



SLOVENSKI STANDARD
SIST EN 4868:2023

01-december-2023

Aeronavtika - Anodno potopno barvanje s temeljno barvo brez šestvalentnega kroma

Aerospace series - Anodic electrodeposition of hexavalent chromium free primer

Luft- und Raumfahrt - Anodische Elektrotauchlackierung mit einer Grundierung ohne hexavalentes Chrom

Série aérospatiale - Électrodéposition anodique d'un primaire sans chrome hexavalent

Ta slovenski standard je istoveten z: EN 4868:2023

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ICS:

49.040	Prevleke in z njimi povezani postopki, ki se uporabljajo v letalski in vesoljski industriji	Coatings and related processes used in aerospace industry
87.020	Postopki za nanašanje barvnih premazov	Paint coating processes

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EUROPEAN STANDARD

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Aerospace series - Anodic electrodeposition of hexavalent chromium free primer

Série aérospatiale - Électrodéposition anodique d'un primaire sans chrome hexavalent

Luft- und Raumfahrt - Anodische Elektrotauchlackierung von chrom(VI)-freier Grundierung

This European Standard was approved by CEN on 12 June 2023.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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EN 4868:2023 (E)**European foreword**

This document (EN 4868:2023) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2024, and conflicting national standards shall be withdrawn at the latest by April 2024.

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 4868:2019.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: 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, Türkiye and the United Kingdom.

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1 Scope

This document specifies the requirements for hexavalent chromium free anodic electrodeposition of organic coatings on aluminium and aluminium alloys for corrosion protection of parts.

This document specifies design, quality and manufacturing requirements. It does not specify complete in-house process instructions; these are specified in the processors detailed process instructions.

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 3840, *Aerospace series — Paints and varnishes — Technical specification*

EN ISO 1518-1, *Paints and varnishes — Determination of scratch resistance — Part 1: Constant-loading method* (ISO 1518-1)

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

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

EN ISO 2812-1, *Paints and varnishes — Determination of resistance to liquids — Part 1: Immersion in liquids other than water* (ISO 2812-1)

EN ISO 2812-2, *Paints and varnishes — Determination of resistance to liquids — Part 2: Water immersion method* (ISO 2812-2)

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

EN ISO 4628-8, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect* (ISO 4628-8)

EN ISO 4628-10, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 10: Assessment of degree of filiform corrosion* (ISO 4628-10)

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

EN ISO 17872, *Paints and varnishes — Guidelines for the introduction of scribe marks through coatings on metallic panels for corrosion testing* (ISO 17872)

EN 4868:2023 (E)**3 Terms and definitions**

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

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

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

3.1 General terms**3.1.1****OEM**

producer who has the design authority and manufactures products or components that are purchased by a company and retailed under that purchasing company's brand name

Note 1 to entry: the OEM can also apply the process.

3.1.2**manufacturer**

company or person who makes, manufactures, assembles components

Note 1 to entry: the manufacturer can also apply the process.

3.1.3**processor**

company or person who applies the process

3.1.4**process instruction**

document that specifies the application scopes, detailed process, quality management, environmental and safety regulations

Note 1 to entry: key parameters and detailed steps are examples of items to be specified in the process instruction.

3.1.5**batch**

unless otherwise specified, a batch is made of parts of the same type, processed at the same time in the same bath

Note 1 to entry: examples of parts of the same types are parts that have similar shape and size and would be made of the same material.

3.2 Technical terms

3.2.1

mechanically disturbed layer

layer that is present at the surface resulting from the rolling process of the material

3.2.2

pit

surface corrosion defect at which the anodic coating is penetrated

Note 1 to entry: typical characteristics of corrosion pits are:

- rounded or irregular or elongated geometry;
- comet tail or line or halo that emerges from the cavity;
- some corrosion by-products inside pits (on aluminium the by-product may be granular, powdery or amorphous and white, grey or black in colour).

Note 2 to entry: to be considered as a corrosion pit, a surface cavity shall exhibit at least two of the above characteristics.

3.2.3

rework

repetition of the anodic electrodeposition process step after complete stripping of the layer

3.2.4

anodic electrodeposition

industrial coating method in which negatively charged organic coating particles in aqueous solution migrate (electrophoresis) toward the anode of a direct-current electrical circuit passing through the solution, so that electrolysis of water creates a localized pH gradient, precipitating a uniform layer of coating on the anode

3.2.5

ultra-filtrate

effluent generated from an electrocoat bath passing across an ultrafilter membrane

Note 1 to entry: the effluent is mainly composed of water and water-soluble species.

4 Purpose of process

4.1 General

This document establishes the requirements for a waterborne, hexavalent chromium free corrosion inhibiting, chemical and solvent resistant, anodic electrodeposition of organic coating capable of curing at 110 °C to 120 °C.

The anodic electrodeposition process applies a protective coating with uniform film thickness control, complete coverage of recessed areas, minimal surface defects and high transfer efficiency. Once the film is deposited on the substrate, a thermal cure is required to achieve the final properties of the coated parts.

4.2 Applicability

It can be used as a protection against corrosion, as an organic coating primer before topcoat application, for electrical insulation, and as a masking before anodizing and/or conversion.

EN 4868:2023 (E)**4.3 Limitations**

4.3.1 All processes that can compromise the anodic electrodeposition film (e.g. forming, blasting, shot peening, heat-treatment) shall be performed prior to surface preparation of the parts to be coated).

4.3.2 Anodic electrodeposition shall not be applied:

- in areas where electrical conductivity is required;
- for high temperature applications (> 180 °C);
- for components which can permanently entrap treatment solutions, except components that can be adequately masked;
- for assemblies with overlap areas (e.g. spot-welded and riveted parts) containing tight tolerances that cannot provide adequate pre-treatment and/or coating penetration between the overlap area.

5 Protection system classification

Coating layer is classified by the three following types:

- type A: thin layer thicknesses (4 µm to 12 µm);
- type B: medium layer thicknesses (12 µm to 30 µm);
- type C: thick layer thicknesses (> 30 µm).

6 Process requirements**6.1 Information for the processor**

- System type.
- Substrate standard reference and heat treatment. <https://standards.iteh.ai/catalog/standards/sist/ce4c670a-55fc-4715-8505-1df5567a7945/sist-en-4868-2023>
- Areas to be coated.
- Coating thickness measurement inspection points.
- Electrical contact points or areas where these are inadmissible.
- Specification for testing parts and/or samples.

6.2 Condition of parts prior to the treatment

All prior operations such as welding, soldering/brazing, blasting, shot peening, machining and heat treatments shall have been completed:

- the parts shall be free of oil, grease, marking inks and other surface contaminations;
- if needed/required, mechanically disturbed layer shall be removed either by mechanical or chemical processes;
- surface treatments prior electrodeposition process are possible. In case of anodic electrodeposition rework, all organic coating residues from the previous coating shall be completely removed.