



Designation: D4026 – 06 (Reapproved 2017)

Standard Test Method for Rubber Latex—Styrene-Butadiene Copolymer— Determination of Residual Styrene¹

This standard is issued under the fixed designation D4026; 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 This test method covers the determination of the residual styrene content of styrene butadiene (SBR) latex. This test method is based upon direct injection of a diluted latex into a gas chromatograph. The amount of residual styrene is calculated using an internal standard technique.

1.2 The range of residual styrene covered is approximately 100 to 3000 mg/kg (ppm) with a lower detection limit of approximately 50 mg/kg (ppm).

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.* (For specific safety statements, see Section 8.)

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

[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](#)

¹ 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.

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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.

[E260 Practice for Packed Column Gas Chromatography](#)

[E355 Practice for Gas Chromatography Terms and Relationships](#)

3. Summary of Test Method

3.1 A sample of latex is mixed with a wetting agent and an internal standard of vinyl toluene. It is then injected into a gas chromatograph equipped with a flame ionization detector. The amount of residual styrene is determined by the internal standard technique.

4. Significance and Use

4.1 The amount of residual styrene (unreacted styrene) in an SBR latex must be studied from health, safety, economic, and environment viewpoints. This test method is useful in studying these aspects of residual styrene and also in research, development, and factory processing problems.

5. Interferences

5.1 Materials that interfere with the complete separation of styrene and vinyl toluene must be absent. Matrix effects (anything in the latex that affects the release of styrene or vinyl toluene, or both) may be minimized by the use of an addition technique.

6. Apparatus

6.1 *Gas Chromatograph:*

6.1.1 Any gas chromatograph whose operating parameters and columns provide well-resolved, narrow, styrene and vinyl toluene peaks, free of interference, may be used. The chromatograph must be equipped with a flame ionization detector (FID) and preferably with some means of electronic or microprocessor type of integration. Detectors must be operated in the 200 to 300°C range and injection ports must be operated in the 200 to 210°C range.

NOTE 1—It is understood that the gas chromatograph will be operated in accordance with the manufacturer's instructions for optimum performance and that the equipment will be operated by persons knowledgeable in the techniques of gas chromatography. Practice [E260](#) and Practice [E355](#), manufacturer's literature, and standard texts on gas chromatography are especially helpful.

6.1.2 Equip the chromatograph with removable glass liners for easy cleaning. *Cleaning will be required when spurious*