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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 46779-2025

**Fine ceramics - Testing method for macro-heterogeneity in
microstructure**

精细陶瓷 微观结构中的低倍组织缺陷测试方法
(English Translation)

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Reference

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 to adopt ISO 18550:2016 "Fine ceramics (advanced ceramics, advanced technical ceramics) - Macroscopic heterogeneity in the microstructure".

Test Methods.

This document has undergone significant structural adjustments compared to ISO 18550:2016. A table comparing the structural numbering changes between the two documents is provided.

See Appendix A.

This document differs significantly from ISO 18550:2016 in several technical aspects. The relevant clauses are indicated in vertical margins.

Single lines (-) are indicated. A summary of these technical differences and their causes can be found in Appendix B.

The following editorial changes have been made to this document.

---To align with existing standards, the standard title has been changed to "Test Method for Low-Magnification Microstructural Defects in Fine Ceramics";

---The units of measurement accuracy and defect density have been changed (see 7.1, 9.3);

--- State the observation conditions in a list format (see 7.2);

---Explanations of the meanings of the formula symbols have been added (see 8.1);

---The references have been changed.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Building Materials Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Industrial Ceramics (SAC/TC194).

1 Scope

This document describes low-magnification microstructures of fine ceramic materials that constitute a certain volume fraction and influence the material's mechanical properties.

Methods for testing defects.

This document applies to fine ceramic sheets with a porosity of less than 10% that are transparent under visible light.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

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

This document.

GB/T 27025 General requirements for the competence of testing and calibration laboratories (GB/T 27025-2019, ISO/IEC 17025:2017) IDT)

3 Terms and Definitions

The following terms and definitions apply to this document.

Low-magnification tissue defects (macro-heterogeneity) Defects in the microstructure of fine ceramic materials have a certain volume proportion and affect the mechanical properties of the material.

Note: Examples include aggregates, pores, inclusions, etc.

The diameter of a circle with the same area as the low-magnification projection of a tissue defect.

4 Principles

Low-magnification structural defects in thin-film fine ceramics can be observed using a microscope in transmitted light mode.

When the ceramic sheet is thin enough, the transmitted light from the optical microscope can penetrate it. Areas with a uniform structure have good light transmittance, resulting in brighter images.

When low-magnification structural defects such as agglomerates, pores, and inclusions exist on ceramic sheets, they will scatter or absorb light, causing the defective areas to become visible.

The light transmission in the field decreases, and the image becomes darker.

5.1 Microscope

A transmission-mode, adjustable-aperture illumination system should be provided, and the magnification should be calibrated using a calibrated glass scale. The maximum magnification of the objective lens...

The magnification ratio should not exceed 10 times.