SLOVENSKI STANDARD
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01-januar-2019

Polimerni materiali - Vbrizgavanje plastomernih preskušancev - 3. del: Ploščice (ISO/DIS 294-3:2018)

Plastics - Injection moulding of test specimens of thermoplastic materials - Part 3: Small plates (ISO/DIS 294-3:2018)

Kunststoffe - Spritzgießen von Probekörpern aus Thermoplasten - Teil 3: Kleine Platten (ISO/DIS 294-3:2018)

Plastiques - Moulage par injection des éprouvettes de matériaux thermoplastiques - Partie 3: Plaques de petites dimensions (ISO/DIS 294-3:2018)

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Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 3:
Small plates

Plastiques — Moulage par injection des éprouvettes de matériaux thermoplastiques —

Partie 3: Plaques de petites dimensions

ICS: 83.080.20

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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.

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).

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).

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.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This second/third/... edition cancels and replaces the first/second/... edition (ISO 294-3:1996), which has been technically revised.

The main changes compared to the previous edition are as follows:

— xxx xxxxxxx xxx xxxx

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

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.

Plastics — Injection moulding of test specimens of thermoplastic materials —

Part 3: Small plates

1 Scope

This part of ISO 294 specifies two two-cavity moulds, the type D1 and D2 ISO moulds, for the injection moulding of small plates measuring 60 mm × 60 mm with a preferred thickness of 1 mm (type D1) or 2 mm (type D2), which can be used for a variety of tests. The moulds may additionally be fitted with inserts for studying the effects of weld lines on the mechanical properties (see Annex A).

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.

((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 294-1:2017, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 1: General principles, and moulding of multipurpose and bar test specimens*

ISO 294-4, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 4: Determination of moulding shrinkage*

ISO 6603-1, *Plastics — Determination of puncture impact behaviour of rigid plastics — Part 1: Non-instrumented impact testing*

ISO 6603-2, *Plastics — Determination of puncture impact behaviour of rigid plastics — Part 2: Instrumented impact testing*

3 Terms and definitions

For the purposes of this part of ISO 294, the terms and definitions given in ISO 294-1 apply.

4 Apparatus

4.1 Type D1 and D2 ISO moulds

Type D1 and D2 ISO moulds are two-cavity moulds (see Figure 1) intended for the preparation of plates measuring 60 mm × 60 mm. The plates produced using these moulds shall have the dimensions shown in Figure 2 and given in Table 1.

The main constructional details of type D1 and D2 ISO moulds shall be as shown in Figure 1 and Figure 2 and shall meet the following requirements:

a) The sprue diameter on the nozzle side shall be at least 4mm according to ISO 294-1:2017, subclause 4.1.1.4, item a).

b) Not applicable.

c) The cavities shall be one-end gated as shown in Figure 1 according to ISO 294-1:2017, subclause 4.1.1.4, item c).

d) Not applicable.

e) Not applicable.

f) The draft angle of the runners shall be according to ISO 294-1:2017, subclause 4.1.1.4, item f).

g) The dimensions of the cavities shall fulfill requirement of ISO 294-1:2017, subclause 4.1.1.4, item g). With reference to ISO 6603 the main dimensions, in millimetres, of the cavities shall be as follows (see also Figure 2):

— length: 60 to 62;

— width: 60 to 62;

— depth: type D2 mould 2,0 to 2,1

type D1 mould 1,0 to 1,1.

h) Ejector pins, if used, shall be located outside the test area, i.e. outside the 50-mm-square central section of the plate specimen.

i) to j) Heating/cooling system and interchangeable cavity plates as well as gate inserts shall be designed according to ISO 294-1:2017, subclause 4.1.1.4, items i) to j).

k) Figure 2 shows the position of a pressure sensor P within the cavity, which is mandatory for the measurement of moulding shrinkage only (see ISO 294-4). It may be useful, however, in controlling the injections period with any ISO mould (see ISO 294-1:2017m subclause 4.1.1.4 item k)). The pressure sensor shall be flush with the cavity surface in order to avoid interference of the melt flow.

l) To ensure that cavity plates are interchangeable between different ISO moulds see ISO 294-1:2017, subclause 4.1.1.4, item l) for construction details.

m) Marking of individual cavities according to ccording to ISO 294-1:2017, subclause 4.1.1.4, item m).

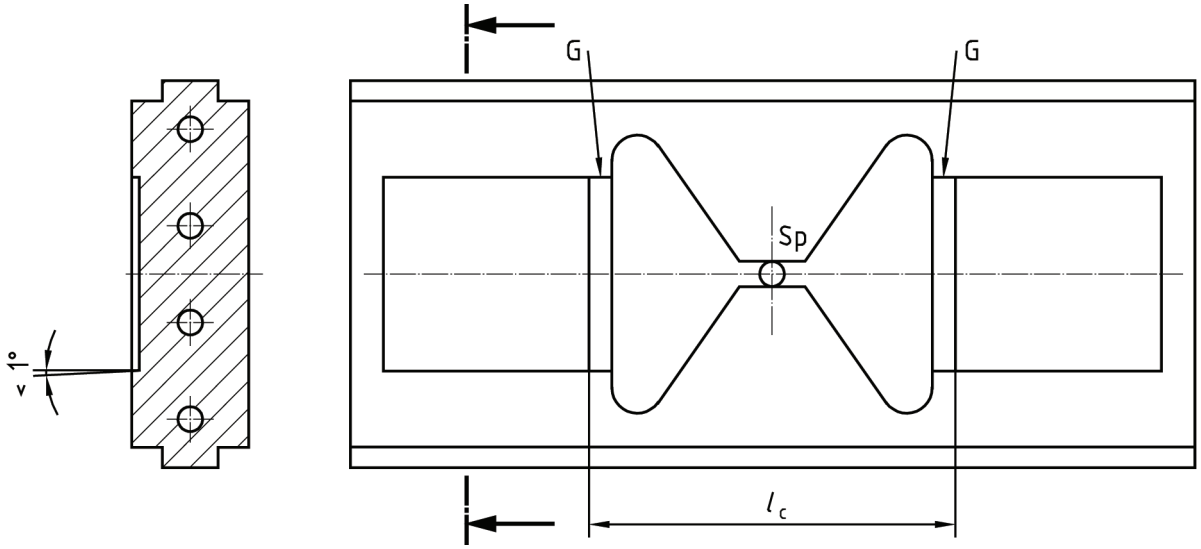
n) Polishing of surface imperfections according to ISO 294-1:2017, subclause 4.1.1.4, item n).

NOTE 1 Gates which are severely limited in height have a great influence on the orientation of the material within the cavity, even at large distances from the gate. The change in height at the gate has therefore been fixed at a value which facilitates subsequent measurement of the moulding shrinkage (see ISO 294-4).

NOTE 2 The height and length of the gate strongly influence the process of solidification of the melt as it flows into the cavity, and hence the moulding shrinkage (see ISO 294-4). The dimensions of the gate are therefore defined with tight tolerances.

NOTE 3 The value specified for the gate length l_G allows the two test specimens to be cut from the runners with a fixed distance l_C between the cuts (see Figure 1), even when the moulding shrinkage varies from one material to another.

NOTE 4 The distance l_C between the lines along which the test specimens are cut from the runners (see Figure 1) is given by $l_C = 2(l_G + l_R + l^*)$ (see Figure 2). Taking this distance as 80 mm gives the advantage that the same cutting machine can be used to cut 80 mm × 10 mm × 4 mm bars from the central sections of multipurpose test specimens [see ISO 294-1:2017, subclause 4.1.1.4, item l)].



Key

Sp Sprue

G Gate

l_C is the distance between the lines along which the test specimens are cut from the runners (see 4.1, notes 3 and 4)

Moulding volume $V_M \approx 23\,000$ mm^3 (at 2 mm thickness)

Projected area $A_P \approx 11\,000$ mm^2

Figure 1 — Cavity plate for type D1 and D2 ISO moulds

Table 1 — Dimensions of plates produced with type D1 and D2 ISO moulds

Dimensions in millimetres

l	Length of plate		60 ± 2[a]
b	Width of plate		60 ± 2[a]
h	Thickness of plate:	type D1 mould	1,0 ± 0,1
		type D2 mould	2,0 ± 0,1[a]
l_G	Length of gate		4,0 ± 0,1[b]
h_G	Height of gate		(0,75 ± 0,05) × h[c]
l_R	Length of runner		25 to 30[d]
b_R	Width of runner at gate		≥ (b + 6)
h_R	Depth of runner		h
l*	Unspecified distance		—
l_P	Distance of pressure sensor from gate		5 ± 2 $l_P + r_P \leq 10$[e] $l_P - r_P \geq 0$

NOTE The dimensions of the plates given in this table differ from the cavity dimensions given in 4.1 g), because shrinkage may be accounted for by larger mould dimensions compared to the final part dimensions.

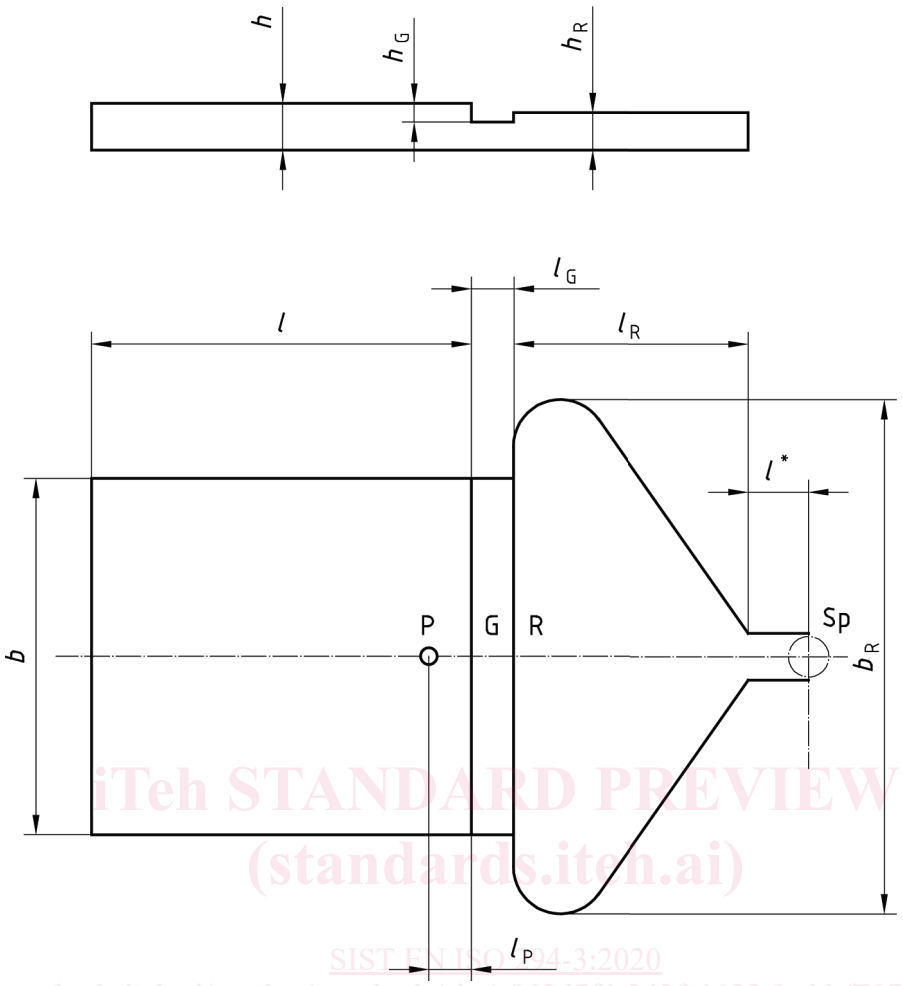
a These dimensions are for the preferred test specimen used in ISO 6603.

b See 4.1, notes 2 and 3.

c See 4.1, notes 1 and 2.

d See 4.1, note 4.

e Where r_P is the radius of the sensor.



Key

Sp Sprue
R Runner
G Gate
P Pressure sensor
For the other symbols, see Table 1.

Figure 2 — Details of type D1 and D2 ISO moulds

4.2 Injection-moulding machine

As specified in ISO 294-1:2017, subclause 4.2, with the following exception:

In 4.2.5, the recommended minimum locking force F_M for type D1 and type D2 ISO moulds is given by

$F_M \geq 11\,000 \times p_{max} \times 10^{-3}$, i.e. 880 kN

for a maximum melt pressure of 80 MPa.

5 Procedure

5.1 Conditioning of material

As specified in ISO 294-1:2017, subclause 5.1.