INTERNATIONAL STANDARD

**ISO 4658**

Third edition
1999-12-01

# Acrylonitrile-butadiene rubber (NBR) — Evaluation procedure

*Caoutchouc acrylonitrile-butadiène (NBR) — Méthode d'évaluation*

Reference number
ISO 4658:1999(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 734 10 79
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

 

# Contents

Page

**Foreword** ..... **iv**
**1 Scope** ..... **1**
**2 Normative references** ..... **1**
**3 Sampling and sample preparation** ..... **2**
**4 Physical and chemical tests on raw rubber** ..... **2**
**5 Preparation of the test mix for evaluation** ..... **2**
**6 Evaluation of vulcanization characteristics by a curemeter test** ..... **6**
**7 Evaluation of tensile stress-strain properties of vulcanized test mixes** ..... **6**
**8 Precision** ..... **7**
**9 Test report** ..... **8**
**Bibliography** ..... **9**

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4658 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 third edition cancels and replaces the second edition (ISO 4658:1990), which has been technically revised.

# Acrylonitrile-butadiene rubber (NBR) — Evaluation procedure

**WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard 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.**



## 1 Scope

This International Standard 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.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 37:1994, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*.

ISO 247:1990, *Rubber — Determination of ash*.

ISO 248:1991, *Rubbers, raw — Determination of volatile-matter content*.

ISO 289-1:1994, *Rubber, unvulcanized — Determinations using a shearing-disc viscometer — Part 1: Determination of Mooney viscosity*.

ISO 471:1995, *Rubber — Temperatures, humidities and times for conditioning and testing*.

ISO 1795:—[1)], *Rubber, raw, natural and synthetic — Sampling and further preparative procedures*.

ISO 2393:1994, *Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures*.

ISO 3417:1991, *Rubber — Measurement of vulcanization characteristics with the oscillating disc curemeter*.

ISO 6502:1999, *Rubber — Guide to the use of curemeters*.

1) To be published. (Revision of ISO 1795:1992)

ISO 8312:1999, *Rubber compounding ingredients — Stearic acid — Definition and test methods*.

ISO 8332:1997, *Rubber compounding ingredients — Sulfur — Methods of test.*

ISO/TR 9272:1986, *Rubber and rubber products — Determination of precision for test method standards*.

ISO 9298:1995, *Rubber compounding ingredients — Zinc oxide — Test methods*.

ISO 11235:1999, *Rubber compounding ingredients — Sulfenamide accelerators — Test methods*.



## 3 Sampling and sample preparation

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

**3.2** Prepare the test portion in accordance with ISO 1795.

## 4 Physical and chemical tests on raw rubber

### 4.1 Mooney viscosity

Determine the Mooney viscosity in accordance with ISO 289-1, on a test portion prepared as indicated in 3.2. Record the result as ML(1+4) at 100 °C.

### 4.2 Volatile matter

Determine the volatile-matter content preferably by the hot-mill method specified in ISO 248. Certain rubbers tend to stick to the rolls during the hot-mill method; if so, the oven method at 105 °C ± 5 °C may be used.

### 4.3 Ash

Determine the ash in accordance with ISO 247.

## 5 Preparation of the test mix for evaluation

### 5.1 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.

### 5.2 Procedure

#### 5.2.1 Equipment and procedure

Equipment and the procedure for preparation, mixing and vulcanization shall be in accordance with ISO 2393.

The compound may be prepared either on a mill or in a miniature internal mixer, although slightly different results may be obtained.