
**Fine ceramics (advanced ceramics,
advanced technical ceramics) — Test
method for determining thermal
expansion coefficient and residual
stress of CVD ceramic coatings**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 206, *Fine ceramics*.

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.

Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for determining thermal expansion coefficient and residual stress of CVD ceramic coatings

1 Scope

This document specifies a test method for determining thermal expansion coefficient up to 2 300 K and the residual stress of chemical vapour deposition (CVD) ceramic coatings (thickness > 0,03 mm) at room temperature. Procedures for test piece preparation, test modes, heat rate, data collection, property calculations and reporting procedures are given.

This document applies to CVD ceramic coatings on metal or ceramic substrates. This test method can be used for material research, quality control, characterization and design data-generation purposes.

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: Micrometers for external measurements — Design and metrological characteristics*

ISO 17139, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Thermophysical properties of ceramic composites — Determination of thermal expansion*

ISO 19603, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for determining elastic modulus and bending strength of thick ceramic coatings*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

relative method

indirect test method to obtain the measured parameter

Note 1 to entry: The expected parameter A is usually difficult to measure directly, but parameters B and C are known parameters or easy to obtain. If the analytical relationship of $A = f(B, C)$ is established, the parameter A can be calculated.

3.2

linear thermal expansion

positive or negative change in one dimension that occurs when a material is subjected to a change in temperature