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Fine ceramics (advanced ceramics, advanced technical ceramics) — Mechanical properties of monolithic ceramics at room temperature — Determination of flexural strength by the ring-on-ring test

Céramiques techniques — Propriétés mécaniques des céramiques monolithiques à température ambiante — Détermination de la résistance à la flexion à l'aide de doubles anneaux

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Contents

Page

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Principle ... **1**

5 Significance and use ... **2**

6 Apparatus ... **2**
6.1 Test machine ... 2
6.2 Test jig ... 3
6.3 Calliper or alternative calibrated device for the measurement of the test piece thickness ... 4
6.4 Device for measuring the temperature and humidity ... 4

7 Test pieces ... **4**
7.1 General ... 4
7.2 Dimensions and tolerances ... 5
7.3 Surface finish ... 6
7.3.1 General ... 6
7.3.2 Surface finishing I: as-fired ... 7
7.3.3 Surface finishing II: grinding/lapping/polishing ... 7
7.3.4 Surface finish III: finishing by agreed procedure ... 7
7.3.5 Check of dimensions ... 7
7.3.6 General requirements ... 8
7.3.7 Number of test pieces ... 8
7.4 Precautions ... 8

8 Procedure ... **8**

9 Calculations ... **9**

10 Test report ... **10**

Annex A (informative) **Typical fracture patterns of ceramic test pieces after a ring-on-ring test** ... **11**

Bibliography ... **13**

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Foreword

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This document was prepared by Technical Committee ISO/TC 206, *Fine ceramics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Fine ceramics (advanced ceramics, advanced technical ceramics) — Mechanical properties of monolithic ceramics at room temperature — Determination of flexural strength by the ring-on-ring test

1 Scope

This document specifies a method for the determination of the nominal equibiaxial flexural strength by the ring-on-ring test of advanced monolithic technical ceramic materials at room temperature.

This document is applicable to materials with a grain size less than 100 µm.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
equibiaxial flexural strength
σ_{rr}
maximum nominal stress at the test piece surface supported by the material at the instant of failure when loaded in linear elastic equibiaxial bending by the ring-on-ring test

Note 1 to entry: The ring-on-ring test for the determination of flexural strength is often referred to as biaxial bending test or equibiaxial bending test (see Reference [1]). These names should not be used without the reference to the ring-on-ring test conditions as there are some other test arrangements for which the term is used or could also be used, such as the ball-on-three-balls test, the punch-on-three-balls test, the ball-on-ring test and the punch-on-ring test.

4 Principle

A round discoidal test piece with a constant thickness is positioned between two concentric rings of different diameters and loaded by an axial force.

The nominal equibiaxial flexural strength is calculated from the axial force which acts during the moment of fracture, the geometry of the test piece and the test arrangement, as well as the Poisson ratio of the test piece material.

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