

ICS 83.060

CCS G 40



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

GB/T 39692-2020

**Rubber, vulcanized or thermoplastic. Low temperature testing.
General introduction and guide**

Issued on: December 14, 2020

Implemented on: November 1, 2021

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Foreword

1 Scope

2 Terms and definitions

3 Types of low temperature test

Foreword

This standard was drafted in accordance with the rules given in GB/T 1:1-2009:

The translation method used in this standard is equivalent to ISO 18766:2014 "Overview and Guidelines for Low Temperature Testing of Vulcanized Rubber or Thermoplastic Rubber":

This standard was proposed by the China Petroleum and Chemical Industry Federation:

This standard is under the jurisdiction of the National Rubber and Rubber Products Standardization Technical Committee (SAC/TC35):

Drafting organizations of this standard: Double Star Group Co., Ltd., Xuzhou Xulun Rubber Co., Ltd., Shandong Linglong Tire Co., Ltd.,

Changzhou Yilifangyuan Composite Material Technology Co., Ltd., Guizhou Tire Co., Ltd., Jiangsu Mingzhu Testing Machinery Co., Ltd., Sailun Group

Co., Ltd., Beijing Rubber Industry Research and Design Institute Co., Ltd:

1 Scope

This standard gives an overview and guidelines for testing methods for low-temperature properties of vulcanized rubber and thermoplastic rubber:

This standard is suitable for understanding the meaning of various low-temperature properties and helps to select appropriate test methods:

2 Terms and definitions

The following terms and definitions apply to this document:

2:1

Low temperature test

Tests to measure various properties under conditions lower than standard laboratory

temperature:

3 Types of low temperature test

3:1 Overview

As the temperature decreases, the hardness of the rubber gradually increases, eventually showing a hard and brittle state, and the recovery of deformation due to external force becomes

More slowly: The point where rubber becomes hard and brittle is the glass transition point: Any physical test can be carried out at low temperature, for some specific

Purpose, it is necessary to pay attention to some performance changes with temperature reduction according to actual applications: These properties include: tensile strength, dynamic mode

Quantity, resilience and resistivity, etc: Commonly used differential scanning calorimetry (DSC) or dynamic thermodynamic analysis (DMTA) to determine the glass transition

Temperature (T_g): It should be noted here that the measurement of T_g depends on the test frequency used: The T_g produced by the "fast" test is higher than that of the "slow" test:

higher: For detailed information, please refer to literature [6]:

In order to facilitate practical applications, some specific low temperature test procedures have been developed to measure the general trends of these behaviors, and have been widely marked

Standardization:

These low temperature tests can be divided into the following categories:

- Rigidity changes;
- Brittle point;
- Recovery rate (compression recovery and stretch retraction):

In addition, certain rubbers, such as natural rubber and neoprene, become stiff due to partial crystallization at low temperatures: This is a gradual transition

It takes several days or weeks: However, this crystallization process will appear very fast for each polymer at a certain temperature:

Speed, for example, natural rubber crystallizes very quickly at -25°C: Therefore, those tests used to determine the crystallization effect must measure low temperature

The change in rigidity or shrinkage performance after a period of "aging":

3:2 Rigidity changes

Historically, before using thermal analyzers, it was difficult to measure tensile or compressive modulus at low temperatures, and the cost was high: Although it is very

The torsion test is rarely used to determine rigidity, but it is very convenient to use it to measure changes in rigidity when the temperature drops: The rubber test method is

ISO 1432 is called the Giman test, which stipulates that the torsion wire is used to provide torque to twist the sample: The measured rigidity and the corresponding temperature are

chinastandards.org · PREVIEW