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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 33061.11-2022

Plastics - Determination of dynamic mechanical properties - Part 11: Glass transition temperature

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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 part 11 of GB/T 33061 "Determination of Dynamic Mechanical Properties of Plastics". GB/T 33061 has issued the following

part.

--- Part 1.General principles;

--- Part 4.Non-resonant tensile vibration method;

--- Part 5.Non-resonant bending vibration method;

--- Part 6.Non-resonant shear vibration method;

--- Part 7.Non-resonant torsional vibration method;

--- Part 10.Determination of complex shear viscosity using a parallel plate oscillatory rheometer;

--- Part 11.Determination of dynamic mechanical properties of plastics Part 11.Glass transition temperature.

This document is modified to adopt ISO 6721-11.2019 "Determination of dynamic mechanical properties of plastics - Part 11.Glass transition temperature".

Compared with ISO 6721-11.2019, this document has made the following structural adjustments.

--- Adjust "select the mode of dynamic mechanical analysis (such as bending, torsion, shearing, compression, tension) according to the shape of the sample submitted for inspection" from the range

Adjust to 5.1;

--- In 5.1, "equipment should be calibrated regularly. When changing the test mode and environment, or when moving and changing the temperature sensor, it should be

Row Calibration See Appendix A" Adjust to front of this paragraph.

The technical differences between this document and ISO 6721-11.2019 and their reasons are as follows.

--- Replaced ISO 472 (see Chapter 3) with the normatively quoted GB/T 2035 to adapt to the technical conditions of our country;

--- Replaced ISO 6721-1 with the normative reference GB/T 33061.1 (see Chapter 3, Chapter 4, 5.2, 6.1, 6.3, Chapter 7, Chapter

8, 9.1 and 12) to adapt to the technical conditions of our country;

--- Added "equipment should be calibrated regularly, when changing the test mode and environment, or when moving and changing the temperature sensor, it should be in accordance with

Appendix A for calibration. "Related descriptions (see 5.1) to facilitate the operator to understand this document;

--- Increased the description of "Sensitivity program of heating rate see Appendix B" (see 5.1) to facilitate the operator to understand this document;

--- The conditions for use of the complete program and the simplified program (see 9.2) are added to the method, which is convenient for the operator;

--- Increase the provisions of significant figures in the result representation (see Chapter 10) to improve the operability of judgment and eliminate ambiguity;

--- The test date requirement has been added to the test report (see Chapter 12).

The following editorial changes have been made to this document.

--- Changed the titles of 9.2.2 and 9.2.3 to be unified with the content of the chapter (see 9.2.2 and 9.2.3);

--- For the convenience of the operator, method A is listed in sub-items (see 9.2).

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

This document covers a method for determining the glass transition temperature values of plastics in temperature sweep mode using the Dynamic Mechanical Analysis (DMA)

program.

This method can replace the use of differential scanning calorimetry (DSC) to measure the glass transition temperature of plastics (see GB/T 19466.2).

DMA is used to determine the storage modulus, loss modulus, and loss factor as a function of temperature and frequency. From these data, it can be determined

glass transition temperature. Many types of commercial equipment can use this technology, in principle, it applies to GB/T 33061.1 described

All loading modes for.

In order to reduce the influence of thermal hysteresis of the sample, the method assumes that the temperature of the furnace body is the temperature of the sample, and the error changes with the heating rate.

This eliminates the need to measure the temperature of the specimen directly, for example, with a thermocouple embedded in the specimen.

GB/T 33061 specifies various methods for determining the dynamic mechanical properties of rigid plastics within the range of linear viscoelastic behavior. proposed to consist of twelve

Partial composition.

--- Part 1.General. The purpose is to establish common definitions and aspects of the test methods for the determination of dynamic mechanical properties.

--- Part 2.Torsion pendulum method. The purpose is to establish an operable, traceable and verifiable method for the determination of the energy storage and loss components of torsional modulus.

real program.

--- Part 3.Resonant bending vibration curve method. The aim is to determine the flexural composite modulus E*f of the homogeneous plastic and the layer for sound insulation

Determination of damping characteristics of compressed plastics, establish operable, traceable and verifiable procedures.

--- Part 4.Non-resonant tensile vibration method. The purpose is to measure the forced non-resonant method for the tensile complex modulus E* of plastics.

Establish procedures that are operable, traceable, and verifiable.

--- Part 5.Non-resonant bending vibration method. The purpose is to measure the forced non-resonance method of plastic bending complex modulus E*f

Establish procedures that are operable, traceable, and verifiable.

--- Part 6.Non-resonant shear vibration method. The purpose is to measure the plastic shear complex modulus G* by the forced non-resonant method

Establish procedures that are operable, traceable, and verifiable.

--- Part 7.Non-resonant torsional vibration method. The purpose is to determine the twist of the shear complex modulus G* of the strip or rod solid polymer.

Convert the measurement to the non-resonance method, and establish operable, traceable and verifiable procedures.

--- Part 8.Wave conduction longitudinal shear vibration method. The purpose is to determine the longitudinal complex modulus L* and the shear complex modulus of the polymer

For the determination of the energy storage component of G*, establish operable, traceable and verifiable procedures.

--- Part 9.Sonic pulse propagation tensile vibration method. The purpose is to measure the storage component of the composite tensile modulus E* of the polymer

Establish procedures that are operable, traceable, and verifiable.

--- Part 10.Determination of complex shear viscosity using a parallel plate oscillatory rheometer. The purpose is to determine the dynamic rheological properties of polymer melts

For the determination of test methods, establish operable, traceable and verifiable procedures.

--- Part 11.Glass transition temperature. The purpose is to determine the determination of glass transition temperature (Tg) for dynamic mechanical properties, to determine

immediately operable, traceable and verifiable procedures.

--- Part 12.Non-resonant compression vibration method. The purpose is to establish an operable,

Traceable, verifiable procedures.

Determination of dynamic mechanical properties of plastics

Part 11.Glass transition temperature

WARNING. Use of this document may involve hazardous materials, operations, and equipment. This document is not intended to address all safety issues related to the use

question. It is the user's responsibility to establish appropriate health and safety practices and to determine the applicability of any other limitations prior to use.