



ISO 4255:2025(en)

First edition

2025-07

[Corrected version: 2025-12](#)

**Fine ceramics (advanced ceramics, advanced technical ceramics) —
Mechanical properties of ceramic composites at high temperature —
Determination of axial tensile properties of tubes**

*Céramiques techniques — Propriétés mécaniques des composites céramiques à haute température —
Détermination des propriétés en traction axiale de tubes*

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 206, *Fine ceramics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 184, *Advanced technical ceramics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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[This corrected version of ISO 4255:2025 incorporates the following corrections:](https://standards.iso.org/iso/catalog/standard/iso/a29b6e01-2eee-45f6-aec1-1a135c28a24d/iso-4255-2025)

— [corrected symbol in 0:](#)

— [added subclause number \(9.5.1\).](#)

Fine ceramics (advanced ceramics, advanced technical ceramics) — Mechanical properties of ceramic composites at high temperature — Determination of axial tensile properties of tubes

1 Scope

This document specifies the conditions for determination of the axial tensile properties of ceramic matrix composite (CMC) tubes with continuous fibre-reinforcement at elevated temperature in air, vacuum and inert gas atmospheres. The applicability of this document is specific to tubular geometries because fibre architecture and specimen geometry factors in composite tubes are distinctly different from those in flat specimens.

This document provides information on the axial tensile properties and stress-strain response in temperature, such as axial tensile strength, axial tensile strain at failure and elastic constants. The information can be used for material development, control of manufacturing (quality insurance), material comparison, characterization, reliability and design data generation for tubular components.

This document addresses, but is not restricted to, various suggested test piece fabrication methods. This document is primarily applicable to ceramic matrix composite tubes with a continuous fibrous-reinforcement: unidirectional (1D, filament winding and tape lay-up), bi-directional (2D, braid and weave) and multi-directional (x D, with $x > 2$), tested along the tube axis.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3611, *Geometrical product specifications (GPS) — Dimensional measuring equipment — Design and metrological characteristics of micrometers for external measurements*

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 9513, *Metallic materials — Calibration of extensometer systems used in uniaxial testing*

ISO 17161, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Ceramic composites — Determination of the degree of misalignment in uniaxial mechanical tests*

ISO 19634, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Ceramic composites — Notations and symbols*

ISO 20507, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Vocabulary*

IEC 60584-1, *Thermocouples — Part 1: EMF specifications and tolerances*

ASTM E2208-02, *Standard Guide for Evaluating Non-Contacting Optical Strain Measurement Systems*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 19634 and ISO 20507 and the following apply.