SLOVENSKI STANDARD
SIST EN ISO 28706-2:2017

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Nadomešča:

SIST EN ISO 28706-2:2012

Steklasti in porcelanski emajli - Ugotavljanje odpornosti proti kemični koroziji - 2. del: Ugotavljanje odpornosti proti kemični koroziji s kislinami in nevtralnimi tekočinami, ki vrejo, bazami in/ali njihovimi parami (ISO 28706-2:2017)

Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 2: Determination of resistance to chemical corrosion by boiling acids, boiling neutral liquids, alkaline liquids and/or their vapours (ISO 28706-2:2017)

Emails und Emaillierungen - Bestimmung der Beständigkeit gegen chemische Korrosion - Teil 2: Bestimmung der Beständigkeit gegen chemische Korrosion durch kochende Säuren, kochende neutrale Flüssigkeiten, alkalische Flüssigkeiten und/oder deren Dämpfe (ISO 28706-2:2017)

Émaux vitrifiés - Détermination de la résistance à la corrosion chimique - Partie 2: Détermination de la résistance à la corrosion chimique par des acides bouillants, ou des liquides neutres bouillants,ou des liquides alcalins et/ou leurs vapeurs (ISO 28706-2:2017)

Ta slovenski standard je istoveten z: EN ISO 28706-2:2017

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25.220.50 Emajlne prevleke Enamels

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 28706-2

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English Version

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This European Standard was approved by CEN on 28 February 2017.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 28706-2:2017) has been prepared by Technical Committee ISO/TC 107 "Metallic and other inorganic coatings" in collaboration with Technical Committee CEN/TC 262 “Metallic and other inorganic coatings” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2017 and conflicting national standards shall be withdrawn at the latest by September 2017.

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Endorsement notice

The text of ISO 28706-2:2017 has been approved by CEN as EN ISO 28706-2:2017 without any modification.

INTERNATIONAL STANDARD

ISO 28706-2

Second edition
2017-02

Vitreous and porcelain enamels — Determination of resistance to chemical corrosion —

Part 2: Determination of resistance to chemical corrosion by boiling acids, boiling neutral liquids, alkaline liquids and/or their vapours

Émaux vitrifiés — Détermination de la résistance à la corrosion chimique —
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*.

This second edition cancels and replaces the first edition (ISO 28706-2:2008), which has been technically revised with changes as follows.

— This document can also be used to determine resistance to chemical corrosion using alkaline liquids. The title of this document has therefore been amended and a section on standard detergent solutions has been included.

— Additional reagents can be used for testing purposes and these have been included.

A list of all parts in the ISO 28706 series can be found on the ISO website.

Introduction

Corrosion of vitreous and porcelain enamels by aqueous solutions is a dissolution process. The main component of the enamel, SiO2, forms a three-dimensional silica network. After hydrolysis, it decomposes and forms silicic acid or silicates. These are released into the attacking medium. Other components, mainly metal oxides, are hydrolysed as well and form the corresponding hydrated metal ions or hydroxides. All corrosion products are more or less soluble in the attacking medium. The whole process results in a loss in mass per unit area.

For some aqueous solutions, the attack on the enamel proceeds linearly during the corrosion time; for other aqueous solutions, the attack on the enamel proceeds in a logarithmic manner during the corrosion time. Only for the first series of solutions can a scientifically exact rate of loss in mass per unit area (g/m2·h) be calculated as well as a corrosion rate (millimetres per year).

The most important parameters influencing aqueous corrosion of the enamel are the enamel quality, the temperature and the pH value. Inhibition effects resulting from the limited solubility of silica can also contribute. The following list describes different types of enamel attack for different corrosion conditions.

a) In aqueous alkali solutions such as 0,1 mol/l NaOH (see ISO 28706-4:2016, Clause 9), the silica network of the enamel is considerably attacked at 80 °C. Silicates and most of the other hydrolysed components are soluble in the alkali. Attack proceeds linearly during regular test times. Therefore, test results are expressed in terms of a rate of loss in mass per unit area (mass loss per unit area and time) and a corrosion rate (millimetres per year).

b) At room temperature, in weak aqueous acids such as citric acid (see ISO 28706-1:2008, Clause 9) or also in stronger acids such as sulfuric acid (see ISO 28706-1:2008, Clause 10), there is only minor attack on the silica network of the enamel. Other constituents are leached to some extent from the surface. Highly resistant enamels will show no visual change after exposure. On less resistant enamels, some staining or surface roughening will occur.

c) In boiling aqueous acids (as described in this document), the silica network of the enamel is being attacked, and silica as well as the other enamel components are released into solution. However, the solubility of silica in acids is low. Soon, the attacking solutions will become saturated with dissolved silica and will then only leach the surface. The acid attack is inhibited and the rate of corrosion drops markedly.

NOTE The glass test equipment also releases silica by acid attack and contributes to the inhibition of the corrosion.

Inhibition is effectively prevented in vapour phase tests. The condensate formed on the test specimen is free of any dissolved enamel constituents.

Examples of enamel corrosion proceeding in a logarithmic manner [see 1)] and linearly [see 2)] are as follows:

1) **Boiling citric acid** (see Clause 11) and **boiling 30 % sulfuric acid** (see Clause 12).

Since only minute amounts of these acids are found in their vapours, the test is restricted to the liquid phase. The attack is influenced by inhibition effects and corrosion depends on the time of exposure. Therefore, test results are expressed in terms of loss in mass per unit area; no rate of loss in mass per unit area is calculated.

2) **Boiling 20 % hydrochloric acid** (see Clause 13).

Since this is an azeotropic boiling acid, its concentration in the liquid and the vapour phase are identical, and liquid phase testing need not be performed. Vigorous boiling supplies an uninhibited condensate, and the attack proceeds linearly with time of exposure. Therefore,

