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Vitreous and porcelain enamels — Inside and outside enamelled valves and pressure pipe fittings for untreated and potable water supply — Quality requirements and testing

Émaux vitrifiés — Robinetterie et raccords de tuyauterie pour conduites forcées émaillés à l'intérieur et à l'extérieur destinés à l'alimentation en eau non traitée et en eau potable — Exigences de qualité et essais

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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.

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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For an explanation of 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 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 11177:2016), which has been technically revised. The following change has been made:

— in 5.6, the normative reference has been changed from ISO 28706-2 to ISO 28706-1:2008, Clause 9, “Class AA”.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The requirements defined in this document regarding the product quality of enamelled valves and pressure pipe fittings for untreated and potable water supply take into account the real stress conditions to which a component can be subjected in the course of its operating life. Typical types of stress are

— during storage: climate, UV radiation, mechanical stress,

— during transportation: mechanical stress, e.g. at certain points (impact), laterally (friction),

— during preparation for installation: cleaning agents, mechanical stress, e.g. at certain points (impact), laterally (friction),

— during installation: mechanical stress, and

— during operation: abrasion caused by the carried medium, corrosion from surrounding medium, mechanical stress from shifting ground loads, UV radiation with valves built in above ground.

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Vitreous and porcelain enamels — Inside and outside enamelled valves and pressure pipe fittings for untreated and potable water supply — Quality requirements and testing

1 Scope

This document specifies the requirements for product quality and product testing of enamelled valves and pressure pipe fittings for untreated and potable water supply.

It does not apply to chemical service glass-enamel and apparatus enamel.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method*

ISO 6370-1, *Vitreous and porcelain enamels — Determination of the resistance to abrasion — Part 1: Abrasion testing apparatus*

ISO 6370-2, *Vitreous and porcelain enamels — Determination of the resistance to abrasion — Part 2: Loss in mass after sub-surface abrasion*

ISO 13807, *Vitreous and porcelain enamels — Determination of crack formation temperature in the thermal shock testing of enamels for the chemical industry*

ISO 15695, *Vitreous and porcelain enamels — Determination of scratch resistance of enamel finishes*

ISO 16474-1, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 16474-2, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 28706-1:2008, *Vitreous and porcelain enamels — Determination of resistance to chemical corrosion — Part 1: Determination of resistance to chemical corrosion by acids at room temperature*

ISO 28706-2, *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*

EN 15771, *Vitreous and porcelain enamels — Determination of surface scratch hardness according to the Mohs scale*

DIN 50929-3, *Corrosion of metals — Probability of corrosion of metallic materials when subject to corrosion from the outside — Buried and underwater pipelines and structural components*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
pore
defect in the enamel coat passed through from the base material

3.2
corrosion
reaction of a material with its environment causing a measurable change in the material which can lead to impaired function of a component or a complete system

3.3
sub-surface migration
type of *corrosion* (3.2) whereby the attack progresses underneath the protective layer parallel to the surface which can lead to separation of the protective layer from the base material

4 Sampling

Sampling shall be agreed between contractual partners.

5 Quality requirements and testing procedures

5.1 Enamelling surface quality

The enamelling shall be uniform and smooth and carried out in such a way on the sealing surfaces that the seal effect is not impaired.

Slight variations in colour on edges and ridge areas do not impair product quality and are acceptable.

Isolated pores are acceptable provided the dimension of an individual pore does not exceed 1 mm and that no more than seven pores are visible on a surface segment with a diameter of approximately 35 mm.

5.2 Coat thickness

The measurement of coat thickness shall be carried out using a calibrated test system in accordance with ISO 2178.

On flat surfaces, coat thickness shall lie between 200 µm and 600 µm. In edge, undercut and ridge areas etc., the coat thickness shall be at least 150 µm.

5.3 Hardness

Surface hardness shall be determined as surface scratch hardness in accordance with the Mohs scale in accordance with EN 15771. The surface scratch hardness shall be ≥ 4.

5.4 Resistance to thermal shock

Testing resistance to thermal shock shall be carried out in accordance with ISO 13807 on enamelled cast-iron samples, however a temperature difference of 200 K and cooling (off) in water at room temperature shall be adopted.

After the testing, the enamelling shall not exhibit any visible defects.

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