



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 15157:2006

ICS 81.060.30

**ADVANCED TECHNICAL CERAMICS -
MECHANICAL PROPERTIES OF CERAMIC
COMPOSITES AT HIGH TEMPERATURE IN AIR
AT ATMOSPHERIC PRESSURE -
DETERMINATION OF FATIGUE PROPERTIES
AT CONSTANT AMPLITUDE**

National Standards
Authority of Ireland
Glasnevin, Dublin 9
Ireland

Tel: +353 1 807 3800
Fax: +353 1 807 3838
<http://www.nsai.ie>

Sales
<http://www.standards.ie>

*This Irish Standard was
published under the
authority of the National
Standards Authority of
Ireland and comes into
effect on:*

4 October 2006

**NO COPYING WITHOUT NSAI
PERMISSION EXCEPT AS
PERMITTED BY COPYRIGHT
LAW**

© NSAI 2006

Price Code G

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 15157

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2006

ICS 81.060.30

English Version

**Advanced technical ceramics - Mechanical properties of ceramic
composites at high temperature in air at atmospheric pressure -
Determination of fatigue properties at constant amplitude**

Céramiques techniques avancées - Propriétés mécaniques
des céramiques composites à haute température dans l'air
à pression atmosphérique - Détermination des propriétés
de fatigue à amplitude constante

Hochleistungskeramik - Mechanische Eigenschaften von
keramischen Verbundwerkstoffen bei hoher Temperatur in
Luft bei Atmosphärendruck - Bestimmung der
Dauerschwingeigenschaften bei Belastung mit konstanter
Amplitude

This European Standard was approved by CEN on 14 July 2006.

CEN members are bound to comply with the CEN/CENELEC 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.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms, definitions and symbols.....	5
4 Principle.....	8
5 Significance and use	8
6 Apparatus	9
6.1 Fatigue test machine	9
6.2 Load train.....	9
6.3 Set-up for heating	10
6.4 Extensometer	10
6.5 Temperature measurement.....	10
6.6 Data recording system	10
6.7 Micrometers.....	10
7 Test specimens	11
8 Test specimen preparation	12
8.1 Machining and preparation.....	12
8.2 Number of test specimens	12
9 Test procedure	12
9.1 Test set-up: temperature considerations.....	12
9.2 Measurement of test specimen dimensions	13
9.3 Testing technique	13
9.4 Test validity	14
10 Calculation of results	14
10.1 Time to failure, t_f	14
10.2 Damage parameters	15
10.3 Residual properties	15
11 Test report	17
Annex A (informative) Schematic evolution of <i>E</i>	18

Foreword

This document (EN 15157:2006) 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 February 2007, and conflicting national standards shall be withdrawn at the latest by February 2007.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 15157:2006 (E)

1 Scope

This European Standard specifies the conditions for the determination of constant-amplitude of load or strain in uniaxial tension/tension or in uniaxial tension/compression cyclic fatigue properties of ceramic matrix composite materials (CMCs) with fibre reinforcement for temperature up to 1 700 °C in air at atmospheric pressure.

This European Standard applies to all ceramic matrix composites with fibre reinforcement, unidirectional (1D), bi-directional (2D), and tri-directional (xD, where $2 < x \leq 3$).

The purpose of this European Standard is to determine the behaviour of CMC when subjected to mechanical fatigue and oxidation simultaneously. Tests for the determination of fatigue properties at high temperature in inert atmospheres differ from those in oxidative atmospheres. Contrary to an inert atmosphere, damage in an oxidative atmosphere accumulates due to the influence of purely mechanical fatigue and to chemical effects of the material's 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 658-1, *Advanced technical ceramics — Mechanical properties of ceramic composites at room temperature — Part 1: Determination of tensile properties*

EN 1892, *Advanced technical ceramics — Mechanical properties of ceramic composites at high temperature under inert atmosphere — Determination of tensile properties*

EN 1893, *Advanced technical ceramics — Mechanical properties of ceramic composites at high temperature in air at atmospheric pressure — Determination of tensile properties*

EN 12291, *Advanced technical ceramics — Mechanical properties of ceramic composites at high temperature in air at atmospheric pressure — Determination of compression properties*

prCEN/TR 13233:2007¹, *Advanced technical ceramics — Notations and symbols*

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

EN 60584-2, *Thermocouples — Part 2: Tolerances (IEC 60584-2:1982)*

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)*

EN ISO 9513, *Metallic materials — Calibration of extensometers used in uniaxial testing (ISO 9513:1999)*

ISO 3611, *Micrometer callipers for external measurement*

¹ To be published in 2007

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-