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

GB/T 11349.2-2025

Replacing GB/T 11349.2-2006

**Mechanical vibration and shock - Experimental determination of
mechanical mobility - Part 2: Measurements using single-point
translation excitation with an attached vibration exciter**

(English Translation)

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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 2 of GB/T 11349 "Mechanical vibration and shock - Test determination of mechanical admittance". GB/T 11349 has been The following parts were published.

- Part 1: Basic terms and definitions, sensor characteristics;
- Part 2: Measurement of single-point translational excitation using a vibrator;
- Part 3: Impact excitation method.

This document replaces GB/T 11349.2-2006 "Test determination of mechanical admittance for vibration and shock - Part 2: Using a single exciter".

Compared with GB/T 11349.2-2006, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Changed the overview of incentives (see 6.1, 6.1 of the 2006 edition);
- Added an overview of other stimulus waveforms (see 6.2.5);
- Added "rotating eccentric mass exciter" (see 6.3);
- Change "Note 1 to Note 4 in 7.3" to the main text, and change "When the ratio of effective mass is greater than 0.06 and less than 0.5, The mass reduction method should be used when the effective mass ratio is greater than 0.05 and less than 0.5. (See 7.3, 7.3 of the 2006 edition);
- Added the requirement that "the sampling frequency should be at least ten times higher than the frequency of interest" (see 8.4.1).

This document is equivalent to ISO 7626-2:2015 "Mechanical vibration and shock - Test determination of mechanical admittance - Part 2: Tests using a vibrator" Single-point translational excitation measurement".

Introduction

0.1 Comprehensive Introduction to ISO 7626 for Admittance Measurement

The dynamic characteristics of the structure can be determined by the relevant frequency response function obtained from the admittance measurement, or by the acceleration corresponding to the frequency response function.

Each frequency response function is the motion response at a point in the structure due to unit force or moment excitation.

The magnitude and phase of these functions are functions of frequency.

The difference between acceleration admittance, displacement admittance and admittance is that acceleration or displacement is used instead of velocity to represent the motion response.

For the sake of simplicity, only the term "admittance" will be used in the various parts of ISO 7626. Of course, all test methods and requirements apply to accelerated Determination of degree admittance and displacement admittance.

Typical applications of admittance measurement.

- a) predict the dynamic response of a structure to known or assumed input excitations;
- b) Determine the modal characteristics of the structure (natural frequency, damping ratio and mode shape);
- c) predicting dynamic interactions between connected structures;

- d) verify the validity of the mathematical model of the structure and improve its accuracy;
- e) Determine the dynamic properties (i.e., complex elastic modulus) of single or composite materials.

In some applications, it may be necessary to measure forces and motions along three mutually perpendicular axes, as well as moments and rotations around these three axes.

To fully describe the dynamic characteristics. For each point of interest, these measurements give a 6x6 admittance matrix. point, the system has an overall admittance matrix of size (6Nx6N).

In most practical applications, it is not necessary to know the entire (6Nx6N) matrix. Usually, only a single point and a single direction of excitation are required.

It is sufficient to measure the admittance of the driving point and some transfer admittance by measuring the translation response at the key points of the structure.

In this case, only the rotational admittance may be of interest.

Mechanical admittance is defined as the frequency-dependent ratio of the phasor of the translational or rotational velocity response to the phasor of the applied exciting force or torque.

If the response is measured with an accelerometer, it must be converted to velocity to obtain admittance. Alternatively, the acceleration and force The ratio of force, i.e. acceleration, can be used to characterize the structure. In other cases, the displacement admittance, i.e. the ratio of displacement to force, can be used.

NOTE: Conventionally, the frequency response function of a structure is usually expressed as the reciprocal of one of the above dynamic characteristics. The arithmetic reciprocal of the mechanical admittance is often called the mechanical impedance.

However, note that this is a misconception, as the arithmetic reciprocal of admittance does not usually represent any element of the impedance matrix of a structure. Instead, admittance is converted to Impedance requires the inversion of the admittance matrix. This is described in detail in ISO 7626-1.

Admittance test data cannot be used directly as part of the structural impedance model. To make the data compatible with the model, the impedance matrix of the model is Convert to an admittance matrix and vice versa (for restrictions see ISO 7626-1).

0.2 Introduction to this document

In many applications of mechanical admittance data, the structure is excited at a certain position and direction, and the translational response is measured at some key points to determine the correct mechanical admittance data.

The admittance of the fixed driving point and a small amount of transfer admittance are

sufficient. These translational excitation forces can be applied by means of a shaker connected to the test structure or by means of a The device is attached to the structure.

Classifying the actuation devices as "connected" and "unconnected" makes a significant difference in the ease with which the actuation point can be moved to a new location.

For example, when using a vibrating hammer, it is easier to change the pulse application location than to move a connected vibrator to a new location on the structure.

Both excitation methods have their own applications for which they are best suited. This document deals with measurements using a single connected shaker; ISO 7626-5. Applicable to shock excitation measurements without a connected shaker.

0.3 About the composition of GB/T 11349

GB/T 11349 "Mechanical vibration and shock - Test determination of mechanical admittance" mainly stipulates the mechanical system under vibration and shock conditions.

Test methods for determining mechanical admittance, including term definitions, test principles, equipment requirements, test procedures, data processing, and test reports.

It is suitable for the dynamic characteristics analysis of mechanical structures, equipment and their components, and aims to provide a scientific basis for the vibration and impact characteristics analysis of mechanical systems.

GB/T 11349 is intended to consist of three parts.

--- Part 1: Basic terms and definitions, sensor characteristics. The purpose is to define basic terms and specify the Calibration tests, environmental tests and physical measurements required to verify the suitability of impedance probes, force sensors and motion response sensors The method mainly provides guidance for the selection, calibration and evaluation of sensors and measuring instruments suitable for mechanical admittance measurement.

--- Part 2: Single-point translational excitation measurement using a vibrator. The purpose is to specify the single-point translational excitation measurement connected to the structure under test.

A method for measuring the mechanical admittance and other frequency response functions of structures (such as buildings, machines and vehicles) using a vibrator.

--- Part 3: Impact excitation method. The purpose is to specify how to use an impact exciter that is not connected to the structure to excite the structure to measure Methods for its mechanical admittance and other frequency response functions.

1 Scope

This document specifies the method for measuring the linear mechanical admittance and Other frequency response function methods.