BRITISH STANDARD

BS EN ISO 294-2:1998

BS 2782-9: Method 910C: 1997

Implementing Amendment No. 1 to BS 2782-9: Method 910C:1997 (renumbers the BS as BS EN ISO 294-2:1998) not published separately and incorporating Amendment No. 1

Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 2: Small tensile bars

The European Standard EN ISO 294-2:1998, with the incorporation of Amendment A1:2005, has the status of a British Standard

ICS 83.080.20

National foreword

This British Standard is the English language version of EN ISO 294-2:1998, including amendment A1:2005. It is identical with ISO 294-2:1996, including amendment 1:2004.

The start and finish of text introduced or altered by CEN amendment is indicated in the text by tags [A1] ⟨A1⟩. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by [A1] ⟨A1⟩.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics, 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 committee can be obtained on request to its secretary.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, page 2, the ISO title page, page ii, pages 1 and 2, an inside back cover and a back cover.

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Amendments issued since publication

Amd. No.	Date	Comments
10234	October 1998	Indicated by a sideline in the margin
16121	28 April 2006	See national foreword

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on 15 May 1997

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 294-2

July 1998

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August 2005

ICS 83.080.20

Descriptors: See ISO document

English version

Plastics — Injection moulding of test specimens of thermoplastic materials — Part 2: Small tensile bars

(includes amendment A1:2005)

(ISO 294-2:1996 + A1:2004)

Plastiques — Moulage par injection des éprouvettes de matériaux thermoplastiques — Partie 2: Barreaux de traction de petites dimensions
(inclut l'amendement A1:2005)
(ISO 294-2:1996 + A1:2004)

Kunststoffe — Spritzgießen von Probekörpern aus Thermoplasten —
Teil 2: Kleine Zugstäbe
(enthält Änderung A1:2005)
(ISO 294-2:1996 + A1:2004)

This European Standard was approved by CEN on 12 June 1998; amendment A1:2005 was approved by CEN on 8 August 2005.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN ISO 294-2:1998 + A1:2005 E

Foreword

The text of the International Standard from Technical Committee ISO/TC 61, Plastics, of the International Organization for Standardization (ISO) has been taken over as a European Standard 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 January 1999, and conflicting national standards shall be withdrawn at the latest by January 1999.

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

Endorsement notice

The text of the International Standard ISO 294-2:1996 has been approved by CEN as a European Standard without any modification.

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

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Foreword to amendment A1

The text of ISO 294-2:1996/Amd 1:2004 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 294-2:1998/A1:2005 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 February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

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

Endorsement notice

The text of ISO 294-2:1996/Amd 1:2004 has been approved by CEN as EN ISO 294-2:1998/A1:2005 without any modifications.

INTERNATIONAL STANDARD

ISO 294-2

First edition
1996-12-15

Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 2:
Small tensile bars

Plastiques — Moulage par injection des éprouvettes de matériaux thermoplastiques —

Partie 2: Barreaux de traction de petites dimensions

Reference number
ISO 294-2:1996(E)

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.

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.

International Standard ISO 294-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

Together with the other parts, this part of ISO 294 cancels and replaces the second edition of ISO 294 (ISO 294:1995) which has been revised to improve the definition of the injection-moulding parameters and has been restructured to specify four types of ISO mould for the production of the basic specimen types required for the acquisition of comparable test data.

Care has been taken to ensure that the ISO moulds described can all be fitted in existing injection-moulding equipment and have interchangeable cavity plates.

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;*

Foreword to ISO amendment

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 (IEC) on all matters of electrotechnical standardization.

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Amendment 1 to ISO 294-2:1996 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

Descriptors: Plastics, thermoplastic resins, injection moulding, moulding materials, test specimens bars (materials), specimen preparation, reference data.

1 Scope

This part of ISO 294 specifies a four-cavity mould, the type C ISO mould, for the injection moulding of small tensile bars measuring > 60 mm × 10 mm × 3 mm (the type 4 test specimen in ISO 8256:1990).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 294. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 294 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO 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 8256:1990, *Plastics — Determination of tensile-impact strength.*

〈A1〉 ISO 11403-3:1999, *Plastics — Acquisition and presentation of comparable multipoint data — Part 3: Environmental influences on properties* 〈A1〉.

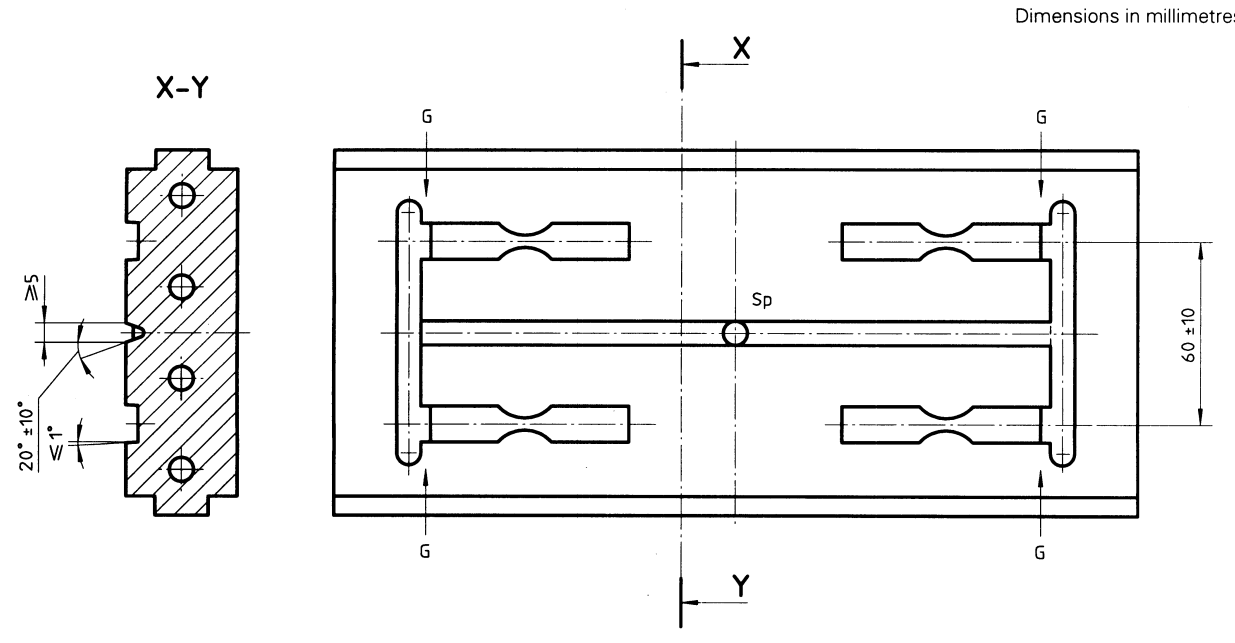
3 Definitions

See ISO 294-1:1996, clause **3**.

4 Apparatus

4.1 *Type C ISO mould*

The type C ISO mould is a four-cavity mould with a double-T runner (see Figure 1) intended for the preparation of small tensile bars to be used for the measurement of so-called "indicative" properties when studying the effects of environmental influences, such as liquid chemicals, heat or weathering, on plastics (see ISO 11403-3). The bar mouldings produced using this mould shall have the dimensions of the type 4 specimen defined in ISO 8256:1990 plus a thickness of 3,0 mm ± 0,2 mm.



Key

Sp	Sprue	Moulding volume $V_M \approx 24\,000$ mm³
G	Gate	Projected area $A_P \approx 5\,500$ mm²

Figure 1 — Cavity plate for a type C ISO mould

The main constructional details of the type C ISO mould shall be as shown in Figure 1 and shall meet the requirements given in ISO 294-1:1996, subclause **4.1.1.4**, items a) to n), with the following exception:

g) The dimensions of the test specimens refer to ISO 8256, i.e. the main dimensions, in millimetres, of the cavities shall be as follows:

— width of central section: 3,0 to 3,1;

— radius of curvature: 15 to 16.

〈A1〉 h) Ejector pins, if used, shall be located outside the test area of the specimen, i.e. at the shoulders of the dumbbell specimens. 〈A1〉

The thickness of the test specimens shall be 3,0 mm ± 0,2 mm, i.e. the depth of the cavities shall be 3,0 mm to 3,2 mm.

4.2 *Injection-moulding machine*

See ISO 294-1:1996, subclause **4.2**, with the following exception:

In subclause **4.2.4**, the recommended minimum locking force F_M for the type C ISO mould is given by $F_M > 5\,500 \times p_{max} \times 10^{-3}$, i.e. 440 kN for a maximum melt pressure of 80 MPa.

5 Procedure

5.1 Conditioning of material

See ISO 294-1:1996, subclause **5.1**.

5.2 Injection moulding

See ISO 294-1:1996, subclause **5.2**, but with the following new text for subclause **5.2.2**.

For the type C ISO mould, it is recommended that the injection velocity v_1 be chosen such that the injection time t_1 is comparable to that used for the type A ISO mould.

NOTE 1 The cavities in the type C ISO mould have a low critical cross-sectional area A_C of only 9 mm^2, i.e. much lower than that for the type A ISO mould (40 mm^2). If the same injection speed v_1 were used for the type C mould as for the type A mould, this would result in a low screw advance speed and hence a low melt speed in the runners and a low melt temperature before the melt enters the cavities of the type C mould. Using the recommended common injection time t_1, however, the injection velocity v_1 for the type C mould is about twice that recommended for the type A mould [see ISO 294-1:1996, equation (3)].

NOTE 2 This part of ISO 294 does not address the question of changes in screw advance speed, e.g. high speeds when filling the runners and low speeds when filling the cavities. As a result of the inertia of the injection-moulding machine, peaks in melt pressure and/or injection speed often cannot be avoided if the screw advance speed is changed during injection.

6 Report on test-specimen preparation

The report shall include the following information:

a) a reference to this part of ISO 294;

b) to h): see ISO 294-1:1996, clause **6**, items b) to h).

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.

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 8256	1990	Plastics — Determination of tensile-impact strength (including Technical Corrigendum 1:1991)	EN ISO 8256	1996

BS EN ISO 294-2:1998 BS 2782-9: Method 910C: 1997

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