



Standard Test Method for Compositional Analysis by Thermogravimetry¹

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1. Scope

1.1 This test method provides a general technique incorporating thermogravimetry to determine the amount of highly volatile matter, medium volatile matter, combustible material, and ash content of compounds. This test method will be useful in performing a compositional analysis in cases where agreed upon by interested parties.

1.2 This test method is applicable to solids and liquids.

1.3 The temperature range of test is typically room temperature to 1000°C. Composition between 1 and 100 weight % of individual components may be determined.

1.4 This test method utilizes an inert and reactive gas environment.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 This standard is related ISO 11358 but is more detailed and specific.

1.7 *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:²

- D3172 Practice for Proximate Analysis of Coal and Coke
- E473 Terminology Relating to Thermal Analysis and Rheology
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- E1142 Terminology Relating to Thermophysical Properties

¹ This test method is under the jurisdiction of ASTM Committee E37 on Thermal Measurements and is the direct responsibility of Subcommittee E37.01 on Calorimetry and Mass Loss.

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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.

E1582 Practice for Calibration of Temperature Scale for Thermogravimetry

E2040 Test Method for Mass Scale Calibration of Thermogravimetric Analyzers

2.2 ISO Standards:³

ISO 11358 Plastics-Thermogravimetry (TG) of Polymers — General Principles

3. Terminology

3.1 Definitions:

3.1.1 Many of the technical terms used in this test method are defined in Terminologies E473 and E1142.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *highly volatile matter*—moisture, plasticizer, residual solvent or other low boiling (200°C or less) components.

3.2.2 *medium volatile matter*—medium volatility materials such as oil and polymer degradation products. In general, these materials degrade or volatilize in the temperature range 200 to 750°C.

3.2.3 *combustible material*—oxidizable material not volatile (in the unoxidized form) at 750°C, or some stipulated temperature dependent on material. Carbon is an example of such a material.

3.2.4 *ash*—nonvolatile residues in an oxidizing atmosphere which may include metal components, filler content or inert reinforcing materials.

3.2.5 *mass loss plateau*—a region of a thermogravimetric curve with a relatively constant mass.

4. Summary of Test Method

4.1 This test method is an empirical technique using thermogravimetry in which the mass of a substance, heated at a controlled rate in an appropriate environment, is recorded as a function of time or temperature. Mass loss over specific temperature ranges and in a specific atmosphere provide a compositional analysis of that substance.

5. Significance and Use

5.1 This test method is intended for use in quality control, material screening, and related problem solving where a

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.