



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 reapproval. 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:

- D 1508 Test Method for Carbon Black, Pelleted—Fines Content²
- D 1509 Test Methods for Carbon Black—Heating Loss²
- D 1510 Test Method for Carbon Black—Iodine Adsorption Number²
- D 1511 Test Method for Carbon Black—Pellet Size Distribution²
- D 1513 Test Method for Carbon Black, Pelleted—Pour Density²
- D 1514 Test Method for Carbon Black—Sieve Residue²
- D 1566 Terminology Relating to Rubber²
- D 1618 Test Method for Carbon Black Extractables—Toluene Discoloration²
- D 1765 Classification System for Carbon Blacks Used in Rubber Products²
- D 1937 Test Method for Carbon Black, Pelleted—Mass Strength²
- D 2414 Test Method for Carbon Black—*n*-Dibutyl Phthalate Absorption Number²
- D 3037 Test Methods for Carbon Black—Surface Area by Nitrogen Adsorption²
- D 3265 Test Method for Carbon Black—Tint Strength²
- D 3313 Test Method for Carbon Black—Individual Pellet Crush Strength²
- D 3493 Test Method for Carbon Black—*n*-Dibutyl Phthalate Absorption Number of Compressed Sample²
- D 3849 Test Method for Carbon Black—Primary Aggregate Dimensions from Electron Microscope Image Analysis²
- D 4820 Test Methods for Carbon Black—Surface Area by Multipoint B.E.T. Nitrogen Adsorption²

¹ These definitions are under the jurisdiction of ASTM Committee D-24 on Carbon Black and are the direct responsibility of Subcommittee D24.41 on Carbon Black Nomenclature and Terminology.

Current edition approved Nov. 10, 1999. Published December 1999. Originally published as D 3053 – 72. Last previous edition D 3053 – 96b.

² Annual Book of ASTM Standards, Vol 09.01.

D 5230 Test Method for Carbon Black—Automated Individual Pellet Crush Strength²

D 5816 Test Methods for Carbon Black—External Surface Area by Multipoint Nitrogen Adsorption²

3. Terminology

3.1 Definitions:

carbon black, *n*—material consisting essentially of elemental carbon in the form of near-spherical colloidal particles and coalesced particle aggregates of colloidal size, obtained by partial combustion or thermal decomposition of hydrocarbons.

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.

carbon black, furnace, *n*—a type of carbon black produced by the decomposition reaction of hydrocarbons when injected into a high-velocity stream of combustion gases under controlled conditions.

carbon black, hard, *n*—See **carbon black, tread grade**, the preferred term.

DISCUSSION—All carbon blacks provide some level of reinforcement when mixed in rubber. The amount of reinforcement is a function of the carbon black grade and amount used. See Terminology D 1566 for the definition of reinforcement.

carbon black microstructure, *n*—arrangement of carbon atoms within a carbon black particle.

carbon black particle, *n*—a small spheroidally shaped (paracrystalline, non-discrete) component of a carbon black aggregate; it is separable from the aggregate only by fracturing.