



Designation: D8268 – 19 (Reapproved 2023)

Standard Practice for Rubber Compounding Materials—Evaluation of Recycled Vulcanizate Particulate Rubber¹

This standard is issued under the fixed designation D8268; 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.

1. Scope

1.1 This practice covers the evaluation methods for the compounding material commercially known as recycled vulcanizate particulate rubber. The methods are of general usage in quality control or are needed for the classification of the recycled vulcanizate particulate rubber according to Classification [D5603](#).

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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

[D297](#) Test Methods for Rubber Products—Chemical Analysis

[D1509](#) Test Methods for Carbon Black—Heating Loss

[D1566](#) Terminology Relating to Rubber

[D5603](#) Classification for Rubber Compounding Materials—Recycled Vulcanizate Rubber

[D5644](#) Test Method for Rubber Compounding Materials—Determination of Particle Size Distribution of Recycled

[Vulcanizate Particulate Rubber](#)

[E105](#) Guide for Probability Sampling of Materials

[E122](#) Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

[E1131](#) Test Method for Compositional Analysis by Thermogravimetry

3. Terminology

3.1 See Terminology [D1566](#).

3.2 Definitions:

3.2.1 *bulk density, n*—mass per unit volume of a material, including any voids present.

3.2.2 *particulate rubber, n*—rubber, vulcanized or unvulcanized, that has been transformed into a collection of particles, with or without a coating of a partitioning agent to prevent agglomeration during production, transportation, or storage (see buffing rubber, granulated rubber, ground rubber, and powdered rubber).

4. Significance and Use

4.1 For quality control and classification purposes, it is required to determine the composition of recycled vulcanizate particulate rubber.

4.2 This practice provides references for standard test methods for composition analysis of rubber and offers a guide for methods widely applied by the recycling industry.

5. Sampling

5.1 As a process quality control effort, it is recommended that samples for the testing be taken for sieve classification at least once per production shift, once per lot or as agreed upon between the customer and the feedstock supplier.

5.2 Test portions for sieve testing on products that are coarser than 800 μm (20 mesh) are selected in accordance with Practices [E105](#) and [E122](#).

6. Test Methods

6.1 The test methods in [Table 1](#) shall be used to determine the composition of recycled vulcanizate particulate rubber.

¹ This practice is under the jurisdiction of ASTM Committee [D11](#) on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee [D11.27](#) on Rubber Sustainability.

Current edition approved Sept. 1, 2023. Published September 2023. Originally approved in 2019. Last previous edition approved in 2019 as D8268 – 19. DOI: 10.1520/D8268-19R23.

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.

TABLE 1 List of Test Methods and Properties

Property	Test Method
Acetone extractable	D297B, ^A Sections 17, 18, 19
Ash, max	D297B, ^A Sections 34, 35, 36, 37
Carbon black	D297B, ^A Sections 38, 39
Loss on heating	D1509
Natural rubber	D297B, ^A Sections 52, 53
Rubber hydrocarbon content	D297B, ^A Section 11

^A Test Method E1131 as alternate method.

7. Test Methods Specific to this Practice

7.1 Determination of Metal Content—To determine the ferromagnetic metal content, a 100 g specimen of the recycled vulcanizate particulate rubber is placed on a flat nonmagnetic surface. A small horseshoe magnet is passed over and through the specimen for 60 s. Weigh the metal fragments collected on the magnet. The mass in grams represents the percentage of free ferromagnetic metal.

7.2 Determination of Fiber Content:

7.2.1 Perform a normal sieve analysis procedure in accordance with Test Method D5644A.

7.2.2 As the test screens are disassembled, there may be free fabric in the form of bundles of fibers or “fabric balls” which can be removed from each screen level.

7.2.3 Accumulate the “fabric balls” as the screens are disassembled.

7.2.4 Weigh the “fabric balls” in grams and record their mass as the percentage of free fabric.

7.2.5 The “fabric balls” may tend to entrap very small particles of rubber. It is permissible to attempt to dislodge these particles by shaking the “fabric balls” or dropping them on a clean surface. Weighing the “fabric balls” with the entrapped rubber will tend to distort the fabric content to the high side.

7.3 Determination of Bulk Density of Recycled Vulcanizate Particulate Rubber:

7.3.1 The measurement of bulk density will provide a relative indication of uniformity of process samples. Particle size control will directly affect the bulk density of the processed sample. The more uniform, large particles will have a lower bulk density than samples that contain a large number of fines.

7.3.2 The bulk density of recycled vulcanizate particulate rubber is determined from the mass of the particulate rubber contained in a cylindrical container that is $1000.0 \text{ cm}^3 \pm 0.1 \text{ cm}^3$ in volume.

7.3.3 Apparatus:

7.3.3.1 Cylindrical Container, 1000 cm^3 , having uniform height and no pouring lip or deformation of the walls of the container.

7.3.3.2 Straightedge or Spatula, at least 150 mm in length.

7.3.3.3 Balance or Scale, with a sensitivity of 0.1 g.

7.3.4 Procedure:

7.3.4.1 Obtain approximately $275 \text{ g} \pm 25 \text{ g}$ of recycled vulcanizate particulate rubber from the lot (see Practice E105).

7.3.4.2 Pour the sample into the center of the tared container from a height not more than 50 mm above the rim of the container. A large enough excess should be used to form a cone of the product above the rim of the cylindrical container. Immediately level the surface with a single sweep of the straightedge or spatula held perpendicular to and in firm contact with the lip of the container. Record the mass of the recycled vulcanizate particulate rubber to the nearest 0.1 g.

7.3.5 Calculation—Calculate the bulk density D_B to the nearest 0.1 kg/m^3 as follows:

$$D_B = \frac{W}{V_c} * 1000 \quad (1)$$

where:

D_B = bulk density, in kg/m^3 ,

W = mass of recycled vulcanizate particulate rubber in the tared cylindrical container, in grams, and

V_c = volume of cylindrical container, in cm^3 .

7.3.6 Report:

7.3.6.1 Report the following information:

(1) Date of test.

(2) Identification of samples.

(3) Result obtained, reported to the nearest 0.1 kg/m^3 .

8. Keywords

8.1 bulk density; composition; fiber; granulated rubber; metal; particulate rubber; recycling

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; http://www.copyright.com/