

# INTERNATIONAL STANDARD

**ISO**  
**294-2**

First edition  
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## **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*

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# Plastics — Injection moulding of test specimens of thermoplastic materials —

## Part 2: Small tensile bars

### 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  $\geq 60 \text{ mm} \times 10 \text{ mm} \times 3 \text{ mm}$  (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.*

ISO 11403-3:—<sup>1)</sup>, *Plastics — Acquisition and presentation of comparable multipoint data — Part 3: Environmental influences on properties.*

### 3 Definitions

See ISO 294-1:1996, clause 3.

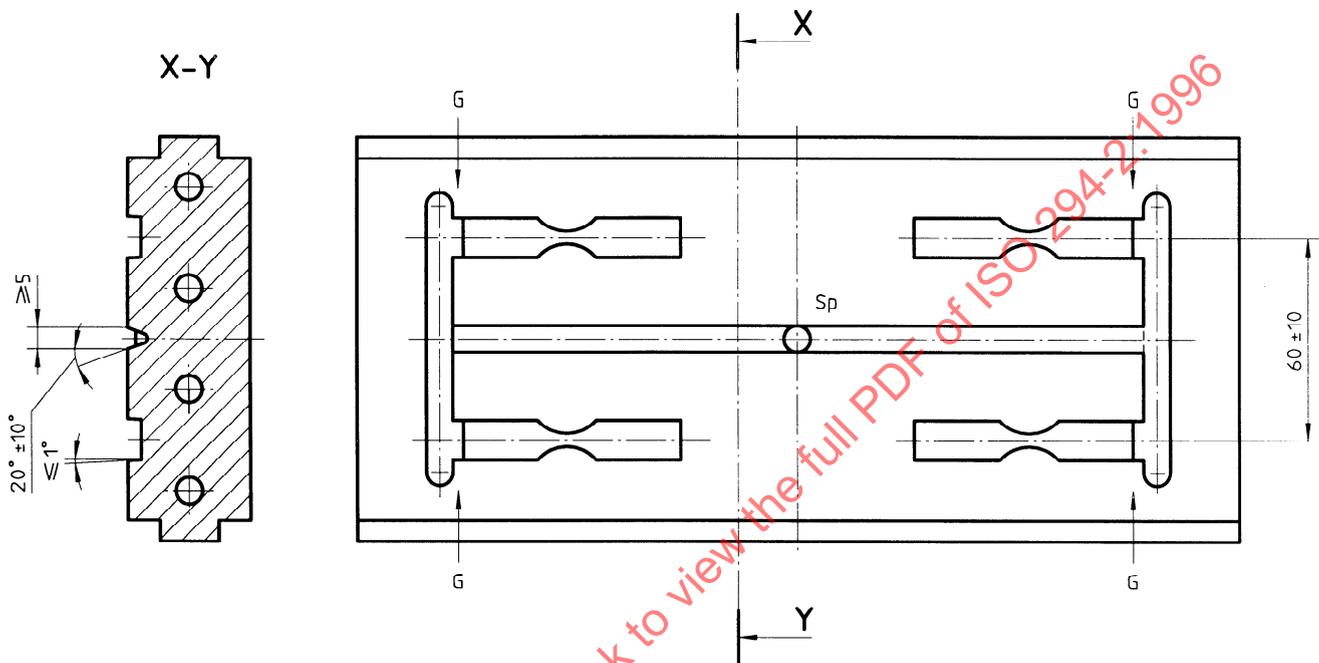
<sup>1)</sup> To be published.

## 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  $3,0 \text{ mm} \pm 0,2 \text{ mm}$ .

Dimensions in millimetres



#### Key

Sp	Sprue	Moulding volume $V_M \approx 24\,000 \text{ mm}^3$
G	Gate	Projected area $A_P \approx 5\,500 \text{ mm}^2$

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.

The thickness of the test specimens shall be  $3,0 \text{ mm} \pm 0,2 \text{ mm}$ , 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  $F_M \geq 5\,500 \times p_{\max} \times 10^{-3}$ , 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.

#### NOTES

1 The cavities in the type C ISO mould have a low critical cross-sectional area  $A_C$  of only 9 mm<sup>2</sup>, i.e. much lower than that for the type A ISO mould (40 mm<sup>2</sup>). 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)].

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).

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