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## Rubber — Acquisition and presentation of comparable single-point data

*Caoutchouc — Acquisition et présentation de données simples  
comparables*



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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 24453 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analysis*.

# Rubber — Acquisition and presentation of comparable single-point data

## 1 Scope

This International Standard identifies specific test procedures for the acquisition and presentation of comparable single-point data for properties of rubber compounds. In general, each property is specified by a single test method and a single experimental value although, in certain cases, properties may be represented by more than one value obtained under different test conditions. The properties presented are those used to characterize processing properties, those most often quoted by manufacturers and in material specifications, and those relevant to more specific applications. An important application of this International Standard consists in helping different suppliers produce material specification sheets in which the same set of properties is measured using the same conditions.

## 2 Normative references

The following referenced documents are indispensable for the application 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 34-1, *Rubber, vulcanized or thermoplastic — Determination of tear strength — Part 1: Trouser, angle and crescent test pieces*

ISO 36, *Rubber, vulcanized or thermoplastic — Determination of adhesion to textile fabric*

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

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

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

ISO 289-2, *Rubber, unvulcanized — Determinations using a shearing-disc viscometer — Part 2: Determination of pre-vulcanization characteristics*

ISO 812, *Rubber, vulcanized or thermoplastic — Determination of low-temperature brittleness*

ISO 813, *Rubber, vulcanized or thermoplastic — Determination of adhesion to a rigid substrate — 90° peel method*

ISO 815-1, *Rubber, vulcanized or thermoplastic — Determination of compression set at ambient, elevated or low temperatures — Part 1: At ambient or elevated temperatures*

ISO 815-2, *Rubber, vulcanized or thermoplastic — Determination of compression set at ambient, elevated or low temperatures — Part 2: At low temperatures*

- ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*
- ISO 1432, *Rubber, vulcanized or thermoplastic — Determination of low temperature stiffening (Gehman test)*
- ISO 1817, *Rubber, vulcanized — Determination of the effects of liquids*
- ISO 1827, *Rubber, vulcanized or thermoplastic — Determination shear modulus adhesion to rigid plates — Quadruple-shear method*
- ISO 1853, *Conducting and dissipative rubbers, vulcanized or thermoplastic — Measurement of resistivity*
- ISO 2007, *Rubber, unvulcanized — Determination of plasticity — Rapid-plastimeter method*
- ISO 2285, *Rubber, vulcanized or thermoplastic — Determination of tension set under constant elongation, and of tension set, elongation and creep under constant tensile load*
- ISO 2393, *Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures*
- ISO 2781, *Rubber, vulcanized and thermoplastic — Determination of density*
- ISO 2782, *Rubber, vulcanized or thermoplastic — Determination of permeability to gases*
- ISO 2921, *Rubber, vulcanized — Determination of low-temperature characteristics — Temperature-retraction procedure (TR test)*
- ISO 3384, *Rubber, vulcanized or thermoplastic — Determination of stress relaxation in compression at ambient and elevated temperatures*
- ISO 3387, *Rubber — Determination of crystallization effects by hardness measurements*
- ISO 3865, *Rubber, vulcanized or thermoplastic — Methods of test for staining in contact with organic material*
- ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*
- ISO 4662, *Rubber — Determination of rebound resilience of vulcanizates*
- ISO 4666-3, *Rubber, vulcanized — Determination of temperature rise and resistance to fatigue in flexometer testing — Part 3: Compression flexometer*
- ISO 6179, *Rubber, vulcanized or thermoplastic — Rubber sheets and rubber-coated fabrics — Determination of transmission rate of volatile liquids (gravimetric technique)*
- ISO 6502, *Rubber — Guide to the use of curemeters*
- ISO 7743, *Rubber, vulcanized or thermoplastic — Determination of compression stress-strain properties*
- ISO 8013, *Rubber, vulcanized — Determination of creep in compression or shear*
- ISO 9026, *Raw rubber or unvulcanized compounds — Determination of green strength*
- ISO 11345, *Rubber — Assessment of carbon black and carbon black/silica dispersion — Rapid comparative methods*
- ISO 15113, *Rubber — Determination of frictional properties*
- ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

IEC 60093, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*

BS 903:A18, *Physical testing of rubber — Part A18: Determination of equilibrium water vapour absorption*

### 3 Terms and definitions

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

#### 3.1

##### **single-point data**

data characterizing a rubber material by means of those property tests in which important aspects of performance can be described with single-value results

### 4 Test piece preparation

Where relevant, materials for test shall be prepared, mixed and moulded following the general principles given in ISO 2393.

The detailed conditions used shall be as recommended by the manufacturer of the rubber compound and shall, for each of the processing steps, be the same for each test piece except that different cure times may be used for different sized test pieces.

The equipment, mixing cycle and conditions used for moulding shall be given in the test report.

The final preparation of test pieces (for example stamping from sheet) shall be in accordance with the relevant test method standard.

The properties of a rubber compound can vary depending on the processing procedures used and this should be taken into account when comparing materials.

To maximize the usefulness of results, processing conditions should be representative of those used in production.

### 5 Conditioning

The time between mixing and moulding shall be between 24 h and one week.

The time between moulding and conditioning shall be between 16 h and four weeks. Recommendations for the storage of vulcanized rubber products are given in ISO 2230.

Test pieces shall be conditioned in accordance with the relevant test method standard. Where this refers to standard laboratory conditions of temperature and/or humidity, these are taken to mean  $(23 \pm 2) ^\circ\text{C}$  and 50 % RH.

**NOTE** If tests are carried out at the alternative standard laboratory temperature of  $(27 \pm 2) ^\circ\text{C}$ , the results will not be strictly comparable unless adjusted by the known relationship of the property with temperature.

For tests at temperatures other than  $(23 \pm 2) ^\circ\text{C}$ , where specific instructions are not included in the test method standard, condition the test pieces at the temperature at which the test is to be conducted for a period sufficient to enable test pieces to attain substantial equilibrium in accordance with ISO 23529.

Details of the conditioning used shall be given in the test report.