



# Standard Specification for Synthetic Brown Iron Oxide Pigment<sup>1</sup>

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## 1. Scope

1.1 This specification covers the pigments commercially known as synthetic pure brown iron oxides and blends. These pigments are suitable for use in paints and coatings. Methods of manufacture are:

- 1.1.1 Precipitation of iron salts.
- 1.1.2 Calcination of precipitated iron oxides.
- 1.1.3 Blends of synthetic red, yellow, and black iron oxides.
- 1.1.4 Blends of synthetic red, yellow, and black iron oxides plus the addition of carbon black to a maximum of 5.0 %. Small amounts of carbon black are added to obtain tinting colors not obtainable when synthetic brown iron oxide or carbon black are used singly.

1.2 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:<sup>2</sup>

- [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](#)
- [D3872 Test Method for Ferrous Iron in Iron Oxides](#)
- [E350 Test Methods for Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron](#)

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## E351 Test Methods for Chemical Analysis of Cast Iron—All Types

## 3. Composition and Properties

3.1 The pigment shall be a manufactured iron oxide or a blend. It shall be a soft dry finely pulverized pigment and shall conform to the following requirements:

FeO	0 to 10 %
Fe <sub>2</sub> O <sub>3</sub>	83 to 98 %
Carbon black, max, %	5.0 %
Moisture and other volatile matter, max, %	1.0 %
Organic coloring matter	none
Total sulfates expressed as SO <sub>3</sub> , max, %	2.0 %
Coarse particles (total residue retained on No. 325 (45- $\mu$ m) mesh sieve, max, %	1.0 %
Matter soluble in water, max, %	0.5 %

3.2 Inasmuch as synthetic brown iron oxides are available in a wide range of shades. 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 when tested by Test Method [D387](#).

## 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 4540 kg or 10 000 lb, 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 between the purchaser and the seller.

5.1.1 *Total Iron Oxide, Sulfur and Organic Coloring Matter*—Test Methods [D50](#).

5.1.2 *Ferrous Iron Content*—Test Method [D3872](#).

5.1.3 *Moisture and Other Volatile Matter*—Test Methods [D280](#)—Use Method A for pigments containing less than 8 %

ferrous iron oxide. Use Method B for pigments containing more than 8 % ferrous iron oxide.

5.1.4 *Matter Soluble in Water*—Test Methods **D1208**.

5.1.5 *Coarse Particles in Dry Pigment*—Test Methods **D185**.

5.1.6 *Carbon Black Content*—Test Methods **E350** or **E351**.

## **6. Keywords**

6.1 brown iron oxide; pigment; synthetic

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