



Standard Test Methods for Rubber—Identification by Infrared Spectrophotometry¹

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

1. Scope

1.1 These test methods, based on infrared examination of pyrolysis products (pyrolyzates) and films can be used for rubber identification.

1.2 These test methods are applicable to rubbers in the raw state and, when compounded, both in the cured and uncured state.

1.3 The values stated in SI units are to be regarded as standard.

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.* Specific precautionary statements are given in Section 17.

2. Referenced Documents

2.1 ASTM Standards:

D 297 Test Methods for Rubber Products—Chemical Analysis²

D 1418 Practice for Rubber and Rubber Latices—Nomenclature²

D 3452 Practice for Rubber—Identification by Pyrolysis-Gas Chromatography²

E 168 Practices for General Techniques of Infrared Quantitative Analysis³

3. Significance and Use

3.1 For research, development, and quality control purposes, it is advantageous to determine the composition of rubbers in cured, compounded products.

3.2 This test method provides such composition analysis utilizing an infrared technique.

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 high purity to permit its use without lessening the accuracy of the determination.

4.2 *Acetone.*

4.3 *Alcohol*, specially denatured (Formula 2-B or 30 is satisfactory).

4.4 *2-Butanone.*

4.5 *Chloroform.*

4.6 *Congo Red Paper.*

4.7 *Diatomaceous Filter Aid*⁵—Some grades are quite unsatisfactory in that they will not sufficiently absorb carbon black.

4.8 *1,2-Dichlorobenzene*⁶—A check on suitability may be made by evaporating 50 cm³ to dryness and making an infrared spectrum of the residue. Any substantial absorbance at positions near those wavenumbers that will be used for rubber analysis, indicates that the 1,2-dichlorobenzene is unsuitable for use.

4.9 *Dry Compressed Air and Nitrogen*, in cylinders, or provided as a laboratory service.

4.10 *Sodium Sulfate*, anhydrous.

4.11 *Toluene.*

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are the direct responsibility of Subcommittee D11.11 on Chemical Analysis.

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

³ *Annual Book of ASTM Standards*, Vol 03.06.

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 *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.

⁵ Fisher Scientific, Catalog No. C211 (Celite) is satisfactory.

⁶ J. T. Baker Chemical Co., Phillipsburg, NJ 08865, Catalog No. 9217 has been found satisfactory.