SLOVENSKI STANDARD
SIST EN ISO 2439:2001

01-junij-2001

Penjeni polimerni materiali - Mehke pene - Ugotavljanje trdote (odpornost na vtiskovanje) (ISO 2439:1997, vključ no s tehnič nim popravkom 1:1998)

Flexible cellular polymeric materials - Determination of hardness (indentation technique) (ISO 2439:1997, including Technical Corrigendum 1:1998)

Weich-elastische polymere Schaumstoffe - Bestimmung der Härte (Eindruckverfahren) (ISO 2439:1997, einschließlich Technische Korrektur 1:1998)

Matériaux polymeres alvéolaires souples - Détermination de la dureté (technique par indentation) (ISO 2439:1997, Rectificatif Technique 1:1998 inclus)

Ta slovenski standard je istoveten z: **EN ISO 2439:2000**

ICS:

83.100	Penjeni polimeri	Cellular materials

SIST EN ISO 2439:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 2439

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ICS 83.100

English version

Flexible cellular polymeric materials - Determination of hardness (indentation technique) (ISO 2439:1997, including Technical Corrigendum 1:1998)

Matériaux polymères alvéolaires souples - Détermination de la dureté (technique par indentation) (ISO 2439:1997, Rectificatif Technique 1:1998 inclus)

Weich-elastische polymere Schaumstoffe - Bestimmung der Härte (Eindruckverfahren) (ISO 2439:1997, einschließlich Technische Korrektur 1:1998)

This European Standard was approved by CEN on 8 September 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

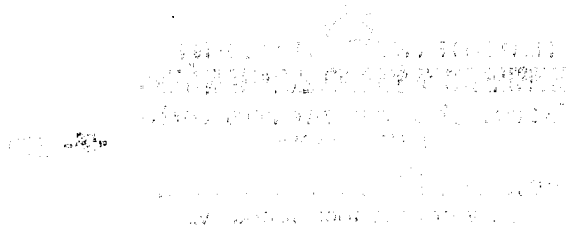
The text of the International Standard from Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 2439:1997, including Technical Corrigendum 1:1998 has been approved by CEN as a European Standard without any modification.



INTERNATIONAL STANDARD

ISO 2439

Third edition
1997-09-15

Flexible cellular polymeric materials — Determination of hardness (indentation technique)

Matériaux polymères alvéolaires souples — Détermination de la dureté (technique par indentation)

Reference number
ISO 2439:1997(E)

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.

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.

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

This third edition cancels and replaces the second edition (ISO 2439:1980), which has been technically revised.

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Flexible cellular polymeric materials – Determination of hardness (indentation technique)

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 three methods for determining the indentation hardness of flexible cellular materials:

method A (indentation hardness index), which gives a single indentation measurement for laboratory test purposes;

method B (indentation hardness characteristics), which provides information about the shape of the hardness indentation curve;

method C (indentation hardness check), which is a quick procedure suitable for quality control testing.

The methods are applicable only to latex, urethane foam and PVC foam of the open cell type.

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

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

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 471:1995, *Rubber — Temperatures, humidities and times for conditioning and testing.*

3 Definition

For the purposes of this International Standard, the following definition applies:

3.1 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 using the test procedure specified below.

4 Principle

The forces required to produce specified indentations under specified conditions are measured.

5 Apparatus

5.1 Test machine

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

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

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

The test machine shall also be capable of maintaining the specified degree of indentation with a precision of ±0,25 mm for the specified period.

5.2 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.

5.3 Indentor

The indentor, vented with holes, shall be mounted preferably by a ball joint free from vertical movement, although other methods of mounting are permitted. It shall be flat and circular, with a diameter of (200^{+3}_{0}) mm and a $(1{,}0^{+0{,}5}_{0})$ mm radius at the lower edge. The lower surface shall be smooth but not polished.

6 Test pieces

6.1 Shape and dimensions

Material shall be cut to obtain a standard size square of length of side (380^{+20}_{0}) mm with a thickness of 50 mm ± 2 mm. Sheets of less than this standard thickness shall be plied together to approximate as closely as possible to the standard thickness.

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.

6.2 Samples showing orientation

If samples show orientation of the cellular structure, the direction in which the indentation is to be carried out shall be agreed between the interested parties. Normally, testing should be carried out in that direction in which the finished product will be stressed under service conditions.

6.3 Conditioning

Material shall not be tested less than 72 h after manufacture, unless at either 16 h or 48 h after manufacture it can be demonstrated that the mean result does not differ by more than ±10% from those obtained after 72 h. Testing is permitted at either 16 h or 48 h if, at the specified time, the above criterion has been satisfied.

Prior to the test, the test pieces shall be conditioned, undeflected and undistorted, for at least 16 h in one of the following atmospheres as given in ISO 471:

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

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

This period can form the latter part of the period following manufacture.

7 Procedure

7.1 Preliminary indentation

Carry out the test, immediately after conditioning, preferably under the same atmospheric conditions as specified in 6.3.

Position the test piece on the supporting surface so that the centre of the test piece, or other agreed test area, is located below the centre of the indentor. Test pieces having cavities on one side shall be placed with the cavity side next to the supporting surface.

Apply a force of (5^{0}_{-2}) N to the selected test area and measure the thickness. Indent the test piece at a rate of 100 mm/min ± 20 mm/min, to produce an indentation of (70 ± 2,5) % of the thickness. After reaching 70 % deflection, release the load at the same rate. Repeat this loading and unloading twice more, then proceed in accordance with 7.2, 7.3 or 7.4 as appropriate.

7.2 Method A — Determination of indentation hardness index

Immediately after the third unloading (see 7.1), indent the test piece by (40 ± 1) % of the thickness. Maintain this deflection for a period of 30 s ± 1 s, note the corresponding force, in newtons, and release the force.

Only the result of a test conducted by method A, on the standard size test piece, without plying, shall be known as the indentation hardness index.

7.3 Method B — Determination of indentation hardness characteristics

Immediately after the third unloading (see 7.1):

a) indent the test piece by (25 ± 1) % of the thickness;

b) maintain this indentation for a period of 30 s ± 1 s;

c) measure the force;

d) increase the indentation to (40 ± 1) %;

e) maintain this indentation for a period of 30 s ± 1 s;

f) measure the force;

g) increase the indentation to (65 ± 1) % of the thickness;

h) maintain this indentation for a period of 30 s ± 1 s;

i) measure the force.