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Standard Specification for Raw and Burnt Sienna Pigments¹

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1. Scope

1.1 This specification covers the pigments commercially known as raw sienna and burnt sienna.

1.2 *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

D50 Test Methods for Chemical Analysis of Yellow, Orange, Red, and Brown Pigments Containing Iron and Manganese

D185 Test Methods for Coarse Particles in Pigments

D280 Test Methods for Hygroscopic Moisture (and Other Matter Volatile Under the Test Conditions) in Pigments

D387 Test Method for Color and Strength of Chromatic Pigments with a Mechanical Muller

D1208 Test Methods for Common Properties of Certain Pigments

3. Composition and Properties

3.1 *Dry Pigments*—The pigments shall conform to the following requirements:

3.1.1 *Raw Sienna*—The pigment shall be in a soft, dry form and shall be a hydrated oxide of iron permeating a siliceous base. The pigment shall conform to the requirements for composition prescribed in **Table 1**.

3.1.2 *Burnt Sienna*—The pigment shall be produced by the calcination of raw sienna and shall conform to the requirements for composition prescribed in **Table 1**.

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 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.

3.2 *Paste in Oil*—For both raw and burnt sienna, the paste in oil shall be made by thoroughly grinding the pigment with linseed oil (with or without a small amount of volatile thinner) together with (where necessary) small amounts of wetting or dispersing agents to produce a paste or semipaste of satisfactory consistency. As received, it shall not be caked in the container and shall break up readily in linseed oil to form a smooth paint of brushing consistency. It shall mix readily in all proportions, without curdling, with linseed oil, turpentine, or volatile petroleum spirits, or any mixture of these substances. The paste shall conform to the following requirements:

Pigment, min, %	60
Nonvolatile vehicle, min, of vehicle	80
Moisture by distillation, max, %	2.0
Coarse particles and skins (total residue retained on a No. 325 (45- μ m) sieve), max, % of dry pigment	1.0

3.3 The mass color and character of the tint and the tinting strength formed by a mixture with a white pigment shall be within mutually agreed upon limits of a standard acceptable to both the purchaser and the seller.

4. Sampling

4.1 Two samples shall be taken at random from different packages from each lot, batch, day's pack, or other unit of production in a shipment. When no markings distinguishing between units of production appear, samples shall be taken from different packages in the ratio of two samples for each 5 tons (inch-pound or SI), except that for shipments of less than 10 000 lb two samples shall be taken. At the option of the purchaser, the samples may be tested separately or after blending in equal quantities the samples from the same production unit to form a composite sample.

5. Test Methods

5.1 Tests shall be conducted in accordance with the appropriate ASTM test methods. Test procedures not covered by ASTM test methods shall be mutually agreed upon by the purchaser and the seller.

5.1.1 *Total Iron Oxide, Calcium Compound, and Organic Coloring Matter*—Test Methods **D50**.

5.1.2 *Coarse Particles*—Test Methods **D185**.

5.1.3 *Pigment and Linseed Oil in Paste in Oil*—Test Methods **D1208**.

TABLE 1 Requirements for Composition of Raw and Burnt Sienna

	Raw Sienna	Burnt Sienna
Iron oxide (Fe ₂ O ₂), min, %	38	40
Calcium compounds (as CaO) max, %	5.0	5.0
Moisture and other volatile matter, max, %	4.0	4.0
Coarse particles (total residue retained on a No. 325 (45-µm) sieve), max, %	2.0	2.0
Organic colors, max, %	none	none

5.1.4 *Moisture in Paste in Oil*—Test Methods **D280**, except that the sample shall be weighed instead of measured and the results shall be expressed as percentage by weight instead of volume.

5.1.5 *Mass Color and Tinting Strength*—Test Method **D387**.

6. Keywords

6.1 burnt sienna; iron; manganese; pigment; raw sienna

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