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# INTERNATIONAL STANDARD 2473

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION · МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ · ORGANISATION INTERNATIONALE DE NORMALISATION

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## Ebonite – Determination of cross-breaking strength

First edition – 1972-08-15

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO 2473:1972](#)

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*Withdrawn*

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UDC 678.066 : 620.172.24

Ref. No. ISO 2473-1972 (E)

**Descriptors** : ebonite, tests, breaking load, test specimens.

Price based on 2 pages

## 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 2473 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products*.

It was approved in December 1970 by the Member Bodies of the following countries :

		ISO 2473:1972
Austria	India	<a href="https://standards.iteh.ai/catalog/standards/sist/6c04ce4-6d98-4974-9a42-33cae14f167/iso-2473-1972">https://standards.iteh.ai/catalog/standards/sist/6c04ce4-6d98-4974-9a42-33cae14f167/iso-2473-1972</a>
Ceylon	Italy	South Africa, Rep. of
Czechoslovakia	Korea, Dem. P. Rep. of	Sweden
Egypt, Arab Rep. of	Netherlands	Switzerland
France	New Zealand	United Kingdom
Germany	Portugal	U.S.A.
Hungary	Romania	U.S.S.R.
		Yugoslavia

No Member Body expressed disapproval of the document.

# Ebonite – Determination of cross-breaking strength

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for measuring the cross-breaking strength of ebonite subjected to bending by a point loading equidistant between two supports.

## 2 DEFINITIONS

**2.1 ebonite:** A hard material made by sulphur vulcanization of rubber in which the hardness is obtained by the action of the vulcanizing agent.

**2.2 cross-breaking strength:** The maximum calculated surface stress in bending which the test piece will withstand prior to failure.

## 3 APPARATUS

**3.1 Testing machine,** to apply a force to the test piece via the loading foot (3.3), and conforming to the following requirements:

- a) the applied force shall be known to within 1.5 % of its true value;
- b) the rate of traverse shall be uniform and such that the applied force reaches its maximum value in  $30 \pm 15$  s.

**3.2 Test piece supports,** consisting of two triangular section hard metal supports placed  $100 \pm 0.2$  mm apart. The bearing edges of these supports shall have a radius of  $3.15 \pm 0.20$  mm and shall be longer than the width of the test pieces.

**3.3 Loading foot,** positioned to within  $\pm 0.2$  mm of the mid-point between the outer supports. Its bearing edge shall have a radius of  $3.15 \pm 0.20$  mm and it shall be of the same length as the outer supports. All three bearing edges shall be perpendicular to the length of the test piece and parallel to each other.

## 4 TEST PIECES

### 4.1 Shape and dimensions

The test piece shall be a rectangular bar of minimum length 120 mm, width  $15 \pm 0.2$  mm and thickness  $6.3 \pm 0.3$  mm.

The variation in width of an individual test piece shall not be greater than 0.1 mm. The variation in thickness of an individual test piece shall not be greater than 0.05 mm.

Any test piece falling outside this limit or showing any irregularities or imperfections shall not be used.

The faces and sides of the test pieces shall be machined to a smooth finish.

### 4.2 Number of test pieces

Three test pieces shall be tested.

### 4.3 Time lapse between vulcanization and testing

**4.3.1** For all test purposes the minimum time between vulcanization and testing shall be 16 h.

**4.3.2** For non-product tests the maximum time between vulcanization and testing shall be 4 weeks, and for evaluations intended to be comparable, the tests, as far as possible, shall be carried out after the same time interval.

**4.3.3** For product tests, whenever possible, the time between vulcanization and testing shall not exceed 3 months. In other cases tests shall be made within 2 months of the date of receipt by the customer of the product.

### 4.4 Conditioning

The test pieces shall be conditioned at the test temperature for at least 3 h immediately before testing.

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## 5 TEMPERATURE OF TEST

All tests shall be carried out at a temperature of either  $20 \pm 2^\circ\text{C}$ ,  $23 \pm 2^\circ\text{C}$  or  $27 \pm 2^\circ\text{C}$ .

## 6 PROCEDURE

### 6.1 Measurement of test pieces dimensions

The width and thickness of the test pieces shall be measured to within 0.02 mm.

### 6.2 Testing

Centre the test piece with its wide face on the outer supports. Apply the force by means of the loading foot to act midway between the outer supports and perpendicularly to the test piece, until failure occurs. The rate of movement of the loading foot shall be such that the maximum force is reached in  $30 \pm 15$  s. Record the maximum force.

## 7 EXPRESSION OF RESULTS

The cross-breaking strength,  $S$ , expressed in meganewtons per square metre, is given by the formula :

$$\frac{3F_l}{2ba^2}$$

where

$F$  is the maximum force, in newtons;

$l$  is the distance between the fixed supports, in millimetres;

$b$  is the width of the test piece, in millimetres;

$a$  is the thickness of the test piece, in millimetres.

The median value of the cross-breaking strength of the three test pieces shall be quoted as the cross-breaking strength.

## 8 TEST REPORT

The test report shall include the following particulars :

a) the cross-breaking strength in meganewtons per square metre;

b) the individual values of cross-breaking strength of the three test pieces;

c) the temperature of the test;

d) the time interval between vulcanization and testing.

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