



Standard Practice for Sampling and Testing of Possible Carbon Black Fugitive Emissions or Other Environmental Particulate, or Both¹

This standard is issued under the fixed designation D6602; 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 sampling and testing for distinguishing ASTM type carbon black, in the N100 to N900 series, from other environmental particulates.

1.2 This practice requires some degree of expertise on the part of the microscopist. For this reason, the microscopist must have adequate training and on-the-job experience in identifying the morphological parameters of carbon black and general knowledge of other particles that may be found in the environment. In support of this analysis, Donnet's book² is highly recommended to be used as a technical reference for recognizing and understanding the microstructure of carbon black.

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

1.4 *This standard may involve hazardous materials, operations, and equipment. 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.*

2. Referenced Documents

2.1 ASTM Standards:³

D1619 Test Methods for Carbon Black—Sulfur Content

D3053 Terminology Relating to Carbon Black

D3849 Test Method for Carbon Black—Morphological Characterization of Carbon Black Using Electron Microscopy

¹ This practice is under the jurisdiction of ASTM Committee D24 on Carbon Black and is the direct responsibility of Subcommittee D24.66 on Environment, Health, and Safety.

Current edition approved Nov. 1, 2013. Published December 2013. Originally approved in 2000. Last previous edition approved in 2010 as D6602 – 03b (2010)^{e1}. DOI: 10.1520/D6602-13.

² Hess, W.M. and Herd, C.R., *Carbon Black Science and Technology*, Edited by Donnet, J.B., Bansal, R.C., and Wang, M.J., Marcel Dekker, Inc., New York, NY, 1993, pp. 89–173.

³ 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. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *aciniform*—shaped like a cluster of grapes.

3.1.1.1 *Discussion*—The spheroidal primary particles of carbon black are fused into aggregates of colloidal dimension forming an acinoform morphology.

3.1.2 *aciniform carbon*—colloidal carbon having a morphology consisting of spheroidal primary particles (nodules) fused together in aggregates of colloidal dimension in a shape having grape-like clusters or open branch-like structures

3.1.3 *carbon black, n*—an engineered material, primarily composed of elemental carbon, obtained from the partial combustion or thermal decomposition of hydrocarbons, existing in the form of aggregates of aciniform morphology which are composed of spheroidal primary particles characterized by uniformity of primary particle sizes within a given aggregate and turbostratic layering within the primary particles.

3.1.3.1 *Discussion*—Particle size and aggregate size (number of particles per aggregate) are distributional properties and vary depending on the carbon black grade. Transmission electron micrographs shown in [Annex A2](#) demonstrate that while particle and aggregate sizes vary greatly within a given grade of carbon black, the primary particle size is essentially uniform within an individual aggregate.

3.1.4 *chain of custody*—a document describing the condition of a sample during its collection, analysis, and disposal.

3.1.5 *char*—a particulate larger than 1 μm made by incomplete combustion which may not deagglomerate or disperse by ordinary techniques, may contain material which is not black, and may contain some of the original material's cell structure, minerals, ash, cinders, and so forth.

3.1.6 *fugitive dust*—transitory, fleeting material comprised of particulates foreign to the surface of deposition.

3.1.7 *fungus, sooty mold, mildew, biofilm*—particulates from a superficial growth that grows on living and decaying organic matter.

3.1.8 *mineral dust*—naturally occurring inorganic particulates inherent to the area such as soil minerals.

3.1.9 *pollen*—particulates from a mass of microspores in a seed plant.