EESTI STANDARD

EVS-EN 1159-1:2003

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Advanced technical ceramics - Ceramic composites - Thermophysical properties - Part 1: Determination of thermal expansion

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EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA	NATIONAL FOREWORD
Käesolev Eesti standard EVS-EN 1159-1:2003 sisaldab Euroopa standardi EN 1159-1:2003 ingliskeelset teksti. Käesolev dokument on jõustatud 14.08.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 1159-1:2003 consists of the English text of the European standard EN 1159-1:2003. This document is endorsed on 14.08.2003 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 methods for the determination of linear thermal expansion characteristics of ceramic matrix composite materials up to 2 300 K, and is applicable to 10, 2D and nD materials. The method describes general principles of construction calibration and operation of the equipment	**Scope:** This Part of EN 1159 describes methods for the determination of linear thermal expansion characteristics of ceramic matrix composite materials up to 2 300 K, and is applicable to 10, 2D and nD materials. The method describes general principles of construction calibration and operation of the equipment

ICS 81.060.30

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EUROPEAN STANDARD

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Advanced technical ceramics - Ceramic composites - Thermophysical properties - Part 1: Determination of thermal expansion

Céramiques techniques avancées - Céramiques composites - Propriétés thermophysiques - Partie 1: Détermination de la dilatation thermique

Hochleistungskeramik - Keramische Verbundwerkstoffe - Thermophysikalische Eigenschaften - Teil 1: Bestimmung der thermischen Ausdehrung

This European Standard was approved by CEN on 23 May 2003.

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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 Management Centre has the same status as the official versions.

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Contents

page

Foreword 3

1 Scope 4

2 Normative references 4

3 Terms and definitions 4

4 Principle 5
4.1 General 5
4.2 Direct measurement 5
4.3 Differential method 5

5 Apparatus 5
5.1 Construction materials 5
5.2 Heating and cooling device 5
5.3 Temperature measurement 5
5.4 Test piece mounting 5
5.5 System for measuring and recording the thermal expansion 6
5.6 Test piece measurement 6

6 Specimens 6
6.1 Test pieces 6
6.2 Reference pieces 6
6.3 Dimensions 7

7 Procedure 7

8 Calculations 7
8.1 Direct measurement 7
8.2 Differential method 8

9 Test report 9

Annex A (normative) Direct measurement apparatus 12
A.1 Determination of measurement sensitivity 12
A.2 Determination of $\overline{\alpha}_A$ 13

Annex B (normative) Differential type measurement apparatus 14
B.1 Determination of measurement sensitivity S 14
B.2 Determination of δ 14

Bibliography 15

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Foreword

This document (EN 1159-1:2003) 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 January 2004, and conflicting national standards shall be withdrawn at the latest by January 2004.

This document supersedes ENV 1159-1:1993.

EN 1159 'Advanced technical ceramics – Ceramic composites – Thermophysical properties' 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*

Annexes A and B are normative.

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.

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1 Scope

This Part of EN 1159 describes methods for the determination of linear thermal expansion characteristics of ceramic matrix composite materials up to 2 300 K, and is applicable to 10, 2D and nD materials.

The method describes general principles of construction calibration and operation of the equipment.

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).

EN 821-1, *Advanced technical ceramics - Monolithic ceramics - Thermo-physical properties - Part 1 : Determination of thermal expansion.*

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

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

ISO 3611, *Micrometer callipers for external measurement.*

ISO 6906, *Vernier callipers reading to 0,02 mm.*

3 Terms and definitions

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

3.1
linear thermal expansion
positive or negative change in one dimension that occurs when a material is subjected to a change in temperature

3.2
linear thermal expansion coefficient at temperature T
derivative of the length L with respect to temperature at the temperature T, divided by the length at temperature T

$$\alpha_{\mathrm{T}} = \frac{1}{L}\left(\frac{dL}{dT}\right)T \tag{1}$$

3.3
mean linear thermal expansion coefficient between temperatures T1 and T2
linear thermal expansion between temperatures T_1 and T_2 divided by the temperature increment T_1 to T_2 and the length at temperature T_1

$$\alpha\left(T_1,T_2\right)=\frac{L\left(T_2\right)-L\left(T_1\right)}{L\left(T_1\right)} \tag{2}$$

3.4
representative volume element (R.V.E.)
minimum volume which is representative of the material considered

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