

---

---

**Plastics — Determination of creep  
behaviour —**

**Part 1:  
Tensile creep**

*Plastiques — Détermination du comportement au fluage —  
Partie 1: Fluage en traction*





**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2017, 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>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Apparatus</b> .....	<b>3</b>
<b>5 Test specimens</b> .....	<b>4</b>
<b>6 Procedure</b> .....	<b>4</b>
6.1 Conditioning and test atmosphere.....	4
6.2 Measurement of test-specimen dimensions.....	5
6.3 Mounting the test specimens.....	5
6.4 Selection of stress value.....	5
6.5 Loading procedure.....	5
6.5.1 Preloading.....	5
6.5.2 Loading.....	5
6.6 Extension-measurement schedule.....	5
6.7 Time measurement.....	5
6.8 Temperature and humidity control.....	6
6.9 Measurement of recovery rate (optional).....	6
<b>7 Expression of results</b> .....	<b>6</b>
7.1 Method of calculation.....	6
7.1.1 Tensile-creep modulus, $E_t$ .....	6
7.1.2 Nominal tensile-creep modulus, $E^*_t$ .....	6
7.2 Presentation of results.....	7
7.2.1 Creep curves.....	7
7.2.2 Creep-modulus/time curves.....	7
7.2.3 Isochronous stress-strain curves.....	8
7.2.4 Three-dimensional representation.....	8
7.2.5 Creep-to-rupture curves.....	8
7.3 Precision.....	9
<b>8 Test report</b> .....	<b>9</b>
<b>Annex A (informative) Physical-ageing effects on the creep of polymers</b> .....	<b>10</b>
<b>Bibliography</b> .....	<b>14</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 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html)

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical behaviour*.

This third edition cancels and replaces the second edition (ISO 899-1:2003), of which it constitutes a minor revision to update the normative references in [Clause 2](#). It also incorporates the Amendment ISO 899-1:2003/Amd.1:2015.

A list of all parts in the ISO 899 series can be found on the ISO website.

# Plastics — Determination of creep behaviour —

## Part 1: Tensile creep

### 1 Scope

This document specifies a method for determining the tensile creep of plastics in the form of standard test specimens under specified conditions such as those of pretreatment, temperature and humidity.

The method is suitable for use with rigid and semi-rigid non-reinforced, filled and fibre-reinforced plastics materials in the form of dumb-bell-shaped test specimens moulded directly or machined from sheets or moulded articles.

The method is intended to provide data for engineering-design and research and development purposes. Data for engineering-design purposes requires the use of extensometers to measure the gauge length of the specimen. Data for research or quality-control purposes may use the change in distance between the grips (nominal extension).

Tensile creep can vary significantly with differences in specimen preparation and dimensions and in the test environment. The thermal history of the test specimen can also have profound effects on its creep behaviour (see [Annex A](#)). Consequently, when precise comparative results are required, these factors are intended to be carefully controlled.

If tensile-creep properties are used for engineering-design purposes, the plastics materials are intended to be tested over a broad range of stresses, times and environmental conditions.

### 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 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 472, *Plastics — Vocabulary*

ISO 527-1:2012, *Plastics — Determination of tensile properties — Part 1: General principles*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 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>