



Standard Test Method for Determination of Total Carbon in Mold Powders by Combustion-Infrared Absorption Method¹

This standard is issued under the fixed designation E 2050; 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.

1. Scope

1.1 This test method covers the determination of total carbon in mold powders in the concentration range from 1 to 25 %.

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:

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications²

E 50 Practices for Apparatus, Reagents, and Safety Precautions for Chemical Analysis of Metals³

E 135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials³

E 882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory⁴

E 1019 Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel and in Iron, Nickel, and Cobalt Alloys⁴

E 1601 Practice for Conducting an Interlaboratory Study to Evaluate the Performance of an Analytical Method⁴

E 1763 Guide for Interpretation and Use of Results from the Interlaboratory Testing of Chemical Analysis Methods⁴

3. Terminology

3.1 For definitions of terms used in this test method, refer to Terminology E 135.

3.2 Definitions:

3.2.1 *mold powder, n*—in the continuous-casting of steel, a metallurgical flux used to provide lubrication of the mold, enhance heat transfer at the strand-mold interface, and provide

thermal insulation of the liquid metal surface to prevent unwanted solidification.

3.2.1.1 *Discussion*—Key chemical components of these powders are fluorides, the oxides of silicon and calcium, and carbon.

4. Summary of Test Method

4.1 Carbon in the test sample is converted in a furnace to a mixture of carbon dioxide and carbon monoxide by combustion in a stream of oxygen. Full conversion of carbon monoxide to carbon dioxide occurs by the passage of sample gases through a catalytic heater assembly. The amount of carbon dioxide is measured by infrared absorption. Any interference from halogens in the sample is eliminated by placement of a halogen trap between the furnace and the analyzer.

5. Significance and Use

5.1 This test method for the determination of total carbon in mold powders is primarily intended to test such materials for compliance with compositional specifications. It is assumed that all who use this test method will be trained analysts capable of performing common laboratory procedures skillfully and safely. It is expected that the 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 E 882.

6. Rounding Calculated Values

6.1 Calculated values shall be rounded in accordance with 3.4 to 3.6 of Practice E 29.

7. Interlaboratory Studies

7.1 This test method has been evaluated in accordance with Practice E 1601 and Guide E 1763. The lower limit in the scope of this test method specifies the lowest analyte content that may be analyzed with an acceptable error.

8. Interferences

8.1 Halogens, normally present in mold powders as fluoride, will interfere with this test method. A halogen trap, as described in 9.4, must be installed in the measure line between the furnace and analyzer to prevent this interference.

¹ This test method is under the jurisdiction of ASTM Committee E-1 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.

Current edition approved Nov. 10, 1999. Published February 2000.

² *Annual Book of ASTM Standards*, Vol 14.02.

³ *Annual Book of ASTM Standards*, Vol 03.05.

⁴ *Annual Book of ASTM Standards*, Vol 03.06.