QUALICOAT SPECIFICATIONS

25th Edition

Volume 2 – Specifications for Chemical Pretreatment Manufacturers

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CHAPTER 1 - GENERAL INFORMATION

1. Scope

These Specifications apply to the QUALICOAT quality label, which is a registered trademark.

The current volume reports on the instructions given to coaters with regard to pretreatment and specifies the general pretreatment processes and the procedure for granting and renewing an approval for pretreatment processes, except for chromate conversion coatings.

It also illustrates the testing programme to be followed by the laboratories involved and the requirements for every test.

2. Language

The official version of these Specifications is the English language version.

In the English language version, certain verbal forms have meanings which correspond to the requirements of the ISO/IEC Directives, Part 2, Clause 7.

The following verbal forms indicate strict requirements to be followed to comply with these Specifications and from which no deviation is permitted:

- Shall
- Shall not

The following verbal forms indicate that among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required. Additionally, in the negative form, a certain possibility or course of action is deprecated but not prohibited:

- Should
- Should not

The following verbal forms indicate a course of action permissible within the limits of these Specifications:

- May
- Need not

The following verbal forms are used for statements of possibility and capability—whether material, physical, or causal:

- Can
- Cannot

In case of ambiguities or uncertainties in any part of the Specifications, clarification shall be requested from QUALICOAT.

3. Terminology

Anodic pretreatment Electrochemical process used to produce an anodic layer before coating.

Approval Confirmation that a specific material (coating or chemical conversion) meets the requirements of the QUALICOAT Specifications.

The following categories of approvals are available:

Classification	Description
P-No.	Approval for powder or liquid coating system
PF-No.	Approval for powder coating system suitable for postforming
A-No.	Approval for chemical pretreatment system (conversion coating) for etched material
AP-No.	Approval for chemical pretreatment system (conversion coating) for pre-anodised material
AN-No.	Approval for chemical pretreatment system (with modified processes or new technologies)

Chromate conversion Chemical treatment using chromate or chromate-phosphate conversion.

Chemical pretreatment Chemical treatment using non-chromate conversion.

Coating line A production line used for coating aluminium for architectural applications that includes a single pretreatment cycle (surface preparation, conversion coating and drying) and a coating cycle (one or more spraying booths and ovens).

Continuous line A production line where parts are pretreated, coated and cured without intermediate handling.

Curing index	A numerical index of cure value that quantifies directly from the curing graph the total coating cure experienced against the coating supplier's paint cure schedule
Licence/Sub-licence	Permission to use the quality label in accordance with the QUALICOAT Specifications for all coatings on aluminium for architectural applications produced on the coating line(s) at the production site inspected.
Licensee/Sub-licensee	The legal entity operating the inspected production site, holding the QUALICOAT licence for this specific production site and acting as this specific licensee on the market. This means marketing all coatings on architectural aluminium produced at this production site using the QUALICOAT label in accordance with the Specifications. The same legal entity may also operate other production sites and hold separate QUALICOAT licences for these.
General licence	Permission to grant licences and approvals in a certain territory.
General Licensee (GL)	National or international association holding the QUALICOAT general licence for a defined territory.
Material for postforming	Coated cold-rolled aluminium material suitable for postforming (sheets or coils).
Postforming	The act of working, by bending or forming (stamping), already coated aluminium sheets or coils.
Pretreatment cycle	A system of tanks for spray or dipping application of chemicals, rinses and/or electrochemical processes, creating a process sequence for pre-treating the workpieces to be coated. A single pretreatment cycle comprises one specific chemical conversion coating step or — in the case of pre-anodising— the pre-anodising bath.
Production site	A production facility for coating materials, chemicals, or coatings. In the case of a coating facility, the licensee may operate one or several coating lines in a production site. A production site shall have a distinct postal address.
Testing laboratories	Independent quality testing and/or inspection bodies duly authorised by the General Licensee or QUALICOAT.

4. Relevant standards

Nº	Title of standard	Reference
ISO 2409	Paints and varnishes - Cross-cut test	on page 26
ISO 1519	Paints and varnishes - Bend test (cylindrical mandrel)	on page 27
ISO 6272-1	Paints and varnishes - Rapid-deformation (impact resistance) tests - Part 1: Falling-weight test, large-area indenter	on page 29
ISO 6272-2	Paints and varnishes - Rapid-deformation (impact resistance) tests - Part 2: Falling-weight test, small-area indenter	
ASTM D2794	Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)	
ISO 9227	Corrosion tests in artificial atmospheres - Salt spray tests	on page 31
ISO 4623-2	Paints and varnishes - Determination of resistance to filiform corrosion - Part 2 Aluminium substrates	on page 33
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	
EN 12487	Chemical conversion coatings - Rinsed and non-rinsed chromate conversion coatings on aluminium and aluminium alloys	on page 8
ISO 3892	Conversion coatings on metallic materials - Determination of coating mass per unit area - Gravimetric methods	
EN 1706	Aluminium and aluminium alloys - Castings - Chemical composition and mechanical properties	on page 6

It is the responsibility of the chemical manufacturers to ensure that they always use the most recent version of the standards.

5. Release and revision of the specifications

The Specifications may be supplemented or amended with update sheets that set out and incorporate QUALICOAT's resolutions until a new edition is issued.

These numbered sheets will state the subject of the resolution, the date when QUALICOAT passed the resolution, the effective date and the details of the resolution.

6. Impartiality

QUALICOAT does not allow commercial, financial or other pressures to compromise its impartiality. The Specifications may be amended when risks of impartiality have been identified or when they need to conform to new standards.

CHAPTER 2 - SPECIFICATIONS FOR PRETREATMENT AT COATING PLANTS

1. Storage of chemical products

Chemical products shall be stored in accordance with the specifications of the chemical material's manufacturer.

2. Pretreatment installations

a) Horizontal installation (immersion/spray)

Pretreatment is carried out on profiles in a horizontal position at all stages.

The products to be treated by immersion shall either be attached to the jig individually or placed in a basket. Each product shall be treated fully in one pass, at each stage.

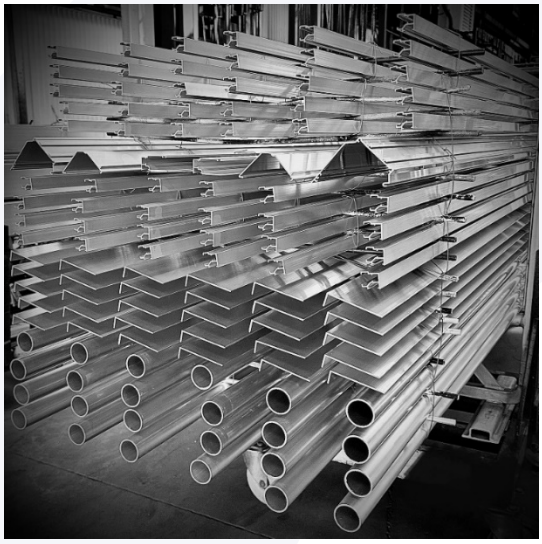

Figure 1 - Batch Treatment

For batch treatment, the products to be treated are arranged in organised loads in baskets used for immersion.

- The material used for separators and hooping shall be compatible with the chemistry used as recommended by the chemical manufacturer.
- The number of separators shall be chosen to minimise contacts.
- The products shall be arranged with sufficient space between them to allow the liquid to pass freely through the load.

- The maximum contact width between the sections shall be 2 mm.
- The distance between the sections shall be at least 1 cm.
- It is important to avoid any surface scratching.

b) Vertical installation (spray, cascade, or others)

Pretreatment is carried out on profiles in a vertical position at all stages.

3. Surface preparation

a) Basic principles

The surfaces of the parts to be treated shall be clean and free of any oxidation, scale or soils, oil, grease, lubricants, hand sweat or any other contamination that may be detrimental to the final finish. The parts shall therefore be etched before conversion coating.

The products to be treated shall either be attached to the jig individually or placed in a basket as stipulated above. Each product shall be treated fully in one pass, at each stage.

It is not permissible, to apply any etching or conversion coating process, which is not stipulated below.

In the case of modified processes or new technologies, a preliminary sampling and testing (PST) of the etching and/or conversion coating process is required and described on page 45 in Chapter 7.

Only after this preliminary testing is successfully completed, an approval (A-No.) of the pretreatment system can be granted.

b) Etching stage

All chemical pretreatments for powder and liquid organic coatings shall include an aluminium etching stage consisting of one or more steps.

Table 1 - Admissable etching types

Type A	Acid Etching
	A1 - Simple acid etching
	A2 - Acid etching + acid etching
Type AA	Dual etching
	AA1 - Alkaline etching and acid etching
	AA2 - Acid etching + alkaline etching + acid etching

Measurement of etching degree

The etching degree is measured by taking the weight of a test sample before and after etching.

The etching degree is measured on extruded sections of alloy EN AW-6060 or EN AW-6063. If the main production on a coating line is on sheets or alloys other than EN AW-6060 or EN AW-6063 the inspector should also check the etching degree with the material actually used.

If a sample cannot be taken, the method used to measure the etching degree shall be defined in agreement with the General Licensee or directly with QUALICOAT in countries without a General Licensee.

Any new coating line shall be designed to allow sampling after each stage of the chemical treatment.

An etching degree is not specified for cast accessories. Etching is optional for such products.

Table 2 - Types of preliminary pretreatments

	Total etching degree	Description
Standard	at least 1.0 g/m^2	---
Enhanced (SEASIDE)	at least 2.0 g/m^2	Including degreasing either in an independent step or in a combined degreasing/etching step
		For type AA (dual etching) the two final steps shall be at least 0.5 g/m^2

c) Etching degree for coil coating

The etching degree is measured by dipping a test sample (same material alloy as production material) in the etching tank solution for a defined time (equivalent to the real etching degree).

For coil coating lines, the total etching degree shall be at least 0,2 g/m^2.

The SEASIDE endorsement is not foreseen for coil coating.

4. Chemical conversion coatings

a) Basic principles

Conversion coating baths used for aluminium should not be used for the treatment of other metal substrates. For any conversion coating bath which is not solely used for aluminium, it is the joint responsibility of both the licensee and the chemical manufacturer to define and obey measures in the manual adapted to the coating line, which shall ensure that the contamination

of the respective conversion coating bath is kept within the limits prescribed by the chemical manufacturer.

After conversion coating pre-treated aluminium shall not be stored for more than 16 hours.

As a rule, it should be coated immediately after pretreatment. The risk of insufficient adhesion increases the longer the products are stored.

Pre-treated aluminium shall never be stored in an atmosphere that is dusty and detrimental to them. Good atmospheric conditions shall always be maintained in the storage area.

All workers handling pre-treated aluminium shall wear clean textile gloves to avoid contamination of the surface.

b) Chromate conversion coatings

This chemical chromate (yellow chromating) or chromate-phosphate (green chromating) conversion shall be carried out according to EN 12487.

Conductivity

The conductivity of the final rinse preceding chemical chromate conversion's step shall comply with the manufacturer's specifications and be checked by the inspector.

Demineralised water shall be used for the final rinse after chemical chromate conversion before drying. When measured on open sections, the conductivity of the dripping water shall not exceed a maximum of 30 µS/cm at 25°C.

Any spray and cascade installation shall be designed (or retrofitted) to allow sampling for measuring the conductivity as described above. The conductivity of the dripping water shall be measured on open sections and can also be measured on hollow sections.

If it is not possible to measure the conductivity of the dripping water for immersion installation, the conductivity of the rinse water in the process tank shall be measured with a maximum conductivity of 15 µS/cm at 25°C before immersion starts.

Measurement of conversion coating weight

The weight of the chromate conversion coating shall be between 0.6 and 1.2 g/m^2 for chemical chromate conversion (yellow coating) and between 0.6 and 1.5 g/m^2 for chemical chromate-phosphate conversion (green coating).

Cooperation with chemical manufacturers

Every two months a production sample shall be sent to the chemical chromate conversion manufacturer who shall carry out an **acetic acid salt spray resistance test.**

If the chemical chromate conversion manufacturer is unable to carry out the acetic acid salt spray resistance test, the test shall be outsourced and carried out by a QUALICOAT approved laboratory or another laboratory accredited for this specific test according to ISO 17025.

The test results shall be communicated to the coater within a period of maximum four months.

The results and any corrective actions communicated by the chemical chromate conversion manufacturer shall be entered and retained along with the related shipping details in records readily accessible to the inspector.

Unsatisfactory values shall have no influence on the result of a QUALICOAT inspection.

c) Chromium-free conversion coatings

Chemical pretreatments other than the chromate conversion coatings described above may not be used until they have been approved by QUALICOAT, following a test programme set out in "Granting of Approvals" in Chapter 4.

Conductivity

In terms of rinsing, there are two types of chemical pretreatment systems:

- Rinse system

  There is a final rinse after the conversion coating stage.

  When measured on open sections, the conductivity of the dripping water of all chemical pretreatment systems with a final rinse shall not exceed a maximum of 30 µS/cm at 25°C.

  Any spray and cascade installation shall be designed (or retrofitted) to allow sampling for measuring the conductivity as described above. The conductivity of the dripping water shall be measured on open sections and can also be measured on hollow sections.

  If it is not possible to measure the conductivity of the dripping water for immersion installation, the conductivity of the rinse water in the process tank shall be measured with a maximum conductivity of 15 µS/cm at 25°C before immersion starts.

- No-rinse system

  There is no final rinse after the conversion stage (a spray mist step after the conversion stage is not considered as final rinse).

  The conductivity of the dripping water of the last rinse before the conversion stage shall not exceed a maximum conductivity as prescribed by the chemical manufacturer in the manual adapted to the coating line, which shall not be higher than 100 µS/cm at 25°C.

  Any installation should preferably be designed (or retrofitted) to allow sampling for measuring the conductivity as described above.

  If it is not possible to measure the conductivity of the dripping water, the conductivity of the last rinse water applied on the pieces shall not exceed a maximum conductivity as prescribed by the chemical manufacturer in the manual adapted to the coating line, which shall not be higher than 50% of the limit prescribed for the dripping water.

Weight of the conversion coating

The weight of the conversion coating shall comply with the manufacturer's specified limits and be checked by the inspector.

The licensed coaters shall use the products as described in the technical data sheet and in the adapted manual provided for the specific coating line by the chemical manufacturer(s) concerning the methods for assessing the quality of the chrome VI-free conversion coating, the device prescribed for analytically determining the coating weight, and the in-house control frequencies. This manual adapted to the coating line shall be accessible to the inspector.

Due to its uncertainty, QUALICOAT does not allow the gravimetric method to measure the weight of the conversion layer below 100 mg/m² using an analytical balance with precision 0.1 mg. The X-ray analysis and spectrophotometry are accepted methods for measuring conversion layer weight below 100 mg/m².

Cooperation with chemical manufacturers

Every two months a production sample shall be sent to the chemical manufacturer who shall carry out an acetic acid salt spray resistance test and a coating weight measurement. The test results and the measurements shall be communicated to the coater within a period of maximum four months.

The results and any corrective actions communicated by the chemical manufacturer shall be entered and retained along with the related shipping details in records readily accessible to the inspector.

Unsatisfactory values shall have no influence on the result of a QUALICOAT inspection.

5. Anodic pretreatment (PRE-OX endorsement)

a) Basic principles

Licensees using anodic pretreatment shall ask their coating suppliers to confirm in writing the compatibility of their coating system with this type of pretreatment.

Postforming is currently not permissible after anodic pretreatment. The anodic layer is cracking when applying bending procedures after the coating.

b) Requirements for in-house anodic pretreatment process

For off-site anodic pretreatment please refer to Appendix C- Specifications for off-site anodisers.

The following minimum requirements shall be met by the coater:

Surface preparation

The aluminium surface shall be treated to eliminate all impurities that could pose problems in the anodic pretreatment.

Etching

The aluminium parts (extrusions and sheet, not cast) shall be etched with a minimum etching rate of 2 g/m². In the case of alkaline etching, desmutting shall be necessary.

Thickness of the pre-anodised layer

The anodic pretreatment shall be chosen so as to produce an anodic coating with a thickness of at least 4 µm (not more than 10 µm) without powdering and without surface flaws.

The anodic pretreatment parameters can be as follows:

Acid concentration (sulphuric acid)	180-220 g/l
Aluminium content	5-15 g/l
Temperature	20-30°C (± 1°C of the temperature chosen by the anodiser)
Current density	0.8-2.0 A/dm^2
Agitation of the electrolyte	

Post-treatment and rinsing after anodic pretreatment

After anodic pretreatment, the aluminium shall be rinsed for such a time and at such a temperature as is required to remove the acid from the pores and to fulfil the requirements of the wet adhesion test.

Enhancing rinsing with a hot sealing step and/or a passivation step with a QUALICOAT approved chemical pretreatment system or chromate conversion coating is permitted. The rinsing process shall not produce a sealed surface, as this increases the risk of adhesion failure. No-rinse passivation is not permitted when a period of 16 hours has passed before coating.

Sealing additives can decrease the quality of the final product. It is the responsibility of the anodiser and the coater to verify the compatibility with the coating process.

Conductivity

When measured on open sections, the conductivity of the dripping water of the final rinse prior to coating shall not exceed a maximum of 30 µS/cm at 25°C.The final rinse prior to the coating shall be performed in either the anodising or coating line.

Any spray and cascade installation shall be designed (or retrofitted) to allow sampling for measuring the conductivity as described above. The conductivity of the dripping water shall be measured on open sections and can also be measured on hollow sections.

If it is not possible to measure the conductivity of the dripping water for immersion installation, the conductivity of the rinse water in the tank shall be measured with a maximum conductivity of 15 µS/cm at 25°C before immersion starts.

Recording of anodising bath test results

Licensees using in-house anodic pretreatment shall perform and record the following additional tests when processing pre-anodising:

- The acid concentration and aluminium content of the anodising bath shall be analysed once per day.
- The temperature of the anodising bath shall be checked every 8 hours.
- The etching rate shall be checked once per day.
- The thickness of the anodic coating shall be checked (every load).

c) Requirements for treatment and coating of pre-anodised aluminium

Applicable for coaters using in-house or off-site pre-anodising.

Storage conditions

Pre-anodised aluminium shall never be stored or transported in an atmosphere that is dusty, damp (condensation or similar) and detrimental to it. Good atmospheric and dry conditions shall always be maintained in the storage area and whilst being transported. All workers handling pre-anodised aluminium shall wear clean textile gloves to avoid contamination of the surface.

Storage time and transportation

Pre-anodised parts shall not be stored for more than 16 hours. However, the parts may be stored (including transportation, where applicable) for up to 72 hours provided that additional rinsing has occurred with demineralised water with a conductivity of maximum 30 mS/cm at 25 °C and drying has taken place prior to coating (no etching allowed). The risk of insufficient adhesion increases the longer the parts are stored.

Pretreatment and rinsing prior to coating

The coater shall ensure that the aluminium after anodic pretreatment has been rinsed for such a time and at such a temperature as is required to remove the acid from the pores and to fulfil the requirements of the wet adhesion test.

Sealing additives can decrease the quality of the final product. It is the responsibility of the anodiser and the coater to verify the compatibility with the coating process.

Enhancing rinsing with a hot rinsing step and/or a passivation step with a QUALICOAT approved chemical pretreatment system or a chromate conversion coating is permitted. The rinsing process shall not produce a sealed surface, as this increases the risk of adhesion failure.

Conductivity

When measured on open sections, the conductivity of the dripping water of the final rinse prior to coating shall not exceed a maximum of 30 mS/cm at 25°C. The conductivity of the dripping water shall be measured on open sections and can also be measured on hollow sections.

The rinsing for the chemical conversion coatings shall follow the requirements described in "Chemical conversion coatings" on page 7.

No etching or double passivation is permitted.

Recording of test results on finished products

Licensees using this type of anodic pretreatment shall perform and record the following additional tests when processing pre-anodising:

- Before application, each coating material (i.e., each colour shade, gloss category, and manufacturer) shall be submitted to a wet adhesion test.
- During application, a wet adhesion test shall be carried out every 4 hours.

d) Cooperation between external anodiser and coater

> Only applicable for coaters using off-site anodic pretreatment.

External anodisers and coaters shall cooperate closely. The test results from the external anodiser shall be delivered to the coater with a delivery note, and the following information shall be included where applicable (i.e., if it was not already described in the general agreement between the external anodiser and the coater):

- QUALANOD licence number or quality management system certificate number.
- Description of all pre-anodising process steps (type of surface treatment, chemical composition, temperature, and treatment time).
- Detailed description of rinsing conditions (30 µS), including information about the usage and type of hot sealing or approved passivation, including parameters, values, and limits.
- Production date and time.
- Number of test panels that are produced in the same lot together with the material.
- Alloy.
- Etching requirements of cast material.
- Location of jigging marks.

For each delivery, the coater shall communicate the following information to the anodiser:

- Name and licence number of the coater.
- Date of anodising.
- Date of coating.
- Order number.
- Rinsing water conductivity.
- P-No. and colour.
- Results of the wet adhesion test.

This information shall be readily available to the inspector.

6. Drying

After chemical pretreatment and before the application of organic coating, the products shall be dried thoroughly in an oven. For this purpose, a drying oven shall be installed prior to the coating cycle.

For continuous treatment, the maximum drying temperature allowed is 100°C.

For discontinuous treatment the products shall be dried at the following temperatures:

- chemical chromate conversion (yellow coating): maximum 65°C
- chemical chromate-phosphate conversion (green coating): maximum 85°C

The specified temperatures apply to the temperature of the metallic parts and not to the air temperature. The products shall be dried thoroughly before the coating is applied, irrespective of the production method (continuous/discontinuous).

For anodic pretreatment, the drying temperature shall be less than 80°C to prevent the anodic coating from being sealed.

Chemical pretreatment systems other than chromate conversion coatings shall be dried following the manufacturer's specifications.

CHAPTER 3 - PRELIMINARY CONDITIONS FOR THE APPROVAL OF CHEMICAL PRETREATMENTS

1. Formal application prior to testing

a) Application form

Chemical manufacturers who plan to submit a chemical pretreatment system for testing shall send a formal request to the General Licensee or to QUALICOAT in countries without a national association using the application form available on the QUALICOAT website.

If the pretreatment system is manufactured at several production plants, the applicant shall name the main production site and/or technical service centre and indicate all other production sites.

Chemical manufacturer	☐ Chemical Pretreatment Approval (A-No.) ☐ Anodic Pretreatment Approval (AP-No.)	Name main production site: Click or tap here to enter text. ……
	☐ Rinse ☐ No Rinse ☐ Dual use	Other production site(s): Click or tap here to enter text. ……

Figure 2 - Chemical pretreatment system application form

b) Technical Data Sheet and Technical Information

The Technical Data Sheet (TDS), a safety data sheet and detailed instructions on treatment cycles shall be submitted to a QUALICOAT approved laboratory selected in agreement with the General Licensee and/or QUALICOAT in countries without a national association.

On the application form and in the TDS, the applicant shall specify whether the product is a rinse or a no-rinse system, whether it is suitable for dual use, depending on the licensee's pretreatment line set-up, or whether it is proposed to be used in combination with pre-anodised substrates.

The following minimum technical information shall also be provided to the QUALICOAT laboratory in charge on a separate sheet (General Technical Information):

Table 3 - Minimum technical information

APPLICATION METHOD (1) (2)					
PRETREATMENT SYSTEM'S TECHNICAL DATA SHEET			VERSION		
PROCESS CYCLE (2) Conductivity Rinse (before / after) conversion					
No.	Step	Product Name / Conductivity [µS]	Temperature [°C]	Concentration pH	Time [min]
ANALYTICAL METHODS FOR BATH (Titration, pH, Conductivity / Frequency)					
ANALYTICAL METHOD FOR COATING WEIGHT MEASUREMENT					
OTHER ANALYSES (Dye Spot Test / Frequency)					
OTHER RECOMMENDATIONS (Equipment, Handling, Storage, etc.) (3)					
CONVERSION COATING COLOURLESS?					

1. Spraying and / or immersion
2. The manufacturer is responsible for ensuring that the cycle used by the coating applicator is suitable for obtaining a coated product conforming to the QUALICOAT Specifications. What are the limits for demineralised water before / after conversion coating?
3. The technical specifications must make clear which items are compulsory, for instance does "recommended" mean compulsory or not?

2. Preliminary conditions

a) Minimum equipment in main production site and/or technical service centre

The chemical manufacturer shall have the following minimum equipment available at least at one location (main production site and/or technical service centre):

- analytical instruments for testing the quality of the conversion coating
- cutting tools and instruments necessary for performing the adhesion test
- apparatus for testing dry adhesion and elasticity (cupping test)
- impact tester
- apparatus for testing resistance to cracking on bending
- analytical balance for determining weight loss (precision 0.1 mg)
- apparatus to carry out the following corrosion tests[1]:
  - Constant climate condensation water
  - Resistance to humid atmospheres containing sulphur dioxide
  - Acetic acid salt spray resistance
  - Wet adhesion test
  - Filiform corrosion test

b) Requirements at other locations

At all other locations not being the main production site and/or technical service centre, the following requirements shall be met:

- A method for testing the quality of the conversion coating shall be available.
- Tests that cannot be carried out on-site shall be performed by the laboratory at the main production site and/or technical service centre or outsourced to any QUALICOAT approved laboratory.

[1] Constant climate condensation water test, resistance to humid atmospheres containing sulphur dioxide and filiform corrosion test may be outsourced and carried out by a QUALICOAT approved laboratory or another laboratory accredited for this specific test according to ISO 17025.

CHAPTER 4 - GRANTING OF APPROVALS

1. Introduction

The methods for corrosion and mechanical tests are based on international standards, where they exist (see "Relevant standards" on page 4).

Before a provisional approval is granted for a new pretreatment system,

- the laboratory in charge shall carry out the testing programme specified below.
- Corrosion tests (including wet adhesion test) shall also be performed by a second laboratory under the responsibility of the laboratory in charge.

Based on positive results of outdoor exposure in Genoa (Italy), an interim approval is granted after two years of exposure and a final approval after 5 years.

2. Panel preparation

a) Samples

Special attention shall be paid to the preparation of samples.

The final results of corrosion and exposure tests depend not only on the treatment but also on the aluminium composition and the reaction between the aluminium surface and chemical products.

The following samples shall be used:

- panels for mechanical tests (thickness of 0.8 or 1 mm): EN AW-5005-H24 or -H14 (AlMg 1 -semihard)
- extruded samples for corrosion tests and outdoor exposure: EN AW-6060 or -6063.

The chemical composition of the samples has an influence on the final results, especially in corrosion tests. For this reason, all laboratories shall use an alloy from the same batch to prepare the samples.

The laboratory's final report shall always indicate the chemical composition.

The samples may be prepared:

- either in the QUALICOAT approved laboratory under the supervision of a representative of the applicant company
- or in the laboratory of the chemical manufacturer under the supervision of a representative of the laboratory in charge.

The number of panels is prescribed below.

Table 4 - Sampling of chemical pretreatment systems (A-Nos)

Test	Chemical pretreatment	
	Number of test pieces	Type
Dry adhesion	3	panels
Cupping test	3	panels
Bent test	3	panels
Impact test	3	panels
Resistance to humid atmospheres/Kesternich	3	sections
Acetic acid salt spray test	3 (a)	sections
Wet adhesion	3	sections
Constant climate condensation water test	3	sections
Filiform corrosion test	3 (a)	sections
Natural weathering test (Genoa)	3	sections
a) Three sections (per production site) with sufficient dimensions to make the incision required for the tests.		

b) Chemical pretreatment

The chemical manufacturers shall indicate the complete pretreatment cycle to be used (degreasing etc.), and the laboratory responsible for preparing the samples shall strictly follow these instructions.

The laboratory preparing the samples shall consider the following parameters:

- Etching degree

  The total etching degree shall be between 1.0 g/m^2 and 2.0 g/m^2 on samples for all tests.

- Weight of the conversion coating
  - close to the system's lower limit value specified by the chemical manufacturer, which means in the range of the lower limit value up to +33,33% of the upper limit value for corrosion test samples
  - close to the upper limit value specified by the chemical manufacturer, which means in the range of the upper limit value down to -33,33% of the upper limit value for mechanical test samples, especially for the adhesion test.

c) Anodic pretreatment

If a pretreatment system is proposed to be used in combination with pre-anodised substrates, it shall be tested both ways, namely once with and once without the anodic pretreatment process. The test samples shall be prepared as follows:

Surface preparation

The aluminium surface shall be treated to eliminate all impurities that could pose problems in the anodic pretreatment.

Etching

The aluminium parts (extrusions and sheet, not cast) shall be etched with a minimum etching rate of 2 g/m^2. In the case of alkaline etching, desmutting shall be necessary.

Thickness of the pre-anodised layer

The anodic pretreatment shall be chosen so as to produce an anodic coating with a thickness of at least 4 µm (not more than 10 µm) without powdering and without surface flaws.

The anodic pretreatment parameters can be as follows:

Acid concentration (H_2SO_4)	180-220 g/l
Aluminium content	5-15 g/l
Temperature	20-30°C (± 1°C of the temperature chosen by the anodiser)
Current density	0.8-2.0 A/dm^2
Electrolyte	agitated

The proposed pretreatment shall then be applied as specified by the supplier.

d) Dual use (rinse/no-rinse)

Products intended for dual use need to be tested both ways. This implies that all tests must be done in duplicate, namely once with and once without the rinse pretreatment step.

e) Organic coating material

The coating system material shall have a QUALICOAT approval.

Each system shall be tested with the following organic coating materials:

- class 1 powder, metallic colour (RAL 9006 or RAL 9007)
- class 2 powder, category 1, RAL 9010
- class 3 powder (when requested by the supplier).
- liquid coating (when requested by the supplier)

3. Laboratory tests

a) Testing programme

Table 5 - List of laboratory tests for the approval of pretreatment systems

Ref.	Name of test	Type of test
b)	Coating thickness	physical
c)	Measurement of conversion coating weight	physical
d)	Measurement of stoving conditions	physical
e)	Dry adhesion	mechanical
f)	Bend test	mechanical
g)	Cupping test	mechanical
h)	Impact test	mechanical
i)	Acetic acid salt spray resistance	corrosion
j)	Wet adhesion	corrosion
k)	Filiform corrosion	corrosion
l)	Constant climate condensation water test	corrosion
m)	Resistance to humid atmospheres (Kesternich)	corrosion

b) Coating thickness

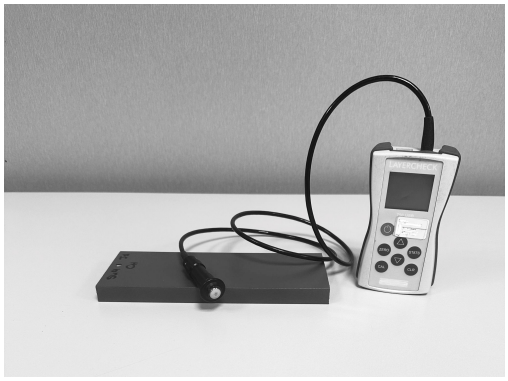

Figure 3 - Thickness measurement

Test method

According to ISO 2360

The thickness of the organic coating on each part to be tested shall be measured on the significant surface at not less than five measuring areas (appr. 1 cm^2).

Coil coating

The coating thickness of the coils shall be measured at the beginning and end of the coil, at not less than three measuring areas (appr. 1 cm^2), in the middle, and approximately 5 cm from each edge of the coil. If there are two or more colours in the same coil, the thickness of each colour shall be measured.

Requirements

Table 6 - Powder coating requirements

Powder coating	Min. thickness
Class 1	60 µm
Class 1.5	60 µm
Class 2	60 µm
Class 3	50 µm
Two-coat powder coating (classes 1 and 2)	110 µm
Two-coat PVDF powder coating	80 µm

Liquid coating

To be defined by the liquid coating supplier and documented within a technical data sheet with the approval of the Executive Committee.

Other organic coatings may require different thicknesses, but they shall only be applied with the approval of the Executive Committee.

Final assessment

None of the measured values shall be less than 80% of the specified minimum value otherwise the thickness test as a whole will be considered unsatisfactory.

The results shall be assessed as shown by four typical examples (minimum average thickness for coatings of 60 µm):

Table 7 - Coating thickness examples

Example	Measured values in µm	Average	Rating
No. 1	82, 68, 75, 93, 86	81	This sample is satisfactory
No. 2	75, 68, 63, 66, 56	66	This sample is good because the average thickness is more than 60 µm and because no value measured is less than 48 µm (80% of 60 µm).
No. 3	57, 60, 59, 62, 53	58	This sample is unsatisfactory and comes under the heading "rejected samples".
No. 4	85, 67, 71, 64, 44	66	This sample is unsatisfactory although the average thickness is more than 60 µm. The inspection is unsatisfactory because the measured value of 44 µm is below the tolerance limit of 80% (48 µm).

Table 8 - Selection of pieces for thickness and appearance control

Lot size (*)	Number of pieces (random selection)	Acceptance limit of rejected pieces
1 - 10	All	0
11 – 200	10	1
201 – 300	15	1
301 – 500	20	2
501 – 800	30	3
801 – 1'300	40	3
1'301 – 3'200	55	4
3'201 – 8'000	75	6
8'001 – 22'000	115	8
22'001– 110'000	150	11
* lot : a customer's complete order in one colour or the part of the order that has already been coated.		

c) Measurement of conversion coating weight

Test Method

The weight of the conversion coating shall comply with the manufacturer's specified limits and be checked by the inspector.

The licensees shall use the products as described in the technical data sheet and in the adapted manual provided for the specific coating line by the chemical manufacturer(s) concerning the methods for assessing the quality of the chrome VI-free conversion coating, the device prescribed for analytically determining the coating weight, and the in-house control frequencies.This manual adapted to the coating line shall be accessible to the inspector.

Due to its uncertainty, QUALICOAT does not allow the gravimetric method to measure the weight of the conversion layer below 100 mg/m^2 using an analytical balance with precision 0.1 mg.The X-ray analysis and spectrophotometry are accepted methods for measuring conversion layer weight below 100 mg/m^2.

Requirements

Chromate conversion coatings

The weight of the chromate conversion coating shall be between 0.6 and 1.2 g/m^2 for chemical chromate conversion (yellow coating) and between 0.6 and 1.5 g/m^2 for chemical chromate-phosphate conversion (green coating).

Chemical pretreatments

The weight of the conversion coating shall comply with the manufacturer's specified limits and be checked by the inspector.

d) Measurement of stoving conditions

The temperatures of the parts and the stoving times shall match the values recommended in the powder manufacturer's technical specifications.

e) Dry adhesion test

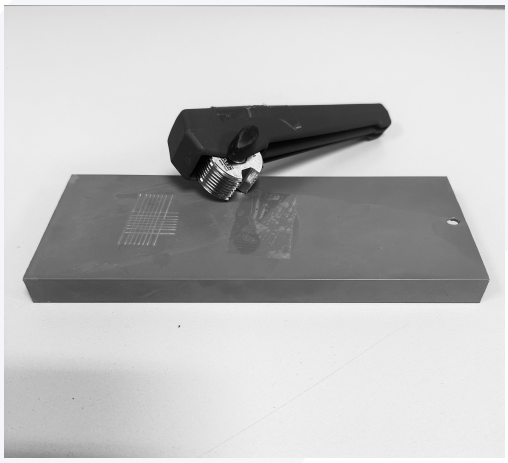

Figure 4 - Cross-cut

Test method

According to ISO 2409 (Cross-cut test)

- The spacing of the cuts shall be 1 mm for organic coating thicknesses of up to 60 µm, 2 mm for thicknesses between 60 µm and 120 µm, and 3 mm for thicknesses over 120 µm.
- An adhesive tape with an adhesive strength between 6 N per 25 mm width and 10 N per 25 mm width shall be used.
- The tape shall be at least 25 mm wide.

Requirements

The result shall be 0.

f) Bend test

Test method

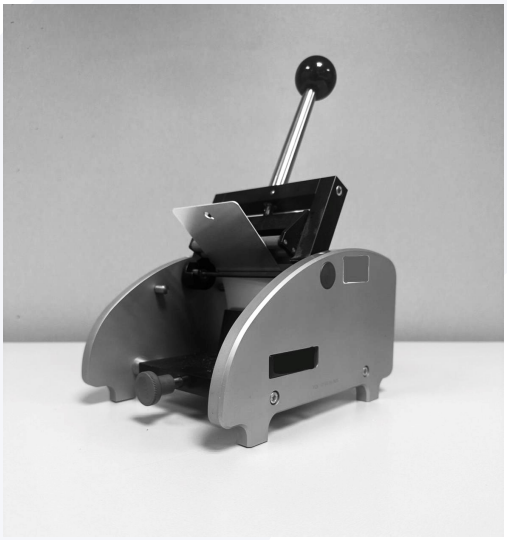

Figure 5 - Apparatus for bend test

According to ISO 1519 for class 1 powder coatings:

Class 1 powder coatings: ISO 1519

Other classes: ISO 1519 followed by a tape pull adhesion test

The test panels shall be made of the alloy EN AW-5005-H24 or -H14 (AlMg1 - semihard) with a thickness of 0.8 or 1.0 mm, unless otherwise approved by QUALICOAT.

The test shall be performed on an organic coating with a thickness approximating the minimum required. It shall be carried out on the reverse side of the significant surface.

ISO 1519 followed by a tape pull adhesion test for class 2, 1.5 and 3 powder coatings

Apply an adhesive tape (at least 25 mm wide) with an adhesive strength between 6 N per 25 mm width and 10 N per 25 mm width to the significant surface of the test panel following the mechanical deformation.

Cover the area by pressing down firmly against the coating to eliminate voids or air pockets. Pull the tape off sharply at right angles to the plane of the panel after 1 minute.

In case of a negative result, the test shall be repeated on a panel coated with a thickness of 60 to 70 µm (classes 1, 1.5 and 2) or 50 to 60 µm (class 3).

Requirements

Bending around a 5 mm mandrel for all organic coatings except for two-component and water-thinnable liquid coatings. For these, use an 8 mm mandrel.

- **Class 1 powder coatings:** Using normal corrected vision, the coating shall not show any sign of cracking or detachment
- **Class 1.5, 2 and 3 powders coatings:** Using normal corrected vision, the organic coating shall not show any sign of detachment following the tape pull adhesion test.

g) Cupping test (only for QUALICOAT laboratory testing of organic coatings)

Test Method

According to ISO 1520 for class 1 powder coatings

According to ISO 1520 followed by a tape pull adhesion test for class 1.5, 2 and 3:

Tape pull adhesion test: Apply an adhesive tape to the significant surface of the test panel following the mechanical deformation.Cover the area by pressing down firmly against the coating to eliminate voids or air pockets. Pull the tape off sharply at right angles to the plane of the panel after 1 minute.

The test shall be performed on an organic coating with a thickness approximating the minimum required.

Table 9 - Cupping test minimum requirements

Type of organic coating	Minimum indentation
Powder coatings (all classes)	5 mm
Two-component liquid coatings	3 mm
Water-thinnable liquid coatings	3 mm
Other liquid coatings	5 mm
Electrophoretic coatings	5 mm

In case of negative result, the test shall be repeated on a panel coated with a thickness of 60 to 70 µm (for classes 1, 1.5 and 2 powder coatings) and 50 to 60 µm (for class 3 powder coatings).

Requirements

Class 1 powder coatings: Using normal corrected vision, the organic coating shall not show any sign of cracking or detachment.

Powder coatings (except class 1): Using normal corrected vision, the organic coating shall not show any sign of detachment after the tape pull adhesion test.

h) Impact test (for powder coating only)

Figure 6 - Apparatus for impact test

The test panels shall be made of the alloy EN AW-5005-H24 or -H14 (AlMg 1 - semihard) with a thickness of 0.8 or 1 mm, unless otherwise approved by QUALICOAT.

The test shall be performed on an organic coating with a thickness approximating the minimum required.It shall be carried out on the reverse side of the significant surface.

Test Method

The impact shall be carried out on the reverse side, whereas the results shall be assessed on the coated side.

Table 10 - Impact test standards

Type of powder coating	Energy	Standard
Class 1 (one- and two-coat)	2.5 Nm	ISO 6272-2 / ASTM D 2794 (indenter diameter: 15.9 mm)
Two-coat PVDF	1.5 Nm	ISO 6272-1 or ISO 6272-2 / ASTM D 2794 (indenter diameter: 15.9 mm)
Classes 1.5, 2 and 3	2.5 Nm	ISO 6272-1 or ISO 6272-2 / ASTM D 2794 (indenter diameter: 15.9 mm) followed by a tape pull adhesion test
Powder suitable for postforming	≥ 5 Nm	ISO 6272-1 or ISO 6272-2 / ASTM D 2794 (indenter diameter: 15.9 mm) according to the powder manufacturer's or coater's TDS or as per the written agreement between coater and customer

Tape pull adhesion test (not applicable for class 1 powder coatings)

Apply an adhesive tape at least 25 mm wide) with an adhesive strength between 6 N per 25 mm width and 10 N per 25 mm width to the significant surface of the test panel following the mechanical deformation.

Cover the area by pressing down firmly against the organic coating to eliminate voids or air pockets.Pull the tape off sharply at right angles to the plane of the panel after 1 minute.

In case of a negative result, the test shall be repeated on a panel coated with a thickness of 60 to 70 µm (classes 1, 1.5 and 2) or 50 to 60 µm (class 3).

Requirements

Class 1 powder coatings: Using normal corrected vision, the organic coating shall not show any sign of cracking to the base metal or detachment.

Powders coatings (except class 1): Using normal corrected vision, the organic coating shall not show any sign of detachment after the tape pull adhesion test.

i) Acetic acid salt spray test (AASS test)

Test Method

According to ISO 9227 with the following changes:

- A X-shape scribe mark with a width of 1 mm shall be made to cut the organic coating down to the metal.
- The crossing point of the X-shape scribe mark has to be included in the evaluation.

Coatings applied on rolled materials (sheets or coils):

In the case of coated material suitable for postforming, the samples shall be prepared in accordance with EN 13523-8. The test shall be carried out on pieces of coated rolled alloys from production (for example, AA 5005, AA 3105, and AA 3003).

Table 11 - AASS testing duration

For all organic coatings except class 3 powder coatings	1000 hours
For class 3 powder coatings	2000 hours

Requirements

No blistering in excess of 0 (S0) according to ISO 4628-2. An infiltration of maximum 16 mm^2 is allowed over a scratch length of 10 cm but the length of any single infiltration shall not exceed 3 mm according to EN 12206-1.

Specific requirements for PRE-OX endorsement

No blistering in excess of 0 (S0) according to ISO 4628-2. An infiltration of maximum 8 mm^2 is allowed over a scratch length of 10 cm but the length of any single infiltration shall not exceed 2 mm.

Proceedings

The results are classified as follows:

Table 12 - AASS test- final assessment (licence granting)

			Rating
A	3 samples satisfactory	0 samples unsatisfactory	positive
B	2 samples satisfactory	1 sample unsatisfactory	positive
C	1 sample satisfactory	2 samples unsatisfactory	negative
D	0 samples satisfactory	3 samples unsatisfactory	negative

Table 13 - AASS test - final assessment for granting an approval

Lab No. 1*	Lab No. 2	Final result/Proceedings
positive	positive	satisfactory
negative	negative	unsatisfactory
positive	negative	The tests shall be repeated in a third laboratory
negative	positive	

* For the renewal of chemical pretreatment approvals, the tests are carried out in a single laboratory (see Chapter 5)

j) Wet adhesion test

Figure 7 - Wet adhesion test

Test method

Immerse a sample for two hours in boiling demineralised water (maximum 10 µS/cm at 25°C). Remove the test sample and allow it to cool down to room temperature.

After one hour but within a two-hour timeframe, a cross-cut shall be made.

Requirements

- No sign of detachment or blistering.
- Cross-cut value 0.
- Colour change is acceptable.

k) Filiform corrosion (FFC) test for SEASIDE and PRE-OX

Test Method

ISO 4623-2 with the following changes:

- Size of samples: preferably 150 x 70 mm
- The scratches shall be made as follows:
  - On each sample, make two scribe marks perpendicular to each other, each at least 30 mm long and at a distance of at least 10 mm from each other and from the edges.
  - The scribe marks shall be 1 mm in width with a rectangular shape.
  - If the samples have a small width (< 50 mm), no horizontal scribe mark (perpendicular to the extrusion direction) shall be made.

Corrosion is produced by dripping hydrochloric acid (concentration 37 %, density 1.18 g/cm^3) along the scratches for 1 minute. Then the acid shall be removed by dabbing gently with a piece of cloth or laboratory paper and the sample shall be allowed to stand at laboratory conditions for 60 minutes.

The samples shall then be put into the test cabinet at 40 $\pm$ 2°C and 82 $\pm$ 5 % relative humidity for 1000 hours in a horizontal position.

Using a ruler, determine the length of the longest filament L (mm) as described in ISO 4628-10 reporting the results for the two scribe marks separately.

The worst results of each test sample shall be reported for the final assessment.

- In case of regular filiform corrosion, use **method 1**.
- For irregular filiform corrosion, use **method 2**.

Coatings applied on rolled materials (sheets or coils)

The test shall be carried out on pieces of coated rolled alloys from production (for example, AA 5005, AA 3105, and AA 3003).

Requirements

Table 14 - FFC filament requirements

	L (longest filament)	M (average length of filaments)
General requirements	≤ 4 mm	≤ 2 mm
Specific requirements for PRE-OX endorsement	≤ 2 mm	≤ 1 mm

Proceedings

The results are classified as follows:

Table 15 - FFC test evaluation criteria

			Rating
A	3 samples satisfactory	0 samples unsatisfactory	positive
B	2 samples satisfactory	1 sample unsatisfactory	positive
C	1 sample satisfactory	2 samples unsatisfactory	negative
D	0 samples satisfactory	3 samples unsatisfactory	negative

Table 16 - FFC test - final assessment for granting an approval

Lab No. 1*	Lab No. 2	Final result/proceedings
positive	positive	satisfactory
negative	negative	unsatisfactory
positive	negative	The tests shall be repeated in a third laboratory
negative	positive	

* For the renewal of chemical pretreatment approvals, the tests are carried out in a single laboratory (see Chapter 5).

l) Constant climate condensation water test

Test Method

According to ISO 6270-2 with the following changes:

- An X-shape scribe mark with a width of at least 1 mm shall be made to score the organic coating down to the metal.

Table 17 - Constant climate testing duration

For all organic coatings except class 3 powder coatings	1000 hours
For class 3 powder coatings	2000 hours

Requirements

No blistering in excess of 0 (S0) according to ISO 4628-2; the maximum infiltration at the cross is 1 mm.

The crossing point of the X-shape scribe mark has to be included in the evaluation.

m) Resistance to humid atmospheres containing sulphur dioxide

Test Method

According to ISO 22479 Method B (0,2 l SO2 - 24 cycles)

- X-shape scribe mark with a width of 1 mm shall be made to cut the organic coating down to the metal.

Requirements

No infiltration exceeding 1 mm on both sides of the scratch, and no change in colour or blisters in excess of 2 (S2) according to ISO 4628-2.

The crossing point of the X-shape scribe mark has to be included in the evaluation.

If there is any colour change, the samples shall be heated at 105°C for 30 minutes and a new assessment of the colour change shall be made.

Dark / brown spots shall be cleaned by polishing (e.g. pumice flour sludge with melamine pad) and a new assessment of the colour shall be made.

n) Evaluation of laboratory test results

Table 18 - Result of one laboratory

	Result
0 panel unsatisfactory	positive
1 panel unsatisfactory	positive
2 panels unsatisfactory	negative
3 panels unsatisfactory	negative

Table 19 - Result of two laboratories

Lab No.1	Lab No.2	Final result/ Proceedings
positive	positive	positive
negative	negative	negative
positive	negative	The tests shall be repeated in a third laboratory
negative	positive	

4. Outdoor exposure in Genoa

a) Panels

All tests shall be made in triplicate.

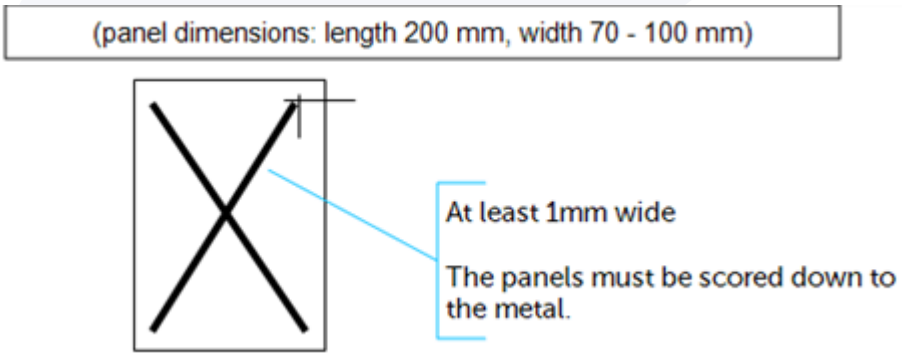

Figure 8 - Scratches for outdoor exposure

b) Requirements

No blistering in excess of 2 (S2) according to ISO 4628-2. An infiltration of maximum 16 mm^2 is allowed over a scratch length of 10 cm but the length of any single infiltration shall not exceed 4 mm.

c) Evaluation of exposure test results

After 2 and 5 years of exposure, an evaluation shall be made, applying the following criteria:

Table 20 - Natural weathering test (Outdoor exposure in Genua) evaluation criteria

			Rating
A	3 samples satisfactory	0 samples unsatisfactory	positive
B	2 samples satisfactory	1 sample unsatisfactory	positive
C	1 sample satisfactory	2 samples unsatisfactory	negative
D	0 samples satisfactory	3 samples unsatisfactory	negative

Table 21 - Evaluation criteria

Ratings	Interim approval	Final approval
A and B	Interim approval granted after 2 years	Final approval granted after 5 years
C and D	Approval cancelled	Approval cancelled

5. Conformity assessment

The testing laboratory shall submit the test report and the basic documentation (TDS, safety data sheet and detailed instructions on treatment cycles) to the General Licensee or to QUALICOAT in countries where there is no General Licensee.

Under the supervision of QUALICOAT, the General Licensee shall decide whether or not to grant or renew an approval.

The results shall be communicated to the chemical manufacturers in writing.

If the results do not meet the requirements, full details and reasons shall be given. The chemical manufacturer shall be entitled to appeal within 10 days to the General Licensee or to QUALICOAT in countries where there is no General Licensee.

6. Certificates

If the test results meet the requirements, QUALICOAT shall issue a certificate which will be automatically reissued every year for a validity period of one year.

The approval status is part of the approval document and is displayed in the list of approvals.

Table 22 - Status of approvals

Requirements met	Status of certificate
after laboratory tests	PROVISIONAL
after 2 years of outdoor exposure	INTERIM
after 5 years of outdoor exposure	FINAL

For identification, chemical pretreatment systems shall be listed with A-No. in the list of approved pretreatment systems and with AP-No. in case of pre-anodised material.

CHAPTER 5 - RENEWAL OF APPROVALS

1. Time Schedule

The renewal process shall begin after the granting of the final approval.

The test panels shall be sent to the laboratory for testing no later than end of March in the following year.

The remaining renewal processes shall follow the same time schedule.

a) Systems with less than 10 coating lines in operation

Approvals shall be renewed every five years, with the full laboratory testing programme carried out by one laboratory including five years of outdoor exposure according to Chapter 3.

b) Systems with 10 or more coating lines in operation

Approvals shall be renewed every five years, only with five years of outdoor exposure according to Chapter 3 (without the laboratory testing programme).

2. Pretreatment systems manufactured at different production sites

If an approved system identified by a single approval number is manufactured at different production sites of the same company, the full testing programme (including the outdoor exposure test) shall be carried out for the main production site and/or technical service centre.

At the other production sites indicated by the chemical manufacturer, the approved pretreatment system shall be checked only with AASS and FCC tests, specifically by sending coated samples that have been treated with the products manufactured at all other production sites to the same laboratory that is also responsible for the main production site. The respective provenance shall be clearly stated.

3. Repetition of unsatisfactory tests

a) Unsatisfactory laboratory tests

If the results of any laboratory test are unsatisfactory, all laboratory tests shall be repeated.

If the repeated laboratory tests again produce unsatisfactory results, the approval shall be cancelled

b) Unsatisfactory outdoor exposure

If the result of outdoor exposure is unsatisfactory, the approval shall be cancelled.

4. AASS test '10+2' rule and FFC test '15+3' rule

a) Identification of unsatisfactory pretreatment systems

The QUALICOAT Secretariat shall determine all the chemical pretreatment systems falling under the AASS test '10+2' rule and FFC test '15+3' rule by evaluating the previous year's AASS and FFC test results from samples taken during the annual inspections at the licensees' production sites.

Table 23 - '10+2' and '15+3' rules

	Percentage of failures	Values	Assessment of the pretreatment
Acetic Acid Salt Spray Test	≥10%	At least two C+D[(a)]	unsatisfactory
		One C+D	satisfactory
Filiform Corrosion Test	≥15%	At least three C+D[(b)]	unsatisfactory
		One or two C+D	satisfactory

a) Combination of two 'C', two 'D' and 'C & D' ratings

b) Combination of three 'C', three 'D', one 'C' and two 'D', two 'C' and one 'D' ratings

b) Information

By the end of June, at the latest, the chemical manufacturers concerned shall be informed by the General Licensee (or directly by QUALICOAT in countries without a General Licensee) that their chemical pretreatment system is being placed 'under observation' for exceeding the AASS test '10+2' rule and/or FFC test '15+3' rule.

All licensees using the chemical pretreatment system placed 'under observation' shall be informed by the General Licensee (or directly by QUALICOAT in countries without a General Licensee) by the end of July. They shall be made aware that they must continue to fully comply with the requirements of the QUALICOAT Specifications.

c) Observation period

The one-year observation period of the chemical pretreatment system shall start with the written notification of the chemical manufacturer by the end of June.

If the chemical pretreatment system does not fall again under the AASS test '10+2 rule' and/or FFC test '15+3' rule in the subsequent calendar year, the status shall be reset, and the chemical manufacturer shall be informed by the General Licensee (or directly by QUALICOAT in countries without a General Licensee).

d) Withdrawal

If a system fails over two consecutive calendar years, it shall be cancelled by 30 June of the second year.

The chemical manufacturer shall be notified by the General Licensee (or directly by QUALICOAT in countries without a General Licensee) that the chemical pretreatment system will be cancelled within 30 days from the notification date.

e) Deadline for licensed coaters to use the product

All licensed coaters using the chemical pretreatment system cancelled due to the AASS test '10+2' rule and/or FFC test '15+3' rule, may continue to use it until end of the year of cancellation. They shall be made aware that they must continue to fully comply with the requirements of the QUALICOAT Specifications.

CHAPTER 6 - RESPONSIBILITIES OF CHEMICAL MANUFACTURERS AND/OR SUPPLIERS

1. Responsibility and cooperation with licensed coaters

Manufacturers and licensees shall cooperate closely.

a) Technical data sheets

For all systems, there shall be technical data sheets, also giving information about other products with which a system may or may not be used. The chemical manufacturer shall be responsible for all cycles used by coating applicator.

b) Manual

To take into account the particular conditions in each plant, a manual adapted to the coating line to be followed by the persons in charge shall be provided to the licensee and shall specify whether the product is to be used as a rinse or no-rinse system in the respective coating line.

For any conversion coating bath which is not solely used for aluminium, it is the joint responsibility of both the licensee and the chemical manufacturer to define and obey measures in the manual adapted to the coating line, which shall ensure that the contamination of the respective conversion coating bath is kept within the limits prescribed by the chemical manufacturer.

The manual adapted to the coating line shall also specify the rinsing requirements.

The methods for assessing the conversion coating may differ from one system to the next since there is not a pertinent standard. The manufacturer indicates how the licensee has to monitor the quality of the chrome VI-free conversion coating during in-house control.

A device to check the coating weight analytically and reporting a specific quantitative figure within the given range shall be prescribed. The method shall prescribe that the device shall indicate a maximum of +/- 20% deviation accuracy.

QUALICOAT recommends the coating weight to be measured in every working shift, or according to the chemical manufacturer's advice, which shall be at least once per day.

Due to its uncertainty, QUALICOAT does not allow the gravimetric method to measure the weight of the conversion layer below 100 mg/m^2 using an analytical balance with precision 0.1 mg. The X-ray analysis and spectrophotometry are accepted methods for measuring conversion layer weight below 100 mg/m^2.

c) Tests

The following tests shall be carried out on the production sample received every two months from the licensed coater:

- acetic acid salt spray resistance test
- coating weight measurement

If the chemical chromate conversion manufacturer is unable to carry out the acetic acid salt spray resistance test, the test shall be outsourced and carried out by a QUALICOAT approved laboratory or another laboratory accredited for this specific test according to ISO 17025.

Receipt of the samples shall be confirmed to the licensee immediately. Detailed results and any corrective actions shall be entered and retained along with the related shipping details in records readily accessible to the inspector and communicated to the licensee within a period of maximum four months.

d) Sanctions in case of failure to cooperate

If the chemical manufacturer fails to cooperate with the licensee within the specified deadlines, the following sanction procedure shall be followed:

A written notification (warning letter) shall be sent to the chemical manufacturer by the General Licensee or QUALICOAT in countries without a General Licensee, giving it four weeks to respond:

- The chemical manufacturer shall immediately acknowledge receipt of the notification.
- The chemical manufacturer shall respond with a justification letter within four weeks.
- The justification shall be assessed by the General Licensee or QUALICOAT (possibly involving the Board of Governors if the decision is not obvious), which could lead to a withdrawal of the approval.
- If no justification letter is submitted within four weeks, the approval shall be withdrawn. The chemical manufacturer shall wait at least three months before sending a new application for approval.

2. Compulsory declaration of changes in formulation of pretreatments

In principle, if the chemical composition of the conversion coating remains the same, it shall not be necessary to apply for a new approval. In practice, this means accepting all the variations specified on the technical data sheet to adjust the system to a specific application

line in order to achieve the specified coating weight. The chemical product may be supplied as a two-component or single-component system.

The chemical manufacturers shall guarantee that the chemical composition of the working solution is essentially the same as that approved by QUALICOAT.

Any change in formula that can result in significant changes in the composition of the conversion coating represents a new product and requires a new QUALICOAT approval.

To give a few examples of such changes, we would like to mention some clear-cut cases:

- Any change in the metal content of the coating through substitution, addition, removal, etc. of the approved metal system when the products are based on transition metals replacing chrome.
- Any change in the polymer composition and, by extension, in the organic components through substitution, addition, removal etc. when they are present in the approved formula.
- Any change in the typical appearance of the conversion coating, for example from colourless to colour.

CHAPTER 7 - PRETREATMENT SYSTEMS WITH MODIFIED PROCESSES OR NEW TECHNOLOGIES

1. Introduction

The pretreatment systems regulated in Chapter 2 are chromate conversion coatings and other chemical pretreatments in combination with different types of etching or anodic pretreatment.

To consider the implementation of modified pretreatment processes or new technologies, this chapter prescribes the procedure for preliminary sampling and testing (PST) of these new processes, prior the commencement of the approval (A-No.) testing.

For pretreatment systems that fully comply to QUALICOAT Specifications, it is not necessary to apply for a PST request.

2. Preliminary Sampling and Testing programme (PST)

The QUALICOAT Executive Committee must confirm or modify the following pre-defined minimum requirements for each PST request, before proceeding with Phase 3.

The Executive Committee can intervene at any time of this procedure and name the reasons. To accelerate the PST process, the Executive Committee can give mandates.

Table 24 - PST - Procedure Steps (Phases 1 to 9)

Phase	Description	Responsible party	Information to
1.	**Formulation of the PST request:** Description of the complete pretreatment process in detail including all relevant process steps, parameters, values and limits as well as TDS and safety data sheet of all chemicals involved. Proposal for the tests (test type and requirements). Minimum test requirements according to Chapter 4. (Outdoor exposure test will be stipulated by QUALICOAT on Phase 6.)	Supplier	General Licensee or QUALICOAT in countries where there is no GL
2.	**Review of description. Confirm or modify the following PST procedure steps.** Naming two QUALICOAT approved laboratories and additional laboratory required in case of inconsistent test results (see Phase 5) in agreement with the GL and/or QUALICOAT in countries where there is no General Licensee. Please note that all the testing institute involved shall not be part of the same corporate group. Naming tests for Phase 3 and 4. Release for Phase 3 and 4.	Executive Committee, after consultation with Convenors of Technical Committee and Pretreatment WG	Supplier
3.	**Institute sampling:** Sampling in one of the two laboratories or in supplier´s factory under the supervision of the laboratory (institute sampling). Sampling shall include a third set of samples as required for a third laboratory in case of inconsistent test results (see Phase 6). Sampling may include a set of samples as required for outdoor exposure in a subsequent approval process according QUALICOAT Specifications. > It is permissible to perform Phase 3 and 4 at the same time.	Laboratories	Supplier

Phase	Description	Responsible party	Information to
4.	**Field sampling:** Sampling in QUALICOAT approved coating line (field sampling) under the supervision of a QUALICOAT inspector on basis of process description and the required tests. Minimum 1000 m^2 of finished products (extrusions or sheets) to be coated with the samples to be taken at the beginning, in the middle and the end of the lot. Sampling shall include a third set of samples as required for a third laboratory in case of inconsistent test results (see Phase 6). > It is permissible to perform Phase 3 and 4 at the same time.	Supplier and Laboratories	General Licensee or to QUALICOAT in countries where there is no General Licensee
5.	Testing in the two named laboratories. Samples of institute sampling (Phase 3) and field sampling (Phase 4) should preferably be tested simultaneously in the same test apparatus. All tests shall be performed in triplicate. If the results of more than one panel are unsatisfactory, the respective test result shall be rated as negative.	Laboratories	General Licensee or to QUALICOAT in countries where there is no General Licensee
6.	Review test results of institute sampling (Phase 3) and field sampling (Phase 4). • If the results in both laboratories are positive, the system is satisfactory. • If the results in both laboratories are negative, the system is unsatisfactory. • If the results are positive in one laboratory and negative in the other, the tests shall be repeated in a third laboratory. Proposal of modifications of QUALICOAT specifications, if necessary. Proposal to Executive Committee and Technical Committee to release for trial process and stipulating outdoor exposure tests required.	Convenor of Pretreatment WG and QUALICOAT	Executive Committee and Technical Committee

Phase	Description	Responsible party	Information to
7.	With satisfactory test results from Phase 3 and 4, and with authorisation from the Executive and Technical Committee, the supplier can administer / operate the system in the plant used for field sampling with a six months testing programme (trial process). Two inspections shall be conducted which include one unannounced inspection.	Supplier and Laboratories	General Licensee or to QUALICOAT in countries where there is no General Licensee
8.	Decision about release for approval process. Defining modifications of QUALICOAT specifications, if necessary.	Technical Committee and Executive Committee	General Licensee or to QUALICOAT in countries where there is no General Licensee
9.	Informing the supplier about the decision of Executive Committee for possible approval (A-No.) process . **Approval (A-No.) process:** If the supplier applies for approval (A-No.) according to Chapter 5, the test results gathered in the PST process, shall be regarded as valid for the approval process as well. QUALICOAT shall issue a provisional approval certificate (AN- No.) which will be automatically reissued every year for a validity period equivalent to the duration of outdoor exposure testing. After the exposure tests, the convenors of the Technical Committee and Pretreatment WG shall evaluate the results and take a decision on transferring the provisional approval (AN-No.) to an approval (A-No.).	General Licensee or to QUALICOAT in countries where there is no General Licensee Convenors of the Technical Committee and Pretreatment WG	Supplier

CHAPTER 8 - USE OF THE QUALICOAT QUALITY LABEL

1. Definitions

The term **Quality Label** refers to our certification activities and our brand, while the term Logo covers the graphic representation of our brand.

2. Ownership of the Quality Label

The Quality Label is owned by QUALICOAT and shall not be used by anyone unless authorised to do so by QUALICOAT.

Authorisation to use the Quality Label may be granted on condition that the applicant operates in accordance with the Specifications. This authorisation is governed by a contract.

The granting of a licence entitles the licensee to use the Quality Label for the products specified. A licence cannot be transferred.

3. QUALICOAT logo

a) Logo description

The QUALICOAT logo represents our commitment to quality, highlighting the elegance and precision of architecture, particularly through the use of our signature 'Q'.

Our brand promise, '*Inspired by architecture, trusted by professionals',* integrates seamlessly. And the use of Reflex Blue and Silver convey quality, our heritage, and our core product, aluminium.

The **standard logo** should be used whenever possible to maintain brand consistency.

QUALICOAT
Inspired by architecture, trusted by professionals

Figure 9 - Standard logo

Alternative one- and two-colour versions are also available for use in situations where colour printing is not feasible or when a monochrome design is required for aesthetic or practical reasons. Only original logo files should be used, and no attempt should be made to recreate the logo.

Figure 10 - Alternative logo options

b) Improper use of the logo

The logo shall not be altered in any way, including its appearance, proportions, colours, or graphical elements.

Figure 11 - Examples of incorrect logo usage

c) Use of the logo by manufacturers

The QUALICOAT logo shall not appear on packaging.

Whenever the logo is used on a printed label (shipping, bar code, identification labels, etc.), it shall only be used in the following forms:

In their business literature and documents, the manufacturers shall only use the logo for products approved by QUALICOAT, stating: «Product approved by QUALICOAT». Wherever the logo is used, the phrase «QUALICOAT is a quality label for licensed coaters.» should also appear in the document.

For any other use of the logo, the manufacturers are required to submit all new documents mentioning QUALICOAT to their national association. In countries without a General Licensee, these documents shall be submitted directly to the QUALICOAT Secretariat before publication.

CHAPTER 9 - RIGHT OF APPEAL

1. Definitions

Appeal	Written formal objection against a certification decision taken by the QUALICOAT Certification Body and submitted by any actor of the QUALICOAT (QUALIDECO) certification scheme.
Appellant	Person, company (coater / powder and/or chemical manufacturer) or any actor of the QUALICOAT (QUALIDECO) certification scheme that submits a written request to reconsider a decision taken by the QUALICOAT Certification Body.

2. General procedure

The chemical manufacturer shall receive a copy of each test and inspection report. If the results do not meet the requirements, full details and reasons shall be given.

The chemical manufacturer shall be entitled to appeal to the General Licensee, or to QUALICOAT in countries where there is no General Licensee, within 10 working days after receiving notification of the results from the GL or from QUALICOAT in countries where there is no General Licensee.

The appellant has to specify which decision or which elements of the decision have to be reconsidered and to explain the reasons for its request. Any documents can be sent to justify the request.

The General Licensee or the QUALICOAT Certification Body in countries with no General Licensee acknowledge receipt of the formal appeal within 5 working days of receipt and make a corresponding entry in the complaint and appeal Register.

The General Licensee or the QUALICOAT Certification Body in countries with no General Licensee have 10 working days to provide to the appellant full details (e.g. laboratory test results, inspection report, confirmation) of the decision.

In case the appellant is not satisfied with the decision from the General Licensee or from the QUALICOAT Certification Body in countries with no General Licensee, the appellant has the right to bring the appeal up to the Label Committee in writing to the QUALICOAT Certification Body explaining the reason for the appeal.

The QUALICOAT Certification Body acknowledges the receipt of the appeal to the Label committee within 5 working days and shall inform the Label committee at the same time.

The final decision of the Label Committee shall be notified in writing to the appellant and to all parties involved within 10 working days of the decision taken by the Label Committee, specifying the reasons for the decision.

Should the appellant inform the General Licensee or the QUALICOAT Certification Body in countries with no General Licensee in writing that he/she gives up the appeal during any stage of the appeal procedure, the appeal procedure shall be considered as terminated and closed.