



**SPECIFICATIONS
FOR A QUALITY LABEL
FOR PAINT, LACQUER AND POWDER COATINGS
ON ALUMINIUM
FOR ARCHITECTAL APPLICATIONS**

👉 **10th Edition** 👈

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It may be supplemented with new update sheets.

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**Main changes compared with the 9th edition
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- Permanent updating of the Specifications (update sheets) as explained in Chapter 1, General Information
- New section **3.2.1 Etching** (Update sheet No 7)
- Modification of former section **3.2.1 Chromate pre-treatment** (Update sheet No 1)
- Numbering of paragraphs in section 3.2
- Modification of section **4.2 Renewal of approved systems** (Update sheet No 4)
- New section **4.3 Use of the logo by coating manufacturers** (Update sheet No 2)
- New section **5.3 Use of the logo by coaters** (Update sheet No 2)
- New section **6.2.1 Testing the etching degree**
- Numbering of paragraphs in section 6.2
- Addition of one sentence in section 6.4.1
- Revision of **Appendix A1 "Regulations for use of the QUALICOAT quality label for paint, lacquer and powder coatings on aluminium for architectural applications"** (Update No 2)
- Revision of **Appendix A2 "Specifications for decoration"** (Update sheet No 6)
- Revision of **Appendix A7 RAL / DELTA E Table** (Update sheet No 3)

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Chapter 1

General Information

1. General Information

These Specifications apply to the QUALICOAT quality label, which is a registered trademark. The regulations for use of the quality label are set out in Appendix A1.

The aim of these Specifications is to establish minimum requirements which plant installations, coating materials and finished products must meet.

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

The Specifications for plant installations are the minimum requirements for producing good quality. Other methods may only be used if they have been previously approved by the Executive Committee.

The aluminium or aluminium alloy material must be suitable for the coating processes specified in this document. It must be free from corrosion and must not have any anodic or organic coating (except anodic pre-treatment as described in these specifications). It must also be free from all contaminants, especially silicone lubricants. The edge radii must be as large as possible.

Finishing plants holding the quality label must treat all products intended for architectural applications in accordance with these Specifications and may only use coating materials approved by QUALICOAT for such products. For external architectural applications, other coating 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 powders, paints and lacquers for purely commercial reasons.

These Specifications form the basis for granting and renewing the quality label. All requirements in these Specifications must be met before a quality label can be granted. The quality assurance representative in the company holding the label must always have the latest version of the Specifications.

The Specifications may be supplemented or amended with update sheets that set out and incorporate the 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 Specifications and update sheets will be distributed to all coating plants which have been or are about to be granted the quality label and to holders of an approval. The Specifications and update sheets are also published on Internet (www.qualicoat.net).

These Specifications do not apply to coil coating.

TERMINOLOGY

Licence:	Permission to use the quality label.
Approval:	Confirmation that a specific manufacturer's product (powder coating, liquid coating or chemical product) meets the requirements of the Specifications.
General licensee (GL):	National association holding the Qualicoat general licence for the whole country in question.
Testing laboratories:	These are independent quality testing and inspection bodies duly authorised by the general licensee or QUALICOAT.

Chapter 2

Test Methods and Requirements

2. Test Methods and Requirements

The test methods described below are used to test finished products and/or coating systems for approval (see chapters 4 and 5).

For the mechanical tests (sections 2.6, 2.7 and 2.8), the test panels must be made of the alloy AA 5005-H24 or -H14 (AlMg 1 - semihard) with a thickness of 0.8 or 1 mm, unless otherwise approved by the Technical Committee.

Tests using chemicals and corrosion tests should be performed on extruded sections made of AA 6060 or AA 6063.

2.1. Appearance

The coating on the significant surface must not have any scratches through to the base metal. When the coating on the significant surface is viewed at an oblique angle of about 60° to the upper surface, none of the defects listed below must 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 coating must be of even colour and gloss with good coverage. When viewed on site, these criteria must 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

2.2. Gloss

ISO 2813:1994 - using incident light at 60° to the normal.

Note: if the significant surface is too small or unsuitable for the gloss to be measured with the glossmeter, the gloss should be compared visually with the reference sample (from the same viewing angle).

REQUIREMENTS:

Category 1	:	0	-	30	+/-	5	units
Category 2	:	31	-	70	+/-	7	units
Category 3	:	71	-	100	+/-	10	units

(permissible variation from the nominal value specified by the coating supplier)

2.3. Coating thickness

EN ISO 2360: 1995

The thickness of the coating on each part to be tested must be measured at not less than *five measuring areas* (appr.1 cm²) with *3 to 5 separate readings* taken at each

area. The average of the separate readings taken at one measuring area gives a *measurement value* to be recorded in the inspection reports. None of the values measured may be less than 80% of the specified minimum value otherwise the thickness test as a whole will be considered unsatisfactory.

REQUIREMENTS:

Powders:

Class 1 ¹	:	60 µm
Class 2	:	60 µm
Two-coat powder system (classes 1 et 2)	:	110 µm
Two-coat PVDF powder system	:	80 µm

Liquid coating

Two-coat PVDF system	:	35 µm
Three-coat metallized PVDF system	:	45 µm
Silicon polyester without primer (minimum 20% silicon resin)	:	30 µm
Water-thinnable paints	:	30 µm
Other thermosetting paints	:	50 µm
Two-component paints	:	50 µm
<u>Electrophoretic coating</u>	:	25 µm

Other coating systems may require different coating thicknesses, but they may only be applied with the approval of the Executive Committee.

The results must be assessed as shown by **four typical examples** (minimum coating thickness for powder coatings: 60 µm):

Example 1:

Measured values in µm : 82, 68, 75, 93, 86 average: 81

Rating:

This sample is perfectly satisfactory.

Example 2:

Measured values in µm : 75, 68, 63, 66, 56 average: 66

Rating:

This sample is good because the average coating thickness is more than 60 µm and because no value measured is less than 48 µm (80% of 60 µm).

¹ There are two different classes of powders that must meet different requirements. The particular class is stated in the approval.

Example 3:

Measured values in μm : 57, 60, 59, 62, 53 average: 58

Rating:

This sample is unsatisfactory and comes under the heading "rejected samples" in table 5.1.4.

Example 4:

Measured values in μm : 85, 67, 71, 64, 44 average: 66

Rating:

This sample is unsatisfactory although the average coating thickness is more than 60 μm . The inspection must be considered failed because the measured value of 44 μm is below the tolerance limit of 80% (48 μm).

2.4. Adhesion

EN ISO 2409:1994

The adhesive tape can be Scotch 610, Permaceal 99 or equivalent. The spacing of the cutters must be 1 mm for coating thicknesses of up to 60 μm , 2 mm for thicknesses between 60 μm and 120 μm , and 3 mm for thicker coatings.

REQUIREMENTS:

The result must be 0.

2.5. Indentation

EN ISO 2815:1998

REQUIREMENTS:

Minimum 80 with the specified required coating thickness.

2.6. Cupping test

All powder systems except Class 2 powders²: **EN ISO 1520:1995**

Class 2 powders:

EN ISO 1520:1995 followed by a tape pull adhesion test as specified below:

Apply a Scotch 610, Permaceal 99 or equivalent adhesive tape to the coated side 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.

² See previous footnote.

REQUIREMENTS:

- Minimum 5 mm for powder coatings (Classes 1 and 2)
- Minimum 5 mm for liquid coatings except
 - two-component paints and lacquers : minimum 3 mm
 - water-thinnable paints and lacquers : minimum 3 mm
- Minimum 5 mm for electrophoretic coatings

To be indicative, the test must be performed on a coating with a thickness approximating the minimum required.

Viewed with the naked eye, the coating must not show any sign of cracking or detachment, except for Class 2 powders.

Class 2 powders :

Viewed with the naked eye, the coating must not show any sign of detachment following the tape pull adhesion test.

2.7. Bend test

All powder systems except Class 2 powders: **EN ISO 1519:1995**

Class 2 powders :

EN ISO 1519 :1995 followed by a tape pull adhesion test as specified below:

Apply a Scotch 610, Permacel 99 or equivalent adhesive tape to the coated side 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.

To be indicative, the test must be performed on a coating with a thickness approximating the minimum required.

REQUIREMENTS:

Bending around a 5 mm mandrel, or an 8 mm mandrel for two-component and water-thinnable paints and lacquers.

Viewed with the naked eye, the coating must not show any sign of cracking or detachment, except for Class 2 powders.

Class 2 powders:

Viewed with the naked eye, the coating must not show any sign of detachment following the tape pull adhesion test.

2.8. Impact test

(for powder coatings only)

This test must be carried out on the uncoated side, whereas the results must be assessed on the coated side.

- Class 1 powders (one- and two-coat): **ASTM D 2794:1993** (impactor diameter: 15.9 mm; energy: 2.5 Nm)
- Two-coat PVDF powders: ASTM D 2794:1993 (impactor diameter: 15.9 mm; energy: 1.5 Nm)
- Class 2 powders: : ASTM D 2794:1993 (impactor diameter: 15.9 mm; energy: 2.5 Nm) followed by a tape pull adhesion test as specified below.

Apply a Scotch 610, Permacel 99 or equivalent adhesive tape to the coated side 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.

To be indicative, the test must be performed on a coating with a thickness approximating the minimum required.

REQUIREMENTS:

Viewed with the naked eye, the coating must not show any sign of cracking or detachment, except for Class 2 powders.

Class 2 powders:

Viewed with the naked eye, the coating must not show any sign of detachment following the tape pull adhesion test.

2.9. Resistance to humid atmospheres containing sulphur dioxide

EN ISO 3231:1997 (0,2 l SO₂ - 24 cycles). A cross-cut incision with a width of 1 mm must be made to cut the coating down to the metal.

REQUIREMENTS:

No infiltration exceeding 1 mm on both sides of the scratch, and no change in colour or blisters visible to the naked eye.

2.10. Acetic acid salt spray resistance

ISO 9227:1990 (testing time: 1000 hours). A cross-cut incision with a width of 1 mm must be made to cut the coating down to the metal. The test must be carried out on three extruded sections of AA 6060 or AA 6063.

REQUIREMENTS:

An infiltration of max. 16 mm² is allowed over a scratch length of 10 cm but the length of any single infiltration must not exceed 4 mm.

The inspector takes three samples of different sections from different lots. The results are classified according to the scale below:

- A. 3 samples satisfactory = 0 sample unsatisfactory
- B. 2 samples satisfactory = 1 sample unsatisfactory
- C. 1 sample satisfactory = 2 samples unsatisfactory
- D. 0 sample satisfactory = 3 samples unsatisfactory

Rating :

	APPROVAL	LICENCE
A	Satisfactory	Satisfactory
B	Satisfactory	Satisfactory with a comment to the coating plant
C	Unsatisfactory	Repetition of the acetic acid salt spray resistance test. If the result of this second test is A or B, the inspection is satisfactory, otherwise it is unsatisfactory.
D	Unsatisfactory	Unsatisfactory

2.11. Machu test

(Accelerated corrosion test, on sections only)

Before immersion, a cross-cut incision with a width of 1 mm must be made to cut the coating down to the metal.

Test solution :

- NaCl : 50 ± 1 g/l
- CH₃COOH (Glacial) : 10 ± 1 ml/l
- H₂O₂ (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 (H₂O₂ 30%) should be added and the pH adjusted with glacial acetic acid or caustic soda. A new solution must be prepared for each test.

REQUIREMENTS:

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

2.12. Accelerated weathering test

EN ISO 11341:1997

Luminous intensity : 550 ± 20 W/m² (290 - 800 nm)

Black standard temperature : $65 \pm 5^{\circ}\text{C}$
 Demineralised water: maximum 10 μS
 Special UV filter (290 nm)

Cycles of 18 minutes in a wet medium and 102 minutes in a dry medium.

After 1000 hours exposure, the samples should be rinsed with fully demineralised water and checked for:

- Gloss variation: ISO 2813:1994
angle of incidence 60°
- Colour change: ΔE CIELAB formula according to ISO 7724/3, with gloss.

3 colour measurements are to be made on the weathered sample and on the unexposed reference sample.

REQUIREMENTS:

Gloss retention: the loss of gloss after the accelerated weathering test must not be greater than 50% of the original value, or 10% for Class 2 powders.

Colour change: according to the ΔE values stipulated in the annexed table. For Class 2 powders, the colour change ΔE must not be greater than 50% of the limits prescribed in the annexed table (see appendix A7).

2.13. Natural weathering test

Exposure in Florida according to ISO 2810:1974.

The test must start in April.

The samples must be exposed to the elements facing 5° south for 1 year; Class 2 powders must be exposed for 3 years with an annual evaluation.

For Class 2 approvals, 10 test panels per colour shade are required (3 per year for weathering and 1 reference panel), while 4 panels per colour shade are required for the other coating systems (3 for weathering and 1 reference panel).

Dimensions of the samples: approx. 100 x 305 x 0.8 - 1 mm

After exposure, the exposed samples are to be cleaned using the following method :

Immersion in demineralised water with a 1% surface-active agent for 24 hours, then cleaning by wiping with a soft sponge soaked with an aqueous solution of a 1% surface-active agent, applying gentle pressure, or using any other method approved by the Technical Committee. This process must not scratch the surface.

The gloss is to be measured according to ISO 2813:1994, at an angle of 60° .

The average is taken from the colorimetric measurements. The conditions for measurement and colorimetric evaluation are:

- Colour variation: ΔE CIELAB formula according to ISO 7724/3, with gloss.
- The colorimetric evaluation must be made for the standard illuminant D65 and the ten-degree normal observer.

To determine the gloss and colour, three measurements will be made on the cleaned, weathered samples and on the unexposed reference panels. These measurements are to be made at different points at least 50 mm apart.

REQUIREMENTS:

Gloss

The residual gloss must be at least 50% of the original gloss.

The following values apply to Class 2 powders:

- after 1 year in Florida : at least 90%
- after 2 years in Florida : at least 75%
- after 3 years in Florida : at least 50%

Colour change

The ΔE values must not exceed the max. values prescribed in the annexed table.(see appendix A7).

The following values apply to Class 2 powders:

- After 1 and 2 years : not greater than 50% of the limits prescribed in the table.
- After 3 years : within the limits prescribed in the table

2.14. Polymerisation test

Prescribed solvent for liquid coatings: MEC or as specified by the paint or lacquer manufacturer and approved by the Technical Committee.

Prescribed solvent for powder coatings: xylene or as specified by the paint or lacquer 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.

The polymerisation quality is assessed according to the following ratings:

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

REQUIREMENTS:

Ratings 3 and 4 are satisfactory.

Ratings 1 and 2 are unsatisfactory.

For powder coatings, this test is optional in in-house control; it is merely indicative and cannot alone cast doubt upon the quality of the coating.

2.15. Resistance to mortar

The test must be performed according to the **ASTM D 3260:1996** standard. The mortar should be made of sand, lime and water. This represents type N according ASTM C 207:1997. The testing time is 24 hours.

REQUIREMENTS:

The mortar must be easy to remove without leaving any residues. Any mechanical damage to the coating caused by grains of sand should be disregarded.

2.16. Resistance to boiling water

Method 1 with boiling water:

2 hours in boiling, demineralised water (maximum 10 µS at 20°C). Remove the sample and allow it to cool down to room temperature. Apply an 18 mm wide strip of Scotch 610, Permacel 99 or equivalent adhesive tape to the surface, ensuring that no air is trapped. After one minute, remove the tape at an angle of 45° with a sharp even pull.

Method 2 with a pressure cooker :

(to be used for powder and electrophoretic coatings only)

Add demineralised water (maximum 10 µS at 20°C) to a pressure cooker with an internal diameter of about 200 mm to a depth of 25 mm and place a test sample measuring 50 mm in it.

Place the lid in position and heat the pressure cooker until steam escapes from the valve. The weighted needle valve must be adjusted to produce an internal pressure of 100 +/- 10 kPA (1 bar). Continue heating for 1 hour, timing from the moment when steam first escapes from the valve. Cool the pressure cooker, remove the sample and allow it to cool down to room temperature.

Apply an 18 mm wide strip of Scotch 610, Permacel 99 or equivalent adhesive tape to the surface, ensuring that no air is trapped. After one minute, remove the tape at any angle of 45° with a sharp even pull.

REQUIREMENTS:

There must not be any defects or detachment . Some colour change is acceptable.

2.17. Constant climate condensation water test

DIN 50017 : 1982.

A cross-cut incision with a width of at least 1 mm must be made to score the coating down to the metal. The test lasts 1000 hours.

REQUIREMENTS:

No blistering visible to the naked eye; the maximum infiltration at the cross is 1 mm.

2.18. Sawing, milling and drilling

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

REQUIREMENTS:

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

Chapter 3

Work Specifications

3. Work Specifications

3.1. Storage of the parts to be treated and layout of equipment

The layout of the equipment should be designed to avoid any form of contamination. The parts to be treated must either be stored in a separate room or at least a good distance away from the processing baths. They must also be protected against condensation and dirt.

3.2. Pre-treatment for powder and liquid coatings

3.2.1 Etching

An initial aluminium etching stage must be carried out for all pre-treatments for powder and liquid coatings.

This etching stage carried out in an acid medium or an alkaline plus acid medium must result in an aluminium etching degree of at least 1g/m^2 for extruded sections made of alloys AA 6060 or AA 6063. The etching degree is not specified for rolled products or castings. Etching is optional for such products.

The etching degree is measured by taking the difference in the weight of a test sample before and after the etching stage. If a sample cannot be taken (for example, vertical lines), the method used to test the etching degree will have to be defined by common consent with the national association or directly with QUALICOAT.

3.2.2 Chromate Pre-treatment

This chromate or chromate-phosphate pre-treatment must be carried out according to **DIN 50939:1988**.

The conductivity of the final rinse preceding chromate treatment must be less than or equal to $1000\ \mu\text{S/cm}$, and is to be checked by inspector.

Demineralised water must be used for the final rinse after chromate treatment before drying. The conductivity of the dripping water must not exceed a maximum of $30\ \mu\text{S/cm}$ at 20°C . The conductivity should only be measured for open sections and not for hollow sections.

The weight of the chromate conversion layer must be between 0.6 and $1.2\ \text{g/m}^2$ for chromate treatment (yellow) and between 0.6 and $1.5\ \text{g/m}^2$ for chromate-phosphate treatment (green).

Pre-treated parts must not be stored for more than 16 hours. As a rule, they should be coated immediately after pre-treatment. The risk of insufficient adhesion increases the longer the parts are stored.

Pre-treated parts must never be stored in an atmosphere that is dusty and detrimental to them. Good atmospheric conditions must always be maintained in the storage area. All workers handling pre-treated parts must wear clean textile gloves to avoid contamination of the surface.

The parts must be dried at the following temperatures :

chromate treatment (yellow) : maximum 65°C

chromate-phosphate treatment (green): maximum 85°C

The maximum drying temperature allowed for continuous treatment is 100°C. The specified temperatures apply to the temperature of the metallic parts and not to the air temperature. The products must be dried thoroughly before the coating is applied, irrespective of the production method (continuous/ discontinuous).

3.2.3 Anodic pre-treatment

The aluminium surface must be treated to eliminate all impurities that could pose problems in the anodising.

The anodising conditions must be chosen so as to produce a film with a thickness of at least 3 µm (not more than 8 µm) without powdering and without surface flaws.

The anodising parameters can be as follows:

- Acid concentration (sulphuric acid) : 180-220 g/l
- Aluminium content : 5-15 g/l
- Temperature : 20-30°C ($\pm 1^\circ\text{C}$ of the temperature chosen by the coater)
- Current density : 0.8-2.0 A/dm²
- Agitation of the electrolyte

After anodising, the aluminium must be rinsed with demineralised water (conductivity less than 30 µS/cm at 20°C) for as long and at such a temperature (less than 60°C) as is required to remove the acid from the pores.

Pre-treated parts must not be stored for more than 16 hours. As a rule, they should be coated immediately after pre-treatment. The risk of insufficient adhesion increases the longer the parts are stored.

Plants using this type of pre-treatment must perform the following additional tests :

Anodising bath:

- the acid concentration and aluminium content must be analysed every 24 hours of operation
- the temperature must be checked 1 hour after anodising starts, then every 8 hours.

Testing of the coated finished products:

- Before application, each coating (of a system or supplier) must be tested for resistance to boiling water, followed by an adhesion test (see section 2.4).

- During application, resistance to boiling water should be tested, followed by an adhesion test every 4 hours.

Coating plants which decide to use such treatments must inform their national association, or QUALICOAT if there is not a national association.

3.2.4 Alternative pre-treatments

Alternative pre-treatments are treatments other than the pre-treatments described above.

Such alternative pre-treatments may not be used until they have been approved by QUALICOAT, following a test programme.

Coating plants which decide to use such treatments must inform their national association, or QUALICOAT if there is not a national association. The coating plants and suppliers must comply with the special specifications set out in Appendix A6.

3.3. Pre-treatment for electrophoretic coatings

All parts to be coated must be cleaned by adapted treatment in an alkaline or acid solution. The cleaned surfaces must be rinsed in fully demineralised water with a maximum conductivity of 30 μ S at 20°C prior to coating. The surfaces must be wettable with water.

The parts must be coated immediately.

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

3.4. Stoving

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

All coatings must be stoved immediately after application. The oven must bring the metallic parts to the required temperature and maintain them at that temperature for the whole length of the stoving time.

The temperature of the metallic parts and the stoving time must match the values recommended in the manufacturer's technical specifications.

It is recommended to keep the difference in temperature between the coldest and hottest sections of the treated parts below 20°C.

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

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

3.5. Laboratory

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

- 1) specular glossmeter
- 2) 2 instruments for measuring coating thickness
- 3) 1 analytical balance (precision 0.1 mg)
- 4) cutting tools and instruments necessary for performing the adhesion test
- 5) instrument for measuring indentation hardness
- 6) apparatus for testing adhesion and elasticity (cupping test)
- 7) impact tester
- 8) recorder for stoving temperature and time with four different measuring points, three on the parts and one to measure the air temperature.
- 9) conductivity meter
- 10) apparatus for testing resistance to cracking on bending
- 11) test solution and material for the Machu test
- 12) test solutions for the polymerisation test

Each piece of apparatus must have a data sheet showing the apparatus identification number and calibration checks.

3.6. In-house control

Coating plants holding the quality label are obliged to monitor their production processes and inspect their finished products in accordance with chapter 6.

Chapter 4

Approval of Coatings

4. Approval of Coatings

The powder and liquid coatings used in quality label coating must be approved before they may be used.

When a two-coat system (primer and coloured topcoat) approved by QUALICOAT is used, the coating plant may apply either a Class 1 or Class 2 topcoat on the approved primer. It is not necessary to have two systems approved. However the two system components used by the coating plant must originate from the same supplier.

It is not permissible to apply a second coat for systems that are intended and approved for the application of one coat.

Any modification of the chemical properties of the binder (resin(s) and/or hardening agent(s)) is tantamount to a new product and absolutely requires a new QUALICOAT approval (see Appendix A3). Furthermore, if the physical appearance of the final coating is modified, the powder manufacturer must obtain a specific QUALICOAT approval and may not use the approval granted for a smooth coating (see appendix A3).

4.1. Granting of an approval

In order for an approval to be granted for a powder and/or family of powders or a paint or lacquer and/or family of paints or lacquers, the following tests must be made:

- 1) Gloss (2. 2)
- 2) Coating thickness (2.3)
- 3) Adhesion (2.4)
- 4) Indentation (2.5)
- 5) Cupping test (2.6)
- 6) Bend test (2.7)
- 7) Impact test (2.8)
- 8) Resistance to humid atmospheres (2.9)
- 9) Acetic acid salt spray resistance (2.10)
- 10) Accelerated weathering test (2.12)
- 11) Polymerisation test (2.14)
- 12) Resistance to mortar (2.15)
- 13) Resistance to boiling water (2.16)
- 14) Condensation water test (2.17)
- 15) Natural weathering (Florida) (2.13)

The tests must be made on three test panels (for mechanical tests) and on three sections (for corrosion tests) coated by a laboratory approved by the Executive Committee. The average of the three samples will be taken to determine the results.

The following colours must be tested in triplicate

white	RAL 9010
blue	RAL 5010
red	RAL 3005

and a metallized shade, if available (see Appendix A4).

The inspector prepares the test panels in the testing laboratory using the coating materials supplied by the manufacturer and performs the above tests on them. The test panels may also be coated elsewhere provided that the inspector is present during the whole time of treatment. The inspector must always select the minimum stoving time and temperature specified by the manufacturer.

The inspector submits the inspection report to the general licensee.

The inspection reports are assessed by the general licensee. Under the supervision of QUALICOAT, the general licensee decides whether or not to grant an approval.

- If the results of tests 1 to 14 meet the requirements, the approval will be granted.
- If the results of the testing do not meet the requirements, the manufacturer of the tested product will be informed that no approval can be granted for the time being, stating the details and reasons.
- The manufacturer must wait at least three months before having tests 1 to 14 repeated.
- The approval will be confirmed if the results of the natural weathering test (Florida) are satisfactory. The approval will be withdrawn if the results are unsatisfactory.

4.2. Renewal of approved systems

The consistency of the quality of the approved paint, lacquer and powder systems will be checked annually by performing tests 1 to 15 (see section 4.1) with two colours every year. Each year two different colours that have not been tested before are to be used for the tests. One more colour must be a metallized shade, if one is produced. Each year QUALICOAT specifies the colours to be tested.

There are three options for sampling systems to be tested for renewal of approvals:

- The inspector takes samples of the required colours during routine inspections at the coating plants.
- The inspector takes samples directly at the system supplier's premises.
- The supplier sends samples of the colours to the inspector. In countries where there is neither a national association nor a testing laboratory, the coating suppliers must send the selected colours to a laboratory approved by QUALICOAT.

The inspector submits the inspection report to the general licensee.

The inspection reports are assessed by the general licensee. Under the supervision of QUALICOAT, the general licensee decides whether to renew or withdraw the approval.

- If the results of tests 1 to 14 do not meet the requirements, tests 1 to 14 must be repeated within one month, using samples taken from a different lot, before submission to the Florida test.
- If the results of this second series of tests are again unsatisfactory, the system will remain approved except for the colour(s) which produced unsatisfactory results.
- If the results of tests 1 to 14 are satisfactory, the natural weathering test in Florida will be started. Should one or two of the colours tested each year produce an unsatisfactory result, the system in question will remain approved with the exception of those unsatisfactory colours.

QUALICOAT will publish a list of all colours (currently) banned.

The suppliers may have the excluded colours tested again. However, as soon as three unsatisfactory colours are registered for any one system, the supplier must submit the three basic colours for another series of QUALICOAT tests. If one of the basic colours produces an unsatisfactory result, the approval will be cancelled.

An approval will also be withdrawn if more than five unsatisfactory colours are registered.

4.3. Use of the logo by coating manufacturers

The use of the logo must comply with the Regulations for use of the QUALICOAT quality label (Appendix A1).

Chapter 5

Licensing of Coating Plants

5. Licensing of Coating Plants

This chapter does not apply to decoration licences. The procedures for granting and renewing a QUALICOAT decoration licence are set out in appendix A2.

5.1. Granting of a licence (quality label)

At least two inspections must be made before a licence is granted. These inspections are to be made at the coater's request but without prior notice in accordance with the inspection form prepared by QUALICOAT and should include the following:

5.1.1 Inspection of laboratory equipment

As specified in section 3.5 to ensure that the equipment is available and functional.

5.1.2 Inspection of plant and equipment

According to sections 3.1 and 3.4.

5.1.3 Inspection of pre-treatment

According to section 3.2 or 3.3.

5.1.4 Inspection of finished products

Certain tests may be carried out on the finished products themselves but the full range of tests must be performed on test panels processed concurrently with a production lot (see section 5.1.5).

Only parts which have been released by the plant inspector are to be tested (all parts ready for dispatch are deemed to have been released by the plant inspector).

The samples for measuring coating thickness are to be taken according to the table below; a minimum of 30 parts must be tested in every case.

Lot size (°)	Number of samples (random selection)	Acceptance limit for rejected samples
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: 1 lot represents a customer's complete order in one colour or that part of the order which is in the coating plant.

The inspector must perform the following tests on the coated parts:

- Appearance (to test the uniformity of production) (2.1)
- Coating thickness (2.3)
- Adhesion (2.4)
- Indentation (2.5)
- Acetic acid salt spray test (2.10)
- Machu test (2.11)
- Polymerisation (2.14)
- Sawing test (2.18)

During the first inspection, the Machu test is carried out prior to the acetic acid salt spray test. If the result of the Machu test is satisfactory, the acetic acid salt spray test will then be performed. However, if the result of the Machu test is unsatisfactory, the first inspection will be considered unsatisfactory and must be repeated. The inspection is satisfactory when the acetic acid salt spray test has been passed.

In the second inspection, only the Machu test will be carried out. If the result of the Machu test is unsatisfactory, the second inspection must be repeated.

5.1.5 Inspection of the test panels

The full range of tests must be performed on test panels processed concurrently with a production lot.

- Gloss (2.2)
- Coating thickness (2.3)
- Adhesion (2.4)
- Indentation (2.5)
- Cupping test (2.6)
- Bend test (2.7)
- Impact test (2.8).

5.1.6 Examination of registers

The inspector must check that the coating plant maintains a control register and that the results recorded in the register coincide with the results of the test panels. For this reason, all test panels must be kept and held at the inspector's disposal for one year.

5.1.7 Final assessment for granting the licence

The inspector submits the inspection report to the general licensee.

The inspection reports are assessed by the general licensee. Under the supervision of QUALICOAT, the general licensee decides whether or not to grant a licence.

- If the results of both inspections meet the requirements, a licence to use the quality label will be granted.
- If the results of one of the two inspections 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 all details and reasons. The coater must wait three months before making a new application for a licence to use the quality label.

5.2. Routine inspections of licensees

After a plant has been granted a licence to use the quality label, it will be inspected at least twice but no more than five times a year. Routine inspections must be made without prior notice and must include:

- Inspection of laboratory equipment as described in 3.5.
- Inspection of pre-treatment as described in 3.2 or 3.3.
- Inspection of finished products as described in 5.1.4 and inspection of test panels as specified in 5.1.5.
- An acetic acid salt spray test to be carried out at least once a year.
- A check that the coating plant maintains a control register and that the results recorded in the register coincide with the results of the test panels. For this reason, all test panels must be kept and held at the inspector's disposal for one year.
- The coating plant must check the accuracy of the oven's temperature indicator or have it checked at least twice a year. The results of this check are to be entered in a special register which is to be presented to the inspector when he makes the routine inspections.

The inspector submits the inspection report to the general licensee.

The inspection reports are assessed by the general licensee. Under the supervision of QUALICOAT, the general licensee decides whether to renew or withdraw the licence.

- 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 must be made within one month (allowing for holiday periods).
- If the second inspection again produces unsatisfactory results, the licence to use the quality label will be withdrawn immediately. The coating plant must wait at least three months before making a new application for a licence to use the quality label.

5.3. Use of the logo by coaters

The use of the logo must comply with the Regulations for use of the QUALICOAT quality label (Appendix A1).

Chapter 6

Specifications for In-House Control

6. Specifications for In-House Control

6.1. Testing the parameters

6.1.1 Pre-treatment baths

The chemical elements defined by the supplier of the pre-treatment products must be analysed **at least**:

once a day (24 hours) per bath.

The coater must increase the frequency of the analyses of his own accord if it proves necessary on account of the analyses made.

The results of these analyses must be entered in charts or some other record (register) readily accessible to the inspector. They must show the nominal values, maximum values not to be exceeded, actual values recorded and the number of shifts worked. A separate record must be kept for each bath.

If necessary, any corrective measures must be noted on the chart opposite the date of the analysis. If not, they must be recorded in the register.

6.1.2 Water Quality

The conductivity of the final rinsing preceding chromate bath and of the demineralised rinsing water must be measured **at least**:

once a day (24 hours)

The coater must increase the frequency of the analyses of his own accord if it proves necessary on account of the analyses made.

The results of these analyses must be entered in charts or some other record (register) readily accessible to the inspector. They must show the nominal values, maximum values not to be exceeded, actual values recorded and the number of shifts worked.

6.1.3 Measuring the temperature of pre-treatment and rinsing baths

The temperature of the pre-treatment baths and the final rinse, if a hot water rinse, must be measured **at least**:

once a day (24 hours) per bath

The results of these measurements must be entered in charts or some other record (register) readily accessible to the inspector. They must show the nominal values, maximum values not to be exceeded, actual values recorded and the number of shifts worked.

6.1.4 Measuring the drying temperature

The drying temperature must be measured **at least**:

once a week

The temperature on the workpiece and, simultaneously, the temperature displayed on the visual display unit must be read and recorded.

The temperature should be measured using a recording instrument or some other means such as thermochromic pencils or tablets.

The results of these measurements should be recorded and retained and the drying curves classified on some record (register) readily accessible to the inspector.

6.2. Quality control in the production process

6.2.1 Testing the etching degree

The degree of aluminium removal during the etching stage must be tested at least once a week using the method described in section 3.2.1 on extruded sections made of alloy AA 6060 or AA 6063.

6.2.2 Testing the weight of the conversion coating (DIN 50939)

The weight of the conversion coating must be tested in accordance with DIN 50939, table 4, method 1, **at least**:

once a day (24 hours)

using the testing method described in section 3.2.2.

6.2.3 Testing the stoving conditions

The stoving conditions according to section 3.4 must be tested **at least**:

- twice in every 24 hours: the displayed temperature must be recorded
- once a week: a stoving curve must be made
- once a month: a stoving curve must be made for a small section (cover-strip type) and a large section (curtain wall type).

The results of these tests should be recorded and retained and the stoving curves classified on some record (register) readily accessible to the inspector.

6.3. Quality control of the finished products

6.3.1 Gloss test (ISO 2813)

The gloss of the coating on finished products and sample panels must be tested **at least** once in every 8-hour work shift for each colour shade and each supplier.

The results of these analyses must be entered in some record (register) readily accessible to the inspector, showing the nominal values, maximum values not to be exceeded, the actual values recorded and the number of work shifts.

6.3.2 Coating thickness test (EN ISO 2360)

The coating thickness must be measured on at least as many samples as specified below:

Lot size (')	Number of samples (random selection)	Acceptance limit for rejected samples
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.*

The results of these measurements (minimum and maximum values) must be entered and retained on some record readily accessible to the inspector.

6.3.3 Appearance test

Lot size (')	Number of samples (random selection)	Acceptance limit for rejected samples
1 - 10	All	0
11 – 200	10	0
201 – 300	15	0
301 – 500	20	0
501 – 800	30	0
801 – 1'300	40	0
1'301 – 3'200	55	0
3'201 – 8'000	75	0
8'001 – 22'000	115	0
22'001– 110'000	150	0

* lot : *a customer's complete order in one colour or the part of the order that has already been coated*

The results of these measurements must be entered and retained on some record readily accessible to the inspector.

6.3.4 Adhesion test (EN ISO 2409)

The adhesion must be tested on sample panels **at least** once in every 8-hour work shift for each colour shade and gloss category and for each supplier.

The results must be entered and retained on some record readily accessible to the inspector.

6.3.5 Indentation (EN ISO 2815)

The indentation test must be carried out on sample panels **at least** once in every 8-hour work shift for each colour shade and gloss category and for each supplier.

The results must be entered and retained on some record readily accessible to the inspector.

6.3.6 Polymerisation test

This test is used to check that the coating polymerisation is good. In in-house control, this test is **optional for powder coatings**.

The polymerisation test must be carried out on sample panels at least once in every 8-hour work shift for each colour shade and gloss category and for each supplier.

The results must be entered and retained on some record readily accessible to the inspector.

6.3.7 Cupping test (EN ISO 1520)

The cupping test must be carried out on sample panels **at least** once in every 8-hour work shift for each colour shade and gloss category and for each supplier

The results must be entered and retained on some record readily accessible to the inspector.

6.3.8 Bend test (EN ISO 1519)

The resistance to cracking on bending must be tested on sample panels at least once in every 8-hour work shift for each colour shade and gloss category and for each supplier.

The results must be entered and retained on some record readily accessible to the inspector.

6.3.9 Impact test (ASTM D 2794)

The impact test must be carried out on sample panels **at least** once in every 8-hour work shift for each colour shade and gloss category and for each supplier

The results must be entered and retained on some record readily accessible to the inspector.

6.3.10 Machu test

The Machu test must be carried out **at least** once a week

The results must be entered and retained on some record readily accessible to the inspector.

6.4. Quality control registers

6.4.1 Control register for the production process

This register is to be maintained by the laboratory supervisor.

It is either a bound register (not a spiral binding) with numbered pages, or a computer listing

It must show the following information:

- the temperature of the baths,
- the chemical parameters specified by the suppliers,
- the results of the etching degree test,
- the results of the tests of the conversion coating weight,
- the results of the water conductivity tests,
- the results of the tests of the drying and stoving conditions.

General remark: the drying and stoving temperature curves must be archived

6.4.2 Control register for sample panels

This register is to be maintained by the laboratory supervisor.

It is either a bound register (not a spiral binding) with numbered pages, or a computer listing.

It must show the following information:

- the production date
- the references of the powder used: RAL or some other reference for identification, lot number, producer's name
- the results of the tests:
 - gloss test,
 - thickness test,
 - adhesion test,
 - indentation test,
 - polymerisation test (optional for powder coatings),
 - cupping test,
 - bend test,
 - impact test,
 - Machu test,
 - colour shade inspection (visual inspection to compare colour with the colour shade required by the customer).

6.4.3 Control register for finished products

This register is to be kept at the end of the production line.

It is either a bound register (not a spiral binding) with numbered pages, or a computer listing.

It must show the following information

- the customer's name and the order or lot identification data,
- the production date,
- the reference of the powder used,
- the results of the tests:
 - coating thickness test,
 - inspection of the colour shade and its gloss
 - appearance

6.5. Table summarising the specifications for In-House Control

Object tested		Minimum frequency	Results to be recorded in:
Pre-treatment baths, degreasing, pickling, chromating, rinsing	Chem. parameters	Once a day (24 hours) per bath	Chart or register
	Temperature	Once a day (24 hours) per bath	Chart or register
Conductivity of the water		Once a day (24 hours)	Chart or register
Temperature of pre-treatment and rinsing baths		Once a day (24 hours) per bath	Chart or register
Etching degree		Once a week	Chart or register
Drying temperature		Once a week	Chart or register
Weight of the conversion coating		Once a day (24 hours)	Chart or register
Stoving conditions		Twice a day: record the displayed temperature Once a week: make 1 stoving curve Once a month: make 1 curve for small and large sections	Chart or register
Gloss		Once in every 8-hour work shift for each shade and supplier	Chart or register
Coating thickness		According to the lot size of the order	Chart or register
Appearance		According to the lot size of the order	Chart or register
Adhesion		Once in every 8-hour work shift for each shade and supplier	Chart or register
Indentation		Once in every 8-hour work shift for each shade and supplier	Chart or register
Polymerisation (optional for powder coatings)		Once in every 8-hour work shift for each shade and supplier	Chart or register
Cupping test		Once in every 8-hour work shift for each shade and supplier	Chart or register
Bend test		Once in every 8-hour work shift for each shade and supplier	Chart or register
Impact test		Once in every 8-hour work shift for each shade and supplier	Chart or register
Machu test		Once a week	Chart or register

Appendices

Appendices

A1 – Regulations for use of the QUALICOAT quality label for paint, lacquer and powder coatings on aluminium for architectural applications

1. Definitions

For the purposes of these regulations, the QUALICOAT "Quality Label" denotes the trademark registered by the Association for Quality Control in the Lacquering, Painting and Coating Industry (QUALICOAT), Zurich, with the Federal Patent and Trademark Office on 8 May 1987 under trademark no. 352 316 and in the International Trademark Register on 14 August 1987 under no. 513 227 and published in the Swiss Official Gazette of Commerce on 5 May 1987

"QUALICOAT" means the Association for Quality Control in the Lacquering, Painting and Coating Industry, Zurich

"GL" means the General Licensee of a country.

"Licence" is a statement issued by or on behalf of the Association authorising the holder to use the Quality Label in accordance with these regulations.

"Specifications" are the "Specifications for a Quality Label for Paint, Lacquer and Powder Coatings on Aluminium for Architectural Applications".

"Holder" is the company authorised to use the Quality label.

2. Ownership of the Quality Label

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

QUALICOAT has granted to the GL a general licence in respect of the Quality Label for (country) with powers to authorise the use of the Quality Label in accordance with these regulations.

3. Qualifications of applicant

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 or approval entitles the Holder to use the Quality Label for the products specified. The licence or approval may not be transferred.

4. Register of holders

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 Holder, the date on which the licence or approval was granted to the Holder, the number assigned to each Holder, the date of withdrawal of the licence or approval 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.

5. Use of the logo by coaters and suppliers

5.1 Use in general

The logo exists in black and white, in white and blue (PANTONE Reflex Blue CV; RGB: 14-27-141; CMYK: 100-72-0-6) and in blue and silver (PANTONE Silver 877u; RGB: 205-211-215; CMYK: 8-3-3-9).

The words "Quality Label for Architectural Coating on Aluminium" (or a text appropriate to national legal requirements) may be added in the space to the right.



The Holder may not make any alteration or addition to the logo when using it. In the event that the Holder's own brands or trademarks are used separately on or in connection with his products, these regulations may not be infringed in any manner whatsoever. Holders of an approval or licence shall at any time provide the GL with all information required as to the use of the logo.

Improper use of the logo may lead to the sanctions stipulated in § 9.

5.2 Use of the logo by coaters

By applying the logo to a product, the coating plant guarantees that the quality of the product supplied meets all the requirements of the Specifications.

If a licence holder operates more than one coating plant and not all these plants are authorised to use the quality label, the quality label may only be used by the authorised plants.

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



Licence n° xxxxx

5.3 Use of the logo by suppliers (coating manufacturers and manufacturers of alternative pre-treatment systems)

The QUALICOAT logo must not appear on packaging or labels. Only the approval number (P-XXXX) of the packed product should be shown.

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

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

6. Other conditions for use of the logo

Some businesses using coated products may wish to use the logo on their finished products or business literature.

They must request written authorisation which may be granted on condition that they:

- ◆ undertake to use solely aluminium products coated by licensed coating plants;
- ◆ undertake to submit all documents that refer to QUALICOAT to the national associations for approval or directly to QUALICOAT in countries where there is no national association;
- ◆ undertake to undergo inspections and controls by the national associations or QUALICOAT.

Such authorisation may require payment of an annual fee.

7. Conditions for granting and renewing approvals and licenses

As stipulated in chapter 4 for coating manufacturers.

As stipulated in chapter 5 for coaters.

As stipulated in Appendix A6 for manufacturers of chemicals

As stipulated in Appendix A2 for decorators.

The granting of an approval or licence shall require payment of an annual fee.

8. Withdrawal of approvals and licences

8.1 Failure to comply with the Regulations

The GL shall withdraw the approval or licence if the Holder ceases to comply with these regulations and in particular if the Holder is guilty of any improper use of the Quality Label or has failed to pay the annual fee.

In the event of withdrawal of an approval or licence, the Holder 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 approval or licence is granted.

8.2 Significant changes in a company

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

If the Holder 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.

8.3 Voluntary withdrawal

In the event of voluntary withdrawal of an approval or 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 approval or 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 national association:

1. *official statement*
2. *reprimand*
3. *withdrawal of the label*

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.

10. Amendments to the Regulations

These Regulations may be amended if and when necessary. However, the Holder of the label shall be allowed 4 months from the date of publication in which to comply with any such amendment.

11. Notices

Any notice required to be given to or by the Holder under these regulations shall be effective if sent by correctly stamped and addressed letter.

A2 – Specifications for Decoration

1. Purpose of the Specifications

Due to continuous research to develop new finishes, widening the field of applications for coated aluminium, it is important to define evaluation criteria in order to judge compliance with the specifications and laws now in force.

New technologies producing special finishes (such as wooden effect), called decorations, have been developed. Different kinds of technology have been established. They are based for example on the transfer of images on coated supports, or on a powder on powder application using suitable technologies.

The object of the following procedure is to ensure constant control of the finished product so that a QUALIDECO licence can be granted for external use.

The procedure does not include process tests because the technology is patented.

2. Steps for granting and renewing a QUALIDECO licence

2.1 Preliminary conditions

The company which performs the coating cycle must hold the QUALICOAT quality label to guarantee that it applies the coating under the best conditions and has the equipment for the tests.

The powder coating must be approved by QUALICOAT.

2.2 Work Specifications

2.2.1 Stoving

To obtain decorated finishes, it is necessary to have a stoving process that operates with a system to check the metal temperature, under the conditions prescribed by the supplier of the decoration system.

2.2.2 Laboratory

The decorator must at least be equipped with the following apparatus:

- ◆ specular glossmeter
- ◆ instrument for measuring coating thickness

2.2.3 In-house control

The decorator is obliged to monitor the production processes and inspect the decorated products in accordance with the following procedure:

◆ **Incoming materials control**

The decorator must have a register showing all data concerning the material received and to be decorated (date, lot, coater, coater’s licence, powder supplier, approval number of the powder, basic colour).

All the coated material must be delivered with a certificate of conformity. This certificate must be archived by the decorator.

◆ **Gloss test (ISO 2813)**

The gloss of the coating on decorated products must be tested for every lot (one lot represents a customer's complete order in one colour or that part of the order which is in the coating plant).

The results of these analyses must be entered in some record (register) readily accessible to the inspector, showing the nominal values and the range.

◆ **Coating thickness test (EN ISO 2360)**

The coating thickness must be measured on at least as many samples as specified below:

Lot size (')	Number of samples (random selection)	Acceptance limit for rejected samples
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

The results of these measurements (minimum and maximum values) must be entered and retained on some record readily accessible to the inspector.

2.3 Granting a QUALIDECO licence

The decorator has to submit for test every decoration for which it asks for a licence. By decoration we mean one aspect in one colour connected with an approved powder system designated by name.

Before a licence is granted, it is necessary first to carry out the laboratory tests to approve the decoration and second, to carry out an inspection.

2.3.1 Laboratory tests

The following tests have to be performed on samples taken from a production lot for architectural application. For the first three tests, the limits are the same as stipulated in the chapter 2 of the QUALICOAT Specifications.

- **Gloss** (Specifications, 2.2.)
- **Coating thickness** (Specifications 2.3)
- **Resistance to humid atmospheres containing sulphur dioxide** (Specifications 2.9.)

- **Accelerated weathering test** (Specifications 2.12.)

Even though the colour is not uniform, it is still possible to measure the colour change with instrumental apparatus. In this case a provisional limit can be Delta E (see definition in QUALICOAT Specifications, 2.12) = 2 for light base and 3 for dark base. In every case the final evaluation is based on visual inspection.

- **Light fastness test**

This test must be performed according to ISO 105/B 02:1988 with a minimum value of 7 on the blue scale.

- **Florida test**

The test must be carried out in the same condition as prescribed by QUALICOAT specifications. The acceptable limits provisionally are the same stipulated in accelerated test. The samples for the Florida test should be prepared from sections of the daily production.

2.3.2 Inspection (see § 3.test report)

The inspection includes the following :

- **Inspection of plant and equipment**

According to § 2.2.1.

- **Inspection of laboratory equipment**

As specified in § 2.2.2 to ensure that the equipment is available and functional.

- **Inspection of decorated products**

The inspector must perform the following tests on the decorated parts :

- Appearance (Specifications, 2.1)
- Gloss (Specifications, 2.2.)
- Coating thickness (Specifications 2.3)

- **Examination of registers**

The inspector must check that the plant maintains a control register (see § 4 Check-list for in-house control).

The inspector submits the inspection report to the general licensee.

The inspection reports are assessed by the general licensee. Under the supervision of QUALICOAT, the general licensee decides whether or not to grant a QUALIDECO licence.

If the results meet the requirements, a QUALIDECO licence will be granted.

If the results do not meet the requirements, the decorator will be informed that the QUALIDECO licence cannot be granted for the time being, stating all details and reasons. The decorator must wait at least three months before making a new application for a licence to use the quality label.

2.4 Renewal of the QUALIDECO licence

2.4.1 Laboratory tests

In order for a licence to be renewed, two decorations selected either by the General Licensee or by QUALICOAT will be tested every year.

The tests are the same as for the granting of the QUALIDECO licence.

If the results of one test for one decoration do not meet the requirements, the test must be repeated.

If the results of the test are again unsatisfactory, the decoration is not valid.

2.4.2 Inspection

After a plant has been granted a QUALIDECO licence, it will be inspected once a year according to § 2.3.2.

The business records must also be examined in order to check that the QUALIDECO licence is only used for approved decorations.

The inspector submits the inspection report to the general licensee.

The inspection reports are assessed by the general licensee. Under the supervision of QUALICOAT, the general licensee decides whether to renew or withdraw the QUALIDECO licence.

- If the results of the inspection meet the requirements, the QUALIDECO licence will be renewed.
- If the results of the inspection do not meet the requirements, another inspection must be made within one month (allowing for holiday periods).
- If the second inspection again produces unsatisfactory results, the QUALIDECO licence will be withdrawn immediately. The decorator must wait at least three months before making a new application for a QUALIDECO licence.

3. Test report

An official test report can be obtained from the national association or directly from the QUALICOAT Secretariat.

4. Check-list for in-house control

See following page

5. Logo

5.1 Qualifications of Decorator

Authorisation to use the QUALIDECO logo may be granted on condition that the Decorator operates in accordance with the Specifications. This authorisation is governed by a contract.

The granting of a licence entitles the Decorator to use the logo for the products specified. The licence may not be transferred.

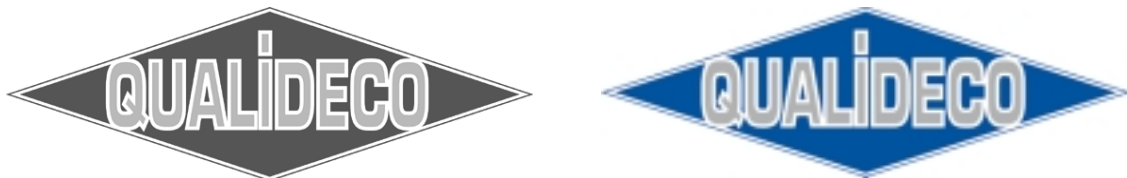
5.2 Register of Decorators

QUALICOAT shall keep a register showing the name, address and trade description of each Decorator, the date on which the licence was granted to the Decorator, the number assigned to each Decorator, the approved decorations, the date of withdrawal of the licence and any other information or details which QUALICOAT may deem necessary at any time.

The Decorator shall notify the General Licensee ("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.

5.3 Use of the logo

The logo exists in black and white, in white and blue (PANTONE Reflex Blue CV; RGB: 14-27-141; CMYK: 100-72-0-6) and in blue and silver (PANTONE Silver 877u; RGB: 205-211-215; CMYK: 8-3-3-9).



The Decorator may not make any alteration or addition to the logo when using it. In the event that the Decorator's own brands or trademarks are used separately on or in connection with his products, these regulations may not be infringed in any manner whatsoever. Holders of a QUALIDECO licence shall at any time provide the GL with all information required as to the use of the logo.

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

Improper use of the QUALIDECO logo may lead to the sanctions stipulated in § 5.5.

5.4 Withdrawal of licences

Failure to comply with the Regulations

The GL shall withdraw the licence if the Decorator ceases to comply with these regulations and in particular if the Decorator is guilty of any improper use of the logo or has failed to pay the annual fee.

In the event of withdrawal of a licence, the Decorator 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 logo 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 QUALIDECO licence is granted.

Significant changes in a company

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

If the Decorator 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 logo 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 QUALIDECO licence is granted.

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 logo 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 QUALIDECO licence is granted.

5.5 Sanctions

In the event of improper use of the QUALIDECO logo 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 national association:

1. *official statement*
2. *reprimand*
3. *withdrawal of the label*

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.

5.6 Amendments

The regulations stipulated in section 5 of these Specifications for Decoration may be amended if and when necessary. However, the Decorator shall be allowed 4 months from the date of publication in which to comply with any such amendment.

5.7. Notices

Any notice required to be given to or by the Decorator under these regulations shall be effective if sent by correctly stamped and addressed letter.

A3 – Compulsory declaration of changes in formulation for powders approved by QUALICOAT

Like all coatings, powders essentially consist of 4 kinds of components:

- binder
- pigments
- extenders
- additives

These are the powder components that determine the powder's characteristics.

1. BINDER

The binder consists of resin(s) + hardening agent together; it imparts the principal characteristics to the powder (reactivity, application properties, mechanical properties etc.). The main types of resins used in Europe are:

- saturated carboxylated polyester
- saturated hydroxylated polyester
- epoxy
- acrylic

These different types of resins can be used with several different kinds of hardeners.

It is quite obvious that variations in the chemical composition of the different resins or changes in the chemical molecular structure of the hardening agent can bring about modifications in the properties or characteristics of the powder and require a new QUALICOAT approval.

2. PIGMENTS

Pigments can be organic, inorganic or metallic and impart colour, appearance and opacity to the coating film.

3. EXTENDERS

Extenders improve the rheological or chemical properties of the final coating.

4. ADDITIVES

These are substances added to the powder in small quantities to improve certain characteristics of the coating (vapour relief, gloss etc.).

These other components (pigments, extenders or additives) of powder coating can also have some influence on the film properties and characteristics controlled within the QUALICOAT label. Nevertheless, as these constituents can be numerous and varied, it is up to the powder coating manufacturers to control their formulations so that they comply with the QUALICOAT label.

5. APPEARANCE OF THE FINAL COATING

Like all other coatings, powders – after curing – can give the final coating different appearances, for example:

- a smooth appearance
- a structured (grained or textured) appearance

A structured appearance cannot be treated like a smooth appearance. Even if the modification of the formulation is based on special additives, a powder imparting an uneven appearance, which does not involve colour gloss or metallic effect, needs a special QUALICOAT approval in a different category from the approvals granted for smooth powder.

A4 – Definition of metallic powder coatings

Metallic powder coatings are powder coatings with a metallic or metallized effect. A metallic powder coating is a "normal" powder coating, the difference is the pigmentation. Powder manufacturers achieve this special effect by incorporating metal (for example: leafing or non-leafing aluminium) or other materials (for example: mica) in the formulation of the powder.

We can separate metallic powder coatings into two categories:

- One-coat systems with a metallized appearance (no clear coat is needed for good outdoor durability and resistance). **The current approvals are sufficient.**
- Two-coat systems: metallic powder coatings that need a clear coat in order to have acceptable weathering resistance. **These specific two-coat systems must be approved separately by QUALICOAT.**

The powder manufacturers are responsible for advising their customers whether they need to use a two-coat system or not.

A5 – Special specifications for coatings on cast accessories for architectural applications under the QUALICOAT quality label

A Introduction and General Remarks

The only cast aluminium alloys suitable for chromating and subsequent powder coating are:

- EN AB-51000 / EN AB-51100
- EN AB-44100 / EN AB-44200
- EN AB-41000
- AG4Z
- AZ10S8G

B Peculiarities of the Testing Methods

Coating plants that coat accessories should produce reference samples which are made of the same aluminium alloy and have the same thickness as the accessories.

(2.3) Measurement of Coating Thickness

The thickness should be measured at 3 to 5 measuring points depending on the size of the test piece.

(2.4) Adhesion

A cutting tool may be used.

C Peculiarities of the Specifications for the Coating

(5.1.4) The following tests (intended for test panels) must be made on the reference samples:

- gloss,
- coating thickness,
- adhesion,
- indentation

The sawing test (intended for sections) must be made on the reference samples.

D. Peculiarities of the Equipment

The temperature of the parts in the curing oven must be measured by positioning the measuring points on the reference sample.

E Peculiarities of Registration and Inspection Reports

In the register, the coating plant should indicate the accessories produced and tests made on the accessories.

In the inspection reports, the inspector should record measures and observations relating to accessories and reference samples.

A6 – Alternative pre-treatment systems

A Responsibilities

1. The supplier is responsible for all cycles used by the coaters. The coater must use these products exactly as instructed by his supplier.
2. For all alternative pre-treatment systems, there must be technical data sheets, also giving information about the other products with which a system may or may not be used.
3. The technical data sheets prepared by the system suppliers also indicate how the quality of the chromium-free conversion coating should be assessed by the inspectors and in the course of plant in-house control.

The methods for assessing the conversion coating differ from one system to the next since there is not a pertinent standard (such as DIN 50939 for chromate conversion coating).

QUALICOAT will send these technical data sheets to the general licensees (national associations) and to the recognised testing laboratories. The system suppliers are required to inform QUALICOAT of any changes to the technical data sheets.

4. The coater is entirely responsible for the quality of the coated products. Only the coater can control all the production parameters in his plant.

The suppliers undertake to check more frequently that their customers strictly follow the instructions given on the technical data sheets and, on their regular visits, to verify the values recorded by the licensed coating plants during their in-house control.

5. QUALICOAT wishes to institutionalise an exchange of information between the coaters and system suppliers. The frequency of visits to customers is not stipulated as such because this can best be judged by the supplier, i.e. some coaters require more frequent counselling and control than others.

B Regular control of approved systems

1. In every country where chromium-free systems are used, the inspector will take additional samples (sections) of two alloys (AA 6060 or AA 6063 and AA 5005) once a year at a coating plant to be selected by the general licensee concerned. These samples will be taken during an ordinary routine inspection.
2. The coater will not be charged any extra costs for the additional tests.

3. In the laboratory, the following tests will be performed on these sections in accordance with QUALICOAT's Specifications:
 - pressure cooker test
 - humidity test,
 - Machu test
 - acetic acid salt spray test
 - filiform corrosion test (for information only)
4. The costs of these additional tests will be borne by the system supplier concerned.

A7 – RAL / DELTA E Table

RAL	DELTA E	RAL	DELTA E	RAL	DELTA E	RAL	DELTA E	RAL	DELTA E	RAL	DELTA E	RAL	DELTA E	RAL	DELTA E	RAL	DELTA E
1000	3.0	2000	6.0	<u>3000</u>	6.0	4001	4.0	5000	4.0	6000	5.0	7000	4.0	8000	4.0	<u>9001</u>	2.0
1001	3.0	2001	8.0	<u>3002</u>	6.0	4002	4.0	5001	4.0	6001	5.0	<u>7001</u>	3.0	8001	4.0	9002	2.0
1002	3.0	2002	8.0	<u>3003</u>	4.0	4003	8.0	5002	4.0	<u>6002</u>	5.0	7002	4.0	8003	4.0	<u>9003</u>	2.0
<u>1003</u>	4.0	2003	6.0	3004	4.0	4004	5.0	5003	5.0	6003	5.0	7003	4.0	8004	4.0	9004	5.0
1004	6.0	<u>2004</u>	5.0	<u>3005</u>	4.0	<u>4005</u>	4.0	5004	5.0	6004	5.0	<u>7004</u>	4.0	8007	4.0	9005	5.0
1005	6.0	2008	6.0	3007	4.0	4007	5.0	<u>5005</u>	4.0	<u>6005</u>	3.0	7005	4.0	8008	4.0	<u>9006</u>	2.0
1006	6.0	<u>2009</u>	4.0	<u>3009</u>	4.0	4009	4.0	5007	4.0	6006	4.0	7006	4.0	8011	4.0	<u>9007</u>	2.0
<u>1007</u>	6.0			3011	6.0			5008	5.0	6007	4.0	7008	4.0	8012	4.0	<u>9010</u>	2.0
1011	3.0			3012	8.0			5009	4.0	6008	5.0	7009	4.0	<u>8014</u>	3.0	9011	5.0
<u>1012</u>	3.0			3013	6.0			<u>5010</u>	4.0	6009	4.0	7010	4.0	8015	4.0	<u>9016</u>	2.0
<u>1013</u>	2.0			3014	4.0			5011	5.0	<u>6010</u>	5.0	7011	4.0	8016	4.0	9018	2.0
1014	3.0			3015	3.0			5012	4.0	<u>6011</u>	4.0	7012	4.0	<u>8017</u>	4.0		
<u>1015</u>	2.0			<u>3016</u>	5.0			5013	5.0	6012	4.0	7013	4.0	<u>8019</u>	3.0		
1016	6.0			3017	8.0			<u>5014</u>	4.0	<u>6013</u>	3.0	7015	4.0	8022	5.0		
1017	3.0			3018	8.0			5015	3.0	<u>6014</u>	4.0	<u>7016</u>	3.0	8024	4.0		
1018	6.0			<u>3020</u>	4.0			<u>5017</u>	5.0	6015	4.0	7021	4.0	8025	4.0		
1019	3.0			3022	8.0			5018	5.0	<u>6016</u>	5.0	7022	4.0	<u>8028</u>	3.0		
<u>1020</u>	6.0			3027	6.0			5019	4.0	<u>6017</u>	5.0	7023	3.0	<u>8070</u>	4.0		
1021	6.0							5020	5.0	6018	4.0	7024	4.0				
1023	3.0							5021	4.0	6019	2.0	7026	4.0				
1027	3.0							5022	5.0	<u>6020</u>	2.0	7030	2.0				
<u>1028</u>	8.0							<u>5023</u>	4.0	6021	4.0	7031	4.0				
1032	6.0									<u>6024</u>	3.0	<u>7032</u>	2.0				
<u>1038</u>	2.0									6025	5.0	7033	3.0				
										<u>6026</u>	5.0	7034	3.0				
										6027	2.0	<u>7035</u>	2.0				
										6028	5.0	7036	3.0				
										6029	5.0	7037	3.0				
										<u>6033</u>	2.0	<u>7038</u>	2.0				
										<u>6034</u>	2.0	<u>7039</u>	4.0				
												<u>7040</u>	3.0				
												<u>7043</u>	3.0				
												<u>7044</u>	2.0				

underlined = colours tested as of November 2002