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

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**Carbon fibre reinforced plastics and metal assemblies -  
Determination of the tensile lap-shear strength**

碳纤维增强塑料和金属组合件 拉伸搭接剪切强度的测定

**(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 is required.

This document is modified to adopt ISO 22841:2021 "Composite materials and reinforcing fibers - Carbon fiber reinforced plastics (CFRPs) and metal composites Determination of tensile lap shear strength of components.

The technical differences between this document and ISO 22841:2021 and their reasons are as follows.

Added the requirements for the coaxiality of the clamping device of the tensile testing machine and the normative reference document GB/T 16491 to facilitate the implementation of this document (see 5.2);

The dimensions and tolerances of the width of each section and notch of the specimen, as well as the parallelism of the bonding area, have been increased to ensure uniformity in specimen preparation.

consistency (see Chapter 6);

The specimen plate length, width and specimen spacing dimensions have been changed to ensure that the specimen distance from the specimen plate edge is met (see

The requirements for surface treatment of adhesive surfaces and the normative reference document GB/T 21526 have been changed to ensure consistency in specimen preparation (see

The sample conditioning requirements have been changed to facilitate the implementation of this document (see Chapter 8); e) Added the size requirement of the specimen cutting position from the edge of the specimen plate to ensure the consistency of specimen preparation (see Chapter 9); f) Added the requirements for recording the type of specimen failure and the normative reference document GB/T 16997, providing important information for judging the test results.

Basis (see Chapter 10);

The calculation formula for tensile shear strength has been added to facilitate the implementation of this document (see Chapter 12). h) the following editorial changes were made to this document.

To coordinate with the existing standards, the name of the standard is changed to "Carbon Fiber Reinforced Plastic and Metal Composites - Tensile Lap Shear Strength"

Determination of the amendments to ISO 22841:2021/DAm1.2022 have been incorporated, and the outer margin positions of the clauses involved are indicated by vertical Double lines (||) are marked;

Added recommended dimensions for notch width and specimen spacing (see Chapter 6). -

## 1 Scope

This document describes the method for determining the tensile lap shear strength of single-lap adhesively bonded assemblies of carbon fiber reinforced plastic (CFRP) and metal.

The method includes sample preparation, test conditions and test steps.

This document is applicable to the evaluation of the suitability of adhesives for bonding carbon fiber reinforced plastics (CFRP) to metal materials.

## 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.

in this document.

GB/T 16491 Electronic universal testing machine GB/T 16997 Method for expressing the main failure types of adhesives GB/T 21526 Guidelines for surface preparation of metals and plastics before bonding with structural adhesives ISO 291 Plastics - Standard atmospheres for condition and testing ing and testing) Note. GB/T 2918-2018 Standard environment for conditioning and testing of plastic specimens (ISO 291:2008, MOD) ISO 472 Plastics-Vocabulary Note. GB/T 2035-2008 Plastics terms and definitions (ISO 472.:1999, IDT)

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 apply.

### 4 Principle

The tensile lap shear strength of adhesive is the strength of the CFRP and metal bonded together when a tensile load is applied parallel to the bonding surface and in the direction of the specimen's principal axis.

The shear stress at a single lap joint of a material.

**Note:** Single lap joint specimens are economical, practical and easy to prepare. They are currently used in the development, evaluation and comparative research of adhesives and bonded products, including manufacturing.

The most widespread form of application in quality control.

### 5 Installation

#### 5.1

Dimension measuring device. such as vernier caliper or micrometer, used to measure the width of the specimen and the length of the bonding area, with the minimum graduation value not greater than 0.05 mm.

#### 5.2

Tensile testing machine. The tensile testing machine selected should be such that the breaking load of the specimen is between 10% and 80% of the full-scale load.

The response time should be short enough to accurately measure the force applied when the specimen fails. The error of the force indication of the testing machine should not be greater than 1%.

The tensile test fixture shall comply with the maximum permissible coaxiality requirements in GB/T 16491. The testing machine shall maintain the constant