



Designation: E342 – 04

# Standard Test Method for Determination of Chromium Oxide in Chrome Ores by Permanganate Titrimetry<sup>1</sup>

This standard is issued under the fixed designation E342; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers the determination of chromium oxide ( $\text{Cr}_2\text{O}_3$ ) in chrome ores in the concentration range from 25 to 60 %.

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

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[D1193 Specification for Reagent Water](#)

[E50 Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials](#)

[E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials](#)

[E276 Test Method for Particle Size or Screen Analysis at No. 4 \(4.75-mm\) Sieve and Finer for Metal-Bearing Ores and Related Materials](#)

[E882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory](#)

## 3. Terminology

3.1 **Definitions**—For definitions of terms used in this test method, refer to Terminology [E135](#).

## 4. Summary of Test Method

4.1 The sample is decomposed by fusion with sodium peroxide. After leaching in water and boiling to decompose peroxides, the solution is acidified with nitric and sulfuric acids. Residual chromium is oxidized to chromate with silver

nitrate, potassium permanganate, and peroxydisulfate. The excess of permanganate is destroyed by the addition of sodium chloride. After cooling, the chromate is reduced by the addition of a measured excess of a ferrous ammonium sulfate, and the excess titrated with a standard permanganate solution.

## 5. Significance and Use

5.1 This test method is intended to be used for compliance with compositional specifications for chromium oxide content. It is assumed that all who use these procedures will be trained analysts capable of performing common laboratory procedures skillfully and safely. It is expected that work will be performed in a properly equipped laboratory and that proper waste disposal procedures will be followed. Appropriate quality control practices must be followed such as those described in Guide [E882](#).

## 6. Interferences

6.1 None of the elements normally found in chrome ores interfere with this test method.

## 7. Reagents and Materials

7.1 **Purity of Reagents**—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society where such specifications are available<sup>3</sup>. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 **Purity of Water**—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type I of Specification [D1193](#).

7.3 **Ammonium Peroxydisulfate Solution (250 g/L)**—Dissolve 25 g of ammonium persulfate (ammonium peroxydisulfate) ( $(\text{NH}_4)_2\text{S}_2\text{O}_8$ ) in water, and dilute to 100 mL. Prepare fresh as needed.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [E01](#) on Analytical Chemistry for Metals, Ores, and Related Materials and is the direct responsibility of Subcommittee [E01.02](#) on Ores, Concentrates, and Related Metallurgical Materials.

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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.

<sup>3</sup> *Reagent Chemical, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole Dorset, U. K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc., (USPC), Rockville, MD.