

Advanced technical ceramics — Notations and symbols

ICS 01.060; 01.075; 81.060.30

National foreword

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The UK participation in its preparation was entrusted to Technical Committee RPI/13, Advanced technical ceramics.

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Amendments issued since publication

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2007

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ISBN 978 0 580 60823 0

Amd. No.	Date	Comments
17519 Corrigendum No. 1	31 December 2007	See national foreword. Change to the identifier on the PD CEN/TR front cover, PD CEN/TR inside front cover and PD CEN/TR back page

English Version

Advanced technical ceramics - Notations and symbols

Céramiques techniques avancées - Notations et symboles

Hochleistungskeramik - Benennungen und Formelzeichen

This Technical Report was approved by CEN on 25 December 2006. It has been drawn up by the Technical Committee CEN/TC 184.

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Foreword

This document (CEN/TR 13233:2007) has been prepared by Technical Committee CEN/TC 184 “Advanced technical ceramics”, the secretariat of which is held by BSI.

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This document supersedes ENV 13233:1998.

1 Scope

This Technical Report defines the symbols to be used to represent physical, mechanical and thermal characteristics, as determined by methods described in relevant CEN publications, for advanced technical ceramics, including ceramic matrix composites. It is a guide for writing the symbols of quantities of these materials to avoid confusion in reporting measurements and characteristics of products.

Where possible, the definitions are in accordance with the relevant parts of ISO 31 and ISO 80000. In addition the symbols used in undertaking measurements of these characteristics are also defined.

2 Normative references

Not applicable.

3 Symbols, units and notations

3.1 General symbols

Contrary to monolithic materials, continuous fibre reinforced ceramic matrix composites show a directional dependence in their thermal and mechanical properties, because of their anisotropic nature. A specific set of standards different from those for monolithic materials is required in order to characterize these properties, both at room temperature and at the anticipated high application temperatures. To allow adequate representation of the directional dependence, a notation convention is needed to identify the reinforcement directions in a right-hand orthogonal coordinate system for purposes of sampling test pieces and for the presentation of results.

3.2 Symbols and notations specific to ceramic matrix composites

The use of the subscripts 1, 2, 3 attached to the symbols used for mechanical properties makes it possible to define the mechanical characteristics of a material along one of its principal directions. The use of the subscripts (12, 13, 23) attached to the symbols used for mechanical properties makes it possible to give a material characteristics in one of the principal planes, for example:

$\sigma_{1,t,m}$: tensile strength in the 1 direction;

G_{12} : shear modulus in the 12 plane.

Figures 1 to 4 give examples of denotation on long fibre ceramic matrix composite materials.

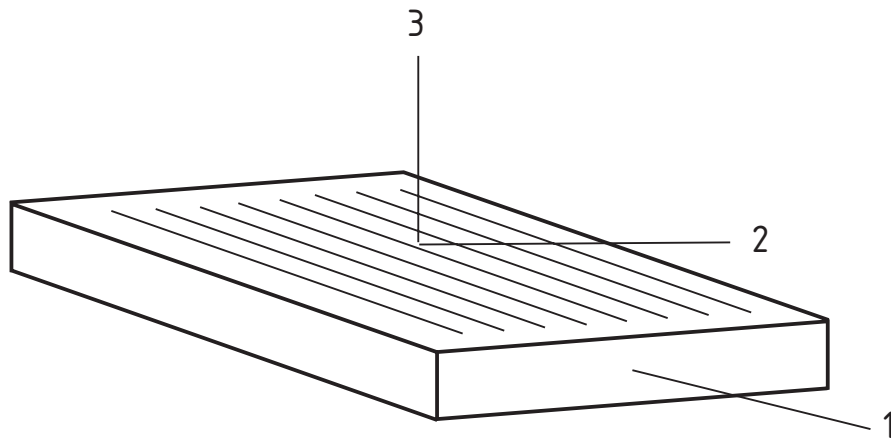


Figure 1 — Schematic diagram of a 1D material (see 3.2 for reference to axes 1, 2 and 3)

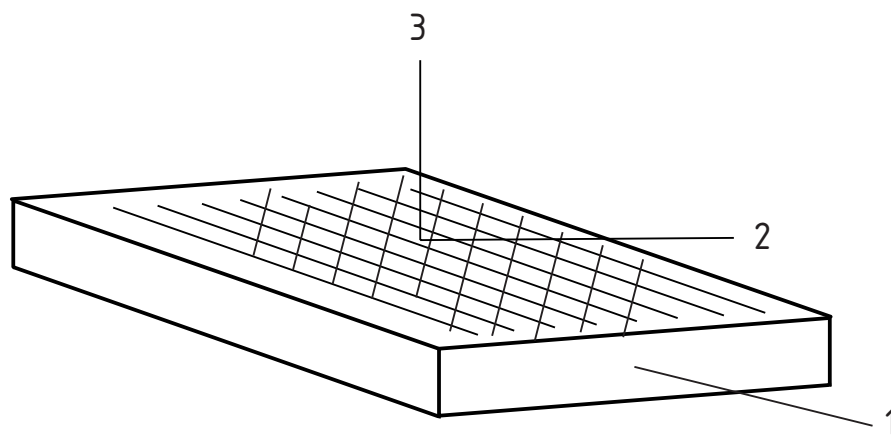


Figure 2 — Schematic diagram of a 2D material (see 3.2 for reference to axes 1, 2 and 3)

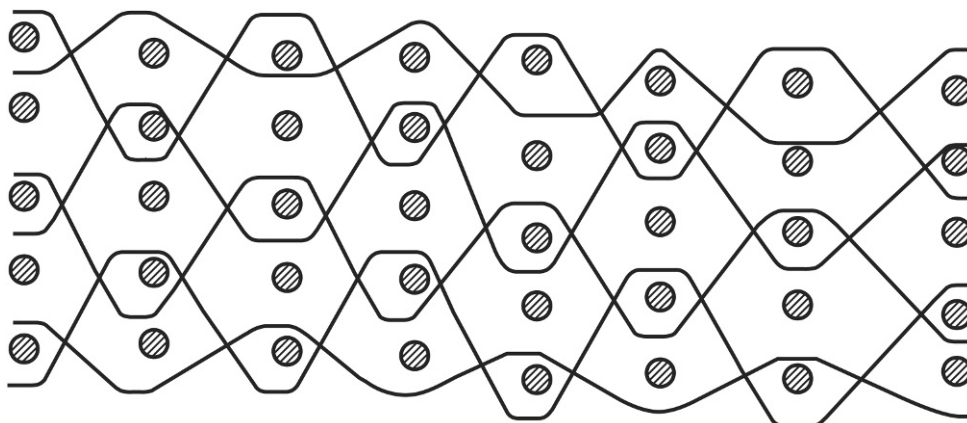


Figure 3 — Schematic diagram of an xD ($2 < x \leq 3$) material

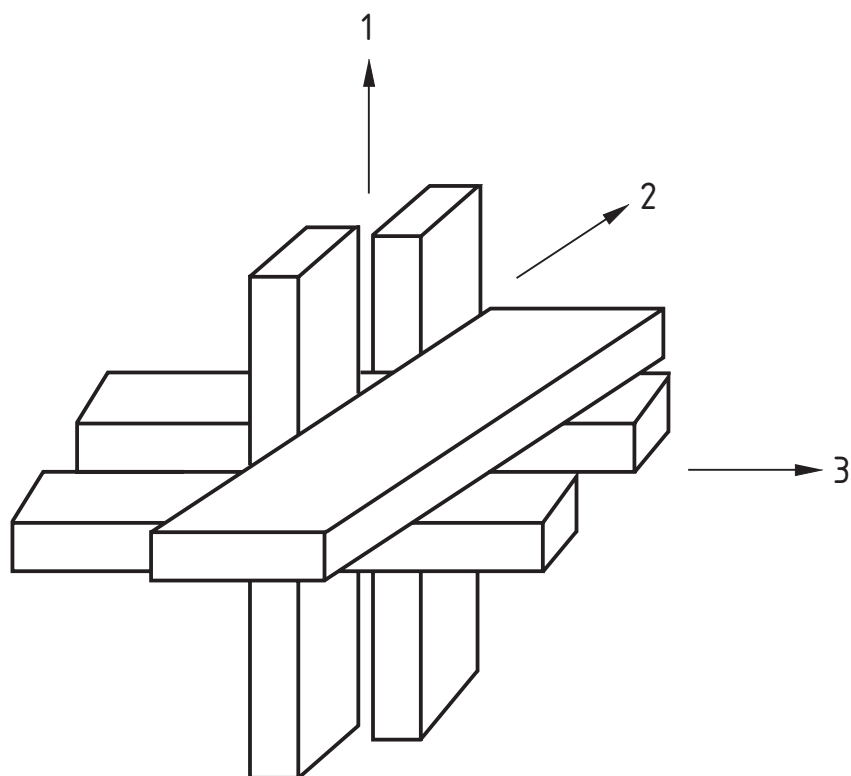


Figure 4 — Schematic diagram of a 3D material (see 3.2 for reference to axes 1, 2 and 3)