



National Standards Authority of Ireland

IRISH STANDARD

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ICS 81.060.30

**ADVANCED TECHNICAL CERAMICS -  
MECHANICAL PROPERTIES OF CERAMIC  
COMPOSITES AT HIGH TEMPERATURE  
UNDER INERT ATMOSPHERE -  
DETERMINATION OF SHEAR STRENGTH BY  
COMPRESSION LOADING OF  
NOTCHED SPECIMENS**

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EUROPEAN STANDARD

**EN 1894**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 81.060.30

Supersedes ENV 1894:1996

English version

**Advanced technical ceramics - Mechanical properties of ceramic  
composites at high temperature under inert atmosphere -  
Determination of shear strength by compression loading of  
notched specimens**

Céramiques techniques avancées - Propriétés mécaniques  
des céramiques composites à haute température sous  
atmosphère neutre - Détermination de la résistance au  
cisaillement par compression d'éprouvettes entaillées

Hochleistungskeramik - Mechanische Eigenschaften von  
keramischen Verbundwerkstoffen bei hoher Temperatur in  
inertter Atmosphäre - Bestimmung der Scherfestigkeit durch  
Druckbeanspruchung von gekerbten Proben

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

CEN members are bound to comply with the CEN/GENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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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## **Foreword**

This document (EN 1894:2005) 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of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.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 1894:1996.

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.

## EN 1894:2005 (E)

### 1 Scope

This document specifies the conditions for determination of the inter-laminar shear strength of ceramic matrix composite materials with continuous fibre reinforcement for temperatures up to 2 000 °C under a vacuum, or a gas atmosphere, which is inert to the material under test, by loading of notched specimens in compression.

NOTE 1 The use of a vacuum or a gas atmosphere is aimed at avoiding changes of the material to be tested due to chemical reaction with its environment during the test.

This document applies to all ceramic matrix composites with continuous fibre reinforcement, unidirectional (1D), bidirectional (2D), and tridirectional ( $x$ D, with  $2 < x < 3$ ), loaded along one principal axis of reinforcement.

NOTE 2 Care should be exercised in interpreting the results of the test method to obtain absolute values of the inter-laminar shear strength of ceramic matrix composites for design purposes.

### 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 Definitions and symbols

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

#### 3.1

**test temperature,  $T$**

temperature at the centre of the test piece

#### 3.2

**shear failure force,  $F$**

maximum force required during a test carried out up to failure

#### 3.3

**interlaminar shear strength,  $ILSS$**

ratio calculated on the basis of the shear failure force and the shear loaded area

### 4 Principle

The test consists of measuring the force required to fracture a transversely notched test specimen of defined shape and dimensions, heated to the test temperature and subjected to compressive loading in direction 1 or 2, such that failure occurs in the form of inter-laminar shear in plane 12. The test is performed at constant crosshead displacement rate.

NOTE The test duration is limited to reduce creep effects.

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