



Standard Test Methods for Rubber Properties in Compression¹

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1. Scope

1.1 These test methods cover two test procedures for determining the compression-deflection characteristics of rubber compounds other than those usually classified as hard rubber and sponge rubber.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products²

D 3767 Practice for Rubber—Measurement of Dimensions²

D 4483 Practice for Determining Precision for Test Method Standards in the Rubber and Carbon Black Industries²

E 4 Practices for Force Verification of Testing Machines³

3. Summary of Test Methods

3.1 These tests constitute one kind of compression stiffness measurement. Deflection is the change in thickness of the specimen upon application of a compressive force. The two different procedures are as follows:

3.1.1 *Test Method A—Compression Test of Specified Deflection*—A compression test in which the force required to cause a specified deflection is determined.

3.1.2 *Test Method B—Compression Test at Specified Force*—A compression test in which the specified mass or compressive force is placed on the specimen and the resulting deflection is measured and recorded.

4. Significance and Use

4.1 These test methods are useful in comparing stiffness of

rubber materials in compression. They can be used by rubber technologists to aid in development of materials for compressive applications.

5. Apparatus

5.1 *Compression Testing Machine*—A compression testing machine conforming to the requirements of Practices E 4, and having a rate of head travel of 12 ± 3 mm/m (0.5 ± 0.1 in./min), may be used for either type of test. Any other type machine that will meet these requirements may be used. For example, a platform scale equipped with a yoke over the platform and a hand-operated screw to apply the force will serve if it will conform to the requirements prescribed for accuracy and rate of travel. Compression tests at specified forces may be performed on any machine that applies minor and major forces gently, without impact, or by placing specified masses gently on the specimen. The machine shall be equipped to permit measurement of the deflection caused by the increase from minor force to major force.

5.2 *Deflection Gage*—The deflection shall be read on a gage of dial type graduated in hundredths of millimetres (or thousands of an inch).

5.3 *Micrometer*—The thickness of the specimen shall be measured in accordance with Test Method A of Practice D 3767.

6. Test Specimens

6.1 The test may be performed either on rubber products or on standard test specimens, as specified.

NOTE 1—Comparable results are obtained only when tests are made on specimens of exactly the same size and shape, tested to the same percentage deflection, or tested under the same force.

6.2 Standard test specimens shall be 28.6 ± 0.1 mm (1.129 ± 0.005 in.) in diameter (650 mm^2 (1.000 in.^2) in area) and 12.5 ± 0.5 mm (0.49 ± 0.02 in.) in thickness, from which all molded surface layers have been removed.

7. Preparation of Specimens

7.1 The standard test specimens may be prepared as follows: A slab approximately 13 mm (0.51 in.) in thickness may be cut from a product or may be molded from the same compound used in the preparation of the product and ground on both sides to obtain smooth parallel surfaces and the standard thickness of 12.5 ± 0.5 mm (0.49 ± 0.02 in.). The grinding shall be carried out as prescribed in Section 5 of Practice

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are the direct responsibility of Subcommittee D11.10 on Physical Testing.

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² *Annual Book of ASTM Standards*, Vol 09.01.

³ *Annual Book of ASTM Standards*, Vol 03.01.