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Fine ceramics (advanced ceramics, advanced technical ceramics) — Mechanical properties of ceramic composites at room temperature — Determination of the interlaminar shear strength and shear modulus of continuous-fibre-reinforced composites by the compression of double-notched test pieces and by the Iosipescu test

Céramiques techniques — Propriétés mécaniques des céramiques composites à température ambiante — Détermination de la résistance au cisaillement interlaminaire et du module de cisaillement des composites renforcés par des fibres continues, par la compression d'éprouvettes à double entaille et par l'essai Iosipescu

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Foreword

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

This second edition cancels and replaces the first edition (ISO 20505:2005), which has been technically revised.

The main changes are as follows:

— Scope revised to include the possibility of measuring the interlaminar shear modulus through the use of a gauges-instrumented Iosipescu sample;

— new entries added to Clause 3;

— 5.3 and 7.2 specify requirements on the gauges-instrumented Iosipescu sample;

— 9.3, 9.4 and 9.5 define formulae to determine the shear modulus;

— material orientation added to Figure 2 and Figure 3;

— subclause on test validity added (8.4);

— Table 1 and Table 2 updated;

— Annex A replaced by a method to verify the shear stress field in the Iosipescu test to ensure that that there are no coupling effects that make this document unsuitable for determining the interlaminar shear properties of the material;

— minor editorial corrections;

— structure revised;

— symbols and notation modified in accordance with ISO 19634.

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Fine ceramics (advanced ceramics, advanced technical ceramics) — Mechanical properties of ceramic composites at room temperature — Determination of the interlaminar shear strength and shear modulus of continuous-fibre-reinforced composites by the compression of double-notched test pieces and by the Iosipescu test

1 Scope

This document specifies a method for the determination of interlaminar shear strength at ambient temperature by the compression of a double-notched test piece and a method for the determination of interlaminar shear strength and modulus at ambient temperature by the Iosipescu test. This document applies to all ceramic matrix composites with a continuous fibre reinforcement, having unidirectional (1D), bidirectional (2D) and multidirectional (xD, with x > 2) fibre architecture, where a major part of reinforcements is a stack of plies.

This document is applicable to material development, material comparison, quality assurance, characterization, reliability and design data generation. The simpler compression test method of a double-notched test piece is applicable only when the shear strength has to be measured.

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 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 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, *Advanced ceramics — Vocabulary*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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