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

GB/T 46910.1-2025

**Non-destructive testing - Acoustic vibration testing of resin
matrix composite parts - Part 1: Tap testing**

无损检测 树脂基复合材料制件的声振检测 第1部分：敲击法

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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 1 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., Shanghai Composite Materials Technology Co., Ltd., and Shandong Special Equipment Inspection and Research Institute Group Co., Ltd. The main drafters of this document are. Jiang Liping, Jiang Jiansheng, Xiao Peng, Wu Shihong, Yuan Yuhui, Ding Jie, Zhang Dongmei, Sheng Tao, Chu Qiqi, and Guo Xiangji. Zhang Ying, Han Lina, Zhang Hao, Wang Xiaolei.

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 1 of GB/T 46910, which specifies the equipment, technical requirements, and evaluation methods for impact testing of resin-based composite parts. The law and other requirements guide the practice of impact testing for resin-based composite parts. Nondestructive testing of acoustic vibration of resin-based composite parts Testing Part

1 Scope

GB/T 46910.1-2025 is the Chinese national standard covering tap testing of composite parts - the oldest inspection there is, a coin tapped on a laminate to hear a delamination, here given an instrument, a procedure and an acceptance criterion instead of an ear. Part 1 of the series, first edition, published with Part 2 on mechanical impedance. 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 percussion testing method for the internal quality of resin-based composite parts based on acoustic vibration testing, and specifies the percussion testing procedures. Requirements such as general requirements, testing procedures, testing records and reports. This document applies to resin-based composite structures such as laminated structures, sheet/sheet adhesive structures, and sandwich structures made of carbon fiber, glass fiber, and blended fiber materials. Impact testing for delamination or debonding of composite material parts. This document does not apply to impact testing of parts with delamination or debonding depths not exceeding 2 mm. Other materials, thicknesses, or structures, etc. The impact test of the component shall be performed in accordance with the same procedure.

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 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 tap testing A non-destructive testing method that uses mechanical impact to stimulate vibration in the workpiece to detect its quality.

3.3 The duration from contact to detachment of the hammer from the surface of the workpiece during hammer strike excitation.

3.4 Sound power spectrum Characterizes the energy distribution of acoustic signals at different frequencies.

Note. This is usually represented by a curve with frequency on the x-axis and power or energy density on the y-axis, reflecting the intensity of each frequency component in the signal; centroid frequency (3.5). It is based on power spectrum calculation, and the two are often used together. First, abnormal frequency bands are identified by power spectrum, and then the changes are quantified by centroid frequency.

3.5 Gravity frequency The frequency that reflects the centroid location of the signal energy distribution.

Note. The weighted average frequency of the signal spectrum describes the center position of the signal spectrum. A higher center frequency indicates that the signal has more high-frequency components.