SLOVENSKI STANDARD
oSIST prEN 12206-1:2019

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Barve in laki - Premazi za aluminij in aluminijeve zlitine v gradbeništvu - 1. del: Premazi iz termoreaktivnih praškov

Paints and varnishes - Coating of aluminium and aluminium alloys for architectural purposes - Part 1: Coatings prepared from thermosetting coating powder

Beschichtungsstoffe - Beschichtungen auf Aluminium und Aluminiumlegierungen für Bauzwecke - Teil 1: Beschichtungen aus Beschichtungspulvern

Peintures et vernis - Revêtements de l'aluminium et des alliages d'aluminium pour applications architecturales - Partie 1: Revêtements à partir de peintures en poudre

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87.040	Barve in laki	Paints and varnishes

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Paints and varnishes - Coating of aluminium and aluminium alloys for architectural purposes - Part 1: Coatings prepared from thermosetting coating powder

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 139.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12206-1:2019) has been prepared by Technical Committee CEN/TC 139 “Paints and varnishes”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12206-1:2004.

In comparison with the previous edition, the following changes have been made:

— 4.2.2.1: Methods of pretreatment now includes deluging;

— 4.2.2.2: Minimum etch is now stated;

— 4.2.2.3.3: Process for non chromate systems more defined;

— 4.2.2.3.4: Process for electrolytic conversion more defined;

— 4.3.1: Identification of powder now required;

— 4.3.1: Separation of conventional technology and enhanced durability products removed;

— 4.3.3.14: Manufacturer to state length of resistance to weathering test;

— 4.3.5: Cupping test – 2 categories introduced;

— 4.3.6: Falling weight test – 2 categories introduced;

— 4.3.7: Bend test – 2 categories introduced;

— 4.5.6: Minimum film thickness requirement altered;

— Annex B: Natural weathering test requirements removed;

— Annex C: Test procedure for film thickness tests removed;

— Annex E: Deleted;

— Annex F: Deleted.

Annexes A, B, C and D of this document are normative.

Introduction

This is the first Part of EN 12206. The present intention is to develop another Part dealing with the organic coating of aluminium and aluminium alloy extrusions, sheet and preformed sections for architectural purposes, prepared from liquid coating materials.

1 Scope

This part of EN 12206 specifies requirements and the corresponding methods of test relating to the organic coating of aluminium and aluminium alloy extrusions, sheet and preformed sections for architectural purposes, using coating powders. It also describes:

a) the pretreatment of the substrate prior to the coating process;

b) the coating powder;

c) the coating process;

d) the final product.

Each item is dealt with separately in this part of EN 12206 so that any interested party can ensure compliance appropriate to its area of responsibility.

CAUTION — The procedures described in this standard are intended to be carried out by suitably trained and/or supervised personnel. The substances and procedures used in this method may be injurious to health if adequate precautions are not taken. Attention is drawn in the text to specific hazards. This standard refers only to technical suitability and does not absolve the user from statutory obligations relating to health and safety.

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.

EN 573-3, *Aluminium and aluminium alloys — Chemical composition and form of wrought products – Part 3: Chemical composition and form of products*

EN ISO 1519, *Paints and varnishes — Bend test (cylindrical mandrel) (ISO 1519)*

EN ISO 1520, *Paints and varnishes — Cupping test (ISO 1520)*

EN ISO 2409, *Paints and varnishes — Cross-cut test (ISO 2409)*

EN ISO 2810, *Paints and varnishes - Natural weathering of coatings - Exposure and assessment (ISO 2810)*

EN ISO 2813, *Paints and varnishes — Determination of gloss value at 20°, 60° and 85° (ISO 2813)*

EN ISO 3231, *Paints and varnishes — Determination of resistance to humid atmospheres containing sulfur dioxide (ISO 3231)*

EN ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints (ISO 3668)*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

EN ISO 6270-1, *Paints and varnishes — Determination of resistance to humidity — Part 1: Condensation (single-sided exposure) (ISO 6270-1)*

EN ISO 8130-9, *Coating powders — Part 9: Sampling (ISO 8130-9)*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227)*

EN ISO 16474-1:2013, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 1: General guidance (ISO 16474-1:2013)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 2859-2, *Sampling procedure for inspection by attributes — Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection*

ISO/CIE 11664-4, *Colorimetry — Part 4: CIE 1976 L*a*b* colour space*

3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
powder coating
continuous layer of a coating powder which has been applied to the aluminium or aluminium alloy substrate and which is protective or decorative, or both

3.2
conversion layer
layer produced on an aluminium surface by chemical pretreatment with or without the use of an applied electric current

3.3
finish
surface of the coated article which determines its appearance

3.4
coating powder
solvent-free coating material in powder form which, after fusing and possible curing, gives a continuous film

[SOURCE: EN 971-1:1996, definition 1.41]

3.5
significant surface
that area of the article on which the coating is essential for serviceability and/or appearance

3.6
specifier
person specifying the performance requirements for the coating and significant surfaces of the article

3.7
test specimen
single sample of the final product to be used for testing

4 Requirements

4.1 Material (substrate)

Aluminium and aluminium alloys are classified in accordance with EN 573-3. Suitable materials are those listed as series 1 000, 3 000, 5 000 and 6 000.

4.2 Pretreatment of the substrate

4.2.1 General

Before application of the coating powder, a pretreatment layer shall be applied. This pretreatment may be either

a) chemical treatment with aqueous solutions containing either chromate ions or chromate and phosphate ions, without applying an electric current, or

b) an alternative pretreatment (for instance chromium-free systems, "no-rinse-dry-in-place pretreatment" or electrolytic conversion, or other processes).

After the conversion process, the substrate is normally rinsed with deionized water, and dried.

4.2.2 Chemical treatment

4.2.2.1 General

The aluminium or aluminium alloy shall be free from corrosion prior to pretreatment.

Any item previously coated or anodized shall be stripped down to the aluminium substrate prior to the pretreatment.

The pretreatment stages shall take place one after the other with the minimum delay in between to ensure that the surface to be pretreated does not become dry between successive stages.

The pretreatment solutions shall be applied either:

a) by dipping in baths of sufficient size to allow efficient operation of the chemical process on all significant surfaces; or

b) by spraying, in tanks or cabinets made so that all significant surfaces are in contact with the spraying solution for the specified period of time; or

c) by deluging, in tanks or cabinets made so that all significant surfaces are in contact with the deluging solution for the specified period of time.

The solution used for the conversion process is normally used for aluminium and aluminium alloys only. Pretreatment of other metals is not authorized unless removal of metallic-ion contamination is ensured.

4.2.2.2 Cleaning, etching and rinsing

All surface contaminants such as oils, greases, lubricants and other residues shall be removed using alkaline or acidic solutions and/or organic solvents in appropriate combinations. Before the conversion stage, the substrate shall be thoroughly cleaned and/or pickled.

After cleaning and/or pickling, the substrate may be rinsed.

The etching shall remove a minimum of 1 g/m² of the Aluminium substrate by weight

4.2.2.3 Conversion of aluminium surface

4.2.2.3.1 General

The conversion of the aluminium surface may be carried out using chromate or non chromate conversion coatings or anodising.

4.2.2.3.2 Conversion and drying of chromate and phosphochromate layers

A conversion layer is produced by application of the appropriate solution.

Chromate conversion layers vary in colour from an iridescent yellow to a golden tan. The layers are characterized by the presence of chromium and the absence of phosphate (see Annex A).

The mass per unit surface area of the conversion layer, often referred to as "conversion coating weight", as measured in accordance with the method described in Annex A, shall be between 0,4 g/m² and 1 g/m².

Phosphochromate conversion layers vary in colour from iridescent to various shades of green. The layers are characterized by the presence of both chromate and phosphate (see Annex A).

The mass per unit surface area of the conversion layer, as measured in accordance with the method described in Annex A, shall be between 0,4 g/m² and 1,2 g/m².

NOTE The colours given above are only indicative. They depend on alloys used and pretreatment and do not characterize the quality of the conversion layer.

Where a rinsed system is used the conversion layer can be rinsed with water and shall finally be rinsed with deionized water. The electrical conductivity of the water draining off from significant surfaces at the final rinse shall be below 30 µS/cm at 20 °C.

If the final rinse is carried out with hot water, the temperature shall not exceed 60 °C and the rinsing time shall be as short as possible in order to avoid dissolving of hexavalent chromium from the conversion layer.

The layer shall be as uniform as possible, adhering to the substrate and free from any powdering.

The drying temperature after pretreatment, as measured on the metal surface, shall not exceed 100 °C if the coating powder is applied without delay or interruption after pretreatment. If it is applied with delay or interruption after pretreatment (less than 16 h but not more), the maximum temperature on the metal surface shall be as follows:

- 65 °C for chromate layers;
- 85 °C for phosphochromate layers.

The coating powder shall not be applied more than 2 416 h after pretreatment.

4.2.2.3.3 Non chromate systems

Alternative pretreatments, e.g. chromium-free systems, "no-rinse-dry-in-place pretreatment" or other processes may be used in place of chromate or phosphochromate.

The use of alternative systems shall be applied in accordance with the supplier or manufacturer's instructions. A set of these instructions and appropriate recording and monitoring instructions shall be maintained by the applicator. The instructions shall include methods of surface preparation methods and post treatment including drying instructions. If the alternative system does not require rinsing then this must be stated. The electrical conductivity of the water draining off from significant surfaces at the final rinse shall be below 30 µS/cm at 20 °C.

The coating powder shall not be applied more than 24 h after pretreatment.

4.2.2.3.4 Electrolytic conversion (Pre- anodising)

The anodic pretreatment shall be chosen so as to produce an anodic coating with a thickness of at least 3 µm (not more than 8 µm) without powdering and without surface flaws. The anodic layer shall not be sealed.

The anodic layer shall be rinsed with deionized water. for as long as is required to remove the acid from the pores The electrical conductivity of the water draining off from significant surfaces at the final rinse shall be below 30 µS/cm at 20 °C.

The coating powder shall not be applied more than 24 h after pretreatment.

4.3 Coating powder

4.3.1 Identification

The following information shall be made available by the supplier for each consignment of coating powder:

a) manufacturer;

b) trade name;

c) colour;

d) gloss level;

e) type of resin;

f) batch number;

g) box number;

h) product reference code;

i) confirmation of length of natural weathering test completed;

j) confirmation of class for flexibility tests 4.3.3.5, 4.3.3.6 and 4.3.3.7;

k) date of manufacture;

l) date of despatch.