



Designation: D1278 – 91a (Reapproved 2020)

Standard Test Methods for Rubber from Natural Sources—Chemical Analysis¹

This standard is issued under the fixed designation D1278; 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 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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

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

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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.

D1193 Specification for Reagent Water

D1485 Practice for Rubber from Natural Sources—Sampling and Sample Preparation

D3533 Test Method for Rubber—Nitrogen Content (Withdrawn 2006)³

D4004 Test Methods for Rubber—Determination of Metal Content by Flame Atomic Absorption (AAS) Analysis

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

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E131 Terminology Relating to Molecular Spectroscopy

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.⁴ 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 **D1193**.

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 Test Methods **D1485**.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For Suggestions on the testing of reagents not listed by the American Chemical Society, see *Annual Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.