QUALICOAT SPECIFICATIONS

26th Edition

Volume 1 – Specifications for Coaters

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QUALICOAT

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CHAPTER 1 - GENERAL INFORMATION

1. Scope

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

The aim of these Specifications is to establish minimum requirements that production sites, coating lines, processes and finished products shall meet.

These Specifications form the basis for granting and renewing the quality label. All requirements in these Specifications shall be met before a quality label can be granted. In case of ambiguities or uncertainties in any part of the Specifications, clarification shall be requested from QUALICOAT.

The Specifications for production sites and coating lines are the minimum requirements for producing good quality. Other methods may only be used if they have been previously approved by QUALICOAT.

These Specifications are designed to ensure high-quality of coated products for use in architectural applications, whatever kind of coating process is used. Any after-treatment not stipulated in these Specifications may affect the quality of an organic coated product and is the responsibility of whoever applies it.

Unless otherwise stipulated, these Specifications also apply to cast accessories, as well as to material suitable for postforming.

Procedures for granting and renewing an endorsement to coaters who produce coated cold-rolled aluminium material suitable for postforming are included.

The current volume is entirely dedicated to the coating on aluminium for architectural applications.

Specifications for the decoration of coated aluminium are dealt with in a separate volume.

2. Coating and pretreatment materials

Licensees shall treat all products intended for architectural applications in accordance with these Specifications and shall only use organic coating materials and chemical conversion coatings approved by QUALICOAT for such products and listed on www.qualicoat.net:

Table 1 - Coating and pretreatment materials classifications

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)

For external architectural applications, other materials may be used only at the customer's written request and only if there are technical reasons for doing so. It is not permitted to use unapproved materials for commercial reasons.

Licensees shall remove any reference to QUALICOAT from documentation concerning products that do not comply with QUALICOAT Specifications, irrespective of technical reasons or customer requests.

3. Test methods and requirements

The test methods are based on international standards, where they exist ("List of standards used by QUALICOAT" below). It is the responsibility of the coaters to ensure that they always use the most recent version of the standards.

The requirements are specified by QUALICOAT based on practical experience and/or testing programs organized by QUALICOAT.

In the current volume, test methods and requirements are described in Chapter 3 (In-House control) and Chapter 4 (Granting of a licence).

4. 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.

5. Terminology

Accessory

An accessory is an object that continuously serves the purpose of a main item and has a corresponding spatial relationship to it. An accessory is not a standalone part. The main item generally is an aluminium extrusion or rolled aluminium sheet. Examples for accessories are parts of the locking system of doors and windows (like handles or fittings) or fence cap or other mounted parts to a fence or an entrance gate.

Approval

Confirmation that a system (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)

Architectural applications

Architectural applications in accordance with the scope of QUALICOAT are related to the planning, design and creation of buildings or structures. Examples for such applications are windows, doors, ceilings, walls, fences, facades or other aluminium elements which are located permanently nearby, outdoor or inside a building.

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).
Paint stripping	The process of removing an existing organic coating (such as powder or liquid paint) from aluminium, typically to allow for re-coating.
Postforming	The act of working, by bending or forming (stamping), already coated aluminium sheets or coils.
Pre-Anodising	Electro-chemical conversion coating process that produces a thin aluminium oxide layer for the application of powder coatings. This process is also called pre-anodisation.
Pre-Mix	Uniform blend of raw materials prepared before extrusion.
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.

6. List of standards used by QUALICOAT

Table 2 - List of standards used by QUALICOAT (including year of reference)

Nº	Year	Title	Relevant Test
ISO 2813	2014	Paints and varnishes - Determination of gloss value at 20° degrees, 60° and 85°	Gloss measurement
ISO 2360	2017	Non-conductive coatings on non-magnetic electrically conductive basis materials - Measurement of coating thickness - Amplitude-sensitive eddy current method	"Coating thickness" on page 38
ISO 2409	2020	Paints and varnishes - Cross-cut test	"Dry adhesion test" on page 42
ISO 1519	2011	Paints and varnishes - Bend test (cylindrical mandrel)	"Bend test" on page 43
EN 13523-7	2021	Coil coated metals - Test methods - Part 7: Resistance to cracking on bending (T-bend test)	Bend test for postforming
EN 1396	2023	Aluminium and aluminium alloys. Coil coated sheet and strip for general applications. Specifications	
ISO 6272-1	2011	Paints and varnishes - Rapid-deformation (impact resistance) tests - Part 1: Falling-weight test, large-area indenter	"Impact test (for powder coating only)" on page 45
ISO 6272-2	2011	Paints and varnishes - Rapid-deformation (impact resistance) tests - Part 2: Falling-weight test, small-area indenter	
ASTM D2794	2010	Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)	
ISO 9227	2022	Corrosion tests in artificial atmospheres - Salt spray tests	"Acetic acid salt spray test (AASS test) " on page 55
ISO 4623-2	2016	Paints and varnishes - Determination of resistance to filiform corrosion - Part 2 Aluminium substrates	Filiform corrosion (FFC) test for SEASIDE and PRE-OX
ISO 4628-10	2024	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	2007	Chemical conversion coatings - Rinsed and non-rinsed chromate conversion coatings on aluminium and aluminium alloys	Chromate conversion coatings
ISO 3892	2000	Conversion coatings on metallic materials - Determination of coating mass per unit area - Gravimetric methods	
EN 1706	2020 + A1: 2021	Aluminium and aluminium alloys - Castings - Chemical composition and mechanical properties	Etching stage

This list refers to ISO standards and their relevant year of issue. It is continuously updated on the Internet (www.qualicoat.net).

7. Release and revision of the specifications

The Specifications for Coaters (Volume 1 of the QUALICOAT 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.

The quality assurance representative in the company holding the label shall always have the latest version of the Specifications for Coaters.

These Specifications and the related update sheets are distributed to all General Licensees and to Licensees in countries where there is no GL.

8. 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 - WORK SPECIFICATIONS

1. Aluminium alloy material

a) Basic principles

The aluminium or aluminium alloy material shall be suitable for the coating processes specified in this document.

It shall be free from corrosion and shall not have any organic or anodic coating (except in case of pre-anodising as described in Section 7 of this chapter).

It shall also be free from all contaminants, especially silicone lubricants. The edge radii shall be as large as possible.

b) Material suitable for postforming

For material destined to postforming, the aluminium sheets and coils shall be in accordance with EN 485-2.

The mechanical characteristics and bending quality of the aluminium substrate shall be according to those requested for the coated final product; it must be remembered that the permissible bend radii are governed by the choice of the Al alloy, its temper, and its thickness. The material shall also be free from corrosion and all contaminants, especially from the residues of the rolling and decoiling process.

In the case of job coaters, it is the responsibility of the coater's customer to provide material with adequate bending characteristics (unpainted material shall have the same mechanical properties that are requested from the painted material).

c) Qualicoat 3.0

To address the problems of corrosion and longevity of coating finishes, QUALICOAT has completed an extensive research programme called 'QUALICOAT 3.0'. The principles of this new quality assessment for the evaluation of the alloying elements, extrusion quality, microstructure, and corrosion potential of both primary and recycled aluminium, are described in a separate document (Chapter 1 - Specifications for QUALICOAT 3.0 of Vol. 1 - Specifications for Coaters).

d) Cast accessories

It is the responsibility of the coater´s customer to define the alloy and cast technique.

Cast material

The composition of cast products (alloys) is specified in EN 1706. Table C.1 of this standard indicates the resistance to corrosion by classifying the different alloys from A (excellent) to F (unsuitable). As a consequence the selection of a certain alloy is influencing the final quality of the coated product regarding corrosion resistance massively. Some alloys – especially those based on copper – are the cause of unsatisfactory resistance to corrosion. It is recommended to select alloys according to the intended environmental category (see Technical Information Sheet "Recommendations for the Corrosion protection").

Quality aspects

The following steps might be necessary to reduce or avoid the risk of failures (e.g. delamination, blistering) in the pretreatment or coating process:

- Pre-heating (Degassing) of the cast material to reduce or avoid blistering in the powder coating layer.
- Extensive rinsing of cast surfaces with high porosity because of chemical and water residues from the pretreatment process.
- Additional degreasing before or during the pretreatment process in case of overdosing mould cleaner or release agent. The usage of mould release agents containing silicone can cause delamination of the powder coating layer and is therefore not permissible.

The following treatments or conditions may improve the corrosion resistance on cast parts:

- Application of 2-layer-coating systems according QUALICOAT-Specifications (Primer + Colored Topcoat)
- Application of pre-anodising according to QUALICOAT-Specifications
- Pre-Cleaning by applying blasting before pretreatment
- Watertight construction, sealing of machined surfaces (after coating) and/or good ventilation and draining of elements.
- Regular cleaning according QUALICOAT Technical Information Sheet No. 1 'Recommendations for care of coated aluminium'

The following treatments or conditions will decrease the corrosion resistance and cannot be influenced by the pretreatment and powder coating process:

- Damaged coating film, e.g. by scratches, tools or post-treatment
- Contact/galvanic corrosion with other materials
- Dirt load, e.g. at connections
- Sharp edges with edge radius < 0.5 mm and burrs
- Stray electrical currents
- No watertight construction, no sealing of machined surfaces (after coating) and bad ventilation and draining of elements.

2. Storage

a) Aluminium

The products to be treated shall either be stored in a separate room or at least a good distance away from the processing baths. They shall also be protected against condensation and dirt.

b) Powder and liquid coating materials

Coating materials shall be stored in accordance with the specifications of the coating material's manufacturer.

c) Chemical products

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

3. Layout of equipment

The layout of the equipment should be designed to avoid any form of contamination.

4. 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.

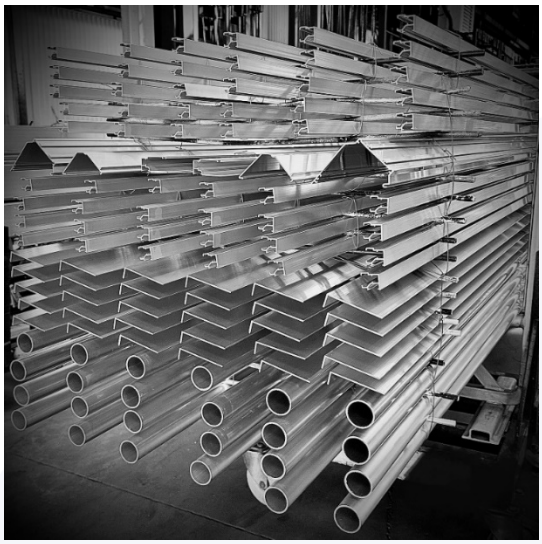

Figure 1 - Batch Treatment

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.

5. 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.

Previously painted material shall be subjected to an appropriate stripping process to remove the existing paint and conversion coating, leaving the surface suitable for a new pretreatment and coating process.

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 according to Chapter 7 of Volume 2 (Specifications for Chemical Manufacturers) is required.

Only after this preliminary testing is successfully completed, an approval (A-No.) of the pretreatment system according to Volume 2 (Specifications for Chemical Manufacturers) can be granted.

Cast accessories

For cast materials the coater shall obtain an adapted manual for the specific coating line from the chemical manufacturer on the pretreatment process.

Wipeable alloy residues or inorganic particles on the surface (after etching) must be removed before chemical conversion coating or pre-anodising by applying an additional chemical treatment step to be followed by intensive rinsing. Otherwise etching is not recommended (high risk of corrosion failures).

Alloys with high content of silicone may not be suitable for pre-anodising.
Blasting (Pre-Cleaning) as an additional treatment before chemical surface preparation is permissible. More intensive degreasing or cleaning might be necessary.

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 3 - 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 4 - Types of preliminary pretreatments

Preliminary Pretreatment	Total Etching Degree	Description
STANDARD (COMPULSORY)	at least 1.0 g/m^2	---
ENHANCED (SEASIDE and PRE-OX)	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

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.

6. 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.

Coaters and chemical pretreatment suppliers should pay particular attention to the presence of bacteria in the rinsing baths before and after conversion, as this can affect the performance of the powder coating.

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) Non-chromate 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 Volume 2 `Specifications for Chemical Pretreatmeant Manufacturers'"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/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.

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.

7. Pre-anodising (PRE-OX endorsement)

a) Basic principles

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

Listing pre-anodising as a suitable pretreatment in the Technical Data Sheet (TDS) of the specific coating system or colour shall be regarded as equivalent to a written confirmation.

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

b) Requirements for in-house pre-anodising process

For off-site pre-anodising 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 pre-anodising.

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

Pre-anodising 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 pre-anodising 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 pre-anodising

After pre-anodising, 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 pre-anodising 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 pre-anodising 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 16.

No etching or double passivation is permitted.

Recording of test results on finished products

It is recommended that before application, each coating material (i.e., each colour shade, gloss category, and manufacturer) should be submitted to a wet adhesion test.

It is mandatory to perform the wet adhesion test and record the test results before delivering the coated material.

d) Cooperation between external anodiser and coater

> Only applicable for coaters using off-site pre-anodising.

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.

8. Electrophoretic coatings

All electrocoated products shall be cleaned by adapted chemical treatment in an alkaline or acid solution before the topcoat is applied. The cleaned surfaces shall be rinsed in demineralised water with a maximum conductivity of 30 µS/cm at 25°C prior to coating. The surfaces should be wettable with water.

The products shall be top coated immediately.

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

Postforming is not permitted.

9. 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 (pretreatment, coating, and curing without intermediate handling), 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 pre-anodising, 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.

10. Coating

For architectural applications the licensee shall use only organic coatings approved by QUALICOAT **(P-No.)**.

For coated material suitable for postforming, it is necessary to use powder coatings with a specific approval **(PF-No.)**.

For cast accessories the usage of additives to the coating material is not allowed.

It is not permissible to apply a second coat for organic coating materials that are intended and approved for the application of a single coat.

When a two-coat organic coating material (primer and coloured topcoat) approved by QUALICOAT is used, the licensed coater may apply either a class 1, 1.5 or class 2 topcoat on the approved primer provided that the powder supplier gives written authorisation for it. It is not necessary to have an approval for each combination. However, the organic coating material (primer and coloured topcoat) used by the licensee shall originate from the same manufacturer.

Two-coat systems: metallic powder coatings that need a clear coat to have acceptable weathering resistance. These specific two-coat systems shall be approved separately by QUALICOAT.

Best before date expiry

At the licensee's request, permission to extend the use of expired powders may be given by the powder manufacturer. It is the powder manufacturer's responsibility to stipulate which additional tests need to be carried out either by themselves or by the licensee. Following satisfactory results, the powder manufacturer shall give written permission to the coater indicating the new "best before" date.

An extension of the best before date of banned or suspended colours shall not be permitted.

11. Stoving

The coating line shall have an oven for drying and one for curing; in cases where the oven is combined (performing both functions), an efficient control system for temperature and time shall be in place to ensure that suppliers' recommended conditions can be followed.

The conditions between the spray booth and the oven shall be free of dust and contamination.

All organic coatings shall be stoved immediately after application. The oven shall bring the products to the required temperature and maintain them at that temperature for the whole length of the prescribed time.

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

If the coater uses a calculation of the curing index, the minimum temperature shall always be according to the curing window specified by the powder manufacturer in the Technical Data Sheet. The curing index value shall be set to 100 by default, unless specified by the coating manufacturer in written form for this specific coater.

If the powder manufacturer allows curing index value < 100 for a specific approval (P-No.), the following conditions must be fulfilled:

- Minimum Curing Index clearly written by the powder manufacturer for the coating plan
- Pre-validation at customer site by the manufacturer by performing the following tests:
  - QUALICOAT Mechanical tests
  - QUALICOAT Water Spot test
  - Differential scanning calorimetry test (ISO 11357-2)

It is recommended to keep the difference in metal temperature during polymerisation phase below 20°C.

It should be possible to measure the temperature over the whole length of the oven.

The oven shall be fitted with an alarm system which operates as soon as the temperature moves outside the prescribed temperature range.

Coil coating

The plant shall be equipped with at least one permanent noncontact device for reading the PMT (Peak Metal Temperature). An additional stoving curve is not necessary.

12. Laboratory

The production site shall have laboratory facilities which are separate from the production facilities. The laboratory shall have the apparatus and chemicals necessary for testing and controlling the process solutions and finished products. The laboratory shall at least be equipped with the following apparatus and equipment:

- Specular glossmeter suitable to measure in 60° incident light mode
- Two instruments for measuring coating thickness according to ISO 2360 (corresponding calibration standards <60 µm and >60 µm)
- One analytical balance with precision 0.1 mg (2 calibrated weights for in-house adjustment)
- Cutting tools and instruments necessary for performing the adhesion test
- Impact tester
- Recorder for stoving temperature and time with four different measuring points, three on the parts and one to measure the air temperature (optional for coil coating)
- Conductivity meter (calibration solution ≤ 100 µS/cm)
- Apparatus for testing resistance to cracking on bending
- Test solutions for the polymerisation test
- pH-meter (calibration solution corresponding to the pH value of the coating line) if specified in the technical data sheet and specific instructions provided by the chemical manufacturer, as described in Volume 2 ´Specifications for Chemical Pretreatment Manufacturers´.
- Device prescribed for the analytical coating weight determination (only for chemical pretreatment)

Each piece of apparatus shall have a data sheet showing the apparatus identification number and calibration records.

The oven temperature recorder shall be checked, and the results shall be registered at least twice per year.

The laboratory conditions may differ from those prescribed by ISO standards for mechanical tests.

13. Operating instructions

For every test the licensee shall have the relevant standards or operating instructions based on these standards. These standards or operating instructions shall be available to all operators carrying out the tests.

14. Registers

The licensee shall maintain registers for:

- production of QUALICOAT products
- in-house control
- tests carried out by the chemical manufacturers
- customers' complaints.

15. General Data of Licensee

Licensees shall fill out the form *General Data of Licensee* and submit it by the end of each calendar year. Having received such information, the General Licensee shall forward this document to QUALICOAT.

The General Licensee, or QUALICOAT in countries without GL, shall forward the information about the production site to the inspector, and to the testing laboratory commissioned with carrying out the inspections.

The licensee shall mark all coating lines used for the coating of aluminium for architectural applications with their respective designation as listed in the form 'General Data of Licensee' so that the lines are clearly identifiable for the inspector.

The licensee shall immediately inform the General Licensee (respectively QUALICOAT in countries where there is no General Licensee) about any changes relevant for the 'General Data of Licensees', e.g., if a coating line is no longer used for coating of aluminium for architectural applications or if an additional coating line is used for coating of aluminium for architectural applications.

16. Training

Training for staff of licensed production sites is mandatory in all countries.

At least one in-house control employee and/or one responsible quality employee shall attend the regularly trainings organised at least once every two years by the General Licensees or by QUALICOAT in countries without GL.

CHAPTER 3 - IN-HOUSE CONTROL

1. Introduction

The aim of in-house control is to give the licensees a tool to keep control over their own production process.

The number of shifts worked, the requirements, the results of the analyses and corrective actions shall be entered in charts or some other records/registration systems readily accessible to the inspector.

The staff responsible for managing in-house control shall follow the educational programmes stipulated by QUALICOAT.

Licensees holding the quality label shall monitor their production processes and inspect their finished products in accordance with the following specifications.

2. Controlling the production process parameters

Table 5 - In-house control of process parameters

Object of control	Frequency
Chemical pretreatment baths, degreasing, pickling, chromating, rinsing	Once per bath in every working shift, or according to the chemical manufacturer's advice, that shall be at least once per day (24 hours).
Chemical Parameters	
Conductivity of the water	
Temperature of chemical pretreatment	
Drying temperature	Once in every working shift: record the displayed temperature. Once a week: make one recording of the temperature using strips or some other means.
Stoving conditions	Once in every working shift: record the displayed temperature. At least twice a week on two different days: make one stoving curve per curing oven on profiles.
Stoving conditions in case of coil coating	At least once every two hours: record the displayed temperature.
Acid concentration and aluminium content of anodising bath (in case of in-house pre-anodising)	At least once per day.
Temperature of the anodising bath	Every 8 hours.
Thickness of the anodic coating	Every load.

3. Quality control of the surface preparation and chemical conversion coatings

Table 6 - In-House Control of Surface Preparation and Chemical Conversion Coatings

Object of the control	Frequency
Etching degree	Once in every working shift, or according to the chemical manufacturer's advice, that shall be at least once per day (24 hours).
	Once per day in case of **in-house pre-anodising**
	Once in every working shift during SEASIDE production if the licensee has got a **SEASIDE endorsement**
Weight of the conversion coating (chromate conversion) - EN 12487	Once in every working shift, or according to the chemical manufacturer's advice, that shall be at least once per day (24 hours).
Weight of the conversion coating (chemical pretreatment [Cr(VI)-free])	

Figure 2 - Analytical balance

Figure 3 - Weights

4. Quality control of the finished products

a) Controls carried out on profiles

Table 7 - In-house control of finished products (profiles)

Control	Frequency	Pretreament	Reference
Appearance	According to the order lot size	All pretreatments	on page 37
Coating thickness	According to the order lot size		on page 38
Gloss	Once in every working shift for each shade and manufacturer		on page 40
Wet adhesion test	Once in every working shift All samples from one day may be tested together.	Chromate conversion and Chemical pretreatment	on page 41
	• Before application: carried out for each coating material (i.e., each colour shade, gloss category and manufacturer) • During application: carried out every 4 hours	In-house pre-anodising	

For cast accessories:

- The gloss control shall be performed on test panels.
- The frequency of the wet adhesion test will be once in every week or once in every working shift, if cast is the main production quantity.
- In case of part dimensions exceeding laboratory apparatus dimensions, it is permissible to cut-off a small piece.
- For no-flat-surface the cross-hatch (dry and wet adhesion) shall be performed manually.

The coating thickness and the appearance shall be controlled on pieces as specified below:

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.		

b) Controls carried out on panels

Table 9 - In-house control of finished products (panels)

Control	Standard	Frequency
Dry adhesion test	ISO 2409	Minimum of 1 x sample for every two production hours.
Bend test	ISO 1519	
Impact test	ISO 6272-1 / ISO 6272-2 / ASTM D 2794	
Polymerisation test (optional for powder coatings)	---	Once in every working shift for each colour shade and gloss category and for each manufacturer

The same panel can be chosen for dry adhesion test, bend test and impact test.

For postforming the tests listed above shall be performed on production material (coils) or on test panels made with the same production material and processed together with the production lot (sheets).

5. Quality control registers

Control registers are either bound registers with numbered pages, or computer listings.

a) Control register for the production process

Records
Temperature of the baths
Chemical parameters specified by the manufacturers
Results of the etching degree test
Results of the tests of the conversion coating weight
Results of the water conductivity tests
Records of the drying and stoving conditions
Drying and stoving temperature curves

b) Control register for test panels

Records
Production date
References of the organic coating material used: RAL or some other reference for identification, lot number, manufacturer's name
Results of dry adhesion test, bend test, impact test, and polymerisation test (optional for powder coatings)

c) Control register for finished products

Records
Customer's name
Order or lot identification data
Production date
Reference of the organic coating material used
Results of the coating thickness control (minimum and maximum values)
Results of the inspection of the colour shade and its gloss
Appearance check
Results of the wet adhesion test

d) Control register for tests carried out by the chemical manufacturer

Records
Sample reference
Date of sampling and dispatch/collect
Chemical manufacturer's test report
Test results
Remarks and/or corrective actions

6. Summary of in-house control

Table 10 - Overview of in-house control

Object of control	Frequency	Remarks / Exceptions
Chemical pretreatment baths, degreasing, pickling, chromating, rinsing	Once per bath in every working shift, or according to the chemical manufacturer's advice, that shall be at least once per day (24 hours).	
Chemical parameters		
Conductivity of the water		
Temperature of chemical pretreatment		
Drying temperature	• Once in every working shift: record the displayed temperature • Once a week: make one recording of the temperature using strips or some other means	
Stoving conditions	• Once in every working shift: record the displayed temperature • At least twice a week on two different days: make one stoving curve per curing oven on profiles *	* If production occurs on only one day within the week, one stoving curve measurement is sufficient for that week. For COIL COATING: Every 2 hours record the displayed temperature (continuous monitoring of PMT)
Acid concentration and aluminium content of anodising bath	At least once per day	IN-HOUSE PRE-ANODISING
Temperature of the anodising bath	Every 8 hours	
Thickness of the anodic coating	Every load	
Etching degree	Once in every working shift, or according to the chemical supplier's advice, that shall be at least once per day (24 hours)	For in-house pre-anodising: Once per day

Object of control	Frequency	Remarks / Exceptions
Weight of the conversion coating (chromate conversion) - EN 12487	Once in every working shift, or according to the chemical supplier's advice, that shall be at least once per day (24 hours)	
Weight of the conversion coating (chemical pretreatment [Cr. VI-free])		
Controls carried out on profiles	**Appearance** - according to the order lot size	For COIL COATING: Measurement at the beginning and at the end of each coil and of each colour
	Coating Thickness - according to the order lot size	
	Gloss -- once in every working shift for each shade and manufacturer	
	Wet adhesion test Once in every working shift All samples from one day may be tested together.	For in-house pre-anodising: • Before Application: carried out for each coating material (i.e., each colour shade, gloss category, and manufacturer) • During Application: carried out every 4 hours
Controls carried out on panels	**Dry adhesion test / Bend test / Impact test** - minimum of 1 x sample for every two production hours. (Same panel for all 3 tests.)	For COIL COATING: Once for each coil and each colour
	Polymerisation test (optional for powder coatings) - once in every working shift for each colour shade and gloss category and for each manufacturer.	

7. Test methods and requirements

a) Appearance

Test method

The appearance shall be evaluated on the significant surface.

The significant surface shall be defined by the customer and is the part of the total surface which is essential to the appearance and serviceability of the item. Edges, deep recesses and secondary surfaces are not included in the significant surface.

Requirements

The organic coating on the significant surface shall not have any scratches through to the base metal.When the organic coating on the significant surface is viewed at an oblique angle of about 60° to the upper surface, none of the defects listed below shall be visible from a distance of 3 metres: excessive roughness, runs, blisters, inclusions, craters, dull spots, pinholes, pits, scratches or any other unacceptable flaws.

The organic coating shall be of even colour and gloss with good hiding power. When viewed on site, these criteria shall be fulfilled as follows:

- for parts used outside: viewed at a distance of 5 m
- for parts used inside: viewed at a distance of 3 m

b) Coating thickness

Figure 4 - 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 11 - 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 12 - 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 13 - 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) Gloss measurement

Figure 5 - Glossmeter

Test method

According to ISO 2813 using incident light at 60° to the normal.

If the significant surface is too small or the finish of the coating (e.g. textured, leathered or orange-peel appearance, highly metallic finishes) unsuitable for the gloss to be measured with the glossmeter, the gloss shall be compared visually with the reference sample provided by the powder coating supplier (from the same viewing angle).

Requirements

Table 14 - Gloss measurement requirements

Gloss category	Gloss range	Acceptable variation*
1 (matt)	0 - 30	+/- 5 units
2 (satin)	31 - 70	+/- 7 units
3 (gloss)	71 - 100	+/- 10 units

* permissible variation from the nominal value specified by the coating supplier

d) Wet adhesion test

Figure 6 - 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.
- No blistering.
- Cross-cut value 0.
- Colour change is acceptable.

e) Dry adhesion test

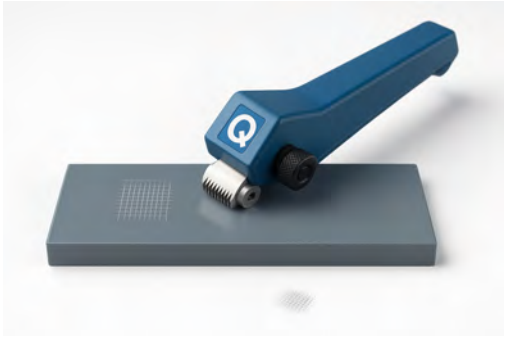

Figure 7 - Cross-cut

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

Figure 8 - Apparatus for bend test

Test method

ISO 1519 for class 1 powder coatings

The test panels shall be made of the alloy EN AW-5005-H24 or -H14 (AlMg1 - semihard) or EN AW 1050A 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) Bend test for postforming

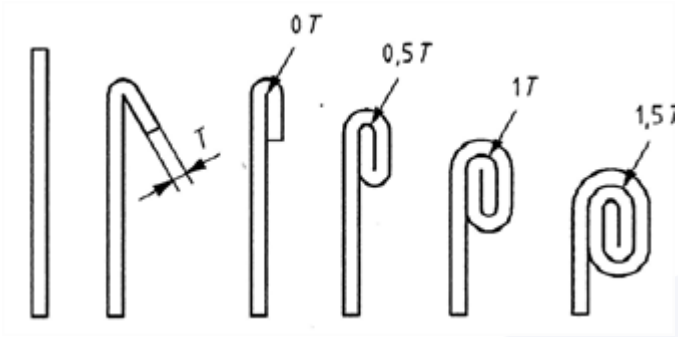

Figure 9 - T-bends

Test Method

EN 13523-7 including alternative device from EN 1396:2023

This test is specific for coated material that will be postformed and shall be conducted in place of the ISO 1519 bending test.

It shall be carried out on the production material (coils) or on Al samples obtained from the same raw Al material used for the production material (sheets).

The bend test shall be conducted according to EN 13523-7, including the alternative device described in EN 1396:2023*, followed by a tape-pull adhesion test, as specified below:

- The test is performed in a longitudinal direction (rolling direction); if the transverse direction is used, it shall be specified in the inspection report.The bending radius is expressed as 'T' bend.
- 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 one minute.

In case of uncertain results due to cracking of the aluminium support, a steel panel with a thickness of 0.51 mm shall be used (Q-panel: QD type/ ISO 3574: Type CR1 steel test panel Type 3).

Bend test specific for postforming (according EN 1396:2023):

As an alternative to the devices covered in EN 13523-7, the following method may be used to carry out the bending:

- The test piece (at least 250 mm x 30 mm) is bent (at 1 cm from one extremity) over an angle of approximately 100 ° by hand or any convenient means.
- The bent test piece is then pressed using a vice or a hydraulic press until the two faces come into contact. This constitutes the '0T' bend.
- If the bent area shows cracks with apparent underlying metal, a second bend is carried out by folding the test piece over the first bend and then pressing it using a vice or press. This constitutes a '0,5T' bend.
- This procedure is continued until a crack-free bend is obtained.
- The bends shall be examined using a 10x magnifying glass.
- The test shall be carried out at a temperature of 23°C ± 2°C and at a relative humidity of 50% ± 5%, 24 h after curing.

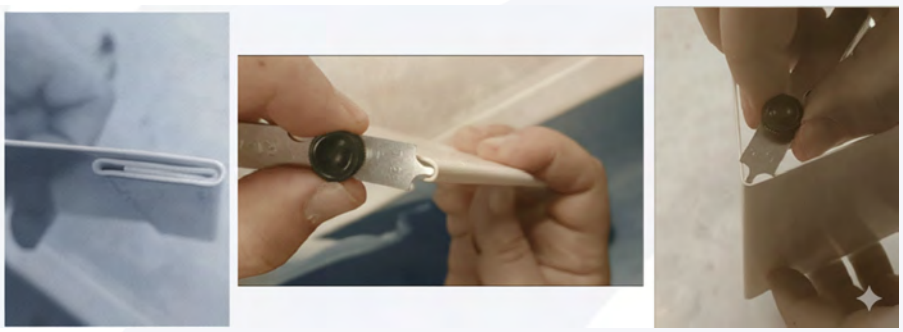

Figure 10 - Bend test for postforming - pressing and measurement

Requirements

The limit values for the bend radii are governed by the choice of metal substrate (alloy, temper, and thickness) and coating material; therefore, the values shall be agreed-upon between the coater and customer according to the characteristics of the raw materials used (aluminium and powder paint) and stated in the order.

If the bending radius is not specified in the coater TDS or agreed-upon between the coater and customer, the bending values shall not exceed 3T.

Using a 10x magnifying glass, the coating, bent with the specified bending radius, shall not show any sign of cracking and shall not show any sign of detachment following the tape-pull adhesion test.

> Material bending properties decrease as temperature decreases; the specified 'T' bend values are intended for a metal temperature which is not less than 21°C during processing.

h) Impact test (for powder coating only)

Figure 11 - Apparatus for impact test

The test panels shall be made of the alloy EN AW-5005-H24 or -H14 (AlMg 1 - semihard) or EN AW 1050A 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 15 - 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.

CHAPTER 4 - GRANTING OF A LICENCE

1. Introduction

This chapter specifies the procedure for granting a licence to a coater for one production site.

Unless otherwise stipulated all the requirements mentioned in this chapter are valid for cast accessories, postforming, and coil coating.

The procedures for granting a licence to coaters applying decoration are set out in a separate volume.

2. Application

Prior to the first inspection in the granting process, the applicant shall fill in the form 'General Data of Licensee' providing detailed information about the production site that the licence is being applied for.

The applicant shall submit the form to the General Licensee, or to QUALICOAT in countries without GL.

3. Preliminary inspection

A preliminary inspection can be requested by the applicant but in this case the results cannot be used for granting the licence.

4. Inspections for granting a licence

a) Basic principles

Every coating line as defined in Chapter 1 shall be inspected and two inspections shall be satisfactory before a licence is granted.

The first inspection will be conducted by appointment.

The second inspection will be unannounced and shall take place within maximum six months once all the results of the first inspection (including the acetic acid salt spray resistance test) have been found satisfactory.

b) Inspection programme

The inspector shall take along a thickness meter, a conductivity meter, and calibration tools for the other tests stipulated below.

The inspector shall check the following aspects using the inspection form approved by QUALICOAT:

Table 16 - Inspections and tests to be carried out before granting a licence

QUALICOAT Inspection for granting a licence		
Inspections / Tests	**Methods and requirements**	**Remarks**
Verification of the data concerning the coating lines	Description on the next page	
Inspection of materials	Description on the next page	
Inspection of laboratory equipment	Description on page 51	
Inspection of production process and equipment	Description on page 51	
Inspection of chemical pretreatment	Description on page 51	
Tests on finished products	Description on page 52	
■ Appearance	Description on page 37	
■ Coating thickness	Description on page 38	
■ Dry Adhesion	Description on page 42	
■ Wet adhesion test	Description on page 41	
■ Machu test	Description on page 53	*Both inspections for granting the licence* The Machu test is not mandatory for cast accessories.
■ Acetic Acid Salt Spray (AASS)	Description on page 55	*During first inspection*
■ Polymerisation	Description on page 59	
■ Sawing	Description on page 59	
■ Filiform corrosion test (FFC)	Description on page 57	*Only for SEASIDE and PRE-OX endorsement*
Inspection of the test panels	See Table 27 - on page 60	
■ Gloss measurement	Description on page 40	

QUALICOAT Inspection for granting a licence		
Inspections / Tests	**Methods and requirements**	**Remarks**
■ Thickness measurement	Description on page 38	
■ Dry Adhesion test	Description on page 42	
■ Bend test	Description on page 43	
■ Impact test	Description on page 45	
Review of in-house control and registers	Description on page 60	

c) Verification of the data concerning the coating lines

The inspector shall verify the plausibility of the data provided by the applicant regarding the coating lines operated at the production site and their use for coatings on aluminium for architectural applications.

He or she shall produce a **separate inspection report for each coating line inspected** and shall indicate the designation of the respective coating line as marked on site.

The inspector shall visually check what kind of parts are produced on the coating lines, especially on those that are not listed for inspection.

If these lines produce coatings on typical architectural products like extrusions or sheets, the inspector shall ask for an explanation why these products are not to be considered architectural. If no sufficient explanation can be given by the coater, the inspector shall make a remark in the inspection report.

d) Inspection of materials

The inspector shall check that for outside architectural applications the coater uses organic coating materials approved by QUALICOAT. If chemical materials other than chromate conversion coating are used, he or she shall also check that these chemical materials are approved by QUALICOAT.

*For **postforming** the inspector shall check that for outside architectural applications the licensee uses organic coating materials approved by QUALICOAT for postforming.*

e) Inspection of laboratory equipment

The inspector shall ensure that the equipment listed in Section 12 of chapter 2 is available, functional, and properly used.

He or she shall also verify whether there are relevant standards or written operating instructions.

f) Inspection of production process and layout of equipment

The inspector shall ensure that the storage of the products to be treated, the layout of equipment, the drying, and the coating and stoving conditions are conformed to the requirements set out in Chapter 2.

g) Inspection of batch treatment (if applicable)

Testing method to evaluate contact mark areas

Use a piece of a pretreated aluminium extrusion that has been marked by a separator. The area on the bar with the marks shall be identified.

A wet adhesion test shall be carried out on the coated samples.

Allow the test piece to cool after the test and examine it for any blistering on the identified area.

Requirements

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

h) Inspection of chemical pretreatment

The inspector shall ensure that the surface preparation, the conversion coating or pre-anodising are performed according to the specifications set out in Chapter 2.

i) Tests on finished products

Only finished products which have been released by the coater shall be tested (all parts ready for dispatch are deemed to have been released by the coater).

The inspector shall perform the following tests on the finished products:

Table 17 - Tests to be performed on finished products before granting a licence

Measurements /Tests		Reference	Proceedings / Remarks
Appearance		on page 37	To test the uniformity of production.
Coating thickness		on page 38	The number of pieces on which film thickness measurements shall be made is shown in table 6 (subject to a minimum of 30 pieces). *For coil coating, a total of 150 thickness measurements shall be made.*
Dry Adhesion*		on page 42	
Wet adhesion test*		on page 41	
Corrosion tests	Machu test*	on the next page	During the first inspection, the Machu test is carried out prior to the acetic acid salt spray test.. During the second inspection, only the Machu test is carried out.
	Acetic acid salt spray test*	on page 55	Only carried out on first inspection
	Filiform Corrosion test*	on page 57	Only carried out for SEASIDE and/or PRE-OX endorsement once a year
Polymerisation test		on page 59	This test is optional for powder coatings. it is merely indicative and cannot alone cast doubt upon the quality of the coating.
Sawing*		on page 59	

* For postforming, destructive tests can be conducted on test panels obtained using the same raw material as substrate of the finished products and processed together with the production material.

For cast accessories:

- The Machu test is not mandatory for granting a licence.
- In case of part dimensions exceeding laboratory apparatus dimensions, it is permissible to cut-off a small piece.
- For no-flat-surface the cross-hatch (dry and wet adhesion) shall be performed manually.

j) Machu test

This accelerated corrosion test shall be made on extruded sections of 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 Machu test will be carried out on the material actually used.

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).

Test Method

Before immersion, a X-shape scribe mark with a width of 1 mm shall be made on the significant surface with a special Sikkens® type scribing tool (according to ISO 17872) to cut the coating down to the metal (according to Figure 12 - X-shape scribe mark). If the dimensions of the sample are smaller than 70 x 70 mm, one scratch will be made lengthwise.

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

Test solution:

NaCl	50 ± 1 g/l
CH_3COOH (Glacial)	10 ± 1 ml/l
H_2O_2 (30 %)	5 ± 1 ml/l
Temperature	37 ± 1°C
Testing time	48 ± 0.5 hours

The pH of this solution is 3.0 - 3.3. After 24 hours, another 5 ml/l of hydrogen peroxide (H_2O_2 30 %) shall be added, and the pH adjusted with glacial acetic acid or caustic soda. A new solution shall be prepared for each test.

Requirements

No infiltration exceeding 0.5 mm on both sides of the scratch.

Proceedings

The inspector takes three test pieces from different lots. The results are classified as follows:

Table 18 - Machu test evaluation criteria

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

Table 19 - Machu test - Final assessment and proceedings (licence granting)

Rating (GR1)	Proceeding / Corrective action	Rating (GR2)	Proceeding / Corrective action
A	The acetic acid salt spray test will be performed.	A	No action
B		B	
C	The license will not be granted. The coater shall wait at least 3 months before making a new application for a licence.	C	The inspection shall be considered unsatisfactory and shall be repeated.
D		D	

k) Acetic acid salt spray test (AASS test)

The test shall be carried out on three test pieces of 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 AASS test will be carried out on the material actually used.

Test Method

According to ISO 9227 with the following changes:

- An X-shape scribe mark with a width of 1 mm shall be made with a Sikkens® type scribing tool (according to ISO 17872) to cut the organic coating down to the metal (according toFigure 12 - X-shape scribe mark).
- The crossing point of the X-shape scribe mark has to be included in the evaluation.

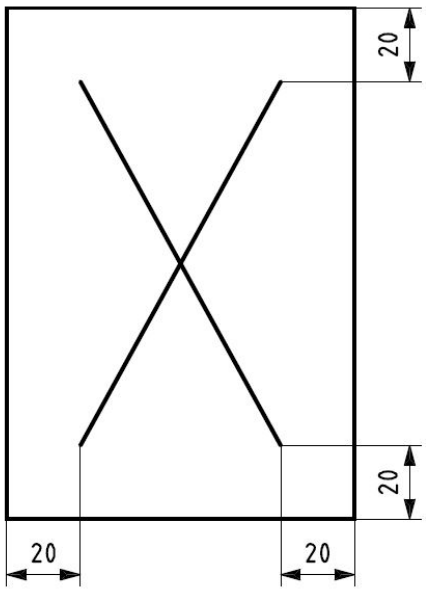

Figure 12 - X-shape scribe mark

Table 20 - AASS testing duration

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

Requirements

No blistering 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 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 21 - AASS test- final assessment

			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 22 - AASS test- final assessment and proceedings (licence granting)

Rating	Proceeding / Corrective action
A	No action
B	Notification to the coater
C	The licence will not be granted.
D	The coater shall wait at least three months before making a new application for a licence.

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

The test shall be carried out on three test pieces of 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 FFC test will be carried out on the material actually used.

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, a T-shape scribe mark with a width of 1 mm shall be made with Sikkens® type scribing tool (according to ISO 17872) to cut the organic coating down to the metal (according to Figure 13 - T-Shape scribe mark) with a lenght of at least 30mm.
  - If the samples have a width between 50-70 mm, then the distance from the scribes to the edges could be reduced to at least 10 mm.
  - If the samples have a width < 50 mm, no horizontal scribe mark (perpendicular to the extrusion direction) shall be made. The distance from the scribe to the edges could be reduced to at least 10 mm.

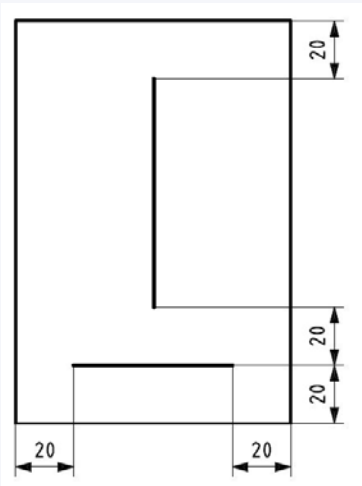

Figure 13 - T-Shape scribe mark

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 ± 2°C and 82 ± 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**.

Requirements

Table 23 - FFC filament requirements

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

Proceedings

The inspector takes three test pieces from different lots.

The results are classified as follows:

Table 24 - 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 25 - FFC test- Final assessment and proceedings (SEASIDE or PRE-OX endorsement)

Rating	Proceedings / Corrective actions	SEASIDE or PRE-OX endorsement
A	No action	Granted
B	Comment to the licensee	
C	• The endorsement will not be granted. • The coater shall wait at least three months before making a new application for an endorsement.	No granting
D		

m) Polymerisation test (optional for powder coating)

Test method

Prescribed solvent for liquid coatings: MEK or as specified by the liquid coating material's manufacturer and approved by the Technical Committee.

Prescribed solvent for powder coatings: xylene or as specified by the powder coating material's manufacturer and approved by the Technical Committee.

Saturate a swab of cotton wool with solvent. Within 30 seconds, rub it lightly back and forth 30 times in each direction over the part to be tested. Wait 30 minutes before making the assessment.

Requirements

The polymerisation quality is assessed according to the following ratings:

Table 26 - Polymerisation test ratings

		Rating
1	The coating is very dull and quite soft.	Unsatisfactory
2	The coating is very dull and can be scratched with a fingernail.	Unsatisfactory
3	Slight loss of gloss (less than 5 units)	Satisfactory
4	No perceptible change. Cannot be scratched with a fingernail.	Satisfactory

n) Sawing, milling and drilling

Test Method

The good quality of the organic coating is tested using sharpened tools suitable for aluminium.

Requirements

The coating shall not crack or chip when sharp tools are used.

o) Inspection of the test panels

The following tests shall be performed on test panels processed concurrently with a production lot:

Table 27 - Tests to be performed on test panels (licence granting)

Inspection of test panels	
Measurement/Test	**Description**
Gloss measurement	on page 40
Thickness measurement	on page 38
Dry adhesion test	on page 42
Bend test or Bend test for postforming	on page 43 and on page 44
Impact test	on page 45
For postforming the above tests shall be performed on production material (coils) or on test panels made with the same production material and processed together with the production lot (sheets).	

p) Review of in-house control and registers

The inspector shall check that in-house control has been carried out and that the coater maintains registers in accordance with Chapter 3.

He or she shall check that the results recorded in the register coincide with the results of the test panels. For this reason, all test panels shall be kept and held at the inspector's disposal for one year.

5. Final assessment for granting the licence

An inspection is satisfactory when all tests (including the Machu test, acetic acid salt spray test and the filiform corrosion test in case of SEASIDE endorsement) are satisfactory.

The inspector submits the inspection reports to the General Licensee for the evaluation.

Under the supervision of QUALICOAT, the procedure below is to be followed by the General Licensee:

- If the results of both inspections meet the requirements, a licence to use the quality label shall be granted.
- In case of a C result in the Machu, AASS and/or FFC test obtained in the first inspection, the coater will be informed that the licence to use the quality label cannot be granted for the time being, stating reasons. The coater shall wait at least three months before making a new application for a licence.
- If the results of the second inspection do not meet the requirements, the inspection shall be repeated within one month.
- If the results of the repeat inspection do not meet the requirements, the coater will be informed that the licence to use the quality label cannot be granted for the time being, stating reasons.

The coater shall wait at least three months before making a new application for a licence.

All information concerning the inspection results and their assessment shall be confidential

6. Granting of a SEASIDE endorsement

Licensees who wish to have the endorsement SEASIDE on their licence certificate shall apply to their General Licensee or directly to QUALICOAT in countries without a General Licensee.

If the coater has applied for the SEASIDE endorsement the etching degree shall be measured following "Etching stage" on page 14, and filiform corrosion test(s) shall be carried out on finished products with every type of pretreatment the coater wishes to use for SEASIDE.

- If the results of the inspection meet the requirements, the SEASIDE endorsement shall be granted.

  A specific QUALICOAT SEASIDE certificate shall be issued stating that the licensee is able to produce finished products that meet the SEASIDE requirements.

- If the results of the inspection do not meet the requirements, the coater shall wait at least three months before making a new application for a SEASIDE endorsement.

7. Granting of a PRE-OX endorsement

A PRE-OX endorsement can be granted by QUALICOAT either to coaters using in-house pre-anodising or to coaters using off-site pre-anodised products.

If the coater has applied for the PRE-OX endorsement, an inspection shall be carried out following the inspection programme summarized above in b) on page 49 and based on the specifications set out in "Pre-anodising (PRE-OX endorsement)" on page 20, and in the case of off-site pre-anodising in Appendix C - Specifications for off-site anodisers.

A filiform corrosion test shall be conducted on finished products.

If the results of the inspection meet the requirements, the PRE-OX endorsement shall be granted for the coating line inspected.

If the results of the inspection do not meet the requirements, the coater shall wait at least three months before making a new application for a PRE-OX endorsement.

8. Granting of a POSTFORMING endorsement

If a coater has applied for the postforming endorsement, an inspection shall be conducted following the guidelines set in Section 4. Inspections for granting a licence of this chapter.

- For coil coating or in case of lines used exclusively for coating material for postforming, the postforming endorsement is mandatory, and each inspection visit shall include all the controls prescribed for postforming. The endorsement shall be granted after two inspection visits, made for granting the licence and the postforming endorsement, have been satisfactory.
- In the case of piece coating (no coil coating), one inspection shall be satisfactory before an endorsement is granted. If the results of the inspection meet the requirements, the postforming endorsement shall be granted.

A specific certificate shall be issued stating that the coating plant installation is able to produce finished products that meet the postforming requirements.

If the results of the inspection do not meet the requirements, the coating applicator shall wait at least three months before making a new application for a postforming endorsement.

CHAPTER 5 - RENEWAL OF A LICENCE

1. Introduction

Once a coater has been granted a licence to use the quality label, this licence shall be renewed if the results of at least two inspections per year meet the requirements.

Every coating line shall be inspected twice a year.

Routine inspections shall be made without prior notice. Inspectors will only be authorised by the General licensee or by the QUALICOAT Secretariat to announce an inspection in the case of travel safety issues or visa problems

Licensees shall immediately inform the General Licensee, or QUALICOAT in countries without GL, in case a coating line is out of operation, regardless of whether planned or due to a technical failure.

The inspectors shall take along a thickness meter, a conductivity meter, and calibration tools for the other tests stipulated.

All information concerning the inspection results and their assessment shall be confidential.

2. Inspections for renewing a licence

a) Verification of the data concerning the coating lines

The inspector shall verify the plausibility of the data provided by the applicant regarding the coating lines operated at the production site and their use for coatings on aluminium for architectural applications.

He or she shall produce a **separate inspection report for each coating line inspected** and shall indicate the designation of the respective coating line as marked on site.

The inspector shall visually check what kind of parts are produced on the coating lines, especially on those that are not listed for inspection.

If these lines produce coatings on typical architectural products like extrusions or sheets, the inspector shall ask for an explanation why these products are not to be considered architectural. If no sufficient explanation can be given by the coater, the inspector shall make a remark in the inspection report.

b) Inspections and tests for renewing a licence

Inspections shall include all tests described in Chapter 3 on page 31.

The inspector shall check the following using the inspection form approved by QUALICOAT:

Table 28 - Inspections and tests to be carried out for renewing a licence

QUALICOAT Inspection for renewing a licence		
Inspection of materials		Description on page 48
Inspection of laboratory equipment		Description on page 51
Inspection of production process and equipment		Description on page 51
Inspection of chemical pretreatment		Description on page 51
Tests on finished products		Description on page 52
■ Appearance		Description on page 37
■ Coating thickness		Description on page 38
■ Dry Adhesion		Description on page 42
■ Wet adhesion test		Description on page 41
Corrosion tests	■ Machu test	During the first inspection of the year (RN1), the Machu test shall be carried out prior to the acetic acid salt spray test. Description on page 53 The Machu test is not mandatory for cast accessories.
	■ Acetic acid salt spray test (AASS)	Samples shall be taken during the first inspection of the year (RN1) Description on page 55
	■ Filiform corrosion test (FFC)	Only for SEASIDE and/or PRE-OX endorsement Samples shall be taken during the first inspection of the year (RN1) Description on page 57
■ Polymerisation		Description on page 59
■ Sawing		Description on page 59
Inspection of the test panels		Description on page 60

QUALICOAT Inspection for renewing a licence	
■ Gloss measurement	Description on page 40
■ Thickness measurement	Description on page 38
■ Dry Adhesion test	Description on page 42
■ Bend test	Description on page 43
■ Impact test	Description on page 45
Review of in-house control and registers	Description on page 60
Attendance in training	The inspector shall check whether at least one in-house control employee and/or one responsible quality employee have attended regularly trainings organised at least once every two years by the General Licensees or by QUALICOAT in countries without GL. In case of non-compliance with this requirement the inspector shall make a remark in the inspection report and, in case of repetition of this non-compliance after the next organised training has taken place, a non-conformity shall be issued.

The results of the corrosion tests (Machu, AASS and FFC) are evaluated and processed as follows:

Table 29 - Machu test - Final assessment and proceedings (licence renewal)

Rating (RN1)	Proceeding / Corrective action	Rating (RN2)	Proceeding / Corrective action
A	The acetic acid salt spray test will be performed.	A	No action
B		B	
C	The inspection shall be considered unsatisfactory and shall be repeated.	C	The inspection shall be considered unsatisfactory and shall be repeated.
D		D	

Table 30 - AASS test- final assessment and proceedings (licence renewal)

Rating	Proceeding / Corrective action
A	No action
B	Notification to the coater
C	Repetition of the AASS test on the second inspection (RN2). If the result of this second test is C or D, the inspection shall be repeated.
D	The inspection shall be repeated

Table 31 - FFC - Final assessment and proceedings (licence renewal)

Rating	Proceeding / Corrective action	SEASIDE or PRE-OX ENDORSEMENT
A	No action	Renewed
B	Comment to the licensee	Renewed
C	The filiform corrosion test shall be repeated on the second inspection of the year (RN2).	Not renewed
	If the result of the second FFC test are unsatisfactory, the inspection shall be repeated.	If the repeat test again produces unsatisfactory results, the endorsement shall be withdrawn immediately. The coater shall wait at least three months before making a new application for an endorsement
D	Another complete and unannounced inspection including SEASIDE or PRE-OX shall be conducted.	If the second inspection again produces unsatisfactory results, the endorsement shall be withdrawn immediately. The coater shall wait at least three months before making a new application for an endorsement.

3. Unforeseen problems during renewal inspections

In cases of unforeseen problems arising at short notice, or in the case that a pretreatment cycle is not in use on the day of the inspection when AASS, FFC, and/or Machu test samples are to be taken, the following rule shall apply:

- The inspector shall fill in the inspection report on the basis of the documentation of the in-house control and shall take the samples for corrosion tests from finished products.
- If such samples are not available on the day of the inspection, the licensee shall send these samples to the testing institute within one month from the inspection date.
- If the licensee fails to do so, the inspection shall be evaluated as 'not satisfactory'.

4. Deadlines for submission of inspection reports

All inspection reports (including test results) shall reach QUALICOAT's Secretariat within three months of the dates of the inspections.

If a production site inspection was unsatisfactory, the General Licensees shall send the report to QUALICOAT's Secretariat within one month after the inspection.

5. Issues and non-conformities

a) Definitions

Non-conformity Failure to comply with a requirement leading to a repetition of the inspection.

Issue Refusal or failure to comply with a requirement not included in the list of non-conformities defined by QUALICOAT.

Correction Action taken to eliminate a detected non-conformity.

Corrective action Action taken to eliminate the cause of a detected non-conformity or other undesirable situation in order to prevent recurrence.

Preventive action Action taken to eliminate the cause of a potential non-conformity or other undesirable potential situation

b) List of nonconformities

Table 32 - List of non-conformities

1	Failure to admit an inspector to carry out an inspection
2	Use of organic coating materials for external architectural applications that have not been approved by QUALICOAT except for technical reasons justified by a customer's written request
3	No apparatus available for measuring coating thickness
4	Delay of more than 16 hours between pretreatment and coating, if the storage prescribed in Section 3. of the Specifications is poor (or 72 hours for pre-anodising)
5	Curing parameters below the powder manufacturer's minimum requirements
6	Etching degree less than the minimum specified
7	Conversion coating weight lower than the minimum prescribed
8	Conversion coating weight higher than the maximum prescribed
9	Conductivity of the final rinse exceeding the acceptable value
10	Coating thickness less than the minimum specified
11	Rejected pieces more than the minimum prescribed for coating thickness
12	No in-house control results recorded for more than one week
13	Failure to comply with the rule stipulated for coaters that the additional samples for the AASS test must be sent every two months
14	Unsatisfactory result in the Machu test
15	Unsatisfactory result in the acetic acid salt spray test (rating D)
16	Unsatisfactory result in the wet adhesion test

6. Final assessment for renewing the licence

The inspector shall submit the inspection reports to the General Licensee for the evaluation.

Under the supervision of QUALICOAT, the procedure below is to be followed by the General Licensee:

- If the results of the inspection meet the requirements, authorisation to use the quality label will continue.
- If the results of the inspection do not meet the requirements another inspection shall be made within one month (allowing for holiday periods) after the coater has received notification of an unsatisfactory inspection from the General Licensee and/or QUALICOAT. In the meantime, the licensee should rectify non-conformities and inform the General Licensee or QUALICOAT immediately.
- If the second inspection again produces unsatisfactory results, the licence to use the quality label will be withdrawn immediately. The coater shall wait at least three months before making a new application for a licence to use the quality label.

7. Renewal of a SEASIDE endorsement

Routine SEASIDE inspections are carried out during QUALICOAT inspections, and a filiform corrosion test is performed on finished products during the first inspection of the year.

At least one SEASIDE inspection shall be possible and satisfactory during the year. If no SEASIDE inspection is possible during QUALICOAT visits, an additional announced inspection shall be carried out.

- If the results of the inspection meet the requirements, the “SEASIDE” endorsement shall be confirmed.
- If the result of the FFC test is D, another complete and unannounced inspection including SEASIDE shall be conducted.
- If the second inspection again produces unsatisfactory results, the “SEASIDE” endorsement shall be withdrawn immediately. The coater shall wait at least three months before making a new application for a “SEASIDE” endorsement.

8. Renewal of a PRE-OX endorsement

Routine PRE-OX inspections are carried out during QUALICOAT inspections, and a filiform corrosion test is performed on finished products during the first inspection of the year.

For lines where parts with chemical conversion as well as parts with pre-anodising are coated, the following rule shall apply:

- During the first inspection of the year, samples for the acetic acid salt spray test and the filiform corrosion test (if the licensee uses chemical conversion for SEASIDE as well) shall be taken on parts with chemical conversion and a separate report shall be filled in.
- Also, during the first inspection of the year, samples for the acetic acid salt spray test and the filiform corrosion test shall be taken on parts with pre-anodising and a separate report shall be filled in.
- During the second inspection of the year, also two reports will be filled in, but the samples shall only be taken from the pretreatment that is in use on the day of the inspection.

If a coating line is only equipped for pre-anodising, then two annual inspections based on pre-anodising shall be conducted.

- If the inspection results meet the requirements, PRE-OX endorsement shall be confirmed.
- If the FFC test result is D, another complete inspection, including PRE-OX, shall be conducted.
- If the repeat inspection produces unsatisfactory results, the PRE-OX endorsement shall be withdrawn immediately. The coater shall wait for at least three months before making a new application for a PRE-OX endorsement

9. Renewal of a POSTFORMING endorsement

Routine postforming inspections shall be conducted during QUALICOAT inspections.

- For coil coating or in case of lines used exclusively for coating material for postforming, the endorsement shall be renewed if the results of at least two postforming inspections per year meet the requirements.
- In case of piece coating plants with mixed production, the endorsement shall be renewed if the results of at least one postforming inspection per year meets the requirements. The coating thickness measurements and corrosion tests shall be carried out on both types of material.
- If the results of the inspection meet the requirements, the postforming endorsement shall be confirmed.
- If the results do not meet the requirements, another inspection shall be made within one month.
- If no postforming inspection is possible during QUALICOAT visits, an additional announced inspection shall be carried out.
- If the additional inspection produces unsatisfactory results, the postforming endorsement shall be withdrawn immediately.

The licensee shall wait at least three months before making a new application for a 'Postforming' endorsement

10. Suspension of an inspection

In case of political unrest or unforeseen circumstances and after consultation with the testing laboratory responsible, the inspection can be suspended for a maximum period of 12 months by QUALICOATin agreement with the General Licensee. No certificate shall be issued for the following year, but the licence shall remain. After the suspension period has elapsed, and if the renewal process is still not achievable, the licence shall be cancelled.

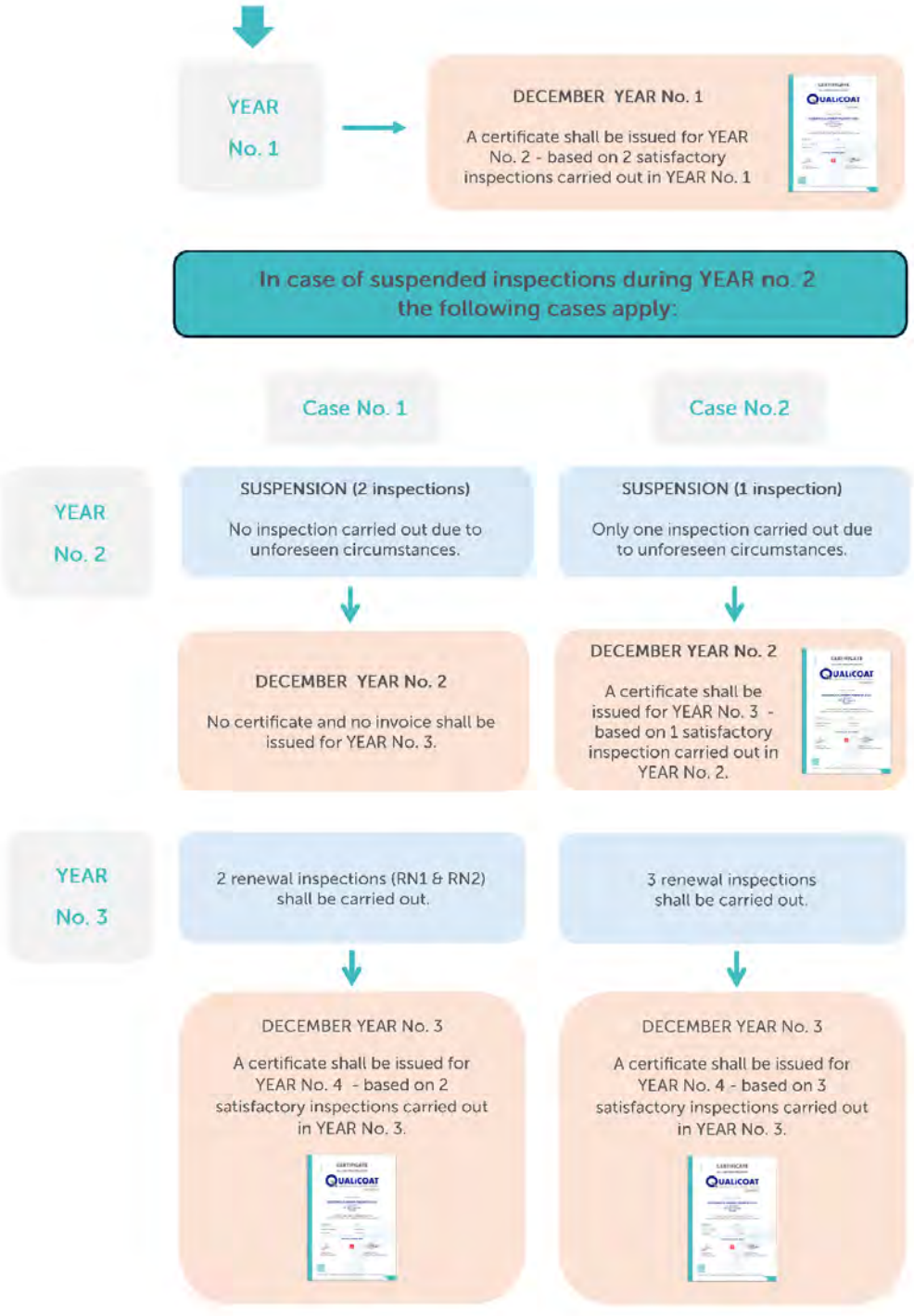

Figure 14 - Procedure Suspension of a QUALICOAT licence

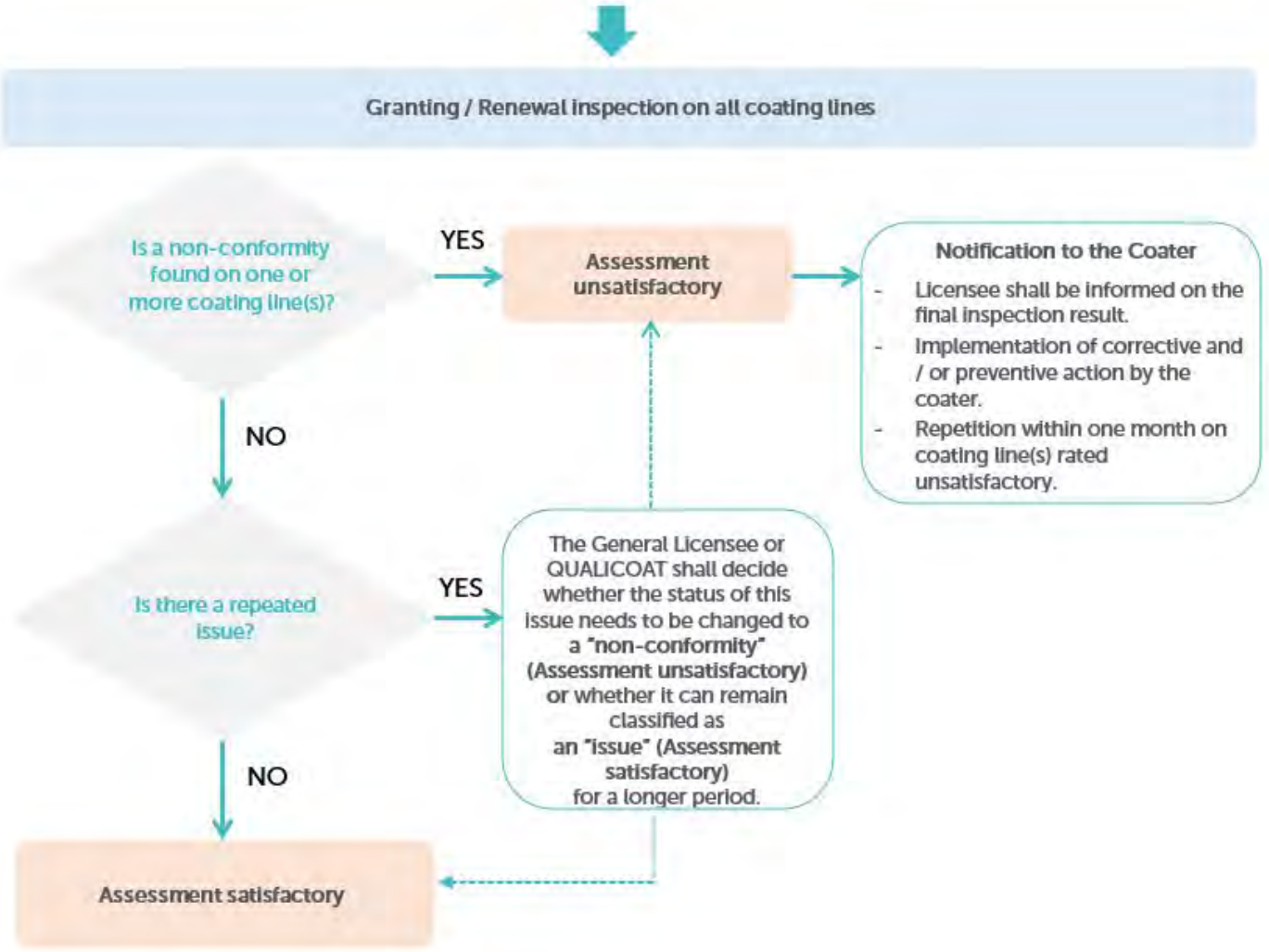

Figure 15 - Procedure for granting / renewing a QUALICOAT licence

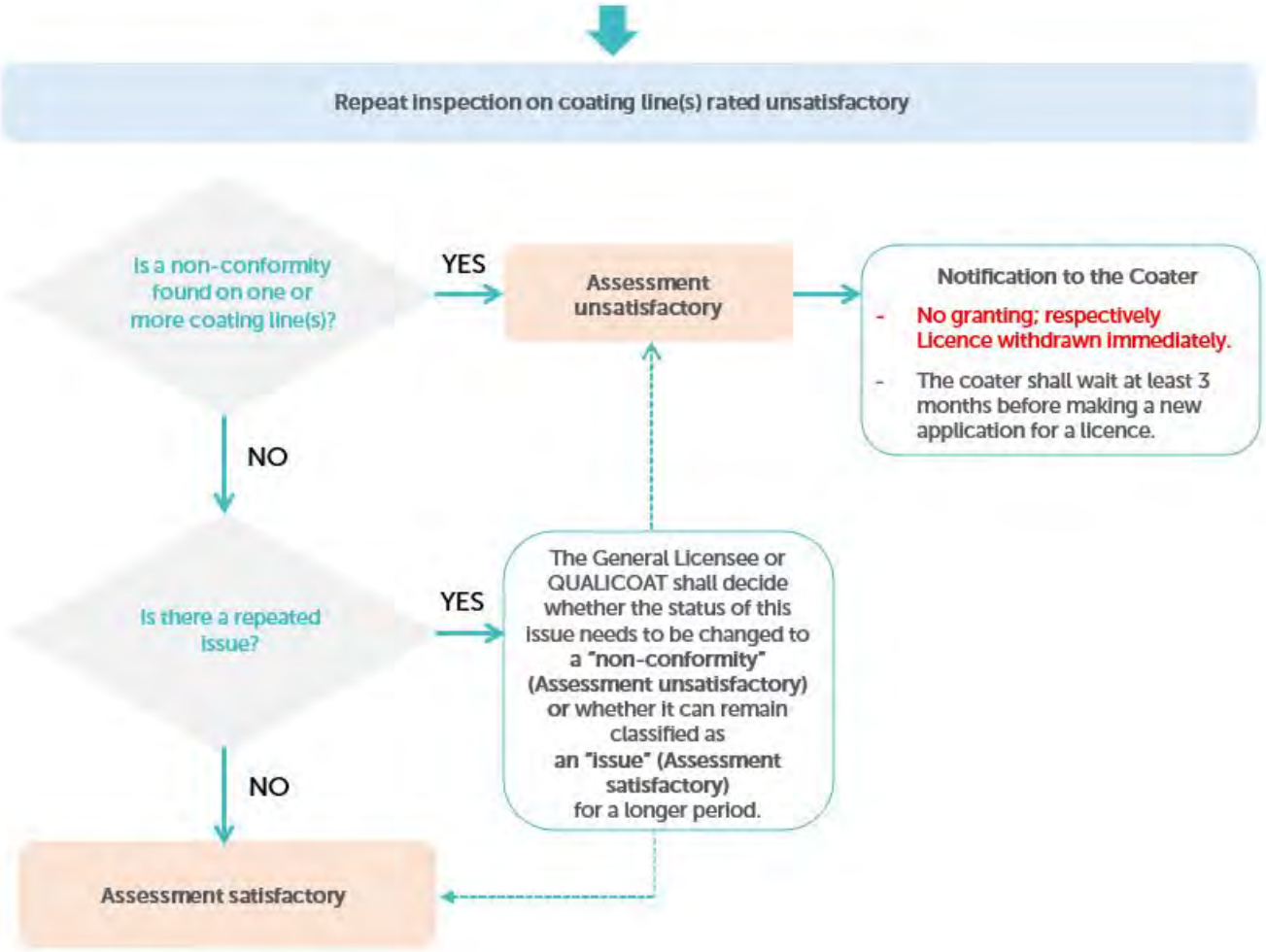

Figure 16 - Procedure for repeating a QUALICOAT licence inspection

CHAPTER 6 - 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 17 - 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 18 - 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 19 - Examples of incorrect logo usage

c) Use of the logo by licensees

Licensees shall not make any alteration or addition to the logo when using it. In the event that the licensee's own brands or trademarks are used separately on or in connection with his products, these regulations shall not be infringed in any manner whatsoever.

Licensees shall at any time provide the GL with all information required as to the use of the logo.

Unless explicitly stated otherwise in individual cases, the licensee assures, by using the logo, that the quality of the entirety of coatings on aluminium for architectural applications produced at the licensed production site meets all the requirements of the Specifications.

Licensees shall remove all references to QUALICOAT from documentation related to products not meeting QUALICOAT specifications, regardless of technical reasons or customer requests.

For licensees that have more than one production site, the quality label shall only be used for the production site for which the licensee is holding the licence.

The logo may be used on the products themselves, business stationery, quotations or invoices, price lists, cards, display boxes and on all company literature and brochures or in catalogues and newspaper advertisements.

Whenever a licensee makes mention or reference to QUALICOAT, it shall systematically indicate its licence number. This shall apply both to the use of the logo and in texts.

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

Figure 20 - Printed logo options

4. QUALICOAT Brand colour palette

The use of Reflex Blue and Silver (Cool Grey 11) convey quality, our heritage, and our core product, aluminium. Orange (Pantone 021) and Aqua (Pantone 3115) represent confidence, strength and trust.

100c 90m 10y *0R 22G 137B* *Reflex Blue* *Hex 001689*	*80k* *84R 86G 90B* *Cool Grey 11* *Hex 54565a*	*60k* *137R 138G 141B* *Cool Grey 8* *Hex 88898d*	*72m 100y* *235R 98G 9B* *Pantone 021* *Hex eb6209*	*67c 27y* *67R 187G 194B* *Pantone 3115* *Hex 43bbc2*

5. Register of licensees

QUALICOAT shall keep a register showing (in addition to other details which may be resolved upon now or later) the name, address and trade description of each Licensee, the date on which the licence was granted, the number assigned to each licence, the date of withdrawal of the licence and any other details which QUALICOAT may deem necessary.

The Holder shall notify the GL forthwith of any changes in name or address and the GL shall in turn inform QUALICOAT in order for the change to be recorded in the register

6. Significant changes in a company

In the case of any significant event (change in shareholders or key personnel, new lines), the licensee shall notify the GL immediately. The GL shall be authorised to make a supplementary visit in order to ensure that the licensee continues to satisfy all the conditions stipulated in the Specifications.

If the licensee ceases to trade, all tags, labels, bands, stencils, stamps, wrappers, containers, price lists, business notices, business cards and any other objects in or upon which the Quality

Label is affixed shall either be delivered to the GL or, upon the GL's instructions, kept at the disposal of the GL until a new approval or licence is granted.

7. Failure to comply with the use of the Quality Label

The GL shall withdraw the licence if the licensee ceases to comply, in particular if the licensee is guilty of any improper use of the Quality Label or has failed to pay the annual fee.

In the event of withdrawal of a licence, the licensee shall be given notice in writing by the GL and such notice shall be effective immediately. In such event, all tags, labels, bands, stencils, stamps, wrappers, containers, price lists, business notices, business cards and any other objects in or upon which the Quality Label is affixed shall either be delivered to the GL or, upon the GL's instructions, kept at the disposal of the GL until a new licence is granted.

8. Voluntary withdrawal

In the event of voluntary withdrawal of a licence, all tags, labels, bands, stencils, stamps, wrappers, containers, price lists, business notices, business cards and any other objects in or upon which the Quality Label is affixed shall either be delivered to the GL or, upon the GL's instructions, kept at the disposal of the GL until a new licence is granted.

9. Sanctions

In the event of improper use of the Quality Label or of any behaviour or action which could impair the image of the Quality Label, the following sanctions may be imposed either by the GL or by QUALICOAT in countries without a GL:

- official statement
- reprimand
- withdrawal of the label

In the event of withdrawal of a licence, the licensee shall be given notice in writing by the GL and such notice shall be effective immediately. In such event, all tags, labels, bands, stencils, stamps, wrappers, containers, price lists, business notices, business cards and any other objects in or upon which the Quality Label is affixed shall either be delivered to the GL or, upon the GL's instructions, kept at its disposal until a new licence is granted.

The party concerned shall have the right to appeal first at the GL's level and finally at the QUALICOAT Executive Committee's level whose decision is final.

CHAPTER 7 - 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 coater 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 coater 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.