test piece between the end caps is accommodated during the test, thus making allowance for thermal expansion.

### 5.2 Injection-moulded tubular test pieces

Injection-moulded test pieces shall conform to the following requirements for the dimensions shown in Figure 1.

The nominal outside diameter  $d_n$  of the test pieces shall be between 25 mm and 110 mm inclusive. The wall thickness will depend on the material concerned.

The free length  $l_0$  of the test pieces, excluding the ends, shall be  $3d_n$ , except for test pieces  $d_n \geq 50$  mm, for which the minimum free length shall be 140 mm.

Injection-moulded test pieces with a longitudinal fusion line and both ends open should preferably be used for comparative and investigative purposes only.

The injection-moulding parameters can strongly influence the stresses in the injection-moulded test piece.

### 5.3 Measurement of dimensions

If necessary for the calculation of the test pressure (see ISO 1167-1:2006, 7.2), find and determine, in accordance with ISO 3126, the minimum wall thickness and the mean outside diameter of the free length of the test piece, using apparatus conforming to 4.2 and 4.3. These measurements shall be used for further calculations. The rounding up procedure of ISO 3126 shall not be applied.

## 6 Test report

Record the information required in order to comply with ISO 1167-1:2006, Clause 11 and include the method of manufacture of the test piece, i.e. by extrusion or by injection moulding.

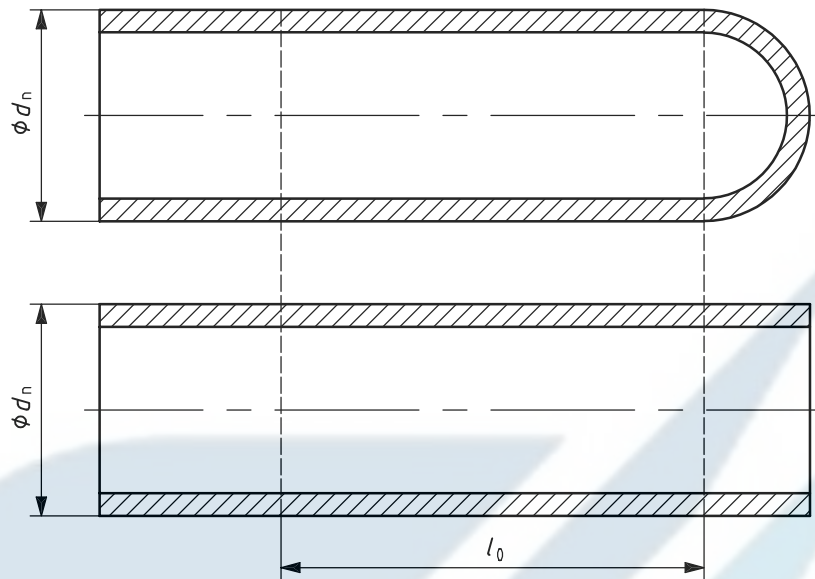


Figure 1 — Injection-moulded test pieces

MAHCO

## Bibliography

- [1] ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics pipe materials in pipe form by extrapolation*
- [2] ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient*





## BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

### Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.  
Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

### Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001.  
Fax: +44 (0)20 8996 7001. Email: [orders@bsi-global.com](mailto:orders@bsi-global.com). Standards are also available from the BSI website at <http://www.bsi-global.com>.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

### Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre.  
Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: [info@bsi-global.com](mailto:info@bsi-global.com).

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.  
Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001.  
Email: [membership@bsi-global.com](mailto:membership@bsi-global.com).

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsi-global.com/bsonline>.

Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

### Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager.  
Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553.  
Email: [copyright@bsi-global.com](mailto:copyright@bsi-global.com).

BSI  
389 Chiswick High Road  
London  
W4 4AL