



Designation: D5051 – 06 (Reapproved 2021)<sup>ε1</sup>

# Standard Test Method for Rubber Compounding Materials—Benzothiazyl Disulfide (MBTS)—Assay<sup>1</sup>

This standard is issued under the fixed designation D5051; 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.

<sup>ε1</sup> NOTE—Corrected 3.2, 6.2, 9.2, and 12.2 editorially in November 2021.

## 1. Scope

1.1 This test method covers the determination of assay of benzothiazyl disulfide (MBTS). It is based on a titration of free iodine liberated upon reduction of MBTS, with potassium iodide (KI) in acid medium.

1.2 The assay is determined as mass percent.

1.3 Free 2-mercaptobenzothiazole (MBT) content is not determined.

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

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>

D1193 Specification for Reagent Water

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

Current edition approved Nov. 1, 2021. Published January 2022. Originally approved in 1990. Last previous edition approved in 2017 as D5051 – 06 (2017). DOI: 10.1520/D5051-06R21E01.

<sup>2</sup> 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.

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

## 3. Summary of Test Method

3.1 In an acid medium, MBTS is reduced with KI to MBT and free iodine. The free iodine is titrated with standard sodium thiosulfate solution.

3.2 MBTS is sparingly soluble in any organic solvent, while MBT, formed during the reaction of MBTS with KI, is very soluble. Therefore, after reagents are added as indicated in the procedure, continue to stir until all MBTS has reacted.

## 4. Significance and Use

4.1 The test method is designed to assess the purity of MBTS, which is used for rubber and latex vulcanization acceleration. The amount of MBTS is of importance in predicting performance in rubber compounds and for raw material purchase and control.

4.2 This test method may be used as a quality control tool and for research and development work.

## 5. Interferences

5.1 KI-reducible contaminants interfere with the results.

## 6. Apparatus

6.1 *Erlenmeyer Flask*, 300 cm<sup>3</sup>.

6.2 *Graduated Cylinder*, 5 cm<sup>3</sup>, 25 cm<sup>3</sup>, 50 cm<sup>3</sup>.

6.3 *Magnetic Stirrer*, with hot plate.

6.4 *Buret*, 50-cm<sup>3</sup> capacity.

6.5 *Analytical Balance*, having a sensitivity of  $\pm 0.1$  mg.

## 7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that