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**Isobutene-isoprene rubber (IIR) —  
Evaluation procedure**

*Caoutchouc isobutène-isoprène (IIR) — Méthode d'évaluation*

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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)).

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](http://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 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 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This seventh edition cancels and replaces the sixth edition (ISO 2302:2014), which has been technically revised.

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

- the normative references have been updated in [Clause 2](#), [5.3](#) and [Clause 10 d](#)), where ISO 247 has been replaced by ISO 247-1 and ISO 247-2;
- the normative references have been updated in [Clause 2](#), [6.2.2.3 j](#)) and [7.1](#), where ISO 3417 has been replaced by ISO 6502-2;
- a footnote has been added to [Table 1](#) allowing the possibility to replace TMDT by an alternative curative.

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).

# Isobutene-isoprene rubber (IIR) — Evaluation procedure

**WARNING** — Users of this document should be familiar with the 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.

## 1 Scope

This document specifies:

- the physical and chemical tests on raw rubbers, and
- the standardized materials, a standardized test formulation, equipment, and processing methods for evaluating the vulcanization characteristics of all types of isobutene-isoprene rubber (IIR).

## 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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 247-1:2018, *Rubber — Determination of ash — Part 1: Combustion method*

ISO 247-2:2018, *Rubber — Determination of ash — Part 2: Thermogravimetric analysis (TGA)*

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

ISO 248-2, *Rubber, raw — Determination of volatile-matter content — Part 2: Thermogravimetric methods using an automatic analyser with an infrared drying unit*

ISO 289-1, *Rubber, unvulcanized — Determinations using a shearing-disc viscometer — Part 1: Determination of Mooney viscosity*

ISO 1795:2017, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures*

ISO 2393, *Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures*

ISO 6502-1, *Rubber — Measurement of vulcanization characteristics using curemeters — Part 1: Introduction*

ISO 6502-2, *Rubber — Measurement of vulcanization characteristics using curemeters — Part 2: Oscillating disc curemeter*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

## 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:

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

## 4 Sampling and further preparative procedure

- 4.1 Select the sample from the lot in accordance with ISO 1795.
- 4.2 Take a laboratory sample of approximately 1,5 kg by the method described in ISO 1795.
- 4.3 Prepare test samples in accordance with ISO 1795.

## 5 Physical and chemical tests on raw rubber

### 5.1 Mooney viscosity

Prepare a test sample in accordance with the preferred procedure in ISO 1795, i.e. without milling, cutting the test sample directly from the laboratory sample. The test sample shall be as free as possible from air and pockets that can trap air against the rotor and die surface.

If agreed between the interested parties or if the condition of the test sample (e.g. excessive porosity) makes milling necessary, it shall be performed in accordance with paragraphs 1 and 2 of ISO 1795:2017, 7.3.2.2.

Determine the Mooney viscosity in accordance with ISO 289-1 on this test portion, as ML(1+8) at 125 °C.

### 5.2 Volatile matter

Determine the volatile-matter content by the hot-mill method or by the oven method as specified in ISO 248-1 or by the method specified in ISO 248-2.

### 5.3 Ash

Determine the ash in accordance with either method A, method B or method C of ISO 247-1:2018, or method A of ISO 247-1:2018.

## 6 Preparation of test mixes for evaluation of isobutene-isoprene rubbers

### 6.1 Standard test formulation

The standard test formulation is given in [Table 1](#). The materials shall be national or international standard reference materials. If no standard reference material is available, the materials to be used shall be agreed by the parties concerned.

**Table 1 — Standard test formulation**

Material	Parts by mass
Isobutene-isoprene rubber (IIR)	100,00
Stearic acid <sup>b</sup>	1,00
Industry reference black <sup>a</sup>	50,00
Zinc oxide <sup>b</sup>	3,00
Sulfur <sup>b</sup>	1,75
<sup>a</sup> The current industry reference black shall be used. <sup>b</sup> Powder materials shall be used (standard curing ingredients used in the industry). <sup>c</sup> It is possible to replace TMTD by an appropriate amount of an alternative curative (e.g. TBzTD) to prevent release of toxic chemical from the mixture prepared for evaluation of isobutene-isoprene rubber.	