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ADVANCED TECHNICAL CERAMICS - MECHANICAL PROPERTIES OF CERAMIC COMPOSITES AT HIGH TEMPERATURE IN AIR AT ATMOSPHERIC PRESSURE - DETERMINATION OF TENSILE PROPERTIES

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Advanced technical ceramics - Mechanical properties of ceramic composites at high temperature in air at atmospheric pressure - Determination of tensile properties

Céramiques techniques avancées - Propriétés mécaniques des céramiques composites à haute température sous air à la pression atmosphérique - Détermination des caractéristiques en traction

Hochleistungskeramik - Mechanische Eigenschaften von keramischen Verbundwerkstoffen bei hoher Temperatur in Luft bei Atmosphärendruck - Bestimmung der Eigenschaften unter Zug

This European Standard was approved by CEN on 15 March 2005.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Contents

Foreword

This document (EN 1893:2005) has been prepared by Technical Committee CEN/TC 184 “Advanced technical ceramics”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

This document supersedes ENV 1893:1996.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies the conditions for determination of tensile properties of ceramic matrix composite materials with continuous fibre reinforcement for temperatures up to 1 700 °C in air at atmospheric pressure.

This document applies to all ceramic matrix composites with a continuous fibre reinforcement, unidirectional (1D), bi-directional (2D), and tri-directional (xD, with $2 < x \leq 3$), loaded along one principal axis of reinforcement.

NOTE 1 In most cases, ceramic matrix composites to be used at high temperature in air are coated with an anti-oxidation coating.

NOTE 2 The purpose of this document is to determine the tensile properties of a material when it is placed under an oxidizing environment but not to measure material oxidation.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 60584-1, *Thermocouples; Part 1: Reference tables (IEC 60584-1:1995)*

EN 60584-2, *Thermocouples; Part 2: Tolerances (IEC 60584-2:1982 + A1:1989)*

EN ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system (ISO 7500-1:2004)*

ISO 3611, *Micrometer callipers for external measurement*

3 Terms, definitions and symbols

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

3.1
test temperature, T
temperature of the test piece at the centre of the gauge length

3.2
calibrated length, l
part of the test specimen that has uniform and minimum cross-section area

3.3
gauge length, L_o
initial distance between reference points on the test specimen in the calibrated length

3.4
controlled temperature zone
part of the calibrated length including the gauge length where the temperature is controlled to within 50 °C of the test temperature

3.5
initial cross-section area, S_o
initial cross-section areas of the test specimen within the calibrated length, at test temperature