Designation: D2632 – 15 (Reapproved 2019)

Standard Test Method for Rubber Property—Resilience by Vertical Rebound[1]

This standard is issued under the fixed designation D2632; 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 impact resilience of solid rubber from measurement of the vertical rebound of a dropped mass.

1.2 This test method is not applicable to the testing of cellular rubbers or coated fabrics.

1.3 A standard test method for impact resilience and penetration of rubber by a rebound pendulum is described in Test Method D1054.

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

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D618 Practice for Conditioning Plastics for Testing

D832 Practice for Rubber Conditioning For Low Temperature Testing

D1054 Test Method for Rubber Property—Resilience Using a Goodyear-Healey Rebound Pendulum (Withdrawn 2010)[3]

D1349 Practice for Rubber—Standard Conditions for Testing

D1566 Terminology Relating to Rubber

D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets

D3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products

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

2.2 *Other Documents:*[4]

ISO-10012-1 Quality Assurance Requirements for Measuring Equipment—Part 1: Metrological Confirmation System for Measuring Equipment[5]

ANSI/NCSL-Z540-1 American National Standard for Calibration—Calibration Laboratories and Measuring and Test Equipment—General Requirements[6]

3. Summary of Test Method

3.1 Resilience is determined as the ratio of rebound height to drop height of a metal plunger of prescribed mass and shape which is allowed to fall on the rubber specimen.

4. Significance and Use

4.1 Resilience is a function of both dynamic modulus and internal friction of a rubber. It is very sensitive to temperature changes and to depth of penetration of the plunger. Consequently, resilience values from one type of rebound instrument may not, in general, be predicted from results on another type of rebound instrument.

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[1] This test method is under the jurisdiction of ASTM Committee D11 on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee D11.10 on Physical Testing.

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[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] The last approved version of this historical standard is referenced on www.astm.org.

[4] This test method previously referenced MIL-STD-4662a *Military Standard: Calibration System Requirements*, which was subsequently canceled by the Department of Defense in February 1995. These are the DoD recommended replacement documents.

[5] Available from the International Organization for Standardization, 1 rue de Varembé, Case postale 56, CH-1211, Geneva 20, Switzerland.

[6] Available from the American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

4.2 This test method is used for development and comparison of materials. It may not directly relate to end-use performance.

5. Apparatus

5.1 A diagram of the essential features and dimensions of the apparatus appears in Fig. 1. It includes means for suspending a plunger at a given height above the specimen, its release, and measuring the subsequent rebound height.

5.1.1 Each resilience instrument shall have a unique identification number assigned and permanently and visibly imprinted or affixed upon it.

5.2 The plunger dimensions are also given in Fig. 1. Its mass shall be 28 ± 0.5 g.

5.3 The height of the drop point and of the resilience scale above the base of the instrument shall be adjustable so that the drop height is always 400 ± 1 mm (16 ± 0.04 in.) above the specimen surface. The resilience scale shall be marked in 100 equally spaced divisions.

5.3.1 The top of the plunger should be in line with 100 on the scale when the plunger is locked in the elevated position. Some models of the apparatus do not meet this requirement, but may be modified to do so.

5.4 The descent of the plunger and its ensuing ascent (rebound) is guided by a vertical rod (plunger guide). In order to minimize friction between the plunger and the vertical rod, a means shall be provided for leveling the base of the instrument and adjusting the perpendicularity of the vertical rod to the instrument base.

5.4.1 The bottom of the vertical rod shall have a 4 mm diameter sharp point formed by a 60° angle, to secure the location of the bottommost end of the vertical rod. This point should indent the test specimen, providing a secure location for the free end of the guide rod.

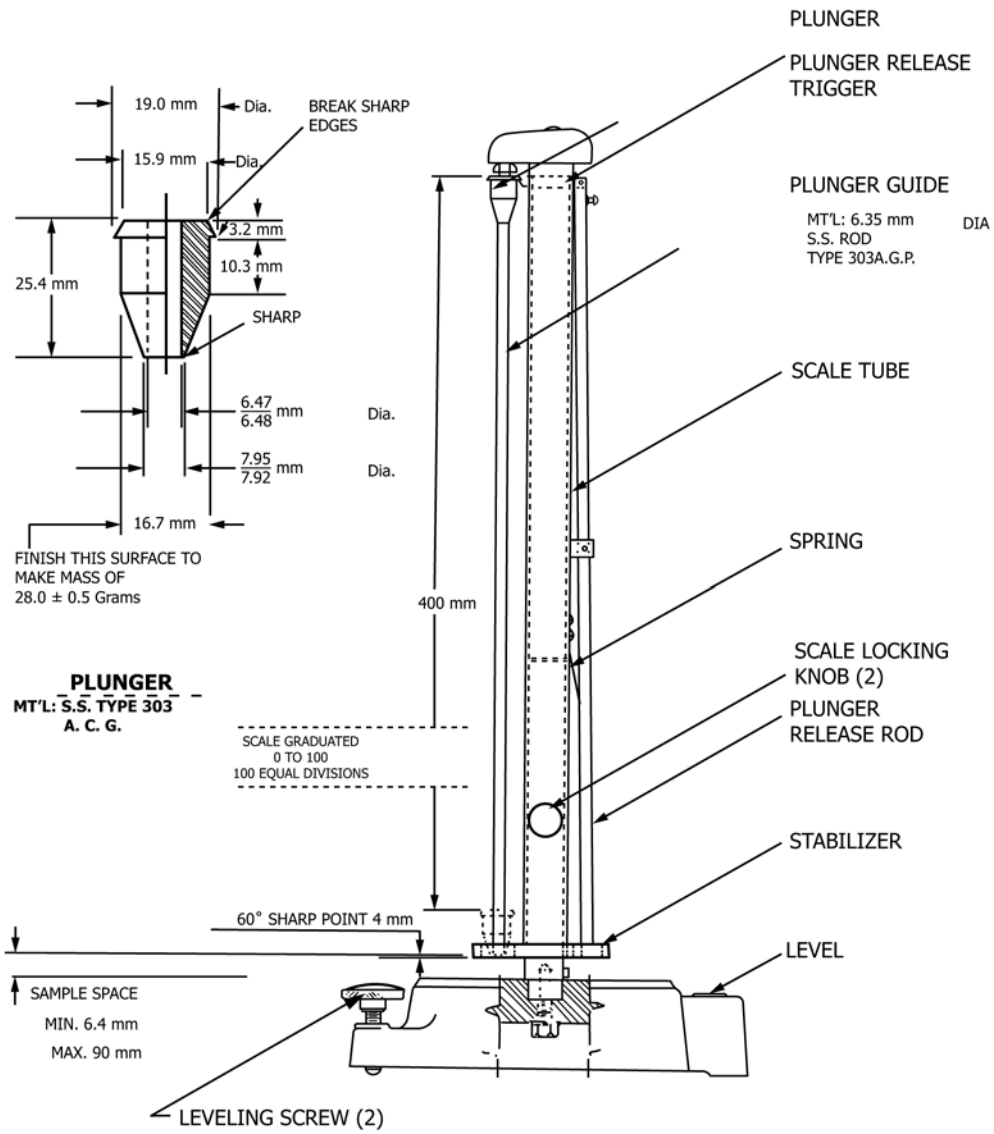

FIG. 1 Vertical Rebound Apparatus