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

GB/T 22159.4-2017

**Acoustics and vibration -- Laboratory measurement of vibro-acoustic
transfer properties of resilient elements -- Part 4: Dynamic stiffness of
elements other than resilient supports for translatory motion**

声学及振动 弹性元件振动-声传递特性实验室测量方法 第4部分：弹性非支撑件平
动刚度

(English Translation)

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Foreword

GB/T 22159 "acoustic and vibration elastic element vibration - acoustic transmission characteristics of laboratory measurement methods" includes the following five sections.

- Part 1. Principles and Guidelines;
- Part 2. Direct measurement method of flat dynamic stiffness of elastic support;
- Part 3. Indirect measurement of elastic dynamic stiffness of the support member;
- Part 4. Elastic non-supported pieces of flat dynamic stiffness;
- Part 5. Measurement method of driving point of low frequency flat dynamic stiffness of elastic support.

This section GB/T 22159 Part 4.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section uses the translation method is equivalent to using ISO 10846-4:2003 "Acoustics and vibration of flexible components vibration - acoustic transmission characteristics of the laboratory test Methods of quantity - Part 4. Flat dynamic stiffness of elastic nonsupport members".

The documents of our country that are consistent with the corresponding international documents that are normative references in this section are as follows.

--- GB/T 2298-2010 Glossary of mechanical vibration, shock and condition monitoring (ISO 2041:2009, IDT);

--- GB/T 3240-1982 commonly used in acoustic measurement frequency (neq ISO 266:1975);

--- GB/T 11349.1-2006 vibration and shock mechanical admittance test to determine Part 1. Basic definitions and sensors (ISO 7626-1:1986, IDT);

--- GB/T 11349.2-2006 vibration and shock mechanical admittance test to determine Part 2 with exciters as a single point of flat-wave Measurement of excitation (ISO 7626-2:1990, IDT);

Mechanical Installation of Mechanical Vibration and Impact Accelerometers (ISO 5348:1998, IDT);

--- GB/T 20485.21-2007 vibration and shock sensor calibration method Part 21. Vibration comparison method calibration (ISO 16063-21:2003, IDT);

Acoustics and vibration - Elastics - Laboratory measurement of sound transmission characteristics - Part 1. Method of measurement.

Principles and Guidelines (ISO 10846-1:2008, IDT).

This section is proposed by the Chinese Academy of Sciences.

This part of the National Acoustic Standardization Technical Committee (SAC/TC17) centralized.

This section mainly drafted units. Acoustics Institute of Chinese Academy of Sciences, Changzhou Dragon Auto Parts Co., Ltd., Shenzhen Zhongya Electrical Industrial Co., Ltd., Tongji University, Anhui Weiwei glue Group Co., Ltd., Anhui Vocational and Technical College, Beijing City Labor Protection Science Research Zhejiang University, Northwestern Polytechnical University, Shanghai Jiaotong University, Hefei University of Technology, Changsha Aobang Environmental Protection Industry Co., Ltd.

Introduction

Various passive isolators are widely used to reduce the transmission of vibration, such as suspension of automobile engines, flexible support of buildings, marine machinery Flexible support and flexible coupling and household appliances in the small vibration isolation components.

This section specifies the linear elastic non-supporting elements (except elastic support), such as flexible bellows, hoses, couplings, cables and pipe hooks Direct and Dynamic

Measurement of Dynamic Transmission Stiffness. This section is elastic components vibration - acoustic characteristics of laboratory measurement methods One of the standards, this series of standards also includes the measurement principle of elastic support and direct measurement method, indirect measurement method and drive point measurement of various ministries Points, ISO 10846-1 provides a comprehensive guide to select the appropriate standard.

The laboratory conditions described in this section include the rational use of static preload.

This method is suitable for the analysis of structural acoustic transmission losses above 20 Hz for elastic elements. However, this method can not be fully described for failure Vibration damping element to reduce the frequency vibration or shock displacement characteristics.

Acoustics and Vibration - Vibration - Acoustic Transmission Characteristics of Flexible Elements Laboratory measurement methods Part 4. Flat, non-supported members

1 Scope

This part of GB/T 22159 details the elastic non-supporting pieces (such as elastic bellows, couplings, power cables, hoses and pipes Hook, see Figure 1) two kinds of measurement methods of dynamic stiffness. No consideration is given here to elements filled with a liquid such as oil or water.

Note 1: Pipe hook and compression-type elastic support is different, it is stretch-type, so the test conditions described in this section and GB/T 22159.2 and GB/T 22159.3 different.

The flanges of the elastic element are not required to be parallel to each other by this method, as long as the flanges of the components or the jig interface can be flattened.

Elastic elements discussed in this section are used to reduce.

a) Transmission of the audio range vibration (structure sound of 20Hz ~ 20kHz) to the structure, for example, it causes the structure to radiate unwanted sound Tone (air, water or other sound);

b) The transmission of low frequency vibration (usually 1Hz ~ 80Hz), for example, it is too strong, it will make the body feel discomfort, the structure is damaged.

In fact, any one test equipment for the size of the specimen are limited, too large or too small are not applicable.

This section also includes vertical and parallel translational measurements of the interface with the flange and clamp. Appendix A, contains a rotating composition Measurement guidelines for conveying stiffness.

The direct method applies for frequencies ranging from 1 Hz up to an upper limit frequency, which depends on the lowest resonance frequency of the test fixture frame (Typically, the frame resonance frequency of the test device with a side length of 1 m is about 300 Hz).

Note 2: In fact, the lower limit frequency depends on the dynamic excitation system.

The frequency range to which the indirect method is applicable depends on the test device and the vibration isolation element under test. The lower limit frequency is usually 20Hz ~ 50Hz, the upper limit the frequency is 2kHz ~ 5kHz.

The measurement data obtained by this method can be used.

- Product information provided by the manufacturer and supplier;
- To provide information for product development;
- Vibration element transmission rate calculation.

a) Cable containing connector and clamping device b) Hook Description.

- 1 --- connector;
- 2 --- cable;
- 3 --- fixture;
- 4 --- fixed device;
- 5 --- flexible components;
- 6 --- pipe fixture.

Figure 1 Connection or fixture connection The interface is an example of a flat, flexible element