



Standard Test Methods for Rubber from Natural Sources—Chemical Analysis¹

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1. Scope

1.1 These test methods cover the sampling and chemical analysis of solid natural rubber in the forms supplied to the rubber industry.

1.2 The analytical procedures appear in the following order:

	Sections
Sampling	5
Volatile Matter	6-8
Dirt	9-13
Ash	14-17
Copper (Referee Colorimetric Method)	18-22
Copper (Alternative Colorimetric Method)	23-27
Copper (Alternative Flame Atomic Absorption Method)	28
Manganese (Colorimetric Method)	29-33
Manganese (Alternative Flame Atomic Absorption Method)	34
Iron (Colorimetric Method)	35-39
Acetone Extract	40-41
Rubber Hydrocarbon	42-43
Nitrogen	44-45

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

1.4 *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 297 Test Methods for Rubber Products—Chemical Analysis²
- D 1193 Specification for Reagent Water³
- D 1485 Test Methods for Rubber From Natural Sources—Sampling and Sample Preparation²
- D 3533 Test Method for Rubber—Nitrogen Content²
- D 4004 Test Methods for Rubber—Determination of Metal Content by Flame Atomic Absorption (AAS) Analysis²
- D 4483 Practice for Determining Precision for Test Method

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are the direct responsibility of Subcommittee D11.22 on Natural Rubber.

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

³ *Annual Book of ASTM Standards*, Vol 11.01.

Standards in the Rubber and Carbon Black Industries²

E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁴

E 131 Terminology Relating to Molecular Spectroscopy⁵

3. Significance and Use

3.1 These test methods are intended for quality control acceptance of natural rubber and may be used for referee purposes.

4. Reagents

4.1 *Purity of Reagents*, Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.⁶ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently higher purity to permit its use without lessening the accuracy of the determination.

4.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Specification D 1193.

5. Sampling

5.1 A lot of natural rubber shall be sampled, the sample prepared for test, and the acceptability of the lot determined from tests on the sample in accordance with Methods D 1485.

VOLATILE MATTER

6. Procedure

6.1 Weigh a 10 to 12-g specimen of homogenized rubber to the nearest 1 mg and then dry it in a circulating-air oven at $100 \pm 5^\circ\text{C}$ to constant mass. If it is suspected that volatile hydrocarbon oils are present, they should be determined by heating the rubber in a circulating-air oven at $160 \pm 5^\circ\text{C}$ to constant weight. The drying is facilitated by cutting the rubber into 25-mm strips having a maximum width and thickness of

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 03.06.

⁶ "Reagent Chemicals, American Chemical Society Specifications," Am. Chemical Soc. Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see "Reagent Chemicals and Standards," by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY, and the "United States Pharmacopeia."