
INTERNATIONAL STANDARD



1209

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Rigid cellular plastics — Bending test

Matières plastiques alvéolaires rigides — Essai de flexion

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 61 has reviewed ISO Recommendation R 1209 and found it technically suitable for transformation. International Standard ISO 1209 therefore replaces ISO Recommendation R 1209-1970 to which it is technically identical.

ISO Recommendation R 1209 was approved by the Member Bodies of the following countries :

Australia	Germany	New Zealand
Austria	Greece	Poland
Belgium	Hungary	Portugal
Brazil	India	Romania
Bulgaria	Iran	South Africa, Rep. of
Canada	Ireland	Spain
Chile	Israel	Sweden
Colombia	Italy	Switzerland
Czechoslovakia	Japan	Thailand
Egypt, Arab Rep. of	Korea, Dem. P. Rep. of	U.S.A.
Finland	Korea, Rep. of	U.S.S.R.
France	Netherlands	Yugoslavia

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

United Kingdom

The Member Bodies of the following countries disapproved the transformation of ISO/R 1209 into an International Standard :

Germany
United Kingdom

Rigid cellular plastics — Bending test

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method of test for determining either

- a) the load for a specified deformation, or
- b) the load at break

of a bar of rigid cellular material under the action of three-point bending.

The method of loading does not produce pure bending and hence does not permit calculation of flexural strength or apparent flexural modulus. The test is primarily used for assessing the behaviour of cellular materials under these laboratory testing conditions.

2 REFERENCE

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*.

3 PRINCIPLE

Application of a bending load at a specified rate, by means of a loading edge to a test piece supported at two points equidistant from the loading edge.

Recording of the load at a specified deflection or of the breaking load.

4 APPARATUS

4.1 The apparatus shall consist of either

- a conventional **compression testing machine**, to which a loading edge and supports are adapted, or
- a **bending test machine**, provided that its range is such that the load applied can be measured with an accuracy of 1 %.

4.2 The loading edge and support edges shall have cylindrical surfaces. In order to avoid excessive indentation, the radius of the edges shall be $5 \pm 0,2$ mm. The supports shall be 100 ± 1 mm apart. The loading edge shall be positioned in the middle of the test piece, between the supports.

5 TEST SPECIMENS

5.1 Shape and dimensions

The test specimen shall be a parallelepiped having the following dimensions :

- length : $120 \pm 1,20$ mm
- breadth : $25 \pm 0,25$ mm
- thickness (testing height) : $20 \pm 0,20$ mm

5.2 Preparation

Test specimens shall be cut without deformation of the original cell structure. The test specimens may have a skin on one or more sides; if so, this fact shall be recorded.

5.3 Number

A minimum of five test specimens shall be tested from each sample. When testing materials which are suspected of being anisotropic, duplicate sets of test specimens shall be prepared having axes respectively parallel to and normal to the suspected direction of anisotropy.

5.4 Conditioning

The test specimens shall be conditioned in one of the atmospheres specified in ISO 291.

6 PROCEDURE

Place the test specimen centrally on the test apparatus in relation to the loading edge so that the height of the test specimen is in the direction of loading.

Bring the loading edge into contact with the test specimen, ensuring that a minimum force is applied.

Note this position as the zero deflection point.

Apply a force by means of the loading edge moving at a rate of 10 ± 2 mm/min.

Note and record the force in newtons corresponding to a deflection of $20 \pm 0,2$ mm.

If the test specimen fractures before the deflection of 20 mm is reached, record the breaking force and deflection at the breaking point.

7 EXPRESSION OF RESULTS

The result shall be reported as either,

- a) the force, in newtons, at 20 mm deflection, or
- b) the breaking force, in newtons, and the corresponding deflection, in millimetres.

8 TEST REPORT

The test report shall include the following particulars :

- a) description and identification of material including density;

- b) presence or absence of skins (or facings) on test specimens and, if applicable, on which faces;
- c) conditioning procedure used;
- d) direction of application of the force with respect to any anisotropy;
- e) individual test results;
- f) the arithmetic mean of the test results;
- g) date of test;
- h) details of any procedure not stipulated in this International Standard and any incidents which may have influenced the results.

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