Advanced technical ceramics - Ceramic composites - Physical properties - Determination of density and apparent porosity

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EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 1389:2004 sisaldab Euroopa standardi EN 1389:2003 ingliskeelset teksti. Käesolev dokument on jõustatud 27.04.2004 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 1389:2004 consists of the English text of the European standard EN 1389:2003. This document is endorsed on 27.04.2004 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 European Standard describes two methods for determination of the bulk density and open porosity of ceramic matrix composites with fibrous reinforcement. Two methods are described and are designated as Methods A and B, as follows :- method A : Determination of bulk density only by measurement of dimensions and mass ;- method B : Determination of bulk density and open porosity by liquid displacement	**Scope:** This European Standard describes two methods for determination of the bulk density and open porosity of ceramic matrix composites with fibrous reinforcement. Two methods are described and are designated as Methods A and B, as follows :- method A : Determination of bulk density only by measurement of dimensions and mass ;- method B : Determination of bulk density and open porosity by liquid displacement

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Võtmesõnad: advanced technical ceramics, bulk density, ceramics, composite materials, densimetry, immersion tests, physical properties, porosity measurement, reinforcing materials

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English version

Advanced technical ceramics - Ceramic composites - Physical properties - Determination of density and apparent porosity

Céramiques techniques avancées - Céramiques composites - Propriétés physiques - Détermination de la masse volumique et de la porosité apparente

Hochleistungskeramik - Keramische Verbundwerkstoffe - Physikalische Eigenschaften - Bestimmung der Dichte und scheinbaren Porosität

This European Standard was approved by CEN on 3 November 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
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Contents

Page

Foreword

This document (EN 1389:2003) has been prepared by Technical Committee CEN/TC 184 “Advanced technial 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 June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

This document supersedes ENV 1389:1994.

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 European Standard describes two methods for determination of the bulk density and open porosity of ceramic matrix composites with fibrous reinforcement.

Two methods are described and are designated as Methods A and B, as follows :

— method A : determination of bulk density only by measurement of dimensions and mass ;

— method B : determination of bulk density and open porosity by liquid displacement.

NOTE Method B is not suitable for the determination of the open porosity for materials which are known to have an average pore size of greater than 200 µm.

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 13233:1998, *Advanced technical ceramics – Ceramic composites – Notations and symbols.*

EN ISO 291, *Plastics – Standard atmospheres for conditioning and testing (ISO 291:1997).*

EN ISO 1675, *Plastics – Liquid resins – Determination of density by the pyknometer method (ISO 1675:1985)*.

ISO 758, *Liquid chemical products for industrial use – Determination of density at 20° C*.

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 13233:1998 and the following apply.

3.1
open pores
pores that are penetrated by an immersion liquid in vacuum, or that are connected with the atmosphere, either directly or via one to another

3.2
closed pores
pores that are not penetrated by the immersion liquid, or that are not connected with the atmosphere

3.3
open porosity π_a
ratio of the total volume of the open pores in a porous body to its bulk volume

3.4
bulk volume, V_b
sum of the volumes of the solid material, the open pores and the closed pores in a porous body