



Designation: D 3053 – 04

Standard Terminology Relating to Carbon Black¹

This standard is issued under the fixed designation D 3053; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This terminology is a compilation of definitions of technical terms used in the carbon black and rubber industries. Terms that are generally understood or adequately defined in other readily available sources are not included.

2. Referenced Documents

2.1 ASTM Standards:²

- D 1508 Test Method for Carbon Black, Pelleted—Fines and Attrition
- D 1509 Test Methods for Carbon Black—Heating Loss
- D 1510 Test Method for Carbon Black—Iodine Adsorption Number
- D 1511 Test Method for Carbon Black—Pellet Size Distribution
- D 1513 Test Method for Carbon Black, Pelleted—Pour Density
- D 1514 Test Method for Carbon Black—Sieve Residue
- D 1566 Terminology Relating to Rubber
- D 1618 Test Method for Carbon Black Extractables—Transmittance of Toluene Extract
- D 1765 Classification System for Carbon Blacks Used in Rubber Products
- D 1937 Test Method for Carbon Black, Pelleted—Mass Strength
- D 2414 Test Method for Carbon Black—Oil Absorption Number (OAN)
- D 3265 Test Method for Carbon Black—Tint Strength
- D 3313 Test Method for Carbon Black—Individual Pellet Hardness
- D 3493 Test Method for Carbon Black—Oil Absorption Number of Compressed Sample
- D 3849 Test Method for Carbon Black—Morphological Characterization of Carbon Black Using Electron Microscopy

D 5230 Test Method for Carbon Black—Automated Individual Pellet Hardness

D 6556 Test Method for Carbon Black—Total and External Surface Area by Nitrogen Adsorption

3. Terminology

3.1 Definitions:

aciniform, *adj*—shaped like a cluster of grapes.

DISCUSSION—The spheroidal primary particles of carbon black are fused into aggregates of colloidal dimension forming an aciniform morphology.

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, uniformity of primary particle sizes within a given aggregate and turbostratic layering within the primary particles.

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 1 of Practice D 6602 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.

carbon black agglomerate, *n*—a cluster of physically bound and entangled aggregates.

DISCUSSION—See Test Method D 3849.

carbon black aggregate, *n*—a discrete, rigid, colloidal mass of extensively coalesced particles; it is the smallest dispersible unit.

carbon black, carcass grade, *n*—a type of furnace carbon black having an average particle size in the range from 31 to 200 nm.

DISCUSSION—Carcass-grade carbon blacks are produced by the oil furnace process. The use of these grades in the rubber industry is not limited to the carcass portion of the tire. These grades are designated with an “N” first character and a second character of “4, 5, 6, or 7” in Table 1 of Classification D 1765. See Terminology D 1566 for the definition of carcass.

¹ These definitions are under the jurisdiction of ASTM Committee D24 on Carbon Black and are the direct responsibility of Subcommittee D24.41 on Carbon Black Nomenclature and Terminology.

Current edition approved Jan. 1, 2004. Published February 2004. Originally approved in 1972. Last previous edition approved in 1999 as D 3053 – 99^{ε1}.

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.