



NSAI
Standards

Irish Standard
I.S. EN ISO 294-4:2003

Plastics — Injection moulding of test specimens of thermoplastic materials — Part 4: Determination of moulding shrinkage (ISO 294-4:2001)

I.S. EN ISO 294-4:2003

Incorporating amendments/corrigenda/National Annexes issued since publication:
EN ISO 294-4:2003/AC:2011

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

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SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

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EUROPEAN STANDARD

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NORME EUROPÉENNE

June 2011

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Version Française
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Plastics - Injection moulding of test specimens of thermoplastic materials -
Part 4: Determination of moulding shrinkage - Technical Corrigendum 1
(ISO 294-4:2001/Cor 1:2007)

Plastiques - Moulage par injection des
échantillons de matériaux thermoplastiques
- Partie 4: Détermination du retrait au
moulage - Rectificatif technique 1 (ISO 294-
4:2001/Cor 1:2007)

Kunststoffe - Spritzgießen von
Probekörpern aus Thermoplasten - Teil 4:
Bestimmung der Verarbeitungsschwindung
(ISO 294-4:2001/Cor 1:2007)

This corrigendum becomes effective on 15 June 2011 for incorporation in the three official language versions of the EN.

Ce corrigendum prendra effet le 15 juin 2011 pour incorporation dans les trois versions linguistiques officielles de la EN.

Die Berichtigung tritt am 15. Juni 2011 zur Einarbeitung in die drei offiziellen Sprachfassungen der EN in Kraft.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Ref. No.: EN ISO 294-4:2003/AC:2011 D/E/F

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Foreword

This document (EN ISO 294-4:2003/AC:2011) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 "Plastics" the secretariat of which is held by NBN.

Endorsement notice

The text of ISO 294-4:2001/Cor 1:2007 has been approved by CEN as a EN ISO 294-4:2003/AC:2011 without any modification.

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I.S. EN ISO 294-4:2003



INTERNATIONAL STANDARD ISO 294-4:2001
TECHNICAL CORRIGENDUM 1

Published 2007-11-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 4:
Determination of moulding shrinkage

TECHNICAL CORRIGENDUM 1

Plastiques — Moulage par injection des éprouvettes de matériaux thermoplastiques —

Partie 4: Détermination du retrait au moulage

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to ISO 294-4:2001 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

Page 1, Clause 2

For the second of the normative references (ISO 294-3), insert the year of publication (2002) and delete the footnote.

In addition, insert the year of publication throughout the document where appropriate.

Page 3, Subclause 4.1

In the fourth paragraph, change “parts 1 to 3 of this International Standard” to “parts 1 and 3 of this International Standard”.

Page 5, Subclause 5.6.4

Correct Equation (1) to read:

$$-\Delta x \approx 4h^2/3x$$

I.S. EN ISO 294-4:2003

EUROPEAN STANDARD

EN ISO 294-4

NORME EUROPÉENNE

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February 2003

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English version

Plastics - Injection moulding of test specimens of thermoplastic materials - Part 4: Determination of moulding shrinkage (ISO 294-4:2001)

Plastiques - Moulage par injection des éprouvettes de matériaux thermoplastiques - Partie 4: Détermination du retrait au moulage (ISO 294-4:2001)

Kunststoffe - Spritzgießen von Probekörpern aus Thermoplasten - Teil 4: Bestimmung der Verarbeitungsschwindung (ISO 294-4:2001)

This European Standard was approved by CEN on 27 December 2002.

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 Management Centre 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 Management Centre has the same status as the official versions.

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



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

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CORRECTED 2003-03-19

Foreword

The text of ISO 294-4:2001 has been prepared by Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 294-4:2003 by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2003, and conflicting national standards shall be withdrawn at the latest by August 2003.

This document supersedes EN ISO 294-4:1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 294-4:2001 has been approved by CEN as EN ISO 294-4:2003 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

Annex ZA

(normative)

Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

Publication	Year	Title	EN	Year
ISO 294-1	1996	Plastics - Injection moulding of test specimens of thermoplastic materials - Part 1: General principles, and moulding of multipurpose and bar test specimens	EN ISO 294-1	1998
ISO 294-3	1996	Plastics - Injection moulding of test specimens of thermoplastic materials - Part 3: Small plates	EN ISO 294-3	1998

I.S. EN ISO 294-4:2003

INTERNATIONAL STANDARD

ISO 294-4

Second edition
2001-12-15

Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 4: Determination of moulding shrinkage

*Plastiques — Moulage par injection des éprouvettes de matériaux
thermoplastiques —*

Partie 4: Détermination du retrait au moulage



Reference number
ISO 294-4:2001(E)

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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 3.

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 part of ISO 294 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 294-4 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This second edition cancels and replaces the first edition (ISO 294-4:1997), which has been technically revised.

ISO 294 consists of the following parts, under the general title *Plastics — Injection moulding of test specimens of thermoplastic materials*:

- *Part 1: General principles, and moulding of multipurpose and bar test specimens*
- *Part 2: Small tensile bars*
- *Part 3: Small plates*
- *Part 4: Determination of moulding shrinkage*
- *Part 5: Preparation of standard specimens for investigating anisotropy*

Annex A of this part of ISO 294 is for information only.

Introduction

See ISO 294-1.

In the injection moulding of thermoplastics, the difference between the dimensions of the mould cavity and those of the moulded articles produced from it may vary with the design and operation of the mould. Such differences may depend on the size of the injection-moulding machine, the shape and dimensions of mouldings including any restrictive action this may have on the shrinkage, the degree and direction of flow or movement of the material in the mould, the sizes of the nozzle, sprue, runner and gate, the cycle on which the machine is operated, the temperature of the melt and the mould, and the magnitude and duration of the hold pressure. Moulding and post-moulding shrinkage are caused by crystallization, volume relaxation and orientation relaxation of the material and by thermal contraction of both the thermoplastic material and the mould. Post-moulding shrinkage may also be influenced by humidity uptake.

The measurement of moulding and post-moulding shrinkage is useful in making comparisons between thermoplastics and in checking uniformity of manufacture.

The method is not intended as a source of data for design calculations of components. Information on the typical behaviour of a material can be obtained, however, by carrying out measurements at different melt and mould temperatures, injection velocities and hold pressures, as well as at different values of other injection-moulding parameters. The information thus obtained is important in establishing the suitability of the moulding material for the production of moulded articles with accurate dimensions.

I.S. EN ISO 294-4:2003

Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 4: Determination of moulding shrinkage

1 Scope

This part of ISO 294 specifies a method of determining the moulding shrinkage and post-moulding shrinkage of injection-moulded test specimens of thermoplastic material in the directions parallel to and normal to the direction of melt flow.

For the determination of shrinkage of thermosets see ISO 2577^[2].

Moulding shrinkage as defined in this part of ISO 294 excludes the effects of humidity uptake. This is included in post-moulding shrinkage and thus in total shrinkage. For cases when post-moulding shrinkage is caused by the uptake of humidity only, see ISO 175^[1].

Moulding shrinkage as defined in this part of ISO 294 represents the so-called free shrinkage with unrestricted deformation of the cooling plates in the mould during the hold period. It may be considered therefore as the maximum value of any restricted shrinkage.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 294. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 294 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 294-1:1996, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 1: General principles, and moulding of multipurpose and bar test specimens*

ISO 294-3:—¹⁾, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 3: Small plates*

1) To be revised. (Revision of ISO 294-3:1996)

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