

Rubber, vulcanized or thermoplastic — Determination of stress relaxation in compression at ambient and at elevated temperatures

ICS 83.060

National foreword

This British Standard reproduces verbatim ISO 3384:1999, including amendment 1:2001 and implements it as the UK national standard. It supersedes BS 903:Part A42:1992 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/22, Physical testing of rubber, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

Additional information

The major changes in this revision, compared with the 1992 edition (of BS 903:Part A42) are as follows:

- a) the deletion of method C;
- b) the deletion of the large cylindrical test piece (6.1.2);
- c) the preference for three test pieces (6.3);
- d) the deletion of 100 °C as the test temperature when there is no technical reason for choosing a particular temperature (7.2).

Cross-references

The British Standards which implement international publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This page consists of a front cover, an inside front cover, the ISO title page, pages ii to iv, pages 1 to 10, an inside back cover and a back cover.

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Sideline in this document indicates the most recent changes by amendment.

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**Rubber, vulcanized or thermoplastic —
Determination of stress relaxation in
compression at ambient and at elevated
temperatures**

*Caoutchouc vulcanisé ou thermoplastique — Détermination de la relaxation
de contrainte en compression à température ambiante et aux températures
élevées*



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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.

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.

International Standard ISO 3384 was prepared by ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Physical and degradation tests*.

This fourth edition cancels and replaces the third edition (ISO 3384:1991), from which method C has been deleted.

Foreword to amendment A1

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.

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

Amendment 1 to International Standard ISO 3384:1999 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analyses*.

Introduction

When a constant strain is applied to rubber, the force necessary to maintain that strain is not constant but decreases with time; this behaviour is called "stress relaxation". Conversely, when rubber is subjected to a constant stress, an increase in the deformation takes place with time; this behaviour is called "creep".

The processes responsible for stress relaxation may be physical or chemical in nature, and under all normal conditions both types of process will occur simultaneously. However, at normal or low temperatures and/or short times, stress relaxation is dominated by physical processes whilst at high temperatures and/or long times chemical processes are dominant.

If the lifetime of a material is to be investigated, it can be determined using the air oven ageing test described in ISO 11346.

In addition to the need to specify the temperatures and time intervals in a stress relaxation test, it is necessary to specify the initial stress and the previous mechanical history of the test piece since these may also influence the measured stress relaxation, particularly in rubbers containing fillers.

The most important factor in achieving good repeatability and reproducibility when making stress relaxation tests is to keep the temperature and compression constant during all measurements.