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Standard Practice for Evaluating Test Sensitivity for Rubber Test Methods[1]

This standard is issued under the fixed designation D6600; 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 testing to evaluate chemical constituents, chemical and physical properties of compounding materials, and compounded and cured rubbers, which may frequently be conducted by one or more test methods. When more than one test method is available, two questions arise: Which test method has the better (or best) response to or discrimination for the underlying fundamental property being evaluated? and Which test method has the least error? These two characteristics collectively determine one type of technical merit of test methods that may be designated as test sensitivity.

1.2 Although a comprehensive and detailed treatment, as given by this practice, is required for a full appreciation of test sensitivity, a simplified conceptual definition may be given here. Test sensitivity is the ratio of discrimination power for the fundamental property evaluated to the measurement error or uncertainty, expressed as a standard deviation. The greater the discriminating power and the lower the test error, the better is the test sensitivity. Borrowing from the terminology in electronics, this ratio has frequently been called the signal-to-noise ratio; the signal corresponding to the discrimination power and the noise corresponding to the test measurement error. Therefore, this practice describes how test sensitivity, generically defined as the signal-to-noise ratio, may be evaluated for test methods used in the rubber manufacturing industry, which measure typical physical and chemical properties, with exceptions as noted in 1.3.

1.3 This practice does not address the topic of sensitivity for threshold limits or minimum detection limits (MDL) in such applications as (*1*) the effect of intentional variations of compounding materials on measured compound properties or (*2*) the evaluation of low or trace constituent levels. Minimum detection limits are the subject of separate standards.

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.*

1.5 The content of this practice is as follows:

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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

3. Terminology

3.1 A number of specialized terms or definitions are required for this practice. They are defined in a systematic or sequential order from simple terms to complex terms; the simple terms may be used in the definition of the more complex terms. This approach generates the most succinct and unambiguous definitions. Therefore, the definitions do not appear in the usual alphabetical sequence.

3.2 *Definitions:*

3.2.1 *calibration material,* CM, *n*—a material (or other object) selected to serve as a standard or benchmark reference material, with a fully documented FP reference value for a test

[1] This practice is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.16 on Application of Statistical Methods.

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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.

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