



Standard Test Method for Ash Content in Thermoplastics¹

This standard is issued under the fixed designation D 5630; 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 was developed to determine the inorganic content of thermoplastics by destructive testing techniques. Ash levels of 0.01 % or above are covered by this test method.

1.2 These ashing procedures are used only to quantify the residual solids in the polymer and are not used to identify the individual chemical components of the ash qualitatively.

1.3 This test method is limited to those materials (including glass) that are stable to 900°C.

1.4 Fluorinated polymers or any polymers containing halogenated components have not been included in these procedures.

1.5 Two different techniques for determining the inorganic residue in plastics are listed as follows:

1.5.1 *Procedure A, Muffle-Furnace Technique*—Samples to be ashed may be in powder or pellet form. This technique uses large sample sizes. Samples are flamed over a burner prior to being ashed in a muffle furnace.

1.5.2 *Procedure B, Rapid-Ash Muffle-Furnace Technique*—Samples to be ashed may be in a powder or pellet form. This technique uses sample sizes of 2 to 8 g. Samples are ignited and ashed in a muffle furnace.

NOTE 1—This test method is similar to ISO 3451/1-1981(E).

1.6 The values stated in SI units are to be regarded as the standard.

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.* See Section 9 for specific precautionary statements.

2. Referenced Documents

2.1 ASTM Standards:

D 883 Terminology Relating to Plastics²

D 1600 Terminology for Abbreviated Terms Relating to Plastics²

E 691 Practice for Conducting an Interlaboratory Study to

Determine the Precision of a Test Method³

2.2

ISO Standard:

ISO 3451/1-1981(E) Plastics—Determination of Ash— Part 1, General Methods, 5.3 Method A—Direct Calcination⁴

3. Terminology

3.1 Definitions—For definitions of plastics terms, see Terminologies D 883 and D 1600. There are no terms in this test method that require new or other than dictionary definitions.

4. Summary of Test Method

4.1 This test method is based on a loss in weight of a thermoplastic sample that is heated and combusted to oxidize all organic matter.

5. Significance and Use

5.1 Inorganic residues from thermoplastics ashing may be antiblock, fillers, or catalyst residues. The quantitative amounts of each are important variables of the manufacturing process.

6. Interferences

6.1 A flame height of over 2.5 cm is likely to cause a loss of fine particles.

6.2 Large sample sizes (Note 4) could result in the evolution of pyrolysis products that could affect the ash recovery.

6.3 Furnace doors must be in the closed position during the ignition period to prevent too-rapid oxidation and combustion of the sample (Note 6).

6.4 Ensure that all crucibles are cooled to ambient temperature before weighing.

7. Apparatus

7.1 *Balance*—This shall be a laboratory balance having the capability to weigh the sample to the nearest 0.0001 g. The balance should be checked periodically to ensure accuracy.

7.2 *Crucibles*—Porcelain or quartz-fiber, of sufficient size.

NOTE 2—Coors porcelain crucibles, or CEM quartz-fiber crucibles No. 303040,⁵ or equivalents, may be used.

7.3 *Muffle Furnace*—Electric-resistance-heated or

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.70 on Analytical Methods.

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² *Annual Book of ASTM Standards*, Vol 08.01.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁵ Porcelain crucibles are available from catalogs such as Fisher. CEM quartz-fiber crucibles are available from CEM Corp., Matthews, NC.