Designation: D 1199 – 86 (Reapproved 2003)

Standard Specification for Calcium Carbonate Pigments[1]

This standard is issued under the fixed designation D 1199; 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.

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

1. Scope

1.1 This specification covers two types of high-content calcium carbonate pigments, as follows:

1.1.1 *Type PC*—Calcium carbonate precipitate, prepared either by complete solution or by carbonation of lime.

1.1.2 *Type GC*—Ground mineral product.

1.2 Six grades of pigments, based on particle size (see 3.3) are covered.

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

2. Referenced Documents

2.1 *ASTM Standards:*

C 25 Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime[2]

D 280 Test Methods for Hygroscopic Moisture (and Other Matter Volatile Under the Test Conditions) in Pigments[3]

D 281 Test Method for Oil Absorption of Pigments by Spatula Rub-out[4]

D 718 Test Methods for Analysis of Aluminum Silicate Pigment[3]

D 1366 Practice for Reporting Particle Size Characteristics of Pigments[3]

D 3360 Test Method for Particle Size Distribution by Hydrometer of the Common White Extender Pigments[3]

E 97 Test Method for Directional Reflectance Factor, 45-deg 0-deg, of Opaque Specimens by Broad-Band Filter Reflectometry[5]

3. Composition and Properties

3.1 The pigment may be prepared by chemical precipitation or by the fine grinding of natural calcium carbonate containing minerals. If additional agents are used or any surface treatment is given, their purpose shall be indicated; acceptance shall be as agreed upon by the purchaser and the seller.

3.2 *Composition*—The pigment shall conform to the requirements for composition prescribed in Table 1.

3.3 *Fineness*—The pigment shall conform to the following general requirements for fineness for the grade specified:

3.3.1 *Grade I* (*Fine Paint Grade*)—This grade possesses substantial amounts of material in the fine sizes, and is in general essentially below 15 to 20 µm maximum size. Coarse particles retained on the No. 325 (45-µm) sieve shall be less than 0.05 %. The maximum Specific Surface Diameter (SSD) shall be 2.5 µm.

3.3.2 *Grade II* (*Coarse Paint Grade*)—This grade is characterized by substantial amounts in the 5- to 45-µm range, and is lower in pigment value than Grade I. Coarse particles retained on the No. 325 (45-µm) sieve shall be less than 0.5 %. The maximum SSD shall be 6 µm.

3.3.3 *Grade III* (*Filler Grade*)—This grade is characterized by substantial amounts in the 10- to 45-µm range but with the coarse particles retained on No. 325 (45-µm) sieve less than 25 % and a maximum SSD of 9 µm.

3.3.4 *Grade IV* (*Putty Powder Grade*)—This grade possesses less fines, and have substantial amounts of coarse particles. The coarse particles, however, shall not exceed 30 % retained on the No. 200 (75-µm) sieve. The maximum SSD shall be 12 µm.

3.3.5 *Grade V* (*Superfine Grade*)—This grade is a superfine ground natural limestone and is characterized by major amounts less than 5 µm and a weight median particle size in the range of 1 µm. The SSD is finer than 1 µm.

3.3.5.1 Particle size methods for Grade V that are applicable include transmission electron microscopy, scanning electron microscopy, and the Sedigraph.[6] Specific Surface Diameter can be determined by BET nitrogen absorption. The method of measurement produces different values, therefore, the method of measurement shall be agreed upon by the purchaser and the seller.

[1] This specification is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.31 on Pigment Specifications.

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[2] *Annual Book of ASTM Standards*, Vol 04.01.

[3] *Annual Book of ASTM Standards*, Vol 06.03.

[4] *Annual Book of ASTM Standards*, Vol 06.01.

[5] Discontinued; See *1992 Annual Book of ASTM Standards* , Vol 06.01.

[6] The sole source of supply of the sedigraph known to the committee at this time is Micromeritics, 5680 Goshen Springs Rd., Norcross, GA 30093. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.