Advanced technical ceramics - Ceramic composites - Thermophysical properties - Part 2: Determination of thermal diffusivity

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EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 1159-2:2003 sisaldab Euroopa standardi EN 1159-2:2003 ingliskeelset teksti. Käesolev dokument on jõustatud 14.10.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 1159-2:2003 consists of the English text of the European standard EN 1159-2:2003. This document is endorsed on 14.10.2003 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This part of EN 1159 describes the laser flash method for the determination of thermal diffusivity of ceramic matrix composites with continuous fibre reinforcement. The experimental conditions are such that the material behaves in an homogeneous manner for each of its axes of anisotropy and that the heat transfer occurs only by thermal conduction	**Scope:** This part of EN 1159 describes the laser flash method for the determination of thermal diffusivity of ceramic matrix composites with continuous fibre reinforcement. The experimental conditions are such that the material behaves in an homogeneous manner for each of its axes of anisotropy and that the heat transfer occurs only by thermal conduction

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English version

Advanced technical ceramics - Ceramic composites - Thermophysical properties - Part 2: Determination of thermal diffusivity

Céramiques techniques avancées - Céramiques composites - Propriétés thermophysiques - Partie 2: Détermination de la diffusivité thermique

Hochleistungskeramik - Keramische Verbundwerkstoffe - Thermophysikalische Eigenschaften - Teil 2: Bestimmung der Temperaturleitfähigkeit

This European Standard was approved by CEN on 1 August 2003.

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 Management Centre 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 Management Centre has the same status as the official versions.

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

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

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Foreword

This document (EN 1159-2:2003) 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 March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.

EN 1159 consists of four parts :

— *Part 1 : Determination of thermal expansion*

— *Part 2 : Determination of thermal diffusivity*

— *Part 3: Determination of specific heat capacity*

— *Part 4: Determination of thermal conductivity*

Annex A is informative.

The document supersedes ENV 1159-2:1993.

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

1 Scope

This part of EN 1159 describes the laser flash method for the determination of thermal diffusivity of ceramic matrix composites with continuous fibre reinforcement.

The experimental conditions are such that the material behaves in an homogeneous manner for each of its axes of anisotropy and that the heat transfer occurs only by thermal conduction.

The method is applicable to materials which are physically and chemically stable during the measurement, and covers the range of temperature between 100 K and 2 800 K. It is suitable for the measurement of thermal diffusivity values in the range between 10^{-4} m^2 s^{-1} and 10^{-7} m^2 s^{-1}.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ENV 843-5, *Advanced technical ceramics — Monolithic ceramics — Mechanical tests at room temperature — Part 5 : Statistical analysis.*

ENV 13233, *Advanced technical ceramics — Ceramic composites — Notations and symbols.*

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

ISO 3611, *Micrometer callipers for external measurement.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in ENV 13233 and the following apply.

3.1
thermal diffusivity, a
ratio of the thermal conductivity to the product of the bulk density and the specific heat capacity

3.2
transient half time, $t_{1/2}$
time from the initiation of the pulse until the increase of the temperature on the back face of the test specimen reaches one half of the maximum temperature increase

3.3
thickness, h
dimension of the test specimen in the direction of heat transfer measurement

4 Principle

One side of a plane and parallel test piece is exposed to a uniformly distributed energy pulse that is of very short duration compared to the transient half time.