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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 9871-2008

Replacing GB/T 9871-1988

**Rubber, vulcanized or thermoplastic -- Determination of aging
characteristics by measurement of stress relaxation**

硫化橡胶或热塑性橡胶老化性能的测定 拉伸应力松弛试验

(English Translation)

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Table of Contents

- Foreword
- Introduction
- 1 Scope
- 2 Normative references
- 3 Instrument
 - 3.1 Stress relaxation meter (for method A or B)
 - 3.2 Tensile testing machine (for Method C)
 - 3.3 Aging me

Foreword

This standard is identical with ISO 6914:2004 "Determination of vulcanized rubber or thermoplastic rubber aging properties of tensile stress relaxation test" (In English).

This standard replaces GB/T 9871-1988 "Determination of vulcanized rubber aging properties (tensile stress relaxation test)." this standard is equivalent translation ISO 6914:2004.

For ease of use, this standard does the following Edit modifications.

- a) Remove the preface to the international standards;
- b) use the "standard" instead of "this International Standard";
- c) use the decimal point. "" instead of a comma as the decimal point "." this standard and GB/T 9871-1988 main technical differences are as follows.
 - Increased introduction, delete the original standard of Chapter 3; Introduction is an overview of the standard test methods and principles, contents it is important but it is not part of the standard normative;
 - Increase the range of content description, details of each method of presentation (see Chapter 1);
 - Normative references increased introductions, reference standards are different (see Chapter 2);
 - Tensile force measurement accuracy and modified by 2% to $\pm 1\%$ (1988 Edition 4.1 and 4.2; 3.1 edition and 3.2);
 - Modify the provisions of the sample size, evenly thickness, width and length of the

non-statutory (1988 Version 5.2; Excerpts 4.1);

--- Modify the number of samples specified, based on the test object and adjust the selection (1988 Version 5.3; 4.2 edition);

--- Increasing the aging temperature selected, and improve the accuracy of temperature control (1988 Version 7.2; 6.2 edition);

--- Modify the results formulation (1988 edition, Chapter 9; Chapter 8 of this edition);

--- Increased normative appendix, calibrated test equipment (Excerpts Appendix A).

Please note that some of the content of this standard may involve patents. The standard release mechanism should not bear the responsibility to identify these patents.

Appendix A of this standard is a normative appendix.

The standard proposed by China Petroleum and Chemical Industry Association.

This standard by the National Rubber and rubber products Standardization Technical Committee rubber physical and chemical test methods Technical Committee (SAC/TC35/SC2) centralized.

This standard was drafted. Beijing Rubber Industry Research and Design Institute.

Drafters of this standard. Ma Weide.

This standard replaces the standards previously issued as follows.

--- GB/T 9871-1988.

GB/T 9871-2008/ISO 6914:2004

Introduction

Comprehensive results of the physical and chemical processes of the rubber samples in a given state of elongation, the stress changes over time are simultaneously present. when Thin rubber samples at high temperatures for a long time exposed to an oxygen-containing environment, chemical process based. Thus, under these conditions, after a period of time Between the exposure, stress deformable thin rubber specimen under test by stretching, the determination of the aging properties of the rubber.

Stress tests following two different methods can be used any one of.

a) continuous strain condition;

b) intermittent strain.

Case a), the continuous strain, elongation of the specimen kept in the aging tank throughout the aging period. Case b), intermittent strain, specimen Aging of the box in an unstressed state of aging, but at a regular interval, the sample is stretched to a short period

of time to determine the extended length shall be measured force. Thus, the latter method is tested as a function of time of the modulus change.

Note 1: The term "continuous stress relaxation" and "intermittent stress relaxation", often used to describe two fundamentally different methods. After a term "intermittent stress relaxation" is Misnomer, since no actual stress relaxation occurs and the measured stress and may even increase with time. For this reason, this document is to avoid with this term, although their application in a lot of the literature.

In the second scenario batch test, the sample regularly from accelerated aging atmosphere is removed, then the measurement should be under standard laboratory conditions force. The advantage of this method is that the need for special equipment, the conventional tensile testing machine can be used to measure stress.

The method according to criteria described in the test can provide information about the structure of the rubber occurs during the aging change.

Continuous strain conditions, as long as the process is not dominant physical relaxation, stress decay is a measure fracture network degradation reactions. And as any new network crosslinking reaction results in the formation, at a test strain state of equilibrium with the main network, and therefore does not create any new stress.

Note 2: even under conditions conducive to the chemical process, some physical relaxation may still occur. It depends on the viscoelastic rubber and test conditions, while the results must be interpreted carefully. Physical relaxation increases with the filler in a short time and lower temperatures will be more obvious, and often proportional to the logarithm of time, Less than the relaxation temperature and chemical sensitivity.

Under intermittent strain, stress attenuation provides fault degradation and crosslinking two reactions on the network metrics.

The effectiveness of the test method described in this standard, depending on the rubber degradation of uniformity. For this reason, the thickness of the sample is used 1.0mm, to the diffusion of oxygen to minimize the effects of aging.

Change stress may be directly concerned, but rubber aging relative tolerance will depend on the application being measured or desired sex can. Therefore, this standard should be considered complementary to the GB/T 3512's.

In addition, the compression stress relaxation test and this test GB/T 1685 prescribed different, which is mainly used in stress relaxation resistance Rubber testing is one of the working performance, such as sealing products.

If you want to study the material life can be measured by the method of GB/T 20028 describes.

When conducting these tests, in order to achieve good repeatability and reproducibility, the

most important factor is to ensure that the temperature throughout the test and Stretch constant.

GB/T 9871-2008/ISO 6914:2004 Determination of vulcanized rubber or thermoplastic rubber aging properties Tensile stress relaxation test

1 Scope

This standard specifies the three measurement sample at a given state of stress elongation method, the purpose is to measure the aging of rubber vulcanized rubber performance.

A method for measuring --- under continuous strain adoption.

--- Method B is in the intermittent strain the preferred method of measurement.

In Method A and B are two cases, the stress relaxation stress meter record at the aging temperature.

--- Method B Method C may be used instead to measure the strain in the intermittent conditions. In the process C, the sample taken from the aging environment the measured stress under standard laboratory temperature.

Appendix A gives a list of these calibration measurements are required.

Measured at a single high-temperature aging, it can be used for quality control purposes, such as the degree of heat aging. According to GB/T 20028 Description the method, in a series of temperature measurements to predict long-term aging properties, can be used for research and development purposes.

Unable to calculate each other between the three methods, the method used depends on the purpose of the test.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms of dated references, all subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to study under this agreement is standard Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 2941 rubber physical test method for preparing and conditioning General Procedure (GB/T 2941-2006, ISO 23529:2004, IDT) ISO 188:1998 vulcanized rubber or thermoplastic rubber Accelerated aging and heat resistance test ISO 5893:2002 Rubber and plastics test equipment tensile, bending and compression type (a constant speed) specification ISO 18899:2004 Rubber test instrument calibration guide