



**International  
Standard**

**ISO 3451-1**

**Plastics — Determination of ash —  
Part 1:  
General methods**

*Plastiques — Détermination du taux de cendres —  
Partie 1: Méthodes générales*

**Sixth edition  
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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This sixth edition cancels and replaces the fifth edition (ISO 3451-1:2019), which has been technically revised.

The main changes are as follows:

- an additional test temperature of 1 100 °C has been added;
- the thermogravimetry (Method E) has been added as alternative test method.

A list of all parts in the ISO 3451 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Plastics — Determination of ash —

## Part 1: General methods

**WARNING — The use of this document can involve hazardous chemicals, materials, operations or equipment. This document does not purport to address the safety problems associated with its use. It is the responsibility of the user of this document to establish proper safety and health practices, and to determine the application of regulatory limitations prior to use.**

### 1 Scope

This document specifies general methods, with suitable test conditions, for the determination of the ash of a range of plastics. The particular conditions chosen can be included in the specifications for the plastic material in question.

Particular conditions applicable to poly(alkylene terephthalate) materials, unplasticized cellulose acetate, polyamides and poly(vinyl chloride) plastics, including some specific filled, glass-fibre-reinforced and flame-retarded materials, are specified in ISO 3451-2, ISO 3451-3, ISO 3451-4 and ISO 3451-5.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 472, *Plastics — Vocabulary*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 4 Principle

It is possible to determine the ash of an organic material by five main methods (methods A, B, C, D and E).

- a) Direct calcination, i.e. by burning the organic matter and heating the residue at high temperature until constant mass is reached, which may be carried out by two different procedures:
  - burning with, for example, a Bunsen burner and one or more calcining steps in a muffle furnace (method A);
  - burning and calcining as one single step in a muffle furnace (method A — rapid ashing), if it can be demonstrated that the rapid ashing yields the same results as method A.