Nederlandse praktijkrichtlijn

NPR-CEN/TS 843-6 (en)

Advanced technical ceramics - Monolithic ceramics - Mechanical properties at room temperature - Part 6: Guidance for fractographic investigation

ICS 81.060.30

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Als Nederlandse praktijkrichtlijn is aanvaard:
- CEN/TS 843-6:2004,IDT

Normcommissie 342 032 "Technische keramiek"

NEN

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Nederlands voorwoord

Voor de in deze praktijkrichtlijn vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

vermelde norm	Nederlandse norm	titel
EN ISO/IEC 17025	NEN-EN-ISO/IEC 17025	Algemene eisen voor de competentie van beproevings- en kalibratielaboratoria (en,nl)

TECHNICAL SPECIFICATION

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CEN/TS 843-6

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English version

Advanced technical ceramics - Monolithic ceramics. Mechanical properties at room temperature - Part 6: Guidance for fractographic investigation

Céramiques techniques avancées - Céramiques monolithiques - Propriétés mécaniques à température ambiante - Partie 6: Guide pour l'analyse fractographique

Hochleistungskeramik - Monolithische Keramik - Mechanische Eigenschaften bei Raumtemperatur - Teil 6: Leitlinie für die fraktographische Untersuchung

This Technical Specification (CEN/TS) was approved by CEN on 17 November 2003 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document CEN/TS 843-6:2004 has been prepared by Technical Committee CEN/TC 184 “Advanced technical ceramics”, the secretariat of which is held by BSI.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

Annexes A to E are informative.

This document includes a Bibliography.

EN 843 *Advanced technical ceramics – Monolithic ceramics – Mechanical properties at room temperature* consists of six parts:

Part 1: *Determination of flexural strength*

Part 2: *Determination of elastic moduli*

Part 3: *Determination of subcritical crack growth parameters from constant stressing rate flexural strength tests*

Part 4: *Vickers, Knoop and Rockwell superficial hardness tests*

Part 5: *Statistical analysis*

Part 6: *Guidance for fractographic investigation*

At the time of publication of this Technical Specification, Part 1 is a European Standard, while Parts 2 to 5 are European Prestandards.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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 Technical Specification contains guidelines to be adopted when evaluating the appearance of the fracture surface of an advanced technical ceramic. The purpose in undertaking this procedure can be various, for example, for material development or quality assessment, to identify normal or abnormal causes of failure, or as a design aid.

NOTE Not all advanced technical ceramics are amenable to fractography. In particular, coarse-grained ceramics can show such rough surfaces that identifying the fracture origin may be impossible. Similarly, porous materials, especially those of a granular nature, tend not to fracture in a continuous manner, making analysis difficult.

2 Normative references

This Technical Specification 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 Technical Specification only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

3 Terms and definitions

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

3.1 General terms

3.1.1
crack
distinct microstructural discontinuity arising during or after manufacture caused by the action of thermal and/or mechanical stress and leading to the generation of new surfaces which do not completely separate

3.1.2
flaw
inhomogeneity which, through stress concentration, can act as a strength defining feature

NOTE The term flaw used in this sense does not imply that the component is defective.

3.1.3
fracture
process of propagation of a crack through a test-piece or component

3.1.4
fracture origin
source from which failure commences

3.2 Terms classifying inherently volume-distributed fracture origins

3.2.1
agglomerate
unintentional microstructural inhomogeneity usually of altered density, for example a cluster of grains of abnormal size, particles, platelets or whiskers, resulting from non-uniformity in processing

3.2.2
compositional inhomogeneity
local variations in chemical composition, usually manifest as agglomerates (3.2.1), or as areas denuded of or enriched in dispersed phases, or as changes in grain size

3.2.3
delamination
generally planar crack within a material arising from the method of manufacture

3.2.4
inclusion
discrete inhomogeneity, usually as a result of inorganic contamination by a foreign body not removed during firing

3.2.5
large grain
grain which is of abnormally large size as a result of poor particle size control or accelerated grain growth, and which can act as a flaw (3.1.2)

3.2.6
pore
cavity or void within a material, which may be isolated or continuously interconnected with others

3.2.7
porous region
zone of enhanced porosity, usually three-dimensional in nature and resulting from inhomogeneity or organic contamination in processing

3.2.8
porous seam
zone of enhanced porosity, usually linear or planar in nature and resulting from inhomogeneity or organic contamination in processing

3.3 Terms classifying inherently surface-distributed fracture origins

3.3.1
chip
small flake of material removed from a surface or an edge of an item or its fracture surface

3.3.2
handling damage
scratches, chips or other damage resulting from contact between items, test-pieces or fracture surfaces, not present normally

3.3.3
machining damage
result of removal of small chips (see 3.3.1) or the formation of scratches at, or cracks near, the surface resulting from abrasive removal of material

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