



Designation: D5899 – 24

Standard Classification System for Rubber Compounding Materials for Use in Computer Material Management Systems¹

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1. Scope

1.1 This classification is intended to establish a method to find compounding materials on a computer data base by both functional and chemical classification. This classification will include rubber compounding materials or ingredients normally used in formulating rubber compounds. This classification is not intended for use in rubber latex or solvent based rubber adhesive applications.

1.2 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- D1765 Classification System for Carbon Blacks Used in Rubber Products
- D2226 Classification for Various Types of Petroleum Oils for Rubber Compounding Use
- D2227 Specification for Natural Rubber (NR) Technical Grades
- D4295 Classification for Rubber Compounding Materials—Zinc Oxide
- D4578 Test Methods for Rubber Chemicals—Determination of Percent Insoluble Sulfur by Extraction

¹ This classification is under the jurisdiction of ASTM Committee D11 on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee D11.20 on Compounding Materials and Procedures.

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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.

- D4676 Classification for Rubber Compounding Materials—Antidegradants
- D4677 Classification for Rubber Compounding Materials—Titanium Dioxide
- D4817 Classification for Rubber Compounding Materials—Stearic Acid
- D4818 Classification for Rubber Compounding Materials—Vulcanization Accelerators
- D4924 Classification for Petroleum Waxes for Use in Rubber Compounding
- D5377 Classification for Rubber Compounding Materials—Ground Coal
- D5603 Classification for Rubber Compounding Materials—Recycled Vulcanizate Rubber

3. Significance and Use

3.1 Commercially available computer material management programs are being used regularly in the rubber industry. These programs typically will retrieve information from a raw material or compounding material data base by chemical name, CAS registry number, trade name, and supplier name. Retrieving information by these fields can present problems. The common chemical names are not standardized. IUPAC nomenclature is standardized but the names typically are too lengthy for easy retrieval. Also, the user may not have information such as trade name, supplier name, or CAS registry number.

3.2 An alternate method of retrieving information from a raw material or compounding material data base is to sort by classification. This has the added advantage of enabling a compounder to select a compounding material from a given classification for a new compound formulation.

4. Basis of Classification

4.1 This classification is based on two methods.

4.1.1 The primary method of classifying raw materials or compounding materials is on the basis of functionality. Functionality is defined by the principal reason for the material's use in the rubber formulation. Even though some compounding materials may have multiple functions, only the principal function should be included in the functional classification. The compounding material should not be included under more than one functional classification.

4.1.2 Under each functional classification there is a second level of classification by chemical description.

5. Classification System

5.1 The classification for compounding materials given in a computer's material management system is as follows:

5.2 *Functional Classification*—Accelerators (see Classification **D4818**):

5.2.1 *Chemical Classification*:

- 5.2.1.1 Dithiocarbamates
- 5.2.1.2 Guanidines
- 5.2.1.3 Maleimides
- 5.2.1.4 Sulfenamides
- 5.2.1.5 Sulfenimides
- 5.2.1.6 Thiazoles
- 5.2.1.7 Thioureas
- 5.2.1.8 Thiurams
- 5.2.1.9 Dithiophosphates
- 5.2.1.10 Amines
- 5.2.1.11 Other

5.3 *Functional Classification*—Adhesion Promoters:

5.3.1 *Chemical Classification*:

- 5.3.1.1 Methylene donors
- 5.3.1.2 Resorcinol donors
- 5.3.1.3 Cobalt salts/compounds
- 5.3.1.4 Polyisocyanates
- 5.3.1.5 Other

5.4 *Functional Classification*—Antidegradants (see Classification **D4676**):

5.4.1 *Chemical Classification*:

- 5.4.1.1 Bisphenols
- 5.4.1.2 Polyphenols
- 5.4.1.3 Alkyl aryl phosphites
- 5.4.1.4 Alkyl aryl-p-phenylene diamines
- 5.4.1.5 Dialkyl-p-phenylene diamines
- 5.4.1.6 Diaryl-p-phenylene diamines
- 5.4.1.7 Mercaptobenzimidazoles
- 5.4.1.8 Quinolines
- 5.4.1.9 Substituted amines
- 5.4.1.10 Substituted phenols
- 5.4.1.11 Thiopropionates
- 5.4.1.12 Waxes (see Classification **D4924**)
- 5.4.1.13 Other

5.5 *Functional Classification*—Antistatic Agents:

5.6 *Functional Classification*—Blowing Agents:

5.6.1 *Chemical Classification*:

- 5.6.1.1 Azodicarbonamide
- 5.6.1.2 Carbonates
- 5.6.1.3 Semicarbazides
- 5.6.1.4 Sulfonylhydrazide
- 5.6.1.5 Other

5.7 *Functional Classification*—Colorants:

5.7.1 *Chemical Classification*:

- 5.7.1.1 Iron oxide
- 5.7.1.2 Titanium dioxide (see Classification **D4677**)
- 5.7.1.3 Other inorganic colorants

5.7.1.4 Organic colorants

5.8 *Functional Classification*—Fillers, Extenders, and Reinforcing Agents:

5.8.1 *Chemical Classification*:

5.8.1.1 Calcium carbonates

5.8.1.2 Carbon blacks, fine particle size (see Classification **D1765**)

- (1) N100 series
- (2) N200 series
- (3) N300 series
- (4) Other

5.8.1.3 Carbon blacks, large particle size

- (1) N400 series
- (2) N500 series
- (3) N600 series
- (4) N700 series
- (5) N800 series
- (6) N900 series
- (7) Other

5.8.1.4 Conductive carbon blacks (other than given above)

5.8.1.5 Other carbon blacks

- (1) Recovered carbon black (rCB)

5.8.1.6 Clays

5.8.1.7 Ground coal (see Classification **D5377**)

5.8.1.8 Flocs

5.8.1.9 Reinforcing resins (reactive)

5.8.1.10 Silicas

- (1) Precipitated
- (2) Pyrogene
- (3) Mineral

5.8.1.11 Silicates

5.8.1.12 Other

- (1) Ground Egg Shells (ES)

- (2) Ground Oyster Shells (OS)

- (3) Fly Ash (FA)

- (4) Tomato Peels (TP)

- (5) Lignin (L)

5.9 *Functional Classification*—Flame Retardants:

5.9.1 *Chemical Classification*:

- 5.9.1.1 Halogen donors
- 5.9.1.2 Metallic oxides
- 5.9.1.3 Hydrates
- 5.9.1.4 Other

5.10 *Functional Classification*—Fungicides:

5.10.1 *Chemical Classification*:

- 5.10.1.1 Organic
- 5.10.1.2 Other

5.11 *Functional Classification*—Masterbatches:

5.11.1 *Chemical Classification*:

- 5.11.1.1 Internal (rework)
- 5.11.1.2 External

5.12 *Functional Classification*—Odorants:

5.12.1 *Chemical Classification*:

- 5.12.1.1 Essential oils
- 5.12.1.2 Other