INTERNATIONAL STANDARD

ISO 19242

Second edition
2021-10

Rubber — Determination of total sulfur content by ion chromatography

Caoutchouc — Détermination de la teneur en soufre total par chromatographie ionique

Reference number
ISO 19242:2021(E)

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Published in Switzerland

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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).

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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.

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

This second edition cancels and replaces the first edition (ISO 19242:2015), of which it constitutes a minor revision. The main changes compared to the previous edition are as follows:

— the CAS numbers have been added for all chemicals listed in this document;

— Clause 3 on “Terms and definitions” has been added.

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.

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Introduction

Titration methods using thorin, a toxic arsenic compound as a reagent, have been used to determine the total sulfur content in raw rubber and rubber compounds. In this document, the sulfur in a test piece is burnt and oxidized to sulfur dioxide, which is then absorbed into a hydrogen peroxide solution and converted to sulfuric acid for determination by ion chromatography.

No hazardous reagents are required, thus improving the working environment as well as being eco-friendly. In addition, ion chromatography is used worldwide for its simplicity and high accuracy.

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Rubber — Determination of total sulfur content by ion chromatography

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 ensure compliance with any national regulatory conditions.

WARNING 2 — The use of this document pre-supposes sufficient working knowledge of the principles and techniques of ion chromatography for the analyst to perform the operations described and interpret the results correctly.

CAUTION — Certain procedures specified in this document can 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 a method for the determination of the total sulfur content of raw rubber and unvulcanized or vulcanized rubber compounds by ion chromatography following the preparation of a sample solution using either a tubular furnace combustion or an oxygen combustion flask method.

The tubular furnace combustion method is applicable for rubbers with sulfur content less than 0,1 % as it is possible that the oxygen combustion flask method will not give sufficiently accurate results.

The oxygen combustion flask method is not applicable to rubbers containing a metal salt that forms an insoluble metal sulfate, such as barium sulfate (CAS 7727-43-7).

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

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 4661-2, *Rubber, vulcanized — Preparation of samples and test pieces — Part 2: Chemical tests*

3 Terms and definitions

No terms and definitions are listed in this document.

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/

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