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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Test method for equibiaxial flexural strength of fine ceramics at room temperature - Ring-on-ring method

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Table of Contents

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1.Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is modified using ISO 17167.2018 "Fine Ceramics (Advanced Ceramics, Advanced Technology Ceramics)". The room temperature mechanical properties adopt double standards.

Determination of bending strength by ring method.

Compared with ISO 17167.2018, this document has many structural adjustments. Comparison list of structure number changes between the two files

See Appendix A.

Compared with ISO 17167.2018, there are many technical differences between this document and the clauses involved in the outer margin of the page.

Single lines (?) are marked. A list of these technical differences and their causes is provided in Appendix B.

This document has made the following editorial changes.

---In order to coordinate with the existing standards, the name of the standard is changed to "Test Method for Biaxial Bending Strength of Fine Ceramics at Room Temperature and Double Ring Method";

---Deleted the notes 3.1 and 7.2 in ISO 17167.2018;

---Deleted Note 1 and Note 3 of Chapter 8 in ISO 17167.2018;

---Added Appendix A (informative) "List of comparison of structure numbers between this document and ISO 17167.2018";

---Added Appendix B (informative) "List of technical differences between this document and ISO 17167.2018 and their reasons".

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

1 Scope

This document specifies a test method for the biaxial bending strength of fine ceramics using the double-ring method at room temperature.

This document is applicable to the determination of biaxial bending strength of single-phase ceramic materials with an average grain size less than 100 μm. This document also applies

The average grain size (or length) of each phase is less than 100 μm, and biaxial bending of composite phase ceramics reinforced by particles, whiskers and/or discontinuous fibers

Determination of bending strength.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations

For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to

this document.

GB/T 16825.1 Inspection and calibration of static uniaxial testing machines for metallic materials Part 1.Tensile and/or compression testing machines

Inspection and calibration of force systems (GB/T 16825.1-2022, ISO 7500-1.2018, IDT)

GB/T 40005 Weibull statistical analysis method for strength data of fine ceramics (GB/T 40005-2021, ISO 20501.

2019,MOD)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

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The test sample is subjected to linear elastic and other biaxial bending loads through the

double-loop method, and the maximum stress at which the sample breaks and fails.

4 Principles

A disk-shaped sample of equal thickness is placed between two concentric rings of different diameters, and a load perpendicular to the plane of the sample is applied.

The equibiaxial bending strength of the sample was calculated based on the sample fracture load, sample geometry, and Poisson's ratio of the sample material.

5 Meaning and use

This document is used for materials development and characterization, quality control, and materials design. The material being tested is elastically uniform and isotropic, and has linear

Stress-strain properties. The strength of the disc-shaped sample was calculated based on its linear elastic bending properties. The strength test results are determined by the microstructure of the material, the sample

It is determined by various factors such as product surface processing procedures, sample size and shape, loading rate and environmental relative humidity. As described in this document, the

For many purposes, the results of a strength test can be described in terms of mean and standard deviation. The test results can be compiled in accordance with GB/T 40005

Design analysis to meet material design.