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

GB/T 43938.2-2024

**Test method for mechanical properties of thin-walled tube of
carbon fiber reinforced composite - Part 2: Compressive testing**

碳纤维增强复合材料薄壁管件力学性能试验方法 第2部分：压缩试验

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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: This document is Part 2 of GB/T 43938 "Test methods for mechanical properties of thin-walled pipes made of carbon fiber reinforced composite materials": GB/T 43938 has published the following parts:

--- Part 1: Tensile test;

--- Part 2: Compression test: 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 was prepared by the National Technical Committee on Standardization of Aerospace Technology and Its Applications (SAC/TC425) and the National Technical Committee on Standardization of Carbon Fibers It was jointly proposed and coordinated by the Committee (SAC/TC572): This document was drafted by: Beijing Satellite Manufacturing Co., Ltd., Xi'an Aerospace Composite Materials Research Institute, Ningbo Zhongke Xianglong Lightweight Technology Co., Ltd., Jiaying Ruixin Innovation Materials Co., Ltd., Ningbo Keyu Aerospace Electronics Technology Co., Ltd., China Aerospace Standardization Institute, Shanghai Fu He Material Technology Co., Ltd., Aerospace Materials and Technology Research Institute, Xi'an Space Radio Technology Research Institute, Langfang Feize Composite Materials Technology Co., Ltd: and Hunan Xingtu Aerospace Manufacturing Co., Ltd: The main drafters of this document are: Liu Lixia, Wang Yang, Tian Guizhi, Ma Qiang, Ma Xiaofei, Li Yu, Liu Jia, Zeng Jinfang, Yan Guangqiang, Chen Weiqiang, Jiang Mingxia, Wu Bin, Wang Tiantian, Tian Jie, Gu Xuhan, Sheng Tao, Rong Jian, Hui Tianli, Huang Ruchao, Zhang Hao, Zhou Yanming, Wang Zhen, Shen Fangzhen, Xin Chaobo, Wang Rong:

Carbon fiber reinforced composite thin-wall pipes are widely used in aviation, aerospace, shipbuilding, automobile, sports goods and other industries due to their excellent properties such as light weight and high strength: GB/T 43938 aims to standardize the mechanical properties test methods of this type of products and is intended to consist of two parts:

--- Part 1: Tensile test: The purpose is to further standardize the tensile test method for carbon fiber reinforced composite thin-walled pipes:

--- Part 2: Compression test: The purpose is to further standardize the compression test method for carbon fiber reinforced composite thin-walled pipes: Mechanics of Carbon Fiber Reinforced Composite Thin-Wall Pipes Performance test methods Part 2: Compression test

1 Scope

GB/T 43938.2-2024 gives the compression test method for thin-walled carbon fibre composite tubes. Thin-walled composite tube is a structural element in its own right, in drive shafts, robot arms, masts, frames and satellite structures, and it cannot be characterised by testing flat coupons cut from it: its compressive behaviour is governed by buckling of the tube wall and by the end conditions, so what is measured is a structural property of the tube rather than a material property. The standard addresses that directly. It sets the principle, the specimen, its length to diameter ratio and the end preparation and potting that prevents brooming, the fixture and the alignment requirements, the instrumentation with strain gauges or extensometers, the conditioning, the loading rate, the recording of the load and deformation, the identification of the failure mode and the rejection of invalid modes, the calculation of the compressive strength and modulus, the statistics and the report. It took effect on 1 August 2024.

This document specifies the test specimens, test conditions, equipment, and test methods for the axial compression performance test of carbon fiber reinforced composite thin-walled pipes: Steps, data processing and test report, etc: This document is applicable to the determination of the axial direction of fiber reinforced composite thin-walled pipes with a wall thickness not exceeding 1 mm and a nominal diameter less than 50 mm: The compressive strength and axial compressive elastic modulus can be used as a reference for other fiber reinforced composite thin-walled pipe fittings:

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 to This document:

GB/T 1446-2005 General principles for test methods for properties of fiber reinforced plastics

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

3 Terms and definitions

There are no terms or definitions that require definition in this document: 4: Samples 4:

1 Specimen type The test specimen type is as specified in Figure 1:

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