
INTERNATIONAL STANDARD



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Flexible cellular materials — Hardness testing by indentation techniques

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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.

International Standard ISO 2439 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products*.

It was approved in August 1971 by the Member Bodies of the following countries :

Austria	India	Spain
Canada	Italy	Switzerland
Ceylon	Netherlands	Turkey
Czechoslovakia	New Zealand	United Kingdom
Egypt, Arab Rep. of	Poland	U.S.A.
France	Portugal	U.S.S.R.
Germany	Romania	Yugoslavia
Hungary	South Africa, Rep. of	

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

Sweden

Flexible cellular materials — Hardness testing by indentation techniques

1 SCOPE

This International Standard specifies three test procedures for determining the indentation hardness of flexible cellular materials.

Procedure A (Indentation hardness index) gives a single indentation measurement for laboratory test purposes.

Procedure B (Indentation hardness characteristics) provides information about the shape of the hardness indentation curve.

Procedure C (Indentation hardness check) is a quick procedure suitable for quality control testing.

2 FIELD OF APPLICATION

The indentation hardness of flexible cellular materials is a measure of their load-bearing properties. The procedures specified can be used for testing finished articles and for the characterization of bulk material.

At present the procedures are applicable to latex, urethane and PVC foams of the open cell type.

The results obtained by these procedures relate only to the test conditions specified and cannot, in general, be used directly for design purposes.

3 DEFINITION

indentation hardness — The total force, in newtons, required to produce under specified conditions, a specified indentation of a standard test piece with a standard apparatus and test procedure as specified below.

4 APPARATUS

Testing machine, capable of indenting the test piece between a supporting surface and an indenter which shall have a uniform relative motion, in the vertical direction, of 100 ± 20 mm/min.

The testing machine shall have a means of measuring the force required to produce the specified indentation with a precision of $\pm 1\%$ or ± 1 N, whichever is the greater, and of measuring the test piece thickness under load with a precision of $\pm 0,25$ mm.

The testing machine for Procedure C shall have its force gauge fitted with a tell-tale needle and/or be equipped to make autographic load-indentation plots.

The testing machine shall also be capable of maintaining the specified degree of indentation with a precision of $\pm 0,25$ mm for the specified period.

4.1 Supporting surface

Unless otherwise specified, the test pieces shall be supported on a smooth, flat, horizontal and rigid surface, larger than the test piece and suitably vented with holes approximately 6 mm in diameter and of approximately 20 mm pitch, to allow the escape of air from below the test piece.

4.2 Indenter

The indenter shall be mounted by a ball joint free from vertical movement. It shall be flat and circular, with a diameter of 200 ± 3 mm and a $1,0 \pm 0,5$ mm radius at the lower edge. The lower surface shall be smooth, but not polished.

5 TEST PIECES

5.1 Form and dimensions

Material shall be cut to a standard size square of 380 ± 20 mm length of side and 50 ± 2 mm thickness. Sheets of less than this standard thickness shall be plied together to reach as near the standard thickness as possible.

Finished articles may be tested as agreed between purchaser and supplier.

NOTE — Results on plied material and on finished articles may not be the same as would be obtained with the standard test piece.

5.2 Conditioning

Materials shall not be tested for at least 72 h after manufacture. Prior to the test, the test pieces shall be conditioned for at least 16 h at :

20 ± 2 °C, $65 \pm 5\%$ relative humidity;

or 23 ± 2 °C, $50 \pm 5\%$ relative humidity;

or 27 ± 2 °C, $65 \pm 5\%$ relative humidity.