

INTERNATIONAL STANDARD

**ISO
6471**

Second edition
1994-01-15

Rubber, vulcanized — Determination of crystallization effects under compression

*Caoutchouc vulcanisé — Détermination des effets de la cristallisation
sous compression*



Reference number
ISO 6471:1994(E)



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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.

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 6471 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Sub-Committee SC 2, *Physical and degradation tests*.

This second edition cancels and replaces the first edition (ISO 6471:1983). Clause 2 has been updated and a new clause "Definitions" has been added.

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Rubber, vulcanized — Determination of crystallization effects under compression

1 Scope

This International Standard specifies a method for the determination of the tendency of vulcanized rubbers to crystallize, and the time dependence of crystallization, by measurement of the recovery of compressed test pieces.

Crystallization, which occurs more rapidly under high compression, reduces the recovery process.

An alternative method of assessing the tendency to crystallize, based on measurements of increase in hardness, is given in ISO 3387. The latter requires longer test durations for vulcanizates, but the test method is applicable to both raw rubber and compounds.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 471:—¹⁾, *Rubber — Times, temperatures and humidities for conditioning and testing*.

ISO 815:1991, *Rubber, vulcanized or thermoplastic — Determination of compression set at ambient, elevated or low temperatures*.

ISO 3387:—²⁾, *Rubber — Determination of crystallization effects by hardness measurements*.

ISO 4648:1991, *Rubber, vulcanized or thermoplastic — Determination of dimensions of test pieces and products for test purposes*.

ISO 4661-1:1993, *Rubber, vulcanized or thermoplastic — Preparation of samples and test pieces — Part 1: Physical tests*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 crystallization: A physical process comprising a phase transition of the first order which in rubbers leads to an increase in hardness and stiffness and a decrease in recovery.

3.2 recovery: The ability of a test piece to recover its shape after deformation and conditioning under specified conditions of temperature and deformation over a given period, determined by measuring the height of the test piece a pre-determined time after release at the test temperature.

3.3 half-time to crystallization: The time required for the recovery to attain exactly one half of its final value.

4 Principle

A test piece is compressed under low strain and the recovery, in the absence of crystallization, is determined. The same or another test piece is then compressed under high strain and the recovery, after crystallization, is determined. From these values, an assessment is made of the tendency of the rubber to crystallize.

1) To be published. (Revision of ISO 471:1983)

2) To be published. (Revision of ISO 3387:1978)