International Standard ISO 3167

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Plastics — Preparation and use of multipurpose test specimens

Plastiques — Préparation et utilisation d'éprouvettes à usages multiples

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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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3167 was developed by Technical Committee ISO/TC 61, *Plastics*.

This second edition was submitted directly to the ISO Council, in accordance with clause 6.11.2 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 3167-1975), which had been approved by the member bodies of the following countries :

Austria	Germany, F. R.	Romania
Belgium	Hungary	South Africa, Rep. of
Brazil	India	Spain
Bulgaria	Ireland	Sweden
Canada	Israel	Switzerland
Chile	Japan	Thailand
Czechoslovakia	Netherlands	Turkey
Egypt, Arab Rep. of	New Zealand	USA
Finland	Poland	USSR
France	Portugal	Yugoslavia

The member body of the following country had expressed disapproval of the document on technical grounds :

United Kingdom

Printed in Switzerland

Plastics — Preparation and use of multipurpose test specimens

1 Scope and field of application

1.1 This International Standard specifies requirements relating to a multipurpose test specimen for plastic moulding materials, intended for processing by injection or compression moulding.

1.2 The dimensions of the type B tensile test specimen (see ISO 527) are such that with only simple machining it can be made suitable for a variety of other tests. Because it has such utility, the type B tensile specimen is referred to in this International Standard as a multipurpose specimen. It may be used for tests relating to the mechanical and thermal properties as given in the table.

1.3 The principal advantage of the multipurpose test specimen is that it enables all specimens for the various tests to be made from similar mouldings. Consequently, properties measured with them are coherent as all are measured with specimens in the same state. In other words, it can be expected that test results for a given set of specimens will not vary appreciably due to unintentionally different moulding conditions. On the other hand, if desired, the influence of moulding conditions and/or different states of the specimens can be assessed without difficulty for all of the properties measured.

1.4 For quality control purposes, the multipurpose specimen may serve as a convenient source of other specimens not readily available. Furthermore, the fact that only one mould is required may be advantageous.

1.5 The use of multipurpose test specimens shall be agreed between the interested parties because there may be significant differences between the multipurpose test specimens and those described in the test methods. Also, numerical results for specimens in which machined surfaces have been stressed may differ from those of similar specimens not having machined surfaces.

2 References

ISO 75, *Plastics and ebonite — Determination of temperature of deflection under load.*

ISO 178, *Plastics — Determination of flexural properties of rigid plastics.*

ISO 179, *Plastics — Determination of Charpy impact strength of rigid materials.*

Table — Recommended applications for multipurpose test specimens or parts thereof

Method	Reference	Dimensions of test specimen mm
Tensile test		
Elastic modulus in tension	ISO 527	Type B (150 × 20/10 × 4)
Tensile stress at break/yield	ISO 527	Type B
Tensile elongation at break/yield	ISO 527	Type B
Tensile creep	ISO 899	Type B (ISO 527)
Flexural modulus of elasticity	ISO 178	80 × 10 × 4
Flexural stress at break/yield/conventional deflection	ISO 178	80 × 10 × 4
Impact strength — Charpy	ISO 179	80 × 10 × 4
Impact strength — Izod	ISO 180	80 × 10 × 4
Ball indentation hardness	ISO 2039	10 × 10 × 4
Environmental stress cracking	ISO 4600	80 × 10 × 4
Temperature of deflection under load	ISO 75	110 × 10 × 4
Vicat softening temperature	ISO 306	10 × 10 × 4
Flammability of plastics	ISO 1210	> 80 × 10 × 4

ISO 180, *Plastics — Determination of Izod impact strength of rigid materials.*

ISO 306, *Plastics — Determination of the Vicat softening temperature of thermoplastics.*

ISO 527, *Plastics — Determination of tensile properties.*[1)]

ISO 899, *Plastics — Determination of tensile creep.*

ISO 1210, *Plastics — Determination of flammability characteristics of plastics in the form of small specimens in contact with a small flame.*

ISO 2039, *Plastics and ebonite — Determination of hardness by the ball indentation method.*

ISO 2557, *Plastics — Amorphous thermoplastic moulding materials — Preparation of test specimens with a defined level of shrinkage —*

Part 1 : Test specimens in the form of parallelepipedic bars (Injection moulding and compression moulding).

Part 2 : Test specimens in the form of rectangular plates (Injection moulding).

ISO 2818, *Plastics — Preparation of test specimens by machining.*

ISO 4600, *Plastics — Determination of environmental stress cracking (ESC) — Ball or pin impression method.*

3 Preparation of test specimens

3.1 Moulding

3.1.1 For the purposes of this International Standard, the multipurpose specimen is the type B tensile test specimen specified in ISO 527, having a thickness of 4 ± 0,2 mm, and a width of the narrow parallel portion of 10 ± 0,2 mm.

It shall be moulded as directed by the relevant ISO specifications and methods and under the conditions defined for the particular kind of material being examined. If those conditions have not been defined, a single cavity mould is recommended. The minimum diameter of the gate should be at least equal to the minimum dimension of the test specimens. Other conditions shall be agreed between the interested parties.

3.1.2 Strict control of moulding conditions is essential to ensure that all test specimens in a set are actually in the same state. Also, for injection mouldings, it may be necessary to agree on one position of the mould gate to obtain comparable test results in different laboratories. Furthermore, to aid in obtaining specimens in the same state, the requirements of ISO 2557/1 or ISO 2557/2 may be observed.

3.2 Machining

3.2.1 Machining of the specimens shall be performed either in accordance with ISO 2818 or as agreed between the interested parties. The surfaces of the central part of the test specimens shall remain as moulded.

3.2.2 Ways in which the multipurpose specimen may be machined into specimens for various tests are shown in the figure.

3.2.2.1 Test specimens having a length of 60 mm or less shall be cut from the central parallel portion of the multipurpose specimen.

3.2.2.2 For test specimens longer than 60 mm, the broad ends of the multipurpose specimen shall be machined to the width of the central parallel portion, care being taken to avoid any damage to the moulded surfaces of that portion during the machining operation. The width of the machined portions of the specimen shall be not less than that of the central parallel portion but may exceed the width of the latter by not more than 0,2 mm.

3.2.2.3 When a multipurpose specimen is cut crosswise to produce a shorter specimen, it shall be cut so that its centre is the same as that of the original specimen.

4 Report on specimen preparation

The report shall contain the following information :

a) reference to this International Standard;

b) complete identification of the moulding material;

c) method of moulding and the conditions used;

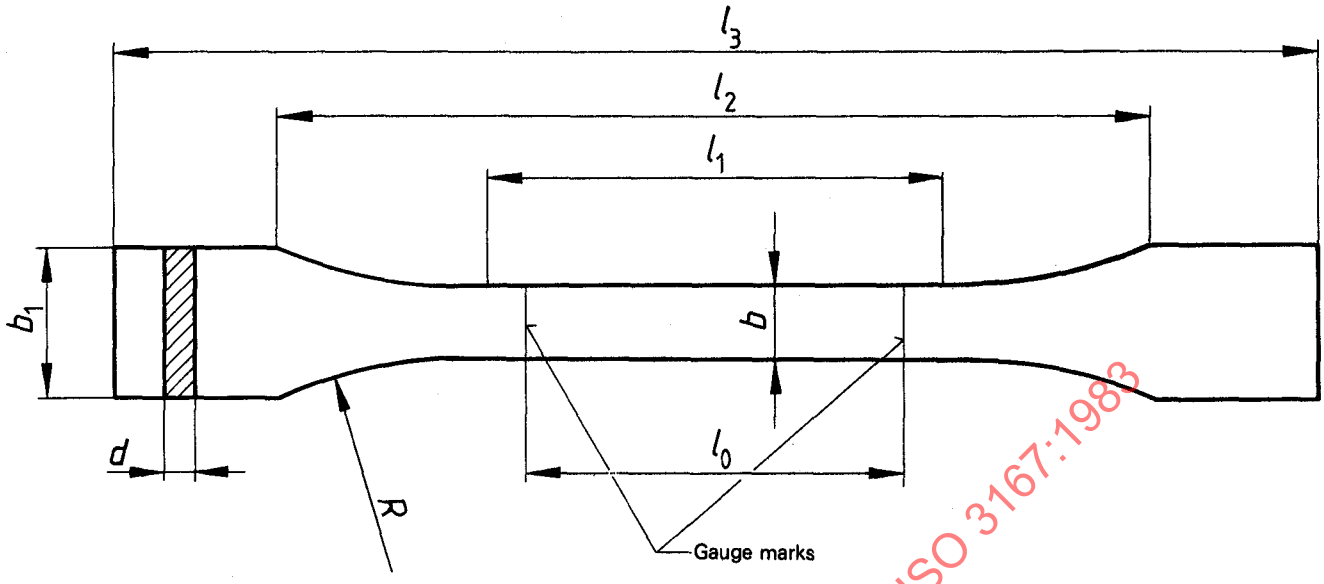
d) conditioning, including annealing and resultant shrinkage if observed;

e) method of machining and the conditions used;

f) final dimensions of the test specimens produced;

g) any other relevant observations.

1) At present at the stage of draft. (Revision of ISO/R 527-1966.)



Dimensions in millimetres

l_3 Overall length, minimum 150
b_1 Width at ends 20 ± 0,2
l_1 Length of narrow parallel portion 60 ± 0,5
b Width of narrow parallel portion 10 ± 0,2
R Radius, minimum 60
d Thickness 4 ± 0,2
l_0 Distance between gauge marks 50 ± 0,5
l_2 Initial distance between grips 115 ± 5

Figure — Multipurpose test specimen conforming to test specimen type B of ISO 527 but with narrower tolerances and the parts which may be used for the determination of various properties