

ICS 83.120

CCS Q 23



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

GB/T 43938.3-2026

**Test method for the mechanical properties of thin-walled
carbon fibre reinforced composite tubes - Part 3: Cantilever
beam bending test**

碳纤维增强复合材料薄壁管件力学性能试验方法 第3部分：悬臂梁弯曲试验

Issued on: January 28, 2026

Implemented on: August 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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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 3 of GB/T 43938 "Test Methods for Mechanical Properties of Thin-Walled Pipes Reinforced with Carbon Fiber". GB/T 43938 has published the following parts.

1. Tensile Testing;

2. Compression Test;

3. Cantilever Beam Bending Test. 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 prepared by the National Technical Committee on Carbon Fiber Standardization (SAC/TC572) and the National Technical Committee on Standardization of Aerospace Technology and its Applications. It was jointly proposed and is under the jurisdiction of the SAC/TC425. This document was drafted by: Beijing Satellite Manufacturing Plant Co., Ltd., China Aerospace Standardization Institute, Dalian University of Technology, and Aerospace Materials and Engineering. Art Research Institute, Xi'an Aerospace Composite Materials Research Institute, Shanghai Composite Materials Technology Co., Ltd., Tianjin Aerospace Ruilai Technology Co., Ltd., Suzhou Hai Seagull Flying Automobile Co., Ltd., Jiangsu Tianniao High-Tech Co., Ltd., Beijing Electronic Engineering General Research Institute, Zhejiang Sci-Tech University. The main drafters of this document are: Hui Tianli, He Nan, Tang Xiaojun, Wang Tiantian, Wang Bo, Xin Liang, Ma Ning, Xu Lixia, Liu Lixia, Yang Yaodong, and Jiang Mingxia. Lü Haiqing, Tian Xin, Yu Wentao, Feng Jindan, Tian Kuo, Gu Xuhan, Mu Cheng, Yan Zhengang, Lin Haibo, Li Xiyan, Zeng Jinfang, Tian Jie, Ning Weiwei, Yan Jun Liu Xiang, Li Ang, and Pan Yunfeng.

Carbon fiber reinforced composite thin-walled tubular fittings are used in aerospace, shipbuilding, automotive, and sporting goods industries due to their excellent properties such as lightweight and high strength. Its industrial applications are becoming increasingly widespread. GB/T 43938 aims to standardize the mechanical property test methods for this type of product and consists of three parts.

1. Tensile Testing. The purpose is to further standardize the tensile testing methods for thin-walled tubes made of carbon fiber reinforced composite materials.
 2. Compression Test. The purpose is to further standardize the compression test method for carbon fiber reinforced composite thin-walled tubular components.
 3. Cantilever Beam Bending Test. The aim is to further standardize the cantilever beam bending test for carbon fiber reinforced composite thin-walled tubular components. Curved test method. Mechanical properties of carbon fiber reinforced composite thin-walled pipes
- Test Methods Part

1 Scope

GB/T 43938.3-2026 is the Chinese national standard covering bending a thin composite tube as a cantilever - the loading a robot arm, a mast or a rotor spar actually sees, and one where the tube fails by local buckling of the wall rather than by the fibres breaking. Part 3 of the series, first edition, with GB/T 47083-2026 on thermal expansion of the same tubes. It was issued on 28 January 2026 and has been in force since 1 August 2026, 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 2026 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 specifies the test principle, specimens, test conditions, and equipment for the cantilever beam bending test of carbon fiber reinforced composite thin-walled tubular components. Preparation, test procedures, data processing, and test reports. This document applies to cantilever beam bending of carbon fiber reinforced composite thin-walled tubular components with a wall thickness not exceeding 1 mm and a nominal outer diameter less than 50 mm. Curved test.

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 1446 General Rules for Test Methods of Properties of Fiber Reinforced Plastics

GB/T 7124 Determination of tensile shear strength of adhesives (rigid material to rigid material)

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4. Experimental Principle As shown in Figure 1, one end of the carbon fiber reinforced composite thin-walled tube sample is fixedly installed, and the sample is mounted on the upper surface, lower surface, or other surfaces where necessary. Strain measurement points were placed at the target location, and deflection measurement points were placed on the upper surface. At the other end, a load perpendicular to the initial axis of the specimen was applied in stages. The load is applied in the same direction until the test load value is reached or the specimen fails or becomes unstable, and during the loading process... Record the strain, deflection, and applied load values of the specimen to obtain performance parameters such as deflection, bending stiffness, and bending load capacity of the specimen.