INTERNATIONAL STANDARD

ISO 8067

Second edition
2008-12-01

Flexible cellular polymeric materials — Determination of tear strength

Matériaux polymères alvéolaires souples — Détermination de la résistance au déchirement

Reference number
ISO 8067:2008(E)

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Published in Switzerland

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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8067 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

This second edition cancels and replaces the first edition (ISO 8067:1989), which has been technically revised to include a second method, using an angle test piece, in addition to the existing method which uses a trouser test piece.

Flexible cellular polymeric materials — Determination of tear strength

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies two methods for the determination of the tear strength of flexible cellular polymeric materials:

— method A, using a trouser test piece;

— method B, using an angle test piece without a nick.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 1923, *Cellular plastics and rubbers — Determination of linear dimensions*

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
tear strength
R
maximum force per unit thickness observed when stretching a test piece to rupture

4 Apparatus

The tear strength shall be measured on a tensile-testing machine which will indicate the force at which rupture of the test piece takes place. An automatic machine should preferably be used which draws the actual curve, or a stylus or scale should be used having an indicator that remains at the point of maximum force after rupture of the test piece.

The accuracy of the test machine shall be class 2 or better as defined in ISO 7500-1.

5 Test pieces

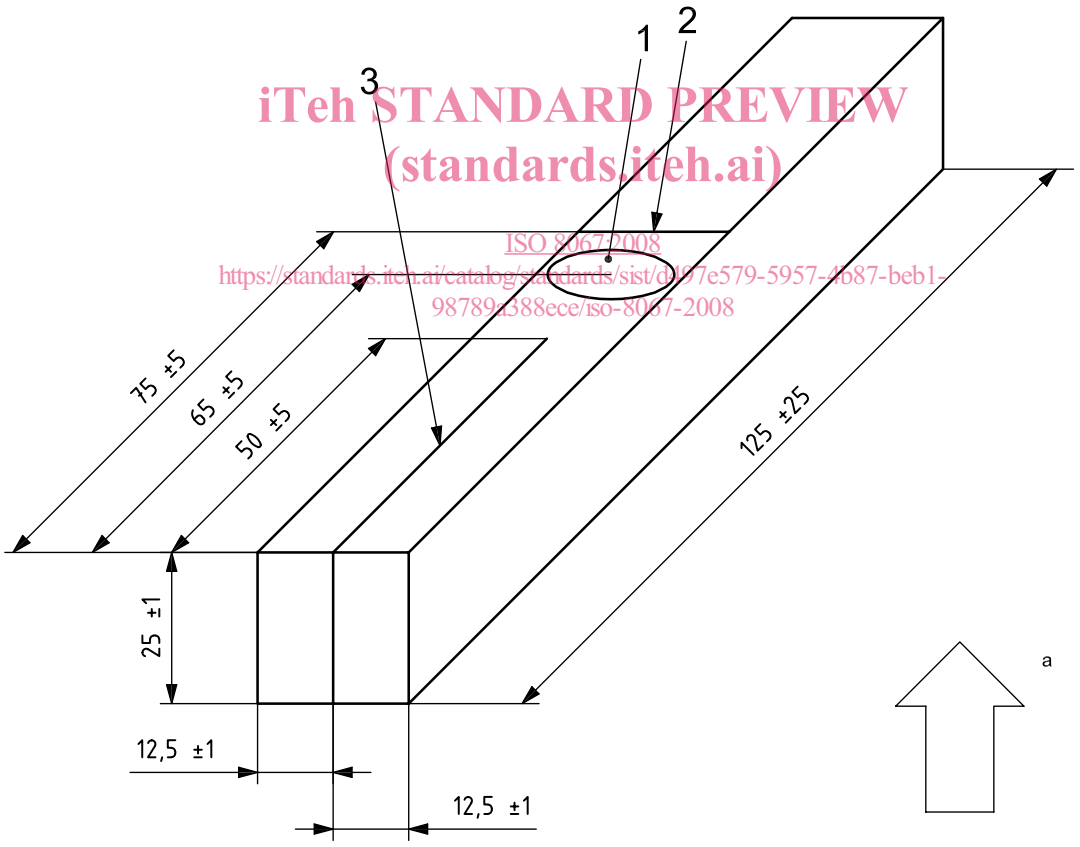
5.1 General

The test pieces shall be free of skin, voids and flow lines. If the material exhibits a predominant direction of cellular structure (orientation of the cells), the trouser test piece shall be taken in such a way that the plane of the cut subsequently made in the test piece (see Figure 1) is parallel to, and the long dimension of the cut perpendicular to, the predominant foam-rise direction and the angle test piece shall be taken in such a way that the plane of the V-shaped side of the test piece (see Figure 3) is parallel to, and the long dimension of the test piece perpendicular to, the predominant foam-rise direction. If this is not possible, the orientation of the long dimension of the cut or the V-shaped side of the test piece with respect to the predominant foam-rise direction shall be stated in the test report.

5.2 Trouser test piece for method A

The trouser test piece shall be a rectangular parallelepiped cut from a sheet of material with a band knife or a cutting die. Each test piece shall have the dimensions given in Figure 1 and a 45 mm to 55 mm cut shall be made at one end. The required tear length (25 mm) shall be marked on the test piece. The predominant foam-rise direction for the trouser test piece is indicated by an arrow in Figure 1.

Dimensions in millimetres



Key

1 location of thickness measurement
2 mark indicating required tear length
3 cut made in test piece

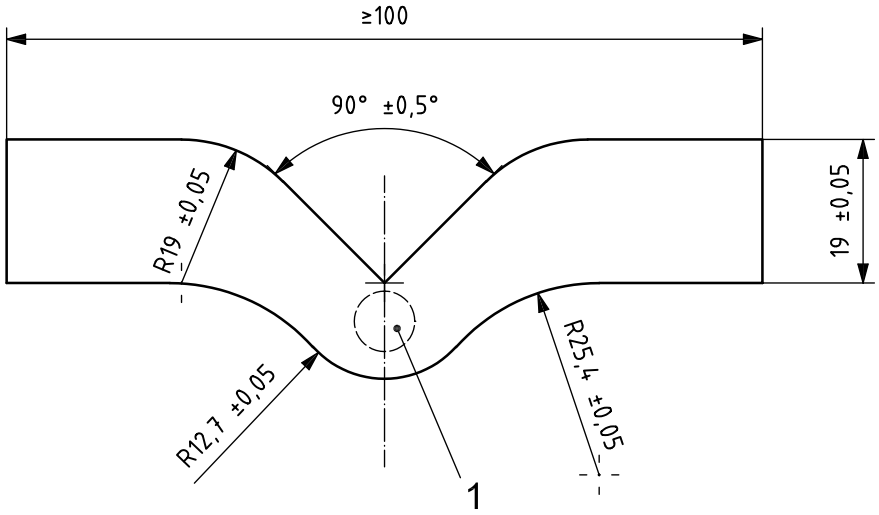
a Predominant foam-rise direction.

Figure 1 — Trouser test piece

5.3 Angle test piece for method B

The test piece shall be cut from a sheet of material of thickness 10 mm to 15 mm with a die having the dimensions and shape shown in Figure 2. The predominant foam-rise direction for the angle test piece is indicated in Figure 3.

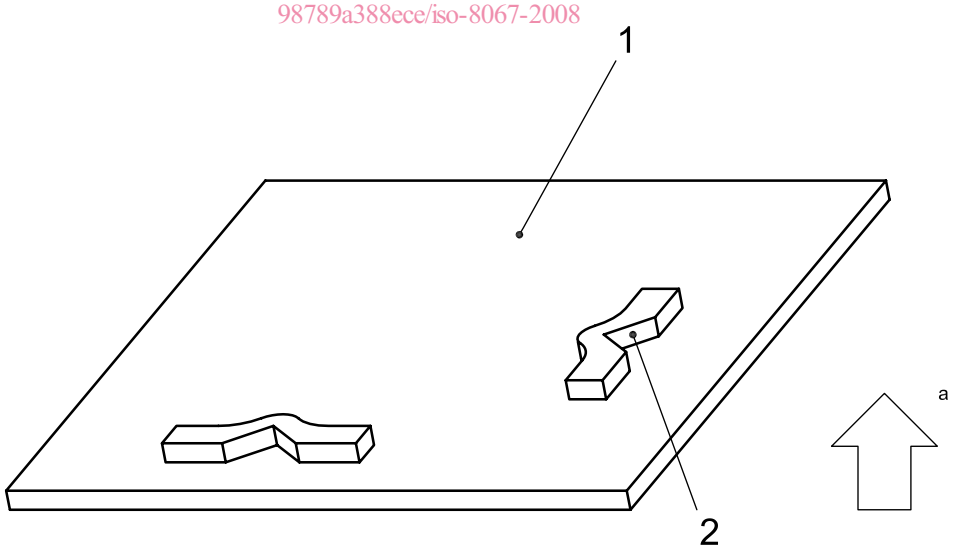
Dimensions in millimetres



Key

1 location of thickness measurement of test piece cut out using die

Figure 2 — Angle test piece die



Key

1 sheet of material

2 V-shaped side of test piece

a Predominant foam-rise direction.

Figure 3 — Predominant foam-rise direction for angle test piece

6 Number of test pieces

Three test pieces shall be tested.

Additional test pieces may be required if the spread of results is too great (see Clause 9) or to compensate for deviation in the progress of the tear (see 8.2).

7 Conditioning

Materials shall not be tested less than 72 h after manufacture, unless it can be demonstrated that the mean results obtained at either 16 h or 48 h after manufacture do not differ by more than ± 10 % from those obtained after 72 h, in which case testing is permitted at either 16 h or 48 h, respectively. Prior to the test, the test pieces or the material from which the test pieces are to be cut shall be conditioned for at least 16 h in one of the following atmospheres, unless otherwise specified:

— (23 ± 2) °C, (50 ± 5) % relative humidity;

— (27 ± 2) °C, (65 ± 5) % relative humidity.

This conditioning period may form the final part of or, in the case of testing 16 h after manufacture, the whole of the period following manufacture.

In the case of quality-control tests, test pieces may be taken a shorter time (down to a minimum of 12 h) after manufacture and testing carried out after conditioning for a shorter period (down to a minimum of 6 h) in one of the atmospheres specified above.

It is recommended that, for referee purposes, the test is performed 7 days or more after the cellular material has been manufactured.

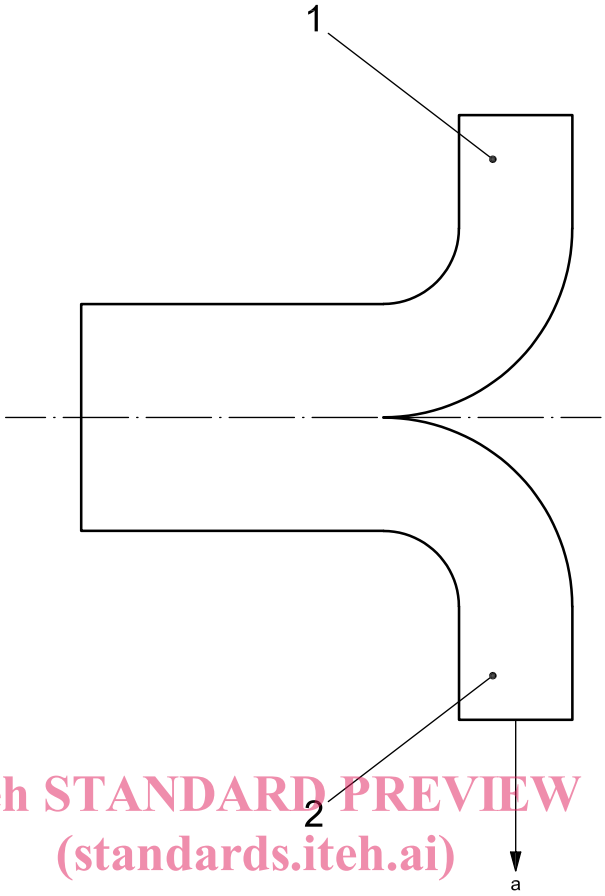
8 Procedure

8.1 General

After conditioning as specified in Clause 7, measure, in accordance with ISO 1923, the thickness of the test piece at the location shown in Figure 1 or Figure 2.

8.2 Method A

8.2.1 Clamp the test piece in the jaws of the test machine, taking care that the jaws grip the test piece properly. Spread the ends of the test piece so that the force is applied in the direction shown in Figure 4. Start the test machine with a jaw speed of 50 mm/min to 500 mm/min.



Key

1 held in fixed clamp

2 held in moving clamp

a Direction of applied force.

Figure 4 — Schematic test arrangement

8.2.2 Where necessary in order to keep the cut in the centre of the test piece while tearing, aid it with light application of a sharp blade, for example a single-edged razor blade.

Cutting should be the exception and should be avoided because it could influence the result.

Care should be taken when using blades.

8.2.3 When the tear has travelled (25 ± 5) mm along the test piece, record the maximum force on the dial or scale. If rupture occurs before a length of 20 mm is torn, reject the test piece and take a fresh one.

8.2.4 For referee purposes, a jaw speed of (50 ± 5) mm/min shall be used.

8.3 Method B

8.3.1 Clamp the test piece in the jaws of the test machine, taking care to adjust it so that it is symmetrical, in order that the tension will be distributed uniformly over the cross-section.

8.3.2 Start the test machine with a jaw speed of 50 mm/min to 500 mm/min and record the maximum force.

8.3.3 For referee purposes, a jaw speed of (500 ± 50) mm/min shall be used.