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Standard Classification System for Carbon Blacks Used in Rubber Products¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This classification system is used to classify rubber grade carbon blacks by the use of a four-character nomenclature system. The first character gives some indication of the influence of the carbon black on the rate of cure of a typical rubber compound containing the black. The second character gives information on the average surface area of the carbon black. The last two characters are assigned arbitrarily.

1.2 All rubber-grade carbon blacks for which a number is currently assigned at the time of publication of this classification system are listed in Table 1 together with some of their typical properties.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension²
- D 1508 Test Method for Carbon Black, Pelleted—Fines Content²
- D 1510 Test Method for Carbon Black—Iodine Adsorption Number²
- D 1513 Test Method for Carbon Black, Pelleted—Pour Density²
- D 1514 Test Method for Carbon Black—Sieve Residue²
- D 2084 Test Method for Rubber Property—Vulcanization Using Oscillating Disk Cure Meter²
- D 2414 Test Method for Carbon Black—*n*-Dibutyl Phthalate Absorption Number²
- D 3053 Terminology Relating to Carbon Black²
- D 3182 Practice for Rubber—Materials, Equipment, and

Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets²

D 3191 Test Methods for Carbon Black in SBR (Styrene-Butadiene Rubber)—Recipe and Evaluation Procedures²

D 3192 Test Methods for Carbon Black Evaluation in NR (Natural Rubber)²

D 3265 Test Method for Carbon Black—Tint Strength²

D 3493 Test Method for Carbon Black—*n*-Dibutyl Phthalate Absorption Number of Compressed Sample²

D 4820 Test Methods for Carbon Black—Surface Area by Multipoint B.E.T. Nitrogen Adsorption²

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

3. Basis of Classification

3.1 The first character in the nomenclature system for rubber-grade carbon blacks is a letter indicating the effect of the carbon black on the cure rate of a typical rubber compound containing the black. The letter “N” is used to indicate a normal curing rate typical of furnace blacks that have received no special modification to alter their influence on the rate of cure of rubber. The letter “S” is used for channel blacks or for furnace blacks that have been modified to effectively reduce the curing rate of rubber. Channel blacks characteristically impart a slower rate of cure to rubber compounds. Thus, the letter “S” designates a slow cure rate. Blacks may vary considerably in “curing rate” within each of the two letter classifications.

3.2 The second character in the system is a digit to designate the average surface area of the carbon black as measured by nitrogen surface area. The surface area range of the carbon blacks has been divided into ten arbitrary groups, and each has been assigned a digit to describe that group. These groups are as follows:

Group No.	Average Nitrogen Surface Area, m ² /g
0	> 150
1	121 to 150
2	100 to 120
3	70 to 99
4	50 to 69
5	40 to 49
6	33 to 39
7	21 to 32
8	11 to 20
9	0 to 10

¹ This classification is under the jurisdiction of ASTM Committee D24 on Carbon Black and is the direct responsibility of Subcommittee D24.41 on Carbon Black Nomenclature and Terminology.

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² *Annual Book of ASTM Standards*, Vol 09.01.