



BSI Standards Publication

Rubber, vulcanized — Determination of creep in compression or shear

National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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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 2, *Testing and analysis*.

This fourth edition cancels and replaces the third edition (ISO 8013:2012), of which it constitutes a minor revision. A few editorial changes have been made including updating the publication dates of normative references in [Clause 2](#).

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.

Introduction

When a constant stress is applied to rubber, the deformation is not constant but increases gradually with time; this behaviour is called “creep”. Conversely, when rubber is subjected to a constant strain, a decrease in the stress in the material takes place; this behaviour is called “stress relaxation”.

The creep test is of particular interest where vulcanized rubbers are used to support a constant load, such as in bearings or mountings.

The processes responsible for creep can be physical or chemical in nature, and under all normal conditions both processes will occur simultaneously. However, at normal or low temperatures and/or short times, creep is dominated by physical processes, while at high temperatures and/or long times, chemical processes are dominant. In general, physical creep is found to be directly proportional to logarithmic time, and chemical creep to linear time; but great care has to be taken in extrapolating time/creep curves in order to predict creep after periods considerably longer than those covered by the test, and in using tests at higher temperatures as accelerated tests to give information on creep at lower temperatures.

In addition to the need to specify the temperature intervals and time intervals in a creep test, it is also necessary to specify the initial strain and the previous mechanical history of the test piece, since these might also influence the measured creep, particularly in rubbers containing filler.

Rubber, vulcanized — Determination of creep in compression or shear

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 determine the applicability of any other restrictions.

WARNING 2 — Certain procedures specified in this document might 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 creep in vulcanized rubber continuously subjected to compressive or to shear forces. The standard cannot be used for intermittent deformation of rubber.

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 1827, *Rubber, vulcanized or thermoplastic — Determination of shear modulus and adhesion to rigid plates — Quadruple-shear methods*

ISO 4664-1, *Rubber, vulcanized or thermoplastic — Determination of dynamic properties — Part 1: General guidance*

ISO 18899:2013, *Rubber — Guide to the calibration of test equipment*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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/>

3.1

creep increment

increase in strain which occurs in a specified time interval under constant force and at constant temperature

Note 1 to entry: It is expressed as the ratio of the increase in deformation over the time interval to the initial, unstrained thickness.