
**Combined coatings on aluminium —
General specifications for combined
coatings of electrophoretic organic
coatings and anodic oxidation
coatings on aluminium**

*Revêtements combinés sur aluminium — Spécifications générales
pour les revêtements combinés appliqués sur l'aluminium composés
d'un revêtement organique obtenu par électrophorèse appliqué sur
un revêtement obtenu par anodisation*





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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Classes	2
5 Quality	3
5.1 General.....	3
5.2 Appearance.....	3
5.3 Colour.....	3
5.4 Gloss.....	3
5.5 Thickness of anodic oxidation coating.....	3
5.6 Corrosion resistance.....	3
5.7 Resistance to accelerated weathering.....	4
5.8 Resistance to cyclic corrosion/UV light.....	4
5.9 Outdoor exposure.....	4
5.10 Hardness of the organic coating.....	4
5.11 Adhesion of the organic coating.....	4
5.12 Solvent resistance of the organic coating.....	4
5.13 Chemical resistance.....	4
5.14 Abrasion resistance.....	5
6 Test specimen	5
6.1 Sampling procedure.....	5
6.2 Size of the test specimen.....	5
6.3 Cleanliness of the test specimen.....	5
7 Test	5
7.1 General condition.....	5
7.2 Test methods.....	5
8 Expression of results	12
9 Test report	12
Annex A (informative) Recommended characteristics and performance	13
Annex B (normative) Rating number charts for evaluation of the corrosion rate	15
Annex C (normative) Rating number charts for evaluation of the alkali resistance test	16
Bibliography	17

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.

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

ISO 28340 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 2, *Organic and anodic oxidation coatings on aluminium*.

Combined coatings on aluminium — General specifications for combined coatings of electrophoretic organic coatings and anodic oxidation coatings on aluminium

1 Scope

This International Standard gives specifications for the combined coatings of electrophoretic organic coatings and anodic oxidation coatings on aluminium used for architecture.

It specifies the characteristic properties of combined coatings on aluminium, outlines the test methods for checking these characteristic properties and specifies their required performance.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1463, *Metallic and oxide coatings — Measurement of coating thickness — Microscopical method*

ISO 2360, *Non-conductive coatings on non-magnetic electrically conductive basis materials — Measurement of coating thickness — Amplitude-sensitive eddy-current method*

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

ISO 2810, *Paints and varnishes — Natural weathering of coatings — Exposure and assessment*

ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees*

ISO 2859-10, *Sampling procedures for inspection by attributes — Part 10: Introduction to the ISO 2859 series of standards for sampling for inspection by attributes*

ISO 4628-1, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

ISO 4892-4, *Plastics — Methods of exposure to laboratory light sources — Part 4: Open-flame carbon-arc lamps*

ISO 7599, *Anodizing of aluminium and its alloys — General specifications for anodic oxidation coatings on aluminium*

ISO 7668, *Anodizing of aluminium and its alloys — Measurement of specular reflectance and specular gloss of anodic oxidation coatings at angles of 20 degrees, 45 degrees, 60 degrees or 85 degrees*

ISO 8251, *Anodizing of aluminium and its alloys — Measurement of abrasion resistance of anodic oxidation coatings*

ISO 8993, *Anodizing of aluminium and its alloys — Rating system for the evaluation of pitting corrosion — Chart method*

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

ISO 11341, *Paints and varnishes — Artificial weathering and exposure to artificial radiation — Exposure to filtered xenon-arc radiation*

ISO 11507, *Paints and varnishes — Exposure of coatings to artificial weathering — Exposure to fluorescent UV lamps and water*

ISO 15184, *Paints and varnishes — Determination of film hardness by pencil test*

AAMA 612-02, *Voluntary specification, performance requirements, and test procedures for combined coatings of anodic oxide and transparent organic coatings on architectural aluminum*

3 Terms and definitions

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

3.1 combined coatings

superimposed electrophoretic organic coating and anodic oxidation coating on aluminium

3.2 significant surface

part of the article covered or to be covered by the coatings, and for which the coatings are essential for service and/or appearance

3.3 standard sample limit sample

sample which defines the criteria for acceptable appearance

Note 1 to entry: This may be agreed between the surface processor and the customer.

4 Classes

The combined coatings are classified by corrosion resistance, which is specified in [5.6](#), resistance to accelerated weathering specified in [5.7](#), and resistance to cyclic corrosion/UV light specified in [5.8](#).

Performance requirements are given in [Table 1](#).

To test the corrosion resistance, the acetic acid salt spray (AASS) test (method A) or copper-accelerated acetic acid salt spray (CASS) test (method B) shall be carried out.

To test the resistance to accelerated weathering, the xenon-arc lamp exposure test (method A) or the open-flame carbon-arc lamp exposure test (method B) shall be carried out.

To test the resistance to cyclic corrosion/UV light, the AASS test (method A) shall be carried out or the CASS test (method B) after the ultraviolet (UV) lamp exposure test specified in [5.8](#). The selection of the test method should be agreed between the surface processor and the customer.

NOTE Classes and applied environments are given in [Table A.1](#).

Table 1 — Classes of combined coatings on aluminium

Characteristic property		Corrosion resistance		Resistance to accelerated weathering		Resistance to cyclic corrosion/UV light			
Test method		A	B	A	B	A		B	
		AASS	CASS	Xenon-arc lamp	Carbon-arc lamp	UV	AASS	UV	CASS
Testing time h	Class 4	1 500	120	4 000	3 000	240	1 500	240	120
	Class 3	1 500	120	2 000	1 500	240	1 500	240	120
	Class 2	1 000	72	1 000	750	240	1 000	240	72
	Class 1	—	24	350	250	—	—	—	—
Criteria		Corrosion: RN 9,5 or more		No remarkable colour change and chalking Gloss retention: 75 % or more		Corrosion: RN 9,0 or more			

5 Quality

5.1 General

The required quality for the applied products shall be chosen from the performances specified in [5.2](#) to [5.14](#) which should be agreed between the surface processor and the customer.

5.2 Appearance

The appearance shall be examined by the method specified in [7.2.1](#), and any visual surface defects, such as scratches, unevenness, peeling, which are unacceptable for the application, shall not be permitted. The quality should be agreed between the surface processor and the customer.

5.3 Colour

The colour and its tolerance level shall be examined by the method specified in [7.2.2](#), and the quality should be agreed between the surface processor and the customer.

5.4 Gloss

The specular gloss of the electrophoretic organic coating shall be examined by the method specified in [7.2.3](#), and the quality should be agreed between the surface processor and the customer.

5.5 Thickness of anodic oxidation coating

The thickness of anodic oxidation coating shall be measured by the method specified in [7.2.4](#), and the quality should be agreed between the surface processor and the customer. The average thickness of anodic oxidation coating, as specified in ISO 7599, shall be more than 5 µm. Furthermore, the minimum local thickness shall not be less than 80 % (4 µm) of the average thicknesses at three or more measurement points.

The total thickness of the combined coatings is not specified because specification is based on performance.

5.6 Corrosion resistance

The corrosion resistance of the combined coatings shall be tested by the AASS test specified in [7.2.5.2](#) or the CASS test specified in [7.2.5.3](#) and shall be evaluated by the degradation in appearance and the corrosion rate [rating number(RN)] for the test specimens. The selection of the test method should be agreed between the surface processor and the customer. The testing time and the quality of the combined coatings shall conform to [Table 1](#).