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

GB/T 46603-2025

**Vitreous and porcelain enamels - Determination of crack
formation temperature in the thermal shock testing of enamels**

搪瓷制品和瓷釉 热冲击试验中裂纹形成温度的测定

(English Translation)

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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 13807:2022 "Determination of crack initiation temperature in thermal shock testing of enamel articles and enamel glaze".

The following structural adjustments have been made to this document.

---Chapter 4 of ISO 13807:2022 has been deleted, and the rest are postponed accordingly.

The technical differences between this document and ISO 13807:2022, and the reasons therefor, are as follows.

a) ISO 19496-1 (see Chapter 3) has been replaced with the normatively referenced GB/T 7410 to adapt to my country's technical conditions and to add [further details needed].

Operability;

b) ISO 3819 (see 5.2) has been replaced with the normatively referenced GB/T 15724 to adapt to my country's technical conditions and increase operability.

Actual nature;

c) ISO 2178 (see 6.1) has been replaced with the normatively referenced GB/T 4956 to adapt to my country's technical conditions and increase operability.

Actual nature;

d) ISO 2746 (see 6.1) has been replaced with the normatively referenced GB/T 7991.6 to adapt to my country's technical conditions and increase operability.

Actual nature;

e) The requirements for sample shape and controlled cooling process have been changed

(see 6.1, 7.1 in ISO 13807:2022) to adapt to my country's technical requirements.

Improve technical conditions and increase operability;

f) The requirement to use low-alloy steel as the metal substrate (7.1 in ISO 13807:2022) has been removed to adapt to my country's technical requirements.

Add components to increase operability;

g) Requirements for heat preservation time, water containers for irrigation, and irrigation height have been increased (see 7.2) to adapt to my country's technical conditions.

Operability;

h) Specific steps for repeating the test on the samples have been added (see 7.5, 7.6) to adapt to my country's technical conditions and increase operability.

The following editorial changes have been made to this document.

---The names of the test methods in the test reports have been removed to align with my country's standards system and increase operability;

---Informative Annex A of ISO 13807:2022 has been deleted to adapt to my country's standards system and increase operability.

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 Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Metallic and Non-metallic Coatings (SAC/TC57).

1 Scope

This document describes a test method for determining the crack initiation temperature of enamel in a thermal shock test.

This document is applicable to comparing the relative thermal shock resistance of different ceramic enamel formulations, but not to determining the thermal shock resistance of finished components.

Crack formation temperature.

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 4956 Measurement of Non-Magnetic Coating Thickness on Magnetic Substrates - Magnetic Method (GB/T 4956-2003, ISO) 2178.1982, IDT) GB/T 7410.1 Enamelware and Enamelware Terminology Part 1: Terms and Definitions (GB/T 7410.1-2025, ISO 19496-) 1.2017, MOD) GB/T 7991.6 Test methods for enamel coatings - Part 6: High voltage test GB/T 15724 Laboratory glassware beakers (GB/T 15724-2024, ISO 3819:2015, MOD)

3 Terms and Definitions

The terms and definitions defined in GB/T 7410.1 and the following terms and definitions apply to this document.

The temperature at which the ceramic surface first shows damage such as cracks or detachment at the thermal shock temperature (3.2).

Temperature of the sample before cold water quenching.

4 Principles

The sample was heated in an oven (5.1), and after reaching the thermal shock temperature (3.2), the enamel surface was rinsed with water at $(20 \pm 10)^{\circ}\text{C}$. The dried sample...

After inspection, visually check the porcelain surface for damage. To make cracks visible, spray the entire porcelain surface with electrostatically charged talcum powder. If on the first...

If no surface cracks are found after the thermal shock test, the test should be repeated at a thermal shock temperature 10°C higher than the previous test.