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

GB/T 46910.2-2025

**Non-destructive testing - Acoustic vibration testing of resin
matrix composite parts - Part 2: Mechanical impedance testing**

无损检测 树脂基复合材料制件的声振检测 第2部分：机械阻抗法

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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 2 of GB/T 46910, "Non-destructive testing of acoustic and vibration components made of resin-based composite materials". The following sections have been released.

1.Tapping Technique;

2.Mechanical Impedance Method. 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 and is under the jurisdiction of the National Technical Committee on Standardization of Nondestructive Testing (SAC/TC56). This document was drafted by: Shanghai Aircraft Manufacturing Co., Ltd., Shanghai Materials Research Institute Co., Ltd., Aerospace Materials and Processes Research Institute, China Commercial Aircraft Corporation of China, Ltd., and Shanghai Composite Materials Technology Co., Ltd. The main drafters of this document are. Jiang Liping, Jiang Jiansheng, Meng Jia, Xiao Peng, Yuan Yuhui, Ding Jie, Wu Shihong, Sheng Tao, Hu Xiaowen, Zhou Hui, and Han Lina. Wang Xiaolei and Luo Ming.

Acoustic vibration testing involves treating the test piece as a vibrating substrate, applying external force to cause it to vibrate, and then testing and analyzing its acoustic frequency, vibration impedance, or bearing capacity. Methods for non-destructive testing are based on changes in vibration characteristics over time. Acoustic vibration testing is used for resin-bonded structures such as laminated structures, sheet/sheet adhesive structures, and sandwich structures. Effective detection methods for defects such as delamination and debonding in resin-based composite parts are needed for the manufacturing, assembly, repair, and service of resin-based composite parts. It is widely used throughout the entire

life cycle of service. GB/T 46910 aims to guide the implementation of acoustic and vibration testing for resin-based composite parts, giving full play to the technical advantages of acoustic and vibration testing. Provides efficient and reliable non-destructive testing technology to ensure the quality of resin-based composite materials products in various industries, while also promoting non-destructive testing exchange and technology. Technical cooperation. Based on the different excitation and reception methods, acoustic and vibration testing of resin-based composite parts can be divided into two categories. GB/T 46910 proposes to consist of two categories. Partial composition.

1.Impact Test. The purpose is to provide an impact test method for resin-based composite parts.

2.Mechanical Impedance Method. The aim is to provide a method for testing the mechanical impedance of resin-based composite parts. This document is Part 2 of GB/T 46910, which specifies the equipment, technical requirements, and specifications for the mechanical impedance testing of resin-based composite parts. The evaluation methods and other requirements guide the practice of mechanical impedance testing of resin-based composite parts. Nondestructive testing of acoustic vibration of resin-based composite parts Testing Part

1 Scope

GB/T 46910.2-2025 is the Chinese national standard covering mechanical impedance testing of composites - a probe measures the local stiffness of the laminate and finds the disbands and delaminations that change it, including under a honeycomb skin where ultrasonics struggles. Part 2 of the series, first edition, the companion of Part 1 on tap testing. It was issued on 31 December 2025 and has been in force since 31 December 2025, as a first edition. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes a mechanical impedance testing method for the internal quality of resin-based composite parts based on acoustic vibration detection, and specifies the mechanical impedance... General requirements for anti-detection methods, testing procedures, testing records and reports, etc. This document applies to the testing of resins in laminated structures, sheet/sheet adhesive structures, and sandwich structures of carbon fiber, glass fiber, and blended fiber materials. For delamination or debonding of composite material parts, the mechanical impedance method should be performed in accordance with the same procedure for other materials or structures.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 20737 General Terms and Definitions for Nondestructive Testing

GB/T 44525 Specification for Comparative Test Blocks of Resin-Based Composite Material Parts by Ultrasonic Testing in Non-Destructive Testing

3 Terms and Definitions

The terms and definitions defined in GB/T 20737 and the following terms and definitions apply to this document.

3.1 A non-destructive testing method that uses vibration excitation on the test piece to detect the quality of the workpiece.

3.2 A method for inspecting the quality of a workpiece by using continuous wave excitation to vibrate the workpiece and analyzing the vibration response of the workpiece.

Note. This includes resonance detection technology and mechanical impedance analysis detection technology.

3.3 This technology enables the quality inspection of manufactured parts by analyzing the complex impedance changes at the resonant point of the inspection system, which includes the inspected part.

Note. The resonant probe is excited at a specific frequency to operate at its optimal resonance point. The complex impedance of the detection system's resonance point is analyzed by examining the effect of load changes on the tested component. The change enables the inspection of the quality of manufactured parts.

3.4 This technology enables the quality inspection of manufactured parts by analyzing changes in the amplitude of mechanical impedance.

Note. A sweep frequency excitation is applied to the test piece to obtain the frequency at which the mechanical impedance difference between the good and defective regions is greatest. The amplitude of the mechanical impedance of the test piece at this frequency is then analyzed. The change in degree enables the inspection of the quality of the manufactured parts.