



Designation: D 1917 – 02

Standard Test Methods for Rubber Property—Shrinkage of Raw and Compounded Hot- Polymerized Styrene-Butadiene Rubber (SBR)¹

This standard is issued under the fixed designation D 1917; 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 Department of Defense.

1. Scope

1.1 These test methods cover the determination of mill shrinkage of hot-polymerized styrene-butadiene rubbers (SBR) and their compounds.

1.2 The values stated in SI units are to be regarded as the standard. The values 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 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets²

D 3896 Practice for Rubber from Synthetic Sources—Sampling²

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

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens³

3. Summary of Test Methods

3.1 A specimen of raw or compounded rubber is prepared on a standard laboratory mill, its dimensions are measured or controlled by a cutting technique, it is heat aged in a circulating oven at 100°C, cooled at room temperature, and the dimensions are again measured. The linear percent shrinkage of the specimen is calculated.

3.2 The following test methods are given:

3.2.1 *Test Method A*—For raw SBR which is particularly applicable to rubbers having shrinkage below 25 %, such as cross-linked types.

3.2.2 *Test Method B*—For compounded SBR.

4. Significance and Use

4.1 The shrinkage of SBR rubbers and their compounds after processing is of importance in many applications. This property can also be used for control, specifications, and fabrication purposes.

5. Apparatus

5.1 *Mill*—A standard laboratory mill as described in Practice D 3182.

5.2 *Laboratory Oven*, having internal horizontal dimensions in excess of 300 by 480 mm (12 by 19 in.) and conforming to the requirements for Type II, Grade B ovens given in Specification E 145.

5.3 *Mill Knife*.

5.4 *Cutting Tools*:

5.4.1 A tool having two parallel blades spaced about 20 mm (0.8 in.) apart. Two standard mill knives bolted together, properly spaced, may be used.

5.4.2 A 150 mm long by 100 mm wide (6.0 by 4.0 in.) metal template approximately 1 mm (0.04 in.) thick, equipped with a handle, and having its longitudinal dimension curved to fit the contour of the mill roll, may also be used. It is especially suitable for raw rubbers that are disjunctive or form a poor sheet. A mill knife is used for cutting the rubber.

5.5 *Smooth Sheet*, of TFE-fluorocarbon, metal, or glass, having dimensions to accommodate the specimen.

5.6 *Linear Scale*, 500 mm (20 in.) long, graduated in 1.0 mm (0.05 in.).

5.7 *Dusting powder*, for example talc or soapstone.

6. Sampling

6.1 Take samples in accordance with Practice D 3896.

NOTE 1—Make sure the sample is talc-free.

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are the direct responsibility of Subcommittee D11.12 on Processability Tests.

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

³ *Annual Book of ASTM Standards*, Vol 14.04.