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

GB/T 33061.10-2025

Replacing GB/T 33061.10-2016

**Plastics - Determination of dynamic mechanical properties -
Part 10: Complex shear viscosity using a parallel-plate
oscillatory rheometer**

塑料 动态力学性能的测定 第10部分：使用平行平板振动流变仪测定复数剪切黏度

(English Translation)

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Foreword

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

Drafting.

This document is Part 10 of GB/T 33061 "Determination of dynamic mechanical properties of plastics". GB/T 33061 has already published the following...

part.

---Part 1: General Rules;

---Part 2: The Torsional Pendulum Method;

---Part 3: Resonance Curve Method under Bending Vibration;

---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 Vibration Viscometer Using a Parallel Plate Vibrating Rheometer;

---Part 11: Glass Transition Temperature;

---Part 12: Non-resonant compression vibration method.

This document replaces GB/T 33061.10-2016 "Determination of dynamic mechanical properties of plastics - Part 10: Using parallel plate vibration".

"Determination of Complex Shear Viscosity by Rheometer" has undergone major technical changes compared to GB/T 33061.10-2016, except for structural adjustments and editorial

modifications.

The following is a simplified version.

---The scope of application has been modified to limit the test method for determining the dynamic rheological properties of polymer melts using a parallel plate vibration rheometer.

For the linear viscoelastic range (see Chapter 1, Chapter 1 of the 2016 edition);

---The version of the normative reference document has been changed from dated references to undated references (see Chapter 3, 2016 edition).

Chapter 3);

---The calibration details for the rheometer have been changed (see 5.5, 5.2 in the 2016 version);

---The measurement range limitation in the test mode has been removed (see 7.5, 2016 version 7.5);

---Added an inspection of the sample after the test (see 7.10);

---Added precision data for my country (see Chapter 9).

This document is modified to adopt ISO 6721-10:2015 "Determination of dynamic mechanical properties of plastics-Part 10: Using a parallel plate vibrating plate".

Rheometer for measuring complex shear viscosity.

This document has undergone the following structural adjustments compared to ISO 6721-10:2015.

---The phrase "within the linear viscoelastic range" in this document corresponds to section 7.5 of ISO 6721-10:2015, which states "according to this part of ISO 6721".

The determination of the dynamic rheological properties of a sample is limited by the linear viscoelastic range of its rheological behavior. Therefore, this part of ISO 6721 addresses this limitation.

Viscoelastic behavior is defined as the behavior in which viscosity and modulus are independent of applied stress or strain. This prerequisite is essential for the analysis of...

"Experimental data is absolutely necessary";

---Appendix A corresponds to Appendix B in ISO 6721-10:2015;

---Appendix B corresponds to Appendix A in ISO 6721-10:2015;

---Appendix C corresponds to Chapter 9 of ISO 6721-10:2015.

The technical differences between this document and ISO 6721-10:2015, and the reasons therefor, are as follows.

---ISO 472 (see Chapter 3) has been replaced with the normatively referenced GB/T 2035 to adapt to my country's technical conditions and increase operability.

Actual nature;

---ISO 5725-1 (see Chapters 3 and 9) has been replaced with the normatively referenced GB/T 6379.1 to adapt to my country's technical conditions.

Increase operability;

---Replace ISO 6721-1 with the normatively referenced GB/T 33061.1 (see Chapters 3 and 4) to adapt to my country's technical conditions and increase...

Increase operability;

---Added precision data for my country (see Chapter 9) to help domestic laboratories assess their testing capabilities and conduct quality control.

Control and improvement.

The following editorial changes have been made to this document.

---The symbol for the complex shear modulus has been changed from G^* to G^*s to conform to the provisions in GB/T 33061.1;

---The symbol for the shear loss modulus has been changed from G'' to $G''s$ to conform to the provisions in GB/T 33061.1;

---The symbol for the shear storage modulus has been changed from G' to $G's$ to conform to the provisions in GB/T 33061.1;

---Formula numbers have been added, and Appendix B has been included in the text (see 8.2);

---Change notes 3 and 4 in ISO 6721-10:2015 to the main text (see Appendix A).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Plastics Standardization (SAC/TC15).

Introduction

This document describes the experimental determination of the dynamic rheological properties of polymer melts in the linear viscoelastic range using a parallel plate vibration rheometer.

method.

GB/T 33061, "Determination of Dynamic Mechanical Properties of Plastics", specifies the methods for determining the dynamic mechanical properties of rigid plastics within the linear viscoelastic behavior range.

The method for assessing mechanical properties is proposed to consist of the following parts.

---Part 1: General Rules. The purpose is to establish general definitions and related content for test methods for determining dynamic mechanical properties.

---Part 2: Torsional Pendulum Method. The aim is to establish a comparable method for determining the stored energy and loss components of the torsional modulus.

---Part 3: Resonance Curve Method under Bending Vibration. The aim is to determine the flexural composite modulus E^* of homogeneous plastics and its application in sound insulation.

Determining the damping characteristics of laminated plastics and establishing comparable methods.

---Part 4: Non-resonant tensile vibration method. The aim is to develop a forced non-resonant method for measuring the tensile complex modulus E^* of plastics.

Establish, define, and comparable methods.

---Part 5: Non-resonant bending vibration method. The aim is to provide a forced non-resonant method for measuring the complex bending modulus E^* of plastics.

Establish, define, and comparable methods.

---Part 6: Non-resonant shear vibration method. The aim is to provide a forced non-resonant method for measuring the complex shear modulus G^* of plastics.

Establish, define, and comparable methods.

---Part 7: Non-resonant torsional vibration method. The aim is to obtain the torsional modulus G^* of the shear complex modulus of strip or rod-shaped solid polymers.

The determination of non-resonance methods establishes comparable methods.

---Part 8: Wave Propagation Longitudinal Shear Vibration Method. The aim is to determine the longitudinal complex modulus L^* and shear complex modulus of polymers.

Determining the energy storage component of G^* and establishing comparable methods.

---Part 9: Sound Velocity Pulse Propagation Tensile Vibration Method. The purpose is to measure the stored component of the tensile modulus E^* of polymer composites.

Establish, define, and comparable methods.

---Part 10: Determination of Complex Shear Vibration Viscosity Using a Parallel Plate