SLOVENSKI STANDARD
SIST EN ISO 28706-5:2012

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Nadomešča:
SIST EN 14483-5:2004

Steklasti in porcelanski emajli - Ugotavljanje odpornosti proti kemični koroziji - 5. del: Ugotavljanje odpornosti proti kemični koroziji v zaprtih sistemih (ISO 28706-5:2010)

Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 5: Determination of resistance to chemical corrosion in closed systems (ISO 28706-5:2010)

Emails und Emaillierungen - Bestimmung der Beständigkeit gegen chemische Korrosion - Teil 5: Bestimmung der Beständigkeit gegen chemische Korrosion in geschlossenen Systemen (ISO 28706-5:2010)

Emaux vitrifiés - Détermination de la résistance à la corrosion chimique - Partie 5: Détermination de la résistance à la corrosion chimique en milieux fermés (ISO 28706-5:2010)

Ta slovenski standard je istoveten z: **EN ISO 28706-5:2011**

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25.220.50	Emajlne prevleke	Enamels

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 28706-5

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English Version

Vitreous and porcelain enamels - Determination of resistance to chemical corrosion - Part 5: Determination of resistance to chemical corrosion in closed systems (ISO 28706-5:2010)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

The text of ISO 28706-5:2010 has been prepared by Technical Committee ISO/TC 107 “Metallic and other inorganic coatings” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 28706-5:2011 by 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of an identical text or by endorsement, at the latest by January 2012, and conflicting national standards shall be withdrawn at the latest by January 2012.

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Endorsement notice

The text of ISO 28706-5:2010 has been approved by CEN as a EN ISO 28706-5:2011 without any modification.

INTERNATIONAL STANDARD

ISO 28706-5

Second edition
2010-10-01

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

Part 5: Determination of resistance to chemical corrosion in closed systems

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

Partie 5: Détermination de la résistance à la corrosion chimique en milieux fermés

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 28706-5 was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*.

This second edition cancels and replaces the first edition (ISO 28706-5:2008), of which it constitutes a technical revision.

ISO 28706 consists of the following parts, under the general title *Vitreous and porcelain enamels — Determination of resistance to chemical corrosion*:

— *Part 1: Determination of resistance to chemical corrosion by acids at room temperature*

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

— *Part 3: Determination of resistance to chemical corrosion by alkaline liquids using a hexagonal vessel*

— *Part 4: Determination of resistance to chemical corrosion by alkaline liquids using a cylindrical vessel*

— *Part 5: Determination of resistance to chemical corrosion in closed systems*

Introduction

Corrosion of vitreous and porcelain enamels by aqueous solutions is a dissolution process. The main component of the enamel, silicon dioxide (SiO_2), 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/m^2), as well as a corrosion rate (mm/year), be calculated.

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 like 0,1 mol/l NaOH (see Clause 9 of ISO 28706-4:2008) 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 like citric acid (see Clause 9 of ISO 28706-1:2008) or also in stronger acids like sulfuric acid (see Clause 10 of ISO 28706-1:2008), 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 (see ISO 28706-2), 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 10 of ISO 28706-2:2008) and boiling 30 % sulfuric acid (see Clause 11 of ISO 28706-2:2008)**

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.

