Designation: D 603 – 66 (Reapproved 1996)ε1

Standard Specification for Aluminum Silicate Pigments (Hydrous)[1]

This standard is issued under the fixed designation D 603; 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.

ε[1] NOTE—Keywords were added editorially in May 1996.

1. Scope

1.1 This specification covers the white pigments that consist substantially of natural hydrous aluminum silicate[2] (of the 1:1 layer type), and are restricted to those minerals which conform to the chemical limits prescribed herein and which can be suitably processed to what is commercially known as paint pigment quality.

2. Referenced Documents

2.1 *ASTM Standards:*

D 281 Test Method for Oil Absorption of Pigments by Spatula Rub-Out[3]

D 422 Test Method for Particle-Size Analysis of Soils[4]

D 718 Test Methods for Analysis of Aluminum Silicate Pigment[5]

D 1208 Test Methods for Common Properties of Certain Pigments[5]

D 1483 Test Method for Oil Absorption of Pigments by Gardner-Coleman Method[3]

D 2448 Test Method for Water-Soluble Salts in Pigments by Measuring the Specific Resistance of the Leachate of the Pigment[5]

E 70 Test Method for pH of Aqueous Solution with the Glass Electrode[6]

3. Composition of Properties

3.1 *Preparation*—The pigment shall be made by grinding, milling, washing, purifying, size-fractionating, or otherwise processing, natural hydrous aluminum silicates, and shall conform to the composition requirements (weight percent) given in Table 1.

TABLE 1 Pigment Composition Requirements

	Ideal	Typical	Range	Max
Aluminum oxide, Al_2O_3, %	39.50	38.8	37 to 42[A]	...
Silicon dioxide, SiO_2, %	46.54	45.4	48 to 43[B]	...
Iron oxide, Fe_2O_3, %	...	0.3	...	0.5
Titanium dioxide, TiO_2, %	...	1.5	...	2.0
Calcium oxide, CaO,%	...	0.1	...	0.2
Sodium oxide, Na_2O, %	...	0.1	...	0.3
Potassium oxide, K_2O, %	...	0.1	...	2.0
Other oxides, %	...	trace	...	0.1
Free moisture (105°C), %	...	...	...	1.0
Loss on ignition (1000°C), %	13.96	13.8	...	15.0

[A] Permitting up to 5 % excess Al_2O_3, for example as allophane.
[B] Permitting up to 5 % excess SiO_2, for example as quartz.

3.2 *pH*—The pH of a water slurry of the pigment shall be within a range as agreed upon between the purchaser and the seller.

3.3 *Water-Soluble Matter*—The water-soluble matter shall be not more than 0.50 %.

3.4 *Wet-Sieve Residue*—The pigment shall contain no more than 0.5 % wet-sieve residue retained on a 45-µm (No. 325) sieve ("grit" or "coarse particles") except as may be agreed upon between the purchaser and the seller.

3.5 *Color*—The color (brightness, reflectance) shall conform to the following requirements:

3.5.1 The color shall be equal, within agreed upon tolerances, to that of a reference standard agreed upon between the purchaser and the seller, or

3.5.2 The color shall be not less than a guaranteed minimum expressed as percent reflectance of standard illuminant C at 457 nm compared to a freshly smoked standard magnesium oxide surface by means of an accepted integrating sphere reflectance spectrophotometer[7] or a monochromatic reflectance meter,[7] or

3.5.3 The color shall be specified by actual determination of dominant wavelength, hue, and spectral efficiency as can be calculated from the tristimulus integration of the reflectance curve.

[1] This specification is under the jurisdiction of ASTM Committee D-1 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] Synonymous terms are china clay and kaolinite.

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

[4] *Annual Book of ASTM Standards*, Vol 04.08.

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

[6] *Annual Book of ASTM Standards*, Vol 15.05.

[7] The General Electric Reflectance Spectrophotometer and the General Electric Reflectance Meter, respectively, have been found satisfactory for this purpose.