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Rubber, vulcanized or thermoplastic — Determination of dynamic properties —

Part 1: General guidance

Caoutchouc vulcanisé ou thermoplastique — Détermination des propriétés dynamiques —

Partie 1: Lignes directrices

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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).

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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 third edition cancels and replaces the second edition (ISO 4664-1:2011), which has been technically revised.

The main changes are as follows:

— other types of deformation mode have been included in Table 2;

— descriptions of nonlinear behaviour have been added in 6.1.2;

— explanations regarding the forced resonant vibration type method have been added in 6.2;

— other shapes and dimensions of test pieces have been added in Table 4 (the former Table 3);

— test conditions (temperature, frequency, strain, etc.) have been expanded in Table 5 (the former Table 4);

— the derivation method for required viscoelastic parameters has been clarified in 9.5;

— test methods for free vibration and forced vibration resonant type have been detailed in Clauses 10 and 11.

A list of all parts in the ISO 4664 series can be found on the ISO website.

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.

Rubber, vulcanized or thermoplastic — Determination of dynamic properties —

Part 1: General guidance

1 Scope

This document gives guidance on the determination of dynamic properties of vulcanized and thermoplastic rubbers. It includes both free- and forced-vibration methods carried out on both materials and products. It does not cover rebound resilience or cyclic tests in which the main objective is to fatigue the 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 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 terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms applying to any periodic deformation

3.1.1
hysteresis loop
closed curve representing successive stress-strain states of a material during a cyclic deformation

3.1.2
energy loss
energy per unit volume which is lost in each deformation cycle, i.e. the hysteresis loop area

Note 1 to entry: It is expressed in J/m^3.

3.1.3
power loss
energy loss (3.1.2) per unit time, per unit volume, which is transformed into heat through hysteresis, expressed as the product of energy loss and frequency

Note 1 to entry: It is expressed in W/m^3.