

Advanced technical ceramics - Mechanical properties of monolithic ceramics at room temperature - Part 7: C-ring tests

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NATIONAL FOREWORD

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This standard is ratified with the order of Estonian Centre for Standardisation dated 30.09.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text .

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English Version

Advanced technical ceramics - Mechanical properties of monolithic ceramics at room temperature - Part 7: C-ring tests

Céramiques techniques avancées - Propriétés mécaniques des céramiques monolithiques à température ambiante - Partie 7: Essais d'échantillons en forme d'anneau en C

Hochleistungskeramik - Mechanische Eigenschaften monolithischer Keramik bei Raumtemperatur - Teil 7: C-Ring-Prüfungen

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Foreword

This document (EN 843-7:2010) 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of an identical text or by endorsement, at the latest by December 2010, and conflicting national standards shall be withdrawn at the latest by December 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

EN 843, *Advanced technical ceramics — Mechanical properties of monolithic ceramics at room temperature*, consists of the following nine parts:

- *Part 1: Determination of flexural strength*
- *Part 2: Determination of Young's modulus, shear modulus and Poisson's ratio*
- *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*
- *Part 7: C-ring tests*
- *Part 8: Guidelines for conducting proof tests*
- *FprCEN/TS 843-9, Advanced technical ceramics — Mechanical properties of monolithic ceramics at room temperature — Part 9: Method of test for edge-chip resistance*

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1 Scope

This European Standard describes a method for undertaking ultimate strength tests on slotted rings (C-rings) in order to determine the strength of ring or tube-shaped components in the manufactured geometry.

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 843-5:2006, *Advanced technical ceramics — Mechanical properties of monolithic ceramics at room temperature — Part 5: Statistical analysis*

EN 1006, *Advanced technical ceramics — Monolithic ceramics — Guidance on the selection of test pieces for the evaluation of properties*

EN ISO 7500-1:2004, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system (ISO 7500-1:2004)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

ISO 3611:1978, *Micrometer callipers for external measurement*

ISO 6906:1984, *Vernier callipers reading to 0,02 mm*

3 Definitions

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

3.1

C-ring test piece

ring-shaped test piece in which a radial slot has been cut to convert it into an incomplete ring

3.2

C-ring compression test

test in which a C-ring test piece is compressed across a diameter away from the slot, and which imposes the maximum tensile stress on the outside surface of the ring remote from the points of compression load application

3.3

C-ring tension test

test in which a C-ring test piece is pulled across a diameter away from the slot, and which imposes the maximum tensile stress on the inside surface of the ring remote from the point of tensile load application

4 Significance and use

This method of test permits the strength of circular symmetry test pieces such as thin-walled rings or tubes to be determined. The diametral loading of a short length of slotted tube or a slotted ring produces a tensile stress in the mid-section of the tube wall, either in the outside region of the wall thickness if the ring is compressed, or in the inside region if the ring is pulled in tension. In both cases the maximum stresses are in