



Test method T1103

Indentation hardness of rubber and
plastics by means of a durometer

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Revision Summary

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Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T1103 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T1103

Indentation hardness of rubber and plastics by means of a durometer

1. Scope

- (a) This test method sets out the procedure for determining the indentation hardness of soft vulcanised rubbers and soft plastics by the Type A Durometer. This test method conforms with the American Society for Testing and Materials Designation D-2240.
- (b) The shape of the indenter and the force applied to it influence the results obtained so that there may be no simple relationship between the results obtained with one type of durometer and those obtained with either another type of durometer or another instrument for measuring hardness. This method is an empirical test intended primarily for control purposes. No simple relationship exists between indentation hardness determined by this method and any fundamental property of the material tested.

2. Apparatus

A durometer, consisting of the following components -

- (a) Presser foot with a hole between 2.5 and 3.2 mm in diameter centered at least 6 mm from any edge of the foot.
- (b) Indenter formed from hardened steel rod between 1.15 mm and 1.40 mm in diameter to the shape and dimensions shown in Figure 1 of ASTM D2240.
- (c) Indicating device on which the extension of the point of the indenter may be read in terms of graduations ranging from zero, for the full extension of 2.46 mm to 2.54 mm, to 100, for zero extension obtained by placing the presser foot and indenter in firm contact with a flat piece of glass.
- (d) Calibrated spring for applying force to the indenter in accordance with the following equation:

$$\text{Force } g = 56 + 7.66 H_A$$

Where H_A is the hardness reading on a Type A Durometer.

3. Test Specimen

- (a) Unless it is known that identical results are obtained with a thinner specimen, the test specimen is to be at least 6 mm thick. The necessary thickness may be composed of a series of thinner pieces but determinations on such specimens may not agree with those obtained on one piece specimen because the plies may not be in complete contact.
- (b) The lateral dimensions are to be sufficient to permit measurements at least 12 mm from the edge unless it is known that identical results are obtained when measurements are made closer to an edge.
- (c) The surface of the specimen is to be flat over sufficient area to permit the presser foot to contact the specimen over a radius of at least 6 mm from the indenter point. A suitable hardness determination cannot be made on a rounded, uneven or rough surface.

4. Calibration

- (a) The spring can be calibrated by supporting the durometer in a vertical position and resting the point of the indenter on a small spacer at the centre of one pan of a chemical balance. A suitable cylindrical spacer may be constructed with the following dimensions:
Diameter 1.25 mm
Height 2.5 mm
with the top surface of the indenter slightly cupped to accommodate the indenter point.
- (b) Balance the mass of the spacer by a tare on the opposite pan of the balance. Add weights to the opposite pan to balance the force on the indenter at various scale readings. The measured force should equal the force calculated by the equation above within ± 8 g.

5. Conditioning

- (a) Carry out testing at $23 \pm 2^{\circ}\text{C}$ if the temperature of the test is not specified. Condition the durometer and test specimen for at least one hour before test.

6. Procedure

- (a) Place the specimen on a hard horizontal surface. Hold the durometer in a vertical position with the point of the indenter at least 12 mm from the edge of the specimen unless the condition under paragraph 3(b) applies.
- (b) Apply the presser foot to the specimen as rapidly as possible without shock, keeping the foot parallel to the surface of the specimen. Apply just sufficient pressure to obtain a firm contact between the presser foot and specimen.
- (c) Unless otherwise specified read the scale within one second after the presser foot is in firm contact with the specimen. (If a reading after a time interval is specified, hold the presser foot in contact with the specimen without change of position or pressure, and read the scale after the specified period).
- (d) Make five (5) measurements of hardness at different positions at least 6 mm apart and determine the arithmetic mean.

7. Reporting

- (a) Report the mean value as the durometer A hardness together with any special conditions of test.