Advanced technical ceramics - Monolithic ceramics. Thermophysical properties - Part 3: Determination of specific heat capacity

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EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 821-3:2005 sisaldab Euroopa standardi EN 821-3:2005 ingliskeelset teksti. Käesolev dokument on jõustatud 22.02.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 821-3:2005 consists of the English text of the European standard EN 821-3:2005. This document is endorsed on 22.02.2005 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 Standard specifies two methods for the determination of specific heat capacity of advanced monolithic technical ceramic materials based on drop calorimetry (method A) and differential scanning calorimetry (DSC, method B) over a temperature range from room temperature upwards, depending on the design of the equipment. Method A may be used for measurements up to temperatures of 2000 °C, and method B for measurements up to 1400 °C.	**Scope:** This Standard specifies two methods for the determination of specific heat capacity of advanced monolithic technical ceramic materials based on drop calorimetry (method A) and differential scanning calorimetry (DSC, method B) over a temperature range from room temperature upwards, depending on the design of the equipment. Method A may be used for measurements up to temperatures of 2000 °C, and method B for measurements up to 1400 °C.

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Advanced technical ceramics - Monolithic ceramics. Thermophysical properties - Part 3: Determination of specific heat capacity

Céramiques techniques avancées - Céramiques monolithiques. Propriétés thermophysiques - Partie 3 : Détermination de la chaleur spécifique

Hochleistungskeramik - Monolithische Keramik - Thermophysikalische Eigenschaften - Teil 3: Bestimmung der spezifischen Wärmekapazität

This European Standard was approved by CEN on 9 December 2004.

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.

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

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

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Contents

Foreword

This document (EN 821-3:2005) 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 August 2005, and conflicting national standards shall be withdrawn at the latest by August 2005.

EN 821 *Advanced technical ceramics — Monolithic ceramics - Thermo-physical properties* consists of the following parts:

Part 1: *Determination of thermal expansion*

Part 2: *Determination of thermal diffusivity by the laser flash (or heat pulse) method*

Part 3: *Determination of specific heat capacity*

This document supersedes ENV 821-3:1993

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 two methods for the determination of specific heat capacity of advanced monolithic technical ceramic materials based on drop calorimetry (Method A) and differential scanning calorimetry (DSC, Method B) over a temperature range from room temperature upwards, depending on the design of the equipment.

NOTE 1 The methods described apply in the case of test materials free from phase transformations, annealing effects or partial melting. If any such effect occurs in a material over the temperature range of the test, spurious results will be obtained unless the data are carefully analysed. In such cases it is usually necessary to conduct repeat tests at a number of temperatures close to the discontinuity, in order to estimate correctly its contribution to the apparent heat capacity.

NOTE 2 Care should be exercised in both methods over the selection of the cell or crucible material and in the selection of the test atmosphere, especially at high temperatures. Test pieces can react with the crucible or the atmosphere, leading to spurious results. In general, an awareness of such problems should be maintained at all times. Especially with regard to Method B, awareness should also be maintained of radiation effects at temperatures above 1000 °C, and of the reproducibility of the output signal.

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*

EN 60584-2, *Thermocouples* Part 2: *Tolerances*

EN ISO/IEC 17025: 2000, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)*

3 Terms and definitions

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

3.1
enthalpy, ΔH
heat content of an object in joules released or absorbed as a result of a temperature change.

3.2
specific heat capacity, c_p
amount of heat (q) in joules required to raise the temperature of a 1 g mass by 1 °C at temperature T at constant pressure, in accordance with the equation

$$c_p = \frac{dq}{dT} = \frac{1}{m}\frac{dQ}{dT} \quad (1)$$

where Q is the total heat required for a test piece of mass m.