International

ISO 3384-1

Rubber, vulcanized or thermoplastic — Determination of stress relaxation in compression —

Part 1: Testing at constant temperature

Caoutchouc vulcanisé ou thermoplastique — Détermination de la relaxation de contrainte en compression —

Partie 1: Essais à température constante

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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 3384-1:2019), which has been technically revised.

The main changes are as follows:

— addition of new ITP results in Annex A.

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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”.

Tests in compression are normally made under continuous stress conditions (i.e. the test piece remains strained throughout the test), and are hence a measure of sealing force. Note that the terms continuous and discontinuous used in this standard refer to whether the measure of force is made continuously of at intervals.

Tests to use stress relaxation in tension as a measure of ageing are given in ISO 6914.

The processes responsible for stress relaxation can 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, while 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 method 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 can 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.