



Standard Test Method for Rubber Property—Plasticity and Recovery (Parallel Plate Method)¹

This standard is issued under the fixed designation D926; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers the determination of plasticity and recovery of unvulcanized rubber by means of the parallel plate plastometer. Uncompounded, compounded, and reclaim rubber may be tested.

NOTE 1—ISO 2007 and Test Method D3194 use a principle similar to this test method although the apparatus, test conditions, and procedure are different.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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:²

D3194 Test Method for Rubber From Natural Sources—Plasticity Retention Index (PRI)

D3767 Practice for Rubber—Measurement of Dimensions

D4483 Practice for Evaluating Precision for Test Method Standards in the Rubber and Carbon Black Manufacturing Industries

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

2.2 ISO Standard:³

ISO 2007 Rubber Unvulcanized—Determination of Plasticity—Rapid Plastimeter Method

¹ This test method is under the jurisdiction of ASTM committee D11 on Rubber and is the direct responsibility of Subcommittee D11.12 in Processability Tests.

Current edition approved Nov. 1, 2013. Published January 2014. Originally approved in 1956. Last previous edition approved in 2008 as D926–08. DOI: 10.1520/D0926-08R13.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute, 25 West 43rd St., 4th Floor, New York, NY 10036.

3. Summary of Test Method

3.1 Plasticity:

3.1.1 A specimen of specific volume and height is tested at room temperature or heated to a specified test temperature for 15 min and then subjected to a compressive force of 49 N for a specified time.

3.1.2 At the end of this time, the height of the specimen is measured, and the plasticity number is calculated.

3.2 Recovery—There are two recovery procedures.

3.2.1 *Procedure A*—The test specimen is removed from the plastometer immediately after the determination of plasticity and allowed to cool and recover some of its original height for 1 min. The height is measured again and the recovery is calculated.

3.2.2 *Procedure B*—The test specimen is compressed to a height of 5 mm for 30 s and then allowed to recover at the test temperature for 5 min. The height is measured again and the recovery is calculated.

4. Significance and Use

4.1 The plasticity number and the recovery of the test specimen are related to the flow properties and the elastic properties, respectively, and may be useful in predicting processing characteristics, such as ease of forming and extrusion characteristics.

4.1.1 In this test method, plasticity is measured in an inverse manner, as noted by the final height of the specimen. Thus, high plasticity rubbers (high degree of flow during test) are indicated by a low plasticity number.

5. Apparatus

5.1 The essential features of the parallel plate plastometer, illustrated in Fig. 1, are as follows:

5.1.1 Two metal plates, not less than 10 mm in thickness and 40 mm in diameter, shall be mounted on a suitable frame so that one plate moves with respect to the other, and so that the two plates are parallel within 0.017 rad (1°) at all times.

5.1.2 The apparatus shall be so designed that a specimen between the parallel plates is subjected to a force of 49 ± 0.5 N, including the effect of the spring in the dial gauge during test.