



Designation: D5668 – 21

# Standard Test Methods for Rubber From Synthetic Sources—Volatile Matter<sup>1</sup>

This standard is issued under the fixed designation D5668; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 These test methods cover a hot mill method, two oven methods, and a press method for the determination of moisture and other volatile matter content in synthetic rubber.

1.2 Either oven method shall be used especially when the rubber is too tacky to be handled satisfactorily on a hot mill.

1.3 The press method shall be used for rubbers that are too crumbly to be retained satisfactorily on a laboratory mill.

1.4 The values stated in SI units are to be regarded as the standard. The values 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:*<sup>2</sup>

[D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets](#)

[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](#)

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and Rubber-like Materials and are the direct responsibility of Subcommittee D11.11 on Chemical Analysis.

Current edition approved Dec. 1, 2021. Published January 2022. Originally approved in 1995. Last previous edition approved in 2019 as D5668 – 19. DOI: 10.1520/D5668-21.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 3. Significance and Use

3.1 These test methods are mainly intended for referee purposes but can also be used for quality control of rubber production.

3.2 The amount of volatiles can affect processing and cure characteristics of compounded rubber.

## 4. Apparatus

4.1 *Mill*, as described in Practice [D3182](#).

4.2 *Oven*, as described in Specification [E145](#).

4.3 *Press*, as described in Practice [D3182](#).

### METHOD A—HOT-MILL TEST METHOD

## 5. Summary of Test Method

5.1 A weighed sample of rubber is sheeted out on a heated mill until all the volatile matter is driven off. The sample is weighed again and the percentage of volatile matter is calculated.

## 6. Procedure

6.1 Weigh a test sample of at least 250 g to the nearest 0.1 g.

6.2 Pass the weighed sample repeatedly for 4 min through a laboratory mill maintained at  $100 \pm 5^\circ\text{C}$  ( $212 \pm 9^\circ\text{F}$ ) with the distance between the rolls set at  $0.50 \pm 0.05$  mm ( $0.020 \pm 0.002$  in.) as determined by a lead slug. Do not allow the sample to band, and take care to avoid any loss of sample. Weigh the sample to the nearest 0.1 g. Pass the sample through the mill for an additional 2 min and reweigh. If the weights at the end of the 4- and 6-min periods are within 0.1 g, calculate the volatile matter; if not, continue passing the sample through the mill for 2-min periods until the weight remains constant within 0.1 g.

## 7. Calculation

7.1 Calculate the percentage of volatile matter as follows:

$$\text{Volatile Matter, \%} = [(A - B)/A] \times 100 \quad (1)$$

where:

$A$  = mass of original sample, g, and

$B$  = mass of sample after milling, g.