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

GB/T 46063-2025

**Continuous fiber reinforced ceramic matrix composite - Test
method for hoop tensile properties of tubes at room
temperature**

(English Translation)

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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 modified to adopt ISO 21971:2019 "Fine ceramics (advanced ceramics, advanced technical ceramics) - Ceramic matrix composites - Room temperature and humidity control".

Determination of the circumferential tensile properties of pipes under compression mechanical properties.

Compared with ISO 21971:2019, this document has undergone many structural adjustments. A table comparing the changes in structural numbering between the two documents is provided.

See Appendix A.

This document differs significantly from ISO 21971:2019. The relevant clauses are indicated in vertical margins.

Single lines (-) are indicated. A summary of these technical differences and their causes can be found in Appendix B.

The following editorial changes have been made to this document.

---To align with existing standards, the standard name has been changed to "Room Temperature Circumferential Tensile Properties of Continuous Fiber Reinforced Ceramic Matrix Composite Pipes".

Test Methods;

---Notes in sections 3.11, 5.3.2.1, 5.3.2.2, 5.3.3.4, 6.1.4, 7.3.1, and 7.3.5 of ISO 21971:2019 have been removed;

---All headings in Chapter 9 of ISO 21971:2019 have been removed, and test reports are presented in list format;

---Appendix A (informative) "Comparison of Structure Numbers in this Document with ISO 21971:2019" has been added;

---Added Appendix B (Informative) "Technical Differences between this Document and ISO 21971:2019 and Their Reasons".

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 by the China Building Materials Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Industrial Ceramics (SAC/TC194).

1 Scope

This document describes a method for testing the room temperature circumferential tensile properties of continuous fiber-reinforced ceramic matrix composite tubular samples. Composite tubing the fiber braiding structure and sample geometry of the sample differ from those of the flat plate sample; therefore, this method is only applicable to the circumferential tensile testing of composite tubular samples.

Performance testing.

This document describes the circumferential tensile properties (such as circumferential tensile strength and circumferential fracture stress) of continuous fiber reinforced ceramic matrix composite tube samples.

Test methods for (variable, circumferential elastic modulus and Poisson's ratio).

This document applies to the circumferential tensile properties of unidirectional, bidirectional, or multidirectional continuous fiber reinforced ceramic matrix and/or glass matrix composite tubing.

Measurement.

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 1216 Outside Micrometer GB/T 12160 Calibration of extensometer systems for uniaxial testing of metallic materials (GB/T 12160-2019, ISO 9513:2012) IDT) GB/T 17991 Terminology for Fine Ceramics (GB/T 17991-2009, ISO 20507:2022, MOD) GB/T 21389 Vernier, dial indicator and digital calipers GB/T 22093 Electronic Digital Micrometer

3 Terms and Definitions

The terms and definitions defined in GB/T 17991 and the following terms and definitions apply to this document.

calibrated length

The length of the sample with a uniform, minimum cross-sectional area.

gauge length

The initial distance between reference points within the calibration length.

outer diameterexternaldiameter do the diameter of the outer circle of the cross-section of the tubular sample within the gauge length.