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## Carbon fiber composite materials - Method for planar biaxial tensile testing of laminates

碳纤维复合材料 层合板平面双轴拉伸试验方法

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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.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the National Technical Committee on Carbon Fiber Standardization (SAC/TC572).

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## 1 Scope

This document describes the principles, equipment and instruments, specimens, test conditions, and test methods of biaxial tensile testing of carbon fiber composite laminates.

Preparation, test steps, data processing and test report, etc.

This document is applicable to the in-plane biaxial tensile test of carbon fiber composite 0/90 cross-ply laminates.

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## 2 Normative references

GB/T 40724

## 3 Terms and Definitions

The terms and definitions defined in GB/T 40724 apply to this document.

## 4 Principles

Apply an orthogonal tensile load parallel to the specimen plane to the cross-shaped specimen, and simultaneously and continuously measure the stress in the central test area of the cross-shaped specimen.

The maximum failure strain of the central test area in the X-axis direction, Y-axis direction and 45° direction is obtained.

### 5.1 Biaxial testing machine

The biaxial testing machine meets the following requirements.

a) Clamping end flatness. The centers of the four clamping ends should be located in the same plane, and the flatness error should not be greater than 0.1mm;



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b) Loading coaxiality. The verticality error of two mutually perpendicular loading axes should be controlled within the range of ±0.1°; the two relative clamps on each axis should be controlled within the range of ±0.1°.

The coaxiality error of the head should be controlled within the range of ±0.1°;

c) Actuator configuration. should be equipped with four independently controlled actuators;

d) Control mode. It should have multiple control modes such as constant load ratio and constant displacement ratio;

e) Data recording function. It should be able to simultaneously record the force and displacement data of four channels over time;

f) Fixture requirements. Hydraulic or mechanical wedge-shaped fixtures should be used. During the test, the fixture should ensure that the specimen does not slip;

g) Alignment requirements. The fixture should ensure that the center position of the specimen is consistent with the center position of the testing machine when clamping, and the center deviation should not exceed 0.1mm.

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