

---

---

**Thermoplastics pipes —  
Determination of creep ratio**

*Tubes en matières thermoplastiques — Détermination du taux de fluage*





**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Symbols</b> .....	<b>1</b>
<b>4 Principle</b> .....	<b>2</b>
<b>5 Apparatus</b> .....	<b>2</b>
<b>6 Test pieces</b> .....	<b>3</b>
6.1 Marking and number of test pieces.....	3
6.2 Length of test pieces.....	3
6.3 Inside diameter of test piece(s).....	4
6.4 Age of test pieces.....	4
<b>7 Conditioning</b> .....	<b>5</b>
<b>8 Test procedure</b> .....	<b>5</b>
<b>9 Determination of the creep ratio</b> .....	<b>6</b>
<b>10 Test report</b> .....	<b>9</b>
<b>Annex A (informative) Creep in thermoplastics material</b> .....	<b>10</b>
<b>Bibliography</b> .....	<b>12</b>

## 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](http://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](http://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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is 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 third edition cancels and replaces the second edition (ISO 9967:2007), which has been technically revised.

## Introduction

Experience shows that when a pipe is installed in the soil in accordance with an appropriate code of practice an increase in deflection may be observed. Depending on the soil and installation conditions this period will vary but normally not exceed two years.

Therefore, the two-year creep ratio as determined in accordance with this International Standard is intended for use when long-term static calculations are carried out.

The theory of creep in thermoplastics materials is briefly explained in [Annex A](#).

For experiments, the test can be carried out based on other ages of the test pieces, other test temperatures and/or other test durations.



# Thermoplastics pipes — Determination of creep ratio

## 1 Scope

This International Standard specifies a method for determining the creep ratio of thermoplastics pipes having a circular cross-section.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

## 3 Symbols

		<b>Unit</b>
$d_n$	nominal diameter of pipe	mm
$d_i$	inside diameter of test piece of pipe	mm
$F$	loading force	kN
$F_0$	pre-load force	N
$p$	pitch	mm
$L$	length of test piece	mm
$y_0$	measured initial deflection	mm
$Y_t$	calculated deflection at time $t$	mm
$Y_2$	extrapolated two-year deflection	mm
$\delta$	vertical deflection used to determine the loading force	mm
$B$	theoretical deflection, at $t = 1$ h	mm
$M$	gradient coefficient	
$N$	number of points on the deflection curve used for the linear regression	
$R$	correlation coefficient	
$t$	time	h
$x$	$\log(t)$	
$y$	measured total deflection	mm
$\gamma$	creep ratio	