



Designation: D297 – 21

Standard Test Methods for Rubber Products—Chemical Analysis¹

This standard is issued under the fixed designation D297; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods cover the qualitative and quantitative analysis of the composition of rubber products of the “R” family (see 3.1). Many of these test methods may be applied to the analysis of natural and synthetic crude rubbers.

1.1.1 *Part A* consists of general test methods for use in the determination of some or all of the major constituents of a rubber product.

1.1.2 *Part B* covers the determination of specific polymers present in a rubber product.

1.1.3 The test methods appear in the following order:

Part A. General Test Methods:	Sections
Rubber Polymer Content by the Indirect Method	11 – 13
Determinations and Report for the General Method	14 and 15
Density	16
Extract Analysis	17 – 26
Sulfur Analysis	27.1 – 33
Fillers Analysis	34 – 40
Ash Analysis	41 – 51
Part B. Determination of Rubber Polymers	52 – 58

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

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.* Specific precautionary or warning statements are given in 31.4.5, 31.6, 37.4.2, 38.4.2, 45.1.3, 53.2.3.5, 54.4.2, 54.6, 56.5.3, and 57.7.3; and X1.3.3 and X2.4.1.6.

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

- D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D982 Test Method for Organic Nitrogen in Paper and Paperboard
- D1416 Test Methods for Rubber from Synthetic Sources—Chemical Analysis (Withdrawn 1996)³
- D1418 Practice for Rubber and Rubber Latices—Nomenclature
- D1646 Test Methods for Rubber—Viscosity, Stress Relaxation, and Pre-Vulcanization Characteristics (Mooney Viscometer)
- D3040 Practice for Preparing Precision Statements for Standards Related to Rubber and Rubber Testing (Withdrawn 1987)³
- D3156 Practice for Rubber—Chromatographic Analysis of Antidegradants (Antioxidants, Antiozonants and Stabilizers)
- D3452 Practice for Rubber—Identification by Pyrolysis-Gas Chromatography
- D3677 Test Methods for Rubber—Identification by Infrared Spectrophotometry
- 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
- E200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis
- E442 Test Method for Chlorine, Bromine, or Iodine in Organic Compounds by Oxygen Flask Combustion (Withdrawn 1996)³
- E443 Test Method for Sulfur in Organic Compounds by Oxygen Flask Combustion (Withdrawn 1996)³

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 D11.11 on Chemical Analysis.

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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.

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