
**Acrylonitrile-butadiene rubber
(NBR) — Evaluation procedure**

Caoutchouc acrylonitrile-butadiène (NBR) — 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).

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 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 3, *Raw materials (including latex) for use in the rubber industry*.

This fourth edition cancels and replaces the third edition (ISO 4658:1999), which has been technically revised. It also incorporates the Amendment ISO 4658:1999/Amd.1:2004.

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

- [Clause 2](#) has been updated;
- the mixing procedure has been specified: method A1 for single stage mixing with LIM is the preferred method; method A2 is for two stages mixing using a LIM for initial mixing and mill mixing for final mixing; method B deals with mill mixing;
- the precision data have been moved to [Annex A](#).

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.

Acrylonitrile-butadiene rubber (NBR) — Evaluation procedure

1 Scope

This document specifies, for acrylonitrile-butadiene rubbers (NBRs):

- physical and chemical tests on raw rubbers;
- standard materials, a standard test formulation, equipment and processing methods for evaluating the vulcanization characteristics.

The mixing preferred method is the single stage mixing with LIM (laboratory internal mixer).

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, *Rubber — Determination of ash — Part 1: Combustion method*

ISO 247-2, *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, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures*

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

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

ISO 6502-3, *Rubber — Measurement of vulcanization characteristics using curemeters — Part 3: Rotorless 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 sample preparation

4.1 Take a sample of mass approximately 1,5 kg by the method described in ISO 1795.

4.2 Prepare the test portion in accordance with ISO 1795.

5 Physical and chemical tests on raw rubber

5.1 Mooney viscosity

Determine the Mooney viscosity in accordance with ISO 289-1, on a test portion prepared as indicated in 4.2. Record the result as $M_L(1+4)$ at 100 °C.

5.2 Volatile matter

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

5.3 Ash

Determine the ash in accordance with ISO 247-1 or ISO 247-2.

6 Preparation of the test mix for evaluation

6.1 Standard test formulation

The standard test formulation is given in Table 1.

The materials shall be national or international standard reference materials, unless no standard reference materials are available in which case the materials to be used shall be agreed between the interested parties.

Table 1 — Standard test formulation for evaluation on NBRs

Material	Parts by mass
NBR	100,00
Zinc oxide ^a	3,00
Sulfur ^b	1,50
Stearic acid ^c	1,00
Carbon black ^d	40,00
TBBS ^e	0,70
Total	146,20

^a Class B1a (see ISO 9298:2017, Annex D).

^b See ISO 8332.

^c See ISO 8312.

^d The current industry reference black (IRB), or an equivalent national or international standard reference material, is used.

^e *N-tert*-Butyl-2-benzothiazole sulfenamide. This is supplied in powder form having an initial insoluble-matter content, determined in accordance with ISO 11235. The material is stored at room temperature in a closed container and the insoluble-matter content is checked every 6 months. If this is found to exceed 0,75 %, the material is discarded or recrystallized.