ICS 83.060

G 40

GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 1685-2008

Replacing GB/T 13643-1992, GB/T 1685-1982

Rubber, vulcanized or thermoplastic -- Determination of stress relaxation in compression at ambient and at elevated temperatures

硫化橡胶或热塑性橡胶　在常温和高温下压缩应力松弛的测定

(ISO 3384:2005, MOD)

Issued on: May 15, 2008 **Implemented on: November 01, 2008**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China;

Standardization Administration of the People's Republic of China.

Table of Contents

Foreword

The modification of this Standard uses the International standard ISO 3384:2005 "Rubber, vulcanized or thermoplastic -- Determination of stress relaxation in compression at ambient and at elevated temperatures" (English version).

This Standard replaces GB/T 13643-1992 "Rubber, vulcanized or thermoplastic -- Determination of compressions tress relaxation (rings)" and GB/T 1685-1982 "Rubber, vulcanized -- Determination of stress relaxation in compression at normal and at elevated temperature".

This Standard has been redrafted based on ISO 3384:2005.

The main differences between this Standard and the international standard ISO 3384:2005, the reasons for these differences, and the changes in clause and sub-clause structure are as follows:

- In the normative references, this Standard replaces ISO/TR 9272 with GB/T 14838-1993 "Rubber and rubber products -- Determination of precision for test method standards". The correspondence between the two is non-equivalent.

- A cylindrical Type I specimen has been added. This provision was primarily established in light of China's specific conditions.

For ease of use, the following editorial changes have been made to this Standard:

a) The term "this International Standard" has been replaced with "this Standard";

b) The decimal comma (",") has been replaced with the decimal point (".");

c) The foreword of the International Standard has been deleted.

Compared with GB/T 13643-1992 and GB/T 1685-1982, the main changes in this Standard are as follows:

- Added an introduction (the introduction to this Edition);

- Deleted Method C from the test methods for ring-shaped test specimens (6.5 of GB/T 13643-1992);

- Revised the provisions for test methods (Chapter 6 of GB/T 13643-1992; Chapter 5 of GB/T 1685-1982);

- Adjusted the specifications for compression devices and measuring devices (GB/T 1685-1982; Chapter 3 of GB/T 13643-1992; Chapter 5 of this Edition);

- Added requirements for the thermal and mechanical conditioning of test specimens (6.5 of this Edition);

- Added content regarding precision and test reports (Chapters 10 and 11 of this edition).

Annex A of this Standard is an informative annex.

This Standard was proposed by China Petroleum and Chemical Industry Association.

This Standard shall be under the jurisdiction of Subcommittee on Physical and Chemical Test Methods for Rubbers of National Technical Committee on Rubbers of Standardization Administration of China (SAC/TC 35/SC 2).

This Standard is interpreted by Subcommittee on Physical and Chemical Test Methods for Rubbers of National Technical Committee on Rubbers of Standardization Administration of China (SAC/TC 35/SC 2).

Main drafting organizations of this Standard: China National Tire & Rubber Corporation Shenyang Rubber Research & Design Institute; Northwest Rubber & Plastics Industry Research & Design Institute.

Main drafters of this Standard: Yu Kaijiang, Zhu Wei, Zhao Bodan.

Versions of standard substituted by this Standard are:

- GB/T 13643-1992;

- GB/T 1685-1979, GB/T 1685-1982.

Introduction

When a constant strain is applied to rubber, the force required to maintain that strain is not constant but decreases over time; this phenomenon is known as stress relaxation. Conversely, when rubber is subjected to a constant stress, the strain increases over time; this phenomenon is known as creep.

In essence, stress relaxation is primarily driven by physical and chemical processes. While these two processes generally coexist, stress relaxation is predominantly caused by physical processes at ambient or low temperatures and/or over short durations, whereas chemical processes dominate under conditions of high temperature and/or long duration.

To investigate the service life of the material, aging tests may be conducted in an air-circulating oven in accordance with GB/T 20028 "Rubber, vulcanized or thermoplastic -- Estimation of life-time and maximum temperature of use from an Arrhenius plot".

In addition to specifying temperature and time intervals, stress relaxation tests require the specification of the initial stress and the loading conditions of the specimen, as these factors influence the test results - particularly for rubber containing fillers.

When conducting stress relaxation tests, maintaining constant temperature and compression is the most important factor for achieving good test repeatability and reproducibility.