INTERNATIONAL STANDARD

ISO 247-1

First edition
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Rubber — Determination of ash —

Part 1: Combustion method

Caoutchouc — Détermination du taux de cendres —

Partie 1: Technique de combustion sèche

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Contents

Page

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analysis*.

This first edition of ISO 247-1 cancels and replaces ISO 247:2006, which has been technically revised.

The main changes compared to the previous edition are as follows:

— "Method C" has been included as a new procedure;

— Annex A has been added.

A list of all parts in the ISO 247 series can be found on the ISO website.

Rubber — Determination of ash —

Part 1: Combustion method

WARNING 1 — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine applicability of any national regulatory conditions.

WARNING 2 — Certain procedures specified in this document might involve the use or generation of substances, or the generation of waste, that could constitute a local environmental hazard. Reference should be made to appropriate documentation on safe handling and disposal after use.

1 Scope

This document specifies three methods for the determination of ash from raw rubbers, compounded rubbers and vulcanizates. The methods are applicable to raw, compounded or vulcanized rubbers of the M, N, O, R and U families described in ISO 1629, except that:

— Method A is not used for the determination of ash from compounded or vulcanized rubbers containing chlorine, bromine or iodine;

— Method B is used for compounded or vulcanized rubbers containing chlorine, bromine or iodine. It shall not be used for uncompounded rubbers;

— Method C is intended to be used for the determination of ash from raw, compounded or vulcanized rubber not containing chlorine, bromine or iodine by wrapping the test portion in ashless filter paper;

— Lithium and fluorine compounds might react with silica crucibles to form volatile compounds, giving low ash results. Platinum crucibles shall therefore be used for ashing fluorine-containing and lithium-polymerized rubbers.

This document does not cover the interpretation of the ash results as to the inorganic chemical content of a compound or vulcanizate. This is the responsibility of the analyst, who has to be aware of the behaviour of rubber additives at elevated temperatures.

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 248-1, *Rubber, raw — Determination of volatile-matter content — Part 1: Hot-mill method and oven method*

ISO 1795, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures*

3 Terms and definitions

No terms and definitions are listed in this document.

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

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 Principle

4.1 Method A

A weighed test portion is heated in a crucible over a gas burner. After expulsion of the volatile decomposition products, the crucible is transferred to a muffle furnace where it is heated until all the carbonaceous matter has been burnt off and constant mass is attained.

4.2 Method B

A weighed test portion is heated in a crucible in the presence of sulfuric acid, first by means of a gas burner and then in a muffle furnace until all the carbonaceous matter has been burnt off and constant mass is attained.

4.3 Method C

A weighed test portion is wrapped in ashless filter paper, pre-ignited at 300 °C ± 25 °C for 1 h, followed by incineration in a muffle furnace at about 550 °C ± 25 °C for 2 h to 4 h until all the carbonaceous matter has been burnt off and constant mass is attained.

4.4 Test results

The three methods of ashing do not give identical results in all cases, and it is necessary to state in the test report the method of ashing employed.

5 Reagent

5.1 Sulfuric acid (for method B only), analytical grade, ρ = 1,84 g/cm^3.

6 Apparatus

Ordinary laboratory apparatus, plus the following.

6.1 Crucible, of porcelain, silica or platinum, of capacity approximately 50 cm^3. For raw synthetic rubbers, it is permitted to use a crucible of minimum capacity 25 cm^3 per gram of test portion.

NOTE Platinum crucibles is used for ashing fluorine-containing and lithium-polymerized rubbers as lithium and fluorine compounds might react with silica crucibles to form volatile compounds, giving low ash results.

6.2 Heat-resistant, thermally insulating board, 100 mm^2 and of thickness approximately 5 mm, with a central hole to accommodate the crucible (6.1). About two-thirds of the crucible shall project below the board.

6.3 Bunsen burner, or similar type of gas burner.

6.4 Muffle furnace, fitted with a flue and with provision for controlling the air flow through the furnace. (This may be achieved by adjusting the door opening.) A temperature-controlling device is required to maintain a temperature of 300 °C ± 25°C or 550 °C ± 25°C or 950 °C ± 25 °C.