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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 9989-2005

Replacing GB/T 9989-2005

Vitreous and porcelain enamels -- Determination of resistance to chemical corrosion -- Part 1: Determination of resistance to chemical corrosion by acids at room temperature

搪瓷耐室温柠檬酸侵蚀试验方法

(English Translation)

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Preview: page 1 of 5 shown, 7 in the full document. Complete English PDF, instant download:
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Table of Contents

Foreword
Introduction
1 Scope
2 Normative references
4 Reagents
5 Materials and equipment

Foreword

GB/T 9989 "Determination of enamel resistant to chemical attack" standard is divided into five parts.

--- Part 1. Determination of acid erosion at room temperature;

--- Part 2. resistant to boiling acids, boiling neutral liquids and their vapors Determination of chemical attack;

--- Part 3. Hexagonal alkali solution container was measured erosion;

--- Part 4. a cylindrical container with a solution of alkali was measured erosion;

--- Part 5. Determination of resistance to chemical attack in a closed system.

This part of GB/T 9989 Part 1.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This Part replaces GB/T 9989-2005 "enamel resistance to room temperature citric acid corrosion test methods." Compared with GB/T 9989-2005, major technological changes in this section are as follows.

--- No longer distinguish visually bright and matt porcelain surface (see 72, 2005, version 7.2.);

--- Modify the results of the rating-related content (see Chapter 8, Chapter 8, 2005);

--- Adds another acid test (see Chapter 10 ~ Chapter 11).

This section uses the translation method identical with ISO 28706-1:2008 "Determination of enamel resistant to chemical attack - Part 1. invasion acid at room temperature Erosion Measurement "(in English).

Consistency correspondence between this part of international documents and normative

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https://chinastandards.org/standards/gb-t-9989-2005

references of our files are as follows.

Laboratory water Specification and test methods (ISO 3696. 1987, MOD) --- GB/T 6682-2008 analysis;

--- GB/T 12804-2011 laboratory glassware cylinder (ISO 4788:2005, NEQ);

--- GB/T 12806-2011 laboratory glassware single marking flask (ISO 1042-1998, NEQ).

Please note that some of the content of this document may involve patents. Release mechanism of the present document does not assume responsibility for the identification of these patents.

This part is proposed by the China National Light Industry Council.

This part of the National food in direct contact with materials and products Standardization Technical Committee (SAC/TC397) centralized.

This section is drafted. Donghua University, the National Optical Glass Enamel Products Quality Supervision and Inspection Center, Zhejiang Kelvin new material limited by shares the company.

Introduction

Aqueous solution of enamel and enamel erosion is a process of dissolution. Enamel main component is silica, it forms a three-dimensional silica Salt network, formed by the hydrolysis of silicic acid or silicates, silicic acid or silicates dissolve these to erode medium. Other components (mainly gold Metal oxide) will be hydrolyzed to form the corresponding metal hydroxide or hydroxide ions. All the products are eroded more or less to dissolve Aggressive medium, the whole process will lead to erosion of material per unit area of \u200b\u200bweightlessness.

Some erosion and water erosion of the enamel surface was linear with time; there are also some erosion of the enamel surface water Erosion time logarithmic relationship. Only water erosion linear relationship, you can use the scientific method to accurately calculate the weight loss per unit area Rate [g/(m2 · h)], and the erosion rate (mm/a).

Effect of water on the surface of enamel erosion is the most important factor enamel mass, temperature and pH. Limited solubility of silica Also played a certain extent. Here are erosion under different conditions in different types of enamel erosion.

a) at a temperature of 80 °C, similar to 0.1mol/L sodium hydroxide alkaline solution (see GB/T 9989.4, Chapter 9), enamel Silicate network by a greater erosion, silicates and most other components are dissolved in an alkaline hydrolysis solution, the amount of erosion and the test time is linear, and therefore, the test results can be (per unit area and per unit of time with weight loss rate per unit area of Weightlessness) and erosion rate (mm/a) to represent.

Preview: page 3 of 5 shown, 7 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-9989-2005

b) at room temperature, similar to the citric acidic solution (see GB/T 9989.1, Chapter 9) or similar strong sulfuric acid solution Liquid (see GB T 9989.1, Chapter/Section 10), enamel silicate network by the small erosion in the enamel deposited on the surface in addition to two Other than the silicon oxide component is limited. After high acid test by enamel, the enamel surface was not observed significant changes. and After the acid test by poor enamel, the enamel surface will produce signs of erosion or rendered rough.

c) boiling in an acidic solution (see GB/T 9989.2), enamel silicate network eroded, silica and other enamel Components are dissolved into the solution, but lower the solubility of silica in the acidic solution. Erosion solution will be dissolved dioxide Silicon quickly saturated, there is deposited only on the enamel surface. Acid erosion will be inhibited, significantly decreased the rate of erosion.

Note: The test apparatus under glass in an acid attack will release silicate, also play a role in suppressing erosion.

In the gas phase experiments, the condensate formed in the surface of the sample does not contain any dissolved components of the enamel, effectively preventing such corrosion inhibition Role.

The following are examples of non-linear enamel erosion and linear erosion.

1) boiling citric acid (see GB/T 9989.2, Chapter 10) and 30% boiling sulfuric acid (see GB/T 9989.2, Chapter 11) Since the gas phase containing only trace amounts of acid, usually only test phase. Inhibitory Effect of acid erosion and erosion Depending on the time trial, so the test results with weight loss per unit area is represented; it can not be calculated per unit area of \u200b\u200bweightlessness rate.

Boiling hydrochloric acid (see GB/T 9989.2, Chapter 122) 20%) Since this is an azeotropic boiling acid concentration in the liquid phase and gas phase it is the same, so no liquid phase test. fierce Boiling provides no inhibitory aggregates, the amount of time and erosion test is linear, and therefore, the test results for with a weight loss rate per unit area (weight loss per unit area and per unit time) and erosion rate (mm/a) to represent.

d) test liquid (see GB/T 9989.5) at high temperature and pressure conditions, the acidic solution is severe erosion. To avoid production Health inhibition test time is limited to 24h, the higher the rate of acid erosion of enamel surface (simulation in a chemical reaction vessel in addition, under these conditions the test conditions), with only a low silicon content of the aqueous test solution was prepared, and erosion test Room was a linear relationship. Thus, 20% hydrochloric acid (see GB/T 9989.5, Chapter 8), simulation test solution (see GB/T 9989.5, Chapter 10) or process fluid (see GB/T 9989.5, Chapter 11) The test results can follow weight loss rate per unit area (Weight loss per unit area and per unit time) to represent.

e) in boiling water (see GB/T 9989.2, Chapter 13), the silicate network is very stable.

Preview: page 4 of 5 shown, 7 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/gb-t-9989-2005

Enamel surface to penetrate the main Lord, the amount of dissolved silica is very limited. Such erosion can be represented by a gas attack, in the liquid phase for high corrosion resistance Enamel, anti-erosion ability. But if the enamel chemical stability tests are relatively poor, the enamel surface will have an alkali metal ion Precipitation, thereby increasing the pH value of the solution, increases the erosion of the liquid, so that liquid and vapor are able to get useful information.

f) due to erosion may be linear or non-linear, the test results for weight loss per unit area is represented, and the test should be given time.

g) For the standard detergent solution Test time 24h or 168h (see GB/T 9989.3, Chapter 9) test, because you can not really Whether a given erosion curve is linear, so can not be included in the test report erosion rate calculations.

h) For other acidic solution (see GB/T 9989.2, Chapter 14) and an alkaline solution (see GB/T 9989.3, Chapter 10 GB T 9989.4, Chapter/Section 10), because during the test did not know whether the erosion rate is linear, so in this standard the test report can not contain the erosion rate calculations.

For the firing temperature is lower than 700 °C enamel material, GB/T 9989 test parameters (medium, temperature and time) is not appropriate for in this type of enamel (such as aluminum enamel) should use other media, temperature, and (or) time. These tests can under Part 1 GB/T 9989 of Points, Part 2, Part 3 "Additional test solution" and Part 4 of the procedure described for.

Determination of enamel resistant to chemical attack Acid erosion was measured at room temperature. Part 1

1 Scope

This section GB/T 9989 requirements and test methods for the enamel glaze enamels acid chemical attack at room temperature was measured, and provides Results classification determined by the method.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

ISO 1042 laboratory glassware single reticle flask (Laboratoryglassware-One-markvolumetric flasks) ISO 3696 for analytical laboratory use - Specification and test methods (Waterforanalyticallaboratoryuse-Specification andtestmethods) ISO 4788 laboratory glassware indexing cylinder (Laboratoryglassware-Graduatedmeasuringcylinders) ISO 28764 enamel and enamel sheet

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