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Rubber - Determination of viscosity and stress relaxation using a rotorless sealed shear rheometer

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules for Standardization Documents"

drafting.

This document is equivalent to ISO 13145.2012 "Determination of Viscosity and Stress Relaxation by Rotorless Sealed Shear Rheometer for Rubber".

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

The rheological properties of rubber are related to the structural properties of rubber, and the rheological properties will affect the performance of rubber during processing and the properties of final products.

able. Therefore, industrial environments require instruments that can quickly and easily evaluate the rheological properties of rubber.

This test method is to use a rotorless closed shear rheometer to evaluate the rheological properties of rubber under specified conditions.

At present, the rubber industry still widely uses the method standard (ISO 289-1) for the determination of Mooney viscosity by Mooney viscometer. This test method can

as an alternative. The test conditions selected for this test method provide shear rates similar to Mooney viscosity measurements with good reproducibility.

This test should be completed in a short time, and it is recommended to be carried out in automatic mode to optimize test efficiency.

Determination of rubber with rotorless closed shear rheometer

Viscosity and Stress Relaxation

Caution --- Personnel using this document need to have practical experience in formal laboratory work. This document does not address all possible security issues

The user is responsible for taking appropriate safety and health measures and ensuring compliance with the conditions stipulated in the relevant national laws and regulations.

1 Scope

This document describes a test method for measuring the viscosity and stress relaxation of raw and mixed rubber under specified conditions.

The determination of viscosity is carried out under the condition of constant strain, temperature and frequency, and the elasticity in the complex shear modulus can be determined during the test.

shear modulus and loss shear modulus.

The determination of shear stress relaxation is carried out under the condition of constant static strain and temperature, and the drop of torque can be measured during the test.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, dated references

For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

this document.

GB/T 25269-2010 Guidelines for Calibration of Rubber Test Equipment (ISO 18899.2004, IDT)

ISO 1382 Rubber-Vocabulary

Note. GB/T 9881-2008 rubber terms (ISO 1382.2008, MOD)

Note. GB/T 25269-2010 Guidelines for Calibration of Rubber Test Equipment (ISO 18899.2004, IDT)

3 Terms and Definitions

The terms and definitions defined in ISO 1382 and the following apply to this document.

3.1

A temperature-controlled mold cavity consisting of two phantoms, one of which can be moved relative to the other to stress or

strain.

3.2

sinusoidal strain

gamma(t)

The strain produced by the oscillations of the mold bodies that make up the test cavity.

Note. Given by the formula gamma(t)=gamma0sin(omegat), gamma0 is the maximum amplitude of the applied strain.

3.3

Loss angle lossangle

The phase angle between stress and strain.

Note. This is an indicator to measure the performance and degree of the viscous behavior of the material. For viscoelastic materials, the phase angle is between 0° and 90°. Ideal Newtonian fluid phase angle

is 90°.

1) ISO 18899.2004 has been abolished and replaced by ISO 18899.2013.Undated references in Appendix A.