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Standard Guide for Carbon Black—Shelf Life¹

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1. Scope

1.1 This guide defines the shelf life of carbon black.

1.2 *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

D1509 Test Methods for Carbon Black—Heating Loss

D1510 Test Method for Carbon Black—Iodine Adsorption Number

D3192 Test Methods for Carbon Black Evaluation in NR (Natural Rubber)

D4821 Guide for Carbon Black—Validation of Test Method Precision and Bias

D6915 Practice for Carbon Black—Evaluation of Standard Reference Blacks

3. Significance and Use

3.1 This guide defines the shelf life of carbon black when stored under proper conditions.

4. Carbon Black Shelf Life

4.1 In accordance with Practice D6915, the shelf life of Standard Reference Blacks (SRBs) is defined as indefinite

¹ This guide is under the jurisdiction of ASTM Committee D24 on Carbon Black and is the direct responsibility of Subcommittee D24.67 on Sustainability.

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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.

when stored in a manner that protects it from liquid water or high humidity environments. The only two properties of carbon black known to change over time are moisture (Test Methods D1509) and Iodine Number (Test Method D1510). The moisture content can change over the short-term (weeks or months), depending on the ambient humidity and the surface area of the carbon black, see 4.4. Iodine Number can change over an extended period (years) due to a slow increase in the oxygen content on the surface of the carbon black. This phenomenon is primarily observed with tread grades (N000 – N300 series) and other high surface area carbon blacks, and manifests itself by a slowly decreasing Iodine Number, although the actual surface area of the carbon black remains unchanged. For more details about the aging effect on iodine number, see subsection 5.1.1 of Guide D4821.

4.2 The same reasoning for the shelf life of SRBs extends to commercial carbon black. It should be noted that the slight change in Iodine Number over an extended period does not affect actual surface area properties and in-rubber performance of the carbon black.

4.3 The in-rubber properties of a wide range of carbon black grades have shown no significant change over a 4 year period, see Table 1 and Table 2.

4.4 In cases where the carbon black moisture level has increased over time, heating the carbon black at 125°C for an adequate amount of time will remove the moisture and render the material fit for use.

4.5 Based on studies by ASTM Committee D24, the shelf life of carbon black is indefinite.

5. Keywords

5.1 carbon black; shelf life