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: D2663 – 14 (Reapproved 2019)$^{\varepsilon 1}$

Standard Test Methods for Carbon Black—Dispersion in Rubber[1]

This standard is issued under the fixed designation D2663; 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.

ε^1 NOTE—Corrected 2.2 editorially in May 2021.

1. Scope

1.1 These test methods cover the degree of dispersion of carbon black in rubber. Four test methods are described as follows:

	Sections
Test Method A—Visual Inspection	3 – 11
Test Method B—Agglomerate Count	12 – 22
Test Method C—Microroughness Measurement with Profilometer	23 – 33
Test Method D—Microroughness Measurement with IFM	34 – 42

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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]

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

2.2 *ASTM Adjuncts:*

Carbon Black Dispersion Standards[3]

Carbon Black Dispersion Chart[4]

TEST METHOD A—VISUAL INSPECTION

3. Scope

3.1 Test Method A is a qualitative visual test method. Ratings are made against a set of standard photographs (Fig. 1),[3] and the results are expressed on a numerical scale. This test method cannot be used for compounds that contain fillers other than carbon black.

4. Summary of Test Method

4.1 The compound rubber is torn or cut to expose a fresh surface for examination by the eye, aided preferably by a hand lens or a low-power binocular microscope. The dispersion level of the carbon black is compared against a series of five photographic standards and then rated numerically from 1 (very low) to 5 (high) (see Fig. 1).

5. Significance and Use

5.1 Visual dispersion ratings correlate with certain important physical properties of the compound. A rating of 5 indicates a state of dispersion developing near maximum properties, while a rating of 1 would indicate a state of dispersion developing considerably depressed properties. Normally, the visual dispersion ratings indicate the following levels of compound quality:

Visual Dispersion Rating	Classification
4 to 5	High
3 to 4	Intermediate
2 to 3	Low
1 to 2	Very low

6. Apparatus

6.1 *Sharp Knife or Razor Blade.*

6.2 *Hand Lens* (10×) or binocular microscope (10 to 20×).

[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.

[3] Available from ASTM International Headquarters. Order Adjunct No. ADJD266302-E-PDF. Original adjunct produced in 1967.

[4] Available from ASTM International Headquarters. Order Adjunct No. ADJD266301-E-PDF. Original adjunct produced in 1967.

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