International Standard

ISO 19984-2

Rubber and rubber products — Determination of biobased content —

Part 2: Biobased carbon content

Élastomères et produits à base d'élastomères — Détermination de la teneur en composés biosourcés —

Partie 2: Teneur en carbone biosourcé

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms, definitions, and abbreviated terms ... **2**
3.1 Terms and definitions ... 2
3.2 Abbreviated terms ... 2
4 Principle ... **2**
5 Sampling ... **3**
6 Measuring method of biobased carbon content by determination of ^{14}C content ... **3**
6.1 General ... 3
6.2 Sample preparation and two methods to determine ^{14}C concentration ... 4
6.3 Calculation of the biobased carbon content ... 4
6.3.1 General ... 4
6.3.2 Correction factor ... 4
6.3.3 Calculation of χ_B^{TC}, the biobased carbon content by Method A (AMS) ... 5
6.3.4 Calculation of χ_B^{TC}, the biobased carbon content by Method B (LSC) ... 6
6.3.5 Examples ... 6
7 Precision ... **6**
8 Test report ... **6**
Annex A (normative) **Method A — Determination by accelerator mass spectrometry (AMS)** ... **7**
Annex B (normative) **Method B — Determination by liquid scintillation counter (LSC)** ... **10**
Annex C (informative) **Examples of the determination of biobased carbon content** ... **13**
Annex D (informative) **Determination of the biobased carbon content of a tyre** ... **14**
Annex E (informative) **Precision results from an interlaboratory test programme** ... **17**
Bibliography ... **19**

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Foreword

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

A list of all parts in the ISO 19984 series can be found on the ISO website.

This second edition cancels and replaces the first edition (ISO 19984-2:2017), which has been technically revised.

The main changes are as follows:

— REF values after 2020 have been added in Table 2;

— several bibliographic entries have 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

The use of biomass materials in rubber compounds helps to decrease the rubber industry's dependence on fossil resources. It is also expected to lead to a reduction of carbon dioxide emission, reducing global warming and promoting a sustainable global environment.

In the ISO 19984 series, biomass is the term used for the biological material from living or recently living organisms such as wood and agricultural waste materials.

Industrial scale biomass is now readily being grown from numerous types of plant sources and a variety of tree species. Biomass also includes plant or animal matter used for the production of fibres or chemicals. It can also include biodegradable wastes. Biomass excludes organic materials which have been transformed by geological processes into substances, such as petroleum or coal. Although fossil fuels have their origin in ancient biomass, they are not considered biomass by the generally accepted definition because they contain carbon that has been "out" of the modern carbon cycle.

The composition of biomass is mainly carbon, hydrogen and oxygen. Nitrogen and small quantities of other elements can also be found.

The ISO 19984 series specifies methods for the determination of the biobased content of rubber and rubber products. The results will give manufacturers and users a quantitative indication of their contribution to the preservation of the environment.

ISO 19984-1 specifies how to categorize constituents of rubber and rubber products and how to calculate the biobased content using the compound formulation and the chemical structure of each constituent.

ISO 19984-2 specifies how to determine the biobased carbon content by radio chemical analyses, i.e. determination of ^{14}C. It can be obtained from the fraction of carbon atoms derived from biomass against the whole amount of carbon atoms in the rubber or rubber products. The methods specified in ISO 19984-2 allow consumers to determine the biobased carbon content even when the formulation of the rubber is unavailable.

ISO 19984-3 specifies how to separate rubber compounds into constituents, how to obtain each constituent's composition ratio and how to determine the biobased carbon content of each constituent by chemical analyses. Thus, the biobased mass content for each constituent can be derived and the biobased mass content for the whole rubber can be obtained by summing up all the constituent values.

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Rubber and rubber products — Determination of biobased content —

Part 2:
Biobased carbon content

WARNING 1 — 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 the applicability of any other restrictions.

WARNING 2 — Certain procedures specified in this document can involve the use or generation of substances, or the generation of waste, that can constitute a local environmental hazard. It is the responsibility of the user to refer to appropriate documentation on safe handling and disposal after use.

1 Scope

This document specifies measuring methods for the determination of biobased carbon contents in rubber and rubber products, including polyurethanes. The methods focus on carbon atoms in rubber or rubber products, and determine whether the carbon-containing component is biobased or not, judging from the concentration of ^{14}C, radiocarbon isotope.

This document applies to rubber and rubber products such as raw materials, materials and final products.

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 123, *Rubber latex — Sampling*

ISO 124, *Latex, rubber — Determination of total solids content*

ISO 1382, *Rubber — Vocabulary*

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

ISO 1928, *Coal and coke — Determination of gross calorific value*

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

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 19242, *Rubber — Determination of total sulfur content by ion chromatography*

ISO 19984-1, *Rubber and rubber products — Determination of biobased content — Part 1: General principles and calculation methods using the formulation of the rubber compound*

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