



Designation: D3192 – 09 (Reapproved 2019)

Standard Test Methods for Carbon Black Evaluation in NR (Natural Rubber)¹

This standard is issued under the fixed designation D3192; 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 standard materials, test formulation, mixing procedure, and test methods for the evaluation and production control of carbon blacks in natural rubber (NR).

1.2 The values stated in SI units are to be regarded as the standard. The values 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.*

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

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D1799 Practice for Carbon Black—Sampling Packaged Shipments

D1900 Practice for Carbon Black—Sampling Bulk Shipments

D2084 Test Method for Rubber Property—Vulcanization Using Oscillating Disk Cure Meter

D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing

Standard Vulcanized Sheets

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

3. Significance and Use

3.1 The major portion of carbon black consumed by the rubber industry is used to improve the physical properties, life expectancy, and utility of rubber products. These test methods provide a natural rubber formulation and directions for evaluating carbon black intended for use in rubber products.

3.2 These test methods may be used to characterize carbon black in terms of specific properties of the standard compound. These test methods are useful for the quality assurance of carbon black production. They may also be used for the preparation of reference compounds, to confirm the day-to-day reliability of testing operations used in the rubber industry, for the evaluation of experimental compounds, and quality control of production compounds.

4. Standard Test Formula

4.1 *Standard Formula:*

Material	IRM ^A No.	Quantity, parts by mass
Natural rubber ^B	...	100.00
Stearic acid	21	3.00
Zinc oxide	91	5.00
Benzothiazyl disulfide	2	0.60
Sulfur	31	2.50
Carbon black ^C	...	50.00
Total		161.10
Batch factor: ^D		
Test Method A—Mill		4.00
Test Method B—Internal Mixer		6.00
Test Method C—Miniature Internal Mixer		0.40

¹ These test methods are under the jurisdiction of ASTM Committee D24 on Carbon Black and are the direct responsibility of Subcommittee D24.71 on Carbon Black Testing in 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.

^A IRM 91 is available from R. E. Carroll, Inc., 1570 North Olden Ave., Trenton, NJ 08638; (800) 257-9365. IRM 2, IRM 21, and IRM 31 are available from Akron Rubber Development Lab, 2887 Gilchrist Road, Akron, OH 44305; (330) 794-6600.

^B SMR L and STR L have been found to give satisfactory performance. Other sources of rubber may give satisfactory results but have not been investigated by Subcommittee D24.71. Other sources of rubber should be checked to ensure that results equivalent to SMR L are attained before using in this test method.