
**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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Contents

	Page
Foreword.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
3.1 Terms applying to any periodic deformation.....	1
3.2 Terms applying to sinusoidal motion.....	3
3.3 Other terms applying to periodic motion.....	6
4 Symbols.....	6
5 General.....	8
5.1 Viscoelasticity.....	8
5.2 Use of dynamic test data.....	9
5.3 Classification of dynamic tests.....	9
5.3.1 General.....	9
5.3.2 Classification by type of vibration.....	9
5.3.3 Classification by mode of deformation.....	10
5.4 Factors affecting machine selection.....	11
6 Principles of dynamic motion for each vibration method.....	12
6.1 Forced vibration non-resonant method.....	12
6.1.1 Dynamic motion in linear response.....	12
6.1.2 Dynamic motion with nonlinear response.....	14
6.1.3 Free-vibration method.....	15
6.2 Forced resonant vibration.....	16
7 Test parameter dependence.....	18
7.1 Interdependence of frequency and temperature (time – temperature superposition).....	18
7.2 Strain amplitude.....	19
8 Conditioning.....	19
8.1 Storage.....	19
8.2 Temperature.....	19
8.3 Mechanical conditioning.....	19
9 Forced vibration non-resonant method.....	20
9.1 Apparatus.....	20
9.2 Test piece.....	22
9.2.1 Test piece preparation.....	22
9.2.2 Test piece shapes and dimensions.....	22
9.2.3 Number of test pieces.....	24
9.3 Test conditions.....	24
9.3.1 Strain.....	24
9.3.2 Frequency and temperature.....	24
9.4 Test procedure.....	25
9.5 Expression of results.....	26
9.5.1 Parameters required.....	26
9.5.2 Wave-form method.....	26
9.5.3 Hysteresis loop method.....	27
9.5.4 Stress-strain relationships and shape factors.....	28
10 Forced vibration resonant method.....	29
10.1 Apparatus.....	29
10.2 Expression of results.....	29
11 Free-vibration method.....	30
11.1 General.....	30
11.2 Test piece dimensions.....	30

11.3 Test conditions.....	30
Annex A (informative) Determination of the degree of nonlinearity(example of the calculation).....	31
Annex B (informative) Procedure for time-temperature superposition(example of the calculation).....	36
Bibliography.....	38

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).

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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 .