



Designation: D6370 – 23

Standard Test Method for Rubber—Compositional Analysis by Thermogravimetry (TGA)¹

This standard is issued under the fixed designation D6370; 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 provides a thermogravimetric (TGA) technique to determine the amounts of organics (oil, polymer), carbon black and ash (filler) in a rubber compound.

1.2 The amount of plasticizer/oil may be determined separately using Test Method [D297](#).

1.3 This test method utilizes previously calibrated, manual or computer assisted TGA instrumentation.

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

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

1.6 *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

[D297](#) Test Methods for Rubber Products—Chemical Analysis

[D1566](#) Terminology Relating to Rubber

[D3053](#) Terminology Relating to Carbon Black

[D4483](#) Practice for Evaluating Precision for Test Method Standards in the Rubber and Carbon Black Manufacturing Industries

¹ This test method is under the jurisdiction of ASTM Committee [D11](#) on Rubber and Rubber-like Materials and is the direct responsibility of Subcommittee [D11.11](#) on Chemical Analysis.

Current edition approved Sept. 1, 2023. Published September 2023. Originally approved in 1999. Last previous edition approved in 2019 as D6370 – 99 (2019). DOI: 10.1520/D6370-23.

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.

[D6085](#) Practice for Sampling in Rubber Testing—Terminology and Basic Concepts

[E473](#) Terminology Relating to Thermal Analysis and Rheology

[E1953](#) Practice for Description of Thermal Analysis and Rheology Apparatus

3. Terminology

3.1 Definitions:

3.1.1 The definitions relating to rubber appearing in Terminology [D1566](#) shall be considered applicable to this test method.

3.1.2 The terminology relating to sampling appearing in Practice [D6085](#) shall be considered applicable to this test method.

3.1.3 The definitions for thermal analysis appearing in Terminology [E473](#) shall be considered applicable to this test method.

3.1.4 The definitions relating to carbon black appearing in Terminology [D3053](#) shall be considered applicable to this test method.

3.1.5 The description of thermal analysis equipment appearing in Practice [E1953](#) shall be considered applicable to this test method.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *ash, n*—residue from incineration of a material under specified conditions (see [D1566](#)), like nonvolatile additives (fillers), such as zinc oxide, talc, silica, etc.

3.2.2 *carbon black, n*—an engineered material, primarily composed of elemental carbon, obtained from the partial combustion or thermal decomposition of hydrocarbons, existing as aggregates of aciniform morphology which are composed of spheroidal primary particles which exhibit uniformity of primary particle sizes within a given aggregate and turbostratic layering within the primary particles (see [D3053](#)).

3.2.3 *organics, n*—organic components of a rubber compound like polymers and all noncarbon black organic additives, such as oil, plasticizers, antioxidants, etc.

4. Summary of Test Method

4.1 The mass of the rubber test sample, heated at a controlled, specified rate in a controlled, specified environment