



Update of QUALICOAT Specifications 2023 Update Sheet No. 4 (V02)

applicable from 01.01.2024

Subject:

**Introduction of Postforming
in the QUALICOAT Specifications**

Proposals/Requests:

Ad hoc WG Coil coating/Postforming (project conducted by Ms. Irene. Marcolungo)

Resolution(s)**Resolution No. 4/TC 16.05.23**

The TC approved update sheet No.4 'Introduction of Postforming'. The implementation date will be 1st January 2024. The necessary forms (application form, annexe to MIR-COAT, etc.) would be prepared until the end of 2023

**Amendment to the
Specifications:**

- Text added
 - Chapter 1: General Introduction
 - Chapter 4: Approval of Organic Coatings
 - Chapter 5: Licensing of Coating Applicators
- New appendix: Appendix A14 – Specifications for Powder coated Material suitable for Postforming

 Amendments (IM and Secretariat) – September 2023

- Taking account of Update sheet SPE 2023-US07 – Combination of wet adhesion and boiling water test applicable from 1.1.2024
- Clarification in A14 - 5.1.10 (Postforming' endorsement) and A14 - 5.2 Routine inspections of licensees (tests to be carried out in case of mixed production)

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1. General Information

Scope of the Specifications

[...]

~~These Specifications do not apply to coil coating.~~

These Specifications apply to material suitable for postforming, but the specific rules, tests, and procedures are detailed only in Appendix A14—Specifications for Powder coated Material suitable for Postforming. There is no mention of postforming in Chapters 2–6.

[...]

Terminology

Material for postforming: Coated cold-rolled aluminium material suitable for postforming (sheets or coils).

Postforming: The act of working, by bending or forming (stamping), already coated aluminium sheets or coils.

4. Approval of Organic Coatings

[...]

Special approvals or extensions of existing approvals may be granted for specific colours or applications, such as decoration, as defined in QUALIDECO Specifications, or for postforming, as defined in Appendix A14.

The concept of RAL families for Class 2 and Class 3 approvals is described in Appendix A11.

5. Licensing of Coaters' Production Sites

[...]

The procedures for granting and renewing a licence to coaters applying for decoration are set out in a separate document available on the [QUALICOAT Website](#).

The procedures for granting and renewing an endorsement to coaters, who produce coated cold-rolled aluminium material suitable for postforming, are set out in Appendix A14.

A14 – Specifications for Powder coated Material suitable for Postforming

A14 - 1. Introduction

A14 - 1.1 Scope of this appendix

According to Chapter 1. 'General Information', the QUALICOAT Specifications do apply to postforming, provided specific requirements defined in Appendix A14 are met.

The scope of this appendix is to establish the minimum requirements that plant installations, organic coating materials, processes, and finished products shall meet for postforming applications.

A14 - 1.2 Suitable aluminium material

The 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).

A14 - 2. Test methods and requirements

The test methods described in this section are used to test finished products and organic coating materials for approval.

All test methods mentioned in Chapter 2 remain valid unless stipulated and/or modified in this appendix.

Substrate description for material that will be postformed:

- Approval of powder coatings suitable for postforming (A14 - 4.): for the mechanical tests stipulated in Chapter 2 § 2.6 and in A14 - 2.7 and 2.8, the powder coating shall be applied with the maximum thickness indicated in the TDS on an aluminium test panel AA 5005 H24 0.81 mm thick (prepared with a chemical pretreatment). In case of uncertain results due to cracking of the aluminium support, a steel panel with a thickness of 0.51 mm will be used (Q-panel: QD type/ ISO 3574: Type CR1 steel test panel Type 3).
- For the in-house control of the mechanical tests stipulated in Chapters 2 § 2.6, A14 - 2.7, and 2.8, mechanical tests 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).

A14 - 2.1 Appearance

See Chapter 2, § 2.1.

A14 - 2.2 Gloss

See Chapter 2, § 2.2.

A14 - 2.3 Coating thickness

Sheets:

See Chapter 2, § 2.3.

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 cm²), 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.

A14 - 2.4 Adhesion

See Chapter 2, § 2.4.

A14 - 2.5 Buchholz Indentation

See Chapter 2, § 2.5.

A14 - 2.6 Cupping test (only for the approval of organic coatings)

See Chapter 2, § 2.6.

A14 - 2.7 Bend test

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

The bend test should 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:

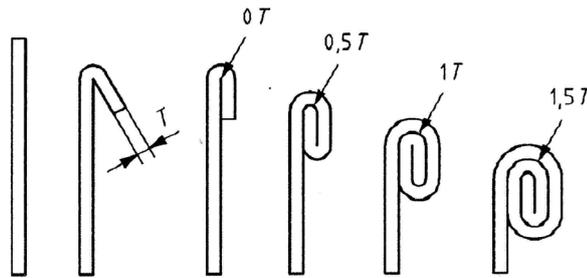
- The test is performed in a longitudinal direction (rolling direction); if the transverse direction is used, it shall be specified in the inspection report. The bending radius is expressed as 'T' bend.
- Apply an adhesive tape (see Chapter 2, § 2.4) to the significant surface of the test panel following 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.

* 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 $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and at a relative humidity of $50\% \pm 5\%$, 24 h after curing.



REQUIREMENTS FOR COATERS:

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 technical data sheet 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.

NOTE: 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.

REQUIREMENTS FOR POWDER SUPPLIERS:

The technical data sheet and label shall specify whether a powder coating is suitable for postforming. The technical data sheet of the product shall also contain the bending value 'T' with the related maximum allowed thickness of the coating (However not less than 60 microns); the permissible values are at a maximum of '1.5T'.

The substrate used for the test shall be specified.

A14 - 2.8 Impact test

For coated material that will be post-formed, the test is carried out for in-house control by

- coaters: on production material
- powder manufacturers: on standard panels

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

Energy:

- Coaters: according to the coater technical data sheet or as per the written agreement between the coater and customer; not less than 5 Nm.
- Coating manufacturers: according to the technical data sheet, but not less than 5 Nm.

Apply an adhesive tape (see § 2.4) 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 one minute.

REQUIREMENTS:

Using normal corrected vision, the organic coating shall not show any sign of cracking or detachment.

The substrate used for the test shall be specified.

A14 - 2.9 Resistance to humid atmospheres containing sulphur dioxide

See Chapter 2, § 2.9.

A14 - 2.10 Acetic acid salt spray resistance¹

For coatings applied on rolled material (sheets or coils):

The test shall be conducted on three test pieces of the same rolled alloys used for production (for example AA 5005, AA 3105, and AA 3003).

In the case of coated material suitable for postforming, the samples shall be prepared in accordance with EN 13523-8.

For other requirements see Chapter 2, § 2.10.

A14 - 2.11 Machu test

Accelerated corrosion test, on coated material:

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

For other requirements see Chapter 2, § 2.11.

A14 - 2.12 Accelerated weathering test

See Chapter 2, § 2.12.

A14 - 2.13 Natural weathering test

See Chapter 2, § 2.13.

¹ Implementation only for data collection: the evaluation of the bent area will not have consequence on test results until 2025

A14 - 2.14 Polymerisation test

See Chapter 2, § 2.14.

A14 - 2.15 Resistance to mortar

See Chapter 2, § 2.15.

~~A14 - 2.16 Resistance to boiling water~~

~~See Chapter 2, § 2.16.~~

A14 - 2.16 Constant climate condensation water test

See Chapter 2, § 2.16.

A14 - 2.17 Sawing, milling and drilling

See Chapter 2, § 2.17.

A14 - 2.18 Filiform corrosion test

For coated material:

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

For other requirements see Chapter 2, § 2.18.

A14 - 2.19 Water spot test

See Chapter 2, § 2.19.

A14 - 2.20 Scratch and mar resistance test (Martindale)

See Chapter 2, § 2.20.

A14 - 3. Work specifications

All the work specifications mentioned in Chapter 3 remain valid unless stipulated and/or modified in this appendix.

A14 - 3.1 Storage of the products to be treated and layout of equipment

See Chapter 3, § 3.1.

A14 - 3.2 Surface preparation

Coil coating is performed in continuous lines (no jig or basket treatment).

A14 - 3.2.1 Etching stage

For sheets

See Chapter 3, § 3.2.1.

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).

a) Standard pre-treatment

For coil coating lines, the total etching degree shall be at least 0,2 g/m².

b) Enhanced pretreatment (for SEASIDE endorsement)

For coil coating, SEASIDE endorsement is not foreseen.

A14 - 3.3 Chemical conversion coatings

See Chapter 3, § 3.3.

A14 - 3.4 Anodic pretreatment (automatic SEASIDE endorsement)

Anodic pretreatment, according to Chapter 3 § 3.4, is not permissible. The anodic layer is currently cracking when applying bending procedures after the coating.

A14 - 3.5 Electrophoretic coatings

Not applicable.

A14 - 3.6 Drying

See Chapter 3, § 3.6.

A14 - 3.7 Coating and stoving

A14 -3.7.1 Coating

For architectural applications, the coating plant installation shall use only organic coatings approved by QUALICOAT according to Chapter 4 'Approval of Organic Coatings'. For coated material suitable for postforming, it is necessary to use powder coatings **with a specific approval (PF-No.)**.

For other requirements see Chapter 3, § 3.7.1.

A14 - 3.7.2 Stoving

See Chapter 3, § 3.7.2.

A14 - 3.8 Laboratory

See Chapter 3, § 3.8.

A14 - 3.9 In-house control

Coating plant installations holding the quality label shall monitor their production processes and inspect their finished products in accordance with A14 - 6.1 to A14 - 6.5.

A14 - 3.10 Operating Instructions

See Chapter 3, § 3.10.

A14 - 3.11 Registers

See Chapter 3, § 3.11.

A14 - 4. Approvals of organic coatings

All requirements for the approval of organic coatings mentioned in Chapter 4 remain valid unless stipulated and/or modified in this appendix.

Powder coatings suitable for postforming shall be granted a specific approval number (PF-No)².

Additional requirements for the approval of powder suitable for postforming:

Panels for mechanical tests

The powder coating shall be applied with the maximum thickness indicated in the technical data sheet on standard test panels, having the characteristics described at the beginning of A14 - 2.

In any case, the test panels shall have at least the same mechanical properties that are requested for the powder coating.

The tests shall be made at the laboratory standard conditions (23°C ± 2°C) after a conditioning of at least 24h after curing.

➤ Bend test (Section A14 - 2.7)

The powder coating shall be considered suitable for postforming if the coated panel can be folded without cracking using the bend test (A14 - 2.7) at a maximum value of 1.5T (the exact value shall be according to the value declared in the technical data sheet).

To limit the influence of the substrate, the test is conducted in the transverse direction.

➤ Impact test (Section A14 - 2.8)

Energy:

5 Nm minimum (the exact value shall be according to the value declared in the technical data sheet); ISO 6272-2 / ASTM D 2794 (indenter diameter: 15.9 mm).

Panels for the acetic salt spray test

➤ Acetic salt spray test (A14 - 2.10)

The panels used for the powder coatings approval shall be in AA 5005 H24 alloy, suitable for 1T bending, correctly pre-treated.

The samples shall be prepared in accordance with EN 13523-8 (for example, panels with a bent area).

A14 - 4.1 Granting of an approval

A14 - 4.1.1 Technical information

The technical data sheet and the label shall specify whether a powder coating is suitable for postforming. The technical data sheet of the product shall also contain:

- the bending value 'T' with the related maximum allowed thickness of the coating (not less than 60 microns).

² Approvals are currently valid only for Class 1.

- the permissible values are at a maximum of '1.5T'.

For powder coatings used in coil coating lines, it is necessary to specify in the technical data sheet: 'suitable for IR curing' and to provide the testing laboratories with the curing conditions simulating the IR curing in a standard oven.

A14 - 4.1.2 Minimum laboratory equipment

See Chapter 4, § 4.1.2.

A14 - 4.1.3 Tests for granting of an approval

See Chapter 4, § 4.1.3.

A14 - 4.1.4 Basic colours to be tested for standard approvals and metallic extensions

A14 - 4.1.4.1 Standard approvals

See Chapter 4, § 4.1.4.1.

A14 - 4.1.4.2 Metallic extension

See Chapter 4, § 4.1.4.2.

A14 - 4.1.4.3 Approval for postforming

If a manufacturer wishes to obtain approval for postforming, the following colours shall be tested:

- white RAL 9010.
- blue RAL 5010.
- red RAL 3005.

A14 - 4.1.5 Basic colours to be tested for special approvals

See Chapter 4, § 4.1.5.

A14 - 4.1.6 Sampling

See Chapter 4, § 4.1.6.

A14 - 4.1.7 Assessment of test results

See Chapter 4, § 4.1.7.

A14 - 4.1.8 Inspection of coating manufacturer's plant

See Chapter 4, § 4.1.8.

A14 - 4.2 Renewal of an approval

See Chapter 4, § 4.2.

A14 - 4.2.1 Laboratory tests and Florida exposure

A14 - 4.2.1.1 Renewal of Class 1 and Class 1.5 approvals

See Chapter 4, § 4.2.1.1.

A14 - 4.2.1.2 Renewal of Class 2 and Class 3 approvals

See Chapter 4, § 4.2.1.2.

A14 - 4.2.1.3 Renewal of special approvals

See Chapter 4, § 4.2.1.3.

A14 - 4.2.1.4 Renewal of approvals for postforming

Consistent quality of approved organic coating materials is monitored with all the tests listed in A14 - 4.1.3 being performed on two colours chosen from the three colours specified by QUALICOAT each year. The colours are chosen from RAL families³ that do not contain critical colours.

The following families are considered as non-critical for the approval of powder coatings suitable for postforming: Class 1—1/A, 1/D, 3/C, 5/A,5/B,5/C, 5/D, 6/A, 6/B, 6/C, 6/D, 6/E, 7/A, 7/B, 7/C, 8/a, 8/B, 8/C, 9/A, 9/B, and 9/C.

A14 - 4.2.2 Sampling

See Chapter 4, § 4.2.2.

A14 - 4.2.3 Assessment of laboratory test results

See Chapter 4, § 4.2.3.

A14 - 4.2.4 Assessment of the Florida test results

See Chapter 4, § 4.2.4.

A14 - 4.2.5 Banned colours

See Chapter 4, § 4.2.5.

A14 - 4.2.6 Suspended colours

See Chapter 4, § 4.2.6.

A14 - 4.2.7 Withdrawal of an approval or extension

See Chapter 4, § 4.2.7.

A-14 - 4.3 Powder manufacturer's right of appeal

See Chapter 4, § 4.3.

A-14 - 4.4 Use of the logo by coating manufacturers

See Chapter 4, § 4.4.

³ See Appendix A11

A14 - 5. Licensing of Coaters' production sites

All the requirements mentioned in Chapter 5 for the licencing of coaters remain valid unless stipulated and/or modified in this appendix.

A14 - 5.1 Granting of a licence (quality label)

See Chapter 5, § 5.1.

A14 -5.1.1 Inspection of materials

Thickness measurements of sheets

See Chapter 5, § 5.1.1.

Thickness measurements of coils

See A14 - 2.3.

A total of 150 measurements shall be made.

A14 - 5.1.2 Inspection of laboratory equipment

See Chapter 5, § 5.1.2.

A14 - 5.1.3 Inspection of production process and equipment

See Chapter 5, § 5.1.3.

A14 - 5.1.4 Inspection of chemical pretreatment

See Chapter 5, § 5.1.4.

A14 - 5.1.5 Inspection of finished products

See Chapter 5, § 5.1.5.

A14 - 5.1.6 Inspection of the test panels (made of the same material as the finished product)

If the material is intended to be postformed, the inspector shall perform the following tests on the finished products:

- Appearance (to test production uniformity) (Chapter 2, § 2.1)
- Thickness (Chapter 2, § 2.3 and A14 - 2.3)
- Gloss (Chapter 2, § 2.2)
- Dry adhesion (Chapter 2, § 2.4.1) and wet adhesion (Chapter 2, § 2.4.2)
- Bend (A14 - 2.7)
- Impact (A14 - 2.8)
- Acetic acid salt spray (Chapter 2, § 2.10 and A14 - 2.10)
- Machu (Chapter 2, § 2.11 and A14 - 2.11)
- Polymerisation (Chapter 2, § 2.14)
- Sawing (Chapter 2, § 2.17)

If mechanical and destructive tests cannot be performed on production material, they shall be conducted on test panels obtained using the same raw material as substrate of the finished products and processed together with the production material.

A14 - 5.1.7 Review of in-house control and registers

See Chapter 5, § 5.1.7.

A14 - 5.1.8 Final assessment for granting the licence

See Chapter 5, § 5.1.8.

A14 - 5.1.9 ‘SEASIDE’ endorsement

For sheets: see Chapter 5, § 5.1.9.

For coil coating: not foreseen.

A14 - 5.1.10 ‘Postforming’ endorsement

If a coater has applied for the postforming endorsement, an inspection shall be conducted following the guidelines set out in the QUALICOAT Specifications and in this appendix.

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 the controls as described in this appendix. 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.

A14 - 5.2 Routine inspections of licensees**Licences with ‘Postforming’ endorsement**

Routine postforming inspections shall be conducted as set out in this appendix during QUALICOAT inspections.

In case of coil coating, the endorsement shall be renewed if the results of at least two postforming inspections per year meet the requirements.

In case of piece coating (no coil coating), the endorsement shall be renewed if the results of at least one postforming inspection per year meet the requirements.

For plants with mixed production (standard and postforming) 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 coating applicator shall wait at least three months before making a new application for a 'Postforming' endorsement.

A14 - 5.3 Licensee's right of appeal

See Chapter 5, § 5.3.

A14 - 5.4 Confidentiality of information

See Chapter 5, § 5.4.

A14 - 5.5 Deadline for submission of inspection reports

See Chapter 5, § 5.5.

A14 - 5.6 Use of the logo by Licensees

See Chapter 5, § 5.6.

A14 - 6. Specifications for in-house control

All in-house control requirements mentioned in Chapter 6 remain valid unless stipulated and/or modified in this appendix.

The mechanical tests shall be conducted on the production material (coils) or AI samples obtained from the same raw AI used for the production material (sheets).

A14 - 6.1 Controlling the production process parameters

A14 - 6.1.1 Chemical pretreatment baths

See Chapter 6, § 6.1.

A14 - 6.1.2 Water quality

See Chapter 6, § 6.1.2.

A14 - 6.1.3 Measuring the temperature of chemical pretreatment and rinsing baths

See Chapter 6, § 6.1.3.

A14 - 6.1.4 Recording and measuring the drying temperature

See Chapter 6, § 6.1.4.

A14 - 6.1.5 Measuring the stoving conditions

For sheets: see Chapter 6, § 6.1.5.

For coil coating: the plant shall be equipped with at least one permanent noncontact device for reading the PMT (Peak Metal Temperature). The displayed temperature shall be recorded at least once every two hours. An additional stoving curve is not necessary.

A14 - 6.2 Quality control of the chemical pretreatment

A14 - 6.2.1 Testing the etching degree

For sheets: see Chapter 6, § 6.2.1.

For coils: see Chapter 6, § 6.2.1 and A14 - 3.2.1.

A14 - 6.2.2 Testing the weight of the conversion coating

See Chapter 6, § 6.2.2.

A14 - 6.3 Quality control of the finished products**A14 - 6.3.1 Gloss test (ISO 2813)**

See Chapter 6, § 6.3.1.

A14 - 6.3.2 Coating thickness test (ISO 2360)

For sheets: see Chapter 6, § 6.3.2.

For coil coating: the coating thickness shall be measured as described in A14 - 2.3. At least 15 measurements per coil shall be made.

A14 - 6.3.3 Appearance test

See Chapter 6, § 6.3.3.

A14 - 6.3.4 Adhesion test**A14 - 6.3.4.1 Dry adhesion (ISO 2409)**

See Chapter 6, § 6.3.4.1.

The test is performed on production material (coils) or on test panels made with the same production material and processed together with the production lot (sheets).

A14 - 6.3.4.2 Wet adhesion

See Chapter 6, § 6.3.4.2.

A14 - 6.3.5 Polymerisation test

See Chapter 6, § 6.3.5.

A14 - 6.3.6 Bend test (A-14 - 2.2)

The test is performed on production material (coils) or on test panels made with the same production material and processed together with the production lot (sheets).

A14 - 6.3.7 Impact test (A-14 - 2.3)

The test is performed on production material (coils) or on test panels made with the same production material and processed together with the production lot (sheets).

A14 - 6.4 Quality control registers**A14 - 6.4.1 Control register for the production process**

See Chapter 6, § 6.4.1.

A14 - 6.4.2 Control register for test panels

See Chapter 6, § 6.4.2.

A14 - 6.4.3 Control register for finished products

See Chapter 6, § 6.4.3.

A14 - 6.4.4 Control register for tests carried out by the chemical manufacturer

See Chapter 6, § 6.4.4.

A14 - 6.5 Table summarizing the Specifications for In-House Control in case of Postforming

CONTROL	OBJECT TESTED		FREQUENCY
Process (A14 - 6.1)	Chemical pretreatment baths, degreasing, pickling, chromating, rinsing	Chemical Parameters	Once per bath in every working shift, or according to the chemical supplier's advice, that shall be at least once per day (24 hours).
	Conductivity of the water		Once per bath in every working shift, or according to the chemical supplier's advice, that shall be at least once per day (24 hours).
	Temperature of chemical pretreatment		Once per bath in every working shift, or according to the chemical supplier's advice, that shall be at least once per day (24 hours).
	Drying temperature		<ul style="list-style-type: none"> 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		Sheets: <ul style="list-style-type: none"> Once in every working shift: record the displayed temperature Twice a week: make 1 stoving curve on profiles Coil coating: <ul style="list-style-type: none"> Every 2 hours record the displayed temperature (continuous monitoring of PMT)
Conversion coating (A14 - 6.2)	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).
	Weight of the conversion coating (chromate conversion)		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 (chromium-free)		Once in every working shift, or according to the chemical supplier's advice, that shall be at least once per day (24 hours).
Finished products (A14 - 6.3)	Gloss		Once in every working shift for each shade and manufacturer. Coil coating: the gloss shall be measured at the beginning and at the end of each coil and of each colour
	Coating thickness		According to the order lot size; for coil coating: the thickness shall be measured at the beginning and at the end of each coil and of each colour.;
	Appearance		According to the order lot size; Coil coating: the appearance evaluation and the colour measurement shall be made at the beginning and at the end of each coil and of each colour.



CONTROL	OBJECT TESTED	FREQUENCY
	Wet adhesion	Once in every working shift <i>All samples from one day may be tested together.</i>
(Panels of finished products (A14 - 6.3))	Dry adhesion	Minimum of 1 x sample* for every two production hours. Once for each coil and each colour
	Polymerisation (optional for powder coatings)	Once in every working shift for each colour shade and gloss category and for each manufacturer. Once for each coil and each colour
	Bend test	Minimum of 1 x sample* for every two production hours. Once for each coil and each colour
	Impact test	Minimum of 1 x sample* for every two production hours. Once for each coil and each colour