

# SLOVENSKI STANDARD

## SIST EN 12206-1:2021

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Nadomešča:

SIST EN 12206-1:2005

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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 - Revêtement de l'aluminium et de ses alliages pour des applications architecturales - Partie 1: Revêtements à partir de peinture en poudre thermodurcissable

Ta slovenski standard je istoveten z: **EN 12206-1:2021**

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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

Peintures et vernis - Revêtement de l'aluminium et de ses alliages pour des applications architecturales - Partie 1: Revêtements à partir de peinture en poudre thermodurcissable

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

This European Standard was approved by CEN on 1 September 2020.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 12206-1:2021) has been prepared by Technical Committee CEN/TC 139 “Paints and varnishes”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by November 2021, and conflicting national standards shall be withdrawn at the latest by November 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12206-1:2004.

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

- 3.4: Definition source amended;
- 4.2.2.1: Methods of pretreatment now includes deluging;
- 4.2.2.2: Change of terminology to etching;
- 4.2.2.2.1: Clause added;
- 4.2.2.2.2 Clause added;
- 4.2.2.3.3: Process for non-chromate systems more defined;
- 4.2.2.3.4: Process for electrolytic conversion more defined;
- 4.2.2.3.4: Separate clause for electrolytic conversion added;
- 4.3.1: Identification of powder now required;
- 4.3.1: Separation of conventional technology and enhanced durability products removed;
- 4.3.2: Clause added;
- 4.3.3.5: Cupping test – 2 categories introduced;
- 4.3.3.6: Falling weight test – 2 categories introduced;
- 4.3.3.7: Bend test – 2 categories introduced;
- 4.3.3.14: Manufacturer to state length of resistance to weathering test;
- 4.5.2-4.5.9: Clauses renumbered;
- 4.5.6: Minimum film thickness requirement altered;
- 4.6: Clause added;
- 5.4: Colourimetrically standards added;

**EN 12206-1:2021 (E)**

- 5.8: Clause amended;
- 5.16: Clause amended;
- Annex B: Natural weathering test requirements altered;
- Annex C: Test procedure for film thickness tests removed;
- Annex D: Deleted;
- Annex E: Deleted;
- Annex F: Deleted.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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## 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.

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**EN 12206-1:2021 (E)****1 Scope**

This document 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 document 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 could be injurious to health if adequate precautions are not taken. Attention is drawn in the text to specific hazards. This document 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 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 16474-2:2013, *Paints and varnishes - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 16474-2:2013)*

EN ISO 16474-3, *Paints and varnishes - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (ISO 16474-3)*

EN ISO 18314-1, *Analytical colorimetry - Part 1: Practical colour measurement (ISO 18314-1)*

ISO 2143, *Anodizing of aluminium and its alloys — Estimation of loss of absorptive power of anodic oxidation coatings after sealing — Dye-spot test with prior acid treatment*

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 procedures for inspection by attributes — Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection*

ISO 4623-2, *Paints and varnishes — Determination of resistance to filiform corrosion — Part 2: Aluminium substrates*

ISO 9223, *Corrosion of metals and alloys — Corrosivity of atmospheres — Classification, determination and estimation*

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

### 3 Terms and definitions (standards.iteh.ai)

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**

coating material in powder form which, after fusing and possibly curing, gives a continuous film

[SOURCE: EN ISO 4618:2014]

**EN 12206-1:2021 (E)****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 (pre-anodising), 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 metallic-ion contamination is continuously removed or less than specified maximum values.

#### 4.2.2.2 Cleaning, etching and rinsing

##### 4.2.2.2.1 Cleaning

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. After cleaning the substrate may be rinsed.

##### 4.2.2.2.2 Etching

Before the conversion stage, the substrate shall be etched with alkaline or acidic solutions or both successively. The etching shall remove a minimum of 1 g/m<sup>2</sup> of the aluminium substrate by weight.

After etching, the substrate may be rinsed.

#### 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/m<sup>2</sup> and 1 g/m<sup>2</sup>.

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/m<sup>2</sup> and 1,2 g/m<sup>2</sup>.

**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), the maximum temperature on the metal surface shall be as follows: