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.

Designation: D4678 – 15a (Reapproved 2019)

Standard Practice for Rubber—Preparation, Testing, Acceptance, Documentation, and Use of Reference Materials[1]

This standard is issued under the fixed designation D4678; 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 practice covers materials used on an industry-wide basis as reference materials, which are vitally important to conduct product, specification, and development testing in the rubber industry. This practice describes the steps necessary to ensure that any candidate material, that has a perceived need, can become a Reference Material. The practice sets forth the recommendations on the preparation steps for these materials, on the testing that shall be conducted to permit acceptance of any candidate material, and on how the documentation needed for the acceptance shall be recorded for future use and review.

1.2 This practice shall be administered by ASTM Committee D11.

1.2.1 Important sections of this practice are as follows:

	Section
Significance and Use	3
Preparation of Industry Reference Materials	4
Overview of Industry Reference Material Testing	5
Chemical and Physical Specifications for IRM	6
Reference Material Documentation	7
Typical Reference Material Use	8
Recommended Package Size for IRM	Annex A1
Recommended Sampling Plans for Homogeneity Testing of an IRM	Annex A2
Test Plan and Analysis for Homogeneity of an IRM	Annex A3
Test Plan and Analysis to Evaluate an Accepted Reference Value	Annex A4
Statistical Model(s) for IRM Testing	Annex A5
Example of Annex Calculations for a Typical IRM	Appendix X1
Two-Way Analysis of Variance for Calculating *Sr*	Appendix X2

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.*

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]

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

D5900 Specification for Physical and Chemical Properties of Industry Reference Materials (IRM)

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E826 Practice for Testing Homogeneity of a Metal Lot or Batch in Solid Form by Spark Atomic Emission Spectrometry

3. Significance and Use

3.1 Reference materials are vitally important in product and specification testing, in research and development work, in technical service work, and in quality control operations in the rubber industry. They are especially valuable for referee purposes.

3.2 *Categories, Classes, and Types of Reference Materials (RM):*

3.2.1 Reference materials are divided into two categories:

3.2.1.1 *Industry Reference Materials (IRM)*—Materials that have been prepared according to a specified production process to generate a uniform lot; the parameters that define the quality of the lot are evaluated by a specified measurement program.

3.2.1.2 *Common-Source Reference Materials (CRM)*—Materials that have been prepared to be as uniform as possible but do not have established property (parameter) values; the knowledge of a common or single source is sufficient for certain less critical applications.

[1] This practice is under the jurisdiction of ASTM Committee D11 on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee D11.20 on Compounding Materials and Procedures.

Current edition approved Nov. 1, 2019. Published December 2019. Originally approved in 1987. Last previous edition approved in 2015 as D4678 – 15a. DOI: 10.1520/D4678-15AR19.

[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.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States