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

GB/T 45159.1-2024

**Mechanical vibration and shock - Characterization of the
dynamic mechanical properties of visco-elastic materials - Part
1: Principles and guidelines**

机械振动与冲击 黏弹性材料动态力学性能表征 第1部分：原理和指南
(English Translation)

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Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
4 Measurement principle
4.1 General Principles
4.2 Resonance method
4.3 Cantilever shear beam method
4.4 Dynamic stiffness method
4.5 Estimation of Poisson's ratio
5 Time Temperature Overlay
6 Sample Conditioning
7 Choice of measurement method
Appendix A (Informative) Linear characteristics of resilient materials
Appendix B (Informative) Analysis of ISO documents related to dynamic measurement
B.1 Document Overview
B.2 Advantages and Disadvantages Analysis
B.3 Characterization of mechanical properties of materials
References

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 1 of GB/T 45159 "Characterization of dynamic mechanical properties of viscoelastic materials subject to mechanical vibration and shock".

GB/T 45159 has published the following parts.

- Part 1: Principles and guidelines;
- Part 2: Resonance method;

--- Part 3: Cantilever shear beam method.

This document is equivalent to ISO 18437-1:2012 "Mechanical vibration and shock - Characterization of dynamic mechanical properties of viscoelastic materials - Part 1 Part. Principles and Guidelines.

Introduction

GB/T 45159 provides three methods for measuring the elastic modulus and loss factor of viscoelastic materials, and two methods for measuring Poisson's ratio.

The method provides unified regulations for users, including the operating principle, measuring device, measurement and data analysis, and is planned to consist of 6 parts.

--- Part 1: Principles and guidance. The purpose is to outline three methods for measuring the elastic modulus and loss factor of viscoelastic materials, and Two methods for measuring Poisson's ratio are presented, along with the test setup, measurement range, and limitations of each method.

--- Part 2: Resonance method. The purpose is to provide unified technical regulations for users of the resonance method.

--- Part 3: Cantilever shear beam method. The purpose is to provide unified technical regulations for users of the cantilever shear beam method.

--- Part 4: Dynamic stiffness method. The purpose is to provide unified technical regulations for users of the dynamic stiffness method.

--- Part 5: Poisson's ratio based on comparison of measurements and finite element analysis.

The use of Poisson's ratio shall provide users with uniform technical regulations.

--- Part 6: Time-temperature superposition. The purpose is to provide unified technical regulations for users of time-temperature superposition.

Mechanical vibration and shock Dynamic mechanics of viscoelastic materials
Characterization of performance Part 1: Principles and guidance

1 Scope

This document is the dynamic mechanical properties of common isotropic viscoelastic materials for vibration isolators specified in GB/T 45159.2~GB/T 45159.51).

The laboratory measurement methods and data collection and analysis methods for elastic modulus, shear modulus, bulk modulus, loss factor, Poisson's ratio have established a basic this document also provides guidance for the appropriate selection of each part.

This document applies to isotropic resilient materials commonly used in vibration isolator designs to reduce.

- a) The transmission of audible frequency vibration to the structure and the induced fluid radiation sound (air noise, structural radiation sound, etc.);
- b) The impact of low-frequency vibration on the human body, or the damage to structures and equipment caused by severe low-frequency vibration;
- c) Energy transfer of shock and noise.

This document and the measurement methods and data collection and analysis methods detailed in GB/T 45159.2~GB/T 45159.51) are used for.

1) GB/T 45159.4 is equivalent to ISO 18437-4:2008; GB/T 45159.5 is equivalent to ISO 18437-5:2011. The two national standards are being formulated.

Concentration.

- 1) Design of vibration isolator;
- 2) Selection of optimal resilience material;
- 3) Theoretical calculation of vibration transmissibility of vibration isolators;
- 4) Information required for product development;
- 5) Product information provided by manufacturers and suppliers;
- 6) Product quality control.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

ISO 472 Plastics-Vocabulary Note. GB/T 2035-2024 Plastics Terminology (ISO 472:2013, IDT) ing-Vocabulary) Note. GB/T 2298-2010 Mechanical vibration, shock and condition monitoring vocabulary (ISO 2041:2009, IDT) ISO 4664-1 Rubber, vulcanized or thermoplastic rubber - Determination of dynamic properties - Part 1: General Note. GB/T 9870.1-2006 Determination of dynamic properties of vulcanized rubber or thermoplastic rubber Part 1: General (ISO 4664-1:2005, IDT) Note. GB/T 33061.1-2016 Determination of dynamic mechanical properties of plastics Part 1: General principles (ISO 6721-1:2011, MOD) ISO 10846-2 Acoustics and vibrations - Laboratory methods for the measurement of vibration-acoustic transfer characteristics of elastic elements - Part 2: Elastic supports