

ICS 71.120; 25.220.50
CCS G 94



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

GB/T 7991.6-2025

Replacing GB/T 7991.6-2014

**Test method of vitreous and porcelain enamels - Part 6: High
voltage test**

(English Translation)

Issued on: August 29, 2025

Implemented on: March 1, 2026

Issued by: State Administration for Market Regulation

Table of Contents

- Foreword
- Introduction
- 1 Scope
- 2 Normative references
- 3 Terms and Definitions
- 4 Experimental Principle
- 5 Experimental Apparatus and Instruments
- 5.1 DC High Voltage Generator

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 Part 6 of GB/T 7991 "Test Methods for Enameled Glass Layers". GB/T 7991 has already published the following parts.

- Part 1: Determination of resistance to corrosion by alkaline solutions;
- Part 3: Determination of resistance to rapid temperature changes;
- Part 4: Determination of resistance to mechanical shock;
- Part 5: Measuring Thickness Using Electromagnetic Methods;
- Part 6: High Voltage Testing;
- Part 7: Determination of the average linear thermal expansion coefficient;
- Part 9: Determination of tensile strength;
- Part 10: Determination and limits of leaching of heavy metal ions from the enamel layer of glass-lined equipment for the production and storage of food.

This document replaces GB/T 7991.6-2014 "Test Methods for Enameled Layers - Part 6: High Voltage Tests", and is consistent with GB/T 7991.6-Compared to 2014, aside from structural adjustments and editorial changes, the main technical changes are as follows.

- a) The scope has been changed (see Chapter 1, Chapter 1 of the 2014 edition);
- b) The term "defect" and its definition have been added (see 3.1);

- c) The performance requirements for DC high-voltage generators have been changed (see 5.1, 2014 version 5.1);
- d) The requirements for insulated handles have been changed (see 5.2.3, 5.2.1 of the 2014 version);
- e) The requirement for a protective resistor has been removed (see 5.2.3 in the 2014 edition);
- f) Added requirements for the enamel layer thickness measuring instrument (see 5.4);
- g) The requirements for "samples" have been changed (see Chapter 6, Chapter 6 of the 2014 edition);
- h) Added requirements regarding the correspondence between the enamel layer thickness and the minimum test voltage (see 7.1);
- i) The criteria for determining the test voltage value have been changed (see 7.2, 7.1 in the 2014 version);
- j) The "Test Procedure" has been changed (see Chapter 8, 7.2 and 7.3 of the 2014 edition);
- k) Added provisions for "any deviation from the prescribed procedures" and "any abnormal phenomena occurring during the testing process" to the "Test Report".

(See Chapter 9.)

This document is modified to adopt ISO 2746:2015 "High voltage test method for enamel coatings".

This document has undergone significant structural adjustments compared to ISO 2746:2015. A table comparing the structural numbering changes between the two documents is provided.

See Appendix A.

The technical differences between this document and ISO 2746:2015, and the reasons therefor, are as follows.

---ISO 2360 (see 5.4, 7.1) has been replaced by the normatively referenced GB/T 4957, and ISO 2178 (see GB/T 7991.5) has been replaced by GB/T 7991.5.

GB/T 13870.1 (5.4, 7.1) replaces IEC 60479-1 (see 5.1) to adapt to my country's technical conditions and improve operability;

---The definitions of the terms "defect" and "weak point" have been revised (see 3.1 and 3.2) to adapt to my country's technical conditions and improve operability;

---Deleted the fourth paragraph of Chapter 4, 5.1.2, and 7.1 in ISO 2746:2015, the latter half of the second paragraph of 7.2, and the third paragraph of Chapter 8.

The latter part and the content on pulsed DC voltage generators in paragraph 5 of Chapter 8 are designed to adapt to my country's technological conditions and improve...

Operability;

---The second paragraph of Chapter 4 in ISO 2746:2015 has been deleted. This is a widely accepted practice among domestic industry professionals, and no further revision is necessary.

Regulation;

---The minimum test voltage specified in Table 1 of ISO 2746:2015 for enamel layer thicknesses of 100μm~400μm has been removed.

The technical details regarding compression values are not applicable to this document.

---Added factors to be considered when determining the test voltage value [see 7.2a)] to ensure that the test voltage complies with relevant standards and design documents.

Regulations;

---The requirement that "the concentration of flammable and explosive gases in the surrounding environment should be within a safe range" has been added before the test [see 8.1c)], in order to ensure...

To ensure the safety of the experiment;

---Added a provision to mark detected defects or weaknesses (see 8.6) to facilitate subsequent processing and repair.

The following editorial changes have been made to this document.

---To harmonize with existing standards, the standard name has been changed to "Test Methods for Enameled Layers Part 6: High Voltage Tests";

---The note for the term "defect" (see 3.1) has been deleted, and a note for the term "weak point" (see 3.2) has been added;

---Note has been removed from Chapter 8 of ISO 2746:2015.

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 Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Enameled Equipment (SAC/TC72).

Introduction

GB/T 7991 aims to accurately measure various performance data of enamel layers and is proposed to consist of 10 parts.

---Part 1: Determination of resistance to corrosion by alkaline solutions. The purpose is to test the resistance of the enamel coating to corrosion by alkaline solutions.

---Part 2: Determination of Resistance to Boiling Acids and Vapor Corrosion. The purpose is to test the resistance of the enamel coating to boiling acids and their vapors.

Corrosion resistance.

---Part 3: Determination of resistance to rapid temperature changes. The purpose is to test the resistance of the enamel layer to rapid temperature changes.

---Part 4: Determination of Mechanical Shock Resistance. The purpose is to test the mechanical shock resistance of the enamel layer.

---Part 5: Measuring Thickness Using Electromagnetic Methods. The purpose is to determine the thickness of the enamel layer.

---Part 6: High Voltage Test. The purpose is to detect defects and weak points in the enamel layer.

---Part 7: Determination of the average linear thermal expansion coefficient. The purpose is to determine the average linear thermal expansion coefficient of the enamel glaze.

---Part 8: Determination of scratch resistance. The purpose is to test the scratch resistance of the enamel layer.

---Part 9: Determination of Tensile Strength. The purpose is to test the tensile strength of the enamel layer.

---Part 10: Determination and limits of heavy metal ion leaching from glass linings in glass-lined equipment for food production and storage. Purpose the purpose is to detect the amount of heavy metal ions leached from the enamel layer.

These 10 performance parameters are crucial for enamel-lined equipment, directly affecting its quality and service life.

This document improves the technical level of the test methods and the accuracy of the test results, enabling more accurate detection and location of defects in the enamel layer.

Identifying weaknesses and vulnerabilities is crucial for evaluating the rationality and advancement of the firing process in enamel-lined equipment, and for improving the quality and service life of the equipment.

It has very important significance.